In February 1972, Drs. Klaus Ruetzler and Arnfried Antonius, Smithsonian scientists from the National Museum of Natural History, made a most fortuitous, albeit accidental, discovery of Carrie Bow Cay off the coast of Belize while headed to another research site. Dr. Ruetzler went on to establish and serve as director of the Caribbean Coral Reef Ecosystems (CCRE) program based on Carrie Bow Cay. He stepped down from that role in 2009, at which time the administration of the program was moved to SMS. Forty years and more than 900 publications later, the Carrie Bow Cay Field Station has made significant contributions to science, underscoring the fact that collaborative, interdisciplinary studies with an ecosystem-based approach are a highly effective means of better understanding the natural world.

It is this approach that has allowed the CCRE program to be such a productive contributor to the current body of knowledge surrounding coral reproduction. Many of the important reef-building corals in the Caribbean reproduce only once per year in the days following the full moons of August and September. These corals reproduce by spawning, a dramatic event when colonies simultaneously release gametes (eggs and sperm) into the water where they fertilize and develop into free-swimming larvae. These events provide a tremendous opportunity for scientists to work on the various aspects of coral biology, ecology, and conservation, and Carrie Bow Cay is an ideal venue for these studies. The island has a productive reef just yards away from the laboratory, a coral population that spawns reliably each year and a flowing seawater room well-suited for rearing coral larvae. Teams of Smithsonian researchers, including six to eight scientists, students, and research assistants, travel to the island each year to study this natural phenomenon. While there, divers go into the water each night for the two to seven days after the full moon and examine corals to see if they are “setting,” or producing bundles of eggs and sperm that sit in the mouths of the polyps before they spawn. When such conditions are observed, researchers put nets over these corals to collect the bundles as they are released. After 40 minutes the nets with their bundles must be removed and transported quickly back to the lab for reproductive studies.

Former Smithsonian Postdoctoral Fellow, Dr. Nicole Fogarty, now an Assistant Professor at Nova Southeastern University, has been traveling to Carrie Bow for eight years to study coral reproduction. Currently, she is interested in the high degree of synchrony that certain species show when spawning. “Colonies that are hundreds of feet apart will spawn within minutes of each other, greatly increasing the likelihood of fertilization,” Fogarty explained. “Yet we don't fully understand how they do this.” She is testing the role that chemical communication may play in triggering spawning.

Other scientists, such as Dr. Valerie Paul, director of both SMS and CCRE, are interested in how the larvae behave. By collecting gametes from different corals, she can rear larvae and conduct experiments on factors that influence the types of surfaces they choose to settle on. As many of these corals’ populations are in decline, understanding these dynamics can have significant implications for coral recruitment and the future of reef management.

In addition to thinking about present-day management, Smithsonian researchers are also thinking to future restoration. Scientists from the Smithsonian's National Zoo see these reproductive studies as an opportunity to ensure the survival of threatened species. Networks of zoos and aquariums all over the world are setting up captive populations of corals, of threatened species. Networks of zoos and aquariums all over the world are setting up captive populations of corals, such as the Staghorn coral (Acropora cervicornis) and Elkhorn coral (Acropora palmata), so that there may be reserve stocks should the need arise to restore native populations.

Many other questions loom as the fate of coral reefs worldwide remains uncertain. Carrie Bow Cay Field Station is an important venue for this research and will continue to stay busy during these late summer full moons.
SMS Hosts Festival To Celebrate IRL
Laura Diederick, Education Specialist

On Saturday, September 29, 2012 from 10:00 am to 3:00 pm, the Smithsonian Marine Station will host its second annual National Estuaries Day (NED) Festival at Museum Pointe Park with dozens of community organizations to highlight the cultural, recreational and environmental importance of the Indian River Lagoon (IRL). In celebration of the day, admission is free to both the St. Lucie County Aquarium, featuring the Smithsonian Marine Ecosystems Exhibit, and the St. Lucie County Regional History Center, located across Museum Pointe Park. Live entertainment, food vendors, hands-on activities for children, touch tanks, “Meet the Smithsonian Scientist” stations, demonstrations and SMS scientist-narrated pontoon boat rides will showcase the significant role the IRL plays in our everyday lives. Exhibitors, including Florida Fish and Wildlife, Florida Department of Environmental Protection, and Coast Guard Auxiliary, will be on hand to provide information on opportunities to become more engaged with cultural, recreational and educational activities on the IRL.

National Estuaries Day is an annual nationwide celebration of America’s estuaries – the vital coastal areas where freshwater and saltwater meet. The celebration, held each year on the last Saturday in September, provides a great opportunity to learn more about these invaluable ecosystems and how everyone can help protect them. To learn more about the estuary in our own backyard, visit the Indian River Lagoon Species Inventory at www.sms.si.edu/irlspec.

The festival at Museum Pointe Park has been made possible by an Outreach Achievement Award from the Smithsonian’s National Museum of Natural History in recognition of the success of the 2011 NED festival, sponsorship by the Friends of the Smithsonian Marine Station and Fort Pierce Authentic Tours, and through the support and cooperation of St. Lucie County. For more information about the festival, contact Cristin Ryan at 772.465.3271. SMS

Banner Year for Life Histories Program
Michael Boyle, Postdoctoral Fellow

The Life Histories Program of Dr. Mary Rice remains steadfast in its tradition as a productive and influential contributor to the natural sciences. Over the past year, Dr. Rice and her postdoctoral fellow, Dr. Michal Boyle, have highlighted their research at international and national conferences in Boston and Charleston, with comprehensive seminars at the Smithsonian’s National Museum of Natural History in Washington, D.C. and the University of Miami, and locally at the Indian River Lagoon Symposium at Harbor Branch Oceanographic Institute. At the annual Society for Integrative and Comparative Biology (SICB) meeting in Charleston, members of the American Microscopical Society (AMS) honored Dr. Rice as an “extraordinary scientist and dedicated mentor” in recognition of her tireless career of research on the development and larval biology of sipunculid worms and other marine invertebrates. Dr. Rice was also a co-author on two scientific papers presented at SICB’s society-wide symposia, *Dispersal of Marine Organisms,* and the AMS keynote lecture, “A Tribute to Dr. Mary E. Rice: From Neanderthals to Naples – A Brief History of Marine Biology from Antiquity to 1900,” was delivered by Dr. Kevin Ecklebarger, a collaborator during the early years of the Life Histories Program. At that same meeting, the AMS awarded Dr. Boyle with the first prize for Excellence in Photomicrography in the color division, and Jeanette Hofstee from the Smithsonian Tropical Research Institute (STRI) was awarded first prize in the grayscale division, further distinguishing the collective efforts of Smithsonian scientists.

In June, Dr. Boyle “took the torch” from Dr. Rice and organized the 2nd International Symposium on the Biology of the Sipuncula, held in Fort Pierce in association with the Smithsonian Marine Station through the support of a generous donation. It had been 42 years since Dr. Rice convened the 1st International Symposium in Kotor, Yugoslavia. In this recent long-awaited meeting, 16 dedicated sipunculan biologists representing 12 nations gathered for an intensive week of formal presentations and workshops to critique the current state of knowledge in their field and plot the course of future studies on these amazing animals.

Dr. Michael Boyle has recently been awarded the Earl S. Tupper 3-Year Postdoctoral Fellowship at the STRI in Panama, and will endeavor to build upon and complement the SMS Life Histories Program with his next project beginning in spring 2013. SMS

More than two dozen community organizations will once again participate in this year’s festival.

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New Faces at SMS

**Neal Asthana** is working on his Masters degree in Marine Affairs and Policy at the University of Miami’s Rosenstiel School of Marine and Atmospheric Studies. Neal joined SMEE this summer as a part-time husbandry intern and recently was hired as a full-time Marine Technician.

**Emily Dark** is working towards her Masters in Conservation Biology from Antioch University in Vermont. An intern for the Smithsonian Environmental Research Center in Edgewater, Maryland, stationed at SMS, Emily spent the summer searching for invasive lionfish, *Pterois volitans*, in local mangrove habitats.

SMS/Link Fellow **Kevin Olsen** is working on his Masters in Biology at the University of North Florida (UNF) with former SMS Postdoctoral Fellow Dr. Cliff Ross, now an Associate Professor at UNF. Kevin is looking at the effects of environmental stressors on coral recruitment and the competition between benthic algae and stony corals.

SMS/Link Fellow **Megan Riley** is a second year PhD student in Biological Sciences at the University of South Carolina. Megan’s research at SMS involved investigating the role of mangrove tree crabs, *Aratus pisonii*, in the mangrove food web, as well as how their diet affects their physiological and reproductive health.

**Justin Speaks** spent the summer with SMEE as an education intern, working with summer camps and interacting with aquarium visitors. Justin is working on his Masters degree in Marine Biology through the University of West Florida in May and recently began teaching in a local school district.

SMS Welcomes Friends, New and Old

The staff of SMS extends a warm welcome and a big “thank you” to new and renewing members of Friends of the Smithsonian Marine Station who provide critical support for research and educational programs. New and renewing members can learn more about the benefits extended to them and download a sponsorship form at [www.sms.si.edu/Get_Involved](http://www.sms.si.edu/Get_Involved). We hope you will join today!

Charles & Janet Alford ~ Robert & Frances Bangert ~ Hugh & Carolyn Benninger
David & Ursula Blackburn ~ William & Clare Bohnett ~ Jack & Sally Chapman
Anne Covert ~ Ashton & Margo DePeyster ~ Eugene Detmer
Richard G. Jennings, IV ~ William Jaeckle ~ Mark & Linda Kaiser
Kenny & Debbie Langley ~ Marilyn Link ~ Alma Lee Loy
Whitney & Elizabeth MacMillan ~ John & Marilyn McConnell ~ Eleanor Sexton
Sumner Gerard Foundation ~ Randy & Mimi Swaringen ~ Peter & Jeanne Tyson
Lace Vitunac ~ Margaret Wisniewski ~ Joel & Amy Zwemer

Many Thanks to FWC

Staff members of the Smithsonian Marine Station and the Ecosystems Exhibit are grateful for the ongoing support provided by the Florida Fish and Wildlife Conservation Commission through the Fish and Wildlife Research Institute. These funds allow us to conduct a number of research and education activities that would otherwise not be possible.

New Grants

Valerie Paul received an award of $15,000 from The Link Foundation for the project, “Graduate Student Training in Marine Sciences.”

Valerie Paul and Jennifer Sneed received an award of $36,629 from Mote Marine Laboratory for the project, “The Influence of Marine Microbes on Coral Recruitment in the Florida Keys: Factors Affecting the Production of Positive Settlement Cues in Inductive Bacterial Strains.”

Valerie Paul received an award of $134,084 from the National Science Foundation for Year 3 of the project “COSEE Florida: Water as Habitat.”

Cristin Ryan received an award of $2,750 from the Fort Pierce Community Redevelopment Agency for the project “Smithsonian Marine Station Outreach Display and Supplies.”

Cristin Ryan and Laura Diedierick received an award of $3,327 from South Florida Water Management District for the project “Smithsonian Teacher Institute: Wildlife Cove Restoration Education.”

Valerie Paul received an award of $204,800 from the Florida Fish & Wildlife Conservation for the project, “Research and Public Outreach Programs.”

Selected Publications


Record-Breaking Summer for SMEE

Chelle King, Marine Biology Educator

This summer was the busiest ever at the Smithsonian Marine Ecosystems Exhibit (SMEE)! Along with record visitor attendance, an additional week of summer camp was added to the schedule to keep up with growing demand, bringing SMEE’s total offerings to six week-long sessions. Campers explored the Indian River Lagoon, took boat trips, went snorkeling and kayaking, and even built tools that scientists use in the field, like Remotely Operated Vehicles (ROVs) and a water quality buoy. SMEE camps fill to capacity quickly each year, so mark your calendars now for the start of summer camp registration, which begins March 1, 2013 for Ocean Discovery Camp (ages 6-8), Ocean Adventure Camp (ages 9-11), and Ocean Explorers Camp (ages 12-14). For more information about summer camps, please email the Education program at smseducation@si.edu.

In early August, SMEE hosted its first Smithsonian Teacher Institute, a four-day workshop for St. Lucie County public school teachers. The workshop was made possible by a grant from the South Florida Water Management District Indian River Lagoon license plate program and engaged teachers in both field-based activities as well as classroom lectures from local scientists. In addition to enjoying a kayak trip on the Indian River Lagoon and a snorkeling excursion at the Fort Pierce Inlet State Park, the 15 workshop participants worked to create 400 bags of oyster shell which were deployed to form three new oyster reefs near downtown Fort Pierce in the IRL. Permitting and assistance with the oyster reef creation and deployment was provided by the St. Lucie County Coastal Resources program and Florida Sea Grant. In addition to the field-based activities, teachers attended lectures from the Smithsonian Marine Station’s benthic ecology lab about assessing the health of estuarine organisms, and by Dr. Vincent Encomio of Florida Oceanographic Society about the benefits of oyster reefs.

For upcoming events, including the second annual National Estuaries Day Festival, be sure to visit our online calendar at www.sms.si.edu/Events_Calendar or follow our Facebook and Twitter pages (SmithsonianSMS) for updates, including daily photos and videos of the wild creatures here at SMEE.