

## BOEM ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

BOEM OCS Region: [Gulf of Mexico](#)

**Planning Areas:** Central and Eastern

**Title:** Abundance and Distribution of Commercially Important Estuarine Dependent Species Populations within the Gulf of Mexico (GM-12-x10)

**Total Cost:** \$1,177,047.63

**Period of Performance:** FY 2012-2017

**Conducting Organization:** University of New Orleans

**BOEM Contact:** [Arie Kaller](#)

### **Description:**

**Background:** Estuarine dependent species including blue crab (*Callinectes sapidus*), white shrimp (*Litopenaeus setiferus*), and brown shrimp (*Farfantepenaeus aztecus*) move through and use multiple, spatially distinct estuarine habitats throughout their life cycle. Dispersal throughout the entire estuary via wind and tidally driven currents is imperative to this life history strategy. Following insemination, mature females migrate with ebb tides to lower estuarine, higher saline waters to release eggs. The eggs are tidally transported farther offshore, out over the continental shelf to higher saline waters to undergo various stages of metamorphosis. The post-larval life stage is then tidally transported back into the lower estuary and settles within some type of complex nursery habitat (sea grass, marsh edge, oyster bed, etc.). As the individuals grow and mature, they will continue to migrate further up the estuary for additional resources. Throughout this large-scale, estuarine-wide migration, the species play significant ecological roles as both predator and prey. Juveniles and adults are preyed upon by coastal birds such as the Whooping Crane (*Grus americana*), American Oystercatcher (*Haematopus palliatus*), White Ibis (*Eudocimus albus*), and Roseate Spoonbill (*Platalea ajaja* or *Ajaia ajaja*), etc., and other commercially and recreationally important species such as the Spotted Sea Trout (*Cynoscion nebulosus*), Red Drum (*Sciaenops ocellatus*), Black Drum (*Pogonias cromis*), Sheepshead (*Archosargus probatocephalus*), etc. A dramatic decrease in blue crab and shrimp abundance would impact the estuarine communities within the affected area, and those adverse impacts would likely resonate throughout the entire food web.

With the species' extensive use of the estuary, including offshore habitat that would directly expose this vulnerable life stage to oil and dispersants; oil coating important lower estuarine, nursery habitat; potentially altered adult migration patterns; potentially altered physiology for all life stages; potentially increased susceptibility to parasites, lesions, viruses, or other abnormalities, along with the species ecological and commercial importance within the estuary, a study of this nature would assess and better understand the population dynamics

following this incident. This study will allow BOEM to gain an accurate perspective for short and long-term adverse impacts to the ecology and commercial fishing of these species within the northern GOM.

### Objectives:

Objective 1: Assess changes in blue crab and white and brown shrimp population distribution and abundance due to OCS activities and potential direct exposure to oil and dispersants (i.e., changes in population density in certain life stages, immediate population or species decline due to mortality, resource limitations, increased competition) by analyzing baseline and monitoring data while also establishing new standardized baseline sampling stations in the northern GOM to increase preparedness in assessing ecosystem health when faced with possible future disasters.

Objective 2: Assess changes in post-larval and early life stage community assemblages in coastal habitat that may offer insight into reduction of crab and shrimp populations (predator/prey interactions, changes in geographic range, resource limitations, etc.) by analyzing baseline and monitoring data.

Objective 3: Determine trends in crab and shrimp external parasites, lesions, or other abnormalities.

### Methods:

1. Partner with other research institutes (i.e. University of Southern Mississippi, Dauphin Island Sea Lab, etc.) within the central Gulf States (Louisiana, Mississippi, and Alabama) to compare relevant baseline data.
2. Quantify and analyze abundance and distribution of certain life stage blue crab, white shrimp, and brown shrimp using 16 foot otter trawl and 50 foot bag seine across the north GOM in the central Gulf States to assess changes in population dynamics using standardized sampling methods across the area. This will be done with spring and fall sampling efforts.
3. Examine crabs and shrimp for parasites, lesions, viruses, or other abnormalities and analyze results.
4. Measure, count, and determine species for crabs and shrimp collected and analyze results.
5. Characterize the habitat and assess water quality and other abiotic factors (DO, salinity, etc.) with standard techniques at each sampling site throughout the affected area.

Products: Quarterly Reports, Technical Summary, Final Report, Digital Copies of Reports

Importance to BOEM: Exploration and development of oil and gas resources in the Gulf of Mexico requires BOEM to produce a variety of National Environmental Policy Act (NEPA) and other environmental documents. BOEM should gather data and other information on commercially and ecologically important estuarine dependent species within the Central and Eastern Planning Areas of the Gulf of Mexico to better understand the role Outer Continental Shelf (OCS) activities may play in shaping estuarine dependent species populations along the Gulf Coast. This study will assess Gulf of Mexico blue crab, white shrimp, and brown shrimp population abundance and distribution. Understanding the abundance and distribution of these three commercially and ecologically important species would not only aid in future impact analyses of the species, but could also demonstrate the overall ecological health within the Northern Gulf of Mexico estuaries and possibly indicate long-term impacts to a lucrative commercial fisheries industry. BOEM would need these abundance and distribution data for NEPA impact and mitigation requirement analyses prior to consultations with associated regulatory agencies.

**Current Status:** Awarded July 17, 2012

**Final Report Due:** August 2017

**Publications:** None- newly awarded

**Affiliated WWW Sites:** none

**Revised date:** August 2, 2012

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