

# **A Retrospective Analysis of Spatial and Temporal Patterns of Growth and Abundance of Juvenile Anadromous Fishes in the Maryland Chesapeake Bay**

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# Goal

**To inform policy and management decisions on restoration and protection of nursery habitat by evaluating trends and variability in production of young fish in the upper Bay and tributaries.**

**A retrospective analysis of long-term monitoring data.**

## *Primary Data Sources*

**MD DNR Juvenile Striped Bass Seine Survey**

**Chesapeake Bay Program Monitoring Surveys**

## Anadromous Species

The abundances go up and down. Is this just “noise” or is there a pattern?

If there is pattern, what causes it?

Are there trends?

Are there differences among tributaries and the upper Bay?

Can management actions be taken to stabilize or improve “recruitment success?”

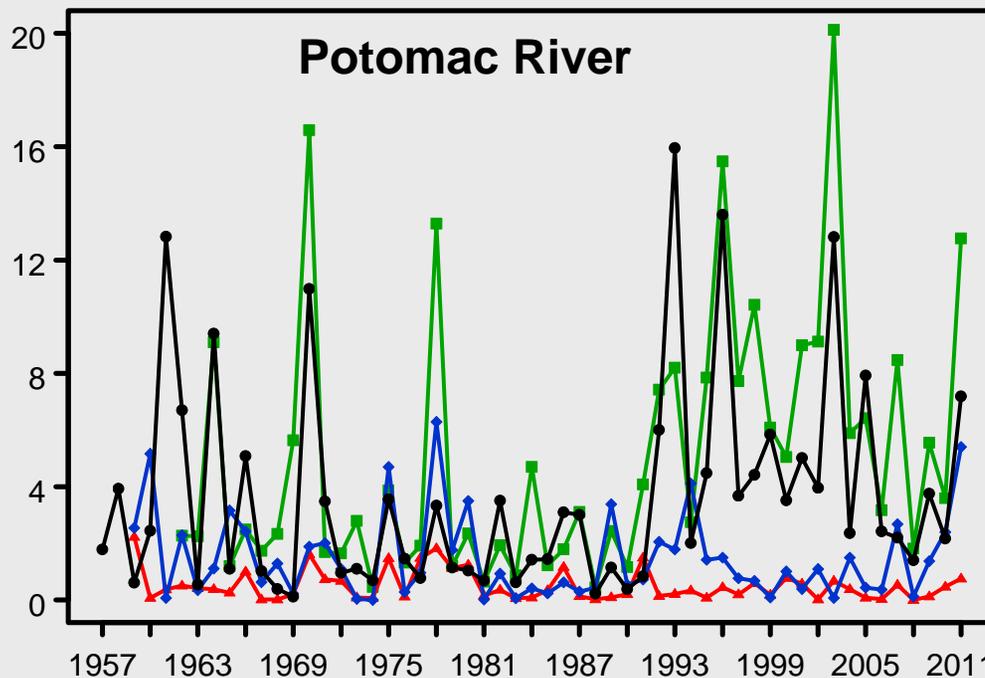
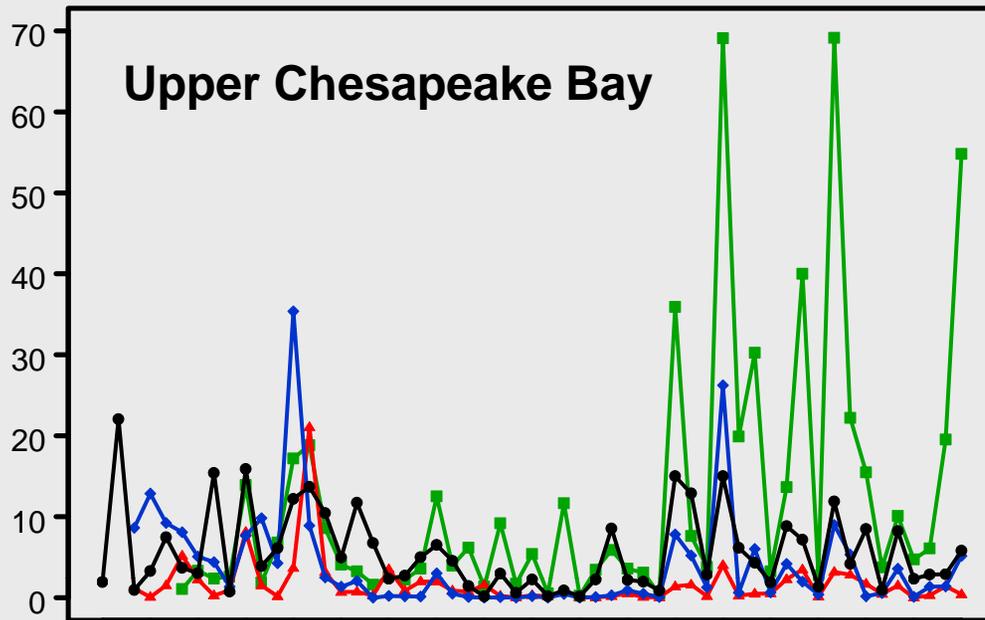
**striped bass**

**white perch**

**blueback herring**

**alewife**

Geometric mean number per seine haul

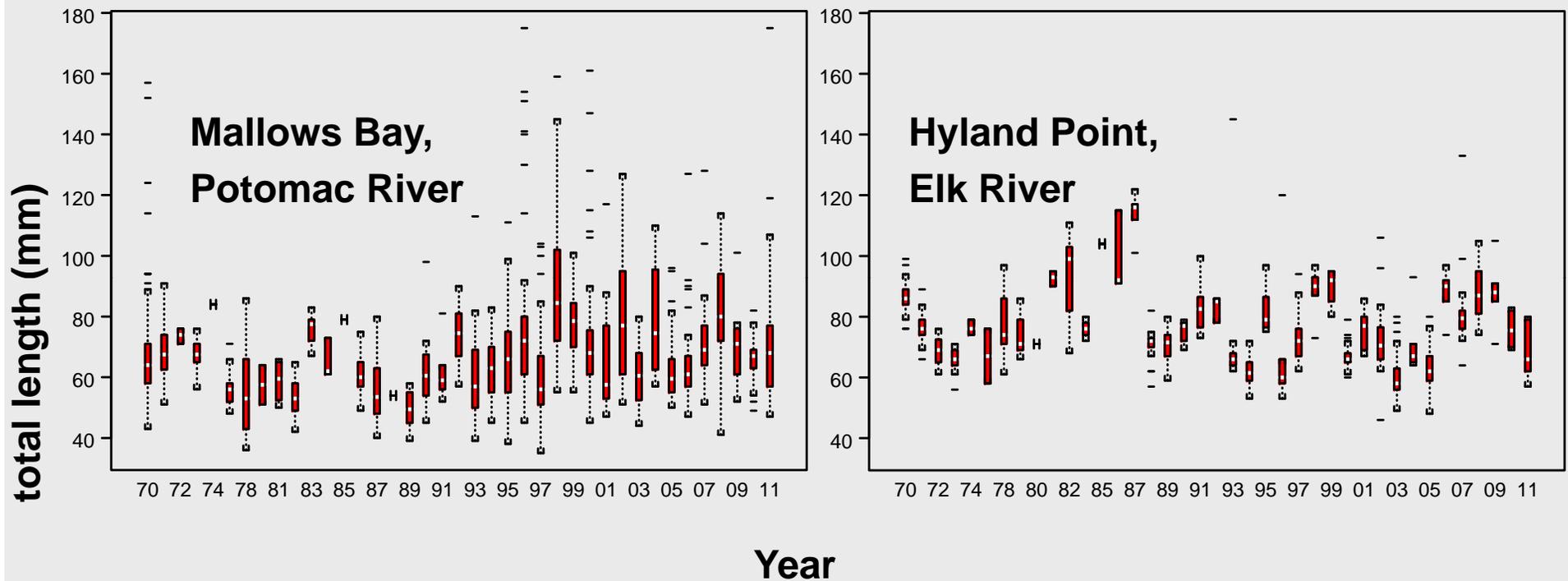


# Objectives

- Describe trends in abundance, size, and growth of juvenile anadromous fishes in upper Chesapeake Bay and tributaries (striped bass, white perch, river herrings and shad)
- Determine if there are differences among tributaries
- Compare availability of zooplankton and benthic prey organisms across tributaries and describe trends through time
- Evaluate relationships between fish community indices, water quality, habitat, environmental variables, and land use metrics



# YOY Striped Bass Length Distributions by Year



Sizes of young striped bass in September differ among years. Both the average size and variability in size appear to differ.

Are there trends in size, suggesting changes in productivity over time?

Are there differences in size (and growth) among tributaries?

# Evidence of Change

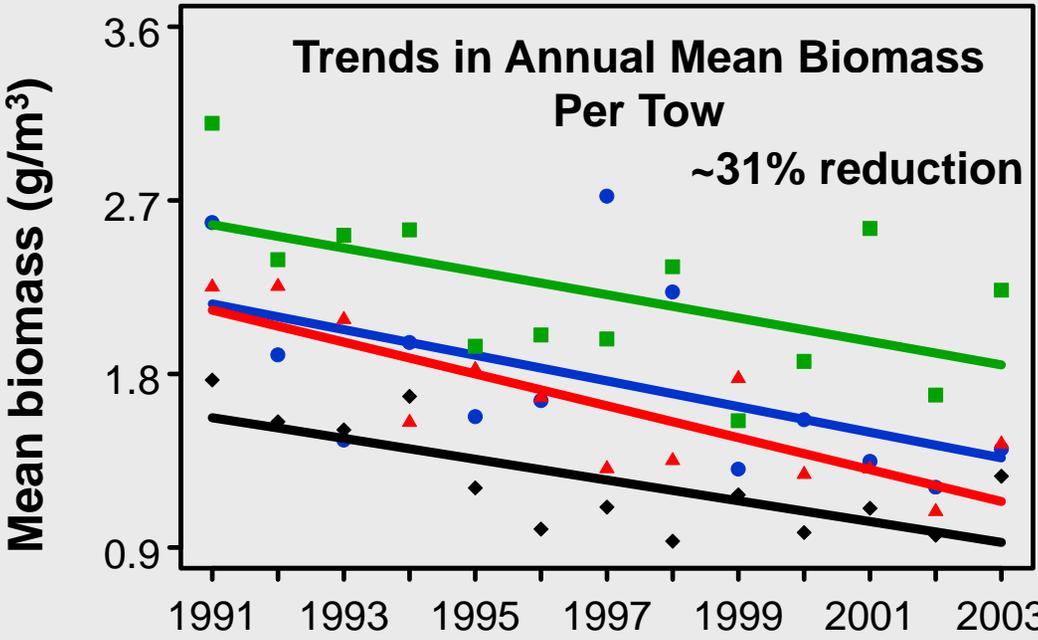
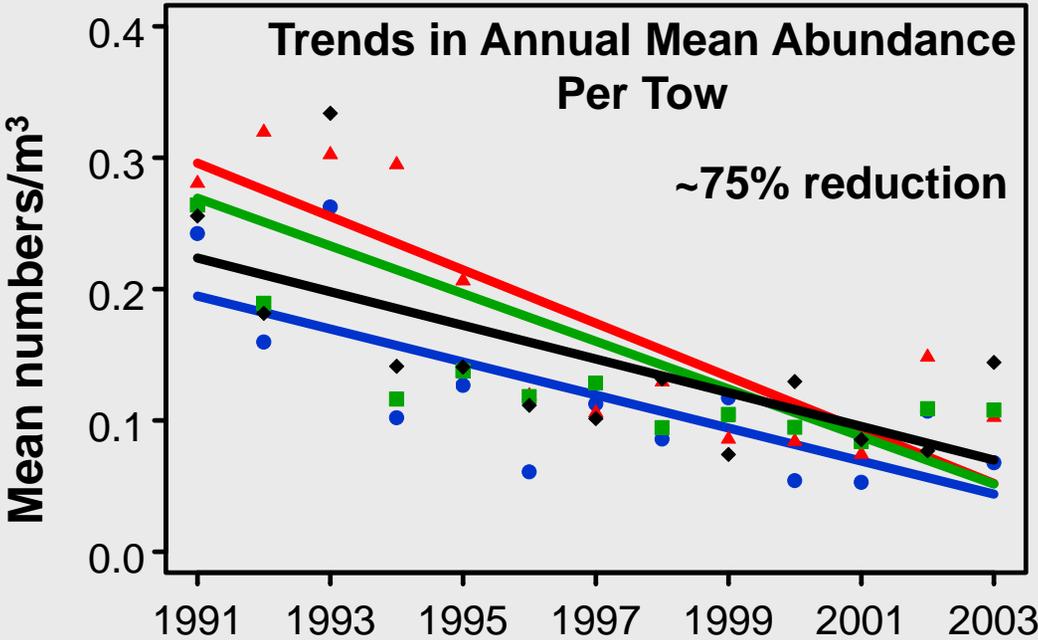
Fish Abundance and biomass in Lower Bay and tributaries

Are there trends?

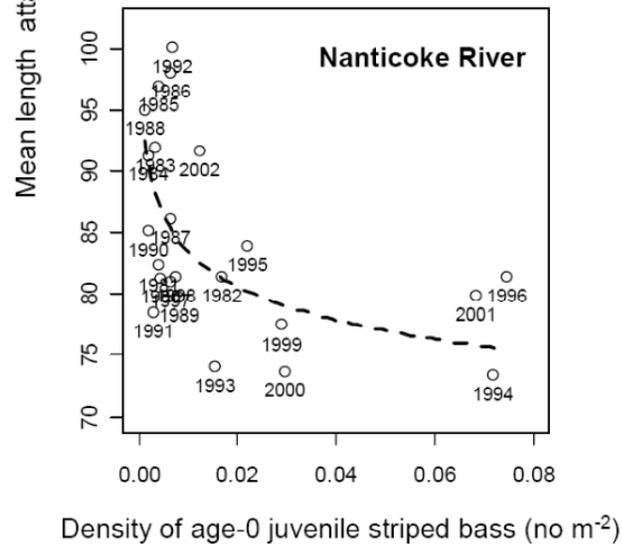
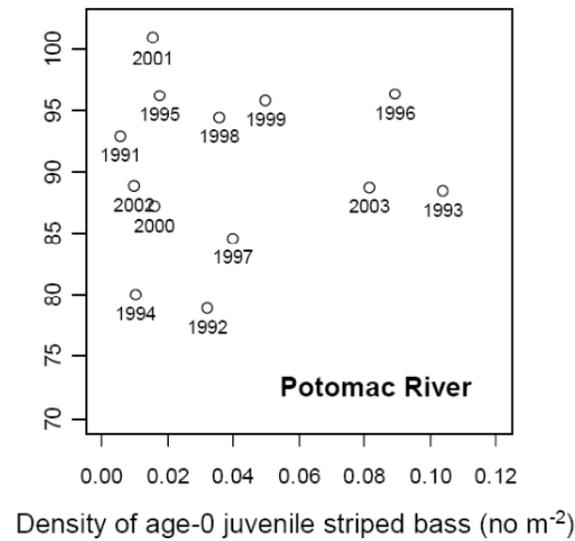
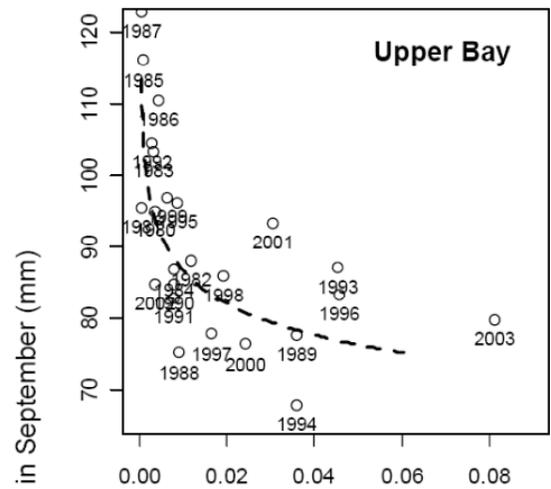
Do trends differ among areas or tributaries?

Rappahannock  
York James Bay

Data from VIMS  
Trawl Survey



# Juvenile Striped Bass, Chesapeake Bay and Tributaries



Growth potential differs among years and is related to juvenile striped bass abundance.

What factors control abundance?

Why is growth affected by striped bass abundance?

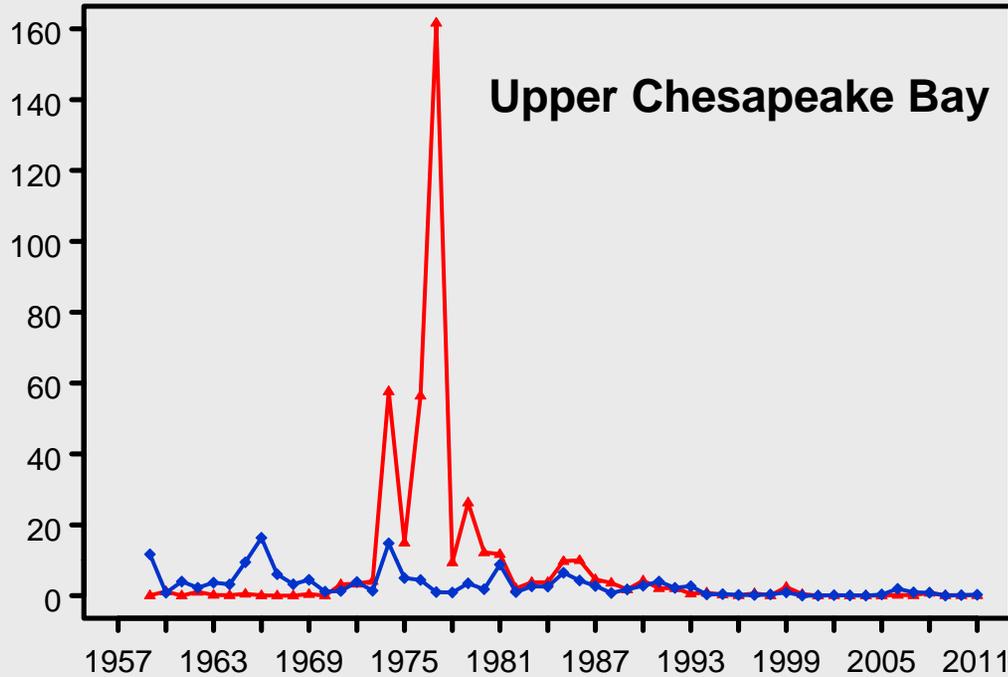
Why is the Potomac River different?

## **Analytical Approaches**

- **Estimate numbers of anadromous fish per unit area of habitat (MDDNR seine data)**
- **Estimate fish growth rates and year-to-year variability, and long-term changes**
- **Estimate per capita prey availability (Chesapeake Bay Program monitoring data)**
- **Link fish and prey production to inter-annual and long-term changes in environmental conditions**



Geometric mean number per seine haul



Estuarine (bay anchovy)  
and offshore (menhaden)  
spawners

bay anchovy

Atlantic menhaden

