



A clean lake reflects well on all of us.

# ONONDAGA LAKE OUTLET STUDY

**Project Description:** A standard stage-discharge relationship does not exist at gaging station locations due to the effects of the NYS Canal System and hydropower operations at Baldwinsville and Phoenix, along with operations and discharges from the Oneida River system. Stage is only one factor in the equation to determine discharge at these sites, velocity is the other factor. A Doppler velocity meter (DVM) is used to measure the speed of the water along with the water level to determine the total discharge in each channel.

**Location:** The project is located at the Outlet of Onondaga Lake.

**Project Sponsor:** Onondaga County serves as the non-Federal sponsor for this on-going Onondaga Lake Partnership project. The U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency have served as the Federal sponsors for gauge installation and continued outlet study. Development of the model is being accomplished by the U.S. Geological Survey (USGS).

**Current Status:** Preliminary results of data collection are as follows:



Aerial View of Study Area

- The discharges that were encountered during the initial 2 years of this study have been highly interactive and very dynamic.
- Bi-directional discharges are more frequent than full reverse discharge.
- The interaction between the Seneca River and Onondaga Lake Outlet is highly reactive and varies in magnitude and duration over varying amounts of time – from very short (minutes) to extended periods (many hours).

The purpose of this project is to:

- (1) Collect stream discharge data from the Outlet of Onondaga Lake, which is known to have bi-directional flow;
- (2) Determine the factors which control the movement of water flowing into and out of Onondaga Lake; and
- (3) Develop an understanding of the unique interactions of the Seneca River and the Outlet of Onondaga Lake and how this affects water quality in both bodies of water.

**The XR is a Upward-Looking DVM**

**Characteristics of the XR**

- Bottom-mounted fixed to streambed.
- Cables must run from XR to shore or radio transmitter.
- Dynamic Boundary Adjustment
  - a. Main cell width changes with water-level
  - b. Multi-cell widths do not change with water levels.

Water surface  
Y<sub>1</sub>  
Y<sub>2</sub>  
Y<sub>3</sub>  
Y<sub>4</sub>  
Y<sub>5</sub>  
Flow Direction  
1.5 MHz Argonaut XR  
Vertical Acoustic Beam  
Stream bottom  
Cross Section view

Technology Used to Determine Flows at Gaging Stations