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

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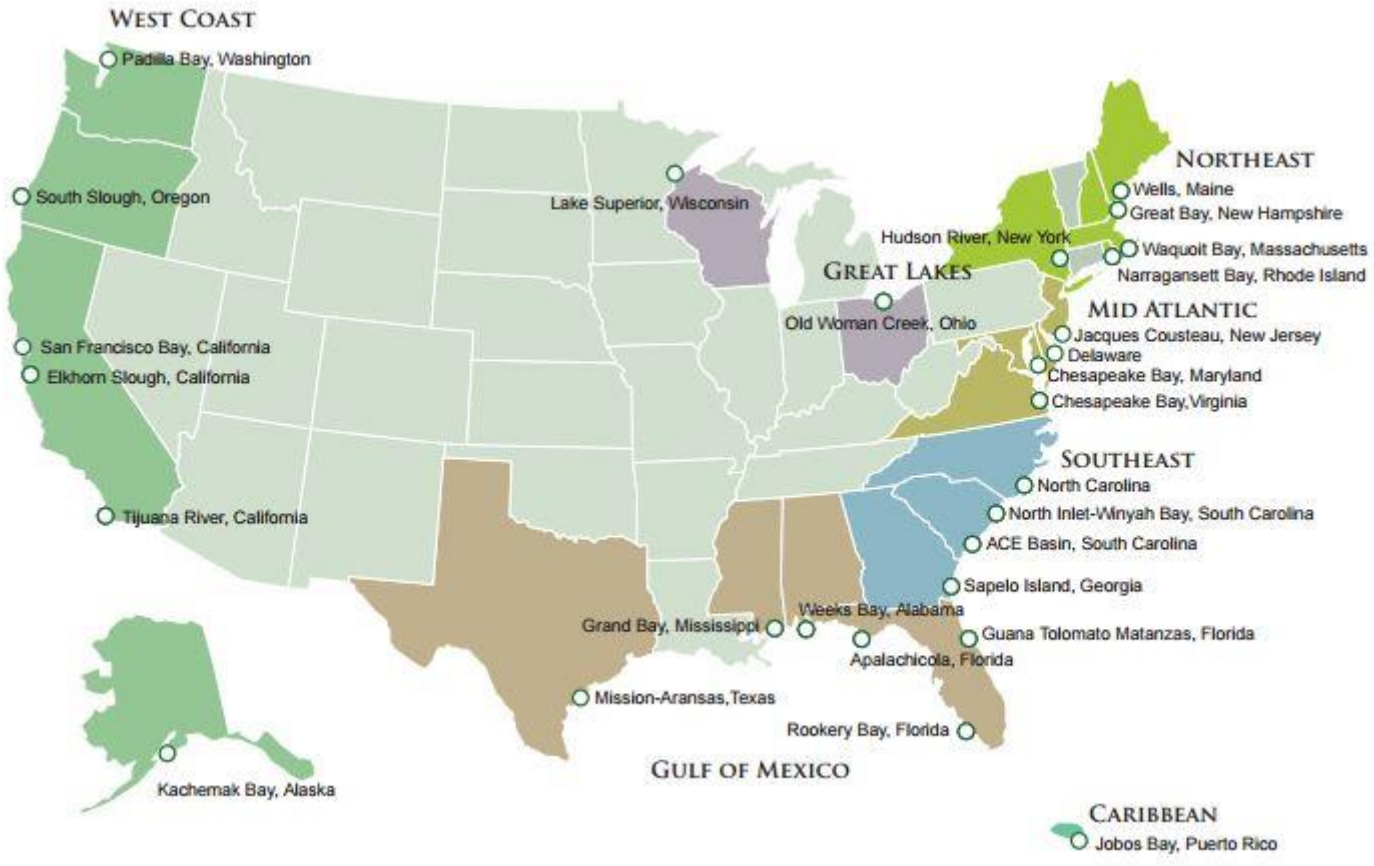
National Estuarine Research Reserve System

MARYLAND DEPARTMENT OF NATURAL RESOURCES

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



National Estuarine Research Reserve System

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Chesapeake Bay – National Estuarine Research Reserve

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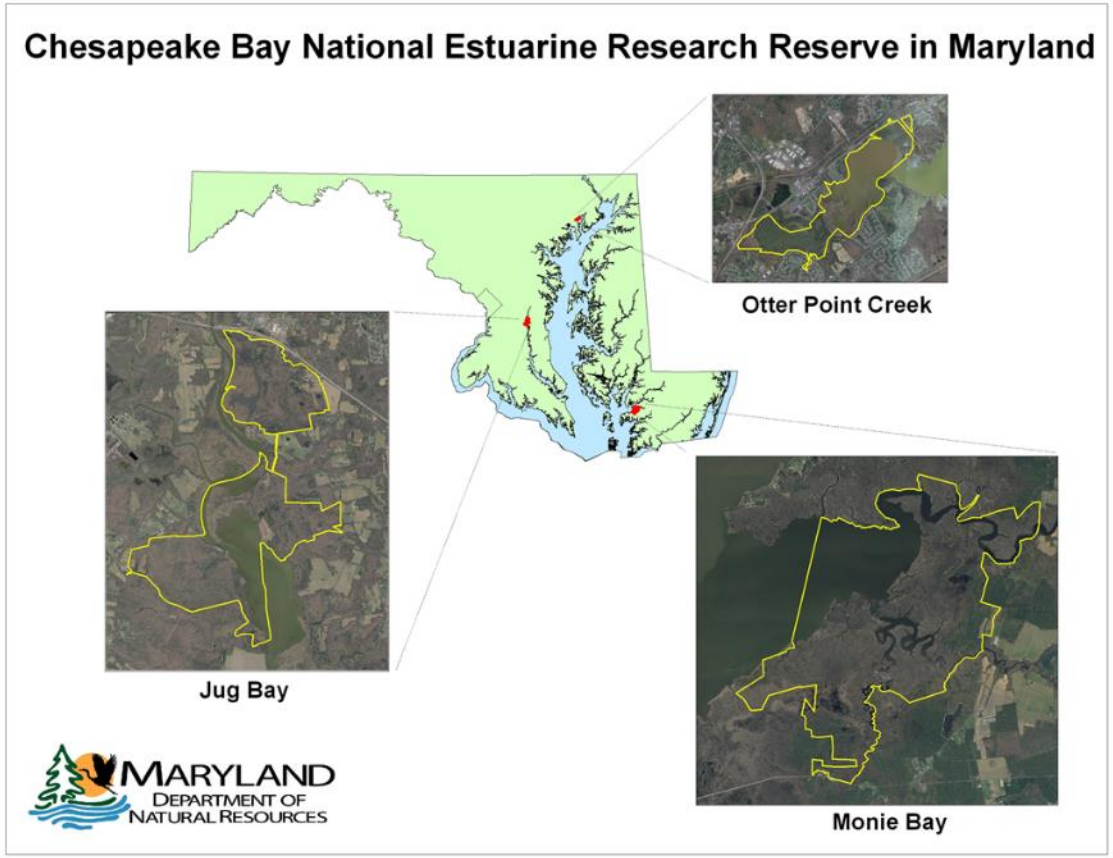
Delivering the national mission to local communities



Chesapeake Bay – National Estuarine Research Reserve

- 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.

Citizen Science Monitoring

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We incorporate volunteers in a wide variety of monitoring and research







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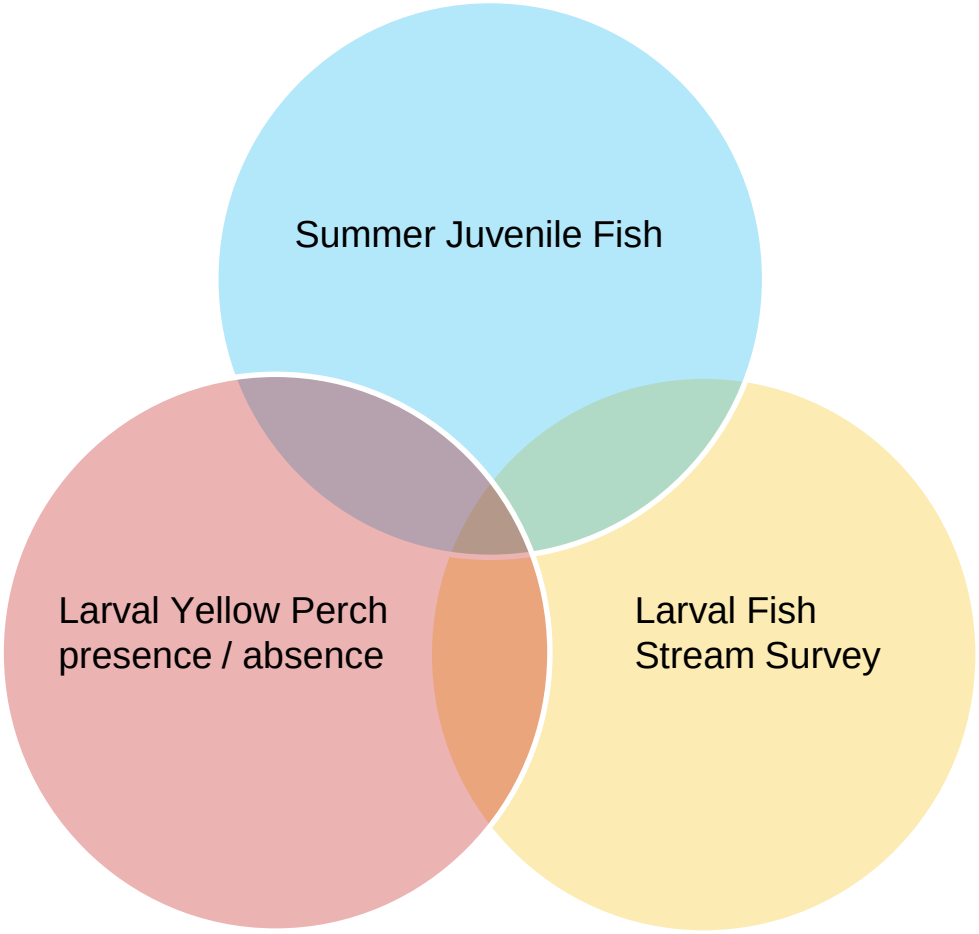
Fish Programs at the Anita C Leight Estuary Center



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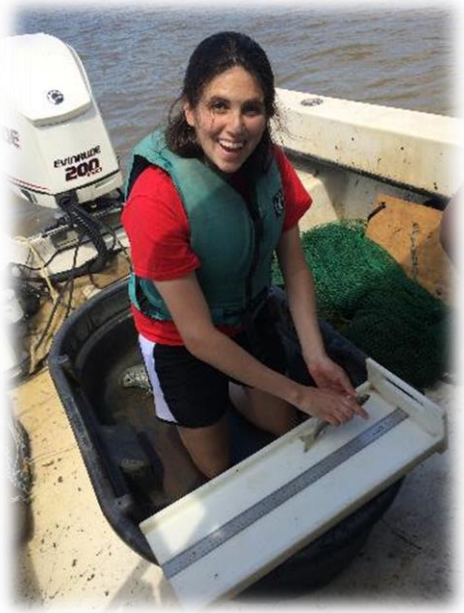
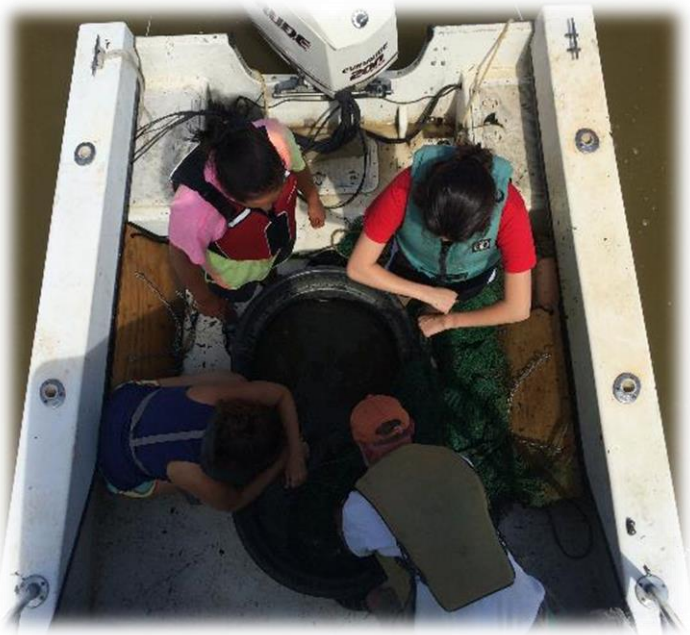
Summer Juvenile Fish

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





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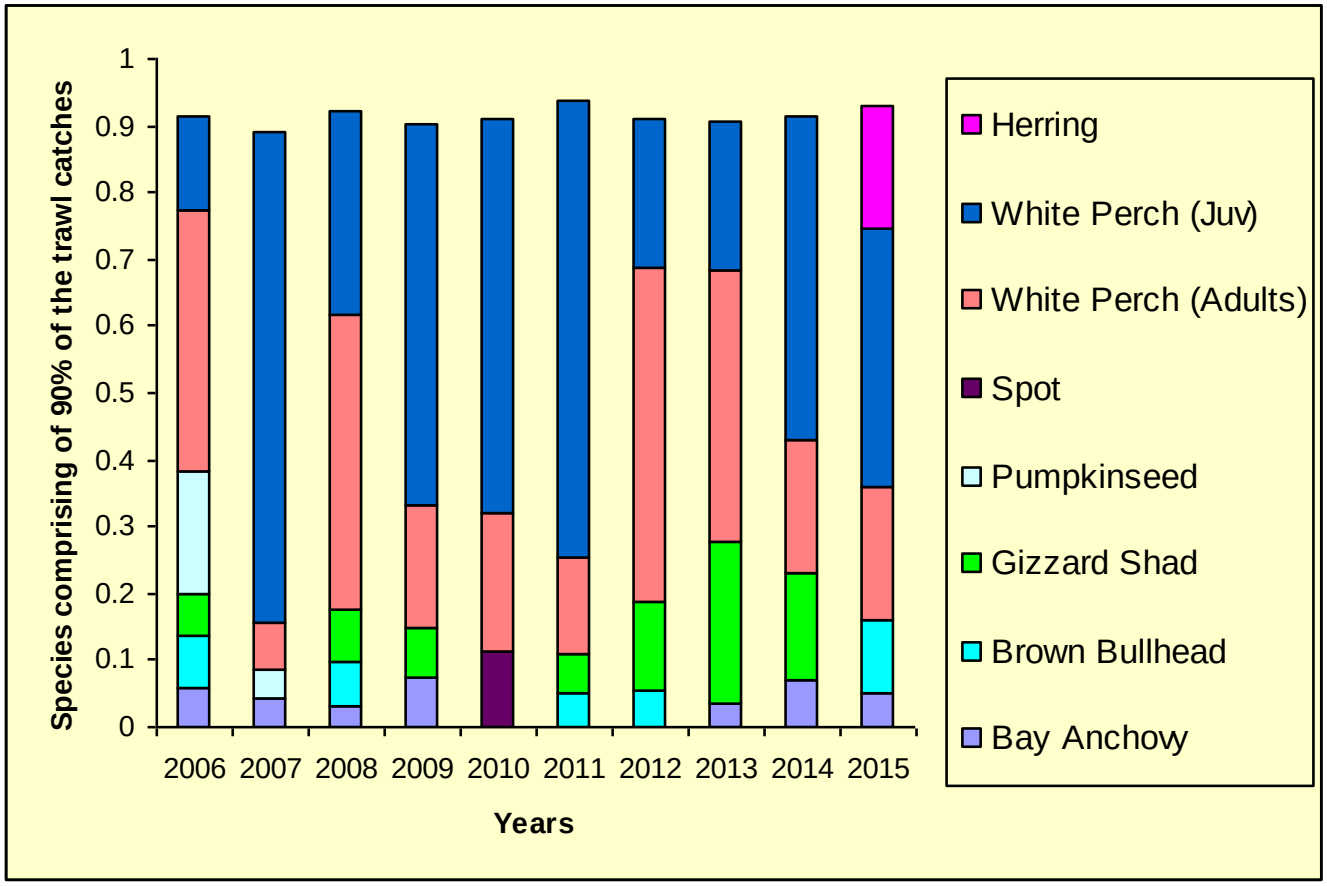
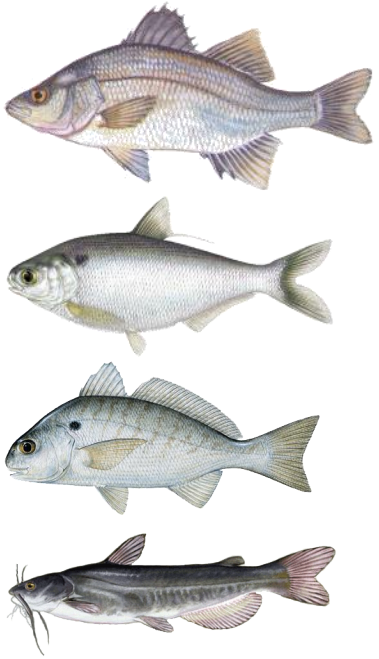
Summer Juvenile Fish – Trawl





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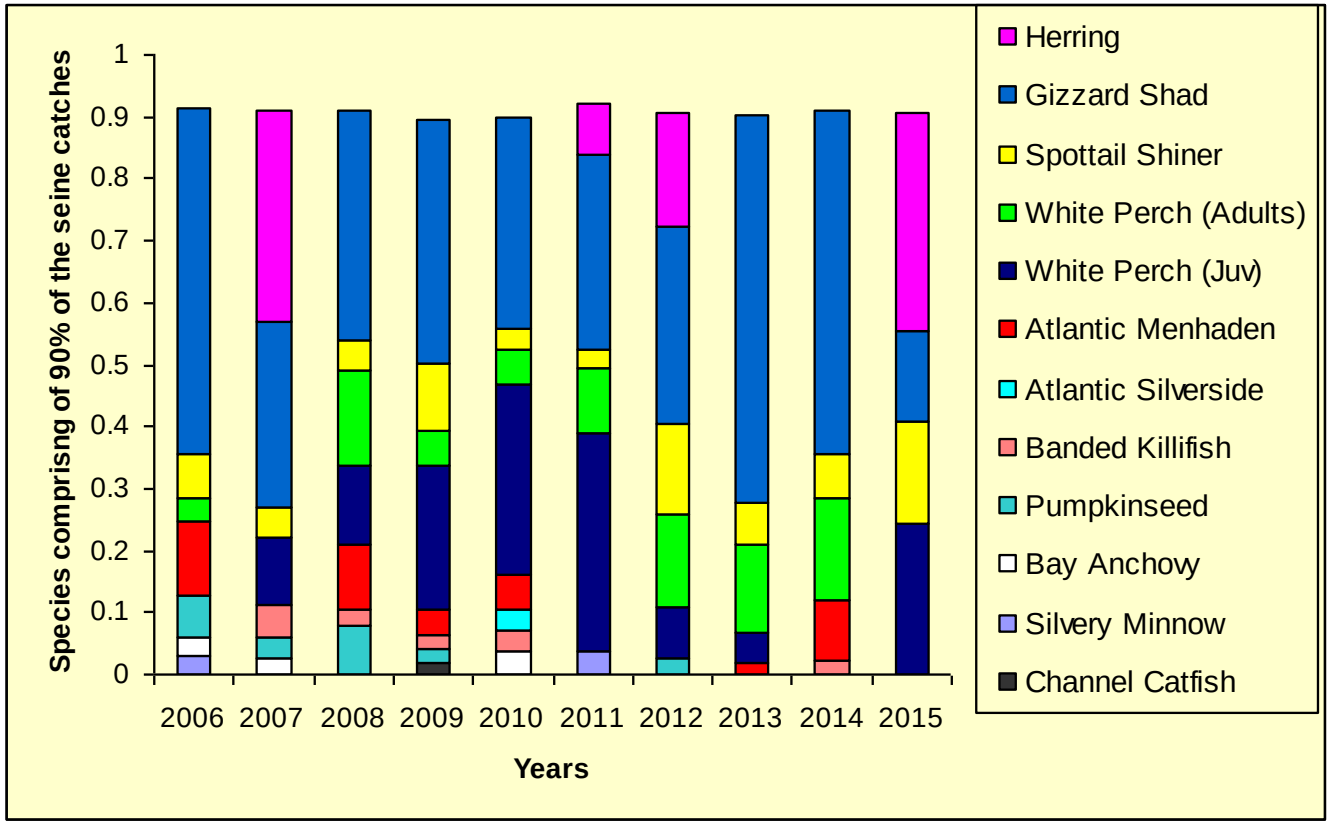
Summer Juvenile Fish – Seine



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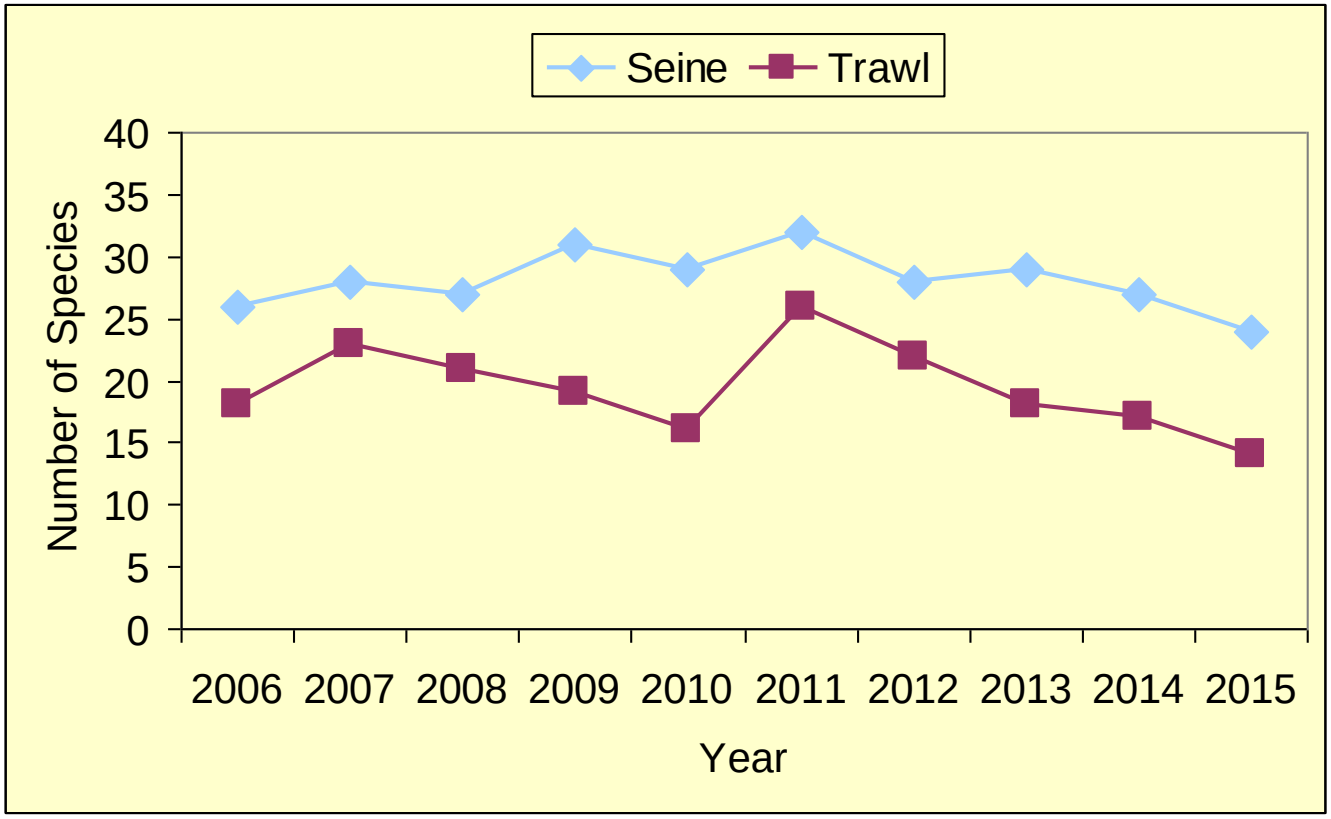
Summer Juvenile Fish



Seine Catch
2014 = 27 Species
2015 = 24 Species

Trawl Catch
2014 = 17 Species
2015 = 14 Species

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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.

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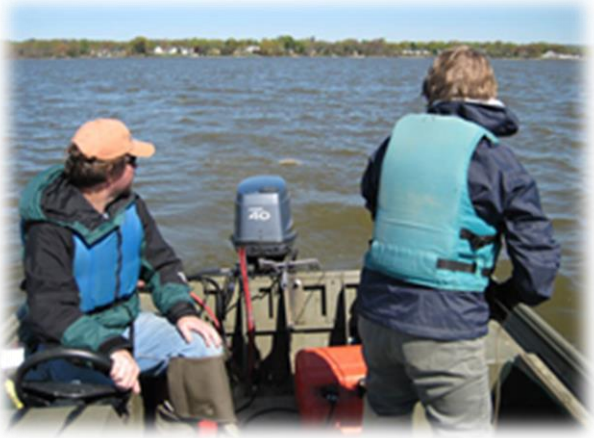
Larval Yellow Perch Presence absence

- ? sampling events in EARLY spring
- 1-2 Volunteers / 2-3 hours per event
- Minimal training required



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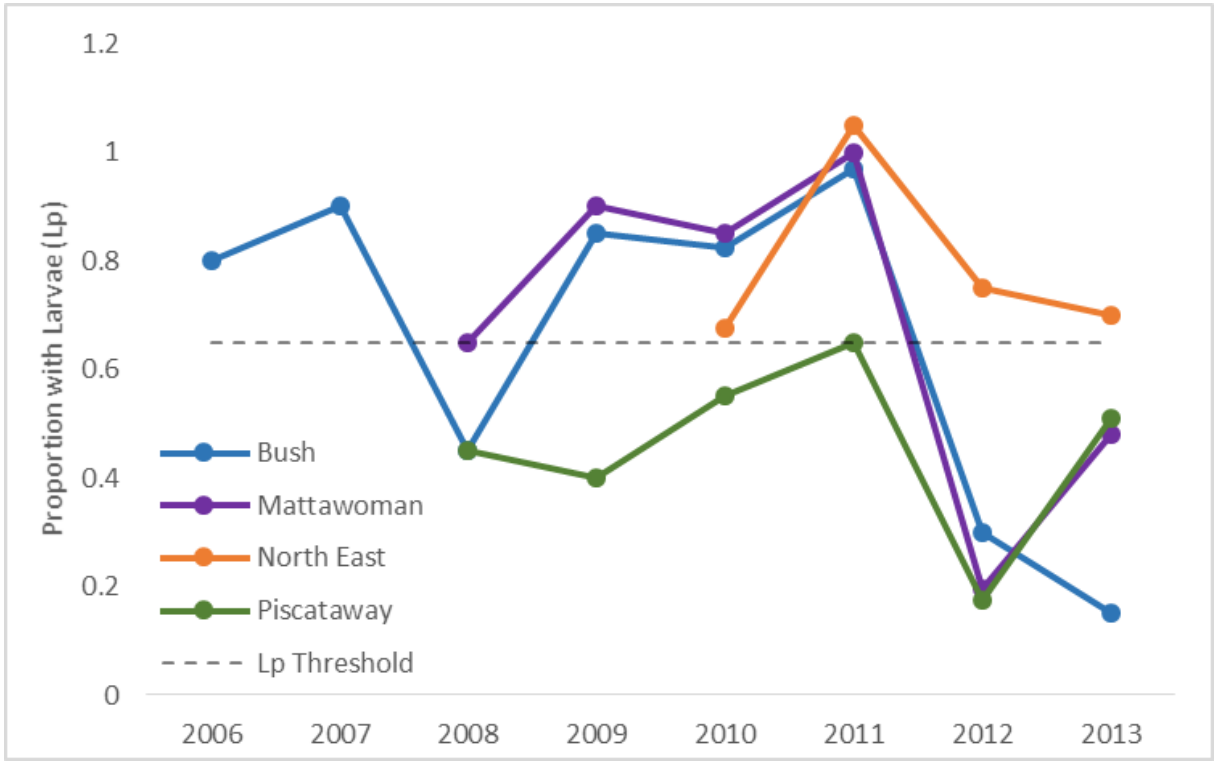
Larval Yellow Perch Presence absence



A persistent *Lp* of 0.65 or lower indicates serious deterioration of tidal-fresh subestuary larval nursery habitat.

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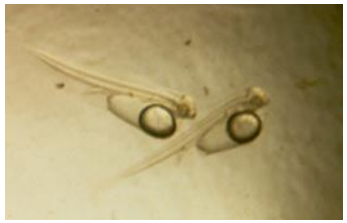
Stream Ichthyoplankton Survey

- Sampling events in spring (April/May)
- 2-3 Volunteers / 2-3 hours per event
- ½ day training required



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Stream Ichthyoplankton Survey

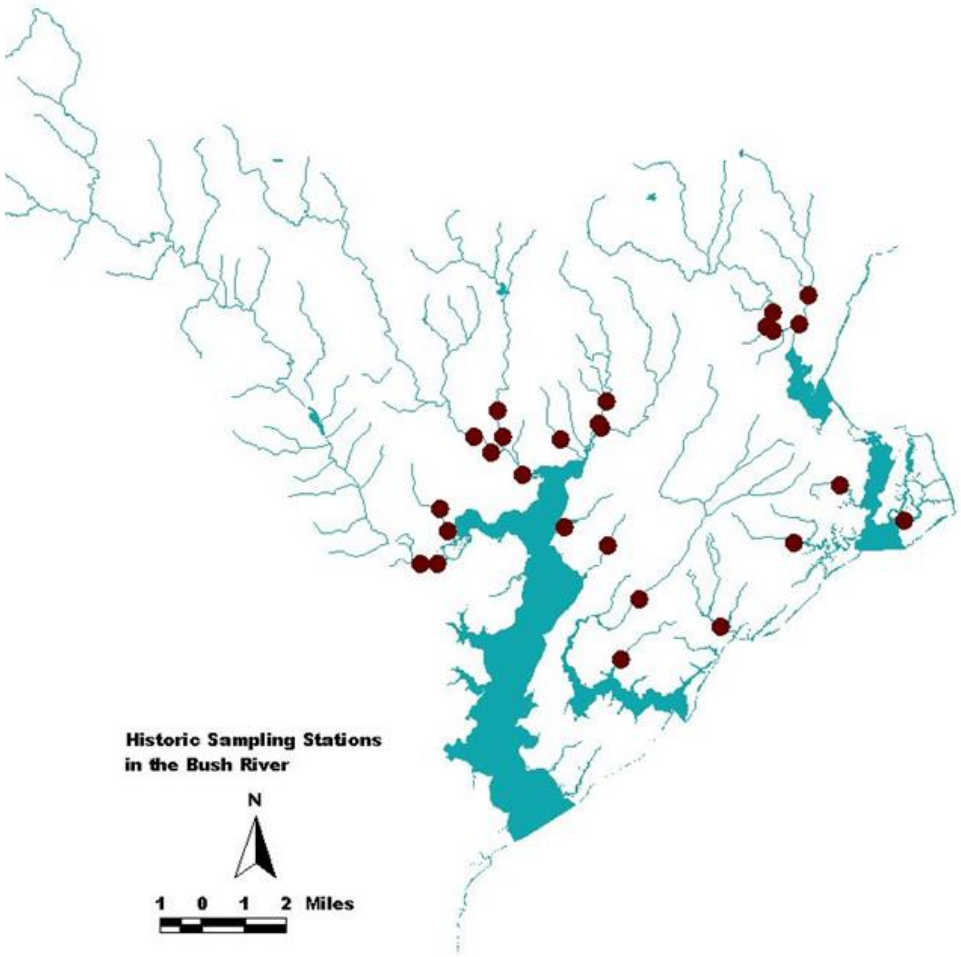
Objective: Identify Spawning Streams in MD

Focal Species:

Herring & Shad

White perch

Yellow perch



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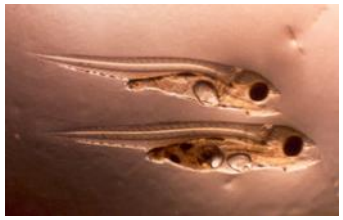
Stream Ichthyoplankton Survey

	HISTORIC		2005		2006		2007		2008		2014	
	Sites Sampled	Samples with Presence	Sites Sampled	Samples with Presence	Sites Sampled	Samples with Presence	Sites Sampled	Samples with Presence	Sites Sampled	Samples with Presence	Sites Sampled	Samples with Presence
Herring	15	7	15	7	15	6	11	8	8	4	6	6
Yellow Perch	15	5	15	0	15	2	11	0	8	0	6	0
White Perch	15	9	15	0	15	0	11	1	8	0	6	2



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Stream Ichthyoplankton Survey

	Mattawoman Creek 1976 / 2008	Bush River 1973 / 2008	Piscataway Creek 1976 / 2008	Deer Creek 1972 / 2012
Impervious %	**4 / 8.5**	**5 / 10**	**10 / 15**	**2.5 / 4.4**
White Perch sites	**2 / 1**	**9 / 0**	**6 / 0**	**1 / 0**
Yellow Perch sites	**1 / 1**	**5 / 0**	**N/A**	**1 / 1**
Herring sites	**6 / 3**	**7 / 4**	**9 / 0**	**2 / 2**

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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

Citizen Science Monitoring – Chesapeake Bay National Estuarine Research Reserve

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The value of Citizen Science Volunteers

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