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NYC Environmental Protection

Prepared in cooperation with the
New York City Department of Environmental Protection

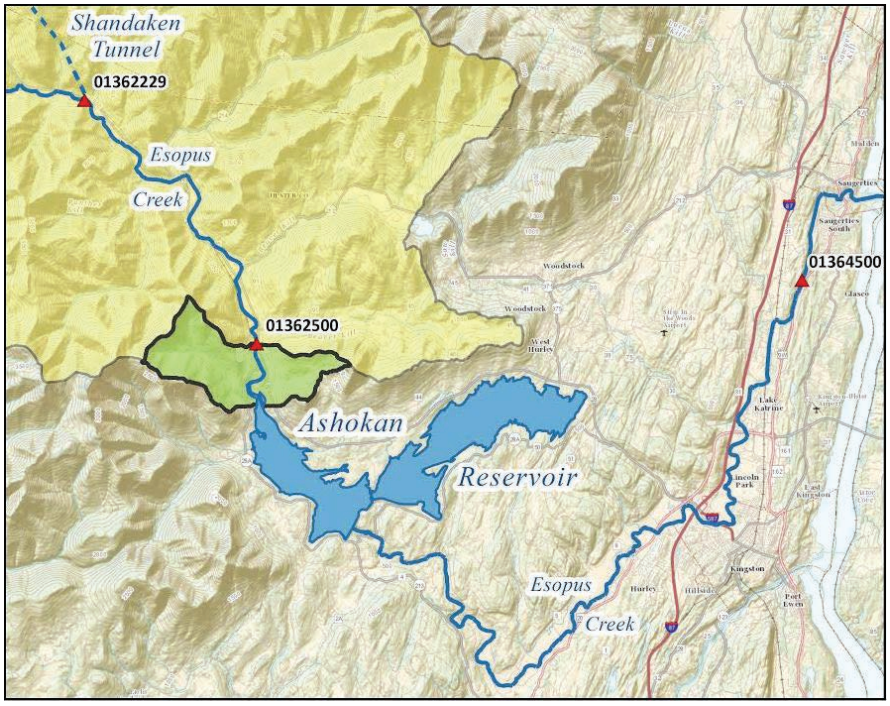
Development of an Estimated Natural Streamflow Record in the Esopus Creek

A regression approach was used to estimate natural daily discharge in the Esopus Creek at a streamgage affected by addition of an inter-basin water transfer and another downstream that is affected by impoundment of the Ashokan Reservoir.

Problem

The Esopus Creek is a tributary of the Hudson River with headwaters in the Catskill Mountains that drains a watershed of 424 mi^2. The Creek is impounded by a dam in Olive Bridge, NY to form the Ashokan Reservoir, a water supply for New York City. The Reservoir was completed in 1913, and serves, along with the Schoharie Reservoir, as the City's Catskill Water Supply. The Schoharie Reservoir discharges through a tunnel to the Esopus Creek about 13 miles upstream of the Ashokan Reservoir. Over the past 100 years, the Esopus Creek has been at the nexus of many controversies among groups representing the interests of local and regional citizens and the management of water flow and water quality in the basin. One of these controversies has been the role of flow management by the New York City Department of Environmental Protection on streamflow and specifically the magnitude of floods in the Esopus basin. The discharge of water to the Esopus Creek through the Schoharie Tunnel increases streamflow and may enhance flooding, whereas the Ashokan Reservoir decreases streamflow and may decrease the size of flood peaks. A clear need exists for an objective approach to estimate "natural" flow in the Esopus Creek in the absence of Tunnel discharge and impoundment.

New York City Reservoirs



Objective

The principal objective of this study is to estimate natural streamflow in the Esopus Creek at two streamgage locations: (1) Coldbrook, NY, downstream of the Schoharie Tunnel, and (2) Mt. Marion, NY, downstream of the Ashokan Reservoir. Records of discharge from nearby streams will be used to estimate natural flow through a regression approach. A newly developed statistical method to estimate natural flows in New York rivers (called the New York Streamflow Estimation Tool), will also be employed to estimate natural flows in the Esopus Creek. Estimated natural flow will be compared to the measured record at the two study sites for the period 1931 – 2012. These natural flow estimates will be compared to the measured records using the Indicators of Hydrologic Alteration software. Several metrics of flow that represent high, medium, and low flow conditions will be calculated by the software, and will form the basis for comparing the natural and measured records. The results of this project will provide an objective assessment of the extent to which the Schoharie Tunnel diversion and Ashokan Reservoir impoundment have altered natural flow conditions in the Esopus Creek.

U.S. Department of the Interior
U.S. Geological Survey

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Ashokan Reservoir Wildflowers

Esopus Creek Portal

Giant Ledge Falls, New York

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