

Video Monitoring of River Herring in Coastal Massachusetts Streams

Matthew K. Burak^{1,2}, Martha E. Mather^{1,2}, John T. Finn¹, John B. Kim³, and Robert M. Muth¹

¹Department of Natural Resources Conservation, University of Massachusetts, Amherst. ²Massachusetts Cooperative Fish and Wildlife Research Unit (USGS).

³Field Stations Program, San Diego State University.

1. Introduction

Alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*) are two similar anadromous fish species, commonly referred to as river herring (Figure 1). Both species can be very abundant in freshwater (Figure 2). They have similar life histories, and occur from Nova Scotia to Florida. As part of their life cycle, adult river herring enter freshwater rivers and streams to reproduce (Figure 3).



Figure 1. River herring - Alewife (top), Blueback Herring (bottom).



Figure 2. Town Brook in Plymouth, MA, abundant with river herring in 2008.

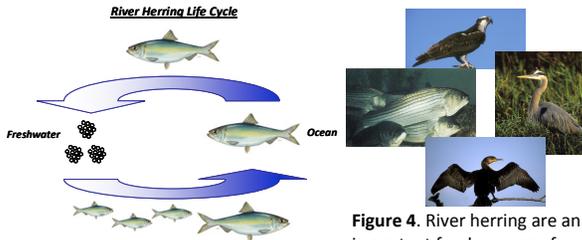


Figure 3. Life cycle of river herring.

Alewife and blueback herring are of commercial and historical importance. Both species are ecologically important, link different environments, and are an important food resource for many top predators (Figure 4). Recently, the abundance of river herring has declined to levels warranting harvest moratoriums. Currently, few Massachusetts rivers have reliable river herring counts; thus a need exists for a simple, inexpensive monitoring system that can be deployed in any small system under any conditions with high reliability and low maintenance.

2. Study Questions

- How does a video monitoring system work?
- Why is video monitoring a practical tool?
- What features make it deployable in any small system under any conditions with high reliability and low maintenance?
- What information can be gained from video monitoring?
- How can video monitoring be used for community outreach?

3. Study Locations

River Herring Video Monitoring Stations

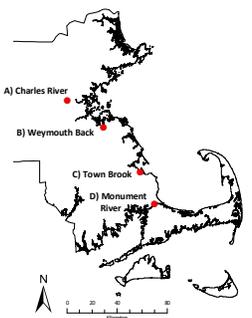


Figure 5. Video monitoring stations: A) Charles River, B) Weymouth Back, C) Town Brook, and D) Monument River.

4. How Does Video Monitoring Work?

- Video cameras are placed over fishways. This allows a uniform area to be filmed without altering the natural flow of water or interfering with passing fish (Figure 5).
- The video obtained is transmitted to a nearby storage device either via WiFi or through a wired connection (Figure 6).
- Being connected to the internet allows for real time monitoring. Time is saved by only addressing problems when they arise.

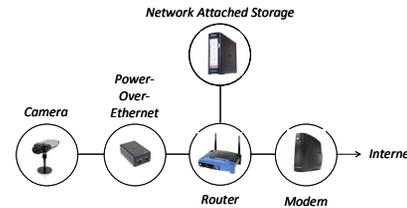


Figure 6. A typical wired video monitoring set up.

5. Why Video Monitoring?

- Low power requirements (with right equipment)
- Low maintenance (for the right equipment placed over the fishway out of water)
- Non-invasive (unlike underwater video or fish counting tubes)
- Permanent record of an entire migration is obtainable
- Retrospective sampling can be done to identify high and low passage times (Figure 7 & 8)
- Adaptable to different locations
- Avenue for public outreach and education



Figure 7. Images from A) Town Brook and B) Weymouth Back River.

6. Information to be Gained

- How many adult river herring returned. This is important to understand trends over time.
- How long migrations last.
- Migration distribution - this will help in identifying when river herring move, and possible environmental correlates that are related to movement (Figure 8).
- Time of day river herring tend to migrate.
- Movement trends over time.

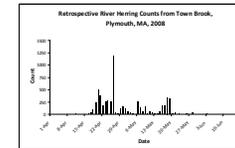


Figure 8. Retrospective river herring counts from Town Brook, Plymouth, MA, 2008 migration.

7. Community Outreach

- Websites can be created featuring video. On these websites, information such as biology, history, and how the public can help are displayed (<http://nrc.umass.edu/index.php/research-outreach/featured-research/river-herring-video-project>).
- Placing video cameras near public sites brings attention to river herring migrations, stimulating discussion between researchers and the public (Figure 9).



Figure 9. The Jenney Grist Mill is a popular historic site on Town Brook.

8. Next Steps

- Determine what measures exist and are best to describe fish migrations (e.g. numbers of peaks, duration).
- Analyze count data using identified measures.
- Collect data in 2009 using video monitoring for future comparisons.

Collaborators



The Kenney Family

ckdesignsma@msn.com

