Biodiversity, restoration, and the future of Green Bay

Dr. Chris Houghton

University of Wisconsin – Green Bay

Brief history of Green Bay

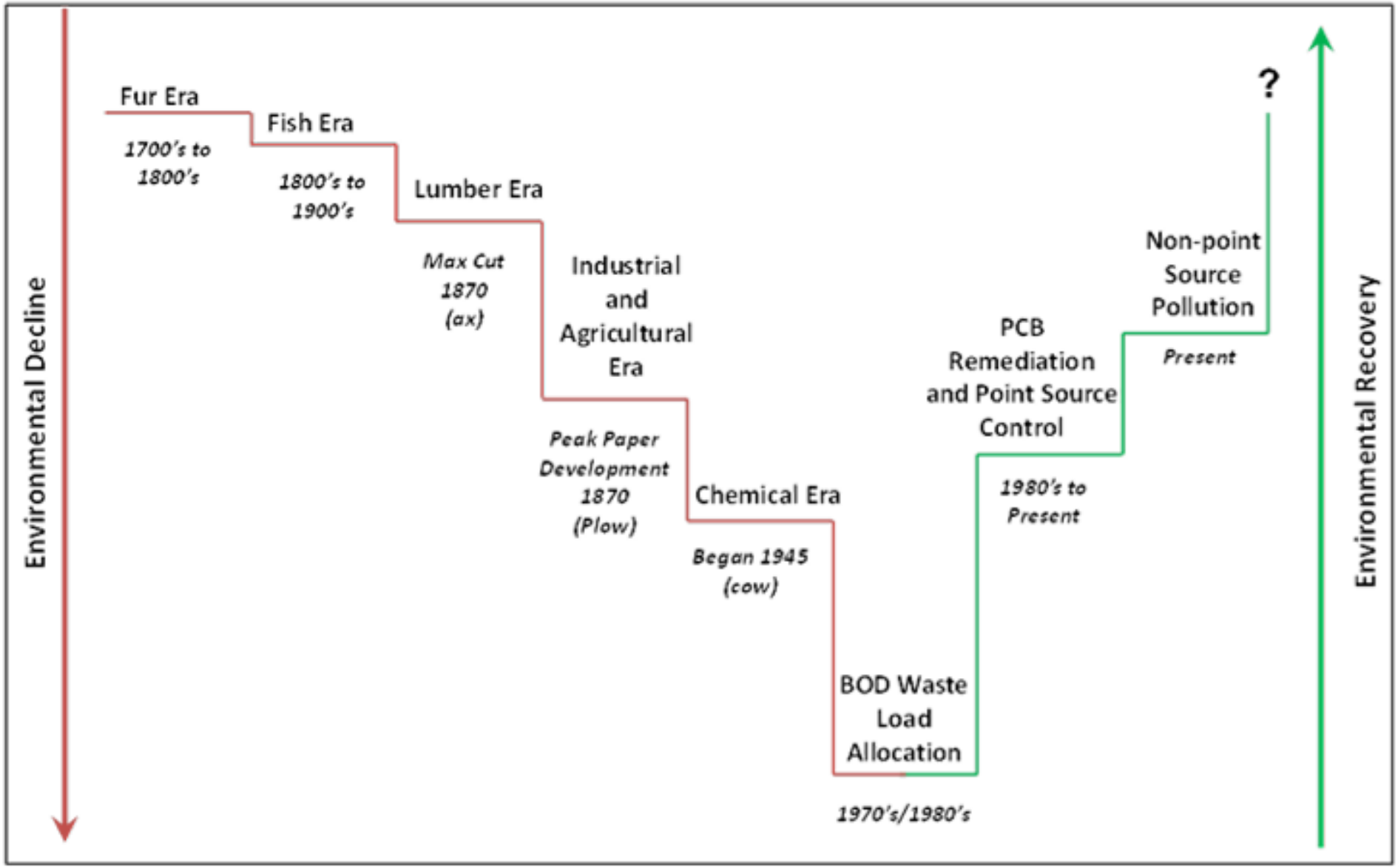


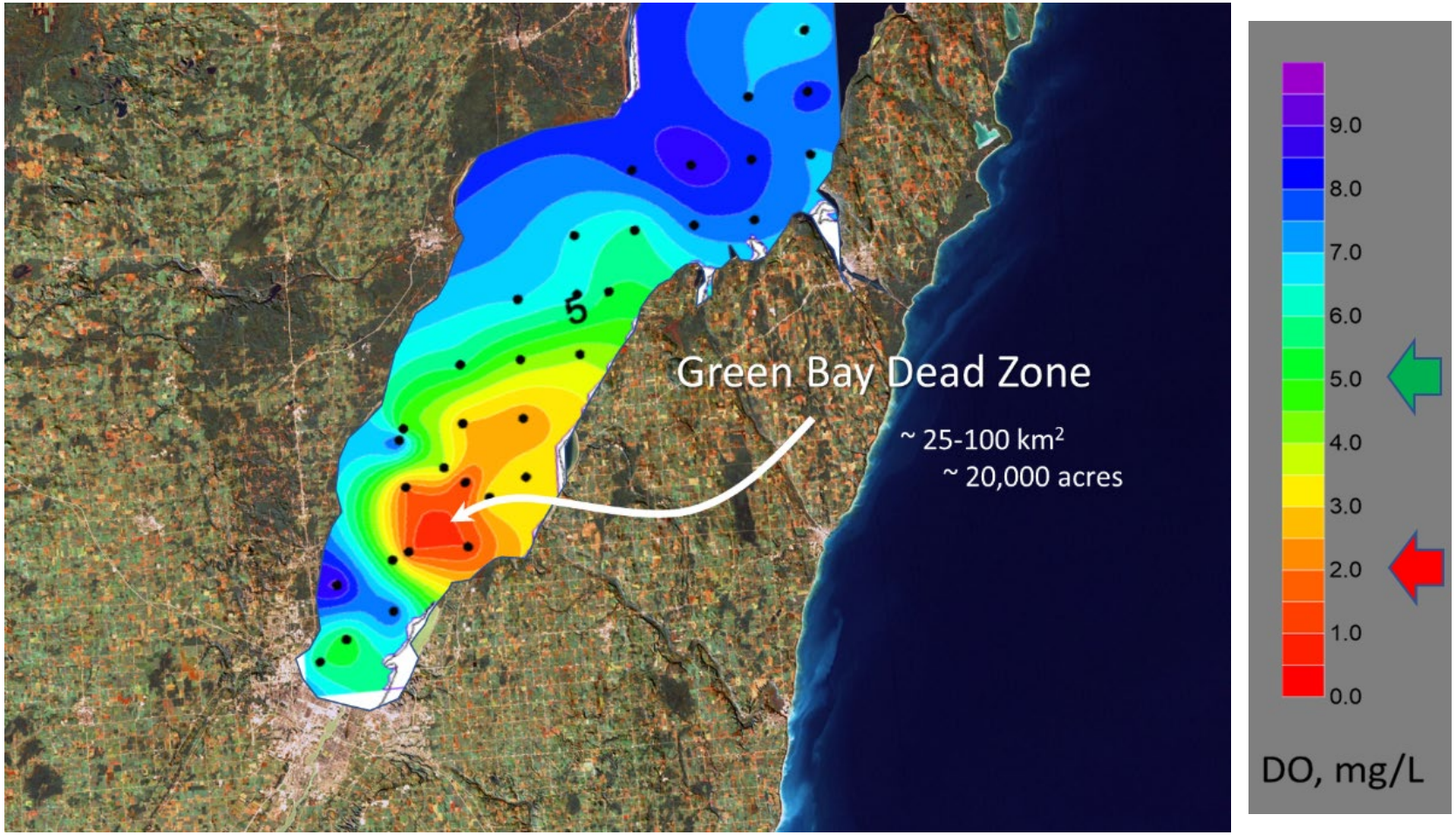
Figure 3: Timeline of environmental degradation and recovery in the Lower Fox River/Green Bay AOC.

State of the Bay Report.
Qualls et al. 2013

Nutrient loading is a persistent problem…

State of the Bay Report – Qualls et al.

Leading to persistent Hypoxia…



Courtesy M. Zorn et al. UWGB

..And harmful algal blooms

High Cliff State Park

Fox River, Green Bay

Bay Shore Park

Photos: Kevin Fermanich

But it's also an exciting time to be working on restoration in Green Bay

Area of Concern Program – US EPA, WDNR, Ducks Unlimited, Army Corps, Partners

Great Lakes Restoration Initiative

Technological advancements

So, what do we do at the Aquatic Ecology and Fisheries lab???

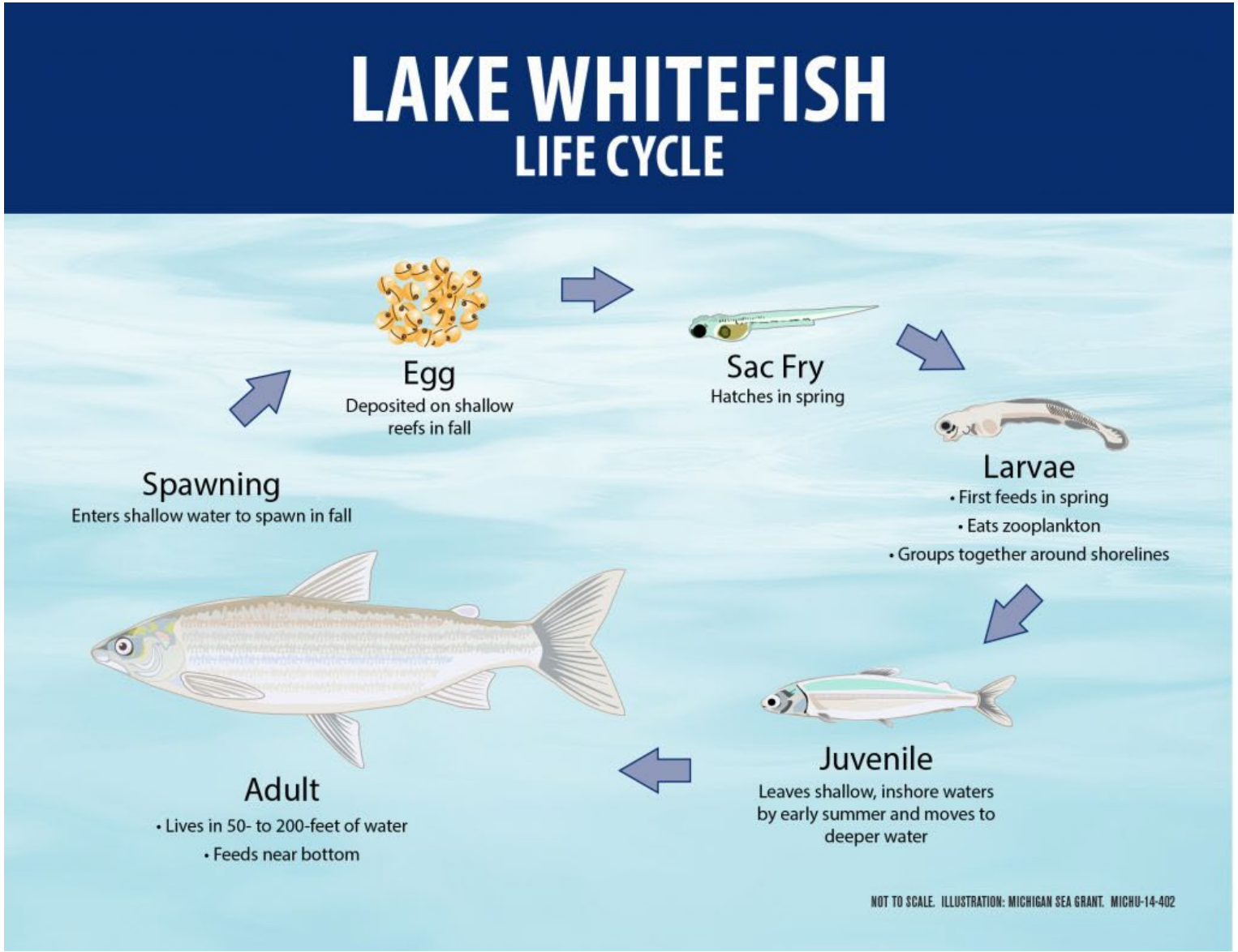
Lots!

- AOC Fish population monitoring
- Assessment of microplastics in fish across lake Michigan
- Population monitoring of lake sturgeon within Green Bay tributaries
- Northern pike spawning and larval production from wetlands
- Stream monitoring with NEW Water
- Round goby monitoring with the Fox River Navigational Authority
- Assessment of benthic invertebrates within streams and the open waters of Green Bay

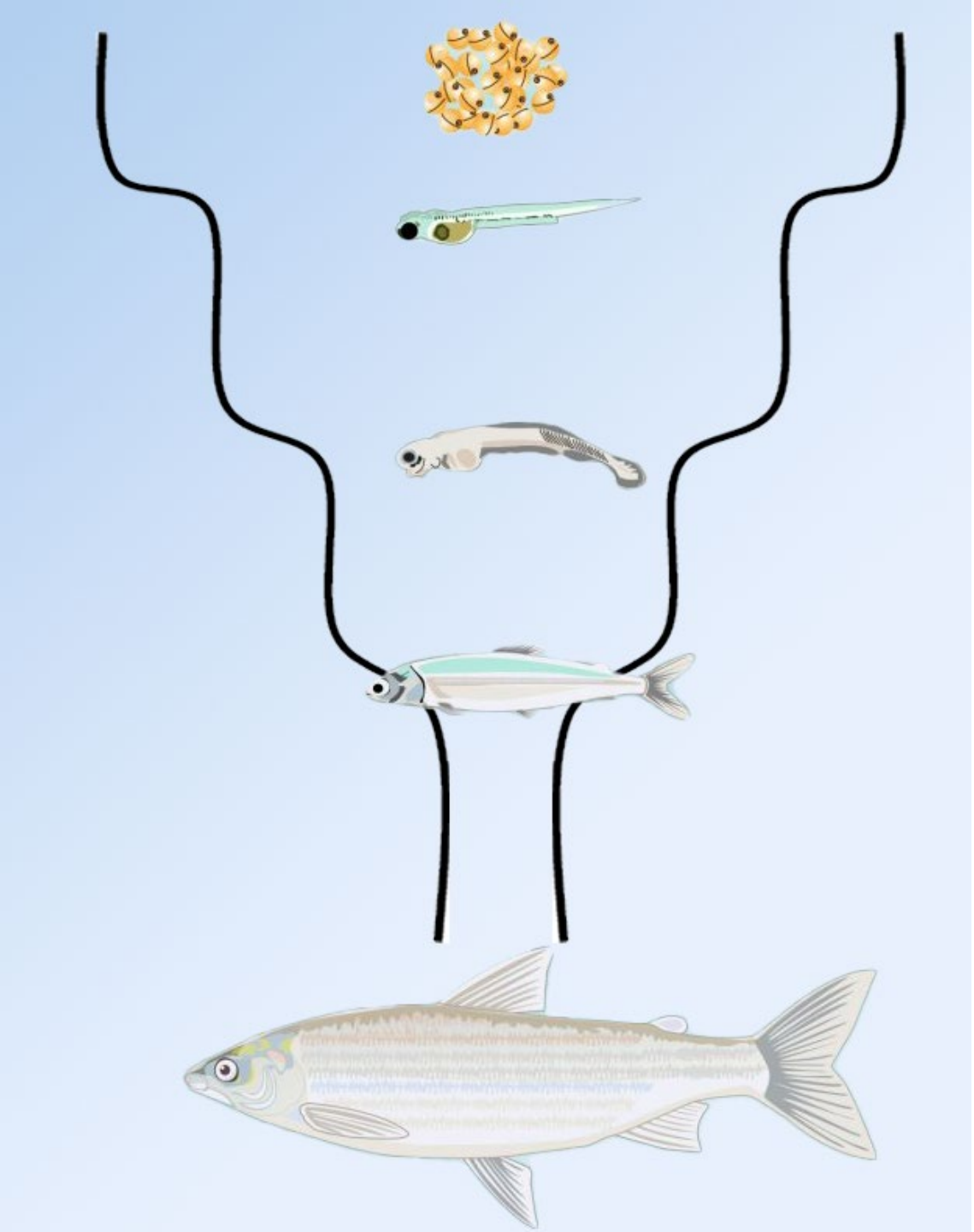
UNIVERSITY of WISCONSIN GREEN BAY

AEAFL

Aquatic Ecology and Fisheries Laboratory

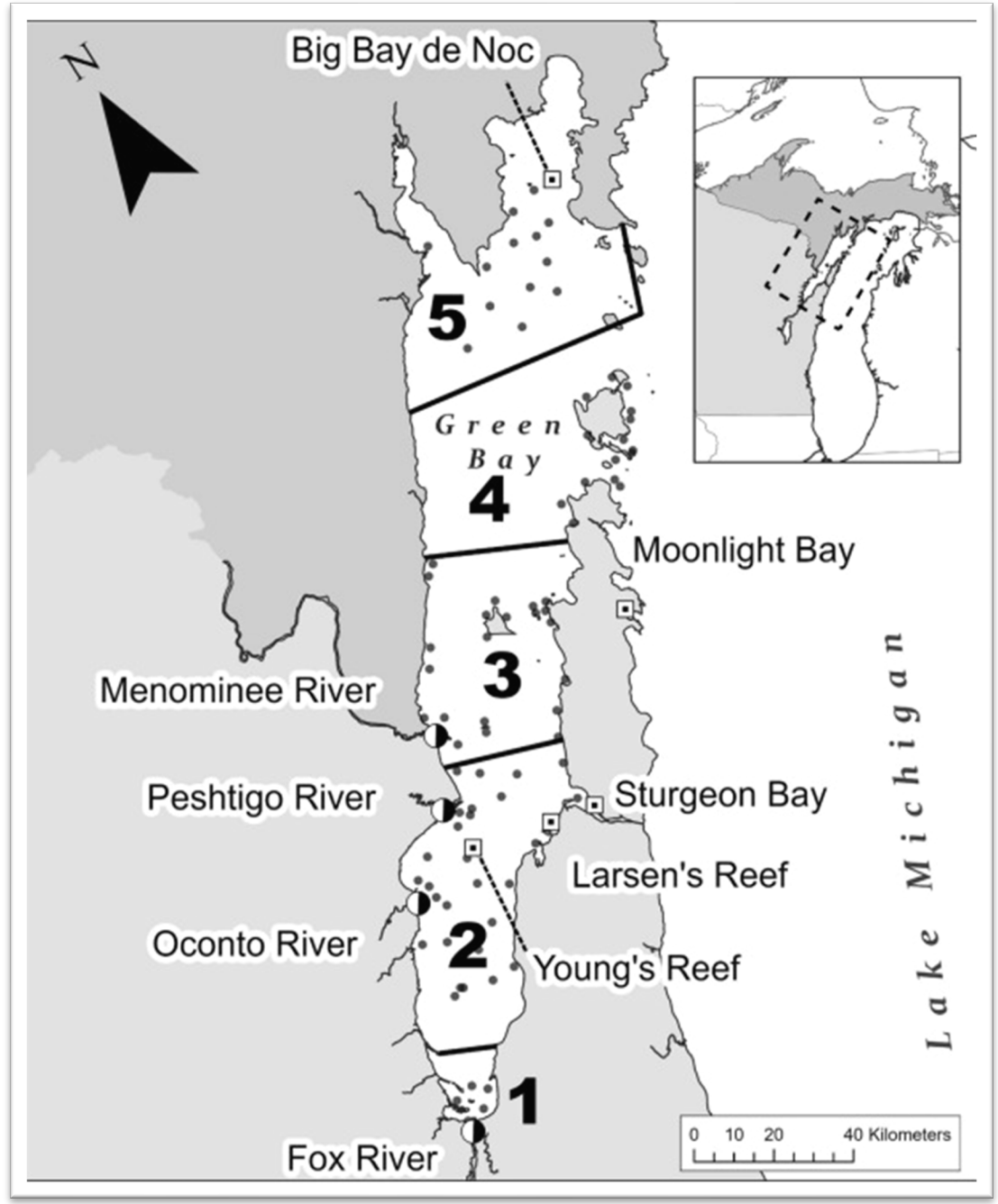


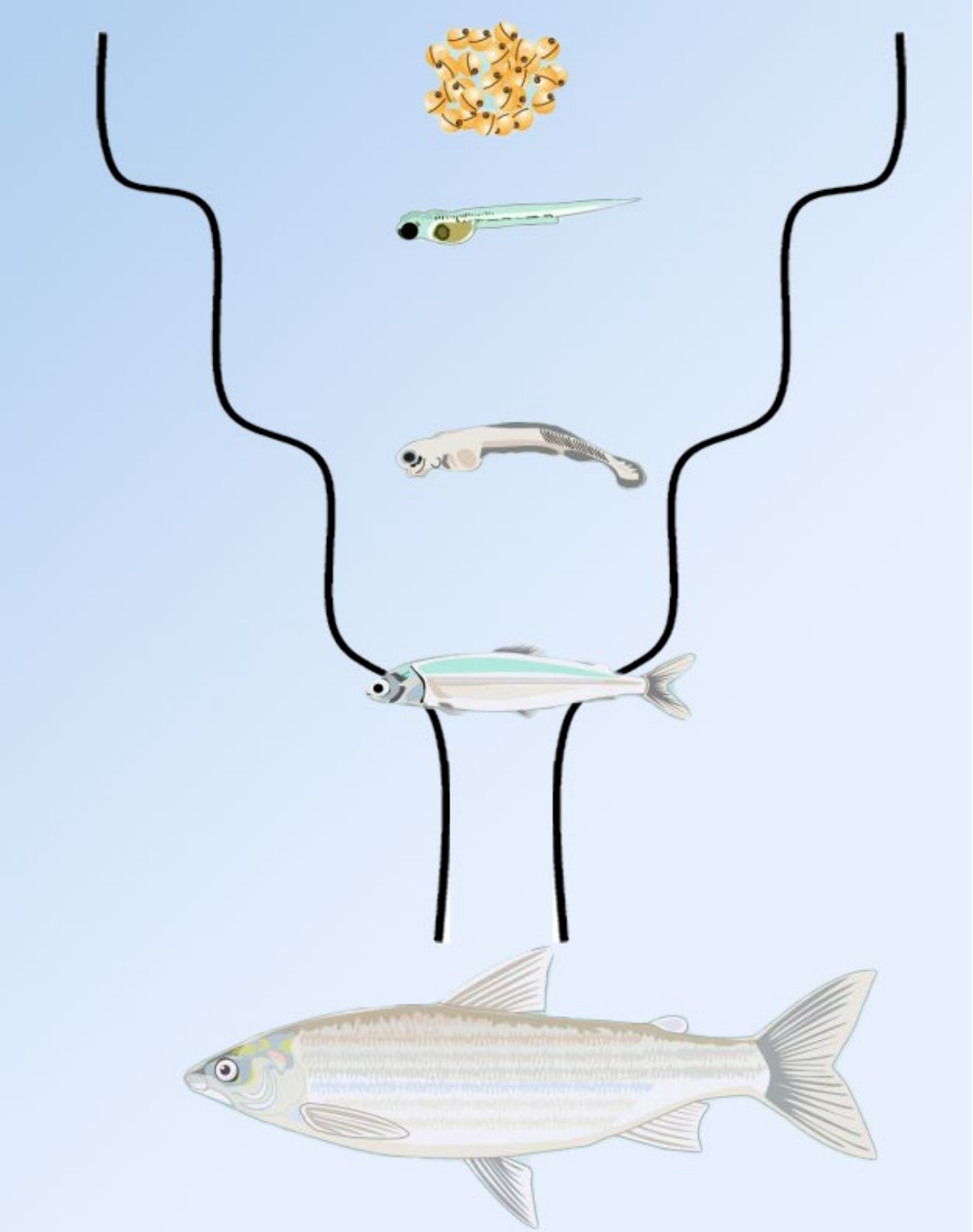
Lake Whitefish | Michigan Sea Grant

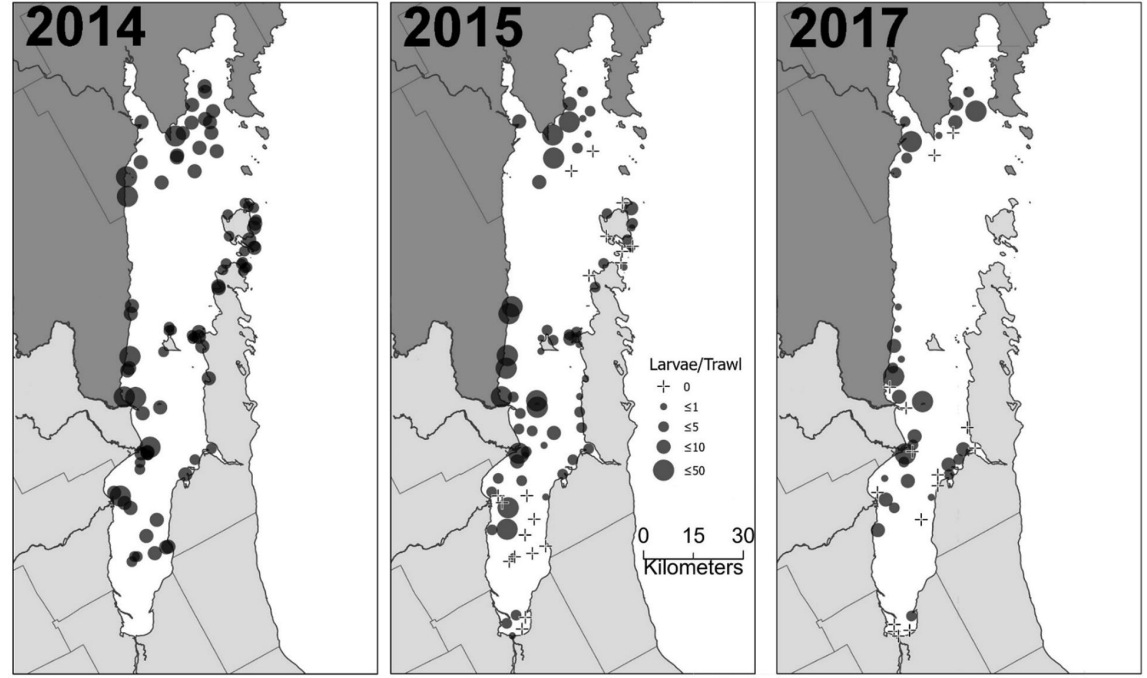


Conservation and Restoration of Fish

- Spawning and Egg Development
- Hatching and drift
- First feeding
- Predation
- Nursery areas
- Availability of adult habitat


N
Big Bay de Noc
5
Green Bay
4
Moonlight Bay
3
Menominee River
Peshtigo River
Sturgeon Bay
Larsen's Reef
2
Oconto River
Young's Reef
1
Fox River
Lake Michigan
0 10 20 40 Kilometers



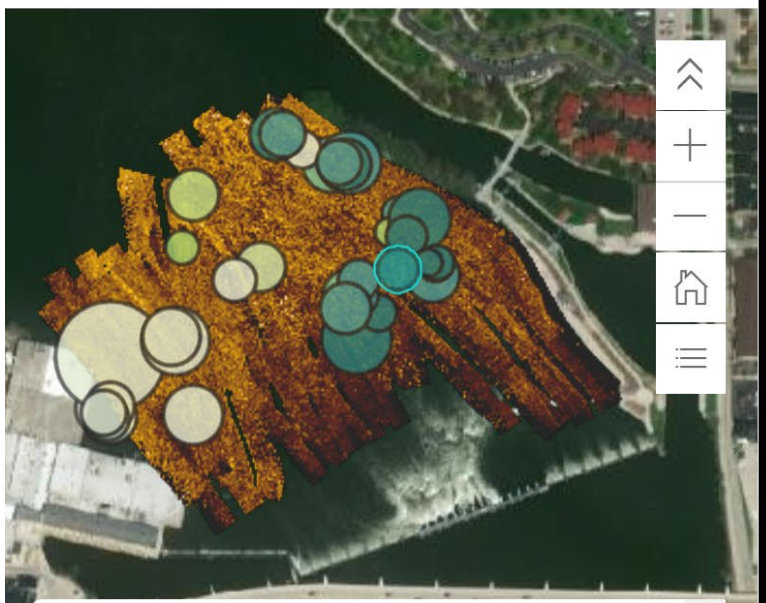

2014
2015
2017
Larvae/Trawl
0
≤1
≤5
≤10
≤50
0 15 30
Kilometers

Depere Dam Substrate Viewer

https://uwgb.maps.arcgis.com/apps/instant/attachmentviewer/index.html?...

Depere Dam Substrate Viewer

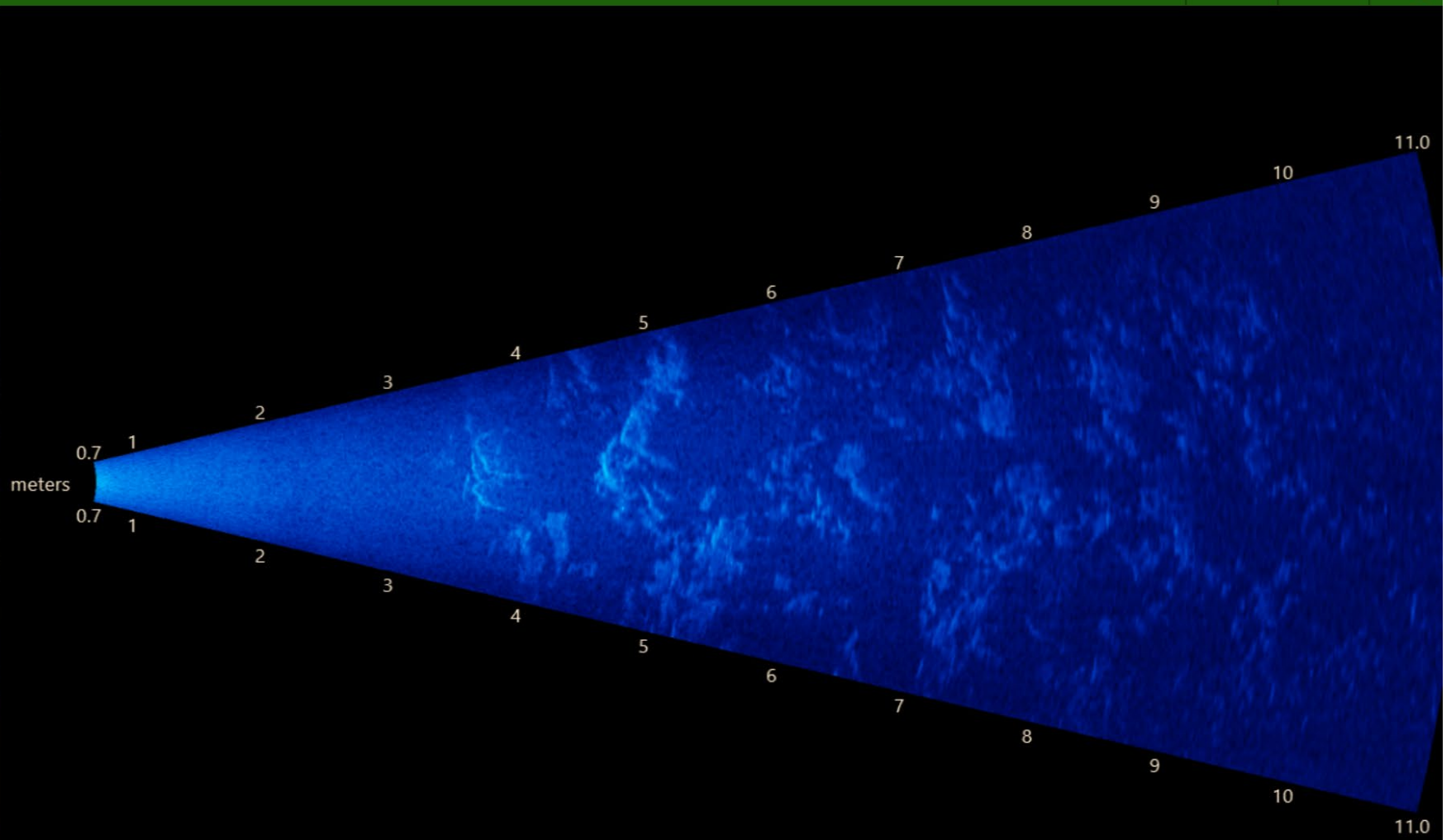
Locations: 9 / 44



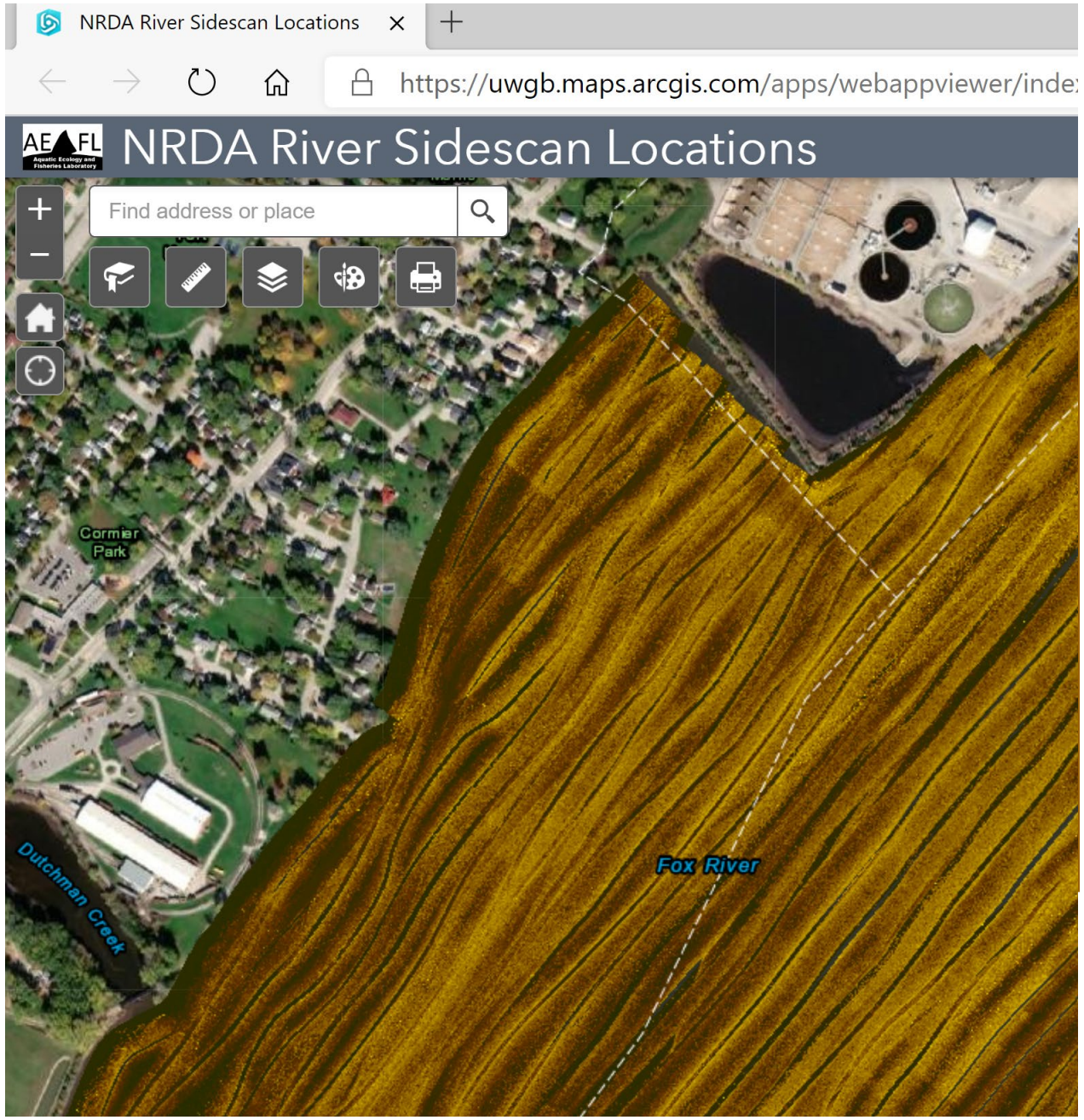
Site
2

Water Velocity (m/s)
0.32

Lake Whitefish Density (count / sq. m)
0.58



Attachments: 1 / 1


NRDA River Sidescan Locations
https://uwgb.maps.arcgis.com/apps/webappviewer/index
AE FL
Aquatic Ecology and Fisheries Laboratory
NRDA River Sidescan Locations
Find address or place
Cormier Park
Dutchman Creek
Fox River

Mixed Bag

Wisconsin DNR Accepting Shooting Range Applications Through Aug. 15

Madison — The Wisconsin DNR is accepting applications for the Shooting Range Grant Program through Aug. 15.

The program provides financial assistance for safe firearm or archery shooting opportunities. Managers of public or private ranges or members of the public interested in building a new range may apply. Ideal ranges are located near highly populated areas and offer educational programming for the public related to hunting and shooting sports. For-profit businesses are not eligible for funding.

Prior to submitting an application, all applicants must contact either Sarah Brenner, DNR Shooting Range Grant Program manager, at Sarah.Brenner@wisconsin.gov or (715) 894-8666, or Brett Johanen, DNR public shooting range manager, at Brett.Johanen@wisconsin.gov or (608) 772-4928 to discuss their interest. More information is on the DNR's shooting range grant program webpage.

Buffalo Co. CDAC Passes on Holiday Hunt

Town of Buffalo, Wis. — The Buffalo County Deer Advisory Council (CDAC) voted 5 to 3 against making a December holiday hunt available this year for antlerless deer, which would then also do away with an extended archery hunt.

Those recommendations will be passed along to the DNR and Natural Resources Board for a final determination on the county's 2026 deer season framework.

The Buffalo County CDAC also set antlerless deer harvest quota recommendations for the 2026 deer seasons. Members voted to keep the harvest quota the same as 2025 at 4,300, with proposed bonus permits available for 175 tags for public land and 750 for private land. Three farmland tags and three bonus tags per license were also recommended by CDAC members, who met Wednesday, April 28, at the Town of Buffalo town hall.

DNR Working Marathon Co. Manure Spill

Athens, Wis. — The DNR responded to a manure spill near the village of Athens in Marathon County. On Tuesday, May 5, the DNR was notified of manure discharging from a waste storage structure at Deercreek Holsteins LLC, a permitted concentrated animal feeding

This 88.58-inch lake sturgeon captured May 5 below the De Pere dam on the Fox River is the second longest ever measured. It grew four inches since its last capture on May 19, 2019. But even more impressive was its girth – 40½ inches versus 33 inches when handled seven years ago. Tessa Losurdo (l-r), Jacob Hoffman, and Lauren Klawiter corralled the fish again May 6. It was estimated at 250 pounds. Photo by Kadisyn Ceplina

Students net 90-inch lake sturgeon at De Pere dam

Big fish estimated to hit 260 pounds

By Kevin Naze
Contributing Writer

De Pere, Wis. — UW-Green Bay graduate Jacob Hoffman, of Coleman, got his feet wet fishing

ecologist and researcher at the University of Illinois-Urbana/Champaign. Tucker, a former graduate student at UW-GB, conducted work on the system from 2018-21, and still assists as a project collaborator.

That group got their hands on an 87.8-inch sturgeon April 26,

getting such little recruitment and larval production out of the Lower Fox River," Hoffman said.

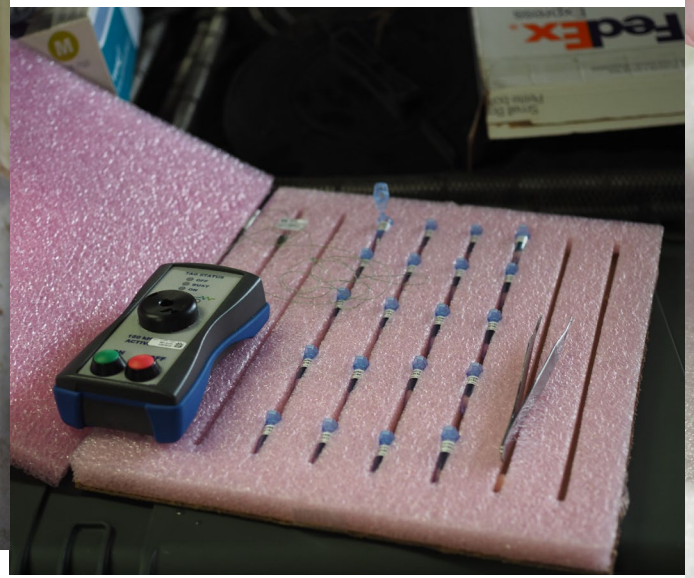
One suspected reason for the low survival rate is that they tend to spawn very close to shore, where eggs are vulnerable to sedimentation, fluctuating water levels, and algal growth. To address this, the

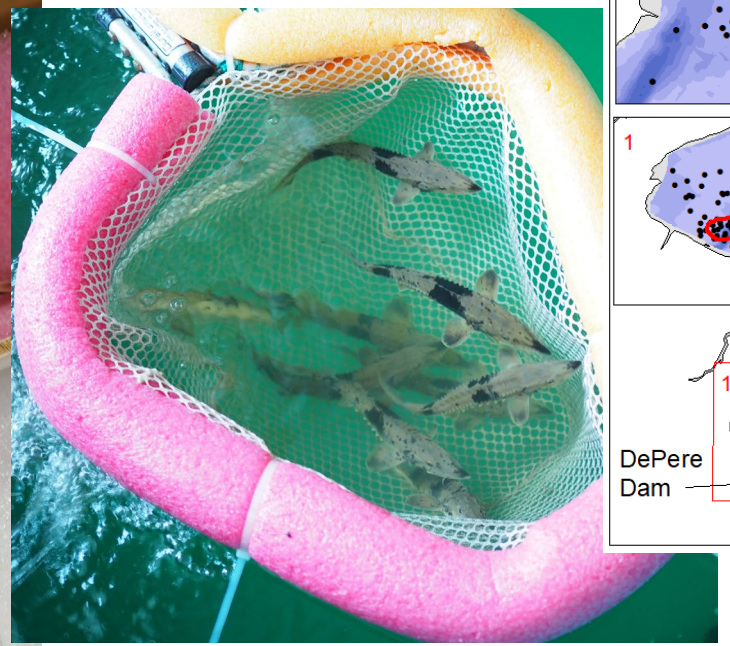
- This year we captured ~190 individual lake sturgeon.
- To date, over 5 years, we have captured and tagged over 450 unique fish
- Hundreds of pounds of eggs are deposited along the shoreline each year
- Equating to millions of eggs annually

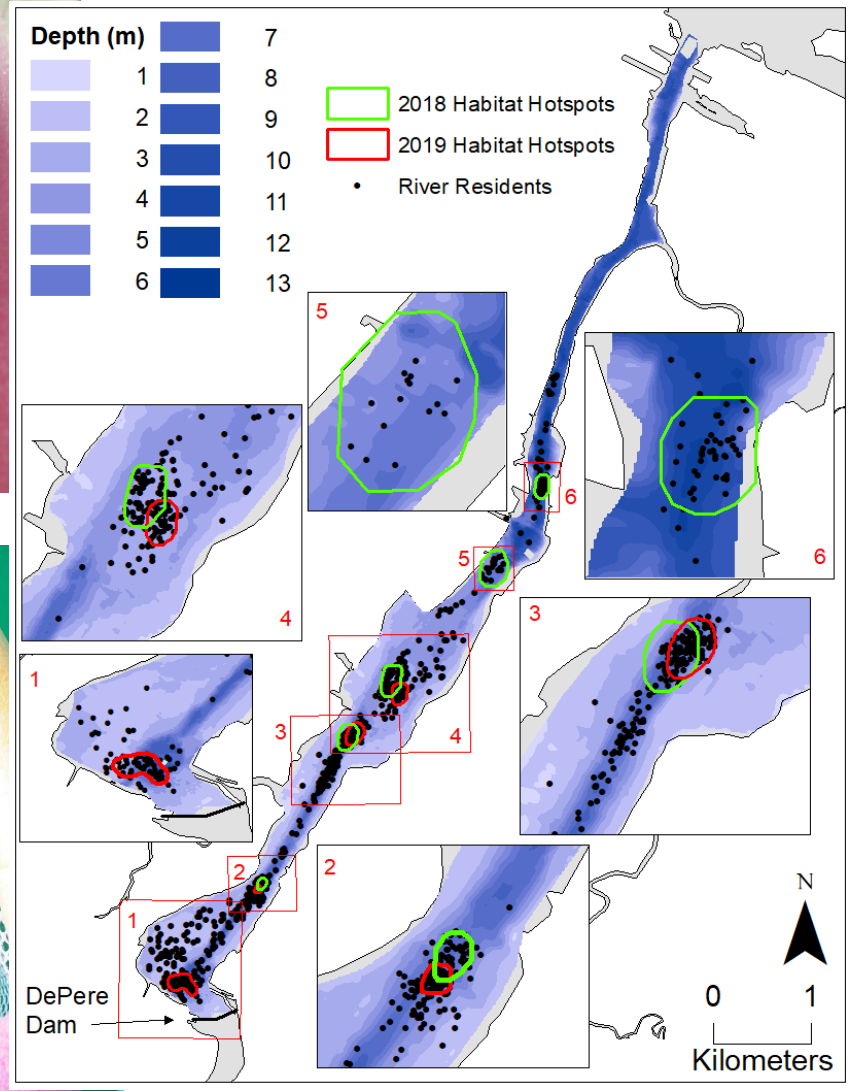
Lake Sturgeon: Larval Drift

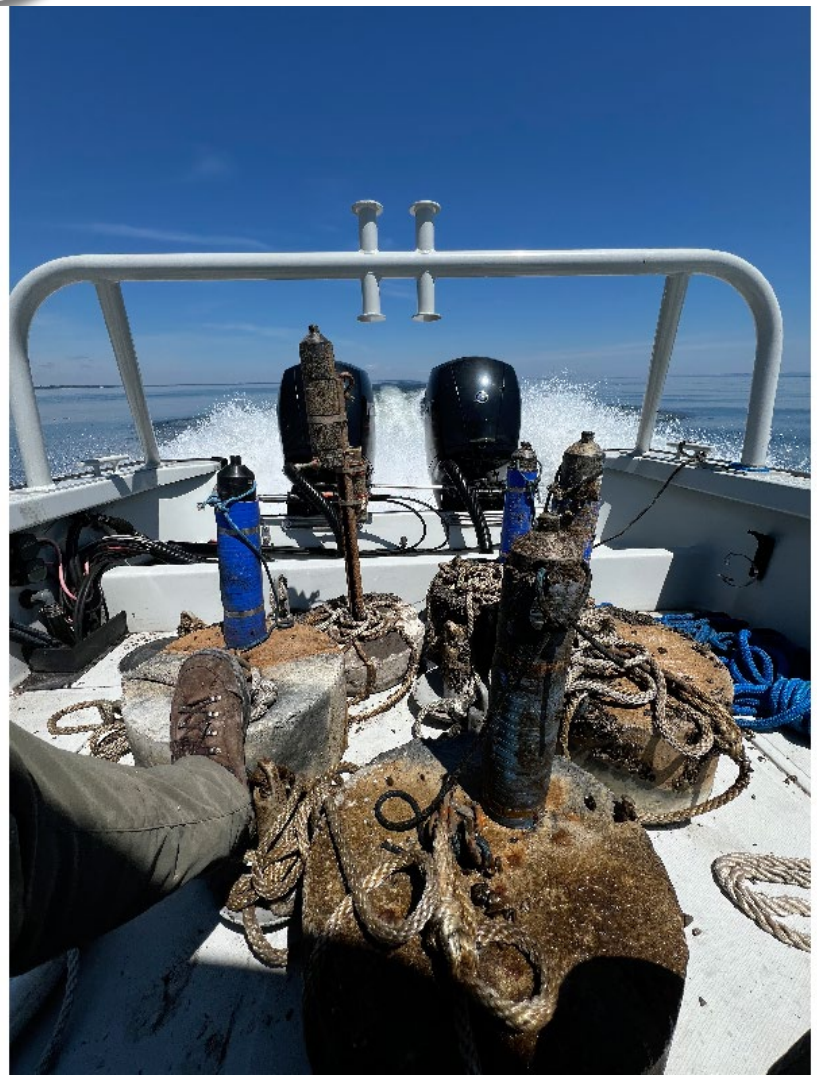
- **22 total lake sturgeon larvae were captured**
- **New highest for the Lower Fox River…**


OHAUS

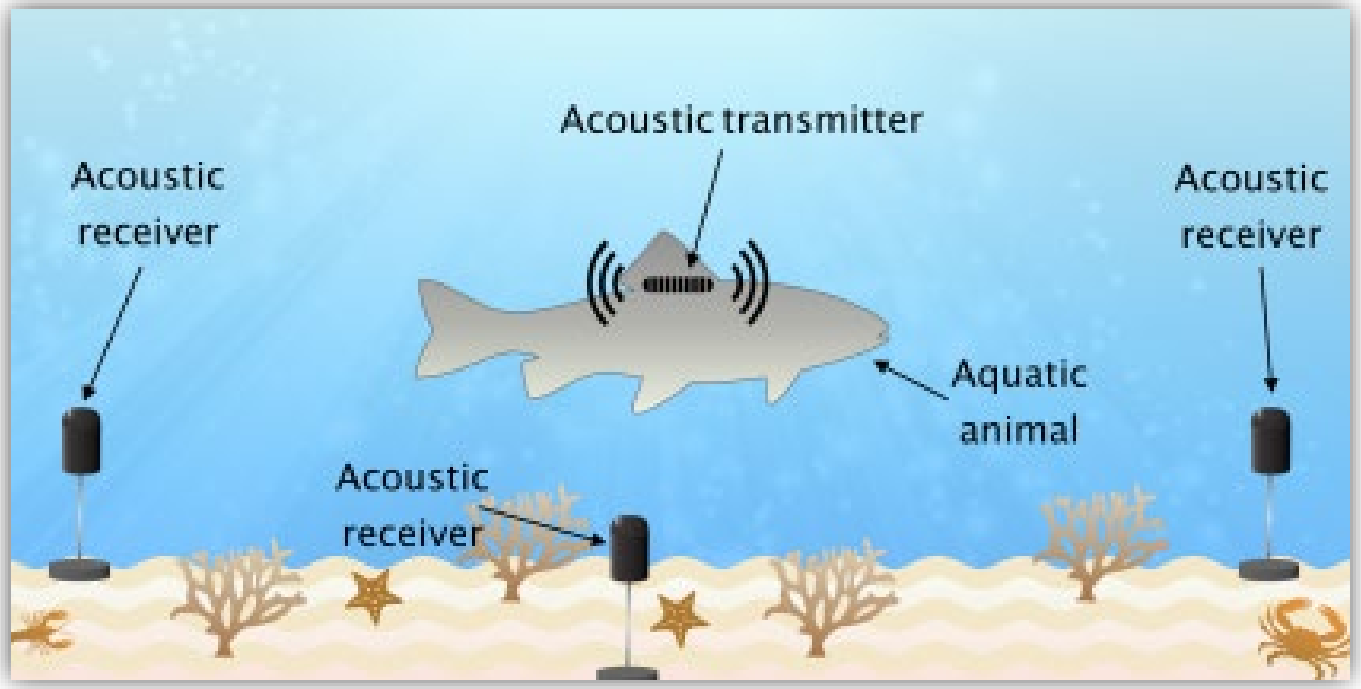





Depth (m)
1
2
3
4
5
6
7
8
9
10
11
12
13
2018 Habitat Hotspots
2019 Habitat Hotspots
River Residents
DePere Dam
N
0
1
Kilometers



GLATOS:
Acoustic telemetry array in Green Bay



GLATOS: Acoustic telemetry array in Green Bay

Tagged species:

Northern Pike

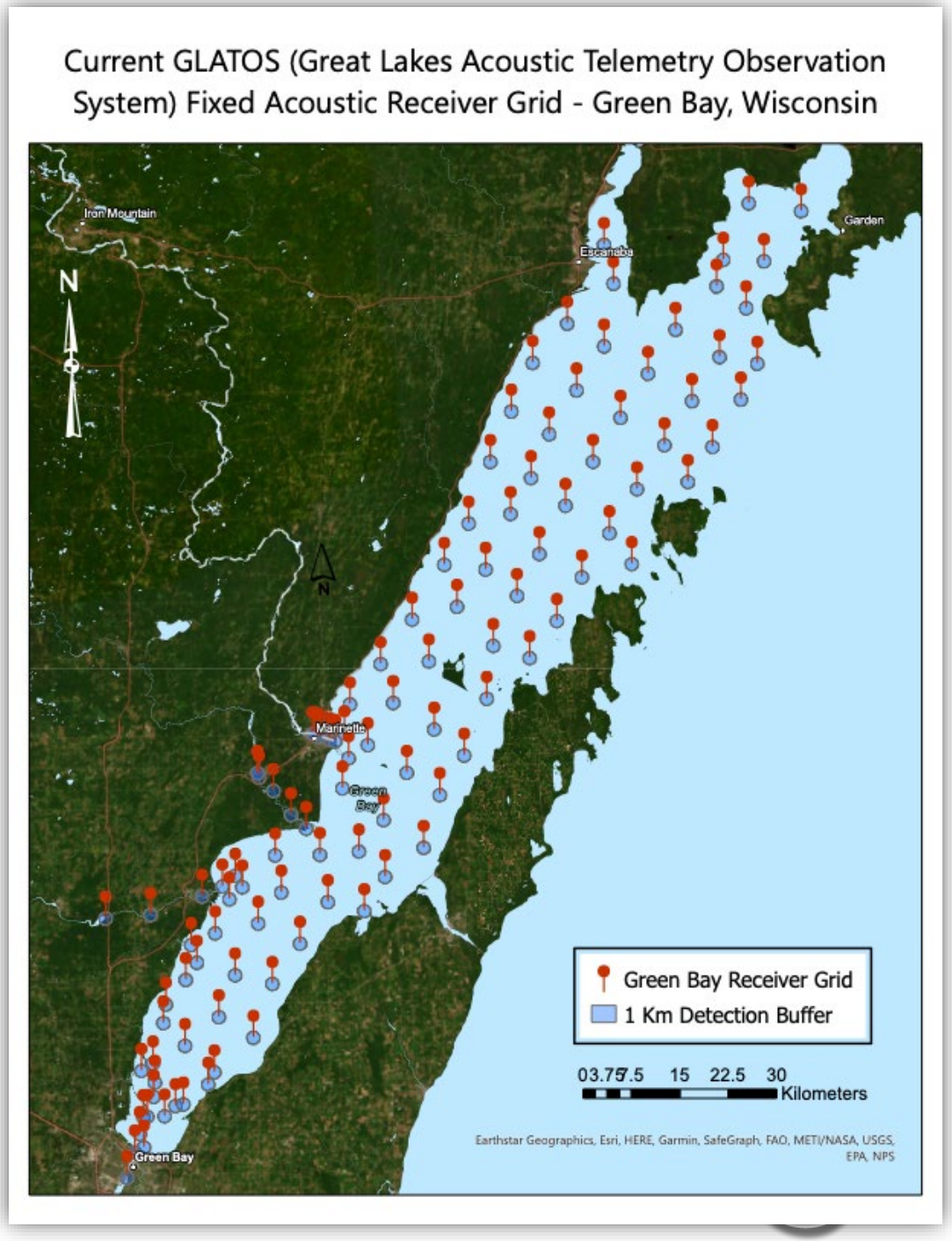
Smallmouth Bass

Muskellunge

Walleye

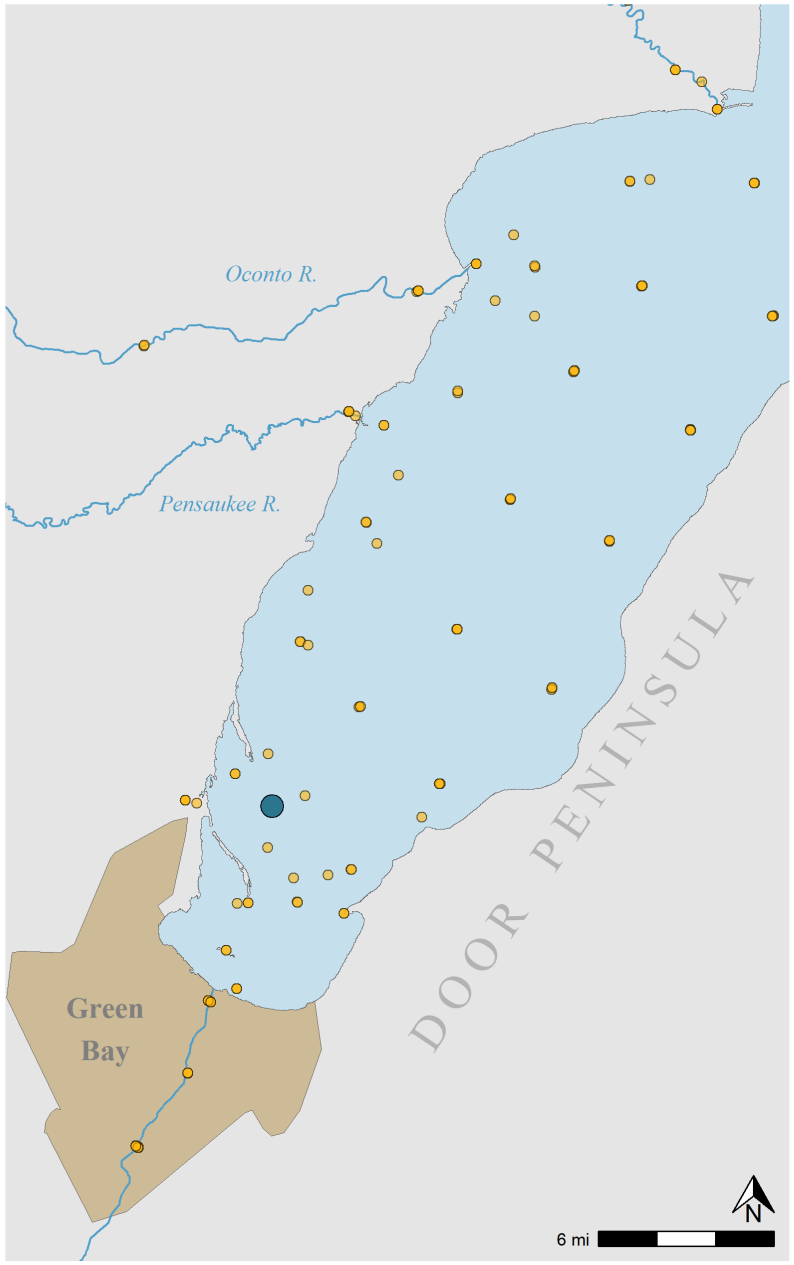
Lake Whitefish

Lake sturgeon



Northern Pike Acoustic Telemetry

April 2022



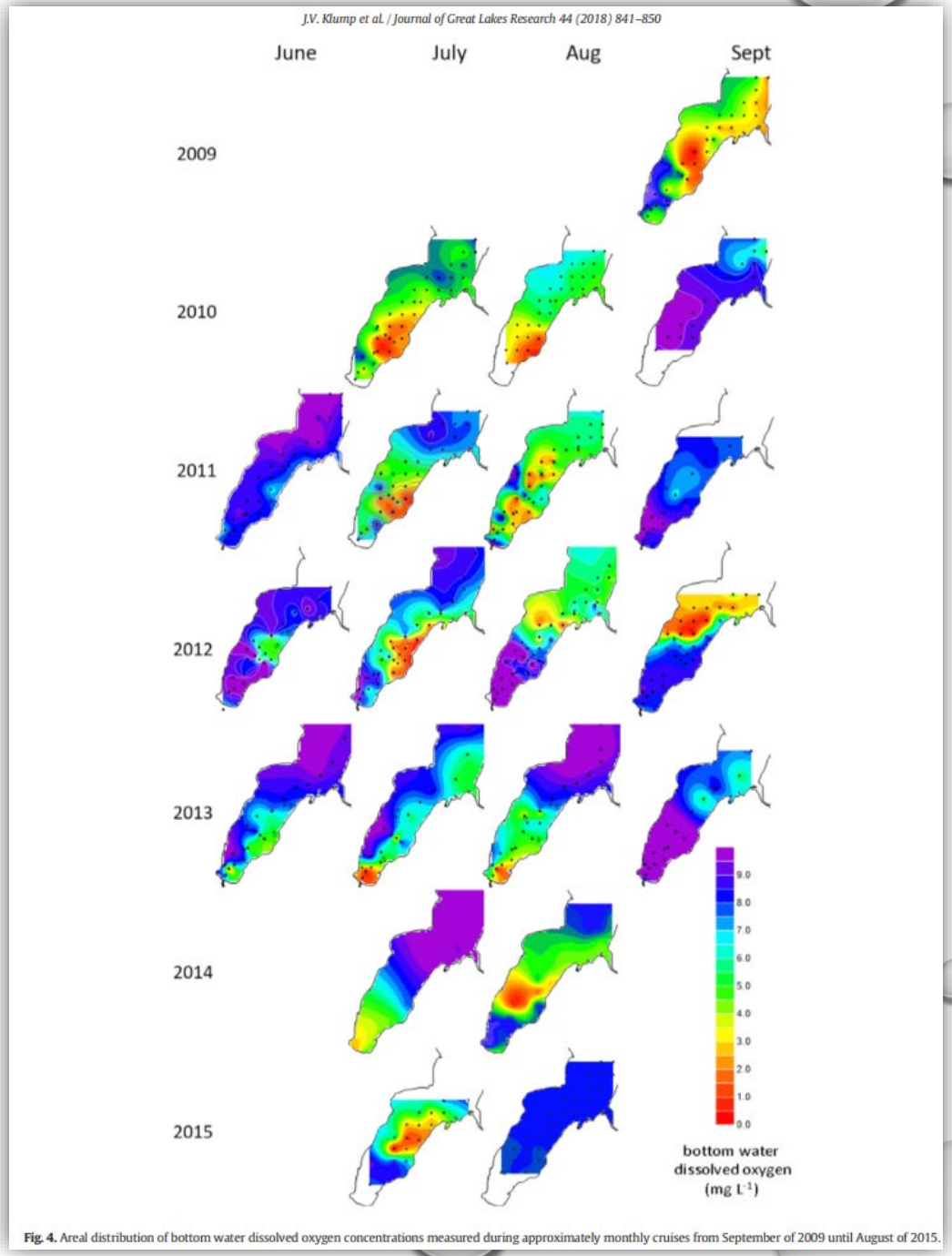
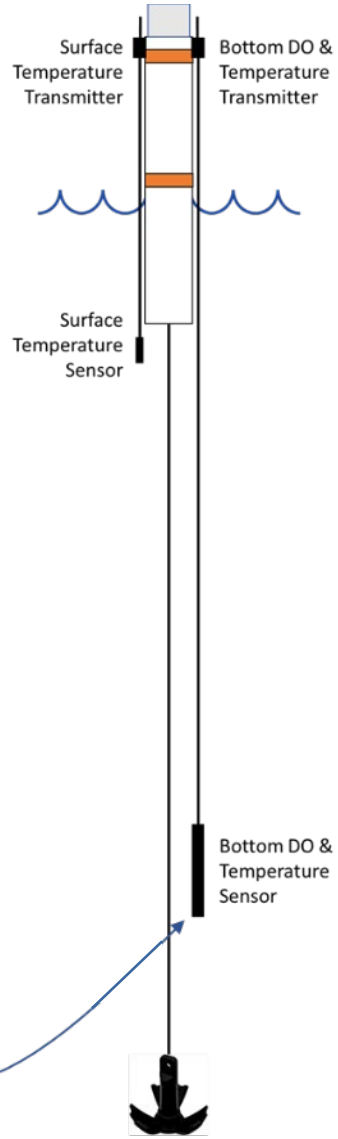


Fig. 4. Areal distribution of bottom water dissolved oxygen concentrations measured during approximately monthly cruises from September of 2009 until August of 2015.

Low-Cost Monitoring Buoys

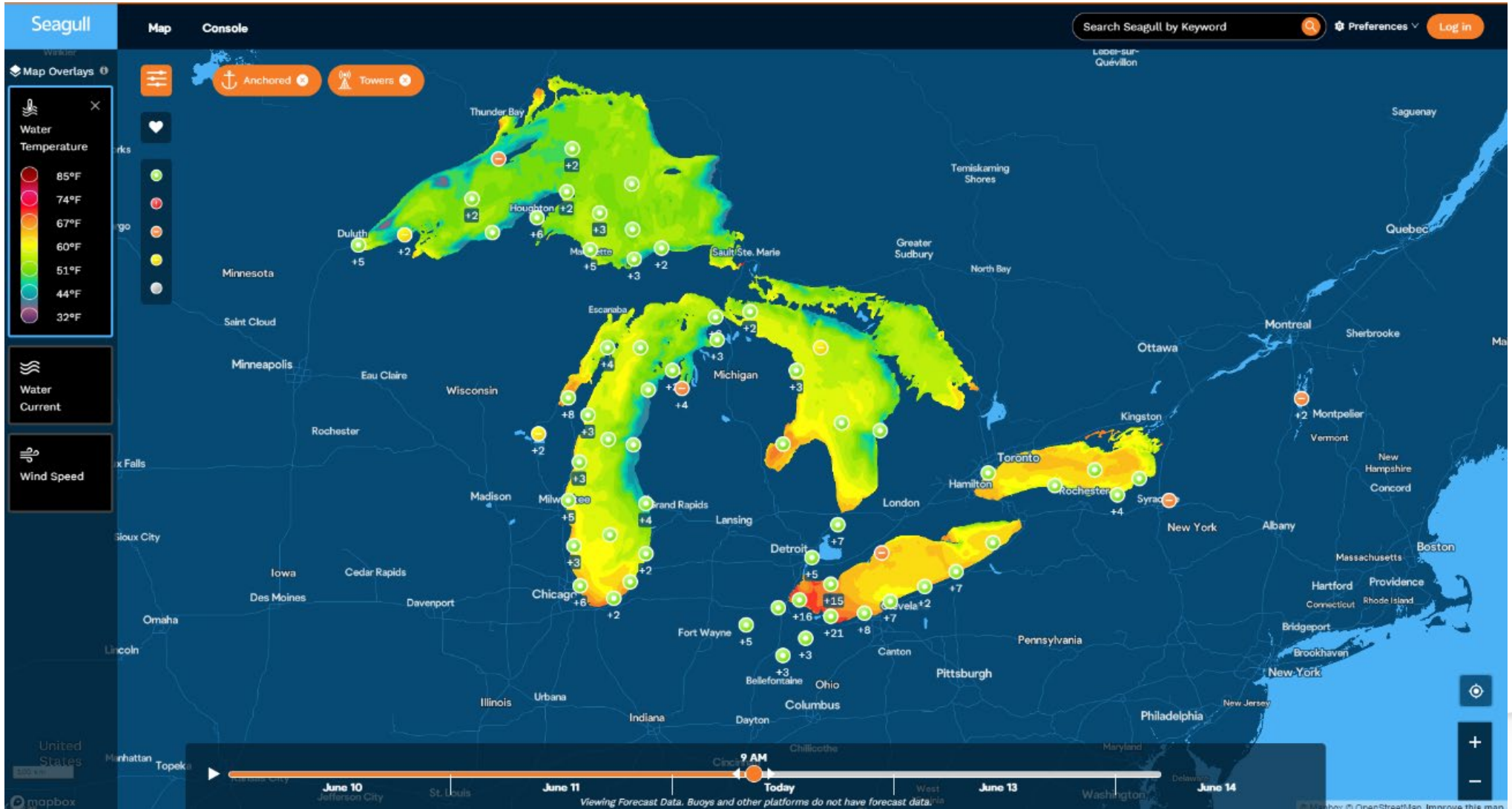
Low cost spar buoy prototype

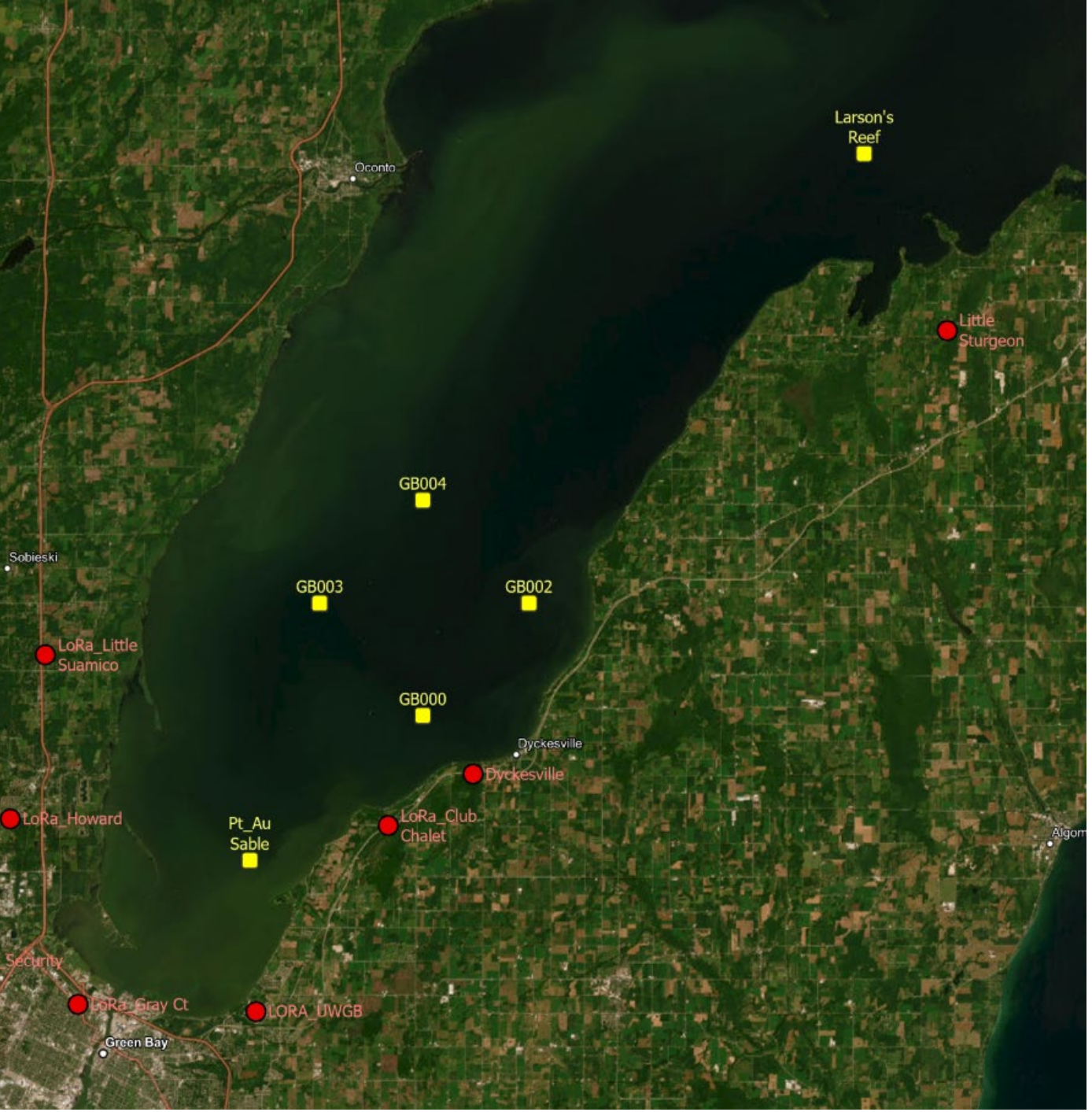
Real time Dissolved Oxygen Sensor



- Great Lakes Observing System (GLOS)
  - Seagull platform

GLOS Seagull Platform





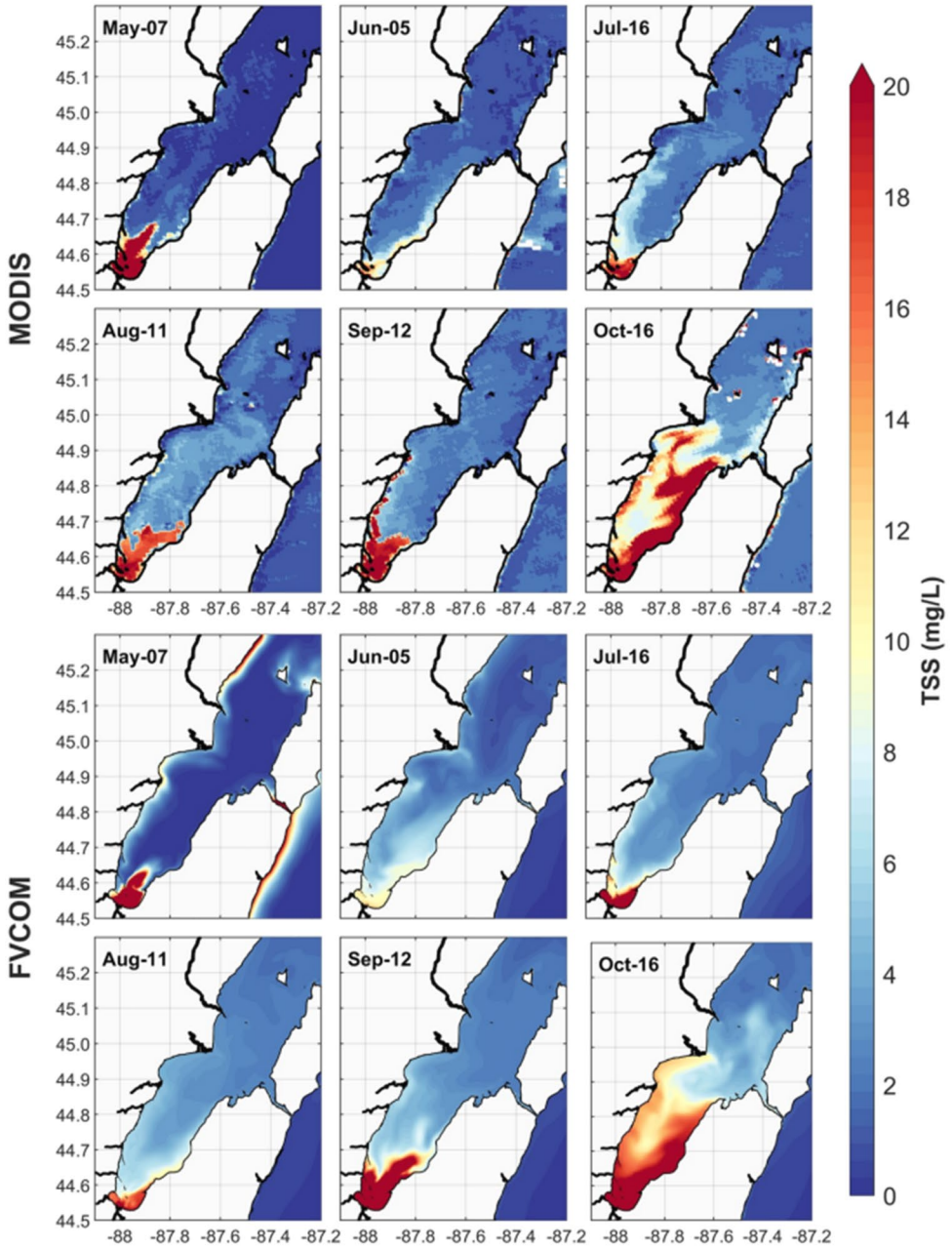
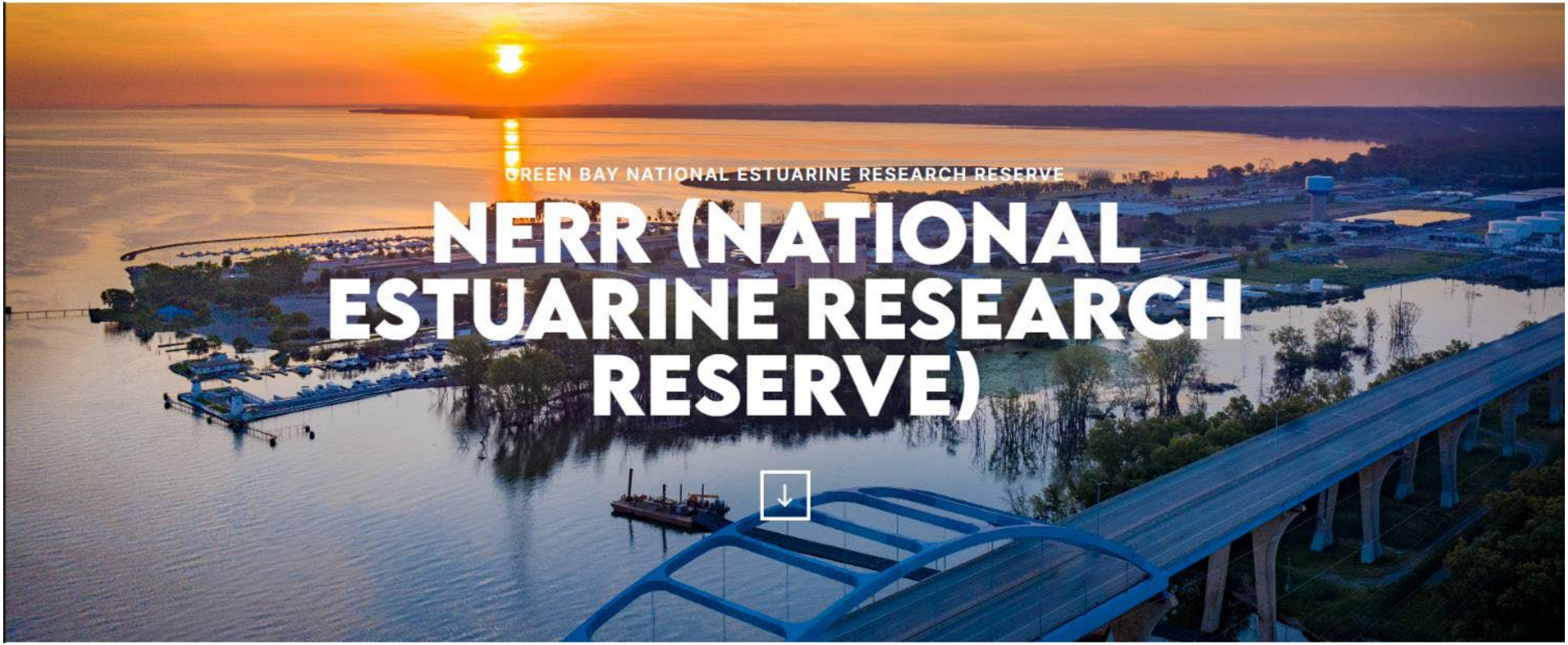


Figure 4. Snapshots of the surface total suspended solids (TSS) in Green Bay for six cloud-free selected days in May–October 2018 period based on MODIS imagery (top) and FVCOM simulations (bottom).

Future: **Green Bay NERR**… and Onward!



Thank you!

Questions?

houghtoc@uwgb.edu