

# ***St. Clair-Detroit River System Initiative Annual Meeting***

Meeting Program &  
Briefing Book



February 5, 2014

Weber's Inn  
Ann Arbor, MI

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# St. Clair-Detroit River System Initiative Annual Meeting Agenda

**February 5, 2014**

9:30 a.m. - 5:00 p.m.

Social to follow

*Celebrating ten years of partnership . . .  
. . . and planning for ten more!*

- 8:30 Registration and Networking
- 9:30 Welcome and Introduction  
*Russ Strach, U.S. Geological Survey, Great Lakes Science Center*  
*Rich Drouin, Ontario Ministry of Natural Resources*
- 9:35 Accomplishments in the Past Ten Years  
*James Boase, U.S. Fish and Wildlife Service*
- 9:50 Presentation of Department of Interior Partners in Conservation Award  
*Russ Strach, U.S. Geological Survey, Great Lakes Science Center*
- 10:00 2013 Annual Meeting Survey Recap  
*Rich Drouin, Ontario Ministry of Natural Resources*
- 10:10 Introduction of New Partnership Agreement and Strategic Vision  
*Roger Knight*
- 10:40 New Facilities to Support the SCDRS Initiative  
*Kurt Newman, U.S. Geological Survey, Great Lakes Science Center*  
*John Hartig, Detroit River International Wildlife Refuge (U.S. FWS)*
- 10:50 Break** (*refreshments sponsored by Environmental Consulting and Technology*)
- 11:15 Great Lakes Acoustic Telemetry Observation System  
*Chuck Krueger, Great Lakes Fishery Commission*  
*Daryl Hondorp, U.S. Geological Survey, Great Lakes Science Center*
- 11:30 Detroit River Phosphorus Loading Determination  
*Debbie Burniston, Environment Canada*
- 11:45 Harmful Algal Blooms  
*Mary Evans, U.S. Geological Survey, Great Lakes Science Center*  
*Peter Esselman, U.S. Geological Survey, Great Lakes Science Center*

- 12:00 To be determined
- 12:15 Conservation Action Plan  
*Robin DeBruyne, U.S. Geological Survey, Great Lakes Science Center*
- 12:30 Lunch**
- 1:30 General Aquatic Invasive Species Priorities and Concerns  
*Chris Vandergoot, Ohio Department of Natural Resources*  
*Todd Kalish, Michigan Department of Natural Resources*
- 1:45 Sea Lamprey GIS  
*Alex Gonzalez, U.S. Fish and Wildlife Service*
- 2:00 Aquatic Nuisance Species  
*Steve Hensler, U.S. Fish and Wildlife Service*
- 2:15 Phragmites Control in the St. Clair Flats  
*Terry McFadden, Michigan Department of Natural Resources*
- 2:30 Transboundary Conservation through the Detroit River International Wildlife Refuge  
*John Hartig, Detroit River International Wildlife Refuge (U.S. FWS)*
- 2:45 Break** (*refreshments sponsored by SmithGroup JJR*)
- 3:15 Habitat Projects in St. Clair and Detroit Rivers  
*Rose Ellison, U.S. Environmental Protection Agency*
- 3:30 Spawning Reef Project Updates  
*Lynn Vaccaro, Michigan Sea Grant*
- 3:45 Sediment Mapping in Detroit River  
*Mary Bohling, Michigan Sea Grant*
- 4:00 Watershed Protection and Restoration Activities  
*Michelle Selzer, Michigan Department of Environmental Quality*
- 4:15 Herps in the SCDRS  
*David Misfud, Herpetological Resource and Management, LLC*
- 4:30 Closing Remarks  
*Rich Drouin, Ontario Ministry of Natural Resources*
- 4:45 Group Photograph  
*Rob Hunter, U.S. Geological Survey, Great Lakes Science Center*
- 5:00 – 7:00 Social & Poster Session

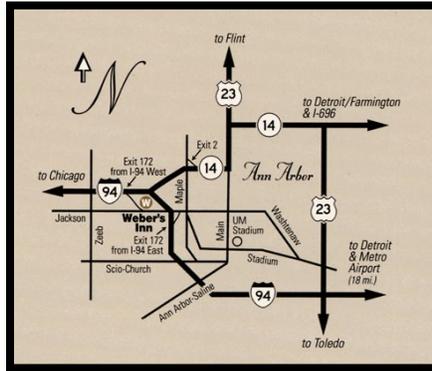
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# Attendees

To be updated following the meeting

# Partner Updates

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# ***St. Clair-Detroit River System Initiative***

## **BRIEFING ITEM**



February 5, 2014

**Names:** Lynn Vaccaro<sup>1</sup>, Jennifer Read<sup>2</sup>, Bruce Manny<sup>3</sup>, Mary Bohling<sup>1</sup>, Elizabeth LaPorte<sup>1</sup>, Jim Diana<sup>1</sup>

**Agencies:** <sup>1</sup>Michigan Sea Grant, <sup>2</sup>University of Michigan Water Center, <sup>3</sup>U.S. Geological Survey

**Briefing Item Type:** Information

**Permission to post on HECI Website:** Yes

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### **An Update on Spawning Reef Construction Projects**

Michigan Sea Grant and the UM Water Center have been working with a number of initiative partners (USGS, USFWS, MDNR, JJRSmithGroup, MI Wildlife Conservancy) to coordinate the construction of a series of spawning reef projects in the St. Clair and Detroit rivers. The projects are designed to compensate for habitat lost during the construction of shipping channels and remediate Beneficial Use Impairments 3 and 14.

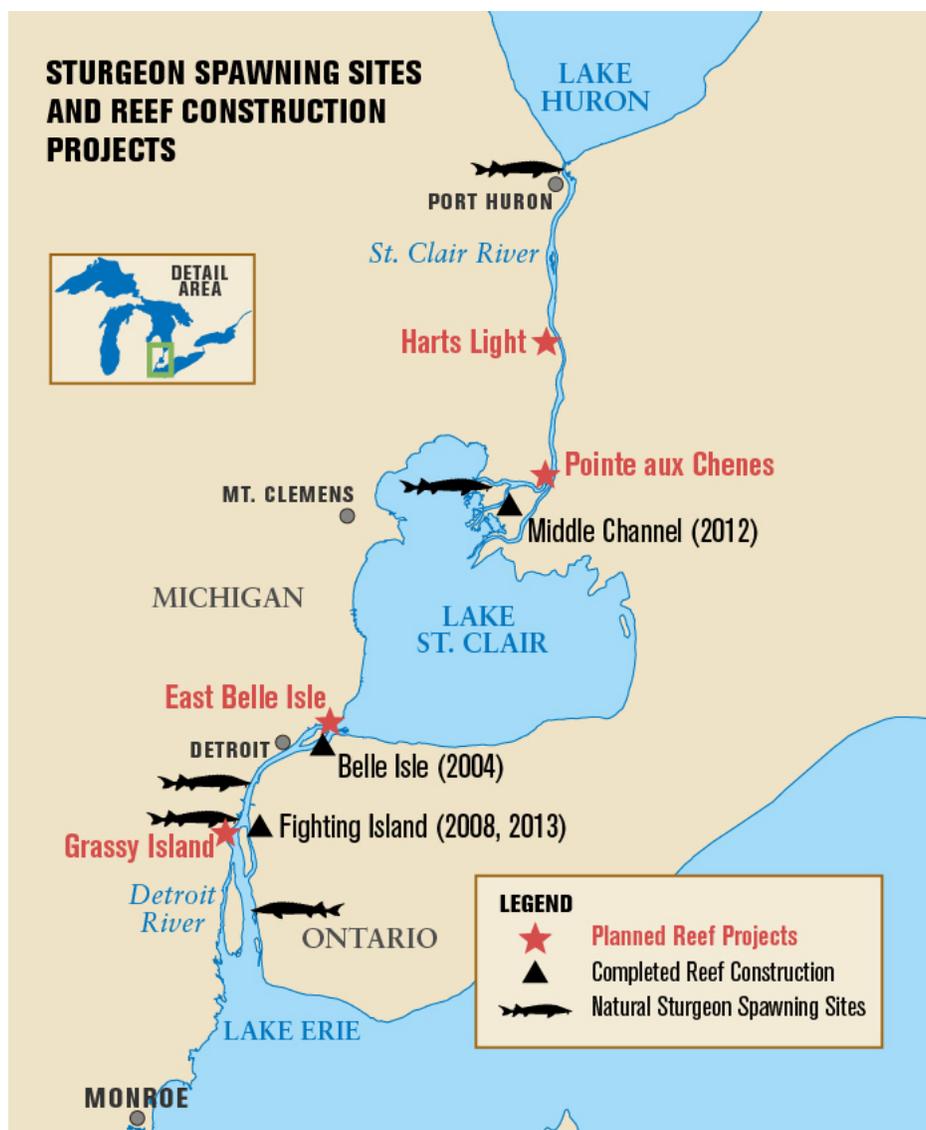
**Middle Channel Reef, St. Clair River** – In spring of 2012, nine experimental reef beds were built, stretching from one side of the Middle Channel to the other. The team has been monitoring adult fish activity, egg deposition, larval drift and juvenile fish communities in the vicinity of the reef project before and after reef construction. Lake sturgeon were observed spawning on the reef in both 2012 and 2013 and preliminary evidence suggest that at least five other fish species are benefiting from the reef (channel catfish, logperch, state endangered northern madtom, walleye and white sucker). Unfortunately, some of the reef beds are becoming covered in sand and silt, which limits their long-term value for fish reproduction. The research team is organizing a workshop February 18, 2014 to solicit advice from additional scientists with expertise in fluvial geomorphology, hydrodynamics and sediment transport. Their advice should help the team improve evaluation and planning for all future reef locations. The Middle Channel Reef project was funded by the NOAA habitat restoration center.

**Harts Light and Pointe aux Chenes Reefs, St. Clair River** – The USGS Great Lakes Science Center received funding through the Great Lakes Restoration Initiative to establish fish spawning reefs at two locations in the St. Clair River: Harts Light, near East China, Mich., and Pointe aux Chenes, near Algonac, Mich. A variety of criteria were used to select locations, including water velocity, water depth and a detailed underwater video and sonar assessment of the site. In 2014, the team expects to build 2.5 – 3 acres of spawning habitat at each location by placing 4 – 8 inch quarried limestone on the river bottom, forming a single bed of loose rock, 2 feet thick, under at least 30 feet of water. Rock will be placed using a crane and clamshell bucket mounted on a marine construction vessel, and construction could take 6 – 7 weeks at each location. The team has been working closely with shoreline homeowners, the shipping industry and permitting agencies to minimize any concerns.

**New Detroit River Reef, East Belle Isle or NE Grassy Island** – The team also received funding through the National Fish and Wildlife Foundation to establish a 1-acre spawning reef offshore from historic Fort Wayne in the Detroit River. Based on feedback received during the permitting process, the team has decided to look for an alternative location for this project. Commercial vessels regularly turn in the Fort Wayne area, which creates immense turbulence that could disrupt the reef. A number of factors still make the Fort Wayne area attractive for spawning habitat restoration, but this would require a comprehensive feasibility study that is beyond the scope of current grant funding. The team is now studying two other high priority locations in the Detroit River: just upstream from Belle Isle, or upstream from Grassy Island. Reef construction is planned for fall of 2014.

**Outreach** – Michigan Sea Grant will continue promoting efforts to restore fish and wildlife habitat throughout the St. Clair Detroit River System. A recent example includes developing feature articles, an up-to-date map and a news release about the DOI Partners in Conservation Award. In conjunction with the upcoming reef projects in the St. Clair River, Sea Grant is writing on a short article series about scientists, habitat construction and monitoring; hosting public events; organizing a webinar and developing a publication for restoration practitioners; and developing new educational curriculum resources using USGS data. Also, look for more information about Sturgeon Fest, May 31 2014 in Port Huron, MI!

For more information, visit: [www.miseagrant.umich.edu/explore/restoration](http://www.miseagrant.umich.edu/explore/restoration)



# **St. Clair-Detroit River System Initiative**

## **BRIEFING ITEM**



February 5, 2014

Name: Dale P. Burkett  
Agency: Great Lakes Fishery Commission  
Briefing Item Type: Informational  
Permission to post on HECI Website: Yes

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### **Title: Sea Lamprey Assessment of the Huron-Erie Corridor During 2013 and Proposed Action for 2014**

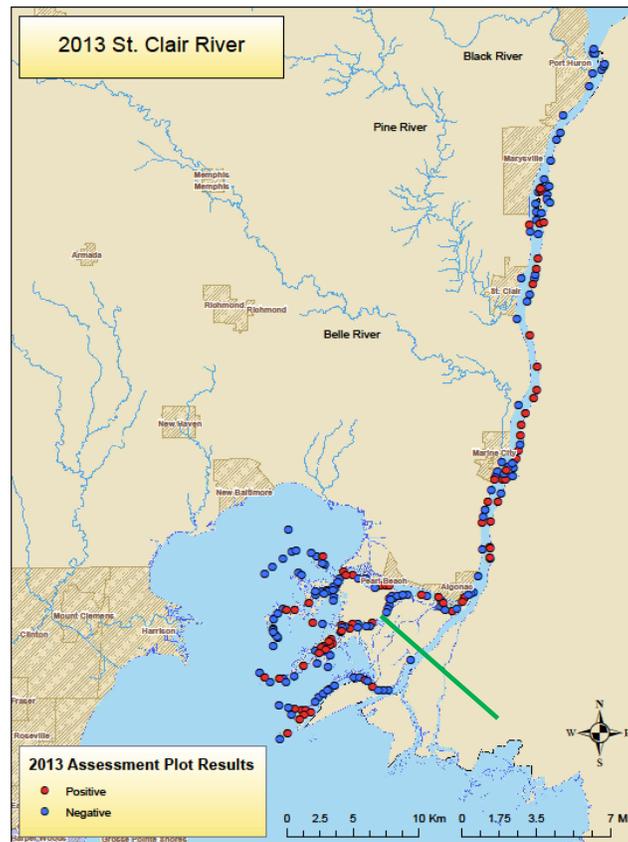
**Update:** Adult sea lamprey abundance in Lake Erie over the last eight years has been considerably higher than during 1990-2004, with a peak in 2009 greater than pre-control levels. Elevated abundances continue despite consecutive treatments of all sea lamprey-producing tributaries to Lake Erie during 2008-2010. The control agents have spent considerable effort evaluating the success of the lampricide treatments and searching for previously unknown sea lamprey sources. Results indicated that lampricide applications were successful and did not reveal untreated sea lamprey sources.

The connecting waterway between lakes Huron and Erie is known as the Huron-Erie Corridor (HEC). The HEC is known to harbor a sea lamprey larvae population within the St. Clair River. Previous assessment of this population suggested that density was low, infestation widespread, sea lamprey production likely minimal, and that sea lamprey would not successfully migrate the full distance of the HEC to Lake Erie. Because assessment information from other tributaries to Lake Erie could not identify an untreated source of sea lamprey production, the control agents intensified assessment effort on the HEC during 2011, continuing with a larger assessment effort during the summer of 2013.

Larval Assessment effort in the HEC was expanded during 2013 using \$230,000 in funding provided by the Department of State. All assessments were conducted using granular Bayluscide, a lampricide used in deep water that kills sea lamprey during assessments. In addition to the normal 16 index plots (total 0.8 hectares), the number of distribution plots delineating the extent of sea lamprey production was increased to 100 (34 upper river, 66 lower river, total 10.0 ha, see Figure 1) and the number of detection plots was increased to 70 (40 upper river, 30 lower river, total 6.95 ha). In addition, 36 plots (3.6 ha) in the lentic areas of Lake St. Clair and 22 plots (1.1 ha) in the Detroit River were also surveyed to assess the production capability of these areas.

The 2013 survey effort resulted in improved knowledge of “hot spots” of larval sea lamprey infestation within the river and proved that larvae are infesting the Lake St. Clair lentic area in low densities. Generally, prevalence of larvae-positive plots was fairly consistent in the riverine parts of the assessment, with 43% of the plots surveyed in the upper river and 38% (range 37-40) of the plots surveyed in the three

lower river channels producing larvae. The upper river plots on average contained almost 4 times the number of larvae than those in the lower river (0.052 vs 0.014 lampreys/m<sup>2</sup>), and contained some relatively high density plots, one of which contained >20% of the upper river catch (Figure 2). These densities are interesting in that the lower river contains about twice as much larval sea lamprey habitat than the upper river. Overall, the average densities of the river (upper and lower) were lower than those seen in 2012. Of the 36 plots in the lentic areas of Lake St. Clair only 14% contained sea lamprey larvae, likely indicating that a majority of the larval production is in the upper and lower river areas. As in 2012, no sea lamprey larvae were captured from plots located within the Detroit River.



**Figure 1.** Map of assessment plots surveyed in 2013. Red dots indicate sea lampreys were present (positive), blue dots indicate no larval sea lampreys were found (negative). Green line approximates division between upper and lower sections of the river. Lentic plots are those around that river mouth that are in open water and not in river channels.

### **Plans for 2014**

Control agents used data collected during 2012 and 2013 to delineate eight potential treatment plots in the St. Clair River. Treatment of those plots was considered for 2014 by ranking them (based on cost/kill of large larvae) against other infested streams in the basin. Seven of the eight plots ranked for treatment during 2014 at a total cost of \$631,000. The Sea Lamprey Control Board made a decision to delay treatment of the St. Clair plots until at least 2015 pending a comprehensive plan that compiles all available assessment information and evaluates possible treatment strategies. Treatment of the HEC will be costly, and concerns such as control around the Walpole Island First Nation lands and permitting requirements from the State of Michigan will need to be resolved to successfully attempt treatment. Staff time required to treat the river with granular Bayluscide would be relatively small, but the chemical costs would impact control efforts in the rest of the basin. Larval assessment efforts in the HEC for 2014 will return to standard levels and 2014 adult trapping in Lake Erie tributaries is expected to provide useful information on the movements and survival of juveniles that were released in the HEC during 2012.

# **St. Clair-Detroit River System Initiative BRIEFING ITEM**



January 17, 2014

**Name:** Michelle Selzer, Melanie Foose, and Jennifer Tewkesbury

**Agency:** Michigan Dept. of Environmental Quality, Office of the Great Lakes

**Briefing Item Type:** Information

**Permission to post on HECI Website:** Yes: Office of the Great Lakes Website: [www.michigan.gov/deqogl](http://www.michigan.gov/deqogl); and the General DEQ Website: [www.michigan.gov/deq](http://www.michigan.gov/deq)

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**Title:** Update of on-going and planned water quality-related activities in the St. Clair-Detroit River System.

**Update:**

**Lake Coordination (Selzer):**

- Helping to plan a statewide Green Infrastructure conference. Conference will be held on May 8-9, 2014, at the Lansing Center in Lansing, MI. More information at: [http://www.michigan.gov/deq/0,4561,7-135-3308\\_3333\\_4169\\_21606-312197--,00.html](http://www.michigan.gov/deq/0,4561,7-135-3308_3333_4169_21606-312197--,00.html).
- Partnering with the River Raisin Partnership organization to find ways to enhance state and local collaboration in the River Raisin Watershed.
- Working with the Natural Resources Working Group comprised of state, federal, university, and non-profits organizations to develop realistic outcomes and a framework for concerted action to address non-point source issues in the River Raisin Watershed.
- Partnering with the Detroit Climate Action Collaborative to develop a city of Detroit Climate Change Action Plan. The plan will be used as a guide to reduce greenhouse gas emissions and to increase the resilience of the city's social, built and natural environment.
- Participating in the South East Michigan Council of Governments Regional Green Vision for Southeast Michigan. The primary goal of this regional vision is to help benchmark the current green infrastructure levels through data collection and envision the future of green infrastructure through various analyses of the data.
- Continuing to engage in the Lake St. Clair Partnership. Next meeting is scheduled for February 13th.
- Helping to coordinate and implement Lake Erie Lakewide Action and Management Plan activities for MI, including the 2014 Coordinated Science and Monitoring Initiative effort and the LAMP Update.
- Involved in Belle Isle AIS outreach/education GLRI project at the Belle Isle Aquarium. More information at: <http://belleisleconservancy.org/>.

**Detroit River Area of Concern (Foose):**

- The Detroit River Public Advisory Council has drafted a list of eleven projects necessary for removal of the Habitat and Populations BUIs on the US side. The habitat plan is expected to be finalized in the spring of 2014.
- A feasibility study is currently underway on Stony and Celeron Islands.
- Sediment characterization has been completed along the Ecorse/River Rouge Shoreline and Celeron Island.
- The Blue Heron Lagoon and South Fishing Pier projects have been completed on Belle Isle.
- Funding is to be requested through NOAA for a feasibility study on the Lake Okonoka habitat project, including a full hydrological study of Belle Isle.
- Funding is expected to be requested for the Milliken State Park habitat restoration project.

### **St. Clair River Area of Concern (Foose):**

- The Upper St. Clair River Shoreline project in Port Huron is nearing completion. A Sustain Our Great Lakes grant was awarded in 2013 for a wetland restoration to complement the shoreline project.
- Habitat designs for the five remaining projects on the St. Clair River Binational Public Advisory Council's Habitat Plan are 30% complete.
- Construction is expected to begin in the spring of 2014 for the Chrysler Beach green infrastructure project.
- A thorough review of the data available on the quality of benthos on the US side of the St. Clair River has been completed.

### **Rouge River Area of Concern (Tewkesbury):**

- After completing the Feasibility Study and Remedial Investigation for the Great Lakes Legacy Act contaminated sediment project on the Lower Rouge River Old Channel the project has moved into the design and implementation phase.
- An application has been submitted to NOAA by the City of Dearborn to acquire a majority of Fordson Island located in the lower Rouge main channel for eventual habitat restoration.
- The Rouge River Advisory Council (RRAC) published a Rouge River AOC BUI Report Card to provide to various stakeholders throughout the watershed.
- The USACE is currently completing preliminary work for possible fish passage around the Henry Ford Estate Dam which would reconnect the upper reaches of the Rouge River to the Great Lakes.
- The RRAC is currently working on updating the AOC's Fish and Wildlife Habitat Work Plan for future implementation.

### **Clinton River Area of Concern (Tewkesbury):**

- Completed design phase of the Clinton River Spillway Habitat Enhancement Project. Currently seeking funds for implementation through various sources.
- Completed implementation of habitat restoration work at the Lake St. Clair Metropark Coastal Wetland Project and the 42-acre Green Parking Lot.
- The USACE is currently completing feasibility studies for three habitat restoration projects within the AOC including the restoration of coastal wetlands at the mouth of the Clinton River.
- The Clinton River Public Advisory Council (PAC) has refined the list of habitat restoration projects that will need to be implemented for potential delisting of the AOC in 2018.

### **River Raisin Area of Concern (Foose):**

- The wetland habitat restoration projects have been completed at Sterling State Park.
- Phase 2 of the fish passage projects is expected to be complete in spring 2014 which includes rock arch ramps at Dams 4 and 5, the bypass channel at the Waterloo Dam, and the mill race enhancement at the Grape Dam. With the completion of these projects, approximately 23 miles of the River Raisin will be open for fish passage up to Dundee, Michigan.

# ***St. Clair-Detroit River System Initiative***

## **BRIEFING ITEM**



February 5, 2014

Name: Robert Reider

Agency: DTE Energy

Briefing Item Type: Information

Permission to post on HECI Website: Yes

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Title: Clean Water Act Section 316(b) Rule (Cooling Water Intake Structures)

Update: A rule proposed by the U.S. Environmental Protection Agency (EPA) covering existing facilities that use > 2 million gallons per day (MGD) design intake flow (DIF) was published in April 2011 and was originally scheduled to be finalized in July 2012. However, pursuant to three subsequent amendments to the Settlement Agreement between the EPA and the plaintiff, Riverkeeper, the parties agreed to extend the deadline to take final action to January 14, 2014. EPA did not take final action on the rule on this date and requested additional time to determine a revised deadline. The delay was “due to continuing inter-agency consultations [between the EPA, National Marine Fisheries Service and the U.S. Fish and Wildlife Service] under the Endangered Species Act”. As currently proposed, power plants with a DIF  $\geq$  50 MGD must submit to the permitting authority the results of several studies within six months of the effective date of the rule. These studies pertain to CWIS design (existing and proposed possible changes), and physical and biological characterizations. It is anticipated that most of the characterization information will be information that has already been collected in earlier studies.

# ***St. Clair-Detroit River System Initiative***

## **BRIEFING ITEM**



January 20, 2014

Name: David Mifsud

Agency: Herpetological Resource and Management, LLC (HRM)

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Title: Amphibian and Reptile Project Updates

Update: HRM has continued to work on a number of innovative projects in the past year within the HEC. The Michigan Herp Atlas online database developed in 2012, integrated another useful and innovative feature of a smartphone app which allows for real time data collection right from the field. We feel this feature will significantly increase the amount of data collected throughout MI. This project has become the most compressive database on the distribution of all species of amphibian and reptile in Michigan and the Great Lakes region! Our goal is 250,000 amphibian and reptile records by end of 2014. We will continue to encourage agencies, researchers, and conservation organizations to provide data directly to the MI Herp Atlas and partner with us on this project.

We are working with the St. Clair Community Foundation to conclude wildlife monitoring (amphibian, reptile, bird, and aquatic macroinvertebrate) associated with a restoration project in the Upper St. Clair River. We also helped design habitat structures including the creation of Mudpuppy habitat, hibernacula, basking areas, and nesting sites. HRM will be involved in continued habitat restoration along this corridor of the St. Clair River assisting with design and establishment of baseline data on target wildlife associated with a wetland restoration for St. Clair County. Other projects for 2014 include the monitoring of amphibians and reptiles associated with Lake Erie Marsh habitat restoration. In 2013, we concluded amphibian and reptile monitoring on Belle Isle associated with the Blue Heron Lagoon and South Fishing Pier habitat restoration. Highlights and recommendations for corrective measures and overall continued habitat improvements were provided.

HRM is actively wrapping up Michigan's first statewide Best Management Practices Manual focused on Amphibians and Reptiles for the Michigan Department of Environmental Quality. This will be the first of its kind in Michigan and an important

resource on reducing impacts to herpetofauna as well as providing resources and design concepts to restore and improve habitat for these imperiled indicator species.



Photo 1: Construction of reptile hibernacula and nesting area along St. Clair River.



Photo 2: Hibernacula and nesting construction complete.

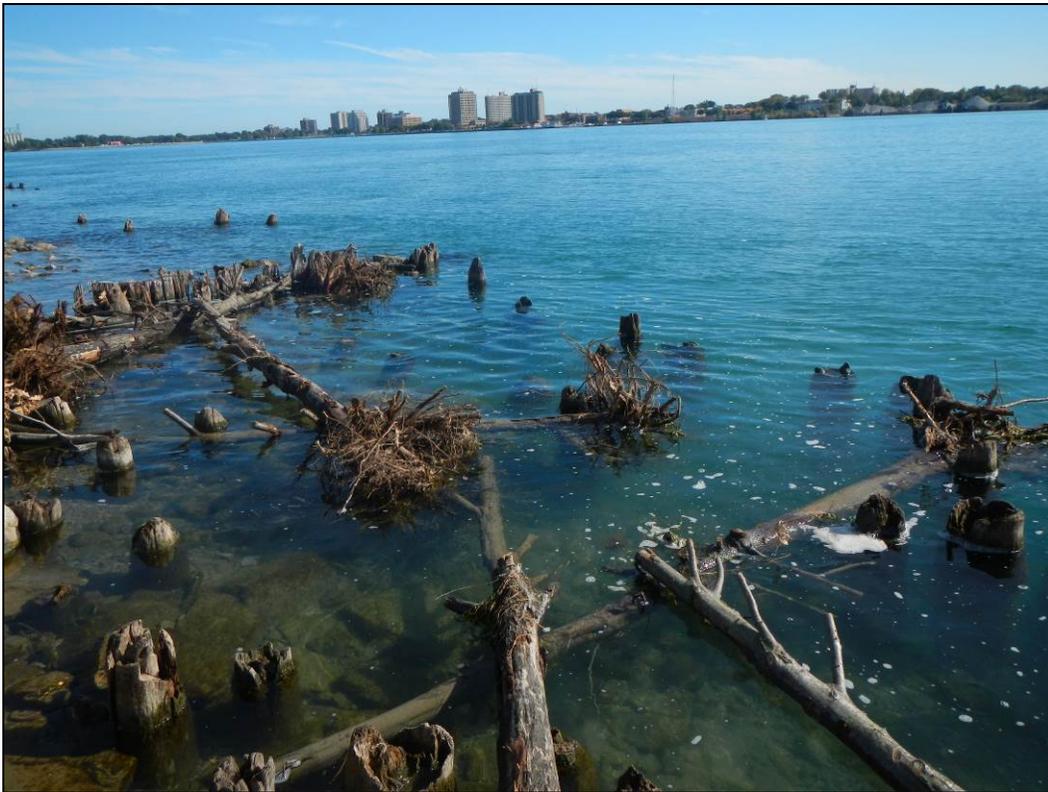


Photo 3: Reptile basking logs and fish cover along St. Clair River.



Photo 4: Mudpuppy and small fish habitat along St. Clair River shoreline.

# ***St. Clair-Detroit River System Initiative***

## **BRIEFING ITEM**



February 5, 2014

Name: Doug Pearsall

Agency: The Nature Conservancy in Michigan

Briefing Item Type: Information

Permission to post on HECI Website: Yes

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Title: Erie Marsh Restoration: A comeback story in progress.

Update: Major wetland restoration underway.



The time has finally come for Erie Marsh, a 2,217-acre expanse of coastal wetlands, containing eleven percent of Southeastern Michigan's remaining marshlands. The Nature Conservancy – led by Restoration Director of Michigan, Chris May – is collaborating with the Erie Shooting and Fishing Club, Ducks Unlimited, and Michigan Department of Natural Resources to launch the first phase of its multi-year plan to reconnect Erie Marsh Preserve to Maumee Bay and Lake Erie. This plan was made possible through a 2.6 million dollar grant from the National Oceanic and Atmospheric Administration's Great Lakes Restoration Initiative. The project started in December, with one goal in mind: improve the overall health and productivity of the wetlands within the bay with hopes of a rewarding outcome.

One of the biggest struggles Erie Marsh faces is being so close to cities like Detroit and Toledo. Erie Marsh endures uncontrollable factors from the cities such as sedimentation, nutrient inputs which cause changes in water quality, and hardening of shorelines. However, there are controllable factors that have been put in place to improve and restore Erie Marsh.

An integral player in the restoration project is the Erie Shooting and Fishing Club. The club donated the property to the Conservancy in 1978, while retaining hunting and fishing rights. The club's directors and members have remained involved and conscious of problems on the marsh such as invasive species control and wetland erosion.

During the 1940s, the Erie Shooting and Fishing Club constructed multiple dikes around the marsh to control water from the bay into the wetlands. As the years progressed, dikes were built covering more than 1,000 acres of the marsh. The dikes were a controversial issue at the time. Although dikes provided control over the amount of water flowing into the wetlands, the dike segregated Erie Marsh from Maumee Bay. As the dikes have degraded since the 1940s, part of the restoration project is to build a sufficient passageway for native aquatic species to enter and exit through the marsh. As Chris May simply puts it, "diked wetlands that have been segregated from natural waters for decades can still be reconnected and be beneficial for native aquatic species." The project consists of constructing a large fish passageway structure, with two four-foot diameter openings that lead into a 258-acre open-water area on the south end.

The restoration project consists of constructing a large double-dike distribution canal connecting the management units of the marsh. Within the canal, water is able to rise to a level above the management units, meaning it can be distributed by gravity versus electricity or fuel-powered pumps. Future plans on the marsh include extending the water distribution to the preserve's northern end.

Pumping will be needed occasionally, and the Conservancy plans on replacing the diesel driven pump and purchasing a modern pump that will flow up to 12,000 gallons per minute and will pump in both directions. This makes it useful for conservation staff to independently manage specific units throughout the marsh.

The restoration project also focuses on the control of invasive and native species. Invasive species (aquatic and terrestrial) cause problems at the marsh. In particular, Phragmites (common reed) poses harmful threats to both land and water. Originally from Asia, Phragmites can grow up to fifteen feet tall and tends to create monocultures which block out sunlight and the struggle for existence for native species is at risk.

"In my opinion, Phragmites is the most devastating invasive species in the entire Great Lakes area," says May. "Plenty of research shows that common reed reduces the diversity of native fish, birds, insects, and crustaceans. The thatches decompose much more slowly, which actually raises the elevation of the marsh and can completely change the local hydrology."

An effective method to control the Phragmites is to spray it with herbicides, remove the standing dead material, and then flood the area with at least three feet of water. The future pumps and shored up dikes will allow staff to control and manage flood affected areas without causing damage elsewhere. May is currently collaborating with local, state, and national partners to develop a state-wide management plan to control Phragmites. Without the help of our partners, the restoration project would not have been able to overcome all of the obstacles Erie Marsh faces. Working together, communicating with one goal in mind: the comeback of Erie Marsh. –

See more at: <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/michigan/explore/restoration-of-the-erie-marsh.xml#sthash.PmLKvySd.dpuf>

Also, a youtube video here: [Restoring Erie Marsh](#)

# St. Clair-Detroit River System Initiative

## BRIEFING ITEM



February 5, 2014

Name: Doug Pearsall

Agency: The Nature Conservancy in Michigan

Briefing Item Type: Information

Permission to post on HECI Website: Yes

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Title: Western Lake Erie Coastal Conservation Vision

Update:

The goal of the Western Lake Erie Coastal Conservation Vision Project is to create a shared regional vision translated through a mapped suite of conservation priorities, which provide multiple complementary benefits for people and nature. The project will engage multi-sector stakeholders throughout the western Lake Erie coastal region; restore and conserve important lands and waters faster, smarter, and more effectively; and inform decision-making around coastal conservation, development, planning, and zoning strategies.

In Year 2 of the project, we successfully:

- Continued to build on regional foundational conservation plans, including the Lake Erie Lakewide Management Plan (LAMP)<sup>1</sup>, the Lake Erie Biodiversity Conservation Strategy (LEBCS)<sup>2</sup>, regional migratory bird research<sup>3</sup>, and Lake Erie islands biodiversity analysis<sup>4</sup>.
- Refined conservation targets and goals developed in partnership with numerous stakeholders.
- Acquired data to spatially represent the identified targets and goals, and using spatial-optimization software (Marxan<sup>5</sup>), developed first iteration maps of priority areas for investment (DRAFT example in Figure 1).
- Completed early one-on-one meetings with conservation leaders, through which, we are further vetting the project approach, data sets, and early maps of priority areas to better represent where land and water protection, coastal development, and novel funding and partnership opportunities can potentially occur.
- Continued to implement and pursue on-the-ground restoration in key areas throughout the western Lake Erie region.

<sup>1</sup> **Lake Erie Lakewide Management Plan (LAMP):** [www.epa.gov/lakeerie/lamp2000/](http://www.epa.gov/lakeerie/lamp2000/)

<sup>2</sup> **Lake Erie Biodiversity Conservation Strategy (LEBCS):**

[www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/michigan/Pages/lakeerie.aspx](http://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/michigan/Pages/lakeerie.aspx)

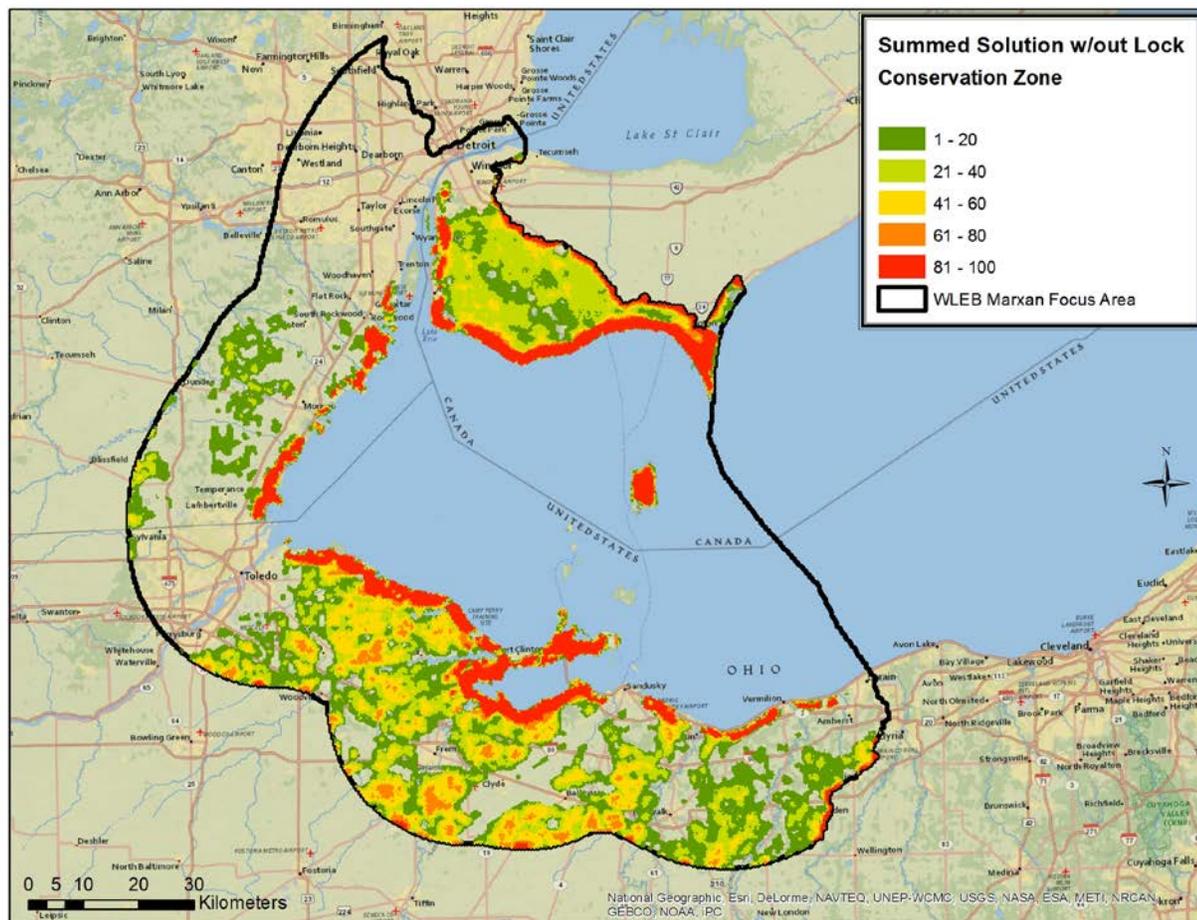
<sup>3</sup> **Regional Migratory Bird Research:** <http://glmigratorybirds.org/resources.html#>

<sup>4</sup> **Lake Erie islands biodiversity analysis:**

[www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/michigan/projects/migratorybirds/Pages/Islands-of-Life.aspx](http://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/michigan/projects/migratorybirds/Pages/Islands-of-Life.aspx)

<sup>5</sup> **Marxan:** [Produced by the University of Queensland and accessible here: http://uq.edu.au/marxan/](http://uq.edu.au/marxan/)

What's more, in addition to maps of ecological conservation targets, we are compiling data that illustrate *socioeconomic* targets such as the places people value for water quality protection (wellhead protection or source water intake areas); places people like to visit (parks, beaches, trails, cultural sites); and places people value for fishing, bird watching, and hunting. We are planning to facilitate group stakeholder meetings in early 2014 to review the stakeholder-informed "first cut" versions of the maps through which we will gain the feedback needed to confidently produce a map of conservation investment opportunities that also address practical challenges of implementation (regulatory, political, funding) in key areas. After these meetings are complete, we will produce the final maps and data sets.



**Figure 1. Early DRAFT map of coastal conservation priorities in western Lake Erie. Colors indicate the frequency of selection of each area out of 100 runs of the spatial optimization software Marxan. Higher frequency of selection indicates greater importance for conservation of coastal biodiversity targets including: coastal wetlands, coastal terrestrial systems, aerial migrants, and islands. A parallel analysis is being completed for aquatic conservation targets including the nearshore zone, connecting channel (Detroit River), and native migratory fish. These maps will be vetted with many partners and stakeholders in early 2014.**

# St. Clair-Detroit River System Initiative

## BRIEFING ITEM



February 5, 2014

Name: Rose Ellison

Agency: US EPA – Great Lakes National Program Office

Briefing Item Type: Information

Permission to post on HECI Website: Yes

**Title:** Update of US EPA’s on-going and planned activities in the SCDRS

**Update:** EPA is continuing to focus on the removal of impairments to beneficial uses (BUIs) in the St. Clair River and Detroit River AOCs, and management actions regarding Lake St. Clair. The information presented below provides a description of current and future actions.

### St. Clair River AOC

BUI	Status	Future actions
Tainting of Fish and Wildlife Flavor	Re-designated, 2011	n/a
Restrictions on Dredging Activities	Re-designated, 2011	n/a
Degradation of Aesthetics	Re-designated, 2012	n/a
Added Costs to Agriculture or Industry	Re-designated, 2012	n/a
Bird or Animal Deformities or Other Reproductive Problems	MDEQ completed initial assessment, 2012 BUI determined to be unimpaired. MDEQ forage fish sampling summer 2013, results expected Spring 2014. Canada’s assessment is complete but doing additional collection of observational data in July 2014.	Expect to change status of BUI to unimpaired by Dec. 2014 depending on forage fish results. US removal should be drafted by the time Canada completes observational study so that the BUI can be removed at the same time in US and Canada.
Degradation of Benthos	MDEQ review of available benthos data complete. Benthic studies obtained by the BPAC, literature search and studies analyzed by DEQ indicate that benthos is not impaired on the US side.	Gain concurrence from BPAC and EPA to change status of BUI to unimpaired on the US side.
Beach Closings	Port Huron CSO elimination by 2015, Chrysler Beach TMDL 2018.	MDEQ to begin assessing change in status to not impaired for this BUI.
Restrictions on Fish and Wildlife Consumption,	Currently under assessment by MDCH.	<ul style="list-style-type: none"> <li>• If assessment shows no impairment, convene technical review committee to re-designate BUI .</li> <li>• If impaired, determine whether impairment caused from inside or outside AOC</li> </ul>
Restrictions on Drinking Water Consumption or Taste and Odor Problems	Determine local criteria appropriate for BUI removal.	<ul style="list-style-type: none"> <li>• Document trans-border notification procedures and PEAS system changes;</li> <li>• Document status of bi-national industry and regulatory efforts to prevent spills.</li> </ul>

Loss of Fish and Wildlife Habitat	Revised plan for removal of Fish & Wildlife BUI completed, 2012.	2014/15, complete design and restoration for all target habitat sites in revised Fish & Wildlife plan: <ul style="list-style-type: none"> <li>• In-river spawning reefs</li> <li>• Port Huron – South site</li> <li>• Upper St. Clair River Shoreline</li> <li>• Cuttle Creek</li> <li>• Cottrellville Twp Shoreline</li> <li>• Marine City Drain</li> <li>• Harsens Island Habitat Restoration</li> </ul>
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## Detroit River AOC

BUI	Status	Future actions
Restrictions on Drinking Water Consumption or Taste and Odor Problems	Re-designated, 2011	n/a
Tainting of Fish and Wildlife Flavor	Re-designated, 2013	n/a
Fish Tumours and other Deformities	MDEQ collected and analyzed 21 bullhead for tumors and found none. Awaiting final USGS report on tumors from 2011-2012 study.	Future actions dependent on results of USGS report.
Degradation of Aesthetics	MDEQ completed assessment, 2012. BUI remains impaired. MDEQ working w/Ed Levy Co. to remediate one identified source.	Follow up assessment of CSO contribution to impairment.
Restrictions on Fish and Wildlife Consumption	MDCH assessment determined fish consumption advisories more restrictive than non-AOCs.	Study contaminants in fish tissue from AOC compared to control site.
Bird or Animal Deformities or Other Reproductive Problems	MDEQ completed assessment, 2012. BUI remains impaired.	Bald eagles, forage fish and colonial nesting birds to be sampled in 2014.
Degradation of Benthos	In 2013 six target contaminated sediment sites were identified.	<ul style="list-style-type: none"> <li>• Harbortown Shoreline – site characterization, 2015</li> <li>• Riverbend Area – site characterization, 2014</li> <li>• River Rouge/Ecorse Shoreline - site characterization, 2013</li> <li>• Mid/Lower Trenton Channel- site characterization, 2014</li> <li>• Celeron Island Area - site characterization, 2013</li> <li>• Upper Trenton Channel - Remedial Design, 2014/2015</li> </ul>
Loss of Fish and Wildlife Habitat & Degraded Fish and Wildlife Populations	<ul style="list-style-type: none"> <li>• Restoration actions at Blue Heron Lagoon, South Fishing Pier, and USS site, complete.</li> <li>• Feasibility study underway on Stony and Celeron Islands.</li> <li>• Drafting revised plan for removal of Fish &amp; Wildlife BUI.</li> </ul>	<ul style="list-style-type: none"> <li>• Initiate habitat restoration actions for Lake Okonoka habitat project, and Milliken State Park habitat restoration project in 2014.</li> <li>• Continue design and construction of reef projects, 2014/2015.</li> <li>• Finalize revised plan for removal of Fish &amp; Wildlife BUI, 2014.</li> </ul>
Restrictions on Dredging Activities	MDEQ completed assessment, 2011. BUI remains impaired.	See Degradation of Benthos
Beach Closings	Impaired	TBD

## Lake St. Clair

On June 4, 2013, Macomb County, Macomb Community College and Wayne State University announced the Huron to Erie Alliance for Research and Training (HEART) – Freshwater Center. The HEART Center will be based at Lake St. Clair Metropark and will feature a permanent classroom and a mobile laboratory in a large trailer. The center will provide opportunities for students, faculty and others to conduct research and learning opportunities focused on urban freshwater systems.

<http://www.heartfreshwatercenter.org>

On June 14, 2013, USACE granted final approval to the Lake St Clair Strategic Implementation Plan

(SIP). The plan is significant because it takes the general recommendations and goals contained in the 2005 Comprehensive Management Plan for Lake St. Clair and provides a structure for Lake St Clair stakeholders to move forward with specific restoration projects. It is also provides a means to access the \$20M authorized under WRDA 2007 for implementation of the Comprehensive Management Plan. In August 2013, Southeast Council of Governments (SEMCOG) held a Lake St. Clair SIP meeting with partners to discuss next steps for evaluating Management Plan projects for funding.

In July 2013, staff at the MDNR Lake St. Clair Fisheries Research Station completed spring index trap net and trawl surveys in Anchor Bay. Species diversity and composition were typical for both surveys. An experimental juvenile lake sturgeon gill net survey was also completed in July. In early August, 138 fish (8 species total) were collected for VHS surveillance at MSU. Most recently, the RV Channel Cat has been trawling for sturgeon in the area of the lake southeast of Huron Point. This effort is part of an ongoing lake sturgeon assessment project.

The State of Michigan has identified 7 parcels comprising 78 acres of land suitable for restoration in the Salt River Marsh near Anchor Bay in Lake St. Clair. USACE has received \$75,000 in GLRI funds to identify the feasibility of habitat restoration and soft shoreline engineering along the shoreline and shallow water environments.

### Coordinated Science and Monitoring Initiative

In 2014, US EPA will be conducting a Costal Conditions Assessment of the SCDRS as part of the 2014 Lake Erie year-of- intensive-monitoring under the Coordinated Science and Monitoring Initiative (CSMI). The Costal Conditions Assessment will define assessment objectives and general design requirements, define target populations and a representative “frame” to be sampled, use statistical design survey methodology to select a representative sample population, and sample with selected measurements to characterize conditions. The Assessment will conclude with a synthesis of overall conditions based on data analysis and statistical summaries of the target populations. US EPA plans to coordinate with SCDRS partners in developing the target population “frame” and set of measurements/indicators.

# **St. Clair-Detroit River System Initiative**

## **BRIEFING ITEM**



January 20, 2014

**Name:** Justin Chiotti, Andrew Briggs, James Boase, and Margaret Hutton

**Agency:** U.S. Fish and Wildlife Service Alpena FWCO – Waterford Substation

**Briefing Item Type:** Information

**Permission to post on HECI Website:** Yes

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**Title:** Adult Fish Community Assessments Associated with the Reef Projects in the St. Clair-Detroit River System

**Methods:** The U.S. Fish and Wildlife Service (Service) has been deploying gill nets to monitor the adult fish community before and after the construction of reefs within the St. Clair-Detroit River System. Experimental gill nets have been fished once per week in the spring and early summer (April through June) and fall (November, December) at several locations in the St. Clair and Detroit Rivers. Locations in the St. Clair River include: the Middle Channel Reef, North Channel Control Site, Hart’s Light Reef, and Algonac Reef. Locations in the Detroit River include the Fort Wayne Reef. An overview of assessment effort can be viewed in Table 1. Two to three gill nets were set at each location. Gill nets consisted of mesh sizes ranging from 75 to 150 mm in 12.5 mm increments with each net having 14 panels (2 of each mesh size). Nets dimensions were 2 m tall x 7.6 m panels x 14 panels (with randomly placed mesh sizes) for a total length of 106 m. Common biological metrics were collected from each fish species along with genetic samples and aging structures from select sport fish.

Adult lake sturgeon and the benthic fish community have also been assessed at the Hart’s Light Reef in the St. Clair River and the Fort Wayne Reef in the Detroit River. An overview of assessment effort can be viewed in Table 2. Setlines were deployed to assess the adult fish community, while minnow traps were used to collect small benthic fish present at the reef sites. Setlines consist of a single solid braided nylon rope 150 m in length with 25 size 9/0 and 25 size 1/0 stainless steel hooks spaced at 3 m intervals along the line. Hooks were baited with frozen, dead round gobies. Three galvanized round minnow traps with 30 mm openings were attached to the setlines. Setlines were attached to upstream and downstream anchors marked by surface buoys.

### **Results:**

**Spring Gill Net Sampling:** Spring gill net catch per unit effort (CPUE) in hours, total number of fish captured, sampling dates, and water temperature at each reef location can be viewed in Table 3. Species richness was highest at the Middle Channel Reef site (20), followed by North Channel Control (17), Algonac Reef (13), and Hart’s Light Reef (11). Species richness was likely lower at the Algonac Reef and Hart’s Light sites because sampling just began at these sites in 2013, while the other sites have been

sampled for several seasons. Lake sturgeon have been captured at the North Channel Control site, Middle Channel Reef, and Algonac Reef sites, however CPUE was greatest at the North Channel Control site. At the North Channel Control site 11 lake sturgeon have been captured with the majority of these fish being juveniles. Northern madtom have been captured at the North Channel Control site, Middle Channel Reef site, and Algonac Reef site. However, it should be noted that the gill nets used in these assessments are not effective at sampling northern madtom due to their small size. Walleye have been captured at all sites, with the highest CPUE at Hart's Light (0.141 fish/hr), which was twice as high as any other site during all years. White sucker have also been collected at every site with similar CPUE values. Information regarding other fish species can be found in Table 3.

Eleven fish species were captured at the Fort Wayne Reef site in the Detroit River in the spring of 2013. No lake sturgeon or northern madtom were captured in gill nets at this site. Walleye CPUE was 0.658 fish/hr, nearly five times higher than the highest walleye CPUE observed in the St. Clair River. Information regarding other fish species can be found in Table 3.

Fall Gill Net Sampling: Fall gill net (CPUE) in hours, total number of fish captured, sampling dates, and water temperature at each reef location can be viewed in Table 4. Species richness was highest at the North Channel Control site (20), followed by the Middle Channel Reef site (17), Algonac Reef site (8), and Hart's Light Reef site (5). Species richness was likely lower at the Algonac Reef and Hart's Light sites because sampling just began at these sites in 2013, while the other sites have been sampled for several seasons. Lake sturgeon have been captured at the North Channel Control site and at the Middle Channel Reef site, however CPUE was greatest at the North Channel Control site. At the North Channel Control site, 9 lake sturgeon have been captured with the majority of these fish being juveniles. Northern madtom have been captured at the North Channel site and Middle Channel Reef site. However, it should be noted that the gill nets used in these assessments are not effective at sampling northern madtom due to their small size. Walleye and white sucker have been captured at all sites with similar CPUE values during all years. Information regarding other fish species can be found in Table 4.

Eight fish species were been captured at the Fort Wayne Reef site in the Detroit River in the fall of 2012. No lake sturgeon have been captured at this site, however one northern madtom has been captured. Walleye CPUE was 0.105 fish/hr. Information regarding other fish species can be found in Table 4.

Pre/Post Reef Gill Net Comparisons: Comparisons pre and post reef construction can only be made at the Middle Channel Reef site. Prior to reef construction, 20 fish species were documented at the reef construction site. Since construction two additional fish species have been documented at this site, channel catfish and logperch. Target species, walleye, white sucker, and redhorse sucker (golden redhorse, shorthead redhorse, and silver redhorse) CPUE in the spring of 2013 (first spring post-construction) remained similar to 2010, 2011, and 2012 (pre-construction) (Figure 1). CPUE values comparing other fish species pre and post-construction remained fairly stable. Data collection during the spring of 2014 will provide more insight regarding pre and post-construction comparisons.

Spring Setlining and Minnow Trapping: Three adult lake sturgeon were captured at the Hart's Light Reef site in the spring of 2013. One of these fish was identified as a ripe male. No adult lake sturgeon have been captured at the Fort Wayne Reef site during setline assessments in 2012 and 2013. Minnow traps deployed at the Hart's Light Reef site did not captured any fish species, however one crayfish was captured (*Cambarus* spp.). Minnow traps deployed at the Fort Wayne site in 2012 and 2013 captured round goby (18), mudpuppies (3), crayfish (3; *Orconectes* spp.), and northern madtom (1).

Juvenile Lake Sturgeon at the North Channel Control Site: The control site near the head of Russel Island and Pt. Aux Chene seems to be an important area for juvenile lake sturgeon. Between 2011 and 2013 a

total of 22 juvenile Lake Sturgeon (0.020 fish/hr) have been captured at this location ranging in size from 335 – 1122 mm.

2014 Field Work: The Service plans to continue deploying gill nets in the St. Clair River during the spring and fall of 2014. Setline and minnow trap assessments will continue at the Hart’s Light Reef site.

Figure 1. Walleye, white sucker, and redhorse sucker spring gill net CPUE at the Middle Channel Reef site. Vertical dashed line represents pre and post reef construction periods. Data was standardized (4.9 – 14.8 C) to include water temperature ranges sampled during all years.

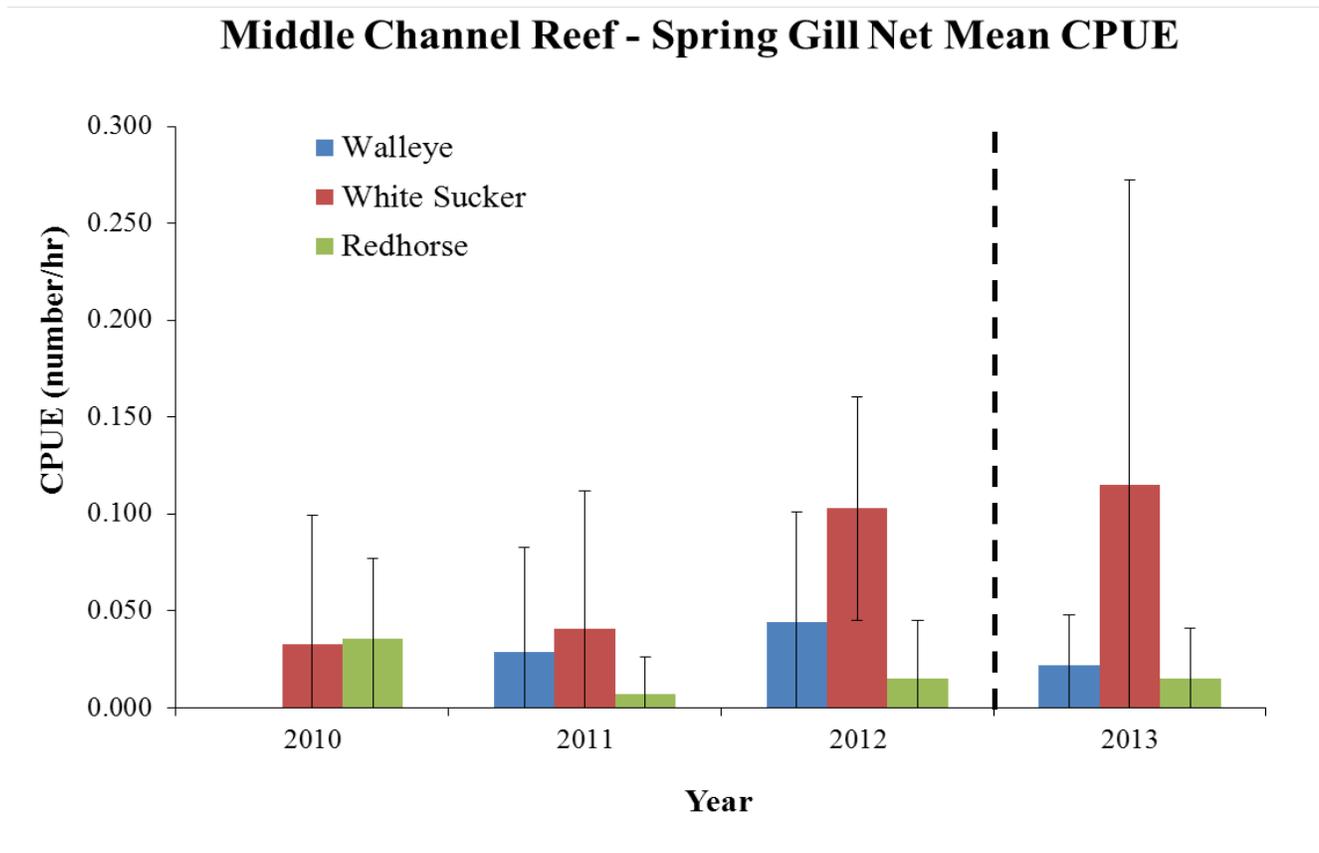


Table 1. Gill net assessment effort associated with the reef construction projects. Effort is reported in hours, number of weeks assessments occurred in parentheses.

<b>Year</b>	<b>Season</b>	<b>Fort Wayne Reef</b>	<b>Algonac Reef</b>	<b>Hart's Light Reef</b>	<b>Middle Channel Reef</b>	<b>North Channel Control Site</b>
2010	Spring	-	-	-	184 (6 weeks)	-
	Fall	-	-	-	-	-
2011	Spring	-	-	-	445 (7 weeks)	266 (5 weeks)
	Fall	-	-	-	135 (2 weeks)	91 2 (weeks)
2012	Spring	-	-	-	113 (2 weeks)	143 (2 weeks)
	Fall	191 (4 weeks)	-	-	219 (4 weeks)	194 (4 weeks)
2013	Spring	304 (10 weeks)	370 (8 weeks)	298 (7 weeks)	403 (8 weeks)	383 (8 weeks)
	Fall	-	237 (5 weeks)	222 (5 weeks)	263 (5 weeks)	249 (5 weeks)

Table 2. Setline and minnow trap assessment effort associated with reef construction projects. Setline effort reported in hook-hours, number of weeks assessments completed in parentheses. Minnow trap effort reported in hours, number of weeks in parentheses.

<b>Year</b>	<b>Fort Wayne Reef</b>		<b>Hart's Light Reef</b>	
	Setline	Minnow Trap	Setline	Minnow Trap
2012	5626 (3 weeks)	367 (3 weeks)	-	-
2013	3992 (4 weeks)	254 (4 weeks)	2601 (2 weeks)	164 (2 weeks)

Table 3. Spring gill net catch per unit effort (CPUE), total number of fish captured, sampling dates, and water temperature at each reef location in the St. Clair and Detroit Rivers.

SPRING GILL NET	St. Clair River							Detroit River		
	North Channel (Control)			Middle Channel				Hart's Light	Algonac	Fort Wayne
Year	2011	2012	2013	2010	2011	2012	2013	2013	2013	2013
Common carp	0.004	-	-	-	-	-	-	-	-	-
Channel catfish	-	-	-	-	-	-	-	0.003	0.003	0.003
Chinook salmon	-	-	-	-	0.007	-	-	-	-	-
Freshwater drum	-	-	-	0.005	-	-	-	-	-	-
Gizzard shad	-	-	0.004	-	-	0.009	-	-	-	0.007
Golden redbhorse	0.004	-	0.004	-	-	0.009	0.012	0.010	0.014	0.003
Lake sturgeon	0.008	0.021	0.016	-	0.002	-	-	-	0.005	-
Lake whitefish	-	-	-	-	-	-	-	-	-	-
Largemouth bass	0.004	-	-	-	-	-	-	-	-	-
Logperch	-	-	-	-	-	-	-	-	-	-
Nothern hogsucker	0.015	-	-	0.016	-	0.009	-	0.007	0.014	-
Northern madtom	0.004	-	-	-	0.002	-	-	-	0.003	-
Northern pike	-	0.007	-	0.021	0.010	0.009	-	-	-	-
Rainbow trout	-	-	-	-	0.002	-	-	-	-	-
Rock bass	0.030	-	0.013	0.026	0.020	-	0.027	0.003	0.024	0.020
Round goby	-	-	-	-	0.002	-	-	-	-	-
Shorthead redbhorse	0.004	-	0.004	0.016	0.005	-	0.016	0.034	0.005	0.026
Silver lamprey	-	-	-	-	-	-	-	-	-	-
Silver redbhorse	0.019	-	0.004	0.037	0.022	-	0.008	0.003	0.014	0.026
Smallmouth bass	-	-	-	-	0.002	-	-	-	-	0.026
Spottail shiner	-	-	-	-	-	-	-	-	-	-
Spotted sucker	-	-	0.004	-	-	-	-	-	-	-
Stonecat	0.015	-	0.013	-	0.018	-	0.016	0.003	0.030	-
Walleye	0.034	0.028	0.029	0.037	0.030	0.044	0.070	0.141	0.043	0.658
White bass	0.038	-	0.038	0.032	0.065	-	0.019	0.007	0.011	0.322
White perch	-	-	-	0.005	0.002	-	-	0.010	0.003	0.115
White sucker	0.083	0.153	0.113	0.042	0.023	0.096	0.132	0.148	0.165	0.023
Yellow perch	-	0.007	-	-	0.007	-	-	-	-	-
<b>Total Fish Captured</b>	69	31	60	45	151	20	77	110	123	374
<b>Dates Sampled</b>	5/11 - 6/21	4/13 - 4/26	4/1 - 6/18	4/19 - 6/8	4/13 - 6/21	4/13 - 4/26	4/1 - 6/18	4/8 - 6/17	4/1 - 6/17	4/2 - 7/1
<b>Water Temperature</b>	9.5 - 16.9	5.8 - 8.3	2.0 - 14.8	8.1 - 18.7	4.9 - 17.4	5.8 - 8.3	1.7 - 14.8	2.0 - 14.8	2.0 - 15.1	3.6 - 21.1

Table 4. Fall gill net catch per unit effort (CPUE), total number of fish captured, sampling dates, and water temperature at each reef location in the St. Clair and Detroit Rivers.

FALL GILL NET	St. Clair River						Detroit River		
	North Channel (Control)			Middle Channel			Hart's Light	Algonac	Fort Wayne
Year	2011	2012	2013	2011	2012	2013	2013	2013	2012
Common carp	-	-	0.004	-	-	-	-	-	-
Channel catfish	-	-	-	-	0.002	-	-	-	-
Chinook salmon	-	-	-	-	-	-	-	-	-
Freshwater drum	-	-	-	-	-	-	-	-	-
Gizzard shad	-	0.010	0.016	0.006	0.009	-	-	-	0.073
Golden redbhorse	0.011	0.004	0.004	0.006	-	0.004	0.010	0.008	-
Lake sturgeon	0.011	0.010	0.024	-	-	0.004	-	-	-
Lake whitefish	-	-	-	-	-	-	-	-	0.005
Largemouth bass	-	-	-	-	-	-	-	-	-
Logperch	-	0.002	-	-	0.002	-	-	-	-
Nothern hogsucker	0.011	0.002	-	0.006	-	-	-	0.013	0.005
Northern madtom	-	0.006	-	-	0.004	-	-	-	0.005
Northern pike	0.011	0.006	-	0.039	0.007	-	-	-	-
Rainbow trout	-	0.002	-	-	-	-	-	-	-
Rock bass	-	0.014	0.004	0.006	0.024	0.011	-	0.013	-
Round goby	-	0.002	-	-	0.002	-	-	0.004	-
Shorthead redbhorse	0.011	0.016	0.040	0.006	-	0.023	0.041	0.008	0.020
Silver lamprey	-	0.002	-	-	-	-	-	-	-
Silver redbhorse	0.011	0.008	0.004	0.013	-	-	0.005	-	-
Smallmouth bass	-	-	-	0.013	-	-	-	0.017	0.037
Spottail shiner	-	0.002	-	-	-	-	-	-	-
Spotted sucker	-	-	-	-	-	-	-	-	-
Stonecat	-	0.006	-	-	0.004	-	-	-	-
Walleye	0.022	0.008	0.012	0.026	0.046	0.011	0.045	0.038	0.105
White bass	-	-	0.004	-	-	-	-	-	-
White perch	-	0.027	-	-	0.004	-	-	-	-
White sucker	-	0.002	0.004	0.013	0.004	0.011	0.005	0.008	0.010
Yellow perch	-	0.002	-	-	-	-	-	-	-
<b>Total Fish Captured</b>	8	65	29	21	52	15	23	26	50
<b>Dates Sampled</b>	11/14 - 11/30	10/11 - 12/6	10/22 - 11/19	11/14 - 11/30	10/17 - 12/6	10/22 - 11/19	10/22 - 11/19	10/22 - 11/19	11/6 - 12/6
<b>Water Temperature</b>	6.0 - 10.0	5.8 - 14.2	7.3 - 13.5	6.0 - 10.0	3.7 - 13.7	7.4 - 13.6	6.7 - 13.5	7.4 - 13.5	5.1 - 6.4

# **St. Clair-Detroit River System Initiative**

## **BRIEFING ITEM**



January 15, 2014

**Name:** Justin Chiotti, James Boase, Margaret Hutton, and Andrew Briggs

**Agency:** U.S. Fish and Wildlife Service Alpena FWCO – Waterford Substation

**Briefing Item Type:** Information

**Permission to post on HECI Website:** Yes

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**Title:** Adult Lake Sturgeon Setline Assessments

**Detroit River Update:** The U.S. Fish and Wildlife Service (Service) has been conducting setline assessments in the Detroit River annually beginning in 2002 to obtain information on adult and subadult lake sturgeon. This data is used to obtain growth information, genetics, distribution, potential spawning sites, and population demographic information. To date, 275 sturgeon have been tagged. Using this mark-recapture data, the estimated population size of adult and subadult lake sturgeon in the Detroit River is near 4,000 individuals. In the spring of 2013, 41 lake sturgeon were captured during setline assessments. Twenty-five of these fish were implanted with transmitters to monitor movement throughout the St. Clair-Detroit River System as part of a larger project funded by the Great Lakes Fishery Trust. Since 2012, 36 lake sturgeon captured in the Detroit River have received transmitters as part of this project.

**Southern Lake Huron Update:** Beginning in 2012 the Service began deploying setlines in the Upper St. Clair River and southern Lake Huron near Port Huron to collect lake sturgeon as part of the Great Lakes Fishery Trust lake sturgeon movement project. Since 2012, 92 adult lake sturgeon have been tagged during these assessments. In the spring of 2013, 28 of these fish were implanted with transmitters to monitor the movement throughout the St. Clair-Detroit River System. Since 2012, 54 lake sturgeon captured in Southern Lake Huron have received transmitters as part of this project.

**Ultrasound:** An ultrasound unit was purchased by the Service in 2012 to evaluate the utility of this gear to determine sex and maturity status of lake sturgeon in the field. The Great Lakes Fishery Trust Lake Sturgeon movement project provided us with the opportunity to test the ultrasound on fish of known sex since a small incision would be needed to insert transmitters. In 2013, ultrasound images were taken of 64 lake sturgeon. Since 2012, ultrasound images have been collected from 134 adult lake sturgeon in the St. Clair-Detroit River System.

**Genetics:** Blood samples and morphological pictures of lake sturgeon were collected from fish that received transmitters in southern Lake Huron. The blood samples and pictures will be used to determine if a distinction can be made between river and lake resident sturgeon.

2014 Field Plans:

The Service plans to continue lake sturgeon mark-recapture assessments in the Detroit River and southern Lake Huron to provide information regarding lake sturgeon demographics and to implant fish with transmitters as part of the Great Lakes Fishery Trust project.

This work is conducted in cooperation with: US Geological Survey Great Lakes Science Center, Michigan Department of Natural Resources, Great Lakes Fish Commission, Ontario Ministry of Natural Resources, and West Virginia University.

# **St. Clair-Detroit River System Initiative**

## **BRIEFING ITEM**



January 15, 2014

**Name:** Justin Chiotti, James Boase, Andrew Briggs, and Margaret Hutton

**Agency:** U.S. Fish and Wildlife Service Alpena FWCO – Waterford Substation

**Briefing Item Type:** Information

**Permission to post on HECI Website:** Yes

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**Title:** Juvenile Lake Sturgeon Assessments in the St. Clair-Detroit River System

**Objectives:**

- 1) Evaluate the efficacy of different gear types used to collect juvenile lake sturgeon in the St. Clair Detroit River System
- 2) Assess the distribution and abundance of juvenile lake sturgeon in the St. Clair-Detroit River System

**Update:** The U.S. Fish and Wildlife Service (Service) has been conducting juvenile lake sturgeon assessments in the St. Clair-Detroit River System (SCDRS) since 2010 evaluating habitat restoration efforts and gaining a better understanding of juvenile distribution and abundance in this system. Juvenile lake sturgeon have been targeted using otter trawls (4.9 and 6.1 m head rope; 3 mm and 32 mm cod end, respectively) and monofilament gill nets (small mesh nets - 25, 38 and 51 mm mesh, 91 m in length; basin wide nets - 114, 203, and 254 mm mesh, 305 m in length).

To date, efforts have included 88, 39, and 93 bottom trawls in the Detroit River, Western Lake Erie, and St. Clair River, respectively for a total sampling area of 375,000 m<sup>2</sup>. Small mesh monofilament gill net effort has consisted of 438 hours (19 sets) in the Detroit River, 638 hours (27 sets) in western Lake Erie, 983 hours (43 sets) in the St. Clair River, and 343 hours (16 sets) in southern Lake Huron. In 2013, we initiated a new sampling protocol (basin wide nets) in the SCDRS targeting larger juveniles 3-15 years in age. Sampling was conducted in western Lake Erie (16 sets, 352 hours of effort) and Southern Lake Huron (16 sets, 356 hours of effort).

From the combined trawl and small mesh gill net effort, six young-of-year (YOY; 134-190 mm) and five juvenile lake sturgeon (325-765 mm) have been captured. Three YOY were captured in a bottom trawl along the east side of Fighting Island in the Detroit River in 2010, two were captured in a bottom trawl near the head of Dickinson Island in 2011, and one was captured in a gill net (38 mm mesh) near the head of Dickinson Island in 2012. There are an estimated 50,000 adult lake sturgeon utilizing the SCDRS, and while good numbers of juveniles over the age of 3 have been observed, different locations and techniques should be considered for the collection of younger age classes.

Using the large mesh gill nets, seven juvenile lake sturgeon (648-886 mm) were captured in western Lake Erie, while no lake sturgeon were captured in southern Lake Huron.

2014 Field Plans: The Service plans to continue juvenile lake sturgeon assessments in the summer of 2014. Juvenile lake sturgeon will be targeted in the SCDRS using small mesh gill nets and setlining. As part of a basin-wide effort targeting juvenile lake sturgeon in Lake Erie, gill nets will be deployed in western Lake Erie near the Detroit River mouth and also near the mouth of the Maumee River.

Assessments conducted in cooperation with: Michigan DNR, University of Michigan, Ontario Ministry of Natural Resources, and U.S. Geological Survey

# St. Clair-Detroit River System Initiative

## BRIEFING ITEM



February 5, 2014

Name: Mark DuFour

Agency: USGS – GLSC (Student Contractor)

Briefing Item Type: Informational

Permission to post on HECI Website: Yes

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Title: Channel specific estimates of larval fish export from the St. Clair and Detroit River system.

### Overview

The St. Clair and Detroit River system is an important spawning and nursery ground for Great Lakes fishes. The system empties into the northwest corner of Lake Erie through a matrix of islands and channels. Unfortunately the lower portion of this system has been drastically altered from its original state through dredging and channelization including the removal of significant shallow water riffle spawning habitat. There are currently five primary channels entering Lake Erie including; Trenton Channel, Sugar Island Cut, Livingstone Channel, Bois Blanc, and Amherstburg Channel. Channel specific estimates of larval fish abundance for ecologically and economically important groups will be helpful in understanding the contribution of this system to Lake Erie fish production. Additionally, this information will help inform managers of the upstream reproductive habitat use for each group.

### Objectives

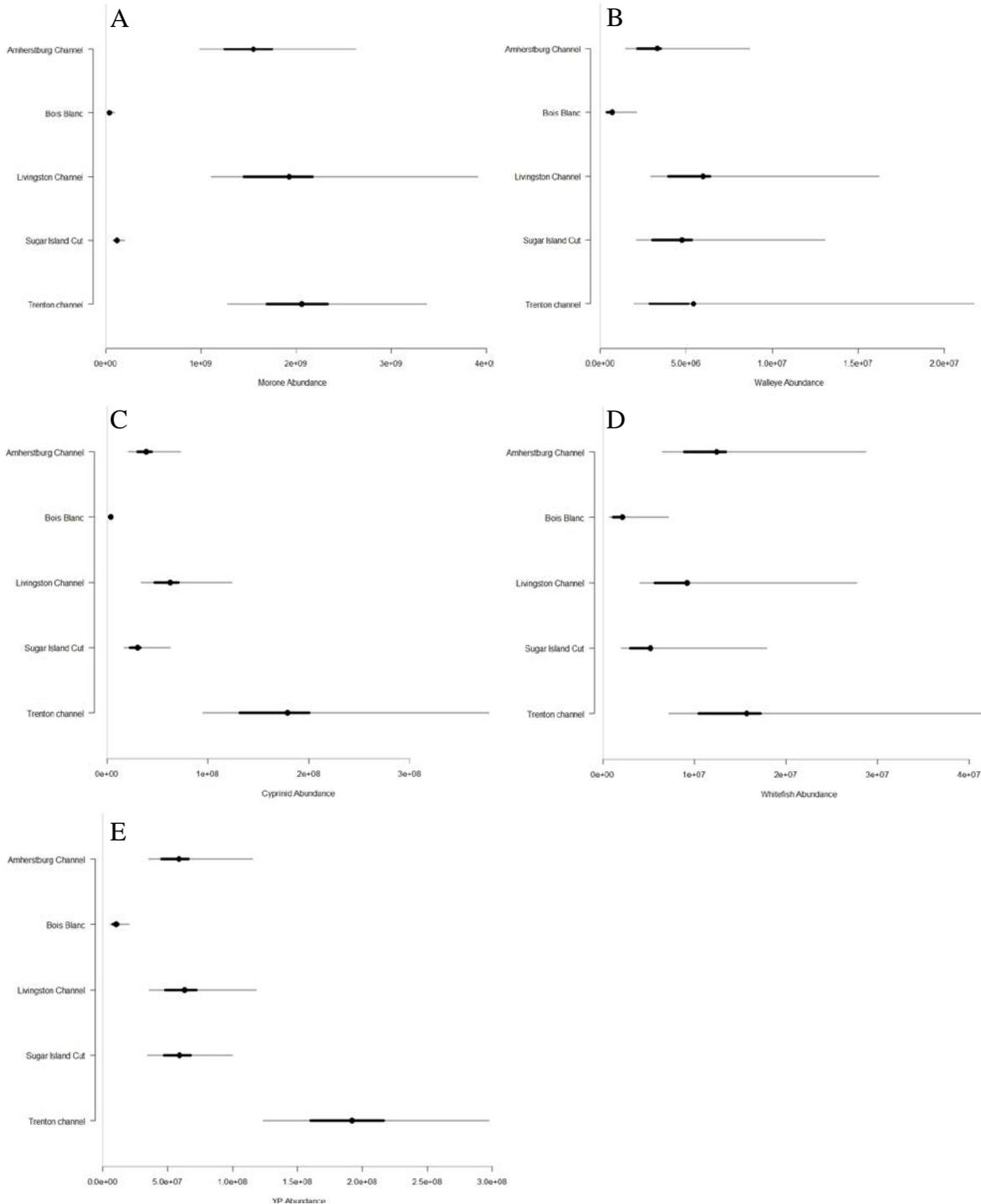
- Estimate 2012 channel specific larval fish abundance for five groups of interest; *Morone* spp., walleye (*Sander vitreus*), *Cyprinid* spp., lake whitefish (*Coregonus clupeaformis*), yellow perch (*Perca flavescens*).

### Results

*Morone* spp. were the most abundant group exported from the system with total abundance estimated at ~5.7 billion fish. Export of *Morone* spp. was greatest from the three largest channels (Trenton, Livingstone, and Amherstburg). The presence of larvae primarily in the largest volume channels indicates that fish may have primarily used upstream spawning habitats (Figure 1A). Total walleye abundance was estimated at ~20.2 million fish, with the highest abundance of fish exported from the western channels (Trenton, Sugar Island, and Livingstone) (Figure 1B). This may indicate substantial spawning habitat use around Grosse Ile. *Cyprinid* spp. abundance was estimated at ~313.1 million fish with more than fifty percent of those exported through the Trenton Channel (Figure 1C). This supports past studies which indicate cyprinids spawn primarily in western bank habitats and tributaries (i.e., Ecorse River and Rouge River). Lake whitefish abundance was estimated at ~44.7 million fish. Patterns in channel specific export were similar to walleye indicating these fish may be using the same spawning habitats (Figure 1D). Finally, yellow perch abundance was estimated at ~383.9 million fish with the majority of these fish exported through Trenton Channel. Similar to *Cyprinid* spp., yellow perch may be using primarily western bank spawning habitats (Figure 1E).

## Future Directions

- Estimate channels specific abundance for the five groups of interest from 2009, 2010, 2011, and 2013.



**Figure 1.** Channel specific abundance estimates of important spawning groups in the St. Clair and Detroit River system; A) *Morone* spp., B) walleye (*Sander vitreus*), C) *Cyprinid* spp., D) lake whitefish (*Coregonus clupeaformis*), and E) yellow perch (*Perca flavescens*). Black dots represent estimated mean values, black bars represent 50 %, and gray bars represent 95% credible intervals.

# St. Clair-Detroit River System Initiative

## BRIEFING ITEM



February 5, 2014

Name: Mary Anne Evans

Agency: USGS Great Lakes Science Center

Briefing Item Type: Information

Permission to post on HECI Website: Yes

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Title: Western Lake Erie *Microcystis* sp. bloom initiation study

Update: The USGS- Great Lakes Science center started data collection in 2013 for a study of seasonal *Microcystis* sp. bloom initiation in the western basin of Lake Erie. Field sampling for this study includes fixed station sampling in the north-west section of the western basin (red pins in the figure) and sampling at variable stations to capture event dynamics. Sampling and analysis are addressing three questions:

1. What are the critical conditions for *Microcystis* bloom initiation?
2. How do river flows and their seasonal timing, wind driven lake currents and seiches, and the physical setting of the Lake Erie western basin combine to influence algal and food web ecology?
3. To what extent are non-HAB phytoplankton species effected by the changing light : nutrient ratios in the Maumee R. and Detroit R. plume mixing zone and along the edges of the Maumee R. plume?

Blooms of the toxic cyanobacteria *Microcystis* in western Lake Erie have been a recurring hazard each summer since their re-emergence in the late 1990s. To predict and ultimately control these blooms, it is necessary to learn the human and environmental conditions that lead to bloom initiation, potential for bloom growth, and the transport of blooms within the lake. This study addresses the conditions that lead to bloom initiation, to improve our ability to predict the risk of blooms in a given week or month. We will also explore the effect of the Maumee and Detroit River plumes on the ecology of the western basin.



**Figure 1:** Proposed sample stations (red) and partner sample locations (green, U. of Toledo, Ohio EPA, Ohio DNR). Additional locations will be sampled by Ohio State University in the south east corner of the western basin.

This study leverages sampling already conducted and planned by university and state partners (green pins in the figure, additional sampling is planned to the east of the current locations) and combined analysis by the research partnership will include measures of bloom size and intensity; meteorological, ecological, and watershed controls on bloom intensity; and ground truthing of remote sensing measurements and simulation model results.

# St. Clair-Detroit River System Initiative

## BRIEFING ITEM



February 5, 2014

Name: Greg Kennedy, Jaquie Craig, Stacey Ireland

Agency: USGS Great Lakes Science Center

Briefing Item Type: Information

Permission to post on HECI Website: Yes

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Title: Egg deposition in the St. Clair – Detroit River System

Update: Objectives: Assess and measure the community composition, phenology, and spatial extent of egg deposition by lithophylic broadcast spawning fishes in the Detroit (DR) and St. Clair (SCR) rivers.

**Milestones:** Intensive longitudinal studies of fish egg deposition using eggmats on natural habitat have been occurring in the DR since 2007 and in the SCR since 2010. Multiple habitat types were sampled in each river including main channels, channel fringes, shallow island margins, rivermouths, and open lake areas. In addition, spawning reefs were constructed in the DR at Belle Isle (2004) and Fighting Island (2008 and expanded in 2013) and in the SCR at Middle Channel (2012). Studies of egg deposition occurred at the reefs sites, and at control sites upstream and downstream, during both pre- and post-construction years. Spring egg collection and rearing focused on walleye, suckers, and lake sturgeon and fall collection and rearing has been lake whitefish. Egg density data are reported as number of eggs/m<sup>2</sup>.

### **Results Overview, 2013**

#### ***Spring***

This spring the full length of the DR was sampled. Eggmats were placed at reef and non-reef areas and the reef areas were for both pre- and post-assessment. Pre-assessment sites were at the heads of Belle Isle and Grassy Island, and Fort Wayne; post-assessment sites were at Belle Isle (2004) and Fighting Island reefs. Non-reef sites included an area just off the seawall at Cobo Hall (Chickenbone), the head of Livingstone Channel, Hole-in-the-Wall, and Sugar Island. Walleye eggs were collected at all sites and comprised at least 98% of the total eggs collected everywhere except at the FI reefs. The greatest densities (eggs/m<sup>2</sup>) of walleye eggs were collected at HIW (63,398), Grassy Island (17,111), and just upstream of the FI reefs (13,437). Sucker eggs were uncommon throughout the river, except on the FI reef (1,250) and just downstream of it (1,460), where they comprised just over 50% of the total eggs collected. No lake sturgeon eggs were collected in the DR in 2013. Average spring riverwide egg density (all sites and species combined) was 12,375 eggs/m<sup>2</sup>. Overall egg density followed trends seen in previous years, in which the DR egg deposition was two orders of magnitude greater than in the SCR.

The sampling sites in the SCR followed the same pre/post-assessment and reef/non-reef design as in the DR. Pre-assessment sites were at Hart's Light and Pointe aux Chenes; post-assessment sites were at

Middle Channel and Mazlinka's reefs. Non-reef sites were located downstream of Port Huron, below St. Clair, and near Algonac. Walleye egg density was greatest at Point Aux Chenes (550) and Hart's Light (278) sites. These sites also had notable sucker egg densities at 34 and 22 eggs/m<sup>2</sup>, respectively, but the greatest sucker egg density (286) was collected at a non-reef site just upstream of the Hart's Light site. Lake sturgeon eggs were collected from Mazlinka's (612), Mid-Channel reefs (27), and one of the Hart's Light eggmats (21). Average spring riverwide egg density was 120 eggs/m<sup>2</sup>.

### ***Fall***

Fall sampling for fish eggs in the DR were in the same geographic areas as spring, except we did not sample at Chickenbone, Fort Wayne, or Sugar Island. All eggs collected were lake whitefish, all sites except Livingstone collected eggs, and the greatest densities were at Grassy Island (997) and downstream of FI (562). Average fall riverwide egg density was 235 eggs/m<sup>2</sup>.

Fall sampling for fish eggs in the SCR was reduced in some non-reef areas so that we could add new pre-assessment sites at Hart's Light. No eggs were collected from any of the fall eggmats in the SCR.

**2014-15 Plans:** Future plans for studying egg deposition as a measure of spawning habitat quality include: DR – pre-assessment at head of Belle Isle and Grassy Island, post-assessment at Fighting Island and Belle Isle (2004) reefs, and continue sampling index stations throughout the river. SCR – pre-assessment at Hart's Light near Marine City and in the North Channel at Pointe aux Chenes, post-assessment of the Middle Channel reef, and continue sampling index stations throughout the river.

# St. Clair-Detroit River System Initiative

## BRIEFING ITEM



February 5, 2014

Name: Ed Roseman

Agency: USGS GLSC

Briefing Item Type: Annual update

Permission to post on HECI Website: [Yes]

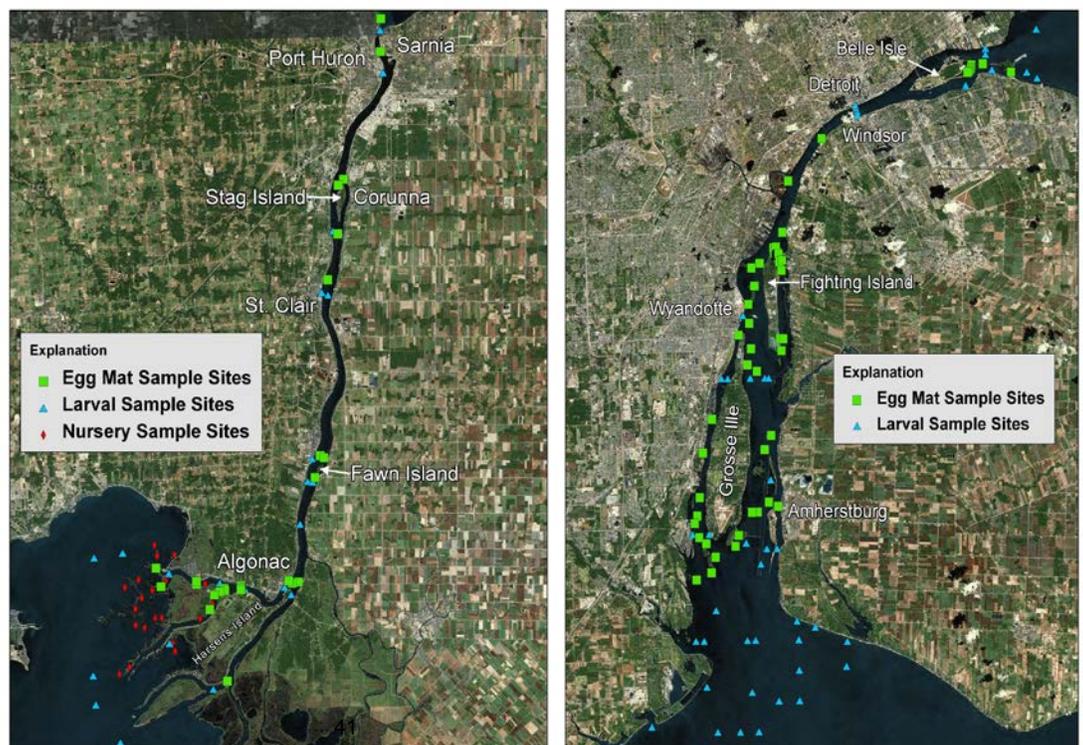
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Title: Larval fish and zooplankton surveys in the St. Clair/Detroit rivers system

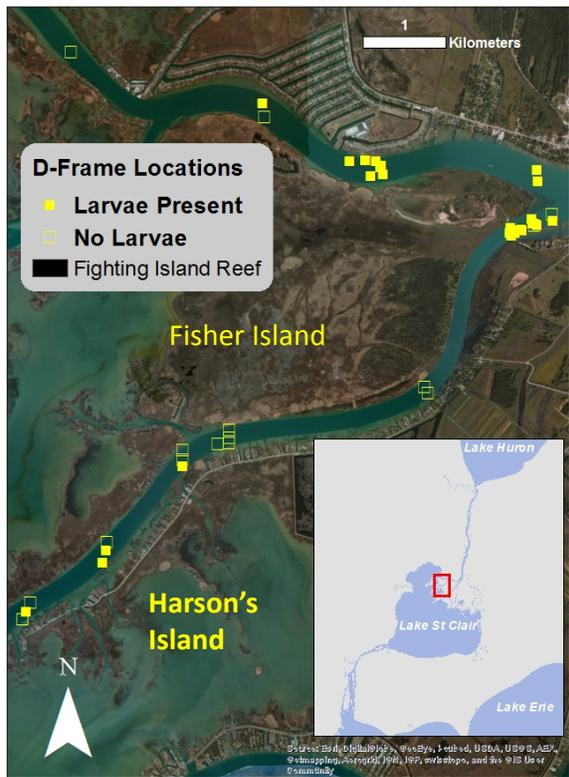
Update: Larval fish were sampled to quantify species composition, abundances, phenology, and production. Daytime bongo sampling was done in both rivers, the SC Delta, and western Lake Erie beginning in spring as soon as ice-out, and continuing through July. Nighttime sampling was conducted using D-frame nets and stratified conical nets to assess larval lake sturgeon drift in the Middle and North channels of the SCR, as well as at the constructed Middle Channel reef. Samples are currently being processed.

Zooplankton samples were collected bi-weekly, then monthly from April through December in both rivers, Lake St. Clair, and western Lake Erie to quantify zooplankton community dynamics. Samples are currently being processed.

Locations of egg mat and larval fish sample sites in the St. Clair (left) and Detroit (right) rivers.



D-frame sample sites for larval lake sturgeon in the St. Clair (left) and Detroit (right) rivers.



# St. Clair-Detroit River System Initiative

## BRIEFING ITEM



February 5, 2014

Name: Jason Ross

Agency: USGS GLSC

Briefing Item Type: Annual update

Permission to post on HECI Website: [Yes]

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Title: Nearshore seining survey in the St. Clair/Detroit Rivers system

Update: We seined at nine sites in the St. Clair and Detroit Rivers to assess nearshore fish communities during late summer (late August – early September). Four sites were located in the St. Clair River, three sites were located in the Detroit River, and one site was sampled in each Lake Erie and Lake Huron (Figure 1). Across the nine sites, we captured 5,025 individuals comprised of 33 species from 11 families. Approximately 60 individuals at site ‘Tiki Bob’ were identified as the endangered species, pugnose shiner (*Notropis anogenus*). Total species richness was greatest ( $> 14$ ) at sites ‘Grosse Ile’, ‘Point Mouillee’, and ‘Tiki Bob’. Sites ‘Trenton’, ‘Lighthouse Park’, ‘Algonac’, ‘Marine City’, ‘Belle Isle’, and ‘Marysville’ had the lowest species richness ( $\leq 10$ ) due to limited habitat complexity.



**Figure 1.** Total fish species richness across nearshore sites in the St. Clair and Detroit Rivers.

# St. Clair-Detroit River System Initiative

## BRIEFING ITEM



February 5, 2014

Name: Mark DuFour and Christine Mayer

Agency: University of Toledo - Lake Erie Center

Briefing Item Type: Informational

Permission to post on HECI Website: Yes

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Title: Estimating larval walleye (*Sander vitreus*) export from the Maumee River

### Overview

Larval fish in large river systems are extremely variable; however estimates of abundance are important for understanding the quality of these systems as reproductive and nursery habitats and their role in population recruitment. Further, estimating larval fish abundance is difficult as logistics often cause sampling to be restricted and incomplete. Therefore, acknowledging and accounting for uncertainty in the estimation process is an important step in providing managers with useful information on temporal trends in larval fish abundance.

### Objectives

- Estimate daily and annual abundance of larval walleye exiting the Maumee River.
- Identify temporal trends in walleye production within and among years.

### Results

Daily temporal trends in walleye production were variable among years (Figure 1). Daily peak production fluctuated from late March (2012) to mid to late May (2011). Daily production patterns from the Maumee River were influenced by discharge and temperature, as lulls in production often occurred during periods of high discharge. Additionally, major shifts in peak production (i.e., 2012) occurred during unseasonably warm regional weather which caused river water temperatures to prematurely spike, initiating an early spawn and hatch. Annual production is also variable, ranging from ~ 13.7 million (2010 most probable value) to ~ 47 million (2013 most probable value) (Figure 2). Although annual production from the Maumee River appears to vary considerably, initial comparison to other Lake Erie tributaries, indicates that Maumee River walleye production is relatively stable.

### Future Directions

- Continue monitoring annual larval walleye production from the Maumee River.
- Compare temporal and annual patterns in production with other major walleye tributary and reef spawning stocks.

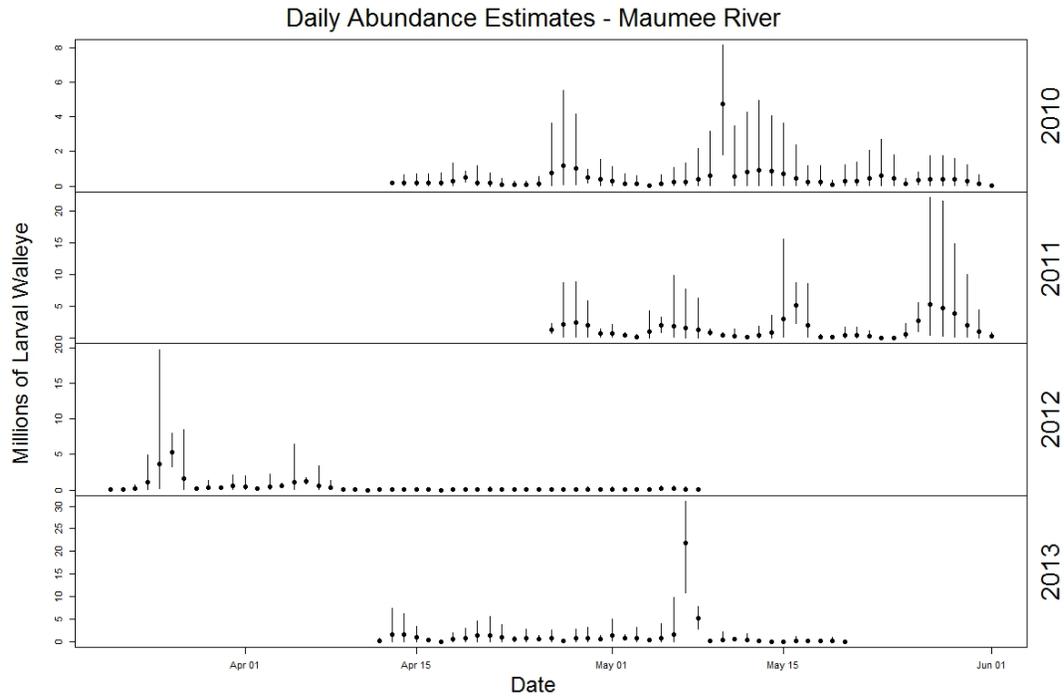


Figure 1. Estimated daily export of larval walleye from the Maume River (2010-2013); mean values (dots) and 95% credible intervals (bars).

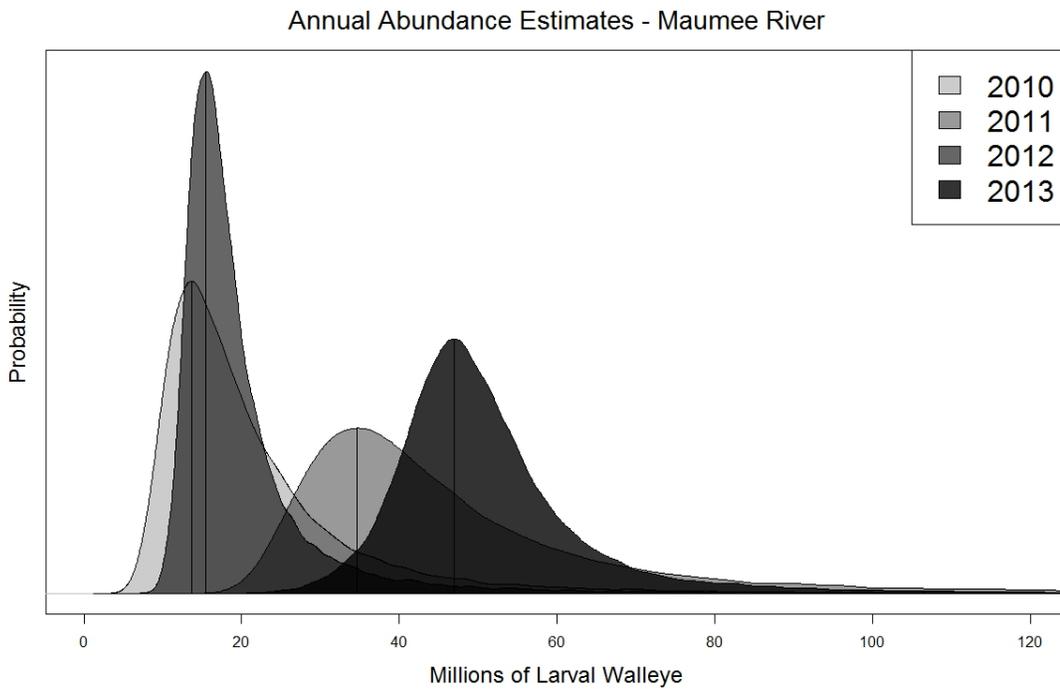


Figure 2. Estimated annual export of larval walleye from the Maume River (2010-2013); distributions display uncertainty in estimates while the peaks of distributions represent most probable values (MPV; vertical lines).

**Names:** Carson G. Prichard<sup>1</sup>, Dr. Thomas Blomquist<sup>2</sup>, and Dr. Carol A. Stepien<sup>1</sup>

**Agencies:** <sup>1</sup>University of Toledo, Lake Erie Center and Dept. of Environmental Sciences, <sup>2</sup>University of Toledo, Dept. of Medicine

**Briefing Item Type:** Information

**Permission to Post on HECI Website:** Yes

**Title:** A New Next-Generation Sequencing Assay to Characterize Fish Communities from Water Samples using Environmental DNA: Application to Restoration Studies

**Rationale:** Informed fisheries management relies on accurate assessment of species identification, composition, and abundance. For rare and endangered species, as well as newly establishing invasive species, effective management depends upon accurate detection and population quantification at low abundances where traditional fish sampling methods often are insufficient. Environmental DNA (eDNA) extracted from sampled water now offers a sensitive proxy for species detection at low abundances, and has been used to ascertain presence of a limited number of fish species. Beyond mere detection, our new assay provides fishery managers with a “community snapshot” to track species presence and abundance spatially and temporally. We are working to apply our new assay in restoration sites, including along the Huron-Erie Corridor (St. Clair-Detroit River System).

**Methods:** We developed a new eDNA assay to detect, identify, and quantify relative abundances of all fish species from a water sample. Included in our assay design are all Great Lakes fish species, as well as all high-risk potential invasive fish species from NOAA’s Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS) watchlist. We developed primers that exclusively amplify a 55 nucleotide diagnostic region of the cytochrome *b* mitochondrial DNA gene of all targeted fishes and PCR conditions were optimized to non-differentially amplify these target markers across all species. To vet the assay in the laboratory, Illumina sequencing libraries were prepared for a series of simulated fish communities containing known, varying concentrations of tissue DNA extractions from 10 representative fish species, including native and high-risk potential invasive species. Observed relative abundances of aligned sequence outputs are highly correlated to relative abundances, confirming the assay’s performance (Fig. 1).

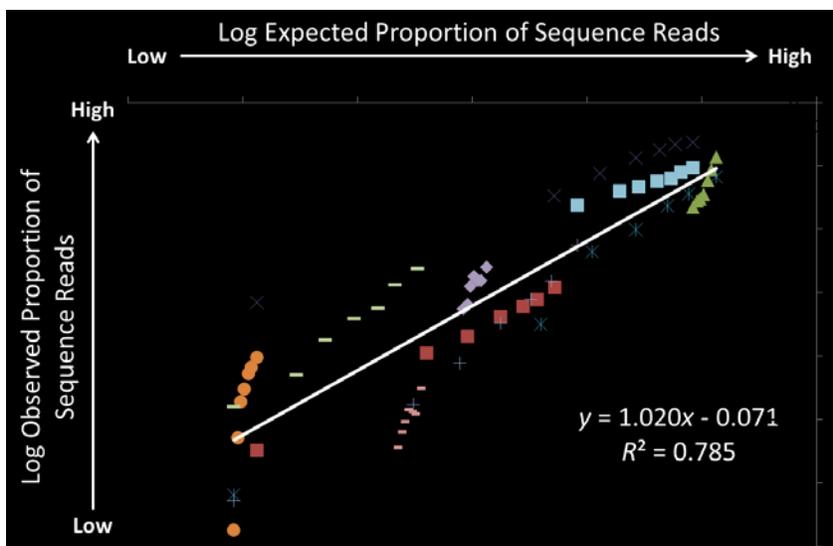


Fig. 1: Assay performance assessed by the observed proportion of sequence Illumina sequence reads assigning to the expected species. For this experiment, seven “simulated fish communities” were prepared by mixing tissue

DNA extractions from each of 10 representative species in known concentrations ranging from 100-10,000 copies/ $\mu$ l. Each symbol corresponds to a single species. The plotted linear regression accounts for all data points

Current directions: Our assay's reliability is being tested using water samples from aquaria with known species presence and abundances. We are ground-truthing results against fish counts from traditional sampling methods (electrofishing and netting) using eDNA from water samples concurrently taken by the Ohio EPA during their fish surveys in 2012. To strengthen species assignments of sequencing outputs from each sample, additional diagnostic markers are being developed from the cytochrome *b* and COI mitochondrial genes, and the RAG1 nuclear gene. To assess the effects of degradation on environmental DNA persistence, multiple "nested" markers of varying amplicon lengths for each diagnostic region are being developed. We additionally are evaluating overlapping regions of successive lengths to determine haplotypes (genetic diversity and variability) of the targeted fishes. We thereby will be able to estimate relative abundances of species in the samples and to calculate genetic diversity.

**Huron-Erie Corridor Initiative**  
(St. Clair-Detroit River System - SCDRS)

**BRIEFING ITEM**



February 5, 2014

Name: Dr. Carol Stepien and Dr. Amanda Haponski

Agency: University of Toledo Lake Erie Center

Briefing Item Type: Information

Permission to post on HECI Website: Yes

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Title: Genetic connectivity and diversity of walleye (*Sander vitreus*) spawning groups in the Huron–Erie Corridor by Haponski and Stepien

Update: Reprint available <http://www.utoledo.edu/nsm/lec/research/glg/publications/1-s2.0-S0380133012002407-main.pdf> J Great Lakes Res (2013), <http://dx.doi.org/10.1016/j.jglr.2012.12.006>

The Huron–Erie Corridor (HEC) connects the upper and lower Great Lakes, providing key fish passage. A century of channelization, dredging, and pollution has led to habitat loss and declining fish numbers. Since 2004, the multi-agency HEC initiative augmented fish spawning habitat at Belle Isle and Fighting Island in the Detroit River, whose populations are examined here. We analyze genetic patterns among seven spawning groups ( $N=311$ ) of walleye *Sander vitreus*, a key fishery species, using nine nuclear DNA microsatellite loci and mitochondrial DNA control region sequences. Results reveal that all spawning groups contained appreciable genetic diversity (microsatellites:  $H_O=0.72$ ; mtDNA:  $H_D=0.73$ ) and showed a mixture of connectivity and divergence. Genetic relationships did not fit an isolation by geographic distance hypothesis, with some closely spaced populations being very different. Notably, the Flint River–Lake Huron spawning group was the most divergent, showing no genetic exchange. The Belle Isle and Fighting Island populations markedly differed, with the latter showing some genetic exchange with the Grosse Ile (Detroit River) and the Huron River (northwest Lake Erie) populations to the south. Walleye spawning at Fighting Island experienced no significant change in overall genetic diversity pre- versus post-habitat augmentation, but the allelic frequency changed. Our results comprise an important baseline for future population analyses and habitat assessment of these habitat augmentation areas. Despite habitat degradation and pollution, it appears that historic walleye spawning groups have persisted along the HEC, meriting continued genetic monitoring and further restoration efforts to conserve and enhance this important and diverse fishery.

**Huron-Erie Corridor Initiative**  
(St. Clair-Detroit River System - SCDRS)

**BRIEFING ITEM**



February 5, 2014

Name: Dr. Carol A. Stepien and Timothy J. Sullivan

Agency: University of Toledo Lake Erie Center

Briefing Item Type: Information

Permission to post on HECI Website: Yes

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Title: Genetic diversity and divergence of yellow perch spawning populations across the Huron-Erie Corridor, from Lake Huron through western Lake Erie, by Sullivan and Stepien

Update: Reprint available at <http://www.utoledo.edu/nsm/lec/research/glg/publications/1-s2.0-S0380133012002389-main.pdf> J Great Lakes Res (2013), <http://dx.doi.org/10.1016/j.jglr.2012.12.004>

The yellow perch *Perca flavescens* supports one of the largest Great Lakes fisheries, whose populations have varied due to environmental changes, including exploitation and habitat degradation. The Huron–Erie Corridor (HEC) connects the upper and lower Great Lakes, running from Lake Huron through the St. Clair River, Lake St. Clair, and Detroit River to western Lake Erie; it serves as an essential fish migration corridor, and contains key spawning and nursery grounds. Its shipping importance led to its extensive channelization and dredging, destroying and degrading habitats. Since 2004, the HEC Initiative has restored some fish spawning and nursery grounds. Our objective is to assess the genetic diversity, connectivity, and divergence of yellow perch spawning populations along the HEC to provide a baseline for assessing future patterns, including responses to improved habitat. Genetic variation of seven spawning populations (N=248), four in the HEC, one in Lake Huron, and two in western Lake Erie, are analyzed at 15 nuclear microsatellite loci. Results showed appreciable genetic diversity of the seven spawning populations (mean observed heterozygosity=0.637±0.020, range 0.568–0.699), which significantly differed in genetic composition ( $\theta_{ST}$ =0.011–0.099, p=0.0001–0.0007), suggesting a history of genetic isolation; relationships did not follow a pattern of genetic isolation by geographic distance. Notably, some nearby spawning populations were very genetically distinctive, with high genetic diversity and high proportions of private alleles, as characterized by the Belle Isle restoration site in the Detroit River. Our study provides a genetic benchmark to assess ongoing and future habitat restoration efforts across the HEC and beyond.