Hydrodynamic model

**Navy Coastal Ocean Model** (NCOM – Barron et al. 2006)

- Velocity and density fields from NCOM AMSEAS
- Topography from Naval Research Laboratory Digital Bathymetry Data
- Atmospheric forcing fields (COAMPS®) model
- Sea surface temperature and altimetry using the NRL-developed Navy Coupled Ocean Data Assimilation (NCODA)
- The model is forced by tides and discharges from 53 rivers in the region (Ko et al. 2003)
Hydrodynamic model

Previous applications

- The AMSEAS model reproduced the oil spill transport in response to the Deepwater Horizon oil spill event with a particular focus on pollution pulses that penetrate into the estuaries east of the MR (Zaron et al. 2015).

- This model was also used to predict likely drift tracks of sea turtles’ carcasses in the north central GOM (Nero et al. 2013).

- In a more recent study, Garavelli et al. (2018) used AMSEAS to simulate coral reef larvae transport within and from the Flower Garden Bank in the northwestern GOM.
Habitat Connectivity Matrix

- Habitat connectivity winter_ins-2016
- Habitat connectivity winter_off-2016
- Habitat connectivity summer_ins-2016
- Habitat connectivity summer_off-2016
Model Results

✧ A high degree of local larval retention was observed in the GOM waters, mainly during summer months when the weak southeastern winds are more likely to yield a shoreward net flow.

✧ Results demonstrated clear evidence of connectivity between the Gulf coast of Florida population and those of Mississippi, Alabama, and Louisiana, suggesting that the blue crab populations in the GOM are intermixed and the hypothesized boundary of the two blue crab stocks at Cape San Blass (Florida) needs further consideration.

✧ Outputs of the model also indicated connectivity between the blue crab population of Florida’s Gulf coast and the South-Atlantic Bight (SAB).
Model Results

- Drivers of larval trajectories:
  - Winds
  - Loop Current (LC) intrusions in the northern GOM
  - LC eddies and their cyclonic counterparts
  - Mississippi River plume that provides a conduit for larval transport from the GOM to the SAB.
- These findings provide evidence of the physical oceanographic processes that sustain the homogenous genetic population structure for blue crabs among SAB and GOM populations, thus highlighting the need for collaborative management of blue crabs in U.S. waters.
Inshore Releases
Inshore Releases

April-01-2016
Inshore Releases

September-01-2016
Offshore Releases
Offshore Releases

February-01-2016
Offshore Releases

March-01-2016