Conversation # 2 on “NC Coastal Concerns”, organized by Elizabeth City State University and George Institute for Biodiversity and Sustainability

April,10, 2018

Authors: Dr. Robert Y. George (ECSU/GIBS) & Dr.Clarence E. Styron (GIBS)
(This report will be published online at www.GIBSconservation.org)

The George Institute for Biodiversity and Sustainability (GIBS) arranged for several scientific, technical and government professionals to contribute to the Research Week (April 9-13, 2018) event of Elizabeth City State University (ECSU) in Elizabeth City, NC. The theme of Research Week was “Dare to Inquire and Inspire” and the full program is available at https://ecsurw.wixsite.com/rw2018 . An agenda for the ECSU/GIBS workshop follows this summary.

GIBS’ objectives in participating in this colloquium were twofold:

1. Follow up on recommendations from CONVERSATION #1 and address coastal concerns in CONVERSATION #2
    a. Risks from climate change
        i. Sea level rise
        ii. Ocean acidification or lowering pH
        iii. Deoxygenation
        iv. Increasing pCO_2
    b. Needs for observational data on inland waters, especially Pamlico, Albemarle and Currituck Sounds
    c. Review opportunities for NSF grants, other funds and collaboration with other institutions to expand ECSU’s participation in coastal environmental research through improved “capacity development.”
2. Provide assistance to ECSU in expanding funding of STEM programs and other opportunities for historically underserved populations in northeast North Carolina

ECSU’s objectives in hosting Research Week were, among others, to investigate possibilities for additional funding to expand its offerings in many areas for historically underserved populations and to better demonstrate the excitement and rewards of careers in research and teaching.

LET US FIRST LOOK AT WHAT TRANSPIRED IN CONVERSATION #1
Venue: NCSU Centennial Campus,Date: September 14, 2016

Conversations About
Technologies for Watershed Based Nutrient Removal

Lonnie Poole Club House Conference Room 201
September 14, 2016
10:30 a.m. – 12:30 p.m.
Agenda

Goal: To recommend potential methods to reduce nutrient load from water-sheds (not in situ treatments in reservoirs) in head-waters of Neuse River and Cape Fear River, NC.

10:30 a.m. – 11:00 a.m.	**Welcome and Introductions**	*Dr. Mary Watzin* *Dean, College of Natural Resources* *NC State University*

NC Coastal and Inland Environmental Issues and Multiple-Stressors/Drivers (Holistic Approach) *Dr. Robert George Director of Research, Center for Education and Research in Remote Sensing (CERSER),Elizabeth City State University, NC*

CONVERSATION # 1 - "Innovative Methods and Approaches: Nutrient Load Reduction"

11:00 a.m. – 12:25 p.m. **Technologies for Nutrient Reduction** ***Moderators:*** *Mike Burchell*, *Larry Band*

Panelists: Hans Paerl (UNC-IMS), Jay Samber (Upper Neuse), Forrest Westall (Neuse River), Hayward Phthisic(Lower Neuse Basin Assoc.)

Government Perspectives *Richard Whisnant*

Legislative Perspectives *The Honorable Chris Malone*

NC General Assembly

Open Discussion *All*

12:25 p.m. **Closing Remarks** *Dr. Robert George*

12:30 p.m. **Adjourn and Lunch at "The Terrace"**

Conversation # 1 Participants:

Larry Band (UNC-CH)
Mike Burchell (NCSU-BAE)
Robert (Bob) George (GIBS)
Tim Goodale (NCSU-STEM)
Ruoying He (NCSU-MEAS)
Ray Lancaster (GIBS)
Chris Malone (NCGA)
Hans Paerl (UNC-IMS)
Haywood Phthisic (Lower Neuse Basin Association)
Jay Sauber (Upper Neuse)
Astrid Schnetzer (NCSU-MEAS)
Harvey Seims (UNCCH-MS)
Clarence Styron (GIBS)
Mary Watzin (NCSU-CNR)
Forrest Westall (Neuse River)
Richard Whisnant (UNC-SOG)

CONVERSATION # 2 APRIL 10, 2018 at ECSU

NSF OCEAN SCIENCES CHIEF ADDRESSES AT ECSU ON APRIL 10 on OBSERVATORIES

REMARKS BY DR. LISA CLOUGH

(FROM NOTES TAKEN BY Prof.. REIDE CORBETT, ECU)

1. Recommends continuous presence of robotic and autonomous systems.
2. Need for both temporal and spatial scale coverage
3. Suggests free access of data by all (students, faculty, citizen scientists, policy makers etc)
4. North Carolina should be looking at afflictions with IOOS, Ocean-sites, ARGO, GOOS and GEOSS.
5. To consider “Essential Ocean Variables” (EOVs)
6. To follow NRC Report on Heat Budget, Carbon Budget And Fresh Water Budget

On 27-29 August, 2018, an Ocean Observatories Initiative (OOI) **Deep Ocean Observing Workshop will be held in Seattle, WA.**

This workshop will provide an interdisciplinary forum to develop deep ocean science questions and identify societal needs that could be addressed using the existing OOI infrastructure. The workshop will provide an opportunity for participants to gather detailed information about OOI infrastructure, data availability, and discuss existing and prospective Essential Ocean Variables that deep-water observatories can address. Particular attention will be paid to the capabilities and utility of the OOI Cabled Array. Two days of presentations and breakout groups will be followed by one day for drafting concepts and project outlines.

A short form for expressing interested is located on the OOI website**.**
Please respond by 1 June for primary consideration.

REPORT BY DR. LARRY ATKINSON, OLD DOMINION UNIVERSITY, VIRGINIA

1. **CHECK WITH SECCORDA AND MARACOOS**
2. **Talk with Dr. Debra Hernandez, SECOORDA**
3. **See March Issue of OCEANOGRAPHY on OBSERVATORIES**

CONVERSATION # 2 AT ECSU ON APRIL 10, 2018

1. REPORT ON GOODALE & GEORGE MEETING WITH UNCW & ECU PARTICIPANTS ON NSF COASTAL MARINE STEM PROPOSAL:

NSF – MARINE STEM PROPOSAL APRIL 10, 2018 –PLANNING MEETING

Participants: Dr. Tim Goodale (ECSU), Dr. Bob George (ECSU), Dr. Clarence Styron, Dr. Reide Corbett (ECSU) and Ms. Erin Moran (UNCW).

The meeting focused on resubmission of the NSF proposal to be submitted in August 2018 to the Directorate of Education and Human Resources. The project will train high school students over a period of 3 years in STEM area with emphasis on climate change impacts on NC coast, use of laboratory experiments on ocean acidification using blue crabs and oysters, development of fisheries models and use of drones and ROV. Each year, there will be research-training cruise aboard *R/V Endeavor* (UNOLS ship).

NOAA National Marine Sanctuaries Program: report on "MONITOR National Marine Sanctuaries off Cape Hatteras, North Carolina, report by Dr. Paul Ticco

"Status of Possible Expansion of Monitor National Marine Sanctuary off Cape Hatteras, North Carolina"

Paul C. Ticco, Ph.D.
East Coast Regional Coordinator
NOAA Office of National Marine Sanctuaries
paul.ticco@noaa.gov
www.sanctuaries.noaa.gov

Dr. Paul Ticco, Speaking at ECSU on April 10, 2018

NOAA's Office of National Marine Sanctuaries

NOAA's Office of National Marine Sanctuaries (ONMS) serves as the trustee for a network of underwater parks encompassing more than 600,000 square miles of marine and Great Lakes waters. National marine sanctuaries are special areas set aside for long-term protection, conservation and management, and are part of our nation's legacy to future generations. The network includes a system of 13 national marine sanctuaries and marine national monuments. ONMS works with diverse partners and stakeholders to promote responsible, sustainable ocean uses that ensure the health of these most valued ocean places. A healthy ocean is also the basis for thriving recreation, tourism and commercial activities that drive coastal economies. The National Marine Sanctuaries Act (NMSA) is the legislation governing the National Marine Sanctuary System of sites. The NMSA authorizes the Secretary of Commerce to designate as marine sanctuaries areas with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational or aesthetic qualities.

The Monitor National Marine Sanctuary

The Monitor National Marine Sanctuary (MNMS) was designated as the nation's first national marine sanctuary in 1975. The site protects the wreck of the famed Civil War ironclad USS *Monitor*, best known for its 1862 battle with the Confederate ironclad CSS Virginia at Hampton Roads, VA. It is located approximately 16 miles southeast of Cape Hatteras, N.C. where it sank in a storm while under tow on December 31, 1862 with the loss of sixteen sailors. The sanctuary consists of a column of water one mile in diameter extending from the seabed to the surface, centered on the shipwreck. The highest priority

management goal for the Monitor sanctuary is resource protection through comprehensive and coordinated conservation and management of the wreck and its surroundings.

Possible Expansion of the Monitor National Marine Sanctuary

NOAA is currently proposing to expand the boundaries of the sanctuary. The NMSA has specific requirements for sanctuary expansion that include inter-agency consultations and environmental analyses, among other activities. NOAA formally considers a site expansion through a public process guided by requirements of the NMSA, the National Environmental Policy Act (NEPA) and other applicable laws and regulations.

Need for Sanctuary Expansion

Beyond the sanctuary's existing boundaries lie many additional historic shipwrecks from many eras. The proposed expanded area focuses primarily on those vessels lost off the Outer Banks during WW II's "Battle of the Atlantic", and are found in federal waters, i.e., seaward of the state's three-mile boundary jurisdiction and within the 200-mile U.S. Exclusive Economic Zone (EEZ). The German U-boat campaign itself claimed more than 90 vessels, primarily in 1942. Almost 1,700 sailors were lost.

The majority of these wrecks are non-military merchant vessels, not protected under current law. While federal legislation intended to reduce the impact of human activities on military shipwrecks and related maritime heritage resources have been effective, this sanctuary expansion would provide additional protection by applying to these merchant wrecks as well. NOAA may also assess civil penalties under the NMSA for violation of Sanctuary regulations. There is also a need to apply education and outreach efforts to these additional shipwrecks to promote responsible use of sanctuary resources, and reduce threats that could adversely impact their historical, archeological, recreational and educational value.

The significance of this area is amplified by the fact that these resources can be easily accessed. Because many of these sites have been popular destination for divers, in some instances for decades, there have been some negative human impacts on these resources. Such impacts include artifact recovery, souvenir hunting, improper diving and anchoring, and selective salvage. All of these activities may adversely impact shipwrecks: large-scale salvage operations, whether legal or illegal, could be sizable enterprises that remove substantial amounts of material, and may favor economic gain over resource protection; artifact recovery by a private business or an individual may not be done in a controlled, scientific and archaeologically sound manner that respects the historic or sensitive nature of the site; and souvenir hunting, that may be small-scale in relation to other activities, could perhaps be the most damaging as the specific artifacts targeted may have the highest historic value.

The additional and complementing authority of the NMSA and the associated regulations of the expanded sanctuary site would provide uniform protection over the entire collection of nationally significant historic shipwrecks, prevent possible degradation from several threats, prohibit looting and damage to sanctuary resources, and provide a platform for research, education and public engagement.

East Coast vs West Coast

(or Why East Coast fisheries are less vulnerable to climate warming than West Coast fisheries)

Dick Barber, Duke Marine Lab, April 10, 2018, ECSU Roundtable,

The East Coast of the United States is a typical western boundary region, with its southern portion dominated by the fast, strong and meandering Gulf Stream and permanent stratification, while its central and north central portions are dominated by southward moving sub-polar gyre waters and strong seasonal mixing. This coastal region is characterized by broad continental shelves that experience large seasonally forced physical cycles. These shelf regions are relatively productive. and this shelf productivity is strongly dependent on the locally-forced physical cycle of mixing and stratification.

The mid-Atlantic, Carolina Capes region, where Gulf Stream separation occurs, is a complex coastal region where eddies, meanders and fronts dominate the hydrography. In this shelf and slope region, the Gulf Stream essentially collides with the much cooler Labrador Current water that flows southward along the mid-latitude western boundary of the North Atlantic. The latitudinal interweaving of subtropical and sub-polar waters produces complex physics, has a variety of chemical conditions, and supports a high diversity of marine organisms. The shelf and slope waters in the coastal region around Cape Hatteras are well recognized as a biological rich area that has both high biological diversity and an abundance of top predators, both fish and marine mammals.

The most impressive characteristic of the coastal ocean north of the Carolina capes to the northern boundary of the Gulf of Maine is its heterogeneity; each sub-region has a different pattern of seasonal physics, productivity, and higher trophic-level diversity. This mid-latitude region is characterized **first** by its wide variety of physical and biological processes, and **secondly** by its strong physical seasonal cycle. At the same time, large-scale inter-annual variability is much less apparent here than in the West Coast setting where one major physical process, the wind-driven upwelling of nutrients, dominates coastal productivity. On the East Coast, there are a variety of strong, but small scale physical processes in play to deliver nutrients to the surface. The biological response to remotely-forced, basin-scale inter-annual forcing is less pronounced along the East Coast.

The entire East Coast of North America is rich in living resources; the first Europeans who came to North America were drawn to the New World in the 1500s by the abundance of easily caught cod on Georges Bank and the Grand Banks. Even after centuries of exploitation, the value of the fish landed at the historic east coast fishing ports is considerably greater than that of the fish landed on the West Coast. According to the *Fisheries of the United States 2010*, for the years 2006 through 2010 the value of East Coast landings averaged **three times the value of West Coast** landings. And, according to the *Fisheries of the United States 2016,* the port of New Bedford, MA has for 17 consecutive years had the highest value of landed fish of anywhere in the U.S.

Dr. & Mrs. Richard Barber, DUML,Beaufort, NC

From 2014 to 2015 West Coast landings revenues were down as follows:

Pacific crabs, down 71% in California, 75% in Oregon, and 10% in Washington;
Squid, down 66% in California;
Sardines, down 66 % in California and 77% in Oregon;
Hake, down 61% in Oregon and 53% in Washington; and
Salmon, down 41% in Oregon and 28% in Washington.
This figure of annual mean current speed in cm/s shows how much more energetic the entire US East Coast current system is compared to the broad, slow and diffuse current system of the West Coast. The energetic East Coast circulation is the source of the submesoscale processes – eddies, fronts and meanders – that presumably generate the East Coast nutrient.

CONVERSATION # 2 AT ECSU ON APRIL 10, 2018

ECU invests in interdisciplinary, inter-institutional coastal research and engagement in North Carolina

Mike Piehler, Interim Director

Coastal Studies Institute

Dr. Michael Piehler

Approximately half of the world's population resides within 100 kilometers of a coastline. Coastal population growth in conjunction with climate change puts increasing pressure on both coastal ecosystems and communities. Natural and anthropogenic coastal change create numerous complex challenges. To inform decisions that will shape

adaptation to changes, and take advantage of opportunities in these ecologically and economically important regions. ECU's coastal enterprise is poised to attack these challenges with a multi-faceted approach relying on contributions from leaders across a broad range of disciplines. Developing innovative, robust, and sustainable solutions to coastal challenges, and ensuring that opportunities are identified requires both new and continuing collaborations within and beyond ECU. Such collaborations must include a full spectrum of physical, social, engineering, and health sciences. As the third largest university in the UNC system and the largest university in North Carolina's coastal zone, ECU is poised to respond to the challenges set forth in UNC's *Our Time Our Future,* which targets coastal and marine science for sustained future investment. We will pursue our goals through collaborations with other UNC entities to elevate coastal and marine science programs in North Carolina to national and international prominence.

The Coastal Studies Institute (CSI) will assimilate ECU coastal expertise and will continue to engage previous partners, including Elizabeth City State University, North Carolina State University, UNC-Chapel Hill, and UNC-Wilmington. CSI research has focused on five main areas:

- Estuarine Ecology and Human Health
- Coastal Engineering and Ocean Energy
- Public Policy and Coastal Sustainability
- Maritime Heritage
- Coastal Processes

CSI will be trans disciplinary and work with ECU Departments, Colleges and other Universities to:

- Understand the North Carolina and global coastal systems and the people that depend upon them so that the problems and opportunities can be addressed successfully to meet the challenge of an economically viable and sustainable future;
- Involve students at all levels in research opportunities and train them in both the specific lessons of the coast, and in the techniques of natural, social, engineering and health science applied to coastal environments;
- Raise awareness and understanding of the dynamic interactions between society and our coasts, particularly through outreach activities that engage a broad range of public and private sectors.

- Engage with coastal communities; testing knowledge gained through research against the real-world challenges in rural and urban areas along the coasts.

ECU is investing in CSI and the broader coastal enterprise. This includes recruiting a new Dean to lead this effort and numerous new faculty who will reside at CSI. ECU has a tremendous opportunity to centralize, streamline, and invigorate its coastal activities. The university is acting on this unprecedented opportunity to affect positive change in this area of historical strength.

CONVERSATION # 2 AT ECSU ON APRIL 10, 2018 Robert Y. George (ECSU)

GEORGE SPEAKS ON COASTAL HAZARDS IN NORTH CAROLINA

BOB GEORGE DELIVERS HIS TALK

Dr. George, in his first talk, brought up some historical facts. In 1970 NC Governor Bob Scott emphasized the need for state govern to focus on the following coastal issues: (1) Commercial Fisheries (2) Recreational Fisheries (3) Oil and Gas developments (4) Climate change concerns (5) Public education (6) Military Interests and (7) Marine Biodiversity/Conservation. Dr. William Friday, subsequently, worked hard to crate the UNC-system. In 1972, I was approached by Dr. Friday to work with Dr. B.J. Copeland at NCSU to develop some guidelines that we formulated at the UNC-Marine Council. I joined hands with Dr. Dirk Frankenberg of UNC to organize the first NC Coastal symposium at UNCW (see photo below).

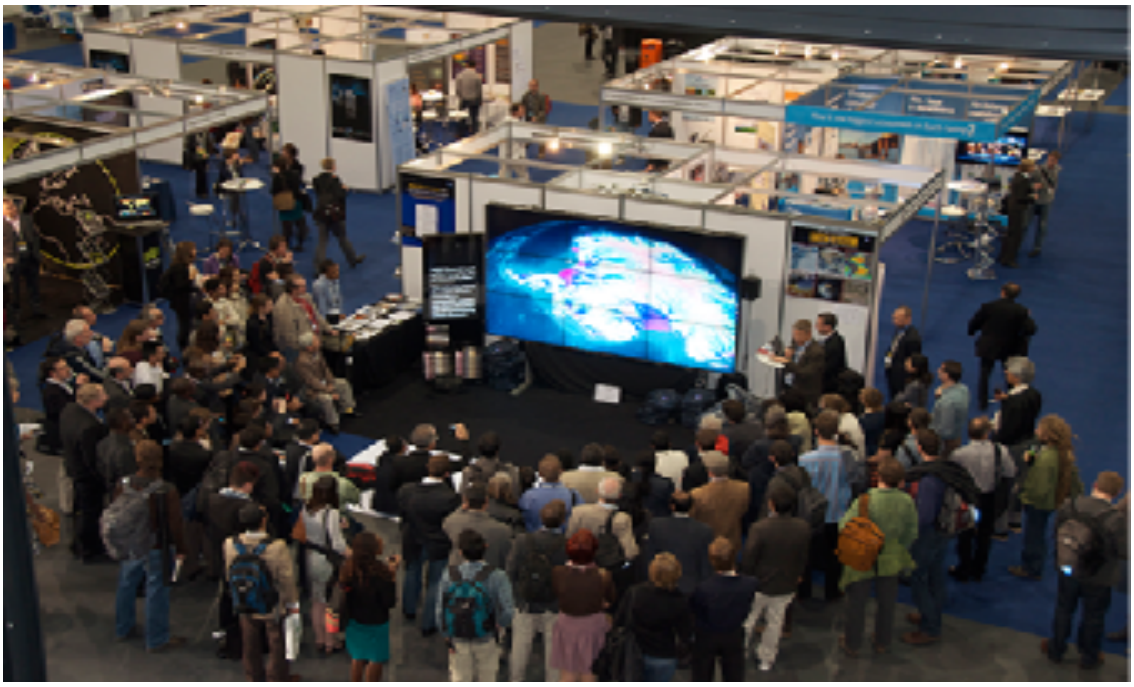
First NC Coastal Ecosystems Symposium at UNCW 1987

In 2017, We realized that in NC we have a come a long way with significant growth in coastal science in all costal campuses –UNC, NCSU, UNCW, ECU and ECSU although there is a real need to promote capacity development in some campuses such as ECSU where the focus has been more thus far on space science and mathematics.

Dr. George also reported on the recent funding of a "Spoke Project" for 1.2 M $ to Georgia Institute of Technology with ECSU as a partner from NSF Directorate of Information and Computer Science. This "Spoke Project" aims to develop models to predict ecosystem changes along the east coast. Presently there is plan to extend this project to include Albemarle-Pamlico Sound with focus on projected ecosystem changes from climate change impacts (Sea Level Rise, Ocean Acidification, pH Change, pCO_2 increase, Deoxygenation, Eutrophication, shell and fin-fisheries response etc).

Dr. George also reported on the Sept. 14, 2017 "Conversation #1 on Neuse River Quality", was held at NCSU under the leadership of Dean Mary Watzin and Dr. Bob George. April 10, 2018 event here at ECSU is a follow-up event with focus on "North Carolina Coastal Concerns.:

In his second talk, Dr. George recommended that we establish local cabled observatories for long term monitoring of both environmental parameters and biodiversity in both Albemarle and Pamlico Sound. He also emphasized the need to develop a Coastal marine STEM project with funds from NSF Education and Human Resources Directorate. He also pointed out the need for enhancing "Citizen Science" in NC Coast and use of NASA 'Hyper Wall' (see figure below) for public awareness and education on climate change threats.



NASA HYPER WALL

ECSU Conference participants

Lt to Rt: Mike Piehler, Jay Levin, Linda Hayden, Bob George, Erin Moran & Paul Ticco

ECSU PROFESSOR DR. LINDA HAYDEN RECEIVES PROF. DARNELL JOHNSON MEDAL FROM PROF BOB GEORGE

UNC PROFESSOR HAN PEARL RECEIVES DIRK FRANKENFERB MEDAL FROM DR. B. J. COPELAND, NORTH CAROLINA SEA GRANT FOUNDING DIRECTOR

Ms. Erin Moran, UNCW delegate to ECSU-NC Coastal Concerns Conference.

Dr. Timothy Goodale, ECSU –Dept. of Education- Conference Participant.

Triangular Talk: After the full-day workshop, BJ Copeland, Clarence Styron and Bob George met for 2 hrs on April 10, 2018 to discuss a prudent plan for the future.

LT to RT: Dr. B.J. Copeland, Dr. Clarence Styron and Dr. Bob George

GEORGE SUMMARIZES THE FUTURE PLAN

As I said at the outset of the workshop, we are here as key players in North Carolina Coastal ecology but much more than the people assembled today at ECSU this event is important to arrive at a cumulative synthesis to do collectively what is next to protect and manage NC coastal ecosystems from different institutions and agencies in the light of climate change challenges ahead (Sea Level Rise, Ocean Acidification, eutrophication, pH decline or pCO2 increase, and hurricane damages to infrastructure and people and their homes, But really, much more significant than this event what comes as most important is the fundamental question what "IDEAS" came out of this workshop at ECSU on April 10, 2018.

THREE IDEAS

1. CAPACITY DEVELOPMENT (UNC-SYSTEM)

   We recommend state funds to address capacity development with focus on matching funds to establish endowed professorships and infrastructure funds for local cabled observatories.

2. BIG PICTURE: INSHORE AND OFFSHORE CONNECTIVITY

   We recommend to emphasize both inshore and offshore research and education in all coastal campuses. We also suggest that NC coastal universities to join the URI (University of Rhode Island) Consortium for use of UNOLS ship *R/V Endeavor* for offshore research, education and in NSF Marine-STEM project of ECSU

3. UNC-Campuses Joint Data -Base on Peer-reviewed Publications on NC Coastal ecosystems, starting with Paerl et al 2018 and Reports on conferences and workshops (staring with George and Watzin 2017 Report on Conversation # 1 at NCSU).

1. Paerl et al (2018) paper entitled "Two decades of tropical cyclone impacts on North Carolina's estuarine carbon, nutrient and phytoplankton dynamics: implications for Coastal North Carolina (USA) has experienced35 tropical cyclones over the past 2 decades; the frequency of these events is expected to continue in the foreseeable future. Individual storms had unique and, at times, significant hydrologic, nutrient-, and carbon (C)-loading impacts on biogeochemical cycling and phytoplankton responses in a larg estuarine complex, the Pamlico Sound (PS) and Neuse River Estuary (NRE). Major storms caused up to a doubling of annual nitrogen and tripling of phosphorus loading compared to non-storm years; magnitudes of loading depended on storm tracks, forward speed, an precipitation in NRE-PS watersheds. With regard to Cycling, NRE-PS was a

sink for atmospheric CO2during dry, storm-free years and a significant source ofCO2 in years with at least one storm, although responses were storm-specific. Hurricane Irene(2011) mobilized large amounts of previously-accumulated terrigenous C in the watershed, mainly as dissolved organic carbon, and extreme winds rapidly released CO2 to the atmosphere. Historic flooding after Hurricanes Joaquin (2015) and Matthew (2016) provided large inputs of C from the watershed, modifying the annual C balance of NRE-PS and leading to sustained CO2 efflux for months.

2. At the 2nd "CONVERSATIONS ON NORTH CAROLINA COASTAL CONCERNS, here at the ECSU Research Week on April 9-10, 2018, we are focusing on the need to establish two observatories here in Northeast North Carolina, one at Albemarle Sound and another at Pamlico Sound. A proposal to NSF will be discussed during the April 10, 2018 Round-Table and also Science Sessions.

REPORTS:

1. George, R.Y. and M. Watzin 2016. "Minutes of the September 14, 2016 "Conversations about nutrient over-enrichments in NC waters with focus on Neuse River Basin. GEORGE-WATZIN REPORT.

2. George, R. Y. and C. Styron, 2018. Conservation # 2 on North Carolina Coastal Concerns, April 10, 2018 – Elizabeth City Sate University Workshop on Ocean Observatories for Albemarle-Pamlico Sounds.
(Published online at www.GIBSconservation.org)

PUBLICATIONS:

1. Hans W. Paerl . Joseph R. Crosswell . Bryce Van Dam . Nathan S. Hall .Karen L. Rossignol . Christopher L. Osburn . Alexandria G. Hounshell .Randolph S. Sloup . Lawrence W. Harding Jr. Biogeochemistry: https://doi.org./10.1007/s 1053-018-0438-x

APPENDIX: APRIL 10, 2018: WORKSHOP AGENDA

ECSU RESEARCH WEEK

NC CONVERSATIONS 2: COASTAL CONCERNS
WORKSHOP
April 10, 2018-Tuesday - 8.00 to 9.30 AM
Moderator: Dr. Bob George, CERSER. ECSU
Location: Pharmacy Complex: First Floor Auditorium
(15 minutes each speaker)

Speaker # 1; Dr. Michael Piehler –"Coastal Studies Institute, Wanchese: "ECU invests in interdisciplinary, inter-institutional coastal research and engagement in North Carolina"

Speaker # 2. Dr. Timothy Goodale –ECSU-Education Dept.: "Martine-STEM: New Vision and Initiatives at ECSU"

Speaker # 3. Dr. Erin E. Moran, CMS: "UNCW Coastal and Marine Sciences: Education, Outreach and Research" Speaker # 5. Dr. Timothy Goodale –ECSU-Education Dept.: "Martine-STEM: New Vision and Initiatives at ECSU"

Speaker # 4. Dr. David Eggleston – CMAST, NCSU: "NC State University, Center for Marine Sciences and Technology: Partnerships in Research, Extension and Education".

Speaker # 5. Dr. Paul Ticco – NOAA; "Status of possible expansion of Monitor National Marine Sanctuary off Cape Hatteras, North Carolina."

Discussion (15 Minutes)
Adjourn 930 AM for Coffee Break

ROUND-TABLE ON: OBSERVATORY FOR MONITORING NC COASTAL AND MARINE ECOSYSTEMS WITH FOCUS ON CLIMATE CHANGE IMPACTS

ORGANIZED BY ECSU SPONSORED PROGRAM

APRIL 10, 2018 10 AM TO 12 NOON
Location: Pharmacy Complex First Floor Auditorium

MEDERATOR; DR. BOB GEORGE, CERSER, ECSU AND CNR, NCSU

SPEAKERS (EACH 20 MINUTES PLUS OPEN DISCUSSION AT END)

1, OPENING REMARKS: NSF PERSPECTIVES ON OBSERVATORIES – DR. LISA CLOUGH, HEAD, OCEAN SECTION, US NSF

2. US EAST COAST (Exclusive of Maine) VS WEST COAST: DR. RICHARD BARBER, DUML

3. NSF- SPOKE PROPOSAL FOR APPLYING VERA-MODELS FOR CHESAPEAKE BAY AND NC SOUNDS OF THE OUTER BANKS. –
-DR. ROBERT Y. GEORGE/CERSER/ECSU

4. FERRY-MON: KEEPING A WATCHFUL EYE ON NORTH CAROLINA'S ALBEMARLE - PAMLICO SOUND SYSTEM AT A TIME OF HUMAN- AND CLIMATICALLY DRIVEN CHANGE. DR. HANS PAERL, IMS, UNC-CH

PANEL DISCUSSION

April 10, 2018 - 1.30 – 2.30 PM

MARNE-STEM PROJECT ($ 1.3 Million proposal to NSF)

Coordinators: Dr. Tim Goodale & Dr. Bob George

CLOSED ROOM MEETING (BY INVITATION ONLY)
Location: Conference Room, 2nd Floor, Pharmacy Complex

ADJOURN AT 2.30 PM

APRIL 10, 2018 –SESSION ON COASTAL CONCERNS IN NORTH CAROLINA:

CLIMATE CHANGE PERSPECTIVES
Location: Pharmacy Complex First Floor Auditorium

3.00 to 5.30 PM

ORGANIZER: PROF. ROBERT Y. GEORGE, CERSER, ECSU
Introductory Remarks (5 minutes)

SESSION A: NATURAL RESOURCES (1 Hr 30 Minutes))
Moderator: Dr. Reid Corbett, ECU

Invited Remarks on US East Coast Observatories Dr.. Lisa Clough, Head, NSF Ocean Section (15 minutes)

Invited Comments; Dr. Siemeon Yurek, Wetland Center, USGS. Interaction between Coastal protection and fisheries (15 minutes)

Invited Comments: Mr. Sam Cook , Vice-President, Hoffman Forest Foundation, College of Natural Resources, NCSU : "Hoffman Forest Resources for Education and Research" (15 Minutes)

Invited Speaker : Dr. Susan White, Director, NC Sea Grant (15 minutes)

Topic:. NC Sea Grant, NC Space Grant and NC Water Resources Research Institute: Research, Education and Outreach Opportunities for Students and Faculty.

DISCUSION (30 MINUTES)

SESSION B: RISKS FROM CLIMATE CHANGE (1 hr)

Moderator: Dr. Clarence Styron, The George Institute (Board of Directors)
(Each speaker 20 minutes)

Speaker # 3. Dr. Robert Y. George, CERSER, ECSU & NCSU College of Natural Resources (UNCW Professor Emeritus)

Topic: "Multi-stressors from Climate Change: Ocean Acidification, Sea-Level Rise, Warming, Deoxygenation and more!!!

Speaker # 4. Dr. Bill Crowell, Albemarle Pamlico National Estuarine Partnership (APNEP): "Collaborative Approaches to Manage Albemarle-Pamlico Ecosystems."

Topic: APNEP GOALS for Ecosystem Health and Virginia-North Carolina Memorandum of Understanding.

DISCUSSION: 10 MINUTES

Closing Remarks Prof. Bob George: Recognizing STEM & Late Prof. Darnell Johnson

GIBS AWARD OF DR. DARNELL JOHNSON MEDAL TO Dr. LINDA HAYDEN
Awarded BY Dr. Bob George
GIBS AWARD OF DIRK FRANKENBERG MEDAL TO Dr. HANS PAERL,UNC
Awarded by Dr. B. J. Copeland