

Nearshore Fish Community Ecological Interactions

Making a Great Lake Superior 2007

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Fish Community Objective – Prey Fish

A self-sustaining assemblage of prey dominated by indigenous species at population levels capable of supporting desired populations of predators and a managed commercial fishery.

Fish Community Objective – Lake Trout

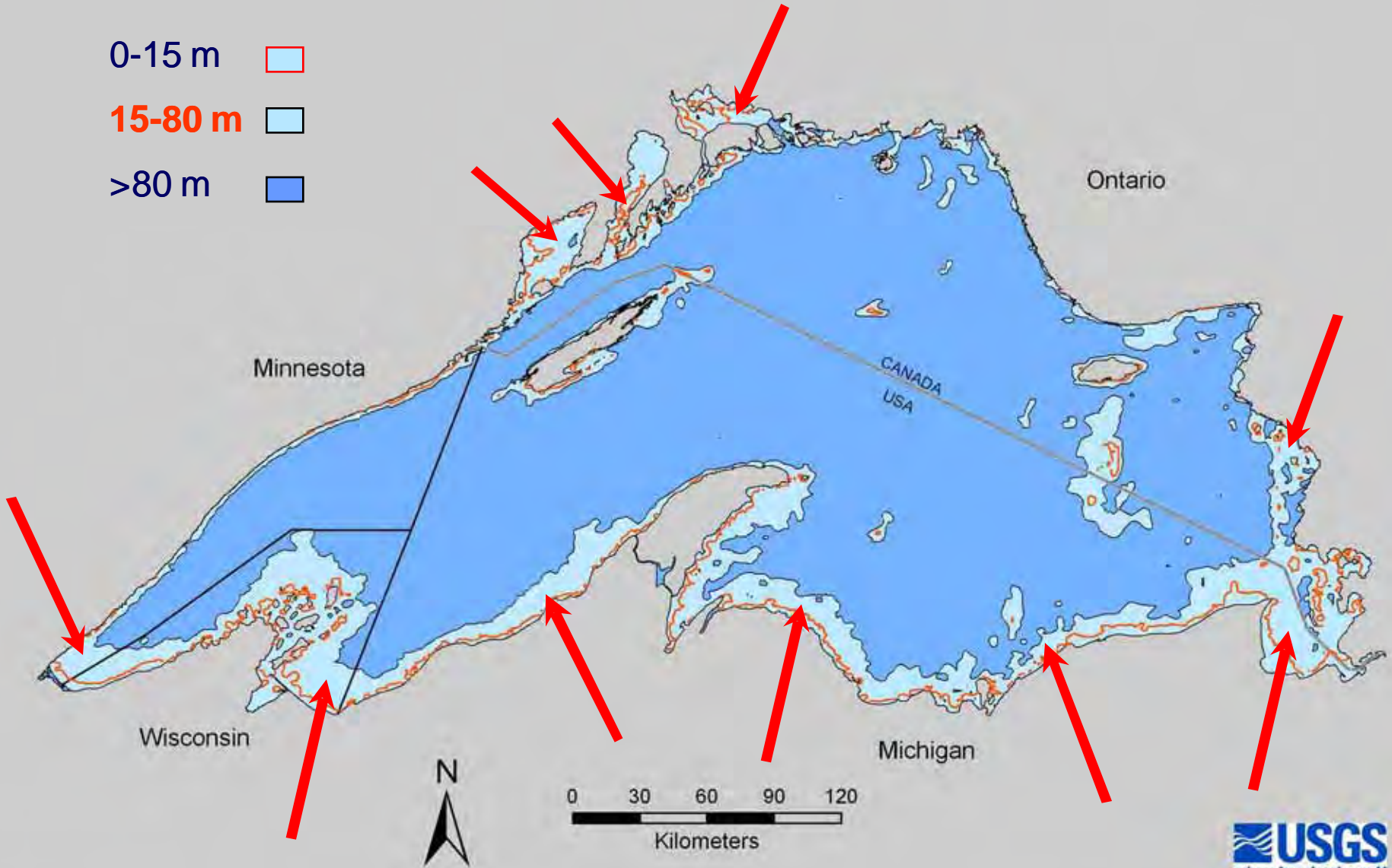
Achieve and maintain genetically diverse self-sustaining populations of lake trout that are similar to those found in the lake prior to 1940, with lean lake trout being the dominant form in nearshore waters, siscowet lake trout the dominant form in offshore waters, and humper lake trout a common form in eastern waters and around Isle Royale.

Lake Superior Depth Zones

0-15 m 

15-80 m 

>80 m 

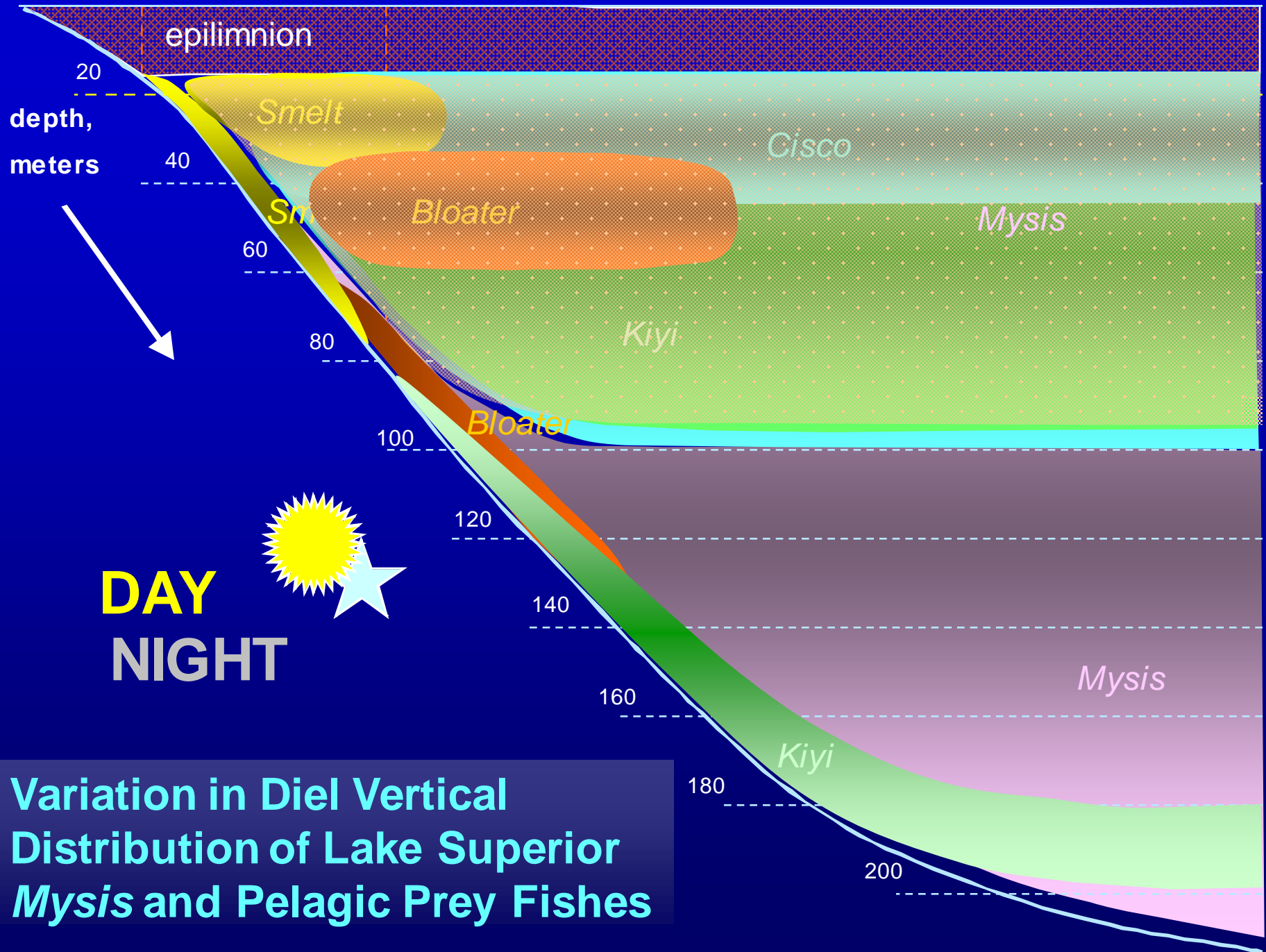


Nearshore Community

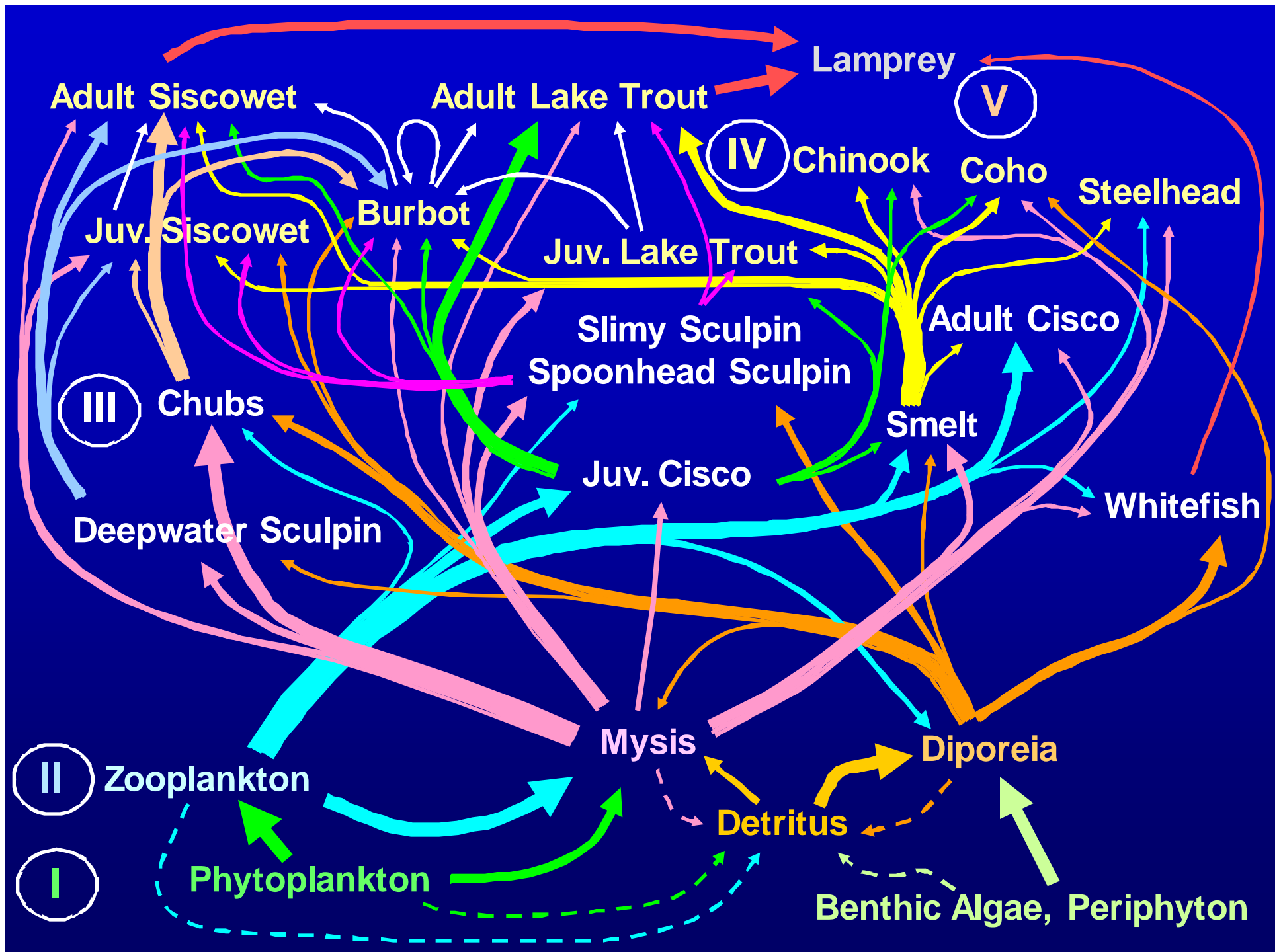
Predators: Lake Trout
Burbot
Sea Lamprey

Prey Fishes: Cisco
Smelt
Bloater
Lake Whitefish
Sculpins (primarily Slimy Sculpin)
Ninespine Stickleback

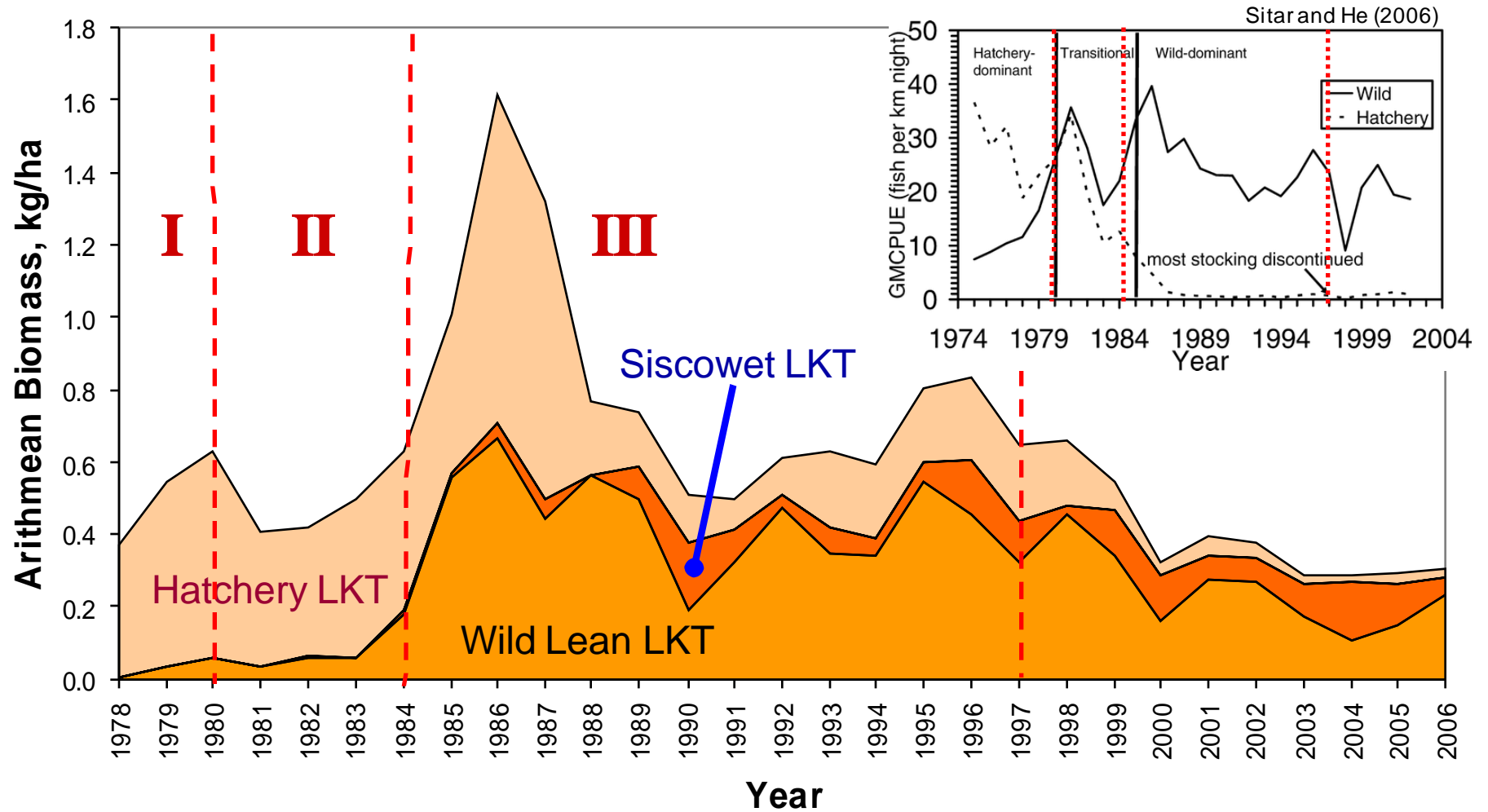
Invertebrates: *Diporeia hoyi*
Mysis relicta
Zooplankton



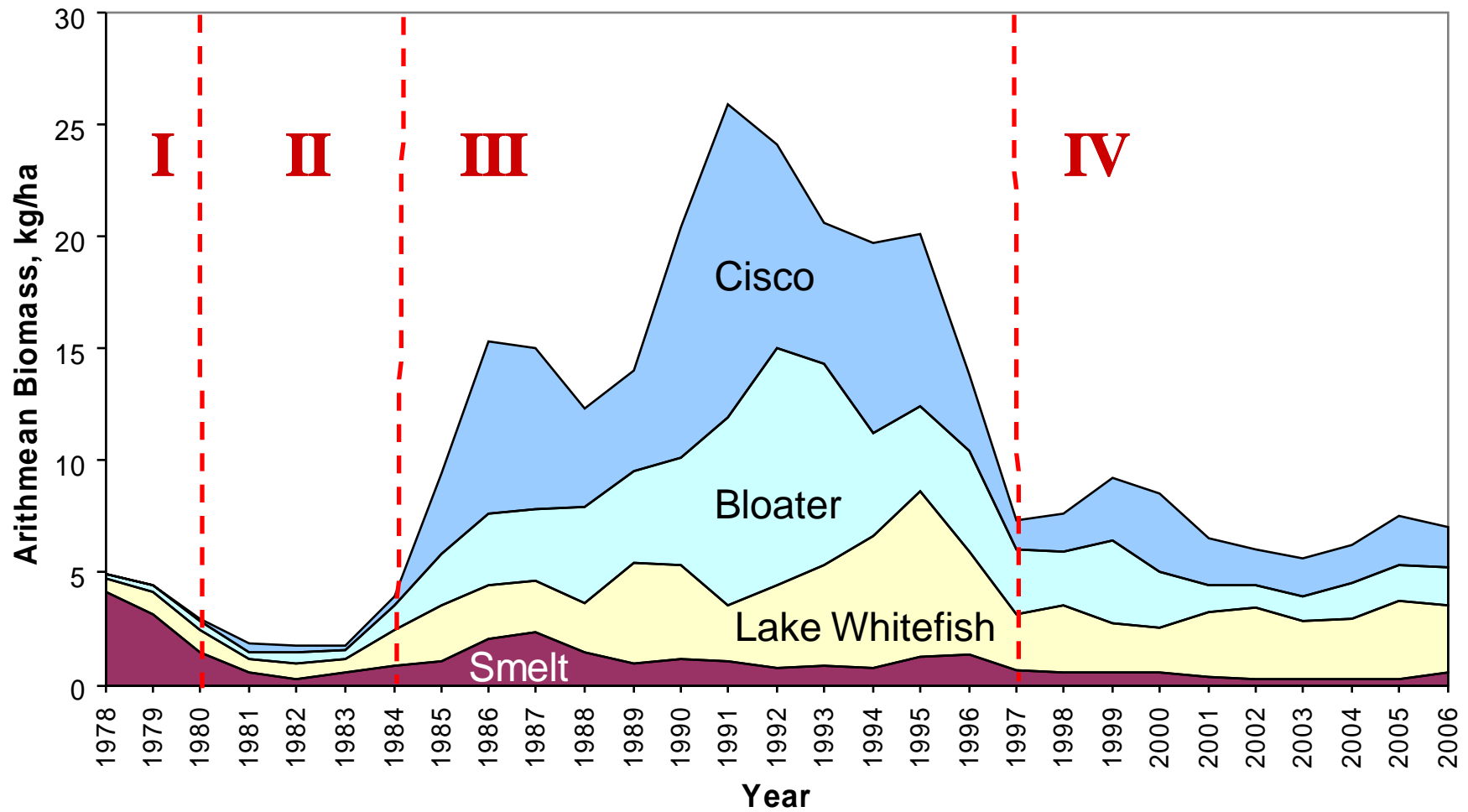
Variation in Diel Vertical Distribution of Lake Superior *Mysis* and Pelagic Prey Fishes



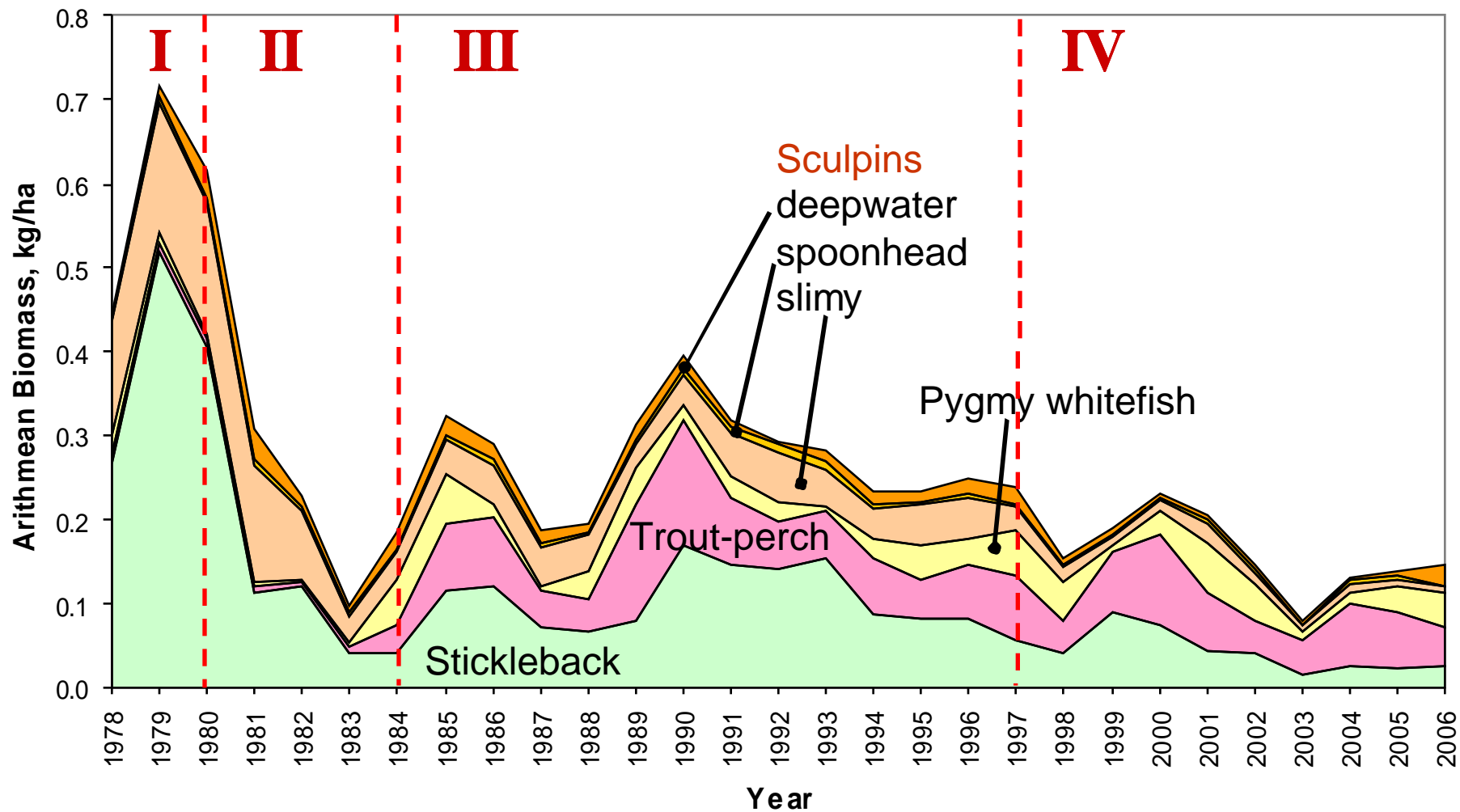
Biomass, Lake Superior Lake Trout - U.S. Waters 1978-2006



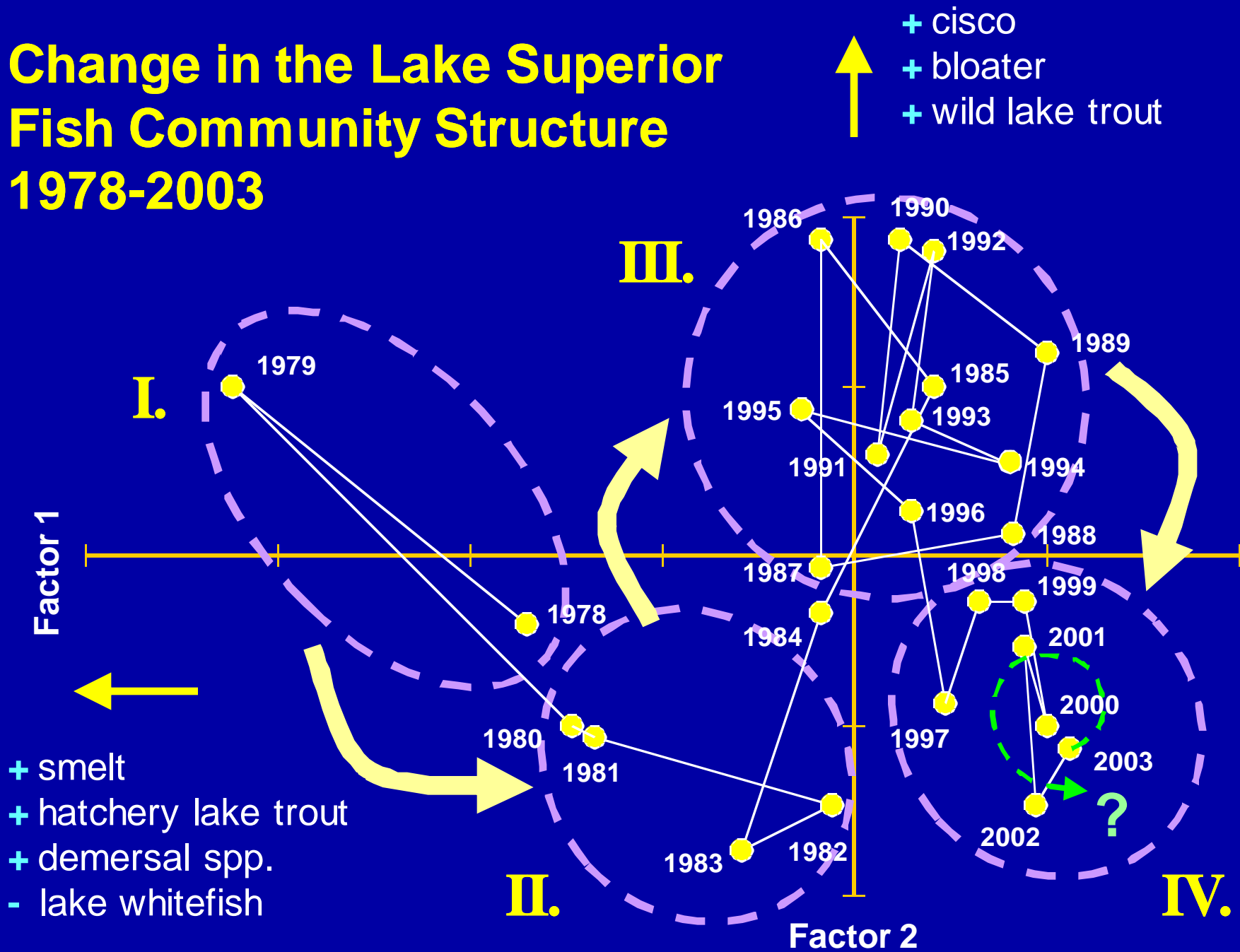
Biomass, Lake Superior Principle Prey Fishes - U.S. Waters 1978-2006



Biomass, Lake Superior Demersal Prey Fishes - U.S. Waters 1978-2006



Change in the Lake Superior Fish Community Structure 1978-2003



Conclusions-1

Fish Community Objective

- The Lake Superior fish community appears to be approaching a state of relative equilibrium.
- The fish community is woven into a complex food web with five distinct levels and characterized by interactions among native species.
- Diel vertical movement is displayed by many species and is driven by food consumption.

Conclusions-2

Fish Community Objective – Prey Fish

- The Lake Superior nearshore prey fish assemblage has recovered from one dominated by non-native rainbow smelt to one dominated by native coregonids, particularly cisco, bloater, and lake whitefish.
- The prey fish assemblage is supported by a set of native crustaceans and zooplankton

Conclusions-3

Fish Community Objective – Lake Trout

- Wild lake trout stocks appear to be recovered and supported largely by an assemblage of native prey species.
- Wild lake trout serves as the principal top predator in the Lake Superior fish community...however
- Sea lamprey still poses a threat to food web stability and community structure and function.

Acknowledgments

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OMNR

LSTC

USFWS

Wisconsin DNR

DFO-Canada

GLIFWC

USEPA

Michigan DNR

GLFC

CORA etc....



