CHARACTERIZING JUVENILE FISH HABITAT USING SEASCAPE CONTEXT AND FRESHWATER INFLOW TO HELP INFORM ESTUARINE HABITAT RESTORATION.

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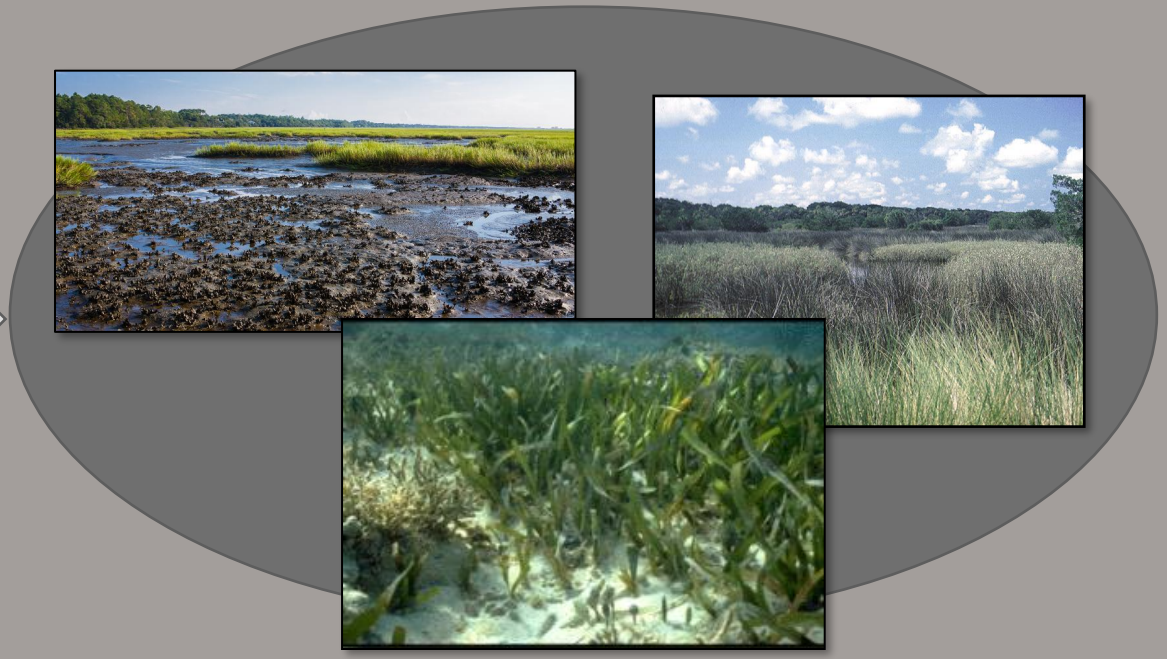
FISHERY PRODUCTIVITY CAN BE LINKED TO COASTAL HABITAT

Vulnerable juvenile life stages



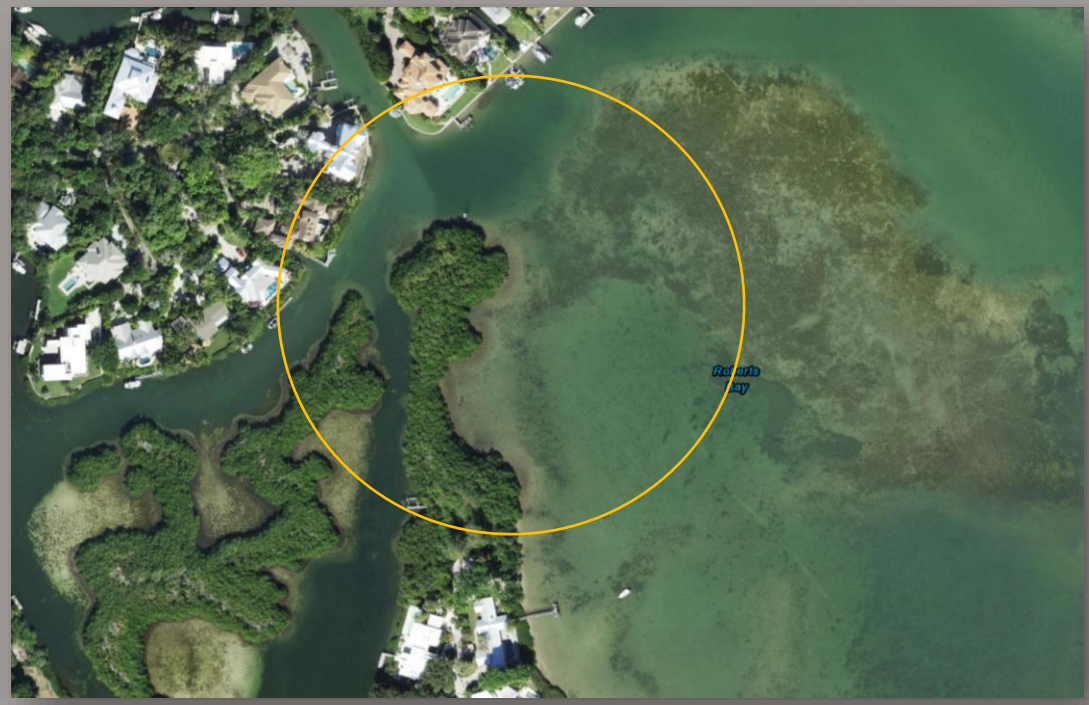
SPOTTED SEATROUT

Cynoscion nebulosus **is one of the most popular recreational species in the southeastern United States.**

JUVENILE SEATROUT

Freshwater inflow conditions

Habitat availability



4 SIZE CLASSES

15 – 50mm Standard length

51 – 100mm

101 – 150mm

151 – 200mm

Apalachicola River

East Pass

Apalachicola Bay

Indian Pass

West Pass

Government Cut

0 5 10 20 Kilometers

Apalachicola-Chattahoochee-Flint River Basin

Study Area

Seatrout Dataset: 4,876 seine samples from 17 years (2001 – 2018) collected by Fisheries-Independent Monitoring Program (Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute) for Apalachicola Bay, Florida

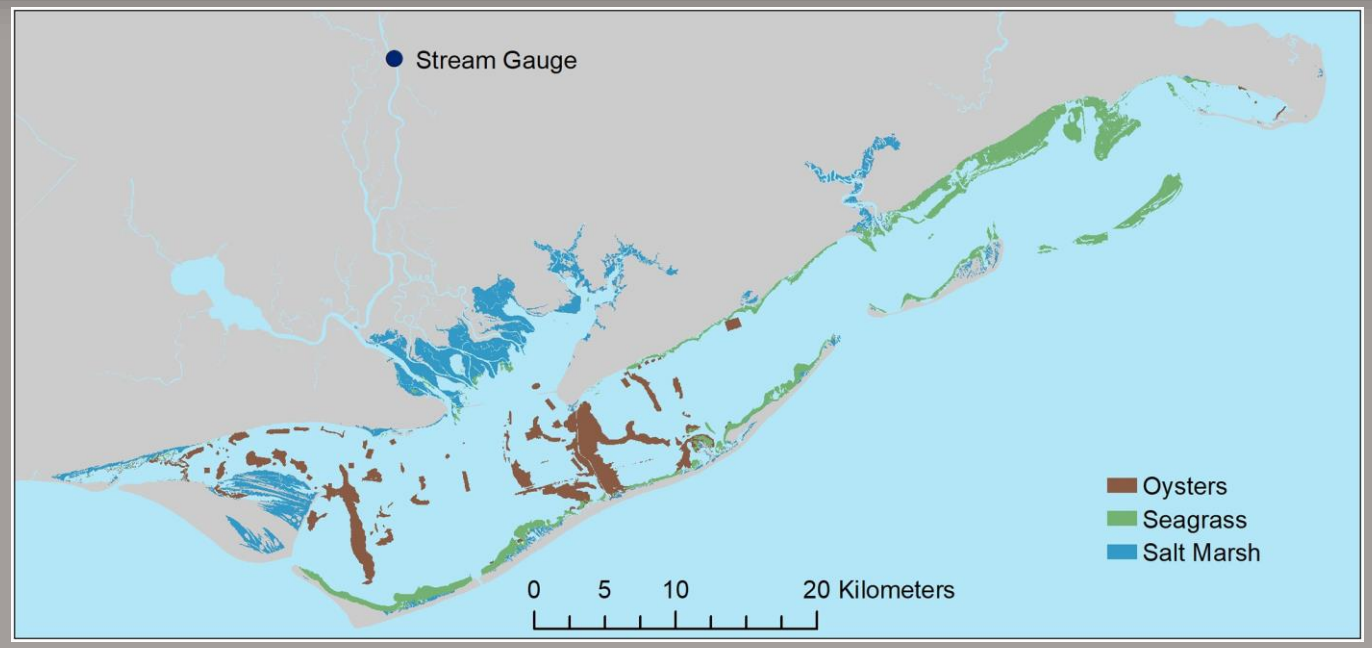
FRESHWATER INFLOW METRICS

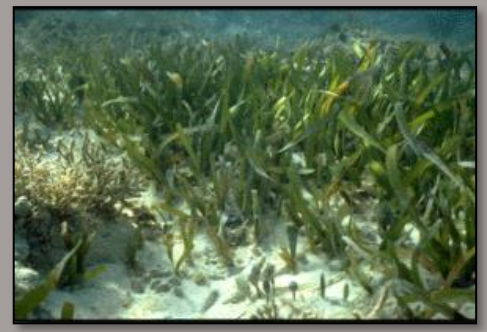
Time Lags:

- The month of sampling
- 3 months prior to sampling
- 6 months prior
- 12 months prior

Dataset: United States Geological Survey (USGS) gauge Site Number 02359170, Apalachicola River near Sumatra, FL

HABITAT CONTEXT





Datasets:

Salt marsh from digital land use and land cover data (1:12,000-scale), Northwest Florida Water Management District;

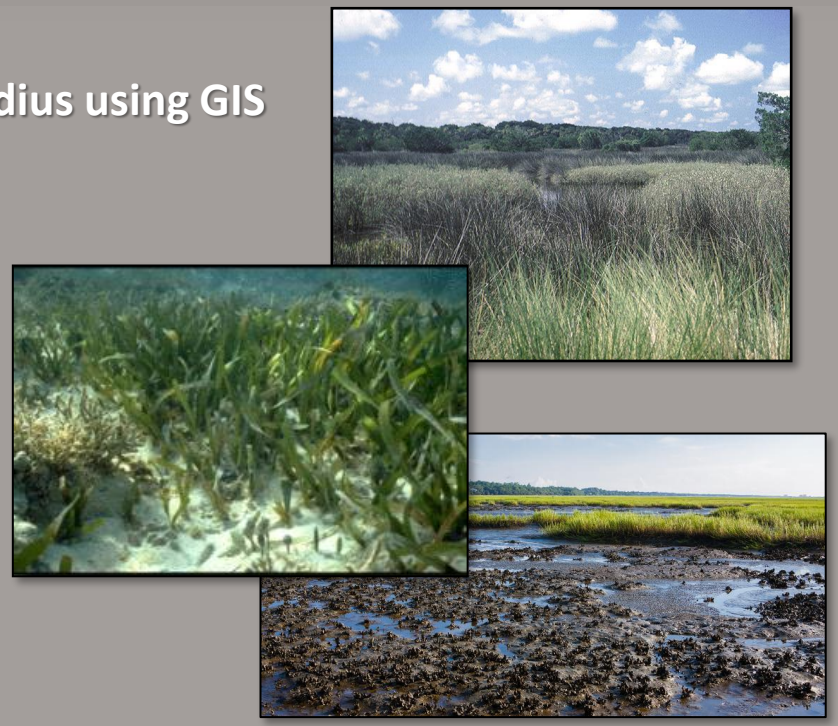
Seagrass interpreted using natural color aerial photography;

Oyster beds (living and dead): statewide oyster compilation data set for Apalachicola Bay, FWRI

HABITAT CONTEXT METRICS

Area of habitat (seagrass, salt marsh, and oyster beds).

Number of habitat types (habitat richness) within a 400-m radius using GIS



FRESHWATER INFLOW

Smaller juveniles (15 – 100mm SL) were related to inflow conditions during the 3-month period prior to peak recruitment.

- This time period corresponds to the egg, larval, and early juvenile stages.
- Inflow may affect these early life stages (mainly planktonic) by influencing passive transport processes of eggs and larvae, or planktonic food availability.

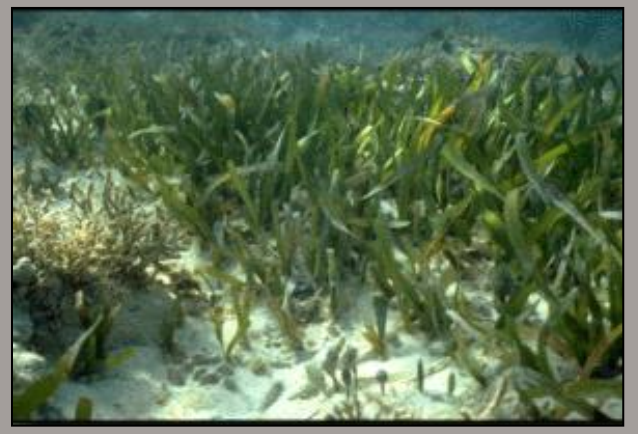
Larger juveniles (101-200mm SL) were unrelated to inflow.

- Inflow-related processes may be less important to the larger juveniles as they have typically settled out of the plankton into benthic habitats.
- Greater mobility.
- Feed on mainly benthic food sources which are not as closely tied to short-term freshwater inflow conditions.

HABITAT CONTEXT

Juveniles of seatrout (all size classes) were most frequently encountered in seascapes containing …

- Relatively large areas of seagrass
- Additional habitat types, such as saltmarshes and oyster beds nearby
- Potential increased food supply (benthic prey) or refuge from predation



HABITAT RESTORATION IMPLICATIONS AND FUTURE RESEARCH

- Spatial occurrence models created in this study may help locate restoration projects that would likely benefit juvenile seatrout populations.
- Results of this study can be used to design and restore mosaics of functionally connected habitats to improve nursery seascape habitat for fishery species such as seatrout.
- Future research could expand the seascape approach into other estuaries within the range of seatrout to compare habitat use patterns found in Apalachicola Bay to seascapes used elsewhere.

Whaley, S. D., Shea, C. P., Santi, E. C., & Gandy, D. A. (2023). The influence of freshwater inflow and seascape context on occurrence of juvenile spotted seatrout Cynoscion nebulosus across a temperate estuary. Plos one, 18(11), e0294178.