

Greenway Ecological Standing Committee
Grantee Status Report

Status Report Date: 9 Jan 2015	
Project Title: Quantifying Relationships between Fish Assemblages and Nearshore Habitat Characteristics of the Niagara River	
Organization: Lake Superior State University	
Report Prepared By: Drs. Kevin Kapuscinski & Derek Crane	
Contact Information: 906-635-2093 (Kapuscinski)	
Project Start Date: 1 Apr 2013	Project Anticipated Completion Date: 1 Apr 2016

1. Describe what progress you have made toward each of your grant objectives since your last status report. Did you meet your goals for this period? Please be specific.

Yes, we met our goals for this period. General administrative progress included (1) hiring and supervising one long-term and three seasonal technicians, (2) purchasing and maintaining equipment, (3) acquisition of housing and storage facilities, (4) vehicle rentals, and (5) boat maintenance. The following progress has been made toward achieving our project objectives:

Objective #1: Predicting occurrences of Niagara River fishes from habitat characteristics

- 93 sites were surveyed during July-Sept 2014. Each site survey included a 50' seine haul to count and identify all fishes captured, and 12 habitat survey plots per site. Habitat surveys included measurements or visual estimation of submersed aquatic vegetation (SAV) species richness, areal SAV cover, SAV height, 3D SAV cover, substrate class, water depth, velocity, GPS point collection, distance from tributary, and shoreline armoring. All habitat plot surveys were conducted simultaneously by two technicians to account for variance in visual estimates
- 29 native and 8 non-native fishes were sampled
- Mottled sculpin, brindled madtom, Iowa darter, longnose gar, and green sunfish were collected for the first time
- Most fishes were identified and counted in the field, but others require the use of a microscope. Identification of preserved specimens will be completed in spring 2015
- Data entry was completed for 2013 surveys and will be completed for 2014 surveys in summer 2015
- Crane began writing code for species distribution modeling in R statistical software

Objective #2: Quantify prey selection by age-0 muskellunge and the caloric content of different prey types

- Energy density of 11 fish species from Buffalo Harbor, the Niagara River, and the St. Lawrence River was quantified by our seasonal technicians and collaborators at SUNY Buffalo State College during 2013
- An investigation of methods used to preserve fishes for calorimetry is ongoing with collaborators from SUNY Buffalo State College and will be completed in 2015
- We will not be hiring a graduate student to complete this project due to Kapuscinski's transfer to Lake Superior State University (undergraduate only institution). We plan to quantify prey selection by age-0 muskellunge during 2015

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Objective #3: Monitor nearshore fish assemblages at muskellunge nursery sites

- Four 100' seine hauls were conducted at 10 index sites (40 total hauls), and all fishes were identified and counted or preserved
- This marks the eighth consecutive year that this standardized survey has been completed

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2. How did you measure your progress since your last status report? What kind of data have been collected to determine whether progress is being made or not being made? What results have been obtained since your last status report?

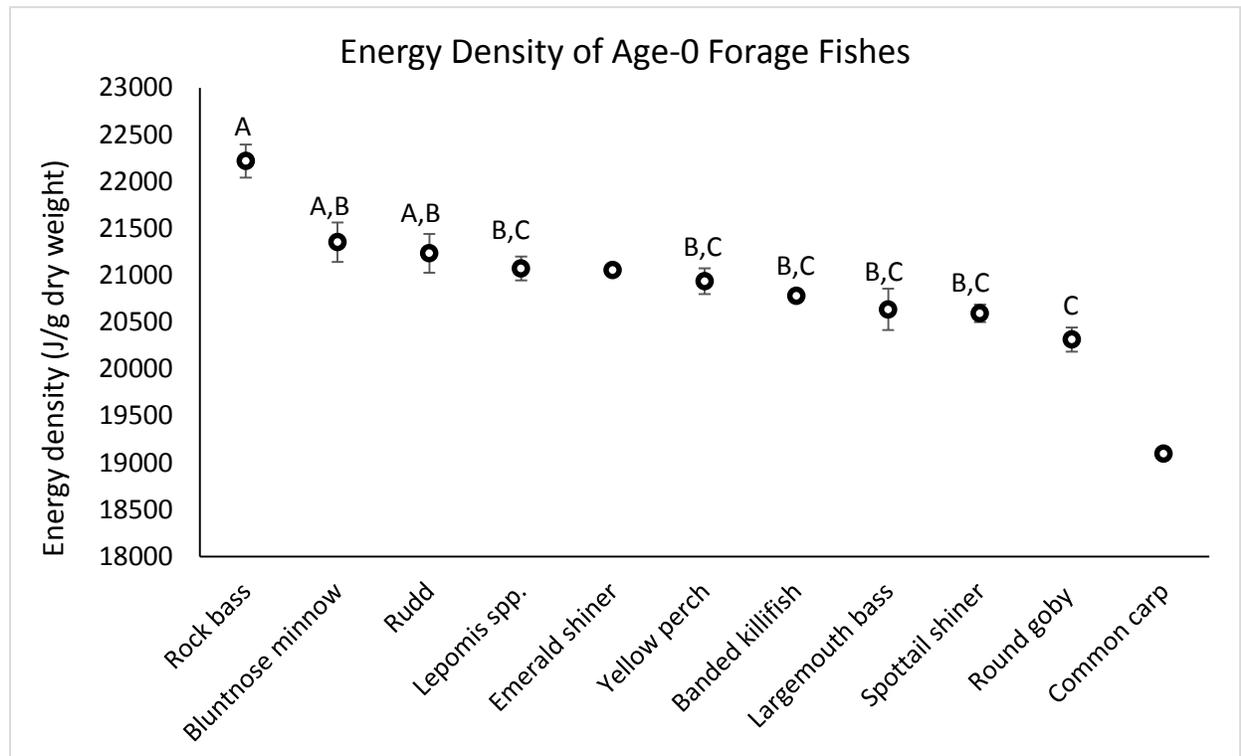
This is our second status report. The following data and results have been obtained:

Objective #1: Predicting occurrences of Niagara River fishes from habitat characteristics

- Data on fishes and habitat at sites surveyed in 2013 have been entered into an Excel database

Objective #2: Quantify prey selection by age-0 muskellunge and the caloric content of different prey types

- Energy density data were entered into Excel and analyzed using analysis of variance



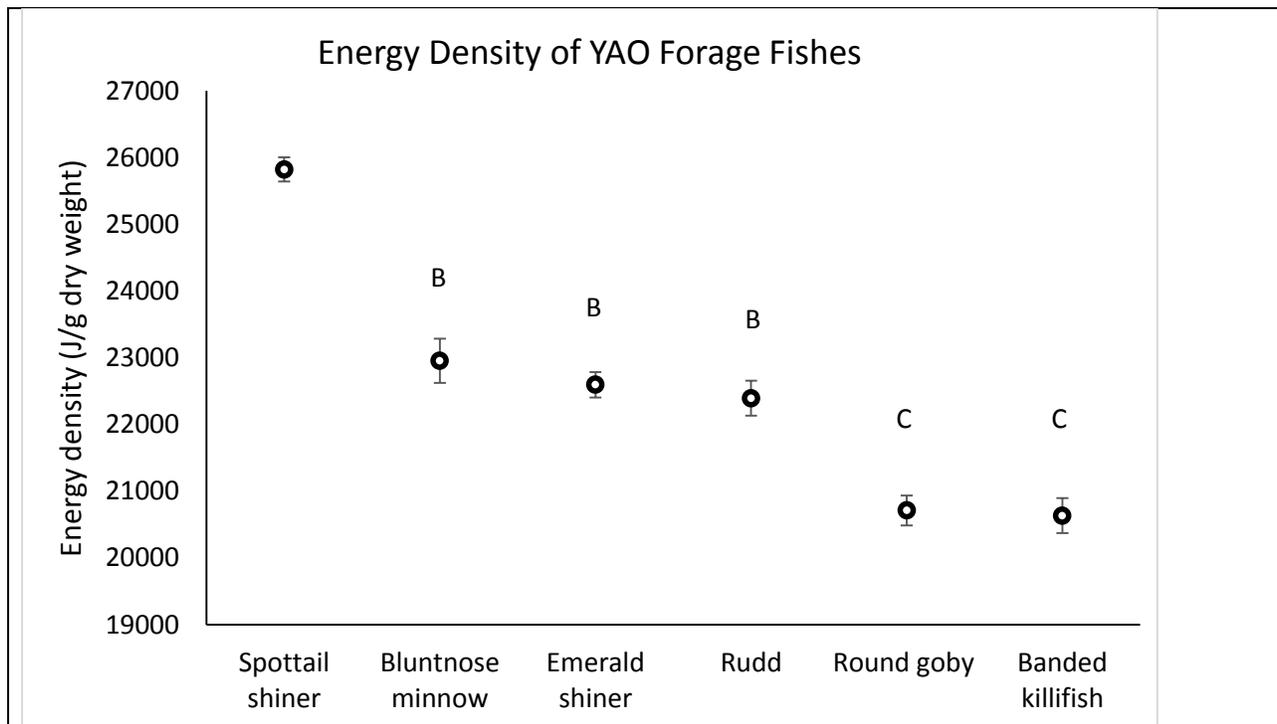
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Significantly different energy density values are denoted by different letters. Only one sample was available for common carp and emerald shiner, so they were not included in the statistical analysis for age-0 fishes.

Objective #3: Monitor nearshore fish assemblages at muskellunge nursery sites

The figure below shows the relative abundance of age-0 muskellunge sampled during our index seining survey of Buffalo Harbor and the upper Niagara River

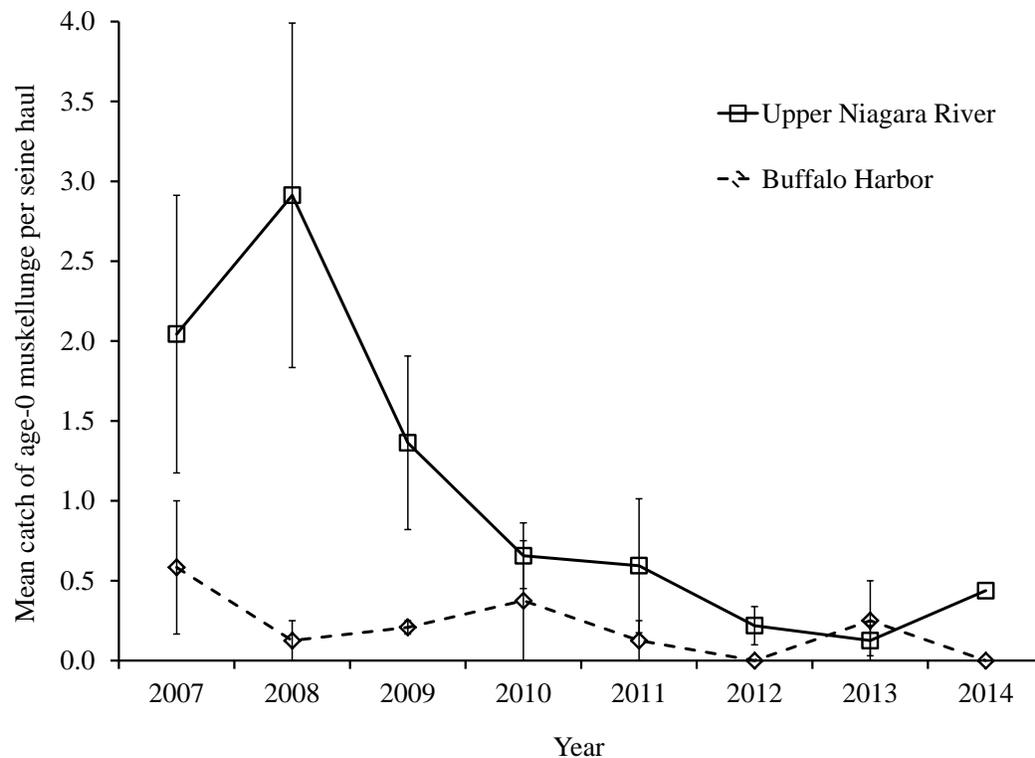
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Similar results will be available for all fishes once preserved specimens have been identified

Products

Publications completed in 2014 related to our research on Buffalo Harbor and the Niagara River are enclosed. In addition to these products, Crane had another paper accepted for publication pending revision. This work built off of Crane et al. (2014), and focused on identifying the timing of muskellunge egg incubation and habitats used. Tasks completed for this work included:

- Habitat and muskellunge egg surveys conducted at 539 points in 4 areas of the UNR (2012-2014)
- 136 viable eggs, and 2 yolk-sac larvae collected from 30 points
- 73 eggs successfully incubated; 72 identified as muskellunge larvae, 1 identified as a northern pike larvae
- Filamentous algae/aquatic macrophyte cover of the substrate was the most important predictor of the presence of muskellunge eggs

Based on Crane et al. (2014) and the findings of this study, muskellunge spawning and egg incubation generally occurs mid-May to early-June in water 1-2 m deep. Substrates at

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spawning and incubation locations consist of muddy-sand or sand that is covered with the greatest available growth of algae/aquatic macrophytes

For additional information on our research, please visit:

<https://masquinongy.wordpress.com/>

<https://cranefishecology.wordpress.com/>

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3. What challenges have you encountered since your last status report? How are you addressing these challenges?

We did not encounter any significant challenges to project success

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4. Are you on schedule to complete your project in the proposed timeline? If not, please explain why you are ahead or behind schedule.

We are currently on schedule to complete our project within the proposed timeline

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5. Please use the table below to report your expenditures since your last status report. Include in-kind support from other resources have you used since your last report below the table. Please explain any differences between anticipated and actual expenditures. Attach copies of any relevant receipts or invoices to this report.

Budget Categories	GESC-approved budget	Funds or in-kind support from other resources	Total expenses to date	Remaining balance
Salaries and Benefits	127,063		113,447	
Travel	24,500		22,113	
Equipment				
Supplies	2,000		6,147	
Meetings				
Printed Material				
Consultants				
Other	1,000.00		6,242	
Indirect costs	35,549		30,441	
Total Funds	190,112		178,390	11,722

Please note that these expenditures do not include expenditures during 20 Dec 2014 - present.

Substantial in-kind support (in the form of personnel time, vehicles, and laboratory space) was provided by the NYSDEC and SUNY-Buffalo State; however, we do not have cost estimates for these.

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6. What progress toward your objectives do you expect to make before your next status report? Please be specific.

Objective #1: Predicting occurrences of Niagara River fishes from habitat characteristics

- We will repeat surveys at about 100 new sites in 2015
- We will finalize writing computer code for the species distribution models
- We will identify all preserved specimens

Objective #2: Quantify prey selection by age-0 muskellunge and the caloric content of different prey types

- Feeding trials to determine selective predation will be conducted in 2015
- We will continue quantifying the energy density of prey fishes using our seasonal technicians and collaborators at SUNY-Buffalo State College

Objective #3: Monitor nearshore fish assemblages at muskellunge nursery sites

- We will complete our standardized seining survey at 10 index sites during 2015

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7. Please include 1 to 2 photographs with dates and short descriptions taken since your last project report.



Egg, yolk-sac larvae, age-0, and juvenile muskellunge photographed while conducting research in the Niagara River, NY. This collage was featured on the cover of the June 2014 issue of *Journal of Great Lakes Research*. Photo credits: Derek Crane, Kevin Kapuscinski, Andrew Panczykowski



Golden shiner and common shiner, which are native to the upper Niagara River, were collected in the same location as the similar looking, but non-native rudd. Photo credit: Derek Crane

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