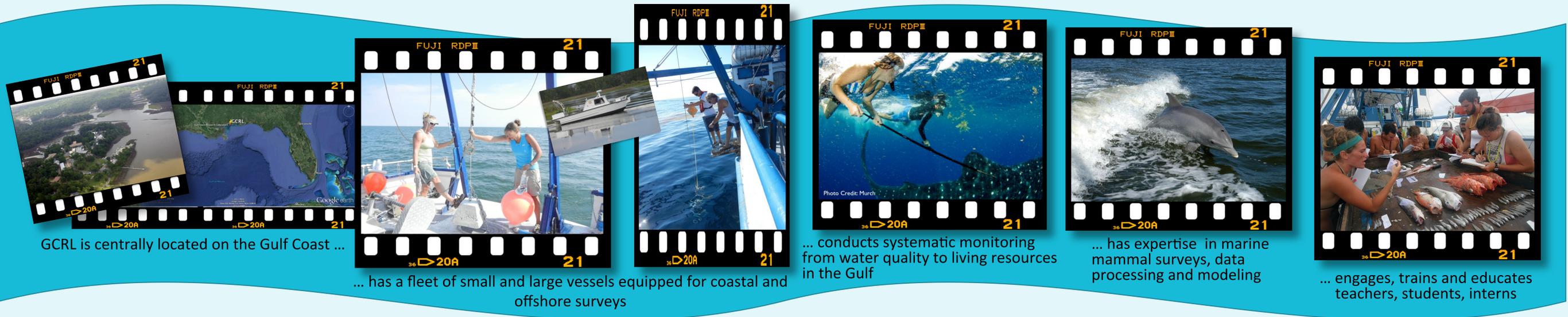


Gulf Coast Research Laboratory, University of Southern Mississippi

Understanding Marine Mammals and their Environment : an interdisciplinary approach

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GCRL is centrally located on the Gulf Coast ...

... has a fleet of small and large vessels equipped for coastal and offshore surveys

... conducts systematic monitoring from water quality to living resources in the Gulf

... has expertise in marine mammal surveys, data processing and modeling

... engages, trains and educates teachers, students, interns

Population Dynamics

Behavior

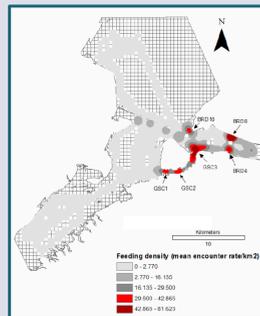
Environmental Drivers

Prey & Predators

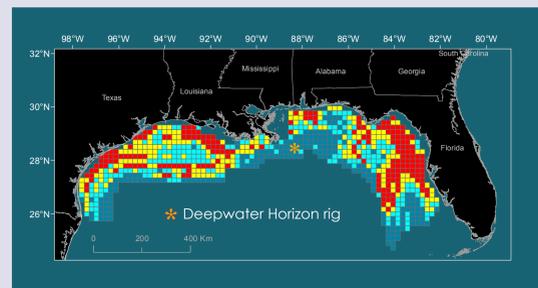
Health Assessment



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/km²

- 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