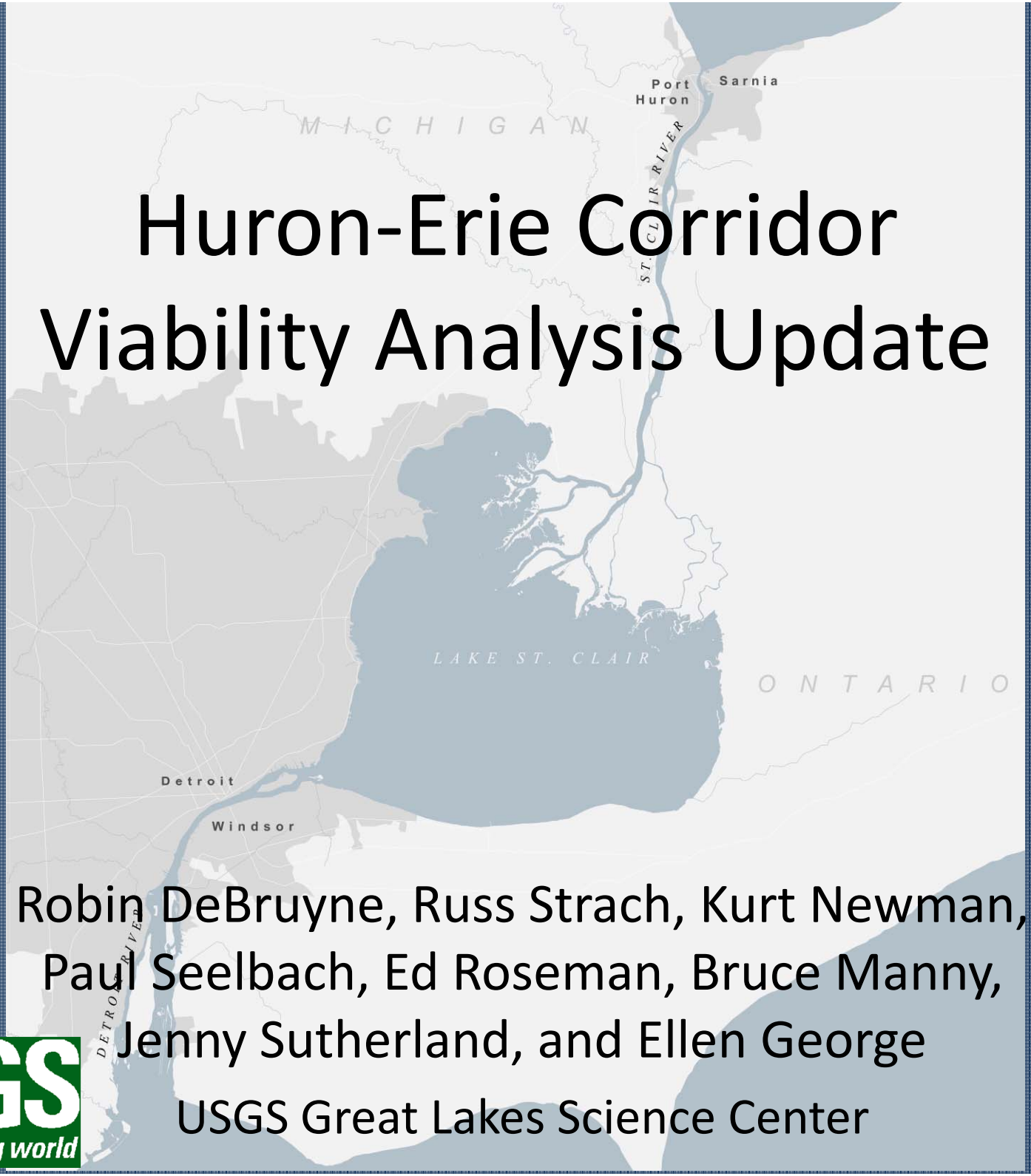


Huron-Erie Corridor Viability Analysis Update

Robin DeBruyne, Russ Strach, Kurt Newman, Paul Seelbach, Ed Roseman, Bruce Manny, Jenny Sutherland, and Ellen George

USGS Great Lakes Science Center

USGS science for a changing world

2012 HECI Meeting

- Doug Pearsall (TNC) presented on Conservation Action Plans (CAP)
  - What
  - When
  - Where
  - How

2012 HECI Meeting

- Doug Pearsall (TNC) presented on Conservation Action Plans (CAP)
  - What
  - When
  - Where
  - How
- Lake Erie Biodiversity Conservation Strategy
  - Lake Erie LaMP; includes Huron-Erie Corridor
  - Completed late 2012, posted December
  - Other Great Lakes BCS
  - St. Mary's River CAP (2009), Niagara River CAP (2010)

Post-meeting Survey Results

- Level of support for pursuing a higher order restoration strategy for entire HEC
  - 18/26 indicated **high to very high**
  - 7/26 indicated **moderate**
- Concerns
  - Time and effort dedicated to this endeavor
  - Scope of topics
  - Longevity of such a plan

- “…let’s not plan it to death…”
- “… I think we’d need strong buy-in from a larger, more diverse group to make it worthwhile. I’d be especially supportive if it could help develop new research questions for scientist partners, …”
- “This process seems like a good focusing mechanism, although it is unclear how useful the final product will be.”
- “… it should have a broader focus than fisheries.”
- “… would provide a good introduction and background in setting the stage for current and future work. … be beneficial for future members to understand what components went into deciding the priorities for ongoing and future work.”
- “As long as it provides something useful, forward looking and long-term. Last thing we need to invest time and resources in another dust-collector.”

Viability Analysis Goals

- Provide a **data driven contemporary assessment** to identify current conditions of the Huron-Erie Corridor for restoration and preservation efforts
  - Identify gaps in basic knowledge throughout the corridor, building on existing knowledge
  - Results can be used in future research, monitoring strategies, management, and conservation planning within the corridor
  - Not to dictate efforts, but to provide full or partial data step completed, easily accessible for all planners, researchers, and managers

Current Scope of Work

- Detailing the current conditions within the corridor (**Viability Analysis**)
  - The status or "health" of a population of a plant/ animal species, or environmental characteristic.
  - Identify Key Ecological Attributes
    - Aspects of a target's biology or ecology that, if missing or altered, would lead to the loss of that target over time.
  - Define Indicators
    - Measurable entities related to a specific information need. A good indicator meets the criteria of being: measurable, precise, consistent, and sensitive.

- Foundation step
- Objective step

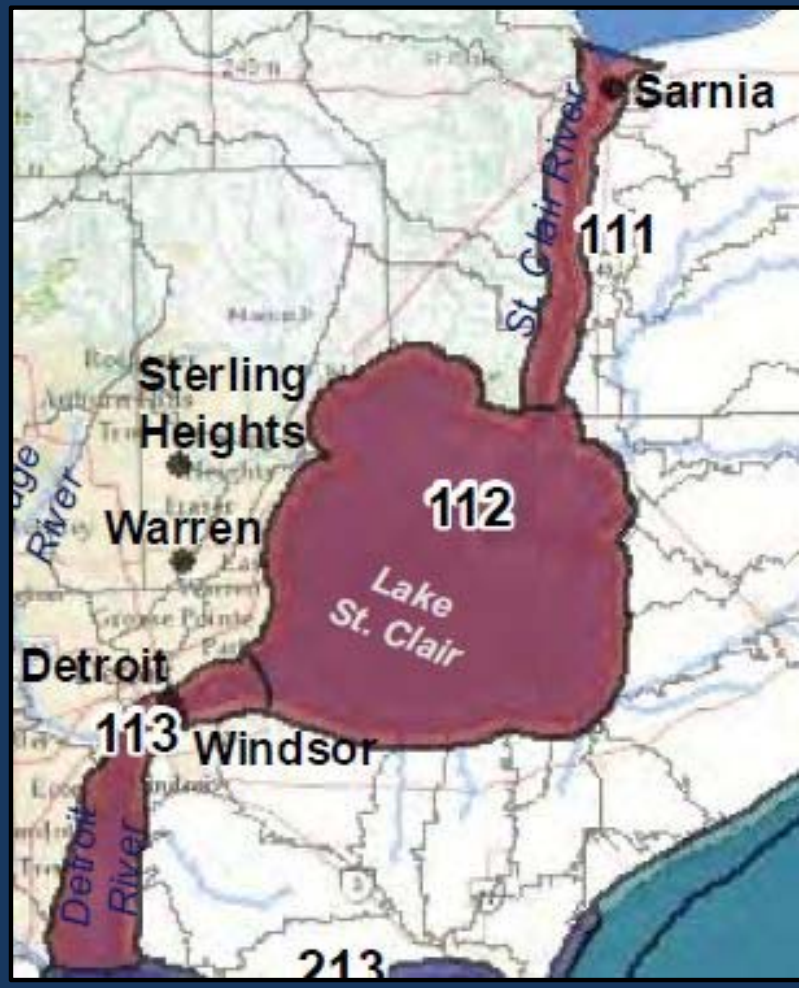
Current Scope of Work

- Detailing the current conditions within the corridor (**Viability Analysis**)

- A larger, comprehensive CAP is hoped for in the future
  - Cooperation
  - Collaboration
  - Commitment

LE BCS Viability Analysis

- Seven targets assessed:
  - Nearshore Zone (22 indicators)
  - Native Migratory Fish (10)
  - Coastal Wetlands (16)
  - Connecting Channels (15)
  - Islands (8)
  - Coastal Terrestrial Systems (10)
  - Aerial Migrants (6)



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Nearshore Zone

Key Ecological Attribute	Indicator	HEC Section 111 (SCR)	112 (LSC)	113 (DR)
Community architecture	3yr running average total native intolerant fish species in annual bottom trawl surveys			
	Mean *Dreissena* density			
	Smallmouth bass population relative abundance			
	Walleye population (age 2+)			
	Yellow Perch (annual biomass)			
Soil/Sediment stability and movement	Bed load traps and groins (# of structures/100km shoreline)		0 (IA)	
	Erosion and deposition rates (from tributaries)		<6 (IA)	
Coastal and watershed contribution	Artificial shoreline hardening index		54.6 (NS)	
	Percent natural land cover in watershed		15.6 (NS)	
	Percent natural land cover within 2km of lake		37.7 (NS)	

Very Good	Good	Fair	Poor	Not Applicable	Not Reported

Nearshore Zone

Key Ecological Attribute	Indicator	HEC Section 111 (SCR)	112 (LSC)	113 (DR)
Landscape pattern and structure	Emergent and submergent vegetation distribution in protected embayments and soft sediment areas			
Water Quality	Dissolved phosphorus load			
	Nitrogen			
	Total Phosphorus concentrations (ug/L)			
	Cladophora standing crop (gDW/m^2) during late summer (Aug-Sept)			
	Contaminants mercury (walleye)			
	Contaminants PCBs (lake trout)			
	DO concentration			
	Extent of harmful algal blooms			
Population size and dynamics	Average native mussels richness per site			
Food Web Linkages	*Hexagenia* mean density in fine sediments (3yr avg)			
	Mean densities of rotifers, copepods, and cladocerans in early summer (ind/L)			

Connecting Channels

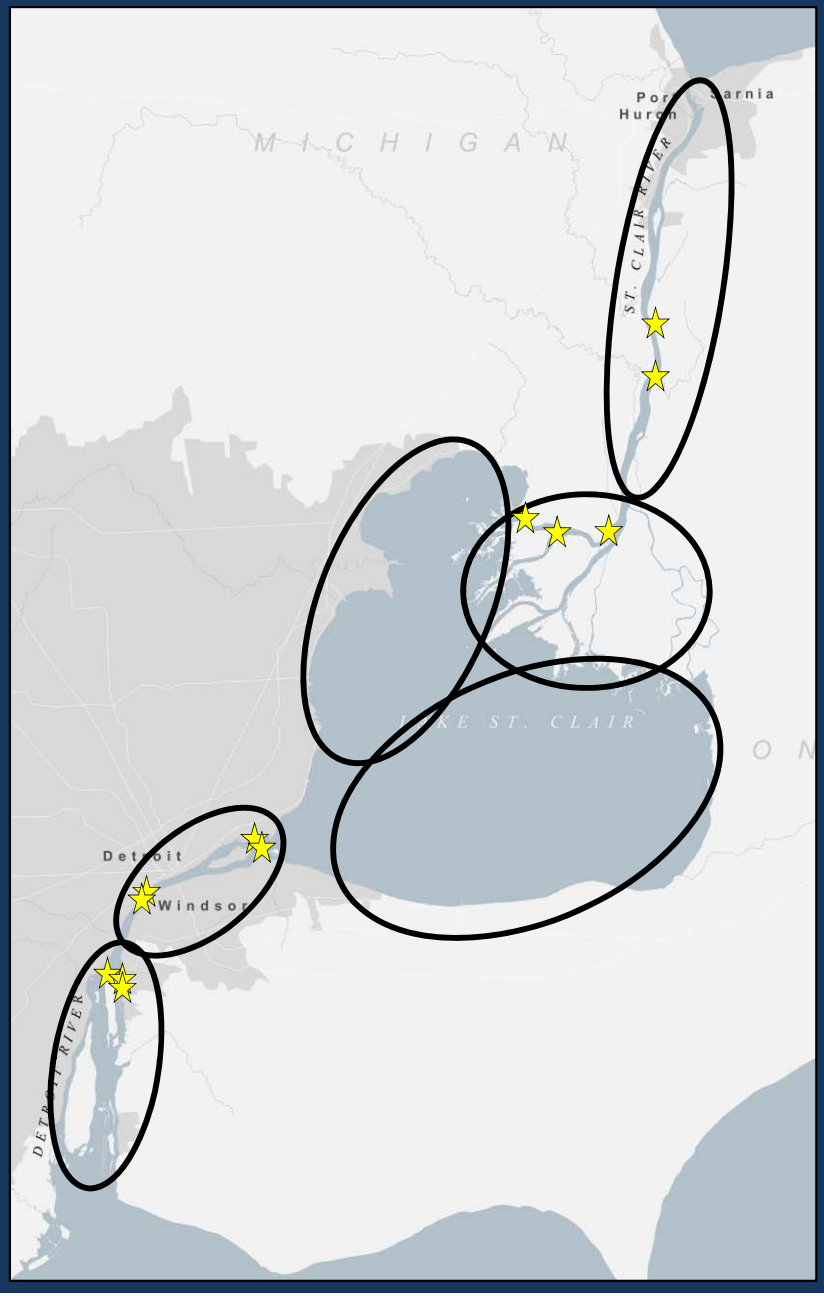
Key Ecological Attribute	Indicator	HEC Section 111 (SCR)	112 (LSC)	113 (DR)
Channel condition	Shoreline hardening	71.6 (IA)	54.6 (IA)	66.1 (IA)
Community architecture	Fish species richness – spawning			
	Fish species richness – larval			
	Wetland area (acres)	986 (IA)	33K (IA)	4K (IA)
Fish tissue	Contaminant load			
Population structure	5yr average of annual peak density of LWF larvae	0 (IA)		(IA)
Water quality	DO concentration	Sat (NS)	Sat (NS)	Sat (NS)
	Hexagenia densities (#/m^2)	(NS)	(NS)	(NS)
	Mean Mar-Oct water levels (m)			
	Total dissolved solids			
	Total phosphorus concentrations (ug/L)			
Population size & dynamics	Average native mussels richness/site			
	Mean *Dreissena* density			
	Native mussel abundance			
	Number mature lake sturgeon	16K (IA)	16K (IA)	6K (IA)

Native Migratory Fish

Key Ecological Attribute	Indicator	HEC Section 111 (SCR)	112 (LSC)	113 (DR)
Access to spawning areas	% of accessible headwater stream habitat (SO 1)	41.4 (IA)	58.7 (IA)	66.2 (IA)
	% of accessible creek habitat (SO 2-3)	40.8 (IA)	56.7 (IA)	67.4 (IA)
	% of accessible small river habitat (SO 4-5)	59.7 (IA)	51.4 (IA)	56.9 (IA)
	% of accessible large river habitat (SO >6)		75.9 (IA)	
	% of accessible tributary wetland habitat	(RG)	(RG)	(RG)
Population size & dynamics	Lake sturgeon status across tributaries	(IA)	(IA)	(IA)
	Status of sauger across tributaries	(RG)	(RG)	
	Status of shorthead redhorse across tributaries	(EK)	(EK)	
	Status of walleye across tributaries		(EK)	
	Status of white suckers across tributaries	(RG)	(RG)	(RG)

Coastal Wetlands; Islands;
Coastal Terrestrial Systems; Aerial Migrants

Proposed Sections



- Six Reporting Units
  - Upper St. Clair River
  - Lower St. Clair River (Delta)
  - East/West Lake St. Clair
  - Upper/Lower Detroit River
- Based on:
  - Ecological attributes
  - Influences to the system

HEC Viability Analysis

- Additional indicators to consider:
  - Weekly min/max flow
  - Area of lentic/lotic reaches
  - % flow through specific channel
  - Relative abundance of AIS
  - % specific substrate
  - Sediment contaminants
  - Specific species/area
  - Fish habitat/fish production

St. Mary's River CAP

Example of Fish Production Table*

Key Ecological Attribute	Indicator	Huron-Erie Corridor Units					
		01 USCR	02 SCDelta	03 WLSC	04 ELSC	05 UDR	06 LDR
Access to spawning areas	% of accessible headwater stream habitat (SO 1)	41.4					
	% of accessible creek habitat (SO 2-3)	40.8					
	% of accessible small river habitat (SO 4-5)	59.7					
	% of accessible large river habitat (SO >6)						
	% of accessible tributary wetland habitat	(RG)					
	Area (m^2) lithophilic spawning substrate						
Reproductive Potential	Egg densities (#/m^2)						
	Larval fish density (#/m^3)						
	Larval fish species richness						
	Adult spawner CPUE						

Your Participation

- Is the template correct?
  - Socio-economic aspects addressed in CAP
- Identify specific subtargets
- Ground truth indicators
- Populate with accurate data
- Condition thresholds

KEA	Indicator
Access to spawning areas	% headwater stream habitat
	% creek habitat
	% small river habitat
	% large river habitat
	% tributary wetland habitat
	Area (m^2) lithophilic spawning substrate
Reprod. Potential	Egg densities (#/m^2)
	Larval fish density (#/m^3)
	Larval fish species richness
	Adult spawner CPUE

Goal: Provide a **data driven contemporary assessment** to identify current conditions of the Huron-Erie Corridor for restoration and remediation efforts

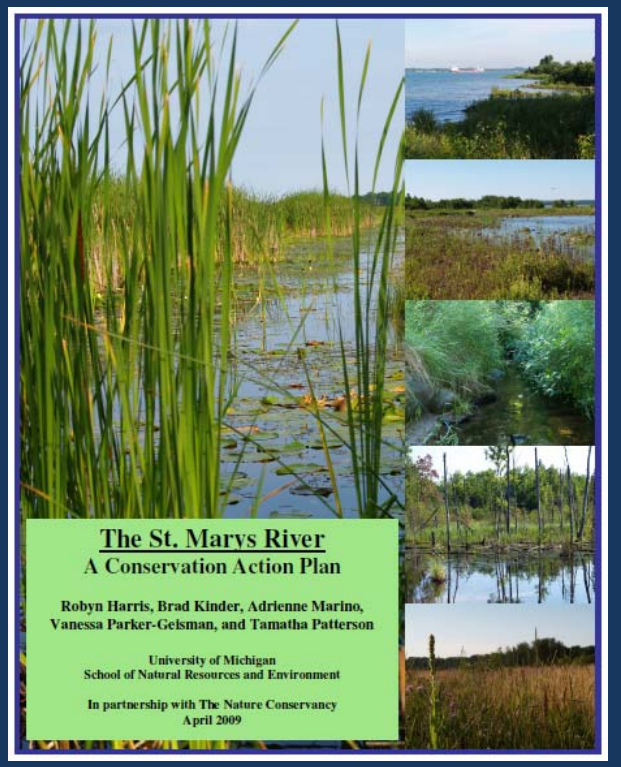
- Cooperation
- Collaboration
- Commitment

Target	Viability Status
Nearshore Zone	Fair
Aerial Migrants	Good
Coastal Terrestrial Systems	Fair
Coastal Wetlands	Fair
Connecting Channels	Fair
Islands	Fair
Native Migratory Fish	Fair
Overall	**Fair**

Pearsall (TNC) 2013 HECI Briefing Book

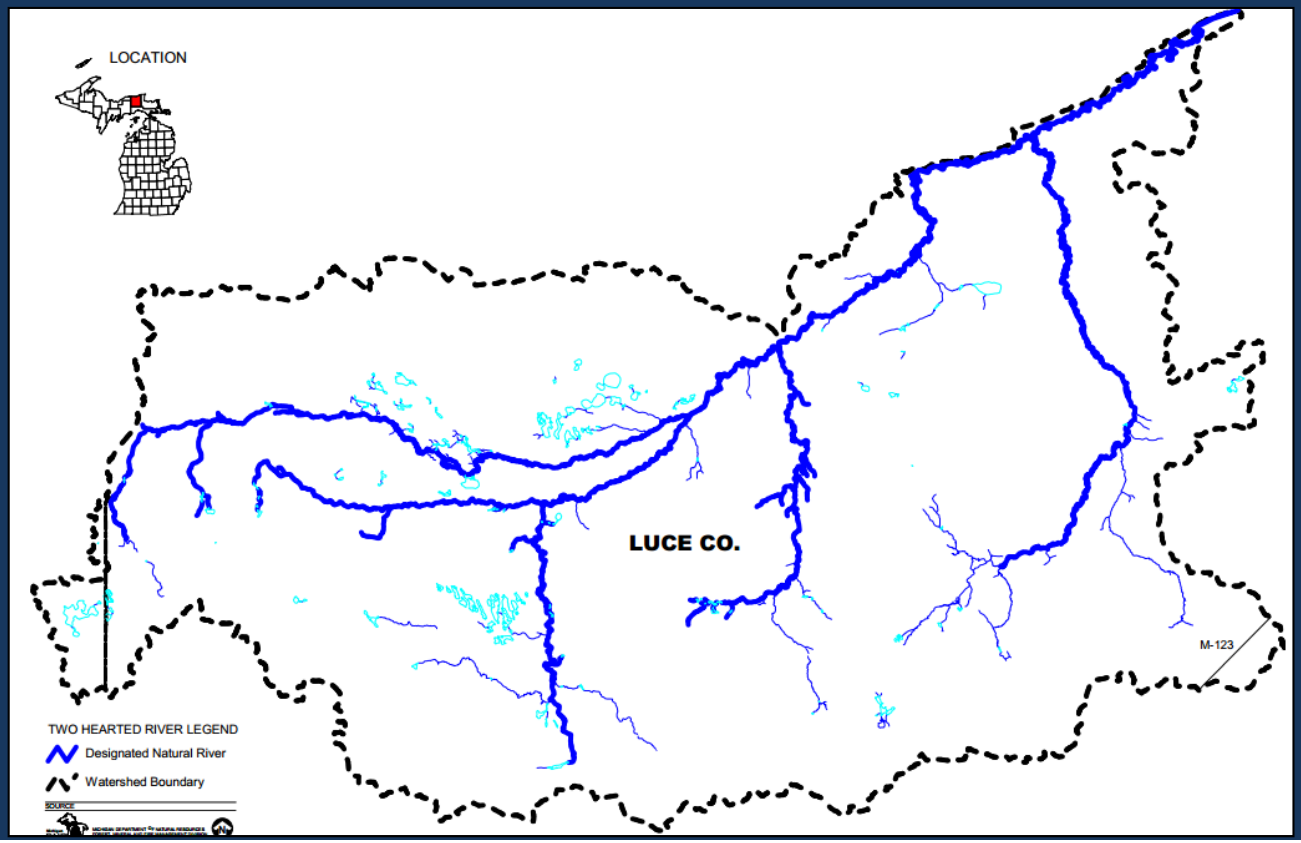
Used for

- Conservation action plan and/or vision for future Corridor plans or strategies
- To identify research or management needs, long-term/standard monitoring
- Assess efficacy of restoration and remediation efforts



Two Hearted River, MI

- Watershed management plan (CAP) completed 2008
- 12 objectives with 37 strategic actions



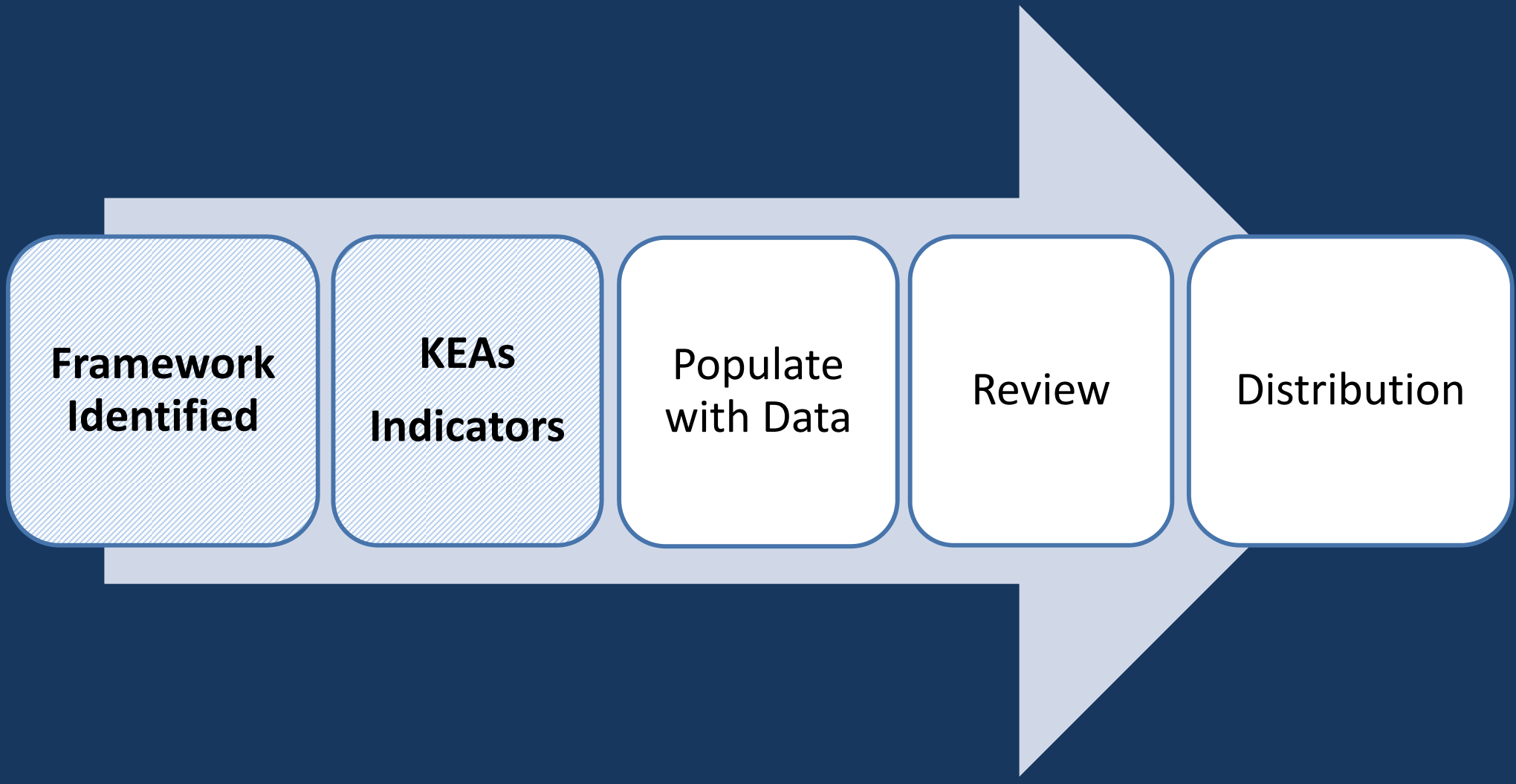
Two Hearted River, MI

- Watershed management plan (CAP) completed 2008
- 12 objectives with 37 strategic actions

Today:

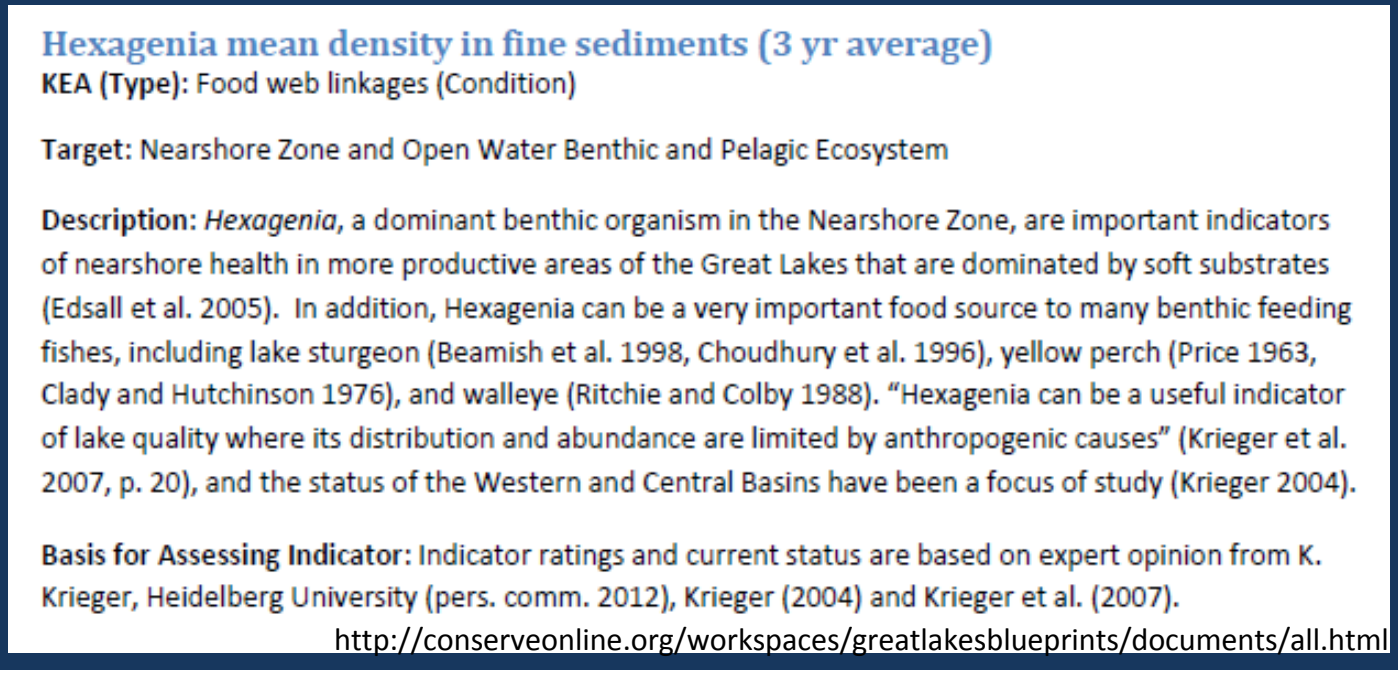
- 4 objectives completed
- 2 close to completion

Timeline


Framework Identified
KEAs Indicators
Populate with Data
Review
Distribution

Products

- Report distributed with descriptions of:
  - process
  - matrices of current conditions
  - full descriptions of indicators
  - sources and contributors



Hexagenia mean density in fine sediments (3 yr average)

KEA (Type): Food web linkages (Condition)

Target: Nearshore Zone and Open Water Benthic and Pelagic Ecosystem

Description: *Hexagenia*, a dominant benthic organism in the Nearshore Zone, are important indicators of nearshore health in more productive areas of the Great Lakes that are dominated by soft substrates (Edsall et al. 2005). In addition, Hexagenia can be a very important food source to many benthic feeding fishes, including lake sturgeon (Beamish et al. 1998, Choudhury et al. 1996), yellow perch (Price 1963, Clady and Hutchinson 1976), and walleye (Ritchie and Colby 1988). "Hexagenia can be a useful indicator of lake quality where its distribution and abundance are limited by anthropogenic causes" (Krieger et al. 2007, p. 20), and the status of the Western and Central Basins have been a focus of study (Krieger 2004).

Basis for Assessing Indicator: Indicator ratings and current status are based on expert opinion from K. Krieger, Heidelberg University (pers. comm. 2012), Krieger (2004) and Krieger et al. (2007).

http://conserveonline.org/workspaces/greatlakesblueprints/documents/all.html

Products

- Report distributed with descriptions of:
  - process
  - matrices of current conditions
  - full descriptions of indicators
  - sources and contributors
- Manuscript describing current conditions as well as gaps in monitoring and areas in need of attention or restoration

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A larger, more thorough and complete conservation action plan is desired, so that we know not only what the system conditions are now, but also where we would like the system to be, and realistic solutions and options for success.

Questions/Discussion

Lake Erie Biodiversity Conservation Strategy

+

St. Mary's/Niagara River CAPs

+

FEEDBACK-INPUT-COLLABORATION

=

SUCCESSFUL, ACCURATE, **APPLICABLE** PRODUCT

Robin DeBruyne (rdebruyne@usgs.gov)