PROGRAM AND ABSTRACTS OF THE 14TH ANNUAL GULF COAST GRADUATE STUDENT SYMPOSIUM

GULF COAST RESEARCH LABORATORY
OCEAN SPRINGS, MISSISSIPPI
APRIL 5-7, 2013

MARINE AND ESTUARINE GRADUATE STUDENT ASSOCIATION
OFFICERS:
Michael Andres, President
Lynn Wilking, Vice President
Christopher Manley, Treasurer
Luca Antoni, Faculty Rep
Linh Pham, Secretary
Friday - 5 April 2013

4:30 - 7:30 REGISTRATION/ CHECK IN
   Location: Cafeteria "Tree house"

6:30 - 9:00 BEACH SOCIAL
   Location: East Beach in front of GCRL Entrance

Saturday - 6 April 2013

7:00 - 8:00 REGISTRATION/ BREAKFAST
   Location: Cafeteria "Tree house"

8:15 OPENING REMARKS
   Location: Caylor Auditorium

8:30 KEYNOTE ADDRESS - Dr. Wolfgang K. Vogelbein -
   PFISTERIA: “THE CELL FROM HELL” OR LABORATORY ARTIFACT? A
   RETROSPECTIVE LOOK.

9:30 - 10:30 Stress/ Pollution - Moderator: Christopher Manley
   Location: Caylor Auditorium

9:30 (1) K. Burns, C. Rakocinski. TOWARD THE DEVELOPMENT OF A MECHANISTIC
   FUNCTIONAL INDICATOR: EXAMINING ALLOMETRIC RELATIONSHIPS IN A
   MODEL MACROBENTHIC SPECIES, CAPITELLA TELETA, IN RESPONSE TO
   HYPOXIA.

9:45 (2) T. W. Guest, A. E. Evans, C. F. Rakocinski, R. B. Blaylock. THE EFFECTS OF PRE-
   RELEASE ANTHROPOGENIC STRESSORS AND SUBSEQUENT STRESS
   RESPONSE ON POST-RELEASE SUCCESS OF HATCHERY REARED SPOTTED
   SEATROUT.

10:00 (3) C. L. Hightower, S. P. Powers, D. W. Evans. EXAMINING CURRENT MERCURY
   CONCENTRATIONS IN NORTHERN GULF OF MEXICO RED DRUM.

10:15 (4) K. Ozhan, S. M. Miles, S. Bargu. TOXICITY OF SOUTH LOUISIANA SWEET
   CRUDE OIL AND THE DISPERSAN COREXIT 9500 ON PHYTOPLANKTON
   SPECIES IN THE GULF OF MEXICO.

10:30 - 10:45 COFFEE BREAK

10:45 - 12:15 Reef/ Fish I - Moderator: Lynn Wilking
   Location: Caylor Auditorium

10:45 (5) P. Gillam, C. Rakocinski. A LOOK INTO SECONDARY PRODUCTION AND
   DIVERSITY OF BENTHIC BIOTA ON ARTIFICIAL REEFS IN THE MISSISSIPPI
   SOUND.

11:00 (6) T. P. Spearman, S. P. Powers, M. J. Drymon. SURVEYING ALABAMA’S REEF
   PERMIT ZONES: INTEGRATION OF SIDE-SCAN SONAR AND TRAWL.
11:15 (7)  **C. Matten, C. Rakocinski.** RESIDENT CRYPTIC FISHES ASSOCIATED WITH ARTIFICIAL REEFS IN THE MISSISSIPPI SOUND: HIGH VERSUS LOW PROFILE STRUCTURES.

11:30 (8)  **K. A. Dahl, W. F. Patterson, J. H. Tarnecki.** EFFECTS OF A RAPID INVASION OF PACIFIC LIONFISH, *PTEROIS VOLITANS*, ON REEF FISH COMMUNITIES AT ARTIFICIAL REEFS IN THE NORTHERN GULF OF MEXICO.

11:45 (9)  **A. Kroetz, S. P. Powers.** EATING BETWEEN THE LINES: NON-TRADITIONAL FUNCTIONAL FEEDING RESPONSE OF BONNETHEADS (*SPHYRNA TIBURO*).

12:00 (10) **J. M. Higgs, J. M. Hendon, E. R. Hoffmayer, W. B. Driggers, III, J. A. Sulikowski.** INVESTIGATING REPRODUCTIVE VARIABILITY FOR FINETOOTH SHARKS (*CARCHARHINUS ISODON*) IN THE NORTHERN GULF OF MEXICO.

12:15-1:30  **LUNCH**  
*Location: Cafeteria "Tree house"*

1:30-3:00  **Fish II**  
*Location: Caylor Auditorium*  
- Moderator: Keith Cuevas

1:30 (11)  **B. Schwartzkopf, J. H. Cowan Jr.** DIET OF RED SNAPPER (*LUTJANUS CAMPECHANUS*) ON NATURAL HARD-BOTTOM BANKS IN THE NORTHWESTERN GULF OF MEXICO.

1:45 (12)  **S. B. Garner, W.F. Patterson, C. E. Porch, J. H. Tarnecki.** EFFECT OF CIRCLE HOOK SIZE ON REEF FISH HOOK LOCATION, CATCH RATES, CATCH COMPOSITION, AND SELECTIVITY AT ARTIFICIAL REEFS IN THE NORTHERN GULF OF MEXICO: IMPLICATIONS FOR RED SNAPPER MANAGEMENT.

2:00 (13)  **A. Bardon-Albaret, E. Saillant.** INVESTIGATIONS ON EGG AND LARVAE QUALITY IN RED SNAPPER *LUTJANUS CAMPECHANUS*.

2:15 (14)  **L. Fitzgerald, W. F. Patterson, III, W. M. Graham.** AGE & GROWTH OF ATLANTIC BUMPER (*CHLOROSCOMBRUS CHRYSURUS*): COMBINING CONTEMPORARY AND HISTORICAL DATA TO EXAMINE POPULATION DYNAMICS OF AN UNEXPLOITED SPECIES.

2:30 (15)  **M. J. Norberg, W. F. Patterson, J. H. Tannecki.** TOMTATE POPULATION DEMOGRAPHICS AND DIET IN THE NORTHERN GULF OF MEXICO.

2:45 (16)  **C. B. Manley, C. F. Rakocinski, P. G. Lee, R. B. Blaylock.** A THRESHOLD STOCKING DENSITY AFFECTS AGGRESSION AND CANNIBALISM IN LARVAL HATCHERY-REARED SPOTTED SEATROUT.

1:30 - 3:00  **Nutrient Cycling**  
*Location: Caylor 103*  
- Moderator: Adrienne Norrell

1:30 (17)  **J. M. Allen, K. S. Dillon.** ANALYSIS OF NITROGEN SPECIES IN RAIN AND STORMWATER ALONG THE MISSISSIPPI GULF COAST: A LANDSCAPE APPROACH.

1:45 (18)  **J. Anders, J. Liefer.** THE BIOAVAILABILITY OF GROUNDWATER DERIVED DISSOLVED ORGANIC NITROGEN.
2:00 (19)  **N. Ortell, A. C. Ortmann.** NOT ALL THAUMARCHAEOTA ARE INVOLVED IN AMMONIUM OXIDATION.

2:15 (20)  **L. Wang.** NITROGEN CYCLING PROCESSES IN THE MOBILE BAY, AL ESTUARY AND ITS SALT MARSH SYSTEMS.

2:30 (21)  **L. E. Wilking, K. S. Dillon.** ASSESSING RESPIRATION AND NUTRIENT DYNAMICS IN ARTIFICIAL REEF BIOFILMS.

2:45 (22)  **A. N. Rellinger, R. P. Kiene, D. J. Kieber.** THE EFFECTS OF PROLONGED DARKNESS ON DMSP AND OTHER BIOGEOCHEMICALLY RELEVANT CONSTITUENTS IN *PHAEOCYSTIS ANTARCTICA*.

3:00 - 3:15  **COFFEE BREAK**

3:15 - 4:45  **Phyto/Eco** - **Moderator:** Carly Somerset  
 **Location:** Caylor Auditorium

3:15 (23)  **E. A. Smith, P. Blanchard, S. Bargu.** EDUCATION AND OUTREACH CONCERNING HARMFUL ALGAL BLOOMS IN ESTUARIES OF SOUTH LOUISIANA.

3:30 (24)  **K. Fisher, B. Harris, J. Whitbeck.** BIOCONTROL EFFORT OF GIANT SALVINIA IN THE BARATARIA PRESERVE.

3:45 (25)  **C. Ma, K.-b. Liu, G. Zhang, Q. Yao, R. Huang, C. Zheng.** POLLEN RECORDS OF VEGETATION AND CLIMATE CHANGES SINCE 8800 YR FROM A PEATLAND IN DABIE MOUNTAINS, EASTERN CHINA.

4:00 (26)  **Q. Yao, K.-b. Liu, V. H. Rivera-Monroya.** MULTI-PROXY CHARACTERIZATION OF THE HURRICANE WILMA (2005) STORM DEPOSIT IN SEDIMENT CORES FROM THE SHARK RIVER SLOUGH, SOUTHWESTERN EVERGLADES.


4:30 (28)  **L. T. Pham, P. D. Biber.** SEAGRASSES IN THE MISSISSIPPI SOUND AND THE NORTHERN CHANDELEUR ISLANDS, AND PROBLEMS ASSOCIATED WITH DECADAL-SCALE CHANGE DETECTION.

3:15-4:45  **Pelagic/ Genetics/ Patho** - **Moderator:** Michael Andres  
 **Location:** Caylor 103

3:15 (29)  **L. Kramer, F. Hernandez, R. Carmichael, S. Powers.** SARGASSUM TROPHIC ECOCOLOGY USING STABLE ISOTOPE ANALYSIS FOR COMMUNITIES OFF THE COAST OF ALABAMA AND BERMUDA.

3:30 (30)  **S. M. Taylor, E. Hoffmayer, J. S. Franks, R. T. Leaf.** A DESCRIPTION OF THE ICHTHYOFaUNA COMPOSITION IN THE LOOP CURRENT IN THE GULF OF MEXICO.

3:45 (31)  **L. Antoni, E. Saillant.** GENETIC VARIATION OF GRAY TRIGGERFISH IN US WATERS OF THE GULF OF MEXICO AND SOUTH ATLANTIC REGIONS.
4:00 (32) **J. Nash, A. Ortmann, J. L. Jones. GENETIC DIVERSITY OF VIBRIO CHOLERAE ISOLATED FROM DIFFERENT SALINITIES IN MOBILE BAY, AL.**

4:15 (33) **J. M. Carrillo. CILIATE PROTOZOA IN CETACEANS.**

4:30 (34) **M. J. Andres, R. M. Overstreet. A MOLECULAR ANALYSIS OF THE INTERRELATIONSHIPS OF THE TREMATODE FAMILY OPECOELIDAE (DIGENEA).**

4:45 - 5:15 **POSTER SESSION**

*Location: Caylor 104*

(35) **A. Bardon-Albaret, N. J. Brown-Peterson, J. T. Lemus, E. Saillant. ONTOGENY OF THE DIGESTIVE SYSTEM OF THE RED SNAPPER (LUTJANUS CAMPECHANUS) RAISED UNDER INTENSIVE LARVICULTURE CONDITIONS.**

(36) **J. L. Kay, M. L. Vozzo, K. M. Brown. IMPACT OF BP DEEPWATER HORIZON OIL SPILL ON OYSTER REEF COMMENSAL COMMUNITIES IN BARATARIA BAY, LA.**


(38) **V. Mazzei, P. Biber. MAPPING ARTIFICIAL REEFS IN THE MISSISSIPPI SOUND.**

(39) **W. A. Scheffel, K. L. Heck, Jr., J. Cebrian, M. Johnson. BLACK MANGROVE (AVICENNIA GERMINANS) EXPANSION INTO NORTHERN GULF OF MEXICO SALT MARSHES: WHAT CHANGES CAN WE EXPECT?**

5:20 **TRANSPORTATION TO SOCIAL LEAVES GCRL**

5:30 - 8:30 **SOCIAL/ STUDENT AWARDS**

*Location: Treasure Oak Country Club*

8:40 **TRANSPORTATION BACK TO GCRL**

*Location: In front of Cafeteria "Tree house"*

**Sunday - 7 April 2013**

7:00 - 9:00 **BREAKFAST/ CHECKOUT**

*Location: Cafeteria "Tree house"*

**DRIVING DIRECTIONS TO TREASURE OAK COUNTRY CLUB**

1. Right onto Halstead Rd. from GCRL
2. Left onto Government St.
3. 1st Right onto Bechtel Blvd.
4. Left onto Bienville Blvd./ HWY 90.
5. Turn right into Treasure Oak Country Club (~450 ft)
Abstracts

(1)
TOWARD THE DEVELOPMENT OF A MECHANISTIC FUNCTIONAL INDICATOR: EXAMINING ALLOMETRIC RELATIONSHIPS IN A MODEL MACROBENTHIC SPECIES, *CAPITELLA TELETA*, IN RESPONSE TO HYPOXIA

Kelsey Burns and Chet Rakocinski
The University of Southern Mississippi, Department of Coast Sciences, Ocean Springs, MS 39564

Body size is a fundamental ecological trait that underpins critical vital rates, including oxygen consumption and feeding rates. Body-size dependent processes provide one means to link environmental stress to changes in metabolic activity on the individual level, which may in turn scale up to changes in the distribution of biomass among discrete size classes. Further, benthic organisms have shown to be valuable indicators to organic enrichment and hypoxia with direct ties to the functional health of the ecosystem through benthic-pelagic coupling. Thus, size-based macrobenthic indicators can be linked to ecosystem function and health and serve as a reasonable functional indicator. The focus of this study is to examine the size-related changes in physiological responses under the environmental stress of hypoxia within the opportunistic polychaete *Capitella teleta* in order to determine emergent patterns for the development of a functional indicator. Experiments will examine various aspects of respiration, tropho-energetics and growth under multiple levels of dissolved oxygen and temperature.

(2)
THE EFFECTS OF PRE-RELEASE ANTHROPOGENIC STRESSORS AND SUBSEQUENT STRESS RESPONSE ON POST-RELEASE SUCCESS OF HATCHERY REARED SPOTTED SEATROUT

Taylor W. Guest, Andrew N. Evans, Chet F. Rakocinski, and Reginald B. Blaylock
Gulf Coast Research Laboratory, The University of Southern Mississippi, Department of Coastal Sciences, Ocean Springs, MS 39564

Alteration of habitat associated with coastal development and increased demand for food and recreation can result in the depletion of fisheries resources such as the spotted seatrout (*Cynoscion nebulosus*), the Gulf of Mexico’s most popular recreational fish. Stock enhancement, or the release of cultured fish to supplement wild populations, is one potential tool for managing important fisheries resources. Although large efforts have been put into the enhancement of some marine species, the effectiveness of stocking is not well understood and techniques for ensuring success have not been well developed. Studies have shown that hatchery environments can affect many fundamentally learned behaviors; however the role that stress associated with handling, transport, and release processes may play in the success or failure of spotted seatrout stock enhancement is unknown. My research is focused on the impacts of physiological anthropogenic stressors and the subsequent stress response to growth and survival upon release for stock supplementation.

(3)
EXAMINING CURRENT MERCURY CONCENTRATIONS IN NORTHERN GULF OF MEXICO RED DRUM

Crystal L. Hightower1,2, Sean P. Powers1,2, and David W. Evans3
1Department of Marine Sciences, University of South Alabama, Mobile, Alabama
2Dauphin Island Sea Lab, Dauphin Island, Alabama
3NOAA NCCOS Beaufort, North Carolina
While the accumulation of Hg in marine fishes in the Gulf of Mexico (GOM) has been established, Hg levels above the United States Food and Drug Administration (FDA) action limit (1.0 ppm) have only recently been reported for red drum *Sciaenops ocellatus*. Red drum are likely candidates for bioaccumulation of Hg since they spend their early years in estuaries, forage in the benthos, are long-lived, and grow to large sizes. Recent Hg studies conducted in Florida and Texas showed that larger size classes of red drum accumulated Hg to concentrations above that of the acceptable limits; however, Hg concentrations for large red drum were lacking from the central region of the GOM. This study also revealed Hg concentrations above the FDA action limit in large red drum caught by fishery dependent and independent methods in the north central GOM. Currently, Texas, Louisiana, Mississippi, and Alabama allow anglers to keep oversized red drum. Understanding concentrations of Hg in GOM red drum is essential in order to properly manage allowable limits to reduce the possibility of Hg contamination due to consumption of contaminated fish.

**TOXICITY OF SOUTH LOUISIANA SWEET CRUDE OIL AND THE DISPERSANT COREXIT 9500 ON PHYTOPLANKTON SPECIES IN THE GULF OF MEXICO**

Koray Ozhan¹, Scott M. Miles², and Sibel Bargu¹

¹Louisiana State University, Department of Oceanography & Coastal Sciences, Baton Rouge, LA 70809
²Louisiana State University, Department of Environmental Sciences, Baton Rouge, LA 70809

The present research applied a controlled laboratory study to assess toxic effects of water accommodated fractions (WAFs) of South Louisiana Sweet crude oil (LSC) on five phytoplankton species indigenous to the Gulf of Mexico. Details on how the composition and concentration of LSC are altered by physical and chemical processes are described to help evaluate LSC toxicity. In decreasing order of tolerance, the following species showed a range of sensitivity to low levels of hydrocarbons from stimulation to severe growth inhibition: *Ditylum brightwellii* > *Chaetoceros socialis* > *Pyrocystis lunula* > *Scrippsiella trochoidea* > *Heterocapsa triquetra*. The degree of LSC influence on phytoplankton growth varied with the concentration of LSC, species of microalgae and their community structure. At a concentration of total petroleum hydrocarbons (TPH) <1200 ppb, dinoflagellates showed significantly better tolerance, while diatoms showed a higher tolerance to LSC at a concentration of TPH >1200 ppb. For both groups, the larger species showed better tolerance than smaller ones. The toxicity potential of LSC seems to be strongly influenced by the concentration of polycyclic aromatic hydrocarbons (PAHs). Addition of the dispersant, Corexit 9500, increased the amount of LSC up to 50 fold in the water column, while the physical enhancement (vigorous mixing of water column) did not significantly increase the amount of TPH concentration in the water column. The species response to LSC was also examined in the five-species community to compare the growth responses of phytoplankton at a higher level of biological organization and a more realistic exposure scenario than the single-species responses. The phytoplankton showed drastically less tolerance to LSC in the five-species community.

**A LOOK INTO SECONDARY PRODUCTION AND DIVERSITY OF BENTHIC BIOTA ON ARTIFICIAL REEFS IN THE MISSISSIPPI SOUND**

Patrick Gillam and Chet Rakocinski

The University of Southern Mississippi, Department of Coastal Sciences, Ocean Springs, MS 39564

In recent years, the state of Mississippi has made an effort to enhance its coastal fishery resources through the placement of artificial reefs. As part of this effort, Mississippi DMR has created and maintained 67
nearshore reefs in order to enhance the reef habitat for resident organisms. The primary objective of these reefs has been to increase the overall carrying capacity of fish and invertebrates for commercial and recreational fishing activities by providing a hard substrate in an relatively featureless and mud bottomed topography found in the Mississippi Sound. Furthermore, it is important to fully understand the effectiveness at which a reef is attracting and producing benthic fauna. The success of two different substrate types currently used for reefs will be illustrated in a comparative study of four artificial reefs representing high and low profiles within the eastern and western portions of the Mississippi coast. Paired substrate baskets containing oyster shell or cement rubble were deployed for six weeks and subsequently processed to recover the colonized benthic biota. Several functional and community maturity related metrics will be used to characterize the fauna including estimates of production and biomass, Production:Biomass (P:B ratio), community turnover time, and a biodiversity index.

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### SURVEYING ALABAMA’S REEF PERMIT ZONES: INTEGRATION OF SIDE-SCAN SONAR AND TRAWL

**Trey P. Spearman¹,², Sean P. Powers¹,², and Marcus J. Drymon¹**  
¹Dauphin Island Sea Laboratory, Dauphin Island, AL  
²University of South Alabama, AL

In 2010, a fishery independent survey was implemented to explore Alabama’s artificial reef permit zones. Specifically, we wanted to compare benthic community assemblages in this previously considered ‘hazardous sampling area’ as a function of season and depth. The reef permit zones were divided into 2 x 2 km grids and each grid was assigned to a depth stratum. Randomly selected grids were swept with side-scan and single-beam sonar to quantify all vertical structure and facilitate trawl avoidance. A 12.2-meter semi-balloon otter trawl was pulled for thirty minutes per selected grid to sample benthic fishes across sand and mud bottom habitats between the higher relief structures. We have found greater assemblage dissimilarities among depth strata with each passing year, and a small, yet significant, dissimilarity among seasons. The use of trawl nets in an area previously considered hazardous provides us with a unique assessment of Alabama’s reef fish populations within one of the world’s largest reef permit zones, and our continued sampling will help us understand if the observed differences translate to biologically meaningful variations.

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### RESIDENT CRYPTIC FISHES ASSOCIATED WITH ARTIFICIAL REEFS IN THE MISSISSIPPI SOUND: HIGH VERSUS LOW PROFILE STRUCTURES

**Claire Matten** and Chet Rakocinski  
The University of Southern Mississippi, Department of Coastal Sciences, Ocean Springs, MS 39564

Resident cryptic fishes associated with artificial reefs can be highly abundant and ecologically important as a trophic link between benthic fauna and transient fishes. We examined the communities of cryptic fishes associated with two types of artificial reef design in the Mississippi Sound. Minnow traps and substrate baskets modified to serve as habitat sample units were used to collect cryptic fishes at two high profile concrete rubble reefs and two low profile oyster shell/rubble artificial reefs during spring and summer seasons. A total of 2,206 fish representing 18 taxa were sampled between September 2011 and August 2012. The most abundant cryptic species occurring across all sites, regardless of profile type, were *Gobiosoma bosc* and *Gobiesox strumosus*. Both species richness and catch per unit effort were significantly lower on high profile than low profile reefs, which was partly attributed to the absence of *Hyleurochilus* spp. and *Hypsoblennius hentz* from the high profile samples.
EFFECTS OF A RAPID INVASION OF PACIFIC LIONFISH, *PTEROIS VOLITANS*, ON REEF FISH COMMUNITIES AT ARTIFICIAL REEFS IN THE NORTHERN GULF OF MEXICO

Kristen A. Dahl, William F. Patterson, and Joseph H. Tarnecki
The University of South Alabama and Dauphin Island Sea Lab, Department of Marine Science, Dauphin Island, AL, 36528

Pacific lionfish, *Pterois volitans*, were introduced off southeastern Florida in the early 1980s. They have since become established throughout the south Atlantic Bight and Caribbean Sea but were not reported in the Gulf of Mexico until 2009. Lionfish spread rapidly in the Gulf and have quickly become established residents on both artificial and natural reefs. Throughout the western Atlantic there are few datasets to document their effect on native reef fish communities. A series of 18 artificial reefs off Pensacola, FL studied since 2004 provide one such dataset. Mean lionfish density on these reefs has tripled since 2010 and current densities (~10 fish 100 m-2) are among the highest reported in the western Atlantic. Significant changes in reef fish community structure have occurred as lionfish density has increased (PERMANOVA, p<0.001). Trophic shifts also are apparent as small pelagic planktivores have increased 3-fold in response to declines in piscivore abundance. Small demersal planktivores have shown the most dramatic declines in abundance. Ongoing research is focused on determining lionfish diet and bioenergetics in the northern Gulf, as well as testing whether declines in reef fish taxa may be due to predation by lionfish, competition with lionfish, or avoidance of reefs housing lionfish.

EATING BETWEEN THE LINES: NON-TRADITIONAL FUNCTIONAL FEEDING RESPONSE OF BONNETHEADS (*SPHYRNA TIBURO*)

Andrea Kroetz and Sean P. Powers
University of South Alabama, Department of Marine Sciences and Dauphin Island Sea Lab, Dauphin Island, AL 36528

Large mobile predators can have strong influences in the structuring of marine food webs. Few quantitative estimates exist but are necessary to evaluate the impact on benthic prey species. Measuring a predator’s functional response provides quantitative information on the potential for predators to regulate local prey populations and community structure. We examined the functional response of bonnetheads (*Sphyrna tiburo*) to one of its few natural prey items brown shrimp (*Farfantepenaeus aztecus*). We simulated natural conditions in outdoor mesocosms and offered live prey at varying densities to quantify functional response of this small coastal shark. Bonnetheads did not display a distinctive type of functional response. Bonnethead response lied in between a type I (R2 =0.847, p < 0.01) and type II (R2 =0.877, p < 0.01) functional response. Bonnethead consumption was proportional to prey density and total damage to the prey population was constant. Results suggest that bonnetheads display what most closely represents a type I functional response. As an alternative to strict typing of predator functional response, we suggest that functional response be viewed as a continuum in order to achieve a more accurate depiction of predation rates of a predator to changing prey densities.

INVESTIGATING REPRODUCTIVE VARIABILITY FOR FINETOOTH SHARKS (*CARCHARHINUS ISODON*) IN THE NORTHERN GULF OF MEXICO

Jeremy M. Higgs¹, Jill M. Hendon², Eric R. Hoffmayer³, William B. Driggers, III ³, and James A. Sulikowski⁴

¹, ², ³, ⁴ University of South Alabama, Department of Marine Sciences and Dauphin Island Sea Lab, Dauphin Island, AL 36528

¹ The University of Texas at Austin, Department of Integrative Biology, Austin, TX 78712
Numerous ectothermic organisms have been shown to exhibit differences or changes in reproductive periodicity. Factors such as temperature, migration energetics, and the availability of consumable energy have been suggested as influencing reproductive periodicity. Among sharks, these reproductive variations are rare. Finetooth sharks, *Carcharhinus isodon*, are reported to display biennial reproduction; however in a recent study two females in the Gulf of Mexico (GOM) appeared to be reproducing annually. The degree to which female finetooth sharks are reproducing annually is presently unknown. The goal of this study was to assess the periodicity of reproducing females within the GOM population and to investigate potential factors influencing this phenomenon. Adult female finetooth sharks were collected monthly in 2011 and 2012 in northern GOM. General reproductive parameters (ovarian follicle size/state, oviducal gland width, uterus state) were recorded from each individual. Gravid females with developing vitellogenic follicles were classified as exhibiting an annual cycle while biennial females were either gravid or had preovulatory follicles. To date 38 of the 49 assessed finetooth females have been identified as exhibiting an annual reproductive cycle. To our knowledge, northern GOM finetooth sharks are the only shark species in a discrete area to exhibit such variability in reproductive periodicity.

(11)

**DIET OF RED SNAPPER (*LUTJANUS CAMPECHANUS*) ON NATURAL HARD-BOTTOM BANKS IN THE NORTHWESTERN GULF OF MEXICO**

**Brittany Schwartzkopf** and James H. Cowan, Jr.
Louisiana State University, Department of Oceanography and Coastal Sciences, Baton Rouge, LA 70803

This project seeks to provide information about red snapper diet on Louisiana (LA) shelf banks. Red snapper were collected twice per quarter from May 2011 to December 2012, from four banks on the LA shelf: Jakkula, McGrail, Bright, and the East Cameron Artificial Reef Planning Area, which differ in the amount of hard substrate present and distance from shore. Standard methods were used for removal and examination of stomach contents. Differences in the diet of red snapper were determined using permutation analysis of variance. Results show that diets at Jakkula, McGrail, and Bright statistically differ from the diet at East Cameron. The diet at Jakkula, McGrail, and Bright consisted of fish, crabs, and shrimp of similar proportions, though the species consumed varied, while the diet at East Cameron consisted of a large number of pteropods, with lesser contributions by crabs and fish. Habitat type may contribute to differences seen; the bottom substrate at East Cameron is composed of lithified-delta mud, whereas medium sand is found at Jakkula, and coral and coarse gravel dominate McGrail and Bright. Determining the prey consumed on natural banks, representing a gradient in the amount of hard substrate present, will provide new insight about habitat utilization.

(12)

**EFFECT OF CIRCLE HOOK SIZE ON REEF FISH HOOK LOCATION, CATCH RATES, CATCH COMPOSITION, AND SELECTIVITY AT ARTIFICIAL REEFS IN THE NORTHERN GULF OF MEXICO: IMPLICATIONS FOR RED SNAPPER MANAGEMENT**
Traditional management strategies often result in high rates of regulatory discards, especially during closed seasons. The purpose of this study was to explore the potential for hook-size regulations to mitigate high discard rates of undersized reef fishes in the Gulf of Mexico, particularly red snapper. Reef fish communities were sampled using a micro remotely operated vehicle (ROV) equipped with a laser scaler. Sites were then fished using one of five circle hook sizes common to the recreational fishery. Fish size generally increased with increasing hook size but at the cost of reduced catch rates for all reef fishes. Red snapper were captured in greater proportions than their observed abundances, but the difference in median total length between the largest and smallest sizes equated to less than one year class (<100 mm). In addition, size at age was significant among hook sizes for ages 3 and 4, indicating larger hooks selected for faster growing individuals. Results of this study suggest regulations mandating large circle hook use would decrease catches of other reef fishes without decreasing red snapper discards, negatively impacting the recreational for-hire sector which relies on multiple species throughout the year to maintain trip frequency during red snapper closed seasons.

INVESTIGATIONS ON EGG AND LARVAE QUALITY IN RED SNAPPER LUTJANUS CAMPECHANUS

Agnès Bardon-Albaret and Eric Saillant
University of Southern Mississippi, Department of Coastal Sciences, Gulf Coast Research Laboratory, Ocean Springs, MS 39564

The viability of red snapper embryos and newly hatched larvae is highly variable, which leads to unpredictable survival of larval batches to first feeding and impedes efforts to develop hatchery techniques for this species. The first objective of this work was to contribute to the development of a general concept of egg quality for red snapper by characterizing the development and survival of embryos and larvae through the unfed phase, including the transitional feeding phase critical to the success of larval trials. The data will serve as a base to compare spawns and test the effects of endogenous characteristics of eggs potentially involved in the viability and fitness of red snapper larvae post hatch. Various early predictors including fertilization rate, morphological development during the first divisions post fertilization, hatch rate are evaluated, as potential early predictors of the quality of a spawn based on this dataset. The effects of environmental factors acting as potential stressors in the hatchery on embryos and newly hatched larvae was also investigated in a series of experiments in order to document the range of red snapper larval tolerance. Factors evaluated included temperature, dissolved ammonia and oxygen concentration.

AGE & GROWTH OF ATLANTIC BUMPER (CHLOROSCOMBRUS CHRYSURUS): COMBINING CONTEMPORARY AND HISTORICAL DATA TO EXAMINE POPULATION DYNAMICS OF AN UNEXPLOITED SPECIES

Lanaya Fitzgerald1, William F. Patterson, III1, and William M. Graham2
1University of South Alabama, Dauphin Island Sea Lab, Dauphin Island, AL
2University of Southern Mississippi, Stennis Space Center, MS

As marine resource management practices begin to focus on ecosystem function, instead of single species, a more complete understanding of population dynamics for unexploited species must be known in order
for effective management to occur. Fishes such as Atlantic bumper (*Chloroscombrus chrysurus*) form important linkages in the food web between the plankton and upper trophic levels, yet little is known about their ecology and population demographics. Age-length information is available for larvae (1.4-25mm), but not for young juveniles, or adults (Leffler & Shaw 1992; Comyns et al. 2002). Age of Atlantic bumper (n=490) was determined via otolith microstructure analysis and a Gompertz growth curve was fit to size-at-age data to model growth. Using an age-length key, age was assigned probabilistically to historical length measurement data from the Southeast Area Monitoring & Assessment Program (SEAMAP) (N= ~93,900). The next step will be to evaluate Atlantic bumper age composition from each annual SEAMAP cruise to track strong year classes across sampling years. Overall, this study will expand the current knowledge of a numerically abundant and ecologically significant group of forage fishes, in the Gulf of Mexico.

(15)

**TOMTATE POPULATION DEMOGRAPHICS AND DIET IN THE NORTHERN GULF OF MEXICO**

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The tomtate, *Haemulon aurolineatum*, is a small haemulid reef fish widespread in the northern Gulf of Mexico (GOM), but little is known about its trophic ecology or population dynamics. Objectives of this study were to test for differences in tomtate abundance, trophic ecology, and population dynamics between natural (NR) and artificial (AR) reefs. Differences between tomtate densities on AR versus NR was not significant (ANOVA, p = 0.56). No significant correlations between stable isotope delta values and total length were observed. Differences in d34S isotope indicate tomtate on NR foraged more on benthic level prey than tomtate on AR. Individuals aged to date (n=563) ranged from 60 to 290 mm TL and 0 to 14 y. A von Bertalanffy growth function (VBGF) fit to size at age date resulted in the function $L_t = 242[1-e^{-0.664(t + 0.11)}]$. Estimates of instantaneous total mortality ($Z$), natural mortality ($M$) and fishing mortality ($F$) were 0.41, 0.30 and 0.11 y$^{-1}$, respectively. Tomtate have been known to be captured and used as bait in the northern GOM reef fish fishery. However, a F:M ratio of 0.36 suggests that fishing may have a moderate impact on the northern GOM tomtate population.

(16)

**A THRESHOLD STOCKING DENSITY AFFECTS AGGRESSION AND CANNIBALISM IN LARVAL HATCHERY-READED SPOTTED SEATROUT**

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Cannibalism is a major source of mortality in the larviculture of the spotted seatrout, *Cynoscion nebulosus*. Cannibalism is often positively related to stocking density, due primarily to the increased likelihood of encounters between predators and prey at high densities. However, it also has been proposed that in some species high densities may alter normal territorial or visual behaviors and result in reduced cannibalism. The goal of this study was to assess the effect of stocking density on cannibalism and aggression in hatchery-reared spotted seatrout. Seven-day-old seatrout larvae were stocked randomly into three replicates of three different densities (15, 30, and 60 fish/L) for a total of nine 15.5 L tanks on a single recirculating system. Aggressive acts were scored using video analysis as: nip (aggressor strikes prey causing prey to dart), chase (aggressor moves more than one body length toward prey), and capture (predator captures prey but is unable to consume it, i.e., Type 1 cannibalism). In all stocking densities, aggression and cannibalism were positively correlated with time since feeding. Stocking densities of 30
fish/L or higher resulted in no increase in aggressive behaviors, which suggests that stocking densities higher than 30 fish/L is feasible for culture of spotted seatrout.

(17)
ANALYSIS OF NITROGEN SPECIES IN RAIN AND STORMWATER ALONG THE MISSISSIPPI GULF COAST: A LANDSCAPE APPROACH

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Nitrogen species from rain and stormwater are being analyzed in three different landscape types along the Mississippi Gulf Coast (residential, hardened, and pristine), as well as from three integrated stormwater pipes that drain to the Mississippi Sound. Rainwater ammonium (NH4) concentrations in 2011 ranged from below detection to 39μM with 15N values ranging from -5 to -1 per mil. Nitrate (NO3) concentrations ranged from 1 to 30μM with -5 to +6 per mil 15N values. Rainwater dissolved organic nitrogen (DON) showed similar concentrations to NH4 and NO3. Stormwater samples from the residential and hardened sites were similar in NH4 and NO3 concentration. The 15N values for NH4 from these sites ranged from -7.5 to +17.3 per mil while the NO3 values were much lighter isotopically. The pristine sites had low concentrations of NH4 and relatively high concentrations of NO3, with 15N-NH4 isotopic values heavier than rainwater, while 15N-NO3 values were unusually light. DON in stormwater was generally higher than that of rainwater. Integrated stormwater sites were similar to residential and hardened sites in nutrient concentration and isotope value. Results indicate that sources of NH4 and NO3 vary spatially and temporally as they flow across different landscape types in this area.

(18)
THE BIOAVAILABILITY OF GROUNDWATER DERIVED DISSOLVED ORGANIC NITROGEN

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Groundwater discharge has been linked to potentially toxic blooms of Pseudo-nitzschia off the coast of Alabama. Long-term monitoring of groundwater in Gulf Shores, AL, indicates that 60 to 90 percent of the total dissolved nitrogen is dissolved organic nitrogen (DON). Concentrations of DON in local groundwater exceed estuarine surface water concentrations by an order of magnitude, but often DON inputs are overlooked in nutrient budgets and assumed to be refractory. The objective of this research is to determine the bioavailability of groundwater derived DON in Alabama coastal waters. We believe that a fraction of DON is readily remineralized and/or is directly assimilated by the microbiota communities. We have conducted preliminary bioassay experiments using groundwater DON, concentrated through the use of SPE cartridges, to quantify the percent of DON uptake in both single specie phytoplankton cultures and in surface waters. In Chlamydomonas cultures we measured that 20% of the added groundwater derived DON was removed over a 14 day period, and in-situ microbial communities removed 90% of the DON during a 48 hour incubation. The removal of groundwater derived DON in our preliminary experiments demonstrates the potential for DON to influence microbiota communities and possibly contribute to the occurrence of HABs in Alabama.

(19)
NOT ALL THAUMARCHAEOTA ARE INVOLVED IN AMMONIUM OXIDATION

Natalie Ortell and Alice C. Ortmann
Archaeal ammonia oxidizers (AOA) are important participants in the marine nitrogen cycle, converting ammonium to nitrite, which can then be converted to nitrate and support primary production. Most marine Thaumarchaeota are believed to be AOA; however this has not been true in all studies. Surface samples and environmental parameters were collected from four sites in the northern Gulf of Mexico along a salinity gradient to assess the contribution of Thaumarchaeota to the nitrogen cycle. Abundances of AOA and Thaumarchaeota were determined by qPCR of the archaeal ammonia monooxygenase subunit A (amoA) and Thaumarchaeota16S rRNA genes. Over the two-year study, offshore sites had higher abundances of Thaumarchaeota and amoA. The ratio of archaeal amoA to Thaumarchaeota 16S rRNA gene abundance was also greater for offshore sites (0.08 ± 0.05) than inshore (0.06 ± 0.01), but in both locations the ratio was much lower than 1.0. Inshore abundances were more uniform compared to offshore sites where spikes in nitrite concentration correlated with increased Thaumarchaeota and amoA. Our data suggests that ammonia oxidation is occurring; however, the low ratio suggests that most Thaumarchaeota are not oxidizing ammonia, thus their role in nitrogen cycling remains unknown.

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NITROGEN CYCLING PROCESSES IN THE MOBILE BAY, AL ESTUARY AND ITS SALT MARSH SYSTEMS

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Excessive nitrogen (N) loading threatens wetland survival and has been linked to poor water quality and harmful algal blooms. Significant amount of N removal happens within the sediment. Although a few factors, including organic matters and salinity, have been shown to affect N removal, many of the mechanisms and microorganism are still unknown. To quantify the effects of organic matter input and salinity on key N cycling processes under natural conditions, measurements in Mobile Bay and the northern Gulf of Mexico will combine biogeochemical rate measurements with quantitative molecular analysis. This approach will provide insight into the potential of nitrification and denitrification to remove N while characterizing the activity and diversity of the microbial community involved in these processes. Preliminary studies have indicated that the rates vary depending on the vegetation present, but that sulfides may play a large role in regulating rates. Quantifying nitrification and denitrification rates along a salinity gradient will further explore the interaction between S and N cycles.

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ASSESSING RESPIRATION AND NUTRIENT DYNAMICS IN ARTIFICIAL REEF BIOFILMS

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Microbial activity in estuarine systems is often limited by nutrient sources, but the presence of an artificial reef can improve nutrient cycling and phytoplankton activity, enhancing microbial growth as well. Rubble deployed at 4 artificial reef sites in Mississippi Sound was used in laboratory incubations to examine nutrient dynamics and heterotrophic bacteria populations. Bacterial production was expected to be highest in incubation chambers containing rubble compared to control chambers without rubble, but this was not observed, and production often decreased over time in chambers with rubble. However, oxygen consumption was greatest in chambers with rubble, indicating higher respiration due to biological
activity. We hypothesize that the low bacteria counts are due to samples being obtained from water samples, which excludes bacteria that may have settled on the substrate. Incubation chambers containing rubble showed greater increases in PO4 when compared to control chambers, as well as greater increases in NH4. These results suggest that biological activity within the biofilm enhances nutrient remineralization at artificial reef sites.

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(22)

THE EFFECTS OF PROLONGED DARKNESS ON DMSP AND OTHER BIOGEOCHEMICALLY RELEVANT CONSTITUENTS IN PHAEOCYSTIS ANTARCTICA

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The prymnesiophyte *Phaeocystis antarctica* is an important primary producer in areas such as the Ross Sea, Antarctica and must survive over 4 months of darkness during the austral winter. *Phaeocystis* is one of the largest producers of the sulfur metabolite DMSP (dimethylsulfoniopropionate) and its role in dark survival is of particular interest. We investigated the effects of prolonged darkness on biogeochemically-relevant constituents of *P. antarctica* (CCMP 1374). Replicate exponential phase cultures of *P. antarctica* were placed in darkness at 1 °C and sacrificed for analysis over several months. Intracellular DMSP, chlorophyll a and cell numbers all declined over the first few days but remained fairly constant for the remainder of the experiment at 38-54%, 64-83% and 59-71% of the initial values, respectively. Additionally, POC and PON followed similar patterns indicating that *P. antarctica* maintains a large proportion of its initial biogeochemical makeup. In contrast, particulate dimethylsulfoxide (DMSO) declined to nearly undetectable levels presumably because its production is light dependent and unlike DMSP, the remaining intracellular pool can readily cross cell membranes into the surrounding medium.

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(23)

EDUCATION AND OUTREACH CONCERNING HARMFUL ALGAL BLOOMS IN ESTUARIES OF SOUTH LOUISIANA

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Harmful algal blooms (HABs) are a growing concern globally; however, specific information available to the public is limited. There is also a breakdown in communication and trust between society and the scientific community which has increased over recent years. Taking steps towards mending this relationship will take time and effort on both sides. In this study, scientific literacy, visual accuracy and knowledge about algae was studied for fishermen (commercial and recreational) in South Louisiana. Fishermen were surveyed about their knowledge and then that information was used to create a brochure to help educate the public about algae and HABs. After the brochure was placed at various piers and fishing docks, fishermen were interviewed again to find out if the brochure had served as an effective means of information. The post-interviews are still on-going. The need for educational outreach concerning HABs is evident and this study demonstrates one method for getting more information out to the public.
**BIOCONTROL EFFORT OF GIANT SALVINIA IN THE BARATARIA PRESERVE**

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Giant Salvinia (*Salvinia molesta*) is an invasive aquatic plant species from southeastern Brazil that has invaded the United States' waterways since the 1990s. Similar to other invasive aquatics, they are ecologically and economically detrimental to wetland ecosystems if left unchecked. The global outbreak of *S. molesta* has currently been restrained since the introduction of the weevil, *Cyrtobagous salviniae*, a native predator of the free-floating salvinia fern. In 2006, Giant Salvinia was first discovered to be a problem in Jean Lafitte National Historic Park and Preserve, and now dominates the Barataria waterways. The Barataria Bay is an open water system that receives water from the Mississippi River and the Gulf of Mexico. It is unknown if the salvinia weevil can successfully control giant salvinia in an open system. In 2011 the Park introduced the salvinia weevils, and monitoring of their progress took place in the summer of 2012. Samples were collected throughout the Preserve and, using Berlese funnels, the weevil population densities were determined. Comparing these numbers with known successful weevil population densities, *C. salviniae* should be successful in controlling Giant Salvinia but more monitoring is needed.

**POLLEN RECORDS OF VEGETATION AND CLIMATE CHANGES SINCE 8800 YR FROM A PEATLAND IN DABIE MOUNTAINS, EASTERN CHINA**

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Two peat cores, 115 cm and 145 cm long, were obtained from the Tiantangzhai Peatland of Dabie Mountains in eastern China. Twelve C-14 dates provide a high-resolution chronology indicating that these cores span the past 8800 cal years. Multiple proxies, including pollen, grain size, TOC, TN, and magnetic susceptibility, were used to reconstruct the vegetation and climate changes. The results show distinct subtropical vegetation characteristics. Several important climatic periods and events are clearly recorded. During 8800-6700 cal. yr BP, the dominant vegetation types consisted of *Pinus*, evergreen *Quercus*, *Liquidambar*, Gramineae, and Cyperaceae, suggesting a warm and wet climate. The 8.2 ka cold event was not obvious here. During 6700-4600 cal yr BP, *Pinus* and Gramineae deceased gradually, while *Fagus*, *Castanea*, *Tilia*, evergreen *Quercus*, *Liquidambar*, and ferns increased, indicating a wet and hot climate. During 4600-3100 cal yr BP, trees and herbs declined but ferns increased, suggesting rather cool and dry climate. The 4.2 ka cold event seems clearly registered here. During 3100-780 cal yr BP, trees decreased significantly except *Pinus*, while Gramineae and Cyperaceae proliferated, suggesting a change towards cold and wet conditions. From 780 cal yr BP till now, *Pinus* and Gramineae were predominant, but Cyperaceae deceased remarkably, indicating possible human activities. The pollen records of the peat cores from Dabie Mountains not only reflect global climate trends but also regional climate variations and vegetation responses.
(26)

MULTI-PROXY CHARACTERIZATION OF THE HURRICANE WILMA (2005) STORM DEPOSIT IN SEDIMENT CORES FROM THE SHARK RIVER SLOUGH, SOUTHWESTERN EVERGLADES

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A 5.25 m sediment core from a mangrove forest at the mouth of the Shark River Slough was used to study the vegetational responses associated with hurricane disturbances and sea-level changes since 7.5 ka in the coastal Everglades of southwestern Florida. The multi-proxy record based on palynological, loss-on-ignition, and X-ray fluorescence analyses suggests that the southwestern Everglades was directly struck by major hurricanes at least four times during the last 3000 years, around 2.9 ka, 1.7 ka, 1 ka and 350 yr BP, in addition to the direct hit by Hurricane Wilma in 2005. The species composition of the mangrove forest fluctuated significantly after each catastrophic hurricane strike. This study presents the oldest basal peat and the longest paleoecological history in the region.

(27)

EFFECTS OF SINGLE-PULSE BURIAL ON A MEDITERRANEAN SEAGRASS AND ASSOCIATED BENTHIC MACROFAUNA: IMPLICATIONS FOR SMALL-SCALE BEACH NOURISHMENT

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Beach nourishment is commonly used to offset shoreline erosion and its effects on adjacent seagrasses have been previously examined. However, no studies have focused on the response of benthic macrofauna associated with Cymodocea nodosa, despite forming one of the major seagrass habitats in the Mediterranean. We used a manipulative experiment to examine burial effects on the growth of C. nodosa and response of macrofauna over 54 days. After five days of burial, C. nodosa canopy height was greater but burial only affected macrofaunal taxa richness. Five of nine experimental plots returned to background levels after 54 days, indicating substantial dwindling of the burial as a result of storm scouring. We found no major effects of burial on abundance or diversity of the macrofaunal community after 54 days. Taxa richness was greater in control plots after three days but effects were ameliorated after 54 days. Our results suggest small pulse burial events occurring during fall season did not have large impacts on the macrofauna of the C. nodosa bed we studied. These communities seem likely to withstand small scale coastal nourishment activities if sediment deposition remains <ca. 13 cm and if activities occur prior to the fall/winter storm season.

(28)

SEAGRASSES IN THE MISSISSIPPI SOUND AND THE NORTHERN CHANDELEUR ISLANDS, AND PROBLEMS ASSOCIATED WITH DECADAL-SCALE CHANGE DETECTION

Linh T. Pham and Patrick D. Biber
Seagrass mapping data from a multitude of previous projects in the Mississippi Sound (MSS) and the northern Chandeleur Islands (NCI) were gathered and combined to provide a more comprehensive analysis of seagrass change from 1940 to 2009. Seagrasses generally occur in three groups: (1) along the Mississippi mainland coastline dominated by *Ruppia maritima*, (2) on the north side of MSS barrier islands dominated by *Halodule wrightii*, and (3) on the west side of the NCI dominated by *Thalassia testudinum* co-occurring with other seagrass species. The study area lost seagrasses over the 69 year period, due to loss of seagrass habitat resulting in less total vegetated area. Comparisons of total seagrass area among various studies that used different mapping methods can result in overestimation or misleading conclusions. A key finding from this research using a long time series of data based on consistent mapping methods is that seagrass loss was not as dramatic as previously reported for the northern Gulf of Mexico.

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**SARGASSUM TROPHIC ECOLOGY USING STABLE ISOTOPE ANALYSIS FOR COMMUNITIES OFF THE COAST OF ALABAMA AND BERMUDA**

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Pelagic *Sargassum* provides substrate in the open ocean and serves as an important nursery habitat for several species of juvenile fish, and as a result is an essential fish habitat (SAFSCMC 1998). In order to conserve this habitat, it is important to understand *Sargassum* food web structure, and the role *Sargassum* has as shelter and as a food source. Stable isotopes, δ13C and δ15N, were quantified to examine and compare the trophic ecology of *Sargassum* communities in the Sargasso Sea and the Northern Gulf of Mexico. Phytoplankton, represented by particulate organic matter (POM), and the two pelagic *Sargassum* species, *S. natans* and *S. fluitans*, were the sources used to determine source contribution to the *Sargassum* food web. There was enrichment of δ15N with increasing trophic level for both areas. There also was more δ15N enrichment in the Northern Gulf of Mexico *Sargassum* communities than communities off of Bermuda. Continuing research will try to identify seasonal and spatial variations in stable isotopes and fish assemblages of *Sargassum* communities across the SEAMAP sampling track from southern Texas to the Florida Keys.

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**A DESCRIPTION OF THE ICHTHYOFaUNA COMPOSITION IN THE LOOP CURRENT IN THE GULF OF MEXICO**

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The Loop Current is an open ocean habitat that is characterized by warm, high density water surrounded by the boundary of cool, low density water. This ecotone acts to provide habitat for a suite of fish species especially larvae and juveniles including billfishes, dolphin fishes, and tunas. In this project we used data collected in the summer of 2003 and 2004 with tucker and oblique trawls to determine the diversity and
abundance of fish taxa in this habitat. We performed a community assessment of the ichthyofauna composition using indices of diversity, richness, and evenness for four different depths (1 m, 10 m, 20 m, and 30 m). Samples were and taken in three habitat types in the Loop Current system: inside the eastern boundary, transition habitat at the boundary lines, and outside the western boundary. Members of the Scombridae and Carangidae have the greatest average abundances in the samples. My preliminary results indicated little variance among depths but high variance between samples indicating patchiness. Although larval fish are generally patchily distributed in pelagic habitats, the physical dynamics of the Loop Current may act to aggregate fish in the Gulf of Mexico.

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Genetic Variation of Gray Triggerfish in US Waters of the Gulf of Mexico and South Atlantic Regions

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The gray triggerfish, *Balistes capriscus*, is a reef fish that supports significant fisheries in offshore waters of the Gulf of Mexico and South Atlantic regions. Currently gray triggerfish are managed as a single stock in U.S. waters in the absence of adequate information on stock structure. Genetic variation among gray triggerfish in U.S. waters was surveyed using 17 microsatellite loci and sequences of a 617 base pairs fragment of the mitochondrial ND4 gene (mtDNA). The microsatellite dataset included genotypes of samples collected from eight localities ranging from South Texas to South Carolina (61-80 fish per locality). Thirty specimens were assayed at the mitochondrial marker in five of the eight localities. Number of alleles and gene diversity statistics averaged 25.3 and 0.783 for microsatellites and 38 and 0.876 for mtDNA. Exact tests of population differentiation and spatial analysis of molecular variance did not reveal occurrence of significant heterogeneity among localities or groups of localities for both classes of markers. The dataset is currently being extended to include localities from South America, Europe, and Africa in order to investigate on population structure along the entire distribution range.

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Genetic Diversity of *Vibrio Cholerae* Isolated from Different Salinities in Mobile Bay, AL

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Many *Vibrio cholerae* strains, which are autochthonous members of estuarine environments, lack the virulence factors to cause cholera. However, these non-toxigenic strains are still capable of causing gastrointestinal illness. In this study, isolates from Mobile Bay were collected from surface water in order to assess the effect of salinity on *V. cholerae* genetic diversity. Site 1 (Dog River; DR) located near the head of Mobile Bay at the mouth of Dog River typically has low salinity (<10 ppt), while Site 2 (Cedar Point; CP) at the mouth of Mobile Bay tends to have higher salinities (>15 ppt) resulting from influences of the Gulf of Mexico. Pulse field gel electrophoresis (PFGE) was was performed on 25 isolates from each site according to the PulseNet *V. cholerae* protocol. NotI and SfiI digests of isolates from CP resulted in 87% and 96% unique fingerprints, respectively. The isolates from DR all produced unique fingerprints, regardless of enzyme used. The higher percentage of unique fingerprints from DR isolates demonstrates greater diversity of *V. cholerae* at this site. Salinity at Site 1 was significantly lower than
CP. Together, these results suggest that salinity may have an effect on the genetic diversity of *V. cholerae*.

(33)

CILIATE PROTOZOA IN CETACEANS

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Ciliates are protozoans that extend almost everywhere where water is available. Most of the species are free-living, but some of them are considered symbionts of other organisms, from small invertebrates to fishes and mammals. The classification of this group has benefited from the use of special stains to highlight the ciliature and molecular techniques to delineate phylogenetic relationships, nevertheless, classifications are still controversial. Although some “ciliated” forms have been found living in close relationships with cetaceans, just four species have been formally described: *Haematophagus megapterae* Woodcock and Lodge, 1921 in humpback whale; *Kyaroikeus cetarius* Sniezek, Coats, and Small 1995 in tooth whales; and *Planilamina ovata* Ma, Overstreet, Sniezek, Solangi and Coats 2006 and *P. magna* Ma, Overstreet, Sniezek, Solangi and Coats 2006 in *Pseudorca crassidens* and *Tursiops truncatus*. The possible pathogenicity to the hosts is not clear, but in the case of *H. megapterae*, host cells have been observed inside the ciliate. The literature suggests that additional species occur in cetaceans. To solve the uncertainty of additional species and the level of symbiosis, I am focusing on those aspects.

Study funded by the Department of the Interior, Project number MS.R. 798.

(34)

A MOLECULAR ANALYSIS OF THE INTERRELATIONSHIPS OF THE TREMATODE FAMILY OPECIOELIDAE (DIGENEA)

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The Opecoelidae is one of the largest trematode families restricted primarily to fishes. It occurs in freshwater, brackish, and marine fishes, including some from the deep sea. Understanding the systematics of the group is difficult because of the relatively unspecialized features of its members, the acceptance of several poorly defined genera, and the great species diversity within the family. The family is presently comprised of four recognized subfamilies: Opecoelinae, Opecoelininae, Stenakrinae, and Plagioporinae. Though a few previous authors suggest the latter may be paraphyletic. To date, molecular phylogenetic studies of the family have been based on few representatives, aimed at elucidating life-cycles, focused on determining the placement of the family within the Digenea, or used to establish the affinity of a particular species. This study investigates the molecular interrelationships of members of the two principle subfamilies of opecoelids to examine for paraphyly of the Plagioporinae based on partial sequences of the nuclear 28S rRNA gene. Our phylogeny is built from 10 species of Opecoelinae, 25 species of Plagioporinae, and two species of *Paragonimus*, as outgroups. Our estimated phylogeny strengthens the paraphyly of the Plagioporinae, shows a surprisingly close affinity of deep-water and freshwater plagioporines, and reveals a grouping of shallow-water marine plagioporines.

(35)

ONTOGENY OF THE DIGESTIVE SYSTEM OF THE RED SNAPPER (*LUTJANUS CAMPECHANUS*) RAISED UNDER INTENSIVE LARVICULTURE CONDITIONS
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The red snapper (Lutjanus campechanus) is a forefront candidate for marine aquaculture in the southern
United States. A major limitation to the development of commercial aquaculture for this species is the
difficulty to raise larvae. Unsuccessful larviculture using traditional live feeds along with high mortality
during early larval stages have been discussed to signal nutritional specific requirements and/or inability
of larval digestive system to process the live preys. In this work, the ontogeny of the digestive system of
the red snapper was histologically described in current intensive larviculture conditions. Larvae were
sampled from 1 day post hatch (dph) to 30 dph to allow detailed descriptions of the morphological
development of the digestive system during this critical phase of development using routine light
microscopy techniques. Red snapper hatch as a rudimentary larva with a single gut and no major digestive
organs. The mouth opens at 3 dph, when the incipient gut derivates in foregut, midgut and hindgut with
no trace of any endogenous feeding material. Gill cavity contains four clusters of branchial arches. Liver,
pancreas and swimbladder are small but already present at this stage. At 5 dph, the swim bladder begins
to inflate with gas gland and rete mirabile visible. The digestive tract forms a loop observed at 9 dph, and
gastric glands were present on 30 days old fish.

(36)
IMPACT OF BP DEEPWATER HORIZON OIL SPILL ON OYSTER REEF COMMENSAL
COMMUNITIES IN BARATARIA BAY, LA

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Oyster reefs provide many ecosystem services, including providing habitat and refuge for many
invertebrates and juvenile fish. In turn, these organisms support higher trophic levels, including
economically important commercial fisheries. While seasonal fluctuations in the species diversity,
richness and abundance of these commensal communities are to be expected, the health of an oyster reef
can also impact the organisms living among them. We hypothesized that commensal organisms from
oyster reefs impacted by the 2010 BP Deepwater Horizon oil spill might be declining. In 2012, we
assessed the diversity and relative abundance of commensal organisms at two sites in Barataria Bay, LA
that experienced oiling from the spill, and two control sites that received no contamination. At each site,
5 replicate Vexar bags containing oyster cultch were deployed for one month every three months, after
which all of the organisms contained in the bags were sorted and identified. Preliminary results show a
decrease in species diversity during the summer sampling period at Bay Jimmy, the most heavily oiled
study site. These data correspond with a simultaneous decrease in oyster settlement, suggesting that
further studies are necessary to determine the cause of these coupled events.

(37)
PREDICTING HABITAT SUITABILITY ON THE CENTRAL TEXAS COAST FOR THE ARANSAS-
WOOD BUFFALO POPULATION OF THE ENDANGERED WHOOPING CRANE, GRUS
AMERICANA

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The Aransas-Wood Buffalo population of whooping cranes is the only natural migratory flock in the world, with a current population of about 280 birds. It is commonly believed among whooping crane researchers that habitat quality and availability in their Central Texas Gulf Coast wintering grounds will act as the limiting factor toward attaining the endangered species de-listing goal of 1,000 birds. Although whooping crane habitat use has been observed by researchers since the 1950’s, few quantitative studies defining critical crane habitat exist. The objective of this study was to identify and quantify the spatial and structural components of habitat used by whooping cranes in this population, and to determine potentially suitable habitat for whooping crane use throughout the study area. 7 years of whooping crane observations, habitat classifications, and derived landscape metrics were used to develop a habitat suitability index for the whooping crane. Potential habitat suitability throughout the study area was then determined and mapped, and habitat transition due to sea level rise was considered using results from a 2010 application of the Sea Level Affecting Marshes Model (SLAMM). Preliminary analysis shows an increase in potential whooping crane habitat by about %15 under 1m sea level rise.

(38)
MAPPING ARTIFICIAL REEFS IN THE MISSISSIPPI SOUND
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The use of artificial reefs as a coastal management tool has become increasing popular worldwide. The most common reasons for artificial reef deployment in coastal areas include enhancement of commercial fish stocks and harvests, maintenance and restoration of habitat and biodiversity, and the establishment of recreational diving and fishing hotspots. The Mississippi Sound has 67 inshore artificial reefs sites, the main goal of which is to increase the production of economically and recreationally important fish such as speckled trout, white trout, redfish, and black drum. The success of artificial reefs in increasing fisheries production depends largely on the quantity of primary and secondary production available on or near the reefs to support a reef-based food web. The objective of our study was to estimate the net epilithic primary production on four artificial reefs (2 high relief and 2 low relief reefs) in the Mississippi Sound from settlement plate production measurements. In order to extrapolate settlement plate production measurements to net habitat primary production, the four study reefs were physically mapped and their surface areas were calculated in ArcGIS. In this poster we present the field mapping technique used, as well as the digital mapping methods and final map products.

(39)
BLACK MANGROVE (AVICENNIA GERMINANS) EXPANSION INTO NORTHERN GULF OF MEXICO SALT MARSHES: WHAT CHANGES CAN WE EXPECT?
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A prime example of climate-induced range shifts is the expansion of the tropically associated black mangrove (Avicennia germinans) into the northern Gulf of Mexico. This tropically associated species has invaded temperate systems dominated by saltmarsh cordgrass (Spartina alterniflora) and black needlerush (Juncus roemerianus) in southern Louisiana and most recently on Horn Island, MS, in the Gulf Islands National Seashore (GUIS). Because salt marshes are critical nursery habitats for a variety of ecologically important finfish and shellfish, the introduction of black mangroves may have significant
consequences on their composition and abundance. To date, little is known about the role black mangroves may play as nursery habitats for juvenile finfish and shellfish or whether they are comparable to salt marshes. The main objective of this study is to quantify and compare fish and macrofaunal use in Spartina-dominated; black mangrove-dominated; and mixed Spartina and black mangrove habitats. Suction sample surveys were conducted every month from April to October 2012 to estimate finfish, shellfish, and infaunal abundances and diversity among the three habitats. Preliminary results do not show any clear differences between habitat types indicating a similar nursery role for finfish and shellfish species.
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