Coastal Breeze

The Official Newsletter of the Coastal Resources Management Ph.D. Program

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Editor: Sorna Khakzad

Issue 3 | 2014
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East Carolina University

Editor: Sorna Khakzad

The Interdisciplinary Coastal Resources Management Ph.D. is the academic program of the Institute for Coastal Science and Policy
In several respects, the Institute for Coastal Sciences and Policy (ICSP) and the Coastal Resources Management (CRM) PhD Program have been transformed over the past several months. ICSP lost four faculty members to other universities and organizations. Craig Landry took a position at the University of Georgia, Jeffrey Johnson at the University of Florida, Jennifer Brewer at the University of New Hampshire, and Tracy Van Holt at the Swedish Academy of Sciences. On the bright side, ICSP has had all those faculty lines returned; we hope to fill two of them starting in the fall of 2015 and two more in the fall of 2016. Our long-time executive assistant to the director, Kay Evans, retired in October 2015, but was replaced by the highly competent Shelia Ellis.

Hans Vogelsong’s tenure as director of the CRM Program ended in 2014; he was replaced by a new director, Dr. Siddhartha Mitra, at the beginning of 2015. Sid is a professor of geological sciences and has a strong record of interacting with graduate students. Hans remains with ICSP at least through the end of the 2014-2015 academic year. We greatly appreciate all Hans was able to do for the program, for individual students, and for ICSP in general. His advice was always highly valuable to me, personally, and I continue to listen to his ideas about the future of our Institute and degree program. We were also able to bring a dynamic economist and director of the Center for Hazards Research, Jamie Kruse, into ICSP in 2015. She will remain with ICSP through the 2015-2016 academic year.

While some of these changes have come with ambivalence—particularly the loss of productive faculty and staff—we continue to move forward with three university-wide initiatives that will enhance ICSP and the CRM Program in ways that should bode well for the students and faculty alike: the proposal to transform ICSP into a School of the Coast has been approved by the Educational Policy and Planning Committee of the faculty senate, moving a step closer to the Chancellor’s approval and that of the UNC General Administration; a Memorandum of Understanding between ECU and the Coastal Studies Institute has been signed by both parties, strengthening their partnership and, hopefully, creating new opportunities for experiential learning and research; and the planning for a joint ECU-UNCW PhD program in coastal and marine science, health, and policy continues to move forward. In December, UNCW hosted ECU faculty and ECU hosted UNCW faculty as part of a growing understanding of how the two universities can benefit from a partnership in terms of research, teaching, and community engagement.

The Brazilian poet Carlos Drummond de Andrade once wrote, in his poem, Residue, “From everything a little remains.” He was talking, I believe, about history. He was talking about what we inherit from the past. I like to think that the little that remains of the legacy of our lost colleagues will be taken up by our new colleagues and enhanced, transformed, and deposited in our collective account of the knowledge we are accumulating about the coast. From that, more than a little will remain.

Dr. David Griffith, Interim Director
Institute for Coastal Science and Policy
February 2015
Letter from former CRM Director

Friends and Colleagues,

I just wanted to inform all of you that as of January 1, 2015, I am no longer the director of the CRM Program here at ECU. While I am not leaving ECU, I am transitioning from ICSP and CRM to a full time role within the Department of Recreation and Leisure Studies.

I also wish to assure everyone that the CRM program is under great leadership with Dr Sid Mitra taking on the role of CRM director as the University transitions ICSP/CRM into what is conceived as “The School of the Coast”. Please join me in welcoming Dr Mitra to the CRM fold.

I have greatly enjoyed working with so many wonderful PhD students and friends/alumni of the CRM program over the past five years. This was a valuable opportunity for me both professionally and socially. I hope to continue to work with these fine people in the future, and to collaborate with many of them on developing coastal research projects and endeavors.

Avoid the Doldrums,

Hans Vogelsong

Coastal Breeze

Welcome to our third issue of Coastal Breeze. As a result of the changes in the CRM and the process to elect a new Director for the program, this issue is a bit delayed. The CRM students would like to thank Dr. Hans Vogelsong for all he has done towards improving the CRM program and supporting the students during the last several. We welcome Dr. Siddhartha Mitra as our new Director. To all the professors who have moved on: best wishes for your future. We will miss you, please come visit when you are in town. Students and faculty have been very busy with their great projects and research endeavors. Please read on to find out about our continued exciting activities and accomplishments in 2013-2014.

News from the Coastal Society

2013 was a successful year for The Coastal Society (TCS), which we hope to continue into 2014. The screening of the acclaimed documentary Chasing Ice brought out students and faculty from across campus which was followed by an intriguing and well-received panel of ECU scientists. Additionally, the critically acclaimed film, Shored Up was also viewed on-campus in April, featuring the director and another panel of ECU experts. The Coastal Society also had a successful fundraising campaign with newly designed t-shirts featuring not only the Coastal Society but also CRM and ICSP. In the fall semester TCS hosted two successful meetings with the annual TCS/ICSP courtyard cookout in Flanagan, and a holiday party at the local Peasants Pub. We plan to continue these partnered gatherings into the Spring semester. Additionally, TCS looks to partner with other area chapters in efforts such as the SciREN (The Scientific Research and Education Network) workshop and potentially an oceans awareness week in early April. We look forward to another successful year and fruitful gatherings of students, faculty, and staff!
New CRM PhD students, 2013-2014

In Fall semester 2013, five new doctoral researchers of different academic and professional backgrounds joined the Coastal Resources Management program. They shared a brief of their background and interest with our newsletter as follows:

**Molly Albecker:** I earned my B.S. in Biology and American Studies from the University of Mary Washington. After graduating, I worked as a zookeeper and backpacked around Europe before coming to ECU for my master’s in biology. After my M.S., I worked for a couple years on various research projects including projects on songbirds, bats, and amphibians. I entered the CRM program in 2013 to further pursue my goal of being a research scientist with training in policy and management. My research interests are centered around amphibians and coastal wetland communities and my project seeks to understand how amphibians will be affected by rising salinity levels due to climate-induced sea level rise.

**Michael James Flynn:** My interest in taking a multidisciplinary approach to coastal resource management developed while working at the Stockton College Coastal Research Center (CRC), Atlantic City Aquarium, and NJDEP Division of Fish & Wildlife. I spent most of my professional career at the CRC as an Environmental Specialist and GIS Assistant working on shoreline monitoring and assessment programs of beach nourishment within the State of New Jersey. Additional projects that I was involved with included: Hurricane Sandy damage assessment and debris removal, Coastal Flood Hazard Outreach for FEMA, and a GIS based beach-dune system susceptibility assessment. I intend to leverage coursework completed while earning a B.S. in Biology and Professional Science Master’s in Environmental Science from Stockton College, and focus my research on coastal development and its impact on environmental quality.
**Tom Garcia:** I am a small-town East Texas country boy who accidentally served for 17 years in the Air Force, and spent an additional 5 years working as a contractor for the Army and Marine Corps. I now wish to exert my energy and efforts towards tackling academia, coastal concerns, pursing some of my many interests, and enjoying life. My research interests include Social Networks, Human Dimensions, natural hazards and perceptions of risk, Cultural Theory and social organization, Human response to climate change and sea level rise, Coastal culture, user group conflict, localism/territorialism in coastal areas, community mobilization, community supported fisheries, perceptions, attitudes, and social norms towards water and waste, perceptions of responsibility, impacts of changing coastal demographics, environmental justice.

**Guy Iverson:** I was born in Oceanside, CA and haven’t stopped moving since then. My family settled down in Havelock, NC in 2002 and I finally found a place that felt like home when I moved to Greenville in 2006 to attend East Carolina University. I earned my B.S. in Geology in 2010, followed by my M.S. in Geology and a Certificate in Hydrogeology and Environmental Geology in 2013. My research interests are water resources, nutrient cycling, water quality and supply, wastewater reuse and management, and environmental geology. When I’m not knee-deep in wastewater, I’m either playing or watching (association) football.

**Hilde Zenil:** My past research has focused on studying oyster restoration. I’m particularly motivated to use passive acoustics to monitor the estuarine and marine environment. It fascinates me how the combination of sounds produced by associated species’ communication, feeding, or moving produces unique acoustic signatures, which can be used to convey information about a habitat. My Master’s research centered on large scale oyster restoration project that took place in the St. Lucie Estuary, Florida. The CRM program will further equip me to able to integrate fisheries scientific knowledge and the policy process.
Faculty members in the spotlight

Marsh Madness around Roanoke Island
By: Dr. J.P. Walsh

It’s been a cold, snowy winter, but research continues on the North Carolina coast near the UNC Coastal Studies Institute (CSI). Why go out in these tough conditions?...it is when much of the action happens in terms of waves and sediment movement. North Carolina experiences dozens of storms over the course of a year, and many of these arrive when marsh grasses are dormant and ice and snow can cover and fragment vegetation (see photo). Also, if extensive, rigorous marsh walking and sampling is needed, it is an excellent time to avoid the heat and protect skin from cuts and mosquito bites.

Roanoke Island, where CSI is located, is nestled between the Outer Banks and the “mainland” of Dare County. The island is well-known for its history but is also a natural wonderland, adorned with vibrant marsh habitat and surrounded by shimmering estuarine waters. For those who have yet to visit CSI, you will be impressed by the new research and education facilities. But CSI’s greatest asset is its position along the coast, making it a perfect base of operations for field studies. Several ECU faculties are working with students and researchers from other institutions to better understand marsh erosion, deposition and ecological changes in areas of the Albemarle-Pamlico estuarine system. One ongoing project in collaboration with the NC Division of Coastal Management focuses on the mapping and measurement of shoreline changes; this research is part of multi-year effort to understand evolution of coastal North Carolina. In conjunction with this work, Drs. J.P. Walsh and Reide Corbett (Geological Sciences, the Institute for Coastal Science and Policy and UNC CSI) have MS students studying relationships between marsh and sound areas (see photos). Another project, funded by the South Atlantic Landscape Conservation Cooperative led by Tom Allen (Geography) and involving scientists from the University of Georgia and University of South Carolina, focuses on the methodology of mapping marsh remotely across the Southeast as part of an effort to track long-term habitat alterations. These are two examples; others are underway or being planned.

These marshes and nearby areas are also the focus for education efforts coordinated by CSI at all levels, from K-12 to adult education. For undergraduates, the Summester at the Coast was initiated in 2013 to give students a chance earn credit while living and learning in the area; the program will be conducted again in May-June 2014 so more students can experience the coast. Clearly, much is happening among the marshes of Roanoke Island already. To allow research and education efforts to grow into the future, Walsh, Corbett and CSI colleagues hope to find donor or other funding for a boardwalk and pier to allow better marsh access and facilitate student/public interaction with dynamic estuarine shore-zone.
News from the laboratory of Dr. Joseph J. Luczkovich

Research: Coastal Resource Management doctoral students that have worked in Dr. Luczkovich’s Laboratory include Greg Meyer (graduated 2010), Becky Deehr (2012 graduate), Cecilia Krahforst, and Hilde Zenil. Dr. Luczkovich has interests in food web modeling, seagrass ecology, and marine bioacoustics. Some recent highlights include:

Shrimp Trawling and Impact on Ecosystem of Core Sound: “Using Stable Isotope Analysis to Validate Effective Trophic Levels from Ecopath Models of Areas Closed and Open to Shrimp Trawling in Core Sound, NC, USA.” by Rebecca Deehr, Joseph J. Luczkovich, Kevin Hart, Lisa Clough, Beverly Johnson, and Jeffrey Johnson. This paper focused on the dissertation work of CRM graduate Becky Deehr (CRM PhD in 2012) comparing social, geological and ecological metrics from areas open and closed to shrimp trawling in NC estuaries. The first paper is expected to be published by Ecological Modelling in the coming year. Becky’s dissertation and this paper has already had significant local impact, being repeatedly cited by shrimp fishers in the proposal to the NC Fisheries Commission to close the inshore waters to shrimp trawling. Becky spoke in support of keeping the existing trawling areas open at a public meeting in New Bern, NC. At this point, shrimp trawling remains legal in the open areas in the sounds of NC, but remains closed in primary and secondary nursery areas. Becky and the ECU and Bates College team funded by NC Sea Grant discovered that shrimp trawling and the bycatch the shrimp fishery generates changes in the ecosystem trophic structure that can be detected in both the stable isotopic values of key species but also in the trophic metrics generated by ecosystem network models run in the software Ecopath. Although less detritus is found in areas open to trawling, the bycatch appears to act as a subsidy to certain scavenger groups (especially polychaete worms, pinfish, spot and blue crabs), and this raises the net productivity of the open trawling area relative to closed areas. Further experimental closures and opening of trawling areas is recommended. This finding suggests that ecosystem based management is feasible for important fisheries like shrimp and blue crabs, the two most valuable fishery species in North Carolina. Website: http://core.ecu.edu/BIOIL/luczkovichj/core_sound/core_sound.html

Bioacoustic Ecology, Sounds of Fishes and Noise Pollution: Toadfish respond to vessel noises in the same way as they do to predator sounds (bottlenose dolphins). Cecilia Krahforst has been researching the issue of underwater noise and its impact on spawning fishes. Fishes use sound to communicate during mating and spawning. Sounds are made by males to attract females in the Sciaenidae or drum-fish family (including the red drum, spotted sea trout, weakfish, Atlantic croaker, silver perch, and many others). The oyster toadfish is also a prominent sound-producer along the Atlantic coast, with males making a boat-whistle or “boop!” sound during mating. When a low-frequency bottlenose dolphin echolocation sound is played back to toadfish living in experimental underwater dens, the toadfish stops calling (as does the silver perch, Luczkovich et al. 2001); the calling rate decreases temporarily until the predator threat passes, and then resumes at the previous rate (10 calls/min). Cecilia reported that large vessel low-frequency and outboard motor (high-frequency) propeller cavitation sounds both cause a similar but less dramatic response in calling male toadfish. The combination of predator sounds and vessel noises completely silences the toadfish (calling rate is 0/min), so the effect of both acoustic disturbances reaction is synergistic. Finally, colonization of experimental dens by adult male toadfish is lowest in the areas with the greatest levels of boat noise and vessel acoustic disturbance (Newport River, near Beaufort, NC) when compared with quiet locations in the Rachel Carson Reserve and Core Sound. Portions of this work were presented by Dr. Luczkovich at
the Third International Conference on the Effects of Noise on Aquatic Life in Budapest, Hungary in Aug 2013 (Figure 1). A book of the proceedings papers will be published in 2014. Dr. Luczkovich was a keynote speaker, asked to summarize the conference’s reports on impacts of noise on fishes. Website: http://www.an2013.org/

Pending Proposals: Proposals have been submitted to a) National Science Foundation (Dissertation Improvement Grant, for C. Krahforst on Impacts of underwater noise on oyster toadfish reproductive success; Acquisition of Acoustic Wave Glider for soundscape studies with Roger Rulifson (Biology/ICSP), Mark Sprague (ECU Physics), and J.P. Walsh (Geological Sciences/ICSP); the b) National Oceanic and Atmospheric Administration (Biodiversity Observation Network proposal for North Carolina, with participating scientists at Duke and UNC-CH, and MARACOOS, the Middle Atlantic Regional Association for Coastal Observing Systems); c) APNEP, Albemarle Pamlico National Estuarine Partnership, to study the distribution of seagrasses and submerged aquatic vegetation in Albemarle sound using SONAR surveys.

News from Dr. Eban Beans activities

In December, Eban Bean, Mike O’Driscoll, and Charlie Humphrey were awarded a grant from the NC Environmental Enhancement Grant.
Program through the Pamlico Tar River Foundation on a multi-year project entitled “Water Quality Restoration and Reduction of Stormwater Runoff via BMP installation in Greens Mill Run Watershed.” The goals of this interdisciplinary project are to improve the water quality and habitat of Greens Mill Run and reduce stormwater volume and nutrient contributions to the river from ECU’s main campus by installing 5 bioretention cells or other stormwater best management practices on campus. This will supplement the existing on-campus stormwater retrofits, including rainwater collection cisterns, existing bioretention, and permeable pavement systems. The researchers will partner with Facilities Services to enhance campus stormwater management. The research component of the project will evaluate how effective retrofitting a developed landscape with bioretention areas are at reducing contaminant transport to Greens Mill Run. In addition, this project will enhance public education and awareness about impacts from urban stormwater runoff and proper management techniques.

Last fall, Eban Bean began a year-long project working with J. H. Rose High School to educate students on the impacts of stormwater runoff. A weather station will be installed on the school’s campus to provide students with weather data. Students will learn about how stormwater runoff is produced, the impacts on streams and water ways, and how to manage stormwater effectively. The project will culminate with students proposing and installing a stormwater management practice on their campus in spring 2014.

In addition, the City of Greenville is undergoing watershed master planning to identify stormwater projects within all of the City’s watersheds. Through the Coastal Water Resources Center, Mike O’Driscoll and Eban Bean will be working with the City of Greenville public works and engineering firms hired on the projects to inventory, monitor, and assess the condition of Green Mill Run and Swift Creek. On a related note, the Coastal Water Resources Center is beginning the process of establishing stream monitoring station on Green Mill Run that would eventually provide real-time weather, flow, and quality data via the Center’s webpage.

In December, Eban Bean, Mike O’Driscoll, and Charlie Humphrey were awarded a grant from ECU to investigate coastal package wastewater treatment plants. These systems are small scale versions of municipal treatment plants that are often implemented when population densities exceed the capabilities of septic systems and are in locations that are cost-prohibitive to connect to a sanitary collection system. There are over 40 of these systems in Carteret County, with a majority located along Bogue Banks. The researchers will be evaluating at least six systems for pollutant and pathogen removal efficiency, energy consumption, and costs. This information help to better evaluate wastewater treatment options for future development in coastal regions.

Study measures economic benefits and ripple effects of beach renourishment
By: Craig Landry

Coastal Barriers are coupled human-natural systems. They are dynamic system that exposes capital and people to risk. Land use and modification in land also alters natural
processes which affect the coastal environment. If these interventions in the coastal areas are uncontrolled, coastal erosion will destroy island homes, businesses, and infrastructure. There are some management options such as shoreline armoring, beach renourishment, and shoreline retreat. A federally funded study is investigating the economic benefits of beach renourishment projects using outer continental sand resources along the Carolinas Coast. The $260,000 study funded by the U.S. Bureau of Ocean Energy Management has three components: One, what effect does renourishment have on property values next to the beaches? Two, do beach improvements create benefits for visitors, and if so, how do these benefits translate into increased use value and changes in economic expenditures? Three, do renourishment projects result in higher tax revenues and employment further inland? The case studies are five coastal North Carolina counties and possibly Horry and Beaufort counties in South Carolina, data permitting. In this study the effect that beach renourishment projects have on property values in these areas is being examined. A preliminary look at prenourishment Dare County, N.C., of 1997 and 1998 shows there is a positive effect on Outer Banks properties within 2,270 feet of the beach, but variables come into play: Do people believe the beach will encroach or recede in the future? What are the perceived recreational values and economic costs of related environmental impacts? Previous studies showed that added value estimates range from $200 to $1,000 per household for an additional foot of beach width, depending on proximity. A survey will also be conducted on households in states that provide the lion’s share of visitors to Carolina beaches to learn about visitation patterns and how visitation and expenditures could change with beach conditions. This survey will establish a baseline of tourist activity and examine how visitation levels might change if beaches become heavily eroded or are widened through beach renourishment. The study also will look at how people view the positive and negative environmental effects and the costs of beach replenishment and is trying to find out if replenishment leads to higher property values or vice versa: high property values may provide an impetus to replenish beaches. In addition, interpretation of Marginal Willingness to Pay for Beach Width coefficients shows that future beach width levels are omitted variables and there is positive correlation between present and future suggests upward bias on coefficient estimates. Based on this study, many property market studies attempt to identify cause-and-effect using good experimental design. But in the case of beach replenishment by government agencies, it’s not so clear, as the value of property protected plays a role in benefit-cost analysis. Ultimately, the aim is to find out if the Carolinas did a better job of beach protection, what would be the implied value to property owners and would there be more visitors?
Maritime Archaeology News: Great Lakes shipwrecks and Native American canoes
By: Dr. Lynn Harris

During summer 2013 Dr. Lynn Harris took 18 graduate students specializing in underwater archaeology to work at the NOAA Thunder Bay National Marine Sanctuary in the Great Lakes. The treacherous waters around Lake Huron’s Thunder Bay is locally dubbed “Shipwreck Alley,” claiming nearly 200 ships. Intense weather patterns, islands and rocky shoals, and heavy vessel traffic and converging shipping lanes all contributed to the area’s vast collection of shipwrecks. These submerged archaeological sites are nearly a complete collection of Great Lakes vessel types from small schooners and pioneer steamboats of the 1830s, to enormous industrial bulk carriers that supported the Midwest’s heavy industries during the twentieth century. Among the wrecks in and around the sanctuary are those vessels that carried immigrants and pioneers traveling west for new homes, schooners carrying Midwestern grain and lumber, passengers and package freight steamers, and evolving generations of bulk freighters specially designed to carry iron ore, coal, grain, cement, and other bulk commodities. They are evidence of the Great Lakes’ pervasive influence in regional and national history, and capture the cultural, personal, environmental, technological and economic aspects of maritime history. Moreover, the shipwrecks of Thunder Bay reflect the movement, bravery, tenacity and innovative spirit of generations of maritime people.

The ECU dive team braved waters as cold as 40 degrees to map, draw, photograph, and collect video footage on several shipwrecks. The objectives included collecting environmental and archaeological baseline information about the wreckage condition and integrity for management purposes, as well as more technological questions about the design and construction of these ships. Many of the exceptionally large vessels were representative of an era when shipbuilders were pushing wooden shipbuilding to the limit, but innovatively adding iron structural components to the design. The dive sites included William P. Rend was constructed as a bulk freighter and originally named the George G. Hadley. Portions of the wreck are nearly awash and the portside extends to just below the water’s surface. The bow is splayed open with a large stem and breast hooks lying to starboard. The sides are largely intact with considerable iron band reinforcement in the form of large diagonal cross-beams attached to the frames. Steel I-beams have replaced some of the traditionally wooden deck beams. A boiler and steam drum on their side, and the remains of an engine room bulkhead are located at the stern. Considerable crushed limestone cargo remains on site. Debris including remains of the superstructure has fallen off to the side of the wreck, and freshwater sponges inhabit the site. The site is visited daily during the summer by a glass bottom boat and is a popular attraction for kayakers and snorkelers. Another popular shipwreck site Ogarita was once a swift three-masted barkentine built for the competitive Lake Michigan grain trade of the 1860s. Long since converted to a lowly towbarge, the ship suffered a disastrous fire in its coal cargo and went down North of Thunder Bay Island. The crew all escaped safely. The wreck's bow, keelson, and hull sides have all survived, although the stern is missing.
Another project summer project led by Harris was the reconstruction of a Native American canoe on Parris Island, South Carolina. Native American and African canoes are often found underwater in local rivers or eroding out of river banks along the south eastern seaboard. These significant cultural objects present a plethora of management challenges for curators and maritime archaeologists. The biggest question is to either leave the artifact *in situ* and possibly stabilize them, or to recover, treat and display them.

The USMC Marine Corps Recruit Depot (MCRD) is situated on Parris Island and several smaller islands located approximately 4 miles south of the City of Beaufort, South Carolina. The primary activity at MCRD has been the training of Marine Corps recruits since 1915. The facility covers more than 8,000 acres, including more than 4,000 acres of salt marsh and tidal streams. The depot also houses the Parris Island Museum, a 10,000-square-foot (930 m²) facility with exhibits that explore the rich legacy of the United States Marine Corps, as well as the history of the Port Royal region. On display are artefacts representing Port Royal's important military role from the American Revolution to the Civil War, along with development of the island into a Marine Corps installation after the Spanish-American War through to the present.

A new section of the museum will soon be dedicated to the native peoples who occupied the land from the Paleoindian period to the Historic era. The centerpiece will be the reconstructed remnants of an ancient single log canoe.

In 1988, Mr. James Cooler, a local marsh comb, discovered the canoe, and the Marines at the USMC recruit depot later recovered it. The canoe fragmented throughout time and with transportation to locales throughout the south eastern seaboard. Beta Analytic in Florida identified the wood as eastern white pine and dated the canoe to the Late Woodland period, as it is approximately 590 years old (AD 1300—1420). The canoe fragments were stored in a variety of repositories in South Carolina before being sent to Tidewater Atlantic Research in North Carolina. There, it was conserved using polyethylene glycol, or PEG. The fragments were sent to the Maryland Archaeological Conservation Laboratory in 2011 to be treated in a freeze dryer. After being treated, the canoe fragments were returned to South Carolina with the intention of reconstructing the canoe and placing it on display at the Parris Island Museum.

In May 2013, Harris, along with two graduate students, Alyssa Reisner and Sonia Valencia, from the Maritime Studies Program at East Carolina University made a preliminary visit to assess the fragmented canoe’s condition and to determine options for display. The wood fragments ranged from being spongy and fragile to moderately firm. Each of the 18 pieces of the canoe were numbered, photographed, labeled, measured, documented, digitized, and finally submitted to the museum’s curator for record keeping purposes. Some fragments exhibited evidence of possible tool and burn marks along with slight depressions that could have been formed by foot wear imprints of the Native American paddlers who often stood upright in canoes. The canoe pieces were then assembled based on shape, color, woodgrain patterns, and thickness in an effort to recreate a best fit for the original structure of the canoe. The larger fragments extended six meters in length when assembled, and the beam measured 80 cm at the preserved extremity.
In December the three-person team returned to Parris Island depot for the reconstruction phase of the project. The assembled canoe pieces were reconstructed, much like a big jigsaw puzzle, and attached through a process of very carefully stitching the associated fragments together using cable ties. The team, aided by a four Marines, embedded the entire canoe assembly within 10 cm of sculptured dark brown, marsh-colored foam. The foam bed was suspended within a hammock of strong plastic webbing, and prepared for temporary storage and transportation from the workshop to the museum, which will take place in late February 2014. The canoe will be ultimately be displayed in a climate-controlled, glass exhibit case that will re-create the feel of an in situ Parris Island marsh environment with the use of marsh grass and oyster shells. In addition to the imagery of the past that the exhibit will evoke, the public will also be able to read a series of informational plaques. The canoe exhibit should provide visitors a dynamic visual representation of the past and hopefully inspire an appreciation for the history of Native American cultures in the area.

**CRM students’ publications and Conference attendances**

**The Society of Historical Archaeology Conference**

One of the largest conferences regarding archaeological research is organized, jointly, by the Society for Historical Archaeology (SHA) and the Advisory Council on Underwater Archaeology (ACUA). SHA is the largest scholarly group concerned with the archaeology of the modern world (A.D. 1400-present). This society has been established in 1967. SHA promotes scholarly research and the dissemination of knowledge concerning historical archaeology, and is specifically concerned with the identification, excavation, interpretation, and conservation of sites and materials on land and underwater. The ACUA has been at the forefront of underwater archaeology for more than 50 years. The ACUA serves as an international advisory body on issues relating to underwater archaeology, conservation, and submerged cultural resources management. The first joint conference of ACUA and SHA was held in 1970.

This year, The 47th Conference on Historical and Underwater Archaeology was held in Quebec City, Canada, from January 8 to 12, 2014.

The coastal resources management program had both students and alumni in attendance at this year’s SHA in Quebec City, Canada. Sorna Khakzad presented the paper Underwater Cultural heritage sites on the way to be listed as World heritage: to ratify the 2001 Convention or not? “Since 2001 there has been a lot debate about ratifying the Convention on Protection of Underwater Cultural Heritage (UCH). Since the countries pioneering underwater archaeology have not yet ratified the Convention, thus the question rises that to what extent ratifying the 2001 Convention can be assisting the State Parties to enhance their UCH practices. New efforts at UNESCO aim at subscribing the best practices of underwater archaeological activities in the World Heritage List, which is considered a privilege for the State Parties. This paper aims at introducing the criteria which UNESCO considers for the best practices, and to present an evaluation of the best practices in the world, not only from the State Parties, but also from the countries which have not ratified the convention. A comparison analysis will take place among these practices based on the criteria for acceptable preservation and public presentation of UCH. The effect of joining the Convention in the present State Parties will be assessed. The paper will rise the question that if the new initiative at UNESCO regarding listing the best practices, will encourage other countries to join the 2001 Convention?”

Alumni Valerie Grussing presented in the same panel a paper entitled Cultural resources toolkit for Marine Protected Area Managers. “Most
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marine protected areas (MPAs) in the U.S. were established to protect biological diversity and ecosystem resources, and MPA managers and staff often lack expertise on cultural resource management. The Cultural Heritage Resources Working Group of the MPA Federal Advisory Committee produced a white paper recommending a Cultural Landscape Approach for integrated management of cultural and natural resources within the National MPA System. Now, the group is taking the next step to put cultural resource information and tools in the hands of MPA managers. A virtual toolkit will consist of a modular approach to cultural resource management training and information, focusing on MPAs. A Fall 2013 workshop will beta test and refine the developing product, and this session will solicit input from conference attendees. Topics will include: ‘Cultural Heritage MPAs 101: benefits, goals, management planning, monitoring; ‘Cultural Landscape Approach; ‘Jurisdiction in the marine environment; ‘Tribal and indigenous issues: authority, rights, cultural resources, TEK, TCPs; ‘Underwater archaeology training; ‘Climate change and cultural resources.”

Jennifer Jones attended as acting graduate student representative for the Advisory Council for Underwater Archaeology, which included development and participation in a day-long workshop covering lectures on various aspects of underwater archaeology, and the direction of a panel: Reaching Out—Public Archaeology for Students and Recent Graduates featuring several CRM faculty—Lynn Harris and Charles Ewen.

Every year, following SHA Conference, Advisory Council on Underwater Archaeology publishes a proceeding including selected presented papers in the conference. Following SHA 2013, Joyce Steinmetz published an article in ACUA Proceedings, titled “Side-Wheel Paddle Steamer Admiral DuPont, 1847-1865: Identification, History, and Structural Integrity,” on pages 109-115. The abstract read:

“This study identifies the side-wheel steamer Admiral DuPont, explores its history, and examines its structural integrity. Launched as the Irish-Welsh ferry Anglia in 1847, it became a Civil War blockade-runner, was captured, sold as a prize, and renamed. In 1865, Admiral DuPont sank in 46 m (150 ft.) of water off southern New Jersey. Since its discovery in the early 1980s, it has been a popular dive site. Commercial bottom fishing has impacted its structural and archaeological integrity: trawl nets drape its paddle wheels, a scallop dredge destroyed several paddle buckets, and its bow and stern are missing above the chine.”

Beneath the Sea Conference: In March 2013, Joyce Steinmetz presented a public outreach session “Side-Wheel Paddle Steamer Admiral DuPont: 1847-1865” to raise sport diver awareness of the natural and anthropogenic threats to the historic Civil War blockade-runner and instill stewardship. The annual Beneath the Sea conference is the largest US diver conference.

Presentations to NOAA Office of Coast Survey, NOAA Office of Maritime Heritage, and the survey team and crew of the NOAA ship Thomas Jefferson

In April and June 2013, Joyce Steinmetz presented the “Search for the Robert J. Walker” in preparation for the remote survey for the historic prototype vessel. (More description in the CRM Student Project section).

2014 Social Coast Forum: Exploring the Values of the Coast, Charleston, and SC.

Participants at the conference included a large contingent from academia and state agencies, as well as federal offices, nonprofits, and the private sector. This interdisciplinary mix of participants allowed for some lively and valuable discussions at the various sessions. By gathering both managers and social scientists in the room with different experiences, expertise, and viewpoints, participants were able to learn about social science applications and share ideas, tools, and resources.
CRM alumni who were present included Chris Ellis and Susan Lovelace.

Michael Flynn, Margaret Garner, and Tom Allen presented the North Carolina Coastal Atlas, demonstrating how to access a variety of geospatial data, maps, and bibliographies. Mary Allen presented ‘The Use of Norm Curves to Investigate Acceptability between Resource Condition and Recreational Use Levels’. Research explored social norms of snorkelers visiting Buck Island Reef National Monument and the Florida Keys. This research provides important information about which resource conditions are acceptable to snorkelers, and what levels of use are appropriate. Norm curves were constructed to reveal the most optimal condition, and the point when acceptable conditions becomes unacceptable conditions. Results showed that snorkelers accept seeing certain levels of coral bleaching, algal cover, and water visibility during their snorkeling experience. It is also acceptable to see certain levels of other snorkelers, scuba divers, and boats at one time in the same location. If used in conjunction with biophysical data, these findings can help managers understand limits of acceptable environmental impacts and levels of use.

Liz Brown-Pickren presented ‘Improving outreach of information on contamination in self-caught fish’. Recreational fishing is popular and fish is a good source of health benefits, yet self-caught fish may be a source of contaminants. Each state issues consumption advisories, some state-wide and some specific to water bodies, and each state manages marine fish and shellfish through catch limits, size limits and closed areas. An open-ended intercept survey of coastal anglers in North Carolina revealed extensive knowledge of catch restrictions but minimal knowledge of the effects of contaminants on health, little concern for contaminants in their catch, and a misguided faith that the government would post warnings at every water body at risk for contaminants. This project is intended to encourage collaboration between fishery management agencies and public health agencies, and outline an effective outreach framework.

Alyson Lewis presented ‘Visitor’s economic value of Cape Hatteras National Seashore’. Research conducted with Craig Landry and Hans Vogelsong examines recreation demand, travel costs, and visitor expenditure patterns for Cape Hatteras National Seashore (CHNS) on the Outer Banks, North Carolina. CHNS is one of the largest protected barrier islands on the East Coast, comprised of nearly 30,000 acres along 140 miles of shoreline. The island system is unique, consisting of primarily thin barrier islands, dunes, and mud flats, backed by a large and shallow back-barrier estuary; CHNS is remote, accessible only by ferry or a single stretch of road running along the chain of islands. Data were collected at various beaches along CHNS in 2001-2002. We estimate count data demand models, controlling for endogenous stratification stemming from the on-site sampling. We present corrected estimates of economic value and extend the analysis of avidity bias to examine the impact of on-site sampling on economic expenditure analysis. Our hypothesis is that expenditure estimates will be downward biased (reflecting lower spending patterns of more avid users that live closer to CNHS), which would give rise to underestimates of economic impact. The estimated net benefit of a day at CHNS is estimated at $75.89/household and $17.21/individual (2002 USD).

Traci Birch presented ‘Back to New Orleans: Lessons of resilience and planning from Hurricane Katrina’. This work examines the myriad of post-Katrina planning efforts through the lens of building social resiliency. We have been guided by the following questions: How have these grassroots efforts been incorporated into the larger formal planning landscape to ensure a more resilient future for the City? What can be done to strengthen this process moving forward in New Orleans and other communities? Based on an analysis of these recent planning activities, we argue that none of the current planning models – needs-based, asset-based, or place-based – are addressing
the needs of a post-disaster city. New Orleans’ formal planning processes have met all of the requirements for Federal and State recovery funding, but have largely focused on large-scale urban redevelopment schemes and ignored the small-scale efforts that have driven recovery. Beyond this, grassroots planning efforts have abounded, with few mechanisms to include these efforts in a more formal planning structure. In this article we problematize decision-making frameworks that prohibit nimble and effective localized planning, as well as the disconnect between contemporary planning theory and practical application that fails to address social capital within the process. This work, based on our empirical research and practice in a wide range of post-Katrina planning processes, proposes that planning for community resilience requires a new model that highlights both needs and strengths – formally identifying community-level assets and relationships, while also analyzing for systemic, structural, and emplaced inequality.

Craig Landry presented ‘Economic values of coastal erosion’. We North Carolina household survey data in order to estimate non-market benefits and costs of beach erosion management alternatives, focusing on beach replenishment, shoreline armoring, and shoreline retreat. The survey gathered data on use (and non-use) of North Carolina’s coastal beaches, perceptions of coastal resource quality, and knowledge of natural coastal processes. By combining information on beach users and non-users, we are able to represent diverse groups of stakeholders and conduct a comprehensive and comparative analysis of economic benefits & costs. Data collection includes revealed preference and contingent behavior data that allow us to estimate beach recreation demand models. These models permit calculation of net economic value of recreation sites for visitors and to predict how behavior and value changes with erosion management regimes and coastal resource quality. In particular, the changes in resource quality we focus on are increasing beach width and negative environmental effects stemming from management (e.g. disruption of benthic habitats due to dredging, loss of beach habitat due to seawalls, beach litter due to retreat). Combined with information on economic expenditures, the results can also be used to estimate changes in economic impact associated with different management regimes and the resulting beach conditions. We also collect contingent valuation data in order to measuring taxpayers’ willingness to pay for beach erosion management projects. These data include responses from both users and non-users, permitting estimation of non-use value.

David Loomis (and alumni Shona Paterson) presented ‘Tradeoffs and the Plausibility of Success (POS)’. The “Plausibility of Success” model compares the level of resource protection against the delivery of ecosystem services. An increase in one factor will by definition result in a decrease in the other factor. This model demonstrates that tradeoffs must be made in terms of ecologically focused goals versus socially focused goals (ecosystem services). Importantly, it shows the non-linear relationship between, for example, resource protection and ecosystem services such that a significant improvement in protection (perhaps 80% of its potential) can be obtained at a relatively low reduction (perhaps 20%) to the delivery of ecosystem services. At the same time, the converse is also true. However, obtaining that last 20% of improvement in protection is extremely costly (80%) to the delivery of ecosystem services. We argue through our model that flexible and socially informed management policies have a higher plausibility of success, while the dogmatic pursuit of “all or nothing” management plans has a lower plausibility of success.

Hans Vogelsong presented ‘Perceptions toward ORV use and environmental conditions at Cape Lookout National Seashore’. The presentation shared results of a human dimensions study on Cape Lookout National Seashore (CALO) that was conducted to gain information from users of CALO to help inform the development of an ORV Management plan. While much was known
about the environmental and ecological impacts of ORV use on the seashore, this study focused on the experiential and social impacts of ORV use. Data for this study was collected from May 2006 through November 2007. A combination of observations, on-site interviews, and mail-back questionnaires were used for gathering data. Survey items included developing a socio-economic profile of visitors to CALO, as well as examining their attitudes and preferences toward ORV use and management at the seashore. Discussion will focus on conflict between ORV users and a comparison of their attitudes and norms toward ORV use on the seashore, as well as their feelings for the seashore and its environmental attributes. In addition, recommendations will be made to help insure that any regulations and/or policies concerning ORV use in the park be accepted by the most visitors possible.

**Students Projects and Activities**

**Internship at UNESCO, Underwater Cultural Heritage Secretariat**

By: Sorna Khakzad

Sorna Khakzad worked as an intern at UNESCO Headquarters Paris, from July to December 2013, under the secretariat of the Convention on the Protection of the Underwater Cultural Heritage (CPUCH), funded by the Flemish Trainee Program in Belgium. CPUCH was adopted by the UNESCO General Conference on 2 November 2001. It aims at protection of all traces of human existence having a cultural, historical or archaeological character, which have been under water for over 100 years.

As a part of this internship, Sorna provided contribution to the organisation of events commemorating the Centenary of the First World War, the preparation of the scientific reports and materials on the subjects under the current Secretariat’s tasks, assisting in the preparation of proposals for fund raising, and helping to promote the 2001 Convention through communication with research and training centres. The tasks were in line with UNESCO goals of capacity building, peace building and heritage protection awareness rising.

Sorna was involved in three main projects. Two of these projects were following the decisions made by the Advisory Body in May 2013. The participants in this meeting emphasized on fostering of archaeological site guardianship to increase site access as well as protection. In this respect, firstly, preparing a collection of best practices from States Parties was recommended in order to identify the good examples as well as encouraging other state to follow these examples. Secondly, promoting children education from very early stages was highlighted.

In order to fulfill these two mandates, Sorna Khakzad prepared a list of best practices in the world. The criteria for this selection were mainly the quality of conservation methods and the quality of providing access to the submerged sites. Out of 45 countries that ratified the 2001 Convention, 14 examples from 10 countries were selected to be discussed in the next advisory body meeting in 2014. Some posters also were prepared in order to promote public interest and awareness. Figure 1 shows one example of the posters from one of the best practices.

The second task was to promote children education regarding underwater archaeology. Two projects have been initiated for this purpose: 1) to create an application for mobile phones (iPad, tablets, etc.) and 2) to develop a study curriculum. To achieve objective (1) two main sites from the world underwater archaeological sites were selected: Alexandria and Kublai Khan Shipwreck, and a sort of educational game was developed. In order to achieve objective two a series of the topics that might be interesting and educational for children were outlined, and in consultancy with the education sector at UNESCO, it was improved. The school educational program is in its preliminary stages, and the future steps will be discussed in the Advisory Body meeting in 2014.
The third project that Sorna was involved was studying the maritime sea routes. One of the main projects, in collaboration with the Silk Road Network Program, was to study the underwater sites and objects of the Silk Routes will enhance our knowledge about shipbuilding technique, trade, and cultural exchange in an important chapter of world history. A list of countries and their related Maritime Silk Routes cultural heritage have been prepared. The main aim is creation of a working group among Asian and African countries on these routes in collaboration with UNESCO, will result in enhancing knowledge, more visibility to these sites, awareness rising, public education and promoting cultural tourism.


In the summer field season of 2013, Cecilia Krahforst had one goal: to conduct field playback experiments to determine if boat noise alters oyster toadfish (*Opsanus tau*) acoustic communication. Male toadfish produce "boop" sounds from dens to signify spawning-readiness to females. Once spawning occurs, the male toadfish stays at the den and guards its eggs for at least one month. Artificial dens were deployed to attract toadfish to the study sites. Sounds of boats, dolphins (a known toadfish predator), both dolphins and boats, and snapping shrimp (control, natural background sound) where played through an underwater speaker to toadfish residing in the dens, and call rates before, during, and after sound exposure were recorded. Because fishes are most acoustically active at night, the experimental procedures occurred between sunset and sunrise. For most field days, the work literally lasted from sunset to sunrise. It's amazing the lengths two graduate students will go to for data.

**Sharks and Fish Sounds after Sunset**  
By: Cecilia S. Krahforst and Chuck Bangley

Field work can be both the most exciting and complicated part of research. This is a tale of two research projects with vastly different goals, both occurring in Core and Back Sounds during the witching hours between sunset and sunrise. For most field days, the work literally lasted from sunset to sunrise. It’s amazing the lengths two graduate students will go to for data.

![Oyster toadfish held by Chuck (Photo by S. Lichti).](image)

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causing the least impact and both dolphins and boats causing the biggest impact to oyster toadfish acoustic communication. This summer there are plans to explore how ambient sounds influence toadfish reproductive output, development, and diet.

Chuck Bangley had a very different goal and target species for his research project. Chuck was interested in shark species using NC estuaries as nursery habitat. In the past, Chuck had limited success catching sharks in Pamlico Sound, but this summer his luck changed. Using longlines, gillnets, and rod and reel gear, we successfully captured 3 shark species and 2 species of ray. Young-of-year Atlantic sharpnose sharks (*Rhizoprionodon terraenovae*) were highly abundant, and were even observed patrolling very shallow seagrass beds during Cecilia's playback experiments. Ominously, some longline hooks were completely bitten or pulled off and an entire fishing rod was pulled into the water. These incidents suggest that something very large and strong was present in Back Sound (and possibly lurking nearby while we were in the water) during the sampling season. The plans for this coming summer include utilizing new techniques to successfully capture the larger sharks that managed to escape with the gear during last summer's sampling season.

Two projects, two goals, two very tired graduate students. By the end of the summer, both of us were exhausted but excited about the data we managed to gather. Currently, we are working through the data and are excited about the preliminary results. We would especially like to thank our funders, ECU's Institute of Coastal Science and Policy and Coastal Resource Management Program, for their support. This project would also not have been possible without field, boating, and office assistance from many individuals, including: Dr. Mark Sprague, Harry Hoppee, Jillian Osborne, Debbie and Steven Lichti, Becky Deehr, Dan Zapf, Taylor Bailey, Walt Rogers, Brie Elking, Mike Baker, Mark Keusenkothen, Gwen Bibbs, Cindy Harper, Kay Evans, Dr. John Fear, and our advisors Joe Luczkovich and Roger Rulifson.

**North Carolina Coastal Atlas: Transforming Coastal Information to Empower Decisions**

By: Michael Flynn

East Carolina University faculty, staff, and students are linking research to management under the leadership and direction of Principle Investigators Dr. Thomas Allen and Dr. J.P. Walsh. The North Carolina Coastal Atlas has developed from a simple prototype tool to a fully functioning integrated website and map-user interface. The NC Coastal Atlas has developed through the efforts of a diverse partnership established in 2012 of personnel from ECU, the NC Department of Environment...
and Natural Resources (DENR), Division of Coastal Management (DCM), and the UNC Coastal Studies Institute. The addition of staff from NC Division of Marine Fisheries, the Albemarle-Pamlico Estuary Partnership, NC Division of Emergency Management, NC Sea Grant, and the Governor’s South Atlantic Alliance comprise the steering committee to date.

The Atlas is an online mapping and investigation portal that combines physical, ecological and human use data to support education, management and decision-making. We are developing the atlas to incorporate user objectives and review user experience iteratively. A needs assessment of coastal planners, managers and other potential users revealed a desire for thematic maps of ecosystem health, biological resources, shoreline change and hazards such as flooding and storm surge. Multiple datasets are now available including estuarine shorelines and associated structures, submerged aquatic vegetation, wetlands extent, and FEMA designated flood risk areas. A unique partnership with East Carolina University’s Joyner Library makes scholarly research discoverable using geo-referencing. Future capabilities of the atlas include decision support tools and public engagement programs that have the potential to help make coastal and estuarine research more accessible and relevant to managers and the public.

The technical aspects and functionality of the Atlas have been designed and continuously improved by staff member Robert Howard, and Michelle Covi compiled the information on the site and coordinated outreach. Michelle recently graduated from the Coastal Resource Management PhD program in February, and took a position at Old Dominion University as Climate Adaptation and Resilience Assistant Professor of Practice. Margaret Garner and Michael Flynn from the CRM program have since joined the project beginning with the 2013 fall semester to assist with development and outreach. The project team members have supported the exhibition of the Atlas at the NC ArcGIS Users Group and North American Cartographic Information Society conferences this past October, and joined the company of other ECU faculty and students in attendance who were also presenting at the NOAA Social Coast Forum in February.

We would like to invite you to explore the NC Coastal Atlas for yourself by visiting www.nccoastalatlas.org. We encourage and value the feedback of our users, so please submit any feedback, suggestions, or map ideas you might have through the “Contact Us” tab. You can further facilitate and enhance the development of the tool by providing data layers, reports, or publications from research projects you have been involved with, refer opportunities for collaboration, or simply share the link.

Two internships in one summer
By: Jennifer Jones

Jennifer Jones completed two internships during the summer of 2013, both with a focus on database development and GIS implementation but for different state/federal management entities. At the North Carolina Underwater Archaeology Branch in Kure Beach, NC, Jennifer helped begin the process of placing thousands of recently digitized records into a GIS database (and mapping system) of marine, intertidal, beached, and underwater archaeological resources (both recorded and unrecorded) in the state of North Carolina. This will be used in conjunction with the State’s database of terrestrial archaeological resources, which will eventually be searchable on line. Additionally, Jennifer spent time at the Thunder Bay National Marine Sanctuary, manipulating and organizing data to provide the Sanctuary with ideas for developing research projects, educational materials, and tourism initiatives.
Re-Discovery of the Historic Paddle Steamer Robert J. Walker
By: Joyce Steinmetz

In March 2013, Captain Albert “Skip” Theberge, NOAA Office of Coast Survey, and Dr. James Delgado, Director of the NOAA Office of Maritime Heritage, requested Joyce Steinmetz’ assistance to locate and identify the wreck of the historic vessel Robert J. Walker. This ship was a prototype iron-hulled steam-powered hydrographic survey ship. The side-wheel paddle steamer Walker was built in 1847 in Pittsburgh, Pennsylvania, and sunk in a collision off Absecon, New Jersey, on 21 June 1860. The Walker is historically significant for its contribution to the evolution of marine technology and as a military memorial site. The Walker was a developmental ship during the transition from wood to iron hulls and from sail to steam propulsion. For the decade prior to the Civil War, the vessel was an essential officer training platform for the new technologies. The Walker was, and still is, the largest causality event for NOAA with the loss of 20 sailors.

Gladly accepting the challenge, Steinmetz partitioned the research into five parts: 1) Comb historical archives for key archaeological features, which might survive on site, 2) Find survivor accounts of the sinking for clues to the search area boundaries, 3) Investigate paddle steamers sunk in the area, to avoid misidentification, 4) Tap into the sport diving community for unidentified wreck candidates, and 5) Review her dissertation database on commercial bottom fishing hangs.

In June, Steinmetz boarded the 208 ft. NOAA survey ship Thomas Jefferson armed with the historical position of the wreck, an unidentified wreck candidate set on divers’ observations, fishing hang locations in the area, Walker’s hull/boiler/engine specifications, and an oil painting image of the Walker.

By utilizing the Thomas Jefferson and its two survey launches, the unidentified wreck was imaged and the surrounding area was surveyed. Out of 10 criteria, Steinmetz expected to be able to confirm or deny 4 from the survey. Thanks to the vessels’ side scan and multi-beam equipment plus real time post-processing by the enthusiastic NOAA survey team, 7 criteria were confirmed on the divers’ wreck.

The next day, NOAA’s archaeological dive team confirmed the remaining 3 criteria. The wreck lies in 85 ft. of water, 10 miles off the coast, in a mud hole with poor visibility. On 21 June, the anniversary of the sinking memorial services was conducted simultaneously at NOAA Headquarters in Silver Spring Maryland and a wreath-laying ceremony at sea from the survey vessel Thomas Jefferson.
This wreck would not have been identified without the collective 40-year knowledge of the wreck diving community, especially local dive boat Captain Eddie Boyle. During the summer, Dr. Delgado and Steinmetz reached out to the wreck diving community to involve them in future activities for the *Walker*: a land-based memorial to the 20 lost sailors, a museum display with donated diver artifacts (recovered before the wreck was identified as a government vessel), and an archaeological diving survey with experienced wreck divers, coordinated and authorized by NOAA. In late August 2013, NOAA Office of Maritime Heritage issued a national press release, website, underwater videos, and 56-page report. For this information on the *Robert J. Walker*, please visit: http://sanctuaries.noaa.gov/maritime/walker/ http://www.noaanews.noaa.gov/stories2013/20130827_robertwalker.html

**Award Winning CRM-ers in 2013**

We would like to congratulate the following professors and students for their awards in 2013-2014:

Dr. David Kimmel was the recipient of the 2013-14 ECU Five-Year Achievement Award for Excellence in Research and Creative Activity, and the 2013-14 Scholarship of Engagement Award. David G. Kimmel is an Associate Professor Department of Biology, Harriot College of Arts and Sciences & the Institute for Coastal Science and Policy.

Molly Albecker jointly with her advisor Dr. Michael McCoy was awarded SeaGrant funding for their proposed work on the effects of saltwater intrusion on coastal animal communities. (2014-2016).

Andrea Dell’Apa was selected as one of the 2014 Knauss fellows, for the NOAA Healthy Oceans Goal Program Analyst position at the NMFS-Office of Management & Budget. The Healthy Oceans Goal is one of the four strategic goals within the NOAA Next Generation Strategic Plan. Andrea is going to work closely with the Leader and members of the Healthy Ocean's Strategic Planning team to carry out strategic planning to identify requirements, capabilities, and resource needs for Healthy Oceans' activities, and to support program evaluation, policy review and communications. He will be providing support to the team advancing the monitoring and implementation of the National Ocean Policy Implementation Plan (NOP-IP) Ecosystem-based Management (EBM) work plan within activities of the different NMFS's office. Andrea will represent the Agency at meetings of the Healthy Oceans Goal Team, Program Planning and Implementation, and NOAA Fisheries Communications meetings, and assist in the development of a revised NOAA Fisheries Strategic Plan. Part of his job will be to coordinate Agency implementation plans, budget justifications, communications material, and other planning and documentation, to conduct planning analyses, and to prepare planning documents, briefings and presentations that document NOAA Fisheries/Healthy Oceans’ program performance.

**Interview with CRM Alumni**

This issue’s featured alumnus is Dr. Kelly Gleason. Dr. Gleason received a BA from the University of Notre Dame in 1998, where she majored in the Program of Liberal Studies. It was a Great Books Program, focused on seminar classes and interdisciplinary study. She graduated from St. Andrews University with a MLitt in Maritime History in 2000, and completed her PhD from ECU in the CRM program in 2006. Currently, she is working under the title of Maritime Heritage Coordinator and Maritime Archaeologist for Papahanaumokuakea Marine National Monument, part of NOAA’s Office of National Marine Sanctuaries.

Kelly (K. G.) kindly accepted to have the following interview with *Coastal Breeze*: 
C. B. How were you informed about the graduate programs at ECU?
K. G. I learned about ECU’s graduate programs while investigating PhD programs in nautical archaeology.
C. B. Why did you pursue your graduate degree at ECU?
K. G. I have always been drawn to interdisciplinary programs, much like my undergraduate program at Notre Dame. When I started researching the program at ECU, it was relatively new (3 years old), but I loved the fact that I would be able to combine the tradition and history of ECU’s Maritime Studies Program with an innovative graduate program that allowed the opportunity to collaborate with several disciplines.

C. B. Did you enjoy your time at ECU in CRM program?
K. G. Very much. I felt inspired by the professors I worked with, and I was part of an incredible class of students who motivated and encouraged each other to succeed in the program.
C. B. What was your favorite course and why?
K. G. It’s difficult for me to identify one particular course I enjoyed the most, because there were several. I probably struggled the most in Lisa Clough’s Ecology Course I took because she really challenged me to think critically in a subject I wasn’t entirely comfortable with (Ecology was one of my two secondary tracks), however, I can also say I learned a great deal in that class. The classes I enjoyed the most were the ones where my class of CRM students were together because we were a really close group, and enjoyed working together. It was a great opportunity to learn to communicate better across disciplines.

C. B. What was your most memorable moment as a Ph.D. student in CRM?
K. G. Probably any opportunity I had to get off campus and apply what we were learning, and there were a lot of opportunities for this at ECU when I was there. One year all of the CRM students who had Maritime Studies as a primary or secondary track took a field trip to Washington DC to visit a number of relevant offices there. The entire trip was incredibly thought provoking and it helped to discuss the hands on learning with my classmates who all had a different perspective about how what we were doing applied to our course of study, and our potential careers.

C. B. What did you do in the year immediately following graduation?
K. G. I actually left Greenville and began an internship with NOAA following my third year of study at ECU. I first spent about five months working in Silver Spring with NOAA’s Biogeography Program, and then I went out to Honolulu where I began working with the Office of National Marine Sanctuaries. By the time I’d graduated two years later, I already had a job with NOAA. I knew that for me, I needed to be actively engaged in the field as much as possible, even while I attempted to write up my dissertation in the two years between leaving Greenville and graduating. It helped me easily segue into a job.

C. B. Please describe your current employment.
K. G. I am a NOAA employee in Honolulu, Hawaii.
C. B. What is your current job title?
K. G. Maritime Heritage Coordinator and Maritime Archaeologist for Papahanaumokuakea Marine National Monument, part of NOAA’s Office of National Marine Sanctuaries. PMNM is located in the Northwestern Hawaiian Islands, but my office is in Honolulu, HI.

C. B. When did your employment begin?
K. G. I began working with NOAA’s ONMS in Honolulu as an unpaid intern in 2004, and was hired on in 2005. I began working with ONMS’s Pacific Islands Region, and moved over to PMNM in 2007.

C. B. Did your education at ECU in CRM help you get or keep any of your current employment?
K. G. Yes, certainly. Through ECU, I developed professional connections that were invaluable. There is such a great ECU network in the field of maritime archaeology. Additionally, I think that having an interdisciplinary PhD provided me with a unique niche, and a skillset that was applicable in a place like Hawaii where I am surrounded by many more ecologists and oceanographers. I needed the experience I gained at ECU working alongside and communicating with scientists of different disciplines in several types of settings.

C. B. Did you ever envisage doing this while you were doing CRM at ECU?
K. G. Not really...I’ve been lucky to have a job that allows me the opportunity to conduct a broad spectrum of work associated with maritime heritage: research, exploration and outreach to name a few. I don’t think I imagined it would be possible to be so engaged in so many different aspects of the field at once.

C. B. Overall, did the CRM degree meet your educational goals?
K. G. It did...though I don’t think I could have fathomed what a great match the program was for me personally when I made the decision to go there.

C. B. Would you recommend CRM to a friend?
K. G. Without hesitation.

C. B. If you could do one thing to improve your CRM program, what would it be?
K. G. It’s difficult for me to answer this one because I do think there are changes in the program since I was there and I’m not sure I know exactly how things are run now. I know that I had a really great experience when I was there.

C. B. What did you like most about CRM?
K. G. The inherent open-mindedness of a multidisciplinary program. And most of all, the opportunity for so many outside the box experiences. Few other programs in the country would have challenged me not just to listen to experts in other fields of study, but to also try to think like one. Being able to conduct field research as a biologist as well as an archaeologist has been was an invaluable lesson I still draw upon when I work alongside ecologists in the field today.

C. B. As a successful CRM alumnus, what message do you have for current Ph. D. student?
K. G. ECU’s CRM Program provides a unique opportunity to make the experience your own. Never pass up an opportunity to grow and learn, no matter how outside the box or impractical it may seem. I jumped at every chance I had to work with someone new, or in a new setting and the diversity of my experience as a graduate student has enabled me to tackle a broad range of projects with a wide spectrum of colleagues and collaborators. I’m grateful to ECU’s CRM program for that.

Announcements

- We would like to congratulate our 2013 and 14 graduates and wish them success for future:

In 2013, Andrew T. Bennett, with dissertation titled: “Characterizing Patterns And Drivers Of Land Use/Land Cover Change Along The Atlantic Coast Barrier Beaches: Examining The Roles Of Development Pressure, Spatial Accessibility, And Policy”, April Whichard Evans, with
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• Following Spring 2014 Data analysis for Coastal Resources Management (CRM 7008) Dr. Luczkovich is writing a book for students in this course about the quantitative data analysis procedures used by CRM faculty, with examples of analyses done in the free statistical program R, with accompanying R code. Topics include: t-tests, ANOVA, Repeated Measures ANOVA, non-parametric alternatives to these tests, correlation, linear regression, multiple linear regression, assessing model adequacy, network models, and multivariate analyses.

• “Coastal Breeze” will use a different picture on the cover page of every issue. The picture will be one of the best pictures which has been taken by a CRM student or faculty member during the semester and related to CRM program and coastal issues. So, please, send your pictures to the editor at: khakzads11@students.ecu.edu

• If you would like to support ICSP/CRM with a monetary contribution, please visit www.ecu.edu/icsp and look for the “Donate” button.

• Please do not hesitate to send your comments and ideas in order to improve our newsletter.

• Many thanks to Cecilia Krahforst for helping out with the text editing of this issue of Coastal Breeze.