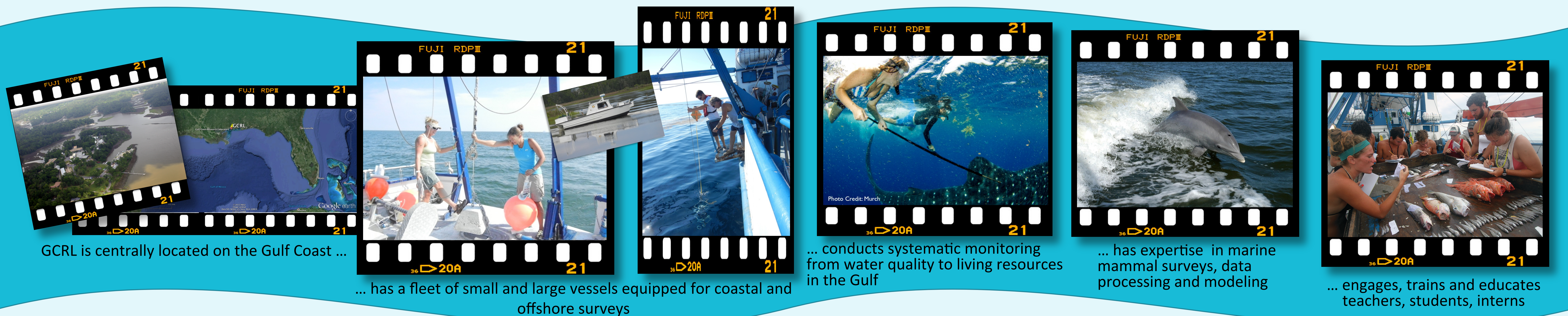


# Gulf Coast Research Laboratory, University of Southern Mississippi

## Understanding Marine Mammals and their Environment : an interdisciplinary approach

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### Population Dynamics

### Behavior

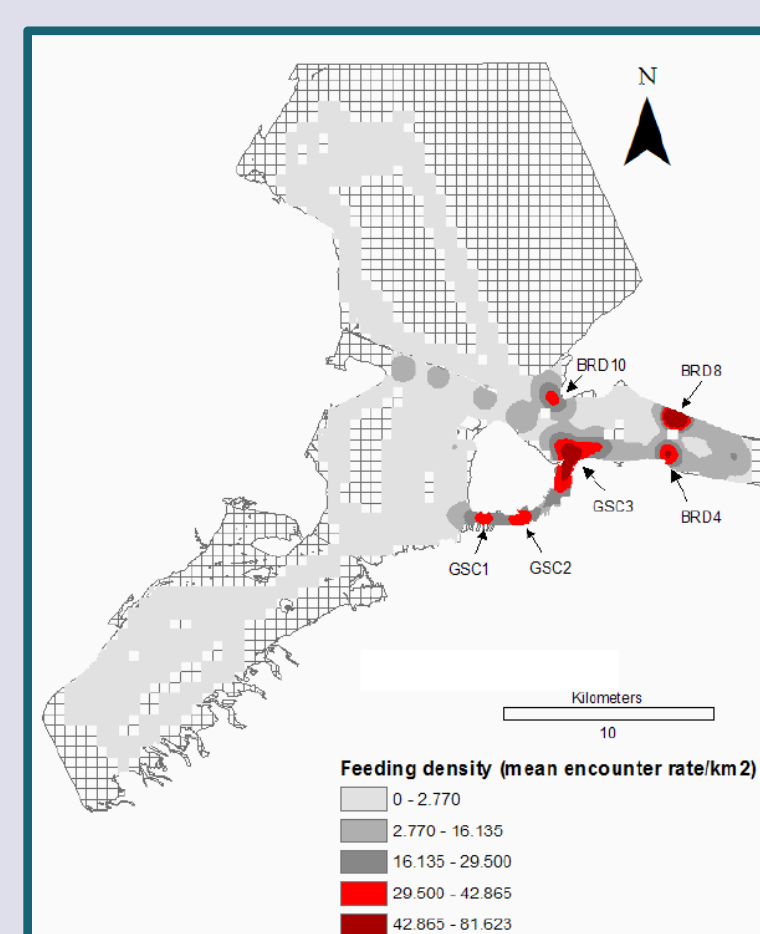
### Environmental Drivers

### Prey & Predators

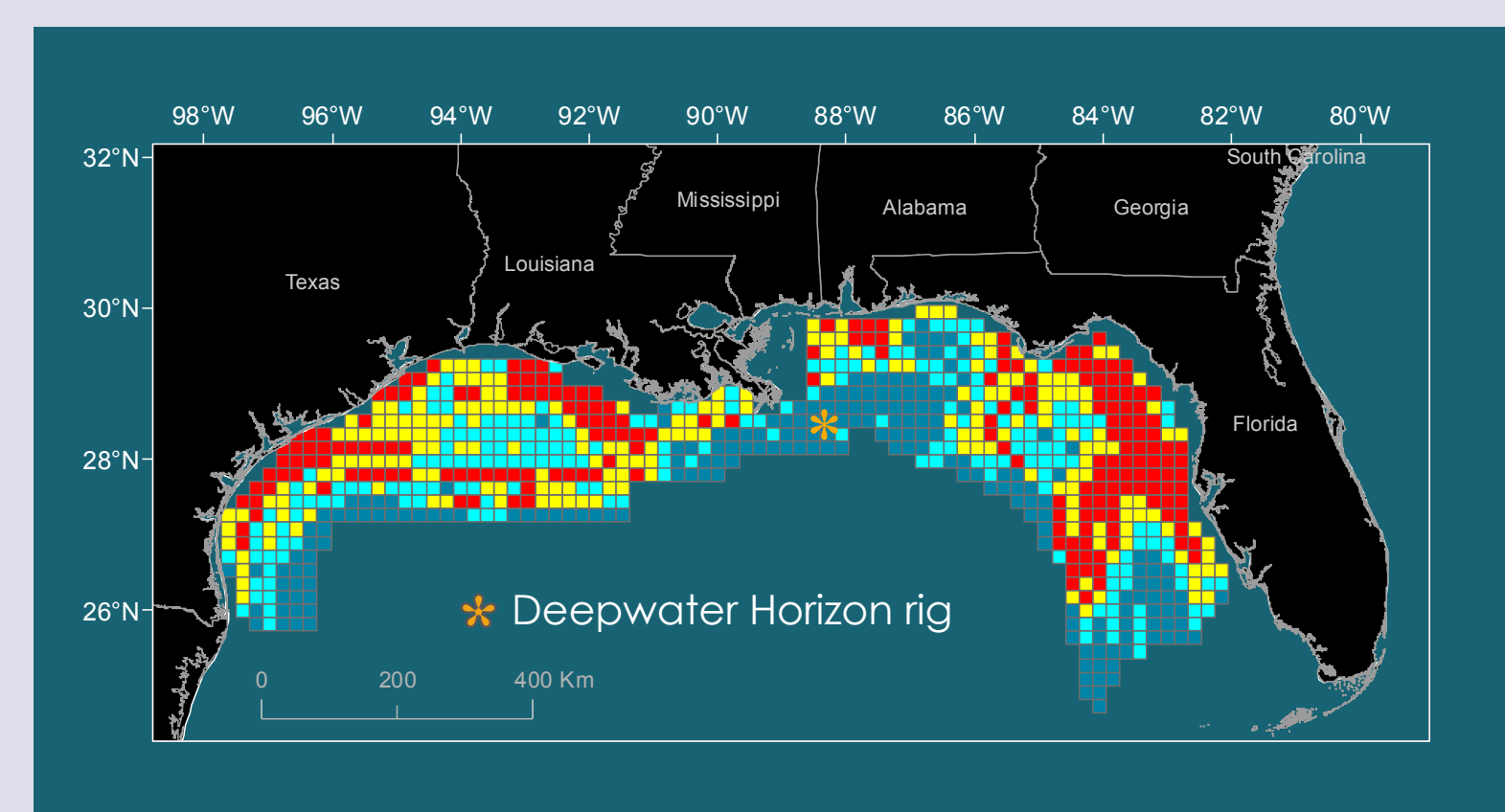
### Health Assessment



#### BD Feeding Hotspots



#### Predicted Abundance of BDs



- Mark-Recapture Techniques:
  - Expedite processing of digital images using advanced matching algorithms
  - Digital archive of 1,000s of Bottlenose dolphins (BD) dorsal fins
  - Goal: Estimate abundance, determine patterns of residency, life-history, connectivity to other BD stocks.
- The Independent Advisory Team (IAT) aims at reducing uncertainty in assessment estimates (e.g. abundance, Mortality & Serious Injury)

- Combining systematic line-transect surveys with behavioral scans/focal follows to estimate prevalence of behaviors at individual, social unit and population level
- Kernel densities revealed 6 core feeding areas in the Galveston Bay
- BDs in Galveston Bay primarily feed in association with shrimping vessels (~60% of feeding events)
- BDs in Galveston Bay are more likely to occur in sub-areas frequently used by shrimping vessels

- Density Surface Modeling accounts for probability of detecting MMs and identifies linear/non-linear association of MM density with environmental conditions
- Relationships can be used to forecast MM distribution under specific environmental or management scenarios
- BD abundance-habitat model developed for the Gulf's continental shelf
- BD vary non-linearly with density of oil/ gas rigs, peaking at ~ 0.15 rigs/km<sup>2</sup>

#### *Tell me what you eat and who'd like to eat you, I'll tell you (almost) all about you*

- GCRL's Center for Fisheries R&D has a long tradition of monitoring shrimp and finfish (e.g. sharks) in collaboration with state and federal partners (e.g., SEAMAP)
- Conducts NRDA studies to investigate potential effects of DWH oil spill
- Assesses the status of endangered, threatened and invasive species (AL-MS Rapid Assessment Team)
- Evans Physiology Lab uses DGGE as a non-invasive assessment of prey

- BDs as Sentinel Species of marine ecosystem health
- Viruses, bacteria, and stress hormones as indicators of individual health
- The Marine Microbial Ecology Lab:
  - Is establishing a BD virome library (68 newly reported viruses)
  - Uses microbial communities from BD skin to assess exposure to water pollution and differentiate coastal vs. offshore BDs
- The Evans Physiology Lab uses cortisol (stress hormone) as an indicator of individual health