Section 4. Tributaries

4.1 Subwatershed Descriptions

The Oneida Lake watershed is composed of seven primary subwatersheds that drain groundwater and surface water from a six county region directly to the Lake (**Map 2.4.1** – Subwatersheds). A general description of the following subwatersheds is presented in this chapter: the Oneida Creek subwatershed (extending throughout portions of Madison and Oneida Counties), the Cowaselon Creek subwatershed (located entirely within Madison County), the Chittenango Creek subwatershed (a portion of which borders Onondaga and Madison Counties), the Limestone/Butternut Creeks subwatershed (that flows through Onondaga County), the Wood Creek subwatershed (presented here in two sections – Wood Creek North and Wood Creek South) that flows through Oneida County, and the Fish Creek subwatershed (divided into the East Branch, West Branch, and Lower Fish Creek), spanning portions of Oneida, Lewis, and Oswego Counties. The section describing the Oneida Lake North Shore subwatershed refers to an area in Oneida and Oswego Counties along the north shore that drains directly into Oneida Lake.

Each of the subwatershed sections contains information about geography, land use, and soils. Additional information is presented on existing programs and, when available, additional sources of information. This information was compiled to help the reader understand the natural features and local issues that influence water quality in Oneida Lake and its tributaries.

4.1.1 Chittenango Creek Subwatershed

The Chittenango Creek subwatershed can be further divided into the following hydrologic units:
-- Upper Chittenango Creek
-- Lower Chittenango Creek

Geography

The headwaters of Chittenango Creek are located in the Madison County Town of Nelson at the Erieville Reservoir (also known as Tuscarora Lake). The stream flows north for 50 linear miles before draining into Cicero Swamp and eventually into Oneida Lake at Bridgeport. Chittenango Creek forms the border between Madison and Onondaga Counties for its lower 18 miles. The remaining portion flows entirely within Madison County. The main stream and its principal tributaries, Limestone and Butternut Creeks, drain approximately equal areas. These two tributaries, located mainly in Onondaga County, flow north and join Chittenango Creek north of the New York State Thruway, approximately 11.7 miles south of Oneida Lake. The Old Erie Canal flows east to west through the Chittenango Creek subwatershed. Cazenovia Lake is also located in this subwatershed, adjacent to the Village of Cazenovia. The drainage area of the Chittenango Creek subwatershed is approximately 99,249 acres.

Topography of the Chittenango Creek subwatershed can be divided into two groups: the Lake Ontario Plain (Lake Plain) Region located north of the Village of Chittenango, and the Appalachian Uplands located to the south. An escarpment located just south of the Village of Chittenango divides the two areas; Chittenango Falls State Park is a dramatic example of the

transition between the Upland and Lake Plain regions. Stream gradients vary from about 5 feet per mile in the Lake Plain to almost 50 feet per mile near the headwaters. Chittenango Creek contributes approximately 18 percent of the total surface water inflow to Oneida Lake.

Land Use

Agriculture is a primary land use, with approximately 60 operating farms in the Madison County portion alone. Thirty-seven of these farms are dairy operations. There are also several cash grain and beef operations, with at least one sheep farm and two pig farms.

The Villages of Chittenango and Cazenovia are located on Chittenango Creek. Development in the subwatershed is also concentrated along the Oneida Lake shoreline. Most of the subwatershed (primarily all land north of the Village of Cazenovia) is located within the Oneida Indian land claim (see Chapter II Section 1.7.2 *Oneida Indian Nation* for additional information).

Soils

North of the Village of Chittenango the soils on the Lake Plain are primarily glaciolacustrine deposits (lake laid sediments). These soils are generally poorly drained with a high water table. Drainage is required for agricultural operations but good outlets are difficult to obtain. An area of glaciofluvial deposits (glacial outwash) exists in the Chittenango Creek gorge south of the Village of Chittenango, but because of the narrow valley, no significant areas of agricultural land exist there. Most of the upland portion of the subwatershed is characterized by glacial till soils with gently sloping to moderately steep areas of fine to medium textured soils. These soils are somewhat poorly drained to moderately well drained. A significant acreage of glaciofluvial soils also exists near the Village of Cazenovia. Some are high quality, well drained, gravely soils that are highly suited to agriculture, but also suited to development. On the Lake Plain, the main problems limiting agriculture are poor drainage and flooding. In the Appalachian Uplands, soil erosion is a concern.

Existing Programs

The Madison County Soil and Water Conservation District (SWCD) researched the causes of flooding in the Lower Chittenango Creek subwatershed following extensive flooding in January 1996. In 1997, a program was initiated to correct the problem by removing logjams from the Creek. Since 1997, Madison County SWCD has had an agreement with the Towns of Sullivan and Manlius (and Cicero since 2000) to remove logjams from the Creek in order to reduce flooding. To date 13 logjams of an original 25 have been removed.

The Cazenovia Area Planning Project (CAPP) is a rural regional planning initiative for the Towns of Cazenovia, Fenner and Nelson, and the Village of Cazenovia. CAPP is a public initiative formed to enhance the social, economic, natural, and historic resources of the four rural municipalities by facilitating a regional plan for area growth management in cooperation with a professional planner. CAPP's role is to act as a facilitator between the public, the professional planner and local governments, and to gather information on the four municipalities. In 2000, CAPP received funding to examine the interaction between land use and water quality protection along Cazenovia Lake and Chittenango Creek. Plans to protect the underlying aquifer are anticipated. The strategy further recommends open space protection and controlling the amount of impervious surface in the watershed. Other goals include expanding existing tourism,

modifying the septic management policy, and land use and zoning protections for Chittenango Creek. Controlling stormwater runoff has also been identified as a key mechanism to protecting water quality in Cazenovia Lake and Chittenango Creek. The *Regional Development and Conservation Strategy: Towns of Cazenovia, Fenner, Nelson, and the Village of Cazenovia* (2001) can be viewed on the Internet at http://www.cazenovia.com.

The USGS has data for discontinued surface water discharge and water quality stations on Chittenango Creek and peak stages and flows on Negro Brook near Bridgeport. Additional water quality monitoring, biological monitoring, and erosion surveys have been done on Chittenango Creek by CNY RPDB, Project Watershed CNY, and the NYS DEC's 1995-1996 RIBS program. Further information on monitoring programs in the Chittenango Creek subwatershed can be found in Chapter II, Section 4.3 *Monitoring Programs*.

4.1.2 Cowaselon Creek Subwatershed

Geography

The Cowaselon Creek subwatershed is contained entirely within the borders of Madison County. The tributaries that flow into Cowaselon Creek originate in the Appalachian Uplands in the central part of the county, flow to the north, and join the main creek after descending the escarpment that separates the Appalachian Upland Region from the low-lying Lake Plain Region. The watershed topography ranges from rolling to steeply sloping in the upland portion of the watershed, to relatively flat in the lower watershed areas.

Main tributaries within the Cowaselon Creek subwatershed include Clockville Creek, Canastota Creek, and Canaseraga Creek. The Old Erie Canal flows east to west through this subwatershed. Cowaselon Creek enters Oneida Lake at Lakeport. Discharge from Cowaselon and Canaseraga Creeks contributes approximately five percent of the total surface water inflow to Oneida Lake.

Land Use

The drainage area of the Cowaselon Creek subwatershed is approximately 69,940 acres. Approximately 40 percent of this area is used for intensive agricultural production. An estimated 59 dairy farms and several beef and sheep farms are found in the watershed. Approximately 29 percent of the watershed is forested. Most of the woodland is comprised of farm wood lots. Population in this subwatershed is concentrated in the Villages of Canastota and Wampsville, as well as along the Oneida Lake shoreline. A portion of the subwatershed is located within the Oneida Indian land claim (see Chapter II Section 1.7.2 *Oneida Indian Nation* for additional information).

Land uses in this subwatershed are changing. Population is growing, public sewer and water services are expanding, and abandoned mucklands are being converted back to wetlands.

Soils

A wide variety of soil types are found in the Cowaselon Creek subwatershed. Soils of glacial till origin make up much of the southern part of the subwatershed, with some small areas of gravel soils in the narrow creek bottoms. The glacial till soils are deep, medium textured, somewhat poorly- to well-drained, moderately permeable, and high in fertility. These soils are found in

rolling to steeply sloping areas; completely level areas are rare. They are excellent agricultural soils. Due to the application of recommended agricultural practices, there is a moderate concern for soil erosion and for soil compaction and loss of tilth. Excess nutrient applications from both fertilizer and animal manure are moderate concerns.

A relatively small area of shallow soils associated with the escarpment is found to the north of this region, near the edge of an east-west oriented strata of limestone. These soils are found in areas that range from nearly level to very steeply sloping. They are medium textured, medium in permeability, well drained, and shallow to the limestone bedrock. Fertility is medium, and they are subject to drought. The medium permeability in conjunction with shallowness to limestone bedrock causes a severe concern for the potential of leaching of nutrients, manure, and agricultural chemicals.

Soils below the escarpment on the Lake Plain are fine to medium textured, poorly to moderately well drained, slowly permeable, and deep to moderately deep. These soils are fertile, and are found in gently sloping to moderately sloping areas. The slow permeability and high moisture content of these soils result in concerns about excess subsurface water and surface runoff, resulting in runoff of nutrients and agricultural chemicals. There is a moderate concern of soil erosion on these finer textured soils.

The Cowaselon Creek subwatershed contains an abundance of muck soils. The Canastota Muckland Area, for example, contains muck and muck silt soil classifications that are largely a result of pre- and post-glacial deposition. These partially decomposed organic mucks contain many characteristics important for agricultural use when drained.

Existing Programs

Water quality monitoring and erosion surveys have been done on Canaseraga, Canastota, and Cowaselon Creeks through the CNY RPDB programs, Project Watershed CNY, and the NYS DEC's 1995-1996 RIBS program. Additional information can be found in Chapter II, Section 4.3 *Monitoring Programs*.

During the fall of 2001, the Central New York Regional Planning and Development Board awarded grant funding to the Madison County Planning Department for a plan to improve water quality in the Oneida Lake watershed. The Oneida Lake Native Shoreline Restoration Incentive grant proposal was designed to provide financial incentive and technical assistance to landowners interested in restoring some or all of their shoreline to a heterogeneous native plant community, thereby improving offshore and in-lake habitat, increasing nutrient buffering capacity, slowing or preventing shoreline erosion, and improving the aesthetic quality of the property. This project specifically targets year-round residents with lakeshore parcels in Madison County. The work will serve as models to seek funding and to promote further shoreline restoration efforts throughout the watershed. Qualified landowners were contacted and a local information session was held to present the idea as well as generate local support. As this is a pilot demonstration project, only two landowners were selected to have their shorelines restored. At the two sites, landscape plans were drawn up, native plant lists and vendors were determined and construction began in the Spring of 2002. It is hoped that this initial effort will expand interest in shoreline restoration throughout the Oneida Lake watershed and will lead to

other funding opportunities to support these efforts. Additional information about this project can be obtained by contacting Scott Ingmire of the Madison County Planning Department.

Additional Data Source

In March 2001 the results of a study funded by the USEPA and the Madison County Planning Department were documented in a report titled, *The Cowaselon Creek Watershed Area Agricultural Protection and Wetland Restoration Project*. The project examined a portion of the Cowaselon Creek subwatershed primarily through Geographic Information System (GIS) mapping and data development. Conclusions, recommendations, and steps for guiding future activities in the area are presented. Issues specifically addressed include determining areas suitable for development, determining the agriculturally viable areas of the muckland region, and the suitability for wetland restoration. The report is an excellent source of information about the Cowaselon Creek subwatershed and is being used as a comprehensive planning tool for future land use activity in the area. Additional information about this effort is available from the Madison County Planning Department.

4.1.3 Fish Creek Subwatershed

The Fish Creek subwatershed can be further divided into the following hydrologic units:
-- East Branch Fish Creek
-- West Branch Fish Creek
-- Lower Fish Creek – the confluence of the East and West Branches

The Fish Creek subwatershed, encompassing approximately 268,676 acres, is located within the Tug Hill Uplands and Lake Plain Regions. Fish Creek is divided into the East Branch, West Branch, and Lower Fish Creek, and spans portions of Lewis, Oneida, and Oswego Counties.

WEST BRANCH FISH CREEK/LOWER FISH CREEK SUBWATERSHED

Geography and Soils

The West Branch of Fish Creek flows in a southeast direction from the Tug Hill Uplands over Ordivician aged sedimentary rocks and low lime glacial till soils. The creek contains glacial outwash deposits underlain by Utica shale. The headwaters of the West Branch of Fish Creek are in Oswego County. Flow rates increase as the creek water travels over the steeper gradients of the Tug Hill Uplands down to the lower Lake Plain Region. The West Branch of Fish Creek flows from an area near Williamstown and Redfield in Oswego County, through Camden and McConnelsville, and then joins the East Branch of Fish Creek in Oneida County. The East and West Branch of Fish Creek join near Blossvale to form Lower Fish Creek that flows south and west, entering Oneida Lake near Sylvan Beach. The West Branch of Fish Creek contributes approximately 21 percent of the total surface water inflow to Oneida Lake.

Land Use

Land cover in the West Branch and Lower Fish Creek subwatershed is primarily forest and farmland, but urban and wetland areas are also present. The watershed contains a variety of agricultural operations including dairy, beef, cash crops, sheep and horse farms. The Village of Camden is located along the West Branch of Fish Creek. Population and development is also

concentrated in the Lower Fish Creek area including the Oneida Lake shoreline, Village of Sylvan Beach, and City of Rome.

EAST BRANCH FISH CREEK SUBWATERSHED

Geography

The East Branch of Fish Creek begins in Lewis County and flows across a terrain of glacial outwash deposits underlain by Utica shale. Access to portions of the East Branch of Fish Creek is limited due to the steep banks and few road crossings. The East Branch of Fish Creek contributes approximately 23 percent of the total surface water inflow to Oneida Lake. It also encompasses one of the least developed areas within the Oneida Lake watershed with private forests comprising a large portion of the upper subwatershed.

The East Branch of Fish Creek is free flowing except at the Tagasoke Reservoir. The creek flows southward through the Tug Hill Upland Region, and through limestone and shale bluffs below the Tagasoke Reservoir. The subwatershed contains numerous wetlands, especially in the headwaters in Lewis County. The East and West Branches join near Blossvale to form Lower Fish Creek that flows in a southwesterly direction until it enters Oneida Lake at Sylvan Beach. The water supplies for the Cities of Rome and Oneida are located in the East Branch of Fish Creek.

Land Use

The majority of land in the East Branch of Fish Creek subwatershed is privately owned. The private tracts are generally smaller and more numerous in the southern portion of this subwatershed. Public lands bordering the East Branch of Fish Creek are located adjacent to the Kessinger Dam, the City of Rome Reservoir, Boyd Dam and Tagasoke Reservoir, and in a small tract of state reforestation land. Eventually, public land will also be located alongside approximately 6 miles of the East Branch of Fish Creek above Tagosoke Reservoir on the former Hancock property.

Most of the stream corridor in this subwatershed is forested and undeveloped. Residential areas are scattered, but can be found in small communities such as Taberg in Annsville. Some agriculture and dairy farming is present in this subwatershed. Forestry activities are primarily found in the northern region. Fishing, hiking, boating, and other recreational opportunities are found throughout the area.

Existing Programs

The USGS once maintained several surface water discharge and water quality stations in the Fish Creek subwatershed. Fish Creek was also monitored as part of NYS DEC's 1996 RIBS program and CNY RPDB's 2002 Oneida Lake watershed monitoring program. Additional information on monitoring programs in the Fish Creek subwatershed is detailed in Chapter II, Section 4.3 *Monitoring Programs*. Also refer to the Oneida Creek subwatershed "Existing Programs" section below for information on research being conducted along Fish Creek and the eastern shoreline of Oneida Lake by the Hamilton College Geology Department.

In 1972, New York State created the Tug Hill Commission, a non-regulatory state agency charged with helping local governments, organizations, and citizens shape the future of the region, especially its environment and economy. Additional information about the Tug Hill Commission is presented in Chapter V, Section 1.3.2 *Tug Hill and Sub-Regions*.

The Tug Hill Reserve Act of 1992 gave additional recognition to the region by stating that Tug Hill provides water, wildlife, forest, farm, and recreational resources of regional, statewide, and national significance. The legislation empowered councils of governments to designate "special areas" to ensure that when state agencies, boards, commissions, and authorities propose development, or review proposed developments, their actions are consistent with the protection of the region.

The Tug Hill region was also designated as a priority landscape by The Nature Conservancy in 2001 in order to protect the largest intact forest in central and western New York, numerous wetlands, and high quality streams and rivers. The NYS DEC and NYS Office of Parks Recreation and Historic Preservation additionally recognized the East Branch of Fish Creek subwatershed in 2001. The Open Space Plan designates the Tug Hill Core Forest and Headwater Streams as a priority project.

The changing ownership of lands in Tug Hill's eastern core forest has caused numerous periods of local concern over the past several decades. Local residents and officials have expressed their wish to keep the region's interior lands forested because of the environmental and economic benefits they provide to the region. Local communities rely on the property tax revenues generated by the private ownership of these lands. This land sale, with its unique combination of fee and easement transfer, addresses the impacts of the sale on local taxes, timber production, hunting access snowmobile trail stability, habitat, and watershed health.

An agreement for the sale of 45,000 acres of property in the Tug Hill region was negotiated in 2002 between Hancock Timber Resource Group and The Nature Conservancy (TNC). The property is located in the towns of Lewis, Martinsburg, Montague, Osceola, and West Turin and features the headwaters and intact stream corridors of several of the region's most important rivers, including the East Branch of Fish Creek. As undeveloped forest, these lands supply timber essential to the region's economy, support important lifestyle pursuits such as fishing, hunting and trapping, provide recreational opportunities important to the region's economy, provide drinking water to the City of Rome, and contain unique wildlife habitats.

TNC will purchase the entire Hancock acreage and retain ownership of approximately 13,000 acres north of an old railroad bed know as the G&W road. TNC will convey a conservation easement to the NYS DEC to permanently protect this acreage while providing for recreational use. TNC will sell more than 30,000 acres of property south of the G&W road to GMO Renewable Resources, a timber management company.

The NYS DEC will own a strip of land approximately 500 feet wide on each side of the East Branch of Fish Creek for a 6-mile stretch south of G&W road. This corridor contains approximately 1,350 acres. The State's land will be classified as a State Reforestation Area, for which the State will pay full town, school and special district taxes, but no county taxes.

The NYS DEC will hold a conservation easement on the entire acreage to be purchased by GMO Renewable Resources. GMO Renewable Resources, and all future owners of the property will be required to operate under the restrictions of this comprehensive agreement. The easement tightly restricts future subdivision and development of the property, ensuring that the property will remain open to provide forest products for the local economy. The easement calls for NYS DEC to approve the company's overall timber management plan, which will be required to follow specific guidelines for logging, especially near watercourses and wetlands. Also under the easement, GMO Renewable Resources must approve NYS DEC's plans for public recreation access on its property. The NYS DEC will pay the corresponding portion of all local taxes due to all taxing jurisdictions, including the county, for lands on which it holds a conservation easement.

TNC, a tax-exempt, private, nonprofit organization, will contribute the bulk of its land and forest management revenues, as well as revenues from recreational leasing, to in lieu payments to local taxing jurisdictions. Moreover, TNC's conveyance of a conservation easement on its 13,000 acres means that the State of New York will automatically pay a portion of the property taxes on the land.

TNC will continue traditional leasing contracts on its lands. The lands will likely be open to the public for bird watching, hiking, cross-country skiing and snowshoeing. The DEC's new East Branch Corridor State Reforestation Area will be open to the public for hunting, fishing, canoeing, hiking trapping, and for low-impact camping. GMO Renewable Resources retains the right to lease most of its land to clubs.

On GMO Renewable Resources land east of the East Branch of Fish Creek, and on TNC's 13,000 acres, traditional leased hunting arrangements will continue at the discretion of the landowner. At the end of 15 years, GMO Renewable Resources' lands west of the East Branch of Fish Creek may be leased under different terms from traditional arrangements. At the 15-year mark, GMO Renewable Resources may offer clubs wishing to continue a lease arrangement on this section of the property the option to lease their camp and five surrounding acres for their use. The remainder of the GMO Renewable Resources property will then be open to the public for other recreational uses to be determined by NYS DEC through a process that will include public input.

Public snowmobile access on designated trails vital to the Tug Hill economy is secured by the conservation easement applied to GMO Renewable Resources lands. These trails will be available without user fees. The stability of this portion of Lewis County's snowmobile system could mean significant cost savings for clubs that maintain the system, and continued benefit to Lewis County's economy.

TNC has chosen to retain permanent ownership of approximately 13,000 acres located on the northern portion of the property. Biologists have identified this portion of the property as the most ecologically important, given that it includes Mad River Swamp and the headwaters of the East Branch of Fish Creek. TNC will work with the NYS DEC to design a conservation easement to ensure long-term protection of the acreage and to restore the area to historically

prevalent spruce forest. TNC will continue traditional lease arrangements with sportsmen's clubs. Portions of the property may be open to the public at various times of the year for activities such as hiking, wildlife observation and nature study, cross country skiing and snowshoeing. TNC will involve the public in decisions determining recreational uses of its land.

Additional Data Source

In 1978 the East Branch of Fish Creek was authorized for study for the possible inclusion in the National Wild and Scenic Rivers System. The East Branch of Fish Creek was the first river lying entirely within New York State to be authorized for study. The *Wild and Scenic River Study: East Branch of Fish Creek, New York*, conducted by the National Park Service, was completed in 1982. The study concluded that the East Branch of Fish Creek, other than a 1.9 mile segment containing Boyd Dam and Tagasoke Reservoir, qualified for inclusion in the National Wild and Scenic Rivers System due to its free-flowing nature and "outstandingly remarkable natural values," including landform, scenery, and recreation. However, national designation was not proposed due to a lack of local support. Many of the towns and landowners along the East Branch were concerned that national designation would increase the level of recreation and associated problems in the area. The local population therefore chose preservation through local initiatives without federal assistance.

4.1.4 Limestone/Butternut Creek Subwatershed

Geography

Limestone Creek originates at DeRuyter Reservoir in Madison County, while the headwaters of Butternut Creek are located south of the Onondaga County line in Cortland County. Butternut Creek flows north through the Jamesville Reservoir and under an Erie Canal aqueduct in the Town of Dewitt. At Fayetteville, before the confluence of Limestone and Butternut Creeks, a structure diverts flow from Limestone to the Old Erie Canal in order to maintain adequate water supply to the Barge Canal. Butternut joins the north flowing Limestone Creek approximately 1.5 miles north of the Village of Minoa in Onondaga County. Within less than a mile, the stream then joins Chittenango Creek in the northern portion of the Town of Manlius and flows into Oneida Lake six miles farther north near Bridgeport. The drainage area of the Limestone/Butternut Creek subwatershed is approximately 110,430 acres.

DeRuyter Reservoir is a one square mile storage basin that was built in 1863 to supply water to the Old Erie Canal. It is fed by an artificially diverted tributary of the Middle Branch of Tioughnioga Creek that increases water flow to the Limestone/Butternut Creek subwatershed. Jamesville Reservoir is located on Butternut Creek and was built as a feeder to the Barge Canal. Homes are located on the shorelines and recreational opportunities are plentiful in both reservoirs. Jamesville Reservoir is maintained at or near the spillway level during the summer for recreational purposes. As a result, there is little flood control storage left to alleviate summer flood events.

A notable drop in elevation along the north-facing escarpment creates beautiful waterfalls such as Pratts Falls. The tributary flow rates then decrease as the streams meander through the flat Lake Plain Region. Limestone Creek drops almost 900 feet from DeRuyter Reservoir in the Appalachian Uplands to its junction with Butternut Creek. As it moves through the Village of

Fayetteville, Limestone Creek changes from a swift moving stream to a tranquil stream. Similarly, Butternut Creek drops almost 1,000 feet in elevation in 16 miles from the Appalachian Uplands to the Jamesville Reservoir.

Land Use

The upper portion of the Limestone/Butternut Creek subwatershed is characterized by rural and forested land and pollution loading is primarily attributed to agricultural and small residential sources. The lower subwatershed is dominated by urban/suburban influences from the City of Syracuse, the Towns of Dewitt and Manlius, and the Villages of East Syracuse, Manlius, Fayetteville, and Minoa. There is approximately 6.8 percent impervious cover in the Limestone/Butternut Creek subwatershed; the Town of Dewitt constitutes 49 percent of that impervious area.

Soils

Upland soils in the Limestone/Butternut Creek subwatershed are characterized by good drainage. An east-west band of Onondaga Limestone influences the character of soils formed in this vicinity. Change in bedrock, as well as increasing distance from the Onondaga Limestone Formation, results in lower lime soils. In general, the upland soils formed in glacial till tend to be deep, fertile, and productive. Soils in the Lake Plain Region that formed in lacustrine deposits tend to erode easily and generally have slow internal drainage. These soils are productive if artificially drained.

Existing Programs

Flow in the Limestone/Butternut Creek subwatershed has been measured at various stations operated by the USGS. Records for active and discontinued USGS monitoring stations on Limestone and Butternut Creeks can be accessed through the USGS website (http://www.usgs.gov). Summary data is provided in this report in Chapter II, Section 4.3.5 *USGS Gaging Stations*.

In addition, sampling was conducted on Limestone and Butternut Creeks as part of the 1999 and 2002 CNY RPDB monitoring program, the 1996 RIBS program, and Project Watershed CNY. An erosion survey of Butternut Creek and its tributaries was conducted in the summer of 2002. Additional monitoring information is summarized in Chapter II, Section 4.3 *Monitoring Programs*.

4.1.5 Oneida Creek Subwatershed

The Oneida Creek subwatershed can be further divided into the following hydrologic units:
-- Lower Oneida Creek
-- Upper Oneida Creek

Geography

Oneida Creek originates in Peterboro Swamp, located in the Town of Smithfield, in the Appalachian Upland in central Madison County. It flows to the southeast into the Stockbridge Valley, where it eventually turns northward. Once the Creek reaches the Lake Plain Region, it meanders and is characterized by oxbow formations. Oneida Creek empties into Oneida Lake at

South Bay. South of the City of Oneida, the stream begins to form the border of Oneida and Madison Counties. The delineation between the upper and lower reaches of the stream is the Middle Road Bridge, located just south of Route 5. Sconondoa Creek, a tributary of Oneida Creek, originates in Oneida County and flows north and west until it joins Oneida Creek near the City of Oneida. The Old Erie Canal flows in a southwesterly direction through this subwatershed. Oneida Creek contributes seven percent of the total surface water inflow to Oneida Lake.

The watershed topography varies from rolling till plains near its origin, to steep valley sides with a flat valley floor in Stockbridge Valley. The creek's gradient ranges from 4 feet per mile in the lowest reach from Oneida City to Oneida Lake, to 75 feet per mile in an upper portion of the stream near the hamlet of Peterboro. The source of the creek is nearly level. Surficial deposits are composed of glacial till, lacustrine, and fluvial sediments. Bedrock is composed of shale and limestone. One of the prominent geologic features in the Oneida Creek subwatershed is Stockbridge Falls in Madison County. The Oneida Creek subwatershed drains approximately 100,782 acres in Madison and Oneida Counties.

Land Use

The Stockbridge Valley is characterized by very steep sides and high stream gradients, resulting in elevated rates of streambank and farm field erosion. Population and development is concentrated in the Cities of Sherrill and Oneida, and Villages of Vernon, Oneida Castle, and Munnsville. Besides the more populated cities and villages in the Oneida Creek subwatershed, rural areas outside of cities and villages have grown as people take advantage of low taxes, high quality of life, and inexpensive land. This migration to rural areas has resulted in the conversion of lands that were previously agricultural or forested.

About 40 percent of the land area in the Oneida Creek subwatershed is used for intensive agricultural production. Approximately 76 farms are located here, including 34 dairy farms. There are also several cash grain operations, as well as beef and sheep operations. About 38 percent of the watershed is forested - primarily wooded swamps on the till plains and forest regions on the steep sides of Stockbridge Valley. A portion of the subwatershed is located within the Oneida Indian land claim (see Chapter II Section 1.7.2 *Oneida Indian Nation* for additional information).

Soils

Soils in the Oneida Creek subwatershed are primarily high lime, silt loams of glacial till origin, with a relatively narrow area of outwash on the flat valley bottom and lower valley sides. The area north of the City of Oneida is made up of soils derived from lake deposits.

The glacial till areas in the southern portion of the watershed are primarily nearly level. Gently sloping to moderately steep areas of fine to medium textured soils are located here. These soils range from somewhat poorly- to well-drained. The permeability is slow to medium and fertility is high. This area is prone to problems with surface runoff, and there is a moderate hazard of sheet and rill erosion.

The gravelly and sandy soils in Stockbridge Valley are nearly level to steep, medium to coarsely textured, and moderate to well-drained. Permeability is rapid and fertility is medium. These soils are subject to streambank and scour erosion and annual flooding. The steeper valley sides are subject to sheet and rill erosion. The upper valley sides and hilltops are composed of soils similar to the upper watershed, but are more steeply sloping. The hazard of sheet and rill erosion is severe. Some areas are shallow to bedrock and are subject to drought.

Soils found on the Lake Plain Region north of the City of Oneida are fine to medium textured, moderate to poorly drained, and nearly level to gently sloping. Permeability is slow to moderate. There is a problem of surface water runoff, streambank erosion, and valley flooding.

Existing Programs

Hamilton College is currently conducting research on the geologic history of the eastern shoreline of Oneida Lake. Research during the 2001 – 2002 school year focused on the geologic (Holocene) history of the Fish Creek alluvial plain, which dates back to at least 9000 B.P. (before present). The construction of the Barge Canal through Oneida Lake in 1918 disrupted the natural flow of sediments from Fish Creek into the Lake. The study hopes to assess the rate of shoreline accretion (increase by natural growth) before the construction of the Barge Canal in order to understand the effect the canal had on the watershed.

The purpose of this study is to develop a history of shoreline development based upon geologic mapping of Fish and Oneida Creeks in an effort to understand how fast the beaches have built westward over time and how fast they may retreat in the future. The beach ridges run north to south and begin approximately a mile east of the present lakeshore. The first two ridges are the most prominent in elevation and have been dated to about 11,000 B.P. Future dating of the western set of ridges will establish a paleoenvironmental record of shoreline progradation (a process by which sediments are deposited resulting in the migration of the shoreline toward the basin) that will be used to compare the historical rates of shoreline accretion. Essentially, by understanding how fast the beaches have built westward over time and how fast they may retreat in the future, the relative role of storms and sediment supply on beach accretion can be understood.

Eventually the subsidence history of the beach ridge system and the alluvial plain will be examined in an effort to better understand flooding patterns, and hence, the economic impact on shoreline communities as well as possible remediation solutions. This work will provide a foundation for predicting the long-term (century scale) changes in flood frequency for the lake by evaluating the role of flooding factors in the past, including anthropogenic influences of the last two centuries. It will also form a base upon which more detailed investigations of the sediment budget and nutrient load contributed from the Fish Creek and Oneida Creek subwatersheds can be undertaken.

Detailed information about the geologic studies at Hamilton College can be obtained from Elizabeth Hiscott's (2000) report *Paleoenvironmental Development of Eastern Shoreline of Oneida Lake, New York: Evidence from Surficial Mapping, Aerial Photography, and Shallow Geophysics*, Cynthia Fadem's (2001) *Chronology of Landscape Evolution at Oneida Lake, New York* and by contacting the Hamilton College Geology Department.

Also in the Oneida Creek subwatershed, the USGS maintains a discharge surface water station and active groundwater level station. Comprehensive monitoring has also been done on Oneida Creek through the 1995-1996 Rotating Intensive Basin Studies (RIBS) program administered by the NYS DEC. Sampling was conducted in 1999 on Sconondoa Creek by the Oneida County SWCD and on Oneida Creek as part of the 1999 CNY RPDB monitoring program. In addition, monitoring efforts on Oneida Creek are on-going as part of Project Watershed CNY. Refer to Chapter II, Section 4.3 for additional information on monitoring programs.

4.1.6 Oneida Lake North Shore Subwatershed

Geography

The Oneida Lake North Shore subwatershed is composed of Big Bay Creek, Scriba Creek, and many ponds and smaller south-flowing tributaries that drain directly into Oneida Lake. Discharge from Scriba Creek contributes approximately four percent of the total surface water inflow to the lake. The NYS DEC Oneida Lake Fish Cultural Station is located near the Scriba Creek outlet. The Oneida Lake North Shore subwatershed is situated in the Lake Ontario Plain Region and falls under the jurisdiction of the Tug Hill Commission. The 88,206-acre subwatershed drains portions of Oneida and Oswego Counties. The North Shore subwatershed is characterized by gently rolling topography, stands of succession forest, and numerous DEC-regulated wetlands. The area is underlain by sedimentary rock from the Ordivician and Silurian age and contains younger formations of sandstone and shale. The surficial geology is mainly a mixture of kame deposits, lacustrine sand, and till.

Land Use

The Villages of Central Square and Cleveland are located in the Oneida Lake North Shore subwatershed. In addition to these two villages, population is also clustered along the Oneida Lake shoreline where seasonal camps are increasingly being converted to permanent homes. Most of the subwatershed is privately owned woodland dominated by hardwoods. Large areas of successional fields also exist.

Soils

In general, soils in the Lake Plain Region are formed in glacial till and are characterized by poor drainage. Soils in the Oneida Lake North Shore subwatershed tend to have a high clay content with poor drainage and high runoff potential.

Existing Programs

Scriba Creek is actively monitored for peak stages and flows by the USGS. In addition, the 2001-2002 Oswego SWCD monitoring program includes five tributary sites in the North Shore subwatershed and an additional two sites under the 2002 CNY RPDB monitoring program. Refer to Chapter II Section 4.3 *Monitoring Programs* for details.

4.1.7 Wood Creek Subwatershed

The Wood Creek subwatershed can be further divided into the following hydrologic units:
-- Wood Creek-North of the Barge Canal
-- Wood Creek-South of the Barge Canal

Geography, Soils and Land Use

Wood Creek flows west through the Lake Plain Region in Oneida County, through the City of Rome and Town of Verona where it empties into the canal and eventually makes its way to Oneida Lake at the Village of Sylvan Beach. The drainage area of the Wood Creek subwatershed is approximately 80,817 acres. Wood Creek contributes approximately six percent of the total surface water inflow to Oneida Lake. Canada Creek is a main tributary to Wood Creek. Silurian aged sedimentary rocks characterize the bedrock geology. Wood Creek soils formed in the floodplain of the glacial Lake Iroquois and the soil associations consist of organic muck soils and lacustrine deposits of silt and sand.

The Wood Creek subwatershed is generally characterized by 26 percent cropland, 14 percent pastureland, 46 percent woodland, 7 percent urban land, and 7 percent wetland/wildlife. According to the *Priority Area Assessment Report for the Oneida Oswego Seneca and Genesee Rivers Basin, Oneida County, New York* (1996), 91 farms are located in the Wood Creek subwatershed. Approximately 70 percent of the farms in this area are dairy farms, but beef, cash crop, sheep and horse farms are also present.

WOOD CREEK NORTH

The Wood Creek subwatershed can further be divided into the Wood Creek North subwatershed and Wood Creek South subwatershed. The Wood Creek North subwatershed is located in central Oneida County. Approximately 55 percent of the total land area is woodland, approximately 8 percent is urban land concentrated in the southeasterly area of the subwatershed, and 6 percent of the land area is wetland/wildlife, which includes the Rome Sand Plains located in the southern portion of the Wood Creek North subwatershed. Cropland and pastureland comprises 16 percent and 15 percent of the land area respectively.

The Wood Creek North subwatershed is farmed intensively and has a high potential for sediment and pollutants to enter the creek. There are approximately 800 acres of highly erodible land (HEL) within the subwatershed. There are 37 farms in the Wood Creek North subwatershed (25 of which are dairy), primarily located in the northern section. These land uses on HEL soils can significantly contribute to soil erosion. In addition, agricultural practices, such as spreading manure on frozen and snow covered farm fields in the winter, contribute to high levels of nutrient runoff to Oneida Lake. Wood Creek also runs through the Rome Sand Plains, where highly erosive streambanks contribute to sediment loading in the watershed. Canada Creek is the other major waterbody within the Wood Creek North subwatershed. It flows through heavily farmed areas and the Oneida SWCD has documented problems of streambank erosion, sedimentation, and agricultural runoff.

Rome Sand Plains

The Rome Sand Plains are a unique area located along Wood Creek. It encompasses approximately 5,000 acres in the southwestern quadrant of the City of Rome. It is one of the few existing inland pine barrens in the nation and its rare setting results from the combination of sand dunes and peat bogs. User trails of the Rome Sand Plains Resource Management Area pass through mixed northern hardwood forests, pitch pine heath barrens, sand dunes, barren openings of moss and lichens, meadows, pitch pine-blueberry peat swamps, black spruce-tamarack bogs, pine barrens vernal bogs, and the shrubby floodplain of Wood Creek – all within a few acres of one another. The Sand Plains were formed from windblown sand along the shores of Lake Iroquois during the last ice age. The dunes now support a pine barrens ecology normally found only in coastal areas.

The Sand Plains are home to rare and unusual plants and other plants of interest including pitch pine, scrub oak, tamarack, pitcher plant, roseshell azalea, blue lupine, sphagnum moss, grass pink orchid, cinnamon fern, cranberry and blueberry. Rare and unusual animals inhabiting the area include the pine warbler, whippoorwill, spotted turtle, buck moth, frosted elfin, red-shouldered hawk, fisher, hermit thrush, Nashville warbler, and ovenbird.

In 2001, The Nature Conservancy initiated a comprehensive management planning process for the Rome Sand Plains in partnership with NYS DEC, US EPA, and Oneida County.

WOOD CREEK SOUTH

Approximately 18 percent of the total land area in the Wood Creek South subwatershed is cropland and 19 percent is pastureland. The subwatershed also has 2,100 acres of HEL that contributes sediment and nutrients to the creek. The soils in the subwatershed are predominately silt with areas of gravel and muck. The subwatershed has 54 agricultural producers, of which 40 are dairy farms. Manure spreading and storage for these dairy farms during the winter months result in saturation of the soils in the spring and runoff problems for Wood Creek. The soils in the Wood Creek South subwatershed have moderate problems with contaminants, organic matter, and nutrient imbalances.

Wood Creek transports a high volume of water, especially during the spring thaw. The surface water in the basin is moderately impacted by direct animal access, manure spreading and storage, and runoff from urban areas.

Existing Programs

Canada Creek was monitored for peak stages and flows by the USGS from 1977-1986 and Wood Creek was documented as part of the 1996 RIBS program. In addition, Wood Creek is part of the 2002 CNY RPDB monitoring program. Additional information can be found in this report in Chapter II Section 4.3 *Monitoring Programs*.

Section 4.2 Fisheries

4.2.1 Fisheries of the Oneida Lake Tributary System

Streams, lakes, and ponds throughout the Oneida Lake watershed provide habitat for warmwater and coldwater fish species. Several warmwater stream segments found in the lower sections of Oneida, Fish, Chittenango, Limestone, Butternut, Cowaselon, and Canaseraga Creeks provide seasonal walleye, perch, and bass fisheries. Warmwater fish species inhabit the Barge Canal at Sylvan Beach year-round. Numerous ponds and medium sized lakes (up to 1,280 acres) in the Oneida Lake watershed also support warmwater fisheries. Thirty-one ponds and lakes over ten acres in size, totaling 4,848 acres, provide fishing for warmwater species, primarily largemouth bass, chain pickerel, yellow perch, and panfish. Although warmwater species are stocked in the Oneida Lake watershed (see Chapter II Section 4.2.2 *Fish Stocking*), the majority of these waterbodies are supported by natural reproduction.

Coldwater fisheries are also present throughout the Oneida Lake watershed. Trout require cool, clean water to survive and are often the first species to disappear from polluted waters; therefore the presence of trout in the watershed is highly regarded. Brown trout streams dominate Oneida Lake tributaries. The headwaters of the tributaries generally contain brook trout, especially in the Fish Creek section of the Tug Hill region in Lewis and Oneida Counties. There are 850 miles of trout streams in the Oneida Lake watershed, including 141 miles of stocked streams (see Chapter II Section 4.2.2 *Fish Stocking*). Water quality is generally high and virtually all trout streams support natural reproduction. Many streams provide high quality fishing for brown trout.

Fish Creek and Chittenango Creek, two of the larger tributaries in the Oneida Lake watershed, are very popular trout streams, ranking 66th and 80th of all waters in New York in terms of angler use (1996 Statewide Angler Survey). New York State has acquired extensive Public Fishing Rights (permanent easements for access for fishing) along the larger trout streams in the watershed. A total of 70.5 miles of easements have been acquired in the watershed, primarily in the Fish Creek and Chittenango Creek subwatersheds.

Fisheries data is provided below on a subwatershed basis. Refer to Chapter II Section 2.4.5 *The Fish Community*, for fisheries data specific to Oneida Lake.

<u>Chittenango Creek Subwatershed</u>
Warmwater walleyes and bullheads can be found in the lower portion of Chittenango Creek north of the NYS Thruway, while coldwater brown trout are stocked upstream through the Villages of Chittenango and Cazenovia. Both Cazenovia Lake and Erieville Reservoir contain self-sustaining warmwater fish communities including largemouth bass, chain pickerel, rock bass, perch, bluegill, pumpkinseed sunfish, and black crappie. Green Lake and Round Lake at Green Lake State Park are very deep, glacially created, plunge pools. They contain a mix of warmwater species including smallmouth bass, rock bass, pumpkinseed sunfish, and yellow perch. Green Lake is also stocked with rainbow trout, which, like brown trout, are more tolerant of warm water than other trout species.

Cowaselon Creek Subwatershed

Canaseraga Creek is considered a nursery area and warmwater fish spawning area, with portions of the creek supporting coldwater populations. According to the NYS Department of Environmental Conservation (NYS DEC), Canaseraga Creek supports a generally satisfactory fishery with appropriate abundance and diversity, and fair to good habitat. Slight impairments result from some siltation, low velocity, and rubble/gravel areas. Dominant species include brown trout and white sucker. Cowaselon Creek, also a fish nursery area, is populated with brown trout. Walleyes travel up this stream in the spring. Upper Cowaselon Creek and Clockville Creek, its main tributary, contain abundant wild brown trout, as does upper Canaseraga Creek. Brown trout are stocked in both Canaseraga and Cowaselon Creeks in the vicinity of NY Route 5, where natural reproduction is limited.

Fish Creek Subwatershed

The headwaters of the East Branch of Fish Creek are known for native brook trout. As the creek flows down off the Tug Hill Uplands with steeper gradients and faster flowing water, coldwater fish species dominate with brook trout, brown trout, and the occasional Atlantic salmon. Fish Creek has historically supported Atlantic salmon spawning runs (Parsons 1973). The West Branch of Fish Creek up to McConnelsville is dominated by warmwater species including smallmouth bass, white sucker, yellow perch, and northern pike. Brown trout have been stocked in the sections above McConnelsville with some of the larger trout moving downstream (NYS DEC 1998). Most, if not all, of the tributaries of both the East and West Branch support wild brook and brown trout.

From Blossvale, the Main Branch of Fish Creek flows south and empties into Oneida Lake near Sylvan Beach. The stream is much deeper and slower moving at this point. Warmwater fish species dominate the lower reaches of Fish Creek, including northern pike, smallmouth bass, and sunfish. Walleye and northern pike spawning runs occur every spring in Fish Creek.

Limestone/Butternut Creek Subwatershed

A high-quality coldwater fishery is found in Limestone Creek from the Village of Fayetteville to the headwaters. The entire length of the West Branch of Limestone Creek also supports a coldwater fishery. A good stream cover of riparian shrubs and hardwoods shade the West Branch of Limestone Creek to help maintain cool temperatures. The stream bottom and resulting riffle and pool areas provide excellent habitat and spawning grounds. In addition to brown and rainbow trout, other coldwater and warmwater species are known to inhabit Limestone Creek, such as chain pickerel, cutlips minnow, bluntnose minnow, blacknose dace, long nose dace, creek chub, fallfish, pearl dace, white sucker, northern hog sucker, stonecat, banded killifish, rock bass, pumpkinseed, fantail darter, mottled sculpin, and slimy sculpin. These fish species, with the exception of the pearl dace, are common to the entire Oneida Lake south shore tributary system. Although trout have been found in the lower section of Limestone Creek below Fayetteville, this section is more characteristic of a warmwater fishery.

Butternut Creek, in the region near the Erie Canal Park, holds northern pike, largemouth bass, yellow perch, sunfish, and bullheads. Roughly from Interstate 481, upstream to the source, Butternut Creek contains a trout fishery similar to Limestone Creek. Public Fishing Rights on

Butternut Creek have been acquired from approximately U.S. Route 20, upstream to NY Route 80.

DeRuyter Reservoir, at the headwaters of Limestone Creek, provides good angler opportunities for warmwater fish species such as largemouth and calico bass, pickerel, yellow perch, and bluegills. Walleyes are stocked in this area. Jamesville Reservoir, along Butternut Creek, also contains a warmwater fish community partially supported by stocking (walleye and tiger musky).

North Shore Subwatershed

Many of the North Shore tributaries are excellent coldwater trout streams. An abundance of wild trout can be found in Black Creek. Many of these streams, especially Scriba Creek, also have warmwater walleye spawning runs in the spring.

Oneida Creek Subwatershed

Oneida Creek supports both coldwater and warmwater fisheries. The principal warmwater game fish present in the stretch between the City of Oneida and Oneida Lake are walleye, smallmouth bass, largemouth bass, and yellow perch. Walleye spawning runs from Oneida Lake occur in early spring. Compared to the upper and lower reaches, fish habitat near the Cities of Oneida and Sherrill is less favorable due to urban runoff and sewage treatment plant effluent. Coldwater brown trout and brook trout are located in Sconondoa Creek and upper Oneida Creek.

The NYS DEC sampled Oneida Creek at the State Route 46 Bridge under the 1995-1996 RIBS program. A generally satisfactory warmwater fishery was reported at the site, noting an abundant and diverse fish community with no significant impairments. The report revealed that habitat under low flow conditions is somewhat limited by wide and shallow sandy reaches. However, numerous pools provide holdover areas for larger fish. The dominant species at this location include rock bass, yellow perch, and smallmouth bass.

Wood Creek Subwatershed

Portions of Wood Creek and Canada Creek are designated as a coldwater fishery. The Barge Canal at Sylvan Beach is home to warmwater species year-round, and early season perch and walleye fishing is excellent. Additional fish species present in the Barge Canal include bass, trout, bullheads, carps and suckers, crappies, pickerel, and other pan fish.

4.2.2 Fish Stocking

Oneida Lake and various tributaries throughout the watershed are stocked with fish on an annual basis by NYS DEC and Onondaga County Carpenter's Brook Fish Hatchery in cooperation with County Federated Sportsmen. A variety of fish species are planted including brown trout, rainbow trout, walleye, and tiger muskellunge. The NYS DEC stocks fish for two main reasons – to enhance recreational fishing and to restore native species to waters they formerly occupied. **Table 2.4.1** lists fish distribution (number and species) for January 1 – December 31, 2001 in the Oneida Lake watershed.

Table 2.4.1 2001 Fish Stocking in the Oneida Lake Watershed		
Waterbody	**Number**	**Species**
Butternut Creek	8,200	Brown Trout
Canada Creek	1,530	Brown Trout
Canaseraga Creek	1,150	Brown Trout
Canastota Creek	300	Brown Trout
Chittenango Creek	16,520	Brown Trout
Cowaselon Creek	1,240	Brown Trout
DeRuyter Reservoir	2,880,000	Walleye
Fish Creek, East Branch	12,980	Brown Trout
Fish Creek, East Branch	1,410	Rainbow Trout
Fish Creek, West Branch	14,750	Brown Trout
Green Lake	20,000	Walleye
Green Lake	4,139	Rainbow Trout
Jamesville Reservoir	1,100	Tiger Muskellunge
Limestone Creek	6,236	Brown Trout
Mad River	2,000	Brown Trout
Oneida Creek	8,970	Brown Trout
Oneida Lake	165,198,100	Walleye
Panther Lake	800	Tiger Muskellunge
Point Rock Creek	1,000	Brown Trout
Pratts Falls	500	Brown Trout
Rome Reservoir	3,000	Brown Trout
Sconondoa Creek	700	Brown Trout
Wood Creek	850	Brown Trout
Source: NYS Department of Environmental Conservation http://www.dec.state.ny.us/website/dfwmr/fish/foe4clst.html		

The Oneida Fish Cultural Station located on Scriba Creek in the Town of Constantia had a successful year in 2001. Improved techniques and a large walleye run allowed the hatchery to net about 320 million eggs (or approximately 60,000 eggs from each female fish). The hatchery stocked a few hundred million fry to the lake and several hundred thousand five-inch walleye fingerlings.

Technological advances have allowed the hatchery to stock its target level of approximately 350,000 fingerlings every year (Diddle 2001).

The Oneida Fish Cultural Station has also experimented with rearing and stocking lake sturgeon – a former inhabitant of Oneida Lake – in an effort to restore the fish to their native waters. This species lives more than 20 years and grows to lengths of 7 feet. This species is considered "threatened" and must be released when caught by anglers. Scientists at the Cornell University Biological Field Station (CBFS), located on Oneida Lake's Shackelton Point, actively tag lake sturgeon in Oneida Lake to monitor their progress. The CBFS is requesting that anglers report the tag number of any lake sturgeon that are caught.

Atlantic Salmon Stocking

The Atlantic Salmon Fish Creek Club, Inc. (ASFCC) is a non-profit organization that was formed for the enhancement and protection of salmonid species native to New York State. The club participates in many activities, such as stocking Atlantic salmon fry in the tributaries, electro-shocking streams to determine population, and taking measurements to document stream ecology. Native Atlantic salmon populations in the Oneida Lake watershed were eliminated due to the construction of dams and the introduction of alewives.

Atlantic salmon eggs and fry are stocked in the East Branch of Fish Creek as well as some tributaries of the West Branch of Fish Creek. Atlantic salmon fry stocking began in June 1997 in Point Rock Creek, a tributary of the East Branch of Fish Creek, by the ASFCC with the help of NYS DEC. In 1998-2001, several more tributaries were stocked with Atlantic salmon fry as part of a research effort by Margaret Murphy as part of her doctoral research conducted at the State University of New York College of Environmental Science and Forestry (SUNY ESF). As a result of this stocking project, useful data are being obtained to evaluate the suitability of these

tributaries to different strains of Atlantic salmon. In addition, in 2001, the ASFCC initiated their own stocking effort by placing 20,000 Grand Lake strain Atlantic salmon, raised by the club from eggs, into several sites along the East Branch of Fish Creek. These fish were doing well when sampled in late July 2001. Also during 2001, the organization confirmed that four fish were living outside of the Fish Creek system. One was found in Oneida Lake, one in the Oneida River, and two were recovered in Cowaselon Creek. The ASFCC club plans on stocking more fry in 2002.

Additional information about the Atlantic Salmon Fish Creek Club can be found on their website http://www.dreamscape.com/flyman, or by calling toll-free 1-888-531-5080.

The future of Atlantic salmon in the Oneida Lake watershed remains uncertain. While it appears that the fry stocked in Fish Creek are doing well, they face many additional threats when they leave the stream. As a migratory fish, the salmon leave the stream as smolts at age 2 or 3 and travel downstream to Oneida Lake and potentially beyond to Lake Ontario. Many predatory fish and birds may be waiting at the mouth of Fish Creek to feed on the disoriented smolts. Once the fish leave Fish Creek and Oneida Lake, there is no upstream passage for their return. Several dams block their migratory route from Lake Ontario. Additional research is needed before the future of Atlantic salmon in the Oneida Lake watershed and throughout the Lake Ontario basin is fully understood.

4.3 Monitoring Programs

Several water quality monitoring programs have been implemented in Oneida Lake and its tributaries over the past decade. Extensive research on the water quality and biological characteristics in the Lake basin continues to be spearheaded by the staff at the Cornell Biological Field Station. A comprehensive summary of this work can be found in Chapter II Section 2 *Lake Characteristics*. An excellent source of historical water quality data for Oneida Lake can also be found in a 1969 report titled, *The Limnology of Oneida Lake: An interim Report*, written by Phillip E. Greeson and George S. Meyers of the U.S. Geological Survey.

Regional tributary monitoring programs throughout the watershed have been implemented by groups such as the NYS DEC (the Rotating Intensive Basin Studies), Project Watershed CNY, and the Central New York Regional Planning and Development Board (CNY RPDB). Counties throughout the Oneida Lake watershed have conducted additional tributary monitoring and the United States Geological Survey (USGS) has monitored tributary flow rates. This chapter provides a comprehensive summary of these monitoring programs. Information on lake level monitoring by the NYS Canal Corporation can be found in Chapter IV Section 6 *Water Level Management*.

4.3.1 Water Quality Monitoring in the Oneida Lake Tributaries

1999 Sconondoa Creek Monitoring

The Oneida County Soil and Water Conservation District (SWCD) conducted a Sconondoa Creek water quality monitoring project from 1999-2000. The objective of the project was to determine the potential impact of agricultural Best Management Practices on the tributary. Bi-

weekly monitoring took place on twelve tributary and main channel sites. Dissolved oxygen (DO), nitrates, phosphates, pH, temperature, and channel width, depth and flow rate were recorded. Dissolved oxygen measures the concentration of oxygen in the water available for aquatic organisms and should be approximately 10 parts per million (ppm). The average DO measured at the 12 sites ranged from 6.3 to 8.2 ppm. Nitrates and phosphates are nutrients derived from animal waste and fertilizer runoff and decay of dead organic materials. Nitrates should not exceed 4 ppm in non-drinking water supplies; phosphates should be nearly 0 ppm. The phosphate average at all the sites was measured to be below 1.0 ppm and the nitrate average ranged from 0.93-4.2 ppm (Oneida County SWCD 2002).

The Oneida County SWCD and Upper Mohawk Valley Regional Water Board performed an additional water quality assessment of Sconondoa Creek from 2000 to 2001. Chemical, planktonic, and macroinvertebrate parameters were analyzed at five sites along the creek. The assessment showed changes in various water quality indicators from site to site along the creek, indicating that Sconondoa Creek is dynamic and strongly influenced by the land use patterns of its watershed (Upper Mohawk Valley Regional Water Board 2001). Occasional monitoring is an ongoing project along the creek.

Overall, the Sconondoa Creek watershed is in good condition. According to the macroinvertebrate data, the creek ranges from not impacted to moderately impacted. Chemical analyses show site-specific water quality is linked to surrounding land use patterns (i.e. close proximity of farms may cause elevated nutrient levels) and natural characteristics of the environment (i.e. surficial and bedrock geology influences total calcium concentrations and specific conductance levels).

The following priorities have emerged from the Sconondoa Creek studies (Oneida County SWCD 2002):

- Filly Street, Town of Vernon: high phosphates relative to the other sites; additional studies needed to determine reason.
- North Road, Town of Augusta: located at the edge of a farm field; higher nitrates noted; vegetative buffer needed.
- Rottamore Road, Town of Augusta: massive erosion of nearby cornfield.
- Simmons Road, Town of Augusta: possible direct disposal of septic waste; needs further verification.

1999 CNY RPDB Tributary Monitoring Program

Nutrients and sediment loading to Oneida Lake from eroding stream banks and agricultural land has been a familiar issue for tributaries located in the southern Oneida Lake watershed. Sedimentation at the base of these tributaries is believed to be impacting fisheries habitat, recreational opportunities, aesthetic appeal, and the overall ecological balance of the Oneida Lake ecosystem. Despite these concerns, there had been no regional, comprehensive research to provide scientific documentation of the sedimentation and eroding stream banks. With NYS DEC funding, the Central New York Regional Planning and Development Board (CNY RPDB) therefore partnered with the Cornell Biological Field Station to implement a uniform monitoring program in the southern region tributaries in 1999 as part of the Southern Region Oneida Lake

and Watershed Strategy. The program was developed for the purpose of documenting nutrient and sediment loading to Oneida Lake from southern region tributaries.

Biological screening, in the form of macroinvertebrate assessments, was used to identify problem areas within the tributaries and to provide a qualitative assessment of water quality. The chemistry sampling sites were then selected through a comprehensive analysis of the macroinvertebrate findings, soil types, topographic characteristics, and land use.

Water samples were collected at 11 sites on eight tributaries in the southern Oneida Lake watershed on six sampling dates. Three sampling dates were nonevent periods and three occurred during hydrometeorological events. The results are presented in a summary written by Dr. Joseph Makarewicz titled, *Nutrient and Sediment Loss From Oneida Lake Tributaries: The South Shore Tributaries, December 2000* (**Appendix F**).

2002 Regional Tributary Monitoring Program

The 2002 monitoring program is an extension of the south shore program with additional sampling sites to provide comprehensive coverage of the entire Oneida Lake watershed. This program is a partnership between CNY RPDB, NYS DEC, Cornell Biological Field Station, and agencies in the four counties that border Oneida Lake (Onondaga County Health Department, Madison County Planning Department, Oneida County SWCD, and Oswego County SWCD). The monitoring program goal is to document nutrient and sediment loading to the lake and to prioritize the streams according to problem severity. This process will help identify watershed areas for potential restoration and protection initiatives.

The monitoring program is presented in two phases. Phase I involves sampling at the base of the primary tributaries flowing into Oneida Lake (including Big Bay, Scriba, East Branch of Fish, Lower Fish, Wood, Oneida, Cowaselon, Canaseraga, Chittenango, Limestone, and Butternut Creeks). Twelve sampling sessions will take place at eleven sites over the course of a 12-month period. Phase II of the tributary monitoring program (to be conducted in 2003-4) will involve segment analysis on a high priority stream with the greatest pollution load to the lake (as determined by Phase I monitoring). Technical summary reports will be completed upon completion of Phase I and II.

2002 Oswego County North Shore Subwatershed Monitoring

As an extension of the Oneida Lake Watershed Monitoring Program, the Oswego County SWCD is using the same procedures and methodology to monitor an additional five tributaries in the Oswego County portion of the Oneida Lake watershed. Sampling will continue from January to December 2002. Baseline samples will be collected once a month and four event samples will be collected during the 12-month period. The sampling sites are summarized below:

1. Little Bay Creek at NYS Route 49 crossing
2. Threemile Creek at Lower Road crossing
3. Dakins Creek at Johnson Road crossing
4. Crandall Creek just West of the County Route 17 crossing
5. Black Creek at Gale Road crossing

4.3.2 Biological Monitoring

In 1996, New York Rivers United completed a biological assessment and survey of the East Branch of Fish Creek. Six sites were sampled in Lewis County. Overall, the study found no major signs of pollution. The water quality and variety of aquatic insects sampled indicates a healthy stream. However, there was a concern with water temperature that rose as high as 76 degrees Fahrenheit. High water temperatures can affect the stocked rainbow and brown trout populations and alter the aquatic insect populations. The report attributes high temperatures in the East Branch of Fish Creek to poor forest management techniques that fail to leave enough stream canopies to provide the necessary insulation from the sun.

The NYS DEC's Stream Biomonitoring Unit began monitoring and assessing the water quality of the State's rivers and streams by using benthic macroinvertebrate communities in 1972. Biological monitoring reveals temporal trends in water quality. These trends were summarized in the report *Twenty-Year Trends in Water Quality of Rivers and Streams in New York State Based on Macroinvertebrate Data 1972-1992* and can be found in **Table 2.4.2**. Overall trends for the Oneida Lake watershed generally show no change or an improvement in water quality from 1972 to 1992. One of the greatest improvements in NYS documented by the DEC occurred in Oneida Creek below the City of Oneida. The 1982 upgrade of the Oneida City Sewage Treatment Plant changed the fauna from a severely impacted community of worms and midges to a diverse community of mayflies, stoneflies, and caddisflies (Bode et al 1993).

Table 2.4.2 NYS DEC Stream Biomonitoring Trends 1972 to 1992 for the Oneida Lake Watershed

Site/Reach	*1992 Water Quality Assessment*	*Change from 1972*
Canastota Creek, Canastota	Moderately Impacted	No Change
Chittenango Creek, Chittenango	Slightly Impacted	No Change
Cowaselon Creek, Canastota	Moderately Impacted	No Change
Limestone Creek, Fayetteville	Slightly Impacted	No Change
Little Bay Creek, above Central Square	Slightly Impacted	No Prior Data
Little Bay Creek, below Central Square	Severely Impacted	No Prior Data
Oneida Creek above Sherrill	Slightly Impacted	No Change
Oneida Creek below Sherrill	Slightly Impacted	**Improved**
Oneida Creek below Oneida	Slightly Impacted	**Improved**
Oneida River, below Lake Outlet	Moderately Impacted	No Prior Data
Sconondoa Creek above Vernon	Slightly Impacted	No Change
Sconondoa Creek below Vernon	Moderately Impacted	**Improved**
Sconondoa Creek in Sherrill	Slightly Impacted	No Change

Source: NYS DEC 1993 Executive Report: Twenty-Year Trends in Water Qualtiy of Rivers and Streams in New York State Based on Macroinvertebrate Data 1972-1992.

Biological monitoring is continuing in the Oneida Lake watershed under the NYS DEC RIBS (Rotating Intensive Basin Studies) program. During the summer of 2001, 12 streams in the Oneida Lake watershed underwent a field examination of macroinvertebrate samples. The results of the preliminary field assessments are presented in **Table 2.4.3**. Final assessments will be made following laboratory processing of the samples (the final assessments are nearly always within one category of the field assessment). The assessment categories are as follows: non-

impacted = very good water quality; slightly impacted = good water quality; moderately impacted = poor water quality; and severely impacted = very poor water quality.

Table 2.4.3 NYS DEC Stream Biological Monitoring: Preliminary Field Assessments for the Oneida Lake Watershed, 2002

Site	*Field Assessment*
Sconondoa Creek	Moderately Impacted
Wood Creek	Moderately Impacted
Butternut Creek	Slightly Impacted
Canastota Creek	Slightly Impacted
Chittenango Creek	Slightly Impacted
Limestone Creek	Slightly Impacted
Oneida Creek	Slightly Impacted
Stony Creek	Slightly Impacted
West Branch Fish Creek	Slightly Impacted
Canada Creek	Non-Impacted
Mad River	Non-Impacted
Scriba Creek	Non-Impacted

Source: Personal Communication, Robert Bode, NYS DEC-Albany, February 2002

During the summer of 2002, the DEC's biological monitoring efforts will continue in the Oneida Lake watershed. Intensive macroinvertebrate assessments will be conducted on an additional six sites potentially including Sconondoa Creek in Sherrill, Fish Creek at Fish Creek Landing, Chittenango Creek in Bridgeport, Scriba Creek at Route 23, Wood Creek at Erie Boulevard in Rome, and the Mad River in Camden. Intensive sampling sites are chosen based on the following criteria:

1. Streams with significant impairment, not meeting designated use;
2. Streams with prior status on the statewide Priority Waterbodies List;
3. Streams of regional interest or concern;
4. Streams that may be considered representative of watershed reference conditions; and
5. Stream sites that have suitable access for both biological and chemical sampling.

The DEC's final biological assessments of the Oneida Lake watershed will be presented in the next RIBS report for the Oswego-Seneca-Oneida Rivers Drainage Basin.

Additional information on biological sampling in the Oneida Lake watershed is detailed in Chapter II Section 4.3.6 *Rotating Intensive Basin Studies (RIBS)*.

4.3.3 Project Watershed Central New York

Project Watershed is a non-profit organization dedicated to facilitating water resource education in Central New York schools by providing student access to programs, equipment, training, and a database on the Internet (http://projectwatershed.org). The program teaches communities about the potential threats to water quality and the importance of continued water monitoring. The Program also supports a community's efforts to achieve optimal water quality in the region's watersheds.

Founded by two science teachers in 1994, Project Watershed is a grassroots, volunteer organization serving high school classes and student groups. As a result of the program's efforts, students are provided an opportunity to:

- learn first-hand about water resources, water quality, the watershed concept, non-point source pollution and stream monitoring;
- collect stream survey data for Project Watershed's Internet database;
- identify specific water quality concerns and communicate their findings to appropriate agencies; and
- develop a sensible stewardship for water resources in their communities.

Project Watershed is supported and guided by a consortium of educational, governmental and industrial professionals, a board of directors, and a cadre of dedicated volunteers. During the 2001-2002 school year, eighteen high school student classes and groups monitored fifteen streams in Onondaga, Cortland, Madison and Oneida Counties. Project Watershed's Director, Bill Legg, meets each of these groups at their selected stream site, orients them to the physical, chemical and biological procedures and, with their teacher, supervises the students' monitoring experience.

When the Central New York Regional Planning and Development Board (CNY RPDB) launched the Oneida Lake Southern Region Strategy in 1998, Project Watershed was invited to participate as a member of the Education and Outreach Committee. In May 1999, Project Watershed and CNY RPDB sponsored a training workshop for interested teachers in the southern Oneida Lake watershed for the purpose of monitoring the lake's tributaries every spring and fall. Since then, these schools have been monitoring the following Oneida Lake tributaries: East Syracuse Minoa High School and Manlius Pebble Hill School, Butternut and Limestone Creeks; Cazenovia High School, Chittenango Creek; Chittenango High School, Chittenango and Canaseraga Creeks; Canastota high School, Cowaselon Creek; and Oneida High School, Oneida Creek. A summary of Project Watershed's monitoring results can be found in **Table 2.4.4**.

Additional information on Project Watershed CNY, including test results, can be obtained from:
Bill Legg, Director, Project Watershed CNY
2563 Webb Road, Lafayette, NY 13084
Phone (315) 677-5194, E-mail leggbill@dreamscape.com

Table 2.4.4 Project Watershed Central New York
Summary Results for Tributaries in the Oneida Lake Watershed

Tributary Name	*Sampling Location*		*Spring 1999*	*Fall 1999*	*Spring 2000*	*Fall 2000*	*Spring 2001*	*Fall 2001*
Butternut Creek	Route 481 Bridge	Macroinvertebrate Water Quality Rating*	Fair	Excellent	Good	Excellent	Good	Good
		Overall Water Quality Index Range**	Good	Good	Good	Good	Good	Good
Butternut Creek	Minoa-Bridgeport Rd. Br.	Macroinvertebrate Water Quality Rating	Poor	Poor	Poor	Fair	Fair	Fair
		Overall Water Quality Index Range	Good	Fair	Good	Good	Good	Good
Canaseraga Creek	Route 5 & Creek Rd.	Macroinvertebrate Water Quality Rating	Fair	~	Excellent	~	Good	~
		Overall Water Quality Index Range	Good	~	Good	~	Good	~
Chittenango Creek	Route 20 Bridge	Macroinvertebrate Water Quality Rating	Excellent	Excellent	~	Excellent	Excellent	Excellent
		Overall Water Quality Index Range	Good	Good	~	Good	Good	Good
Chittenango Creek	Russell St. Bridge	Macroinvertebrate Water Quality Rating	Good	~	Excellent	Good	Good	Incomplete data
		Overall Water Quality Index Range	Good	~	Good	Excellent	Good	Good
Cowaselon Creek	N. Main St. Bridge	Macroinvertebrate Water Quality Rating	Good	~	~	~	~	~
		Overall Water Quality Index Range	Good	~	~	~	~	~
Cowaselon Creek	Elm St. Bridge	Macroinvertebrate Water Quality Rating	~	Poor	Poor	Fair	~	Poor
		Overall Water Quality Index Range	~	Good	Good	Good	~	Good
Limestone Creek	Route 5 Bridge	Macroinvertebrate Water Quality Rating	Fair	Good	~	Good	Good	Fair
		Overall Water Quality Index Range	Good	Good	~	Good	Good	Good
Limestone Creek	Kirkville Rd. Bridge	Macroinvertebrate Water Quality Rating	Fair	Fair	~	Fair	Good	Good
		Overall Water Quality Index Range	Fair	Fair	~	Good	Good	Good
Oneida Creek	Route 5 Bridge	Macroinvertebrate Water Quality Rating	Poor	~	Fair	~	Poor	Fair
		Overall Water Quality Index Range	Good	~	Good	~	Good	Good

* Living on the bottom of a stream, benthic macroinvertebrates include mainly immature insects, as well as crustacean, mollusk and aquatic worms species. Macroinvertebrate Water Quality Rating is initiated by identifying and categorizing each of the macroinvertebrates collected into one of three groups according to their known response to pollution (sensitive, somewhat sensitive, or tolerant). The number of each organism is converted to a letter code (A=1-9; B-10-99; C=>100). The number of letters in each group is added and multiplied by the appropriate index number (sensitive=3; somewhat sensitive=2; tolerant=1). The three products are added to determine the Macroinvertebrate Water Quality Rating [Excellent(>22); Good(17-22); Fair(11-16); Poor(<11)]. The perceived diversity of the macroinvertebrate sample, not so much the numbers in each group, is the important indicator of water quality at the stream site. Source: Save Our Streams Program, Isaak Walton League of America.

** The Overall Water Quality Index Range is determined by nine tests (dissolved oxygen, fecal coliform, pH, reactive phosphate, nitrate, chloride, turbidity, and total dissolved solids). The test results are recorded on a weighting curve chart where a numerical value is obtained for each test result. The numerical value is multiplied by a weighting factor for each test. The weighting factor for each parameter varies according to its impact on water quality. Each of the nine resulting numbers (numerical value x weighting factor) are added to attain the Water Quality Index (WQI). Since the WQI is a number based on 100, it is then assigned to a range [Excellent(90-100); Good(70-90); Fair(50-70); Poor(25-50)]. Source: Field Manual for Water Quality Monitoring by Mitchell and Stapp, 1996, Global Rivers Environmental Education Network (GREEN).

4.3.4 Stream Erosion Surveys

1974 Statewide Inventory

The *Erosion and Sediment Inventory of New York State* was conducted in 1974 by the U.S. Department of Agriculture Soil Conservation Service (now known as Natural Resource Conservation Service) in cooperation with Soil and Water Conservation Districts, the New York Soil Conservation Districts Association, Inc., and the New York State Soil and Water Conservation Committee. This statewide inventory was developed to heighten public interest and support for erosion control and sedimentation. The report contains data for the annual soil loss in tons per acre for each type of land use, as well as sediment delivery rates to selected points for more than 550 watersheds across New York State (including 15 subwatersheds of Oneida Lake). Erosion sources were divided into sheet erosion on all lands including construction sites, and erosion from streambanks and roadbanks. The report effectively displays the relationship of soil losses among the various land uses within and between watersheds.

1995 Oneida Creek Subwatershed Study

The Soil and Water Conservation Districts of Oneida and Madison Counties participated in a cooperative study of non-point source pollution in the Oneida Creek subwatershed in 1995. The primary goal of the research was to determine the source and amount of sediment loading in the Oneida Creek subwatershed. The long-term objective was to reduce the sediment load in the stream through the design and installation of conservation practices on critical banks. Erosion rates were estimated at almost 1,000 tons of sediment per year generated from nine miles of critical banks in the stream.

1996 Sconondoa and Taylor Creek Study

In 1996 the Oneida County SWCD completed a streambank erosion inventory on two tributaries of Oneida Creek with assistance from the Hamilton College Geology Department. In the Sconondoa Creek watershed, erosion rates ranged from 2.3 tons of sediment/year from six banks between Norton Road and Route 31, to as much as 131.1 tons/year from 24 banks between Sholtz Road to Route 365. In the Taylor Creek watershed, one of the reaches was measured to have 330 tons of sediment/year eroding from 60 banks. Thirteen of those banks were labeled a priority because they had erosion rates of greater than five tons per year. Overall, Sconondoa and Taylor Creeks were found to be eroding over 650 and 450 tons per year respectively. The Oneida County SWCD has implemented streambank erosion control projects on three priority banks in Sconondoa Creek and two priority banks in Taylor Creek. Total erosion control has been estimated at approximately 200 tons per year.

1999 Streambank Erosion Surveys

During the summer of 1999 the Central New York Regional Planning and Development Board, in cooperation with the Madison and Onondaga County Soil and Water Conservation Districts, hired two graduate student interns from the SUNY College of Environmental Science and Forestry to assess erosion rates on the southern region streams that flow into Oneida Lake. The study was designed to help identify point source inputs of sediment to Oneida Lake. Streambanks on Butternut, Limestone, Canaseraga, Cowaselon, Canastota, and Chittenango Creeks were characterized. The interns were trained in the "New York Procedure for

Calculating Streambank Erosion" and measured soil loss in terms of tons of soil per mile per year by assigning numerical values to soil texture, stream alignment, vegetation, stream gradient, slope of bank, and slope of inside depositional bar. A total of 64.4 miles of stream were assessed. The eroding stream banks were estimated to contribute 2,212 tons of soil per year. **Appendix G** contains additional information about the 1999 Streambank Erosion Surveys.

1999 Building Sites and Road Ditches

In 1999, the Madison County SWCD completed an assessment of erosion from building sites and road ditches in the Madison County portion of the Oneida Lake watershed. The SWCD estimated that building sites contribute 9,300 tons of soil per year and that County and local highway departments annually clean between 178 and 203 miles of road ditch per year.

2001 Road Ditch Cleaning and Stabilization

In 2001, the Lewis County SWCD, in cooperation with the Town of Lewis Highway Department, cleaned and hydro seeded nine miles of road ditches in the East Branch of Fish Creek subwatershed in the Town of Lewis. The effort resulted in the establishment of a firm seeding, which stabilized the areas and provided a filter for roadway pollutants before reaching surface waterbodies (especially the City of Rome Reservoir, located on the Lewis County line in the East Brach of Fish Creek subwatershed). The Lewis SWCD is looking for additional funding to access, rank, and perform remediation work on road ditches throughout the entire Oneida Lake watershed in Lewis County.

2002 Erosion Survey of Butternut Creek and its Tributaries

During the summer of 2002 the Onondaga County Department of Health hired a seasonal aide to conduct a survey of Butternut Creek and its Cascade and Conklin Creek tributaries to identify areas of severe streambank erosion. The banks were ranked in order of their potential sediment contribution to the Jamesville Reservoir and prioritized for potential remediation efforts.

4.3.5 USGS Gaging Stations

The United States Geological Survey (USGS) currently maintains three surface-water continuous record stations (where hydrologic measurement are collected at frequent intervals) and two crest-stage partial record stations (where only peak stages and flows are recorded) in the Oneida Lake watershed. A surface water station is also located on the Oneida River to continuously monitor outflow from the lake. In addition, the USGS monitors the elevation of the water table at one groundwater well in the Oneida Creek subwatershed. Several years of records are also available for surface-water discharge, surface-water quality, and crest-stage partial record stations in the Oneida Lake watershed at discontinued sites. The location of each station is listed in **Table 2.4.5**, along with data type, period of record, and drainage area. Additional information can be obtained from the USGS on the World Wide Web: http://www.usgs.gov.

Table 2.4.5 Status of USGS Water Monitoring in the Oneida Lake Watershed

Station Name	Station Number	County	Drainage Area (sq. mi.)	Period of Record (water years)
Active Surface Water Continuous Record Stations (d=discharge, e=elevation)				
Oneida Creek at Oneida (d)	04243500	Oneida	113	1949 - present
Meadow Brook at Syracuse (d)	04245236	Onondaga	2.9	1970 - present
Oneida Lake at Brewerton (e)	04246000	Onondaga	1,382	1951 - present
Oneida River near Euclid (d)	04247000	Oswego	1,439	1996 - present
Active Crest Stage Partial Record Stations				
Butternut Creek near Jamesville	04245200	Onondaga	64.2	1955 - present
Scriba Creek near Constantia	04245840	Oswego	38.4	1966 - present
Active Ground Water Level Station				
Local well number M 178	430056075354102	Madison	~	1975 - present
Discontinued Surface Water Discharge Stations				
W. Br. Fish Creek at Blossvale	04241200	Oneida	204.0	1966 - 1968
E. Br. Fish Ck. near Constableville	04241500	Lewis	74.3	1924 - 1932
E. Branch Fish Creek at Taberg	04242500	Oneida	188.0	1923 - 1995
Chittenango Ck. near Chittenango	04244000	Madison	66.3	1950 - 1968
Limestone Creek at Fayeteville	04245000	Onondaga	85.5	1940 - 1986
Butternut Creek below Dewitt	04245250	Onondaga	58.6	1964 - 1966
Oneida River at Caughdenoy	04246500	Oswego	1,382.0	1948 - 1998
Discontinued Surface Water Quality Stations				
E. Branch Fish Creek at Taberg	04242500	Oneida	188.0	1966 - 1967
Buternut Creek near Jamesville	04245200	Onondaga	32.2	1966 - 1967
Chittenango Creek at Bridgeport	04245500	Madison	not listed	1967 - 1969
Scriba Creek near Constantia	04245840	Oswego	38.4	1966 - 1967
Oneida River at Caughdenoy	04246500	Oswego	1,382.0	1958
Discontinued Crest Stage Partial Record Stations				
Canada Ck. Trib near Lee Center	04242795	Oneida	1.3	1977 - 1986
Chittenango Cr. near Chittenango	04244000	Madison	66.3	1978
Limestone Creek at Fayeteville	04245000	Onondaga	85.5	1987 - 1995
Nero Brook near Bridgeport	04245405	Madison	1.5	1976 - 1979

Source: USGS Water Resources Data New York Water Year 2000, Volume 3: Western New York

4.3.6 Rotating Intensive Basin Studies (RIBS)

Surface water quality is routinely monitored for large drainage areas in New York State through the NYS DEC Division of Water's Statewide Waters Monitoring Program (SWMP). The SWMP initiates monitoring studies in two or three major drainage areas in New York State each year, resulting in coverage of the entire state over a five-year period. Under SWMP, the Oswego-Seneca-Oneida Rivers Basin was scheduled for water quality planning and issue identification in 2001, monitoring and data collection in 2002, evaluation and water quality assessment in 2003, and development and implementation of corrective management strategies for years 2004 and 2005. Components of the Statewide Waters Monitoring Program include the Rotating Intensive Basin Studies (RIBS), Lake Classification and Inventory, Stream Biomonitoring, Sediment Assessment, Toxicity Testing, and Regulatory Sampling Programs.

Since 1987, NYS DEC surface water monitoring has been conducted under the Rotating Intensive Basin Studies Sampling Program. The objectives of RIBS include intensive overall assessment of water quality, long-term trends analysis of water quality, multimedia (chemical and biological) sampling, characterization of background conditions, and the establishment of baseline conditions for other site-specific water quality investigations. The water quality data and assessments generated by the RIBS Sampling Program are used to support various water quality management functions within the NYS DEC Division of Water. Specifically, RIBS information is used in compiling the Priority Waterbodies List (PWL), writing the New York State 305(b) Water Quality Report, selecting locations for intensive toxics surveys and other special water quality monitoring projects, and developing water quality based State Pollutant Discharge Elimination System (SPDES) permit limits.

The NYS DEC Division of Water's April 1999 report titled, *The Oswego-Seneca-Oneida Rivers Basin Report 1995-1996, Rotating Intensive Basin Studies Water Quality Assessment Program*, summarizes the findings of the 1995-1996 RIBS ambient surface water monitoring program on the waters of the Oswego-Seneca-Oneida Rivers Drainage Basin. The report also outlines other water quality information included in the PWL for the drainage basin. Refer to **Appendix H** for Oneida Lake watershed RIBS data.

4.4 Priority Waterbodies List

The Priority Waterbodies List (PWL) was last updated in 1996 for the Oswego-Seneca-Oneida Rivers Drainage Basin. This list is periodically published by the NYS DEC Division of Water and is used by the department as a resource for program management. The list includes surface waters that cannot be fully used as a resource and/or have problems that can damage their environmental integrity. The PWL list only includes waters with known or suspected problems.

The Priority Waterbodies List includes individual waterbody data sheets describing the conditions, causes, and sources of water quality problems in the Oswego-Seneca-Oneida Rivers Drainage Basin. The data sheets also note resolution potential as *high, medium, or low*. High resolution potential indicates that the water quality problem has been deemed worthy of the expenditure of available resources (time and dollar) because of the level of public interest and the expectation that the commitment of these resources will result in a measurable improvement in the situation. Medium resolution potential generally indicates that the resources necessary to address the problem are beyond what are *currently* available. Segments with low potential for resolution indicate water quality problems so persistent that improvements are expected to require an unrealistically high commitment of resources, not likely to become available (acid rain lakes for example).

Table 2.4.6 Surface Waters Classification and Best Usage

Class	Best Usage
AA	Drinking water
A	Drinking water
B	Primary contact recreation (swimming, etc.) Secondary contact recreation (fishing, etc.)
C	Fishing
D	Fishing (doesn't support fish propagation)

Note: All classifications above "D" support fish propagation and (T) designates trout spawning.

The assessment of water resources contained in the

PWL is based on the ability of waters to support a range of specific designated uses such as water supply, shell fishing, public bathing, fish consumption, aquatic life support, habitat/hydrology, recreation, and aesthetics. Expectations for specific waterbodies are based upon the classification of that waterbody (**Table 2.4.6**). Surface waters in the Oneida Lake watershed are largely class C waters where fishing is the best usage, though Oneida Lake is class B; classes AA, A, and D are also represented (**Map 2.4.2** – NYS DEC Surface Water Classifications). The PWL also evaluates the severity of use impact within four categories: *precluded, impaired, stressed,* or *threatened* (**Table 2.4.7**).

Table 2.4.7 Categories of Impact

Precluded	Water quality and/or associated habitat degradation precludes, eliminates, or does not support a classified use; natural ecosystem functions may be significantly disrupted. This category is used for the most severe impacts.
Impaired	Water quality and/or habitat characteristics frequently impair a classified use. Also applied when the designated use is supported, but at a level significantly less than would otherwise be expected. Natural ecosystem functions may be disrupted. These waters have severe impacts.
Stressed	Reduced water quality is occasionally evident and designated uses are intermittently or marginally restricted; ecosystem may exhibit adverse changes. These waters have moderate impacts.
Threatened	Water quality presently supporting designated use and ecosystem experiencing no obvious signs of stress; existing or changing land use patterns may result in restricted usage or ecosystem disruption. These waters have the least impacts.

Adapted from the 2000 Water Quality Strategy Onondaga County, New York.

There are more than 20 segments listed on the PWL for the Oneida Lake watershed (**Map 2.4.3 –** PWL Locations). A summary of the Oneida Lake watershed PWL segments (1996) is provided in **Table 2.4.8**. Detailed data sheets for these segments can be found in **Appendix I**.

Table 2.4.8 1996 Priority Waterbodies List (PWL) Segment Summary for the Oneida Lake Watershed									
Map ID	**Segment Name**	**Subwatershed**	**Segment Size**	**Class**	**Primary Use Affected**	**Severity**	**Documentation**	**Primary Pollutant**	**Primary Source**
Cortland County (No segments in the Oneida Lake watershed)									
Lewis County (No segments in the Oneida Lake watershed)									
Madison County									
45	Canaseraga Creek	Cowaselon Creek	4.0 Miles	C	Fish Propagation	Stressed	Some	Oxygen Demand	Agriculture
97	Canastota Creek*	Cowaselon Creek	2.0 Miles	C	Fishing	Impaired	Poor	Aesthetics	CSOs
451	Cazenovia Lake	Chittenango Creek	1233.0 Acres	A	Bathing	Stressed	Some	Nutrients	On-Site Systems
46	Chittenango Creek	Chittenango Creek	10.0 Miles	C(T)	Fish Propagation	Threatened	Poor	Silt (Sediment)	Construction
47	Cowaselon Creek	Cowaselon Creek	12.0 Miles	C	Fish Propagation	Stressed	Some	Oxygen Demand	Agriculture
733	DeRuyter Reservoir	Limestone/ Butternut	600.0 Acres	B	Fishing	Impaired	Good	Nutrients	Agriculture
3131	Tuscarora Lake	Chittenango Creek	307.0 Acres	B	Aesthetics	Impaired	Good	Nutrients	On-Site Systems
Oneida County									
283	Canada Creek*	Wood Creek	2.0 Miles	C(T)	Fishing	Impaired	Poor	Priority Organics	Land Disposal
280	Lower Oneida Ck.	Oneida Creek	14.0 Miles	C	Fish Propagation	Impaired	Poor	Silt (Sediment)	Agriculture
271	Sconondoa Creek	Oneida Creek	7.0 Miles	C(T)	Fish Propagation	Stressed	Some	Oxygen Demand	Municipal
285	Wood Creek	Wood Creek	7.0 Miles	C, C(T)	Fish Survival	Stressed	Poor	Silt (Sediment)	Agriculture
Onondaga County									
98	Butternut Creek	Limestone/ Butternut	2.0 Miles	C(T)	Fish Propagation	Threatened	Poor	Nutrients	Agriculture
90	Butternut Ck. Tributary	Limestone/ Butternut	1.6 Miles	C	Fish Propagation	Threatened	Poor	Nutrients	Agriculture

Table 2.4.8 1996 Priority Waterbodies List (PWL) Segment Summary for the Oneida Lake Watershed									
Map ID	**Segment Name**	**Subwatershed**	**Segment Size**	**Class**	**Primary Use Affected**	**Severity**	**Documentation**	**Primary Pollutant**	**Primary Source**
Onondaga County (continued)									
61	Chittenango Creek*	Chittenango Creek	3.0 Miles	C	Fish Propagation	Precluded	Some	Nutrients	Agriculture
1358	Jamesville Reservoir	Limestone/ Butternut	640 Acres	AA	Bathing	Impaired	Some	Silt (Sediment)	Agriculture
67	Limestone Creek*	Limestone/ Butternut	2.0 Miles	C(T)	Fish Propagation	Impaired	Some	Silt (Sediment)	Resource Extraction
68	Meadow Brook*	Limestone/ Butternut	3.0 Miles	D>C	Aesthetics	Stressed	Poor	Salts	Urban Runoff
94	Oneida Lake Tributary	Chittenango Creek	1.0 Miles		Fish Propagation	Threatened	Poor	Nutrients	Agriculture
70	Pools Brook	Chittenango Creek	2.2 Miles	C(T)	Fish Propagation	Threatened	Poor	Nutrients	Agriculture
100	Pools Brook & Tributary*	Chittenango Creek	1.0 Miles	C(T), D	Fish Propagation	Threatened	Poor	Silt (Sediment)	Construction
Oswego County									
49	Little Bay Creek	North Shore	2.0 Miles	D	Fish Survival	Stressed	Some	Oxygen Demand	Municipal
6	Oneida Lake		51090 Acres	B	Bathing	Impaired	Some	Nutrients	Agriculture

* Indicates segments with “high” resolution potential

Source: The 1996 Priority Waterbodies List for the Seneca-Oswego-Oneida Rivers Basin, NYS DEC

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