



Environmental Cooperative Science Center
Florida A&M University - Lead Institution



Performance Report for Cooperative Agreement No: NA11SEC4810001

For the period from March 1-August 31 2012

Submitted By:

Florida Agricultural and Mechanical University (Lead Institution)

Texas A&M University-Corpus Christi, Creighton University, Delaware State University, Jackson State University, and University of Texas-Brownsville

**National Oceanic and Atmospheric Administration
Environmental Cooperative Science Center**

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Executive Summary

The mission of the ECSC is to educate a new generation of environmental professionals, particularly from under-represented minorities, in the NOAA-related sciences, and to develop natural and socioeconomic science research products and policy/decision making tools in support of NOAA's needs and objectives in coastal environmental science and management. The ECSC consists of Florida A&M University (lead institution) and Texas A&M -Corpus Christi, Jackson State University, Delaware State University, Creighton University and the University of Texas-Brownsville. ECSC has four core goals that are essential to its mission: 1) Increase the number of well trained and highly qualified scientists and managers, particularly from under-represented minority groups, entering the NOAA and NOAA-related workforce; 2) Enhance the scientific understanding of human interactions with the coastal environment in support of NOAA's place-based management specifically as it relates to the response of coastal and marine ecosystems to natural and human induced stressors; 3) Improve the scientific basis for coastal resource management by developing tools and research products to characterize, evaluate, and forecast coastal and marine ecosystem responses to natural and human induced stressors; and 4) facilitate community education and outreach relating to the function and relevance of coastal ecosystems and the services they provide to society. During this reporting period (March 1 through August 31 2012), we accomplished a number of education, research and administrative goals and milestones.

Education

While NOAA and its partner agencies recruit their scientists and managers primarily from the natural sciences, there is a growing awareness of the need for training in socioeconomic disciplines, as well as STEM fields relevant to the needs and objectives of NOAA and NOS as specified in their strategic plans. During the first year of this cooperative agreement, we recruited and provided support to 27 graduate and undergraduate students at the six partner institutions. These students are currently enrolled in classes and beginning research projects that are aligned with NOAA and NOS interests and objectives. The recruitment of these students, and the beginning of their training, addresses the following EPP education performance measures:

- 1) Number of students from underrepresented communities who are trained and graduate in NOAA-mission sciences annually. *23 students from underrepresented communities have been recruited into the program and are being trained to date.*
- 2) Number of students who are trained and graduate in NOAA mission sciences annually. *A total of 27 students have been recruited into the program and are fully supported by ECSC. Our target for this reporting period was to have recruited 10% of the total number of students that were budgeted for in this five year agreement, and we have exceeded this goal. As this report covers a portion of the first year of the grant, no students supported by this award have graduated yet.*

3) Number of students trained. ECSC has trained a total of 592 students in postsecondary degree programs and 66 students in experiential research during this period. The distribution of the students by institution and the course offerings are in Section II.B(below). These students are enrolled in degree programs and have taken at least one ECSC course that is required by their major.

4) Number of students completing experiential opportunities at NOAA facilities *During this period, newly-recruited students were paired with NOAA mentors and ECSC advisors, enrolled in classes, and developed research projects that address NOAA and NOS needs and interests. None of these newly enrolled students have yet completed experiential activities at NOAA facilities. Synopses of the proposed faculty led, student-centered research projects were developed to ensure that all ECSC research is NOAA/NOS relevant, and that all ECSC students are provided with high quality experiential research opportunities. All ECSC fully supported graduate students will have a NOAA scientist as part of their advisory committee, and will have the opportunity to work at NOAA facilities or NERR sites.*

5) Number of EPP funded students who are hired by NOAA, NOAA contractors and other environmental, natural resource, and science agencies at the Federal, State, local and tribal levels, in academia and the private sector. *As this report covers the part of the first year of this new cooperative agreement, none of the students recruited under this agreement have yet graduated or been hired by NOAA or other employers. To date, 10 ECSC students that were funded under previous cooperative agreements have been hired by NOAA, and 22 others are employed in NOAA-related disciplines by other agencies at the federal, state and local levels or in the private sector.)*

In addition to training at the undergraduate and graduate levels, ECSC includes an outreach program to engage students at the middle and high school levels with the goal of establishing and maintaining a holistic pipeline for students in the STEM disciplines, particularly from underrepresented minorities, into the NOAA workforce.

6) Number of outreach participants engaged in NOAA mission relevant learning opportunities. *ECSC outreach activities engaged about 45 students, including 25 high school and middle school students who participated in our Environmental Science Summer Camp held in June 2012, in NOAA-related learning opportunities during this reporting period.*

Research

The ECSC uses research as a tool to train the next generation of scientists and managers for the NOAA-relevant workforce, and to address specific problems and projects of interest to NOAA and NOS as outlined in their strategic plans. ECSC research addresses

natural and social science dimensions of environmental issues in the northern Gulf of Mexico. The ECSC is organized into five synergistic focus areas (ecosystem characterization, ecosystem processes, forecasting and modeling, social and economic processes, and policy and decision tools). To assure that student projects are closely aligned with the NOA and NOS missions, each student, in coordination with ECSC faculty, prepares a synopsis of their proposed research. Each research project includes direct participation and guidance by NOAA scientists and use of NOAA facilities and resources as necessary. The specific research projects that are planned are detailed below in the body of the report. Synopses of the recently recruited students have been submitted to our NOAA technical monitors for comments and input to ensure alignment with NOAA and NOS missions and agency needs, and review comments are expected in the near future. The following research performance objectives were addressed:

7) Number of collaborative research projects undertaken between NOAA and MSI partners in support of NOAA operation. *A total of 27 graduate and undergraduate students were supported by the ECSC this reporting period. Each has been or will be partnered with an ECSC faculty advisor and a NOAA scientist as part of their advisory committee.*

8) Number of NOAA science and administrative personnel engaged in ECSC education and outreach, scientific research, and education functions. *To date, we have two technical monitors, and are in the processes of appointing a Center advisory board that will include five additional NOAA scientists and managers to assist in ECSC planning, management, education and research activities. Five NOAA scientists have been identified as committee members/collaborators for student projects to date, and we have submitted a total of 18 projects to our NOAA technical monitors to assist in identifying additional potential NOAA collaborators. All student projects will include a NOAA scientist as advisor and mentor, so this number will increase as more projects are developed and additional students recruited.*

9) Number of students and faculty who participate in and complete postdoctoral level research programs in support of the NOAA mission. *Three postdoctoral positions are funded in this cooperative agreement. One postdoctoral position was filled during the reporting period. Applications have been accepted and interviews have begun to fill the remaining two positions. These postdocs will interact with over 30 ECSC students and faculty at the participating institutions, as well as with NOAA and NERR scientists.*

10) Number of peer-reviewed papers published in NOAA mission sciences by scientists (faculty, postdoctoral fellows, and students) sponsored by NOAA EPP. *During the reporting period, ECSC faculty and students published a total of 14 peer-reviewed papers (published or in press) in disciplines relevant to NOAA's mission.*

11) Funds leveraged with NOAA EPP funds (including student support). *ECSC faculty served as PIs or co-PIs on external grants totaling over \$3 million during this reporting period. These leveraged funds came from 16 new or ongoing different external grants. ECSC faculty also submitted an additional 8 grant proposals during this reporting period.*

Administrative

To achieve the research and teaching goals of the ECSC, administrative plans and structures have been developed, and communication tools implemented to share our activities among partner institutions, with NOAA, and across the broader scientific community. During this reporting period, we revised and finalized our Strategic Plan, Implementation Plan, Science Plan, and Student Development Plan, as required by the NOAA EPP. ECSC personnel also developed and maintained a website, prepared recruiting materials, and initiated an ongoing series of meetings and conference calls among the partners to plan and coordinate center activities. A webinar series to share scientific presentations across the participating institutions was planned and is being implemented this Fall, 2012. We also advertised for and hired staff and postdoctoral positions that are funded by the current award. The three research coordinator positions for our participating NERR sites have all been filled and the coordinators have begun working with our students at these field sites. The education coordinator position for the center has also been filled.

To improve communication across the ECSC and with the other Cooperative Science Centers, and to showcase our work to NOAA and the broader scientific community, the ECSC hosted the NOAA EPP Sixth Education and Science Forum at Florida A&M University on March 26-28 2012. This forum continues a series of biannual meetings that brings together faculty and students from all of the Cooperative Science Centers, as well as NOAA scientists and managers, CSC alumni now working for NOAA or in other environmentally-related careers, and others from the federal, state, and local science and policy community. Invited speakers included representatives from NOAA, the Gulf of Mexico Alliance, the Florida Department of Environmental Protection, the US Army Corps of Engineers, and several universities. Over 100 talks and 90 posters, mostly by current CSC students or recent graduates, were presented at the forum. As a result of this forum ECSC increased its visibility within the local area and nationally, resulting in an increased number of inquiries and applications (about 25%) for environmental science majors, culminating in the recruitment of two outstanding minority students into our undergraduate program.

I. Status of Award Tasks

A. Research and Training Activities

The four core goals of the ECSC are to: *1) Increase the number of well trained and highly qualified scientists and managers, particularly from under-represented minority groups entering the NOAA and NOAA-related workforce, 2) Enhance the scientific understanding of human interactions with the coastal environment in support of NOAA's place-based management specifically as it relates to the response of coastal and marine ecosystems to natural and human induced stressors, 3) Improve the scientific basis for coastal resource management by integrating natural and social science research to develop tools and research products to characterize, evaluate, and forecast coastal and marine ecosystem responses to natural and human induced stressors, and 4) Facilitate community education and outreach relating to the function and relevance of coastal ecosystems and the services they provide to society.* These are central to the ECSC's vision of providing a well-integrated framework for informing coastal resource management through integrated science that will balance societal demands and the preservation of sustainable GOM coastal ecosystems.

Development and implementation of a number of tools to facilitate effective research and training activities occurred during this reporting period. The ECSC Executive Committee worked toward the establishment of the center-wide core competencies short course and this will be fully implemented by the end of year 2, as detailed in the ECSC Implementation and ECSC Education plans. This short course will ensure that ECSC students are well prepared to effectively carry out their research and to ensure that they are well-trained in NOAA-relevant topical areas. The course will focus on integrated science in support of coastal management, and will be topically based; examining the various demands placed on coastal systems by human uses, as well as anthropogenic stresses, ecosystem processes and ecosystem services. It will include general conceptual information from each of the ECSC focus areas (i.e. site characterization; ecological processes; social and economic processes; forecasting and modeling; and policy and decision tools).

The Executive Committee has also worked on the development and implementation of the ECSC webinar series. Software options to allow webcasting and video/audio conferencing were identified and tested, and the Blackboard Elluminate platform that was already available at FAMU was selected for initial trials. An MS thesis defense seminar presented by FAMU student Judith Sarkodee-Adoo was used as a test and demonstration of the concept, and worked successfully. The seminar program will be expanded and held on a regular basis beginning in the Fall semester 2012.

ECSC faculty and staff also developed and began implementing and populating an internal ECSC student tracker database to capture all progress students make as they matriculate through the ECSC training program. This is based on Taskstream software, and allows detailed evaluation of student progress, including coursework, research

activities and accomplishments. This software will also be used to develop and implement student development plans, as discussed in the ECSC education Plan.

With input from our Technical Monitors and Advisory Council Chair, the ECSC established and implemented a process that will greatly facilitate ECSC faculty/student/post doc exchange with NOAA scientists and staff. Graduate students entering the program will work with ECSC advisors and NOAA mentors to develop projects that are aligned with NOAA's mission and interest, and submit internal proposals for review by the ECSC leadership and NOAA technical monitors. This is discussed further below, and the first group of proposals that have been developed are listed by focus area.

Below are the ECSC Core Goals 1-3 with aligned research and training performance metrics and progress toward Center wide year one deliverables for this reporting period (i.e. as outlined in Appendix B of the Science Plan). We also report progress made during this reporting period within each of the 5 focus areas.

YEAR ONE PERFORMANCE METRICS AND DELIVERABLES

ECSC Goal #1: Expanding the pipeline for under-represented minority students into NOAA-related sciences and workforce.

Performance Measures Goal #1(Recruitment)

- At least 10% of the total number of students budgeted for the ECSC will have been recruited
 - A total of 27 students have been recruited into the program. In the ECSC implementation plan, a goal of having at least 10 % of the total students budgeted for in the entire 5 year cooperative agreement recruited by the end of the first year. This goal has been achieved and exceeded.
- One of the three budgeted post-doctoral research associates will have been recruited and hired
 - One postdoctoral research associate was hired during this reporting period. The remaining two positions were advertised, with the application period closing in late July. Short lists of applicants to be interviewed were developed by the search committees, with interviews to begin in September. We anticipate that the remaining two positions will be filled before the end of the next reporting period.
- By the end of the first year, at least 10% of the total number of students recruited into the ECSC will participate in experiential opportunities in NOAA mission-relevant sciences

A proposal synopsis template for faculty led, student-centered research was developed for Center-wide use. These proposal synopses will be used for several purposes, including ensuring that all ECSC research is NOAA/NOS relevant, and that all ECSC students are provided with high quality experiential research opportunities. Each proposed project includes a NOAA scientist as collaborator/committee member. A total 19 graduate students entered the program, and 18 proposed projects have

been reviewed by the ECSC focus area leads and center management and submitted to our NOAA technical monitors to assure alignment with these goals, and additional projects are in preparation. Students will then have the opportunity to participate in experiential opportunities with NOAA as identified by their NOAA mentors. It is our intent and expectation that all ECSC faculty/student research will be represented by a proposal synopsis and that by the end of year one, most ECSC students will be engaged accordingly.

- By the end of the first year, at least 10% of the total number of students recruited into the ECSC will be engaged in ECSC approved research activities
 - As discussed above, all recruited students (100%) have developed or are developing proposals for research projects that will be approved by ECSC faculty and NOAA scientists. A total of 18 of these synopses were submitted to our NOAA technical monitors for comment during this reporting period; thus, 94% of graduate students are on projects for which a proposal synopsis has been submitted. These synopses will be used for several purposes, one of which is to ensure that all student research is both ECSC and NOAA/NOS relevant.

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Performance Measures Goal #1 (Training)

- Percentage of ECSC partner institutions where ECSC-relevant core STEM courses have been identified and integrated into ECSC student study plan
 - We have developed a matrix that lists all ECSC relevant STEM core courses at ECSC partner institutions. All partner institutions (100%) have participated in this process and identified and integrated relevant courses into their curricula.
- Integration of currently existing ECSC core-competency curriculum into a center-wide core competency (CWCC) certification short course will be 50% complete
 - The ECSC Executive Committee has been meeting monthly via teleconference calls as well as held a face to face meeting in late March 2012 to discuss and plan the ECSC Center-Wide Core Competency Certification short course. Development of this course is more than 50 % complete; a draft curriculum has been prepared and is being finalized. We anticipate the course will be fully implemented by the end of year 2. We are on target with our goals for this course development.
- Development and design of a monthly ECSC webinar series will be 50% complete
 - This goal has been met. The ECSC Executive Committee met monthly via teleconference calls as well as face to face in late March 2012 to discuss and plan the ECSC Webinar Series. We identified and tested software to implement webinars among the participating institutions, and have tested these on two occasions; one involved participants from NOAA-EPP. We are implementing this webinar series on a regular basis during the next reporting period.

ECSC Goal #2: Enhance the scientific understanding of human interactions with the coastal environment in support of NOAA's place-based management.

Performance Measures

- By the end of this reporting period, 10% of the total number of students recruited into the ECSC will be assigned ECSC faculty advisors
 - This goal has been met and exceeded. All students (27/27, 100%) recruited into this new cooperative agreement have been assigned an ECSC advisor.
- By the end of this reporting period, 50% of ECSC Post-Docs will be assigned ECSC faculty advisors
 - One postdoctoral position has been filled and partnered with an ECSC advisor (1/3, 33%) We are in the process of hiring two additional ECSC postdocs. Once individuals have been hired and their interests and skills are known, they will be paired with a faculty advisor
- By the end of this reporting period, a NOAA specialist/scientist mentor will be identified for 10% of the total number of students recruited into the ECSC
 - All (100%) of ECSC students are required to include a NOAA or NERR scientist as a committee member. During this reporting period, 3/27 (11%) of the proposed student projects have identified a NOAA collaborator (see lists of affiliated personnel for each focus area in the sections below). The research proposal synopses that were submitted will allow our technical monitors and advisory committee to assist us in identifying appropriate NOAA collaborators and student mentors.
- A NOAA specialist/scientist mentor will be identified for 50% of the of the ECSC post docs
 - No postdocs have yet been assigned a NOAA mentor. One postdoc was hired in August 2012 near the end of this reporting period, and we are in the process of hiring two additional ECSC postdocs. Once hired, they will also develop a proposal synopsis and internal ECSC proposal. We will use these synopses to identify a NOAA specialist/scientist mentor for each ECSC post doc.
- By the end of this reporting period, 25% of the total ECSC faculty will have developed an ECSC approved research proposal (mandatory for ECSC funding)
 - The proposal synopses required center wide will ensure that all ECSC research is NOAA/NOS relevant. To date, 52% of faculty have submitted proposal synopses. Faculty at all of the partner institutions of the ECSC have participated in developing these proposals. Once reviewed by both the ECSC Leadership Team and our NOAA ECSC Technical Monitors, the student projects will be revised and finalized.

ECSC Goal #3: Improve the scientific basis for coastal resource management through development of tools and research products to characterize, evaluate, and forecast coastal and marine ecosystem responses to natural and human induced stressors.

Performance Measures

- By the end of this reporting period, 5% of the total ECSC faculty will establish collaborations with ECSC regional observing partners, NERR and NMS scientists, and/or local and regional coastal managers
 More than 5% of the submitted proposal synopses identify specific collaborations between ECSC faculty, students, and regional observing partners, NERR and NMS scientists, and/or local and regional coastal managers. 6/18 (33%) of the proposal synopses submitted identify work planned at specific NERR sites.
- By the end of this reporting period, 2 % ECSC faculty will present research findings at NOAA facilities
 During this reporting period, no ECSC faculty presented research findings at NOAA facilities. However, several ECSC faculty presented research findings at the 6th NOAA EPP forum, which included participants from NOAA headquarters and several line offices.

B. Focus Area-Specific Progress

The ECSC is organized into five integrated and complimentary focus areas: Ecosystem Characterization; Ecological Processes; Social and Economic Processes; Forecasting and Modeling; and Policy and Decision Tools. A unique set of strategies for student research and training was developed for each focus area. However, each area maintains synergy with other focus areas in support common research, education and outreach goals of the ECSC. Progress during this reporting period for each focus area and its associated strategies is summarized below.

Ecosystem Characterization

Table I.B.1. Faculty, students and NOAA collaborators identified to date participating in the ecosystem characterization focus area.

Jim Gibeaut	TAMUCC	Faculty, focus area lead
John Schalles	Creighton	Faculty
Christopher Heckscher	DSU	Faculty
Mingxin Guo	DSU	Faculty
Fengxiang Han	JSU	Faculty
Padmanava Dash	JSU	Faculty
Yungul Kim	JSU	Faculty
John Wood	TAMUCC	Ph.D. Student
Jacqueline McComb	JSU	Ph.D. Student
Jenna Dampler	JSU	MS Student
Marimar Guitarrez	DSU	MS Student
John Olley	Creighton	MS Student
Mark Woodrey	GBNERR	Research Coordinator/Collaborator
Jenna Wanat	ANERR	Research Coordinator/Collaborator

Sally Morehead	MANERR	Research Coordinator/Collaborator
Patricia Tester	NOAA-NCCOS	NOAA Scientist/Collaborator

Personnel associated with this focus area are identified in Table IB.1. Additional NOAA collaborators for student projects will be identified as the student research proposals for this focus area are finalized. The following research projects have been developed in this focus area and submitted to our technical monitors to assure alignment with NOAA goals and interests:

Geospatial Analysis of Seagrass Remote Sensing Data from Redfish Bay, Texas TAMU-CC Student: John S. Wood, Co-Advisors. Jim Gibeaut and Wes Tunnell

Biogeochemistry of the Grand Bay Reserve and its Effect on Environmental Quality JSU student Jacqueline McComb, Co-Advisors Fengxiang Han and Paul Tchounwou

Apalachicola NERR barrier island stopover ecosystems: local, regional, and seasonal carry-over effects DSU student Mariamar Guterrez, advisor C. M. Heckscher (also in Ecological Processes focus area)

Quantification of Harmful Algal Blooms (HABs) in the Grand Bay JSU student Jeanna M. Dampier, advisor Padmanava Dash

Additional activities performed and milestones achieved for this focus area include:

1) Training students working in this focus area in the development of geospatial databases, geospatial analysis, mapping techniques, and remote sensing through work on specific problems in our partner NERRS and the FGBMS.

John Schalles, Drew Seminara and Jim Gibeaut met with researchers and administrators at the Mission-Aransas NERR (MANERR) in Texas to discuss relevant ecosystem characterization studies, mapping, and data management projects. Schalles and Seminara are also consulting with the geospatial analyst and research coordinator at the Grand Bay NERR on several projects. Student projects have been developed that uses geospatial techniques to address problems in several NERR sites. Examples include student projects on geospatial analysis of seagrass using remote sensing data from Redfish Bay in MANERR, and quantification of harmful algal blooms (HABs) in Grand Bay NERR.

2) Providing research problems that require students working in the geospatial sciences to work with students and researchers in policy, economics, and ecosystem sciences to accomplish objectives.

Faculty from this focus area worked with MANERR and other ECSC members to identify potential projects that require an interdisciplinary approach. John Schalles and Drew Seminara worked with Jennifer Cherrier to develop a vegetation classification with World View 2 imagery of coastal wetlands at Snipe Island,

Florida and performed ground truthing/field survey work in April 2012. Additionally, a number of projects are under development in cooperation with NOAA and NERR scientists that involve work bridging several focus areas, as reported above.

- 3) Developing content for a certification course, webinars, or tutorials that will provide all ECSC students with an understanding of proper data management and introduce students to tools and technologies for geospatial data management, mapping, and analysis to apply in their projects.

Working with the ECSC Executive Committee, we began developing ideas for topics to be covered and the logistics for various webinars or training workshops/courses. Modules on geospatial techniques will be included in the core-competencies short course that is under development to begin in summer 2013.

- 4) Encouraging and assisting ESCS students to present geospatial research findings and products at NOAA or professional meetings and to submit their written findings for publication in peer-reviewed journals.

Several students from the ecosystem characterization focus area presented papers at the 6th NOAA EPP Forum held at Florida A&M University on March 2012. As student projects develop and data and results are obtained, faculty in this focus area will continue to work with students and encourage them to communicate their findings at professional meetings and in peer reviewed journals.

Ecological Processes

Table I.B.2. Faculty, students and NOAA collaborators identified to date participating in the ecological processes focus area.

Charles Jago	FAMU	Faculty, Distinguished Scientist, Focus area lead
Jennifer Cherrier	FAMU	Faculty, Deputy Director
Michael Abazinge	FAMU	Faculty, Director
Ping Hsieh	FAMU	Faculty
Paul Tchounwou	JSU	Faculty
Ibrahim Farah	JSU	Faculty
Yungkul Kim	JSU	Faculty
Fengxiang Han	JSU	Faculty
John Schalles	Creighton	Faculty
Christopher Heckscher	DSU	Faculty
Dennis Macintosh	DSU	Faculty
Gulni Ozbay	DSU	Faculty
Kevina Vulinec	DSU	Faculty
Greg Stunz	TAMUCC	Faculty
Wes Tunnell	TAMUCC	Faculty

Paul Montagna	TAMUCC	Faculty
David Hicks	UTB	Faculty
Carlos Cintra-Buenrostro	UTB	Faculty
Alejandro Fierro	UTB	Faculty
Kim Tucker	FAMU	Ph.D. Student
Jason Caldwell	FAMU	Ph.D. Student
Patrick Connally	FAMU	Ph.D. Student
Daryl Sibble	FAMU	Ph.D. Student
Shelton Clark	JSU	Ph.D. Student
Jacqueline McComb	JSU	Ph.D. Student
Maria Pilado	TAMUCC	Ph.D. Student
Judson Curtis	TAMUCC	Ph.D. Student
Mario Marquez	UTB	MS Student
Claudia Tames	UTB	MS Student
Crystal Martinez	UTB	MS Student
Mariammar Guitarrez	DSU	MS Student
Winston Luke	NOAA-ARL	NOAA Scientist/Collaborator
David Evans	NOAA-NCCOS	NOAA Scientist/Collaborator
Steve Morton	NOAA-HML	NOAA Scientist/Collaborator

Personnel associated with this focus area are identified in Table IB.2. Additional NOAA collaborators for student projects will be identified as the student research proposals for this focus area are finalized. Research projects that have been developed in this focus area and submitted to our technical monitors to assure alignment with NOAA goals and interests to date are:

Mercury in the northern Gulf of Mexico: trophic transfer and food web relationships. FAMU student Jason Caldwell, co advisors: Dr. Michael Abazinge and Dr. Charles Jagoe. NOAA collaborators Winston Luke and David Evans

Evaluating The Effectiveness of Residential Rain Garden Water Retention System to Mitigate Surface and Subsurface Contaminant Loading To Apalachicola Bay, Florida. FAMU student Patrick Connally, advisor J. Cherrier

Decomposition patterns and Nitrogen dynamics in transitional wetlands linked to the Lower Laguna Madre, Texas. UTB student Mario Marquez, advisor Alejandro Fierro

Barnacles as potential indicators of ecosystem status in South Texas estuaries. UTB student Crystal Martinez, advisors Alejandro Fierro and Carlos Cintra-Buenrostro

Comparing the current trophic transfer of mercury in Lavaca Bay with data collected 20 years ago. TAMU-CC student Maria Pillado, advisor Dr. Paul Montagna, NOAA collaborator David Evans.

Development and evaluation of a multi-metric index to assess restoration status of the Bahia Grande estuary, Cameron County Texas. UTB student Claudia A. Tamez, advisor David Hicks

*Nutrient input effects on *Karenia Brevis* and *Pseudo-nitzschia* and subsequent marine mortalities in the Gulf of Mexico.* FAMU student Kimberly Tucker J. Cherrier, NOAA collaborator S. Morton

Activities performed and milestones achieved for this focus area also include:

1) Providing ECSC students with key knowledge, skills and abilities to address NOAA's needs in coastal stewardship and management related to ecosystem processes, status and health.

Curriculum review is currently underway at partner institutions, and a center wide core competency short course is in preparation to begin in summer 2013. We finalized and submitted Science and Student Development plans to NOAA-EPP during this reporting period, and these plans detail specific goals, objectives, strategies and milestones for achieving this strategic objective.

2) Mentoring and assisting ECSC students to conduct research in areas relevant to NOAA's interest in healthy, sustainable coastal ecosystems.

Ecological processes faculty and students prepared and submitted research synopses to focus and align their work with NOAA goals and needs. A total of 8 projects (out of 20 total, or 40%) were submitted from this focus area. Alignment with NOAA's mission will be ensured by the review process, which includes NOAA technical monitors, and the inclusion of a NOAA collaborator on each project. In addition, faculty in this focus area have applied for or secured additional leveraged external funding, that includes additional student support, for NOAA mission relevant areas, as detailed in Appendix 4.

3) Establishing research collaborations involving graduate and undergraduate students among ECSC faculty, NOAA, NERR and NMS specialists/scientists and local/regional coastal managers.

Several student projects are underway or in planning phases that will involve our NERR partners at Apalachicola, Grand Bay and Mission-Aransas, as well as the Flower Garden Banks National Marine Sanctuary. Scientists at various NOAA centers, including the Hollings Lab and NCCOS, have agreed to serve on student committees.

4) Developing content for a certification course, webinars, or tutorials that will provide all ECSC students a deeper understanding and appreciation for coastal ecosystem sciences, including the impacts of anthropogenic stressors and climate change on these systems.

The ECSC Executive Committee has met monthly via teleconference calls, with a face to face meeting in late March to discuss and plan the ECSC Center-Wide Core Competency Certification short course. These meetings also included discussions and plans for the ECSC Webinar Series. We tested software and videoconferencing capabilities for this purpose, and held two webcast seminars to demonstrate capability during the reporting period. A regular webinar series among the partner institutions begins in the fall semester of 2012

5) Leading, encouraging and supporting students in presenting research findings at NOAA or professional meetings and submitting research results for publication in peer-reviewed journals.

ECSC students presented papers at several meetings, including the NOAA-EPP forum (see Appendix 3). To date, there are no publications submitted from any of the newly recruited students, but future progress in this area is anticipated as the students conduct and complete their research.

Forecasting and Modeling

Table I.B.3. Faculty and students identified to date participating in the forecasting and modeling focus area.

Paul Montagna	TAMU-CC	Faculty, Focus area lead
Elijah Johnson	FAMU	Faculty
Wenrui Huang	FAMU	Faculty
Amy Edwards	FAMU	Ph.D. Student
Cara Garcia	TAMU-CC	Ph.D. Student

Personnel associated with this focus area are identified in Table I.B.3. NOAA collaborators for student projects will be identified and recruited as the student research proposals for this focus area are finalized. Research projects that have been developed and submitted to our technical monitors to assure alignment with NOAA goals and interests in this focus area to date are:

Modeling of nitrates and phosphorus in Apalachicola River watershed runoff using BASINS and HSPF software. FAMU student Amy E. Edwards, advisor Elijah Johnson

The effects of freshwater inflow and drought on benthic communities in Rincon Bayou, Texas. TAMU-CC student Cara Garcia, advisor Paul Montagna

Milestones achieved for this focus area include:

1. Providing ECSC students with skills to analyze and model natural phenomena and create forecasts, simulations, or scenarios that can be used to support decision making tools relevant to NOAA's mission

Students have taken one course in Experimental Design and will take a course in Natural Systems Modeling in Fall, 2012. Began working with the ECSC Executive committee to develop an outline for dedicated workshops and intensive courses to provide this training.

2. Establishing mentoring opportunities for modeling and forecasting-related research collaborations with ECSC faculty, NOAA specialists/scientists and local/regional coastal managers

Two students have been recruited to work in this focus area. We are developing study plans and will then recruit NOAA scientists to serve on committees. One student has completed a study plan.

3. Developing coursework and webinar opportunities that train ECSC students to learn modeling and forecasting techniques, and how to use them to evaluate outcomes related to coastal areas and NOAA mission-relevant sciences

Members of this focus area began working with the ECSC Executive committee to develop an outline for dedicated workshops and intensive courses to provide this training.

4. Encouraging and assisting ESCS students to present modeling-related research findings at NOAA or professional meetings, organize information and create manuscripts, and submit their written findings for publication in peer-reviewed journals

Work in this strategic objective is in progress.

Social and Economic Processes

Table I.B.4. Faculty and students identified to date participating in the Social and Economic Processes focus area.

David Yoskowitz	TAMU-CC	Faculty, Focus area lead
Dwayne Fox	FAMU	Faculty
Marcia Owens	FAMU	Faculty
Dreamel Worthen	FAMU	Faculty
Jolvan Morris	FAMU	Ph.D Student
Lauren Hutchinson	TAMU-CC	Ph.D Student
Symone Johnson	DSU	MS Student

Personnel associated with this focus area are identified in Table I.B.4. Additional NOAA collaborators for student projects will be identified and recruited as the student research proposals for this focus area are finalized. Research projects that were developed and

submitted to our technical monitors to assure alignment with NOAA goals and interests for this focus area are:

Enhancing Understanding of Coastal Habitat Ecosystem Services to Improve Management and Decision-making. TAMU-CC student Lauren Hutchison, advisor David Yoskowitz

Conservation plan for the sand tiger shark in mid-Atlantic nearshore coastal habitats. DSU student Symone Johnson, advisor Dwyane Fox (also in Policy and Decision Tools)

Other activities and milestones for this focus area include:

1) Providing students with additional exposure to environmental and sustainability economics through content in a short course and dedicated workshops in order to integrate the human dimensions in environmental decision making.

Working with ECSC leadership and the Policy and Decision Tools focus area team, we have developed a socio-economics/policy module for the intensive summer student workshop.

2) Establishing human dimension education and outreach opportunities with stakeholders through our NERR partners.

We have identified potential socio-economic issues that need to be addressed in the Mission-Aransas NERR and are beginning to organize our efforts with the ECSC coordinator that has recently joined the MANERR staff

3) Mentoring and assisting ECSC students to present their findings at NOAA OPP sponsored and professional meetings and help with their submission of their manuscripts for publication in peer-reviewed outlets.

Manuscripts have been submitted for publication in a special “Human Dimensions of our Coast” issue of the journal *Estuaries and Coasts*.

4) Establishing a network of human dimensions professionals to act as a mentor group for ECSC students including individuals from NGOs, government, academia, and the private sector.

Names of potential participants are being collected. Formal letters of invitation will go out in the 4th quarter of 2012.

Policy and Decision Tools

Table I.B.5. Faculty and students identified to date participating in the Policy and Decision Tools focus area.

Robert Abrams	FAMU	Faculty, Focus area lead
Randall Abate	FAMU	Faculty
Dwayne Fox	DSU	Faculty
Richard McLaughlin	TAMU-CC	Faculty
Marcia Owens	FAMU	Faculty
Jolvan Morris	FAMU	Ph.D Student
Symone Johnson	DSU	MS Student
Michael Nichola	FAMU	JD Student
Stacy Fallon	FAMU	JD Student
Akuma Olumba	FAMU	JD Student
Harriet Nash	TAMU-CC	Ph.D Student
Lucy Flores	TAMU-CC	MS Student

Personnel associated with this focus area are identified in Table I.B.5. NOAA collaborators for student projects will be identified and recruited as the student research proposals for this focus area are finalized. Projects that have been developed in this focus area and submitted to our technical monitors to assure alignment with NOAA goals and interests are:

Legal Institutions Operating and Affecting Resource Management Outcomes in the Coastal Zone – International Law and other Governance Regimes Affecting Marine Resources in the Gulf of Mexico. FAMU student Stacy Fallon, advisor Randall S. Abate

Legal Institutions Operating and Affecting Resource Management Outcomes in the Coastal Zone – Fisheries Management and Climate Adaptation in the Gulf of Mexico. FAMU student Michael Nichola, advisor Randall S. Abate

Legal Institutions Operating and Affecting Resource Management Outcomes in the Coastal Zone – Federalism Issues and the Gulf of Mexico. FAMU student Akunna Olumba, advisor Robert Abrams

This reporting marks the culmination of the first stage of the FAMU College of Law’s participation in the NOAA-ECSC. The first stage had been taken up, in large measure with adding Policy and Decision Tools to the scope of the grant, becoming familiar with the ECSC processes and protocols and participating in the 2012 NOAA-EPP Forum. Activities performed and milestones achieved for this focus area include:

- 1) Providing ECSC students with skills to analyze natural and social science research outcomes and translate them into decision making tools relevant to NOAA’s mission.

Following up on participation in Executive Committee meetings and other less formal meetings with ECSC affiliated faculty at other institutions, Professors Abrams and Abate have actively been working with other members of the Policy and Decision Tools focus area and the Social and Economic Processes focus area to develop a simulation exercise for the Spring 2013 core competencies short course.

Professors Abrams and Abate interviewed approximately 20 current students at the College of Law who expressed an interest in the program. The first three students were brought on board in Summer 2012 and tasked with developing materials from which a set of guides could be developed. The first set of guides are planned to be very detailed and inclusive, intended for use by future law student participants in the program, giving them a grounding in the aspects of law that touch on the Gulf of Mexico's resources and the NOAA areas of interest under the EPP ECSC-NOAA program. The second set of guides are intended to be course materials for the non-law trained ECSC-affiliated students that sufficiently familiarize them with the legal process as it touches on the ocean and coastal resources of the region that those students will be better equipped to understand how their scientific efforts can be used to inform policy and decisions affecting those resources.

A second group of three students was selected to begin in the Fall, 2012 term. Their efforts will involve undertaking research bearing on specific legal-scientific issues of the Gulf or other NOAA-appropriate topics. The form of the research outputs will be decided during the Fall of 2012, and may include White Papers or other reports intended primarily for non-law audiences, scholarly works that may be submitted for publication in law reviews or other more academically oriented venues, and research suitable for presentation at future NOAA-EPP forums.

2) Establishing mentoring opportunities and policy-related research collaborations with ECSC faculty, NOAA specialists/scientists and local/regional coastal managers.

Efforts to further integrate the policy and decision tools components into the larger ECSC-NOAA collaboration are being explored. These discussions within the ECSC and with other stakeholders will influence the longer term deliverables that the Policy and Decision Tools effort will provide to the program.

3) Developing coursework and webinar opportunities that train ECSC students to effectively evaluate the appropriateness of policy and management options related to coastal areas and NOAA mission-relevant sciences.

Starting in Summer, 2012 students began work on an hourly basis in the program undertaking legal research activities in support of the materials for the core competency course to begin in summer of 2013. The College of Law also initiated a series of presentations on Oceanography and affiliated legal topics. The goal is to increase student interest and lay the groundwork for an increased and better prepared applicant pool for future ECSC fellowship opportunities in the College of Law. The first scheduled event was a lecture from Dr. Sarah Krejci, Ph.D. in Oceanography, "Principles of Oceanography for Environmental Lawyers," on August 29, 2012. This presentation was also webcast to the FAMU

main campus in Tallahassee to allow participation by students and faculty in the School of the Environment.

4) Encouraging and assisting ESCS students to present policy-related research findings at NOAA or professional meetings and to submit their written findings for publication in peer-reviewed journals.

A series of on-going efforts has been initiated, including

- Providing ECSC students with skills to analyze natural and social science research outcomes and translate them into decision making tools relevant to NOAA's mission
- Establishing mentoring opportunities and policy-related research collaborations with ECSC faculty, NOAA specialists/scientists and local/regional coastal managers
- Developing coursework and webinar opportunities that train ECSC students to effectively evaluate the appropriateness of policy and management options related to coastal areas and NOAA mission-relevant sciences
- Encouraging and assisting ESCS students to present policy-related research findings at NOAA or professional meetings and to submit their written findings for publication in peer-reviewed journals
- Requiring the NOAA fellows to take Professor Abate's new course, *Ocean and Coastal Law Seminar*, in the Spring of 2013

Cross-Center Collaborations

We also have begun several cross-center collaborations in addition to the projects reported above by focus areas within the ECSC. ECSC is cooperating in a joint project with the LMRCSC and NCAS to evaluate the potential effects of climate change on productivity and forage fish dynamics. A proposal on this topic, co authored by the ECSC distinguished scientist, entitled "*Trophic ecology of forage fishes: linking primary productivity to fisheries production*" was submitted to EPP and approved during this reporting period. The ECSC will be responsible for field collections of forage fish, plankton and water chemistry data at several locations around the northern Gulf of Mexico. ECSC will also be responsible for analyzing samples for various contaminants, including mercury, and for data analysis, archiving and reporting.

Development of three other projects, involving other CSCs also continued during this reporting period. One, involving all four of the CSCs, is an intensive summer camp/training activity for new undergraduate students entering the CSCs. This summer camp will be hosted at the University of Maryland-Eastern Shore beginning in the summer of 2013. The cross-center summer camp has already acquired external (NSF) funding. Students at the camp will be taught by faculty, staff and graduate students from each of the four CSCs. This will increase student awareness of the breadth and scope of CSC activities and the NOAA mission, as well as facilitating interactions among students

and faculty from the ECSC and the broader NOAA community. A second project across all four CSCs involves the acquisition and testing of autonomous and/or remote controlled drone aircraft fitted with sensor platforms (imaging and hyperspectral) to support a variety of cross center projects. ECSC plans to acquire two aircraft (a fixed wing and a hexacopter) to address different data acquisition needs across a range of coastal habitats. These will be fitted with interchangeable imaging, GPS and multiband spectral equipment for remote sensing projects. Having complementary sensor units and flight hardware available across all of the CSCs allows students and faculty to collaborate on a variety of projects over a broad geographic area.

A fourth project emerged from discussions that began among ECSC and CREST faculty and students at the EPP forum held in Tallahassee in March 2012 (see section C below). This project involves assessment and mitigation of non-point source urban runoff into estuarine coastal waters. Such runoff has been identified as a major factor impacting coastal water quality in many urban areas. Specifically, a catchment system containing soil and selected plants will be installed at a site in Brooklyn, NY, and the efficacy of this system in mitigating a variety of non-point source pollutants (including nutrients and metals) will be assessed. NCAS at Howard University has also signed onto the project to provide expertise in meteorological factors influencing stormwater dynamics and runoff. A proposal is currently in preparation for submission to EPP during the next reporting period.

C. The 2012 NOAA-EPP Forum

The 6th NOAA Educational Partnership Program was held on Mar 26-28 2012, hosted by the Environmental Cooperative Science Center at Florida A&M University, Tallahassee FL. The detailed program, as well as lists of invited speakers, award winners, and a photo gallery, are available at <http://www.ecsc.famu.edu/2012/>

The forum included presentations by students and faculty from all of the Cooperative Science centers, as well as invited speakers from NOAA, other government agencies, and the broader academic community. The technical sessions were organized into 4 thematic areas, based on the next-generation NOAA strategic plan. The thematic areas were 1) Healthy Oceans, 2) Weather Ready Nation, 3) Climate Adaptation and Mitigation, and 4) Resilient Coastal Communities and Economies. J. Cherrier (ECSC DD) and J. Tunnell (TAMU-CC ECSC PI) took the lead in organizing the technical sessions for the forum. These chairpersons were assisted by the NOAA EPP office, Bernadette Kelley (ECSC E&O Lead), Charles Jagoe (ECSC DS), ECSC focus area leads, CSC leadership from other centers and ECSC staff. There were over 100 technical talks, and over 90 posters, mostly by CSC students. Presentations by ECSC students and faculty, including presentations at the EPP forum, are listed in Appendix 3.

The forum was very beneficial for ECSC. It increased our visibility within the local community, statewide and nationally. As a result of this exposure, there was an increased

number of enquiries about NOAA ECSC and majoring in Environmental science. Our graduate student applications increased 25% compared to that of last year. In the undergraduate recruitment, two outstanding minorities enrolled as ECSC students; Tyler S. Hansberry, an award winner in “North Florida Regional Science and Engineering Fair, 2011 and Andrea Pugh, one of the top 25 Young Futurists recognized at the White House by President Obama in 2011.

D. Development of Management Plans

Another major activity during this period was revision of several management plans, and submission of the revised documents to NOAA-EPP as required as a condition of this new award. ECSC leadership revised the 1) Strategic Plan, 2) Implementation Plan, 3) Science Plan, and 4) Student Development Plan that were submitted in the previous reporting period. Drafts of these plans had been submitted to NOAA-EPP during the previous reporting period. The revisions addressed comments and questions provided by the NOAA-EPP. The revised plans were accepted during this reporting period, and implementation of the various plans has begun.

II. Education and Outreach Activities

A. Students recruited and supported

The purpose of the ECSC is to train the next generation of scientists and managers in the STEM disciplines relevant to the NOAA mission, and to create and maintain a pipeline of opportunities to advance students from K-12 through undergraduate and graduate studies. To this end, ECSC activities are student centered, and all of our research activities involve a core student training component. As reported above in Section I, the ECSC has recruited 27 graduate and undergraduate students, 23 from minorities that are underrepresented in the STEM and socioeconomic disciplines relevant to the NOAA mission. These have been partnered with ECSC advisors. They have also been partnered (or soon will be) with NOAA and/or NERR scientists to provide research advice and career mentoring. A list of students supported during this reporting period, with their degree objectives and respective partner institutions is presented in Appendix I. All students are expected to work with ECSC advisors and NOAA scientists to develop a research project directly aligned with the needs and interests of NOAA, and particularly with our partner line office the National Ocean Service. To date, 18 proposed projects have been submitted to our NOAA technical monitors to assure alignment with these goals, and additional projects are in preparation.

B. Students Trained and ECSC Course offerings.

Students in the ECSC can earn degrees in a variety of STEM disciplines from the six partner institutions as shown below. The table also lists students who completed a course in a NOAA-mission relevant STEM discipline at one of the ECSC partner institutions, and students who performed experiential research during this reporting period.

STUDENTS TRAINED			
Institution	March 1-August 31, 2012		
Florida A&M Univ.			
Discipline	Number of Students Experiential Learning	Number of Students Trained	
B.S. in Environmental Sciences, with concentrations in: Environmental Monitoring and Instrumentation, Environmental Restoration and Waste Management, Environmental Policy, and Environmental Toxicology/Risk Assessment M.S. in Environmental Sciences, with concentrations in: Environmental Biotechnology, Environmental Restoration, Marine and Estuarine Environments, Environmental Policy and Management, and Radiation Protection Ph.D. in Environmental Sciences, with concentrations in: Environmental Chemistry, Biomolecular Science, Environmental Policy and Management, Aquatic and Terrestrial Ecology J.D. through the College of Law, with concentrations in: Environmental law and policy	Supervised Research- 10 Thesis- 3 Dissertation- 2	113	
Total	15	113	
Creighton University			
Discipline	Number of Students Experiential Learning	Number of Students Trained	
B.S. in Atmospheric Science, Biology, and Environmental Science with Environmental Science concentrations in: Global Environmental Systems, Organismal and Population Ecology, Pollution and Environmental Toxicology, and Environmental Policy and Society M.S. in Atmospheric Science, Environmental Science	Master's Thesis- 1	88	
Total	1	88	
Texas A&M Univ. - Corpus Christi			
Discipline	Number of Students Experiential Learning	Number of Students Trained	
B.S. in Biology, Geology, Chemistry, GIS, Environmental Sciences M.S. in Biology, Environmental Sciences, Fisheries and Aquaculture Ph.D. in Coastal and Marine System Sciences, Marine Biology	Supervised Research- 20 Thesis- 12 Dissertation- 8	37	
Total	40	37	
Delaware State University			
Discipline	Number of Students Experiential Learning	Number of Students Trained	
B.S. in Natural Resources, Agricultural Science, Plant Biology with concentrations in: Wildlife Biology, Fisheries Sciences, Environmental Science M.S. in Natural Resources, Agricultural Science, Plant Biology with concentrations in: Wildlife Biology, Fisheries Sciences, Environmental Science	Supervised Research- 3	65	
Total	3	65	
Univ of Texas - Brownsville			
Discipline	Number of Students Experiential Learning	Number of Students Trained	
B.S. in Biology, Chemistry, Environmental Science M.S. in Biology, Chemistry, Environmental Science	Thesis- 6 Graduate Research- 1	289	
Total	7	289	
Jackson State University			
Discipline	Number of Students Experiential Learning	Number of Students Trained	
B.S. in Earth System Science, Biology with Biology concentrations in: Environmental Science, Marine Science M.S. in Hazardous Materials Management, Environmental Sciences with Environmental Science concentrations in: Environmental Science and Marine Science Ph.D. in Environmental Science	<i>not provided at time of report</i>	<i>not provided at time of report</i>	
Total	<i>not provided at time of report</i>	<i>not provided at time of report</i>	
ECSC Total	66	592	

The table below lists courses taught by ECSC faculty during the reporting period.

ECSC COURSES	
INSTITUTION	March 1-August 31,2012
Florida A&M Univ.	
	Course Name
	Environmental Ethics
	Environmental Policy and Risk Management
	Fundamentals of Environmental Science
	Environmental Modeling Principles
	Subsurface Fate and Transp Of Cont
	Marine Microb Eco w/Lab
	Intro Environmental Science
	Sourc/Cont Environ Polu
	Environmental Colloquium/Seminar
Creighton University	
	Course Name
	Zoology with Lab
	Environmental Science
	Seminar in Undergraduate Biology Instruction
Texas A&M Univ.- Corpus Christi	
	Course Name
	Marine Benthic Design
	Spatial System Science
	Experimental Design
	Environmental Economics
	Fisheries Biology
Delaware State University	
	Course Name
	Ecosystems
	Advanced Ecosystems
	Conservation Biology
	Ornithology
	Wetlands Biology
	Advanced Wetlands Biology
Univ of Texas- Brownsville	
	Course Name
	Biostatistics
	Research Problems in Biology
	Coastal Ecology lecture and lab
	Coastal Ecology lecture and lab
	General Biology Lab
	Biological Concepts Lab I
	Biological Concepts Lab II
	Historical Geology Laboratory
	Historical Geology
Jackson State University	
	Course Name
	Environmental Science Seminar
	Risk Assesment and Management
	General Zoology
	General Zoology with Lab
	Ecology with Lab
	Chemistry Seminar
	Chemical Instrumentation

C. Education and Outreach for K-12 students

The NOAA Environmental Cooperative Science Center (ECSC) at FAMU hosted the 2012 Environmental Sciences Institute (ESI) High School Summer Camp from June 4-22, 2012. Twenty-five participants, mostly from Leon County FL and surrounding counties, participated in classroom, field and laboratory activities in marine and environmental sciences. We partially based our curriculum on State of Florida Department of Education common core standards and learning objectives, focusing on those objectives most closely aligned with ocean and environmental sciences. Information about these standards and objectives, including the Sunshine State Standards for Science are available at the Florida CPALMS website <http://www.cpalms.org/Homepage/index.aspx>? By utilizing this approach, we sought to harmonize our classroom and laboratory activities with the curricula that students were expected to master at their respective schools. We envision that this approach will also facilitate better integration of our summer curriculum for students with future professional development programs that we are planning for high school teachers in the STEM disciplines.

The kick-off for the SOE Summer Camp was an orientation, followed by a reception on June 3, 2012. Camp participants, their parents/guardians, ECSC/SOE faculty, staff, and students were in attendance. An overview of the camp was given, guidelines and expectations were discussed. Also, participants were given a handbook which outlines the camp requirements and lists the daily schedule.



The formal instructional/training portion of the camp took place June 4-20th. Lectures and laboratory experiments were led by ECSC/SOE graduate students. Summer camp activities included a variety of classroom and laboratory modules focused on contemporary environmental topics including nutrient cycling, carbon sequestration, ocean acidification, climate change, and runoff/nonpoint source pollution. Laboratory activities included hands on experiments and interactive demonstrations. Classroom learning activities included computer models and interactive games and simulations, as well as more conventional lectures and directed readings. ECSC faculty, graduate and undergraduate students, participated in module development and in delivering and directing lab and classroom activities. Daily guest speakers, including ECSC graduate

students, discussed current questions and topics in marine and environmental sciences including the effects of oil spills, emerging pollution issues, and terrestrial and ocean exploration.



Participants took part in a water sampling activity where they collected water samples from ponds on campus and Apalachicola Bay, and used them in experiments. The campers participated in a field trip to St. George Island, which was hosted by the Apalachicola National Estuarine Research Reserve Education Department. During the trip, camp participants took part in oyster shucking and they examined specimens from seine netting.



Subsequent to the lecture and laboratory portion of the summer camp, participants were allotted time on June 18-19 to prepare for their group (total of 4 groups) research presentations. On June 20th at 9:00 am, each group gave their oral presentation on laboratory results before a panel of judges. Some of the judging criteria included: the

quality of the data presented, the data interpretation, the supporting PowerPoint presentation, and the speakers' knowledge of the topic. The Summer Camp participants presided over the End of the Camp Awards Banquet on June 20th at 3:30 pm in the FAMU Development Research High School cafeteria. Parents and Guardians were invited to attend so that they would witness first-hand the accomplishments of the camp participants.

The end of Camp trip to Tampa/St. Petersburg, Florida took place June 21-22, 2012. The trip included a tour of the University of South Florida College of Marine Science onsite aquarium and ocean observing systems, a facility Tour of U.S. Geological Survey Center for Coastal & Wetland Studies, a tour of the Florida Aquarium, and a Wild Dolphin Ecotour.

ECSC education personnel developed a brief written test to measure knowledge of environmental science topics that was administered to the camp participants at the beginning and end of the camp. There was a significant increase ($p < 0.05$ by paired t test) in test scores at the end of the camp, indicating that the student participants had increased their knowledge and understanding of the marine and environmental fields during the camp experience. *For more information, visit <http://www.ecsc.famu.edu/camp2012/index.html>.*

In addition to summer camp activities, the ECSC supports a FAMU High School Ocean Science Bowl Team. The team competed in the National Ocean Sciences Bowl (NOSB) Regional Spoonbill Bowl Competition on March 3, 2012. The event was held at the College of Marine Science at the University of South Florida in St. Petersburg. The ECSC team competed against other high school teams in the west coast of Florida. The format for the competition included timed multiple-choice and short-answer questions drawn from scientific and technical disciplines used in studying the oceans (such as chemistry, physics, biology, geology and atmospheric science). Although the young team did not place this year, they made an impressive showing as they competed against more experienced teams. In addition, the ECSC Ocean Science Bowl Team exhibited great sportsmanship with passion and determination, which are good qualities of a winning team.

III. Success Stories

Three ECSC students graduated from Florida A&M University during this reporting period— Judith Sarkodee-Adoo (MS, Environmental Science), Jessica Wise (MS, Environmental Science) and Ariana Marshall (Ph.D Environmental Science).

ECSC student Samuel Camarillo received a BS degree in biology from the University of Texas, Brownsville. He has been accepted into the MS program in forestry at Stephen F. Austin State University, Nacogdoches, TX

We increased the number of students recruited into our program to 28, and additional students are currently in the pipeline and will be supported during the next reporting

period. Students and their ECSC advisors have developed 18 projects to date, and these have been submitted to our NOAA technical monitors to assure that these align with NOAA and NOS needs and interests, and to identify and recruit NOAA scientists to provide advice and mentorship on each of these projects.

After Graduation, Judith Sarkodee-Adoo accepted a job as a researcher at Queens College, CUNY.



Jolvan Morris, ECSC Ph.D. Candidate in Environmental Science at FAMU, won the Thomas E. Bigford Best Student Presentation Award at the 23rd Biennial Coastal Society Conference. The event took place June 3-6, 2012 in Miami, Florida. The theme of the conference was “Our Coasts, Our Heritage: Ecosystem Services for the Common Good”. Jolvan presented her Master’s thesis research in a presentation entitled “Evaluating Biological and Sociological Concerns in the Section 7 Process: Using Conservation Units to Protect Sturgeon Populations.

The 6th NOAA-EPP forum, hosted by the ECSC and Florida A&M University in March 2012, was the culmination of nearly a year of planning and hard work by ECSC faculty and staff. This event showcased the research and training activities of all the CSCs and featured invited talks by scientists from all of the NOAA line offices, as well as an address from Dr. Paul Sandifer, NOAA’s Senior Science Advisor. There were over 100 technical talks, and over 90 posters, mostly by CSC students. The forum received excellent reviews from participants, and continues a series of successful event of this type hosted by various CSCs. Additional details, including a photo gallery of the events, are available at <http://www.ecsc.famu.edu/2012/index.html>

The ECSC Environmental Science Summer Camp hosted 25 middle and high school students from June 4-22 2012. Students activities included classroom and laboratory modules focused on contemporary environmental topics including nutrient cycling, carbon sequestration, ocean acidification, climate change, and runoff/nonpoint source pollution. Daily guest speakers, including ECSC graduate students, discussed current

questions and topics in marine and environmental sciences including the effects of oil spills, emerging pollution issues, and terrestrial and ocean exploration. Students also traveled to ANERR and to the Florida Aquarium in Tampa to learn about marine life and ocean sciences. Pre and post camp tests and surveys indicated that students gained significant knowledge in coastal and environmental sciences as a result of the summer camp experience.

The ECSC and Florida A&M University welcomed Patrick Holmes, a freshman environmental science student. Patrick had participated in several of our high-school summer camp activities in previous years, and decided to major in environmental science.

IV. Revisions to Tasks as Described in the Original Grant Award, Amendments and Impact to the Award

In response to direction from the EPP office, we planned for a 10-20% reduction in budget. To this end, we combined the computer specialist and education specialist positions requested in our original proposal into a single position. This should have minimal impact on student training and research activities.

Monitoring visits are planned for all our partners. In June, the Center Director, Budget Coordinator and a representative of FAMU's Sponsored Programs office visited Jackson State University. This was to ensure compliance with the award conditions and streamline billing processes. As an outcome of this visit, monthly invoicing from all our partners has been instituted, and all expenses must have a justification that is associated with a NOAA ECSC goal.

During this reporting period, ECSC has advertised, interviewed and narrowed the selection of candidates for two postdoc. positions (ecological processes and social/economics). The Distinguished Scientist position has been advertised and the interview process is ongoing.

Appendix 1. Students Recruited and Supported

Last Name	First Name	Institution	Degree Objective	Expected Graduation Date
Connally	Patrick	FAMU	MS	Dec 2013
Caldwell	Jason	FAMU	PhD	May 2015
Pre	Krystal	FAMU	PhD	May 2015
Sibble	Daryl	FAMU	PhD	May 2015
Tucker	Kimberly	FAMU	PhD	May 2015
Morris	Jolvan	FAMU	PhD	May 2014
Taylor	Angelique	FAMU	BS	May 2016
Pugh	Andrea	FAMU	BS	May 2016
Holmes	Patrick	FAMU	BS	May 2016
Hansberry	Tyler	FAMU	BS	May 2016
Curtis	Judson	TAMU-CC	PhD	Aug 2013
Hutchison	Lauren	TAMU-CC	PhD	Aug 2014
Flores	Lucy	TAMU-CC	MS	Dec 2013
Nash	Harriet	TAMU-CC	PhD	Aug 2013
Pillado	Maria	TAMU-CC	MS	Aug 2013
Wood	John	TAMU-CC	PhD	Dec 2012
McComb	Jacqueline	JSU	PhD	
Clark	Shelton	JSU	PhD	
Olley	John	Creighton	MS	May 2013
Tamez	Claudia	UT-B	MS	Dec 2013
Marquez	Mario	UT-B	MS	Aug 2013
Martinez	Crystal	UT-B	MS	Dec 2013
Montemayor	Isidro	UT-B	BS	May 2013
Camarillo	Samuel	UT-B	BS	May 2012*
Rodriquez	Jonathan	UT-B	BS	May 2013
Garza	Victor	UT-B	BS	Dec 2014
Gray	John	UT-B	MS	Aug 2013

* Graduated during this reporting period

Appendix 2. Peer Reviewed Publications. ECSC student authors are identified by *

Appendix 2.a Published

Abrams, R.H. 2012. Water, Climate Change, and the Law: Integrated Eastern States Water Management Founded on a New Cooperative Federalism, 42 Environmental Law Reporter 10433.

Abrams, R. H. 2012. Legal Convergence of East and West in Contemporary American Water Law, 42 Environmental Law, 42 Environmental Law 65.

Bryan, A.L. Jr., Brant, H.A. Jagoe, C.H., Romanek, C.S. and I.L. Brisbin Jr. 2012 Mercury concentrations in nestling wading birds relative to diet in the southeastern United States: A stable isotope analysis. Archives of Environmental Contamination and Toxicology 63:144-152

Dash, P., Walker, N., Mishra, D., D'Sa, E., and Ladner, S. 2012. Atmospheric Correction and Vicarious Calibration of Oceansat-1 Ocean Color Monitor (OCM) Data in Coastal Case 2 Waters. Remote Sensing, 4:1716-1740.

Kelly, J., F.X. Han, Y. Su, Z. Y. Xia, V. Philips, Z. Shi, D.L. Monts, S.T. Pichardo and K. Xia. 2012. Rapid determination of mercury in contaminated soil and plant samples using a portable mercury direct analyzer without sample preparation, a comparative study. Water Air and Soil Pollution 223:2361-2371.

Khodaverdilloo, H., M. Rahmanian, S. Rezapour, S.G. Dashtaki, H. Hadi, and F.X. Han. 2012. Effect of Wetting-Drying Cycles on Redistribution of Lead in Some Semi-Arid Zone Soils Spiked with a Lead Salt. Pedosphere 22(3): 304-313.

Santos, C.P., C. Carollo, and D.W. Yoskowitz. 2012. Gulf of Mexico Ecosystem Service Valuation Database (GecoServ): Gathering ecosystem services valuation studies to promote their inclusion in the decision-making process. Marine Policy 36:214-217.

Yoskowitz, D.W., C. Plantier Santos, and C. Carollo. 2012. Integrating Ecosystem Services into Restoration Decisions for the Gulf of Mexico: Workshop Proceedings. 23 pages.

Yoskowitz, D.W., C. Carollo, J. Beseres-Pollack, C.P. Santos, K. Welder, and J. Francis. 2012. Assessment of Changing Ecosystem Services Provided by Wetland Habitat in the Galveston Bay Region. March 2012. 74 pages. (Prepared for the Gulf of Mexico Foundation and the Gulf of Mexico Alliance Habitat Conservation and Restoration Priority Issue Team.)

Appendix 2. b In press

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Yoskowitz, D. Measuring and Communicating Socio-Economic Values of MPAs” Gulf MPA Lunch Bag Webinar Series, May 10, 2012.

Appendix 4. External Funding (Proposals Submitted and Ongoing)

Appendix 4a. External Funding (Ongoing Funding)

Acute effect of oil on northern Gulf of Mexico reef communities. Florida Institute of Oceanography/BP. Co-PIs: W. Patterson (UWF) and Jagoe C. (FAMU) \$167,376 August 2010-August 2012

Assessing the impact of the Deepwater Horizon oil spill on coastal waters of the Florida panhandle: water, sediment and fish. Florida Institute of Oceanography/BP. Co-PIs: C. Jagoe (FAMU), R. Snyder (UWF) and J. Cherrier (FAMU) \$193,518 August 2010-August 2012

Ecosystem Services Provided by Gulf of Mexico Habitats: Tools, Valuation, and Application. Mississippi-Alabama Sea Grant Consortium. PI D. Yoskowitz,(TAMU-CC) D C. Carollo (co-PI), J. Cebrian (co-PI), J. Gibeaut (co-PI), A. Krupnick (co-PI), P. Montagna (co-PI), S. Nanez-Jame (co-PI), J. Pollack (co-PI), J. Ritchie (co-PI) -\$648,388 (SG funds) \$843,306 (SG funds+match). Feb 2012 to Jan 2014

Impacts from MC252 oil on ecologically and commercially important plankton of the Gulf of Mexico. Florida Institute of Oceanography/BP. Co-PIs: D. Rumbold (FGCU) and Jagoe, C. (FAMU). \$ 350,779 August 2010 to August 2012

Integrated Multi-scale Study of Climatic Impacts on Watershed and Downstream Coastal Environments. Estuary Modeling Component, Funded by National Aeronautics & Space Administration Award Number, NNX11AE42G via a subcontract from the University of Texas at Austin award UTA11-000400. PI: P. A. Montagna (TAMU-CC). \$50,000. Jun 2011 to May 2012.

Macrobenthos Monitoring in Mid-Coastal Estuaries – 2012. Texas Water Development Board. PI: P. A. Montagna (TAMU-CC). \$30,000. Jan 2012 to Dec 2012.

Modeling and Analysis Tools For Nutrient Dynamics in the Gulf of Mexico. NOAA award number NA11NOS0120024 via a subcontract from Texas A&M Research Foundation. PI: P. A. Montagna (TAMU-CC). \$58,360. Jun 2011 to May 2014.

Movement and population connectivity of fishes across estuarine seascapes. NOAA – Sea Grant. Co-PIs: J. Rooker (TAMUG) and G. Stunz (TAMU-CC). \$308,588. Feb 2012 to Jan 2014.

South Texas artificial reef monitoring: Fish community assessment. Texas Parks and Wildlife Department. PI: G. Stunz (TAMU-CC). \$442,356. Sept 2011 to Aug 2013.

Status and Trends in the Corpus Christi Bay Area – Phase 2: Data Analysis. Coastal Bend Bays & Estuaries Program, Project 1105. PI: P. A. Montagna (HRI). \$40,000.00. Oct 2011 to August 2012.

Tracing the intrusion of the GOM-2010 oil spill on coastal and marine food webs using radiocarbon and stable isotopes. Co-PIs: J. Cherrier with J.P. Chanton (FSU), L. Chasar (USGS), and K. Craig (FSU). Florida Institute of Oceanography/BP. \$297,258 August 2010 to August 2012

Appendix 4b. External Funding (Newly funded during this reporting period)

Development of Radiochemistry Education and Research Program at Jackson State University. Co PIs Yu, Z. and F.X Han (JSU). NRC-HQ-12-G-38-0038 Nuclear Regulatory Commission Amount: \$213087. July 2012 to June 2015

Global Observatory of Lake Responses to Environmental Change (GloboLakes; Andrew Tyler, PI) Travel support for J. Schalles first workshop in Glasgow, Scotland in December, 2012) National Environmental Research Council (United Kingdom) Oct 2012 to Sept 2015

LTER - Georgia Coastal Ecosystems III (Merryl Alber, PI; (subcontract to J Schalles, Creighton University) National Science Foundation \$100,800; Nov 2012 to Oct 2018

Travel Minigrant to Attend NASA Workshop for Remote Sensing of Coastal and Inland Waters J. Schalles NASA Nebraska Space Grant and NASA \$ 558 June 2012

Stakeholders and Participatory Parties in the Gulf of Mexico and A Healthy Gulf and a Healthy Economy. Shell Exploration and Production. Co-PIs: D. Yoskowitz (TAMU-CC) and C. Leon (CONABIO). \$166,000. Jan 2012 to Dec 2012

Appendix 4c. External Funding (Submitted during this reporting period)

Gulf of Mexico Ecosystem Report Card Framework. EPA Gulf of Mexico Program. CO-PIs: L.D. McKinney (HRI) and J.W. Tunnell (HRI). 1 January 2012 to 31 December 2012. \$305,394.00 (submitted).

Gulf of Mexico Ecosystem Health Report Card (Ecosystem Workshop grant). Walton Family Foundation. Co-PIs: L.D. McKinney (HRI) and J.W. Tunnell (HRI). April to December 2012. \$250,000 (submitted).

Gulf of Mexico Ecosystem Health Report Card (Implementation grant). Walton Family Foundation. Co-PIs: L.D. McKinney (HRI) and J.W. Tunnell (HRI). 2012 to 2015. \$3,254,164.00 (submitted).

Health survey of Mississippi Oysters. Mississippi Department of Marine Resources. Amount: \$153,408. 2012 (submitted).

Investigating the Environmental Fate and Health Impact of Deep Horizon Oil Spill in Mississippi Coastal Areas. Y. Kim PI, (JSU) Mississippi Alabama Sea Grant Consortium. Amount: \$229,666. (submitted).

Regional Biofuels Program J. Schalles (Creighton U), Co-PI Duration: July 1, 2013 - June 30, 2014 \$113,112 (to Creighton), \$249,895 (total requested, including subcontractors) National Science Foundation (submitted)

Understanding and Assessing Natural Carbon Sequestration Processes: Preproposal (P.I. Robert Chen; co-PI J Schalles, Creighton U) Duration: 4 years National Science Foundation – Frontiers in Earth System Dynamics (submitted)

Water Resource Quality in Nebraska: A Biological and Genomic Base-Line Study Along the Proposed Keystone Pipeline Corridor (Charles Brockhouse, PI, co-PI J. Schalles, Creighton U) 2 Years \$850,000 Nebraska Environmental Trust (Submitted)

Appendix 5. Abbreviations and links

ANERR Apalachicola National Estuarine Research Reserve

CSC - Cooperative Science Center

DSU-Delaware State University

EPP - Educational Partnership Program

ECSC - Environmental Cooperative Science Center

FAMU- Florida A&M University

GBNERR – Grand Bay National Estuarine Research Reserve

Florida CPALMS – Florida Department of Education’s platform for educators to Collaborate, Plan, Align, Learn, Motivate and Share

JSU – Jackson State University

MANERR – Mission-Aransas National Estuarine Research Reserve

TAMUCC – Texas A&M Corpus Christi

UTB – University of Texas Brownsville

Links

ECSC website <http://www.ecsc.famu.edu>

ECSC Environmental Science Summer Camp for high school and middle school students
<http://www.ecsc.famu.edu/camp2012/index.htm>

Twitter: <https://twitter.com/NOAAECSC>