

Prepared in cooperation with the
 Cornell Cooperative Extension of Ulster County
 New York State Department of Environmental Protection
 New York City Department of Environmental Conservation

Quantitative Assessment of Water Quality in Upper Esopus Creek: Fish, Macroinvertebrates, Periphyton, Turbidity, and Nutrients

A good understanding of potential effects of known and potential stressors on key resources is needed to better assess management strategies intended to improve biological condition and water quality throughout the Upper Esopus Creek watershed and its major tributaries.

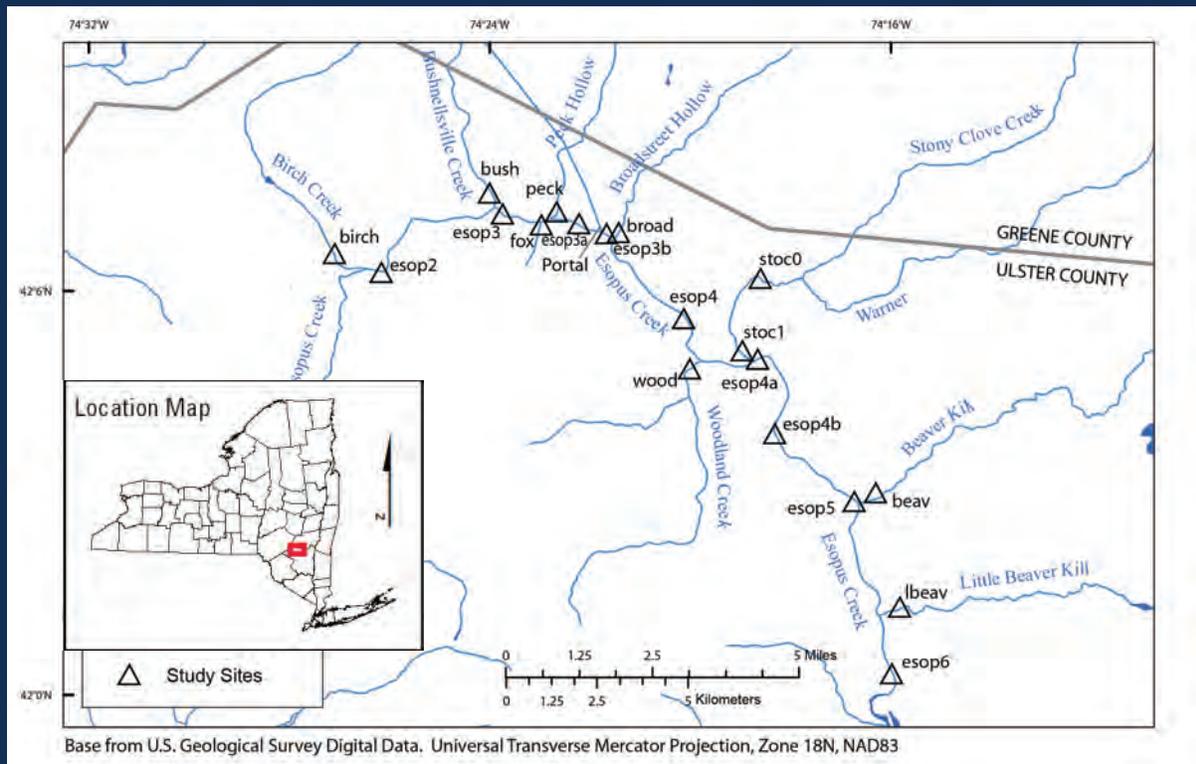
Waters from the Schoharie watershed enter Upper Esopus Creek at the Shandaken portal and travel 18 km before entering the Ashokan Reservoir. The two reservoir's account for approximately 40% of NYC's mean annual water supply. The Upper Esopus Creek is also a world-class trout fishing and recreational stream. Waters from the portal have been the focus of controversy and legal action, however, because they are sometimes turbid and believed to negatively impact local trout populations and water quality. Primary sources of turbidity in the Schoharie and Ashokan watersheds are

Background

The Esopus Creek is located in the Catskill Mountains of New York State and is part of the New York City (NYC) drinking water supply system. The basin was dammed in 1915 to form the Ashokan Reservoir splitting the creek into Upper (upstream of the reservoir)

and Lower segments. The drainage area of Upper Esopus Creek, between the source (Winisook Lake) and the Ashokan Reservoir is approximately 192 mi². The Schoharie Reservoir, located 27 miles north of the Ashokan Reservoir, also supplies water to Upper Esopus Creek (and to the Ashokan Reservoir) via the Shandaken tunnel.

Upper Esopus Creek Study Sites



large deposits of eroding glacial clays along stream channels and hill slopes. Fine clay particles, when suspended in stream waters, can adversely affect growth and survival of fish and macroinvertebrates along with the health of their communities. The NYC watershed management plan also considers turbidity a source of water quality impairment because it is aesthetically unpleasing, reduces effectiveness of drinking water disinfection, and indicates the potential presence of bacteria and viruses.

Objectives

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- study are to,
- characterize current water quality and ecosystem conditions,
 - define potential effects of known and potential stressors (e.g., turbidity, nutrient enrichment, *Didymosphenia geminata*) to important natural resources, and
 - compile information needed to assess management strategies intended to improve biological condition and water quality throughout the Upper Esopus Creek watershed and its major tributaries.

Approach

During summer 2009, the [New York State Department of Environmental Conservation \(DEC\)](#), [US Geological Survey \(USGS\)](#),

[NYC Department of Environmental Protection \(DEP\)](#), and [Cornell Cooperative Extension \(CCE\)](#), will begin a comprehensive study of biological resources (fish, invertebrates, and periphyton), water quality (turbidity and nutrients), hydrology, and water temperatures in the Upper Esopus Creek basin. Staff from the USGS, [Ulster County Community College \(UCCC\)](#), and CCE will conduct quantitative habitat and fish community surveys at as many as 20 study sites in the main stem Upper Esopus Creek and its major tributaries during summer 2009. The DEC and USGS will conduct initial macroinvertebrate and periphyton sampling efforts at 20 mainstem and tributary sites during August, 2009. Staff from the USGS will install automated water samplers and data loggers (which control samplers and record discharge and temperature data) at 10-13 mainstem and tributary sites during September, 2009. If additional funding is made available, surveys will be done again (at 10-to-20 sites) during 2010 and 2011 to document ecosystem variability caused by annual changes in environmental conditions. Comprehensive data on aquatic biota and water quality in the Upper Esopus Creek will be compiled and evaluated to quantify existing conditions, relationships between various ecosystem parameters, and possible sources and extents of impairment in the Upper Esopus Creek watershed. Results from the study will be summarized in one or more reports or refereed journal articles and will be available at, <http://ny.usgs.gov>.

Shandaken Portal



Brown Trout



Esopus Creek Fish-sampling site near Big Indian



Didymosphenia geminata bed in the Upper Esopus Creek



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For Additional Information

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