Synthesis of Environmental Impacts on Key Fishery Resources in Chesapeake Bay

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ERT, Inc. / NOAA Chesapeake Bay Office
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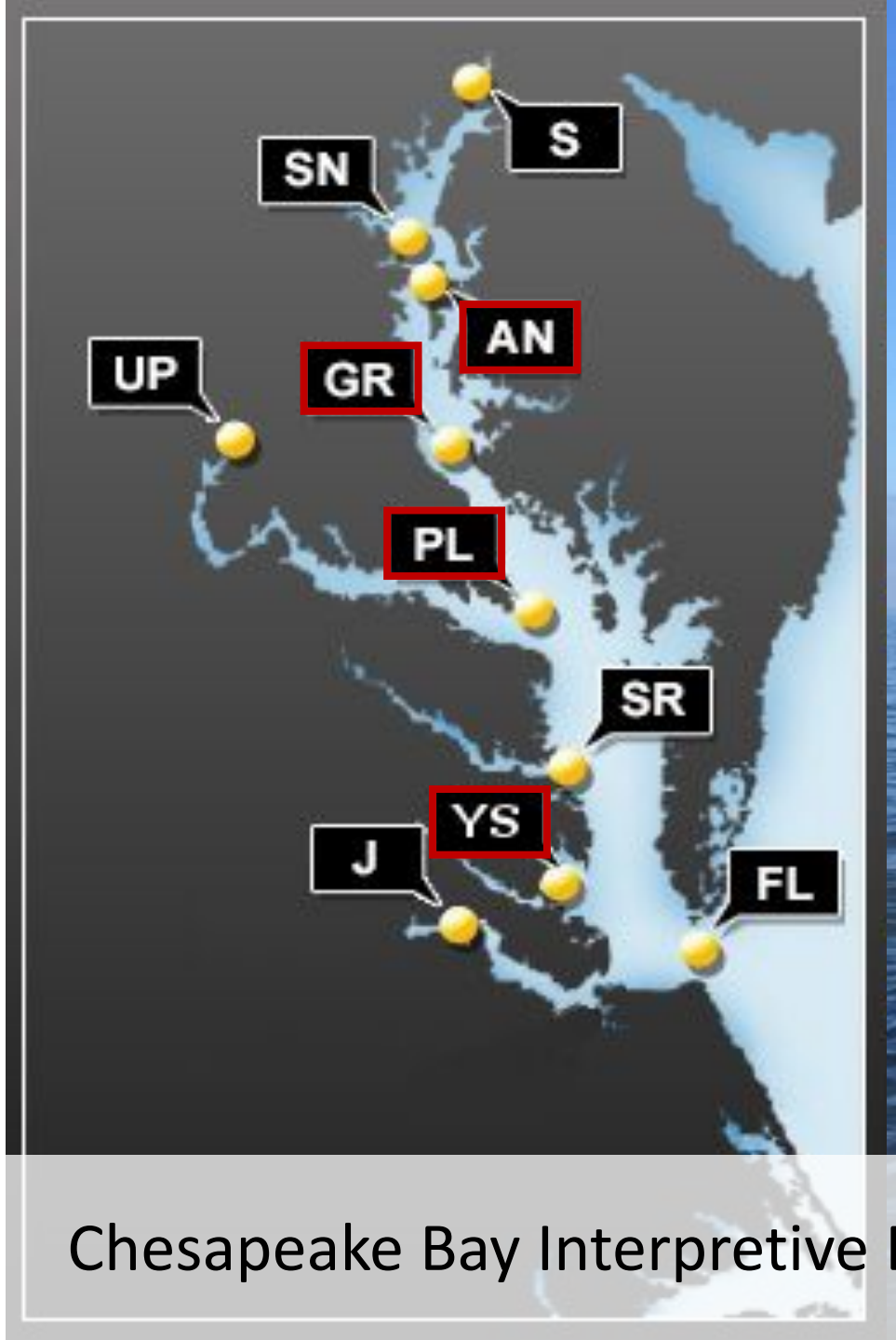
Purpose

- Inform managers and public about recent environmental conditions relative to long-term averages
- Linking changes in environmental conditions to effects on living resources to inform EBFM
- Inclusion in the Mid-Atlantic SOE Report

Data Sources

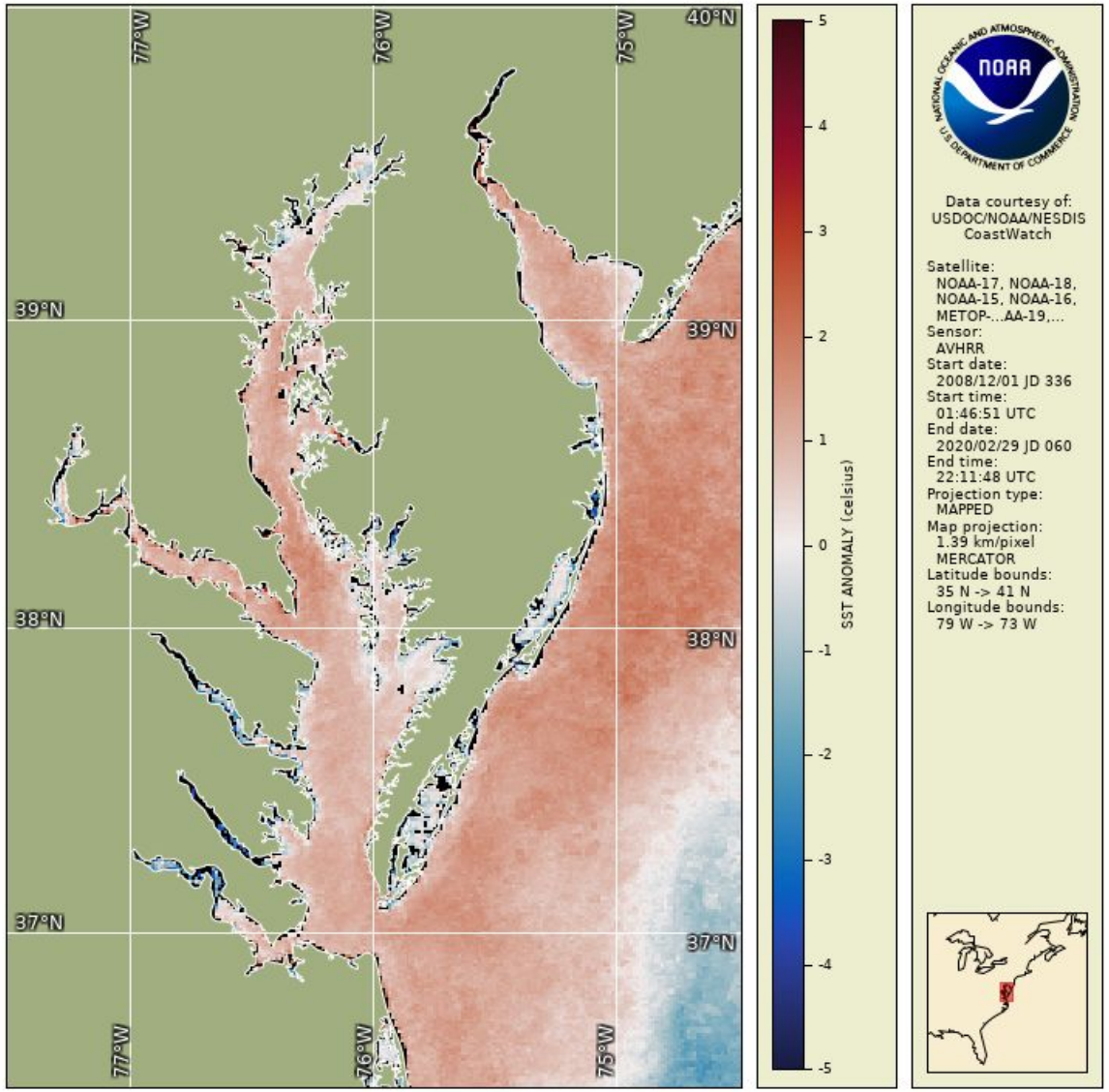
- NBCO Chesapeake Bay Interpretive Buoy System (CBIBS)
  - Real-time water temperature and salinity data
- NOAA CoastWatch Program
  - SST anomalies from satellite observations
- U.S. Geological Survey streamflow data

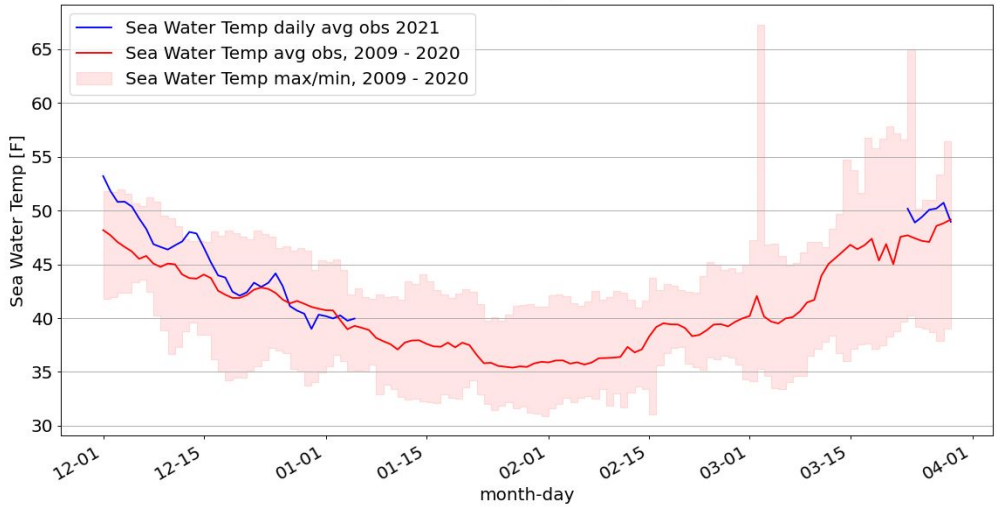


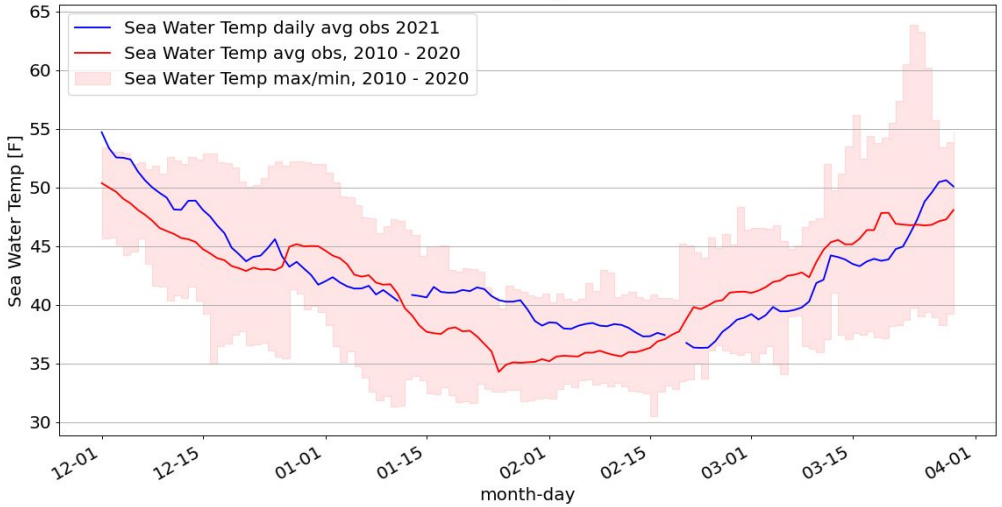
Chesapeake Bay Interpretive Buoy System

Winter 2020-21

Marginally warmer water temperatures relative to previous decade's average




NOAA CBIBS Station: Annapolis - Sea Water Temp 2021
latitude: 38.96 longitude:-76.44
Sea Water Temp daily avg obs 2021
Sea Water Temp avg obs, 2009 - 2020
Sea Water Temp max/min, 2009 - 2020
Sea Water Temp [F]
month-day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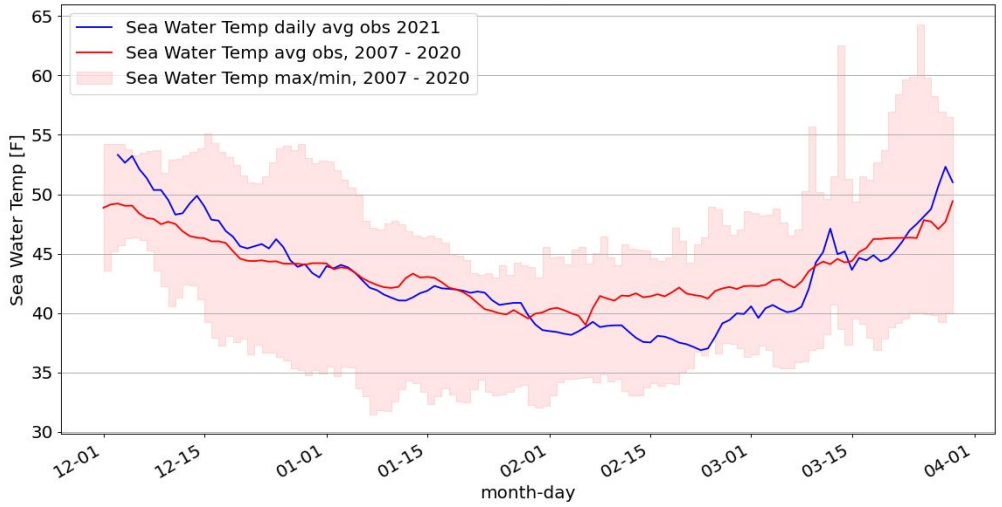
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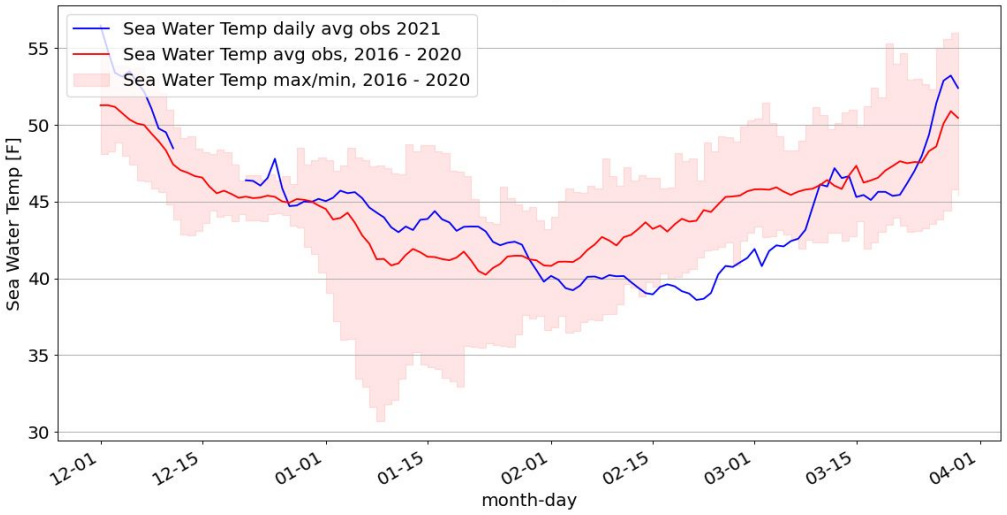
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Sea Water Temp daily avg obs 2021
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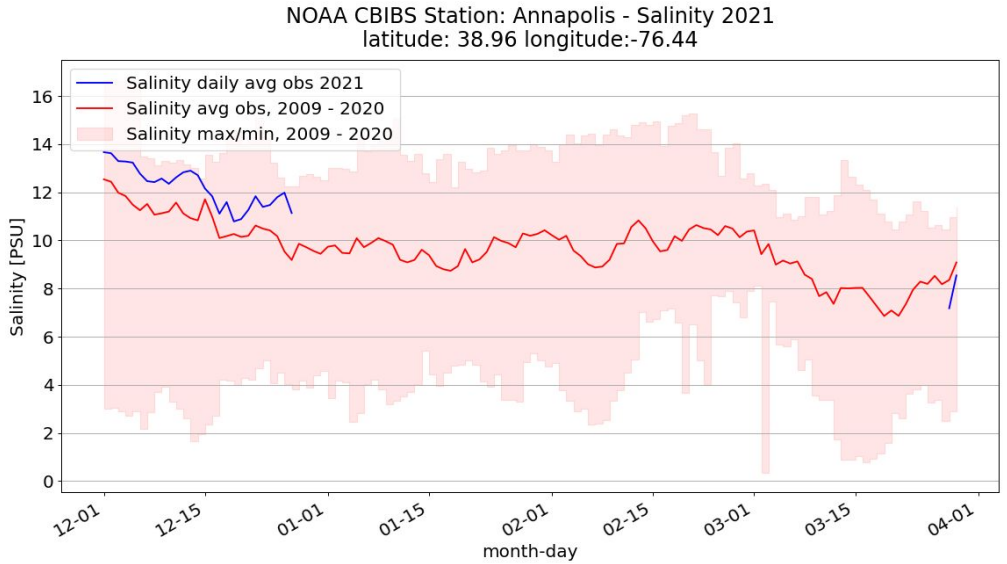
Sea Water Temp max/min, 2016 - 2020
Sea Water Temp [F]
month-day

Water Temperature Impacts

- Cooler winter temps correlated with increased recruitment success of striped bass
  - Marginal increase unlikely to have significant impact
  - Other factors also important (e.g. flow, predation)

- Warmer winter temps reduce blue crab overwintering mortality
  - Average overwintering mortality in 2020-21 based on WDS results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Salinity daily avg obs 2021
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month-day
12-01
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03-01
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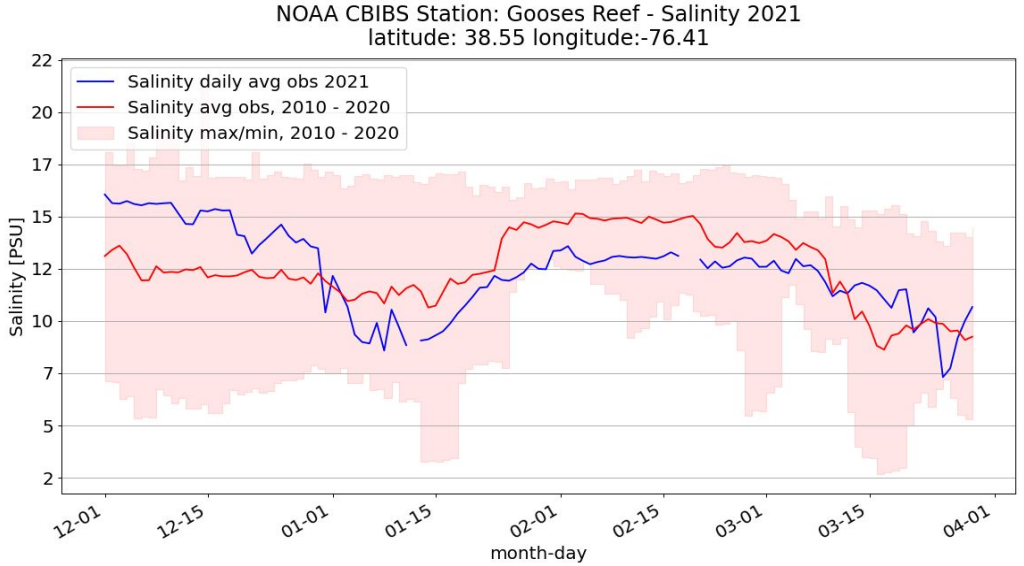
04-01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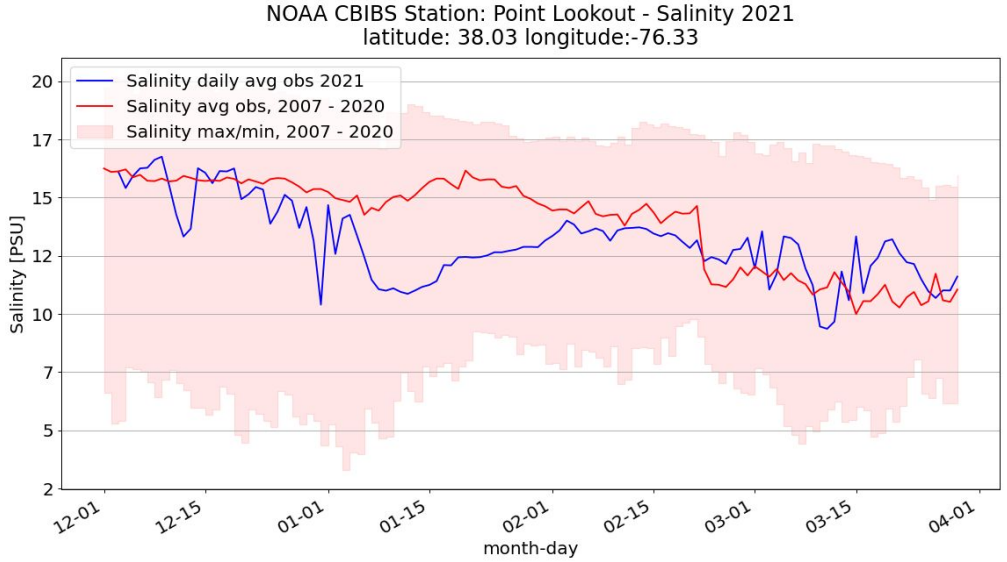
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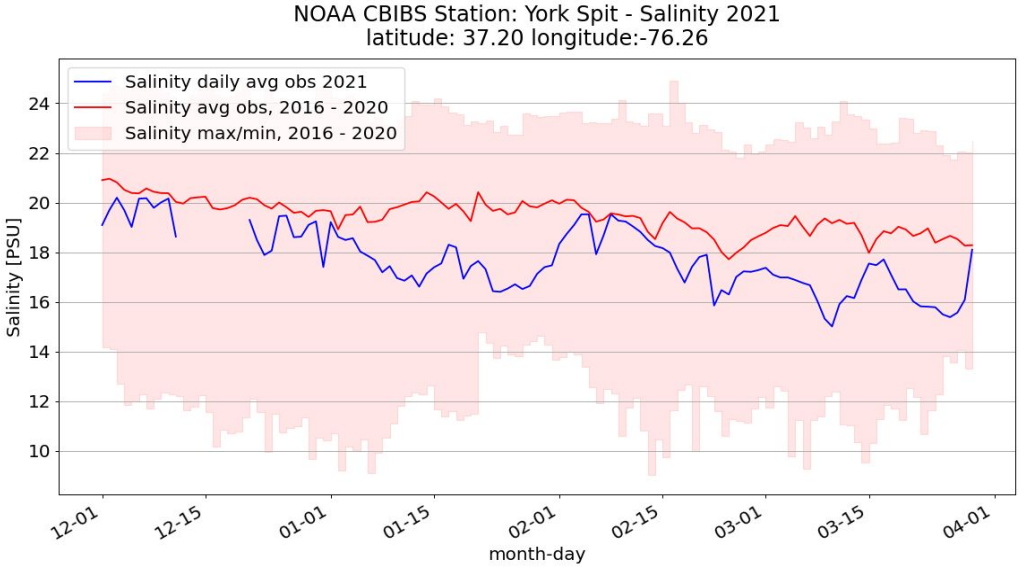
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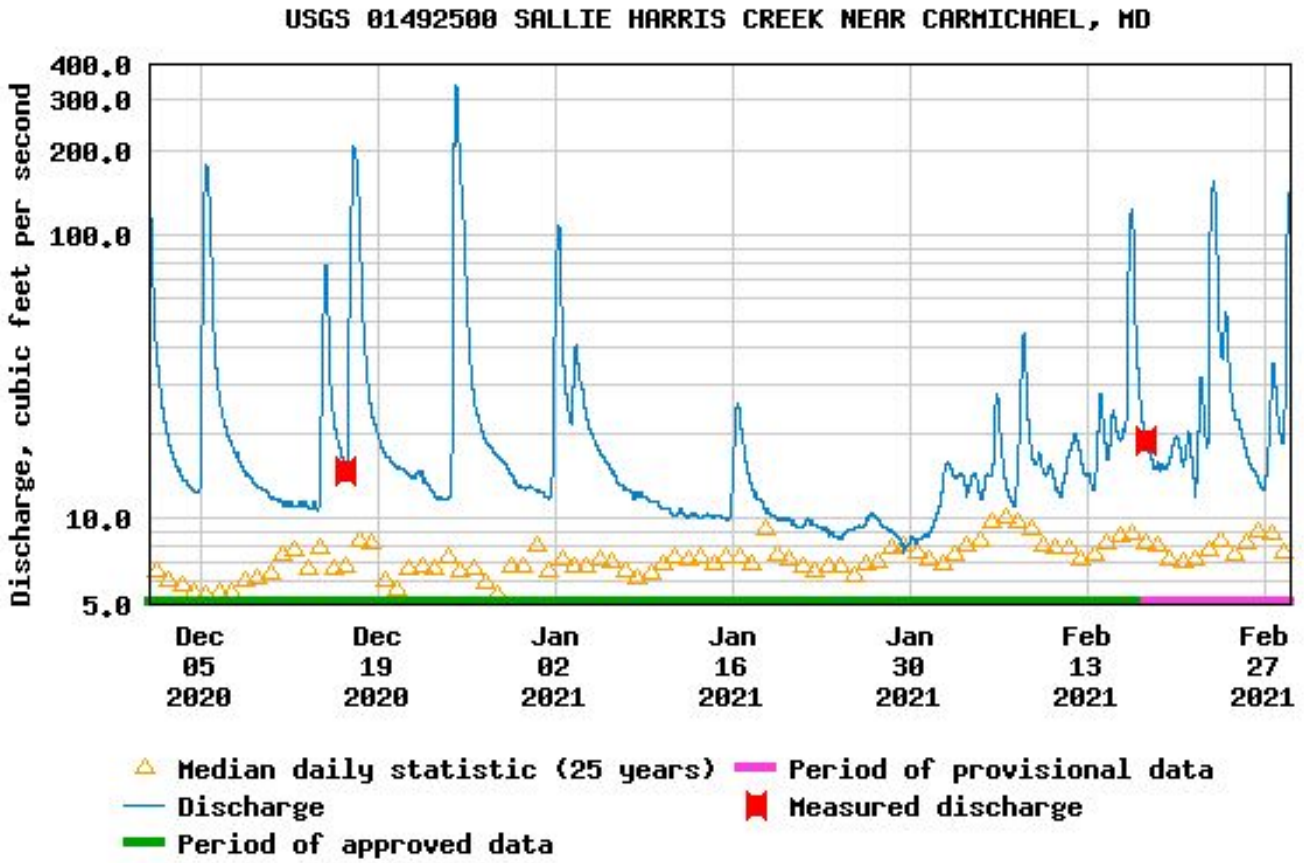
Winter 2020-21

Average to slightly lower-than-average salinity relative to previous decade

Higher-than-average streamflow based on USGS gauge data

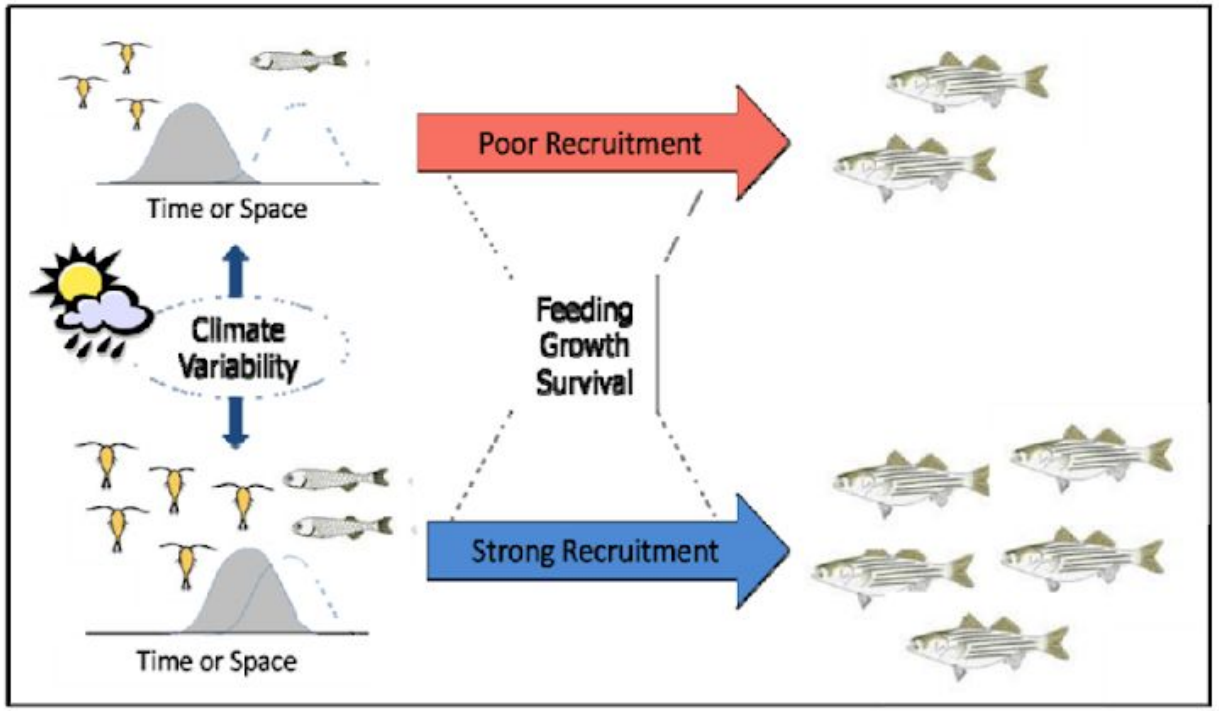


Salinity Impacts

- Increased salinity correlated with high juvenile oyster abundance (increased recruitment success)
  - Spring and summer conditions tend to be more important
  - Higher salinities also support increased disease prevalence and infection intensity
- Salinity is an important factor determining suitable winter habitat for bay anchovy
  - > 23.7 psu is “suitable”; less than ideal in Winter 2020-21
  - Other factors are also important (e.g. DO, sediment composition)

Flow Impacts

- Survival of early life stages of striped bass is strongly correlated with freshwater flow
  - Spatio-temporal overlap with zooplankton prey
  - Continued high flows in spring could benefit striped bass in 2021



Summary

- Average to marginally warmer temperatures
  - Not likely to have significant impact on living resources
- Average to slightly lower salinity and higher flow
  - Might affect striped bass recruitment and forage abundance
  - Also depends on other factors and spring/summer conditions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