Vertical Distribution of Walleye 
(*Sander vitreus*) in Lake Erie: 
Ecological and Management Implications

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Lake Erie Walleye

- Native Percid
- Naturally-reproducing
- Top predator
Lake Erie

- Habitat: 18-24°C, Turbid, Low light, Diel

- Spawn Spring
- Move 300 km to cooler water
- Return to Overwinter
Objectives

1) Quantify seasonal and geographic changes in the vertical habitat use of walleye using pressure-sensing acoustic telemetry.

2) Describe diel changes in vertical habitat use relevant to gill net surveys of walleye.

3) Contrast tagging results with walleye occurrences in gill net surveys as a function of depth.
Acoustic Telemetry

- ~50 mature adults tagged, 2012 & 2014
- Vemco V16, pressure-sensing 69kHz
- GLATOS
Vertical Distribution
Seasonal & Geographic

- 171 receivers
- > 97K observations, 20 fish

Quartiles of the Water Column

Fish1 = propQ1
Fish2 = propQ2
Fish1 = propQ3
Fish2 = propQ4

Vertical Distribution
Vertical Distribution
Seasonal & Geographic

JUN, WB
JUL-OCT, EB
NOV
Vertical Distribution
Seasonal & Geographic

Unexpected
1. Bottom at night
   – Diel movements
2. Bottom in Fall
   – Gill net data

Concern
Is the **thermocline** a transmission barrier? **NO.**
- Few detections in top of water column, even after turnover
- Vertical range test (+/- 0.9 m)
Vertical Distribution

Diel

Quartiles - Within Daily Range of Depths Used by Individual Fish
Vertical Distribution in the Fall Telemetry vs. Gill Nets

Telemetry
- Fall 2013-2014: bottom-oriented

In Ohio, we still catch fish in our suspended nets...

Gill nets
- Fall: suspended nets catch more adult WAL than bottom nets (except East)
- Bottom-orientation is not a recent trend
- 2013: more in suspended
- 2014: more in bottom, NS
If Walleye are bottom-oriented and do not move “up” at night, why do we catch them in our suspended nets?

- Are prey fish captured in the gill net acting as bait? *(Dartay & Duman, 2014)*; Is this more probable at night because of increased foraging activity?

- Is the telemetry only describing behavior of “large” fish while gill nets sample age 2+? *(Middel et al., Lake Trout)*

- Are high catches in the suspended nets (i.e. less-preferred habitat) an indication of a density-dependent habitat limitation?
Summary

1. Walleye were strongly oriented towards the bottom quarter of the water column even in the fall. [little or no time was spent at the surface]

2. Daily vertical migration occurs but is limited.

3. Gill nets in the surface layer were far more efficient than bottom nets for collecting walleye, BUT behavioral results from telemetry tags do not yet provide an explanation for why this is so.

4. *97K is not enough information to change assessment...*
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