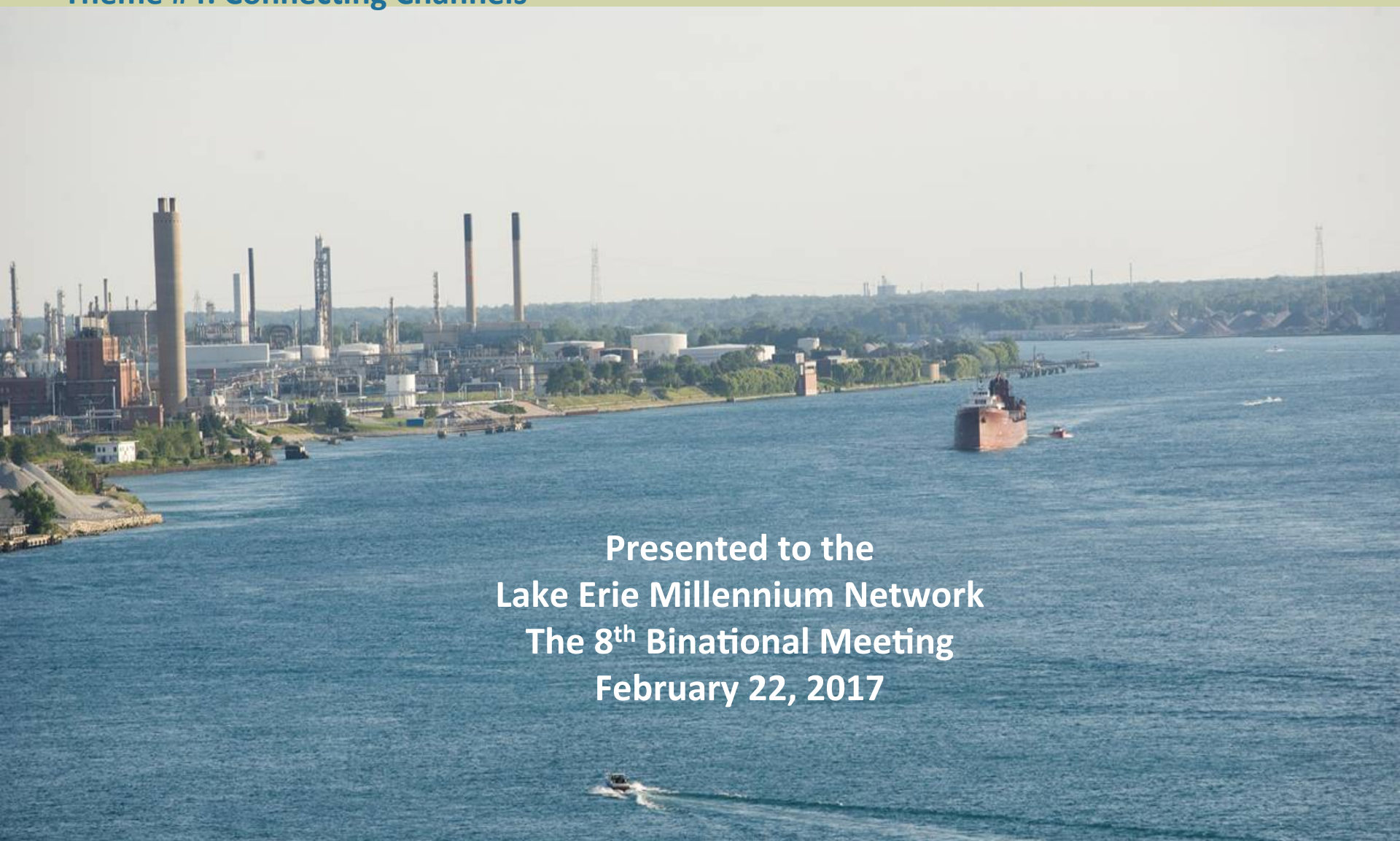


BUI Research and Monitoring in the St. Clair River Area of Concern

Theme #4: Connecting Channels



Presented to the
Lake Erie Millennium Network
The 8th Binational Meeting
February 22, 2017

Status of Canadian BUIs



Impaired

**Restrictions on F & W
Consumption**

Degradation of Benthos

***Restrictions on Dredging**

**Restrictions on Drinking
Water Consumption or Taste
and Odour Problems**

**Loss of Fish and Wildlife
Habitat**

***Beach Closings**

RFA

**Degraded Fish and Wildlife
Populations**

**Fish Tumours or Other
Deformities**

***Bird or Animal Deformities
or Reproductive Problems**

RFA

Not Impaired

**Tainting of Fish and
Wildlife Flavour**

**Eutrophication or
Undesirable Algae**

**Degradation of
Aesthetics**

**Degradation of Phyto/
Zooplankton Populations**

**Added Costs to
Agriculture or Industry**



Monitoring and Studies:

Impaired BUIs

Restrictions on F & W Consumption

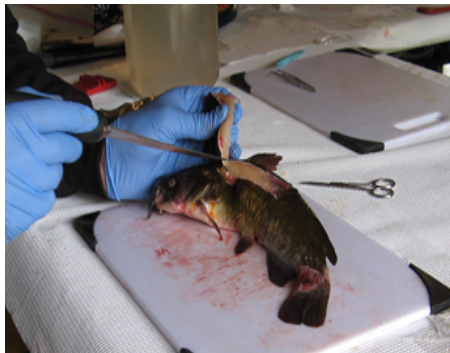
- Provincial Sport Fish Contaminants Monitoring Program.
- Brown Bullhead study to assess contaminant levels for consumption (and Tumour BUI).
- Several wildlife studies measured body burdens.

Degradation of Benthos

- Provincial and federal studies/monitoring of benthos and suspended sediment.
- Academic studies e.g. GLIER

Loss of Fish and Wildlife Habitat

- Wetland health monitoring across the Great Lakes.
- Fish habitat survey in the WIFN delta.



Loss of Fish and Wildlife Habitat

Study and Monitoring Highlights



Fish Habitat Study

- Comprehensive 4 week fish habitat survey in collaboration with Walpole Island First Nation to survey bays and channels.
- Quantify and qualify fish habitat.

Coastal Wetland Monitoring

- Assesses wetland habitat quality using various indices.
- Creates an Indices of Biological Integrity (IBI) score.
- Monitoring since 2006.



Reports: *Loss of Fish & Wildlife Habitat*

Extent of Non-Native *Phragmites australis* in Coastal Wetlands in the Canadian Huron-Erie Corridor

March 2014



 Environment
Canada
Canadian Wildlife
Service

Environnement
Canada
Service canadien
de la faune

Status of Coastal Wetland Habitat in the Canadian Huron-Erie Corridor

March 2014



 Environment
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Canadian Wildlife
Service

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de la faune

Detroit River and St. Clair River Areas of Concern: Coastal Wetland Habitat Assessment Report 2013 Update

March 2014



 Environment
Canada
Canadian Wildlife
Service

Environnement
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Service canadien
de la faune

Determination of Riparian buffers within the St. Clair River AOC Subwatersheds

St. Clair Region Conservation Authority
3/16/2012
Alison Sedler
Maria Strybos
Chris Durand



St. Clair River Shoreline Restoration Report



1

AOC Wetland Assessment 2013



AOC STEWARDSHIP PROJECT DATABASE 1995-2013

St. Clair Region Conservation Authority

BUI Studies and Monitoring



RFA

BUI

Studies or Monitoring

Degradation of fish and wildlife populations

- Provincial monitoring for fish diversity and abundance.
- Federal fish health (body burden/health) studies.
- No formal AOC “wildlife monitoring” program; using data from existing monitoring programs.
- Aboriginal Traditional Knowledge (ATK)

Fish Tumours or other deformities

- Federal studies on Redhorse Suckers and Brown Bullheads.

Bird or Animal Deformities or Reproductive Problems

- Federal studies on 2 aquatic indicator species to assess hatching success and deformity rates.



BUI's: Degradation of Fish & Wildlife Population

Assessment of Wildlife Population Status and Trends at the St. Clair River Area of Concern



Robert Stewart Wetland, St. Clair AOC. Photo by U.S. EPA.

Produced for: Environment Canada

10 August 2011

Robert W. Rankin



Status of the St. Clair River Area of Concern: a Synthesis of Recent Assessments

David Anthony Kirk¹ and April White²

¹Aquila Conservation & Environment Consulting, 75 Albert Street, Suite 300 Ottawa, Ontario K1P 5E7

²Central AOC Program Officer, Great Lakes Areas of Concern, Great Lakes Division, Environment Canada, Downsview, Ontario

FINAL REPORT: May 2014

This is a final document reviewing the status and trends of biodiversity in the St. Clair River Area of Concern to substantiate why the AOC should be designated as "not impaired"

Assessment of wildlife status and trends within the St. Clair River and Detroit River Areas of Concern Using Bird Studies Canada Data

Final Report



Left: Detroit River AOC; Right: St. Clair River AOC; photos by U.S. Environmental Protection Agency

Produced for: Environment Canada

March 2012

By Doug Tozer and Myles Falconer



Migrant Waterfowl use of the St. Clair and Detroit River Areas of Concern

Sept. 2013

Reproductive Health and Development in Northern Leopard Frogs (*Rana pipiens*) in the Detroit River Area of Concern

December 2012

K.D. Hughes, S.R. de Solla, P.A. Martin, T.V. McDaniel, and K. Palonen

ABSTRACT

Reproductive health and development were examined in a multi-year study of northern leopard frogs (*Rana pipiens*) in the Detroit River Area of Concern (AOC) identified (in part) as a result of high concentrations of contaminants in the aquatic environment. Two exposure studies were conducted in the laboratory in which embryos were raised in water (2008) and sediment and water (2010) collected from several locations within the AOC to assess hatching success and frequencies of deformities in embryos. Overall hatching success of embryos was high (>85%) and frequencies of embryonic deformities were low (< 5.3%) at AOC locations in both exposure studies with statistically similar frequencies reported at non-AOC Great Lakes reference sites. Surveys of wild populations of frogs revealed that the prevalence of deformities in young of year frogs from the AOC ranged widely in three study years (0.8%-9.0%) with reported frequencies significantly higher in 2008, marginally significant in 2010 and not significantly different in 2011

An Assessment of Reproductive Health and Development of Snapping Turtles (*Chelydra serpentina*) from the Walpole Delta in the St. Clair River Area of Concern

December 2012

K.D. Hughes, S.R. de Solla, and P.A. Martin

Abstract

Snapping turtle eggs were collected from the Walpole Delta, an area in the downstream Canadian portion of the St. Clair River Area of Concern (AOC) in 2011, analyzed for contaminants and assessed for evidence of impairment of reproductive health and development. Hatching success of artificially-incubated eggs and hatchling deformities were examined as two reproduction and development endpoints associated with elevated contaminant exposure. Hatching success was high (93.5%) and the

BUI Studies and Monitoring



RFA

BUI

Studies or Monitoring

Degradation of fish and wildlife populations

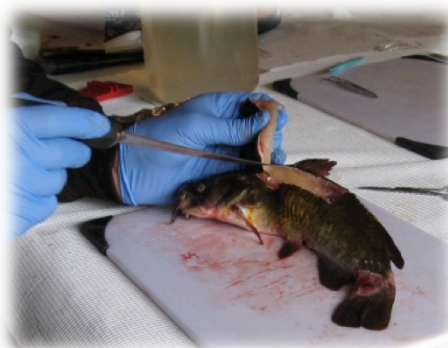
- Provincial monitoring for fish diversity and abundance.
- Federal fish health (body burden level) studies.
- Federal waterfowl and marsh bird monitoring.
- Aboriginal Traditional Knowledge (ATK)

Fish Tumours or other deformities

- Federal studies on Redhorse Suckers and Brown Bullheads.

Bird or Animal Deformities or Reproductive Problems

- Federal studies on 2 aquatic indicator species to assess hatching success and deformity rates.



Fish Tumour Prevalence Study

BUI # 4



BUI Studies and Monitoring



RFA

BUI

Studies or Monitoring

Degradation of fish and wildlife populations

- Provincial monitoring for fish diversity and abundance.
- Federal fish health (body burden level) studies.
- Federal waterfowl and marsh bird monitoring.
- Aboriginal Traditional Knowledge (ATK)

Fish Tumours or other deformities

- Federal studies on Redhorse Suckers and Brown Bullheads.

***Bird or Animal Deformities or Reproductive Problems**

- Federal studies on 2 aquatic indicator species to assess hatching success and deformity rates.



Challenges & Opportunities



Challenges:

- High agriculture land use and land value
 - Little interest or incentive for buffers.
 - High conversion of wetlands to agricultural use.
 - Zoning (re-zoning challenges).

Opportunities:

- Data management and sharing.
 - DR/SCR Portal
- Continue Monitoring and Modelling.



Thank-You



ST. CLAIR RIVER AREA OF CONCERN U. S. SIDE



STELLA CLAIR
Artist: Lou Rodriguez
Fabricated at Wood Michigan Metals

ST. CLAIR RIVER AOC – BENEFICIAL USE IMPAIRMENTS

- 1. Tainting of fish and wildlife flavor – Removed 2009**
- 2. Restrictions on dredging activities – Removed 2011**
- 3. Degradation of aesthetics – Removed 2012**
- 4. Added costs to agriculture or industry – Removed 2012**
- 5. Degradation of benthos – Removed 2014**
- 6. Beach closings – Removed 2016**
- 7. Bird or Animal Deformities or Reproductive Problems – COMING SOON!**
- 8. Loss of fish and wildlife habitat – COMING SOON!**
- 9. Restrictions on drinking water consumption, or taste or odor problems**
- 10. Restrictions on fish and wildlife consumption**

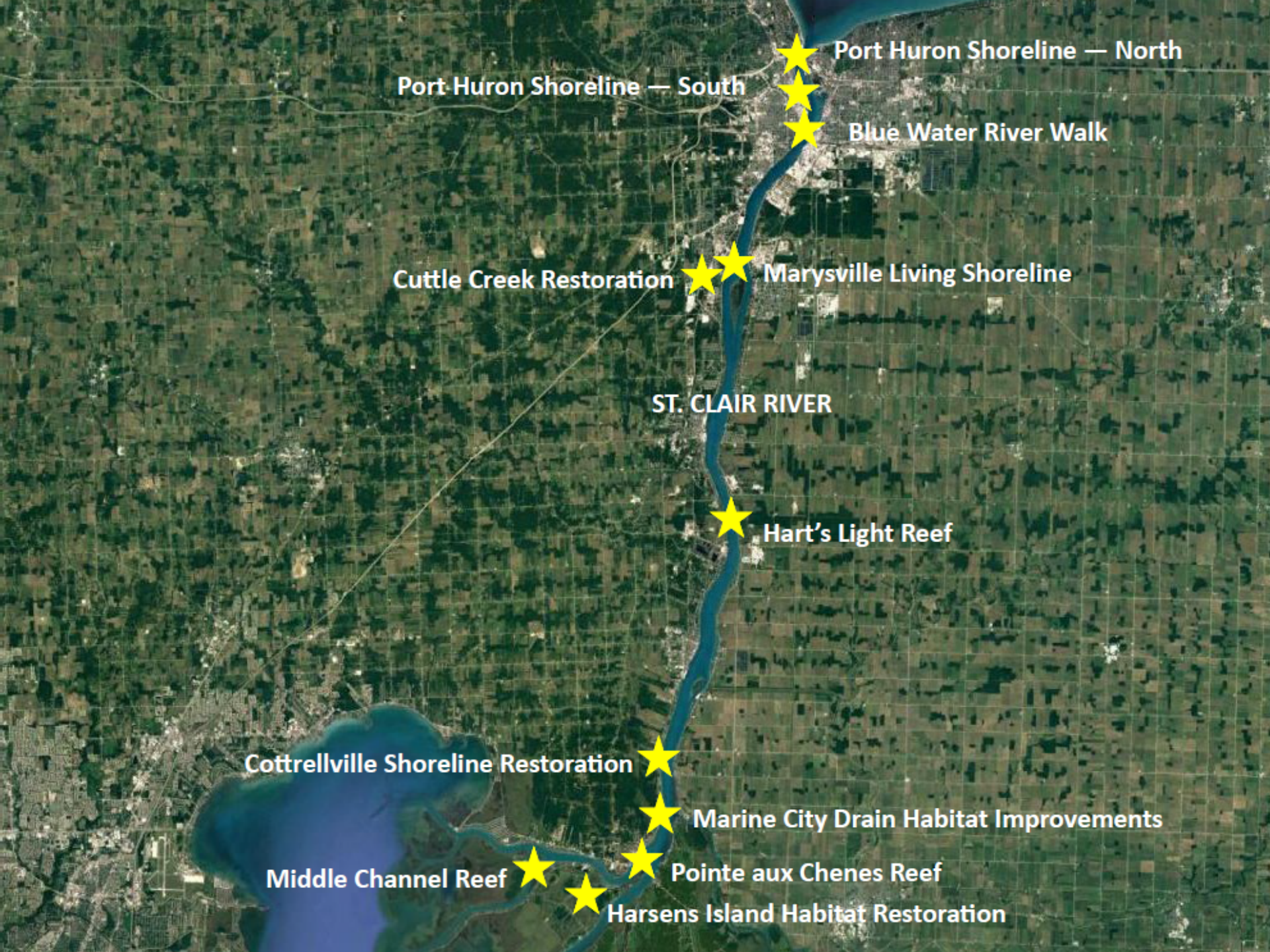
BIRD OR ANIMAL DEFORMITIES OR REPRODUCTION PROBLEMS

- **Mink**
- **Bald Eagles**
- **Tree Swallows**
- **Carp**
- **Forage Fish**
- **Removal Recommendation Report Finalized**
- **Official BUI Removal Expected Soon**

LOSS OF FISH AND WILDLIFE HABITAT

Nine Projects in Twelve Locations:

1. Port Huron North Shoreline
2. Port Huron South Shoreline
3. Blue Water River Walk and Blue Water River Walk Wetlands
4. Marysville Living Shoreline
5. Cuttle Creek
6. Cottrellville Township Shoreline
7. Marine City Drain Habitat Improvements
8. Krispin Drain Restoration
9. St. Clair River Fish Spawning Reefs
 - Hart's Light
 - Pointe aux Chenes
 - Middle Channel



Port Huron Shoreline — North

Port Huron Shoreline — South

Blue Water River Walk

Cuttle Creek Restoration

Marysville Living Shoreline

ST. CLAIR RIVER

Hart's Light Reef

Cottrellville Shoreline Restoration

Marine City Drain Habitat Improvements

Middle Channel Reef

Pointe aux Chenes Reef

Harsens Island Habitat Restoration

RESTRICTIONS ON FISH AND WILDLIFE CONSUMPTION

■ PREVIOUS MONITORING 2014:

- Report Issued Spring 2014
- Control sites: Little Bay De Noc (Lake Michigan) and Les Cheneaux Islands (Lake Huron)
- Carp, Rock Bass, Smallmouth Bass and Yellow Perch collected.
- Higher concentrations of PCB in Smallmouth Bass compared to Les Cheneaux Islands.
- Higher total Mercury in Rock Bass compared to Little Bay De Noc.

■ CURRENT MONITORING 2016:

- Fish Collected in 2016, Awaiting Analysis

THANK YOU!

