The Chesapeake Bay National Estuarine Research Reserve: Incorporating Citizen Science Into Our Place-Based Research and Stewardship Programs

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Stewardship Coordinator
WHO WE ARE: The National Estuarine Research Reserve System is a Partnership Program Between NOAA and Coastal States

Managers
Scientists
Story Tellers
Educators
Trainers
Data Geeks
Planners
Resilient estuaries and coastal Watersheds — Where human and natural communities thrive.
Delivering the national mission to local communities

Chesapeake Bay National Estuarine Research Reserve in Maryland

Otter Point Creek
Jug Bay
Monie Bay
The Reserve covers over 6,000 acres and is focused on the following:

- **Stewardship.** Undertakes initiatives to keep the estuary healthy.
- **Research.** Reserve-based research and monitoring data are used to aid conservation and management efforts on local and national levels.
- **Training.** Local and state officials are better equipped to introduce local data into the decision-making process as a result of reserve training efforts.
- **Education.** Thousands of children and adults are served through hands-on laboratory and field-based experiences.
We incorporate volunteers in a wide variety of monitoring and research.
Fish Programs at the Anita C Leight Estuary Center

- Summer Juvenile Fish
- Larval Yellow Perch presence / absence
- Larval Fish Stream Survey
Summer Juvenile Fish

- 6 sampling events in summer
- 5-7 Volunteers / 3-4 hours per event
- 2.5 hour training
Citizen Science Monitoring

Summer Juvenile Fish – Trawl

Species comprising of 90% of the trawl catches
- Herring
- White Perch (Juv)
- White Perch (Adults)
- Spot
- Pumpkinseed
- Gizzard Shad
- Brown Bullhead
- Bay Anchovy
Citizen Science Monitoring

Summer Juvenile Fish – Seine

Species comprising of 90% of the seine catches:

- Herring
- Gizzard Shad
- Spottail Shiner
- White Perch (Adults)
- White Perch (Juv)
- Atlantic Menhaden
- Atlantic Silverside
- Banded Killifish
- Pumpkinseed
- Bay Anchovy
- Silvery Minnow
- Channel Catfish
Summer Juvenile Fish

Seine Catch
2014 = 27 Species
2015 = 24 Species

Trawl Catch
2014 = 17 Species
2015 = 14 Species
Summer Juvenile Fish – How survey informs fisheries managers

- Species diversity continued to decline in trawl and seine samples
- Bush River Estuary is still productive habitat, but there are differences between bottom habitat usage and inshore habitat usage. More species make up 90% of the inshore samples
- The first time since recording that Herring species were among the top 90% in trawl samples; Herring present in top 90% in seine samples since 2012
- DO < 5mg/L has increase to 7% of sampling events in 2015 (2008*)

Value of Survey

- 15+ years of data is atypical
- Volunteer results match fisheries biologist.
Citizen Science Monitoring

Larval Yellow Perch Presence absence

- 2 sampling events in EARLY spring
- 1-2 Volunteers / 2-3 hours per event
- Minimal training required
A persistent $L_p$ of 0.65 or lower indicates serious deterioration of tidal-fresh subestuary larval nursery habitat.
Stream Ichthyoplankton Survey

- Sampling events in spring (April/May)
- 2-3 Volunteers / 2-3 hours per event
- $\frac{1}{2}$ day training required
Stream Ichthyoplankton Survey
Objective: Identify Spawning Streams in MD

Focal Species:
- Herring & Shad
- White perch
- Yellow perch
Stream Ichthyoplankton Survey

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<th></th>
<th>HISTORIC</th>
<th>2005</th>
<th>2006</th>
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<tbody>
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<td>Sites Sampled</td>
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<td>Samples with Presence</td>
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<td>Herring</td>
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<tr>
<td>Yellow Perch</td>
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<td>White Perch</td>
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Sites Sampled, Samples with Presence

2014: 6 sites sampled, 6 samples with presence
## Stream Ichthyoplankton Survey

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<tbody>
<tr>
<td><strong>Impervious %</strong></td>
<td>4 / 8.5</td>
<td>5 / 10</td>
<td>10 / 15</td>
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<td><strong>White Perch sites</strong></td>
<td>2 / 1</td>
<td>9 / 0</td>
<td>6 / 0</td>
<td>1 / 0</td>
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<tr>
<td><strong>Yellow Perch sites</strong></td>
<td>1 / 1</td>
<td>5 / 0</td>
<td>N/A</td>
<td>1 / 1</td>
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<tr>
<td><strong>Herring sites</strong></td>
<td>6 / 3</td>
<td>7 / 4</td>
<td>9 / 0</td>
<td>2 / 2</td>
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Stream Ichthyoplankton Survey & Larval Yellow Perch Presence absence

– How survey informs fisheries managers
  • No obvious decline in occurrence of hearing eggs
  • Occurrences of white and yellow perch at site less frequent
  • Overall indication of declines in stream spawning habitat and activity

Management
  • Increased impervious cover associated with development is correlated with a decline in spawning habitat for focal species
The value of Citizen Science Volunteers

- Increased productivity
- Broad set of skills
- Willingness to learn new things
- Desire to contribute