Evaluating Habitat Restoration in the St. Clair-Detroit River System using Egg Deposition on Spawning Reefs and Larval Drift of Native Fishes

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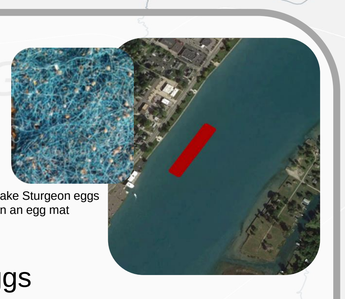
Background

- **Pollution, channelization, dredging, and development in the St. Clair and Detroit Rivers reduced water quality and removed natural spawning substrate for fishes leading to declines in fish populations including lake sturgeon *Acipenser fulvescens.***
- **These losses resulted in designation of portions of the system as a Great Lakes Area of Concern with Beneficial Use Impairments (BUI) related to habitat and population losses.**
- **Improvements to water quality provided opportunities for habitat and population restoration.**
- **Toward this end, artificial reefs are being constructed and monitored through a collaborative multi-agency partnership to delist BUI's within the system.**
- **Assessment and monitoring of egg deposition at reefs has been conducted with egg mats and larval lake sturgeon drift with D-frame nets.**

Pointe aux Chenes Reef

- 1.5 acres constructed in 2014
- Sorted Limestone – 10 to 15 cm



Lake Sturgeon eggs on an egg mat

Survey Results

Pre-assessment began in 2013

- Low density walleye and sucker eggs

Post-assessment began in 2015

- Lake sturgeon eggs captured on the reef averaging 897 eggs/m^2
- Low density walleye and sucker species were captured on reef site

Port Huron North

- Mixed rock
- 0.2 acres total reef area

Harts Light Reef

- 3.8 acres constructed in 2014
- Sorted Limestone – 10 to 15 cm

Survey Results

Pre-assessment began in 2013

- Lake sturgeon eggs were captured in 2013 (21 eggs/m^2) and 2014 (150 eggs/m^2) upstream of the reef site

Post-assessment began in 2015

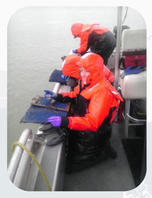
- Lake sturgeon eggs captured on the reef averaging 3,240 eggs/m^2 of egg mat
- Larval drift results from 2015 suggest larval lake sturgeon are actively using the constructed reef
- Other eggs collected on reef include sucker species
- Control egg mats collected walleye, sucker species, and lake whitefish

E Belle Isle Reef

- Will add 2 acres of reef area
- Sorted Limestone – 10 to 15 cm

Pre-assessment

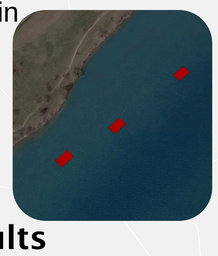
- Eggs collected include walleye, sucker species, and lake whitefish



Crew checking egg mats

Belle Isle Reef

- 0.027 acre area constructed in 2004
- Limestone, fieldstone, and coal cinders



Survey Results

Pre-assessment began in 2004

- Walleye density averaged 91 eggs/m^2 of egg mat

Post-assessment began in 2005

- No lake sturgeon eggs have been collected to date
- Eggs collected include walleye, sucker species, troutperch, and lake whitefish

NE Belle Isle Reef

- Constructed in 2012, part of the Blue Heron Lagoon Habitat Restoration
- Natural rock material

Middle Channel Reef

- 1.0 acre total area constructed in 2012
- Mixed rock and limestone – 10 to 20 cm

Pre-assessment began in 2010

- Walleye eggs were captured in the reef area

Post-assessment began in 2012

- Lake sturgeon eggs were collected in 2012 and 2013
- 2014 season has been the most successful year to date for larval lake sturgeon drift though no eggs were collected on the reef

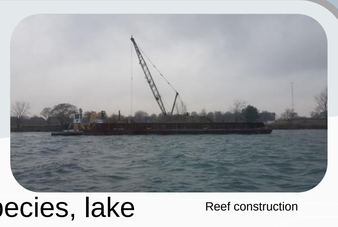
Fort Wayne Reef

- Test reef constructed in 2015

Survey Results

Pre-assessment

- Egg collections include sucker species, lake whitefish and high densities of walleye (5,657 eggs/m^2 of egg mat in 2013)



Reef construction

Fighting Island Expansion

- Constructed in 2013
- 1.2 acre expansion below western third of original FI Reef
- Made of sorted Limestone – 10 to 15 cm

Survey Results

- Sturgeon egg densities averaged 1,382 eggs/m^2 of egg mat in 2014 and 256 eggs/m^2 of egg mat in 2015

Grassy Island Reef

- 4 acres constructed in 2015
- Sorted Limestone – 10 to 15 cm

Survey Results

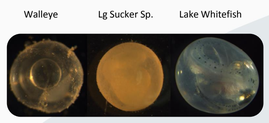
Pre-assessment began in 2013

- Eggs collected include high densities of walleye (1,711 eggs/m^2 of egg mat) and lake whitefish (2241 eggs/m^2 of egg mat)

Post-assessment to begin in 2016

Fighting Island Reef

- 0.81 acre total reef area constructed in 2008
- Shot-rock, sorted limestone, and sorted round stone



Walleye | Lg Sucker Sp. | Lake Whitefish

Lake Sturgeon Eggs

Survey Results

Pre-assessment began in 2007

- Walleye, trout-perch, sucker species, and lake whitefish were collected

Post-assessment began in 2009

- LAS eggs have been collected in 2009-2010, 2012, & 2014-2015 on the western reefs
- Highest density year of LAS was 2012 with 329 eggs/m^2 of egg mat
- Other eggs captured include walleye, sucker species, trout-perch, and lake whitefish

Restoration Sites

- Completed Reefs
- Planned Reefs Under Construction 2016
- Sites Under Evaluation for Reef Placement