Oneida Lake State of the Lake and Watershed Report

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Chapter II: Environmental Setting

Section 1. Regional Profiles

The Oneida Lake watershed is situated within the Oswego-Seneca-Oneida Rivers Drainage Basin that drains to Lake Ontario, through the Gulf of St. Lawrence, to the Atlantic Ocean. The watershed includes three physiographic provinces: the Tug Hill Uplands, Appalachian Uplands, and Lake Ontario Plain (Lake Plain) Regions. The Lake Ontario Plain is also often referred to as the Erie-Ontario Lowlands or Oneida Lake Plain. Portions of six counties drain surface water and groundwater to Oneida Lake (**Map 2.1.1** – Area by County). The following regional profiles include a brief characterization of the physical environment of each county. Regional profiles of the Tug Hill and Oneida Indian Nation also follow, as these regions are distinct, politically defined land areas that are important constituents of the Oneida Lake watershed.

1.1Cortland County

Cortland County contains the smallest portion of the Oneida Lake watershed. Approximately 358 acres (0.6 square miles) of the 320,000-acre (500 square mile) county is included in Oneida Lake's Limestone/Butternut subwatershed. The character of this land is primarily rural and forested. Therefore, the area poses no significant water quality concerns for the watershed. Due to the small percentage (<1%) that Cortland County contributes to the Oneida Lake watershed, additional data specific to Cortland County is not provided in this chapter. Information about the Limestone/Butternut subwatershed, however, can be found in Chapter II Section 4.1.4 *Limestone/Butternut Creek Subwatershed.*

1.2 Lewis County

Lewis County is located in the northern-most portion of the Oneida Lake watershed and does not border the lake itself. Lewis County has 84,971 acres (132.8 square miles) of land located in the Oneida Lake watershed, including portions of six towns. This land contributes 9.7 percent of the total Oneida Lake watershed area and drains to the East Branch of Fish Creek. The 816,000-acre (1,275 square mile) Lewis County is located halfway between the St. Lawrence River and the New York State Thruway, and is bordered on the west by the Tug Hill Uplands and on the east by the Adirondack Mountains. Lewis County is rural, containing many villages and hamlets but no cities. According to the U.S. Census Bureau (2000) approximately 996 people live in the Lewis County portion of the Oneida Lake watershed.

Lewis County contains portions of three distinct environments: the Tug Hill Uplands (part of which is in the Oneida Lake watershed); the Black River Valley (noted for its thriving dairy industry, yet is located outside the Oneida Lake watershed); and the Adirondack Mountains (the nation's largest forest preserve, also outside the Oneida Lake watershed). Within Lewis County each of these regions is unique, and is most noted as offering a variety of recreational opportunities.

Lewis County is the "land of the great outdoors" with numerous forests and streams. The county contains four deer management units and several hundred thousand acres of public land, forest preserve, wildlife management area, and state forestland. Lewis County is the state's top producer of maple syrup and boasts recreational opportunities such as canoeing, kayaking, camping, snowmobiling, skiing, biking, fishing, golfing, hunting, horseback riding, hiking, and ATV riding. The southern portion of Lewis County that falls within the Oneida Lake watershed is a remote, densely forested area with many wetlands.

More detail about the Tug Hill portion of the watershed is found in Chapter II, Section 1.7.1 *Tug Hill Region*, Section 3 *Watershed Characteristics*, Section 4 *Tributaries*, and in other areas throughout this report.

1.3 Madison County

Madison County borders the southern shore of Oneida Lake and comprises 23.8 percent of the Oneida Lake watershed. The county itself is rural in nature and covers a total area of approximately 419,840 acres (656 square miles). The county has one city, Oneida, and several towns and villages. The northern half of Madison County drains to Oneida Lake. This part of the watershed contains portions of 11 towns, the City of Oneida, and the Villages of Canastota, Cazenovia, Chittenango, Munnsville, and Wampsville (the county seat). Many of the Madison County towns located in the Oneida Lake watershed have experienced an increase in residential growth rates as a result of the expanding Syracuse metropolitan area. Oneida Lake's southern shoreline, which is the northern border of the Towns of Lenox and Sullivan, is the most heavily developed area of Madison County. According to the U.S. Census Bureau (2000) approximately 50,607 people live in the Madison County portion of the Oneida Lake watershed.

A dramatic change in elevation can be found as the county transitions from the low-lying Lake Plain region (in approximately the northern third of the county) to the Appalachian Upland region (comprising the remainder of the county.) Both of these regions are found in the Oneida Lake watershed. Approximately 48 percent of the total county land use is dedicated to farming practices, with approximately 700 active farms. The primary industry is agriculture, and Madison County is ranked 11th in total milk production for New York State. In addition, potatoes, onions, celery, and other cash crops are grown on over 2,000 acres (3 square miles) of muck soil in the northern part of the county.

The primary tributaries within Madison County that drain to Oneida Lake are included within the Oneida, Cowaselon, Chittenango, and Limestone Creeks subwatersheds. The remaining portion of the county drains to the Susquehanna and Mohawk River Basins. Madison County is situated at a higher elevation, upstream from most of its neighbors. The County boasts high quality streams and trout fisheries, several lakes and reservoirs, unique wetlands of state and national significance, and quality surficial aquifers.

1.4 Oneida County

Oneida County comprises 34.7 percent of the land area within the Oneida Lake watershed and is situated primarily to the east and northeast of Oneida Lake. The County has a total land area of

approximately 776,320 acres (1,213 square miles) and includes the eastern 1/2 of the lake itself. The county's population is concentrated in and around the cities of Utica (which is not located in the watershed) and Rome (which has its western 1/2 located in the watershed). Other smaller population concentrations can be found in the City of Sherrill (located entirely in the watershed) and several villages. The areas of Oneida County that are within the Oneida Lake watershed include portions of 13 towns, the Villages of Camden, Oneida Castle, Sylvan Beach, and Vernon, and the cities of Rome and Sherrill. According to the U.S. Census Bureau (2000) approximately 59,557 people live in the Oneida County portion of the Oneida Lake watershed.

The primary tributaries within Oneida County that drain to Oneida Lake include the Oneida Creek, Fish Creek, Wood Creek and North Shore subwatersheds. The portion of the Erie Canal within the Oneida Lake watershed primarily flows through Oneida County toward the west and into Oneida Lake. The City of Rome is near the hydrologic drainage divide between the eastward and westward flows of the Erie Canal.

Surface topography of Oneida County is variable. There are five major physiographic provinces in the county including the Tug Hill Uplands, Adirondack Highlands, Lake Ontario Plain, the lowland valley along the Mohawk River, and the Appalachian Uplands. The County's portion of the Oneida Lake watershed includes the lowlands of the Lake Plain and uplands of the Appalachian and Tug Hill physiographic provinces. Elevations in Oneida County vary more than 1,500 feet from the lowlands in the valley corridor near Oneida Lake to the higher elevations of the Appalachian Plateau and Adirondack highlands.

Agricultural land use is concentrated in the southern and western portions of Oneida County, while lands to the north and northwest are primarily forested and nearer the Tug Hill region of the watershed.

More detail about the Tug Hill portion of the watershed is found in Chapter II, Section 1.7.1 *Tug Hill Region*, Section 3 *Watershed Characteristics*, Section 4 *Tributaries*, and in other areas throughout this report.

1.5 Onondaga County

Onondaga County borders the southwestern portion of Oneida Lake and has a total land area of 499,200 acres (780 square miles). The county's municipal boundary stops at Oneida Lake's south shore. The City of Syracuse (partially located in the Oneida Lake watershed) is the county seat and serves as an important industrial service and transportation center in Central New York. Most of the people in Onondaga County, as well as the surrounding counties, make their living in Syracuse. As a result of influences from Lake Ontario, Syracuse has the largest annual snowfall of any metropolitan area in the United States with a population over 200,000. In addition to the City of Syracuse, portions of 8 towns and the Villages of East Syracuse, Fayetteville, Manlius and Minoa are located in the Oneida Lake watershed. According to the U.S. Census (2000) approximately 110,078 people in Onondaga County live within the Oneida Lake watershed. Onondaga County contains the largest percentage of the population within the Oneida Lake watershed, but only 14.9 percent of the watershed's land area. The eastern part of the county drains to Oneida Lake via the Chittenango and Limestone/Butternut Creeks subwatersheds.

The northern portion of Onondaga County is within the Lake Plain region, while the southern portion is part of the Appalachian Upland region. In Onondaga County, parts of both of these regions fall within the Oneida Lake watershed. In general, agriculture and forestry are the largest land uses in the county. Dairying is the principal type of farming. Most of the forest acres are commercial, and the majority of the acres occur in small, scattered woodlots. Forests in the southern portion of the county are mostly natural and reforested areas owned by the county or state. The northern portion of Onondaga County is much more populated and developed than the rural farm and forest land to the south.

1.6 Oswego County

Oswego County is bounded on the north and west by Lake Ontario and on the south by Oneida Lake. The western portion of Oneida Lake is actually contained within the county, as Oswego's southern municipal boundary extends to Oneida Lake's southern shore. The county covers an area of approximately 619,520 acres (968 square miles) and encompasses two physiographic regions, the Tug Hill Uplands and the Lake Ontario Plain. The entire county eventually drains into Lake Ontario, either through the Oswego River, Salmon River, Oneida Lake, or through direct drainage. Oneida Lake drains 146,557 acres (183 square miles) of Oswego County. This land comprises 16.8 percent of the total Oneida Lake watershed land area and flows to Oneida Lake through the Fish Creek and North Shore subwatersheds. In Oswego County these subwatersheds drain portions of 9 towns and the Villages of Central Square and Cleveland. According to the U.S. Census Bureau (2000) the Oneida Lake watershed population in Oswego County is approximately 40,852 people.

Agriculture and woodland are the predominant land uses in Oswego County. Oswego also contains one of the largest acreages of wetlands in the state, most of which contain muck soils. Big Bay and Three Mile Bay State Wildlife Management Areas found along Oneida Lake contribute to the county's wetland acreage. In addition to wetlands, Oswego County's land area specifically within the Oneida Lake watershed is also largely forested.

1.7 Overlapping Areas

1.7.1 Tug Hill Region

The Tug Hill region is a physiographic area within the northern portion of the Oneida Lake watershed that overlaps portions of Lewis, Oneida, and Oswego Counties. The entire Tug Hill region covers approximately 1.3 million acres (2,100 square miles) in north-central New York State stretching west from the Adirondacks to Lake Ontario and north from Oneida Lake to the Black River. The entire Tug Hill region encompasses 41 towns (containing 21 villages). About half of those towns have a portion of their land in the Oneida Lake watershed (**Map 2.1.2** – Tug Hill Service Region).

The defining feature of the Tug Hill region is the "plateau" – a physiographic area delineated by natural features of the land including elevation and topography. The region's elevation peaks at 640 meters (2,100 feet). However, the Tug Hill area is also referenced by the political

subdivision of municipalities included under the guidance of the Tug Hill Commission. Municipalities within the entire Oneida Lake watershed situated north of the Lake (except for the City of Rome) are included under the coverage of the Tug Hill Commission. The political structure of the Tug Hill region and Tug Hill Commission are discussed further in Chapter V, Section 1.3.2.

Logging, farming, hunting and fishing have shaped Tug Hill since the early 1800s. The abandonment of farmland, coupled with the state's reforestation efforts, resulted in the core forest's regeneration and the resurgence of logging and related industries. Approximately 12 percent of Tug Hill is publicly owned forestland. Large, privately owned parcels of land have allowed the core forest of Tug Hill to remain intact and relatively free from development.

Tug Hill is largely known for forestry, hydroelectric projects, and outdoor recreation as a result of its poor soils, few roads, and severe winter snowfalls. Water, one of Tug Hill's most abundant resources, is used for recreation (canoeing and world-class fishing), generating electric power, and municipal and industrial water supplies. Large users of surface water in the Oneida Lake watershed include wire-manufacturing firms along the West Branch of Fish Creek, fish hatcheries, and the cities of Rome and Oneida.

1.7.2 Oneida Indian Nation

The Oneida Indian Nation of New York is a federally recognized Nation of 1,100 members. The homeland of the Oneida Indian Nation is located in the southern Oneida Lake watershed within Madison and Oneida Counties. The Oneida Indian Nation currently owns approximately 15,000 acres (23 square miles), most of which lies in the Oneida Creek subwatershed. The majority of the land is located in the Towns of Vernon and Verona in Oneida County and the Town of Stockbridge and the City of Oneida in Madison County. The Turning Stone Casino and Resort, their major entrepreneurial effort, is located in the Town of Verona in Oneida County.

The Oneida Indian Nation of New York, together with the Oneida Indian Tribe of Wisconsin, and the Thames Band of Oneida (Canada) lay claim to over 200,000 acres in Madison and Oneida Counties, much of which is in the Oneida Lake watershed. In an effort to settle the land claim, the three Oneida tribes, New York State, and Madison and Oneida Counties entered into negotiations in 1999. In February 2002, New York State, Madison and Oneida Counties, and the Oneida Indian Nation of New York announced that a framework for settlement had been agreed upon. The framework included the establishment of a New York Oneida Indian reservation of 35,000 acres (54.7 square miles), 5,000 (7.8 square miles) of which would remain forever as green space. Although the location of a future reservation has not been identified, it is expected that it would be within the Oneida Creek subwatershed.

Chapter IV: Human Influences

Section 1. Land Use

Land use data presented in this report is derived from the New York State Office of Real Property Service's (NYS ORPS) database. For the purposes of this report, the NYS ORPS property type classification codes have been used and grouped into five general land use categories, summarized as follows:

- **Agricultural** – Property used for the production of crops or livestock.
- **Residential** – Property used for human habitation. Living accommodations such as hotels and motels are in the commercial category.
- **Vacant Land** – Property that is not in use, is in temporary use, or lacks permanent improvement.
- **Commercial / Industrial** – Property used for the sale of goods and/or services, or the production and fabrication of durable and non-durable man-made goods.
- **Wild / Forested / Conservation Lands / Public Parks / Public Services / Community Services / Recreation and Entertainment** – Reforested lands, preserves, private hunting and fishing clubs, property used to provide services to the general public, property used for the well-being of the community, or property used by groups for recreation, amusement or entertainment.

The following section describes land use in the Oneida Lake watershed in textual, graphic, and tabular form. However, prior to this discussion, it is important to identify a few cautionary notes in the interpretation of available data.

- It should be noted, for example, that the primary intent of land classifications used by NYS ORPS is for the valuation of property for tax purposes and not necessarily for land use or land cover mapping and analysis. While certain land use trends and land cover information are evident, some inconsistencies remain.

- An additional cautionary note involves how a parcel is classified within the many land use categories. Typically, the local assessor classifies a parcel by its primary use. For example, a large property (i.e. 50 acres) dominated by forest, with a house on it, may be classified as residential. Therefore, in calculating land use coverages, the entire 50 acres will be included as residential property when it in fact, may be primarily made up of forested area.

- It is also necessary to note that some land uses on certain parcels are graphically mapped as "unknown" because the property classification codes have not been recorded in the database or because a link could not be established between the real property data and the digital tax map.

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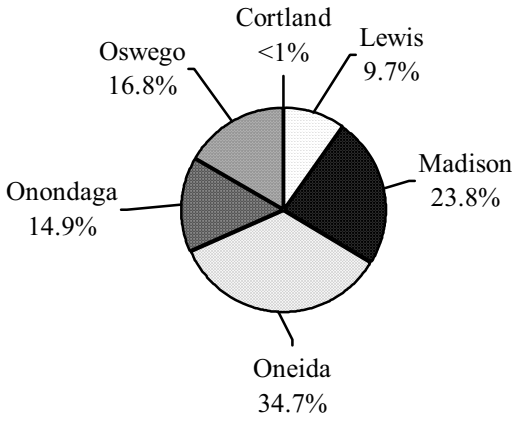
The Oneida Lake watershed covers 872,722 acres (about 1,363 square miles) of land area. Approximately 9.7 percent of the acreage of the watershed lies within Lewis County, 23.8

percent in Madison County, 34.7 percent in Oneida County, 14.9 percent in Onondaga County, 16.8 percent in Oswego County, and less than one percent in Cortland County (**Figure 4.1.1**).

There are approximately 120,225 parcels (a plot or tract of land) in the watershed that vary greatly in size. The more populated cities and villages typically have a greater number of parcels that are smaller in size, while parcels in the more rural areas of the watershed tend to be much larger in size and consequently fewer in number. This trend is evident in **Map 4.1.1** – Land Use. *(A larger version of this map (1'9"x1'5") is available for viewing at select agencies in your county. Contact CNY RPDB at 315-422-8276 for map locations. Maps can also be accessed on the Internet at http://www.cnyrpdb.org/oneidalake).*

Figure 4.1.1 Oneida Lake Watershed Land Area by County



Also from the map, it is evident that agricultural activity is concentrated in the southern portion of the watershed, especially Madison County and the southern portions of Oneida and Onondaga Counties. Commercial and industrial activities and residential land uses are primarily centered in and around the cities and villages. There is a predominance of wild, forested, conservation lands, public parks, public and community service, and recreation and entertainment property in the Tug Hill Upland region (Lewis County and northern Oneida and Oswego Counties). Isolated occurrences of wild, forested, conservation lands, public parks, and public service property can also be found through the watershed. Cicero Swamp in northern Onondaga County is an example. In Oneida County north of Oneida Lake and in some areas of Onondaga County, there is a higher proportion of properties classified as vacant. Some parcels, primarily in Lewis County, are "unknown" because the property classification codes have not been recorded in the database or the data linkage has not been maintained.

Table 4.1.1 shows the percentage of land area for properties in the Oneida Lake watershed broken-down by general land use categories for each of the six counties. The percentages shown in this table are based on the total number of acres in each property class.

Over half of the land area in Lewis County (56%) is classified as wild, forested, conservation lands, public parks, public services, community services, or recreation and entertainment. Not surprising, commercial/industrial classified properties make up the smallest acreage of land area in Lewis County (1%). Out of all of the counties, Lewis County has the smallest percentage of land area (7%) in the residential land use category.

Land area in Madison County is dominated by properties in the agricultural land use classification (44%). Based on acreage, the next largest land use category in Madison County is

residential (28%). Compared to the other counties in the Oneida Lake watershed, Madison County has the least amount of acres classified as wild, forested, conservation lands, public parks, public services, community services, and recreation and entertainment.

Table 4.1.1 Percent Land Area of Properties in the Oneida Lake Watershed by Land Use Category

County		Total Acres	Unknown	Agriculture	Residential	Vacant Land	Commercial /Industrial	Wild/Forested/ Parks/Public & Community Service/Recreation & Entertainment
Cortland	*(%)*	100%	0%	12%	22%	53%	0%	13%
	Acres	350	0	42	77	186	0	46
Lewis	*(%)*	100%	26%	4%	7%	6%	1%	56%
	Acres	84,580	21,991	3,383	5,921	5,075	846	47,365
Madison	*(%)*	100%	1%	44%	28%	20%	2%	5%
	Acres	198,902	1,989	87,517	55,693	39,780	3,978	9,945
Oneida	*(%)*	100%	5%	26%	29%	25%	2%	13%
	Acres	272,050	13,603	70,733	78,895	68,013	5,441	35,367
Onondaga	*(%)*	100%	3%	23%	32%	24%	4%	14%
	Acres	119,393	3,582	27,460	38,206	28,654	4,776	16,715
Oswego	*(%)*	100%	0%	5%	38%	28%	3%	26%
	Acres	114,621	0	5,731	43,556	32,094	3,439	29,801
Oneida Lake Watershed	*(%)*	100%	3%	29%	27%	22%	2%	17%
	Acres	789,896	23,697	229,070	213,272	173,777	15,798	134,282

Source: Calculated by HOCCPP, from data provided by the NYS ORPS.
Note: The percentages are based on the number of acres in each property class.

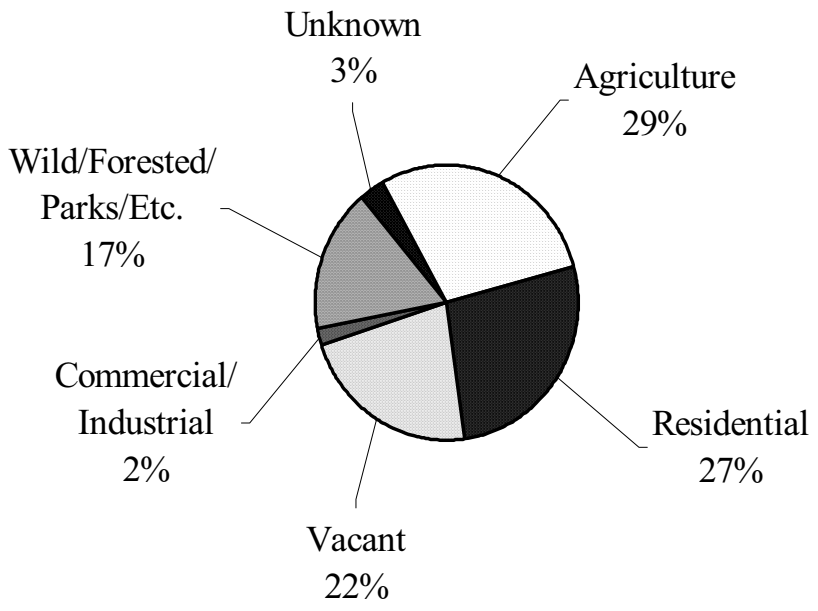
In Oneida County, the greatest amount of land area is dedicated to agricultural, vacant, and residential land uses (26%, 29%, and 25% respectively). Compared to other counties, Oneida County has the second largest percent of acres in the watershed classified as agriculture.

Land area in Onondaga County is largely classified as residential (32%). Agriculture and vacant land use classifications also make up a significant percent of the County's land area (23% and 24% respectively). Compared to other counties in the watershed, Onondaga County has the largest percentage of their land area classified as commercial/industrial (4%).

The land classification with the greatest number of acres in Oswego County is the residential category (38%). Vacant land and wild, forested, conservation lands, public parks, public services, community services, and recreation and entertainment lands also constitute a significant portion of Oswego County's land area (28% and 26% respectively). Commercial/industrial properties comprise three percent of Oswego County's land area and five percent of the land area is classified as agriculture.

When comparing all of the acres contained within the Oneida Lake watershed, most are dedicated to agriculture (29%) and residential (27%) land uses. Twenty-two percent of the land area in the watershed is classified as vacant land. Approximately 17 percent of the watershed land area is in the wild, forested, conservation lands, public parks, public services, community services, and recreation / entertainment land use classification. Commercial / industrial properties comprise the smallest land area in the Oneida Lake watershed (2%). These land use trends for the watershed are visually displayed in **Figure 4.1.2**.

Figure 4.1.2 Oneida Lake Watershed Land Use



Source: NYS ORPS, 2002

Section 2. Agricultural Land Use

2.1 Overview of Agriculture in the Oneida Lake Watershed

Much of the Oneida Lake watershed is characterized by productive soils, favorable climate, and good market outlets for agricultural products. Over 300 commercial, full-time farms currently operate almost one-third of the land within the 872,722-acre Oneida Lake watershed (**Table 4.2.1**). No operating farms are currently known to exist in Cortland and Lewis Counties. The majority of the farms are dairies located within Madison, Oneida, and Onondaga Counties. These dairies have an average herd size of 159 cows and grow a crop rotation of corn and hay used for livestock feed. Non-dairy operations within the watershed include a thriving vegetable trade as well as burgeoning sheep, beef, and equine industries. According to data from the NYS

Office of Real Property Services, approximately 29 percent of the land area in the Oneida Lake watershed is classified as agricultural (**Map 4.2.1** – Agricultural Properties) and is primarily located in Madison, Oneida, and Onondaga Counties.

Table 4.2.1 Farms in the Oneida Lake Watershed

County	*Farms (#)*
Cortland	0
Lewis	0
Madison	169
Oneida	93
Onondaga	43
Oswego	11
Total	316

Agriculture's economic impact in the Oneida Lake watershed is *at least* $126 million (data is not yet available for all farms in the watershed). According to county-level statistics, in Madison, Oneida, and Onondaga, where the watershed's farms are concentrated, agriculture has a combined economic impact of over $500 million annually and employs a workforce of over 5,000. Of these three Counties, Madison generates the greatest amount of sales of agricultural products. Over half of the farms in the Oneida Lake watershed are located in Madison County. While agriculture represents only four percent of the workforce in Madison County, its land use covers approximately 44 percent of the acres in the County.

Agriculture's diversity and prosperity within the southern portion of the Oneida Lake watershed is due in large part to a favorable mix of physiographic and climatic conditions. The growing season lasts approximately 171 days, typically extending from late April through mid-October. A mixture of high lime glacial tills and deep lacustrine (lake laid) deposits provides prime farmland soils in the Appalachian Uplands and the Lake Ontario Plain. Crop growth and forage quality for pastured livestock benefit from the approximately 45 inches of annual precipitation (rain and snow) within the watershed.

While the physiographic and climatic conditions in the Oneida Lake watershed can be assets to a farm, they can also present farm management challenges. Soils on steep slopes on the Appalachian Uplands are subject to erosion. Heavy rainfall and snowmelt contribute to runoff from barnyards and cropland where manure is spread. Snow covered fields and perennially wet areas on farms create difficulties for manure spreading. High precipitation in the watershed coincides with a high rate of nitrogen leaching, whereby the nutrient can be washed downward through the soil profile, below the roots of plants. Erosion, runoff, and leaching from farms are collectively known as agricultural non-point sources of pollution.

Agricultural non-point sources of pollution affect Oneida Lake and 15 of the Lake's tributaries according to the NYS DEC. High sediment load is caused by erosion from agricultural land in the subwatersheds of Oneida Creek, Wood Creek, Limestone Creek, Butternut Creek, and Sconondoa Creek. According to the Madison County Soil and Water Conservation District, erosion and sedimentation resulting from agricultural activities is also a concern in the Chittenango, Cowaselon, and Canaseraga Creek subwatersheds. Excessive sediment covers fish eggs, fills in spawning beds and pools and reduces food supplies. Runoff from barnyards and crop fields contributes to nutrient loading in the Lake as well as in Butternut Creek, Chittenango Creek, and Canastota Creek. Excessive nutrients spawn oxygen consuming aquatic weeds creating an oxygen demand for the other organisms in the stream or Lake. Pesticide application