

# OPEN PIT MINING WITHIN THE SENECA LAKE WATERSHED

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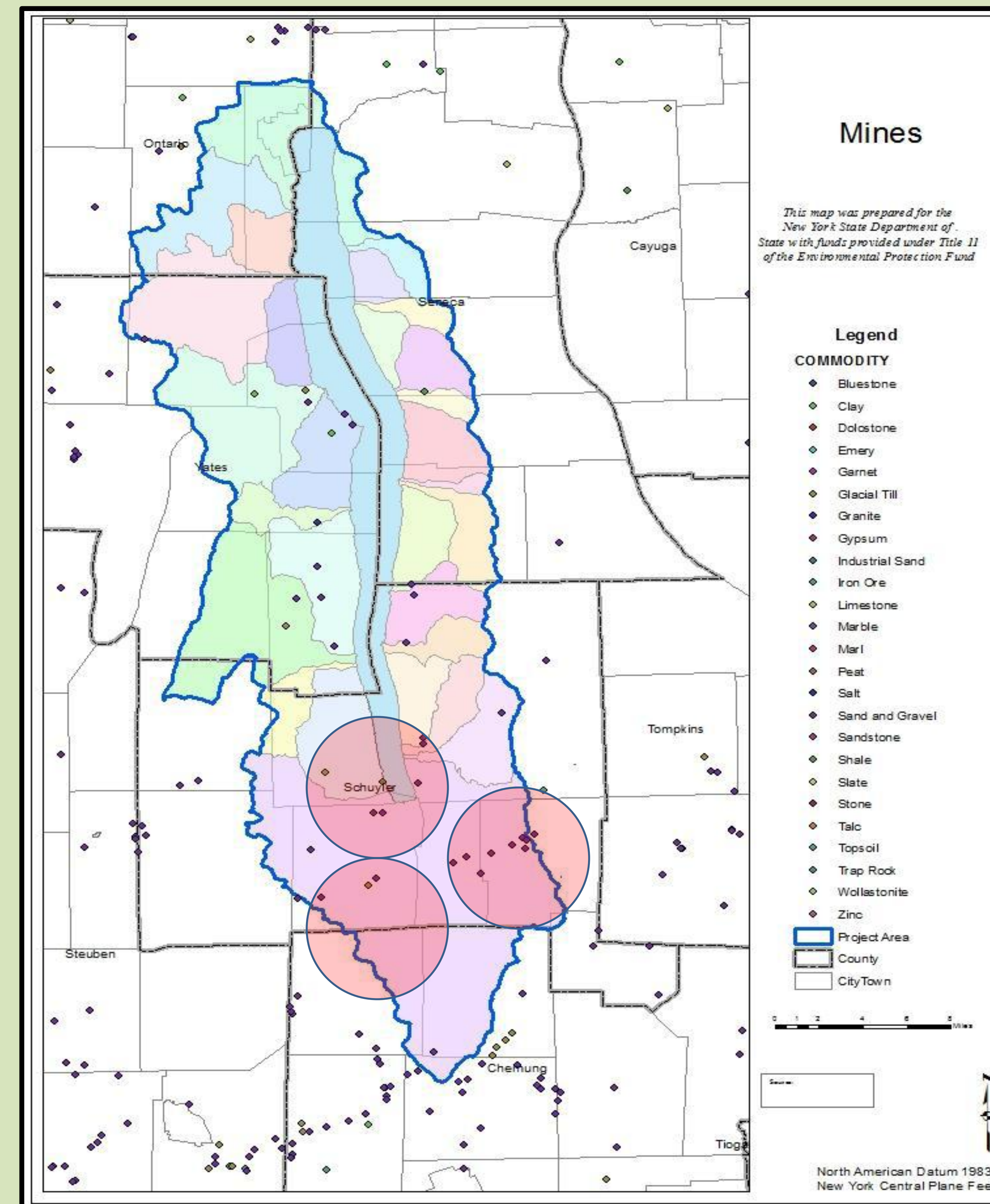
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## Abstract

This portion of the SIE group project was designed to examine the hazardous environmental effects that mining has on both Seneca Lake and its entire watershed. The project focuses on both sedimentation and erosion rates within the lake and its sub-watersheds due to mining activity. This poster was constructed in accordance with the Group SIE class at the Hobart and William Smith Colleges in Geneva, NY and should be used to educate the surrounding community of the potential environmental hazards that mining operations have on Seneca Lake.

## Introduction

Seneca Lake is home to approximately 60,000 people who live within the watershed boundaries and provides them with grade AA drinking water throughout the year. Though there is quite an abundance of fresh drinking water for the watershed's population, it seems that over the years that the quality of the drinking water has slightly diminished due to the increase of sedimentation and turbidity in the water column. The purpose of this project was to determine whether or not mining activity poses a threat to Seneca Lake and its watershed. The project focused heavily on the specifics of mining waste, how that waste is transported down slope, what happens to that waste once it reaches Seneca Lake, and what actions can be taken in order to keep the lake in a healthy state for years to come.



(Figure 1) Map of all active/inactive mines within the Seneca Lake watershed. 30 of which are sand and gravel pit mines. Red circles delineate areas of heavy mining operations.

## Turbidity, Erosion, and BMPs

- ❖ Turbidity is a measurement of how much organic and inorganic matter is in the water
  - ❖ Tested by how much light passes through water
  - ❖ Algae
  - ❖ Sediment
    - ❖ Turbidity levels have increased in the past 10 years
- ❖ Four factors that affect the erosion of any watershed
  - ❖ Type of climate
    - ❖ Seneca Lake Watershed accumulate approximately 35 inches of rain per year
  - ❖ Slope of the topography
    - ❖ The watershed has an average slope gradient of 32°
  - ❖ Soil characteristics
  - ❖ Vegetation
    - ❖ 81% of land use within the watershed is rooted land that includes forested and agricultural land
- ❖ Best Management Practices (BMPs) limit sediment erosion
  - ❖ Silt fences trap fine grade sediment
  - ❖ Diversion ditches move water away from lake
  - ❖ Vegetation barriers absorb runoff water

County	Sub-Watershed/DD	NYS DEC Permits
Seneca	Indian Creek Mill Creek	2
Schuyler	Catharine Creek Reading DD Hector Falls Creek Glen Eldridge Sawmill/Bullhorn Creek Valois DD	21
Yates	Benton DD Kashong Creek Keuka Lake Outlet Long Point DD Plum Point Creek Starkey DD Big Stream	13

(Table 1) List of permitted mines to be reclaimed once mining activity ceases.

Land Use	1971	1980	1995
(1) Agricultural	42.50%	53.20%	39.10%
(2) Forest	40.40%	38.50%	41.30%
(3) Idle	14.00%	2.10%	11.30%
(4) Development	3.10%	6.20%	8.30%

(Table 2) Land use percentages from 1971, 1980, and 1995 for Seneca Lake watershed.

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### Works Cited

- Hobart & William Smith Colleges, Genesee Finger Lake Regional Planning Council and Southern Tier Central Regional Planning and Development Board. "Seneca Lake Watershed Management Plan." Feb. 2012.pdf file.
- Makarewicz, Joseph C, Daniel J White, and Theodore W Lewis. "Water Quality of the North End of Seneca Lake: 1991-2006." 1 July 2007. Microsoft Word file.

## Conclusions

Seneca County Soil and Water Conservation District (SCSWCD) has gathered the following conclusions: For Seneca Lake, minimum mean yearly turbidity was observed in 2002 at  $0.53 \pm 0.06$  NTU. Maximum mean yearly turbidity occurred one year later in 2003 at  $3.87 \pm .39$  NTU. Mean annual turbidity for the study period was 0.98 NTU which is below the 1 NTU standard required for nonfiltration of drinking water in New York State. With quite a large residence time, Seneca Lake can be polluted with mining waste just as easily as it can be cleaned after mining activities cease. Preventing erosion rates and sedimentation rates in the lake is the most important act of stewardship one community can have on the productivity and cleanliness of Seneca Lake and its fragile watershed