Using the GLATOS Network to Understand Fish Behavior and Movement at Unprecedented Spatial Scales

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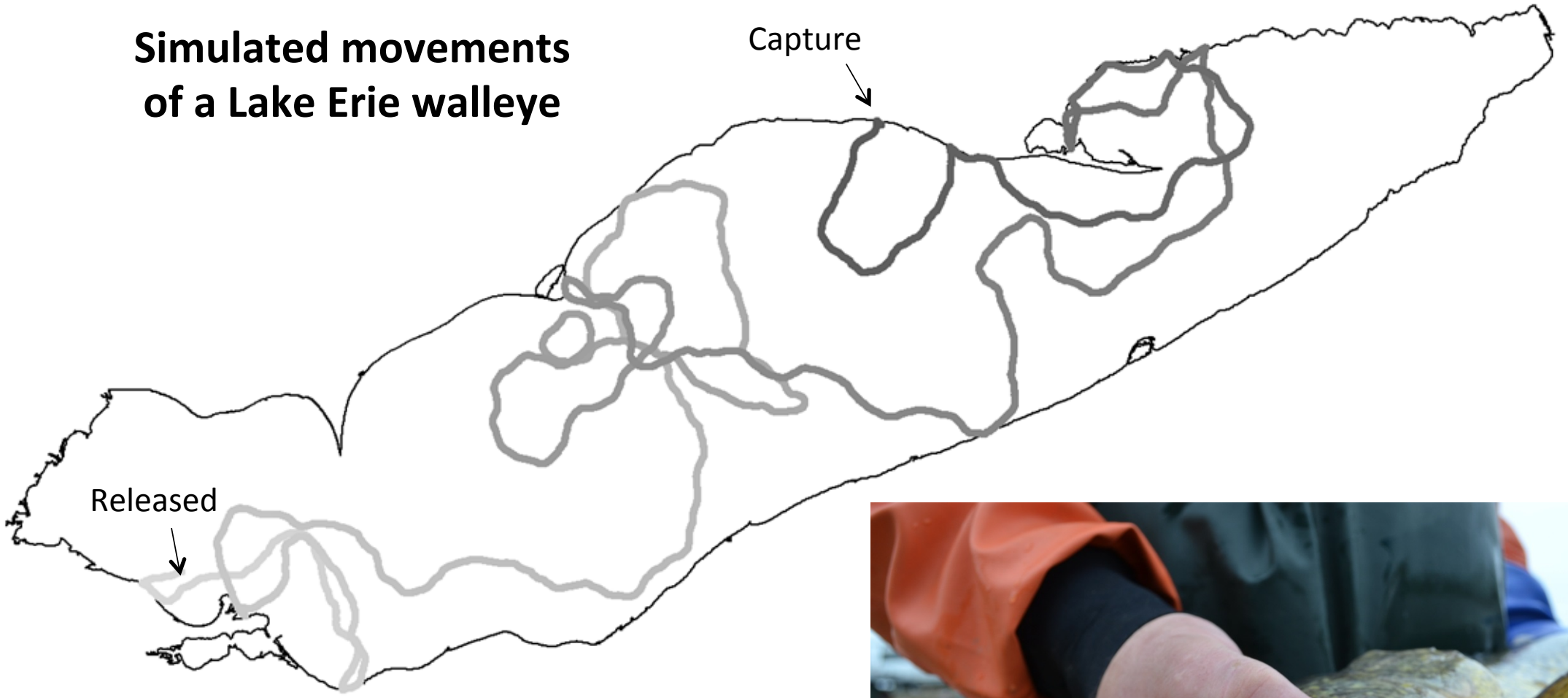
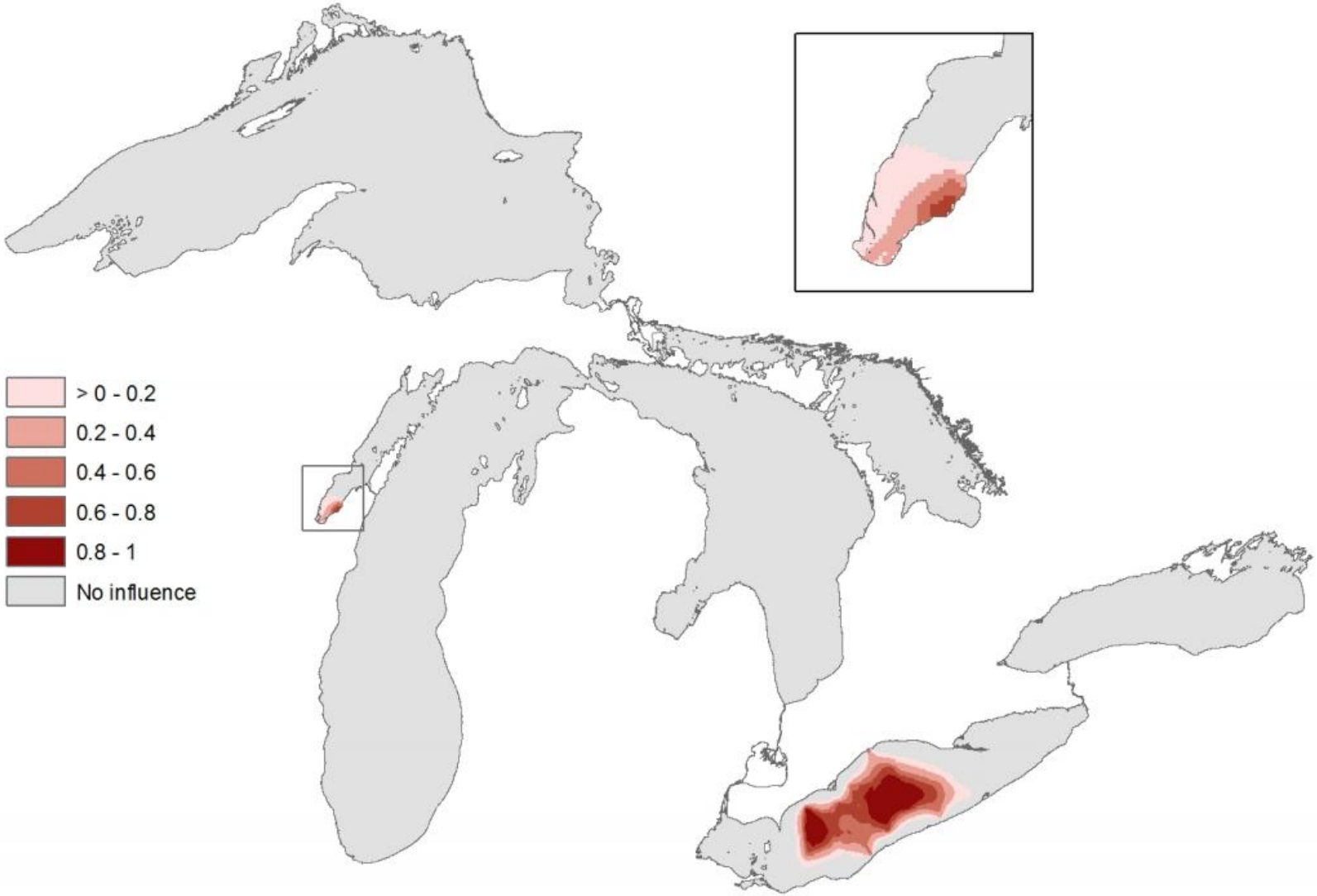
09-165809-16


MI MAR LYNNE

Simulated movements of a Lake Erie walleye



Spatial distribution of hypoxia as a stressor in the Laurentian Great Lakes (Inset: Green Bay, Lake Michigan)



http://greatlakesmapping.org/great_lake_stressors/6/hypoxia

GLATOS

Great Lakes Acoustic Telemetry Observation System

"to conduct studies of fish movement and behavior at *scales that were previously not feasible (impractical/ impossible).*"

1) conduct novel research over broad geographic scales
2) establish a network of researchers
   - develop collaborative partnerships
   - facilitate data sharing among projects

GLATOS

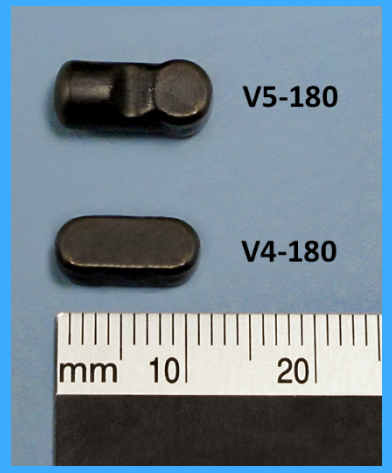
Great Lakes Acoustic Telemetry Observation System

"to conduct studies of fish movement and behavior at *scales that were previously not feasible*."

- capitol investment of acoustic telemetry infrastructure made 2010
- initially 4 projects (lake trout, walleye, sea lamprey, lake sturgeon)
- 43 projects, 36 species, 6 617 fish tagged, 118 million fish detections
- receiver arrays in all Laurentian Great Lakes and interconnecting waterways
- collaborative research, variety of funding sources, expertise and resources

Great Lakes Fishery Commission · USGS science for a changing world · Michigan State University · great lakes observing system · Ocean Tracking Network · Great Lakes Restoration

Transmitter



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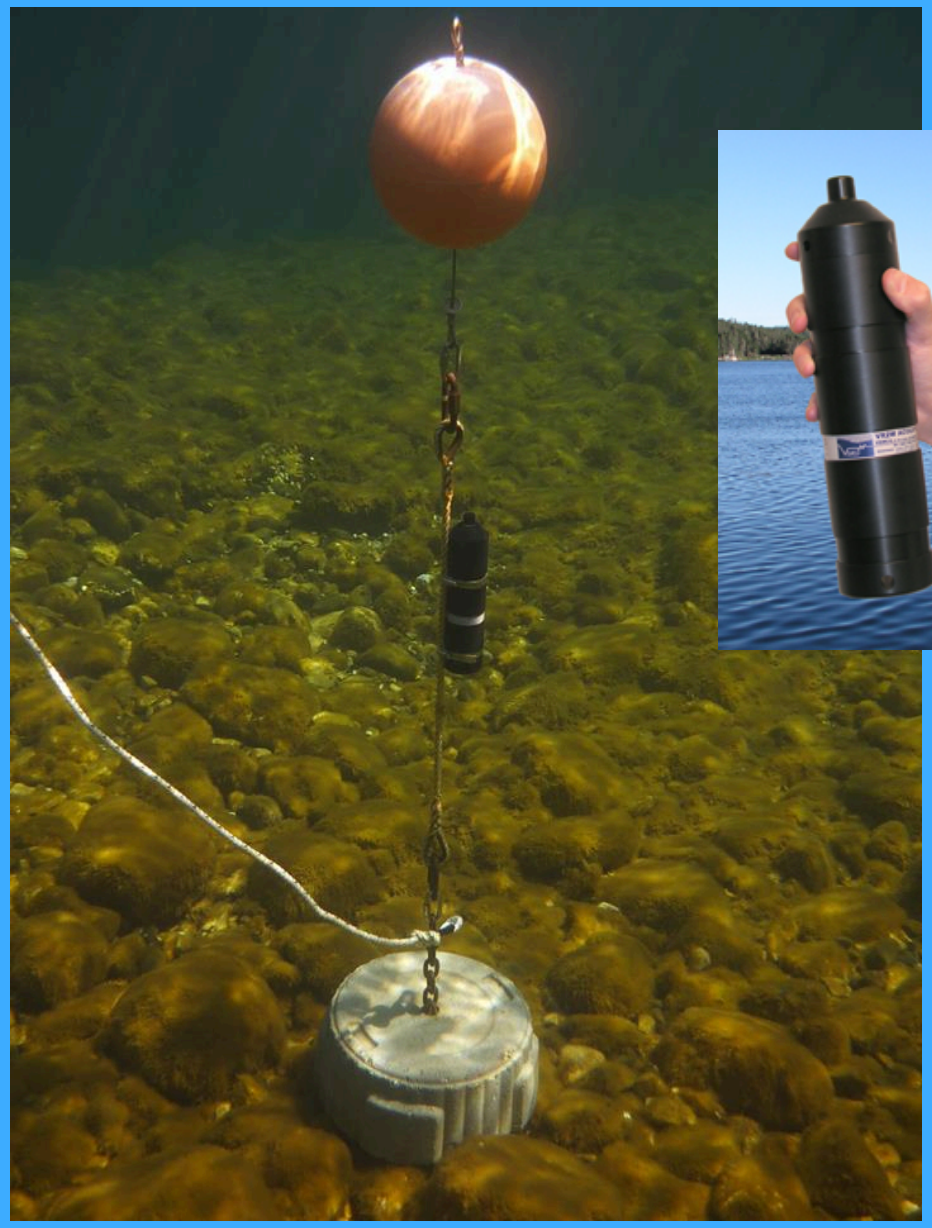
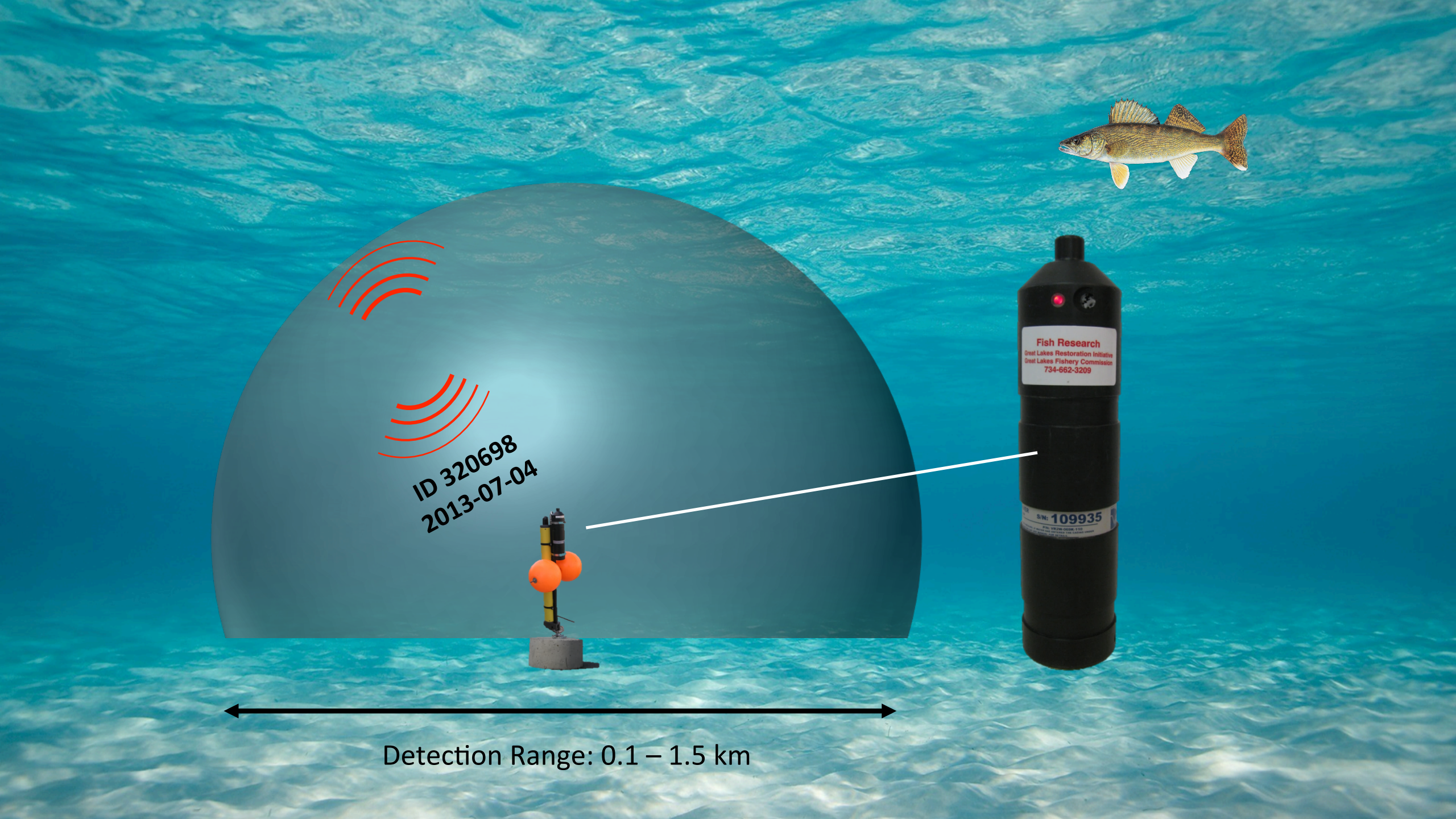
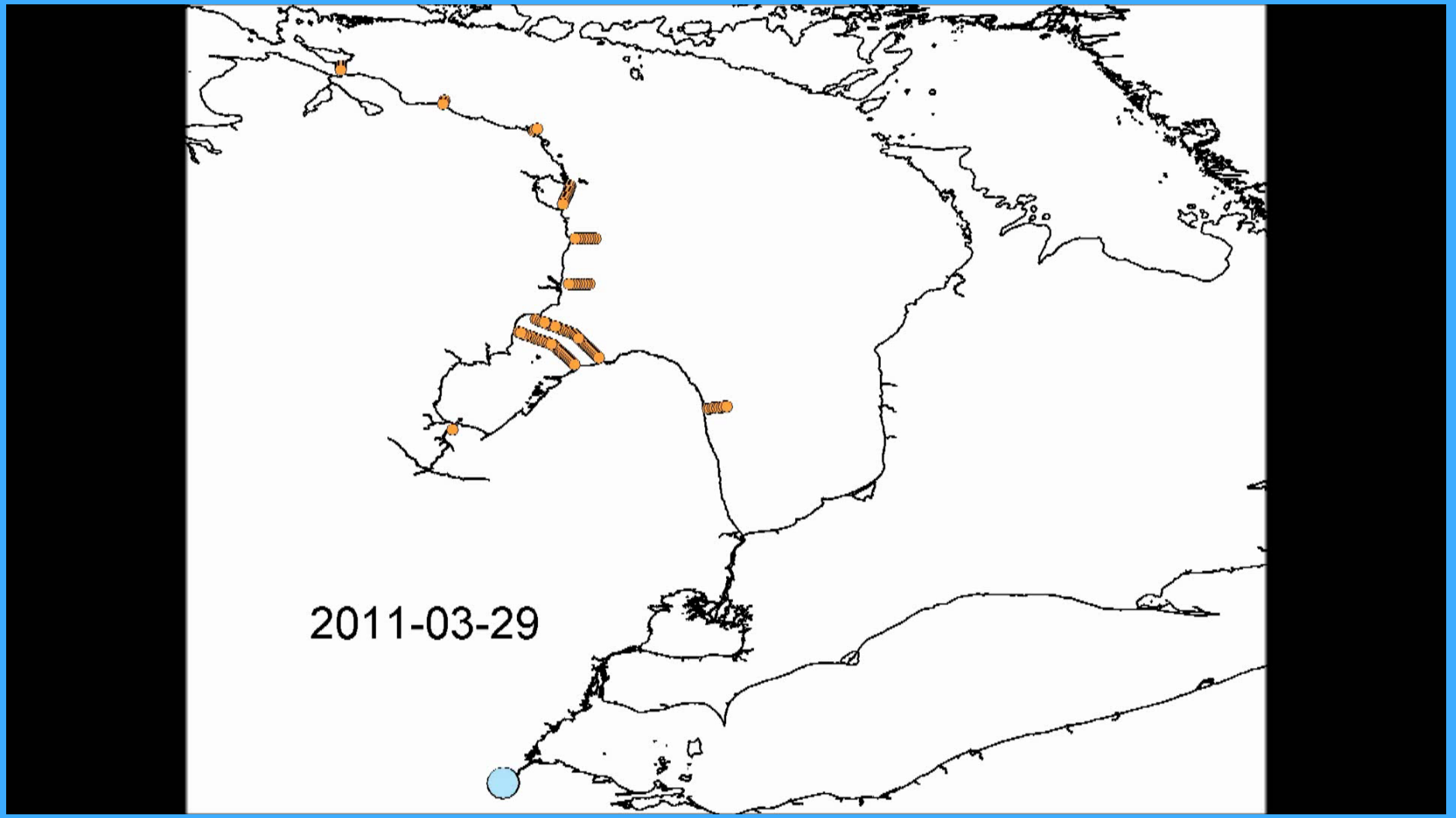


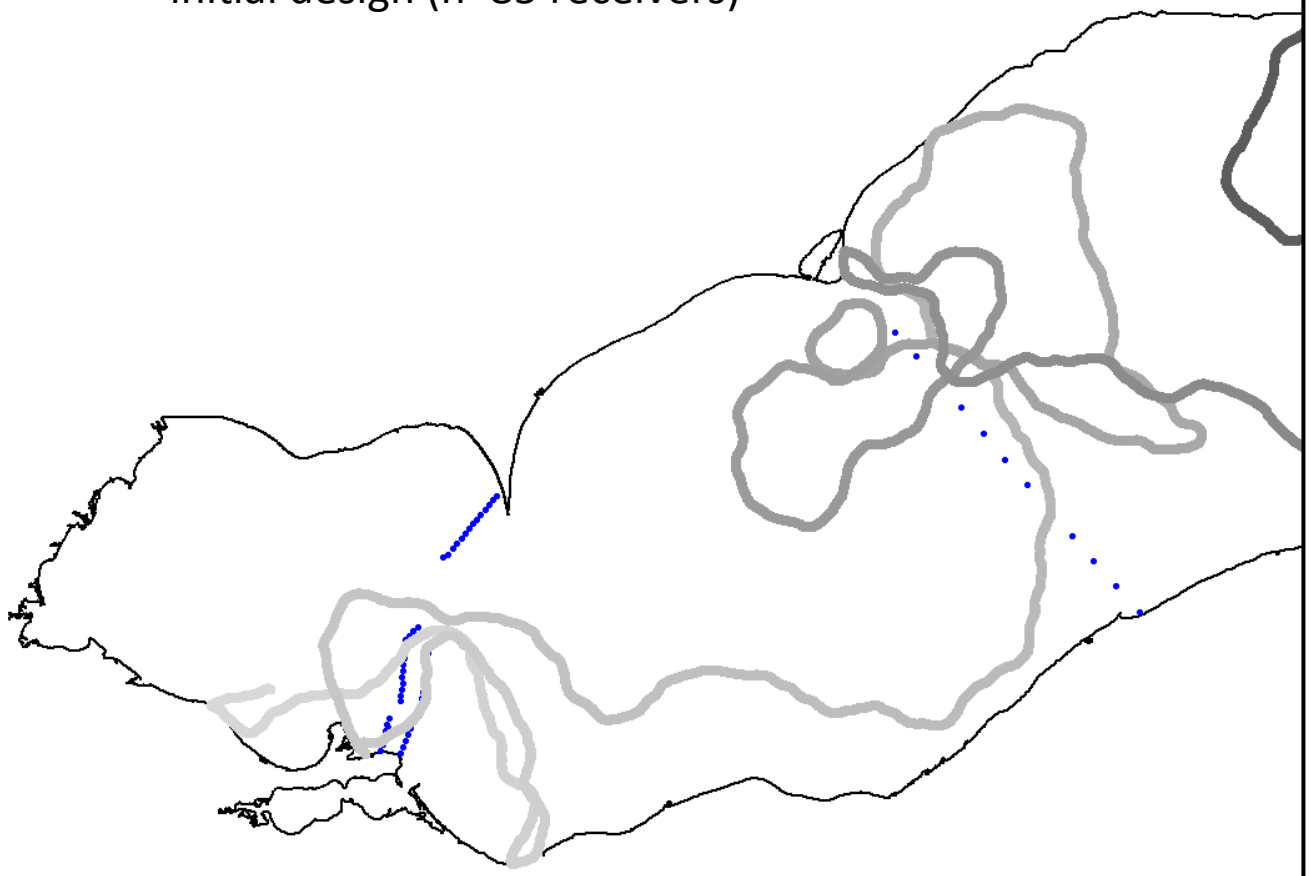

ID 320698
2013-07-04
Fish Research
Great Lakes Restoration Initiative
Great Lakes Fishery Commission
734-662-3209
S/N: 109935
Detection Range: 0.1 – 1.5 km

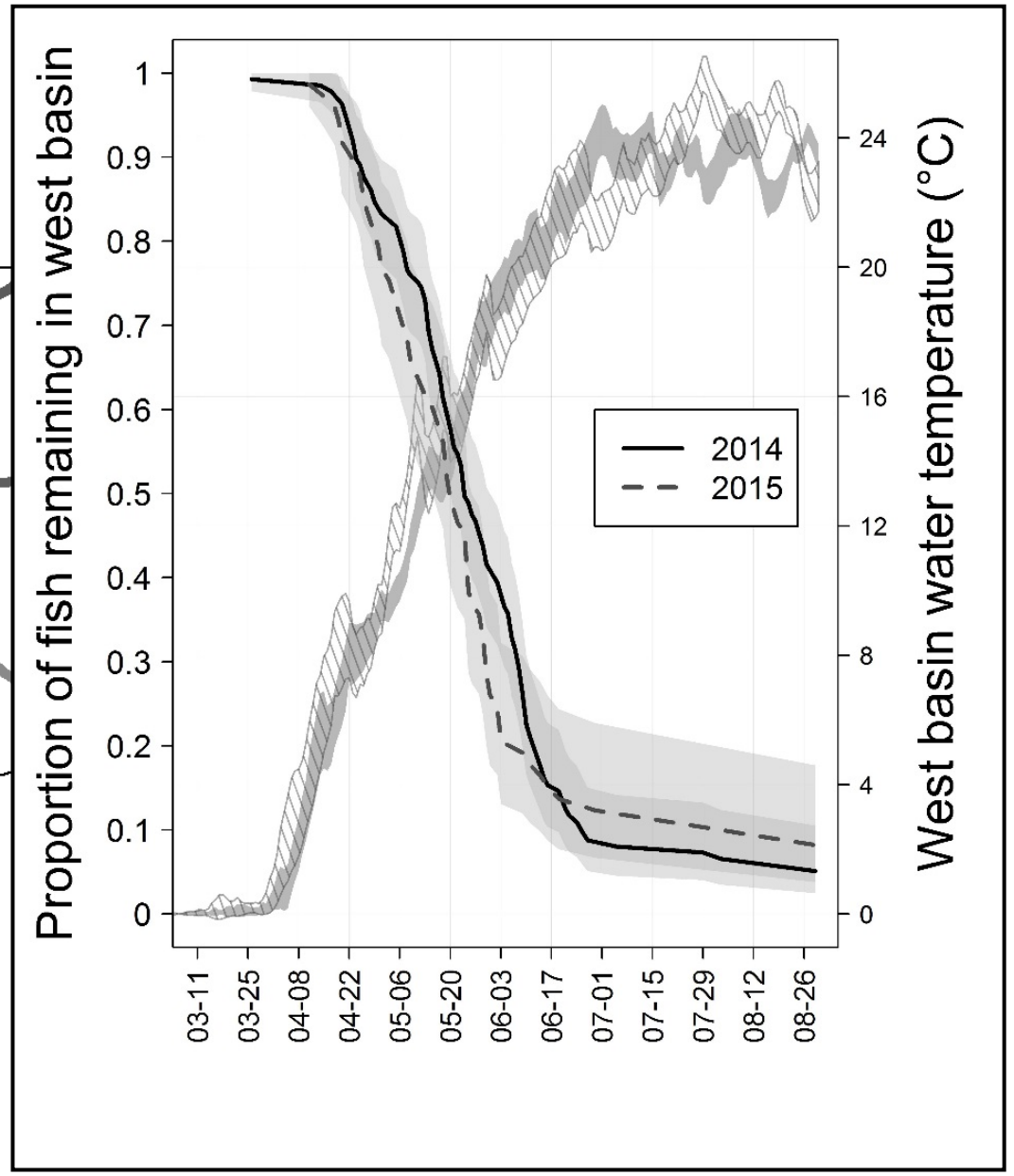

GLATOS
Great Lakes Acoustic Telemetry
Observation System

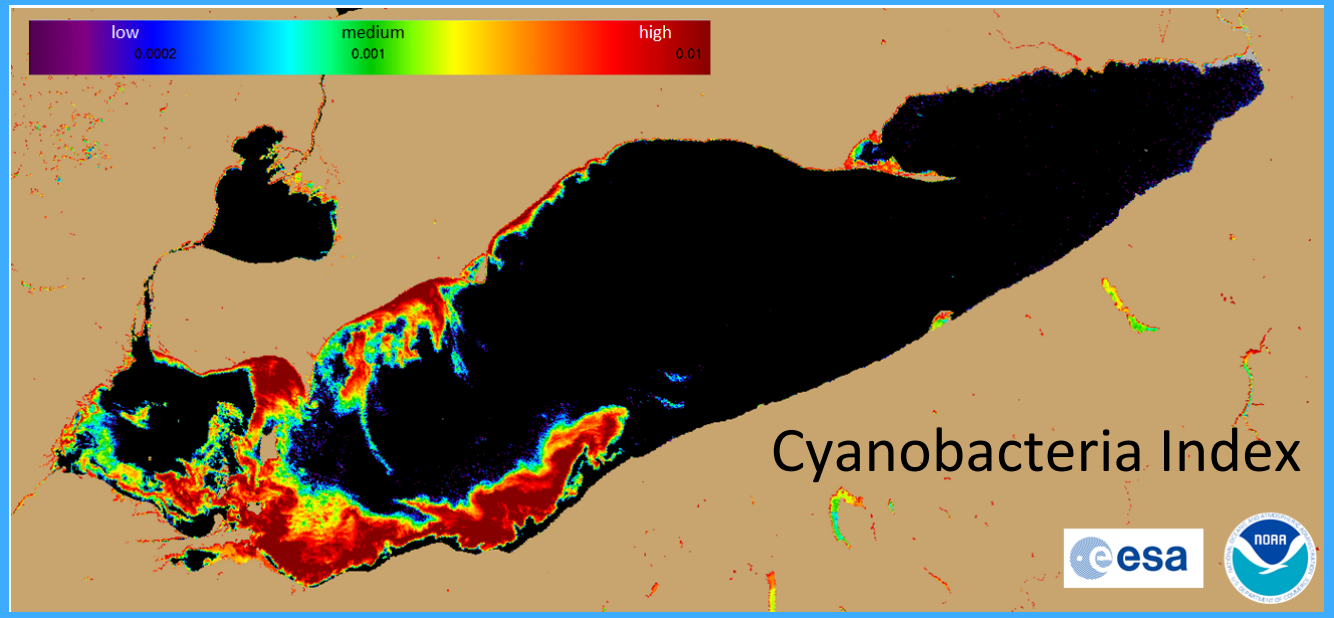

2011-03-29

Simulated Walleye Movements

- initial design (n=85 receivers)



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medium
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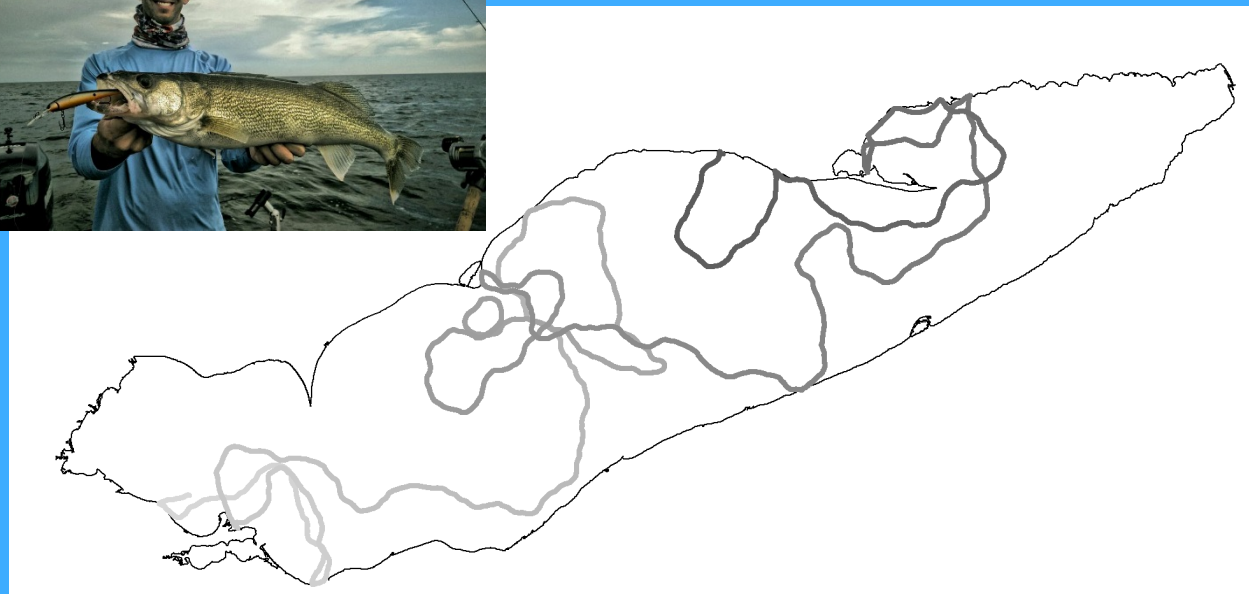
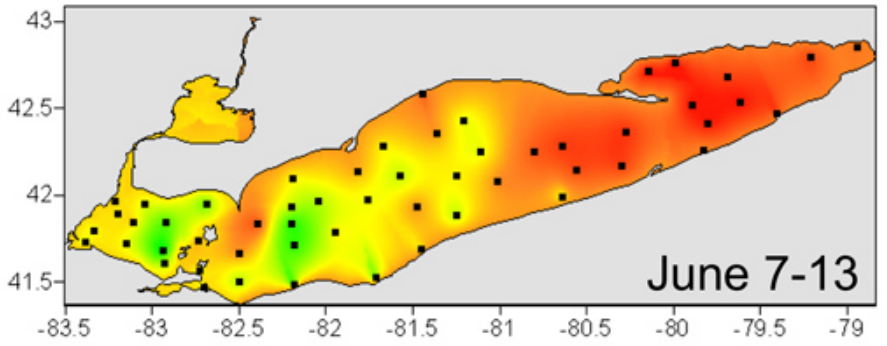
high
0.01
Cyanobacteria Index
esa
NOAA

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42.5
42
41.5
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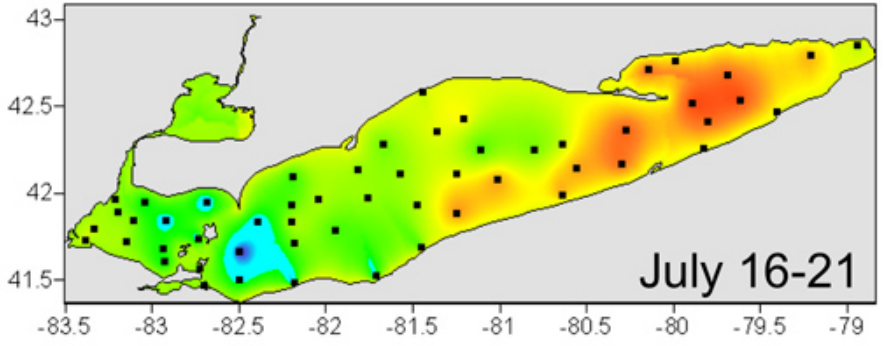
-79
June 7-13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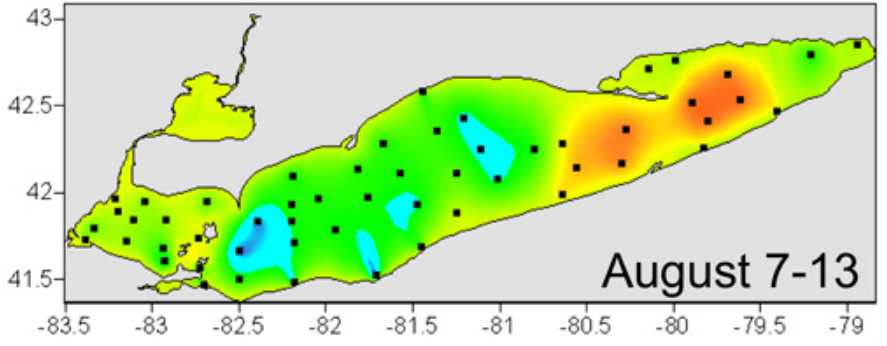
July 16-21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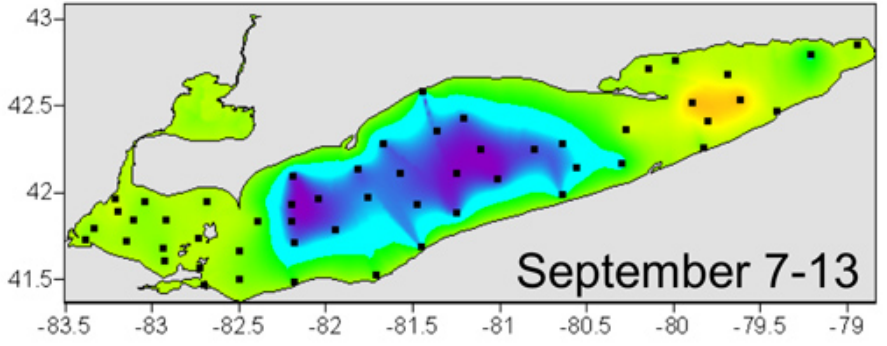
August 7-13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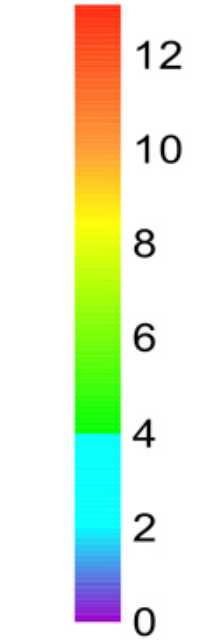
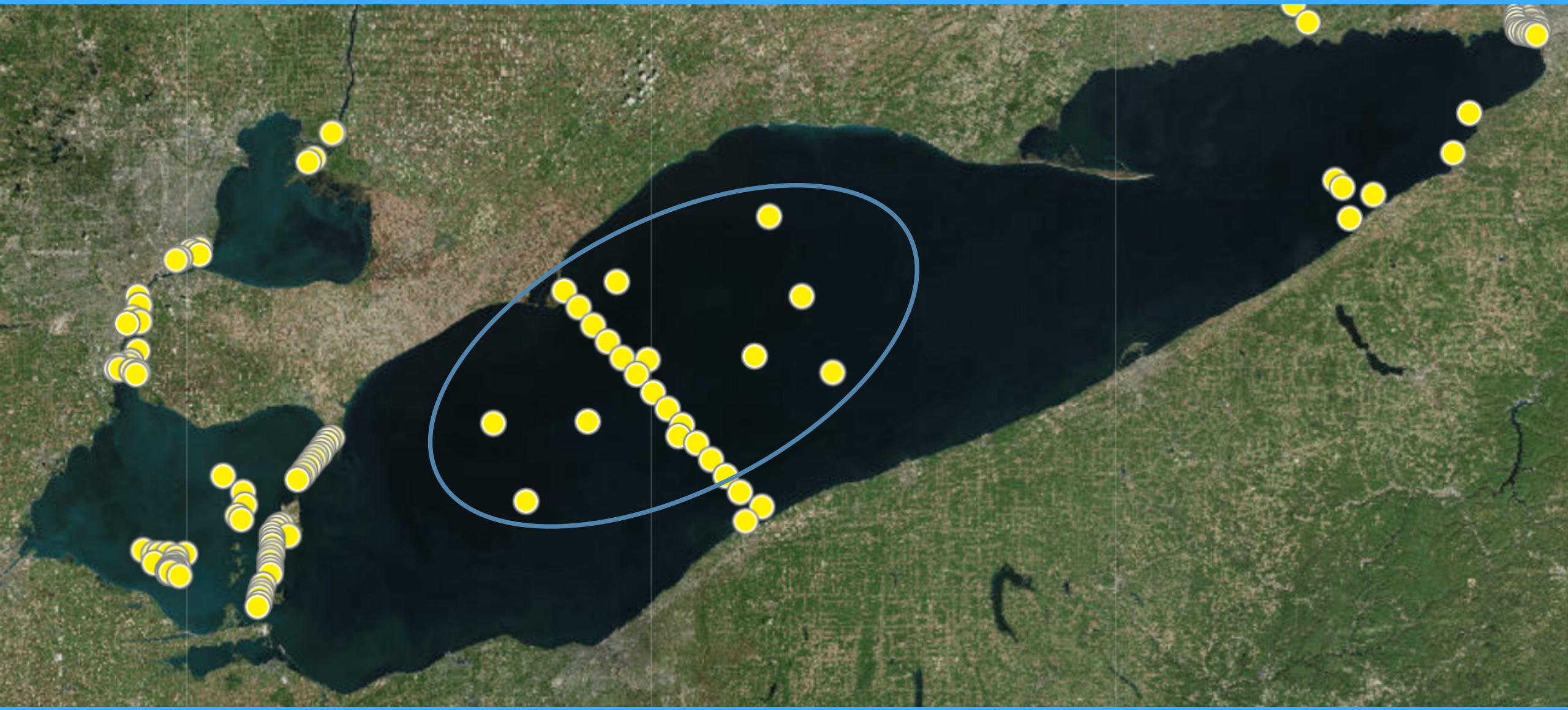
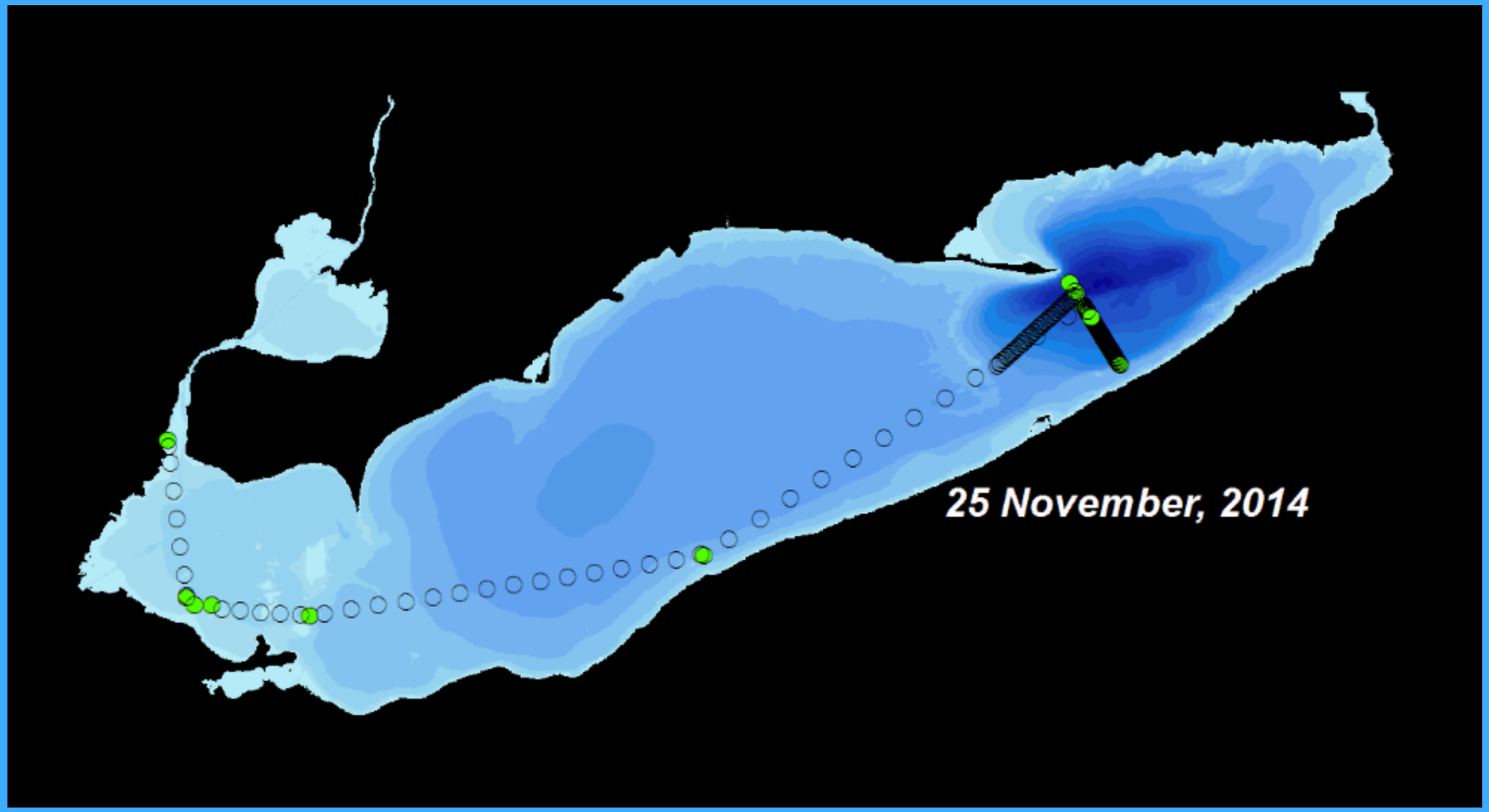
September 7-13

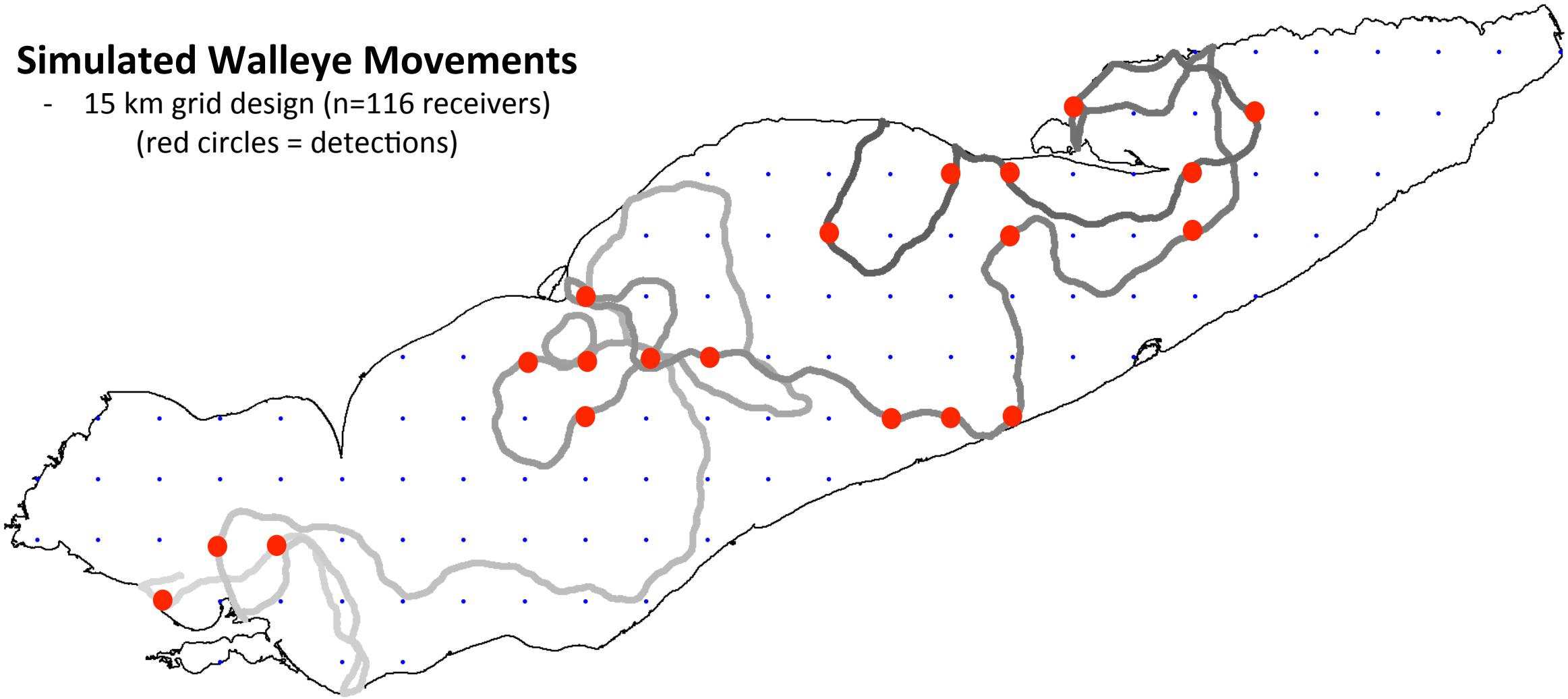

12
10
8
6
4
2
0
Dissolved Oxygen (mg/l)

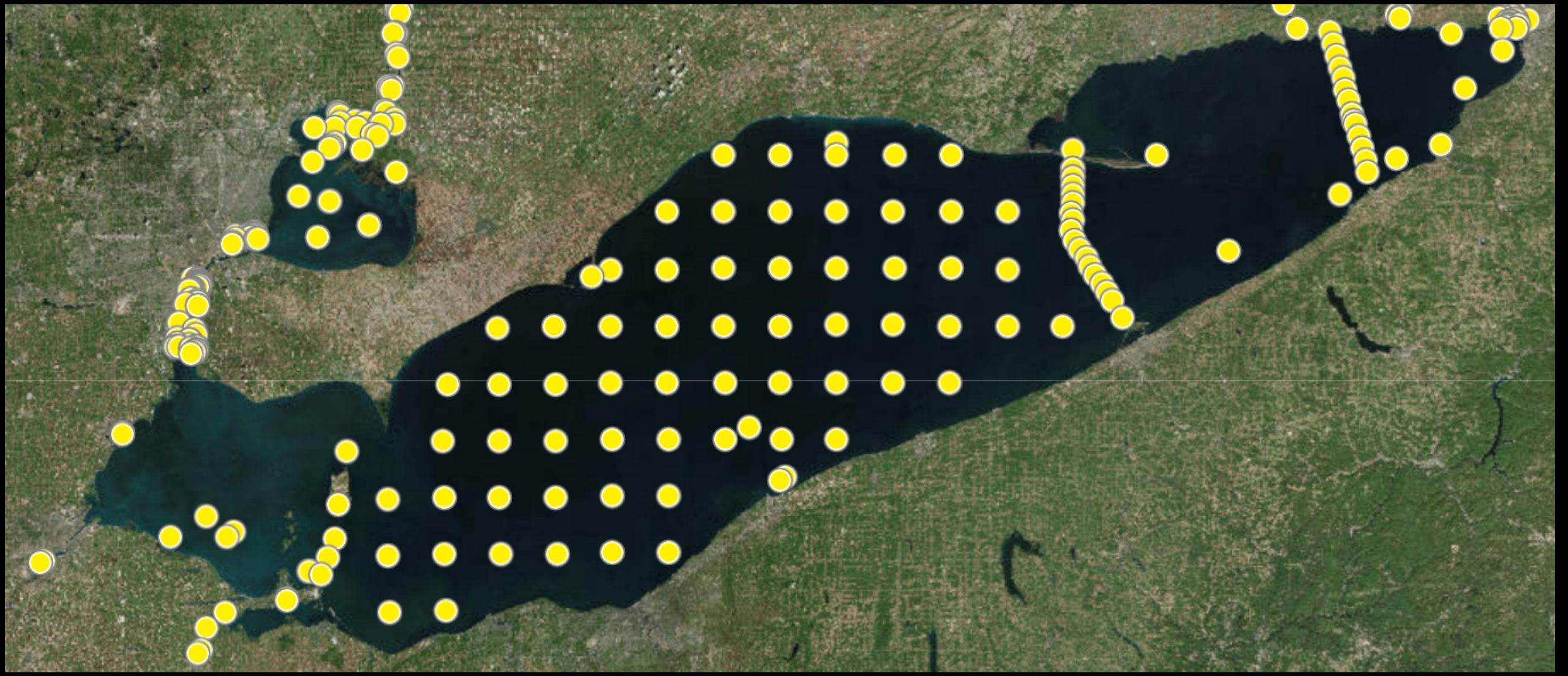



25 November, 2014

Simulated Walleye Movements

- 15 km grid design (n=116 receivers)
  (red circles = detections)





ID 320698
2013-07-04
7.9 m; 18.6 C*

Detection Range: 0.1 – 1.5 km

Dissolved Oxygen/ Temperature Logger
HOBO (Onset) U26-001

Dynamic hypoxic zones in Lake Erie compress fish habitat, altering vulnerability to fishing gears[1]

Richard T. Kraus, Carey T. Knight, Troy M. Farmer, Ann Marie Gorman, Paris D. Collingsworth, Glenn J. Warren, Patrick M. Kocovsky, and Joseph D. Conroy

CJFAS 2015 vol. 72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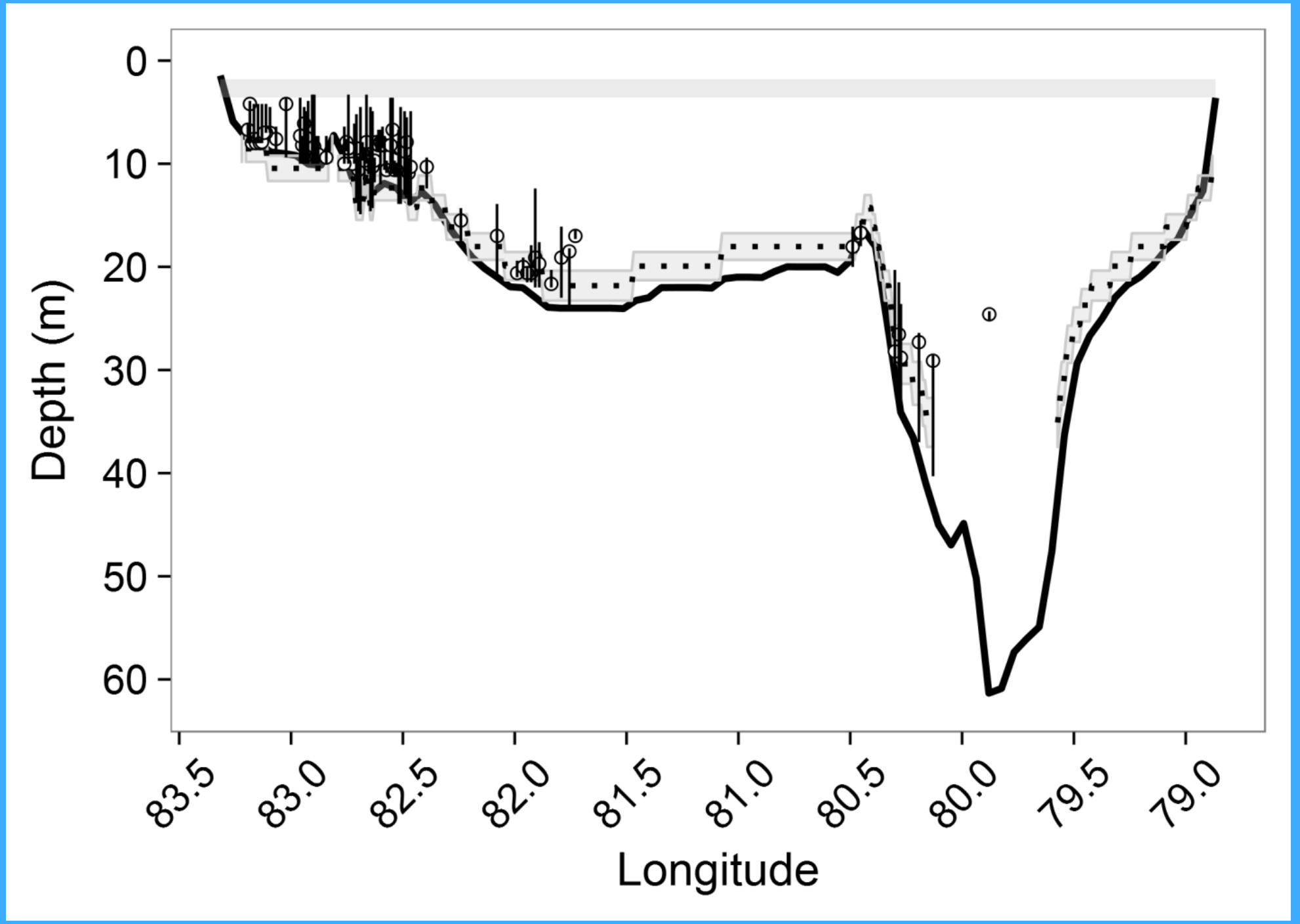
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60
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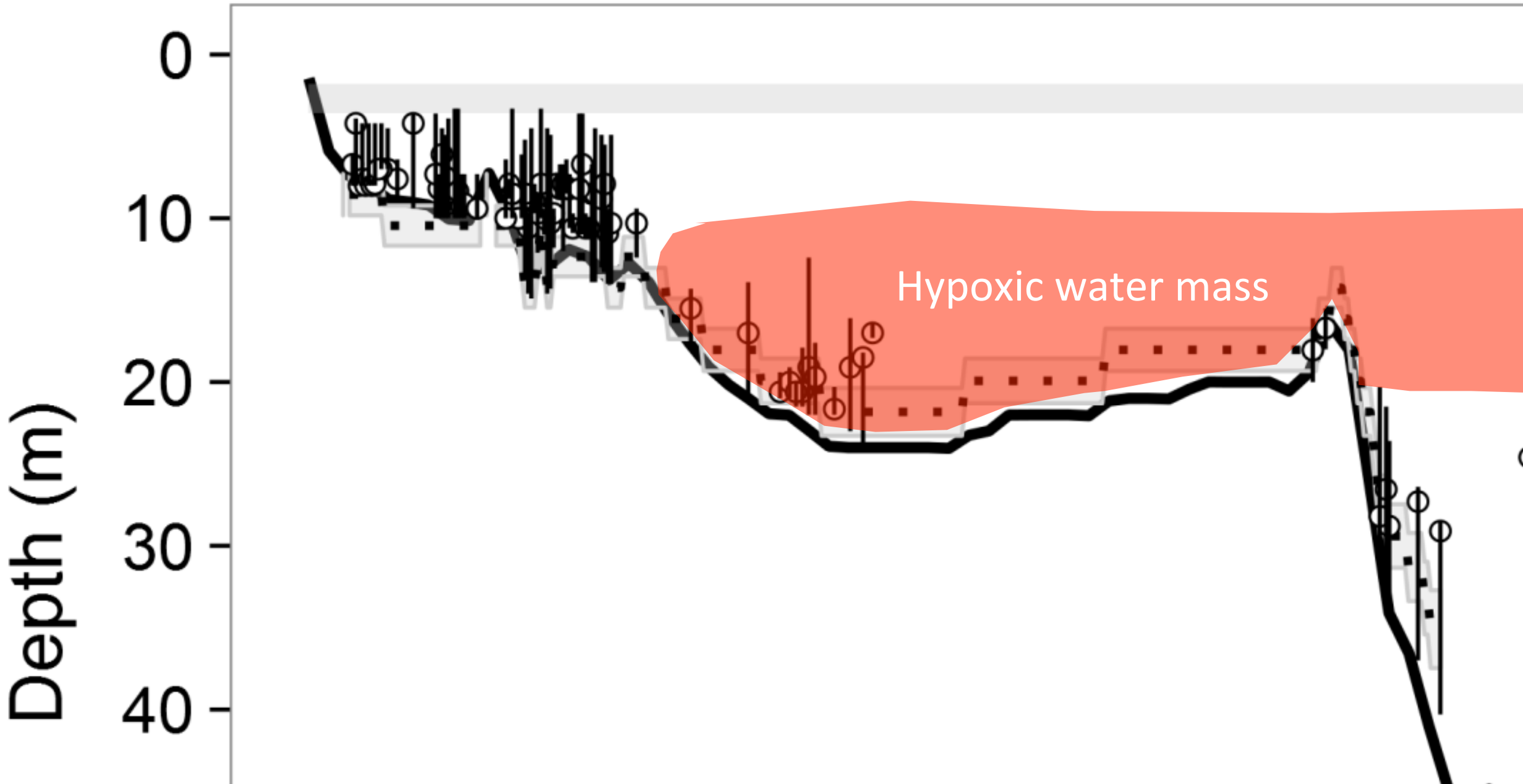
80.0
79.5
79.0
Longitude


Depth (m)
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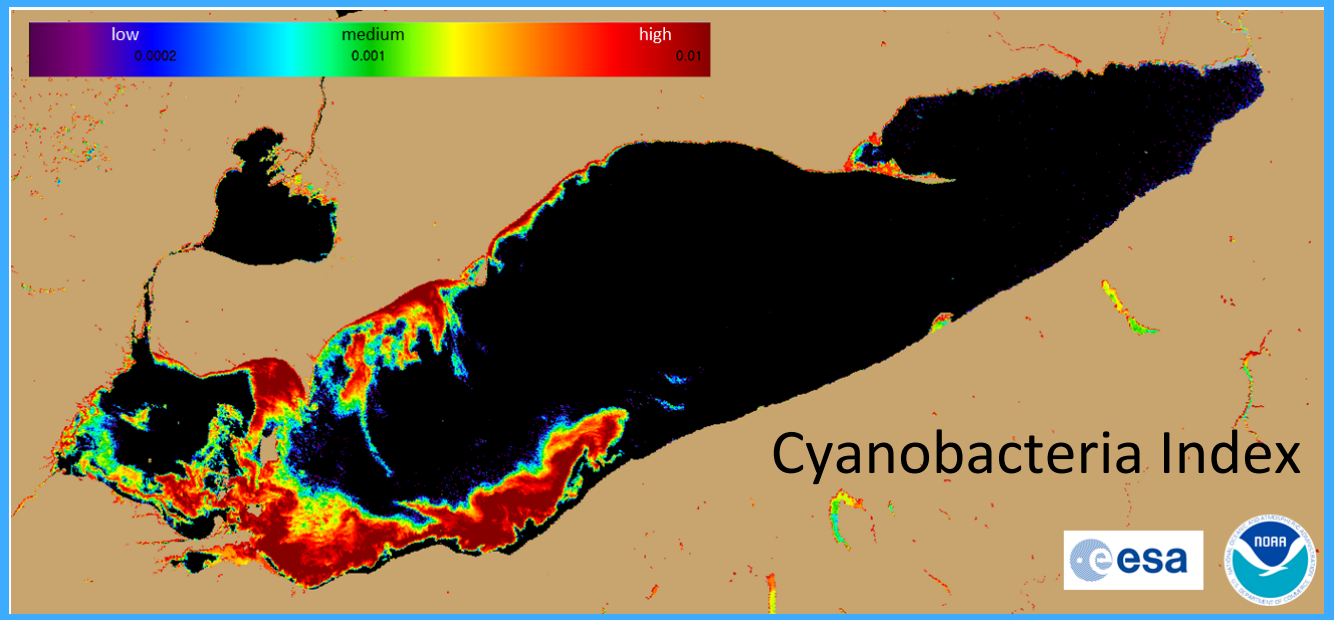
40
Hypoxic water mass


y
x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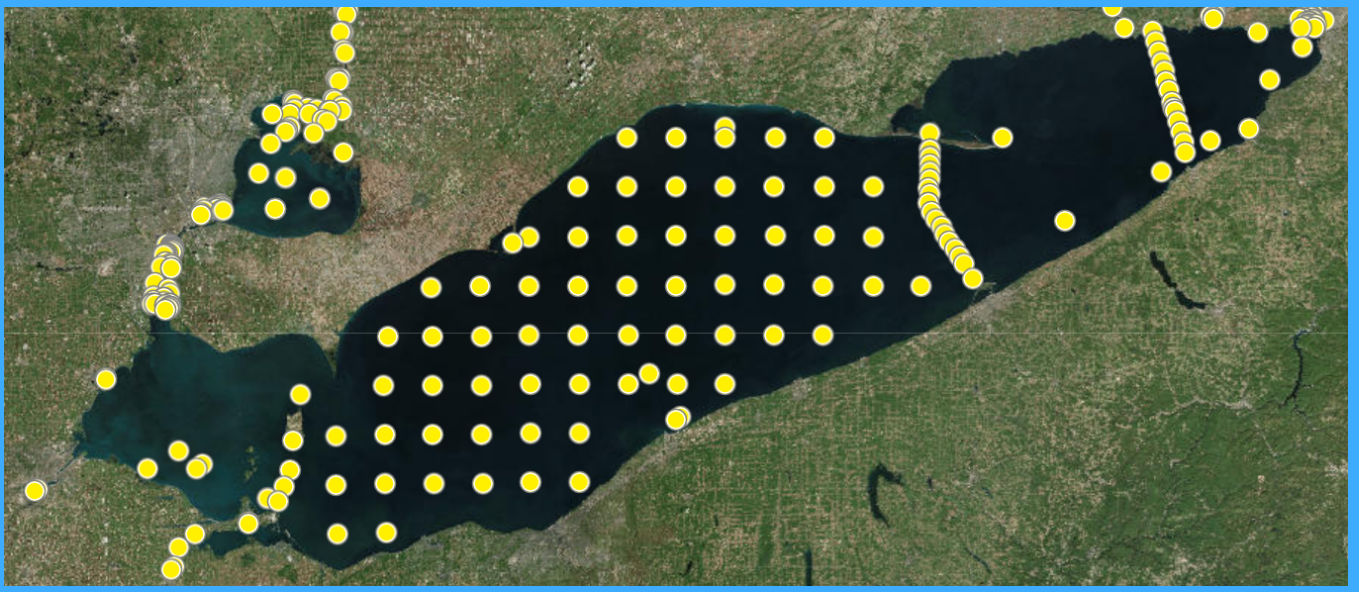

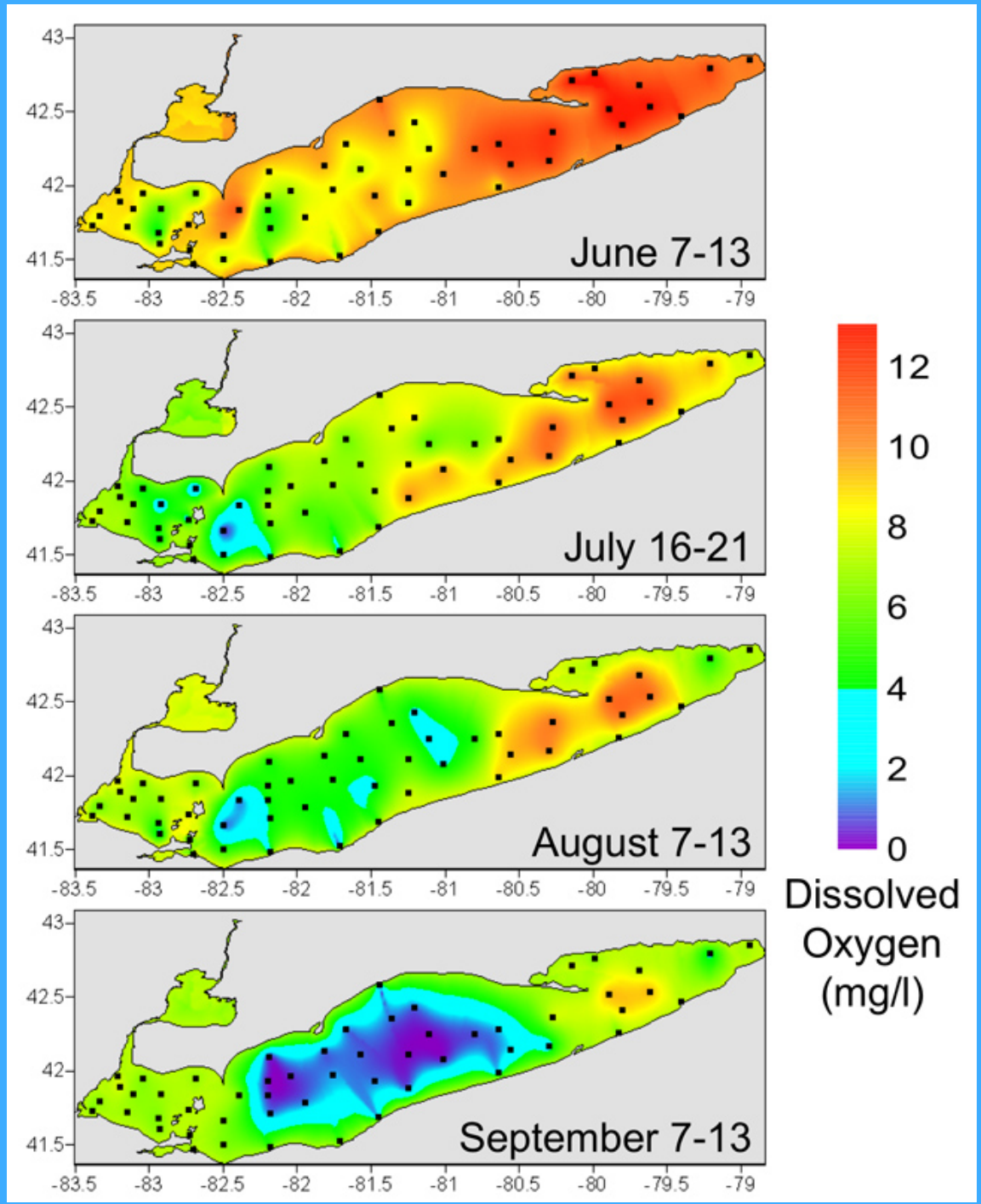
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Dissolved Oxygen (mg/l)

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