

# Winter sampling needs at USGS- Great Lakes Science Center

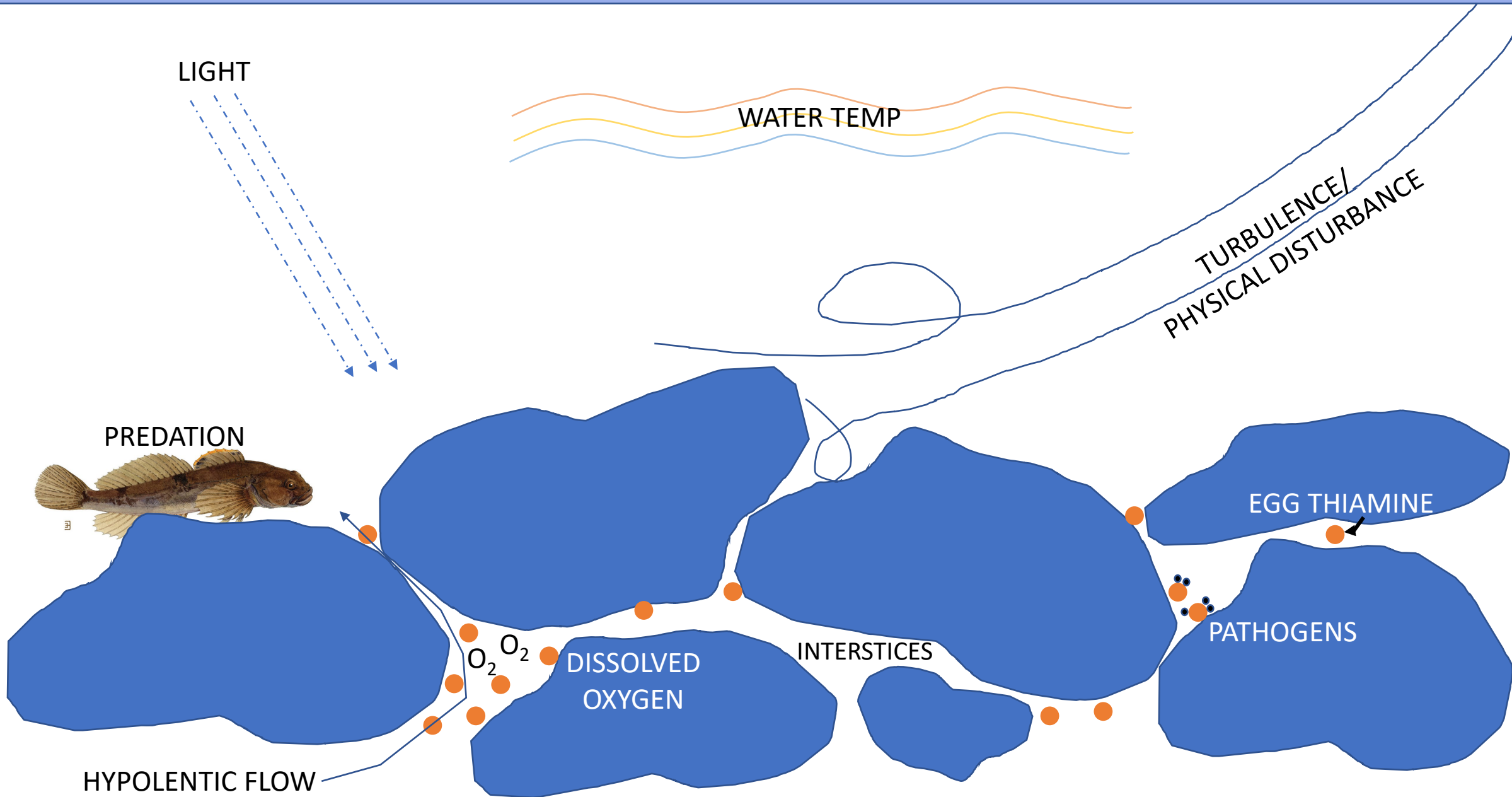
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# USGS needs for winter sampling capacity

- GLSC highly invested in research to support fisheries management decisions
- Increasing effort on native fish restoration & conservation
  - Historical focus on lake trout; increasing focus on Coregonines.
  - What impedes native fish populations? What can be done to reduce impediments?
- 50 years of research has shown restoration/conservation not failing at the adult stage
  - impediments are in early life stages
  - Surveys that estimate eggs, larvae, & juveniles with the habitat/environmental conditions are needed.
- Many fishes of interest spawn in November-December, egg incubate overwinter, larvae emerge in Feb-May (Lake Trout, Cisco, Bloater, Lake Whitefish, Kiyi), all requires winter sampling, some shallow (1-6m), some deep (6-100m?).
- Fisheries in eutrophic bays potentially limited by DO
- Winter distributions uncertain for important prey species (i.e., round goby)

# ICE COVER (EXTENT, TIMING, DURATION)



## Select 'winter' sampling needs

### Status of incubating Lake Trout eggs in specific habitats

- November – March, large or small vessel
- Specific habitats, 2 - 30m with different interstitial depths
- Need egg in hand, excludes video or eDNA methods
- Currently testing pumps in November via small vessel
- Once ramps freeze can not access in LO via small vessel

### Status of incubating Coregonine eggs in specific habitats

- December – March
- specific habitats, 1-12m (spot sampling, not drag), w/ different interstitial depths
- Need egg in hand, excludes video or eDNA
- Currently using pumps through ice

## Select 'winter' sampling needs

### Determine the habitats where Bloater and Kiyi spawn

- Unknown timing, assume December – April?
- Unknown depths, assume 10-100m?
- Conduct in Lake Michigan, Superior, and/or Huron
- Possible methods: egg traps with surface buoys, AUV video, drop video, eDNA?

### Winter distributions of round goby

- Evidence suggests divergent strategies in different contexts
- Observed to 190 m in Lake Michigan by Jude et al.
- Possible antagonistic interactions with deep water sculpin
- Possible methods: micromesh gill nets, ROVs, AUV imaging, drop video, eDNA?

### Saginaw Bay dissolved oxygen

- Potentially limiting to predators and prey fish
- Possible methods: manual sampling through ice, AUVs