Instream Flow Recommendations for the Great Lakes Basin of New York and Pennsylvania

RCN Grant # 2010-2
2011 4th Quarter Abstract

This project will employ the Ecological Limits of Hydrologic Alteration (ELOHA) framework in the Great Lakes drainage of New York and Pennsylvania to develop an objective, spatially explicit process for evaluating the ecological impacts of new withdrawals of water from the tributaries of Lakes Erie, Ontario, and the Upper St. Lawrence River. The goal is to provide the scientific information necessary to support development and implementation of in-stream flow standards for managing the Great Lakes surface and ground-waters of New York and Pennsylvania under the terms of the Great Lakes Compact.

Milestones for the fourth quarter of 2011 were achieved, including selection of flow-dependent fish and aquatic organisms to serve as targets of analysis and modeling; and documentation, based on extensive review of scientific literature, of the flow requirements of these fish and aquatic organisms. This work has been summarized in a report that will be distributed to our 25-member Technical Advisory Team for comment. This project is on schedule to complete a final report in January 2013.

NORTHEAST REGIONAL CONSERVATION NEED GRANT QUARTERLY REPORT

Grant Number: 2010-02

Grant Title: Instream Flow Recommendations for the Great Lakes Basin of New York and Pennsylvania

Grant Receipt: The Nature Conservancy

Grant Contact Name: David Klein

Report #- 3 - October 1, 2011 – December 31, 2011

Were planned goals/objectives achieved last quarter? This project is on schedule to organize a flow alteration-ecological response workshop with our Technical Advisory Team in June 2012 (step 5 in our project narrative).

Regional Conservation Need Addressed: This project will provide the information necessary to develop and implement science-based instream flow standards for managing the Great Lakes surface and ground-waters of New York and Pennsylvania under the terms of the Great Lakes Compact.

Progress Achieved: During this quarter, our objectives included steps 2 and 3 in our project narrative::
Step 2: *Produce a synthesis report for Technical Advisory Team identifying flow-dependent biota, and assembling available data, models and literature review of the documented or modeled responses to hydrologic alteration of these elements of concern.* This synthesis report has been completed for the fish species that will serve as targets for further analysis and modeling. We now plan to complete a similar analysis for macro-invertebrates, including mussels.
Step 3: *Formulate initial conceptual relationships between responses of particular biota – fish species, macro-invertebrates, riparian plant communities – and the degrees and types of hydrologic alteration.* We completed formulation of these initial conceptual relationships in a workshop with our Technical Advisory Team in June, 2011. Jason Taylor, the post-doctoral associate who is focusing on this project, has further refined and extended these conceptual relationships in his synthesis report (please see below for a report on Jason's work during the 4th quarter).

Summary of Progress: (Provide a paragraph describing progress, work to come, and timelines) We include below the narrative of progress completed by Jason Taylor, Project Post-doctoral Associate at Cornell University:

Steps 2 and 3 in the project narrative:

> I have conducted an extensive literature review and written sections of the report that synthesizes flow requirements for fluvial target species including cold headwater fish, riffle obligate fish, riffle associate fish, and anadromous sport fish. I have also developed life history summary tables, and flow-ecology diagrams relating life history information to representative hydrographs to supplement these sections. I am currently finishing sections on Esocids (pikes), mussels and riverine macroinvertebrates and anticipate having a draft report ready in early January.
>
> I have also put together a fish traits database for fish species within the study area based on Frimpong and Angermeier's FISH TRAITS database supplemented with information from the Ontario Freshwater Fishes

Life History Database. This information may be useful if we pursue a traits-based approach in developing any flow-ecology relationships.

Step 4 in the project narrative (scheduled for completion in April 2012): *Classify streams in the GL basin of NY and PA by size, hydrologic pattern, gradient, geology, geomorphology, ecological and other factors, and characterize baseline and current hydrologic conditions.*

I have been assessing the applicability of using modeled flow data in our stream classification and I am communicating with the USGS Great Lakes Office to acquire the AFINCH flow modeling tool for NY, which is currently being reviewed. AFINCH models simulate monthly median flows based on watershed characteristics, climate data (precipitation, temperature), and withdrawal information and will be useful in developing a more comprehensive stream classification as well as estimating flow alteration for un-gauged streams. USGS has indicated that the beta version of the AFINCH tool will be available for us to use very soon.

Difficulties Encountered: We are waiting for USGS to complete the AFINCH flow modeling referenced above. If this process is delayed, we will need to rely on other methods for completing a stream classification and estimating flow alteration.

Activities Anticipated Next Quarter: During the 1st quarter of 2012, we will complete steps 4 and 5 in our project narrative: classifying streams and characterizing hydrologic conditions; and organizing a workshop to refine specific hypotheses of ecological response to flow alteration for quantitative and qualitative testing.

Expected End Date: This project is scheduled to conclude in January 2013 with flow recommendations for the streams of different types in the Great Lakes basin of NY and PA.

Costs:

Funds Expended to Previous to this Report:	$ 0.00
Amount of RCN Funds Requested within this Report:	$ 12,990.30
Total Approved Budgeted RCN Funds:	$100,000.00
Are you within the approved budget plan?	Yes
Are you within approved budget categories?	Yes

Signature: David Klein

Date: Jan. 18, 2012