BAYS & BAYOUS

SYMPOSIUM 2016

# From Thoughts to Actions – Restoration on the Gulf Coast

Mississippi-Alabama
Bays and Bayous
Symposium

**Book of Abstracts**

**Nov. 30-Dec. 1, 2016 | Mississippi Coast Coliseum and Convention Center | Biloxi, MS**

# 2016 Mississippi-Alabama Bays and Bayous Symposium Book of Abstracts

To navigate through the book of abstracts, click on the presentation titles at the beginning of the document or use the bookmarks.

Presentations are divided by session topic and type of presentation (oral or poster). In each session topic, they are in alphabetical order based of the presenting author's last name.

**MASGP-16-032.** This publication was supported by the U.S. Department of Commerce's National Oceanic and Atmospheric Administration under NOAA Award NA14OAR4170098, the Mississippi-Alabama Sea Grant Consortium, Alabama Department of Conservation and Natural Resources State Lands Division, Mobile Bay National Estuary Program, The University of Southern Mississippi School of Ocean Science and Technology, EPA Gulf of Mexico Program, Chevron, Gulf of Mexico Alliance, Auburn University Marine Extension and Research Center, Mississippi Department of Marine Resources, Northern Gulf Institute, NOAA Office for Coastal Management, NOAA Gulf of Mexico Regional Collaboration Team, Covington Civil and Environmental, Pickering, Volkert, GeoEngineers and Environmental Science Associates (ESA). The views expressed herein do not necessarily reflect the views of any of these organizations.

# TABLE OF CONTENTS

FLOOD AND WIND MITIGATION CHALLENGES AND PROGRESS
*David Perkes, Mississippi State University, dperkes@gccds.msstate.edu

THE COMMUNITY RATING SYSTEM, NFIP PARTICIPATION, AND FLOOD DAMAGE CLAIMS
*Daniel R Petrolia, Mississippi State University, d.petrolia@msstate.edu

THE PORTS RESILIENCE INDEX: IMPROVING RESILIENCE AT THE LAND-SEA INTERFACE
*Tracie Sempier, Mississippi-Alabama Sea Grant Consortium, tracie.sempier@usm.edu

DEVELOPING A DECADAL SCALE SEDIMENT BUDGET: QUANTIFYING VERTICAL FLUXES CONTRIBUTING TO THE EVOLUTION OF A MARSH PLATFORM
*Christopher G Smith, U.S. Geological Survey, cgsmith@usgs.gov

INCORPORATING CLIMATE AND HAZARD RESILIENCE INTO THE MARINE EDUCATION TOOLKIT FOR ACHIEVING SUSTAINABLE COMMUNITY GROWTH
*Christopher T. Snyder, The University of Southern Mississippi, Gulf Coast Research Laboratory, Marine Education Center, christopher.snyder@usm.edu

SOCIAL SCIENCE INFORMED RISK COMMUNICATION: TIPS AND TECHNIQUES FOR COMMUNICATING RISK TO FOSTER CLIMATE AND HAZARD RESILIENCE
*Heidi Stiller, NOAA Office for Coastal Management, heidi.stiller@noaa.gov

RESILIENCE TOOLS AND SERVICES GAP ANALYSIS
*LaDon Swann, Mississippi-Alabama Sea Grant Consortium, swanndl@auburn.edu

THE VALUE OF OPEN SPACE AS WATERFRONT USE: COMMUNITY STAKEHOLDERS' PERSPECTIVES
*Joan M. Wesley, Jackson State University, joan.m.wesley@jsums.edu

DEVELOPING A HYBRID MODEL TO PREDICT THE IMPACT OF SEA-LEVEL RISE ON COASTAL WETLANDS
*Wei Wu, The University of Southern Mississippi, wei.wu@usm.edu

QUANTIFYING VEGETATION AND SOIL DYNAMICS OF SELECTED COASTAL HABITAT TYPES WITHIN THE GRAND BAY NERR
*Michael Archer, Grand Bay National Estuarine Research Reserve, michael.archer@dmr.ms.gov

ASSESSMENT OF COASTAL ELEVATION CHANGES USING UNMANNED AERIAL SYSTEMS
*Justin Blancher, University of Southern Mississippi, justin.blancher@usm.edu

NORTHERN GULF OF MEXICO SENTINEL SITE COOPERATIVE: SUCCESSFUL CONTINUATION OF A GULF COAST PARTNERSHIP
*Casey Fulford, Northern Gulf of Mexico Sentinel Site Cooperative, cfulford@disl.org

NEARSHORE AND INTERTIDAL MODERN FORAMINIFER BIOFACIES ACROSS THE SALT-MARSHES OF THE EASTERN MISSISSIPPI SOUND, U.S.A.
*Christian Haller, University of South Florida – College of Marine Science, challer@mail.usf.edu

IMPACTS OF COASTAL ACIDIFICATION ON THE STRUCTURE OF LOUISIANA PHYTOPLANKTON COMMUNITIES
*Amy J Mallozzi, Louisiana State University, amallo5@lsu.edu

HABITAT PREFERENCES OF *UCA LONGISIGNALIS* ACROSS GULF COAST TIDAL MARSH VEGETATION ZONES
*Gwendolyn A Murphy, Southern Illinois University, Plant Biology, gmurphy@siu.edu

GREEN SEA TURTLE GRAZING PRESSURE IN A FLORIDA BAY
*Alex Rodriguez, Dauphin Island Sea Lab/University of South Alabama, arodriguez@disl.org

AN EVALUATION OF MARSH SHORELINE CHANGE USING BOTH GEOSPATIAL AND FIELD-BASED TECHNIQUES
*Joseph Terrano, University of South Florida and the U.S. Geological Survey, terranoj@mail.usf.edu

SEA LEVEL RISE AND SURGE MOVEMENT THROUGH THE UNCONFINED AQUIFER IN HARRISON COUNTY MISSISSIPPI
*Chuck H Thibault, University of Memphis, cthibalt@memphis.edu

ADDRESSING COASTAL BUSINESS NEEDS AND COASTAL HAZARDS: BUSINESS RESILIENCE INDICES
*Jody Thompson, AUMERC, jody.thompson@auburn.edu

NOAA MARINE DEBRIS SHORELINE MONITORING PROJECT EXPANSION TO THE GULF OF MEXICO MAPS OCCURRENCE AND ACCUMULATION RATES
*Caitlin Wessel, Marine Debris Program, National Oceanic and Atmospheric Administration, caitlin.wessel@noaa.gov

"LEAVE ONLY FOOTPRINTS" INITIATIVE CLEANS UP THE BEACHES IN GULF SHORES AND ORANGE BEACH, ALABAMA
*Chandra Wright, Mississippi-Alabama Sea Grant Consortium and Gulf Shores & Orange Beach Tourism, cwright@gulfshores.com

HABITAT MANAGEMENT AND RESTORATION

BAYOU CADDY ECOSYSTEM RESTORATION, HANCOCK COUNTY, MISSISSIPPI: CONSTRUCTION OF A LIVING SHORELINE
*Richard J Allen, USACE, Mobile District, richard.j.allen@usace.army.mil

RESTORATION OF THE EROSION-IMPACTED AND STORM-VULNERABLE NORTHERN TIP OF MON LOUIS ISLAND, MOBILE COUNTY, AL
*Emery Baya, Thompson Engineering, ebaya@thompsonengineering.com

EVALUATING NET ECOSYSTEM SERVICE BENEFITS FOR RESTORATION PROJECTS FUNDED THROUGH DEEP WATER HORIZON OIL SPILL
*Don Blancher, Moffatt & Nichol, dblancher@moffattnichol.com

MOVING TOWARDS A SPATIALLY AND ECOLOGICALLY BALANCED APPROACH TO ARTIFICIAL REEF PLACEMENT
*George S. Bosarge, Fisheries Ecology Lab of the Dauphin Island Sea Lab & the Department of Marine Sciences of the University of South Alabama, sbosarge@disl.org

NATURALIZED STABILIZATION MEASURES IN SOUTHWEST ALABAMA
*Wade Burcham, Integrated Science and Engineering, wburcham@intse.com

EFFICACY OF “LIVING SHORELINE” RESTORATION DESIGNS FOR ENVIRONMENTAL BETTERMENT: LESSONS LEARNED FROM MULTI-YEAR PROJECTS IN COASTAL ALABAMA
*Just Cebrian, Dauphin Island Sea Lab, jcebrian@disl.org

SHOULD MISSISSIPPI BE CONCERNED IF DAUPHIN ISLAND IS ALLOWED TO CONTINUE TO ERODE?
*Glendon L. Coffee, Mobile Bay Sierra Club, coffeegl@aol.com

SUB-WATERSHED STANDARDIZED RESTORATION MONITORING FRAMEWORK FOR MOBILE BAY: A CASE STUDY IN D’OLIVE WATERSHED
*Renee Collini, Mobile Bay National Estuary Program/Northern Gulf of Mexico Sentinel Site Cooperative, rcollini@disl.org

ESTIMATING THE WILLINGNESS TO PAY TO PRESERVE OPEN SPACE ASSOCIATED WITH COASTAL WATERFRONTS USING CONTINGENT VALUATION METHOD
*Ram P. Dahal, Mississippi State University, rpd72@msstate.edu

EXAMINATION OF TROPHIC RELATIONSHIPS AFFECTING OYSTER REEF RESTORATION SUCCESS IN THE MISSISSIPPI SOUND
*Virginia Fleer, University of Southern Mississippi Gulf Coast Research Laboratory, virginia.fleer@usm.edu

SOUTH BALDWIN COUNTY’S COASTAL STREAMS AND RIVERS. CAN WE BALANCE THE FUTURE IMPACTS OF DEVELOPMENT AND QUALITY OF LIFE ISSUES?
**Author(s)** Conrad Grazzier, Consultant

MOBILE BAY NATIONAL ESTUARY PROGRAM INVOLVEMENT IN IMPLEMENTING THE THREE MILE CREEK WATERSHED MANAGEMENT PLAN
*Tom Herder, Mobile Bay National Estuary Program, therder@mobilebaynep.com

CHOREOGRAPHING SEDIMENTS IN MOBILE BAY
*Rob Holmes, Auburn University, rbh0012@auburn.edu

D'OLIVE WATERSHED RESTORATION USING SUSTAINABLE STREAM STABILIZATION AND STORMWATER PROJECTS
*Greg Jennings, Jennings Environmental, jenningsenv@gmail.com

IMPACTS OF WINTERING REDHEAD DUCKS (A*THYA AMERICANA*) ON SHOAL GRASS (*HALODULE WRIGHTII*) AND WIDGEON GRASS (*RUPPIA MARITIMA*) IN THE NORTHERN GULF OF MEXICO
*Maddie Kennedy, Dauphin Island Sea Lab/University of South Alabama, mak.kennedy.24@gmail.com

OYSTER HABITAT EVALUATION USING HYDROCOAST SALINITY DATA FOR THE BILOXI MARSH AND MISSISSIPPI SOUND (2013 TO 2015)
*John A. Lopez, Lake Pontchartrain Basin Foundation, jlopez@saveourlake.org

DETERMINING THE DRIVERS OF PLANT COMMUNITY COMPOSITION CHANGE IN A RESTORED MARSH EXPERIENCES SEA-LEVEL RISE
*Sara E Martin, Mississippi State University, Coastal Research and Extension Center, semartin309@gmail.com

COASTAL ECO-MORPHOLOGICAL REAL-TIME FORECASTING (CERF) SYSTEM
*Francesca Messina, The Water Institute of the Gulf, fmessina@thewaterinstitute.org

FREQUENCY OF HYPOXIA AT ARTIFICIAL REEFS WITHIN THE MISSISSIPPI SOUND AND BIGHT, JUN - OCT 2016
*Scott P. Milroy, The University of Southern Mississippi, scott.milroy@usm.edu

IMPACTS TO BLUE CRAB (*CALLINECTES SAPIDUS*) HABITAT SUITABILITY CAUSED BY FRESHWATER DIVERSIONS ASSOCIATED WITH THE BONNET CARRE SPILLWAY, JAN - AUG 2016
*Scott P. Milroy, The University of Southern Mississippi, scott.milroy@usm.edu

DETECTING CHANGE IN COASTAL MARSHLANDS FROM 1950 – 2014 ASING TEXTURAL ANALYSIS OF PANCHROMATIC IMAGERY
*Heather Nicholson, University of Southern Mississippi, h.nicholson@eagles.usm.edu

PERMITTING YOUR LIVING SHORELINE PROJECT: CHANGES ON THE HORIZON AND LOCAL OPPORTUNITIES
*Niki L Pace, Louisiana Sea Grant Law & Policy Program, nlpace@lsu.edu

URBAN GREEN INFRASTRUCTURE AND LOCAL FLOODING: THE IMPACT OF LANDSCAPE PATTERNS ON PEAK RUNOFF IN FOUR TEXAS MSAS
*Yunmi Park, Assistant Professor, Community Planning Program, Dept. of Political Science, Auburn University, ympark@auburn.edu

EMPLOYING UNMANNED AERIAL SYSTEMS (UAS) TO UNDERSTAND AND MANAGE RESOURCES AT GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE
*Jonathan L Pitchford, Grand Bay National Estuarine Research Reserve, jonathan.pitchford@dmr.ms.gov

DEVELOPING NATURAL ASSETS FOR NATURE TOURISM: COASTAL MISSISSIPPI'S NATURE BASED TOURISM MASTER PLAN
*Rhonda Price, MS Department of Marine Resources, rhonda.price@dmr.ms.gov

COLLABORATION YIELDS MISSISSIPPI'S LARGEST HABITAT RESTORATION PROJECT
*George Shuford Ramseur, Mississippi Department of Marine Resources, george.ramseur@dmr.ms.gov

THE IMPACT OF A ONE-DAY EXPERIENTIAL LEARNING PROGRAM IN ADDITION TO AN ECOLOGY UNIT ON THE ENVIRONMENTAL KNOWLEDGE AND ATTITUDE TOWARD THE ENVIRONMENT OF HIGH SCHOOL BIOLOGY STUDENTS
*Anita B Salinas, Mobile County Public Schools, asalinas@mcpss.com

DEVELOPMENT OF THE CPRA OYSTER LEASE ACQUISITION AND COMPENSATION PROGRAM (OLACP) – FROM LITIGATION TO LEGISLATION
*Jason K Shackelford, GeoEngineers, jshackelford@geoengineers.com

THE EFFECTS OF SEA-LEVEL RISE AND PLANTING DENSITY ON RESTORED MARSH FUNCTIONALITY
*Eric Sparks, Mississippi State University and Mississippi-Alabama Sea Grant, eric.sparks@msstate.edu

SUBMERGED AQUATIC VEGETATION MAPPING IN MOBILE BAY AND ADJACENT WATERS OF COASTAL ALABAMA IN 2015
*Tim Thibaut, Barry A. Vittor & Associates, Inc., tthibaut@bvaenviro.com

MODELING UNCERTAINTIES IN THE 2017 LOUISIANA COASTAL MASTER PLAN INTEGRATED COMPARTMENT MODEL
*Eric Davidson White, The Water Institute of the Gulf, ewhite@thewaterinstitute.org

THE SPATIAL DISTRIBUTION AND INVASIVE PATTERN OF CHINESE TALLOW UNDER MULTI-SCALES AT SOUTH COASTAL AREA OF MISSISSIPPI
*Shaoyang Yang, Forestry department of Mississippi State Universtity, sy377@msstate.edu

ENVIRONMENTALLY-FRIENDLY ALTERNATIVES TO BULKHEADS FOR RESILIENT AND HEALTHY SHORELINES: EVALUATION AND IMPLANTATION OF TWO LIVING SHORELINE DESIGNS

*Jamie L Amato, Dauphin Island Sea Lab, jamato@disl.org

THE LIFE AND CONSERVATION OF *LEPIDOCHELYS KEMPI* IN THE GULF OF MEXICO
*Forrest W Collins, University of Alabama at Birmingham, forrestcol10@gmail.com

MYCORRHIZAL COLONIZATION OF COASTAL WETLAND PLANT SPECIES
*Bradley Delfeld, Southern Illinois University, Bmdelfe@siu.edu

FAUNAL ASSEMBLAGES ASSOCIATED WITH LIVING SHORELINES AND IMPLICATIONS FOR ECOSYSTEM FUNCTIONING
*Daniel C Firth, Mississippi State University Dept. of Wildlife, Fisheries and Aquaculture, dcf72@msstate.edu

GEOLOGIC FRAMEWORK AND SURFICIAL PROCESSES, GRAND BAY, MISSISSIPPI-ALABAMA
*Stanley D. Locker, U. S. Geological Survey, slocker@usgs.gov

LONGLEAF PINE (*PINUS PALUSTRIS*) REGENERATION RESPONSE IN RELATION TO BASAL AREA MANAGEMENT
*Cameron Poyner, Auburn University, School of Forestry and Wildlife Sciences, csp0028@auburn.edu

ENGINEERING SALINITY CONTROL IN LAKE CALCASIEU, LOUISIANA TO PROTECT FRINGING WETLANDS AND ESTUARINE ECOSYSTEMS WHILE PRESERVING DEEP-DRAFT ACCESS TO THE PORT OF LAKE CHARLES
*Cyndhia Ramatchandirane, The Water Institute of the Gulf, cramatch@thewaterinstitute.org

SEA GRANT FELLOWSHIP OPPORTUNITIES
*Melissa Schneider, Mississippi-Alabama Sea Grant, melissa.schneider@usm.edu

EFFECTS OF MARSH PLATFORM SLOPE, SEDIMENT TYPE, SEA-LEVEL RISE, AND INITIAL PLANTING DENSITY ON NUTRIENT RETENTION IN A RESTORED MARSH
*Nigel A Temple, Mississippi State University, Coastal Research and Extension Center, nigel_temple@yahoo.com

OYSTER GARDENING IN ALABAMA
*PJ Waters, ACES/MASGC, waterph@auburn.edu

SUPERSIZE ME: NEKTON HABITAT PREFERENCE BASED ON LIFE STAGE AND HOW IT RELATES TO HABITAT REDUNDANCY VS. COMPLEMENTARITY IN THE GULF OF MEXICO
*Laura A West, Dauphin Island Sea Lab, lwest@disl.org

“MUCK TO MARSHES”: VOLUNTEER MONITORS FOR BENEFICIAL USE MARSH RESTORATION IN MISSISSIPPI
*Janet Wright, Mississippi Habitat Stewards, jwright01@cableone.net

LIVING RESOURCES

SPATIAL VARIABILITY IN THE INDIVIDUAL GROWTH OF SHEEPSHEAD (*ARCHOSARGUS PROBATOCEPHALUS*) IN THE GULF OF MEXICO: IMPLICATIONS FOR ASSESSMENT AND MANAGEMENT
*Grant D Adams, Division of Coastal Sciences, School of Ocean Science and Technology, University of Southern Mississippi 703 East Beach Drive, Ocean Springs, Mississippi 39564, USA, grant.adams@eagles.usm.edu

CHARACTERIZING THE RESPIRATORY RESPONSE OF A BENTHIC POLYCHAETE EXPOSED TO MULTIPLE STRESSORS
*Alyssa D Bennett, University of Southern Mississippi- Gulf Coast Research Laboratory, alyssa.bennett@usm.edu

LONG TERM DYNAMICS OF SEAGRASSES IN THE MISSISSIPPI SOUND: AREA CHANGE AND FRAGMENTATION PATTERNS FROM 1940 TO PRESENT
*Patrick Biber, The University of Southern Mississippi, patrick.biber@usm.edu

AN ASSESSMENT OF SPOTTED SEATROUT (*CYNOSCION NEBULOSUS*) STOCK STATUS IN ALABAMA WATERS
*Erin C Bohaboy, University of South Alabama / Dauphin Island Sea Lab, ebohaboy@disl.org

USE OF SHIPPING CHANNELS AND FAIRWAYS BY THE WEST INDIAN MANATEE (*TRICHECHUS MANATUS*) IN THE NORTHCENTRAL GULF OF MEXICO
*Ruth H. Carmichael, Dauphin Island Sea Lab/ University of South Alabama, rcarmichael@disl.org

IS DENITRIFICATION DRIVEN BY ELEVATION OR PLANT TYPE AT A GULF COAST *JUNCUS ROEMERIANUS* AND *SPARTINA ALTERNIFLORA* MIXED SALTMARSH?
*Patrick Chanton, University of Alabama, Dauphin Island Sea Lab, preinchanton@gmail.com

ANALYSIS OF MANATEE PERIOTIC BONE MICROCHEMISTRY AS A TOOL TO TRACK WEST INDIAN MANATEE MIGRATIONS IN THE NORTHCENTRAL GULF OF MEXICO
*Kayla P DaCosta, Dauphin Island Sea Lab/University of South Alabama, kdacosta@disl.org

EFFECT OF TEMPERATURE ON THE DEVELOPMENT AND GROWTH OF TWO COPEPOD SPECIES (*ACARTIA TONSA* AND P*ARVOCALANUS CRASSIROSTRIS*) USED IN MARINE FINFISH AQUACULTURE
*Adam Daw, USM, Gulf Coast Research Laboratory, adam.daw@usm.edu

SUPPLEMENTING BROODSTOCK AND LARVAL DIETS FOR FLORIDA POMPANO TRACHINOTUS CAROLINUS WITH TAURINE TO IMPROVE EGG, LARVAL, AND WEANED JUVENILE QUALITY
*Thomas J Derbes II, Auburn, tjd0020@auburn.edu

CLIMATIC TELECONNECTIONS AND FORECASTING COASTAL MS-AL HYDROLOGY

*Juzer F Dhondia, University Corporation for Atmospheric Research, Tuscaloosa, Alabama, USA. & Department of Civil, Construction and Environmental Engineering, University of Alabama, Tuscaloosa, Alabama, USA., jdhondia@ucar.edu

MAXIMIZING THE RETURN ON INVESTMENT OF OYSTER AQUACULTURE BY MANAGING MUD BLISTER WORM INFESTATION

*Kelly M Dorgan, Dauphin Island Sea Lab, kdorgan@disl.org

ECOLOGICAL RESEARCH AND OBSERVATIONS OF JOHNSON BAYOU, MS

*Brandon D Drescher, Univ. of Southern Mississippi, Gulf Park Campus, brandon.drescher@usm.edu
Jennifer M Walker, Univ. of Southern Mississippi, Gulf Park Campus

A NOVEL APPROACH FOR MITIGATING DEPREDATION, A SOURCE OF CRYPTIC FISHING MORTALITY FOR GULF OF MEXICO RED SNAPPER (L*UTJANUS CAMPECHANUS*)

*J. Marcus Drymon, University of South Alabama, mdrymon@disl.org

PLASTIC POLLUTION: PERCEPTION, AWARENESS, AND WILLINGNESS TO PAY FOR ALTERNATIVES

*Emily C Fischbach, Mississippi State University Coastal Research and Extension Center, fischbach.emily@gmail.com

EXPERIMENTAL ASSESSMENT OF CIRCLE VERSUS J HOOK PERFORMANCE AND SELECTIVITY IN THE NORTHERN GULF OF MEXICO RECREATIONAL REEF FISH FISHERY

*Steven B Garner, University of South Alabama, Dauphin Island Sea Lab, sgarner@disl.org

FINS, FISHES, FISHERIES: A FISH TALE IN TEACHER EDUCATION

*Greg Graeber, Dauphin Island Sea Lab, ggraeber@disl.org

INVESTIGATIONS OF TARPON, MEGALOPS ATLANTICUS, LEPTOCEPHALI FROM MISSISSIPPI COASTAL WATERS

*Patrick Graham, University of Southern Mississippi- Gulf Coast Research Laboratory, Patrick.M.Graham@usm.edu

CHAETOGNATH ECOLOGY AND POTENTIAL NICHE OVERLAP WITH CO-OCCURRING LARVAL FISHES IN THE NORTHERN GULF OF MEXICO

*Jana M Herrmann, University of Southern Mississippi, Gulf Coast Research Lab, School of Ocean Science and Technology, Coastal Sciences Division, Jana.Herrmann@usm.edu

CITIZEN-SCIENCE PROVIDES DATA ON SEASONAL OCCUPANCY OF WEST INDIAN MANATEES (*TRICHECHUS MANATUS*) IN THE NORTHCENTRAL GULF OF MEXICO

*Elizabeth E Hieb, Dauphin Island Sea Lab, ehieb@disl.org

USING ACTION CAMERAS TO CORRECT FOR RED SNAPPER DEPREDATION EVENTS DURING FISHERY INDEPENDENT SURVEYS IN ALABAMA'S ARTIFICIAL REEF PERMIT ZONE
*Crystal L Hightower, University of South Alabama and Dauphin Island Sea Lab, chightower@disl.org

ARE ASIAN TIGER SHRIMP *(PENAEUS MONODON*) A NEW INVASIVE THREAT OR A PAPER TIGER? WHAT WE KNOW FROM THE INTERACTIONS OF TIGER SHRIMP WITH ESTUARINE PREY AND PREDATORS
*Jennifer M. Hill, Louisiana Tech University, jmhill@latech.edu

USING PHENOLOGY DERIVED FROM NASA EARTH OBSERVATIONS TO MONITOR MARSH CONDITIONS IN COASTAL ALABAMA IN SUPPORT OF THE ALABAMA COASTAL FOUNDATION'S RESTORATION AND CONSERVATION INITIATIVES
*Darius Hixon, NASA DEVELOP, dhixonl91@gmail.com

PRELIMINARY ANALYSIS OF GRAY TRIGGERFISH LIFE HISTORY AND DISTRIBUTION IN THE ALABAMA ARTIFICIAL REEF ZONE
*Amanda E Jefferson, University of South Alabama and Dauphin Island Sea Lab, ajefferson@disl.org

DO VERTEBRAL CHEMICAL SIGNATURES DISTINGUISH JUVENILE BLACKTIP SHARK (*CARCHARHINUS LIMBATUS*) NURSERY REGIONS IN THE NORTHERN GULF OF MEXICO?
*Justin P Lewis, Gulf Coast Research Laboratory, The University of Southern Mississippi, j.p.lewis@usm.edu

UTILIZATION OF A COASTAL ESTUARY BY A DEMERSAL FINFISH FAMILY (SCIAENIDAE): IMPLICATIONS FOR HABITAT ASSOCIATIONS AND ECOLOGICAL INTERACTIONS
*Mariah C Livernois, University of South Alabama, mlivernois@disl.org

COASTAL MARINE PLANNING IN ALABAMA
*Christian L Miller, Auburn University Marine Extension and Research Center, christian@auburn.edu

SUBTLE TEMPERATURE DIFFERENCES MAY WELL DETERMINE WHO WINS: A STORY OF THREE SUBMERGED AQUATIC PLANT SPECIES.
*Molly M Miller, University of South Alabama, mmm314@jagmail.southalabama.edu*

VALIDATION OF OTOLITH AND VERTEBRAL CHEMISTRY SALINITY RELATIONSHIPS
*Reid Nelson, DISL / University of South Alabama, tnelson@disl.org

DEVELOPMENT OF A GENOMIC APPROACH FOR THE GENETIC MANAGEMENT OF AQUACULTURE AND STOCK ENHANCEMENT OF THE RED SNAPPER (*LUTJANUS CAMPECHANUS*)
*Adrienne E. Norrell, The University of Southern Mississippi, adrienne.norrell@usm.edu

AN EXAMINATION OF TROPHIC INTERACTIONS IN THE NORTHERN GULF OF MEXICO: PAST WORK, PRESENT UNDERSTANDING AND FUTURE CHALLENGES

*Megumi C Oshima, Division of Coastal Sciences, School of Ocean Science and Technology, The University of Southern Mississippi, megumi.oshima@usm.edu

INSIDE THE BLACK BOX OF BLACKFISH: TAGGING ATLANTIC TRIPLETAIL (*LOBOTES SURINAMENSIS*) IN ALABAMA'S COASTAL WATERS
*Meagan Schrandt, University of South Alabama & Dauphin Island Sea Lab, mschrandt@disl.org

SPATIAL DYNAMICS OF DEMERSAL COMMUNITIES IN THE NORTHCENTRAL GULF OF MEXICO
*Trey P Spearman, University of South Alabama & Dauphin Island Sea Lab, tspearman@gmail.com

EFFECTS OF DESICCATION PRACTICES AND PLOIDY IN CULTURED OYSTERS, *CRASSOSTREA VIRGINICA*, ON *VIBRIO SPP.* ABUNDANCES IN PORTERSVILLE BAY (ALABAMA, USA)
*William C. Walton, Auburn University Shellfish Lab, billwalton@auburn.edu

UNDERSTANDING THE DIRECT AND INDIRECT IMPACTS OF MICROPLASTICS IN EASTERN OYSTERS
*Caitlin C Wessel, University of South Alabama, Dauphin Island Sea Lab, cwessel@disl.org

LIONFISH (*PTEROIS SPP.*) ABUNDANCE AND DISTRIBUTION WITHIN THE ALABAMA REEF PERMIT ZONE
*Sarah E White, University of South Alabama & Dauphin Island Sea Lab, swhite@disl.org

FRESHWATER EXPOSURE AND HUMAN INTERACTION: CASE HISTORY OF A TWICE-STRANDED BOTTLENOSE DOLPHIN IN ALABAMA WATERS
*Noel L Wingers, Dauphin Island Sea Lab, nwingers@disl.org

EFFECTIVE MONITORING TO EVALUATE ECOLOGICAL RESTORATION IN THE GULF OF MEXICO: AN OVERVIEW OF THE 2016 NATIONAL ACADEMIES REPORT
*Mark Woodrey, Grand Bay NERR/Mississippi State University, Mark.woodrey@msstate.edu

EVALUATION OF MISSISSIPPI RIVER DISCHARGE, PRODUCTIVITY, AND TEMPERATURE ON THE DYNAMICS OF LARVAL GULF MENHADEN IN THE NORTHERN GULF OF MEXICO
*Grant D Adams, Division of Coastal Sciences, School of Ocean Science and Technology, University of Southern Mississippi, grant.adams@eagles.usm.edu

EXPLORATORY STUDY: THE INFLUENCE OF CLIMATE VARIABILITY ON A COMMUNITY OF ESTUARINE SPECIES IN COASTAL WATERS OF MISSISSIPPI
*Evan J Anderson, USM Gulf Coast Research Laboratory, evan.anderson@usm.edu

PRELIMINARY ESTIMATES OF POST-RELEASE MORTALITY AND SITE FIDELITY OF HATCHERY-RAISED RED DRUM (SCIAENOPS OCELLATUS) USING ACOUSTIC TELEMETRY
*Courtney Buckley, University of South Alabama, Dauphin Island Sea Lab, cbuckley@disl.org

OYSTER INFESTATION: ABUNDANCE OF MUDBLISTER WORMS (*POLYDORA WEBSTERI*) IN MOBILE BAY OYSTER FARMS
*Sarah M Cole, University of South Alabama, Dauphin Island Sea Lab, scole@disl.org

ASSESSING THE ECOLOGICAL BENEFITS OF A NEW ARTIFICIAL REEF NETWORK IN THE NORTHERN GULF OF MEXICO
*T. Erin Cox, Dauphin Island Sea Lab, ecox@disl.org

AERIAL THERMOGRAPHIC DETECTION OF MANATEE REFUGIA IN THE NORTHCENTRAL GULF OF MEXICO
*Angela Garelick, Dauphin Island Sea Lab/ California State University Channel Islands, angela.garelick026@myci.csuci.edu

OYSTER REEF RESTORATION: SUBSTRATE SUITABILITY MAY DEPEND ON SPECIFIC RESTORATION GOALS
*Patrick M Graham, University of Southen Mississippi- Gulf Coast Research Laboratory, Patrick.M.Graham@usm.edu

UNDERSTANDING TROPHIC TRANSFER OF CIGUATOXIN PRECURSORS IN HERBIVOROUS REEF FISH FROM ST. THOMAS, US VIRGIN ISLANDS
*Jessica K Gwinn, University of South Alabama,, jessekgwinn@gmail.com

SPATIAL ECOLOGY OF STINGRAYS IN MOBILE BAY
*Matthew B Jargowsky, University of South Alabama, Dauphin Island Sea Lab, mjargowsky@disl.org

DETERMINING THE CONDITION INDEX AND CARBONATE PRODUCTION OF *CRASSOSTREA VIRGINICA* IN THE MISSISSIPPI SOUND
*Kelsey M. Kuykendall, USM Gulf Coast Research Laboratory, kelsey.kuykendall@usm.edu

EVALUATION OF CANDIDATE FISHERY REFERENCE POINTS FOR MISSISSIPPI'S SPOTTED SEATROUT STOCK
*Robert Thomas Leaf, University of Southern Mississippi, robert.leaf@usm.edu

MANAGEMENT STRATEGY EVALUATION OF ALTERNATIVE APPROACHES FOR CALCULATING LIMITS TO HUMAN-CAUSED MORTALITY OF MARINE MAMMALS BASED ON DATA AVAILABILITY
*Paula T Moreno, University of Southern Mississippi, Gulf Coast Research Laboratory, Ocean Springs, MS, paula.moreno@usm.edu

THE POLYCHAETE, *CAPITELLA TELETA*, EXHIBITS ALTERNATIVE AEROBIC RESPIRATION STRATEGIES AT DIFFERENT TEMPERATURES UNDER HYPOXIA
*Chet F. Rakocinski, Division of Coastal Sciences School of Ocean Science and Technology The University of Southern Mississippi Gulf Coast Research Laboratory Ocean Springs, MS, 39564, chet.rakocinski@usm.edu

SHARING SCIENCE: BRIDGING THE PUBLIC TRUST IN SCIENCE GAP

*Joyce M. Shaw, Gunter Library, Gulf Coast Research Laboratory, joyce.shaw@usm.edu

CAN SIMPLE TACKLE MODIFICATIONS AND USE OF FISH DESCENDERS DECREASE HARMFUL FISHERY INTERACTIONS WITH BOTTLENOSE DOLPHINS?
*Steve F. Shippee, Marine Wildlife Response Group, shippee3@cox.net

INDEPENDENT RED SNAPPER STOCK ASSESSMENT RESEARCH PROGRAM
*LaDon Swann, Mississippi-Alabama Sea Grant Consortium, swanndl@auburn.edu

OUTCOMES FROM 40 YEARS OF SEA GRANT SUPPORTED OYSTER RESEARCH AND EXTENSION
*LaDon Swann, swanndl@auburn.edu

MODELING THE GULF MENHADEN FISHERY: A SPATIAL NETWORK APPROACH
*Robert Trigg, Division of Coastal Sciences, School of Ocean Science and Technology, The University of Southern Mississippi, 703 East Beach Dr., Ocean Springs, Mississippi, 39564, USA, robert.trigg@usm.edu

A MULTI-SCALE APPROACH TO DETECTING THE RESPONSE OF MIGRATORY LAND BIRDS TO CHANGES IN HABITAT AVAILABILITY
*Theodore J Zenzal, The University of Southern Mississippi, tjzenzal@gmail.com

OIL SPILL IMPACTS

TRACKING GULF RESTORATION WITH THE DWH PROJECT TRACKER
*Laura Bowie, Gulf of Mexico Alliance, Laura.Bowie@gomxa.org

DISTURBANCE OF NORTHERN GULF OF MEXICO REEF FISH COMMUNITIES: THE DEEPWATER HORIZON OIL SPILL AND THE LIONFISH INVASION
*Kristen A Dahl, University of South Alabama at Dauphin Island Sea Lab, kdahl@disl.org

INTEGRATING ACADEMICS INTO RESPONSE- THE ROLE OF THE NOAA SCIENTIFIC SUPPORT TEAM
*Adam Davis, National Oceanic & Atmospheric Administration, adam.davis@noaa.gov

TWO YEARS LATER: A FOLLOW-UP STUDY OF OIL SPILL SCIENCE COMMUNICATION IN THE GULF
*Chris Ellis, NOAA, chris.ellis@noaa.gov

DEEPWATER HORIZON OIL SPILL: A VERY DIFFERENT DISASTER
*Heather A Finnegan, Gulf Coast Behavioral Health and Resiliency Center, hfinnegan@southalabama.edu

GET THE REAL SCOOP ABOUT THE SLICK: ANSWERS TO THE TOP QUESTIONS ASKED ABOUT THE DEEPWATER HORIZON OIL SPILL

*Larissa J Graham, Mississippi-Alabama Sea Grant Consortia, larissa.graham@auburn.edu

THE VALUE OF BASELINE DATA: DISCRIMINATING BETWEEN DEEPWATER HORIZON IMPACTS AND NATURAL VARIATIONS IN LARVAL FISH CONDITION
*Frank J Hernandez, University of Southern Mississippi, frank.hernandez@usm.edu

ENGAGING FISHER FOLKS IN DATA COLLECTION TO ENHANCE NATURAL SCIENCE RESEARCH AND SCIENCE LITERACY
*Jessie Kastler, University of Southern Mississippi - School of Ocean Science and Technology, jessica.kastler@usm.edu

OCCUPATIONAL AND ENVIRONMENTAL HEALTH IN THE GULF COAST
*Katherine H Kirkland, Association of Occupational and Environmental Clinics, kkirkland@aoec.org

PUZZLE PIECING RESTORATION COMPONENTS: MISSISSIPPI STRATEGY FOR RESTORATION
*Robert Kroger, Covington Civil and Environmental, robbie@ccellc.us

"STRESSOR SENSITIVE SERVICES": SUCCESSFUL INTEGRATED BEHAVIORAL HEALTH SERVICES FOR DISASTER-VULNERABLE POPULATIONS
*Jennifer Langhinrichsen-Rohling, University of South Alabama, Gulf Coast Behavioral Health and Resiliency Center, jlr@southalabama.edu

SCIENCE COMMUNICATION THROUGH BLOGGING
*Rachel B. McDonald, Dauphin Island Sea Lab, rmcdonald@disl.org

ACUTE AND CHRONIC IMPACTS OF THE DEEPWATER HORIZON OIL SPILL ON RED SNAPPER IN THE NORTHERN GULF OF MEXICO
*William F Patterson III, University of South Alabama and Dauphin Island Sea Lab, wpatterson@disl.org

A HEALTH INFORMATION EXCHANGE, CONTINUITY OF CARE AND DISPLACED PERSONS. A CASE STUDY.
*Tim Rehner, The University of Southern Mississippi, School of Social Work, tim.rehner@usm.edu

ADDRESSING THE MENTAL HEALTH IMPACT IN FLORIDA
*Glenn E Rohrer, LCSW, Ph.D., University of West Florida, Department of Social Work, grohrer@uwf.edu

IMPACTS OF DEEPWATER HORIZON OIL POLLUTION ON WETLANDS RESILIENCY
*Whitney A Scheffel, Dauphin Island Sea Lab, wscheffel@disl.org

SPECIES AND FUNCTIONAL DIVERSITY OF APEX AND MESOPREDATORS IN THE NORTHERN GULF OF MEXICO
*Emily A Seubert, University of South Alabama, emseubert@gmail.com

SYNERGISTIC SUPPRESSION OF THE ARYL HYDROCARBON RECEPTOR AND HYPOXIA INDUCIBLE FACTOR PATHWAYS AFTER EXPOSURE TO OIL AND HYPOXIA DURING EARLY LIFE STAGES OF *CYPRINODON VARIEGATUS*
*Danielle J Simning, The University of Southern Mississippi, danielle.simning@eagles.usm.edu

THE INFLUENCE OF MARINE-BASED TECHNOLOGICAL DISASTERS ON HUMAN HEALTH AND WELL-BEING
*Anthony H Speier, Louisiana State University Health Science Center-New Orleans Department of Psychiatry, aspei1@lsuhsc.edu

ASSESSMENT OF OILING ON THE BIODIVERSITY AND RESILIENCE OF THE BENTHIC MICROBIAL ASSEMBLAGES IN SUB-TIDAL AND INTERTIDAL HABITATS
*Katherine Baltzer, University of South Alabama & the Dauphin Island Sea Lab, kbaltzer@disl.org

INFLOW OF SALINE OFFSHORE WATERS INTO THE MISSISSIPPI SOUND AND MOBILE BAY IN OCTOBER 2015
*Mustafa Kemal Cambazoglu, The University of Southern Mississippi, mustafa.cambazoglu@usm.edu

A TEMPORAL STUDY OF NITROGEN CYCLING IN A DEEPWATER-HORIZON IMPACTED COASTAL MARSH SYSTEM
*Alice Kleinhuizen, University of Alabama and Dauphin Island Sea Lab, akleinhu@gmail.com

SHARING THE LATEST OIL SPILL SCIENCE DISCOVERIES: AN OVERVIEW OF A GULF-WIDE, MULTIDISCIPLINARY OUTREACH PROGRAM
*Stephen H Sempier, Mississippi-Alabama Sea Grant Consortium, stephen.sempier@usm.edu

WATER RESOURCES: QUALITY AND SUPPLY

INVESTIGATING THE EFFECTS OF COASTAL RESIDENTIAL DEVELOPMENT ON NUTRIENT FLUX VIA SUBMARINE GROUNDWATER DISCHARGE IN MOBILE BAY
*Donald A Beebe, University of South Alabama, dbeebe@southalabama.edu

INCREASING ATMOSPHERIC CARBON DIOXIDE CONCENTRATION AND SURFACE WATER ALKALINITY
*Claude E. Boyd, Auburn University, boydce1@auburn.edu

INNOVATIVE STREAM RESTORATION TECHNIQUES TO ENHANCE STREAM STABILITY, WATER QUALITY, AND HABITAT
*Georganna Collins, Ecology and Environment, Inc., gcollins@ene.com

CHANGES IN PRIMARY PRODUCTION AT GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE: WHAT CAN WE LEARN FROM LONG-TERM MONITORING DATA?
*Kim Cressman, Grand Bay NERR, MS Dept of Marine Resources, kimberly.cressman@dmr.ms.gov

EFFECTS OF RECURRENT PHOSPHATE SPILLS TO A COASTAL ESTUARY
*Kevin S. Dillon, Division of Coastal Sciences, University of Southern Mississippi School of Ocean Science and Technology, kevin.dillon@usm.edu

RED TIDE BLOOM EVENT IN COASTAL ALABAMA: A PHYSICAL PERSPECTIVE
*Brian Dzwonkowski, University of South Alabama/Dauphin Island Sea Lab, briandz@disl.org

BON SECOUR RIVER, OYSTER BAY, AND SKUNK BAYOU WATERSHED MANAGEMENT PLAN
*Paige Felts, Volkert, Inc., paige.felts@volkert.com

CREATING A CLEAN WATER FUTURE
*Rick Frederick, Mobile Bay National Estuary Program, rfrederick@mobilebaynep.com

SWAMP - GENERATING BEHAVIOR CHANGE THROUGH EXPERIENTIAL LEARNING AND WATER QUALITY MONITORING
*Cade Kistler, Mobile Baykeeper, ckistler@mobilebaykeeper.org

BIVALVE SHELLS RECORD ANTHROPOGENIC EFFECTS ON WATER QUALITY IN GUANTANAMO BAY, CUBA
*Anika Knight, Dauphin Island Sea Lab, University of South Alabama, aknight@disl.org

SPATIAL AND TEMPORAL VARIABILITY IN PRIMARY PRODUCTION WITHIN THE MISSISSIPPI BIGHT ECOSYSTEM
*Jeffrey W Krause, Dauphin Island Sea Lab, jkrause@disl.org

ESTABLISHING COMPREHENSIVE VOLUNTEER WATER QUALITY MONITORING IN COASTAL ALABAMA
*Jason Kudulis, Mobile Bay National Estuary Program, jkudulis@mobilebaynep.com

RELATING SATELLITE (MERIS)-DERIVED ESTUARINE WATER QUALITY TIME-SERIES DATA TO WATERSHED LOADS OF NITROGEN, PHOSPHORUS, ORGANIC MATTER, AND SEDIMENTS
*John C Lehrter, University of South Alabama, jlehrter@southalabama.edu

DEVELOPMENT OF A LOW COST LAGRANGIAN STYLE DRIFTER WITH ARDUINO CONTROLLED CONDUCTIVITY, TEMPERATURE, AND POSITION SENSING AND LOGGING CAPABILITIES
*Grant R. Lockridge, Dauphin Island Sea Lab, glockridge@disl.org

SHIFTS IN NUTRIENT ALLOCATION DURING BLACK MANGROVE (*AVICENNIA GERMINANS*) ENCROACHMENT INTO SALT MARSH (*SPARTINA ALTERNIFLORA*)
*Aaron Macy, Dauphin Island Sea Lab & University of South Alabama, amacy@disl.org

RESTORING ALABAMA'S COAST - CASE STUDY ON NATURAL CHANNEL DESIGN FOR APPLIED SHEAR STRESS, 2-DIMENSIONAL MODELING, AND PROJECT IMPLEMENTATION
*William H McLemore, Goodwyn, Mills & Cawood, Inc., wmclemore@gmcnetwork.com

TRACKING PROGRESS ON COASTAL WATERSHED PLANS
*Christian L Miller, Auburn University Marine Extension and Research Center, christian@auburn.edu

SOURCES AND RELATIVE EFFECTS OF WASTEWATER ON OYSTERS (*CRASSOSTREA VIRGINICA*) IN AN URBANIZED ESTUARY
*Haley S Nicholson, University of South Alabama/Dauphin Island Sea Lab, hnicholson@disl.org

“IDENTIFICATION AND CHARACTERIZATION OF BACTERIAL GENES UTILIZED IN TRICLOSAN DEGRADATION
*Trenton K. O'Neal, University of South Alabama, tko1201@jagmail.southalabama.edu

ALABAMA HARMFUL ALGAL BLOOMS: CROSSING THE BOUNDARIES OF FRESHWATER, ESTUARINE, AND COASTAL WATERS
*Alison Robertson, Dept. Marine Sciences, University of South Alabama & the Dauphin Island Sea Lab, arobertson@disl.org

HYDROLOGIC CONDITIONS CONTROL THE SEASONAL CHANGES IN DISSOLVED ORGANIC MATTER DELIVERY TO THE LOWER PEARL RIVER ESTUARINE WATERS
*Shatrughan Singh, Department of Geosciences, Mississippi State University, Mississippi State, MS 39762., ss3339@msstate.edu

FUTURE PROJECTIONS OF COASTAL MS-AL STREAMFLOW
*Sahar Tabatabaei Sadeghi, Department of Civil, Construction and Environmental Engineering, University of Alabama, 35487 , Tuscaloosa, Alabama, stabatabaeisadeghi@crimson.ua.edu

TREE-RING RECONSTRUCTION OF PASCAGOULA RIVER STREAMFLOW
*Matthew D Therrell, University of Albama, matthew.therrell@gmail.com

THE 2015-2016 EL NINO AND COASTAL MISSISSIPPI-ALABAMA STREAM-FLOW
*Glenn A Tootle, Associate Professor, gatootle@eng.ua.edu

CONNECTING INLAND WATERS AND COASTAL ENVIRONMENTS USING SEDIMENT RECORDS FROM THE SE USA
*Matthew N Waters, Auburn University, mwaters@auburn.edu

HOW DO WIND DYNAMICS IMPACT WATER QUALITY IN THE GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE?
*Cher Griffin, Grand Bay NERR, MS Dept. of Marine Resources, cher.griffin@dmr.ms.gov

THE USE OF WEB TOOLS TO EDUCATE THE COMMUNITY ON WATER QUALITY ISSUES IN COASTAL ALABAMA.
*Laura Jackson, Mobile Baykeeper, ljackson@mobilebaykeeper.org

BENTHIC FORAMINIFERA AS POSSIBLE BIO-INDICATORS OF ENVIRONMENTAL CONDITIONS IN MOBILE BAY
*Michelle M LaBelle, University of South Alabama, mml1322@jagmail.southalabama.edu

UNDERSTANDING THE FUNCTIONAL ROLE OF SECONDARY METABOLITES IN BENTHIC DINOFLAGELLATES: TOWARDS BETTER MANAGEMENT AND MONITORING
*Alexander Leynse, University of South Alabama & the Dauphin Island Sea Lab, aleynse@disl.org

CONTROL OF DIATOM SILICA PRODUCTION AND GROWTH BY SILICIC ACID AVAILABILITY ON THE LOUISIANA SHELF
*Israel A Marquez, University of South Alabama/Dauphin Island Sea Lab, imarquez@disl.org

THE ROLE OF DIATOM FRUSTULE MORPHOLOGY ON THE FORMATION OF REVERSE WEATHERING PRODUCTS
*Rebecca A Pickering, Univ. of South Alabama, Dauphin Island Sea Lab, RPickering@disl.org

TURKEY CREEK MAKING A VISIBLE DIFFERENCE COMMUNITY WATER QUALITY PARTNERSHIP
*Troy Pierce, EPA Gulf of Mexico Program, Pierce.Troy@epa.gov

ABUNDANCE OF ANTIBIOTIC RESISTANT ENTEROCOCCI UPSTREAM AND DOWNSTREAM OF TWO WASTEWATER TREATMENT PLANTS IN MOBILE, ALABAMA
*Amy R Schwarber, University of South Alabama, ars1525@jagmail.southalabama.edu


# Climate and Hazard Resilience

# PUBLIC PERCEPTIONS OF RISK, VULNERABILITIES AND OPPORTUNITIES ASSOCIATED WITH GULF COAST URBAN FORESTS

**Author(s)**
*Arnold "Beau" M Brodbeck, Alabama Cooperative Extension System, brodbam@auburn.edu
Jason Gordon, Mississippi State University

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
By 2020, the Mississippi-Alabama Gulf Coast population is projected to increase by 75% to 1.3 million residents. This rate of urbanization impacts urban forest ecosystems which in turn influence local resilience regarding, e.g., thermal comfort, energy use, air quality, carbon storage, wildlife habitat, health benefits, property values, and commercial benefits. Urban forests also act as natural storm buffers by reducing wind speeds, improving water quality, and intercepting the flow of precipitation reaching the ground. This presentation will address research findings and outreach project outcomes related to three issues: (1) understanding public values, attitudes and concerns towards coastal urban forests; (2) describing public engagement efforts to conduct citizen-led tree inventories; and (3) using tree canopy data as a baseline for informed urban forest management and policy. To this end, we identified resident needs and concerns about urban trees and storm mitigation from key informant interviews and a mail survey across the study area. Using the survey information, we then implemented four bottom-up, volunteer-based urban tree inventories. Inventory projects included several trainings and workshops for which we gathered evaluation data. Research outcomes indicated lower than expected hazard tree concerns, increasing homeowner insurance challenges and concerns for sustainable urban tree management. Despite this, evaluations of the outreach component demonstrated a significant increase in knowledge and positive attitudes about trees, urban forest management, and level of self-efficacy regarding project participants' ability to contribute to community forest well-being. The paper concludes with implications for public participation in urban tree management along the Gulf Coast.

***Presenter Biography**
Beau Brodbeck is an Auburn Univeristy Extension forester housed on Alabama's gulf coast. He holds a Ph.D in forestry and has worked in the field of urban forestry for the past 11 years providing technical education, hurricane recovery assistance and research. Jason Gordon is an Associate Extension Professor at Mississippi State University in the field of community forestry. Jason has research interests in community forestry and participatory natural resource management.

## BUILDING RESILIENCE INTO PROTECTED COASTAL LANDSCAPES: NERRS DISASTER RESPONSE PLANNING

**Author(s)**
*Matthew Chasse, NOAA Office for Coastal Management, matt.chasse@noaa.gov

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
A retrospective view of federal, state, and local responses to the 2010 Deepwater Horizon oil spill showed the need for a more coordinated disaster planning effort among the National Estuarine Research Reserve System (NERRS). Identified by NOAA's Damage Assessment Remediation and Restoration Program as a NOAA trust resource, the five Gulf Reserves protect more than 400,000 acres of vulnerable coastal habitats for research and education. Recognizing that historical events provide a valuable set of experiences that can guide future disaster responses, NOAA supported a pilot disaster response planning effort at the Gulf NERRs. This presentation will review how this effort evolved from response planning for a range of hazards to research on impacts of hazards on natural systems. It will show how these disaster response plans were designed, developed and implemented to help a reserve improve their coordination and integration with the local emergency management community. Each plan ensures that emergency responders and managers have a clear understanding of a reserve's critical infrastructure and important natural resources in the event of a disaster. Exercising plans provide opportunities to bring together scientists and emergency managers in collaborations that research the impacts of disasters on coastal ecosystems and green infrastructure. Looking toward the future, this effort also created a planning template to serve as a model for the entire reserve system and comparable trust resources.

***Presenter Biography**
Matt works with NOAA's Office for Coastal Management supporting the National Estuarine Research Reserve System and has more than 20 years of experience natural resource and water quality issues in government and the private sector. He has a Masters in Environmental Science and Policy from Johns Hopkins University

# EVALUATING WETLAND LOSS AS A FUNCTION OF RELATIVE SEA-LEVEL RISE, BIOLOGICAL, HYDROLOGICAL, AND GEOMORPHIC CHARACTERISTICS FOR THE NORTHERN GULF OF MEXICO USING BAYESIAN INFERENCE

**Author(s)**
*Tyler T Hardy, University of Southern Mississippi, tyler.t.hardy@usm.edu
Wei Wu, University of Southern Mississippi

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
The coastal wetlands in the Northern Gulf of Mexico (NGOM) account for 40% of coastal wetland area in the United States and provide various ecosystem services to the area. Increasing rates of relative sea-level rise (RSLR), and reduced sediment input have increased coastal wetland loss in the NGOM, accounting for 80% of coastal wetland loss in the nation. Traditional models for predicting the impact of RSLR on coastal wetlands in the NGOM have focused on coastal erosion due to solely geomorphic characteristics, and/or at small spatial extents. We developed a model that used Bayesian inference to make probabilistic prediction on wetland loss over the entire NGOM as a function of RSLR, sediment input, and vegetative organic accumulation. Sediment input was approximated using stream discharge and watershed area, and vegetative organic accumulation was approximated using remotely sensed vegetative indices. We found a significantly negative relation between wetland loss and both vegetative organic accumulation and sediment input, indicating both allochthonous sediment input and in-situ vegetation productivity contribute to wetland resilience to RSLR. There showed an 11% increase in the probability of high wetland loss category under high RSLR scenarios. In light of increasing SLR, our model offers a method for natural resource managers to develop wetland restoration and management plans tailored specifically to the hydrologic, biologic, and geomorphic conditions of their target sites.

***Presenter Biography**
Tyler Hardy is a M.S. student at University of Southern Mississippi's Gulf Coast research lab, and research assistant in the Landscape Ecology Lab. His undergraduate research focused mostly on landscape ecology in northeastern forests and its application in wildlife management plans.

## THE GULF COAST RESTORATION INITIATIVE: TRAINING AND MENTORING THE NEXT GENERATION OF CONSERVATIONIST

**Author(s)**
*John M Hosey, The Corps Network Gulf Coast Region, jhosey@corpsnetwork.org

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
PRESENTATION SUMMARY: Funded by the Walton Family Foundation and operated by The Corps Network, the Gulf Coast Restoration Initiative (GCRI) was established in 2013 with the goal of creating and expanding Service and Conservation Corps programs in all five Gulf Coast States. This presentation will share the challenges and successes of this Initiative.

ABSTRACT: On a regional level, coastal habitat restoration has not always had funding that could provide predictable and long-term employment for a broad spectrum of the community. Environmental restoration jobs have generally been professional in nature, falling into the fields of engineering, science, academia, and government. Construction-related jobs in environmental restoration are typically sporadic and depend upon the availability of project funding. However, the wide variety of habitat needs in the Gulf means that restoration projects can require a wide range of skills, creating positions for machinists, welders, surveyors, and a variety of laborers, scientists, and project managers. Settlements from the 2010 Deepwater Horizon oil spill have made billions of dollars available to the Gulf Coast states to implement natural resource restoration projects. This level of investment means that there is a predictable, long-term source of funding that will produce a heavy demand for local labor skilled in a broad array of restoration techniques, including but not limited to: sediment dredging, reef building, shoreline stabilization, hydrology restoration, and land management practices. Labor needs for these projects will vary based on the size and complexity of individual projects. This presentation will demonstrate how a strong network of Service and Conservation Corps across the Gulf would help address the region's environmental, economic and employment issues. Corps would work with communities and land/water management agencies to identify and complete service projects designed to address environmental degradation. Numerous Corps across the country have for many years been involved in stream restoration, bank stabilization, marsh creation, water quality monitoring, fish re-population, invasive species removal and other activities associated with coastal and aquatic habitat restoration. New Corps programs throughout Gulf Coast communities could easily perform similar projects. In exchange for their service, young people and veterans enrolled in Corps would each receive a stipend or living allowance, and potentially also receive scholarship money. Participation in the service projects would provide the Corpsmembers with hands-on experience in environmental restoration techniques as well as the chance to earn professional credentials certifying their proficiency in various techniques. Service projects also give Corpsmembers the opportunity to learn from and work alongside environmental restoration professionals. Upon completing their term of service, Corpsmembers would have the skills, knowledge, credentials and professional connections to be competitive in the growing ecosystem restoration industry. In particular this presentation will share findings/data collected during

the creation of two new conservation Corps in 2014/15 located in Gulfport, Mississippi and Apalachicola, Florida. The presentation will share best practices learned from developing partnerships with local, state and federal government agencies and NGOs. At the completion of this pilot project, the locally-hired Conservation Corps crews had successfully collected baseline coastal stream and ecological data to support The Nature Conservancy's Coastal Streams and Habitat Restoration and Management Initiative. In the process of collecting data, Corpsmembers learned about the environment and gained valuable work experience for potential future employment in the growing restoration economy. Corps can promote community resilience, enrich the local economy and help protect our fragile coastal ecosystems.

***Presenter Biography**

John Hosey is the Director for The Corps Network's Gulf Region Conservation Corps Projects. Since 2013. He has worked with local, state and federal organizations and agencies in the Gulf Region to establish and strengthen local conservation corps. Before coming to TCN, John has served in several non-profit organization in Mississippi addressing community resilience issues and disaster response.

## FUTURE OF WIRELESS EMERGENCY ALERTS AND WARNINGS – A CASE STUDY OF THE MISSISSIPPI GULF COAST RESIDENTS AND FIRST RESPONDERS

**Author(s)**
*Bandana Kar, University of Southern Mississippi, bandana.kar@usm.edu
David M. Cochran, University of Southern Mississippi
Joslyn Zale, University of Southern Mississippi
Xiaohui Liu, University of Southern Mississippi
Nicole Callais, University of Southern Mississippi

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
Given increasing risk and rising costs of disasters, building community resilience through public and private partnerships has been the forefront of many research and policy initiatives. The Sendai Framework for Disaster Risk Reduction 2015-2030, a recent United Nation's initiative to building resilience, has identified the need to build resilient communities, and reduce disaster risk and losses by implementing a multi-hazard approach. One component of this framework focuses on implementing a people-centered early warning system for risk communication. While significant advances have been made in warning systems, increasing public response to alerts and warnings still remains a challenge from the perspective of the public response subsystem (PRS). In this Department of Homeland Security funded project, the effectiveness of PRS was examined in terms of: (i) warning message content and style, message source, and message delivery technologies; and (ii) social and psychological characteristics of the public in the three counties of the Mississippi Gulf Coast. A number of findings of this study have already been used by the Federal Communications Commission for policy changes, including: (i) resident trust and reliance upon alert and warnings received from conventional technologies, (ii) public preference towards social media, especially to communicate with families and friends, (iii) the issue of language in warning messages and the need to acknowledge non-English speakers as recipients of the messages, (iv) the need for lengthening warning messages to make them more useful to the public.

***Presenter Biography**
Dr. Bandana Kar is an Associate Professor in the Department of Geography and Geology at USM. Her research interests focus on advancing the concepts of Geographic Information Science and applying them to study the interaction of social and physical environments.

# ASSESSING SEDIMENT SOURCE USING FORAMINIFERA OF THE 2015 TROPICAL CYCLONE PAM FROM VANUATU

**Author(s)**
*Thomas J. Kosciuch, University of Southern Mississippi, thomas.kosciuch@usm.edu
Jessica E. Pilarczyk, University of Southern Mississippi
Hermann M. Fritz, Georgia Institute of Technology
Isabel Hong, Rutgers University
Alan Rarai, Vanuatu Geological Survey

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
South Pacific islands are susceptible to inundation by tropical cyclones. Tropical Cyclone (TC) Pam (Cat. 5) made landfall on Vanuatu in March 2015, with storm surge and wave contributions extended up to 7 meters above sea level (m.s.l.). Historical accounts of events are fragmentary and temporally limited. Geologic studies conducted in low-energy coastal settings provide an opportunity to expand and resolve the storm record. In this study we document the largest known TC in Vanuatu which that serves as an important modern analogue for future paleotempestological investigations. We examined the foraminiferal assemblages contained within TC Pam sediments at a mixed-carbonate embayment, and a volcaniclastic beach. The TC Pam sediments were up to 45 cm which could be discriminated from underlying units by a sharp contact, decrease in organic matter, and increase in foraminiferal concentrations. At both sites, the assemblage was dominated by intertidal and subtidal species such as *Amphistegina spp.* (11 to 37%), *Baculogypsina sphaerulata* (9 to 50%), *Calcarina mayori* (11 to 29%), and *Pararotalia spp.* (8 to 46%). The assemblage is characterized by individuals that were unaltered (0 to 30%) and abraded (52 to 97%). Provenance was assessed by employing cluster analysis to compare surface foraminiferal distributions from an undisturbed bay to those from TC Pam sediments. Within the bay, cluster analysis identified the: beach, mangroves, intertidal, subtidal, lagoon (proximal and distal) environments. Discrete intervals sampled from TC Pam sediments were individually clustered with the surface samples and revealed a supratidal to subtidal (1.0 to -4.9 m.s.l.) source.

***Presenter Biography**
Thomas Kosciuch has previously worked as a front-end developer for a Canadian Exxon subsidiary and a consultant for an environmental engineering firm. In 2015 Thomas left the corporate world to help resolve storms and tsunami chronologies, and ultimately mitigate the impact of storms and tsunamis in the future.

## CLIMATE CHANGE IN THE GULF OF MEXICO: A TEACHER WORKSHOP TO PROMOTE CLIMATE LITERACY.

**Author(s)**
*Jennifer Latour, Dauphin Island Sea Lab, Discovery Hall Programs, jlatour@disl.org
Tina Miller-Way, Dauphin Island Sea Lab,Discovery Hall Programs
Jenny Cook, Dauphin Island Sea Lab, Discovery Hall Programs

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
In order to increase resilience, community members must be aware of and understand the challenges they face. Many of these current challenges are related to climate and climate change. Thus, climate literacy should be an integral part of resiliency efforts. With this need in mind and the recognition that recent K-12 science standards are explicitly including climate change topics, Discovery Hall Programs has developed a workshop for formal and informal educators titled “Climate Change in the Gulf of Mexico”. With support from the Mississippi-Alabama Sea Grant Consortium, this workshop offers educators a variety of experiences, tools, lessons and resources for their classrooms or teaching environments. One of the key purposes of the workshop is to foster the confidence that teachers have when teaching about climate change concepts. In 2016, 18 teachers from Alabama, Mississippi, Louisiana, Tennessee, Missouri, Massachusetts, New York and Arizona participated in this 3.5 day workshop. Grades taught ranged from K-2 to high school and the group included 2 informal educators. Through hands-on activities, scientist led presentations, and a research vessel trip, the workshop addressed climate vs weather, greenhouse effect, albedo, ocean acidification, sea level rise, changes in species distributions, paleoclimatology, and hurricanes and storm surge and tools such as sensors, GPS, the ocean observing system and computer modeling. Pre and post-testing indicated significant gains in content knowledge. Workshop evaluations indicated that participants felt almost all activities were very valuable/valuable.

***Presenter Biography**
Jennifer Latour is going into her 4th year as a Marine Educator in the Discovery Hall Program at the Dauphin Island Sea Lab. Prior to this she was the Education Coordinator at the Tennessee Aquarium.

## THE ALABAMA COASTAL MARINE GIS PUBLIC VIEWER

**Author(s)**
*Charlene M. LeBleu, Auburn University Landscape Architecture, leblecm@auburn.edu
Rebecca Retzlaff, Auburn University Community Planning
Joshua Cameron, Auburn Univerity GIS Technician

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
Coastal Marine Planning (CMP) is a comprehensive, adaptive, ecosystem-based planning process that analyzes current and anticipated uses of coastal areas to reduce environmental impacts and conflicts among users. The Alabama Coastal Marine GIS Public Viewer allows technical and non-technical users to visualize, question, analyze, and interpret data to understand relationships, patterns, trends and conflicts along the Alabama coast. The viewer was developed using existing geographic information datasets concerning the Mobile Bay area as well as ongoing consultations from stakeholders. Data collected principally by the Geological Survey of Alabama (GSA) and the Mobile Bay Estuary Program (MBNEP) were modified to suit the web mapping environment and loaded directly into an ESRI ArcGIS Online web application service. Users who follow the URL are presented with a number of layers concerning Mobile Bay and the surrounding areas ranging from man-made features such as oil and gas pipelines to natural features such as oyster reefs. This study evaluated the use of an Internet-based public participation geographic information system (PPGIS). Specific research objectives were to examine the Alabama coastal marine planning data set, identify key data layers, and reformat these data layers into an easy to use GIS viewer tool for public use. Stakeholder feedback was used to assess the methodological strengths and weakness of the PPGIS approach. The results of this research increased public awareness of Alabama coastal marine planning by using a GIS public viewer to show relationships, patterns, trends and conflicts along the Alabama coast.

***Presenter Biography**
Charlene M. LeBleu, FASLA, AICP is an Associate Professor and Chair of Landscape Architecture program at Auburn University, Alabama. Charlene is a member of the American Institute of Certified Planners, and a Fellow of the American Society of Landscape Architects.

# HELPING COASTAL STAKEHOLDERS SELECT AND USE CLIMATE CHANGE TOOLS/MODELS: INTRODUCING AN ONLINE DECISION SUPPORT TREE FOR THE GULF OF MEXICO

**Author(s)**
*Christina Mohrman, Northern Gulf of Mexico Sentinel Site Cooperative, cmohrman@disl.org
Renee Collini, Northern Gulf of Mexico Sentinel Site Cooperative
Decision Support Tree Project Team

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
The Northern Gulf of Mexico Sentinel Site Cooperative, Gulf of Mexico Alliance Resilience Team, and Gulf of Mexico Climate Community of Practice have partnered to develop an online, interactive decision-support tree for selecting climate change tools and models. Stakeholders (e.g. local and regional governments, planners, and communities) can have difficulty finding the best climate model or tool when tackling coastal issues related to climate change. They can also be overwhelmed by the large number of climate-related tools and models available. Coastal stakeholders have identified guidance in tool selection as a critical need to incorporate climate change science into decision making, community planning, resource management, and conservation. This project will leverage existing materials and data to characterize coastal issues that can be informed by climate change tools and models. Once completed, the decision support tree will provide a “one stop” website where stakeholders can walk through a series of questions that will help users identify the best climate tool for their needs. Background on the project and contributing data, methods for completing the project, and conceptual function of the tree will be presented.

***Presenter Biography**
Christina Mohrman is Project Coordinator for the Northern Gulf of Mexico Sentinel Site Cooperative. Ms. Mohrman has over 10 years experience bringing stakeholders and resources together and is looking forward to kicking off this project.

## NFIP AND CRS: MAXIMIZING COMMUNITY OUTREACH POINTS THROUGH THE FORMATION OF A PROGRAM FOR PUBLIC INFORMATION

**Author(s)**
*Niki L Pace, Louisiana Sea Grant Law & Policy Program, nlpace@lsu.edu
Melissa Daigle, Louisiana Sea Grant Law & Policy Program
Tracie Sempier, Mississippi-Alabama Sea Grant Consortium
Wesley Shaw, Blue Urchin/Stormsmart
Stephen Deal, Mississippi-Alabama Sea Grant

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
Changes to the National Flood Insurance Program resulting from the Biggert-Waters Act 2012, the Homeowners Flood Insurance Affordability Act 2014, and the 2013 Community Rating System (CRS) Coordinator's Manual have altered the landscape for communities in the CRS program. In particular, under the 2013 Manual, communities may no longer receive the same number of points for current activities, causing some communities to drop a class (which would raise flood insurance premiums across the community and cost residents money). However, the Manual also creates new opportunities for communities to gain CRS points through new mechanisms like the Program of Public Information (PPI). A PPI refers to a committee-based localized approach to community outreach under the CRS. Communities that conduct their CRS outreach activities through the coordination of a PPI stand to gain more points than they would for conducting the same outreach as a standalone activity. A PPI planning committee becomes a value-added mechanism for maximizing a community's CRS score. In 2014, MS-AL Sea Grant, Louisiana Sea Grant, and BlueUrchin received funding from the EPA Gulf of Mexico Program to work with communities in Mississippi and Louisiana as they developed PPIs. This presentation will discuss best practices and lessons learned, including the benefits to working with attorneys and outreach specialist in drafting a PPI and in preparing the products and messages used for outreach. There are still many questions in regards to PPIs and this presentation will examine what questions have come up and how we have addressed them.

***Presenter Biography**
Niki Pace is an attorney and certified floodplain manager with the Louisiana Sea Grant Law & Policy Program where she works with coastal communities on issues of long-term sustainability and resilience to natural and man-made challenges. Prior to joining Louisiana Sea Grant, Pace spent 7 years with the Mississippi-Alabama Sea Grant Legal Program.

# FLOOD AND WIND MITIGATION CHALLENGES AND PROGRESS

Author(s)
*David Perkes, Mississippi State University, dperkes@gccds.msstate.edu
Kelsey Johnson, Mississippi State University

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
The long term resilience of households and communities along the Gulf Coast is shaped by two locational factors: 1) all the communities are in a high wind zone and 2) 23% of the community's residents (approximately 56,000 households) are in a special hazard flood zone. The combination of these two factors puts a high performance demand on the houses and a high economic burden on the residents. When asked, residents predictably respond that their biggest economic concern is the cost of insurance and the uncertainty of rising insurance costs. The 2012 Biggert Waters Act put in motion the eventual removal of subsidies for flood insurance. Even though subsequent legislation slowed down the rise of flood insurance cost, uncertainty and worry that houses will lose their resale value remains a great concern. The Gulf Coast Community Design Studio is working to quantify the wind and flood mitigation needs for the Mississippi Gulf Coast. We recently completed research of all of the mitigation programs in the region since Katrina, which supports two conclusions: first, with the success of the Fortified Home Program, wind mitigation is heading in a positive direction and is on track to be market driven; second, flood mitigation remains an overwhelming challenge. We are in the process of mapping all of the Special Hazard Flood Zones and looking at the social and economic vulnerability of households to show the location and number of houses that don't meet the flood plain requirements. The proposed presentation will explain these research findings.

***Presenter Biography**
David Perkes is a licensed architect, professor of Mississippi State University, and the founding director of the Gulf Coast Community Design Studio. His education includes BS in Civil and Environmental Engineering from Utah State University, Master of Architecture from the University of Utah, Master of Environmental Design from Yale University and Loeb Fellowship from Harvard University.

## THE COMMUNITY RATING SYSTEM, NFIP PARTICIPATION, AND FLOOD DAMAGE CLAIMS

**Author(s)**
*Daniel R Petrolia, Mississippi State University, d.petrolia@msstate.edu
Eugene Frimpong, East Carolina University
John Cartwright, Mississippi State University

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
The Community Rating System (CRS) was introduced to encourage community-level flood mitigation and increase household-level National Flood Insurance Program (NFIP) participation. It is not clear, however, if and to what extent community participation in the CRS increases household participation in the NFIP and decreases damage claims payments. Using time-series data for the states of Alabama and Mississippi, we employ matching methods and then estimate panel fixed- and random-effects regression models, controling for key geospatial, socioeconomic, and time effects, to isolate the CRS treatment effect on these outcomes. Results show a positive and significant effect of CRS participation (versus non-participation) on NFIP participation, but no significant effect on damage claims payments. We also analyze the effect of individual CRS mitigation activities on outcomes among CRS-participating communities. In this case, results indicate that outreach (c330) and flood data maintenance (c440) activities have a positive and significant effect on NFIP participation whereas floodplain mapping (c410) and flood protection (c530) activities have a negative effect. Flood protection information (c350) and storm water management (c450) activities are found to have a negative effect on damage claims payments, whereas floodplain management planning (c510) and acquisition and relocation (c520) activities have a positive effect.

***Presenter Biography**
Dan is an associate professor at Mississippi State University, whose research focuses on the economics of coastal resources. Dan splits his time between the MSU building at Stennis Space Center and the agricultural economics department on the main campus.

## THE PORTS RESILIENCE INDEX: IMPROVING RESILIENCE AT THE LAND-SEA INTERFACE

**Author(s)**
*Tracie Sempier, Mississippi-Alabama Sea Grant Consortium, tracie.sempier@usm.edu
Melissa Daigle, Louisiana Sea Grant Law and Policy Program
Lauren Land, Louisiana State University
Niki Pace, Louisiana Sea Grant Law and Policy Program

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
Coastal and inland ports are located at the intersection of land and sea, providing a connection between users of both. Due to their location, they are at risk to natural coastal hazards, waterway hazards, organizational challenges, and technological interruptions. Since U.S. ports handle 2 billion tons of imports and exports annually, natural hazard vulnerability threatens the national economy. No specific federal requirements exist for natural disaster planning at ports. However, Gulf of Mexico ports devote time and resources to security planning and existing disaster preparedness plans. Understanding assets and capabilities of our ports prior to a disaster will help port management increase efficiency of disaster response and recovery, thereby increasing resilience. In 2013, the Gulf of Mexico Alliance in collaboration with the Mississippi-Alabama Sea Grant Consortium received a grant from NOAA to extend the successful Coastal Community Resilience Index model to several industry-specific sectors, including ports and harbors. Louisiana Sea Grant coordinated the development of the Ports Resilience Index; a simple and inexpensive self-assessment that port and marine transportation leaders can use to predict their ability to reach and maintain an acceptable level of functionality during and after disasters. This assessment has been pilot tested with four ports across the Gulf, helping these ports to identify strengths and weaknesses in their operations and identify action items to enhance their resilience. This presentation will focus on the process for creating the tool, the case studies developed as part of the pilot, and the plans for future implementation at additional Gulf ports.

***Presenter Biography**
Tracie Sempier is the Coastal Storms Outreach Coordinator for the Mississippi-Alabama Sea Grant Consortium and the Regional Program Manager for the Gulf of Mexico Alliance. In this capacity she works with local communities, state and federal agencies, non-profit organizations, port authorities, emergency and floodplain managers, residents, and other audiences to try and decrease the negative impacts of coastal storms on families, communities, the environment, natural resources, and property.

## DEVELOPING A DECADAL SCALE SEDIMENT BUDGET: QUANTIFYING VERTICAL FLUXES CONTRIBUTING TO THE EVOLUTION OF A MARSH PLATFORM

**Author(s)**
*Christopher G Smith, U.S. Geological Survey, cgsmith@usgs.gov
Marci Marot, US Geological Survey
Terrence McCloskey, US Geological Survey
Christian Haller, US Geological Survey
Nicole Khan, US Geological Survey
Stanley Locker, US Geological Survey
Lisa Osterman, US Geological Survey
Kathryn Smith, US Geological Survey

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
Marshes accrete through distinct processes of organic production and sediment accumulation. Feedbacks between the two processes can create large variability in vertical accretion at daily to annual time scales. As such, short-term and/or limited-duration measurements do not adequately address marsh response to long-term-sustained pressures such as sea-level change. An often complimentary approach is to examine vertical accretion and sediment accumulation at time scales that average across this high-frequency noise. Over the last three years, United States Geological Survey (USGS) scientists have been collecting data to develop a sediment budget for the marsh-estuarine system along Grand Bay (GB), Alabama/Mississippi. A portion of this study focuses on environmental change preserved in the marsh platform sediments. These data complement efforts by GB National Estuarine Research Reserve scientists and National Wildlife Refuge managers to monitor sedimentation and productivity. Chronological data from eight cores collected across the GB region suggest a young transgressive marsh platform. From 1950 to 2000, Decadal-scale accumulation rates determined using lead-210 and cesium-137 isotopes were 500-650 g/m$^2$/y, comparable to carbon-14-based accumulation rates averaged over the last ca. 800 years (300-500 g/m$^2$/y). Since approximately 2000, accumulation rates have nearly doubled to greater than 1000 g/m$^2$/y. Increased accumulation during this period coincides with decreased organic matter content, suggesting enhanced inorganic flux, which is most likely linked to one-or-more tropical storms that passed over the region over the last 15-20 years. Marsh accumulation rates will be integrated with other geophysical, geospatial, and geological data collected around GBNERR to constrain the marsh-estuarine sediment budget.

***Presenter Biography**
Christopher G. Smith has been a research geologist with the U.S. Geological Survey since 2008, where he focuses on coastal groundwater hydrology and fine-grained sediment dynamics in wetlands and estuaries.

# INCORPORATING CLIMATE AND HAZARD RESILIENCE INTO THE MARINE EDUCATION TOOLKIT FOR ACHIEVING SUSTAINABLE COMMUNITY GROWTH

**Author(s)**
*Christopher T. Snyder, The University of Southern Mississippi, Gulf Coast Research Laboratory, Marine Education Center, christopher.snyder@usm.edu
Jessica Kastler, The University of Southern Mississippi, Gulf Coast Research Laboratory, Marine Education Center
Samual Clardy, he University of Southern Mississippi, Gulf Coast Research Laboratory, Marine Education Center

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
In order for coastal communities to effectively address the mounting array of challenges that face their efforts to achieve sustainability through community resilience, their populations must first understand the nature of these challenges and both the natural and the man-made causes that led to them. The University of Southern Mississippi, Gulf Coast Research Laboratory's, Marine Education Center provides an array of educational programs and platforms designed to to enlighten the citizenry to produce a cadre of well informed and knowledgeable stewards of our coastal ecosystems. Strategy: Through these programs we translate the relevance of coastal sciences research to the public by conducting meaningful and successful programs with highly qualified faculty, staff, and students. Many of these programs are centered on one of the four Mississippi-Alabama Sea Grant Consortium focus areas. They are designed to the provide science-based information to help community members be better stewards of the Gulf of Mexico. This presentation will outline specific educational efforts and tools designed to meet these educational goals and advance our communities understanding of these issues and provide them with the tools they need to effectively overcome these challenges. Included in the description of programs and tools will be a discussion of the new Marine Education Center. Its buildings will be important educational tools - appropriate to the landscape, storm-resistant, and built with environmentally sustainable materials and systems, while serving as an example of how to employ sustainable, green coastal building techniques in harmony with the coastal environment.

***Presenter Biography**
Responsible for the administration and daily operations of the Gulf Coast Research Laboratory's Marine Education Center. Responsible for the collaboration with the Mobile County Environmental Studies Center and the Dauphin Island Sea Lab to provide the education component for MASGC.

## SOCIAL SCIENCE INFORMED RISK COMMUNICATION: TIPS AND TECHNIQUES FOR COMMUNICATING RISK TO FOSTER CLIMATE AND HAZARD RESILIENCE

**Author(s)**
*Heidi Stiller, NOAA Office for Coastal Management, heidi.stiller@noaa.gov

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
Effective communication that raises awareness and fosters action is essential if communities are to successfully build resilience to hurricanes, coastal flooding, and sea level rise. Social science provides insights into how to understand and connect with diverse audiences on the topic of inundation risk, and existing community-level efforts have included a variety of innovative communication techniques and approaches. This presentation will share social science findings related to what works and what does not work for communicating risk in a way that fosters personal and community action. A series of social science-informed best practices will be outlined, as well as examples from community-level engagement and communication efforts. Attendees will come away with communication practices and approaches that they can apply with diverse audiences impacted by climate and hazard risks. Attendees will also be exposed to how social science findings and tools can be used to inform and improve the effectiveness of communication.

***Presenter Biography**
With a background in public policy, coastal management, and sociology, Ms. Stiller has been with NOAA's Office for Coastal Management since 2001, and focused on the Gulf of Mexico region since 2006. One focus of her work is helping communities understand, address, and communicate coastal inundation risks.

## RESILIENCE TOOLS AND SERVICES GAP ANALYSIS

**Author(s)**
*LaDon Swann, Mississippi-Alabama Sea Grant Consortium, swanndl@auburn.edu
Tracie Sempier, Mississippi-Alabama Sea Grant Consortium
Chris Ellis, MASGC

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
The Gulf of Mexico Alliance, the Mississippi-Alabama Sea Grant Consortium and NOAA's Office of Coastal Management are conducting a gap analysis of resilience tools and services used in the Gulf of Mexico Region. The gap analysis is one objective in a larger project funded by a NOAA Regional Coastal Resilience Grant, entitled: A systematic and integrated approach to creating more resilient communities in the Gulf of Mexico Region. Data to inform the gap analysis were collected by means of an online survey and follow-up interviews. The survey was disseminated broadly through partner listservs in an attempt to gather data from a variety of audiences who utilize resilience tools (i.e. local municipalities, natural resource managers, floodplain managers, city planners, practitioners, consultants). Interviewees indicated in the survey they were willing to be contacted with additional questions to help clarify and refine the findings from the assessment. The results of the gap analysis will be used to guide federal and state agencies, businesses and non-governmental organizations on how to improve the resilience tools and services each entity provides to communities. Equally important will be understanding how and when a specific tool can be used through an integrated approach to increase coastal resilience. A gap analysis is a tool frequently used by businesses to identify gaps between actual performance and desired performance. This project defines current performance as status quo and desired performance as the systematic use of an array of tools and services used by communities to increase resilience in the built, natural, economic and human domains.

***Presenter Biography**
LaDon Swann is the director of the Mississippi-Alabama Sea Grant Consortium and the director of Marine Programs at Auburn University. LaDon has spent the last 16 years helping coastal communities become more resilient.

## THE VALUE OF OPEN SPACE AS WATERFRONT USE: COMMUNITY STAKEHOLDERS' PERSPECTIVES

**Author(s)**
*Joan M. Wesley, Jackson State University, joan.m.wesley@jsums.edu
Jason Gordon, Mississippi State University
Robert Grala, Mississippi State University
Samanth Islam, University of South Alabama

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
The use of open space remains a topic of interest to Mississippi and Alabama residents living along the Gulf Coast. Decisions surrounding the development and utilization of these spaces ideally engages substantive input from residents who are most heavily impacted by developmental issues. The choice may become one between economic, market-driven development versus non market values. Our research highlights the perspectives of community stakeholders' attitudes and values about open space as waterfront usage. Data were collected from a series of focus groups conducted over a two-year period. Through a series of open ended questions, participants shared their attitudes and values about open space as waterfront usage. Focus group participants represented a wide array of stakeholders living in select Mississippi and Alabama Gulf Coast counties. They included elected officials, businesspersons, wildlife professionals, local fishermen, and community residents. Outcomes reflect diverse interests and concerns surrounding the use of open space: wetlands protection, new development, historic preservation, and overall desire to safeguard the unique and natural qualities of Gulf Coast communities. Overall, focus group participants expressed overwhelming support for the concurrency of economic growth and commercial development alongside the protection of open and public spaces that sustain the authentic assets of their coastal communities. The qualitative data collected from the focus groups will help inform decisions surrounding the value of open space and waterfront use.

***Presenter Biography**
Joan Wesley is Associate Professor in Urban and Regional Planning at Jackson State University. Her work emphasizes the intersection of community empowerment and environmental and social justice to promote healthy, resilient and sustainable communities.

## DEVELOPING A HYBRID MODEL TO PREDICT THE IMPACT OF SEA-LEVEL RISE ON COASTAL WETLANDS

**Author(s)**
*Wei Wu, The University of Southern Mississippi, wei.wu@usm.edu
Matthew Bethel, Louisiana Sea Grant
Patrick Biber, The University of Southern Mississippi

**Session**
Climate and Hazard Resilience

**Presentation**
Oral presentation

**Abstract**
Stability of coastal wetlands platform relies on balance between inputs due to allochthonous matter deposition and in situ vegetation production versus removal through erosion and organic matter decomposition. When allochthonous sediment is limited as in the Grand Bay National Estuarine Research Reserve (Grand Bay NERR), Mississippi, vegetation production plays a key role in maintaining coastal wetlands. We developed a hybrid model to predict the impact of sea-level rise (SLR) on landscape change of coastal wetlands and applied it to the Grand Bay NERR. The hybrid model integrates a mechanistic model which simulates biophysical processes for elevation change and a statistical model which estimates the probability of coastal wetlands converting to open water. The mechanistic submodel is based on the Marsh Equilibrium Model, and the statistical submodel is based on a logistic regression model. The results showed the model simulated wetland change over 20 years well, both in location and number of change, with an adjusted kappa statistic of 0.53. In addition, the feedback between inundation frequency and vegetation production increased resilience of coastal wetlands to SLR. The model predicted ~950 ha (43%) loss of coastal wetlands at the Grand Bay NERR under 72 cm rise in sea level by 2100, a scenario with 1% of increase of sea level rise rate each year. Without the feedback accounted for, the model predicted a larger loss of ~ 1170 ha and 53%. This hybrid model presents a useful tool for evaluating coastal wetlands' vulnerability and helping prioritize restoration efforts under climate change.

***Presenter Biography**
Wei Wu, Associate Professor at the University of Southern Mississippi, focuses on quantitatively modeling real and complex ecosystems in spatio-temporal scales, using interdisciplinary and systematic approaches. Her research interests have centered on ecological resilience through understanding species' and diverse ecosystems' response to environmental change.

## QUANTIFYING VEGETATION AND SOIL DYNAMICS OF SELECTED COASTAL HABITAT TYPES WITHIN THE GRAND BAY NERR

**Author(s)**
*Michael Archer, Grand Bay National Estuarine Research Reserve, michael.archer@dmr.ms.gov
Will Underwood, Alabama Department of Conservation and Natural Resources
Jonathan Pitchford, Grand Bay National Estuarine Research Reserve

**Session**
Climate and Hazard Resilience

**Presentation**
Poster presentation

**Abstract**
Marsh resiliency is unknown when faced with the prospect of sea-level rise. Coastal marshes provide economic and ecological functions that will be lost if marshes are unable to maintain elevation relative to sea-level rise or migrate into upslope habitats. Mechanistic models, such as the Marsh Equilibrium Model (MEM) developed by Dr. Jim Morris, can be used to forecast marsh response to sea-level rise. Above- and belowground biomass was measured at 52 vegetation plots predominantly in stands of *Juncus roemarianus* and *Spartina alterniflora* along a coastal transition transect during peak growing season in 2015 at the Grand Bay National Estuarine Research Reserve (GBNERR). Peak biomass, root and rhizome to shoot ratio and maximum (95%) root depth data will be used to fill gaps and confirm predictions of the MEM developed for GBNERR. Light attenuation readings were taken at each plot using an AccuPar LP-80 Ceptometer at maximum, mid- and ground-level vegetation height and compared to biomass data to determine if a non-destructive way to estimate biomass data is available. Results from this project will be used to update forecasts of marsh resilience at GBNERR based on changing sea-level rise data, which will help inform future land management practices such as the frequency of prescribed burns to promote upland marsh migration.

***Presenter Biography**
Michael Archer is a coastal ecologist at Grand Bay National Estuarine Research Reserve. He previously worked as a hedge fund accountant in New York City before coming to his senses and leaving the cubicle to pursue his interests in estuarine ecology and marsh resiliency.

# ASSESSMENT OF COASTAL ELEVATION CHANGES USING UNMANNED AERIAL SYSTEMS

**Author(s)**
*Justin Blancher, University of Southern Mississippi, justin.blancher@usm.edu
Thomas J Kosciuch, University of Southern Mississippi
Haley Anderson, University of Southern Mississippi

**Session**
Climate and Hazard Resilience

**Presentation**
Poster presentation

**Abstract**
The decreasing cost and rapidly improving resolution of unmanned aerial systems (UASs) has increased accessibility of coastal monitoring. Small UASs are a means of replacing traditional surveying techniques due to their low up-front cost (< 2,500 USD), portable size (< 25 kg), low time requirement, minimal human error, improved resolution (2.6-cm/px resolution or better), and reproducible flight paths (horizontal +/-1.5 m; vertical +/- 0.5 m). Through employing UASs, time-series surveys with are easy to generate using software available on hand held devices. Flight path imagery is compiled using parallax of overlapping georeferenced photographs acquired by the UAS into digital elevation models (DEMs) which can be subtracted to elucidate the change in elevation. These techniques were tested in a study to assess the resilience of a small (0.25 km^2), anthropogenically-nourished beach in Waveland, MS after a high precipitation event. Aerial imagery was taken by two 20-minute field campaigns less than two months apart (22 June 2016, and 16 August 2016) with a DJI Inspire 1. The imagery was analyzed using the Pix4D software to generate a DEM for each flight. These were compared against one another to produce a net change in sediment availability over the study period. The quantification of sediment change in Waveland, MS within this study emphasizes the ease of integration of UAS systems in place of traditional surveying methodologies, in addition to unconventional applications which reap the benefits of the improved resolution.

***Presenter Biography**
Justin Blancher is a master's student at the University of Southern Mississippi, Division of Marine Science. His research focuses on the use of unmanned aerial systems in an oceanographic setting.

## NORTHERN GULF OF MEXICO SENTINEL SITE COOPERATIVE: SUCCESSFUL CONTINUATION OF A GULF COAST PARTNERSHIP

**Author(s)**
*Casey Fulford, Northern Gulf of Mexico Sentinel Site Cooperative, cfulford@disl.org
Renee Collini, Northern Gulf of Mexico Sentinel Site Cooperative
Marian Hanisko, David Kidwell, NOAA National Ocean Service
Tracie Sempier, Mississippi-Alabama Sea Grant Consortium/Gulf of Mexico Alliance
Heather Young, Florida Fish & Wildlife Conservation Commission
Jennifer Harper, Apalachicola National Estuarine Research Reserve
John Tirpak, Sue Wilder, U.S. Fish & Wildlife Service
Mike Osland, U.S. Geological Survey

**Session**
Climate and Hazard Resilience

**Presentation**
Poster presentation

**Abstract**
The Northern Gulf of Mexico Sentinel Site Cooperative (NGOM SSC) is a partnership of federal to state governments, non-profits, non-governmental organizations, researchers, and natural resource managers whose mission is to translate and transition sea-level rise science and inundation research into stewardship applications. Annually, the partners participate in a workshop to guide the efforts of the NGOM SSC within its broader mission. This is accomplished through a discussion of needs and gaps in sea-level rise monitoring, research, and decision-making captured within the NGOM SSC Implementation Plan. The updated list is then prioritized to determine what gaps will be the focus of the work plan for the following year. In August 2016, the partners came together to discuss the progress made on the prioritized gaps and needs of the previous year, as well as identify new priorities that the partners would like addressed in the updated work plan. In 2016, the NGOM SSC made progress on inventorying and assessing capacity of sea-level observing infrastructure and on making recommendations to decision-makers regarding sea-level rise model and tool selection. Additionally, participants suggested that the NGOM SSC build on these existing successes by prioritizing these gaps and needs: 1) facilitate strategic installation and monitoring of SETs to address current gaps, 2) recommendations for decision-makers on how to use available information, particularly models, and 3) improved outreach & communication of SLR science and issues at the local and community level. These three gaps will be the focus of the NGOM SSC 2017 work plan.

***Presenter Biography**
Casey Fulford is an intern for the NGOM SSC stationed at the Dauphin Island Sea Lab. Her project is focused on inventorying existing infrastructure for observing sea-levels in the Gulf Coast.

# NEARSHORE AND INTERTIDAL MODERN FORAMINIFER BIOFACIES ACROSS THE SALT-MARSHES OF THE EASTERN MISSISSIPPI SOUND, U.S.A.

**Author(s)**
*Christian Haller, University of South Florida – College of Marine Science, challer@mail.usf.edu
Lisa E. Osterman, USGS St. Petersburg Coastal and Marine Science Center
Terry McCloskey, USGS St. Petersburg Coastal and Marine Science Center
Christopher G. Smith, USGS St. Petersburg Coastal and Marine Science Center

**Session**
Climate and Hazard Resilience

**Presentation**
Poster presentation

**Abstract**
The surface distribution of foraminiferal assemblages in the eastern Mississippi Sound salt-marshes (Grand Bay, Pascagoula River, Fowl River, and eastern Dauphin Island) can be used to establish the relationship between modern foraminiferal assemblages and environmental variables, for use as analogs in paleoenvironmental interpretations of this barrier island and estuarine complex. A total of 38 species were identified from across the elevational gradient at 87 surface stations. Nine biofacies were defined by cluster analysis of the dead assemblages. Indicative species and abundances were found for estuarine, low, middle, and high marsh, and upland transition settings. Estuarine environments were dominated by calcareous taxa, with increasing abundances of coarse-grained agglutinated taxa such as *Ammotium salsum* and *Ammobaculites exiguus* near the marsh shoreline and in marsh channels. *Ammotium salsum* and *A. exiguus* were most abundant in the low marsh. Low marsh species tapered off in the middle marsh, which hosts the most diverse assemblages characterized by *Arenoparella mexicana*. High marsh and upland transition environments decreased in test densities and their assemblage was dominated by *Entzia macrescens*, *Haplophragmoides manilaensis*, *Pseudothurammina limnets*, and *Trochamminita irregularis*. Canonical correspondence analysis was applied to study the relationships between the biofacies and measured environmental data (differential GPS-measured elevation, sediment grain size, organic content, and salinity). This analysis supports the hypothesis that inundation frequency (elevation) is the dominant variable explaining the distribution of foraminifera. Future paleoenvironmental analyses of downcore (fossil) distributions in the Mississippi Sound area can be interpreted using this baseline dataset.

***Presenter Biography**
Christian Haller a PhD candidate in Marine Geology working with micropaleontology to solve problems. His special interest lies in reconstructing past environments, documenting sea-level rise, and developing foraminifera as paleo-tempestological proxies

# IMPACTS OF COASTAL ACIDIFICATION ON THE STRUCTURE OF LOUISIANA PHYTOPLANKTON COMMUNITIES

**Author(s)**
*Amy J Mallozzi, Louisiana State University, amallo5@lsu.edu
Reagan Errera, Louisiana State University
Sibel Bargu, Louisiana State University

**Session**
Climate and Hazard Resilience

**Presentation**
Poster presentation

**Abstract**
Ocean acidification has the potential to impact the ocean's biogeochemical cycles and food web dynamics, and phytoplankton are in the distinctive position of profoundly influencing both. Individual phytoplankton species play unique roles in energy flow and element cycling. Previous studies focus on short-term exposure of monocultures to low pH, but are insufficient in that they neglect competitive dynamics within natural phytoplankton communities. This study quantifies the responses of phytoplankton communities to acidification over an extended period through creation of large microcosms. Phytoplankton were collected from two biogeochemically distinct Louisiana estuaries, Barataria and Four League Bay. The inorganic carbon chemistry of the cultures was manipulated by bubbling with $CO_2$ enriched air corresponding to current (400 ppm) and future (1000 ppm) $pCO_2$ levels. We will present an evaluation of community changes in terms of biomass (chlorophyll a), structure (photopigment analysis), and function (CHN). The development of the communities over time was significantly different between $pCO_2$ treatments, though also varied as a function of the startup community. This is indicative that community response will be nonuniform, and that current climate change models amalgamating response by plankton functional types may not truly be representative. Changes in primary producers will resonate through the carbon cycle and up the food web, and this study identifies potential for taxonomic and functional community shifts in response to ocean acidification.

***Presenter Biography**
Amy is a second year Master's student in Louisiana State University's Department of Oceanography and Coastal Science. She is studying the effects of coastal acidification on phytoplankton and oysters.

## HABITAT PREFERENCES OF *Uca Longisignalis* ACROSS GULF COAST TIDAL MARSH VEGETATION ZONES

**Author(s)**
*Gwendolyn A Murphy, Southern Illinois University, Plant Biology, gmurphy@siu.edu
Loretta L Battaglia, Southern Illinois University

**Session**
Climate and Hazard Resilience

**Presentation**
Poster presentation

**Abstract**
Interspecific facilitation influences tidal marsh structure and function by ameliorating stress, thus playing an important role in estuarine ecosystems. Research in salt marshes dominated by the grass *Spartina alterniflora* indicates that above- and below-ground plant characteristics affect fiddler crab burrowing and in turn, crab activity enhances primary productivity by increasing soil oxygen and nutrient cycling. These crab-plant interactions have not been well-studied in microtidal Gulf Coast marshes where the *S. alterniflora* zone is narrow, the rush *Juncus roemerianus* forms the extensive brackish marsh vegetation zone, a narrow fresh marsh zone flanks the edge of the forest-marsh ecotone and salt pannes are interspersed. It is unknown how the structure of these vegetation zones affects density of crab burrows and how these features may in turn influence primary productivity, a key driver of estuarine food webs. To determine fiddler crab usage of these zones, we conducted a seasonal habitat preference study in tidal marshes in coastal Mississippi using burrow density as a proxy for crab abundance. We hypothesized that fiddler crabs would be most abundant in marsh zones with intermediate substrate hardness and vegetation density. Preliminary results indicate that crabs burrow in all four vegetation zones, but to varying degrees. Fresh marsh had the highest density of burrows as well as vegetation and soil characteristics most representative of intermediate habitat conditions, lending support for our hypothesis. Preferential fiddler crab usage of upslope habitat in our Gulf Coast site suggests that transitions to higher elevations with sea level rise may be relatively smooth.

***Presenter Biography**
Gwendolyn A Murphy is a Plant Biology graduate student at Southern Illinois University. Her research focuses on mutually facilitative interactions between Gulf coast tidal marsh plants and fiddler crabs.

## GREEN SEA TURTLE GRAZING PRESSURE IN A FLORIDA BAY

**Author(s)**
*Alex Rodriguez, Dauphin Island Sea Lab/University of South Alabama, arodriguez@disl.org
Kenneth L Heck Jr, Dauphin Island Sea Lab/University of Alabama

**Session**
Climate and Hazard Resilience

**Presentation**
Poster presentation

**Abstract**
Climate-induced habitat expansions are occurring at a rapid rate, increasing the need for assessments of climate change impacts to local ecosystems. The Gulf of Mexico is a prime location to study these habitat expansions because of the gradient from tropical to subtropical to temperate climates. As sea surface temperature warms, animals such as the green sea turtle (*Chelonia mydas*) are likely to become more abundant at the northern limits of their ranges and expand further. Green turtles of the Gulf of Mexico feed primarily on turtlegrass. Seagrasses are a vital, globally threatened ecosystem that provide numerous critical services, such as being a nursery habitat, carbon sequestration, shoreline protection, sediment stabilization, and nutrient cycling. As *C. mydas* assemblages increase in the northern limits of their range, grazing pressure on turtlegrass is also likely to increase. The overarching goal of this study is to quantify current green sea turtle grazing and estimate future effects on the turtlegrass beds of Saint Joseph Bay, Florida. The objectives are to: (1) quantify green sea turtle abundance (2) measure their consumption rates and compare them to the primary production rate of turtlegrass beds and (3) use these data to predict effects on primary productivity as turtle numbers increase. Given the likelihood for a climate-induced range expansion in coming years, it is critical that we track the changing status and deepen our understanding of these biological systems if we hope to maintain or restore resiliency.

***Presenter Biography**
Alex Rodriguez is a Master's student with the Dauphin Island Sea Lab/University of South Alabama under Dr. Ken Heck. Her graduate work looks at the ecological effects of grazing by turtles on seagrasses in St. Joseph Bay, FL.

# AN EVALUATION OF MARSH SHORELINE CHANGE USING BOTH GEOSPATIAL AND FIELD-BASED TECHNIQUES

**Author(s)**
*Joseph Terrano, University of South Florida and the U.S. Geological Survey, terranoj@mail.usf.edu
Kathryn Smith, U.S. Geological Survey
Jonathan Pitchford, Grand Bay National Estuarine Research Reserve Mississippi Department of Marine Resources
Paul Nelson, U.S. Geological Survey
Christopher Smith, U.S. Geological Survey
Stephen Bosse, U.S. Geological Survey

**Session**
Climate and Hazard Resilience

**Presentation**
Poster presentation

**Abstract**
Throughout the northern Gulf of Mexico, marsh shorelines are eroding due to wave attack, sea-level rise and subsidence. Shoreline erosion results in net marsh loss when transgression rates at the marsh-water edge exceed upland-marsh migration. Coastal marsh serves important ecologic and economic functions, such as providing habitat, absorbing floodwaters and storm surges, and coastal carbon sequestration. Therefore, the rate and processes of shoreline change are important considerations when evaluating the overall health and vulnerability of coastal marshes to future scenarios of sea-level rise, climate change, and global carbon budget. Shoreline erosion can be measured using remote sensing techniques or field-surveyed methods. Geospatial techniques have the benefit of greater spatial coverage that is relatively inexpensive, but can be hindered by mapping error, low spatial resolution, and data availability. Field-surveyed techniques have greater spatial accuracy and the potential for frequent and regular measurements, but are lacking regional coverage and availability of historic data due to the high costs and time intensive requirements. A combined approach provides sufficient data on both large- and small-scale processes impacting marsh shoreline change for a more robust analysis. This poster presents preliminary data on shoreline change for Grand Bay National Estuarine Research Reserve (GBNERR) using geospatial techniques and field-based surveys. Digitized shorelines representing multiple dates were used to gather regional, long-term shoreline change rates. Multiple field surveys provide short-term, high-resolution measurements. Calculated shoreline change rates will be used for future studies of marsh sedimentation, estuarine carbon-flux measurements, and numerical modeling.

***Presenter Biography**
Joseph Terrano received his Bachelors degree in Environmental Science and Policy from the University of South Florida, St. Petersburg and is currently working towards a masters degree in Geology at the University of South Florida, Tampa with funding and support of the U.S Geological Survey Coastal and Marine Science Center.

# SEA LEVEL RISE AND SURGE MOVEMENT THROUGH THE UNCONFINED AQUIFER IN HARRISON COUNTY MISSISSIPPI

**Author(s)**
*Chuck H Thibault, University of Memphis, cthibalt@memphis.edu

**Session**
Climate and Hazard Resilience

**Presentation**
Poster presentation

**Abstract**
The Mississippi coastline is a dynamic system undergoing modification by waves and wind, diurnal changes by tidal forces, sudden and potentially catastrophic changes by tropical systems and long term changes in relative sea level. This poster considers the impact of sea level rise, storm surge, and coastline modifications on the unconfined Harrison County surficial aquifer. The poster includes results from field and analytical data collection, boring log data, formulation of a hydrologic budget, erosion estimations, processed dem files and processed satellite data. The above results are then used to develop a conceptual site model and a generalized computer model of the coastal hydrology of Harrison County, Mississippi. The results of computer simulations are presented and estimate the timing of movement of a saline plug through the surficial aquifer.

***Presenter Biography**
Chuck Thibault is a PhD candidate at the University of Memphis. His academic interests are in coastal geomorphology and hydrology.

## ADDRESSING COASTAL BUSINESS NEEDS AND COASTAL HAZARDS: BUSINESS RESILIENCE INDICES

**Author(s)**
*Jody Thompson, AUMERC, jody.thompson@auburn.edu

**Session**
Climate and Hazard Resilience

**Presentation**
Poster presentation

**Abstract**
Coastal Alabama's fisheries and tourism businesses are vital to the state's economy and area employment. 2013 estimates show that coastal tourism in Baldwin County alone contributed 45,000 travel related jobs. Generally speaking, fisheries (commercial and charter fishing enterprises, seafood processing, and related industries) and tourism (hotels, condominiums, food service, nature-based tourism endeavors, etc.) businesses are small, locally-owned endeavors, and are vulnerable to a myriad of coastal hazards. In an attempt to address the needs of these stakeholders, serval partners, led by the Mississippi-Alabama Sea Grant Consortium, have developed individual resilience indices to address specific fisheries and tourism business needs and concerns in preparing for and responding to coastal hazards. These indices are modeled after the success Community Resilience Index, developed by MASGC and the Gulf of Mexico Alliance. Following this model, the Fisheries Resilience Index and Tourism Resilience Index provide a simple, inexpensive method for businesses to perform a self-assessment of their resilience to coastal hazards, and identify weaknesses that business may want to address prior to the next hazard event while highlighting strengths the business possesses. Designed to be a facilitated discussion, preliminary exercises have provided a positive response from participating businesses. A brief summary describing the process of developing the indicators and subsequent pilot testing will be discussed.

***Presenter Biography**
A native of Mobile, Alabama, Jody Thompson has worked in natural resources planning and extension in coastal Alabama since 1999. She provides extension and outreach on coastal resiliency and water quality issues to the communities along the Gulf Coast.

# NOAA MARINE DEBRIS SHORELINE MONITORING PROJECT EXPANSION TO THE GULF OF MEXICO MAPS OCCURRENCE AND ACCUMULATION RATES

**Author(s)**
*Caitlin Wessel, Marine Debris Program, National Oceanic and Atmospheric Administration, caitlin.wessel@noaa.gov

**Session**
Climate and Hazard Resilience

**Presentation**
Poster presentation

**Abstract**
Marine debris is any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment. Marine debris is an economic, environmental, human health and aesthetic problem posing a complex challenge. Coastal communities are among the most seriously affected because of increased expenses for beach cleaning, public health and waste disposal, as well as a loss of income from decreased tourism. To better document this problem NOAA is expanding their marine debris monitoring and assessment project (MDMAP) into the Gulf of Mexico. The first monitoring site was set up on 6 barrier islands in the northern Gulf of Mexico (nGoM) to investigate four specific questions: (1) what are the major types and possible sources (land or ocean based) of shoreline debris; (2) does the rate of debris deposition onto the shoreline show seasonal oscillations; (3) how does debris deposition change from east to west in the nGoM; and (4) what are the possible causes of the temporal and spatial trends found (e.g. rainfall and runoff, human population, boat traffic)? Over the last year monitoring programs have also been established in Texas at the Mission-Aransas NERR and in Louisiana at the Barataria Terrebonne NEP. In the nGOM we are seeing more trash consistently washing up on the ocean-side versus the sound-side of barrier islands and a significant increase in the amount of trash on the shoreline during tourist/boating season (May-Sept), although these trash items tend to be smaller in size.

***Presenter Biography**
Caitlin Wessel is the Gulf coast regional coordinator for NOAA's Marine Debris Program whose mission is to investigate and prevent the adverse impacts of marine debris. Since the inception of the NOAA Marine Debris Program in 2006, we have strived to combat this issue by finding solutions through research, removal and prevention efforts.

# "LEAVE ONLY FOOTPRINTS" INITIATIVE CLEANS UP THE BEACHES IN GULF SHORES AND ORANGE BEACH, ALABAMA

**Author(s)**
*Chandra Wright, Mississippi-Alabama Sea Grant Consortium and Gulf Shores & Orange Beach Tourism, cwright@gulfshores.com

**Session**
Climate and Hazard Resilience

**Presentation**
Poster presentation

**Abstract**
The coastal communities of Gulf Shores and Orange Beach, Alabama, are home to beautiful beaches which attract more than 5 million visitors every year. In recent years, the increasing numbers of visitors brought more and more items with them to the beach – chairs, tents, umbrellas, coolers, toys and trash – and usually left them behind on the beach at the end of the day and even at the end of their vacation. The tremendous amounts of personal property not only decreased the aesthetic beauty of the beaches but also created several hazards to people and to the creatures which also rely on the beach habitat. In 2015, the cities of Gulf Shores and Orange Beach joined with Gulf State Park, Gulf Shores & Orange Beach Tourism, and many of their beach-based businesses (hotel and condo property managers and owners, beach chair rental businesses, and others) to develop a plan for reducing the amount of property left on the beach overnight. As a result of the stakeholder meetings, both cities adopted ordinances which became known as the “Leave Only Footprints” Initiative and which were implemented in 2016. While not identically written or executed, the cities worked together to make them so substantially similar as to allow Gulf Shores & Orange Beach Tourism to craft one message to educate people about the policy changes. This poster will examine the Initiative and the results of its first year.

***Presenter Biography**
Chandra Wright is the Nature Tourism Specialist for Mississippi-Alabama Sea Grant Consortium and Gulf Shores & Orange Beach Tourism. She works with nature-based tourism businesses to help them be financially successful while also being good stewards of the natural resources upon which they depend.

BAYS & BAYOUS SYMPOSIUM 2016

# Habitat Management and Restoration

## BAYOU CADDY ECOSYSTEM RESTORATION, HANCOCK COUNTY, MISSISSIPPI: CONSTRUCTION OF A LIVING SHORELINE

**Author(s)**
*Richard J Allen, USACE, Mobile District, richard.j.allen@usace.army.mil
Joseph M Black, IV, USACE, Mobile District
John E Bass, USACE, Mobile District
Elizabeth S Godsey, USACE, Mobile District
Justin S McDonald, USACE, Mobile District
Susan Rees, PhD., USACE, Mobile District

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Congressional authorization directed the U.S. Army Corps of Engineers in the Department of Defense Appropriations Act, 2006 (P.L. 109-148) 30 December 2005, under the Mississippi Coastal Improvements Program (MsCIP), to recommend near term projects and a plan of action to develop a comprehensive plan. Under this authorization MsCIP developed fifteen improvement projects along the coast of Mississippi, one of which was Bayou Caddy Ecosystem Restoration. The Interim Projects were subsequently authorized and funded for construction on 25 May 2007 (P.L.110-280). The Bayou Caddy Ecosystem Restoration Project was originally constructed in 2010 with geotubes to create 18 acres of high quality tidal wetland and prevent erosion of over 2000 acres of existing wetland using dredge material as fill from nearby Cadet Bayou Federal Navigation Channel. Over the life of the project the geotubes have been replaced once due to tropical storm activity. In response, the team designed and are in the process of constructing a composite segmented breakwater from rock and living shorelines to provide protection to the geotubes, expand the marsh area, and provide long term protection to the created wetlands. USACE has contracted Integris Projects, LLC and construction is expected to begin June 2016. The project completion is anticipated to be September 2016. This presentation will highlight the contracting, design, fabrication, and construction methods used by the Federal Government for living shorelines and how this project will hopefully become the catalyst for many more federal projects incorporating living shoreline along the Gulf Coast.

***Presenter Biography**
Richard Allen is a Coastal Engineer at the U.S. Army Corp of Engineers, Mobile District. Mr. Allen obtained a Bachelors of Science in Civil Engineering and a Master's of Science in Civil Engineering from the University of South Alabama. His primary research interest and Master's Thesis topic is living shoreline wave attenuation technologies. Mr. Allen's Thesis was selected as the University of South Alabama Master's Thesis of the Year in Math, Physical Sciences, and Engineering. Mr. Allen has also received the ASBPA Student Education Award (2011) and the Nicholas Kraus Coastal Scholar Award (2012) for work on living shoreline wave attenuation technologies.

## RESTORATION OF THE EROSION-IMPACTED AND STORM-VULNERABLE NORTHERN TIP OF MON LOUIS ISLAND, MOBILE COUNTY, AL

**Author(s)**
*Emery Baya, Thompson Engineering, ebaya@thompsonengineering.com
Tom Herder, Mobile Bay National Estuary Program

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Construction is complete on Mon Louis Island at the mouth of East Fowl River surmounting design, funding, and permitting obstacles. Erosion along the northern tip of this wetlands-covered peninsula exceeds that of more southern MLI shorelines, leaving it vulnerable to storm-related breaching across a lee-side embayment with subsequent wetlands loss, diminished hazard mitigation, and increased sedimentation. MBNEP secured funding through the NFWF Gulf Environmental Benefits Fund in 2013 to stabilize the shoreline and create additional marsh habitat. Thompson Engineering selected a continuous rock breakwater with over-four-acre area to be filled with dredged material to create salt marsh habitat. Permitting obstacles and low-quality dredge sediment forced consideration of alternative marsh creation sources. With suitable sand in the Fowl River Open Water Disposal Area close to the project and $800,000 from the State, a strategy was developed to 1) construct the breakwater, 2) hydraulically borrow material from the FROWDA to create marsh, and 3) without further mobilization/demobilization expenses, using the equipment to undertake maintenance dredging in the Fowl River navigation channel to replace borrowed material. Phase 1 included rock placement and dredging operations. Rocks were staged on the north side of the river mouth, and delivery and placement were undertaken from shallow draft barges with shallow draft equipment. Dredging operations followed rock placement, then channel maintenance and borrow site restoration. After de-watering and settlement of placed material, the marsh area will be graded, tidal creeks installed, and native vegetation planted. The project area will be monitored from three to five years.

***Presenter Biography**
Emery Baya is a Senior Vice President and Lead Environmental Engineer at Thompson Engineering in Mobile, AL. With extensive experience leading environmental restoration efforts, Mr. Baya's footprints continue to be left where environmental conditions are improved through careful planning thoughtful implementation.

# EVALUATING NET ECOSYSTEM SERVICE BENEFITS FOR RESTORATION PROJECTS FUNDED THROUGH DEEP WATER HORIZON OIL SPILL

**Author(s)**
*Don Blancher, Moffatt & Nichol, dblancher@moffattnichol.com
Meg Goecker, Moffatt & Nichol

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
As part of the Natural Resource Damage Assessment process the responsible party (RP) must make the public whole by paying for the costs of lost resources. The emphasis is usually on the cost of the restoration effort necessary to offset the injury, and does not set a value for the injured resource. The Deepwater Horizon Early Restoration agreement between the Federal and State Trustees and RP presents a unique case where the two parties intensely negotiated both the ecological benefits (services restored) of restoration projects, and costs the RP was willing to pay for those benefits. As part of the injury assessment, a team of specialists adapted the EPA ecotoxicologic fate and effects ecosystem model AQUATOX, Release 3.1 NME (nearshore marine environment) version to represent nearshore habitats of the Mississippi and Alabama coasts. With this model, primary, secondary and higher level productivity estimates can be made for specific habitats, taxa, or trophic-level guilds. AQUATOX outputs for productivity can be utilized in Habitat Equivalency Analysis and Resource Equivalency Analysis and then combined this with the willingness-to-pay information from Early Restoration to arrive at an ecosystem services monetary value for restoration projects. This can be useful in prioritizing individual projects by either specific ecosystem services targeted by restoration initiatives or maximizing benefits from funding sources. We applied this methodology to assist in decision-making for two potential restoration projects along western Mobile Bay.

***Presenter Biography**
Don Blancher is Supervisory Coastal Scientist with Moffatt & Nichol located in Mobile, Alabama and has extensive experience with various assessment and restoration efforts along numerous Gulf Coast Estuaries. He was involved with several Deepwater Horizon activities in Mississippi and Alabama and worked directly for several Natural Resource trustees with that process.

## MOVING TOWARDS A SPATIALLY AND ECOLOGICALLY BALANCED APPROACH TO ARTIFICIAL REEF PLACEMENT

**Author(s)**
*George S. Bosarge, Fisheries Ecology Lab of the Dauphin Island Sea Lab & the Department of Marine Sciences of the University of South Alabama, sbosarge@disl.org
Crystal L. Hightower, Fisheries Ecology Lab of the Dauphin Island Sea Lab & the Department of Marine Sciences of the University of South Alabama
Sean P. Powers, Fisheries Ecology Lab of the Dauphin Island Sea Lab & the Department of Marine Sciences of the University of South Alabama
J. Marcus Drymon, Fisheries Ecology Lab of the Dauphin Island Sea Lab & the Department of Marine Sciences of the University of South Alabama

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
The Acoustic Benthic Habitat Assessment Program (ABHAP) of the Dauphin Island Sea Lab's Fisheries Ecology Lab and the University of South Alabama's Department of Marine Sciences is currently in its 10th year of operation. Over the past 7 years the ABHAP has been involved in systematically mapping the Alabama Artificial Reef Permit Zone (AARPZ) utilizing side-scan, multi-phase interferometric and single beam sonar to locate, classify and inventory artificial and natural reef structures within the AARPZ in support of the Fisheries Independent Ecosystem Survey; a survey designed to assess the populations of reef associated fish species using bottom and vertical longline, ROV video and trawl surveys. This expansive data set provides a unique opportunity for exploring strategies that involve the use of spatial and ecological data to aid in artificial reef placement or enhancement activities. This talk will discuss potential spatial analyses and workflows incorporating habitat, abiotic and snapper fisheries data within proprietary and open source geographic information systems (GIS) desktop applications that could benefit habitat resource managers in their reef placement programs, specifically the Alabama Artificial Reef Program, as well as provide an experimental framework to test the efficacy of this approach should it be adopted.

***Presenter Biography**
Stan Bosarge is the senior research laboratory manager of the Marine Sciences Fisheries Lab of the University of South Alabama and the acoustic benthic habitat assessment program manager of the Fisheries Ecology Lab of the Dauphin Island Sea Lab. In addition to interests in marine remote sensing utilizing a variety of sonar platforms, Stan's interests are also, desktop and internet GIS, spatial statistics & analysis, geoprocessing and cartographic task automation, and finally free and open source (FOSS) GIS desktop applications, the latter of which he teaches a class in for Northeastern University's Geographic Information Technology Program.

# NATURALIZED STABILIZATION MEASURES IN SOUTHWEST ALABAMA

**Author(s)**
*Wade Burcham, Integrated Science and Engineering, wburcham@intse.com

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
In 2010 a Watershed Management Plan was created for the D'Olive Bay Watershed in Baldwin County, Alabama. That plan recommended several measures to "stop the bleed" of severely head cut stream sections. Two of these measures have been installed and five more are in construction now. This presentation will discuss the design and construction of approximately 5000 linear feet of stream improvements. Each project's unique design considerations and basis of design will be presented as well as lessons learned. These naturalized stabilization measures will be contrasted with conventional design and natural stream restoration.

***Presenter Biography**
Wade Burcham is a Professional Engineer with Integrated Science and Engineering. His 19 years of experience has facilitated a balanced viewpoint from perspectives obtained as Civil Engineer, Municipal Consultant, and Developer's Representative.

## EFFICACY OF "LIVING SHORELINE" RESTORATION DESIGNS FOR ENVIRONMENTAL BETTERMENT: LESSONS LEARNED FROM MULTI-YEAR PROJECTS IN COASTAL ALABAMA

**Author(s)**
*Just Cebrian, Dauphin Island Sea Lab, jcebrian@disl.org
Shailesh Sharma, Dauphin Island Sea Lab
Josh Goff, Dauphin Island Sea Lab
Dottie Byron, Dauphin Island Sea Lab
Jeff DeQuattro, The Nature Conservancy
Carl Ferraro, State Lands Division Coastal Section, Alabama Department of Conservation and Natural Resources
Judy Haner, The Nature Conservancy
Ken Heck, Dauphin Island Sea Lab
Crystal Hightower, Dauphin Island Sea Lab and Department of Marine Sciences, University of South Alabama
Sean Powers, Dauphin Island Sea Lab and Department of Marine Sciences, University of South Alabama
Steven Scyphers, Dauphin Island Sea Lab and Department of Marine Sciences, University of South Alabama (current affiliation Department of Marine and Environmental Sciences, Northeastern University)

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
The exploitation of coastal ecosystems by humans has resulted in widespread loss of ecologically important natural habitat, such as marshlands, seagrass beds and oyster reefs. These habitats provide many valuable services to humankind and, if they continue to be destroyed, the development and use of coastal systems by humans will be unsustainable. To help reverse this trend, we have been testing the cost-effectiveness of restoration methods based on the creation of subtidal reefs that can be used in a variety of coastal systems. Reefs were expected to be colonized by oysters, which reduce wave energy and increase water clarity, in turn ameliorating conditions for seagrass growth and enhancing sediment deposition and marsh expansion on adjacent shorelines. The reefs range in shape, size and composition, and have been deployed for time periods spanning from 1.5 to 5 years. The impacts of these various subtidal reefs are disparate. In general the reefs generate habitat for shellfish and finfish, but the effects on surrounding water quality, seagrass beds, and shorelines and marshes are smaller and site-specific. We compare the performance of these subtidal reefs with intertidal reefs closer to the shoreline, which seem to be more effective in reducing shoreline erosion and enhancing marsh habitat. The environmental outcomes and improvements obtained with these diverse reefs are discussed. Our findings can help inform decisions for cost-effective coastal restoration, but they also point to a number of important gaps that require further work for improving our understanding and management of coastal systems.

***Presenter Biography**

Just Cebrian is a Senior Marine Scientist at the Dauphin Island Sea Lab and Professor of Marine Sciences at the University of South Alabama. His work is focused on the understanding and restoration of coastal ecosystems.

## SHOULD MISSISSIPPI BE CONCERNED IF DAUPHIN ISLAND IS ALLOWED TO CONTINUE TO ERODE?

**Author(s)**
*Glendon L. Coffee, Mobile Bay Sierra Club, coffeegl@aol.com

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Dauphin Island has been a feature of Alabama's coastline for 6,000 years. Continually nourished by sand transported from the east, the island has recovered from countless hurricanes, demonstrating its natural resiliency over pre-historic time. As a buffer from the Gulf, the island plays a crucial role in maintaining the estuarine habitat of Mobile Bay and Mississippi Sound, within which occur large expanses of coastal marsh, oyster reefs, and extensive nursery areas. Importantly, Mississippi's barrier islands owe their existence to sand carried westward from Dauphin Island. Dauphin Island was relatively stable until the last century. A U.S. Geological Survey (USGS) study found that after 1958, the island entered a persistent net erosional phase. After considering sea level rise and storms, the USGS concluded a decrease in sand supply was the primary factor causing Dauphin Island's erosion. Dredging the Mobile Harbor channel permanently removes large volumes of beach quality sands from the littoral system. When strong political support exists, the proper mix of science, engineering, economics, stewardship, and politics can come together to develop balanced solutions to reverse coastal erosion. An example is the recently recommended Mississippi Barrier Island Restoration Plan. However, governmental decision-making within Alabama has not matured to the point that responsible maintenance of Mobile Harbor is prioritized when balancing financial profits against the risk of future environmental damage. The long-term future of Mississippi's Barrier Islands will ultimately depend upon decisions made in Alabama relative the proposed enlargement of Mobile Harbor and the potential to exacerbate Dauphin Island's ongoing erosion.

***Presenter Biography**
Mr. Coffee received his B.S. and M.S. degrees in biology from the University of Alabama. After a 31-year career with the U.S. Army Corps of Engineers, he retired in 2004 and continues to work as an independent environmental consultant with a number of local and national engineering firms.

## SUB-WATERSHED STANDARDIZED RESTORATION MONITORING FRAMEWORK FOR MOBILE BAY: A CASE STUDY IN D'OLIVE WATERSHED

**Author(s)**
*Renee Collini, Mobile Bay National Estuary Program/Northern Gulf of Mexico Sentinel Site Cooperative, rcollini@disl.org

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
The Mobile Bay and the surrounding sub-watersheds, much like other areas in the northern Gulf of Mexico, are undergoing extensive planning, assessment, and restoration. Multiple restorations and changes in watershed management within a sub-watershed can have complementary and synergistic effects on ecosystem function and services beyond the geography of individual projects. Recognizing this the Mobile Bay National Estuary Program (MBNEP) tasked its Science Advisory Committee (SAC) with development of a standardized monitoring framework to determine pre-restoration baselines and shifts in ecosystem function. Through the efforts of a working group, and then the entire SAC, the Mobile Bay Subwatershed Restoration Monitoring Framework (Framework) was developed. It has four primary focus areas: sedimentation and flow, water quality, habitat quantity and quality, and biology. The Framework lays out parameters to sample, frequency, location relative to restoration focus and concerns, and methodology. Concurrent to the development of the Framework plans to begin work on the 12 most degraded stream reaches in the D'Olive watershed were moving forward. Located in the northeast corner of Mobile Bay, D'Olive has experienced rapid urbanization coupled with minimal watershed management and a steep elevation gradient. These factors have led to erosion, sedimentation, and degradation and loss of downstream habitat such as freshwater wetlands and submerged aquatic vegetation. Recognizing this as an opportunity to test the efficacy of the indicators in the Framework, it was applied in D'Olive. In this presentation the Framework, how it has been applied to D'Olive, and preliminary results will be reviewed.

***Presenter Biography**
Ms. Collini is the Science Coordinator for the Mobile Bay National Estuary Program and the Coordinator for the Northern Gulf of Mexico Sentinel Site Cooperative with Mississippi-Alabama Sea Grant. She has extensive experience in hydrographic and meteorological monitoring, project coordination and management, and interagency collaboration.

# ESTIMATING THE WILLINGNESS TO PAY TO PRESERVE OPEN SPACE ASSOCIATED WITH COASTAL WATERFRONTS USING CONTINGENT VALUATION METHOD

**Author(s)**
*Ram P. Dahal, Mississippi State University, rpd72@msstate.edu
Robert K. Grala, Mississippi State University
Jason S. Gordon, Mississippi State University
Ian A. Munn, Mississippi State University
Daniel R. Petrolia, Mississippi State University
Samantha Islam, University of South Alabama
Joan M. Wesley, Jackson State University

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Waterfront open spaces are dynamic places and represent an interface between aquatic and terrestrial communities. Waterfront open space provides environmental benefits, recreational opportunities, and opportunities for water-dependent economic activities (e.g., ports, boat yards, marinas, storage facilities, fishing docks, seafood markets, and others). Benefits from waterfront open space are critical to coastal communities and their visitors. However, with a growing population and urbanization, these areas compete with various land use changes. Rapid growth presents important challenges for elected officials, planners, and natural resource managers because urban development can increase stress on the landscape and compromise environmental quality and community resilience. This study evaluated residents' willingness to preserve open space in coastal regions of Mississippi and Alabama. A contingent valuation method (CVM) was employed to estimate citizen's willingness to pay (WTP) to support open space preservation. The CVM involved two scenarios where citizens voted for or against the open space preservation program. This approach enabled us to examine the extent to which coastal communities valued availability of open space and their willingness to support open space preservation. Study findings suggested the majority of residents valued waterfront preservation. They also believed that commercial development, as opposed to other types of development such as residential, was the major growth issue in the community. While respondents valued open space preservation, they also recognized importance of some forms of economic development. Results will help guide local elected officials in maintaining a balance between urban development and waterfront open space, and access to associated benefits of both.

***Presenter Biography**
Ram Dahal (presenter) is a Ph.D. student in the Department of Forestry at Mississippi State University. The presenter is interested in research related to nonmarket valuation and natural resource economics.

# EXAMINATION OF TROPHIC RELATIONSHIPS AFFECTING OYSTER REEF RESTORATION SUCCESS IN THE MISSISSIPPI SOUND

**Author(s)**
*Virginia Fleer, University of Southern Mississippi Gulf Coast Research Laboratory, virginia.fleer@usm.edu
Chet F Rakocinski, University of Southern Mississippi Gulf Coast Research Laboratory

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Over recent years, natural and anthropogenic changes due to altered hydrology, hurricanes, variable precipitation, and the BP oil spill have all taken their toll on existing oyster reefs in Mississippi. In response, considerable oyster reef restoration efforts are currently underway within the region. In order to understand why these efforts succeed or fail, it is crucial to consider predator-prey relationships within the context of the overall trophic dynamics of oyster reefs. Thus, we have initiated an integrated three-pronged approach to understand key trophic interactions affecting oyster recruitment, growth and survival, comprising field sampling, manipulative lab experiments, and individual-based modeling. Key members of the trophic web were quantified at twelve oyster reef sites over the course of seven months. Specimens of key members of the trophic web were obtained from sampling trays for lab experiments. A variety of experiments examined: (1) the predatory responses of both oyster drills and mud crabs on various sizes of oyster spat; (2) whether any predators can consume oyster drills; (3) oyster reef trophic dynamics in the context of different substrate types; and 4) the effects of predator removals on trophic relationships. Mesocosm experiments showed that mud crabs and oyster drills greatly reduced oyster spat survival. Moreover, size selectivity by both of these predators was evident. Video recordings revealed stone crabs and blue crabs to be capable of consuming drills, and that large drills can cannibalize small drills. More complex experiments involving multiple predators revealed that limestone substrate used for restoration leads to greater mud crab mortality, but also greater spat survival, in contrast to oyster shell. Information from this study will be instrumental to the overall project goal of understanding trophic relationships affecting oyster reef restoration in the Mississippi Sound.

***Presenter Biography**
Virginia Fleer is a Ph.D. candidate in Chet Rakocinski's benthic ecology lab. She is in the final stages of completing her dissertation work which focuses on understanding various factors affecting oyster reef restoration in the Mississippi Sound.

## SOUTH BALDWIN COUNTY'S COASTAL STREAMS AND RIVERS. CAN WE BALANCE THE FUTURE IMPACTS OF DEVELOPMENT AND QUALITY OF LIFE ISSUES?

**Author(s)**
Conrad Grazzier, Consultant

**Session**
Habitat Management and Restoration

**Presentation**
Oral Presentation

South Baldwin County is experiencing widespread urban development in the area generally south of I-10 but the area south of US 98 to the beaches is the primary tourist area. Here quality of life issues, i.e. surface and groundwater quality and wetland protection are most important. The coastal streams and rivers in these areas receive surface water runoff and provide groundwater base flow into Perdido Bay, the Intercoastal Waterway, Mobile Bay Estuary and ultimately the Gulf of Mexico. Areas immediately north of the beaches have historically been agricultural that have modified watershed characteristics, increased runoff and decreased recharge to surficial aquifers. Urbanization further modified these agri-drainage features to accommodate streets, subdivisions and commercial areas. Watersheds have become geographical features and no longer support the streams and associated environments. South Baldwin County's urban areas discharge treated wastewater into this degraded surface water system. Nutrients from wastewater have been indicted by the Florida Department of Environmental Protection as the cause of a catastrophic decline in the environmental health of the Perdido Bay Estuary. Some of south Baldwin County's urban areas currently discharge treated wastewater into the Perdido Bay Estuary. As the population of south Baldwin County continues to grow, alternative methods of wastewater disposal must be developed to reduce and prevent nutrient contamination and to grow the existing sewer systems into unserved areas where septic tanks are in widespread use.

## MOBILE BAY NATIONAL ESTUARY PROGRAM INVOLVEMENT IN IMPLEMENTING THE THREE MILE CREEK WATERSHED MANAGEMENT PLAN

**Author(s)**
*Tom Herder, Mobile Bay National Estuary Program, therder@mobilebaynep.com

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
With the Three Mile Creek Watershed Management Plan completed in 2014, implementation is underway. This Plan identified challenges including pollutant loads, degraded infrastructure, stormwater runoff, altered hydrology and creek morphology, nuisance SAV and invasive species, and potential groundwater contamination. The cost of fully implementing WMP recommendations is expensive, but the cost of doing nothing is exponentially greater. “Lowest hanging fruit” among recommended management measures fell under Stormwater, Ecology, and Access. More expensive/challenging measures fell under Wastewater and Sea Level Rise. Stakeholders favored creating a Creek-side bicycle trail from the campus of the University of South Alabama to Downtown Mobile and addressing problems from stormwater runoff, including trash/litter, eutrophic stressors, stream bank erosion and sedimentation, and flooding in lower lying areas.

MBNEP is supporting implementation of projects to improve water quality, provide access, protect and improve health of fish and wildlife, restore the heritage and cultural connection between the watershed and the community, and plan and prepare for climate resiliency. Involvement has included:

- Securing funding to begin construction of a TMC Greenway beginning in traditionally underserved neighborhoods.
- Leading community adaptation planning in Toulmins Spring Branch.
- Stabilizing problem areas of Twelve Mile Creek to reduce sediment affecting the lakes at Langan Park.
- Creating an Invasive Species Control Plan focused on aquatic vegetation.
- Creating an Alabama Coastal Conservation and Resiliency Corps to connect at-risk young adults from the lower Three Mile Creek Watershed to their environment through education, conservation training, and employment implementing TMC WMP-recommended measures.

***Presenter Biography**
Tom Herder is a UNCW and University of Florida-educated estuarine biologist in his tenth year on the MBNEP team. He lives in Midtown Mobile with his wife, Rhoda, dogs, birds, and fish, and loves to do field work on a surfboard.

## CHOREOGRAPHING SEDIMENTS IN MOBILE BAY

**Author(s)**
*Rob Holmes, Auburn University, rbh0012@auburn.edu

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
In coastal and estuarine environments such as Mobile Bay, sediments are influenced by a wide variety of environmental processes, such as erosion and deposition, and human activities, including navigational dredging, beach nourishment, and shoreline modification. Sediments are both mobilized and stabilized by these influences. The matrices of sand, silt, and clay that form the physical substrate for coastal ecosystems result. Consequently, the availability of sediment is often a restricting factor for efforts to restore, maintain, or build healthy coastal ecosystems. Multiple challenges to successfully orchestrating sedimentary flows to achieve habitat goals exist, including the compartmentalization of sedimentary management, lack of public understanding of and interest in sediment, and the difficulty of properly accounting for the value of sediment. This presentation will discuss strategies for overcoming these challenges, including the development of regional choreographies of sedimentary sinks and surpluses, fostering public engagement with and advocacy for sediment, and valuing sediment — and the landscapes it sustains — as critical infrastructure. To do so, the presentation visualizes the existing choreography of sediments in Mobile Bay and then draws on a long-term research project the author is currently part of to situate Mobile Bay within broader context of sedimentary management in several distinct coastal regions of the United States, including the Gulf Coast as a region, the New York-New Jersey Harbor Estuary, and the San Francisco Bay/Sacramento–San Joaquin Delta Estuary.

***Presenter Biography**
Rob Holmes is an assistant professor of landscape architecture at Auburn University and co-founder of the Dredge Research Collaborative. Prior to joining Auburn, he practiced landscape architecture in Virginia and taught in Florida, Virginia, Louisiana, and Ohio.

## D'OLIVE WATERSHED RESTORATION USING SUSTAINABLE STREAM STABILIZATION AND STORMWATER PROJECTS

**Author(s)**
*Greg Jennings, Jennings Environmental, jenningsenv@gmail.com
Roberta Swann, Mobile Bay National Estuary Program
Tom Herder, Mobile Bay National Estuary Program
Ashley Campbell, City of Daphne, AL

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
The Mobile Bay National Estuary Program is coordinating 11 watershed restoration projects funded by the National Fish and Wildlife Foundation to reduce sedimentation into D'Olive and Mobile bays using sustainable stream stabilization and stormwater management. The D'Olive Creek Watershed Management Plan (2010) described factors underlying excessive erosion and sedimentation, identified unstable streams, and recommended restoration measures to reduce sediment sources and prevent future degradation. The watershed's three principal tributaries appear on the State's 303(d) list of Impaired Waters due to sediment and habitat alteration. NFWF's Gulf Environmental Benefit Fund, recognizing the impact of sedimentation on natural resources damaged in the Deepwater Horizon oil spill, provided funding in 2014 to implement projects to address critical erosion problems. Stream restoration along the Eastern Shore in Baldwin County is challenging due to substantial topographic relief, layers of erodible sand and clay, intense rainfall patterns, and urban landscape. Previous efforts to stabilize stream systems included rock armoring, natural riparian planting, stormwater retention retrofits, and a boulder step-pool stormwater conveyance for gully stabilization. The goal of the current project is to reduce sediment loading by applying all appropriate technologies, including sustainable natural stream restoration and stormwater management measures. The watershed leadership team developed a comprehensive implementation plan to include six local engineering firms working collaboratively to implement the 11 projects efficiently. Through 2016, eight projects have been completed and are being monitored for their effectiveness. This presentation highlights the lessons learned through collaborative planning and implementation of these complex watershed restoration projects.

***Presenter Biography**
Greg Jennings is President of Jennings Environmental and Professor Emeritus at North Carolina State University where he taught ecological engineering and stream restoration classes. He has consulted on planning, design, and implementation of more than 150 watershed restoration projects throughout the nation.

## IMPACTS OF WINTERING REDHEAD DUCKS (*Athya americana*) ON SHOAL GRASS (*Halodule wrightii*) AND WIDGEON GRASS (*Ruppia maritima*) IN THE NORTHERN GULF OF MEXICO

**Author(s)**
*Maddie Kennedy, Dauphin Island Sea Lab/University of South Alabama, mak.kennedy.24@gmail.com
Ken L Heck, Dauphin Island Sea Lab/University of South Alabama
John F. Valentine, Dauphin Island Sea Lab
Tommy Michot, Ecology Center, University of Louisiana Lafayette

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
While it has been well established that waterfowl can control the distribution and abundance of seagrasses in other regions, less is known about their effects in the northern Gulf of Mexico. I measured the effects of waterfowl, specifically redhead duck (*Athya americana*) foraging on biomass of mixed shoal grass (*Halodule wrightii*) and widgeon grass (*Ruppia maritima*) beds using caging experiments at three locations along the northern Gulf of Mexico coast. Seagrass biomass samples were taken five times throughout the year (before grazing, during grazing, following grazing, peak seagrass reproduction and peak seagrass growth) to quantify variation in grazing effects on seagrass biomass. Time-lapse photography provided estimates of the abundance and feeding activities of the birds, and waterfowl gut contents were examined to determine the amount of seagrass consumed. Results showed that redhead duck actively and regularly fed in all experimental areas for extended periods of time, with as many as 100% of the individuals feeding at any given time. Overall, mean shoal grass biomass increased at most locations during the two year study period, and the effects of grazing varied substantially among locations. Thus, only in some ungrazed plots was the amount of biomass greater than in grazed plots, suggesting that waterfowl are unlikely to be over exploiting their seagrass food resources along the northern Gulf coast.

***Presenter Biography**
Maddie recently finished her Master's degree at the Dauphin Island Sea Lab/University of Alabama under Dr. Ken Heck. She will be starting as a Sea Grant Knauss Fellow this winter and enjoys long walks on the beach with her dog Grayson.

# OYSTER HABITAT EVALUATION USING HYDROCOAST SALINITY DATA FOR THE BILOXI MARSH AND MISSISSIPPI SOUND (2013 TO 2015)

**Author(s)**
*John A. Lopez, Lake Pontchartrain Basin Foundation, jlopez@saveourlake.org
Patrick Smith, Lake Pontchartrain Basin Foundation

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
The Lake Pontchartrain Basin Foundation (LPBF) mapped oyster salinity suitability in the Pontchartrain Basin including the Biloxi Marsh and Mississippi Sound (Preau, 2016, see saveourlake.org). LPBF used two techniques derived from approaches taken by Mark Chatry and others (1983) and by Thomas Soniat (2012). Chatry and others (1983) identified an ideal salinity regime for each month based upon empirical data collected from public seed ground within the Breton Sound Basin. The model used by Soniat (2012) encompasses four parameters that characterize optima for salinity and substrate based on theoretical values found in literature and a field validation. These two approaches were applied to surface water salinity information from LPBF Hydrocoast Maps of the Pontchartrain Basin to identify the areas with the most optimal oyster salinities for each year from 2013 through 2015 (saveourlake.org/coastal-hydromap.php). The result show that oyster suitability east of the Mississippi River is now centered in and around the Biloxi Marsh where historic oyster reefs occurred in 1912, and suggests that since the closure of the Mississippi River Gulf Outlet (MRGO) in 2009 that surface water salinity has been reduced to condition similar to that before the MRGO was built in 1965. Fishery independent oyster dredge data and monitoring of actual oyster fleet activity also corroborate that there is significant oyster propagation in Biloxi Marsh and Mississippi Sound. The eastward extent of oyster propagation into Chandeleur Sound is likely limited by re-occurring hypoxia rather than inappropriate higher salinity regime of the normally oxygenated waters.

***Presenter Biography**
John Lopez is the Coastal Sustainability Program Director for the Lake Pontchartrain Basin Foundation which oversees and conducts coastal restoration research. Born in New Orleans, he holds a Masters in Geology from the University of Southern California and a Ph.D. in Applied Science and Engineering from the University of New Orleans.

## DETERMINING THE DRIVERS OF PLANT COMMUNITY COMPOSITION CHANGE IN A RESTORED MARSH EXPERIENCES SEA-LEVEL RISE

**Author(s)**
*Sara E Martin, Mississippi State University, Coastal Research and Extension Center, semartin309@gmail.com
Julia A Cherry, University of Alabama, New College and Department of Biological Sciences
Eric L Sparks, Mississippi State University, Coastal Research and Extension Center
Just Cebrian, University of South Alabama, Department of Marine Sciences and Dauphin Island Sea Lab

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
As sea level rise (SLR) continues, marsh restoration and creation projects are becoming increasingly important. In addition to recovering ecosystem services, these projects may enhance resilience to future environmental changes, but their success may depend on planting effort and responses to SLR. To determine the effects of these factors on plant community structure, we restored three fringing marshes in Weeks Bay, Alabama by transplanting intact sods of Juncus roemerianus (JURO) at varying cover levels (0, 25, 50, 75, and 100%) and by manipulating SLR using weirs (+SLR or –SLR controls). Changes in plant community structure were monitored over three growing seasons. To identify potential drivers of observed changes, we conducted a full-factorial greenhouse study for one season using intact sods of JURO exposed to different salinity (0, 4, and 8 ppt) and inundation (-5, 0, and +5 cm) treatments. Planting effort in the field resulted in similar plant cover among the 50, 75, and 100% treatments, with no significant effects of SLR. However, relative abundances of flood-tolerant species tended to increase in response to SLR. In the greenhouse study, there were no significant treatment effects, though species richness did increase over time. Collectively, these studies indicate that plant community composition changes were driven by planting effort, not SLR. Furthermore, similar plant cover and species richness in medium to high effort treatments implies moderate effort is sufficient to restore marsh structure and that use of intact sods with robust propagule banks may result in more resilient marshes.

***Presenter Biography**
Sara Martin received her M.S. in Biological Sciences from the University of Alabama in 2015 and is now working as a research associate with Mississippi State University, Coastal Extension and Research Center.

## COASTAL ECO-MORPHOLOGICAL REAL-TIME FORECASTING (CERF) SYSTEM

**Author(s)**
*Francesca Messina, The Water Institute of the Gulf, fmessina@thewaterinstitute.org
Ashok Khadka, The Water Institute of the Gulf
Ehab Meselhe, The Water Institute of the Gulf
Daniel Twight, Deltares
Lora Buckman, Deltares

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
The Water Institute of the Gulf, together with Deltares, has developed a forecasting and information system for a pilot location in Coastal Louisiana, specifically Barataria Bay and Breton Sound Basins in the Mississippi River Deltaic Plain. The primary objective of the system is to provide a seven-day forecast of the conditions of the pilot location and the system dynamics under atmospheric and coastal forecasted conditions. Currently, the system forecasts water level, salinity, and water temperature. In future, the system capabilities will be expanded to include ecological and geomorphological processes. The Flood Early Warning System (FEWS) is used as a platform to import multivariate environmental data from several sources and use them to monitor the pilot location and to provide boundary conditions to the model. A hindcast model is applied with the aim to compare the model outputs to the observed data, and to provide initial condition to the forecast model. This system builds on a calibrated and validated hydrodynamic and morphodynamic basin-wide model. Applying morphological model in a predictive manner is an innovative concept and a powerful tool. This system can be used to optimize the freshwater diversion operations, in order to reduce the possible negative impacts on the environment and improve the operation efficacy. Real-time observations and model predictions can be used as guidance to decision makers regarding the operation of control structures in response to forecasted weather or river flood events. Moreover, coastal communities can benefit from water level and salinity forecast to manage their activities.

***Presenter Biography**
Francesca Messina is a Research Scientist with The Water Institute of the Gulf's Natural Systems Modeling and Monitoring group; she is involved in the development and application of hydrologic numerical models in coastal, estuarine and riverine systems. Francesca Messina's background mainly focus on groundwater; her doctoral research was devoted to modelling flow and colloidal particle transport phenomena in saturated porous media.

## FREQUENCY OF HYPOXIA AT ARTIFICIAL REEFS WITHIN THE MISSISSIPPI SOUND AND BIGHT, JUN - OCT 2016

**Author(s)**
*Scott P. Milroy, The University of Southern Mississippi, scott.milroy@usm.edu
Christian Mayeaux, The University of Southern Mississippi
Mark Primo, Mississippi Gulf Fishing Banks
Read Hendon, The University of Southern Mississippi

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
While the periodic incidence of hypoxia in the coastal waters of Mississippi is often chronicled on an event-by-event basis, there is little documentation of the frequency or intensity of these hypoxia events when they occur in waters overlying artificial reef habitats. In the context of habitat management and restoration, it is absolutely crucial that water quality is supportive of primary and secondary production at our artificial reefs, in order to establish these reefs as functional habitats and not merely as on-bottom fish aggregating devices (FAD). Twelve artificial reef sites were chosen throughout the Mississippi Sound and Bight, ranging in reef type (concrete reef balls and steel-hulled vessels), water depth (3.6 – 41.1 m), and distance from shore (6.3 – 49.0 statute miles). At each site, MGFB divers deployed an array of HOBO loggers to continuously record ambient water temperature, salinity, and dissolved oxygen concentrations at 15 minute intervals. These loggers were deployed for a period of approximately 6 weeks at a time, and swapped with new data loggers to ensure continuous data coverage during data off-load. Each of these reefs was monitored continuously for the entire summer season (Jun - Oct) of 2016. Results indicate that hypoxia was prevalent among a large majority of the artificial reef sites, and quite frequent (2-3 occurrences per month). The duration of these hypoxia events were relatively long-lived (2-4 days), and in some cases quite extreme, lasting nearly 30 days. It is hoped that these data will help direct efforts to improve water quality at the most grievously-affected artificial reef sites, and will help resource managers select locations for new artificial reef sites which are less likely to be affected by future hypoxia events.

***Presenter Biography**
Dr. Scott P. Milroy is an Associate Professor and Assistant Chair for the Division of Marine Science in the University of Southern Mississippi's School of Ocean Science and Technology. Dr. Milroy is a Coordinator of the USM Marine Science Baccalaureate Program, and is also the author of the marine science text "Field Methods in Marine Science: from Measurements to Models".

# IMPACTS TO BLUE CRAB (*Callinectes sapidus*) HABITAT SUITABILITY CAUSED BY FRESHWATER DIVERSIONS ASSOCIATED WITH THE BONNET CARRE SPILLWAY, JAN - AUG 2016

**Author(s)**
*Scott P. Milroy, The University of Southern Mississippi, scott.milroy@usm.edu
Tasheena Powers, The University of Southern Mississippi
Stephan Howden, The University of Southern Mississippi
Kevin Dillon, The University of Southern Mississippi
Donald Redalje, The University of Southern Mississippi
Davin Wallace, The University of Southern Mississippi
Kevin Martin, The University of Southern Mississippi

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
After heavy rains in the Mississippi and Ohio River valleys in late 2015 - early 2016, the Bonnet Carre Spillway was opened on 10 Jan 2016 to prevent the volume of Mississippi River flows at New Orleans from exceeding 1.25 million cubic feet per second (cfs). The Spillway was open for a total of 22 days, with a mean discharge of 62,325 ± 41,600 cfs, and a peak discharge of 203,000 cfs on 17 Jan 2016. The impacts of these discharges to nearshore water quality, particularly as they relate to the habitat suitability of blue crab (*Callinectes sapidus*) within Mississippi Sound, were quantified using Habitat Suitability Indices (HSIs) incorporating measures of temperature, salinity, dissolved oxygen, chlorophyll, water clarity (as total suspended sediment, particulate organic carbon, and colored dissolved organic material), and substrate quality (via grain size analyses and total organic content). These were collected from multiple stations throughout the Mississippi Sound to capture both the spatial and temporal gradients of blue crab habitat suitability, as defined by release event impacts and the post-event recovery, from Jan – Aug 2016.

***Presenter Biography**
Dr. Scott P. Milroy is an Associate Professor and Assistant Chair for the Division of Marine Science in the University of Southern Mississippi's School of Ocean Science and Technology. Dr. Milroy is a Coordinator of the USM Marine Science Baccalaureate Program, and is also the author of the marine science text "Field Methods in Marine Science: from Measurements to Models".

## DETECTING CHANGE IN COASTAL MARSHLANDS FROM 1950 – 2014 ASING TEXTURAL ANALYSIS OF PANCHROMATIC IMAGERY

**Author(s)**
*Heather Nicholson, University of Southern Mississippi, h.nicholson@eagles.usm.edu
Gregory Carter, University of Southern Mississippi, Gulf Coast Geospatial Center

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Coastal marshlands are among the world's most highly productive ecosystems but they have diminished greatly in the past several decades owing to sea-level rise and direct anthropogenic influences. An effective means of quantifying loss or gain in marsh area is through the use of aerial image data, which offers synoptic views of the landscape at decadal-scale sampling frequencies. However, a potential problem with older panchromatic, or black-and-white, imagery is the absence of multispectral information that might be used otherwise in remote identification of vegetation types. Nevertheless, the analysis of horizontal variability in image brightness values, or image texture, can be used in deriving marsh areal coverage from even the oldest-available aerial photography. This project employed imagery acquired in 1955, 1975, 1992, and 2014 over Jackson County, MS, to determine the extent of marshland loss or gain in the vicinity of the present-day Grand Bay National Estuarine Research Reserve (GBNERR). After pre-processing the images, image textural parameters were computed using the Grey-Level Co-Occurrence Matrix procedure (ENVI v X.X). A Maximum-Likelihood classification of the textural parameters to vegetation type was derived based on ground control point data. A change detection analysis then was applied among years. Preliminary results suggest that a net loss of over 10% in marsh area occurred in the GBNEER vicinity from 1955 to 2014. Results will assist resource managers in determining locations that may be most vulnerable to continued sea level rise and direct human impact.

***Presenter Biography**
Heather Nicholson is currently working on her Master of Science in Geography from the University of Southern Mississippi. She has been working in the field of environmental remote sensing for the past four years.

# PERMITTING YOUR LIVING SHORELINE PROJECT: CHANGES ON THE HORIZON AND LOCAL OPPORTUNITIES

**Author(s)**
*Niki L Pace, Louisiana Sea Grant Law & Policy Program, nlpace@lsu.edu

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Concern is increasing about the expansion and impact of seawalls and bulkheads along the Gulf coast, leading to coastal habitat loss and degradation. A recent analysis of shoreline hardening in the U.S. found that at least 14 percent or about 14,000 miles of the nation's tidal shoreline is already hardened. However, despite growing interest in protecting natural shorelines and living shoreline projects, the regulatory framework is still rapidly evolving at the federal level and varied at the state and local level. In June 2016, the USACE released proposed nationwide permits for authorization in 2017. For the first time ever, this list includes a proposed nationwide permit specifically for living shoreline projects, Proposed NWP B – Living Shorelines. Likewise, the USACE Mobile District is reauthorizing its regional general permit for living shorelines which has been out for several years. Without reauthorization, the current regional general permit is set to expire in October 2016. This presentation will discuss the new permitting frameworks from the USACE and how the federal permitting system interacts with state and local efforts. The presentation will also discuss opportunities for local government implementation through the use of local land use planning and the potential for credit under the NFIP's Community Rating System in participating communities.

***Presenter Biography**
Niki Pace is an attorney and certified floodplain manager with the Louisiana Sea Grant Law & Policy Program where she works with coastal communities on issues of long-term sustainability and resilience to natural and man-made challenges. Prior to joining Louisiana Sea Grant, Pace spent seven years with the Mississippi-Alabama Sea Grant Legal Program.

## URBAN GREEN INFRASTRUCTURE AND LOCAL FLOODING: THE IMPACT OF LANDSCAPE PATTERNS ON PEAK RUNOFF IN FOUR TEXAS MSAS

**Author(s)**
*Yunmi Park, Assistant Professor, Community Planning Program, Dept. of Political Science, Auburn University, ympark@auburn.edu
Hyun Woo Kim, Lecturer, Dept. of Landscape Architecture and Urban Planning, Texas A&M University

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Even though there is a general acknowledgement that green infrastructure can have a positive role in reducing stormwater runoff, few studies have explored how specific spatial configurations of landscape — one of the critical components of green infrastructure — could influence runoff generation. This study attempts to address this gap by examining the landscape patterns in terms of size, shape, isolation, and connectivity across the four largest metropolitan areas in Texas, using landscape ecology metrics. The outcomes indicate that larger, less fragmented, and more connected landscape patterns are likely to mediate the mean annual peak runoff. In contrast, larger developments of complex shapes with more edges, clustered, and connected are likely to augment the peak runoff. The findings of this paper provide empirical evidences for policy makers to further the importance of interconnection and clusters of green infrastructure and plan strategic green hubs and corridors to more effectively manage stormwater runoff.

***Presenter Biography**
Dr. Yunmi Park is an assistant professor in Auburn University's Community Planning Program, specializing in urban design and policy, neighborhood planning, land use planning, and urban revitalization. Her current research focuses on contemporary land use practices (e.g., smart growth, new urbanism, form-based codes, and transect zoning) and seeking ways to retrofit and reclaim declining and shrinking neighborhoods.

# EMPLOYING UNMANNED AERIAL SYSTEMS (UAS) TO UNDERSTAND AND MANAGE RESOURCES AT GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE

**Author(s)**
*Jonathan L Pitchford, Grand Bay National Estuarine Research Reserve, jonathan.pitchford@dmr.ms.gov
Lindsay Spurrier, Grand Bay National Estuarine Research Reserve
Robert Moorhead, Mississippi State University & Northern Gulf Institute
Michael Archer, Grand Bay National Estuarine Research Reserve

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Unmanned Aerial Systems (UAS) provide an opportunity to study coastal marsh ecosystems with great efficiency. Grand Bay National Estuarine Research Reserve (GBNERR) in partnership with Mississippi State University (MSU) and the Northern Gulf Institute (NGI) is using UAS to collect remotely sensed data for several applications. Past efforts included monitoring a simulated chemical spill in Bang's Lake, creating single species vegetation maps of Sentinel Sites, and mapping the burned extent of two large wildfires within the GBNERR in 2015. During the summer of 2016, flights over the Sentinel Sites were repeated in an effort to monitor change in vegetation communities using remote sensing. These results can be compared with field-based vegetation surveys to examine the strengths and weaknesses of both methods. Also, a re-flight of one of the wildfire areas is scheduled for late summer 2016. The total burned extent mapped from the previous flight indicated that the fire burned approximately 4,249 acres from the northwestern edge of the GBNERR in Mississippi extending east into Alabama. Imagery collected from this area in 2016 will be used to generate estimates of vegetation re-growth following the wildfire, which has several applications including testing indices of wildfire severity developed by U.S. Fish and Wildlife Service.

***Presenter Biography**
Jonathan Pitchford has been involved in ecological research and conservation for many years from New York to the Gulf Coast. He is currently the Stewardship Coordinator at the Grand Bay National Estuarine Research Reserve where he is involved in a variety of projects within the reserve designed to understand and conserve natural resources.

# DEVELOPING NATURAL ASSETS FOR NATURE TOURISM: COASTAL MISSISSIPPI'S NATURE BASED TOURISM MASTER PLAN

**Author(s)**
*Rhonda Price, MS Department of Marine Resources, rhonda.price@dmr.ms.gov
Bridgette Varone, MS DMR
Kimberly M Miller, AllenES
Melissa Pringle, AllenES

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
For the Mississippi Gulf Coast, nearly one in five jobs is tourism-related, making it a primary economic engine driving the area. Nature-based tourism in Coastal Mississippi continues to be an untapped area of economic revenue. Investing in the region's bays, bayous, parks and preserves can provide a glimpse into the natural richness of areas largely unchanged since the first European settlers arrived. A focused Nature Based Tourism program is key to attracting tourists drawn to areas for their beauty and uniqueness. Under the guidance of the Mississippi Gulf Coast National Heritage Area, a Nature-based Tourism Master Plan was developed to promote this industry in Mississippi's six (6) coastal counties. The Plan builds on the multitude of existing nature-based activities along the coast to promote the region's parks, preserves, trails and blueways. It provides recommendations for improving maintenance and enhancing public access. Now that the plan is in place, engaging partners, building on what is working, and expanding the tourism network are vitalnext steps. This session will focus on goals and actions of the plan, including: (1) Encouraging local stewardship of the region's waters and lands; (2) Developing common maintenance standards for natural areas; (3) Supporting growth of the Blueways Network and the completion of the MCHT; (4) Restoring publicly accessible habitats damaged by natural and man-made events; (5) Increasing education and outreach about Coastal Mississippi's natural assets; (6) Developing a one-stop shop for tourism packages, (7) Creating a recognition program for exemplary businesses, (8) Training the workforce with unique skills to explore, interpret and enhance the Mississippi Gulf Coast

***Presenter Biography**
Rhonda Price is the Deputy Director, Coastal Restoration and Resilience for the Department of Marine Resources. She manages the Mississippi Gulf Coast National Heritage Area program, the Coastal Impact Assistance Program and is state coordinator for the Sport Fish, Clean Vessel Act program, and the Boating Infrastructure Program for the State of Mississippi.

## COLLABORATION YIELDS MISSISSIPPI'S LARGEST HABITAT RESTORATION PROJECT

**Author(s)**
*George Shuford Ramseur, Mississippi Department of Marine Resources, george.ramseur@dmr.ms.gov
Marc Wyatt, Director, Office of Restoration, Mississippi Department of Environmental Quality
Robert Kroger, Ph.D, PWS, Chief Scientific Officer, Covington Civil and Environmental, LLC

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Recently, something long, low and luminous has become visible in the Mississippi Sound south of Pascagoula in Jackson County, Mississippi. Lying just north of Round Island, the object is a newly completed 14,000 ft. long sand berm designed to enclose and protect Mississippi's largest marsh restoration project. The marsh is to be constructed by pumping in material dredged from the upcoming expansion of the Pascagoula Ship Channel. This beneficial use of dredged material (BU) project achieves many important "firsts" in Mississippi's "post oil spill" era of habitat restoration. It represents an unparalled level of cooperation between a diverse group of partners. In only a few months, the National Fish and Wildlife Foundation (NFWF), Mississippi Department of Environmental Quality (MDEQ), The Mississippi Department of Marine Resources (MDMR), U.S. Army Corps of Engineers (USACE Mobile District) and the Port of Pascagoula were able to execute a Memorandum of Understanding which enabled NFWF to prioritize funds for the berm construction and the USACE Mobile District to initiate the channel expansion project. MDEQ's Mississippi Restoration Team which includes Covington Civil and Environmental, LLC (Covington) led the design and contracting efforts for the berm with support from all the team members. The project should be complete by the end of 2016, and essentially will have built a 220-acre island featuring beach/dune, Chenier and marsh habitats in less than 9 months. The timing and scale of this project represent a major step in Mississippi's growing efforts to address its annual coastal habitat loss of 200 acres.

***Presenter Biography**
George Ramseur is the Director of the Office of Restoration and Resiliency at the Mississippi Department of Marine Resources. He is a graduate of Tulane University with Majors in Geology and Anthropology and is an avid student of systems and processes of all types.

# THE IMPACT OF A ONE-DAY EXPERIENTIAL LEARNING PROGRAM IN ADDITION TO AN ECOLOGY UNIT ON THE ENVIRONMENTAL KNOWLEDGE AND ATTITUDE TOWARD THE ENVIRONMENT OF HIGH SCHOOL BIOLOGY STUDENTS

**Author(s)**
*Anita B Salinas, Mobile County Public Schools, asalinas@mcpss.com

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
This dissertation in practice examined the environmental knowledge and attitude toward the environment of students participating in a high school Biology course and how their knowledge and attitudes toward the environment were impacted by a one-day experiential learning program at the environmental studies center. Experiential Learning Theory serves as the theoretical framework for this study. This mixed methods study collected quantitative data in the form of pre and post tests of environmental knowledge, pre and post questionnaires of attitude toward the environment, and information pertaining to student demographics. The qualitative data collected in this study consisted of students' written responses to open-ended survey questions and a select sample of oral responses to standardized open ended interview questions. Independent samples t tests revealed a statistically significant difference in the change in environmental knowledge for the control group and intervention group, and no significant difference in the change in attitude toward the environment for the two groups. A univariate general linear model found a statistically significant main effect for ethnicity, gender, and grade level as possible predictors of environmental knowledge of students entering a Biology course, and a statistically significant main effect for ethnicity as a possible predictor of attitude toward the environment of students entering a Biology course. Analysis of qualitative data lead to implications of the importance of professional development opportunities for teachers of Biology students. The environmental studies center featured in this study has presented a plan for program enhancement in response to the results of this study.

***Presenter Biography**
Anita Salinas is a resource teacher at the Environmental Studies Center and serves as the lead teacher for the high school ecology program. Anita is a doctoral candidate at the University of South Alabama in the department of Leadership and Teacher Education.

# DEVELOPMENT OF THE CPRA OYSTER LEASE ACQUISITION AND COMPENSATION PROGRAM (OLACP) – FROM LITIGATION TO LEGISLATION

**Author(s)**
*Jason K Shackelford, GeoEngineers, jshackelford@geoengineers.com

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
The Louisiana oyster fishery is a lease-based industry in which the state has historically leased oyster habitat via 15-year contracts, for a nominal fee. In addition, the state has maintained public oyster grounds from which seed and marketable oysters could be obtained by leaseholders and the public. This system coexisted with the oil and gas industry for a number of years. The introduction of the state's coastal restoration and protection program in the early 1990's complicated this relationship and introduced an additional competing use of state owned water bottoms. Once issued, an oyster lease cannot be cancelled or revoked. Therefore, the state needed to establish a program by which the leases could be acquired. In order to accomplish this, a single, consistent valuation method had to be established. Prior to the adoption of the current Oyster Lease Acquisition and Compensation Program (OLACP), there were many competing valuation methodologies associated with oyster lease harvest rights. These included: damage payments from oil and gas activities; lease auction sale data; recorded sales; judicial awards; and an earlier voluntary acquisition program. These different value indicators will be explored and compared in relation to the current Fair Market Value Appraisal Methodology employed under the OLACP. Their role and relative importance in the development of the OLACP will be explored.

***Presenter Biography**
Mr. Shackelford is a shellfish ecologist and environmental scientist with GeoEngineers. His professional experience is in large scale ecosystem restoration planning.

## THE EFFECTS OF SEA-LEVEL RISE AND PLANTING DENSITY ON RESTORED MARSH FUNCTIONALITY

**Author(s)**
*Eric Sparks, Mississippi State University and Mississippi-Alabama Sea Grant, eric.sparks@msstate.edu
Just Cebrian, Dauphin Island Sea Lab and University of South Alabama
Julia A Cherry, University of Alabama
George S Ramseur, Jr., Mississippi Department of Marine Resources

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Restoration and enhancement projects have been used as an attempt to restore the lost functions and services associated with marsh degradation. However, the majority of these projects are limited in evaluation of the ecosystem services they provide, cost-effectiveness, and resiliency. One of the most valuable ecosystem services provided by coastal marshes is the removal excess of nutrients prior to entering coastal waters. Thus, we focused on how effective different initial planting densities of restored marsh are at removing nutrient pollution and if nutrient removal capacity changes under short term sea-level rise conditions. We created marshes in abandoned canals and, within them, planted plots containing 5 different densities (0%, 25%, 50%, 75%, and 100%) of *Juncus roemerianus*. In half of the plots, we simulated short term sea-level rise to approximate levels projected at 2030. We compared porewater concentrations of dissolved inorganic nitrogen (DIN), through time, and used this measurement as a proxy for nutrient removal across all plots. Our findings indicate the 50%, 75%, and 100% planting densities suppress porewater DIN concentrations to similar levels and at significantly greater levels than the 0% and 25% planting densities. Therefore, the 50% planting density is suggested as the most cost-effective design for nutrient removal. Effects of short term sea-level rise on DIN concentrations varied by marsh location, but, in general, did not have a large effect. This information can be used by managers to best design cost-effective restoration projects that take into account the potential effects of sea-level rise.

***Presenter Biography**
Dr. Sparks has a Ph.D. in marine sciences from the University of South Alabama and Dauphin Island Sea Lab and a B.S. degree in marine biology from Troy University. As an Assistant Extension Professor for Mississippi State University and Coastal Ecology Specialist for Mississippi-Alabama Sea Grant, he focuses his extension and research activities on coastal restoration, estuarine and wetland ecology, environmental stewardship, and citizen science.

## SUBMERGED AQUATIC VEGETATION MAPPING IN MOBILE BAY AND ADJACENT WATERS OF COASTAL ALABAMA IN 2015

**Author(s)**
*Tim Thibaut, Barry A. Vittor & Associates, Inc., tthibaut@bvaenviro.com
Roberta Swann, Mobile Bay National Estuary Program
Carl Ferraro, Alabama Department of Conservation and Natural Resources, State Lands Division

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Submerged aquatic vegetation (SAV) was mapped in coastal Alabama for the Mobile Bay National Estuary Program (MBNEP) and Alabama Department of Conservation and Natural Resources State Lands Division (SLD), and compared with prior MBNEP/SLD surveys in 2002 and 2009. Two seasonal surveys were performed based on aerial imagery acquired during summer (July/August) and fall (October) 2015. The ortho imagery was used as a base map to outline SAV signatures in a GIS environment. Field data were collected at 1,437 locations. A total of 26 SAV species were recorded. Overall, there were 3,875 more acres mapped in 2015 compared to 2009, mostly due to a 2,455-ac increase in the Bridgehead quadrangle and a 511-ac increase in the Mobile quadrangle. Compared to 2002, the 2015 survey had 2,535 more acres mapped in the Bridgehead quadrangle. SAV was mapped in 2015 at several locations without it in 2002 or 2009, including Dog River and its tributaries, Duck Lake, Heron Bayou, Threemile Creek, and East Fowl River in Mobile County, and Nolte Creek, Shelby Lake, and Bon Secour Bay in Baldwin County. There were 1,201 fewer acres mapped in the fall survey compared to summer, with most of the change in upper Mobile Bay. The seasonal decline might have been a response to higher salinity, which increased from 2.8 PSU to 8.8 PSU between September 15th and October 1st at the Meaher Park environmental monitoring station on the Mobile Causeway. North of the Causeway, SAV extent and species assemblages remained more consistent between seasons.

***Presenter Biography**
Tim Thibaut is a Senior Program Manager at Barry A. Vittor & Associates, Inc. in Mobile, AL., specializing in biological science, regulatory compliance, and coastal planning. He has degrees from Auburn University in Marine Biology (1986) and Zoology (1992), and is a member of the Science Advisory Committee of the Mobile Bay National Estuary Program.

# MODELING UNCERTAINTIES IN THE 2017 LOUISIANA COASTAL MASTER PLAN INTEGRATED COMPARTMENT MODEL

**Author(s)**
*Eric Davidson White, The Water Institute of the Gulf, ewhite@thewaterinstitute.org
Ehab Meselhe, The Water Institute of the Gulf
Yushi Wang, The Water Institute of the Gulf
Mandy Green, Louisiana Coastal Protection and Restoration Authority

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
In long-term coastal planning efforts, especially one as critical as the Louisiana Coastal Master Plan, it is important to consider the effects of uncertainties on predicted outcomes. In the modeling effort of the 2017 Coastal Master Plan, two primary sources of uncertainties were investigated. First is the uncertainty in the environmental drivers, namely, eustatic sea level rise, subsidence, precipitation, and evapotranspiration. This uncertainty was addressed through an environmental scenario approach, where the modeled landscape response was evaluated across different combinations of values for these environmental drivers. The second source of uncertainty investigated is associated with the calculations of critical model variables and how they influence key model output. This uncertainty was analyzed by applying perturbations to model variables that are directly linked to the calculations of land area. The model variables examined include water level, salinity, wetland types, suspended mineral sediment concentration, and organic accretion. This presentation will focus on the relative significance of each of these uncertainty sources: environmental drivers versus model parametric error. The primary model outcome, land area, will be assessed in both quantitative and spatial terms. The quantitative measure (e.g., land area) is important for planning efforts due to the project selection process which emphasizes individual project benefits in terms of land area built or sustained. The spatial component of the uncertainty analysis is equally important to fully understand whether the relative performance of one project may be unfairly penalized due to being placed in a region of the model domain that is intrinsically more uncertain.

***Presenter Biography**
Eric White is a licensed Environmental Engineer with nearly a decade with hydrologic and hydraulic modeling experience. He served as the lead developer for model integration efforts for the 2017 Louisiana Coastal Master Plan.

## THE SPATIAL DISTRIBUTION AND INVASIVE PATTERN OF CHINESE TALLOW UNDER MULTI-SCALES AT SOUTH COASTAL AREA OF MISSISSIPPI

**Author(s)**
*Shaoyang Yang, Forestry department of Mississippi State Universtity, sy377@msstate.edu
Andrew W. Ezell, Forestry department of Mississippi State University
Zhaofei Fan, School of Forestry and Wildlife Sciences of Auburn University

**Session**
Habitat Management and Restoration

**Presentation**
Oral presentation

**Abstract**
Chinese tallow has become a serious ecological threat at south coastal area of America, especially for the local longleaf-slash pine ecosystems. The longleaf-slash pine ecosystems are fire (wild and prescribed) dependent systems, but the fire can also increase the risk of Chinese tallow invasion. Therefore, understanding and obtaining Chinese tallow invasive pattern are important for coastal ecosystem management and restoration. In this paper, Chinese tallow invasive patterns and its impact factors, such as age structure, tallow seedlings and saplings, canopy closure, understory vegetative biodiversity, seeds bank, fire intervals and micro-topography of stand, are investigated and analyzed through 4 Chinese tallow stands, 27 randomly selected plots, and linear sampling spots in stand and landscape level at Mississippi Sandhill Crane Wildlife Refuge and Grand Bay Wildlife Refuge. The results indicate that compared to the annual burn, periodic burn tends to favor tallow invasion and establishment. Meanwhile in landscape scale the Chinese tallow will invade from the edge of the landscape to the center of the region via the powerline, highway, and fire break. The Chinese tallow invasive pattern in stand level shows that the Chinese tallow invasion starts from the hot spot which may be the seed tree or snag, and the micro-topography could influence the Chinese tallow distribution by affecting the seeds bank distribution. Except seeds bank and micro-topography, the negative binomial regression indicates that overstory pine density and/or canopy closure also relate to the density of tallow seedlings and saplings. However, tallow is not common in completely open area (savanna) in this region.

***Presenter Biography**
Shaoyang Yang, the PhD student (research assistant) of forestry department in Mississippi State University and visiting scholar in Auburn University. His research interest is the invasion of Chinese tallow at southeast coastal and gulf area, and the restoration of local longleaf-slash pine ecosystems.

# ENVIRONMENTALLY-FRIENDLY ALTERNATIVES TO BULKHEADS FOR RESILIENT AND HEALTHY SHORELINES: EVALUATION AND IMPLANTATION OF TWO LIVING SHORELINE DESIGNS

**Author(s)**
*Jamie L Amato, Dauphin Island Sea Lab, jamato@disl.org

**Session**
Habitat Management and Restoration

**Presentation**
Poster presentation

**Abstract**
There are a few different techniques that can be used to address the problem of coastal erosion. In areas like Mobile Bay, bulkheads became a common solution to this problem. These vertical walls were meant to reduce erosion; however, we have evidence that these bulkheads are actually increasing this erosion by reflecting the wave energy. The sediment and marshes below and beside the bulkheads often become significantly damaged (Douglass and Pickell 1999). Living Shorelines, a technique where marsh is created in order to stabilize a coastline, are becoming a more popular solution over bulkheads. Through the help of private landowners, The Nature Conservancy, and Dauphin Island Sea Lab, I will be creating living shorelines to determine their effectiveness over bulkheads to reduce shoreline erosion and create a better habitat for wildlife. Effectiveness will be determined by four metrics: marsh plant cover, shoreline stabilization, fish habitat, and filtration of nutrient pollution. There will be a total of six shorelines constructed. Three will be built in areas where there are no bulkheads, and three will be built over existing bulkheads. The two different types of shorelines will be examined for their cost-effectiveness, which will be useful for private landowners that may want to utilize these techniques on their property. This project is still in its very beginning stages of picking out sites and working with landowners. However, spreading awareness of this project will allow the public to get a better understanding of the different techniques they can use to protect their coastline.

***Presenter Biography**
Jamie Amato graduated from Louisiana State University in 2016 with a degree in Natural Resource Ecology and Management. She is now a graduate student at the University of South Alabama and studies Marine Sciences at the Dauphin Island Sea Lab.

## THE LIFE AND CONSERVATION OF *Lepidochelys kempi* IN THE GULF OF MEXICO

**Author(s)**
*Forrest W Collins, University of Alabama at Birmingham, forrestcol10@gmail.com

**Session**
Habitat Management and Restoration

**Presentation**
Poster presentation

**Abstract**
*Lepidochelys kempi* is known as the most endangered sea turtle in the world with a declining population from global warming, predation, fishing, shrimping, stressful environments, loss of food, and oil spills. With efforts focused on their nesting beaches, research needs to be performed on their journey to and from their nesting and foraging areas. Research was first performed off of Dauphin Island, an island that is the midway point for migrating sea turtles. Many Ridleys were found dead and washed up without any sign of injury. With each dead Ridley found while walking the beaches, data was taken on their coordinates, physical attributes, estimated age, size, color, hypothesized death, and gender (if applicable). Since research was performed on one single point in the Gulf, not enough data was collected to figure out the life or apparent decline of the Kemps Ridley in the entire Gulf of Mexico. The next step would to go out into the Gulf of Mexico to tag and collect data from captured Kemps Ridleys. Tagging this species with flipper tags and some with satellite tags can help track their movement, population size, and the percent yield surviving to reproductive age. Taking blood from this species can show how healthy, stressed, and strong they are while migrating. Due to funding, this part of the experiment was not performed, but planned for future experimentation. This will help further understand the life of this species, and help decipher why they are declining so rapidly.

***Presenter Biography**
I am a current student at the University of Alabama at Birmingham majoring in biology and a concentration of Marine Sciences. I am currently doing research on the history of the Kemps Ridley and population restoration of the Diamondback Terrapin.

# MYCORRHIZAL COLONIZATION OF COASTAL WETLAND PLANT SPECIES

**Author(s)**
*Bradley Delfeld, Southern Illinois University, Bmdelfe@siu.edu
Pamela Weisenhorn, Argonne National Laboratory
Julia Cherry, University of Alabama
Loretta Battaglia, southern Illinois University

**Session**
Habitat Management and Restoration

**Presentation**
Poster presentation

**Abstract**
Coastal marshes are among the first ecosystems to be altered by climate change. With escalating sea level rise and associated loss of habitat, assisted migration may be useful to establish potential founder populations upslope in more favorable conditions. Mycorrhizal mutualisms, that aid in nutrient uptake, could play a key role in determining success of these populations, but there has been no published research on this topic to date. To evaluate these relationships, we initiated a field experiment at the Grand Bay National Estuarine Research Reserve in coastal Mississippi and a greenhouse experiment using soils from the field sites. As a first step, we established a pilot study to determine whether dominant marsh species in this system are indeed mycorrhizal and if so, to what degree. Eight plots were established in salt, brackish and fresh marsh zones (n=24). Multiple individuals of the dominant species were taken from plots in their respective zones; composite root samples were cleared, stained and mycorrhizal occurrence was assessed at 200x using a compound light microscope. All species were mycorrhizal, and ANOVA revealed that the salt marsh dominant *Spartina alterniflora* had the lowest abundance, the brackish marsh dominant *Juncus roemerianus* was intermediate, and the fresh marsh species *Panicum virgatum* had the highest mycorrhizal colonization. Our ongoing work will provide insight into the identity of the mycorrhizal mutualists, whether these plant species partner with different mycorrhizae when migrated upslope, and ultimately the role these mutualisms play in plant migration and their ability to keep pace with rising seas.

***Presenter Biography**
Brad Delfeld is a graduate student at Southern Illinois University. His research focuses on mycorrhizal mutualisms in coastal wetlands.

# FAUNAL ASSEMBLAGES ASSOCIATED WITH LIVING SHORELINES AND IMPLICATIONS FOR ECOSYSTEM FUNCTIONING

**Author(s)**
*Daniel C Firth, Mississippi State University Dept. of Wildlife, Fisheries and Aquaculture, dcf72@msstate.edu
Eric Sparks, Mississippi State University, Coastal Research and Extension Center
Just Cebrian, University of South Alabama, Department of Marine Sciences
Nigel Temple, Mississippi State University, Coastal Research and Extension Center
Sara Martin, Mississippi State University, Coastal Research and Extension Center

**Session**
Habitat Management and Restoration

**Presentation**
Poster presentation

**Abstract**
Living shorelines have been used as an alternative to hardened shorelines to reduce coastal erosion. These projects are environmentally friendly alternatives to hardened shorelines because they provide additional ecosystem functions and services. In our study, we focus on the potential role of different living shoreline designs to provide habitat and investigate the linkage between faunal assemblages and ecosystem function. Additionally, we will compare soil infauna and fish assemblages in plots planted with nursery grown marsh plants, naturally colonized marsh stands, and bare sediment both with and without offshore breakwaters. Our study site is located in Bon Secour Bay, AL and contains 600 meters of breakwaters, constructed in 2012 by a collaboration of The Nature Conservancy and the Weeks Bay National Estuarine Research Reserve. Along the breakwater shoreline and an adjacent non-breakwater shoreline, we planted nursery grown sods of *Spartina alterniflora* in 4 square meter plots and established similar sized plots of naturally colonized marsh and plots with no vegetation. Each treatment combination is replicated 8 times behind breakwaters and non-breakwaters, for a total of 48 plots. Within each plot we are assessing faunal presence and abundance with Breder traps, trawl nets, and infaunal core samples. Furthermore, measurements of ecosystem services, such as nutrient removal and carbon storage, will be used to examine the correlations of these services and the faunal community data collected. This study will inform end-users on the magnitude and implications of faunal assemblages associated with different living shoreline designs, of varying cost and effort.

***Presenter Biography**
Mr. Firth has a B.S. degree in biological sciences from the University of Southern Mississippi. He is currently pursuing a M.S. degree in wildlife, fisheries and aquaculture at Mississippi State University under Dr. Eric Sparks. He focuses his research activities on coastal restoration, estuarine and wetland ecology.

## GEOLOGIC FRAMEWORK AND SURFICIAL PROCESSES, GRAND BAY, MISSISSIPPI-ALABAMA

**Author(s)**
*Stanley D. Locker, U. S. Geological Survey, slocker@usgs.gov
Christopher G. Smith, U.S. Geological Survey
Nancy T. DeWitt, U.S. Geological Survey
Arnell S. Forde, U.S. Geological Survey
Chelsea A. Stalk, U.S. Geological Survey
Jake J. Fredericks, U.S. Geological Survey

**Session**
Habitat Management and Restoration

**Presentation**
Poster presentation

**Abstract**
The Grand Bay marsh-estuarine system has been changing in response to long-term changes in freshwater inflows, coastline configurations, and sea-level rise. In an effort to better understand the geologic evolution of this area, and to inform future planning in the face of increasing rates of sea-level rise, the United States Geological Survey has been conducting a multidisciplinary investigation to assess sediment budgets (marsh/estuary exchange) as well as stratigraphic and physical controls influencing change. This presentation is focused on the geologic framework component within the estuary. A range of geophysical and acoustic mapping technologies have been deployed in Grand Bay in an integrated manner to understand recent Holocene history and seafloor characteristics. These systems include single beam bathymetric mapping, subbottom profiling using Chirp and boomer sound sources, side-scan-sonar mapping, acoustic bottom classification (QTC), and high-resolution multibeam imaging of selected eroding marsh edges. These data sets are being integrated with surface sediment samples and cores to calibrate the acoustic data in terms of sediment properties and chronology, and in turn to extend the interpretation of sedimentary facies spatially. These data provide an understanding of how this system is evolving, a baseline for assessment of future change, and information for management planning.

***Presenter Biography**
Dr. Stan Locker is a research geologist with the U.S. Geological Survey, Coastal and Marine Geology Program. His research interests broadly consider the stratigraphic architecture and depositional history of continental margins and the role of sea-level change.

# LONGLEAF PINE (*Pinus palustris*) REGENERATION RESPONSE IN RELATION TO BASAL AREA MANAGEMENT

**Author(s)**
*Cameron Poyner, Auburn University, School of Forestry and Wildlife Sciences, csp0028@auburn.edu
Joseph Fan, Auburn University, School of Forestry and Wildlife Sciences
Shaoyang Yang, Mississippi State University, Department of Forestry
John Kush, Auburn University, School of Forestry and Wildlife Sciences

**Session**
Habitat Management and Restoration

**Presentation**
Poster presentation

**Abstract**
Arguably the most important tree species in the southern United States, the longleaf pine tree (*Pinus palustris*) ecosystem has experienced a drastic reduction in area, from approximately 92 million acres pre-European settlement, to today's lowly 3.3 million acres. Longleaf pine ecosystems provide essential habitats for fauna that other ecosystems cannot. One major problem associated with the decline of this species coverage is regeneration failures. Our study investigated the regeneration of longleaf pine in a managed area in southern Alabama. This research site has been managing for longleaf pine since the 1940's, with burn history, site index, basal area, and tree canopy heights recorded for just as long. This gives us a unique opportunity to assess what situations prohibit/enhance regeneration of this species. We found that basal area management is not that important in determining the amount of longleaf pine seedling recruitment, but in order to ensure survival of those seedlings to saplings and eventual adult trees, basal area management is extremely important. Anything under 60 sq. ft. / acre was suitable for maximum longleaf regeneration survivability. Additionally, previous studies have shown a 16 meter zone of exclusion under mature longleaf pine trees where very minimal regeneration is found. However, we found this zone of exclusion to be <5 meters in size. After the zone of exclusion, there is no relationship between the distance to mature trees and sapling heights (R2 = 0.0125). These results will help land managers identify more appropriate management techniques of this critical species.

***Presenter Biography**
I am a Masters of Forestry student at Auburn University. As a research assistant, my research is focused on longleaf pine regeneration and Chinese tallow re-sprouting abilities.

## ENGINEERING SALINITY CONTROL IN LAKE CALCASIEU, LOUISIANA TO PROTECT FRINGING WETLANDS AND ESTUARINE ECOSYSTEMS WHILE PRESERVING DEEP-DRAFT ACCESS TO THE PORT OF LAKE CHARLES

**Author(s)**
*Cyndhia Ramatchandirane, The Water Institute of the Gulf, cramatch@thewaterinstitute.org
Ehab A Meselhe, The Water Institute of the Gulf
Mead A Allison, The Water Institute of the Gulf
Austin Feldbaum, Louisiana Coastal Protection and Restoration Authority
Diana Di Leonardo, Department of Earth and Environmental Sciences, Tulane University
Collin Ortals, The Water Institute of the Gulf
Dallon H Weathers, The Water Institute of the Gulf

**Session**
Habitat Management and Restoration

**Presentation**
Poster presentation

**Abstract**
The Calcasieu Ship Channel Salinity Control Measures is a large-scale hydrologic restoration project proposed as part of Louisiana's Comprehensive Master Plan for a Sustainable Coast (CPRA 2012). The Lake Calcasieu estuary is a productive commercial and recreational fishery in southwest Louisiana. Like many coastal water bodies in Louisiana, saltwater intrusion threatens the fisheries and the health of freshwater wetlands fringing the estuary. The Calcasieu Ship Channel, which serves the Port of Lake Charles, is regularly dredged to maintain federally mandated navigation safety dimensions. This provides a conduit for saline water to enter the estuary, a problem exacerbated by rising sea levels. The hydrology of surrounding bayous, rivers, and artificial channels entering the estuary has also been regulated with gated structures (e.g., weirs and flap gates). The State of Louisiana is proposing measures to regulate the connectivity between the Ship Channel and the surrounding estuary to limit future salinity increases. Multiple alternative solutions were proposed and analyzed for feasibility and cost. To support the feasibility study, a data mining and targeted data collection program was carried out to calibrate and validate quantitative numerical models to test impacts of alternatives on salinity. Now that one alternative has been selected for the engineering and design phase, a second phase of data collection and modeling has been initiated to characterize sediment transport dynamics and develop a basin sediment budget. This phase is needed to support evaluation of the project's influence on navigation channel maintenance and resources, such as oyster seed grounds in Lake Calcasieu.

***Presenter Biography**
Cyndhia Ramatchandirane is a Research Associate at The Water Institute of the Gulf with the Physical Processes and Sediment Dynamics group. She completed her Master of Science degree in the Department of Earth and Environmental Sciences at Tulane University.

## SEA GRANT FELLOWSHIP OPPORTUNITIES

**Author(s)**
*Melissa Schneider, Mississippi-Alabama Sea Grant, melissa.schneider@usm.edu
Loretta Leist, Mississippi-Alabama Sea Grant

**Session**
Habitat Management and Restoration

**Presentation**
Poster presentation

**Abstract**
The Mississippi-Alabama Sea Grant Consortium offers fellowship opportunities each year for several fellowships. This poster will focus on making graduate students, professors and agencies aware of the fellowship opportunities. The Sea Grant John A. Knauss Marine Policy Fellowship, which places graduate students in Washington DC to work with federal agencies or legislative offices on national marine policy decisions. The NOAA Fisheries/Sea Grant Fellowship Program, which offers graduate students the opportunity to work with a mentor in two fields: population and ecosystem dynamics involving fish populations and marine ecosystems or marine resource economics. Finally, the NOAA Coastal Management Fellowship offers on-the-job training for two years with a state coastal resource agency project. The projects, and the states where the fellowships take place, vary from year to year.

***Presenter Biography**
Melissa Schneider is the communications coordinator for the Mississippi-Alabama Sea Grant Consortium.

# EFFECTS OF MARSH PLATFORM SLOPE, SEDIMENT TYPE, SEA-LEVEL RISE, AND INITIAL PLANTING DENSITY ON NUTRIENT RETENTION IN A RESTORED MARSH

**Author(s)**
*Nigel A Temple, Mississippi State University, Coastal Research and Extension Center, nigel_temple@yahoo.com
Daniel C Firth, Mississippi State University, Coastal Research and Extension Center, Department of Wildlife, Fisheries, and Aquaculture
Just Cebrian, Duauphin Island Sea Lab, University of South Alabama, Department of Marine Sciences
Eric L Sparks, Mississippi State University, Coastal Research and Extension Center, Mississippi-Alabama Sea Grant Consortium
Sara M Martin, Mississippi State University, Coastal Research and Extension Center

**Session**
Habitat Management and Restoration

**Presentation**
Poster presentation

**Abstract**
Marsh degradation has contributed to coastal eutrophication. In response, coastal land managers have designed and implemented marsh restoration projects aimed at reducing nutrient pollution. However, relatively high costs and minimal monitoring typically associated with these projects often discourages other land managers from implementing projects. For this project we will evaluate the effectiveness of different restoration designs, of varying cost and effort, at removing nutrient pollution. Previous work suggests nutrient retention is similar in marshes planted at 50% cover and greater. However, both sediment type and slope can affect the residence time of nutrients within the rhizosphere, limiting plant and microbe nutrient processing. Sea-level rise (SLR) may additionally affect restoration outcomes by increasing marsh hydro-periods. To determine the effects of initial planting cover, sediment type, platform slope and SLR on nutrient processing, we implemented a field experiment on the Fish River within the Weeks Bay National Estuarine Research Reserve, Alabama. We utilized sods from a nearby donor marsh to establish three replicate subplots of 24 treatment combinations: three plant (Juncus romerianus) cover (0%, 50%, and 100%), two slope (gentle and steep), two sediment types (coarse and fine), and two SLR scenarios (current and future). Within subplots, we will simulate runoff events using water of known dissolved inorganic nitrogen concentration. Porewater collected after simulation from wells set in the rhizosphere will then be used to determine individual and interactive treatment effects on nutrient processing. Elucidating these effects will provide insight into the design of effective, low cost restoration projects for coastal management.

***Presenter Biography**
Nigel has a M.S. in Biology from the University of Alabama and a B.S. in Biological Sciences from Virginia Polytechnic and State University (Virginia Tech). As a research assistant at Mississippi State University's Coastal Research and Extension Center, Nigel focuses on coastal restoration ecology.

# OYSTER GARDENING IN ALABAMA

**Author(s)**
*PJ Waters, ACES/MASGC, waterph@auburn.edu

**Session**
Habitat Management and Restoration

**Presentation**
Poster presentation

**Abstract**
Volunteer Gardeners of the Mobile Bay Oyster Gardening Program have grown more than 600,000 advanced stocker sized oysters for restoration, established a 10 acre oyster sanctuary and launched the Oyster Trail in Mobile and Baldwin Counties. This citizen driven, extension supported effort addresses reef damage and the corresponding loss of ecosystem services provided by oyster reefs in Mobile Bay and the Mississippi Sound. Students to retirees raise juvenile oysters from June through November in protective gardens before returning them to the wild. There, they will spawn, providing tens of millions of additional larvae for the overall estuarine system. To extend the reach of this project, and further the message of the dynamic role oysters play in our coastal culture, economy and ecology, The Oyster Trail was launched. Now, with more than 25 stops around Mobile Bay, the Trail serves as a visible reminder of the ongoing services provided by our molluscan assets. Through a scavenger hunt for knowledge (and prizes), visitors and locals come face to face with GIANT oysters, and begin to understand the value of oysters beyond their culinary attributes. With proceeds from the Trail going back into restoration, individual and corporate citizens have come together for the common good, to enjoy, better understand, protect and grow our natural resources which we have come to rely on for work and recreation.

***Presenter Biography**
Extension Specialist with AL Cooperative Extension System and MS-AL Sea Grant. Coordinator of the oyster gardening programs in Alabama and Mississippi.

## SUPERSIZE ME: NEKTON HABITAT PREFERENCE BASED ON LIFE STAGE AND HOW IT RELATES TO HABITAT REDUNDANCY VS. COMPLEMENTARITY IN THE GULF OF MEXICO

**Author(s)**
*Laura A West, Dauphin Island Sea Lab, lwest@disl.org
Ryan Moody, Dauphin Island Sea Lab
Ken Heck, Dauphin Island Sea Lab
Dottie Byron, Dauphin Island Sea Lab
Just Cebrian, Dauphin Island Sea Lab

**Session**
Habitat Management and Restoration

**Presentation**
Poster presentation

**Abstract**
Habitat redundancy is the functional overlap between habitats in the provision of food and shelter, and species may rely on either habitat alone to furnish their needs. Habitat complementarity, on the other hand, occurs when a species uses different habitats at different times, and that species requires both habitats to thrive. These concepts continue to receive attention because they are important for our understanding of coastal ecosystem services and functional resiliency. Here we examine evidence of redundancy and complementarity between seagrass beds and fringing marshes in the northern Gulf of Mexico and consider habitat preferences of nekton based on life stage (size). We sampled nekton communities in seagrass beds and paired fringing marshes in three locations in coastal Alabama and two locations in the Florida panhandle from 2010 – 2012. Univariate analysis (i.e. abundance of individual species) indicated substantial habitat redundancy for a number of nekton species since the species were frequently captured in both habitats. However, some species (e.g. blue crabs, penaeid shrimp) appeared to show a distinct preference for one habitat over the other which varied with life stage. This suggests seagrass beds and fringing marshes may be redundant habitats for some species, but complementary habitats to those that may use one habitat exclusively as juveniles and move to a different habitat as adults. These findings contribute to a better understanding of habitat redundancy vs. complementarity and functional resiliency in the northern Gulf of Mexico.

***Presenter Biography**
Laura obtained her Bachelor of Science in Biology at Gordon State College in Georgia. She jumped right into the deep end of graduate school and is now a PhD student at Dauphin Island Sea Lab in Alabama under Dr. Just Cebrian.

# "MUCK TO MARSHES": VOLUNTEER MONITORS FOR BENEFICIAL USE MARSH RESTORATION IN MISSISSIPPI

**Author(s)**
*Janet Wright, Mississippi Habitat Stewards, jwright01@cableone.net
Jared Harris, Mississippi Department of Marine Resources
Alison Leggett, Mississippi Department of Marine Resources
George Ramseur, Mississippi Department of Marine Resources

**Session**
Habitat Management and Restoration

**Presentation**
Poster presentation

**Abstract**
Marsh restoration projects frequently lack a long-term monitoring component that can assess the trajectory of the restoration or allow for adaptive management. We have developed a long-term program, "Muck to Marshes," in which trained volunteers monitor the status of projects under Mississippi Department of Marine Resources' Beneficial Use marsh restoration program. Since April 2014 the volunteers, Mississippi Habitat Stewards, have surveyed vegetation, macrofauna, and birds in a quarterly protocol at restoration and natural reference marsh sites on Deer Island, Harrison County, Mississippi. 24 volunteers have participated in 42 site surveys. Panoramic photos provide a visual record of changes at each site. At restoration sites, percent cover and vegetation diversity (Simpson's index) have increased, although cover type does not yet mimic the natural marsh. Bird observations show increasing use of restoration sites by marshbirds, although bird abundance and guild diversity overall has not shown a pattern. Our original measure of target macrofauna assumed more tidal channels than have actually formed in the restoration sites, and we are reviewing the utility of this measure. Results from this program so far have been used to assess the value of artificial planting, promote the Beneficial Use approach, and alert authorities to hydrology issues. The program is expanding to reach additional Beneficial Use sites under construction. While other, recently initiated, marsh restoration programs may include a funded professional monitoring component (usually for a limit of 5-7 years), we note several features that make a volunteer citizen-science program uniquely valuable.

***Presenter Biography**
Janet Wright, PhD, a retired biology professor, has been volunteering with citizen science efforts on the Mississippi Coast for the past 10 years. As a member of Mississippi Habitat Stewards, she coordinated with Mississippi Department of Marine Resources in developing the "Muck to Marshes" monitoring program.


Living Resources

## SPATIAL VARIABILITY IN THE INDIVIDUAL GROWTH OF SHEEPSHEAD (*Archosargus probatocephalus*) IN THE GULF OF MEXICO: IMPLICATIONS FOR ASSESSMENT AND MANAGEMENT

**Author(s)**
*Grant D Adams, Division of Coastal Sciences, School of Ocean Science and Technology, University of Southern Mississippi 703 East Beach Drive, Ocean Springs, Mississippi 39564, USA, grant.adams@eagles.usm.edu
Robert T Leaf, Division of Coastal Sciences, School of Ocean Science and Technology, University of Southern Mississippi 703 East Beach Drive, Ocean Springs, Mississippi 39564, USA

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Understanding geographic variations in individual growth is essential for the management of exploited fish populations because such variations are used to define stock structure and individual growth is known to influence stock productivity. Sheepshead (*Archosargus probatocephalus*) is a sparid of commercial and recreational importance distributed throughout estuarine and coastal waters in the Gulf of Mexico and preliminary work indicates that there is substantial heterogeneity in state-specific estimates of length at age. To investigate the variability of growth dynamics in the northern Gulf of Mexico we used fishery-dependent and – independent age and length data from Texas, Louisiana, Mississippi, Alabama, and the Gulf Coast of Florida. These data were used to construct a hierarchically structured three parameter von Bertalanffy growth model (VBGM) in the Bayesian framework. This model fitting allows parameter estimates to vary spatially (by state) as a random effect. Mean posterior gulfwide VBGM parameter estimates were: $L\infty$= 478 mm FL, k = 0.306 y-1, and t0 = -1.69 y and these varied considerably among states. Estimates of asymptotic lengths $L\infty$ were greater in Alabama and Mississippi, while estimated growth coefficients k were lower in Florida and Mississippi. Results of the present study indicate that state Sheepshead stocks should be managed separately for maximum efficiency because of the observed heterogeneity in growth. Variations in the individual growth of Sheepshead are likely due to variations in environmental conditions but we note that state sampling and age determination protocols may also contribute to the observed contrasts.

***Presenter Biography**
After serving with the Peace Corps in Peru for four years Grant is pursuing a master's degree in coastal sciences with Dr. Robert Leaf. His research focuses on understanding variation in commercially important fish stocks to inform sustainable marine resource use.

# CHARACTERIZING THE RESPIRATORY RESPONSE OF A BENTHIC POLYCHAETE EXPOSED TO MULTIPLE STRESSORS

**Author(s)**
*Alyssa D Bennett, University of Southern Mississippi- Gulf Coast Research Laboratory, alyssa.bennett@usm.edu
Chet F Rakocinski, University of Southern Mississippi

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
In light of increasing pressures from hypoxia and elevated ocean temperatures, more studies need to address effects of multiple stressors. Higher temperatures associated with climate change exacerbate the threat of hypoxia within coastal ecosystems. Elevated temperatures exacerbate effects of hypoxia on marine organisms by raising metabolic demands while lowering oxygen solubility. Moreover, physiological effects of these concurrent stressors are not likely additive. Here we characterize mass-specific aerobic respiration as a surrogate of metabolic cost for the opportunistic polychaete, *Streblospio gynobranchiata*, at combined levels of dissolved oxygen and temperature, and relative to different exposure periods. Mass-specific aerobic respiration was measured for subjects after 24 hours of acclimation across the full range of body sizes at three levels of dissolved oxygen (20%, 60%, and 100% oxygen saturation) and three temperatures (15°C, 25°C, and 35°C). To consider differences due to acclimation period, repeated measurements on individuals were also made after 3, 6, 9, and 12 hours of exposure to hypoxia (20%), at 25° C. Allometric responses in aerobic respiration were observed for every treatment combination. Respiration rates tended to increase with increasing temperatures and decreasing DO, suggesting higher metabolic costs in order to oxyregulate. Different periods of exposure elucidated a nonlinear temporal pattern in the respiratory response. For example, aerobic respiration was initially elevated, subsequently decreased, and again increased after 12 hours of exposure. More complete information about physiological adaptations on the organismal level will help managers understand the consequences of declining oxygen levels in the face of climate change.

***Presenter Biography**
Alyssa is a master's student at the University of Southern Mississippi. She is studying the synergistic effects of varying levels of dissolved oxygen, temperature, and body size on the respiratory response of the Spionid polychaete, *Streblospio gynobranchiata*.

# LONG TERM DYNAMICS OF SEAGRASSES IN THE MISSISSIPPI SOUND: AREA CHANGE AND FRAGMENTATION PATTERNS FROM 1940 TO PRESENT

**Author(s)**
*Patrick Biber, The University of Southern Mississippi, patrick.biber@usm.edu
Linh Pham, The University of Southern Mississippi

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Seagrasses are submerged aquatic angiosperms that are found in shallow, coastal marine environments. Species found in the Mississippi Sound include *Halodule wrightii* (shoal grass), *Ruppia maritima* (widgeon grass), *Syringodium filiforme* (manatee grass), and *Thalassia testudinum* (turtle grass). Seagrasses are subjected to numerous stressors such as direct physical damage to seagrass habitats, nutrient and sediment pollution, the introduction of exotic species, and global climate change. A seagrass landscape can be defined in many ways but its definitions invariably include an area containing an interacting mosaic of patches with a structure (pattern) that is hypothesized to influence its function. A study of historical change for seagrasses in the Mississippi Sound was conducted under the broad theme of habitat loss and fragmentation. Seagrass mapping data were collated from a multitude of projects including field surveys, herbarium records, remote sensing imagery, and geographic information system (GIS) maps to provide information on seagrass change from 1940 to 2011. Detailed analysis of these data utilizing theories and techniques borrowed from landscape ecology were used to quantify patterns and dynamics of seagrass landscape change on the barrier islands using the Fragstats software. Fragmentation and pattern analysis included area to edge, shape, and aggregation metrics. Seagrass loss and fragmentation was different among islands and at various temporal scales, within the least amount of seagrass present during the 1970s. Horn Island had the least patchy landscape with most seagrass, while West Ship Island had the least amount of seagrass and was the most fragmented throughout the period of analysis.

***Presenter Biography**
Dr. Patrick Biber is an Associate Professor in the Division of Coastal Sciences at the University of Southern Mississippi, Gulf Coast Research Laboratory in Ocean Springs. His research interests include plant physiology, landscape ecology, and coastal restoration, with a special interest in the northern Gulf of Mexico.

## AN ASSESSMENT OF SPOTTED SEATROUT (*Cynoscion nebulosus*) STOCK STATUS IN ALABAMA WATERS

**Author(s)**
*Erin C Bohaboy, University of South Alabama / Dauphin Island Sea Lab, ebohaboy@disl.org
John Mareska, Alabama Department of Conservation and Natural Resources, Marine Resource Division
Brian Klimek, University of South Alabama / Dauphin Island Sea Lab
William F Patterson, University of South Alabama / Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Spotted seatrout (*Cynoscion nebulosus*) are among the most targeted gamefish in northern Gulf of Mexico estuaries, including in Alabama. Catch per unit effort has declined since 2012 in Alabama fishery-dependent and -independent indices, raising concerns over spotted seatrout stock status. To address these concerns, a stock assessment was performed in Stock Synthesis, an integrated statistical age-structured population model. Data inputs included catch and length/age composition from the recreational fishery and a fishery-independent gillnet survey through 2015, as well as age and growth estimates computed from otolith samples. A base model (where natural mortality = 0.35 per year and Beverton-Holt spawner-recruit function steepness = 0.87) and several sensitivity runs were completed. All model runs indicated declining stock biomass since the late 1990s, with fishing mortality peaking in the last 5 years. The base model run indicated that the 2015 spawning potential has been reduced to 0.21. Sensitivity runs indicated that assumed natural mortality strongly affects assessment results and stock status. Overall, assessment results suggest that it would be prudent for managers to closely monitor spotted seatrout fishing mortality to help ensure sustained future yield in Alabama.

***Presenter Biography**
Erin Bohaboy is a Ph.D. student at the University of South Alabama / Dauphin Island Sea Lab and a Sea Grant – NMFS Population and Ecosystem Dynamics fellow. Her research focuses on recreational discarding, discard mortality, and their effect on stock assessment and management of several northern Gulf of Mexico fisheries.

# USE OF SHIPPING CHANNELS AND FAIRWAYS BY THE WEST INDIAN MANATEE (*Trichechus manatus*) IN THE NORTHCENTRAL GULF OF MEXICO

**Author(s)**
*Ruth H. Carmichael, Dauphin Island Sea Lab/ University of South Alabama, rcarmichael@disl.org
Elizabeth Thompson, Harding University, Searcy, AR
Allen M. Aven, Dauphin Island Sea Lab/ University of South Alabama
Elizabeth E. Hieb, Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Watercraft collisions are a primary cause of injury and death to endangered West Indian manatees. A record number of boat-related manatee deaths occurred in Florida during 2016. In the northcentral Gulf of Mexico (GOM), where manatee occurrences have increased in recent years, boat-related mortality is low but increasing. Defining when and how manatees use boating channels can help evaluate risk associated with channel use; however, manatee use of boating channels has been largely unstudied in this region. To determine if manatees use navigable waterways and the conditions of use, we compared known manatee locations from public sightings and satellite GPS tags to locations of nearshore shipping channels and open water fairways. We compared numbers of manatees in and outside channels to biweekly periods of the year, time of day, water temperature, and salinity. We found that manatees used all types of boating channels when traveling in the northcentral GOM, but used nearshore channels (130m, 300m) more frequently than fairways. Manatees used channels more often during earlier (May-Jul) and later (Oct) periods of their seasonal occupancy, suggesting channel use may be associated with entry and exit migration. In particular, nearshore channels (130m) were more often used at lower temperatures (Oct-Dec), corresponding to timing of exit migrations. Manatee population growth and suitable habitat for manatees throughout the northcentral GOM could further increase interactions with boats in the region, making these data of increasing importance to survival, conservation, and recovery of this endangered species.

***Presenter Biography**
Dr. Carmichael is a Senior Marine Scientist at DISL and Associate Professor of Marine Sciences at University of South Alabama. She is a population and trophic ecologist who founded and Directs DISL's Manatee Sighting Network and the Alabama Marine Mammal Stranding Network at DISL.

# IS DENITRIFICATION DRIVEN BY ELEVATION OR PLANT TYPE AT A GULF COAST *Juncus roemerianus* AND *Spartina alterniflora* MIXED SALTMARSH?

**Author(s)**
*Patrick Chanton, University of Alabama, Dauphin Island Sea Lab, preinchanton@gmail.com
Behzad Mortazavi, University of Alabama, Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Wetlands provide a critical ecosystem service in the removal of anthropogenic nitrogen. Denitrification, reduction of NO3- to N2 gas, takes place at the interface of oxygenated and anoxic sediments in salt marshes. Oxygen penetration is driven by tidal waters, and by the leakage of plant root systems. Gulf coast salt marshes are typically dominated by *Spartina alterniflora* or *Juncus roemerianus*. Past studies have found clear differences in the pore water geochemistry between these species; however, it has yet to be determined if variability porewater geochemistry is a result of differences in elevation and inundation, or belowground biomass allocation. Therefore, we measured denitrification rates within an *S. alterniflora* dominated marsh that is interspersed with *J. roemerianus* to determine if variability in porewater sulfide concentrations impacts denitrification. Porewater sulfide concentrations *in J. roemerianus* plots were consistently lower than those measured in *S. alterniflora* plots. Potential denitrification measured at nitrate concentrations of 100 µM in *J. roemerianus* (47.6 – 141.4 µmol N m-2 hr-1) was generally higher than in *S. alterniflora* (6.8 – 126.1 µmol N m-2 hr-1). Denitrification measured with the isotope pairing technique was higher in *J. roemerianus* (21.0 – 81.2 µmol N2 m-2 hr-1) than in S. alterniflora (14.7 – 52.1 µmol N2 m-2 hr-1). Our results indicate that plant type, rather than elevation appears to impact sulfide concentrations and drive patterns of denitrification.

***Presenter Biography**
Patrick earned his BA in biochemistry from Earlham College in 2010 and his Masters in biology of Georgia Institute of Technology. He now studies nitrogen and carbon cycling in salt marshes as a research specialist at the University of Alabama.

# ANALYSIS OF MANATEE PERIOTIC BONE MICROCHEMISTRY AS A TOOL TO TRACK WEST INDIAN MANATEE MIGRATIONS IN THE NORTHCENTRAL GULF OF MEXICO

**Author(s)**
*Kayla P DaCosta, Dauphin Island Sea Lab/University of South Alabama, kdacosta@disl.org
Katie Brill, NOAA Affiliate
Ruth H Carmichael, Dauphin Island Sea Lab/University of South Alabama

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Understanding migrations and habitat use of West Indian manatees in the northcentral Gulf of Mexico (nGOM) is critical for determining their conservation needs. Satellite tags have been deployed, but these samples are spatially and temporally limited. Estimates of lifetime migration are also limited to sightings of known manatees throughout their range. Chemical analysis of hardparts (i.e. otoliths) of marine taxa ranging from molluscs to mammals has enabled inference about migration pathways, population connectivity, and habitat use. A similar approach has the potential to aid in determining manatee migrations via analysis of chemical constituents in their periotic bone. Manatee periotic bones display annual growth layers similar to those found in fish otoliths or mollusc shells, thus chemical analysis of transects across these structures may reveal age-specific information about migrations. To examine this potential, manatee periotic bones were collected from necropsied animals along the nGOM coast from Mississippi to the western Florida Panhandle. A laser ablation-inductively coupled plasma-mass spectrometer (LA-ICP-MS) was used to analyze the growth layers of the periotic bones to determine if variations in chemical signatures occurred among growth layers. Preliminary analysis of Sr:Ca and Ba:Ca ratios indicate variation in saltwater versus freshwater influence while fluctuations in other elements of interest (e.g.; Fe, Zn, Pb) reflect changes in habitat use along migration pathways. Use of this technique will increase understanding of lifetime manatee habitat use in the nGOM and can be coupled with stable isotope ratios to determine diet during migrations.

***Presenter Biography**
Kayla DaCosta is a Ph.D. student studying manatee migration and habitat use at the Dauphin Island Sea Lab and the University of South Alabama. She received a B.S. degree in Conservation Biology from Brigham Young University.

# EFFECT OF TEMPERATURE ON THE DEVELOPMENT AND GROWTH OF TWO COPEPOD SPECIES (*Acartia tonsa* AND P*arvocalanus crassirostris*) USED IN MARINE FINFISH AQUACULTURE

**Author(s)**
*Adam Daw, USM, Gulf Coast Research Laboratory, adam.daw@usm.edu
Reginald Blaylock, USM, Gulf Coast Research Laboratory
Eric Saillant, USM, Gulf Coast Research Laboratory

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Copepods are optimal first prey for several difficult to rear marine fish species due to their small size and high nutritional value. However, their large-scale culture as live feed is hampered by the elevated cost and variable performance of current production protocols as compared to that of rotifers and Artemia. *Acartia tonsa* and *Parvocalanus crassirostris* are two calanoid species currently investigated for intensive culture. This study is part of a project examining their environmental requirements to assist in optimizing production. The growth and development rates of *A. tonsa* and *P. crassirostris* from egg to reproductive adult were assessed at five temperatures (20, 22.5, 25, 27.5, 29.5°C). Egg hatch experiments were conducted in triplicate with sampling at equally spaced intervals to assess percent hatch. Newly hatched N1 copepods were stocked at a density of 1.0 ml-1, fed a diet of *Tisochrysis lutea*, sampled (N ≈ 25), staged, and measured at 4, 8, 12, 18 and 24 hours post stocking, and then every 12 hours until 100% of the population had reached the C6 stage. Using the proportion of each copepod stage at sampled times, we calculated the average age (in hours post stocking) of copepods in each stage group. For both species, egg development and growth rate are inversely related to temperature, with temperatures below 25°C resulting in a significantly delayed development. *P. crassirostris* eggs hatch more quickly and with less variability in time than *A. tonsa* eggs.

***Presenter Biography**
Adam Daw is currently a Coastal Sciences Ph. D. student at the University of Southern Mississippi's Gulf Coast Research Laboratory. He has a B.S. in Marine Biology from Texas A&M University at Galveston and an M.S. in Tropical Conservation, Biology, and Environmental Science from the University of Hawaii at Hilo. Research interests include developing larval rearing techniques for marine fish and invertebrates, sustainable aquaculture methods, and cephalopod biology/ecology.

# SUPPLEMENTING BROODSTOCK AND LARVAL DIETS FOR FLORIDA POMPANO TRACHINOTUS CAROLINUS WITH TAURINE TO IMPROVE EGG, LARVAL, AND WEANED JUVENILE QUALITY

**Author(s)**
*Thomas J Derbes II, Auburn, tjd0020@auburn.edu
Melanie Rhodes, Auburn
Guillaume Salze, Auburn
Nicole Rhody, Mote Marine Labs
Matthew Resley, Mote Marine Labs
Kevan Main, Mote Marine Labs
Marie Head, Alabama MRD
D. Allen Davis, Auburn

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Florida Pompano have been identified as an ideal species for aquaculture in America. As with many cultured marine finfish species there is a production bottleneck between egg and weaned juveniles. Florida Pompano have the potential to produce up to 1.5 million eggs but it is not uncommon to have survivability of 5% to 15% from eggs to weaned juveniles. Recent research shows that amino acids supplemented in broodstock diets were passed onto the eggs. Taurine, a 2-aminoethanesulfonic acid, is a common organic compound and has been suggested to help enhance egg quality. To evaluate the potential of taurine supplementation for Florida Pompano broodstock and larvae, a 2x2 factorial experiment was conducted, where two group of adult fish received formulated gel diets with or without taurine supplementation, and the resulting larvae were divided to receive taurine-supplemented or unsupplemented live prey. Broodstock received experimental diets three times a day for 3 weeks prior to spawning, while the larvae were raised on an otherwise standard protocol based on rotifers (in green water) and Artemia enriched with a commercial emulsion and weaned on a dry feed at 15 days-post-hatch when the trial was terminated. Results show that supplementation of the broodstock diet could be beneficial while larval supplementation may not be warranted. Further research is being conducted to strengthen and complement these results. Graphs 1 & 2. Interaction plots for length and weight results of the trial at termination (15 dph) (Legend: BC- Broodstock Control, BT- Broodstock Taurine, LC- Larval Control, LT- Larval Taurine) (Graphs Attached)

***Presenter Biography**
Born and raised in the Panhandle of Florida. Attained bachelors in marine biology at UWF and currently a Masters student at Auburn University doing research on fish nutrition and Pompano at Claude Peteet Mariculture Center and Mote Marine Aquaculture Park.

# CLIMATIC TELECONNECTIONS AND FORECASTING COASTAL MS-AL HYDROLOGY

**Author(s)**
*Juzer F Dhondia, University Corporation for Atmospheric Research, Tuscaloosa, Alabama, USA. & Department of Civil, Construction and Environmental Engineering, University of Alabama, Tuscaloosa, Alabama, USA., jdhondia@ucar.edu
Oubeidillah A Aziz, University Corporation for Atmospheric Research, Tuscaloosa, Alabama, USA
Sahar T. Sadeghic, Department of Civil, Construction and Environmental Engineering, University of Alabama, Tuscaloosa, Alabama, USA
Glenn A. Tootle, Department of Civil, Construction and Environmental Engineering, University of Alabama, Tuscaloosa, Alabama, USA
Mattew D. Therrell, Department of Geography, University of Alabama, Tuscaloosa, Alabama, USA.
Bennett Bearden, Water Policy and Law Institute, University of Alabama, Tuscaloosa, Alabama, USA.

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
The knowledge of future streamflow (drought or flood, gradual or abrupt) events can provide useful information to state water agencies or management authorities to take steps to manage living resources to maintain the streamflow for protecting biological diversity, drought or flood planning. Further knowledge of amount of water in future can have far fetching impact on water related policies, law, and related issues. Few recent studies have shown the effect of Pacific and Atlantic Ocean sea surface temperature (SST) has connections with the continental USA streamflow [Tootle etal. 2006]. Various researches have shown that there exists a so-called “Climatic Teleconnections” of specific regions in Atlantic and Pacific oceans on the long-term forecast of streamflow in rivers [Tootle, etal 2008; Aziz, etal 2010; Aziz, etal 2012; Sagarika etal 2014]. Out of the various statistical methods, including canonical correlation analysis or combined principal component analysis, the singular value decomposition (SVD) is simple and preferable method to determine the coupled relationships or “teleconnections” between oceanic SST and hydrological variability [Wallace etal 1992]. The hydrological variability can best be measured as “streamflow” in unimpaired rivers. Thus this study is undertaken to identify such “teleconnections” between the Pacific and/or Atlantic oceans SST and the seasonal / long term or short term “streamflow” of unimpaired coastal rivers of MS and AL. This study will help in understanding the effects of climatic variability on forecasting the water availability in coastal rivers in MS and AL. And answers to questions such as - Is there impact on coastal rivers of MS and AL due to climatic variability in Pacific and Atlantic oceans? Is this impact seasonal, long term or short term? Keywords: Ocean Sea Surface Temperature (SST), Streamflow, Teleconnection, Climate variability, Hydrological variability, Forecast, Mississippi, Alabama

***Presenter Biography**
Mr. Dhondia is an experienced hydrologist and environmental and water resource engineer. He has worked extensively on development and application of operational and decision support systems, mathematical simulation models, data assimilation and uncertainty analysis tools, and their application

to research and consultancy projects worldwide. After working for 20 years in The Netherlands, Mr. Dhondia is at present working as UCAR Associate Scientist / NOAA Affiliate at the National Water Center, Tuscaloosa, Alabama, USA, working on modeling projects and operational system of National Weather Service, USA. Since fall 2016 he is also a research assistant at Department of Civil, Construction and Environmental Engineering, University of Alabama, Tuscaloosa, Alabama, USA.

## MAXIMIZING THE RETURN ON INVESTMENT OF OYSTER AQUACULTURE BY MANAGING MUD BLISTER WORM INFESTATION

**Author(s)**
*Kelly M Dorgan, Dauphin Island Sea Lab, kdorgan@disl.org
William Walton, Auburn University
Sarah M Cole, Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Off-bottom oyster farming is relatively new on the Gulf Coast and may provide a large economic boon to the region, both to producers and the support industry, and helps watermen continue working on the water even when fisheries close. A key challenge to this industry, noted by farmers and chefs, is that whereas periodic air-drying controls most bio-fouling, mud blisters formed by polychaete worms such as *Polydora websteri* seem to be resistant to current methods. We aim to develop methods to cost-effectively control mud blister worms in the northern Gulf of Mexico by targeting specific questions about the life history of the worms and growth rates of oysters and worms. Understanding the factors contributing to mud blister worm infestations will enable farmers to target specific times and conditions for labor- or cost-intensive treatments and to better assess the costs and benefits of treatment. Our project integrates laboratory experiments to characterize durations and variability in larval growth and settlement with ongoing field experiments in which oysters are deployed at 4 different farms along the coast of Alabama. Different stocking densities and ploidies are being tested to vary growth rates. Oyster condition, infestation, larval worm abundances and distributions, and environmental conditions will be sampled to better understand these factors contributing to worm infestations.

***Presenter Biography**
Kelly Dorgan completed her PhD at University of Maine on the mechanics of burrowing and postdoctoral training at UC Berkeley and Scripps Institution of Oceanography. She is a Senior Marine Scientist at Dauphin Island Sea Lab, where her research integrates biology and physics to understand how organisms interact with their environments, primarily focused on sediment ecosystems.

# ECOLOGICAL RESEARCH AND OBSERVATIONS OF JOHNSON BAYOU, MS

**Author(s)**
*Brandon D Drescher, Univ. of Southern Mississippi, Gulf Park Campus, brandon.drescher@usm.edu
Jennifer M Walker, Univ. of Southern Mississippi, Gulf Park Campus

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Johnson Bayou, located in Pass Christian, MS, has been the primary focus of three years of ecological research and observation. Major research goals include observing the burrowing habits of two species of clams, Rangia cuneata and Polymesoda caroliniana, identifying resident, migratory or perennial wildlife, and understanding how the system changes under natural and anthropogenic pressures. The burrowing habits and location of clams are likely influenced by sediment type. There are three major sediment types (sand, silt, and clay) in Johnson Bayou. Characterization of organic matter content and grain size for each type is ongoing. Current data on clam burrowing habits suggest significant differences between sediment types and burrowing times. Factors include pre-burrowing orientation (i.e., exposure above the sediment) with respect to the substrate, and size differences between the clams; approximately 38 to 62 mm in shell length. Results of this work will lead to a better understanding of how these species burrow and live in different types of sediment within a single system. While working with the two clam species, numerous animal and plant species have been identified in Johnson Bayou. In addition to biotic assessments and observations, abiotic measurements have been taken almost daily over this three year period to assess seasonal changes in the water column. Observations of natural ecological disturbances have indicated alterations of plant species locations and movement of sediment material. Human development of the area also has direct impacts on restructuring the shoreline, wildlife displacement, and decreased water quality resulting from runoff and littering.

***Presenter Biography**
The presenter is a graduate student in the Biological Sciences Department of USM Gulf Park campus that researches estuarine ecology and the burrowing behaviors of infaunal clams. He often takes undergraduate students out on kayak excursions to help collect data, get hands on experience with field techniques, and assists in bayou cleanups.

## A NOVEL APPROACH FOR MITIGATING DEPREDATION, A SOURCE OF CRYPTIC FISHING MORTALITY FOR GULF OF MEXICO RED SNAPPER (L*utjanus campechanus*)

**Author(s)**
*J. Marcus Drymon, University of South Alabama, mdrymon@disl.org
Glen M Borchert, University of South Alabama
Kristen Dahl, University of South Alabama
Sean P Powers, University of South Alabama

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Knowledge of species interactions within marine fisheries can lead to a more holistic approach to management. While some interactions (e.g. trophic) are intuitive, others are more subtle. Depredation, the partial or complete removal of hooked fish from fishing gear by non-target species, is a source of cryptic fishing mortality. In the Gulf of Mexico, recent increases in Red Snapper (*Lutjanus campechanus*) depredation have been reported, straining a fishery already under strict regulation; unfortunately, mitigating these harmful effects requires identifying the species responsible for depredation, a task with clear logistic difficulties. Given the strong economic and ecologic consequences of this unique interaction, we developed an exciting, new technique to identify the depredating species from residual levels of DNA left on the damaged fish. Using video and field evidence of actual depredation events, we confirmed that our PCR strategy can accurately and definitively determine the predator responsible for red snapper mortality. These findings present the development of a powerful new tool for positively identifying depredating species, a critical precursor to successful depredation mitigation.

***Presenter Biography**
J. Marcus Drymon is a Research Assistant Professor at the University of South Alabama. His research focuses primarily on the spatial and trophic ecology of coastal sharks in the northern Gulf of Mexico.

## PLASTIC POLLUTION: PERCEPTION, AWARENESS, AND WILLINGNESS TO PAY FOR ALTERNATIVES

**Author(s)**
*Emily C Fischbach, Mississippi State University Coastal Research and Extension Center, fischbach.emily@gmail.com
Eric Sparks, Mississippi State University Coastal Research and Extension Center, Missisippi-Alabama Sea Grant Consortium

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Plastic pollution in marine and coastal habitats is an increasing problem, with direct and indirect threats to wildlife across the world. While plastic makes up only 10% of waste, it represents 80% or more of the waste that accumulates on lands, shorelines, ocean surfaces, and seabeds. Roughly 50% of plastics are used for single-use disposable applications, including packaging, disposable consumer items, and agricultural films. Thus, we focused on disposable items found in restaurants and fast food in the Gulf Coast region. We created a survey that aims to examine 1) Public perception of plastic pollution, 2) Public awareness of Gulf Coast issues, 3) Consumer habits, 4) Consumer preferences, and 5) Consumer willingness to pay for plastic alternatives. Qualtrics was used as our survey platform, which was distributed online to various contacts. In-person surveys were also done using Ipads. Preliminary results show that most consumers are willing to pay 50 cents or more, per person per meal. This is followed by a willingness to pay of 41 - 50 cents per person per meal. Majority of survey takers have high awareness of plastic pollution in the Gulf and have a high concern for it. Data collected from this survey can help refine outreach and educational programs regarding the Gulf, as well as provide valuable information for businesses to make informative decisions in reducing their use of plastic.

***Presenter Biography**
Emily Fischbach has a BSc in Ecology and Natural Resources from Rutgers University. She recently completed her NOAA-NGI Diversity Internship, focusing on plastics and microplastic pollution in the Gulf Coast, with plans for graduate school regarding natural resource management.

# EXPERIMENTAL ASSESSMENT OF CIRCLE VERSUS J HOOK PERFORMANCE AND SELECTIVITY IN THE NORTHERN GULF OF MEXICO RECREATIONAL REEF FISH FISHERY

**Author(s)**
*Steven B Garner, University of South Alabama, Dauphin Island Sea Lab, sgarner@disl.org
William F Patterson, III, University of South Alabama, Dauphin Island Sea Lab
Clay E Porch, National Marine Fisheries Service, Southeast Fisheries Science Center

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Few data exist to evaluate the performance or assess the potential impacts of hook regulations on catchability or selectivity of recreational fisheries in the northern Gulf of Mexico. The purpose of this study was to test the effects of hook type (circle versus J hook) and hook size (1/0, 4/0, and 7/0) on catch composition, traumatic hooking, species-specific catches, and size-selectivity of red snapper, *Lutjanus campechanus*, and gray triggerfish, *Balistes capriscus*. Selectivity was estimated by conditioning size distributions from hook-specific catches against in situ size distributions observed with a remotely operated vehicle. Deep hooking (hook set in gills or beyond) was low in all hook treatments for red snapper (<10%) and gray triggerfish (<6%), but was generally higher with J hooks, especially for other fishes caught with the largest J hook (34%). Hook type did not significantly affect catches, but catches decreased significantly with increasing hook size in all groups except red snapper. Selectivity curves were dome-shaped for both focus species in all hook treatments and selection peaks were similar among treatments for red snapper. Peak selectivity was 78.1 mm larger for J hooks than circle hooks for gray triggerfish. Overall, study results indicate that the circle hook regulation may have reduced traumatic hooking mortality by up to 50%, and that catchability is similar between hook types for both red snapper and gray triggerfish when controlling for hook size. Strong dome-shaped selection estimated for nearly all selectivity curves suggest logistic size-selectivity assumptions in assessment models are likely inappropriate for recreational sectors targeting red snapper or gray triggerfish.

***Presenter Biography**
Steve Garner acquired an interest in fisheries ecology through an internship at the NMFS Panama City Laboratory and the University of West Florida before pursuing a Master's degree in Oceanography and Coastal Science from Louisiana State University. He is currently a Ph.D. candidate working to complete his dissertation research on the effects of hook-and-line gears on reef fishes and the implications for stock assessment.

## FINS, FISHES, FISHERIES: A FISH TALE IN TEACHER EDUCATION

**Author(s)**
*Greg Graeber, Dauphin Island Sea Lab, ggraeber@disl.org
Dr. Tina Miller-Way, Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Does immersive professional development lead to learning outcomes for teachers? The Dauphin Island Sea Lab (DISL) has presented a week-long professional development opportunity for educators funded by the MS-AL Sea Grant Consortium. The Fins, Fishes, and Fisheries program is workshop for teachers to see first-hand fisheries science across a broad spectrum of topics. Ranging from ichthyoplankton early life stages to modern fisheries lab and field techniques to aquaculture and culminating with a field trip to a local seafood processor, the program represents fisheries from the egg to the table. The mixture of classroom activities, field-based sampling, morphology studies, and lectures from fisheries scientists have resulted in a highly beneficial learning experience for informal and formal educators alike. Just how beneficial? Come join the DISL educators to find out.

***Presenter Biography**
Greg Graeber is a Marine Educator III at the Dauphin Island Sea Lab (DISL), who has been teaching marine science at DISL for nearly 14 years. Throughout those 14 years, he has created or helped create numerous K-12 curriculum and teacher professional development opportunities.

# INVESTIGATIONS OF TARPON, MEGALOPS ATLANTICUS, LEPTOCEPHALI FROM MISSISSIPPI COASTAL WATERS

**Author(s)**
*Patrick Graham, University of Southern Mississippi- Gulf Coast Research Laboratory, Patrick.M.Graham@usm.edu
James Franks, University of Southern Mississippi- Gulf Coast Research Laboratory
John Anderson, University of Southern Mississippi- Gulf Coast Research Laboratory
Dyan Gibson, University of Southern Mississippi- Gulf Coast Research Laboratory
Jason Tilley, University of Southern Mississippi- Gulf Coast Research Laboratory
TJ Fayton, University of Southern Mississippi- Gulf Coast Research Laboratory

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Tarpon, *Megalops atlanticus*, are large, migratory fish that frequent coastal and inshore waters of the tropical and subtropical Western Atlantic Ocean, including the Gulf of Mexico and Caribbean Sea. Occurrence of adult Tarpon in Mississippi waters is infrequent and thought to coincide with summer feeding migrations. Tarpon possess a unique larval form (leptocephalus) transported on ocean currents from offshore spawning grounds to inshore nursery areas. Historically, Tarpon leptocephali were rare (N=6, pre-metamorphic, 22.5 - 26.2 mm SL) in Gulf Coast Research Laboratory fisheries assessment and monitoring collections prior to summer/fall 2013, at which time directed sampling for leptocephali produced 40 pre-metamorphic larvae (20.2 - 27.5 mm SL). Additional collection efforts along the Mississippi Sound shoreline in 2015 and 2016 provided 19 specimens (16.0 – 27.8 mm SL). All larvae were collected July - October using a beam plankton trawl (BPL, 750µm mesh) pulled by hand at fixed stations (< 1.5m depth) during daytime. Leptocephali were collected at surface water temperatures and salinities of 24.8 - 34.1°C and 13.4 - 28.9 ppt., respectively. Preliminary larval age estimates based on otolith (sagittae) microstructure analysis ranged 28 - 34 days. The source of the leptocephali is unknown, but based on dates of collection, calculated hatch dates, preliminary examination of coastal current patterns within the Mississippi Bight, and recent evidence of spawning capable tarpon from the northern Gulf of Mexico, it is presumed the larvae were dispersed from suspected summer spawning grounds located offshore Mississippi into local estuaries.

***Presenter Biography**
Patrick Graham is a research technician in the Gulf Coast Research Laboratory's Center for Fisheries Research and Development and received his masters degree in Fisheries and Mariculture from Texas A&M University-Corpus Christi.

# CHAETOGNATH ECOLOGY AND POTENTIAL NICHE OVERLAP WITH CO-OCCURRING LARVAL FISHES IN THE NORTHERN GULF OF MEXICO

**Author(s)**
*Jana M Herrmann, University of Southern Mississippi, Gulf Coast Research Lab, School of Ocean Science and Technology, Coastal Sciences Division, Jana.Herrmann@usm.edu
Frank J. Hernandez, Jr., University of Southern Mississippi, Gulf Coast Research Lab, School of Ocean Science and Technology, Coastal Sciences Division

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Chaetognaths (Arrow Worms) are among the most abundant zooplankton predators. All are carnivorous and several studies have shown that chaetognath predation can drastically alter zooplankton populations. Due to their relatively high abundance, chaetognaths could significantly affect food resources available to winter-spawned larval fishes in the northern Gulf of Mexico (nGoM), when secondary production is relatively low. The objectives of this research are to determine: 1) taxon-specific chaetognath seasonal abundance, diversity, and richness; 2) chaetognath vertical distribution; and 3) potential feeding overlap between chaetognath species and co-occurring winter-spawned larval fishes. Depth-discrete zooplankton samples were collected monthly over a two-year period (2004-2006) with a multiple opening and closing net sampler fitted with seven 202µm mesh nets. Sampling occurred along the 20 m isobath south of Dauphin Island, Alabama. Additional surveys were conducted quarterly to collect depth-discrete zooplankton samples over diel cycles (dawn, mid-day, dusk, mid-night) for 72 hour periods. Preliminary taxonomic results show eleven chaetognath species with *Parasagitta frederici* and *Flaccisagitta enflata* being the dominant taxa. Preliminary dietary overlap results indicate copepods are the primary prey for chaetognaths, with Calanoida and Cyclopoida being dominant prey items. Preliminary results also show that species in the genus Corycaeus are the dominant Cyclopoda prey items. The results of this research will provide information about chaetognath ecology and knowledge of how fisheries recruitment dynamics are influenced by the trophic interactions between chaetognaths and ichthyoplankton in the nGoM.

***Presenter Biography**
My primary research interests are in zooplankton ecology, with an emphasis on zooplankton behavior, identification and taxonomy, and how biological and physical processes influence zooplankton dynamics. I am also interested in the trophic dynamics between zooplankton and ichthyoplankton and how those interactions can provide a better understanding of fisheries recruitment dynamics.

## CITIZEN-SCIENCE PROVIDES DATA ON SEASONAL OCCUPANCY OF WEST INDIAN MANATEES (*Trichechus manatus*) IN THE NORTHCENTRAL GULF OF MEXICO

**Author(s)**
*Elizabeth E Hieb, Dauphin Island Sea Lab, ehieb@disl.org
Ruth H Carmichael, Dauphin Island Sea Lab, University of South Alabama
Allen Aven, Dauphin Island Sea Lab, University of South Alabama
Courtney Nelson-Seely, Dauphin Island Sea Lab
Nicole Taylor, Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
The northcentral Gulf of Mexico was historically considered outside the typical range of the endangered West Indian manatee (*Trichechus manatus*); however, in recent years reported manatee sightings have increased in this region. To better define the extent of manatee occurrence in the northcentral Gulf of Mexico, we used citizen-science methods, compiling data from opportunistic public sightings of manatees in understudied areas of Alabama and Mississippi. More than 2,000 live manatee sightings were documented from 1978-2015, with peak sightings occurring in rivers and subembayments along the AL-MS coastline during warm months (Jul - Aug). Manatee mortalities, which have significantly increased since the mid-1980s, were most often recorded Nov - Feb and attributed to cold stress. We analyzed the effect of public education and outreach activities on the number and timing of reported sightings to detect potential bias in our use of citizen-science methods. Our results indicated that while targeted outreach efforts were effective in generating manatee sighting reports, the temporal distribution of sightings was primarily driven by manatee presence in local waters. We found that quantitative and consistent documentation of opportunistic, citizen-sourced data enhanced knowledge of manatee habitat use over a broad geographic area and on a decadal time-scale, demonstrating the importance of the northcentral Gulf of Mexico as seasonal manatee habitat. This long-term monitoring effort has increased our understanding of manatee movement ecology and population distribution and is essential to guide effective management and recovery efforts, especially in light of ongoing anthropogenic impacts and large-scale environmental perturbations to local waters.

***Presenter Biography**
Elizabeth E. Hieb is a research technician and acting manager of the Dauphin Island Sea Lab's Manatee Sighting Network. She obtained her B.S. in Biology from Spring Hill College in 2010 and M.S. in Biology from the University of South Alabama in 2012.

# USING ACTION CAMERAS TO CORRECT FOR RED SNAPPER DEPREDATION EVENTS DURING FISHERY INDEPENDENT SURVEYS IN ALABAMA'S ARTIFICIAL REEF PERMIT ZONE

**Author(s)**
*Crystal L Hightower, University of South Alabama and Dauphin Island Sea Lab, chightower@disl.org
J. Marcus Drymon, University of South Alabama and Dauphin Island Sea Lab
Sean P Powers, University of South Alabama and Dauphin Island Sea Lab
John Mareska, Alabama Department of Marine Resources

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Fishery independent vertical longline surveys are being conducted to improve abundance estimates of commercially and recreationally important reef fishes, namely Red Snapper (*Lutjanus campechanus*), in state and federal waters of the Gulf of Mexico (GOM). The Fisheries Ecology Lab at the University of South Alabama has been involved in developing standardized protocols for vertical longline surveys in the GOM via the Southeast Area Monitoring and Assessment Program (SEAMAP). Current protocols for these surveys include the use of action cameras to collect video of fishes being captured. Depredation events on hook and line caught fishes are common and carried out by marine mammals and elasmobranchs as evidenced by observations of fish heads remaining on hooks. Video data can also inform scientists of fishes completely removed from hooks. We corrected catch per unit effort (CPUE) for Red Snapper removed from vertical longlines and compared this to non-corrected CPUE at several spatial scales. CPUE versus corrected CPUE was not largely different throughout our entire study area; however, on the station level, as much as 70% of the total Red Snapper catch was removed by depredating sharks. Since these predators are highly mobile, effects on the station level when predators are present, can be significant. Use of action cameras is a relatively low cost and simple method of improving important CPUE data that drive model estimation used in management of commercially and recreationally important fisheries.

***Presenter Biography**
Crystal Hightower is the research laboratory manager and a research assistant in the Fisheries Ecology Lab at the University of South Alabama and the Dauphin Island Sea Lab. Her research interests include the ecology and population dynamics of commercially and recreationally important finfish and their management in coastal waters of the Gulf of Mexico.

## ARE ASIAN TIGER SHRIMP *(Penaeus monodon*) A NEW INVASIVE THREAT OR A PAPER TIGER? WHAT WE KNOW FROM THE INTERACTIONS OF TIGER SHRIMP WITH ESTUARINE PREY AND PREDATORS

**Author(s)**
*Jennifer M. Hill, Louisiana Tech University, jmhill@latech.edu
Olivia Caretti, North Carolina State University
Kenneth L. Heck, Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Asian tiger shrimp (*Penaeus monodon*) have steadily appeared in commercial shrimp catches from North Carolina to Texas since 2011. Their consistent presence is ecologically concerning because the tiger shrimp's large body size, broad diet, aggressive carnivory, and estuarine distribution suggest they may consume native shrimp or other crustaceans and that biotic resistance to invasion may be limited due to gape-limited fish predators. To assess these concerns, we used a series of mesocosm experiments to determine: a) the predation rates of tiger shrimp on adult and juvenile native shrimp; b) the behavioral responses of native shrimp to tiger shrimp, c) tiger shrimp diet preferences in estuarine environments, and; d) the abilities of red drum (*Sciaenops ocellatus*) predators to consume adult tiger shrimp. In contrast to the initial fears, predation rates on native shrimp species were generally low. However, despite their success at evading most tiger shrimp predation attempts, native shrimp often displayed avoidance behaviors that displaced them from their preferred habitats. Diet experiments also indicated juvenile blue crabs, an important commercial species, will be threatened by tiger shrimp as they were the preferred prey in multispecies diet experiments. Consequently, tiger shrimp will likely have context and species specific impacts on estuarine prey. Conversely, when tiger shrimp were offered as prey to red drum, tiger shrimp were consumed as often as similarly-sized native white shrimp suggesting native predators may provide some biotic resistance to the tiger shrimp invasion occurring on the Gulf Coast.

***Presenter Biography**
Jennifer Hill is an assistant professor and crustacean wrangler who uses empirical lab and field experiments to examine how animal behavior and trophic interactions affect communities.

# USING PHENOLOGY DERIVED FROM NASA EARTH OBSERVATIONS TO MONITOR MARSH CONDITIONS IN COASTAL ALABAMA IN SUPPORT OF THE ALABAMA COASTAL FOUNDATION'S RESTORATION AND CONSERVATION INITIATIVES

**Author(s)**
*Darius Hixon, NASA DEVELOP, dhixonl91@gmail.com
Saranee Dutta, NASA DEVELOP
Vishal Arya, NASA DEVELOP
Jeanett Bosarge, NASA DEVELOP
Austin Clark, NASA DEVELOP
Manoela de Oliveira Rosa, NASA DEVELOP
Tyler Lynn, NASA DEVELOP

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
The marshlands fringing Mobile and Baldwin counties collectively comprise one of the most dynamic ecosystems in the Northern Gulf of Mexico. Coastal Alabama wetlands are an important ecological region providing a number of important ecosystem support services, such as breeding and nursing habitats, creating buffer zones for storm surge, and water filtration. However, many marsh areas have deteriorated both in health and extent due to a combination of anthropogenic and natural stressors, including nutrient pollution, turbidity, and urbanization. This study used NASA Earth observations to investigate the present and future health of wetlands in coastal Alabama. The datasets were derived from the United States Department of Agriculture Forest Service ForWarn Normalized Difference Vegetation Index (NDVI), which uses imagery captured by Moderate Resolution Imaging Spectroradiometer (MODIS). Additionally, data from Landsat satellites 5, 7, and 8 were used to provide higher resolution imagery over larger temporal scales to aid in land use and land cover classifications. The NDVI was then used in conjunction with data from the Coastal Change Analysis Program to classify marsh type, health, and extent over several decades. The data were then used for modeling of future marsh health using TerrSet Geospatial Monitoring and Modeling System Land Change Modeler software. Collectively, these analyses provided a holistic assessment of current and future marsh health for select watersheds over wide temporal and spatial scales. The Alabama Coastal Foundation can use these results to more efficiently direct restoration efforts to the most critically impaired watersheds.

***Presenter Biography**
Environmental toxicology graduate student at the University of South Alabama currently assessing the presence of pharmaceutical residues in urban watersheds. Research interests include water quality monitoring and environmental impact assessment.

# PRELIMINARY ANALYSIS OF GRAY TRIGGERFISH LIFE HISTORY AND DISTRIBUTION IN THE ALABAMA ARTIFICIAL REEF ZONE

**Author(s)**
*Amanda E Jefferson, University of South Alabama and Dauphin Island Sea Lab, ajefferson@disl.org

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
The over-exploitation of targeted Gulf of Mexico (GOM) reef fish stocks, such as red snapper (*Lutjanus campechanus*), has led to increasingly strict regulations imposed upon both commercial and recreational fishing sectors. The Gulf of Mexico gray triggerfish (*Balistes capriscus,* GRT) population has experienced a concurrent increase in popularity among both sectors. According to the 2015 SouthEast Data, Assessment, and Review (SEDAR) assessment, the GOM GRT population is presently considered overfished and the stock is not projected to rebuild by the 2017 deadline. The goal of this study is to assess the distribution and habitat preferences of the Alabama Artificial Reef Zone (AARZ) GRT population. Catch data and remotely operated vehicle (ROV) footage derived from a fishery-independent vertical longline survey dating from 2010 through 2016 were analyzed to determine abundance of AARZ GRT by reef type. Both ROV footage and catch data showed that more GRT are seen and caught on artificial habitat compared to natural habitat; specifically, chicken transport devices and pyramids appear to be the preferred structure types for AARZ GRT. Analysis of ROV footage revealed more GRT on pyramids with tires compared to plain pyramids; however, the number of GRT actually caught on plain pyramids was greater than the number caught on pyramids with tires. Future work involves determining comprehensive sex-specific age and growth parameters for AARZ GRT. The results of this research will provide stock assessment scientists with updated information which can be used to establish management measures that ensure the sustainability of AARZ GRT.

***Presenter Biography**
Amanda Jefferson received her BS in Marine Biology from UNC Wilmington in 2013. She is currently working towards a Master's degree at the University of South Alabama and the Dauphin Island Sea Lab Fisheries Ecology Lab, and is supervised by Dr. Marcus Drymon.

## DO VERTEBRAL CHEMICAL SIGNATURES DISTINGUISH JUVENILE BLACKTIP SHARK (*Carcharhinus limbatus*) NURSERY REGIONS IN THE NORTHERN GULF OF MEXICO?

**Author(s)**
*Justin P Lewis, Gulf Coast Research Laboratory, The University of Southern Mississippi, j.p.lewis@usm.edu
William F Patterson III, Dauphin Island Sea Lab, Universtity of South Alabama
John K Carlson, National Marine Fisheries Service, Southeast Fisheries Science Center
Katherine McLachlin, Electro Scientific Industries

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
The life history traits of large coastal sharks make them particularly susceptible to over harvest. Conservation efforts, though focused on reducing fishing mortality, often strive to conserve and protect nursery areas as well. However, we currently lack estimates of connectivity between juvenile and adult populations making it difficult to evaluate the importance of nursery conservation to population stability and recovery. By analyzing trace metals incorporated into vertebral cartilage, it may be possible to infer natal origin based on nursery-specific chemical signatures. To assess the efficacy of this approach, we collected juvenile blacktip sharks (*Carcharhinus limbatus*; n = 93) from four regions in the Gulf of Mexico in 2012 and 2013 and analyzed their vertebral centra with laser ablation-inductively coupled plasma-mass spectrometry. We observed significant regional differences in six element : Ca ratios in both 2012 and 2013. Multi-element chemical signatures were significantly different among regions and between year-classes. Year-class-specific linear discriminant function analysis yielded regional classification accuracies of 81% for 2012 and 85% for 2013, although samples were not obtained from all four regions in 2012. Combining year-classes resulted in an overall classification accuracy of 84%, thus demonstrating the usefulness of this approach. These results are encouraging yet highlight a need for more research to better evaluate the efficacy of vertebral chemistry to study elasmobranch population connectivity.

***Presenter Biography**
Justin Lewis is completing his MS with Dr. Patterson at the University of South Alabama. Currently, he works as a technician for the Center for Fisheries Research and Development at The University of Southern Mississippi's Gulf Coast Research Laboratory.

# UTILIZATION OF A COASTAL ESTUARY BY A DEMERSAL FINFISH FAMILY (SCIAENIDAE): IMPLICATIONS FOR HABITAT ASSOCIATIONS AND ECOLOGICAL INTERACTIONS

**Author(s)**
*Mariah C Livernois, University of South Alabama, mlivernois@disl.org
Sean P Powers, University of South Alabama

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Coastal estuaries support a variety of habitats and associated organisms, and exhibit vast ranges in environmental conditions. Abiotic factors such as salinity, turbidity, and dissolved oxygen often fluctuate greatly throughout estuarine systems, which can influence the structure and distribution of nektonic communities. Within this variable landscape, biogenic habitats including seagrass, saltmarsh, and oyster reefs emerge among open sand bottom and mud flats, each providing an array of unique ecosystem services and functions. Structured habitats are especially critical in their role as refuge, foraging, and nursery grounds for demersal fish. A group of particular interest is the family Sciaenidae, the drums, which includes two recreationally-important demersal predators: Red Drum (*Sciaenops ocellatus*) and Spotted Seatrout (*Cynoscion nebulosus*). The habitat associations and environmental affinities of this group of fish are often unique between species, but they can also inhabit many of the same regions. When a spatial overlap between species occurs, habitat utilization and foraging behaviors may be altered. In this preliminary investigation, the results of an ongoing long-term experimental gillnet survey will be examined, the scope of which spans an entire estuary (Mobile Bay and Mississippi Sound, AL). Focusing on the sciaenids, especially the two aforementioned predators, patterns in the abundance of species will be explored in relation to abiotic conditions, presence of other species, and location within the estuary. Understanding the environmental preferences of these fish at a bay-wide scale may lend insight into their potential ecological interactions, and inform future studies of habitat and resource partitioning.

***Presenter Biography**
I am a M.S. student in Dr. Sean Powers' fisheries ecology lab at the University of South Alabama and the Dauphin Island Sea Lab. I am interested in the habitat utilization preferences and ecological interactions of recreationally-important estuarine fish species.

# COASTAL MARINE PLANNING IN ALABAMA

**Author(s)**
*Christian L Miller, Auburn University Marine Extension and Research Center, christian@auburn.edu
Rebecca Retzlaff, Auburn University
Charlene LeBleu, Auburn University

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Coastal Marine Planning (CMP) is a comprehensive, adaptive, and ecosystem-based spatial planning process that analyzes current and anticipated uses of coastal areas and oceans to reduce environmental impacts and conflicts among users. The Mobile Bay National Estuary Program (MBNEP) has contracted with the Alabama Department of Conservation and Natural Resources (ADCNR) to initiate CMP for the State of Alabama. The process for defining CMP for Alabama began in 2012 and includes two Alabama coastal counties, Baldwin County and Mobile County (ACAMP, 2015). This planning currently exists as a themed spatial Geographic Information System (GIS) inventory that falls at and below the continuous 10-foot contour, and adjoining State water bottoms continuing 200 miles offshore into Federal waters. The current CMP GIS scheme is organized and maintained by the Geographical Survey of Alabama (GSA). The thematic (vector and raster) management, development, and modifications for this project utilizes Environmental Systems Research Institutes, Inc. (ESRI®) ArcGIS®, as well as, extensions and tools for project development or assessing data including ArcGIS Spatial Analyst and other analysis tools. The integration of the current CMP themed spatial GIS inventory integrates with existing traditional terrestrial land use coastal planning through mapping overlays.

Four task were accomplished within this project:
Task 1—GIS data review (coordinated with past efforts)
Task 2—Stakeholder engagement
Task 3—Development of GIS viewer tool for public use
Task 4—Access tool functionality/ test tool on stakeholders.

The Alabama Coastal Marine Planning Tool may be accessed at the following URL:
http://www.arcgis.com/apps/Viewer/index.html?appid=28ee2b81558d4aeab563164137b1cec7

***Presenter Biography**
Christian Miller is a extension specialist focusing in the area of nonpoint source pollution and works out of the Auburn University Marine Extension and Research Center in Mobile, AL. The position is shared between the Mississippi-Alabama Sea Grant Consortium, the Mobile Bay National Estuary Program, and the Alabama Clean Water Partnership.

# SUBTLE TEMPERATURE DIFFERENCES MAY WELL DETERMINE WHO WINS: A STORY OF THREE SUBMERGED AQUATIC PLANT SPECIES.

**Author(s)**
**Molly M Miller, University of South Alabama, mmm314@jagmail.southalabama.edu*
Timothy D. Sherman,

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
As temperatures increases globally, shifts in the distribution of plant species are expected, with unknown effects on invasive species abundance. It is then of value to understand the role increased temperature may have on invasive species. Although non-homeothermic organisms are the mercy of environmental temperatures, their physiology is still temperature-dependent, with species-dependent thermal optima. By identifying the thermal optimum of a species and determining the amount of time spent annually in that optimal temperature zone, success can be predicted under different temperature regimes. Here we identify species-specific differences in the thermal optima of three submerged plants, *Hydrilla verticillata, Myriophyllum spicatum*, and *Vallisneria neotropicalis*. Utilizing a biochemical approach, activity of a key metabolic enzyme NADH malate dehydrogenase (MDH) was used to assess the thermal dependencies of Km and Vmax in each species. A Michaelis-Menten model was then employed to predict reaction velocity across a range of temperatures (10˚C-40˚C). The predicted reaction velocities were compared to multi-year in situ temperature data. At low temperatures (10-20˚C), all three species had similar thermal behavior. However, at temperature > 20˚C, enzyme activity *H. verticillata* exhibited a sharp increase to a level 2-3 times higher than *M. spicatum* and *V. neotropicalis*. *H. verticillata* is metabolically more competent at lower temperatures (earlier in season) allowing rapid growth earlier than other co-existing species. This data suggests that as water temperatures increase, the highly invasive *H. verticillata* will be favored over co-ocurring species. Additionally, a northward expansion of the dioecious, southern biotype of this species is likely.

***Presenter Biography**
Molly is a PhD candidate at the University of South Alabama. Her research interests lie in the field of plant ecophysiology and climate change impacts on community structure.

## VALIDATION OF OTOLITH AND VERTEBRAL CHEMISTRY SALINITY RELATIONSHIPS

**Author(s)**
*Reid Nelson, DISL / University of South Alabama, tnelson@disl.org
Sean Powers, DISL / Univeristy of South Alabama

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Strontium (Sr) and barium (Ba) concentrations in otoliths are used to reconstruct fish habitat use because they are positively and negatively correlated with salinity, respectively. However, these relationships are non-linear, confounded by surrounding water chemistries, affected by physiological processes, and vary across species. The objective of this study was to validate the salinity relationships of strontium and barium in otoliths of juvenile Red Drum, Gulf Killifish, and vertebrae of Atlantic Stingray, in coastal Alabama. This information is imperative for lifetime habitat reconstructions of adult fishes based on otolith chemistry. Fishes and stingrays, were held in low (MRL), medium (FRL), and high (PDL) salinity recirculating lab systems for two months. These systems were filled with field collected water from low, medium, and high salinity Alabama estuaries. Sr and Ba edge concentrations of otoliths and vertebrae were quantified using LA-ICPMS. Killifish Sr was higher than Drum at all sites, and was positively correlated with salinity. The lowest values were observed at MRL, medium values at FRL, and high values at PDL. The Drum Sr pattern was similar, however FRL and PDL were indistinguishable. Ba was negatively related to salinity, MRL had the highest Ba for both species, but Killifish concentrations were 4 times higher than Drum at that site. Drum had the next highest concentration at FRL and the lowest Ba at PDL. Killifish Ba was similar to Drum at FRL and PDL, however these two sites did not differ for this species. Stingray vertebral concentrations did not differ for either element.

***Presenter Biography**
Reid Nelson is currently a PhD student at the Univeristy of South Alabama and the Dauphin Island Sea Lab, completing research on population contingents of estuarine fishes.

## DEVELOPMENT OF A GENOMIC APPROACH FOR THE GENETIC MANAGEMENT OF AQUACULTURE AND STOCK ENHANCEMENT OF THE RED SNAPPER (*Lutjanus campechanus*)

**Author(s)**
*Adrienne E. Norrell, The University of Southern Mississippi, adrienne.norrell@usm.edu
Kenneth L. Jones, University of Colorado School of Medicine
Eric A. Saillant, The University of Southern Mississippi

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Responsible stock enhancement requires monitoring and managing the genetic impacts of cultured fish on wild populations. Initial steps of a genetic program include characterizing the structure and genetic diversity of wild populations in order to assist with the design and monitoring of management units. The red snapper is reef fish of major economic importance in the Gulf of Mexico currently being developed for stock enhancement. Due to limitations of traditional molecular markers, previous genetic surveys of red snapper were unable to characterize non-neutral sources of genetic variation, such as local adaptation, potentially leading to false inferences of genetic homogeneity. This work applied newly available high-throughput sequencing and genotyping technologies to develop a comprehensive genetic assessment of red snapper prior to enhancement. A high-density linkage map, a first iteration draft genome sequence, and a panel of 96 Single Nucleotide Polymorphisms were developed during this project. These tools allowed neutral and non-neutral genetic variation to be investigated, permitting the discovery of genomic regions potentially harboring genes affecting important phenotypic traits involved in local adaptation. The study revealed significant divergence between northern and southern red snapper populations (FST estimate 0.188) and Bayesian clustering indicated a complete lack of current gene flow, suggesting separate conservation of the two groups is warranted. In contrast, little evidence of population differentiation was found among geographic populations of northern red snapper, consistent with the existence of highly connected geographic stocks. The 96 locus panel developed in this work will be available for forthcoming management efforts.

***Presenter Biography**
Adrienne Norrell recently completed her Master thesis at the University of Southern Mississippi. Her thesis work focused on developing genomic tools for conservation and management of the red snapper.

## AN EXAMINATION OF TROPHIC INTERACTIONS IN THE NORTHERN GULF OF MEXICO: PAST WORK, PRESENT UNDERSTANDING AND FUTURE CHALLENGES

**Author(s)**
*Megumi C Oshima, Division of Coastal Sciences, School of Ocean Science and Technology, The University of Southern Mississippi, megumi.oshima@usm.edu
Taylor T Daley, Division of Coastal Sciences, School of Ocean Science and Technology, The University of Southern Mississippi
Robert T Leaf, Division of Coastal Sciences, School of Ocean Science and Technology, The University of Southern Mississippi

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
The purpose of this study is to describe the trophic dynamics, identify critical links, and elucidate interaction among prey and fish predators in the Northern Gulf of Mexico (NGOM). To achieve this we performed a comprehensive literature search of diet papers focusing on fishes. We surveyed 136 literature sources, including published journals, technical documents, and graduate theses. We constructed a database of 240 predator species from 84 families. Sciaenidae (Drums, n = 36), Sparidae (Sea breams and Porgies, n = 21), and Lutjanidae (Snappers, n = 17) were the most frequent families represented and the most studied species were Atlantic Croaker (*Micropogonias undulatus*, n = 14), Spotted Seatrout (*Cynoscion nebulosus*, n = 12), and Pinfish (*Lagodon rhomboides*, n = 11). Of 662 unique prey taxa, the most prominent species were Blue Crab (*Callinectes sapidus*, n = 26), Atlantic Croaker (*Micropogonias undulatus*, n = 22), and Gulf Menhaden (*Brevoortia patronus*, n = 20). Penaeidae (marine crustaceans, n = 55), Portunidae (swimming crabs, n = 51), and Gammaridae (amphipods, n = 50) occurred most frequently of the 432 families represented. The majority of published work evaluated diet in the coastal regions of Florida, Mississippi, and Texas encompassing a variety of habitats. This work provides a comprehensive inventory of previously published diet investigations in the region allowing gaps in the understanding of key species' dietary habits in the NGOM to be identified. Further analysis through the use of ecosystem-based models will allow a new perspective on ecosystem-based fishery management and multi-species interactions.

***Presenter Biography**
Megumi Oshima is a first year graduate student at the University of Southern Mississippi Gulf Coast Research Laboratory. Her research focuses on population dynamics and quantitative fisheries modelling.

## INSIDE THE BLACK BOX OF BLACKFISH: TAGGING ATLANTIC TRIPLETAIL (*Lobotes surinamensis*) IN ALABAMA'S COASTAL WATERS

**Author(s)**
*Meagan Schrandt, University of South Alabama & Dauphin Island Sea Lab, mschrandt@disl.org
John Dindo, Dauphin Island Sea Lab
Sean Powers, University of South Alabama & Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
In Alabama, coastal resources are crucial to the economy of the entire state. Coastal fisheries are key players in these systems and healthy stocks need to be maintained by science-based management. For some species, fishermen have expressed concern via anecdotal reports of declines in fish numbers and sizes. One of these species is the Atlantic Tripletail (*Lobotes surinamensis*), or Blackfish. Historically, Blackfish have been an understudied species, seemingly because of the lack of interceptions during standardized research surveys. This also puts them in the 'data-limited' category. In response to concerns of fishermen, as well as the need for more scientific research with this species, the Dauphin Island Sea Lab (DISL) and the University of South Alabama (USA) have started a tagging project, funded through a private donation, to assess Blackfish in Alabama's coastal waters. The tag and recapture information can help scientists estimate fishing effort, fishing mortality, population size, growth, and movement patterns of local Blackfish – all of which are important for management. To date, nearly 40 fish have been tagged by scientists. Recaptures report movements ranging from a few hundred meters within a few days to 100+ kilometers within a few months, and one growth estimate reaches over an inch per month. DISL and USA, with the aid of anglers calling in tag recaptures, plan to continue this research to start estimating population size, fishing effort, and mortality rates of local Blackfish. Some of this information would be the first of its kind for Alabama's Blackfish population.

***Presenter Biography**
Meagan Schrandt is a postdoctoral researcher in the fisheries ecology lab with the University of South Alabama and the Dauphin Island Sea Lab. She studied coastal pelagic fisheries for her dissertation and started the Blackfish tagging program as a continuation of that work; she also works on an oil-spill related oyster project examining the role biodiversity plays in resilience to spills and clean up efforts.

## SPATIAL DYNAMICS OF DEMERSAL COMMUNITIES IN THE NORTHCENTRAL GULF OF MEXICO

**Author(s)**
*Trey P Spearman, University of South Alabama & Dauphin Island Sea Lab, tspearman@gmail.com
J Marcus Drymon, University of South Alabama & Dauphin Island Sea Lab
Sean P Powers, University of South Alabama & Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
The northcentral Gulf of Mexico supports commercial and recreational fisheries maintained by state and federal single-species management plans. To aid in the development of new ecosystem-based fisheries management (EBFM) plans, fisheries-independent data for demersal communities are needed to place the target species in the context of their environment. Due to their close proximity and use of the sea floor, these demersal communities are more closely influenced by benthic habitats and sediment composition than the transient and water column-dwelling species. The demersal communities are important in the ecosystem as both prey for larger predators as well as being local co-habitants using space and resources. The goal of this research is to describe the demersal fish and invertebrate community assemblages in the northcentral Gulf of Mexico. Multiple diversity indices describe significant differences between communities across the area sampled, while NMDS and multivariate PERMANOVA reveal a more complex story of temporal and spatial variation, as well as depth effects. In addition, the presence of large quantities of artificial reefs in the Alabama Artificial Reef Zone likely plays a role in structuring the demersal fish assemblage, and is the focus of ongoing analyses. This fishery-independent data fills a spatial gap that is critical to understanding a natural boundary for many demersal species, and it provides information to support EBFM plans in the northcentral Gulf of Mexico.

***Presenter Biography**
Trey is a Research Assistant at the Dauphin Island Sea Lab. He graduated from the University of South Alabama in 2015 with a Masters in Marine Science.

# EFFECTS OF DESICCATION PRACTICES AND PLOIDY IN CULTURED OYSTERS, *Crassostrea virginica*, ON *Vibrio spp.* ABUNDANCES IN PORTERSVILLE BAY (ALABAMA, USA)

**Author(s)**
*William C. Walton, Auburn University Shellfish Lab, billwalton@auburn.edu
Stephanie M. Grodeska, Auburn University SFAAS
Jessica L. Jones, FDA, Gulf Coast Seafood Laboratory
Cova R. Arias, Auburn University SFAAS

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Regular desiccation practices associated with off-bottom culture of oysters (*Crassostrea virginica*) expose oysters to ambient air in order to eliminate bio-fouling. These practices are also increase *Vibrio parahaemolyticus* and *V. vulnificus* levels in oysters, known human health hazards. The use of triploid oysters is becoming increasingly popular in culture, because their sterility results in rapid growth and good summer meat condition. Research suggests that the lack of gonads may lead to lower *Vibrio spp.* levels in triploid oysters. In this study, triploid and diploid oysters cultured on Australian long line systems were subjected to two typical desiccation practices, air dried or freshwater dipped followed by air drying. Desiccated and continually submersed control oysters were evaluated for *V. parahaemolyticus* and *V. vulnificus* abundances. Three two-week long summertime experiments revealed that *Vibrio spp.* levels in oysters that underwent desiccation (either air dried or freshwater dipped/air dried) returned to levels similar to those of submersed oysters by day three. However, the *Vibrio spp.* levels in desiccated oysters did not significantly decrease from the elevated levels seen immediately following treatment until seven days after re-submersion. There was no significant difference in *Vibrio spp.* levels between triploid and diploid oysters. These results suggest that oysters that have been desiccated should be re-submersed for at least seven days prior to harvest to mitigate any additional human health risk contributed by desiccation practices, regardless of oyster ploidy.

***Presenter Biography**
Bill Walton, Associate Professor at Auburn University and Extension Specialist with Alabama Cooperative Extension, works at the Dauphin Island Sea Lab and with Mississippi-Alabama Sea Grant on issues related to oyster restoration, fisheries and aquaculture. He is presenting this work on behalf of his former graduate student, Stephanie Grodeska.

## UNDERSTANDING THE DIRECT AND INDIRECT IMPACTS OF MICROPLASTICS IN EASTERN OYSTERS

**Author(s)**
*Caitlin C Wessel, University of South Alabama, Dauphin Island Sea Lab, cwessel@disl.org
Just Cebrian, Dauphin Island Sea Lab
Alison Robertson, University of South Alabama

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Microplastics, or plastics smaller than 5mm, present a real, but poorly understood threat to the health and viability of northern Gulf of Mexico (nGoM) ecosystems and seafood industry. Microplastics can cause direct damage to marine biota, absorb hazardous chemical contaminants, and bio-accumulate in benthic invertebrates and fish destined for human consumption. Research at the Dauphin Island Sea Lab has demonstrated that microplastics are prevalent in nGoM waters and shorelines, but the potential impacts on key marine resources remain unknown. Microplastics can be found in everything from the water we drink to the food we eat, however, we do not yet know if this has a negative or negligible impact on marine organisms, marine food webs, and ultimately human consumption of seafood. To examine this juvenile eastern oysters, *Crassostrea virg*inica, were used to investigate the uptake, fate and chronic effects of microplastic ingestion. Over the course of five months oysters were exposed to a variety of single and combined treatments of polyethylene (10-50 µm), polystyrene (20 µm), and ethinyl estradiol (EE2). During this time their growth, respiration, filtration, and plastic loads were measured to determine if microplastics were having any effect on the oysters. Lastly, we examined oyster tissues by visual and chemical means to determine the residence time of various plastics and residues of EE2 desorbed from plastics and taken up in their tissues. With these data we hope to evaluate the use of oysters as a bioindicator of microplastics contamination in local bays and coastal zones.

***Presenter Biography**
Caitlin Wessel is a PhD candidate at the Dauphin Island Sea Lab who's dissertation work focuses on marine debris and its impacts in the Gulf of Mexico.

## LIONFISH (*Pterois spp.*) ABUNDANCE AND DISTRIBUTION WITHIN THE ALABAMA REEF PERMIT ZONE

**Author(s)**
*Sarah E White, University of South Alabama & Dauphin Island Sea Lab, swhite@disl.org
Marcus Drymon, University of South Alabama & Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Lionfish (*Pterois spp.*) have been highly successful at invading new habitats since their introduction off the Atlantic coast of Florida in the late 1980s. Since then, much research has focused on investigating multiple aspects of lionfish ecology in order to mitigate the harmful impacts of their invasion on native species. The objective of this study was to analyze the distributions and abundances of lionfish within the Alabama Reef Permit Zone (ARPZ) using a remotely operated vehicle (ROV). From 2011 to 2015, 304 ROV surveys were conducted in the ARPZ including natural and artificial reef habitats. The first lionfish was identified in 2012; since then, 1,141 lionfish have been identified during semi-annual ROV surveys. While lionfish have been found throughout the entirety of the ARPZ, they are most concentrated in the southern region of the Don Kelley North General Permit Zone in the ARPZ. Highest abundances of lionfish have been recorded on artificial structures and, of those artificial structures, lionfish are found in highest densities on chicken transport devices. Lionfish abundances on natural structure is significantly lower than what is seen on artificial structure. Continued monitoring of the ARPZ and adjacent portions of the northern Gulf of Mexico is needed to document the spread of this species, and to evaluate the effectiveness of ongoing mitigation efforts.

***Presenter Biography**
Sarah White is a Master's student at the University of South Alabama studying Marine Conservation and Resource Management. She works in the Fisheries Ecology Lab at the Dauphin Island Sea Lab under the supervision of Dr. Marcus Drymon.

# FRESHWATER EXPOSURE AND HUMAN INTERACTION: CASE HISTORY OF A TWICE-STRANDED BOTTLENOSE DOLPHIN IN ALABAMA WATERS

**Author(s)**
*Noel L Wingers, Dauphin Island Sea Lab, nwingers@disl.org
Ruth H Carmichael, Dauphin Island Sea Lab
Debra P Moore, Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
Extended freshwater exposure is understudied, but believed to cause a variety of health problems in cetaceans such as bottlenose dolphins (*Tursiops truncatus*), which commonly strand in the Gulf of Mexico. In February 2016, the Alabama Marine Mammal Stranding Network (ALMMSN) received a report of two bottlenose dolphins in a small freshwater lake off the upper Perdido River in Seminole, AL. The animals were reported again in the lake three weeks later. Due to low salinity, the animals developed skin lesions linked to an electrolyte imbalance. One dolphin exited the lake during ALMMSN intervention. Attempts to herd the second dolphin out of the lake were unsuccessful, and she was net rescued on 25 March 2016, tagged with a satellite transmitter, and relocated to a higher salinity region of Perdido Bay. The relocated dolphin (aka “Alli”), was observed feeding and socializing with other dolphins for nearly two months after relocation, but in June 2016 she was found stranded dead. An external exam revealed healing of her skin lesions and healthy integument. A small fragment of net identified as consistent with commonly used shrimp trawling gear was found attached to the tag and a necropsy exam revealed signs indicative of possible drowning. Histology and known case history were used to detect underlying health conditions and better define cause of death. This case provides a unique opportunity to study the effects of both freshwater exposure and fishery interaction, two likely but rarely definitive causes of death for bottlenose dolphins in our region.

***Presenter Biography**
Noel Wingers is the Stranding Coordinator with the Alabama Marine Mammal Stranding Network. She has studied marine megafauna for ten years and worked at DISL since 2013.

## EFFECTIVE MONITORING TO EVALUATE ECOLOGICAL RESTORATION IN THE GULF OF MEXICO: AN OVERVIEW OF THE 2016 NATIONAL ACADEMIES REPORT

**Author(s)**
*Mark Woodrey, Grand Bay NERR/Mississippi State University, Mark.woodrey@msstate.edu

**Session**
Living Resources

**Presentation**
Oral presentation

**Abstract**
The National Academies recently released a report highlighting the importance of monitoring for restoration projects associated with damages from the 2010 Deepwater Horizon oil spill. Losses were estimated to include a 20% reduction in commercial fishery landings and damage to >1,770 km of coastal wetlands. Funding for restoration and related efforts currently exceeds $16 billion. Historically, restoration monitoring has been underfunded resulting in a lack of accountability and loss of valuable information to the conservation community. Section I of the report highlights broad concepts and guidelines associated with monitoring plans and programs, including recommending specific elements for inclusion. The committee recommends that monitoring should be an integral element of all restoration projects and at a minimum should include both construction and performance monitoring. Additionally, when appropriate, monitoring should be conducted within an adaptive management framework to inform and improve future restoration efforts. Specific monitoring elements discussed in this presentation include (1) clearly articulated, measurable restoration objectives, (2) identification of well-articulated management questions, (3) identification of appropriate metrics, targets and criteria for questions, (4) evaluation of available baseline data, (5) appropriate sampling and analysis designs, (6) well-documented/standardized sampling protocols; (7) a rigorous data management plan, (8) description of methods for data analysis/evaluation, (9) realistic project budgets and staffing to support appropriate level of monitoring, and (10) a monitoring program management plan. Section II of the report provides specific restoration monitoring guidelines for habitats including wetlands, seagrasses, and oyster reefs and taxa groups including commercial fisheries, marine mammals and birds.

***Presenter Biography**
Dr. Woodrey serves as the Research Coordinator for the Grand Bay National Estuarine Research Reserve and is a coastal ecologist with Mississippi State University. His research focuses on solving 'real-world' coastal conservation issues.

# EVALUATION OF MISSISSIPPI RIVER DISCHARGE, PRODUCTIVITY, AND TEMPERATURE ON THE DYNAMICS OF LARVAL GULF MENHADEN IN THE NORTHERN GULF OF MEXICO

**Author(s)**
*Grant D Adams, Division of Coastal Sciences, School of Ocean Science and Technology, University of Southern Mississippi, grant.adams@eagles.usm.edu
Robert T Leaf, Division of Coastal Sciences, School of Ocean Science and Technology, University of Southern Mississippi
David S Hanisko, Mississippi Laboratories, Southeast Fisheries Science Center, National Marine Fisheries Service, NOAA
Glenn A Zapfe, Mississippi Laboratories, Southeast Fisheries Science Center, National Marine Fisheries Service, NOAA

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
Annual contrasts in Mississippi River discharge have been shown to be a predictor of the recruitment dynamics of Gulf Menhaden *Brevoortia patronus* and are thought to influence the distribution of larvae and food availability. Using a series of regression models we analyzed plankton survey data obtained from the Southeast Area Monitoring and Assessment Program (SEAMAP;1982 – 2014). We evaluated the effect of Mississippi River discharge levels, chlorophyll a concentration, settled plankton volume, and sea surface temperature (SST) on the distribution, presence, and relative abundance of larval Gulf Menhaden. We found that river discharge significantly altered the spatial distribution of larvae: greater levels of river discharge resulted in larvae being encountered further offshore and served to restrict their distribution to the east of the Mississippi River delta. We hypothesize that such patterns are due to forcing from the anticyclonic curvature of the enhanced Mississippi River plume. Furthermore, the relative abundance and presence of larval Gulf Menhaden decreased during low river discharge levels. We found positive correlations between chlorophyll a concentration and the presence and abundance of larvae. SST was negatively correlated with the presence and abundance of Gulf Menhaden larvae. We suggest that despite the increased offshore distribution of larvae, increases in Mississippi River discharge enhance favorable temperature and food conditions for larval Gulf Menhaden.

***Presenter Biography**
After serving four years in the Peace Corps in Peru, Grant is pursuing a Master's degree with Dr. Robert Leaf. His research focuses on understanding variation in the dynamics of fish populations to inform the sustainable use of marine resources.

# EXPLORATORY STUDY: THE INFLUENCE OF CLIMATE VARIABILITY ON A COMMUNITY OF ESTUARINE SPECIES IN COASTAL WATERS OF MISSISSIPPI

**Author(s)**
*Evan J Anderson, USM Gulf Coast Research Laboratory, evan.anderson@usm.edu
Guillermo Sanchez-Rubio, USM Gulf Coast Research Laboratory

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
Since 1974, two fixed sampling sites in the Back Bay of Biloxi (stations 34 and 36) and two in the Mississippi Sound (stations 32 and 37) have been surveyed monthly using a 16-ft trawl net by the Mississippi Department of Marine Resources and the Gulf Coast Research Laboratory. Annual indices of abundance (number per 10-minutes 16-ft trawl) of estuarine species were calculated for both areas and grouped separately by weather-related years imposed by the coupling of the Atlantic Multi-decadal Oscillation and North Atlantic Oscillation phases. Non-parametric rank-sum tests (Mann-Whitney U-test, Z statistic) were performed on the annual number of species, the annual abundance by species, and the annual Simpson's index of diversity (1-D) at the species level and grouped by the coupling of AMO and NAO phases. Weather-related hydrographic characteristics driven by decadal variability in climate influence the diversity and abundance of estuarine species in the northern GOM. High numbers of estuarine species in the Back Bay of Biloxi and the Mississippi Sound were found during the wet regime (1974-1994) and those numbers were only confirmed in the Back Bay by the high values of the Simpson's Diversity Index. In general, the response of estuarine species to the shift from wet to dry regimes was variable but consistent in both study areas. While the abundance of some species decreased, increased or was steady in both study areas, other species vanished or appeared in both areas.

***Presenter Biography**
Evan John Anderson is a research scientist for the Center for Fisheries Research and Development at the University of Southern Mississippi's Gulf Coast Research Laboratory. John has over 20 years of experience working in several different fields most notably on Mississippi's Inter-jurisdictional Sampling Program, a fisheries assessment and monitoring project started in 1974, and his main interest are early life history studies and analyzing long term fisheries data.

# PRELIMINARY ESTIMATES OF POST-RELEASE MORTALITY AND SITE FIDELITY OF HATCHERY-RAISED RED DRUM (SCIAENOPS OCELLATUS) USING ACOUSTIC TELEMETRY

**Author(s)**
*Courtney Buckley, University of South Alabama, Dauphin Island Sea Lab, cbuckley@disl.org

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
Restoration efforts to enhance Red Drum populations in Alabama have been underway for many years. The Claude Peteet Mariculture Center in Gulf Shores, Alabama has been raising and releasing Red Drum into Alabama state waters in an effort to enhance stocks of this popular sportfish. In cooperation with the University of South Alabama, Alabama Marine Resource Division and the Dauphin Island Sea Lab, acoustic transmitters have been placed in 48 hatchery-raised and 18 wild-caught fish. The goal of this study is to determine post-release mortality of hatchery-raised fish and compare site fidelity and movements of hatchery-raised fish to wild-caught fish. Fish movements will be recorded using Vemco VR2W hydrophones as a part of the Coastal Alabama Acoustic Monitoring Program (CAAMP), which consists of an array placed throughout Fowl River, Dog River and additional sites around Mobile Bay. Wild fish were collected using hook and line gear and transported to the hatchery. The hatchery-raised and wild-caught fish were surgically implanted with Vemco V9 acoustic transmitters and Floy internal anchor tags (FM-95W). Fish were monitored at the hatchery for a week prior to release. The fish were released at four sites in Dog River and four sites in Fowl River in August 2016. Post-release mortality and movements will be analyzed this winter following 4-8 months of data collection. Comparing the movement dynamics of hatchery-raised and wild-caught fish is essential to ensuring the success of this and similar restoration efforts.

***Presenter Biography**
Courtney received her B.S. in Environmental Science from the SUNY College of Environmental Science and Forestry. She traveled from Long Island, NY to Dauphin Island, AL to pursue her M.S. in Marine Conservation and Resource Management.

# OYSTER INFESTATION: ABUNDANCE OF MUDBLISTER WORMS (*Polydora websteri*) IN MOBILE BAY OYSTER FARMS

**Author(s)**
*Sarah M Cole, University of South Alabama, Dauphin Island Sea Lab, scole@disl.org
Kelly M Dorgan, University of South Alabama, Dauphin Island Sea Lab
William Walton, Auburn University, Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
Mudblister worms (*Polydora websteri*) infest the shells of oysters in off-bottom oyster farms across Mobile Bay, Alabama. Worms bore into oysters, which cover mud-filled bore holes with layers of shell, creating the mud blister. When shucked, the oyster shell will break more easily and mud blisters can burst releasing anoxic mud with a foul odor. The half shell market is growing along the Alabama coast, and Mudblister worms devalue oysters. This study quantified settlement of these worms over a full season of growth, with the aim of identifying preventative methods for oyster farmers. Specifically, we measured abundances of *P. websteri* on triploid versus diploid oysters and on oysters at different stocking densities. Diploid and triploid oysters at three different densities were set out at four Mobile Bay oyster farms, and collected in winter, spring, and early summer. *P. websteri* were extracted from oysters. These treatments showed minimal effects, although there was a slight trend for higher abundances of *P. websteri* in triploid oysters and those grown under high stocking density. Abundances varied among seasons, with half the sites having a higher infestation in the spring than early summer or winter. Knowing when higher abundances of *P. websteri* occur and at what stocking density could help oyster farmers prevent high infestation, and reduce mud blisters in oyster shells.

***Presenter Biography**
Sarah Cole is a masters student at the University of South Alabama completing her research and studies at Dauphin Island Sea Lab. She received her bachelor's in Marine Science from Eckerd College in 2016.

# ASSESSING THE ECOLOGICAL BENEFITS OF A NEW ARTIFICIAL REEF NETWORK IN THE NORTHERN GULF OF MEXICO

**Author(s)**
*T. Erin Cox, Dauphin Island Sea Lab, ecox@disl.org
Mark A. Albins, Dauphin Island Sea Lab
Sean P. Powers, Dauphin Island Sea Lab
Marcus Drymon, Dauphin Island Sea Lab
Just Cebrian, Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
Artificial reefs are often used to increase fishing opportunities, particularly in areas like the Northern Gulf of Mexico, where natural reef habitat is limited. Yet, the ecological benefits of such reefs remain a topic of debate. Reefs could serve to attract fish away from nearby habitats, aggregating them in known locations and thereby making them easier to catch. Reefs could also increase habitat availability and/or food resources to result in increased production. The aggregation of fishes without concomitant increases in production would serve the immediate goal of increasing fishing opportunities, but may ultimately reduce sustainable catch levels for associated fisheries. Therefore, it is of primary importance to assess the degree to which artificial reefs increase production. The creation of a network of new artificial reefs in the Gulf of Mexico by the Alabama Department of Conservation and Natural Resources Marine Resource Division provides an opportunity to quantify and monitor primary productivity and fish population structure and community composition through time. The ultimate goal of this research is to elucidate the links between primary production and fish production on artificial reefs in order to shed light on the attraction-production debate and to determine whether these particular reefs have the desired fishery enhancement effect. Initial monitoring is underway. Proposed research design and preliminary results will be shared.

***Presenter Biography**
T. Erin Cox is a post-doctoral researcher at Dauphin Island Sea Lab. She studies human impacts to benthic ecology.

## AERIAL THERMOGRAPHIC DETECTION OF MANATEE REFUGIA IN THE NORTHCENTRAL GULF OF MEXICO

**Author(s)**
*Angela Garelick, Dauphin Island Sea Lab/ California State University Channel Islands, angela.garelick026@myci.csuci.edu
Kayla P. DaCosta, Dauphin Island Sea Lab/ University of South Alabama
Ruth H. Carmichael, Dauphin Island Sea Lab/ University of South Alabama

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
Cold stress is the main cause of death for endangered West Indian manatees (*Trichechus manatus*) in the northcentral Gulf of Mexico. Manatees cannot survive extended periods at water temperatures below 20°C, and mortality rates increase during sustained cold (annual low air temp. <14°C). The aim of this study was to identify potential warm water refugia in coastal Alabama that manatees could use during colder months. Aerial surveys were conducted in January (coldest month of the year), with a following survey in March, using a thermal camera (FLIR T620 with geo-referencing) to cover known areas of manatee habitat. FLIR Tools software was used to analyze images and collect location-specific temperature data (accurate to ~0.1°C 2m-2). Outliers to the correlation between maximum and minimum temperatures were used to detect thermal anomalies, which were further analyzed to determine refuge potential. We found no primary refugia (continuous warm water source ≥ 20°C), but did find a potential secondary (discontinuous, ≥ 20°C) thermal refuge at the Barry Steam plant outfall, when the facility was discharging slightly above minimum flow. The timing, flow rate, and temperature of discharge is episodic based on demand, which limits regular use of the site. With increasing presence of manatees in Alabama waters, it is important that we define thermal refugia where manatees may aggregate at certain times of the year to help identify factors that mediate manatee distribution patterns, affect survival, and enhance rescue and stranding response.

***Presenter Biography**
Angela Garelick is an undergraduate student at CA State University at Channel Islands. She was an NSF REU intern at the Dauphin Island Sea Lab during summer 2016.

## OYSTER REEF RESTORATION: SUBSTRATE SUITABILITY MAY DEPEND ON SPECIFIC RESTORATION GOALS

**Author(s)**
*Patrick M Graham, University of Southen Mississippi- Gulf Coast Research Laboratory, Patrick.M.Graham@usm.edu
Jennifer B Pollack, Texas A&M University - Corpus Christi
Terence A Palmer, Texas A&M University - Corpus Christi

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
A limited supply of oyster shell for restoration practices has prompted investigations of alternative substrates used in construction of artificial oyster reefs. The success of oyster reef restoration projects is increasingly focused on not only oyster densities, but on habitat provisioning for associated fauna. A subtidal oyster reef complex (0.24 $km^2$) was restored in the Mission-Aransas Estuary, Texas, USA, in July 2013 using replicated mounds of concrete, limestone, river rock, and oyster shell substrates. Oyster and reef-associated fauna characteristics were quantified quarterly for 15 months, using sampling trays that were deployed 3 months after construction. The highest densities of oyster spat occurred nine months after tray deployment (July 2014, 1264 $m^{-2}$) whereas juvenile oyster densities increased throughout the study period to 283 $m^{-2}$. Concrete (1022 $m^{-2}$) and limestone (939 $m^{-2}$) supported the greatest number of oysters over all dates. Oyster shell (1533 $m^{-2}$) and concrete (1047 $m^{-2}$) substrates supported the highest densities of associated motile fauna. Faunal diversity (Hill's N1) did not vary by substrate material, but did show seasonal variation. A simple benefit-cost ratio was used to indicate the localized monetary value for each of the substrates. Oyster shell and concrete substrates returned the highest benefit-cost ratio for motile fauna, while concrete yielded the highest benefit-cost ratio for oyster abundance. Incorporating benefit-cost ratios in restoration planning will allow practitioners to better integrate substrate-specific ecological values with economic considerations and project goals to maximize return on restoration investments.

***Presenter Biography**
Patrick Graham is a Research Technician at the Gulf Coast Research Laboratory and received his masters degree in Fisheries and Mariculture from Texas A&M University- Corpus Christi.

# UNDERSTANDING TROPHIC TRANSFER OF CIGUATOXIN PRECURSORS IN HERBIVOROUS REEF FISH FROM ST. THOMAS, US VIRGIN ISLANDS

**Author(s)**
*Jessica K Gwinn, University of South Alabama,, jessekgwinn@gmail.com
Will Patterson, University of South Alabama, Dauphin Island Sea Lab
Tyler Smith, University of the Virgin Islands
Alison Robertson, University of South Alabama, Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
Ciguatera fish poisoning (CFP) is a seafood-borne illness found in tropical and subtropical regions of the world. CFP is contracted when fish contaminated with algal toxins ("ciguatoxins" or CTX) are consumed. Low toxicity precursors of CTX are produced by epiphytic microalgae (*Gambierdiscus spp.*) and enter the marine food web as they are consumed by herbivorous fish feeding on macroalgae and corals, which serve as substrate for Gambierdiscus. As the CTX precursors move to higher trophic levels they are biotransformed and can increase in toxicity. The transfer of algal metabolites to herbivorous fish represents a critical point in the fate of CTX in the marine food web. To understand this process, we studied three species of herbivores from St. Thomas, U.S. Virgin Islands including: ocean surgeonfish (*Acanthurus bahianus*), redband parrotfish (*Sparisoma aurofrenatum*), and stoplight parrotfish (*Sparisoma viride*). Stable isotope analysis was conducted to identify ecological differences that may relate to toxicity and showed overlapping trophic position of surgeonfish and redband parrotfish. However, preliminary CTX screening indicated that ocean surgeonfish constitute a higher proportion of toxic fish, which suggests that trophic position alone may not account for ciguatoxicity of herbivores. Our study further explores variable toxicity of these herbivores and the effects of diet, trophic position, size, and geographical location. Due to warming sea surface temperature, the prevalence of Gambierdicus and incidence of CFP are increasing in geographical extent and frequency in the Gulf of Mexico and Caribbean. As such, it is critical to identify pathways of toxicity in subtropical ecosystems.

***Presenter Biography**
Jessica Gwinn is a recent graduate of Texas A&M University conducting research in the Dauphin Island Sea Lab's Ecotoxicology Lab. She is studying the movement of algal toxins in subtropical reef fish and is interested in the biochemical transformations of natural products and their effects at the cellular, organism, and ecosystem levels.

# SPATIAL ECOLOGY OF STINGRAYS IN MOBILE BAY

**Author(s)**
*Matthew B Jargowsky, University of South Alabama, Dauphin Island Sea Lab, mjargowsky@disl.org
J Marcus Drymon, University of South Alabama, Dauphin Island Sea Lab

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
The fourth largest estuary in the United States, Mobile Bay is a dynamic watershed home to a diverse aquatic assemblage. Several species of stingray, including smooth butterfly ray (*Gymnura micrura*), Atlantic stingray (*Dasyatis sabina*), southern stingray (*Dasyatis americana*), lesser electric ray (*Narcine sp.*), and one species of skate, clearnose skate (*Raja eglanteria*), coexist throughout portions of Mobile Bay. To better understand the distribution of this assemblage, we initiated a fishery-indepedent trawl survey in 2016. Since February, 72 trawls have been done throughout Mobile Bay, most often in the southern portion near Fort Morgan. All rays caught have been sexed, weighed, and measured. Catch rates were highest for all four stingray species in June. Immature and mature individuals of both sexes have been caught for all species of stingray, although the sex ratio is male-dominated (223:129,M:F). Smooth butterfly rays are the numerically dominant species, comprising 75% of the total stingrays caught. Mature males are present year-round, but large gravid females don't appear in the trawls until early May. Atlantic stingrays are also common, with peak catch rates occurring in May and June. Southern stingrays were caught as early as March, however smaller individuals (disc width <200mm), were not caught until mid-June. Lesser electric rays were only caught in May and June and their catch was male dominant (31:6, M:F), suggesting some degree of sexual segregation. Mobile bay clearly serves as important habitat for these rays, and further studies examining the mechanisms by which they partition resources are needed.

***Presenter Biography**
Matthew Jargowsky is a technician in the Fisheries Ecology Lab at the Dauphin Island Sea Lab. He graduated from the University of Maine with a bachelor's degree in Wildlife Ecology.

## DETERMINING THE CONDITION INDEX AND CARBONATE PRODUCTION OF *Crassostrea virginica* IN THE MISSISSIPPI SOUND

**Author(s)**
*Kelsey M. Kuykendall, USM Gulf Coast Research Laboratory, kelsey.kuykendall@usm.edu
Bradley Keesee, USM Gulf Coast Research Laboratory
Caeleighn Bernard, Mississippi Gulf Coast Community College
Eric N Powell, USM Gulf Coast Research Laboratory

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
The eastern oyster, *Crassostrea virginica*, is a keystone organism that provides habitat complexity in the form of oyster reefs that support a diversity of estuarine life, a primary source of calcium carbonate in most estuaries, and other ecosystem services such as biofiltration and nutrient cycling. The eastern oyster also supports a valuable commercial fishery along the Gulf of Mexico. The health of an oyster in terms of yield and meat quality can be estimated by a metric called the condition index. The condition index has historically been calculated using a variety of methods, all of which estimate the extent of utilization of the shell cavity by an oyster, with maximum utilization indicating optimal health and circumstances. Evaluations of carbonate production depend on the estimate of shell weight from population size-frequency and mortality measures, yet variation in shell weight with height among populations is poorly known. The condition indices of oysters from three reefs of increasing distance from freshwater input in the Mississippi Sound were calculated using four combinations of wet meat weight and shell parameters. The most accurate model was identified and was then used to calculate the condition indices for oysters from the three reefs. The indices were then examined to elucidate differences in condition of oysters between the reefs. Shell weight-to-length relationships were also developed and compared for the three reefs.

***Presenter Biography**
Kelsey Kuykendall is a laboratory technician at the Gulf Coast Research Laboratory who works on bivalve fisheries and modeling. Currently Kelsey is involved in a Dermo monitoring program in the Mississippi Sound and examination of habitat management areas in the Mid-Atlantic Bight.

## EVALUATION OF CANDIDATE FISHERY REFERENCE POINTS FOR MISSISSIPPI'S SPOTTED SEATROUT STOCK

**Author(s)**
*Robert Thomas Leaf, University of Southern Mississippi, robert.leaf@usm.edu
David A. Dippold, The Ohio State University

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
Because of the popularity of Spotted Seatrout (*Cynoscion nebulosus*) as a recreational target and the recent increases in the magnitude of recreational harvest, the goal of this study was to evaluate the dynamics of the Mississippi Spotted Seatrout stock using a statistical catch-at-age model, develop a management target spawning potential ratio SPR for Mississippi (a widely used metric on the Gulf Coast for this and other fish stocks), and describe how various combinations of fishing morality rates and lengths of entry into the fishery can be used to reach target levels. The data used for this study were the commercial and recreational harvest-at-age from 1993 to 2014, a fishery-independent index of abundance, a fishery-dependent index of abundance, and age-specific natural mortality estimates and maturity estimates. Sensitivity and retrospective analyses were conducted to determine how model inputs affected the estimated spawning stock biomass and estimates of instantaneous fishing mortality. The current mean fishing mortality rate for Mississippi Spotted Seatrout is calculated as the mean F2012 to 2014, 1.43 y-1 and current mean spawning stock biomass SSB2012 to 2014 is 264 mt. The results of the sensitivity analysis indicates that the status estimate is robust to changes in the model inputs and changes in the terminal year of the age-structured model. Given the historical patterns of exploitation and population response we recommend a target %SPR value of 18%.

***Presenter Biography**
Robert Leaf is an Assistant Professor at the University of Southern Mississippi. His interest is in conservation and management of living resources.

# MANAGEMENT STRATEGY EVALUATION OF ALTERNATIVE APPROACHES FOR CALCULATING LIMITS TO HUMAN-CAUSED MORTALITY OF MARINE MAMMALS BASED ON DATA AVAILABILITY

**Author(s)**
*Paula T Moreno, University of Southern Mississippi, Gulf Coast Research Laboratory, Ocean Springs, MS, paula.moreno@usm.edu
John R Brandon, Independent Consultant, San Francisco, CA
Andre E Punt, University of Washington, School of Aquatic and Fishery Sciences, Seattle, WA
Randall R Reeves, Okapi Wildlife Associates, Canada

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
Bottlenose dolphins (*Tursiops truncatus*) are the most prevalent marine mammal species in the bays, Sounds and estuaries (BSE) of the Gulf of Mexico, where 31 stocks are designated as distinct populations for management purposes. Typically, BSE stocks are small with slow growth potential and can be subject to numerous human threats. BSE stocks are particularly vulnerable to human impacts, as emphasized by the protracted recovery time of the Barataria Bay, LA and Mississippi Sound dolphin stocks (39 and 46 years, respectively) to pre-DWH oil spill abundance levels. To maintain stocks at/above their "optimum sustainable level", an annual limit to human-caused mortality, or Potential Biological Removal (PBR), is set. We used Management Strategy Evaluation (MSE) to evaluate the performance of a tier PBR framework relative to the management objectives. We test alternative methods of determining PBR according to data availability (i.e. data-poor to data-rich stocks). This simulation approach shows that averaging abundance estimates from multiple surveys, instead of the standard approach of using only the most recent survey estimate, allows the use of a higher percentile to estimate minimum stock abundance, while ensuring equivalent management performance (i.e. 95% probability of depleted populations recovering to numbers above Maximum Net Productivity Level in 100 years). In addition, an averaging approach leads to lower inter-annual PBR variability, thus reducing year on year variability in regulatory actions on commercial fisheries managed according to PBR. These findings confirm the value of a MSE approach to evaluate management systems and refine guidelines for marine mammal stock assessment.

***Presenter Biography**
My research focuses on spatial and temporal patterns in abundance and distribution of populations using multivariate statistics and simulation to understand environmental drivers and stressors of marine populations and to inform conservation and management decision-making.

## THE POLYCHAETE, *Capitella teleta*, EXHIBITS ALTERNATIVE AEROBIC RESPIRATION STRATEGIES AT DIFFERENT TEMPERATURES UNDER HYPOXIA

**Author(s)**
*Chet F. Rakocinski, Division of Coastal Sciences School of Ocean Science and Technology The University of Southern Mississippi Gulf Coast Research Laboratory Ocean Springs, MS, 39564, chet.rakocinski@usm.edu
Kelsey Burns Gillam, Division of Coastal Sciences School of Ocean Science and Technology The University of Southern Mississippi Gulf Coast Research Laboratory Ocean Springs, MS, 39564

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
Resource managers require ecological indicators with clear connections to ecosystem function, especially when it comes to critical environmental problems involving multiple large-scale stressors, like hypoxia and ocean warming. Populations respond to stressors via mechanistic links to bioenergetic capacities of individuals. Based on that premise, we are using a hypoxia mass balance model (HMBM) to integrate ecophysiological responses of the model tolerant polychaete, *Capitella teleta*. Previously, we hypothesized an allometric relationship for the mass-specific oxygen consumption rate (OCR) as a function of DO concentration based on metabolic ecology considerations. To test this hypothesis, aerobic respiration was examined for worms of various sizes exposed to 12 treatment combinations of DO (20%, 50%, 70% and 100% saturation) and temperature (15°, 20° and 25° C). A non-linear response surface for the size exponent of the OCR curve was derived relative to DO and temperature. Using four 32 d simulated hypoxia/temperature exposure scenarios, alternative aerobic respiration strategies were inferred for *C. telata*, depending on temperature. At high temperatures, observed OCR values tracked hypothesized OCR values; and smaller organisms oxyconformed more than larger organisms. An oxyregulation respiration strategy was exhibited at cooler temperatures; and smaller organisms tended to hyper-regulate. All sizes of organisms oxyregulated more under moderate hypoxia than under severe hypoxia. Assuming ingestion varies proportionally with OCR, energy budgets of marine organisms should suffer more deficits under high temperatures, despite lower costs of aerobic respiration. This study elucidates interesting complexity when individual-level ecophysiological mechanisms are used to explain population-level responses to multiple stressors.

***Presenter Biography**
The presenter and his students conduct research dealing with effects of environmental stress on estuarine biota and factors affecting habitat restoration. Current topics of interest encompass ecophysiological links to population responses, trophic interactions as drivers of habitat persistence, effects of hypoxia on macrobenthic communities, and ecological indicators.

## SHARING SCIENCE: BRIDGING THE PUBLIC TRUST IN SCIENCE GAP

**Author(s)**
*Joyce M. Shaw, Gunter Library, Gulf Coast Research Laboratory, joyce.shaw@usm.edu
Tracy Englert, Unviersity Libraries, The University of Southern Mississippi
Jessica A. Kastler, GCRL Marine Education Center, University of Southern Mississippi

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
In April 2016, The University of Southern Mississippi (USM) Libraries, the College of Science and Technology, and the USM Speaking Center sponsored a workshop and practicum called “Sharing Science.” Funded by a grant, ”Implementing the Sharing Science Workshop & Practicum” and created by the Museum of Science in Boston, the purpose of the program was to provide graduate students and early career scientists with training and practical experience in engaging with the public to communicate about scientific topics. Participants attended a three-hour workshop developed from the NISE Network and presented by three USM communication studies graduate students. Following the workshop, participants engaged in a two hour practicum experience with high school students at USM for the Mississippi Science Olympiad. “Sharing Science” is a component in outreach efforts at USM to help bridge the public trust in science gap and promote science literacy in the community.

***Presenter Biography**
Joyce M. Shaw is the Head of Gunter Library (Gulf Coast Research Laboratory) and Professor (University of Southern Mississippi University Libraries). Her involvement with science literacy, communication, and outreach includes managing the GCRL Science Café, a program designed to allow those from all backgrounds to learn about scientific topics in a relaxed and informal setting.

# CAN SIMPLE TACKLE MODIFICATIONS AND USE OF FISH DESCENDERS DECREASE HARMFUL FISHERY INTERACTIONS WITH BOTTLENOSE DOLPHINS?

**Author(s)**
*Steve F. Shippee, Marine Wildlife Response Group, shippee3@cox.net
Hannah Roth, Marine Wildlife Response Group
Christina Toms, University of Central Florida
Courtney Nelson Seely, Marine Wildlife Response Group
Chris Verlinde, Florida Sea Grant, IFAS/University of Florida
Randall S. Wells, Sarasota Dolphin Research Program of Chicago Zoological Society
Katherine McHugh, Sarasota Dolphin Research Program of Chicago Zoological Society

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
Bottlenose dolphins interact frequently with recreational fishing at offshore reefs in the northern Gulf of Mexico resulting in potential harm to the animals and to fish stocks. Anglers complain that dolphins frequently depredate fish off hooks being reeled up from depth and scavenge on discarded fish that suffer from barotrauma and disorientation. Modifications to terminal tackle used on bottom fishing rigs that incorporates a dolphin mitigation device (DMD) is suggested as a method to reduce depredation. Fish descender tools, such as the Seaqualizer recompression device, are being promoted as a means to successfully return embolized reef fish to depth. We conducted a study to measure the effectiveness of using these techniques to reduce dolphin interactions with recreational fishing and evaluated: 1) tackle modifications using DMDs to deter depredation; 2) effectiveness of commercially available descender devices to mitigate dolphin scavenging of released fish; 3) applicability of using such devices in inshore fishing to alleviate dolphin interactions; and 4) acceptability of using these tools by sport anglers. An additional component of our study was to survey Gulf shoreline fishing piers in the area to assess the incidence of dolphin interactions and gauge angler attitudes. The results of this study will benefit outreach efforts to encourage use of mitigation techniques that reduce dolphin interactions and enhance conservation of both dolphins and reef fish stocks.

***Presenter Biography**
Dr. Shippee earned his BS in marine biology at the University of West Florida in 1983 and then worked for the Navy Marine Mammal Program, in Hawaii from 1984-1993, and in San Diego from 1993-2005. He moved to the University of Central Florida to pursue the doctoral program in Conservation Biology and completed his dissertation work on bottlenose dolphin habitat use, stranding mortality, and fishery interactions along the Gulf coast.

# INDEPENDENT RED SNAPPER STOCK ASSESSMENT RESEARCH PROGRAM

**Author(s)**
*LaDon Swann, Mississippi-Alabama Sea Grant Consortium, swanndl@auburn.edu
Loretta Leist, Mississippi-Alabama Sea Grant Consortium
Stephen Sempier, Mississippi-Alabama Sea Grant Consortium

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
The red snapper is a popular target of the sport fishing and commercial fishing industries throughout the Gulf of Mexico. Historical overharvesting resulted in an overfished red snapper population. Under current federal and state management measures the population is recovering, with full recovery expected by 2032. Fisheries stock assessments provide science information to conserve and manage fishery stocks such as red snapper. A stock assessment provides fisheries managers with information to determine if the fish stock is increasing or decreasing, how many fish can be harvested each year and if overfished what management actions have to be taken to allow the stock to rebuild to healthy levels. Red snapper stock assessments in the Gulf of Mexico region are conducted every 3 years with the next stock assessment scheduled for 2017. There is some disagreement among resource managers, fishermen and environmental groups surrounding the 2014 and earlier stock assessments for red snapper. Much of the disagreement centers on the accuracy of estimating the red snapper population around oil and gas platforms, artificial reefs and other structures considered to be difficult to sample using traditional sample methods. In 2016, Congress directed Sea Grant to use $5 million for fisheries data collections, surveys, and assessments independent of the National Marine Fisheries Service. Sea Grant is working closely with the National Marine Fisheries Service to obtain a one-time estimate of absolute abundance of red snapper in the U.S. Gulf of Mexico region. To reduce the uncertainty among different fishing sectors and resource managers, a two-phase competitive research grants program will be described.

***Presenter Biography**
LaDon Swann is the director of the Mississippi-Alabama Sea Grant Consortium and the director of Auburn University's Marine Programs. For the past 16 years, LaDon has worked to increase the resilience of coastal communities in the natural, built, economic and social domains.

## OUTCOMES FROM 40 YEARS OF SEA GRANT SUPPORTED OYSTER RESEARCH AND EXTENSION

**Author(s)**
*LaDon Swann, swanndl@auburn.edu
Loretta Leist, Mississippi-Alabama Sea Grant Consortium
Stephen Sempier, Mississippi-Alabama Sea Grant Consortium

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
The Mississippi-Alabama Sea Grant Consortium (MASGC) was established in 1972. Since that time, the MASGC has sustained investments in wide range of oyster research and extension projects. More than 50 projects totaling more than $4 million has been invested by MASGC with an additional $2 million provided in non-federal match. Oyster projects funded by MASGC include work in the areas of reef restoration, seafood safety, chemical contaminates, harvesting technologies, selective breeding, diseases, marketing, farming production technologies, farm management, ecosystem services provided by oysters, and other lines of research. Sea Grant's modest, but sustained investment in oysters has resulted in multiple positive impacts on the environment and the economy. The presentation will provide a research and extension phylogeny to demonstrate and future research and extension opportunities.

***Presenter Biography**
LaDon Swann is the director of the Mississippi-Alabama Sea Grant Consortium and the director of Auburn University's Marine Programs. For the past 16 years LaDon has worked to increase the resilience of coastal communities in the natural, built, economic and social domains.

## MODELING THE GULF MENHADEN FISHERY: A SPATIAL NETWORK APPROACH

**Author(s)**
*Robert Trigg, Division of Coastal Sciences, School of Ocean Science and Technology, The University of Southern Mississippi, 703 East Beach Dr., Ocean Springs, Mississippi, 39564, USA, robert.trigg@usm.edu
Robert Leaf, Division of Coastal Sciences, School of Ocean Science and Technology, The University of Southern Mississippi, 703 East Beach Dr., Ocean Springs, Mississippi, 39564, USA

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
The purpose of this study is to investigate the movement and harvest dynamics of the Gulf Menhaden (*Brevoortia patronus*) fishery. The data used in this work are fishery-dependent data (years 2006-2009 and 2011) provided to NOAA by the Gulf Menhaden fishing industry and describe vessel-specific information on catch locations and magnitude of harvest (mt). We found that the middle 50% (25th to 75th percentile) of the number of fish schools caught per vessel-day was 3 to 7 schools for all days, and 4 to 8 schools for fishing days of more than 4 hours. The middle 50% of the magnitude of harvest ranged from 10.8 mt to 32.0 mt. The middle 50% for the distances traveled between schools ranged from 10.9 km to 32.4 km (6.8 to 20.1 mi). A series of probability distribution functions (PDFs) were fit to the frequency distributions of number of catches per day (Poisson), between-catch distances (gamma), and harvest (log-normal). These analyses were used to inform an individual-based model (IBM) which is in development. This study describes fleet dynamics of one of the most important commercial fisheries in the region and illustrates how they can be simulated using a spatially-explicit IBM.

***Presenter Biography**
Robert Trigg is a data wrangler, programmer, and master's student at the University of Southern Mississippi. Robert's interests include open source software, GIS, interdisciplinary studies, modeling, and data visualization.

# A MULTI-SCALE APPROACH TO DETECTING THE RESPONSE OF MIGRATORY LAND BIRDS TO CHANGES IN HABITAT AVAILABILITY

**Author(s)**
*Theodore J Zenzal, The University of Southern Mississippi, tjzenzal@gmail.com
Jeffrey J Buler, University of Delaware
Frank R Moore, The University of Southern Mississippi

**Session**
Living Resources

**Presentation**
Poster presentation

**Abstract**
Each autumn, the Northern Gulf of Mexico coast provides habitat for birds migrating from temperate breeding locations to tropical wintering grounds; however, these habitats are constantly at odds with natural and anthropogenic change. Loss of stopover habitat, especially close to ecological features (oceans, deserts), can limit the migrants depending on those areas to rest and refuel. Disappearing stopover habitat likely increases migrant density in remaining available habitats, depressing already limiting food resources located within these areas. Given that the coastal counties of Mississippi and Alabama have increased in urban development and decreased in forested area, our objective is to use a multi-scale approach to determine the response of migratory birds to changes in stopover habitat availability within Alabama (Baldwin and Mobile counties) and Mississippi (Jackson county). Our approach involves: 1) Using weather surveillance radar, to take a broad-scale approach by mapping how migrant densities respond to changes in land use. We expect migrant densities to decrease in areas that experienced urbanization or deforestation, while migrant densities should increase in areas reforested or protected. 2) Using long-term bird banding data collected from the Bon Secour National Wildlife Refuge in Fort Morgan, AL, to take a local-scale approach by determining if migrant abundance and physiology track changes in stopover habitat availability. Specifically, we might expect a higher abundance of migrants, especially in lean condition, if migrants are unable to stopover earlier en route. These two complementary, long-term datasets provide a unique perspective on the reliance of coastal habitat by landbird migrants.

***Presenter Biography**
Zenzal is a post-doctoral researcher with the Department of Biological Sciences at The University of Southern Mississippi and is affiliated with Department of Entomology and Wildlife Ecology at the University of Delaware. His current research, supported by the MS-AL Sea Grant Consortium, focuses on understanding land bird migration along the MS-AL coast by combining long-term data collected at two complementary spatial scales.


# Oil Spill Impacts

# TRACKING GULF RESTORATION WITH THE DWH PROJECT TRACKER

**Author(s)**
*Laura Bowie, Gulf of Mexico Alliance, Laura.Bowie@gomxa.org
Jes Skillman, Ducks Unlimited
Dave Reed, Florida Fish and Wildlife Research Institute

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
On April 20, 2010 the Macondo oil well exploded and the Deepwater Horizon oil rig caught fire in the Gulf of Mexico, causing eleven deaths and spilling millions of barrels of oil into the gulf. The oil flowed from the sea floor for 87 days, initiating many health, economic, and environmental damages. The parties responsible for the spill include British Petroleum (BP), Transocean, MOEX, Halliburton and Anadarko. Through civil and criminal fines, penalties, and settlements, along with voluntary payments, this disaster will cost these organizations more than $25 billion dollars. The Deepwater Horizon Project Tracker (DWHPT) was launched in April 2014 as a centralized directory of research, recovery and restoration projects funded as a result of the 2010 Deepwater Horizon oil spill. Updated on a regular basis, it provides a comprehensive picture of the location, type, cost, funding sources, and scope of funded projects. Each project snapshot includes a brief project description, a point of contact, and a link to access detailed project information. Website tools also help users efficiently search and summarize information, including readily accessible summaries of funding by state, category, and funding program, a searchable map viewer, and a downloads page. The DWHPT is a public source of reliable information that helps stakeholders collaborate effectively and quickly assess where and how to focus their work for maximum benefit. The funding programs voluntarily provide the project information to the Tracker, thus improving both the accuracy of the information and the transparency of the recovery process.

***Presenter Biography**
Laura Bowie is the Executive Director of the Gulf of Mexico Alliance (GOMA), a partnership network comprised of the five Gulf States, federal agencies, academia, non-governmental organizations, and businesses. The Alliance's goal is to significantly increase regional collaboration in an effort to enhance the ecological and economic health of the Gulf of Mexico.

# DISTURBANCE OF NORTHERN GULF OF MEXICO REEF FISH COMMUNITIES: THE DEEPWATER HORIZON OIL SPILL AND THE LIONFISH INVASION

**Author(s)**
*Kristen A Dahl, University of South Alabama at Dauphin Island Sea Lab, kdahl@disl.org
William F Patterson, III, University of South Alabama at Dauphin Island Sea Lab
Richard A Snyder, Eastern Shore Laboratory, Virginia Institute of Marine Science

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
Substantial declines in reef fishes were observed at northern Gulf of Mexico artificial reef sites between 2009-10 and 2011-12, a period that bracketed the appearance of invasive lionfish in this ecosystem. Small demersal reef fishes, the predominant prey of lionfish in other systems, displayed the greatest declines. However, a confounding factor during this time was the Deepwater Horizon Oil Spill (DWH) in summer 2010. In some areas, targeted lionfish removals have been demonstrated to mitigate negative effects on native fishes. Therefore, we conducted a two-year experiment to examine the effectiveness and ecological benefits of targeted lionfish removals at artificial reefs (n=27) off northwest Florida, where lionfish densities reached the highest recorded in the western Atlantic by 2013. All lionfish were removed via spearfishing from 17 reefs in December 2013, nine of which were periodically re-cleared of lionfish through May 2015. Remaining sites served as uncleared controls. Both juvenile and adult lionfish quickly recruited to cleared reefs, with lionfish reaching pre-clearance densities in less than a year on reefs cleared only once. Removal treatment significantly affected reef fish community structure at experimental reefs, but removal effort was insufficient to facilitate recovery for most taxa, and declines in several taxa were observed throughout regardless of treatment. It is unclear whether chronic effects of the DWH or regionally high lionfish densities were more important factors in explaining trends observed in reef fish communities, but small-scale targeted lionfish removal efforts had few positive impacts overall on native reef fish communities in this study.

***Presenter Biography**
Kristen is a PhD student under Dr. William Patterson studying the ecology of invasive lionfish in the northern Gulf of Mexico. Prior to graduate school, she received her BS in Marine Biology from the University of West Florida and worked on Florida apple snails in the Everglades and conducted fisheries dependent monitoring for Florida Fish and Wildlife Conservation Commission.

## INTEGRATING ACADEMICS INTO RESPONSE- THE ROLE OF THE NOAA SCIENTIFIC SUPPORT TEAM

**Author(s)**
*Adam Davis, National Oceanic & Atmospheric Administration, adam.davis@noaa.gov

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
NOAA's Emergency Response Division (ERD), which is composed of the Scientific Support Team (SST) and regional Scientific Support Coordinators (SSCs), has provided scientific support for oil and chemical spill response since 1976. NOAA SSCs are assigned to U.S. Coast Guard districts and work directly within these regions in support of the USCG as the designated Federal On Scene Coordinator (FOSC) and U.S. Department of Commerce trustee representatives. The role of the NOAA SSC has been formalized and codified in federal regulations since amendments to the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) in 1980. One of the primary tasks of the SSC is science coordination for response. Researchers have expressed an interest in being able to conduct field research in areas affected by a spill, but are often impeded or experience significant obstacles to carrying out their research during an active response. This presentation will highlight the role of the SSC and NOAA ERD and specifically address coordination with the greater scientific community during response. A secondary objective of the presentation is to discuss opportunities to align research interests with response needs, timing of coordination, and integration of academic research into short term and longer term recovery and restoration efforts

***Presenter Biography**
Adam Davis is a NOAA Scientific Support Coordinator for U.S. Coast Guard District 8. He works at the NOAA Gulf of Mexico Disaster Response Center in Mobile, AL.

## TWO YEARS LATER: A FOLLOW-UP STUDY OF OIL SPILL SCIENCE COMMUNICATION IN THE GULF

**Author(s)**
*Chris Ellis, NOAA, chris.ellis@noaa.gov
Stephen Sempier, MS/AL Sea Grant Consortium
LaDon Swann, MS/AL Sea Grant Consortium
Ginny McCown, College of Charleston

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
In 2014, the Gulf of Mexico Research Initiative (GoMRI), which is administered through the Gulf of Mexico Alliance, supported a new oil spill outreach program that the four Sea Grant College Programs based in the Gulf of Mexico are administering. The purpose of the program is to increase the use of oil spill science by people whose livelihoods depend on a healthy Gulf. An initial phase of this new outreach effort was to understand the current network and flow of oil spill science information among the people the Sea Grant programs serve, by means of a social network analysis (SNA). SNA is a tool for evaluating relationships and connectivity, typically by means of survey inquiry. A second SNA was undertaken in 2016. The purpose of this second effort was to examine how the volume of communication and structure of the social network may have changed over time. In addition, participants were asked to identify oil spill science topics that are of interest to the target audiences. Finally, several questions were added to the survey to inform GoMRI synthesis and legacy related activities. This presentation will focus on the results of the 2016 SNA, and some preliminary comparison between the two years of data.

***Presenter Biography**
Chris Ellis is a Social Scientist with NOAA's Office for Coastal Management, in Charleston, SC. His work focuses on survey design and implementation, risk communication and behavior, and organizational behavioral networks.

## DEEPWATER HORIZON OIL SPILL: A VERY DIFFERENT DISASTER

**Author(s)**
*Heather A Finnegan, Gulf Coast Behavioral Health and Resiliency Center, hfinnegan@southalabama.edu
Candice N Selwyn, Gulf Coast Behavioral Health and Resiliency Center
Jennifer Langhinrichsen-Rohling, Gulf Coast Behavioral Health and Resiliency Center

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
Environmental and technological disasters in the Gulf Coast Region represent a significant source of social, financial, and psychological stress. Accurate assessment of both direct and indirect effects of a technological disaster such as the Deepwater Horizon Oil Spill (DHOS) is essential is promoting recovery and future preparedness. Although the human impact of disasters is often far-reaching, the effects of technological disasters may be less direct and thus, more difficult to assess and treat. Data collected by the Gulf Coast Behavioral Health and Resiliency Center (GCBHRC) from a local federally qualified health center between April 2014 and July 2016 revealed few respondents reported the DHOS impact on their well-being. For instance, of 1,646 patients referred to a behavioral health provider within, only 3.6% (n = 60) endorsed continued problems resulting from the DHOS on a quantitative mental health survey. However, in clinical interviews patients self-reported impacts such as job loss, forced relocation, and financial insecurity indirectly resulting from the oil spill in 2010. Case studies will be used to illustrate difficulties in assessment of the human impact of the DHOS on residents in the Gulf Coast Region. Possible explanations for lack of initial acknowledgment will be discussed, including lack of direct exposure to the disaster (no oil contact = no impact). Future directions may include community education and outreach regarding the impact of technological disasters, as well as efforts by researchers and policy-makers to re-conceptualize measurement.

***Presenter Biography**
Heather A. Finnegan is a postdoctoral fellow at the Gulf Coast Behavioral Health and Resiliency Center through the University of South Alabama. She received her Ph.D. in Clinical Psychology from the University of Windsor in Canada in 2015.

# GET THE REAL SCOOP ABOUT THE SLICK: ANSWERS TO THE TOP QUESTIONS ASKED ABOUT THE DEEPWATER HORIZON OIL SPILL

**Author(s)**
*Larissa J Graham, Mississippi-Alabama Sea Grant Consortia, larissa.graham@auburn.edu
Chris Hale, Texas Sea Grant
Emily Maung-Douglass, Louisiana Sea Grant
Stephen Sempier, Mississippi-Alabama Sea Grant Consortium
Tara Skelton, Mississippi-Alabama Sea Grant Consortium
LaDon Swann, Mississippi-Alabama Sea Grant Consortium
Monica Wilson, UF/IFAS and Florida Sea Grant

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
After the Deepwater Horizon oil spill, local residents had many questions about the spill and its impact on the environment and human health. People asked what techniques responders used to clean up the oil and how they implemented these techniques. They wanted to know where the oil went after the spill and still question where the oil is now. Coastal residents expressed concern about the safety of swimming in the Gulf after dispersants were used and were unsure if Gulf seafood was safe to eat. People wanted to know the about impact the oil spill had on wildlife, fisheries, and habitats. In 2014, the Sea Grant oil spill science outreach team formed to answer these questions and share the answers with specific audiences along the Gulf of Mexico and beyond. This presentation will answer the questions that were most commonly asked after the oil spill.

***Presenter Biography**
Larissa Graham is the Oil Spill Science Outreach Specialist with the Mississippi-Alabama Sea Grant Consortium. She is one of four specialists that are sharing oil spill science with coastal audiences whose livelihoods depend on a healthy Gulf of Mexico or who are involved in the management of the Gulf of Mexico coastal, marine, or human resources.

# THE VALUE OF BASELINE DATA: DISCRIMINATING BETWEEN DEEPWATER HORIZON IMPACTS AND NATURAL VARIATIONS IN LARVAL FISH CONDITION

**Author(s)**
*Frank J Hernandez, University of Southern Mississippi, frank.hernandez@usm.edu
Jesse E Filbrun, Southern Arkansas University
John T Ransom, Benzie Conservation District (Beulah, MI)
Jeffrey Fang, Indiana University, Bloomington

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
After the Deepwater Horizon oil spill (DWHOS), it was evident that long-term, baseline data were lacking for many ecosystem components, which presented challenges in following damage assessments. Baseline data are critical in determining DWHOS impacts because many parameters of interest (e.g., faunal abundances, organismal health, trophic interactions) vary spatially and temporally, therefore teasing apart "impacts" is difficult without an understanding of the background ecosystem variability. In this study, we used data from a long-term plankton survey off the coast of Alabama to examine larval abundance and proxies for condition (morphometrics and dry weight, standardized by length) for Red Snapper larvae collected during summer months in years prior to (2007-2009), during (2010) and after (2011, 2013) the DWHOS. We found that larval Red Snapper were in poorer body condition during 2010, 2011, and 2013 as compared to the 2007–2009 (pre-spill) period, a trend that was strongly (and negatively) related to variation in Mobile Bay freshwater discharge. In addition, larvae collected during and after 2010 were in relatively poor condition even after accounting for variation in freshwater discharge and other environmental variables. By contrast, no differences in larval abundance were detected during these survey years. Taken together, our results suggest the supply of larval Red Snapper did not change relative to the timing of the DWHOS, but larval condition was negatively impacted. We hope to broaden the scope of this study to incorporate an expanded set of environmental parameters and a wider geographic range of larval collections.

***Presenter Biography**
Dr. Hernandez is an Assistant Professor in the Division of Coastal Sciences at the University of Southern Mississippi. He has over 20 years of experience working in the Gulf of Mexico, with an emphasis in fisheries oceanography and the ecology of marine fish early life stages.

# ENGAGING FISHER FOLKS IN DATA COLLECTION TO ENHANCE NATURAL SCIENCE RESEARCH AND SCIENCE LITERACY

**Author(s)**
*Jessie Kastler, University of Southern Mississippi - School of Ocean Science and Technology, jessica.kastler@usm.edu
Thao Vu, Mississippi Coalition for Vietnamese American Fisher Folks and Families
Candace Bright, USM, Department of Political Science, International Development and International Affairs

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
Fisher folks of the northern Gulf coast are concerned about changes to their natural resource and their community that have occurred since Hurricane Katrina (2005) and Deepwater Horizon Oil Spill (2010). They have a strong understanding of coastal processes based on decades of observations made while working on the water, but are not strongly connected to the scientific community, which collects data according to reproducible research methods. Project CONCORDE, a Gulf of Mexico Research Initiative research consortium, engages fishermen to learn research methods, and collect and share water quality data with research scientists. Upon analyzing the data, researchers will share the results with fishermen and discuss what the numbers mean in terms of normal or unusual coastal conditions as described through the systematic process of science. During this interaction, fisher folks will share with researchers their traditional ecological knowledge and both groups will consider the coastal area from the perspective of the other community. Because language access is a problem for many senior members of the fishing community, sessions are conducted in both English and Vietnamese. We anticipate project activities will contribute to building a bridge between the fishing and research communities that can benefit both, e.g., researchers gaining new insight to guide their work and increased trust among fishermen in the process of science as it is used in decision-making regarding coastal fisheries.

***Presenter Biography**
Dr. Kastler is a coastal ocean scientist who works with a variety of audiences to share the process of science and processes occurring in the coastal ocean. In recent years she has focused on communicating impacts of natural disasters and human activities.

# OCCUPATIONAL AND ENVIRONMENTAL HEALTH IN THE GULF COAST

**Author(s)**
*Katherine H Kirkland, Association of Occupational and Environmental Clinics, kkirkland@aoec.org
Maureen Y Lichtveld, Tulane University School of Public Health and Tropical Medicine Department of Global Environmental Health Sciences
Hannah H Covert, Tulane University School of Public Health and Tropical Medicine Department of Global Environmental Health Sciences

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
In the aftermath of the Deepwater Horizon oil spill, the Association of Occupational and Environmental Clinics (AOEC), along with the Center for Gulf Coast Environmental Health Research at Tulane University's School of Public Health and Tropical Medicine, has been working with a number of Federally Qualified Health Centers (FQHCs) in the Gulf Coast region to try to address the health occupational and environmental health (OEH) concerns of community members and to help primary care clinicians understand the impact of factors on their patients' health. Since 2013, AOEC staff and members have participated in outreach efforts to engage the FQHCs in the region. These efforts have included personal visits by AOEC staff, participation in community and regional meetings, free online continuing education, and establishing a referral network for patients to be evaluated by OEH specialists. Over 200 community members have been evaluated by board certified occupational physicians since late 2013. Data are currently available of 198 of those evaluated (not all patients have a data report on file). AOEC staff and members have interacted with over 600 community members and 300 clinical staff since the program began. The most frequently mentioned environmental issues raised during these interactions that are possibly related to health concerns include the Deepwater Horizon oil spill, dispersants used during the oil spill clean-up, and air pollution from petrochemical plants. The health concerns include but are not limited to: reproductive, respiratory, cancers, children's developmental issues and dermatitis. The work is funded by the Gulf Region Health Outreach Program.

***Presenter Biography**
Katherine Kirkland, DrPH, MPH is the Executive Director of the Association of Occupational and Environmental Clinics (AOEC), working with occupational and environmental clinics to provide education, outreach and clinical services. She has been working in the Gulf Coast region as part of the Gulf Region Health Outreach Program since 2013.

## PUZZLE PIECING RESTORATION COMPONENTS: MISSISSIPPI STRATEGY FOR RESTORATION

**Author(s)**
*Robert Kroger, Covington Civil and Environmental, robbie@ccellc.us
Marc Wyatt, Mississippi Department of Environmental Quality

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
Given the scale of funding available to the various Gulf States as a result of the Deepwater Horizon, as well as the temporal duration of those funds, it is imperative that States put together a gameplan for how to effectively implement restoration. Furthermore, as championed by Gulf stakeholders, and articulated in numerous visions and plans, coordination and leveraging of funding streams should be a quintessential ingredient for restoration. The State of Mississippi, in striving to "Make Mississippi Whole", has taken an all in approach to cross pollinating funding streams and leveraging. Mississippi's outlook on restoration is purposefully called a gameplan because you have to shift and adapt strategies, ideals, and objectives as Mother Nature dictates, or as ecosystem priorities change. In this presentation you will learn about the State of Mississippi's gameplan and how it gets implemented with the 2017 slate of projects through the various funding streams. Coordination and leveraging of various funds will highlight how by understanding where the problems lie, and looking across the funding streams, the State of Mississippi is maximizing the ecosystem service benefit of projects and tying them together to enhance regional efforts.

***Presenter Biography**
Robbie Kroger is the Chief Scientific Officer of Covington. He works for MDEQ in helping to provide scientific support to restoration projects implemented in Mississippi. Prior to joining Covington Robbie was the Science Coordinator for the RESTORE Council, helping standup the science framework for RESTORE funding for the Gulf.

# "STRESSOR SENSITIVE SERVICES": SUCCESSFUL INTEGRATED BEHAVIORAL HEALTH SERVICES FOR DISASTER-VULNERABLE POPULATIONS

**Author(s)**
*Jennifer Langhinrichsen-Rohling, University of South Alabama, Gulf Coast Behavioral Health and Resiliency Center, jlr@southalabama.edu

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
Disaster-related efforts consist of several processes: preparation, response, and recovery. The specific features of these vary substantially by the type, extent, frequency, and breadth of any particular disaster. In 2010, the DeepWater Horizon (DWH) oil spill introduced a new type of disaster into the Gulf Coast region, a region typically beset by hurricane, tornado, and flooding disasters. The DWH disaster was novel because of its breadth of geographic impact, the extended uncertainty before the well was capped, its regional novelty, and the untested use of dispersants and Vessels of Opportunity for clean-up. DWH was also unique because, instead of extended legal wrangling, some comprehensive litigation was settled rather quickly. One settlement (Gulf Region Health Outreach Program, GRHOP) was noteworthy because it deliberately addressed multiple facets of disaster efforts: immediate response, recovery within vulnerable populations, and long-term capacity building to facilitate future disaster preparation and mitigation activities. This paper will explicate one GRHOP component, the Mental and Behavioral Health Capacity Project – Alabama (MBHCP-AL). Post-spill, MBHCP-AL provided response services to particularly vulnerable populations, while building sustainable mental health capacity into existing healthcare systems. Data from 1667 patients (51% White; 44% Black; 73% Female) who received on-site behavioral healthcare at a FQHC indicate many experience on-going stressors, including financial (62%), employment (42%), transportation (24%), and housing (25%) problems. Evidence that interventions as brief as one session can reduce stress in these patients will be presented. One implication is that disaster recovery, response, and future preparation services need to be stressor-sensitive to be successful.

***Presenter Biography**
Dr. Langhinrichsen-Rohling is a University of South Alabama Psychology Professor, a Licensed Clinical Psychologist, and the Director of the Mental and Behavioral Health Capacity Project - Alabama. Her clinical-practice-research areas include trauma, evidence-based interventions, and culturally sensitive services to vulnerable and under-resourced populations. She has over 125 peer reviewed publications and book chapters and is a frequent presenter at local, regional, national, and international conferences.

# SCIENCE COMMUNICATION THROUGH BLOGGING

**Author(s)**
*Rachel B. McDonald, Dauphin Island Sea Lab, rmcdonald@disl.org
Tina Miller-Way, Dauphin Island Sea Lab
Dottie Byron David, Dauphin Island Sea Lab

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
The Alabama Center of Ecological Resilience (ACER) consortium outreach group is currently reaching out to the general public through several methods including an online educational blog. The blog aims to increase awareness on key words, tools and habitats relating to the Deepwater Horizon oil spill along with the research and activities of ACER scientists. Currently, the blog platform is the ACER website where it is featured under ACER Happenings and then shared through social media. The blog stories fall under three categories including Word Wednesday, Tool Talk and Habitat Focus and use various multimedia to help explain the topic. Word Wednesday introduces and explains key terms and jargon, Tool Talk describes some of the methods and equipment used in ACER research, and Habitat Focus shows and describes the coastal habitats that are the focus of ACER research. The target audience for the blog is the general public, specifically individuals with an interest in science news as well as K-12 and informal educators, who may find the topics relevant to educational programming.

***Presenter Biography**
Rachel McDonald is an Educator for the Discovery Hall Programs at the Dauphin Island Sea Lab. A graduate of the University of South Alabama with a Masters degree in marine science, she is also currently the coordinator for the regional student ROV competition.

# ACUTE AND CHRONIC IMPACTS OF THE DEEPWATER HORIZON OIL SPILL ON RED SNAPPER IN THE NORTHERN GULF OF MEXICO

**Author(s)**
*William F Patterson III, University of South Alabama and Dauphin Island Sea Lab, wpatterson@disl.org
Shannon Calay, National Marine Fisheries Service
Jeff Chanton, Florida State University
Ethan Goddard, University of South Florida
David Hollander, University of South Florida
Steve Murawski, University of South Florida
Isabel Romero, University of South Florida

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
Red snapper, *Lutjanus campechanus*, is perhaps the most economically and ecologically important reef fish in the northern Gulf of Mexico (nGOM). Given that distinction, as well as its contentious fisheries management, there are more pre-Deepwater Horizon Oil Spill (DWH) data to examine spill effects for this species than any other fish in the nGOM. Remotely operated vehicle survey data demonstrate declines in adult as well as juvenile red snapper abundance following the DWH, and stock assessment results clearly indicate declining recruitment in the eastern but not western GOM. Projections of those recruitment declines into the future predict declining yields for the Gulf-wide fishery at a time when the western GOM population is projected to continue its recovery, thus further complicating red snapper management. We are aware of no evidence that directly links the DWH to declining red snapper recruitment. However, we will present a range of evidence that demonstrates acute and chronic effects of the DWH on red snapper, including exposure of red snapper to PAHs in the years of the DWH, changes in fish density and size composition on natural and artificial reefs, shifts in diet and muscle stable isotope ratios that indicate food web effects of the spill, and declines in red snapper size at age that have implications for spawning stock biomass and future egg production. Implications for these post-DWH changes will be placed in the context of red snapper fisheries management, including population structure assumptions for both assessment and management of this iconic species.

***Presenter Biography**
Will Patterson is a fisheries ecologist who has 20 years experience examining the ecology, habitat utilization, population structure, and population dynamics of marine fishes, including extensive research on Gulf of Mexico red snapper.

## A HEALTH INFORMATION EXCHANGE, CONTINUITY OF CARE AND DISPLACED PERSONS. A CASE STUDY.

**Author(s)**
*Tim Rehner, The University of Southern Mississippi, School of Social Work, tim.rehner@usm.edu

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
In the aftermath of disasters, whether human made or natural, residents of affected communities are often displaced. Following Katrina in 2005 and to some extent after the Deepwater Horizon Oil Spill in 2010 Gulf Coast residents were dislocated due to a loss of housing or income. For individuals with mental or medical health conditions, this can have a deleterious effect. Displaced individuals must attempt to re-establish healthcare with new providers. The absence of accurate medical records require patients to be the sole source of their health information. This can cause treatment delays and increase the risk for medical errors. The establishment of the Gulf Health Outreach Program (GRHOP) resulting from the 2010 Deepwater Horizon Oil Spill medical settlement and the federal push to adopt health information exchanges in 2012 provided a unique opportunity to address delays in treatment and medical errors for disaster related displacements. The GRHOP funding facilitated the establishment of a steering committee comprised of a local university, a federally qualified health center and the Mississippi Health Information System (MSHIN). This partnership sought to link both medical and behavioral health medical records and providers to an accurate and accessible Health Information Exchange. This project has connected coastal hospitals and primary care to current information on patients seeking care. In the event of a future disaster, providers across the state will have access to the data needed to provide immediate, safe, and effective treatment. The current status along with developmental milestones for implementing this initiative will be discussed.

***Presenter Biography**
Tim Rehner, PhD. currently serves as the Director for the University of Southern Mississippi's School of Social Work and is the Principal Investigator for the Mississippi Integrated Health and Disaster Program. Some of his accomplishments include the establishment of a School of Social Work sponsored family counseling center and the development of a non traditional delinquency program.

# ADDRESSING THE MENTAL HEALTH IMPACT IN FLORIDA

**Author(s)**
*Glenn E Rohrer, LCSW, Ph.D., University of West Florida, Department of Social Work, grohrer@uwf.edu

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
As part of the Gulf Region Health Outreach Project – Mental and Behavioral Health Capacity Project, the University of West Florida was selected to administer the project in Florida. Guidance from the court settlement directed projects to work within communities that serve the most vulnerable populations by providing direct services and creating a sustainable network of services, making a more resilient community. Directions from the court included working in conjunction with Federally Qualified Health Centers (FQHC's), because of their direct work in high-risk communities. This connection allowed our project to work within a primary care setting, leading to the establishment of an integrated approach to addressing the mental and behavioral health needs. As the project developed, another viable service delivery location was identified in the school system. In partnership with school districts, the most needy populations were identified. As the project has been implemented across the grant area, sustainable positions have been created. The process was implemented by integrating a licensed (or licensed eligible) clinician into the centers and schools. Grant funding was used to support salaries to demonstrate need, viability of the project, and to allow for credentialing of clinicians. Once established, technical assistance was provided to assist in billing Medicaid and private insurance carriers to create permanent, sustainable positions. The process has resulted in the establishment of nineteen positions. The result of this work is that mental health services are available to underserved populations across our service area that were not available prior to the project.

***Presenter Biography**
Dr. Rohrer is a professor at the University of West Florida and is the Executive Director of the Mental and Behavioral Health Project. He has extensive experience in mental health and substance abuse programs in Ohio, North Carolina and Florida.

# IMPACTS OF DEEPWATER HORIZON OIL POLLUTION ON WETLANDS RESILIENCY

**Author(s)**
*Whitney A Scheffel, Dauphin Island Sea Lab, wscheffel@disl.org
Anne R Hughes, Northeastern University
Kenneth L Heck, Jr., Dauphin Island Sea Lab, University of South Alabama
Just Cebrian, Dauphin Island Sea Lab, University of South Alabama
Josh Goff, Dauphin Island Sea Lab

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
Biodiversity can positively influence ecosystem services, and these effects may be strongest in the presence of disturbance. Thus, wetland plant diversity may be critical for ecosystem responses in the aftermath of oiling from the Deepwater Horizon incident. We predicted that the positive effects of increased wetland plant diversity on ecosystem processes would be more prominent in oiled than unoiled areas. We tested this in 3,785 L mesocosms, where we examined the interactive effects of oil exposure, and plant genetic and species diversity on key ecosystem processes. Experimental tubs within mesocosms (N=24-25 per) were assigned to a no plant control or one of five plant diversity treatments: *Spartina alterniflora* genotypic monoculture, *S. alterniflora* genotypic polyculture, *S. alterniflora* genotypic monoculture + *Avicennia germinans*, *S. alterniflora* genotypic polyculture + *A. germinans*, or *A. germinans* only. In two oil-exposed mesocosms, we used a 5-day repetitive dosage procedure, with each tub receiving 1 L m-2 of a 1:1 oil-water mixture. In two non-oiled mesocosms, seawater was added using the same procedure. During each of our five sampling events (Dec. 2015- Sept. 2016), we quantified plant growth, morphology, and productivity as a function of plant diversity and oiling. Results indicated negative impacts of oiling on Spartina survival, growth and flowering, and Avicennia leaf number and canopy area. In addition, the magnitude of oiling effects on Spartina was reduced in mixed species and polyculture treatments.

***Presenter Biography**
Whitney received her Master's degree in the fall of 2015 from the University of South Alabama where her research focused on the range expansion of the black mangrove into northern Gulf of Mexico salt marshes. She is currently a project manager at the Dauphin Island Sea Lab examining the role wetland biodiversity plays in determining resiliency to oil disturbance.

# SPECIES AND FUNCTIONAL DIVERSITY OF APEX AND MESOPREDATORS IN THE NORTHERN GULF OF MEXICO

**Author(s)**
*Emily A Seubert, University of South Alabama, emseubert@gmail.com
Marcus J Drymon, University of South Alabama
John Valentine, Dauphin Island Sea Lab

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
High biodiversity can enhance the resiliency of an ecosystem and hasten the recovery of collapsed populations. Apex and mesopredators often overlap trophic niches, and thus can facilitate the ability of an ecosystem to rebound from a disturbance. To investigate the species and functional diversity of apex and mesopredators across the northern Gulf of Mexico in response to the Deepwater Horizon Oil spill, we initiated a spatially stratified bottom longline survey in inshore and offshore waters. Species diversity was calculated from catch data using standard diversity indices while functional diversity will be determined through ongoing analyses of the stable isotope ratios of carbon, nitrogen, and sulfur sampled from white muscle and blood plasma. Preliminary species diversity results show that overall, offshore sites in Louisiana have the highest diversity while offshore sites in Mississippi contain the lowest diversity. Inshore sites in Alabama encountered the highest number of species whereas offshore Alabama sites encountered the fewest number of species per region. Initial data from spring 2016 shows variability in these preliminary diversity trends, as well as differences among the dominant species in each region. Early evidence of high predator diversity across a small spatial scale indicates that the ecosystem may be resilient in the face of environmental disturbances, which are not uncommon in the northern Gulf of Mexico. Investigating the potential for this system to recover from environmental disasters is critical for both preemptive management and post-disaster mitigation strategies.

***Presenter Biography**
Emily is a master's student at the Dauphin Island Sea Lab studying functional ecology of apex and mesopredators across the Northern Gulf of Mexico with Dr. Marcus Drymon. She received her B.S. in Biological Sciences from UC Davis and is from Seattle, WA (go Mariners!!!).

# SYNERGISTIC SUPPRESSION OF THE ARYL HYDROCARBON RECEPTOR AND HYPOXIA INDUCIBLE FACTOR PATHWAYS AFTER EXPOSURE TO OIL AND HYPOXIA DURING EARLY LIFE STAGES OF *Cyprinodon variegatus*

**Author(s)**
*Danielle J Simning, The University of Southern Mississippi, danielle.simning@eagles.usm.edu
Christopher Perkins, The University of Connecticut
Thijs Bosker, Leiden University
Maria Sepulveda, Purdue University
Sylvain De Guise, The University of Connecticut
Joe Griffitt, The University of Southern Mississippi

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
Hypoxic environments dominate the bottom waters of the northern Gulf of Mexico (nGoM). After the 2010 Deepwater Horizon oil spill, fishes in the nGoM were simultaneously exposed to both oil and hypoxic stressors. Cross-talk between the Hypoxia Inducible Factor and Aryl Hydrocarbon Receptor pathways has been documented to occur in response to both stressors due to completive inhibition of binding to the Aryl Hydrocarbon Nuclear Transport Protein (ARNT), which is responsible for gene transcription and cellular defense. The current research investigates the occurrence of the cross-talk between the Hypoxia Inducible Factor and Aryl Hydrocarbon Receptor pathways in early life stages of the sheepshead minnow (*Cyprinodon variegatus*) under different environmental conditions. Embryonic (15 hpf), post-hatch (4dpf), and post-larval (8dpf) developmental stages were exposed to different HEWAF concentrations under a combination of high/low salinity and hypoxic/normoxic conditions for 48 hours. After the 48h exposure fish were tranfered to clean normoxic water for the duration of the experiment. Quantitative Polymerase Chain Reaction (qPCR) was the method used to evaluated differential expression of Cytochrome P450 1A1 (PAH detoxification) and erythropoietin (red blood cell production) to determine potential effects on the two defense pathways. Suppression of both defense pathways was observed in only the post-larval developmental stage under hypoxic conditions. These results suggest that the post-larval developmental stage is the most sensitive to simultaneous exposure to both stressors.

***Presenter Biography**
I am a master's student at The University of Southern Mississippi's Gulf Coast Research Laboratory studying under Dr. Joe Griffitt. My research interests are focused on using new molecular techniques to examine how organisms react to both anthropogenic and environmental stressors.

## THE INFLUENCE OF MARINE-BASED TECHNOLOGICAL DISASTERS ON HUMAN HEALTH AND WELL-BEING

**Author(s)**
*Anthony H Speier, Louisiana State University Health Science Center-New Orleans Department of Psychiatry, aspei1@lsuhsc.edu
Tonya C Hansel, LSUHSC-NO Psychiatry
Howard J Osofsky, LSUHSC-NO Psychiatry
Joy D Osofsky, LSUHSC-NO Psychiatry
Nicole J Savage, LSUHSC-NO Psychiatry

**Session**
Oil Spill Impacts

**Presentation**
Oral presentation

**Abstract**
The Oil Spill of April 20, 2010 disrupted the lives, culture, traditions and livelihood of current and future generations like no previous disaster. Residents of parishes directly affected by the oil spill are survivors of natural disasters including the devastation caused by Hurricane Katrina. In our 2011 study, we reported a statistically significant presence of post traumatic stress symptoms and physical health symptoms in cohorts within the general population. However there were no differences between Hurricane Katrina loss, oil spill concerns and oil spill disruption. The implications of such an enormous technological incident on the health and well-being of individuals and communities is profound. The 2013 Deepwater Horizon Medical Benefits Class Action Settlement provided enhanced health services to the residents of the most affected areas of the Gulf. As part of the Louisiana Mental and Behavioral Health Capacity Project (MBHCP-LA) integrating behavioral health care into primary care clinics and enhancing health literacy in communities became a wide spread recovery initiative This paper will review the obvious and not so obvious forces which resulted in extreme psychological distress to children, families, and adults. The strategies and health integration innovations developed through local partnerships with health clinics, demonstrate the importance of addressing the stigma of seeking health care. Data assessing the impact of these services revealed significant decreases on PTSD symptoms and significant increases in resilience over the course of treatment. The positive health benefits which can emerge when health outcome initiatives become part of a community's resilience will be discussed.

***Presenter Biography**
Dr. Speier, is an associate professor of clinical psychiatry at the LSUHSC-Department of psychiatry. He has served in the public sector in Louisiana for over 35 years. He was formerly the state wide director of Disaster Behavioral Health in Louisiana. He directed the state's BH response to Hurricane Katrina and the BP Deepwater Horizon oil spill. He has managed or consulted to over 20 large-scale disaster incidents in the United States and its territories.

# ASSESSMENT OF OILING ON THE BIODIVERSITY AND RESILIENCE OF THE BENTHIC MICROBIAL ASSEMBLAGES IN SUB-TIDAL AND INTERTIDAL HABITATS

**Author(s)**
*Katherine Baltzer, University of South Alabama & the Dauphin Island Sea Lab, kbaltzer@disl.org
Lucie Novoveska, University of South Alabama & the Dauphin Island Sea Lab
Hidetoshi Urakawa, Florida Gulf Coast University
Jessica Gwinn, University of South Alabama & the Dauphin Island Sea Lab
Stephanie Smith, University of South Alabama & the Dauphin Island Sea Lab
Rachel Smolinski,
Michael Parsons, Florida Gulf Coast University
Alison Robertson, University of South Alabama & the Dauphin Island Sea Lab

**Session**
Oil Spill Impacts

**Presentation**
Poster presentation

**Abstract**
All substrates within euphotic zones of aquatic systems are colonized by photosynthetically active assemblages of microorganisms, consisting of microscopic, unicellular eukaryotic algae and cyanobacteria, and non-photosynthetic protists, Bacteria, and Archaea. This microbial consortium contributes to the sediment's role in biogeochemical cycling and supports higher trophic levels in the benthos. While photosynthetic organisms drive productivity at the surface (0-5 cm), protists and other non-photosynthetic organisms dominate metabolic processes in deeper sediments (5-40 cm). This study focused on characterizing the natural phylogenetic diversity of the sediment microbial community from intertidal and subtidal habitats in the Chandeluer Islands, a region impacted by Deep Water Horizon in 2010. High throughput sequencing was conducted to evaluate the natural microbial community assemblage in sediments across a natural oiling gradient. PAH profiling was conducted to provide an oiling index in sediment, pore water, and surface waters. Interestingly, our most southern site (deemed moderately oiled from 2010 NOAA SCAT surveys) had the lowest PAHs in sediments at all depths and habitat types. Conversely, a central site, (also classified as moderately oiled) had significantly higher levels of PAHs compared to all other field sites at all core depths, and across all habitats (Two-way ANOVA; $p<0.001$). Within this site, sediments in salt marsh, and Ruppia beds had the highest PAH levels (200-700 ppb). We will discuss the relationships observed in the phylogenetic diversity of the microbial community in Chandeluer sediments with oiling, habitat type, and the potential impacts of natural disturbance on buried oil.

***Presenter Biography**
Katie is the lab manager in the Marine Ecotoxicology lab at the Dauphin Island Sea Lab. She received her MS in Marine Environmental Sciences at the University of the Virgin Island and DISL in 2015, and has a research focus on the sub-lethal effects of toxins and contaminants in marine ecosystems.

# INFLOW OF SALINE OFFSHORE WATERS INTO THE MISSISSIPPI SOUND AND MOBILE BAY IN OCTOBER 2015

**Author(s)**
*Mustafa Kemal Cambazoglu, The University of Southern Mississippi, mustafa.cambazoglu@usm.edu
Inia Soto Ramos, The University of Southern Mississippi
Stephan Howden, The University of Southern Mississippi

**Session**
Oil Spill Impacts

**Presentation**
Poster presentation

**Abstract**
Salinity levels within coastal areas of Mississippi and Alabama are generally high in openwater areas located south of the barrier islands, and low in near-coastal areas inside the Mississippi Sound and Mobile Bay estuary due to freshwater sources flowing into the estuarine system. Salinity records from stations near the barrier islands show that the surface inflow of high salinity Gulf of Mexico waters into the Mississippi Sound and Mobile Bay, i.e. north of the Barrier Islands, happen episodically. These saltwater inflow events are observed to be short-lived, i.e. on the order of hours and usually less than a day. In October 2015, persistent easterly winds and surface currents caused the salinity over the shelf in the Mississippi Bight to increase and a prolonged inflow of saline offshore waters into the Mississippi Sound occurred through the barrier island passes and into the Mobile Bay estuary through the main pass. This untypical event was different in its duration of 7-10 days and lasted until Tropical Storm Patricia passed over the system. The Mobile Bay estuary waters were likely trapped from exiting from the main Mobile pass and transported to East Mississippi sound via Pass aux Herons. We want to understand the dynamics that led to this event and the mechanisms of transport and exchange in between estuarine waters and offshore waters in the Mississippi sound during the event. Such an influx of offshore waters into our coastal areas could intensify the damage on the ecosystem if such an event coincided with an oil spill.

***Presenter Biography**
Dr. Cambazoglu is a research scientist at USM working on Ocean Dynamics and Modeling. He currently has an active role in the physical oceanography/observations and modeling subgroups of the Consortium of Coastal River Dominated Ecosystems (CONCORDE) project working on coupling ocean modeling products with in-situ measurements as well as satellite imagery.

# A TEMPORAL STUDY OF NITROGEN CYCLING IN A DEEPWATER-HORIZON IMPACTED COASTAL MARSH SYSTEM

**Author(s)**
*Alice Kleinhuizen, University of Alabama and Dauphin Island Sea Lab, akleinhu@gmail.com
Patrice Crawford, University of Alabama
Nikaela Flournoy, University of Alabama
Caitlyn Taylor, University of Alabama
Sarra Hinshaw, University of Alabama and Dauphin Island Sea Lab
Patricia Sobecky, University of Alabama
Behzad Mortazavi, University of Alabama and Dauphin Island Sea Lab

**Session**
Oil Spill Impacts

**Presentation**
Poster presentation

**Abstract**
Coastal wetlands are critical to the exchange of nitrogen and other nutrients between land, sea and the atmosphere. Knowledge on the effects of anthropogenic activities (e.g., oil spills), on nitrogen (N) cycling and the N-cycling marine microbial populations in coastal wetlands is needed so as to better understand how to affect restoration and recovery of such vital habitats. The impact of the Deepwater Horizon (DWH) oil spill disaster on N-cycling microorganisms, particularly denitrifiers, in northern Gulf of Mexico marsh systems is a surprisingly understudied area of research to date. Denitrification is a key ecosystem function that contributes to nitrogen removal in coastal marine ecosystems. The objective of this current study was to investigate N cycling and associated microbial populations in marsh sediments including subtidal sediments at locations in the Chandeleur Islands, Louisiana, that were previously exposed to oil from the DWH disaster. The research approach included measurements of nutrient fluxes and denitrification rates along with a molecular ecology functional gene-based approach to assess the impact of the spill on the denitrifying microbial community. Denitrification rates were measured by the isotope pairing technique and functional gene abundances were determined by quantitative PCR. Results highlight that denitrification rates were higher in marsh sediments as compared to the unvegetated sub-tidal habitat. Denitrification biomarker gene abundances indicated variations in population sizes based on season and sample type. We will discuss how our results can provide greater insights into the long-term impacts of oil spills on N cycling in vital coastal wetlands.

***Presenter Biography**
Alice Kleinhuizen received her Master's in Marine Science from the University of Alabama in the Summer of 2015 looking at rates of denitrification and nutrient fluxes in the sediments of salt marshes in coastal Alabama. She is currently working as the Lab manager in Behzad Mortazavi's Biogeochemistry Lab with the University of Alabama and the Dauphin Island Sea Lab.

# SHARING THE LATEST OIL SPILL SCIENCE DISCOVERIES: AN OVERVIEW OF A GULF-WIDE, MULTIDISCIPLINARY OUTREACH PROGRAM

**Author(s)**
*Stephen H Sempier, Mississippi-Alabama Sea Grant Consortium, stephen.sempier@usm.edu
Larissa Graham, Mississippi-Alabama Sea Grant Consortium
Chris Hale, Texas Sea Grant
Emily Maung-Douglass, Louisiana Sea Grant
Tara Skelton, Mississippi-Alabama Sea Grant Consortium
LaDon Swann, Mississippi-Alabama Sea Grant Consortium
Monica Wilson, UF/IFAS Florida Sea Grant

**Session**
Oil Spill Impacts

**Presentation**
Poster presentation

**Abstract**
During the Deepwater Horizon (DHW) oil spill, many questions arose about the impacts of the oil spill on people and ecosystems. The questions did not abate after the well was capped. The science community invested substantial resources towards answering oil spill-related questions. In spite of these efforts, the answers often did not reach the people who were asking the questions. Currently, the Gulf of Mexico Research Initiative (GoMRI) is investing $500 million to answer oil spill science-related questions. The Sea Grant programs in the Gulf of Mexico work with people who make a living on or manage coastal resources. Sea Grant developed an oil spill science outreach program with support by GoMRI. The program includes a team of multidisciplinary, full-time outreach professionals based at each Sea Grant program in the Gulf. The team translates and synthesizes the latest oil spill science information and works closely with target audiences to identify and answer their questions. In two years, the outreach team has produced more than a dozen publications, organized more than a dozen seminars, and presented at more than 80 venues throughout the Gulf of Mexico and beyond. The team has engaged with more than 1,600 people to date. During the next three years, the program is expanding to reach a larger set of target audiences and will be delivering the latest oil spill information using more diverse methods. The team will be developing training modules, job aids, videos, a science on a sphere module, and other print and electronic-based materials.

***Presenter Biography**
Steve Sempier is the outreach manager for the Gulf of Mexico Sea Grant Oil Spill Science outreach program and serves as deputy director for Mississippi-Alabama Sea Grant Consortium. He has worked with the four Gulf of Mexico Sea Grant College Programs on Gulf-wide issues since 2007, including coordinating the development of the Gulf of Mexico Research Plan and managing a hydrologic restoration program through a NOAA Restoration Center Community-based partnership program.


# Water Resources: Quality and Supply

# INVESTIGATING THE EFFECTS OF COASTAL RESIDENTIAL DEVELOPMENT ON NUTRIENT FLUX VIA SUBMARINE GROUNDWATER DISCHARGE IN MOBILE BAY

**Author(s)**
*Donald A Beebe, University of South Alabama, dbeebe@southalabama.edu
David T Allison, University of South Alabama
Beverly A. Lowery, University of South Alabama
Michelle M. LaBelle, University of South Alabama

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
Submarine groundwater discharge (SGD) has recently been recognized as a diffuse and nearly ubiquitous source of water and dissolved nutrients to the coastal environment. Here we focus on SGD from an estuarine shoreline (i.e. Mobile Bay, AL) to investigate effects of residential development on coastal water quality. Various techniques including a hydrologic balance, Darcy's law calculations, seepage meter measurements, and radon-222 inventories were used to quantify the total and freshwater components of SGD under differing hydrometeorological scenarios. Samples of groundwater from onshore wells, SGD from seepage meters, and Bay water were analyzed for nutrient content throughout the year to determine nutrient sources and fluxes. Our results indicate that SGD in Mobile Bay and associated nutrient fluxes vary over both temporal and spatial scales. Although daily SGD per meter of shoreline (0.1 – 6.1 $m^3$ per day per m shoreline) was relatively insignificant throughout the year relative to the volume of Mobile Bay, the shoreline distance considered for our study is approximately 13 km, thus yielding daily SGD approaching the reported median discharge of nearby Fowl River. Concentrations of nutrients in SGD were consistently enriched an order of magnitude over surface waters, further substantiating the role of SGD in affecting the nutrient balance of coastal waters. Despite onsite wastewater treatment, the concentration of nutrients in shallow groundwater was consistently lower than SGD thereby indicating additional nutrient sources within the subterranean estuary. These results highlight the application of both hydrogeologic and oceanographic techniques to study the effects of SGD on coastal water quality.

***Presenter Biography**
Alex Beebe is an Assistant Professor of Geology at the University of South Alabama. As a coastal hydrologist, his research interests include groundwater seawater exchange and contaminant transport to coastal waters.

# INCREASING ATMOSPHERIC CARBON DIOXIDE CONCENTRATION AND SURFACE WATER ALKALINITY

**Author(s)**
*Claude E. Boyd, Auburn University, boydce1@auburn.edu
Benjaporn Somridhivej, Auburn University

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
A recent, highly-publicized study claimed that acidic atmospheric deposition was causing stream alkalinity to increase. But, the rising atmospheric carbon dioxide concentration seems a more likely cause. Rising concentration of atmospheric carbon dioxide is increasing solubility of limestone, calcium silicate, and feldspars. For example, calculated equilibrium alkalinity between atmospheric carbon dioxide and pure calcium carbonate in a distilled water system was 52 mg/L in 1973 and 58 mg/L in 2015. This calculation agrees with the increase in equilibrium alkalinity of limestone from a quarry near Auburn, Alabama; equilibrium alkalinity was 58 mg/L in 1980 and 65 mg/L in 2014. A stream from a protected wooded area near Auburn, Alabama had alkalinity of 14-18 mg/L in the 1970s, but today alkalinity is 17-23 mg/L. Streams in several physiographic regions of Alabama and Mississippi had an average alkalinity of 41.5 mg/L in 1973. The survey was repeated in 2014-2015, and average alkalinity was 47.19 mg/L. There was a corresponding – but slightly greater – increase in total hardness in the streams. Alkalinity of surface waters has increased modestly over the past four to five decades, and the increase will continue because the atmospheric carbon dioxide concentration is expected to reach at least 0.045%. However, even at the future projected atmospheric carbon dioxide level, the solubility of limestone should not increase by more than 10-12% above present solubility. It seems likely that the modest increase in alkalinity will have serious negative impacts on aquatic ecosystems or water use.

***Presenter Biography**
Claude E. Boyd is a Professor Emeritus in the School of Fisheries, Aquaculture and Aquatic Sciences at Auburn University. He has been involved in research on water-related issues for over 40 years.

# INNOVATIVE STREAM RESTORATION TECHNIQUES TO ENHANCE STREAM STABILITY, WATER QUALITY, AND HABITAT

**Author(s)**
*Georganna Collins, Ecology and Environment, Inc., gcollins@ene.com

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
Using case studies, including in Alabama and Mississippi coastal streams, this presentation will illustrate how watershed approach, a sound process, various assessment techniques, and innovative practices can enhance stream stability, water quality, and habitat. Urbanized watersheds leave little room for natural processes and ecological functions, yet there are opportunities which will be highlighted. Having a plan that provides cost estimates is an additional aid to gaining stakeholder buy-in and funding support that will also be discussed as means to improve education and policy decisions.

***Presenter Biography**
Ms. Collins is Chief Restoration Specialist with 30 years national and international practice experience within a full range of wetland and stream ecosystems. She combines science and engineering for nature-based solutions that protect and restore habitats and sustainable communities.

## CHANGES IN PRIMARY PRODUCTION AT GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE: WHAT CAN WE LEARN FROM LONG-TERM MONITORING DATA?

**Author(s)**
*Kim Cressman, Grand Bay NERR, MS Dept of Marine Resources, kimberly.cressman@dmr.ms.gov
Jane Caffrey, University of West Florida
Marcus Beck, USEPA
Cher Griffin, Grand Bay NERR, MS Dept of Marine Resources

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
Chlorophyll a has been increasing significantly at long-term monitoring sites in Grand Bay National Estuarine Research Reserve (GBNERR) over the last decade. To understand the context of these increasing chlorophyll numbers, we estimated net ecosystem metabolism (NEM) based on dissolved oxygen data and used a BZI (biomass-photic depth(z)-irradiance) model to calculate phytoplankton contribution to gross primary production (GPP) at three long-term monitoring stations. NEM calculations show a gradient, from more heterotrophic at the most landward site (long-term average NEM -52 mmol $O_2/m^2/d$) to near balanced at the most marine site (-6 mmol $O_2/m^2/d$). BZI calculations suggest that phytoplankton contribute between 20-60% of overall primary production, indicating that microphytobenthos play a major role in primary production and NEM at these sites. Seasonal Kendall trend tests on monthly average GPP show significant, but opposite, trends at two sites. Given the long-term increases in chlorophyll a, and in the absence of obvious stressors in the watershed, it is possible that the dominant primary producer community is shifting from benthic producers to phytoplankton.

***Presenter Biography**
Kim Cressman is the Water Quality Monitoring Coordinator at Grand Bay National Estuarine Research Reserve, where she oversees data collection, laboratory analysis, and quality control for the water quality/nutrient/weather monitoring program. She has worked with water quality in the Southeast for more than 10 years and has been at the NERR since 2011.

# EFFECTS OF RECURRENT PHOSPHATE SPILLS TO A COASTAL ESTUARY

**Author(s)**
*Kevin S. Dillon, Division of Coastal Sciences, University of Southern Mississippi School of Ocean Science and Technology, kevin.dillon@usm.edu
Jane Caffrey, Center for Environmental Diagnostics and Bioremediation and Department of Biology, University of West Florida
Ruth H. Carmichael, Dauphin Island Sea Lab, University of South Alabama
Brian Dzwonkowski, Dauphin Island Sea Lab
Elizabeth D. Condon, Dauphin Island Sea Lab, University of South Alabama
Kim Cressman, Grand Bay National Estuarine Research Reserve
Mark Woodrey, Grand Bay National Estuarine Research Reserve

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
The effects of industrial phosphate spills to Bangs Lake in the Grand Bay National Estuarine Research Reserve were examined in 2014 and 2015. Higher phosphate concentrations in sediments and porewater were measured in Bangs Lake compared to the reference site. Exposure experiments revealed phosphate adsorption rates were lower in Bangs Lake sediments relative to reference sites. Peaks in particulate organic phosphorus concentrations in southeastern Bangs Lake corresponded in time to at least one known major phosphate spill in 2005. Transport of a contaminant plume was also evaluated by releasing a fluorescent dye near the spill site. Transport and dilution rates on the day of the study were driven by tidal action and a very strong western wind. Although the known source of phosphorus to the estuary is on the northwestern side of Bangs Lake, hydrological processes may concentrate finer sediments and associated particulate phosphorus in the southeastern part of the Lake. Pb 210/ Cs dating conducted on the sediment cores were corroborated by Th isotope data, which confirmed greater pollution at sites in Bangs Lake relative to reference sites. Phytoplankton nutrient bioassay experiments showed that phytoplankton in Bangs Lake were very strongly limited by nitrogen. Preliminary results suggested that both ammonium and nitrate were effective at stimulating growth, and grazing by microzooplankton was sometimes significant. Benthic microalgae in Bangs Lake appeared to be decreasing, although they were still generally higher than at the reference site. Benthic microalgal growth was not stimulated by addition of ammonium, phosphate or both.

***Presenter Biography**
Kevin Dillon is an Associate Professor in the Division of Coastal Sciences at the University of Southern Mississippi School of Ocean Science and Technology. His current research focuses on carbon/nutrient cycling and food web dynamics in aquatic systems.

## RED TIDE BLOOM EVENT IN COASTAL ALABAMA: A PHYSICAL PERSPECTIVE

**Author(s)**
*Brian Dzwonkowski, University of South Alabama/Dauphin Island Sea Lab, briandz@disl.org
Alison Robertson, University of South Alabama/Dauphin Island Sea Lab
Lucie Novoveska, Dauphin Island Sea Lab
Grant Lockridge, University of South Alabama/Dauphin Island Sea Lab

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
In the fall of 2015, a significant harmful algal boom (HAB) of the red tide dinoflagellate, *Karenia brevis* impacted the Mississippi and Alabama coastlines. While HABs of this type are common in some regions of the Gulf of Mexico, the severity and duration of this event was a major water quality issue for coastal Alabama, particularly for oyster farmers who experienced harvest closured for approx. three months from mid-November through mid-January. Using time series data of meteorological and marine parameters from a number of regional oceanic and estuarine monitoring systems, the physical conditions associated with the *K. brevis* bloom were examined to better understand the progression of the event in the coastal environment. Wind conditions were conducive to a westward and onshore transport of *K. brevis* throughout the fall season prior to its observed presence in Mobile Bay, implying an offshore and eastern source. This was consistent with the typical oceanic origin of *K. brevis* as well as the reported blooms along the Florida Panhandle in the early Fall. Once inside Mobile Bay, the intensity of the *K. brevis* blooms positively correlated to site salinity conditions, with high salinity areas yielding the highest phytoplankton abundances. By improving our understanding of the physical characteristics and nearshore processes associated with HAB events, better prediction and management can be achieved. This marine-based event also highlights the importance of offshore conditions on the water quality of the regional bays and bayous.

***Presenter Biography**
Brian Dzwonkowski is a physical oceanographer at Dauphin Island Sea Lab. He is focussed on processes that influence three-dimensional transport in the coastal ocean as well as how this transport impacts marine ecosystem.

# BON SECOUR RIVER, OYSTER BAY, AND SKUNK BAYOU WATERSHED MANAGEMENT PLAN

**Author(s)**
*Paige Felts, Volkert, Inc., paige.felts@volkert.com
Melissa Pringle, Ph.D., Allen Engineering and Sciences, Inc.
Joe Dalrymple, Louis Berger

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
The project team comprised of members from Volkert, Inc., Allen ES, and Louis Berger was tasked by the Mobile Bay National Estuary Program (NEP) to develop a watershed management plan for the Bon Secour River, Oyster Bay, and Skunk Bayou Watersheds in south Baldwin County, AL. The plan follows guidance from the EPA's nine key elements for watershed planning. Components of the plan include defining project goals and objectives, characterizing the watershed, public participation, identifying watershed issues and management measures, developing implementation strategies, developing preliminary cost and schedule estimates, identifying potential funding sources, and developing a monitoring plan.

***Presenter Biography**
Mrs. Felts holds a B.S. in Science and a B.S. in Engineering from the University of Alabama. Her environmental project experience includes conducting habitat assessments, identifying and delineating wetlands, wetland mitigation, conducting threatened and endangered species surveys, coordination with state and federal regulatory agencies, environmental permitting, and developing BMP plans.

# CREATING A CLEAN WATER FUTURE

**Author(s)**
*Rick Frederick, Mobile Bay National Estuary Program, rfrederick@mobilebaynep.com

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
On the Gulf Coast, water quality equates to quality of life. The Mobile Bay National Estuary Program along with numerous partners developed the Create a Clean Water Future campaign, a simple outreach program that has been embraced by the community to address the serious impacts from stormwater runoff. The campaign is a public education and outreach program to bring awareness to stormwater pollution. The Create a Clean Water Future campaign was originally developed to address limitations of local governments to fully adopt stormwater management programs and a need to help Alabama residents understand the link between reducing polluted runoff and the preservation of a unique way of life built on Alabama's waterways. The Create a Clean Water Future public service campaign is designed to explain what stormwater is and to encourage actions resulting in the reduction of stormwater pollution at both an individual, community, government, and business level. The campaign includes a website and Facebook page with numerous resources and logo to be used freely by all partners. Tools to spread the word, such as videos and flyers, has also led to the success of the campaign, as well as a list of simple tips that individuals and businesses alike can incorporate in day to day life to become a Clean Water Future partner. From keeping trash contained in the bed of your pickup truck to attending an area litter clean up, every little bit helps, and as each of us does our part, we'll make sure our streams, rivers, bayous, and bays are clean and beautiful for generations to come.

***Presenter Biography**
Rick Frederick is the Community Relations and Business Resource Manager for the Mobile Bay National Estuary Program. Rick leads the development and implementation of the strategies to advance the goals and objectives of the Mobile Bay NEP, taking a community based approach to advance local environmental challenges.

# SWAMP - GENERATING BEHAVIOR CHANGE THROUGH EXPERIENTIAL LEARNING AND WATER QUALITY MONITORING

**Author(s)**
*Cade Kistler, Mobile Baykeeper, ckistler@mobilebaykeeper.org
Jamie Bullock, Mobile Baykeeper
Laura Jackson, Mobile Baykeeper
Casi Callaway, Mobile Baykeeper

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
Mobile Baykeeper works to ensure responsible growth in Coastal Alabama, assist in resolving environmental issues in the region, educate citizens on how they impact the environment, and engage them to become active in protecting their local environment. Despite recent catastrophic natural and manmade disasters in the Gulf of Mexico region, a disconnect still exists in regard to the link between healthy water quality and quality of life. Education is the key to help citizens make this connection, and experiential education that directly connects citizens to their environment allows individuals make this connection much more powerfully than traditional educational techniques. Mobile Baykeeper's Strategic Watershed Awareness and Monitoring Program (SWAMP) was created to educate students and citizens on the importance of water quality for quality of life and economic vitality and engage them in monitoring and protecting our waterways. Ultimately, the most compelling and successful strategy to engender stewardship of the environment is through education, specifically experiential education. Therefore, SWAMP's activities and lessons emphasize place-based experiential monitoring efforts to connect participants directly to the environment and encourage lifelong stewardship. Educating students and community members on the importance of water quality by having them participate in activities on and in local waterways can lead to grassroots efforts for better decision making, problem solving, and stewardship. Through SWAMP, Mobile Baykeeper aims to change behavior by increasing environmental literacy, encouraging a more active citizenry to embrace environmental stewardship, and connecting the community to monitor water quality and work actively towards solutions.

***Presenter Biography**
Cade earned his B.S. from Auburn University and has completed coursework towards his M.S. from Auburn. As Program Director, Cade engages in policy matters to ensure responsible growth throughout the area, manages activities to resolve pollution resulting from infrastructure issues such as sewage overflows, and designs and implements new programs to educate and engage citizens on environmental issues.

## BIVALVE SHELLS RECORD ANTHROPOGENIC EFFECTS ON WATER QUALITY IN GUANTANAMO BAY, CUBA

**Author(s)**
*Anika Knight, Dauphin Island Sea Lab, University of South Alabama, aknight@disl.org
Ruth H Carmichael, Dauphin Island Sea Lab, University of South Alabama
Mike j Risk, Professor Emeritus, McMaster University

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
Guantanamo Bay, Cuba has experienced large algal blooms that negatively impact coral reef communities, potentially due to inputs of anthropogenic nutrients and other contaminants from either the watershed development at Guantanamo Bay or upstream on mainland Cuba. To characterize contaminants to Guantanamo Bay, we sampled bivalve shellfish at several sites in Guantanamo Bay, Guantanamo River and on the Caribbean Sea coastline. We measured organic stable isotopes (δ15N, δ13C) and trace elements (TE) (e.g.; As, Co, Cr, Cu, Fe, Hg, Mn, Pb, V, Zn) in shells from different locations and times, reflecting varying levels of human influence. Stable isotope values ranged from 0.4‰ to 9‰ for δ15N and -23‰ to -17‰ for δ13C. The site with highest δ15N, suggesting processed wastewater entry to the area, was near a marina and known wastewater outfall to Guantanamo Bay. TE concentrations indicative of wastewater, agricultural runoff, and vessel traffic were also found near the marina, while TE signatures common to industrial and urban wastewater were highest in the northern portion of Guantanamo Bay and in a nearby semi-enclosed lake. These findings suggest different sites have different human influences, and mainland Cuba may be a more significant source of contaminants to Guantanamo Bay than previously estimated. Because trace element and nitrogen inputs fuel algal blooms and subsequent eutrophication, managing both types of pollution may be required to reduce bloom frequency and support recovery of local ecosystems.

***Presenter Biography**
Anika is a second-year graduate student at the Dauphin Island Sea Lab. Her dissertational research focuses on using bivalve shells to trace anthropogenic influences through marine systems.

# SPATIAL AND TEMPORAL VARIABILITY IN PRIMARY PRODUCTION WITHIN THE MISSISSIPPI BIGHT ECOSYSTEM

**Author(s)**
*Jeffrey W Krause, Dauphin Island Sea Lab, jkrause@disl.org
Liesl K Cole, Department of Marine Sciences, University of South Alabama
Allison K Mojzis, 3Division of Marine Science, School of Ocean Science and Technology, The University of Southern Mississippi
Adam D Boyette, 3Division of Marine Science, School of Ocean Science and Technology, The University of Southern Mississippi

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
The Mississippi Bight Ecosystem (MBE) supports highly productive fisheries (e.g. Gulf Menhaden). It is affected by the Mississippi River outflow in the southeast domain, and discharge in the northern domain mainly from the Pascagoula River and the Mobile Bay, the latter being the fourth largest freshwater source in North America (Mississippi River is the highest). Given the MBE's proximity to two of the top four freshwater point sources on the continent and its high fisheries productivity, the magnitude for primary production is expected to be high. Here we report preliminary results from three system-wide cruises during Fall 2015, Spring 2016 and Summer 2016, and a higher temporal resolution data set at one site in the northern domain. Early results demonstrate that the degree of temporal variability among seasons at the fixed site is similar to the spatial variability observed within the entire system during one cruise period. The contribution of large phytoplankton to total primary production is highest during spring in the western domain. The Chlorophyll-normalized rates of primary production (i.e. a proxy for growth rate) in larger phytoplankton were not significantly different from normalized rates in smaller phytoplankton, suggesting that the main reason why large cells have higher proportional contribution to primary production is due to food-web processes (e.g. lack of grazing pressure). These results underscore that this system is highly dynamic and resolving effects due to developing stressors (e.g. ocean acidification) or low-frequency events (e.g. oil spill) will require significant shifts in magnitude given the high natural variability.

***Presenter Biography**
Jeffrey Krause is a Senior Marine Scientist at the Dauphin Island Sea Lab and Assistant Professor at the University of South Alabama. His research focuses on general pelagic biogeochemistry and phytoplankton ecology, with an emphasis on the global Silicon cycle and diatom processes.

# ESTABLISHING COMPREHENSIVE VOLUNTEER WATER QUALITY MONITORING IN COASTAL ALABAMA

**Author(s)**
*Jason Kudulis, Mobile Bay National Estuary Program, jkudulis@mobilebaynep.com

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
In coastal Alabama comprehensive watershed management planning is in full swing. In all, thirty one watersheds are targeted to get a plan, truly a massive and historic undertaking for coastal Alabama water resources. To guide planning efforts the EPA identifies nine key elements for inclusion, one of which is a monitoring component. Monitoring is vital to understanding the overall health of a watershed. It can be used to evaluate the success or failure of implemented planning strategies or determine where additional focus is needed. Often citizen driven volunteer monitoring programs are established to meet this critical need. However, organizing, funding, and retaining volunteer monitors to build a longstanding program can be a challenge. To address these obstacles and ensure support of both existing and future volunteer programs the Community Action Committee (CAC) of the Mobile Bay National Estuary Program has identified citizen monitoring as a priority and taken steps to allocate substantial resources including hiring a Volunteer Monitoring Coordinator. Using partnerships, technology and Alabama Water Watch's EPA approved data collection methods the CAC has fashioned a framework to get new monitoring programs operational and outfitted for success. Additionally, the CAC is bringing all monitoring entities to the table to strengthen their individual group efforts and foster a unified volunteer monitoring community to advocate for water quality and wise stewardship. The volunteer monitoring program model is currently being piloted in the Fowl River Watershed.

***Presenter Biography**
Jason currently serves as the Volunteer Monitoring Coordinator for the Mobile Bay National Estuary Program where he is responsible for developing and implementing a comprehensive volunteer water quality monitoring program in coordination with the Community Action Committee (CAC). He holds a Bachelor of Science from the University of South Alabama and a Masters of Science from the University of Alabama.

# RELATING SATELLITE (MERIS)-DERIVED ESTUARINE WATER QUALITY TIME-SERIES DATA TO WATERSHED LOADS OF NITROGEN, PHOSPHORUS, ORGANIC MATTER, AND SEDIMENTS

**Author(s)**
*John C Lehrter, University of South Alabama, jlehrter@southalabama.edu
Chengfeng Le, Ocean College, Zhejiang University

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
Relationships between watershed nutrient loads and water quality impairments in many coastal systems remain unquantified. This is partially due to a lack of observations. In many bays, satellite ocean color data may be used to supplement limited spatial and temporal field observations and improve understanding of nutrient – water quality linkages. However, progress using these data has been hindered by a lack of algorithms in organic rich coastal waters and by the small spatial scale of many coastal systems. Thus, a study was undertaken in Pensacola Bay to develop new algorithms for chlorophyll a (chla); colored dissolved organic matter (CDOM); and suspended particulate matter (SPM) using the MEdium Resolution Imaging Spectrometer (MERIS) satellite. MERIS had suitable spatial resolution (300 m) for the scale of Pensacola Bay (area = 370 $km^2$) and a spectral band centered at wavelength 709 nm that was used to minimize the effect of organic matter on chla retrieval. New empirical band-ratio algorithms were developed, validated, and applied to daily MERIS remote sensing reflectance data acquired from 2003 to 2011 to calculate a nine-year time-series of monthly chla, CDOM, and SPM concentrations. The nine-year time-series were then analyzed for statistical relations with mean monthly watershed loads of nitrogen, phosphorus, dissolved organic carbon, and SPM. The results revealed significant relationships, between river loads and MERIS water quality, but these relationships varied spatially within the estuary and with different time lags. Lessons learned for deriving satellite-based water quality data and communicating results to managers will be presented.

***Presenter Biography**
John Lehrter is an associate professor in the Department of Marine Sciences, University of South Alabama and a Senior Marine Scientist at the Dauphin Island Sea Lab. Current research interests aim to understand human impacts to coastal biogeochemical cycles, hypoxia, and acidification, and the ecosystem characteristics that afford resilience to these impacts.

# DEVELOPMENT OF A LOW COST LAGRANGIAN STYLE DRIFTER WITH ARDUINO CONTROLLED CONDUCTIVITY, TEMPERATURE, AND POSITION SENSING AND LOGGING CAPABILITIES

**Author(s)**
*Grant R. Lockridge, Dauphin Island Sea Lab, glockridge@disl.org
Brian Dzwonkowski, Dauphin Island Sea Lab

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
Advances in the development and availability of basic electrical components, programing software, and sensor technologies have made it possible to engineer low cost sensing and data logging devices without the need for extensive background knowledge. As a result, customizable sondes with the ability to measure a range of water quality parameters can be developed without major capital investment, potentially expanding the capabilities of resource managers, scientists, educators, and may other groups with a need for environmental monitoring. In order to examine the robustness of low cost options for regional monitoring in the bays and bayous of the Mississippi Bight, a sensor design that can be modified to a specific sampling objective was developed and tested. In particular, a sonde based on the Arduino Mega Microcontroller capable of measuring and logging temperature, conductivity, and position data for deployments of less than 24 hours was designed for a Lagrangian style drifter. Functional testing consisted of a 55 hour deployment in combination with a regularly maintained water quality sensor at the Dauphin Island Sea Lab weather station. Data from the Arduino based sensors and weather station were highly correlated and had root mean squared errors (RMSE) 0.154 °C and 1.35 psu for temperature and salinity respectively. The electronics and sensing package along with the drifter housing for these units were created from inexpensive and readily available components. The low cost and customizability of user developed sensing technologies such as these, makes these alternatives attractive to many researchers and educators.

***Presenter Biography**
Grant Lockridge M.S. (Coastal Carolina University 2010), Diving Safety Officer/Lead Engineering Technician, DISL, PhD Student, University of South Alabama.

# SHIFTS IN NUTRIENT ALLOCATION DURING BLACK MANGROVE (*Avicennia germinans*) ENCROACHMENT INTO SALT MARSH (*Spartina alterniflora*)

**Author(s)**
*Aaron Macy, Dauphin Island Sea Lab & University of South Alabama, amacy@disl.org
Just Cebrian, Dauphin Island Sea Lab & University of South Alabama
Michael Osland, US Geological Survey
Julia Cherry, University of Alabama

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
In the coming century, warmer winter temperatures along the northern Gulf of Mexico are expected to enable the poleward migration of mangrove forests at the expense of some salt marshes. In Louisiana, the black mangrove, *Avicennia germinans*, is expected to expand into coastal wetlands historically dominated by the salt marsh grass, *Spartina alterniflora*. While both species provide similar ecosystem services, including shoreline stabilization, carbon sequestration, nutrient filtration, and habitat provision, it is unclear how the magnitude of these services will change with *A. germinans* expansion. In this study, we are investigating seasonal allocations of carbon and nitrogen to different plant tissues and to the sediment environment of wetlands dominated by *A. germinans* or *S. alterniflora* in Port Fourchon, Louisiana. The two species have different seasonal growth patterns. Whereas *A. germinans* retains leaves during winter, the aboveground biomass of *S. alterniflora* senesces each winter, and then resprouts the next year from belowground biomass reserves. As the dominant vegetation shifts from *S. alterniflora* to *A. germinans*, the associated seasonal changes in carbon and nitrogen availability could influence trophic fluxes. In Louisiana, high rates of nutrient removal during the spring and summer play an important role and help to diminish the extent of coastal eutrophication in the Gulf of Mexico's "Dead Zone". Changes in seasonal patterns of nutrient allocation could affect nutrient uptake during this critical period. Our study provides a better understanding of the implications of mangrove expansion into salt marsh for ecosystem services related to nutrient removal and cycling.

***Presenter Biography**
Aaron is a PhD student at the Dauphin Island Sea Lab studying impacts of mangrove expansion into salt marsh habitats. He completed his bachelor's degree in Oceanography at Florida Institute of Technology and has worked in a variety of systems including the US Southeastern wetlands, New England beaches, the Bering Sea, Western Australia, the Mediterranean Sea, Bahamanian shorelines, and the Baltic Sea.

# RESTORING ALABAMA'S COAST - CASE STUDY ON NATURAL CHANNEL DESIGN FOR APPLIED SHEAR STRESS, 2-DIMENSIONAL MODELING, AND PROJECT IMPLEMENTATION

**Author(s)**
*William H McLemore, Goodwyn, Mills & Cawood, Inc., wmclemore@gmcnetwork.com
Justin Barrett, Goodwyn, Mills & Cawood, Inc.
David Bidelspach, 5 Smooth Stones Restoration, PLLC
Michael Geenen, Watershed Restoration, PLLC
John Curry, Hydro Engineering Solutions, a Division of Timble

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
Coastal Alabama is a vital part of the economics and beauty of the state that plays a pivotal role in the overall health of the environment. Coastal areas have been negatively impacted by both natural and man-made disasters. A crucial portion of the overall health of the ecosystem is sediment supply from the various streams and rivers to Mobile Bay. Sediment delivery to the bay has increased due to watershed impacts associated with land development and increased storm activity. The D'Olive Creek watershed is a watershed with increased sediment supply and drains part of the eastern shore of Mobile Bay. Changes in land-use have impacted water quality and habitat in the watershed and Mobile Bay. Increased runoff has influenced erosion and stream channel degradation, which has resulted in extensive sediment loads and destroyed habitat. Using methods associated with natural channel restoration design, the design team has developed plans for restoring approximately 4100 linear feet of stream that drain directly to Mobile Bay. The streams' ability to access its floodplain and withstand applied shear stress to the floodplain was also assessed. Through 2-Dimensional hydraulic modeling, the design team evaluated shear stress, velocity, and scour. The design proposes to restore and stabilize the channel through natural channel restoration and best engineering practices. This objective is met through the design and construction of proper channel dimension, layout, and profile based on reference reach data and instream stabilizing structures. The design also mitigates sediment deposition downstream through channel stabilization and native vegetation installation.

***Presenter Biography**
William is an environmental engineer and project manager in Goodwyn, Mills & Cawood's Environmental Department with nine years of natural channel restoration design and implementation experience. William earned a Bachelor's Degree in Environmental Engineering from Tulane University.

# TRACKING PROGRESS ON COASTAL WATERSHED PLANS

**Author(s)**
*Christian L Miller, Auburn University Marine Extension and Research Center, christian@auburn.edu

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
The Mobile Bay Watershed drains most of Alabama and parts of three other states. It comprises many subwatersheds classified numerically by the USGS into Hydrologic Unit Codes, or HUCs. For planning purposes, the EPA prefers a scale of 12-digit HUCs. There are ninety-eight 12-digit HUCs in Alabama's two coastal counties draining into receiving waters like Fowl River, Magnolia River and many others. Towards developing a five-year ecosystem restoration strategy, MBNEP's Project Implementation Committee (PIC) adopted a protocol of watershed management planning (WMP) at the 12-digit HUC level to guide science-based project implementation. This process, guided by the PIC and watershed stakeholders, charts a conceptual course for improving and protecting the things people most value about living along the Alabama coast. In addition to meeting requirements for watershed planning specified by the EPA's Nine Key Elements, these plans also encompass issues related to environmental health and resiliency, culture and heritage, public access, and critical coastal habitats identified by the MBNEP's Science Advisory Committee as most threatened by anthropogenic stressors (freshwater wetlands; streams, rivers and riparian buffers; and intertidal marshes and flats). Once completed, these plans will provide a roadmap for restoring and conserving watersheds and improving water and habitat quality in areas where resources may have been damaged by the Deepwater Horizon incident. Key projects identified by WMPs will feed into the upcoming Coastal Alabama Restoration Plan. This effort is focused on improving the quality of the water entering Mobile Bay, as well as the Gulf of Mexico, and increasing the amount of nursery habitat necessary for sustaining a healthy fishery.

***Presenter Biography**
Christian Miller is an extension specialist focusing in the area of nonpoint source pollution/water quality, and shares his services with the Mississippi-Alabama Sea Grant Consortium, the Mobile Bay National Estuary Program, and the Alabama Clean Water Partnership. Mr. Miller works out of the Auburn University Marine Extension and Research Center in Mobile, AL.

# SOURCES AND RELATIVE EFFECTS OF WASTEWATER ON OYSTERS (*Crassostrea virginica*) IN AN URBANIZED ESTUARY

**Author(s)**
*Haley S Nicholson, University of South Alabama/Dauphin Island Sea Lab, hnicholson@disl.org
Ruth H Carmichael, University of South Alabama/Dauphin Island Sea Lab
William Burkhardt III, Gulf Coast Seafood Laboratory: Food and Drug Administration
Kevin R Calci, Gulf Coast Seafood Laboratory: Food and Drug Administration

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
Wastewater influence to many urbanized estuaries includes wastewater treatment plants (WTP) and riverine discharge, which can affect distribution and settlement of larval oysters and ability to harvest adults that have grown out in affected areas. To determine relationships between grow-out areas and wastewater influence, we measured indicator bacteria and viruses, including fecal coliforms (FC), *E. coli* (EC), and male-specific coliphage (MSC) in oysters and water at larval settlement locations. To define primary sources of indicators we compared estimated microbial loading rates from a major WTP (WTPCCW) and Mobile River in the northern Mobile Bay/Mississippi Sound (MB/MS) system to indicator concentrations in water and adult oysters. Oyster settlement was highest in Mississippi Sound where salinity was higher, while microbial indicators were highest in northern Mobile Bay near WTP and riverine discharges. FC and EC levels in water and FC in oysters correlated with riverine discharge (water: rFC = 0.91, rEC = 0.84; oysters: rFC=0.81). When WTP flow rates were high (43 vs. 26 MGD), MSC levels were high (water: rMSC=0.88). Results indicated that Mobile River is a primary source of indicator bacteria, while WTP is a source of indicator viruses, and both sources were mediated by source flow rates. Dilution, lower levels of anthropogenic waste input, and microbial decay down bay likely limited wastewater influence at oyster settlement locations in the MB/MS system. Oysters in this system, however, may be vulnerable to future urbanization that changes freshwater flow and wastewater inputs, altering larval settlement patterns and limiting harvest of adult oysters.

***Presenter Biography**
Haley Nicholson was raised in Pensacola, FL and attended the University of Miami where she completed a BS in Marine Biology and competitively swam. She is currently working on her PhD at the University of South Alabama/Dauphin Island Sea Lab, with Dr. Ruth Carmichael.

# “IDENTIFICATION AND CHARACTERIZATION OF BACTERIAL GENES UTILIZED IN TRICLOSAN DEGRADATION

**Author(s)**
*Trenton K. O'Neal, University of South Alabama, tko1201@jagmail.southalabama.edu
Sínead M. ní Chadhain, University of South Alabama

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
Triclosan is an antimicrobial incorporated into various personal care products including soaps, toothpastes, cleaning agents and medical instruments. It is now known that triclosan can bio-accumulate in higher organisms leading to negative effects such as disruption of T4 thyroid hormone. This research project is focused on identifying and characterizing the genes bacteria utilize to degrade triclosan. Enrichment cultures were previously established using soil and water collected on the University of South Alabama campus in Mobile, AL. Incubations were supplemented with triclosan as the sole source of carbon and energy and serially diluted onto agar plates in order to obtain pure cultures of triclosan degrading bacteria. Amplified ribosomal DNA restriction analysis and ribosomal intergenic spacer analysis of the culture collection for separation of isolates into operational taxonomic units (OTU). Forty-eight triclosan degrading bacterial isolates were obtained representing 18 different OTUs. Sequencing of the16S rRNA gene allowed identification of bacteria to genus or species. Pseudomonads were most abundant representing 60% of bacteria with other gammaproteobacteria and betaproteobacteria identified. The isolates were screened by PCR for the triclosan degradation specific tcsA amplicon. 10 isolates yielded positive amplification. Additional PCR primers were also designed to chlorophenol-4-monooxygenase (tftD) and 2,4-dichlorophenol 6-monooxygenase (tfdB) genes which yielded 10 bacteria positive for portions of tftD amplicons. Our results indicate that the ability to degrade triclosan is widespread among bacteria. PCR results indicate that some isolates may degrade triclosan by utilizing previously described degradation genes but it is likely that others utilize novel degradation genes.

***Presenter Biography**
Trenton K. O'Neal is a second year graduate student working towards his Masters of Science in Biology at the University of South Alabama. Once receiving a masters, Trenton plans to pursue a PhD where he will study environmental or anthropogenic effects on microbial community structure and activity.

# ALABAMA HARMFUL ALGAL BLOOMS: CROSSING THE BOUNDARIES OF FRESHWATER, ESTUARINE, AND COASTAL WATERS

**Author(s)**
*Alison Robertson, Dept. Marine Sciences, University of South Alabama & the Dauphin Island Sea Lab, arobertson@disl.org
Lucie Novoveska, University of South Alabama & the Dauphin Island Sea Lab
Katherine Baltzer, University of South Alabama & the Dauphin Island Sea Lab
Brian Dzwonkowski, University of South Alabama & the Dauphin Island Sea Lab
William Walton, Auburn University Shellfish Lab

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
Toxin producing harmful algal blooms (HABs) represent some of the most significant environmental exposures in coastal areas of the world, with large-scale morbidity and mortality seen in fish, shellfish, aquatic birds, terrestrial and marine mammals, and humans. These phytoplankton blooms and the potent toxins that they produce are increasing in their frequency, toxicity, and geographical range, so it is critical to have monitoring and management plans in place to maintain seafood safety and seafood security to meet consumer demands. The AL and MS coastline is a budding area for oyster aquaculture with production exceeding 2 million oysters per year and representing more than $1M for the industry annually. In the past 12 months, a major neurotoxic phytoplankton species known as *Karenia brevis* was blooming in the northern Gulf of Mexico, causing widespread human respiratory illness, marine mammal mortalities, fish kills, and long-term closures of commercial oyster reefs in the northern Gulf States. During this event, we also identified four additional toxigenic HAB species blooming, including the marine dinoflagellates, Prorocentrum and Dinophysis (associated with diarrhetic shellfish poisoning), the diatom Pseudo-Nitzschia (associated with amnesic shellfish poisoning), and Karlodinium (associated with the ichthyotoxic, karlotoxins). Likewise, toxigenic freshwater cyanobacteria Microcystis and Anabaena have been identified in the Mobile Tensaw Delta. With these new regional data, we will discuss the importance of developing an AL HAB monitoring network that is integrated with industry and other stakeholders, and the implications of nearshore coastal processes on the propagation and movement of blooms in coastal AL.

***Presenter Biography**
Dr. Robertson is a marine ecotoxicologist and environmental chemist with >15 years experience with HABs and emerging coastal contaminants across the globe. She received her PhD in Australia (2005) and her key research interests are on elucidating mechanisms of resistance employed by organisms to cope with combined toxin exposure.

# HYDROLOGIC CONDITIONS CONTROL THE SEASONAL CHANGES IN DISSOLVED ORGANIC MATTER DELIVERY TO THE LOWER PEARL RIVER ESTUARINE WATERS

**Author(s)**
*Shatrughan Singh, Department of Geosciences, Mississippi State University, Mississippi State, MS 39762., ss3339@msstate.edu
Padmanava Dash, Department of Geosciences, Mississippi State University, Mississippi State, MS 39762.
Saurav Silwal, Department of Geosciences, Mississippi State University, Mississippi State, MS 39762.
Sankar M. Sasidharan, Department of Geosciences, Mississippi State University, Mississippi State, MS 39762.
Robert J. Moorhead, Geosystems Research Institute and Northern Gulf Institute, Mississippi State University, Mississippi State, MS 39762.
Peng Shang, Department of Geological Sciences, University of Alabama, Tuscaloosa, Alabama, AL 35487.
Yuehan Lu, Department of Geological Sciences, University of Alabama, Tuscaloosa, Alabama, AL 35487.

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
The quality and quantity of riverine discharge of dissolved organic matter (DOM) represents the linkages between the terrestrial ecosystem and receiving aquatic ecosystems. DOM quantity, quality, transport and fate can be modified through complex interactions of various biogeochemical, physical, and hydrological processes such as photo- and bio-degradation, climate, and hydrological discharge. In this study, we examined the seasonal variability of DOM amount and quality in the lower Pearl River estuary. Surface water samples were collected during four field campaigns, each spanning over a week, conducted in December, 2014, and in March, May, and August, 2015. DOM composition was determined using a suite of spectrofluorometric indices and a site-specific parallel factor analysis model, and dissolved organic carbon (DOC) and total nitrogen (TN) concentrations were measured in the laboratory. Terrestrially derived humic-like DOM, fluorescence and biological indices, and DOC were sensitive to higher river discharge during spring (March and May), whereas labile DOM compositions and a250:a365 ratio corresponded to low river discharge and possibly to increased photo- and bio-degradation and autochthonous production during summer (August) and winter (December). A non-conservative relationship of terrestrially and microbially derived humic-like DOM was observed with salinity, which could potentially be due to flocculation, sorption, autochthonous production, and photo- and bio-degradation. Thus, seasonal variability in discharge, temperature, and photo- and bio-degradation processes mainly controlled the DOM character in the lower Pearl River estuarine waters. This study furthers our understanding of seasonal variability of DOM with hydrological changes and changes in other physicochemical controls in estuarine environments.

***Presenter Biography**
Shatrughan Singh is a graduate student in the Department of Geosciences at Mississippi State University and working towards his PhD in Earth and Atmospheric Sciences. His research interest lies in exploring

water quality changes due to organic matter transformation and transport from inland waters to oceanic environments.

# FUTURE PROJECTIONS OF COASTAL MS-AL STREAMFLOW

**Author(s)**
*Sahar Tabatabaei Sadeghi, Department of Civil, Construction and Environmental Engineering, University of Alabama, 35487 , Tuscaloosa, Alabama, stabatabaeisadeghi@crimson.ua.edu
Abdoul A Oubieidillah, University Corporation for Atmospheric Research, Tuscaloosa, Alabama, USA.
Juzer F Dhondia, Department of Civil, Construction and Environmental Engineering, University of Alabama, Tuscaloosa, Alabama, USA.
Glenn A Tootle, Department of Civil, Construction and Environmental Engineering, University of Alabama, Tuscaloosa, Alabama, USA
Mattew D Therrell, Department of Geography, University of Alabama, Tuscaloosa, Alabama, USA.
Bennett Bennett Bearden, Water Policy and Law Institute, University of Alabama, Tuscaloosa, Alabama, USA.

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
There is a scientific consensus that global warming has had a significant effect on water availability and the hydrologic cycle. This research evaluates the impact of climate change on long-term water availability in coastal MS-AL basins. In this research, the Variable Infiltration Capacity (VIC) model was utilized to simulate future streamflow. Future forcings of wind speed, maximum and minimum temperature, and precipitation were inputs into calibrated VIC models. Ensemble multiple models and three emission scenarios at a higher spatial and temporal resolution (based on the concentration of $CO_2$ and A2) asses uncertainty in climate change scenarios and global climate models. Decision makers can use the stream flow projections to manage and address future issues of water demand within these basins.

***Presenter Biography**
Sahar Sadeghi is a PhD student in the Department of Civil, Construction and Environmental Engineering at the University of Alabama. She received her bachelor and master degree in Chemical Engineering in 2006 and 2013 respectively.

# TREE-RING RECONSTRUCTION OF PASCAGOULA RIVER STREAMFLOW

**Author(s)**
*Matthew D Therrell, University of Albama, matthew.therrell@gmail.com
Grant Harley, University of Southern Mississippi
Glenn Tootle, University of Alabama

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
In this study we present new research on warm-season stream flow of the Pascagoula River in southern Mississippi utilizing a long (1150-2014) bald cypress (Taxodium distichum) tree-ring chronology. Our tree-ring record explains about half the variance of the ecologically important warm-season (MJJ) flows, and provides a reasonably good record of flow from April through October. Our record also indicates that the current decadal-scale low-flow period as well as other extreme low periods (e.g., 1930s, 1950s) in the instrumental record are not unusual in the context of the longer tree-ring record and in fact more severe single year as well as decadal events are prevalent. For example, severe low flows in the 1890s as well as early 1800s, early 1700s, and during the well-known late 16th century "megadrought" stand out in the record. These events suggest that the instrumental record does not provide adequate context for understanding the potential range of variability in streamflow in this important river system.

***Presenter Biography**
Dr. Matthew Therrell is an associate professor of geography at the University of Alabama. His work focuses on using tree rings to study past climate particularly the reconstruction of extreme climate events such as drought and flooding.

# THE 2015-2016 EL NINO AND COASTAL MISSISSIPPI-ALABAMA STREAM-FLOW

**Author(s)**
*Glenn A Tootle, Associate Professor, gatootle@eng.ua.edu
Christopher L David, Graduate Research Assistant
Tyler S Lamparter, Graduate Research Assistant
Matthew D Therrell, Associate Professor
Bennett L Bearden, Associate Professor
Juzer Dhondia,
Sahar T Sadeghi,

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
When evaluating the impacts of historic extreme El Nino events on coastal Mississippi-Alabama (MS-AL) hydrology, the association of increased moisture (e.g., increased precipitation resulting in increased streamflow) was misleading. When compared to the historic long-term average, January through August streamflow volumes for five gages located in coastal MS-AL had an average increase of 20% following an extreme El Nino event. However, this overall increase was due to excessive moisture during the winter-early spring (January through April) season whereas the average increase in streamflow volume for the five gages was 32%. In evaluating the temporal (monthly) variability of streamflow, the summer (June through August) season was excessively dry following an extreme El Nino event with streamflow volumes for the five gages decreasing by an average of -21%. Given the lack of impoundments and irrigated lands in coastal MS-AL, the agricultural industry would likely be severely impacted by an El Nino driven summer “drought.” The current 2015-2016 El Nino was considered a “Godzilla” like extreme event. We evaluated the influence of the current El Nino on January through August 2016 streamflow to determine if a similar pattern was observed of excessive winter- early spring streamflow followed by a summer drought.

***Presenter Biography**
Glenn Tootle is an Associate professor at the University of Alabama, with research interests in climactic impacts on water resources and paleo-hydrology. Glenn is a retired Captain of the Navy Seabees after 25 years of service.

# CONNECTING INLAND WATERS AND COASTAL ENVIRONMENTS USING SEDIMENT RECORDS FROM THE SE USA

**Author(s)**
*Matthew N Waters, Auburn University, mwaters@auburn.edu
Stephen Shivers, University of Georgia
Steve Golladay, Joseph Jones Ecological Research Center
Michael F Piehler, UNC-Chapel Hill
Joseph M Smoak, USF St. Petersburg

**Session**
Water Quality and Quantity

**Presentation**
Oral presentation

**Abstract**
Human impacts to inland freshwater environments include nutrient inputs, alterations to hydrology, eutrophication, non-native species invasions, and decreases in ecosystem services. While these impacts are well documented and managed for many systems, less attention is given to how these impacts affect biogeochemical processes and the outflow of materials to connected coastal habitats. Here, we present data from sediment cores collected from a wetland, a natural lake and a reservoir in the SE USA showing how these systems could impact the coastal habitats connected to their outflows. Organic matter, nutrients (C, N, P), stable isotopes, and photosynthetic pigments were measured on the core sections to reconstruct material deposition, primary producer responses, and long-term processes altered by human stressors. Results show that these inland systems store large amounts of nutrients that could be released during extreme weather events or or ecosystem state chagnes. In addition, hydrologic changes demonstrated the focus of inland water management on specific targets while the fate of outflows to coastal areas were less considered. Finally, the role of invasive species is capable of altering particulate material outputs and impacting down stream coastal habitats. These findings show the need to include a more comprehensive understanding of freshwater connections to coasts with regards to the management of particulate materials and hydrologic flows.

***Presenter Biography**
Dr. Waters is an Assistant Professor of Environmental Science at Auburn University where he studies historic changes in aquatic systems using the sediment record. His research is focused on ecological, climatic, and environmental change of systems in the SE USA.

# HOW DO WIND DYNAMICS IMPACT WATER QUALITY IN THE GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE?

**Author(s)**
*Cher Griffin, Grand Bay NERR, MS Dept. of Marine Resources, cher.griffin@dmr.ms.gov
Kim Cressman, Grand Bay NERR, MS Dept. of Marine Resources

**Session**
Water Quality and Quantity

**Presentation**
Poster presentation

**Abstract**
The Grand Bay National Estuarine Research Reserve (NERR) is a shallow retrograding estuary, in which wind likely has a strong influence on dissolved oxygen, turbidity, and the hydrodynamics that impact depth and salinity. This is the first attempt to characterize winds at Grand Bay NERR's weather station in Crooked Bayou and assess the relationship with water quality variables. Wind speed and direction were collected every 15 minutes from 2008 to 2015. These data were summarized by year and month using wind rose diagrams. Tropical and hurricane storm-related data were removed from analysis due to their substantial effect in the directional distribution and ranges of wind speed to standardize for the majority of conditions. Wind at Grand Bay NERR appears to be seasonally variable in direction and speed. The strongest winds occurred in March, April, and May, where median wind speeds were > 3.8 m/s and maximum wind speeds exceeded 15 m/s. The strong winds during these months (>6 m/s) were out of the south and southeast. Across the time period the prevailing winds originated from the north with an overall frequency of 22%; 42% when combined with northwest and northeast. This was especially noticeable with >30% of wind per month from October through February blowing from the north. A multiple regression was performed to quantify the relation between wind and selected water quality variables to further understand factors that could contribute to future management applications for finfish and shellfish in the NERR.

***Presenter Biography**
Cher Griffin has a background in fisheries ecology. She has been working at Grand Bay NERR for 2 years on water quality and weather monitoring.

# THE USE OF WEB TOOLS TO EDUCATE THE COMMUNITY ON WATER QUALITY ISSUES IN COASTAL ALABAMA.

**Author(s)**
*Laura Jackson, Mobile Baykeeper, ljackson@mobilebaykeeper.org
Casi Callaway, Mobile Baykeeper
Cade Kistler, Mobile Baykeeper

**Session**
Water Quality and Quantity

**Presentation**
Poster presentation

**Abstract**
Mobile Baykeeper is a community organization that researches environmental issues that affect our community, collaborate with partners to develop solutions, and educate the community on these issues. One challenge in achieving our mission is educating citizens on these issues and getting them engaged. Baykeeper has developed two new web tools that provide the community with a visual on environmental issues affecting water quality in Coastal Alabama. Sewer spills are a primary source of bacteria entering our local waterways, with over 3.2 million this year alone. To help citizens understand where sewer spills are occurring in Mobile and Baldwin County, we created the "Sewage Spill Explorer" web tool. The web tool shows where the spills are distributed in the area in two different visual layers. The first layer is based on frequency of occurrence and the second displays proportionally sized symbols showing the amount of sewage spilled. Through our educational program, Strategic Watershed Awareness and Monitoring Program (SWAMP), interested individuals are trained and certified as water quality monitors using Alabama Water Watch (AWW), EPA-approved methodology. Monitors choose a site on a local waterbody and monitor monthly. Partnering with Water Rangers, we developed a web interface that houses this location-based water quality data and gives monitors the ability to input and view their data. The tool also helps to report pollution, providing local organizations and agencies to respond and resolve these issues. Technology and creative visuals have given our organization the means to successfully engage citizens on water quality issues.

***Presenter Biography**
Laura received a B.A. in Environmental Studies from Dickinson College and her M.S in Marine Science from the University of South Alabama. She worked for the Dauphin Island Sea Lab before obtaining her new job at Mobile Baykeeper as the Program and Grants Coordinator.

# BENTHIC FORAMINIFERA AS POSSIBLE BIO-INDICATORS OF ENVIRONMENTAL CONDITIONS IN MOBILE BAY

**Author(s)**
*Michelle M LaBelle, University of South Alabama, mml1322@jagmail.southalabama.edu
Kaylyn C. Bellais, University of South Alabama
Donald A. Beebe, University of South Alabama
Murlene W. Clark, University of South Alabama

**Session**
Water Quality and Quantity

**Presentation**
Poster presentation

**Abstract**
Benthic foraminifera are an abundant and diverse group of marine protozoans that produce shells composed of either calcium carbonate (calcareous foraminifera) or sediment grains (agglutinated foraminifera). Because benthic foraminifera exhibit diverse environmental preferences, are limited in mobility, have short life-cycles, and leave behind fossilized shells, they have been used extensively as biological and paleoenvironmental indicators of short and long-term changes in marine environments. Here we attempt to investigate the relationships between shallow benthic foraminiferal assemblages and environmental conditions at a field site in Mobile Bay. A pair of box core samples and several push core samples were collected in January and July of 2016 and processed to determine foraminiferal abundance, diversity, and percentage agglutinated in the top 10 cm of sediment along a transect extending 50 meters offshore. Physical and chemical explanatory parameters including sediment grain size distribution, sediment fraction of organic carbon, water depth, pore water chemistry, and submarine groundwater discharge rates were recorded to identify correlations between environmental conditions and foraminiferal assemblages. Results from box core samples collected in January reveal a decrease in agglutinated foraminifera percentage correlated to an increase in mean grain size, water depth, distance from shore, and pore water solute content. Further processing of push core samples collected in July is currently underway and thus far has revealed minute changes in foraminiferal assemblages from core to core. While our research is still preliminary, we are hopeful that changes in benthic foramniferal assemblages will provide insight into environmental stressors in Mobile Bay and nearby estuaries.

***Presenter Biography**
Michelle LaBelle is a senior geology student at the University of South Alabama. She has a strong interest in micro-paleontology and plans to continue her studies in graduate school.

# UNDERSTANDING THE FUNCTIONAL ROLE OF SECONDARY METABOLITES IN BENTHIC DINOFLAGELLATES: TOWARDS BETTER MANAGEMENT AND MONITORING

**Author(s)**
*Alexander Leynse, University of South Alabama & the Dauphin Island Sea Lab, aleynse@disl.org
Alison Robertson, University of South Alabama & the Dauphin Island Sea Lab

**Session**
Water Quality and Quantity

**Presentation**
Poster presentation

**Abstract**
Benthic phytoplankton communities can be major contributors to carbon production in coastal ecosystems. In addition, A large suite of the dinoflagellate species belonging to these communities are also capable of producing secondary metabolites including palytoxins, okadaic acid, dinophysistoxins, ciguatoxins, and maitotoxin which, upon consumption, have cytotoxic effects on a variety of marine organisms and humans. The complex suite of compounds produced by benthic dinoflagellates requires considerable energy expenditure, so must play an integral functional role. Allelopathy is the competition between microalgae driven by the production of allelo-chemicals that may inhibit growth and other cell function of nearby competitors. The role that such interactions play in shaping the species composition of benthic microalgal communities has important implications on ecosystem health and seafood safety. In this study we observed direct (i.e. physical and chemical) and indirect (i.e. chemical) interactions between several co-existing diatoms and dinoflagellate species. The results provide information on the importance of competitive allelopathy and its role in shaping the species composition of benthic micro-algal communities. Additionally, insight is provided on how benthic phytoplankton communities may ultimately affect the health of grazers and organisms at higher trophic levels, and the challenges that this presents for routine monitoring.

***Presenter Biography**
Alexander Leynse is a PhD Student in the Marine Ecotoxiology Lab, USA, investigating the chemical ecology of benthic phytoplankton. He received his MS at Florida Gulf Coast University where he worked on phytoplankton physiology and nutrient regulation.

# CONTROL OF DIATOM SILICA PRODUCTION AND GROWTH BY SILICIC ACID AVAILABILITY ON THE LOUISIANA SHELF

**Author(s)**
*Israel A Marquez, University of South Alabama/Dauphin Island Sea Lab, imarquez@disl.org
Jeffrey W Krause, Dauphin Island Sea Lab/University of South Alabama
Sydney K Acton, Dauphin Island Sea Lab

**Session**
Water Quality and Quantity

**Presentation**
Poster presentation

**Abstract**
Diatoms are a critical phytoplankton group in marine systems, responsible for ~20% of total global oceanic primary production and a higher proportional importance in coastal ecosystems. Diatoms have an obligate requirement for silicon which they use to produce a siliceous shell and grow; thus diatom productivity, at times, may be limited by silicic acid availability, especially when its stoichiometric availability is suboptimal relative to inorganic nitrogen, e.g. Si:N required in ~1:1 ratio. The Mississippi River (MR) discharges nutrient-rich water onto the coastal Louisiana Shelf; however, the Si:N stoichiometry of the MR water varies seasonally among Si:N >1 and Si:N <1, the latter may lead diatoms into silicon-limitation as riverine nutrients are drawn down on the shelf. Here we explore whether silicon is limiting diatom production and how this changes as a function of surface salinity (i.e. proximity to MR plume) and vertically within the water column. Preliminary data is reported from the Louisiana Shelf in late summer 2016, during the low-flow season for MR discharge. We used a fluorescent tracer as a proxy for silicon uptake and deposition in experiments with ambient (no additions) and enhanced (added Si) silicic acid concentrations. We predict that kinetic limitation of Si uptake by diatoms will be positively correlated with surface salinity, and that such limitation will decrease with depth as light becomes more limiting to diatom productivity.

***Presenter Biography**
Undergraduate degree earned at University of California Santa Barbara, B.S. Environmental Sciences, and a M.S. in Marine Sciences at the University of South Alabama. Israel Marquez is now a second-year Ph.D. student at South Alabama under Dr. Jeffrey W. Krause.

# THE ROLE OF DIATOM FRUSTULE MORPHOLOGY ON THE FORMATION OF REVERSE WEATHERING PRODUCTS

**Author(s)**
*Rebecca A Pickering, Univ. of South Alabama, Dauphin Island Sea Lab, RPickering@disl.org
Jeffrey W Krause, Dauphin Island Sea Lab, Univ. of South Alabama

**Session**
Water Quality and Quantity
**Presentation**
Poster presentation
**Abstract**
The global rates for delivery of dissolved silicic acid (dSi) to the ocean and burial of biogenic silica (bSi) are dominated by processes occurring in land-sea interface systems. Previous studies on the bSi content of low-latitude coastal sediments have failed to include authigenically altered bSi from reverse weathering. In the last decade this process has been shown to be an important sink for Si, especially in river-dominated systems (e.g. Louisiana and Mississippi-Alabama shelf systems); however, the mechanisms regulating this process are still poorly understood. Here we report the results of laboratory experiments examining the formation of authigenic products using three morphologically distinct diatom genera (Thalassiosira, Navicula, Chaetoceros) as a bSi substrate. Cleaned bSi was incubated in a chamber which was separated from coastal clay (<2 µm) suspensions by 12-14 kDa dialysis membrane. Clay suspensions were made from northern Gulf of Mexico (GoM) sediments, collected on the 20 m isobath, near the outflow of the Mobile Bay freshwater plume. All materials were suspended in HEPES buffered GoM seawater and placed in a rotating wheel (2 rpm) to keep particles in suspension. Dissolution amounts for the ten months of sampling ranged from 350 to 460 µmol L-1, 600 to 1100 µmol L-1 and 850 to 1300 µmol L-1 for Chaetoceros, Thalassiosira, and Navicula, respectively. The presence of clay suspensions reduces the bSi dissolution rate between 20 and 200 µmol L-1 relative to controls with no sediments. Fluid chemistries were monitored over the course of the experiment and results from solid phase analyses after 10-month incubations are presented.

***Presenter Biography**
Rebecca Pickering is a second year PhD student at the University of South Alabama Department of Marine Sciences and the Dauphin Island Sea Lab.

# TURKEY CREEK MAKING A VISIBLE DIFFERENCE COMMUNITY WATER QUALITY PARTNERSHIP

**Author(s)**
*Troy Pierce, EPA Gulf of Mexico Program, Pierce.Troy@epa.gov
Jerry Boos, EPA Gulf of Mexico Program
Lael Butler, EPA Gulf of Mexico Program
Rachel Houge, EPA Gulf of Mexico Program
Coen Perott, MS Department of Environmental Quality
Judy Steckler, Land Trust for the Mississippi Coastal Plain
David Beddick, EPA Office of Research and Development
Stephanie Friedman, EPA Office of Research and Development
James Farmer, Mississippi Gulf Coast Community College
Paulette Carter, North Gulfport 8th Grade

**Session**
Water Quality

**Presentation**
Poster presentation

**Abstract**
The historical communities of Turkey Creek originated in 1866, when a group of emancipated African-Americans purchased land in Harrison County, MS, along the Turkey Creek watershed. Many of the current members of this community are descendent from the original settlers. This watershed provided a way-of-life for the settlers and for the present-day communities including fishing, recreation and community baptisms. What was once a forested and riparian floodplain has been dramatically altered as the influx of commercial development merged the Turkey Creek community into the city of Gulfport, MS. EPA is focused on lending support to local communities as part of the Agency's "Making a Visible Difference" program. In response to their needs, EPA worked with the community to align environmental concerns with economic priorities, including community involvement, community organizations, and connecting the community to local officials. The Gulf of Mexico Program initiated a Citizens' Science partnership to increase water-quality monitoring and community participation within the Turkey Creek watershed. Students from a near-by middle school and community college along with their EPA partners, collected weekly water samples at various previously-determined impaired stations along the watershed and used the IDEXX method to quantify the *E. coli* levels on a weekly basis. Stations with higher levels of *E. coli* will be studied more in-depth to evaluate source of the fecal contamination. The monitoring data collected by the students and EPA staff are regularly presented to the Turkey Creek Steering Committee and in the future, the source-tracking results should provide additional leverage to support decisions and target environmentally-feasible solutions. This presentation will show-case the Citizens' Science project along with the environmental data.

***Presenter Biography**

Dr. Troy Pierce is the Chief Scientist and Head of the Science Team at EPA's Gulf of Mexico Program. He has been with the Program for eight years and is responsible for developing water quality monitoring activities.

# ABUNDANCE OF ANTIBIOTIC RESISTANT ENTEROCOCCI UPSTREAM AND DOWNSTREAM OF TWO WASTEWATER TREATMENT PLANTS IN MOBILE, ALABAMA

**Author(s)**
*Amy R Schwarber, University of South Alabama, ars1525@jagmail.southalabama.edu
Sinéad M. Ní Chadhain, University of South Alabama

**Session**
Water Quality and Quantity

**Presentation**
Poster presentation

**Abstract**
Antibiotic resistant bacteria are frequently detected in the surface water in the world and pose environmental, health, and economic threats. Natural bacterial communities can be altered when a subpopulation of resistant bacteria is able to out-compete a nonresistant subpopulation. Billions of dollars in unnecessary medical costs are spent because of infections caused by antibiotic resistant bacteria. In the US in 2013, the CDC attributed 2,049,442 illnesses and 23,000 deaths to antibiotic resistance. Antibiotics, antibiotic resistant bacteria, and antibiotic resistance genes have been detected in both wastewater treatment systems and surface water systems. Enterococci are one group of bacteria in which emerging antibiotic resistance is a concern. While enterococci are commonly monitored to ensure beach safety, there is a lack of information on the abundance of antibiotic resistant enterococci in waterways of the Mobile, Alabama region. In this study, water samples were collected upstream and downstream of two wastewater treatment plants on the Mobile River in Mobile, Alabama. Fecal coliforms and enterococci colonies were enumerated then screened against antibiotics from various classes to determine the range of antibiotic resistance. Water chemistry tests were also done to test for correlations between water quality parameters and the abundance of antibiotic resistant enterococci. Preliminary results show no significant difference in the abundance of enterococci upstream and downstream of the wastewater treatment plants. To date, the enterococcal abundance at all sampling sites has been below US EPA recreational water quality criteria.

***Presenter Biography**
Amy Schwarber is in the Master's of Environmental Toxicology program at the University of South Alabama.

Thank you to the sponsors
of the 2016 Bays and Bayous Symposium.

Sea Grant
Mississippi-Alabama

STATE LANDS
ALABAMA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION

GULF OF MEXICO PROGRAM

Mobile Bay National Estuary Program

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

THE UNIVERSITY OF
SOUTHERN
MISSISSIPPI

Auburn University
Marine Extension
& Research Center
SEA GRANT EXTENSION

Chevron
human energy

GULF
OF MEXICO
ALLIANCE
Building Partnerships for a Healthier Gulf
Resilience • Habitats • Water • Wildlife • Monitoring • Education

MISSISSIPPI
DEPARTMENT OF MARINE RESOURCES
ENHANCE ★ PROTECT ★ CONSERVE

NGI
NORTHERN GULF INSTITUTE
a NOAA cooperative institute

thompson
ENGINEERING

COVINGTON
CIVIL AND ENVIRONMENTAL
WWW.CCELLC.US

ESA

GeoEngineers
Earth Science + Technology

Pickering

VOLKERT