ABSI Modeling
Hydrographic Modeling Update

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Forcing at boundary:
- Currents
- Temperature
- Salinity
- Water elevation (tides)
- From Gulf of Mexico hydrodynamic model

Atmospheric forcing:
- From weather model or
- Downscaled from climate model

ACF watershed and Apalachicola River distributary flow from ACF STELLA Model and downscaled FVCOM

Oyster larvae dispersal and derived products
ABS1 Hydrodynamic Model Configuration

- **Finite Volume Coastal Ocean Model (FVCOM)**
- **Mesh Resolution**: 800m - 30m (water and land)
- **Vertical Grid**: 10 layers
- **Surface Forcing**: CFSR (atmospheric model) and Wind Observations
- **River Discharge**: USGS or Leitman’s Model
- **River Temperature**: NOAA NOS station
- **Initial Condition (U, V, T, S)**: HYCOM Reanalysis
- **Boundary Condition (Tide, T, S)**: HYCOM Reanalysis
- **Model Periods run to date**: 1998, 2011-2012, 2019
Model Results: Water Surface Elevation
Model vs. Observation (Temperature 2019)
Model vs. Observation (Salinity 201901)

National Estuarine Research Reserve System
Model vs. Observation (Salinity 2019)
Model vs. Observation (Salinity 2019 vs. 2012)

USGS Sumatra river discharge for 2019 and 2012
Model vs. Observation (Salinity 2012)
Sub-domain Videos (Salinity 201203)

Dry Bar

Cat Point
Hydrodynamic Model-Derived Products

Model output is analyzed to develop derived products informative to the stakeholder community and to inform restoration efforts.

- Model hindcasts to estimate past conditions in the bay
- Predictions of possible future scenarios (freshwater flow / climate)
- Statistical analyses that can provide information for forecasting future conditions
- Mapped products of environmental variables
- Input to Larval dispersion models
- Input to habitat suitability models
Maps of salinity quantiles (median, 25\textsuperscript{th} percentile, 75\textsuperscript{th} percentile) corresponding to wet, normal, and dry March.

River Discharge (m\textsuperscript{3}/s)

March

Habitat Suitability Models

The hydrodynamic model variables can be used as input to Oyster Habitat Suitability Models.

Environmental Variables
- Salinity
- Temperature
- Current Direction
- Current Velocity
- Exposure
- Substrate Type
- Nutrient content
- Sea Level Height
- pH
- Dissolved Oxygen
- Precipitation

Observed Presence/Absence Data

Example HSM output

Statistical Analysis (Models)