



DECEMBER • 2011

Science Café

January 9, 2012 • 6-8 pm
McCurdy's Restaurant
Atlantic Beach

Topic - Linking Land Use and Water Quality

Speaker: Dr. Rachel Nobel,
Associate Professor
UNC Institute of Marine Sciences

Hurricane Irene & CMAST

Repairs are complete after
devastating storm p.4



Skeleton Crew

Bottlenose dolphin skeleton
project update p.5

Awards

Several awards received by
CMAS programs p.7

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Keeping Fish on the Hook: Sustainable Fisheries Research at CMAST

There is little disagreement that the demand for fisheries products is increasing rapidly while supplies and stocks of many species continues to decline. A sustainable fishery is one that is harvested at a rate whereby the fish population does not decline over time because of fishing practices. The growing human population and corresponding demands for sustainable sources of protein, as well as the health benefits of fishery products, make marine fisheries research essential to our future. Research at the NCSU Center for Marine Sciences and Technology in Morehead City and at the university's main campus in Raleigh have consistently provided rigorous and timely research in support of the needs for sustaining both recreational and commercial fishing interests.

Research examples include studies of habitat requirements, diet, growth, survival, movement

patterns, and spawning habitats, as well as socio-economic information such as understanding the different types of fishers, their willingness to accept certain management actions, and the economic consequences of management actions. Moreover, the demand for highly trained fishery scientists has outpaced their supply from universities. NC State and CMAST are trying to meet the demand to help ensure that fishery resources are managed in a sustainable manner for future generations.

Marine fisheries research performed at the CMAST, in partnership with other major universities, continues to identify important information leading to sustainable fisheries and habitat management in North Carolina.

Sustainable fisheries research encompasses a wide variety of topics and species. Several of the research projects conducted at CMAST follows.

Black Sea Bass

*Estimating discard mortality of black sea bass (*Centropristis striata*) and other reef fish in North Carolina using a tag-return approach*



Reducing discard mortality is a central tenet in modern fisheries management practices in U.S. marine waters. The cumulative work on black sea bass over that past few years showed that some gears and depths of capture have lower discard and discard mortality percentages than others. Depth and gear data for estimates of discard mortality are useful in assessments and can be used to condone or

continued on page 2



From the Director

The development of sustainable sources of protein is a global challenge that NC State University can help meet. Locally, North Carolina commercial fishermen landed 72 million pounds of seafood with a dockside price of ~\$80 million dollars in 2010 while at the national level, U.S. commercial fishers landed 8.2 billion pounds of fish valued at \$4.5 billion dollars. The demand for seafood is predicted to increase 70% over the next 30 years, and currently 60% of U.S. seafood is imported resulting in a \$3 billion annual trade deficit. Recreational fishing also is extremely important to the U.S. economy; the last economic analysis (in 2006) found that 25 million saltwater anglers spent \$5.6 billion on trip-based expenditures and \$25 billion on equipment while fishing 127 million days. Recreational anglers spent \$1.1 billion in trip-based and equipment expenditures in that same year for North Carolina. To sustain these rates of fishing and their positive impact on our state and nation's economy, it is clear that there will be a continued need for assessment of our nation's living marine resources; however, we need to improve the efficiency and sustainability of fishery resources through a better understanding of their population dynamics, the ecosystem in which they live, and the economics of individual fisheries.

In this issue of the CMAST Communicator, we highlight how CMAST faculty, staff and students are conducting basic and applied research in support of sustainable fisheries, and how NC State is training the next generation of fishery scientists. NC State University has a strong track record in conducting innovative research in quantitative fisheries science and in training quantitative scientists to ensure sustainable fisheries production through diverse, yet integrated graduate programs in marine, earth, & atmospheric sciences (MEAS), biology, fisheries, wildlife, & conservation biology (FWCB), statistics, natural resource economics, and biomathematics. Additionally, state and federal management agencies rely on NC State faculty to perform research to help improve the assessment and management of many species of aquatic animals.

This issue also provides an overview of the devastating effects of hurricane Irene on CMAST, and the rapid and professional response by NCSU facilities in repairing the damage, allowing CMAST to re-open its doors within three weeks of the hurricane. We also update you on our joint Marine Mammal Stranding Program with the NC Division of Marine Fisheries, an emerging Marine Biotechnology Center of Innovation, a fascinating hearing study in diamondback terrapins, and CMAST outreach at the NC Seafood Festival. We are excited about two opportunities that will help support student research and education programs at CMAST: (1) CMAST Specialty License Plate, and (2) "Skeleton Crew" dolphin re-articulation project.

I invite you to visit our web site, our facility located on Bogue Sound in Morehead City, or contact any of our faculty, staff or students with any questions.

With best wishes, Dave Eggleston

PHOTO CREDITS AND CAPTIONS: p.1: *top*, Bluefin tuna school, photo Brian Skerry, New England Aquarium; p.3: Estuary, CMAST file photo; p.4: CMAST hurricane damages and restoration; photos by Ernie Yeager; p.5: photos by Vicky Thayer; p.6: *top*, photo by Dee Shore; *bottom*, photo by Heather Broadhurst; p.7: photo by Jill Miller; p.8: photos by Brandon Puckett; pp.1-2: Fish illustrations by Duane Raver.

Sustainable fisheries continued from p.1

regulate the gear and fishing depths that reduce the percentage of dead discarded fish in the U.S. South Atlantic reef fishery. The South Atlantic Marine Fisheries Council utilized the data from this study to develop the current regulations in place for black sea bass.

The final research component in the project is to catch and tag fish underwater (~100 feet deep) using SCUBA. During the same trips fish will be tagged boatside and underwater and the tag return rates of the two groups of marked fish will be compared. Determinations can then be made how pressure trauma influences rates of discard mortality of black sea bass that are caught near the deep end of their depth distribution in the U.S. South Atlantic.



Bluefish

Winter survival of bluefish and recruitment implications

Fisheries biologists are interested in the overwintering period of bluefish as mortality may be high during this time, which can lead to a bottleneck in recruitment. Juvenile fish are forced to rely on stored lipid reserves to sustain them during winter. Experimental work suggests that the ability to feed during the winter can greatly increase survival, especially with smaller individuals, because of their lower energy stores. This research involves two areas - examining the foraging ecology and energy storage dynamics of juvenile bluefish during their first winter, and the survival of juvenile bluefish cohorts, spawned at different times of the year, and their relative importance to the population.

This research helps managers understand how the overwintering period can affect the survival of juvenile marine fishes. More specifically, how stressful winter is for juvenile bluefish, and helps determine which spawning seasons produce the majority of bluefish recruits, thereby aiding fishery managers in choosing an appropriate juvenile abundance index to track the status of the population.



Blue Crab

Interacting effects of humans and nature: Hurricanes, fishermen, and dynamic blue crab populations

An important measure of the status of any fishery population is the size of the spawning

stock and the subsequent juveniles that are spawned and return to replenish the population. In general, as the size of the spawning stock increases so does the size of the juvenile population until the carrying capacity of a given habitat or population is reached. In partnership with the North Carolina Division of Marine Fisheries, scientists at CMAST have assessed the status of the blue crab spawning stock using data from a trawl-survey program conducted by the state since 1987. The data shows a precipitous drop in the size of the blue crab spawning stock from 1999 to 2000 due to the interacting effects of floodwaters from hurricanes Dennis and Floyd in 1999, migration of crabs in response to floodwaters, and overfishing of crabs where they were aggregated in Pamlico Sound. Interestingly, the winds associated with hurricanes Dennis and Floyd delivered the highest numbers of early juvenile stage blue crabs to Pamlico Sound from offshore waters where they were growing as larvae. Thus, hurricanes can be very beneficial to replenishing blue crab populations due to storm-driven transport of early life stages into Pamlico Sound. However, the sustainability of blue crab populations also requires that we balance the benefits of hurricanes to the blue crab population, with the potential to overfish crabs that might aggregate in high salinity areas after major flooding.



Spotted Seatrout

Tagging and telemetry to determine movement, identify stock boundaries, estimate fishing and winter mortality rates

Through the first extensive tagging and telemetry study of spotted seatrout in the state, researchers are examining both fishing and natural mortality. Accurately quantifying the level of mortality due to harvest is essential to successful management of this fishery. North Carolina is at the northern limit of the species' geographic range and winter mortality in estuaries can be significant. Phenomena known as cold-stun events, where rapid declines in water temperature shock and eventually kill spotted seatrout, have been recorded in North Carolina for at least the last 300 years. This research is the first to quantify the mortality attributed to these events, and will not only improve our understanding of this neglected ecological question but will also help managers in efforts to assess the overall health of the North Carolina spotted seatrout population.



Oysters
Restoration of oyster reefs in Pamlico Sound

This research involves monitoring a suite of oyster reserves, or areas protected from harvest, and optimizing future reserve designs, using Pamlico Sound in eastern North Carolina as the model system. With oyster harvests at historic lows along the southeastern Atlantic coast, this work addresses several applied questions such as: Are existing oyster reserves functioning as an interconnected network that is self-sustaining and capable of persisting through time? If so, which of these reserves contribute most to network persistence (i.e. which reserve provides the most “bang for the restoration buck”)? And if not, how does increasing the size and/or number of reserves improve network persistence?

The research, which partners academic scientists with state (NC Division of Marine Fisheries) and federal agencies (National Marine Fisheries Service), commercial fisherman, and high school students, will ultimately assist in the management of oyster reserves and future regulations. In addition, this work will increase the current knowledge and expertise on spatial management practices and in particular, marine reserve network design.



Blue Marlin
Feeding ecology of blue marlins, dolphinfish, yellowfin tuna and wahoos from the North Atlantic and comparisons with other oceans

Ten years of data collection on marlin, yellowfin tuna, dolphin fish and wahoo at the Big Rock Blue Marlin Fishing Tournament, held in Morehead City, NC each year, has been published. Researchers examined the stomach contents of these four apex fish predators to determine temporal and spatial patterns in the feeding ecology in the North Atlantic and compared this to other oceans. Research has found that several species had overlapping diets due to reliance on scombrid prey. Dolphinfish had low overlap with other predators due to consumption of prey associated with Sargassum algae. Diets of each predator species were generally consistent temporally (over the past three decades in the Gulf Stream) and spatially (among oceans), despite potential effects of fishing or environmental changes.



Striped Bass
Spatial and temporal patterns of movement of striped bass along the Eastern U.S. coast

Work has started on analyzing the sets of data on tagged striped bass over the past 20 years. These fish were tagged on spawning grounds in several North Carolina rivers. It is hoped that this information will determine how much stock mixing occurs within North Carolina and Atlantic migratory populations of striped bass. Information on stock mixing is necessary for stock assessment of the species.



Southern Flounder & Red Drum
Bycatch-reducing rectangular gillnet webbing tested in the Neuse and Newport Rivers, North Carolina Southern flounder fishery

The concern prompting this study was the high rate of bycatch of roundfish in the large-mesh gillnets that targets Southern flounder. Gillnet mesh generally assumes a square shape. The objective of this study was to determine whether experimental gillnets composed of a rectangular mesh could maintain the catch rates of legal Southern flounder while simultaneously reducing catch rates of sub-legal Southern flounder, red drum, and

other roundfishes. Preliminary findings show that the change in mesh size significantly reduces the amount of bycatch and may have a far-reaching influence in the fishery.



Fisheries Habitats
Worked with Division of Marine Fisheries to identify strategic habitat areas as part of Coastal Habitat Protection Plan

Researchers studied how marine fisheries species use and interact with coastal and marine resources and habitats. One project included the development of a mathematical model to evaluate the biological and economic effectiveness of using oyster reef restoration as a black sea bass management tool in the southeast United States vs. the current management practices of reducing catch by fishermen. Another project allowed the comparison of fish catch data with output from a site selection model for the Albemarle and Pamlico Sounds. Data compiled allowed the North Carolina Division of Marine Fisheries to determine strategic habitat areas necessary to develop a Coastal Habitat Protection Plan mandated by the General Assembly.

Support CMAST Student Research

Research requires funding. CMAST has developed a specialty license plate, which provides the opportunity to raise funds to support student research in sustainable fisheries in North Carolina. In July 2011, the NC General Assembly approved legislation authorizing the sale of sustainable fisheries plates.

Public support of the CMAST Sustainable Fisheries License Plate Program will allow continued research and conservation of recreational and commercially important fisheries, support undergraduate and graduate student training, and provide educational outreach to help keep North Carolina waters, and hooks, full for generations to come.

Before plates can be produced, the Division of Motor Vehicles must receive three hundred paid applications. The cost of a plate is \$30 (\$60 for personalized plates), in addition to any regular license fees. Part of the proceeds goes to DMV with the remaining going to a special fund earmarked for CMAST research and programs. To preorder a specialty plate contact CMAST at 252-222-6302 for an application or visit www.cmast.ncsu.edu for details.



Hurricane Irene damages CMAST building

Despite best preparedness efforts by faculty and staff, the CMAST facility sustained significant damage from Hurricane Irene on August 27, 2011. The then Category 1 storm pelted the building for 36 hours with water and winds at times in excess of 85 mph. Water seeped through the windows on the south side adjacent to Bogue Sound, soaking carpeting and drywall on all four floors. Without electricity for three days, mold started to grow in the building.

Response was rapid from an emergency team from NC State's Facilities and Restoration Services in Raleigh on the Monday following the storm. Evaluations were quickly made of the damages. All NCSU faculty and staff, Carteret Cooperative Extension, Carteret

Community College instructors and North Carolina Sea Grant personnel were advised to move from their offices and classrooms – some to makeshift offices in nearby locations while others set up work at home. Access was limited to the building, and discouraged, but necessary for those needing to retrieve mail or shipments and to resume research projects underway. Generators provided backup power to key freezer space and internet connectivity.

Within that first day after the hurricane, crews were in force moving furniture, working on moisture extraction, setting up air scrubbers to minimize airborne mold, and tearing out wet wallboards. Others worked outside to clean up large amounts of storm debris washed ashore. Crews worked 18-hour



shifts at times to get the work done.

Within three weeks, repair and renovations, although not totally finished, were completed enough so personnel could move back to start recovering and organizing to get back to work. To date the estimated cost for renovations is: emergency moisture extraction \$25,000; repair and replacement of drywall / carpeting \$111,000; exterior waterproofing \$18,000; total costs \$153,000.

Being situated at the coast in a salt-water environment accelerates the need for maintenance and upkeep of the 11-year-old building. Ironically, CMAST was slated for repairs to the windows a year before the storm, but due to budget cuts the work was put on hold. The repairs made after the storm however are only a partial fix. There are still some leaks to be found in the building during heavy storms. In the meantime, CMAST waits for much needed funds to make more permanent repairs to the windows and walls to help prevent a repeat performance from any future hurricanes.



Marine Biotechnology Center of Innovation work begins

In June 2011, the North Carolina Biotechnology Center (NCBC) awarded a \$2.5 million, Phase II project with NC Eastern Region as fiscal agent to establish the Marine Biotechnology Center of Innovation. The primary aim of the Marine Center of Innovation is to accelerate the identification, development and commercialization of research in targeted industries. CMAST Professor David Green serves on the Project Management Team (PMT) along with Rachel Nobel, UNC Institute of Marine Science, Tom Schultz, Duke University Marine Laboratory, Marti Van Scott, East Carolina University, Dan Baden and Steve Fontana, UNC Wilmington along with Randall Johnson and Mark Phillips from the NCBC.

The PMT selected the Wellington Group of Fuquay, NC to manage the Executive Director search. The process of selecting a Board of Directors has begun and interviews for the COI Executive Director position will begin soon. The COI Executive Director is charged with revision of the draft business plan and development of a five-year pro forma budget. The Marine Biotechnology Center of Innovation is expected to be self-supporting on completion of the five-year grant. For more information, contact Mary Beth Thomas, Vice-President for Centers of Innovation, NCBC or John Chaffee, Director, NC Eastern Region.

Marine mammal stranding update

During September and October, central NC stranding personnel have been involved in the response to five pygmy sperm whale strandings and one bottlenose dolphin stranding. In September, stranding personnel assisted in the northeastern part of the state with two separate strandings of presumed mother-calf pairs of pygmy sperm whales that stranded on the beach in Kill Devil Hills and on the Cape Lookout spit. A team including many organizations responded via boats provided by NCMM and Cape Lookout National Seashore. In both cases the calves were alive when the teams arrived. Because they were dependent calves with no release potential with a very poor prognosis for life in captivity (or surviving transport to any facility that could attempt it), euthanasia was elected following consultation with the NMFS Southeast Regional Office. In October, stranding personnel also

responded to a live stranded male pygmy sperm whale on the north end of South Core Banks, Cape Lookout. The whale was euthanized after consultation with the NMFS Southeast Regional Office.

Also in October, a juvenile male bottlenose dolphin was stranded dead on Roanoke Island. He was entangled in two different types of gill nets on the head and pectoral fin respectively, and the tail flukes were cleanly removed. The animal was eventually brought to NCSU CMAST for examination and fishing gear identification. The nets were tentatively identified as flounder and spiny dogfish gear.

Although pygmy sperm whales strand fairly frequently in North Carolina, the five that this region responded to, plus an additional three that stranded in the northern part of the state, is an unusually high number. The only common finding to date has been a heavy infestation with a nematode (*Crassicauda spp.*) that is known to infect both baleen and toothed whales. - Submitted by Dr. Vicky Thayer

CMAST Skeleton Crew

The reconstruction project of a bottlenose dolphin skeleton is progressing smoothly. When the stranded dolphin was chosen for the project, its carcass was buried in the sand in January 2010 to allow for the natural decomposition. Dr. Vicky Thayer, Marine Mammal Stranding Coordinator and Skeleton Crew coordinator, worked with students from her Environmental Biology class from Carteret Community College to exhume the skeleton. The skeletal remains were unearthened and are now being soaked in an ammonia solution. The skeleton will then be dried and stored until enough funds are raised to begin the restoration. When complete, the skeleton is planned for display in the two-story lobby of the CMAST building. For more information or to join the Skeleton Crew, visit www.skeleton-crew.org.



Student Melinda Ryan unearths dolphin skeleton.

cmastpeople

Dr. David Green, Professor and Extension Seafood Specialist was presented the Visionary Leadership Award from Epsilon Sigma Phi's Xi Chapter on November 17 in Raleigh. This award honors an Extension professional who has demonstrated visionary leadership resulting in a new direction of Extension programs. Green was recognized for "spearheading efforts on behalf of other faculty and staff to establish the Entrepreneur Initiative for Food (ei4f) as well as a recent award of \$1.2 million from the U.S. FDA to collaboratively develop and implement a uniform national standard in regulatory training of federal and state inspectors in acidified food products." He heads up the Seafood Laboratory, a unit of the NCSU Department of Food, Bio-processing and Nutrition Sciences (FBNS) Extension Program.

Dr. Patricia McClellan-Green, Research Assistant Professor, presented posters on two research projects at the 32nd Annual Society of Environmental Toxicology and Chemistry (SETAC) Conference held in Boston, MA November 13-17, 2011. The posters are "Comparative Study of Reproductive Capacity and Oxidative Stress in Blueback Herring in North Carolina," detailing a study supported by the Coastal Recreational Fishing License Grant Program, and "Influence of Pesticide Exposure on Dermo Infection and Stress-related Responses in the Eastern Oyster (*Crassostrea virginica*)," a project funded by the NC Sea Grant Bluecrab and Shellfish Program. SETAC is a nonprofit, worldwide professional society, which promotes the advancement and application of scientific research related to contaminants and other stressors in the environment, education in the environmental sciences, and the use of science in environmental policy and decision-making. McClellan-Green is with NCSU Department of Environmental and Molecular Toxicology and is located at CMAST.

Dr. Emily Christiansen, joins CMAST as a Zoological Medicine Resident with the NCSU College of Veterinary Medicine. The three-year program provides specialized clinical training with a focus on aquatics. Originally from Pennsylvania, she received her veterinary degree and a wildlife medicine internship at Tufts University in Massachusetts.

Ashlee Lillis, Graduate Research Assistant for Dr. David Eggleston, was awarded the Kathy Johnston Scholarship Award from the American Academy of Underwater Sciences. Her project proposal entitled "Can you hear me now? Habitat-associated sound as a larval settlement cue for estuarine benthic invertebrates," earned the second highest mean score in the panel review.

cmastvisitors

Ferruzzi scholarship ceremony held

The Livio Ferruzzi Scholarship in Agriculture, established by friends and family in memory of Mr. Livio Ferruzzi, was celebrated at an endowment signing ceremony at the CMAST building on December 8. Mr. Ferruzzi, an agronomist with global vision and reach, spent over 40 years impacting international agriculture and agro-business. In the 1970s, he was entrusted with the development of Open Grounds Farm, an area of approximately 40,000 acres in Carteret County, NC. Mr. Ferruzzi, a Beaufort resident since 1974, passed away in March 2011.

Through the generous support and gifts of business partner Carlo Sama and other associates of Mr. Ferruzzi, including FerSam Holding S.A. and Agropeco S.A., the establishment of the Livio Ferruzzi Memorial Agricultural Scholarship Endowment will support students



Family and friends sign the endowment. From l-r: Claud Wheatly, Giulia Ferruzzi, Mario Ferruzzi and Carlo Sama

from the state of North Carolina in their pursuit of degrees in the College of Agriculture and Life Sciences at North Carolina State University.

Attending the ceremony along with members of the Ferruzzi family were repre-

sentatives from NC State University including Dean Johnny Wynne of the NCSU College of Agriculture and Life Sciences and CMAST Director Dr. David Eggleston.

- Excerpted from an article by Dee Shore, CALS Communications.

cmastresearch

Diamondback terrapins hearing studied

In September and November 2011, NCSU-CVM-CMAST veterinarian Dr. Craig Harms and staff teamed up with Lori Lester, doctoral candidate (Drexel University) and Wendy Dow-Piniak, doctoral candidate (Duke University), to investigate the hearing ability of diamondback terrapins. Lori's focus of study is the effects of boats on terrapins. She works with her advisor, Dr. Harold Avery, mainly in Barnegat Bay, NJ, where he has a mark-recapture study looking at the population ecology of the terrapins in that area. Many of the terrapins that are captured exhibit evidence of boat strike injuries. Lori's research addresses whether terrapins can hear boats and whether they behaviorally respond to the sound of boat engines. Wendy studies the hearing sensitivity of sea turtles in an underwater environment. Her experience testing the hearing capabilities of various sea turtle species underwater was key in helping to organize and implement this collaborative project.

In marsh habitats, turbidity, or low visibility, may cause turtles to rely more on their hearing to sense their surroundings, find food, locate mates, and avoid predators. Studies have been done to learn the hearing sensitivity of diamondback terrapins in-air; however, it has never been studied underwater. The hearing



Preparing Diamondback terrapin for anesthesia.

sensitivity of the terrapins was tested using auditory evoked potential (AEP) measurement techniques, emitting a series of sounds at various frequencies and measuring the brain's response resulting in an audiogram. This is similar to how the hearing sensitivity of a human baby is tested.

In order to obtain the underwater AEP measurements, the terrapins were submerged in a barrel of brackish water containing a waterproof speaker. It was important that the turtle remain motionless for up to an hour so the only electrical impulses recorded were that of the turtles' brain response to the sound. To achieve this, each turtle was anesthetized and intubated with an endotracheal tube specially designed by Dr. Harms to use for underwater ventilation of turtles. While resting in a

sling, the veterinarians assisted the turtles by manually respiring for them during the hearing test. Once completed, blood was drawn and analyzed for each animal then anesthesia medications were reversed and all the turtles recovered successfully.

The results of this particular study will provide the first underwater hearing sensitivity measurements of terrapins and allow these to be compared to their in-air hearing abilities. The results will also show evidence of whether or not terrapins are able to hear the frequencies that are produced by boat motors. This information can be used to further investigate ways to deter terrapins from fisheries and boat interactions.

- Submitted by Heather Broadhurst, CVM Research Technician

Food and Drug Administration food safety grant awarded

In September 2011, the U.S. Food and Drug Administration issued grants to seven institutions including NC State University to help design, develop and disseminate food safety training programs that are consistent with implementation of the National Integrated Food Safety System (IFSS). CMAST Professor Dr. David Green was awarded a three-year, \$1.14 million project in acidified food products training and certification of federal, state, local, territorial and tribal public health officials. Green said, "There is a growing need for food safety training programs with a specific emphasis on assisting the FDA in the development of a national curriculum in support of the IFSS program."

NC State University will take the lead in development of a uniform national standard, training and certification in acidified food products. Green leads a project team that includes from NCSU Drs. Fletcher Arritt, Keith Harris, Lee-Ann Jaykus, Department of Food, Bioprocessing and Nutrition Sciences, Dr. Fred Breidt, US Department of Agriculture Agricultural Research Service among others from NCSU DELTA (Distance Education and Learning Applications); NC Department of Agriculture and Consumer Services; USDA Agricultural Research Service; University of Wisconsin; and the Association of Food and Drug Officials.

Cooking with Chefs Wins International Award

In October 2011, the International Festivals & Events Association (IFEA) honored "Cooking with the Chefs" with a silver Pinnacle Award for "Best Educational Program" among festivals worldwide having a budget in the range of \$250,000 to \$749,999. This is the second award for Cooking with the Chefs from IFEA. In 2009 it won the gold Pinnacle Award for "Best Event within an Existing Festival." Barry Nash, Seafood Technology and Marketing Specialist for North Carolina Sea Grant located at CMAST, has been instrumental in the planning and organization of the popular event since it began.

Cooking with the Chefs is a program in which area chefs demonstrate seafood preparations using seasonal, local seafood as the pri-

mary ingredient. The program began during the 2005 Seafood Festival when community organizers debuted Carteret Catch, a partnership between fishermen and restaurants to raise the visibility of local seafood and the county's commercial fishing industry. Carteret Catch has been the primary sponsor of the Chef's Tent each year.



Dr. Craig Harms

Harms recipient of Stange Award

Dr. Craig Harms, associate professor of aquatic, wildlife, and zoological medicine at the NC State University College of Veterinary Medicine, is the recipient of the Stange Award for Meritorious Service presented by Iowa State University "for outstanding professional achievements in education, government, industry, practice, or other professional endeavors in veterinary medicine."

A graduate of ISU, Dr. Harms was honored in by the ISU alumni association in on-campus ceremonies. The following information is posted on the ISU Alumni Association web site:

In an ever-changing world where veterinarians are playing a more important role in understanding how the environment, the animal world, and health interconnect, Craig Harms is a leader in bridging the veterinary profession and the aquatic environments and increasing the awareness of One Health/One Medicine concepts. Through research, teaching, and example, he has made innumerable contributions to the advancement of zoological medicine, particularly in aquatic animal medicine.

Dr. Harms shares his expertise among three aquariums in North Carolina, the College of Veterinary Medicine at NC State, and the marine mammal and sea turtle stranding networks of North Carolina. He also serves as president of the American College of Zoological Medicine. His unique skill sets and ability to perform under pressure made him the ideal person to take on the challenge of developing the marine veterinary programs at the NC State's Center for Marine Sciences and Technology. Although Dr. Harms is an extremely productive scholar, scientist, and clinician, he has a particular talent for mentoring young veterinarians and veterinary students. Despite his many degrees, certifications, and publications, he unassumingly supports students and facilitates their individual contributions to veterinary medicine. Said one former student: "He is one of those rare individuals who changed the direction of a life."

Dr. Harms is on the aquatic animals staff at NC State's Center for Marine Sciences and Technology (CMAST) in Morehead City, NC.
-From CVM Web site

National Science Foundation oyster research grant awarded

The NCSU Department of Marine, Earth & Atmospheric Sciences was recently awarded a \$1.24 million grant from the National Science Foundation entitled: "Collaborative Research: Interacting Effects of Local Demography and Larval Connectivity on Estuarine Metapopulation Dynamics." The award will fund research on identifying the paths of larval dispersal connecting isolated populations, and how variation in the intensity of dispersal along these paths influences population connectivity using the eastern oyster in Pamlico Sound as the model system. Dr. David Eggleston, Professor of Marine Science and CMAST Director, is the lead Principle Investigator.

Eggleston said, "This inter-institutional grant with UNC-CH and University of Maryland will produce new tools, as well as test and refine others for studying larval connectivity in marine systems, as well as providing decision support tools for improving the efficacy of marine reserves for management and restoration of marine species and ecosystems. There is also an extensive education and outreach component in the form of training undergraduate and graduate students, mentoring post-docs, and providing hands-on research opportunities for high school students and their teachers."



North Carolina Seafood Festival 2011

For a third year, CMAST took part at the annual North Carolina Seafood Festival held September 30 - October 2, 2011 in Morehead City. An interactive display offered seafood specimens on ice and made available for visitors to “get up-close and personal” with a variety of fish. Fish market-style signs provided information about each species and any relevant research being performed at CMAST. Hundreds of people visited the popular display over the weekend-long festival.



Top: Dr. Jeff Buckel shows shark teeth to young visitor. Middle left: CMAST faculty Dr. Craig Harms (left), Dr. Jeff Buckel (middle) and CVM Resident Emily Christiansen (right) attend display. Middle right: Girl examines a dolphin fish. Bottom left: Dr. Vicky Thayer, DMF Marine Mammal Stranding Coordinator, talks with a visitor. Bottom right: Boy checks out the black tip shark and dolphinfish on display.

