

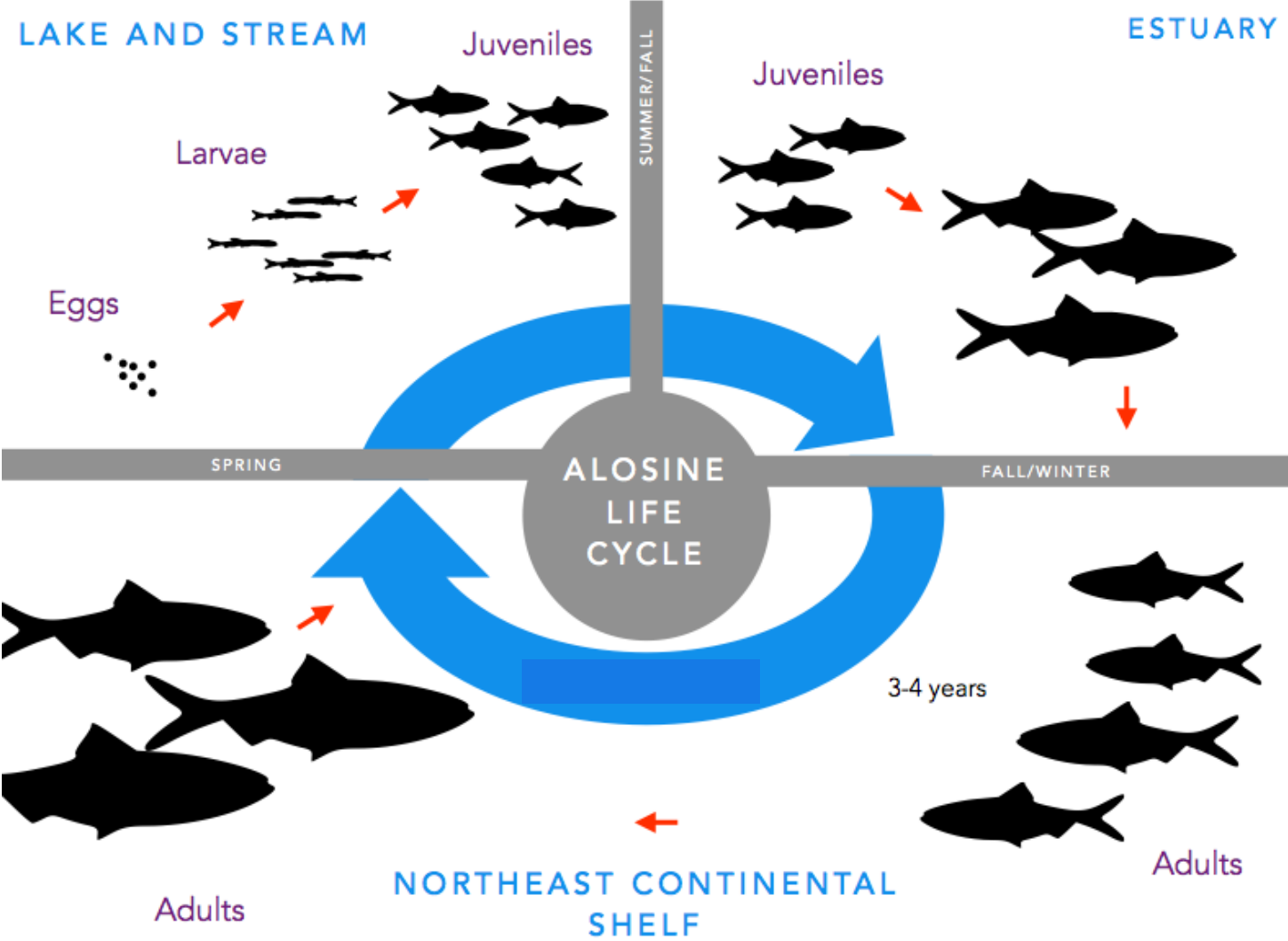


Early life history of river herring from contrasting freshwater environments

Joel Llopiz, Andy Jones, John Sheppard, Justin Suca, Caroline Rosinski, Sam Cox, Jacob Strock



River herring life history





Ongoing river herring research at WHOI

- Larval river herring ecology in different SE Mass ponds
- Camera system for understanding juvenile numbers and emigration dynamics
- Juvenile alewife and blueback feeding variability in Great Herring Pond, and drivers of emigration
- Nursery habitat variability in Maine after dam removal
- Adult diets in the marine environment

Ongoing river herring research at WHOI

- **Larval river herring ecology in different SE Mass ponds**
- **Camera system for understanding juvenile numbers and emigration dynamics**
- Juvenile alewife and blueback feeding variability in Great Herring Pond, and drivers of emigration
- Nursery habitat variability in Maine after dam removal
- Adult diets in the marine environment
- Andy Jones: Coonamessett River adult PIT tagging and tracking

**Larval river herring
ecology in different SE
Mass ponds**

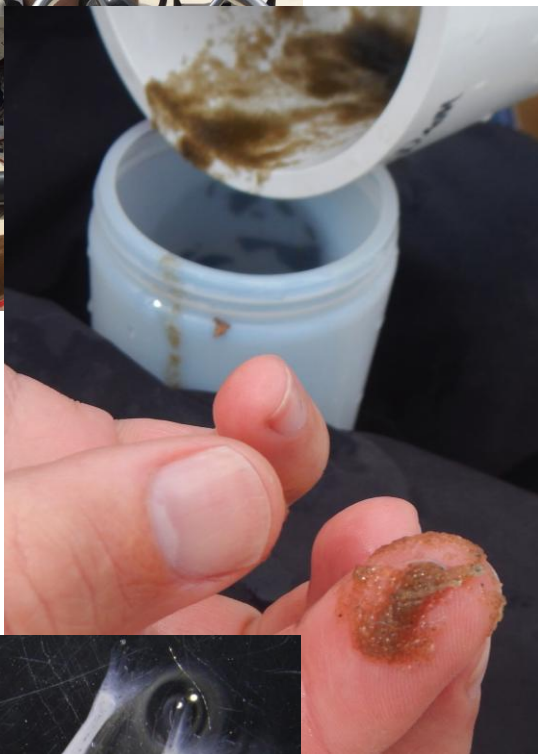
A satellite map of Massachusetts is shown in the background. A large blue semi-transparent text box is overlaid on the right side of the map. The map includes labels for various locations: Boston, Weymouth, Whitmar, Lake Nippenick, Taunton, Middleboroug, Wareham, Falmouth, Buzzards Bay, Dennis, Barnstable, Upper Millpond, Chatham, and Harwich. The text box contains a title 'Overview' and a list of project details.

Overview

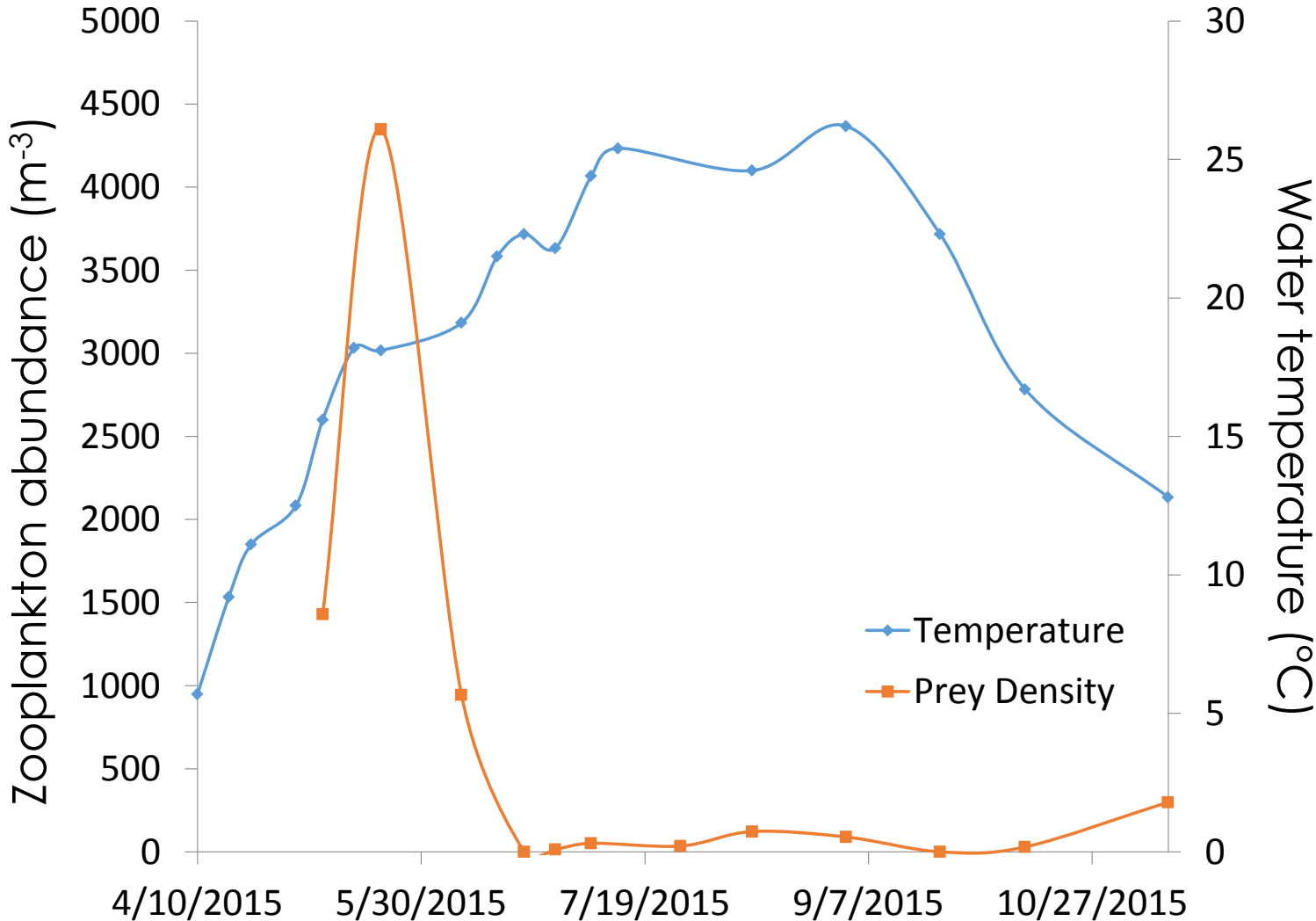
- 2 year project (2015 and 2016)
- Weekly sampling of 4 ponds during the period of larval presence
- Plankton tow for collecting larvae
- Plankton tow for collecting and enumerating zooplankton (i.e. food)
- Water properties with depth: temperature, pH, O₂, TDS
- Larval growth analyses (via otoliths)
- Larval diet and feeding success



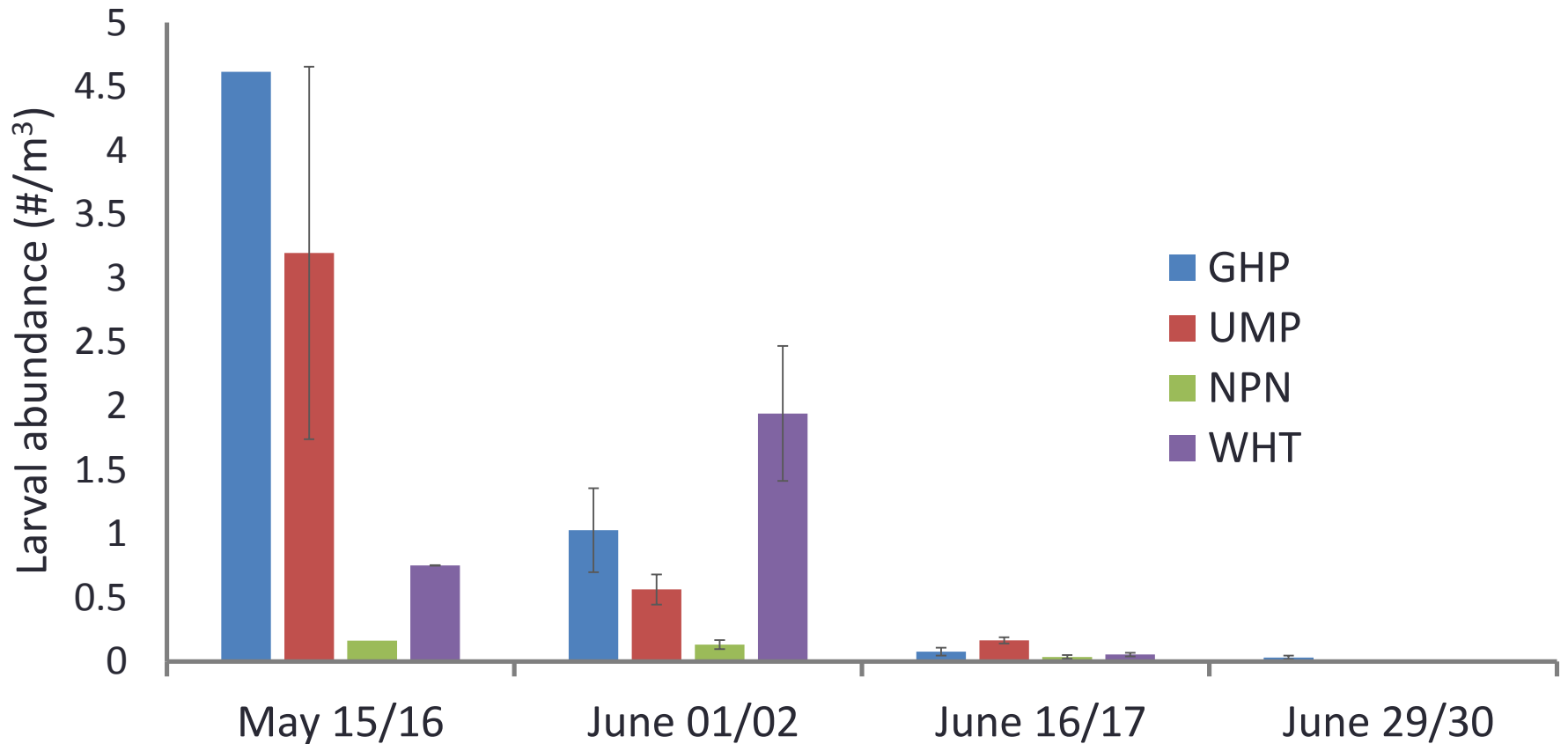




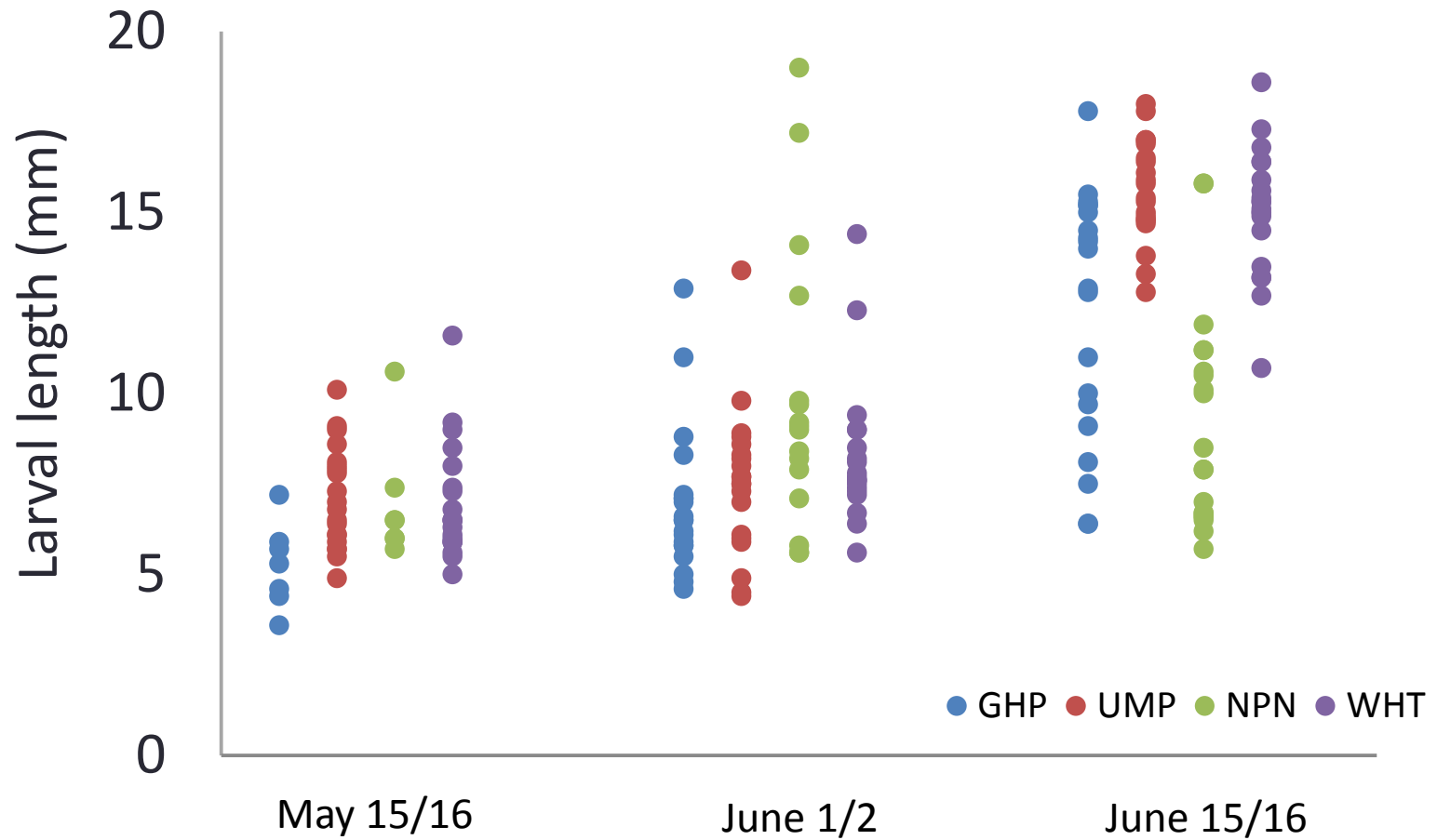
Environmental Conditions: Great Herring Pond



Larval Abundance by Pond and Date in 2015

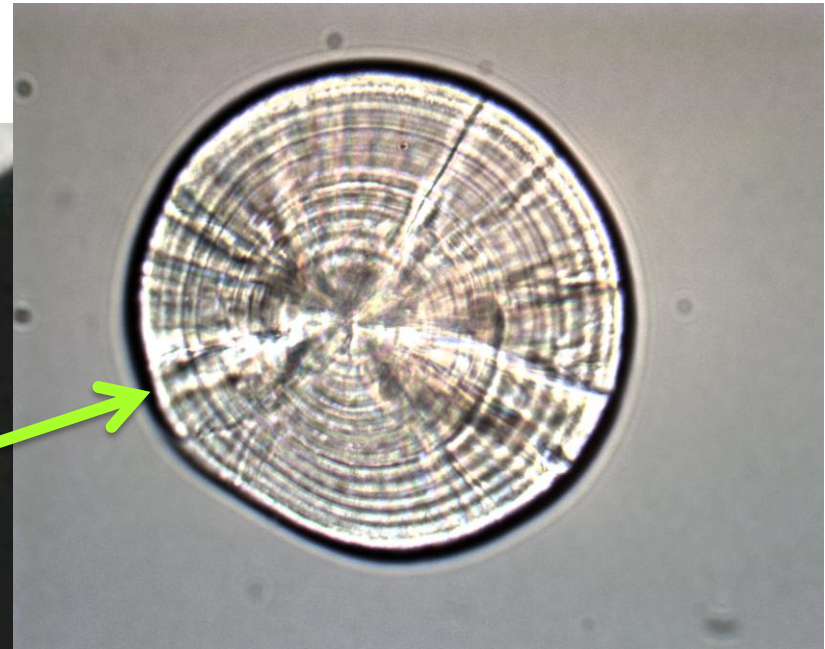
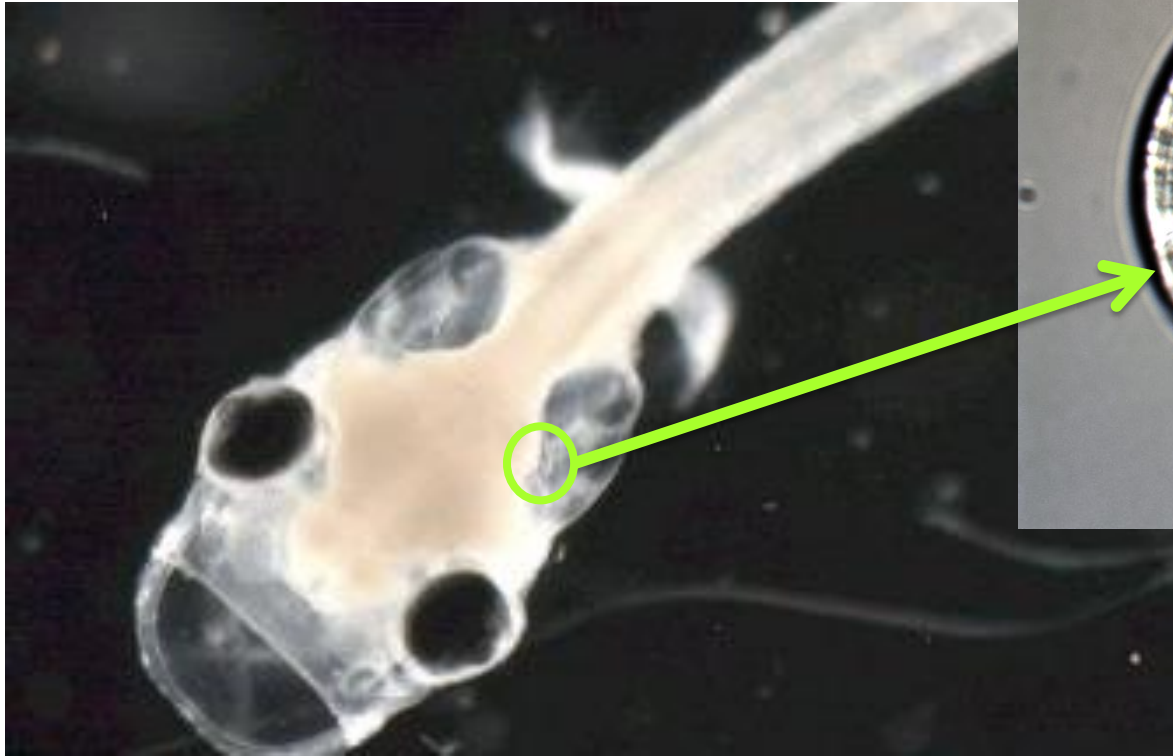


Larval lengths through time



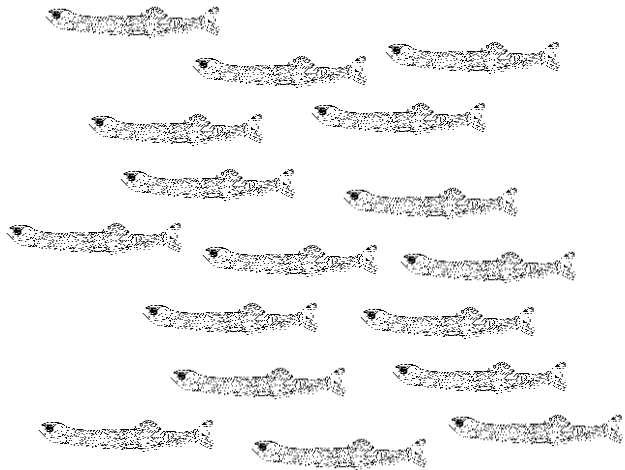
Larval growth rate variability

Our window: the otolith

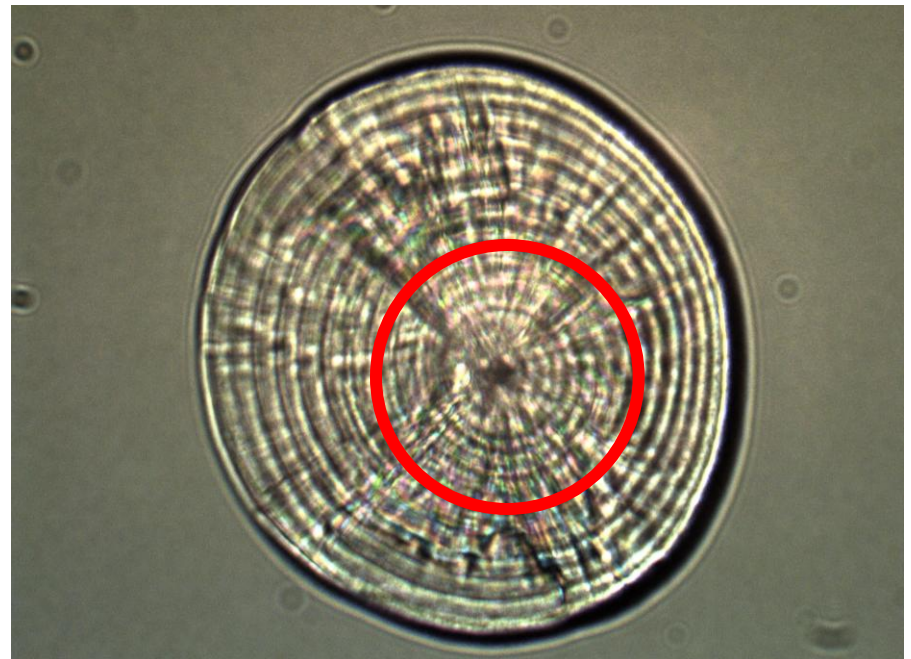
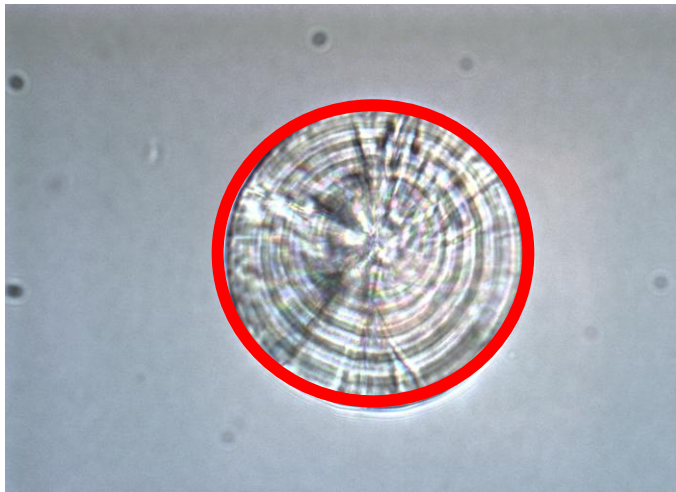
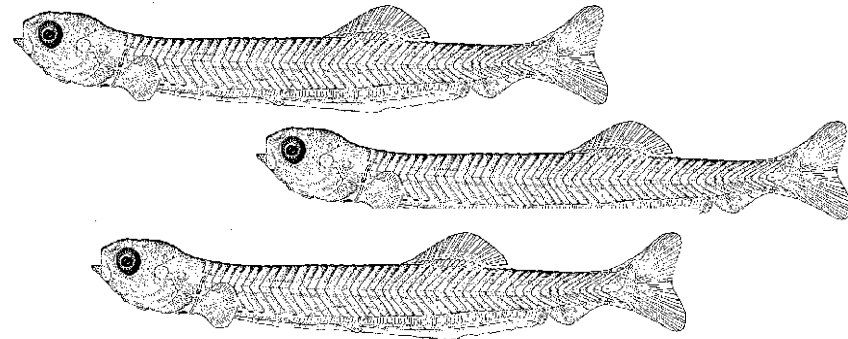


- Larval age
- Hatch date
- Daily growth rates
(from increment widths)
- Larval size at age
(since increment radius \propto larval length)

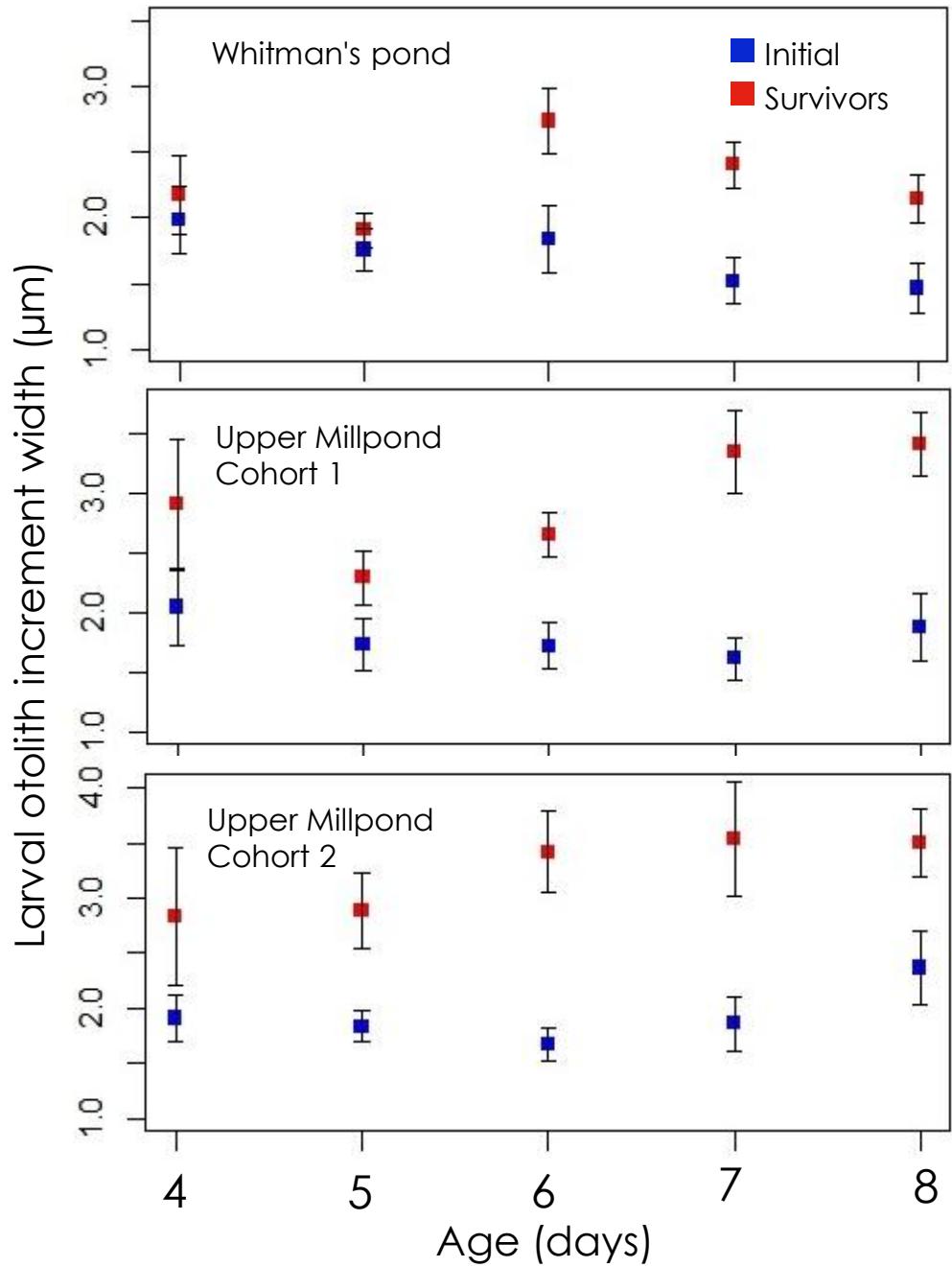
Initial population



Survivors

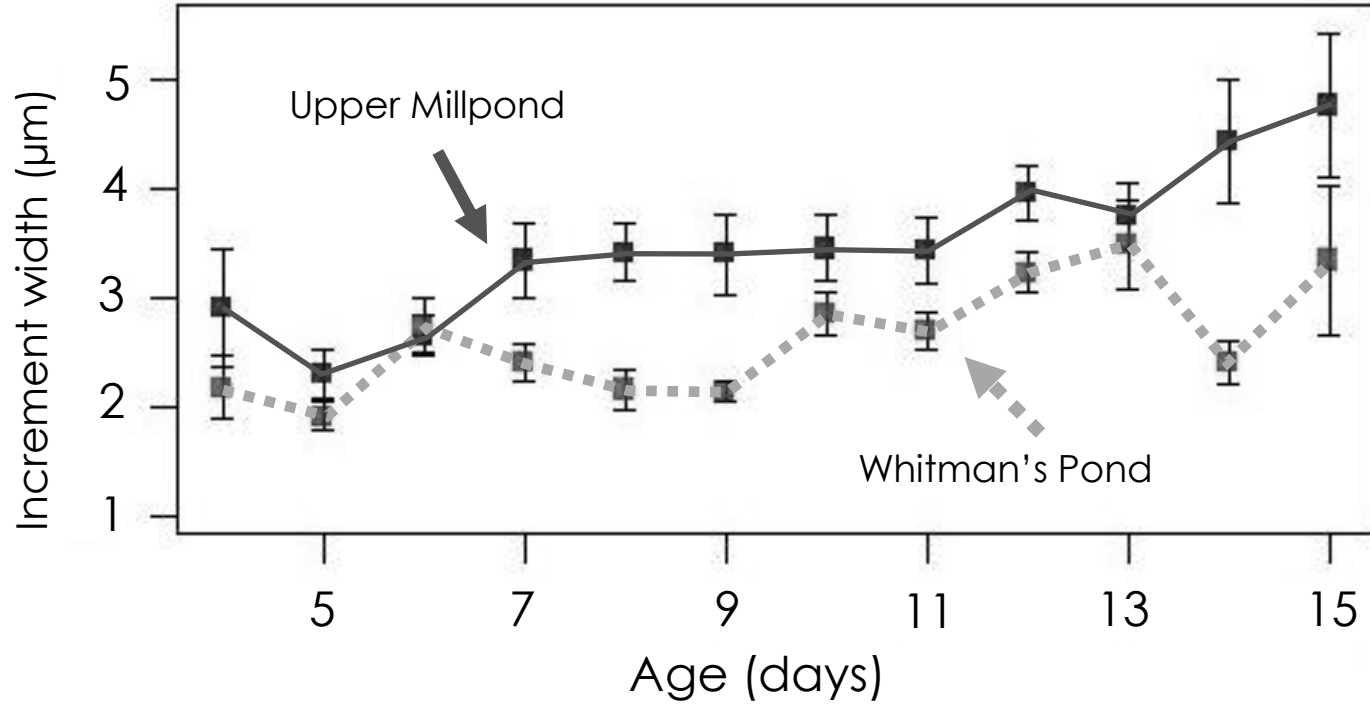


Selective mortality

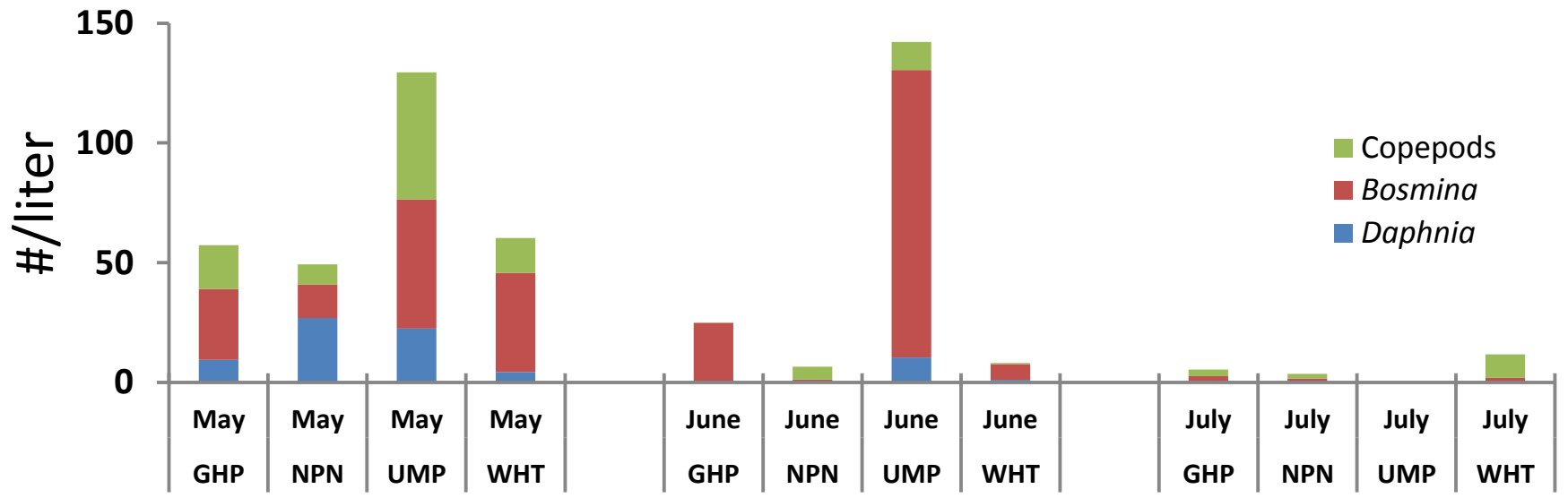


Fast growing larvae are the ones surviving

Between-lake growth rate differences



Zooplankton (larval herring prey) abundance



**Camera system for
understanding juvenile
numbers and emigration
dynamics**



*Herring
Run*
MOTEL

VACANCY
COLOR TV
AIR CONDITIONED







Conclusions and future directions

- **Nursery habitat for larval river herring:**
 - Can be highly variable
 - Translates to growth and mortality differences
 - What's important?
 - Zooplankton availability
 - Predators?
- **Camera system for juveniles:**
 - Juvenile count (along with an adult count) directly related to pond productivity (number of juveniles per spawning adult)
 - Future: several cameras in different systems will allow for focusing restoration efforts on poor quality nursery habitat



Thanks!

