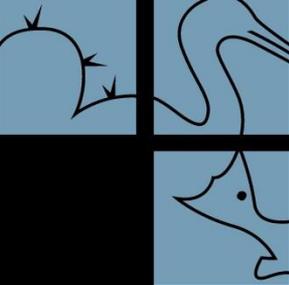


Assessing the effects of freshwater inflows and other key drivers on the population dynamics of blue crab and white shrimp using a multivariate time-series modeling framework: Phase 2

Dr. Lindsay P. Scheef

Dr. Edward J. Buskey

Mission-Aransas National Estuarine Research Reserve



Phase 1 summary

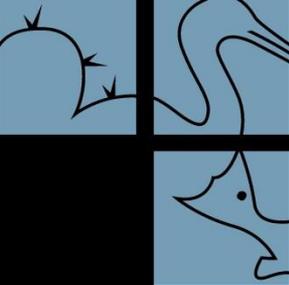
- **Data from the Texas Parks and Wildlife Department (TPWD) Coastal Fisheries monitoring program, U.S. Geological Survey (USGS) flow gage stations, and several other sources were acquired for 1982–2013**
- **Drivers of blue crab and white shrimp population dynamics were assessed using multivariate autoregressive (MAR) models**
- **Detected significant lagged effects of predators, water temperature, salinity, and river discharge on the abundances of both focal species**
- **Effects of freshwater inflows on focal species abundances must be assessed in conjunction with other drivers at time lags of up to two years**

Phase 2 Timeline

Tentative timeline	Accomplishments
2016 Apr-May	✓ Update datasets and rerun original models
2016 Jun-Aug	✓ Reformat datasets to reflect TCEQ inflow standard seasonal increments ✓
2016 Sep-Dec	✓ Run new sets of MAR models using reformatted data ✓ Assess whether particular seasons are more influential on focal species abundances
2017 Jan-Jun	✗ Present results at national meeting → Model adaptation for inflow scenario assessment
2017 Jul-Oct	<ul style="list-style-type: none">• Prepare final report• Present results to GSA BBASC• Submit final report• Submit data and annotated R code



Behind schedule



Updated Data

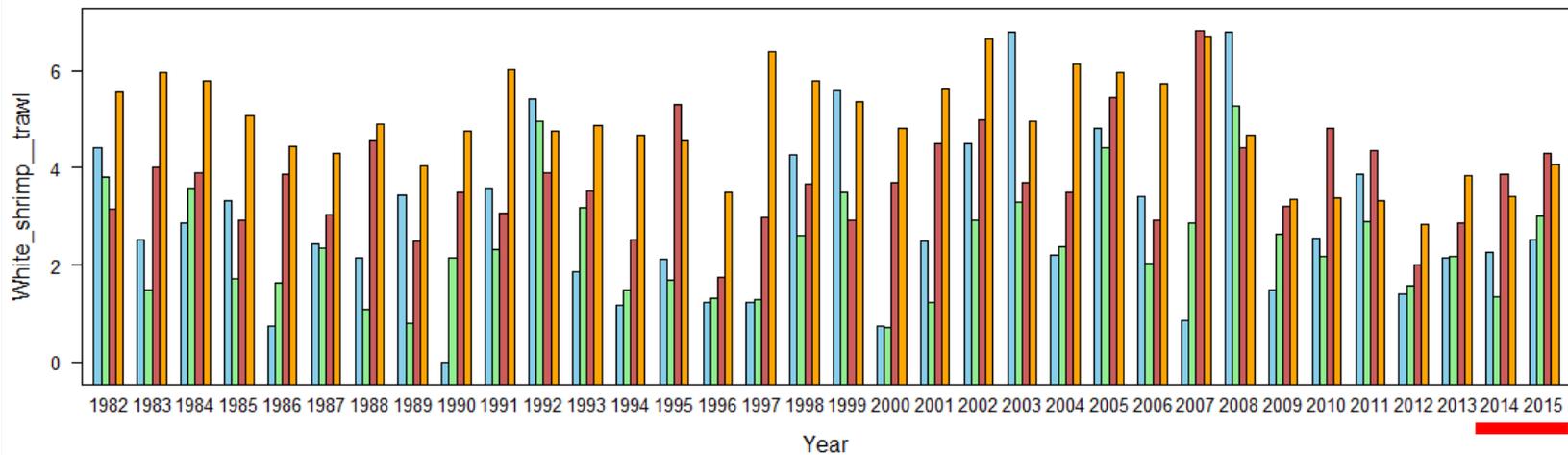
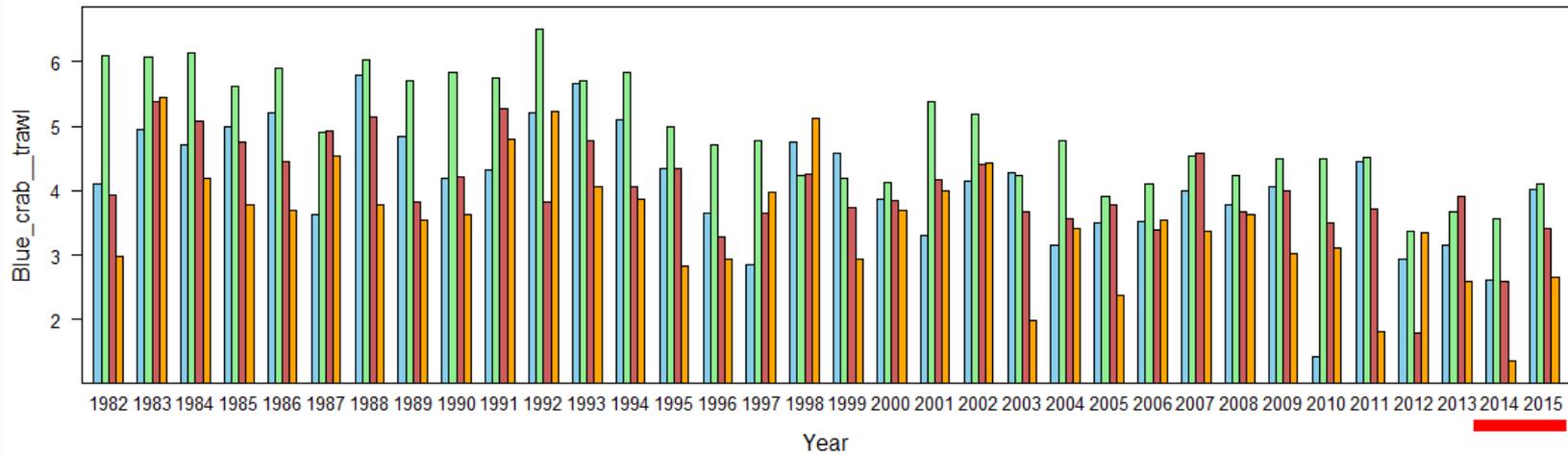
Seasonal divisions:

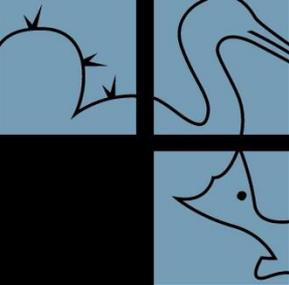
Winter (Jan-Mar)

Spring (Apr-Jun)

Summer (Jul-Sep)

Fall (Oct-Dec)





Updated Data

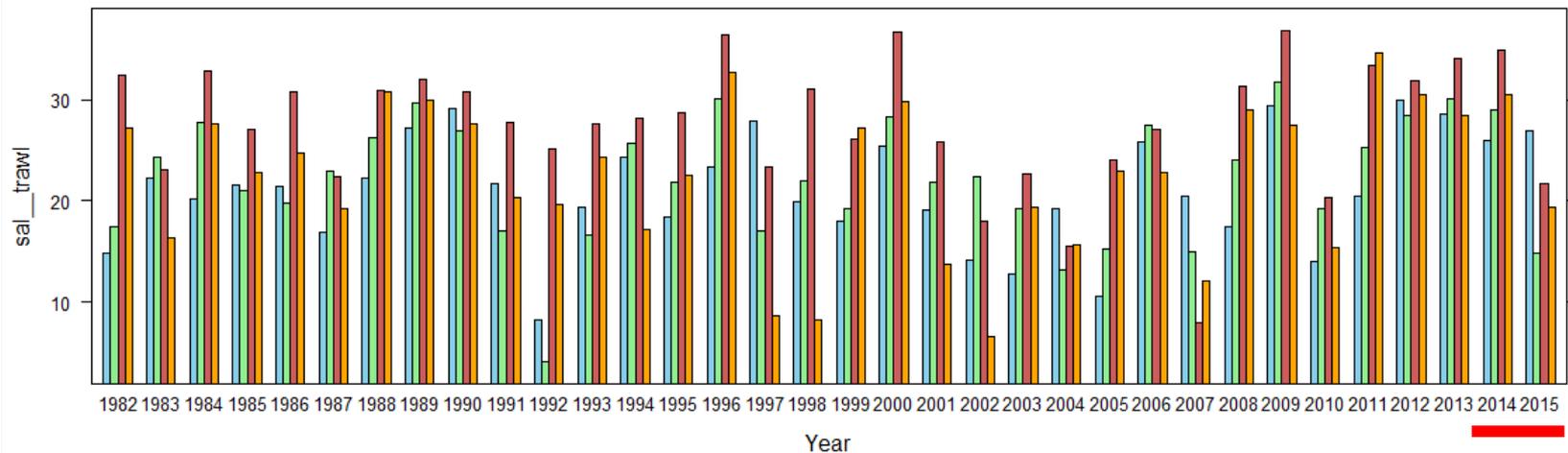
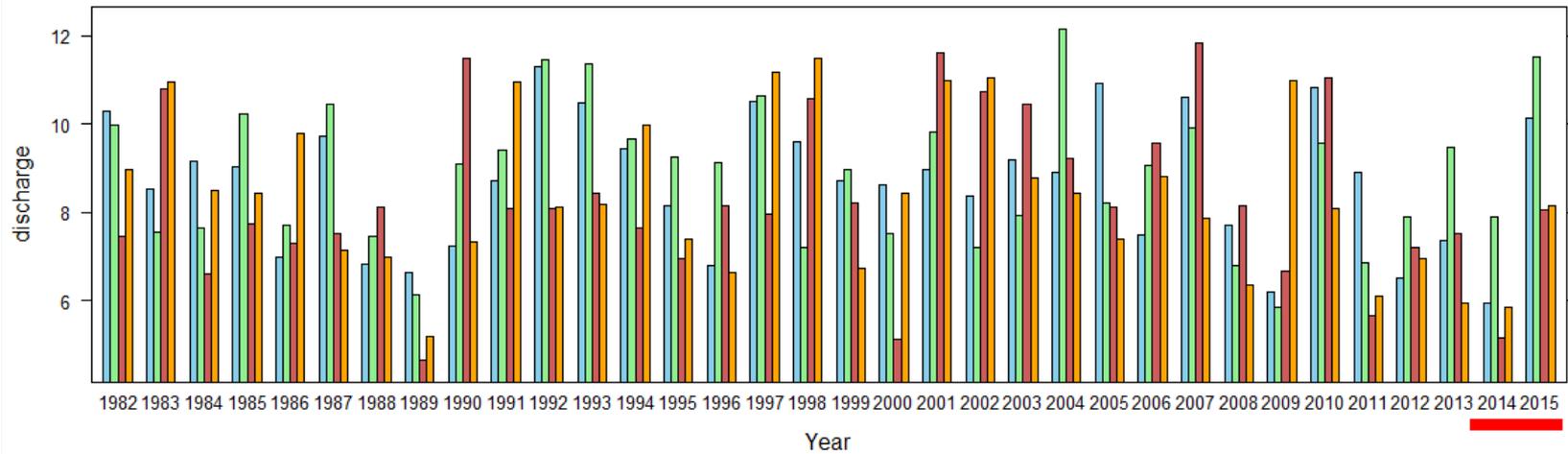
Seasonal divisions:

Winter (Jan-Mar)

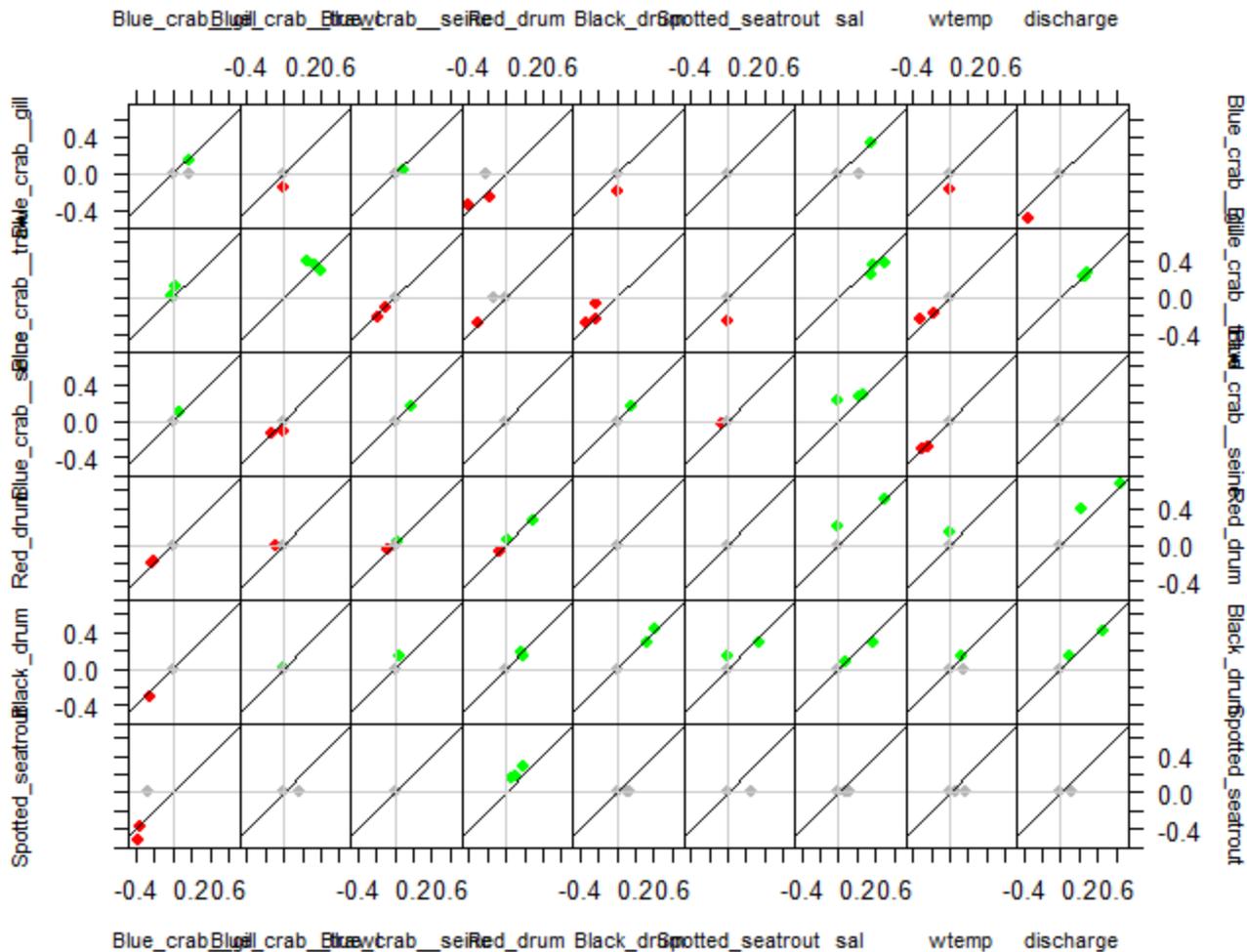
Spring (Apr-Jun)

Summer (Jul-Sep)

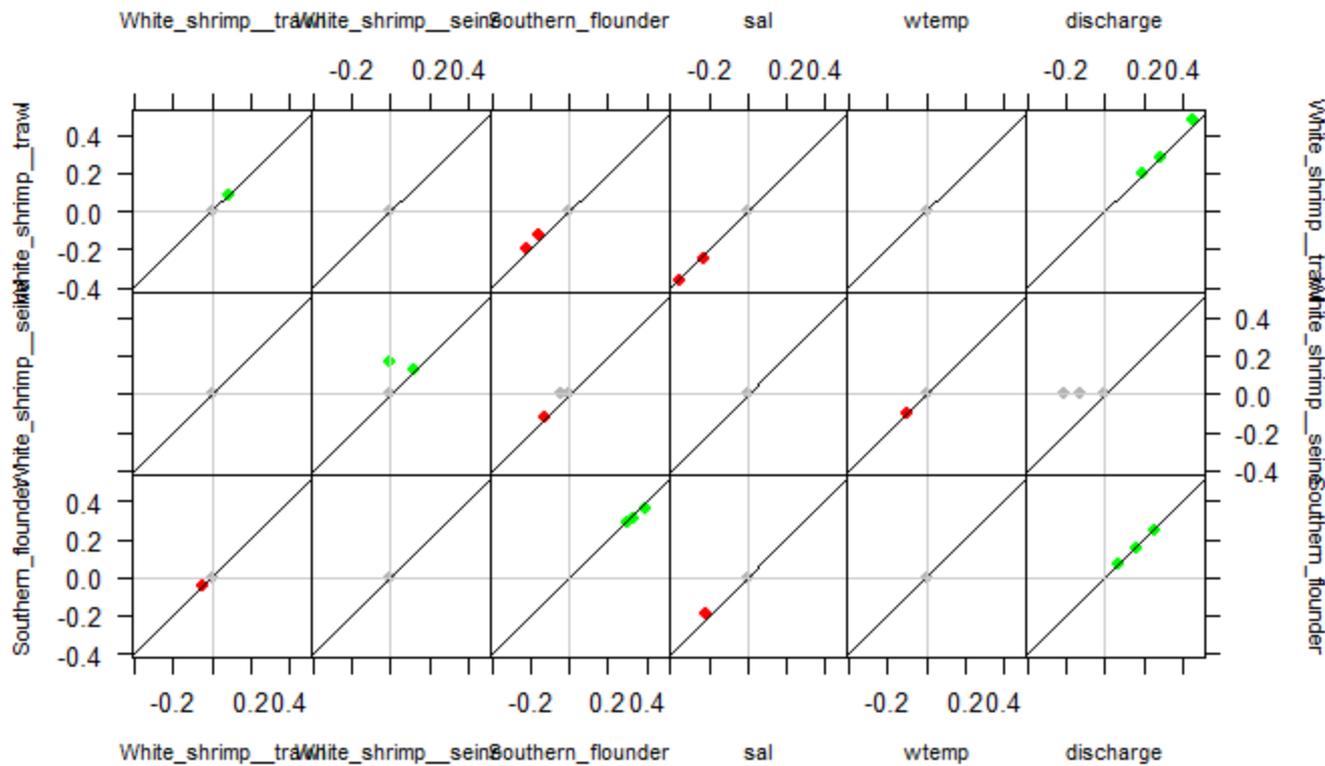
Fall (Oct-Dec)



Updated vs. Original Data Models

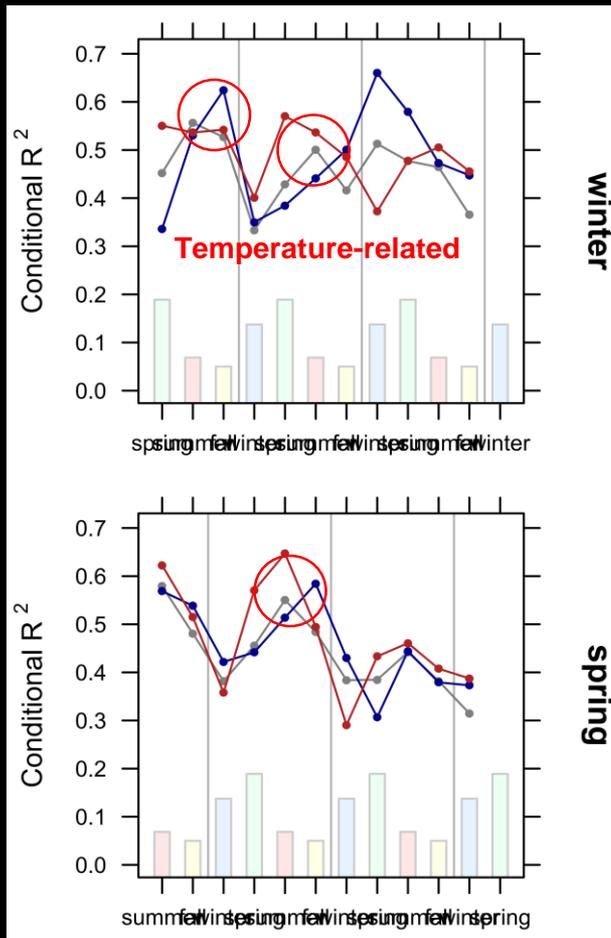


Updated vs. Original Data Models

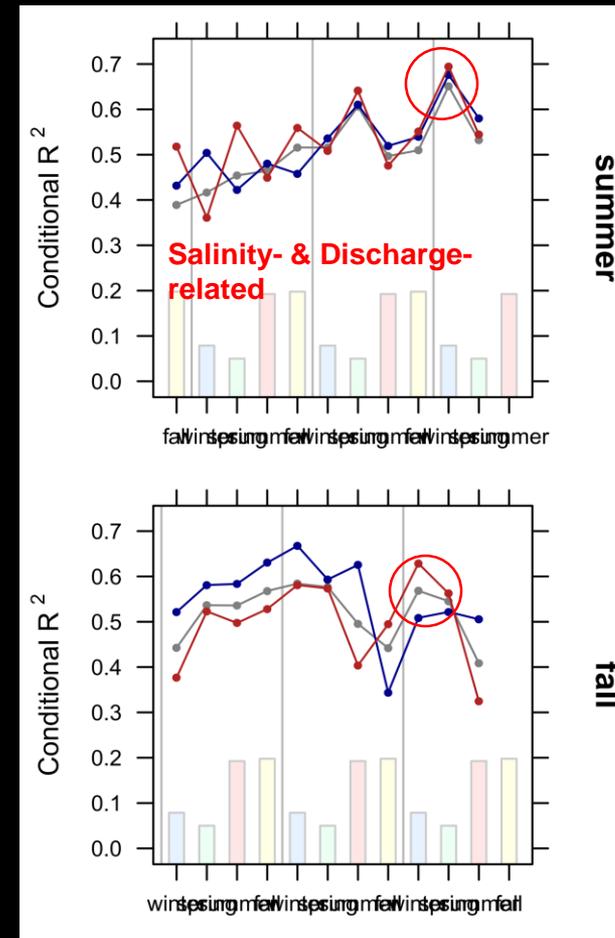


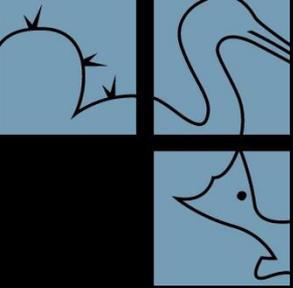
Seasonal models

Blue Crab (trawl)



White Shrimp (trawl)





Seasonal model adaptation

- **Simplify seasonal model configurations and code**
 - **See how omitting predator effects and intraspecific effects changes model results**
 - **Model selection not needed for inflow assessment model ⇒ use native R models**
- **Simulate inflow values based on various scenarios**
- **Run model with simulated datasets to assess whether focal species abundances increase or decrease in response to inflow changes**

