Section 1. Summary Statement

During the past 3 years, Jackson State University (JSU) has significantly contributed to the ECSC mission by recruiting, mentoring and training a new generation of environmental scientists in the NOAA-related sciences, especially in environmental, coastal and marine sciences. Our goal in this regard is to increase the number of graduates in the Environmental Science and STEM areas of relevance to the NOAA mission. We have recruited and provide training to 6 PhD students (Jeanna Dampier, Mark Dugo, Shelton Clerk, Jacqueline McComb, Taimei Harris, and Eric Gulledge), 1 MS student (Willis Lyons), and 3 undergraduate students (Latasha McLemore, Erin Bowens, and Keara Johnson). We have conducted innovative research to 1) Enhance the scientific understanding of human interactions with the coastal environment, particularly through integrated assessments in support of NOAA’s place-based management; 2) understand the response of coastal ecosystems to human activities and stressors; 3) Improve the scientific bases for coastal resource management; and 4) Facilitate community education and outreach relating to the function and significance of coastal ecosystems. Resultantly, we have published twenty nine peer-reviewed papers and made several conference presentations. We have leveraged the ECSC support to develop and implement outreach activities in support of pipeline development into the environmental, coastal, and marine sciences emphasizing under-represented minority students through recruitment and engagement of K-12 students in a Summer Bridge enrichment program. We have also participated in other important ECSC-related activities including EPP forums, ECSC annual meetings, student enrollment in core competency course, and workshops. In addition, we have strengthened the graduate environmental science curriculum by adding 2 new courses in GIS and remote sensing.

Section 2. Body of Report

1.0 Institution name : Jackson State University

2.0 Scope of Work (sub-award)

JSU has implemented the project according to the scope of work described in the sub-contract.
3.0 Activity- Last three years

During the past 3 years, Jackson State University has significantly contributed to the ECSC mission by recruiting, mentoring and training a new generation of environmental scientists in the NOAA-related sciences, especially in environmental, coastal and marine sciences. Our goal in this regard is to increase the number of graduates in the Environmental Science and STEM areas of relevance to the NOAA mission.

Our efforts in this area have led to the recruitment and training of 6 PhD students including Jeanna Dampier, Mark Dugo, Shelton Clerk, Jacqueline McComb, Taimei Harris, and Eric Gulledge, 1 MS student (Willis Lyons), and 3 undergraduate students (Latasha McLemore, Erin Bowens, and Keara Johnson).

JSU has also leveraged the ECSC support to develop and implement outreach activities in support of pipeline development into the environmental, coastal, and marine sciences emphasizing under-represented minority students through recruitment and engagement of K-12 students in Saturday Academy and Summer Bridge enrichment programs. This program is designed to enhance their STEM (science/biology/chemistry/physics/mathematics/computer science) and English communication skills, and to facilitate their transition and increase their readiness for college.

JSU faculty and students have conducted innovative research to 1) Enhance the scientific understanding of human interactions with the coastal environment, particularly through integrated assessments in support of NOAA’s place-based management; 2) understand the response of coastal ecosystems to human activities and stressors; 3) Improve the scientific bases for coastal resource management; and 4) Facilitate community education and outreach relating to the function and significance of coastal ecosystems.

Most of our research falls in two areas of ECSC research emphasis including Ecological Processes, and Ecosystem Characterization. JSU faculty and students are investigating a variety of ecological parameters and processes in the Grand Bay National Estuarine Research Reserve and the coastal areas of the Gulf of Mexico related to ecosystem structure, function and health. JSU faculty and students have also been engaged in ecosystem characterization research focusing on GIS and remote sensing for habitat identification and characterization, and integrated assessment and management of coastal ecosystems. The following students’ projects have been or are being implemented:

Shelton L. Clerk (PhD student – Graduated May 2014 – Currently Scientist at USDA-Greenville, MS, and Adjunct Assistant Professor at MVSU): Characterizing March Soil Contaminants of Runoff Watershed Loading Affecting the Ecological System at Bangs Lake - Grand Bay National Estuarine Research Reserve
Jacqueline McComb (PhD student): Biogeochemistry of Trace Elements, and Heavy Metals in the Grand Bay Reserve Impact at the Grand Bay National Estuarine Research Reserve

Eric Gulledge (PhD student): Characterization of soil carbon stocks of the Grand Bay Natural Estuarine Research Reserve (NERR) wetland ecosystems of the North Gulf of Mexico Region (NGMR): Geo-spatial modeling approach

Taimei Harris (PhD student): Remote sensing based wetland biomass and carbon estimates in the Grand Bay National Estuarine Research Reserve (NERR)

Mark Dugo (PhD student): Modeling Xenobiotic Toxicity of Fundulus jenkinsi within a Phylogenetic Context – A Toxicity Assessment among Select Fundulus Topminnows with Divergent Physiologies

Jeanna Dampier (PhD student): Quantification of Harmful Algal Blooms (HABs) in the Grand Bay

Willis Lyons (MS student): Microbiological Source-tracking in Assessing the Ecological and Anthropogenic Health

JSU students have also participated in ECSC center-wide core competency field course. JSU faculty and students have participated in NOAA EEP symposia and other relevant conferences.

Two new courses (ENV 717 Introduction to Remote Sensing for Environmental Science; and ENV 718 Application of Remote Sensing in Environmental Science) have been developed and are being taught to strengthen the Environmental Science graduate program.

Since 2011, the faculty and students published several peer-reviewed papers and book chapters including the following:


Ates, M.; Arslan, Z.; Demir, V.; Daniels, J.; Farah, I.O. “Accumulation and toxicity of CuO and ZnO nanoparticles through waterborne and dietary exposure of goldfish (Carassius auratus)”. Environmental Toxicology, 2014 doi: 10. 1002/tox.22002


Van der Voet GB, Centeno JA, Mullick FG and Tchounwou PB. Metal-Induced Toxicologic Pathology: Human Exposure and Risk Assessment. In: Encyclopedia of
4.0 Proposed Activity – Next two years

Continue to mentor and engage students in ecosystem characterization and ecological processes research

Continue with the study on the biogeochemistry of trace elements and heavy metals in the Grand Bay area, by studying the seasonal changes of water quality as well as trace metal speciation in waters and soils.

Continue to study the spatial distribution and change of the Total Biomass C in salt marsh plants in the Grand Bay with remote sensing technology.

Continue studies on the estimation of Total Biomass C in salt marsh plants and wetland soil of the Grand Bay NERR

Continue the study on toxicology of heavy metals and xenobiotic chemicals on fundulus fish and oysters in the Grand Bay NERR.

Continue to investigate the water quality, as well as microbial quality/microbial dynamics and its relation to ecosystem health at the Ross Barnett Reservoir and the Grand Bay NERR.

Continue to organize K-12 STEM enrichment activities.