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Louisiana Universities Marine Consortium: Relatively New Kid on the Block

NANCY N. RABALAIS

INTRODUCTION

The Louisiana Universities Marine Consortium (LUMCON) recently marked the 30th anniversary of its founding with legislation in 1979. Thus, LUMCON is a relatively new addition to the marine laboratories fringing the Gulf of Mexico. Its building was started in 1983 and completed in 1986. The following years have seen LUMCON grow in its research breadth, its regional and national renown, and its role in research and education programs directly relevant to Louisiana's needs in marine and coastal science. LUMCON serves all Louisiana schools with interests in marine research and education and reaches well beyond the state's borders. LUMCON strives to make all levels of society increasingly aware of the environmental, economic, and cultural value of Louisiana's coastal and marine environments.

HISTORICAL FOUNDATION

In the late 1960s Louisiana university representatives began to discuss plans for the development of a marine research and education consortium that could meet the growing needs of researchers and provide educational enrichment for students throughout the state. The Louisiana Advisory Commission on Coastal and Marine Resources, 1971–73, produced a report calling for funds to build a marine research center on the Louisiana coast. Instrumental in taking that report to fruition were Sammy Nunez, at the time the president of the Louisiana Senate; Darryl Felder, University of Southwestern Louisiana, now University of Louisiana at Lafayette; Jack Van Lopik, Louisiana Sea Grant College Program Director; David Boudreaux at Nicholls State University (whose wife was the daughter of Woody J. DeFelice, member of the Board of Regents, see below); and Lyle St. Amant of the Louisiana Department of Wildlife and Fisheries. The proposal to form the Louisiana Universities Marine Consortium for Research and Education (LUMCON) was endorsed by the Louisiana Board of Regents and enacted into law by the Louisiana legislature in 1979.

GOVERNANCE

LUMCON is an institution of higher education under the Louisiana Board of Regents

representing a consortium of 20 public and private universities (Fig. 1). The 13-member LUMCON Council and Executive Committee in the original legislation was changed to a joint university governance in 1995. LUMCON is now governed by an executive board of the chancellor and a vice-chancellor of Louisiana State University, and a president and vice president of the University of Louisiana at Lafayette and Nicholls State University. The executive director formulates programs and conducts the daily business of LUMCON.

Leadership over the years has been provided by the following people:

Donald F. Boesch, Executive Director, 1980–90
 Michael J. Dagg, Interim Director, 1990–91
 Paul W. Sammarco, Executive Director, 1991–95
 Michael J. Dagg, Interim Director, 1995–96
 Michael J. Dagg, Executive Director, 1996–2001
 Kerry St. Pé, Interim Administrator, 2002–05
 Nancy N. Rabalais, Executive Director, 2005–present (2011)

THE EARLY YEARS

After 4 yr of operating out of trailers, the time finally came for LUMCON to break ground on construction of its Marine Research and Education Center. It was April 1983, and Governor David Treen (1980–84) flew down to Cocodrie in a helicopter through rough weather for a ceremony in a hastily drawn-up National Guard tent in the quagmire of the construction site (Fig. 2).

Out of the dredged spoil material cut from the future marina for the LUMCON Marine Center, doubled end-on-end 60-foot sections of 18-inch-diameter pipe were joined together and filled with cement to form one of the pillar foundations of the LUMCON Marine Center. Eight hundred of these 120-foot pilings filled with concrete formed the foundation of the LUMCON Marine Center. These 800 cement pilings formed a friction bed on top of dredged spoil material on which the 75,000-square-foot building was constructed from 1983 to 1986 at a height of 18 feet above sea level. A separate building housing maintenance, the heating and cooling system, and vessel operations was constructed at ground level. The few LUMCON employees at the time occupied temporary



Fig. 1. The Louisiana Universities Marine Consortium Marine Center, view from harbor.

trailers subject to hurricane flooding and large insects inside and out.

The early LUMCON employees, some of whom are still in residence today, called the days of pre- and during-construction the “Trailer Days,” because LUMCON was then housed in five temporary trailers (Fig. 3). The administration trailer was raised to a level of 18 feet, and the four accompanying trailers—the library and miscellaneous offices trailer, the zooplankton lab, the benthic lab, and the “housing” trailer with a few bunk beds and a kitchen—were at a much lower elevation. “It was obvious who would be least likely to get wet feet,” remembers Nancy Rabalais, one of the earlier researchers who occupied the benthic lab, which filled halfway with water in Hurricane Juan in October 1985.

LUMCON employees moved into the new Marine Center in 1986, even though its construction was not completed until 1987. The Marine Center’s dedication ceremony was held

beneath the facility in May 1987 and was attended by approximately 200 people, including Governor Edwin Edwards (Fig. 4), LUMCON Council Chairman Darryl Felder, U.S. Representative Billy Tauzin, and U.S. Senator John Breaux. “John Breaux can clearly be considered one of the political founders of LUMCON. He supported the concept of the Consortium back in the late 1970s,” said first director Donald Boesch (1980–90).

Another strong advocate of the Consortium was Woodrow J. DeFelice (1914–87). In January 1996, the Marine Center was renamed the W. J. “Woody” DeFelice Marine Center in recognition of his support for LUMCON and his dedication to improving education in Louisiana. DeFelice served as Lafourche Parish school superintendent from 1959 to 1971 and served on the Louisiana Board of Regents from 1974 to 1980, during the formative years of LUMCON.

As LUMCON forged ahead, increasing its number of employees and expanding and strengthening its research and education pro-



Fig. 2. Governor David Treen breaks ground on the future LUMCON Marine Center. To his left is Sammy Nunez, president of the Louisiana Senate. To the right is 10-yr-old Kristin Boesch.



Fig. 3. The “Trailer Days,” when LUMCON was housed in five temporary offices, laboratories, and a residence/cafeteria. The main library was housed at Nicholls State University in Thibodaux, LA.



Fig. 4. Governor Edwin Edwards (right) addresses a meeting of the Louisiana Board of Regents shortly after the opening of the new Marine Center, dedicated by him in 1987.

grams, the old, weather-beaten trailers began to slowly disappear...one by one. Only the administrative trailer that housed Boesch's office still remains in its original location.

TODAY'S MARINE CENTER

The Woody J. DeFelice Marine Center is strategically located in Cocodrie, LA, at the upper end of one of Louisiana's larger estuaries, Terrebonne-Timbalier Bay, about 2 hr from New Orleans and 3 hr from Baton Rouge. The marine lab is close to and between two major rivers (the Mississippi and the Atchafalaya) that dictate the coastal ecosystem's morphology, processes, and functions; north of a productive coastal ocean; and close to the remainder of the Gulf of Mexico. The Marine Center stands amidst unique dynamic circumstances: a new delta and a degrading delta, large areas of coastal erosion and wetland degradation, hurricane-impacted landscapes, areas of coastal restoration and flood control, highly productive fisheries, a large seasonally hypoxic coastal water ecosystem, a changing coastal ocean ecosystem, a transportation/oil and gas production nexus, and a unique social and cultural milieu.

With an observation tower that rises 65 feet above the ground, the Marine Center is a striking feature on the flat marsh landscape. The sprawling building and the neighboring 5,500-square-foot maintenance and vessel operations center are the anchor of LUMCON. The Marine Center was designed with ample protection from hurricane flooding and winds: the main floor is elevated 18 feet above mean sea level, the exterior is constructed to withstand wind gusts of up to 250 miles per hour, and the laboratories are centrally located within the building to

protect LUMCON's research and supporting scientific instruments and equipment. Other research and office spaces surround the inner core of laboratories.

Below the main level, facilities include a fisheries lab, a seawater system, a lobby display area, and storage. The facility has persevered through multiple tropical storms and major hurricanes, often with severe setbacks (as with Juan, Andrew, Ivan, Lilli, Katrina, Rita, Gustav, and Ike), but in other circumstances has survived well. The design and resiliency of the facility will serve marine research and education well into the future. One issue with any marine laboratory on the Gulf of Mexico is the ability to withstand sea-level rise and LUMCON's architectural structure provides for the future.

The main level of the building has 26,000 square feet of research, educational, computer, library, and administrative space located in the south wings next to the marina below. Eight full-sized research laboratories (460–650 square feet), including a spawning and hatchery facility, are maintained by faculty members for their research, and for graduate education, visiting collaborators, and support of university courses. Seven smaller (250-square-foot) labs are available for visiting scientists, summer faculty, and special projects. In addition to individual research laboratories, shared research space is available in the forms of a 2,750-square-foot main-level seawater room with a dedicated room for the culture of plankton, a ground-level 1,520-square-foot fisheries laboratory, and a ground-level shaded open area (unheated and unenclosed) with large and small holding systems that are easily reconfigured.

Half of the laboratories of the Marine Center are equipped with running sea water—the heart and soul of an experimental marine laboratory. The seawater supply system has the capacity to deliver 100 gallons per minute of either ambient, unfiltered, or filtered high-salinity (30–35 psu) water. High-salinity water is made available at the Marine Center by transporting open Gulf sea water in the storage tanks aboard the R/V *Pelican*.

The education facilities include two laboratories with access to the seawater system, a multipurpose classroom with a small lab bench, a darkroom, a distance-learning video conferencing classroom with an integrated laboratory, and an educators' resource room. Additional facilities include a collections room, a 97-seat auditorium, a small conference room, a multi-use computer laboratory, and a library containing Louisiana's most comprehensive collection of up-to-date marine science journals. There are



Fig. 5. Research vessel *R. J. Russell*.

also dormitories and a cafeteria to serve overnight classes, summer school, and visiting researchers.

LUMCON's six remote environmental monitoring stations along the Louisiana coast collect and archive real-time meteorological and hydrographic data to provide a broad community of scientists, educators, students, and the public with quality-controlled environmental data from Louisiana's Gulf coast. A Vaisala 915 megahertz LAP-3000 lower-atmosphere profiler and a radio acoustic sounding system located at the Marine Center provide a profile of wind speeds and air temperatures throughout the lower atmosphere. The data from the stations and profiler are freely available in real-time (<http://weather.lumcon.edu>). LUMCON also hosts two sites, one at the DeFelice Marine Center and one at LUMCON's Port Fourchon lab, for the Los Alamos National Laboratory's Lightning Mapping Array project to collect and transmit lightning data during storm events (especially hurricanes) to the Los Alamos National Laboratory for the study of storm intensity. Additionally, Nancy Rabalais' hypoxia studies include two coastal ocean observing systems offshore (<http://wavcis.csi.lsu.edu>, stations CSI-6 and CSI-9).

VESSELS

Marine research and education centers are often known as much by their seagoing vessels as their land-based facilities. LUMCON's research vessels, crew, and marine technicians have long been an integral part of the Consortium's success. LUMCON's vessel operations have gained the Consortium respect from researchers and educators worldwide.

LUMCON acquired its first research vessel, the *R. J. Russell*, from Louisiana State University in 1982 (Fig. 5). The vessel was named for the well-known geologist Russell, who adamantly stated several times that Louisiana State University



Fig. 6. LUMCON's research vessel *Pelican*, a heavily subscribed member of the University-Naval Oceanographic Laboratory System.

should never own a research vessel. Cruises on the *Russell* were more than a little rocky and more than a little leaky.

While LUMCON's researchers were thankful for the *Russell*, they realized her limitations and their need for a larger, better-outfitted oceangoing vessel. LUMCON Executive Director Donald Boesch (1980–90) spent several years planning for the new ship, and when the 105-foot sparkling blue and white R/V *Pelican* (Fig. 6) turned the bend and sailed into LUMCON's harbor in May 1985, it was greeted with great celebration. LUMCON's R/V *Pelican* was designed by Gulf Marine Design, Inc., of Mandeville, LA, and was built by Allied Shipyard in LaRose, LA. The first cruise was a Louisiana Wildlife and Fisheries groundfish survey and the second was the first shelf-wide documentation of the hypoxic zone in the Gulf of Mexico—both projects continue to this day. Within the ship's first year, Hurricane Juan (October 1985) tested the seaworthiness of the *Pelican* and its crew.

The *Pelican* has proven herself to be an exceptional ship, repeatedly ranking as one of the nation's top University-National Oceanographic Laboratory System (UNOLS) vessels. The *Pelican* is the most heavily subscribed vessel of the UNOLS regional and coastal class fleet, averaging 250 d/yr for the past 10 yr. In 2001 the *Pelican* became a 116-foot vessel with a midlife refit (Fig. 6). Each trip to the shipyard enhances the performance of its technical equipment, winches and cranes, and navigation capabilities. She continues to be fitted with the latest technological advances. The *Pelican* hosts a variety of scientific cruises supporting LUMCON research activities as well as those of many other organizations (e.g., U.S. Geological Survey, Louisiana Department of Wildlife and Fisheries, Woods Hole Oceanographic Institution, Dauphin Island Sea Lab, Texas A&M University, University of Southern Mississippi, Bureau of



Fig. 7. The research vessel *Acadiana* at dock in Cocodrie under the observation tower of the LUMCON Marine Center.

Ocean Energy Management, Regulation and Enforcement). The *Pelican* has sailed as far south as Venezuela and as far north as Georges Bank.

Although the *Pelican* is well-suited for oceanographic research, LUMCON needed a smaller vessel for nearshore research and educational cruises. In 1986, LUMCON sold the *R. J. Russell* and added to its fleet the R/V *Acadiana* (Fig. 7), a 58-foot ship that was built by Breaux's Bay Craft in Loraeville, LA. School groups from across the country have sailed through Terrebonne Bay aboard the *Acadiana*, learning about the estuary through hands-on activities such as fish and invertebrate collection and identification and water quality testing. Research cruises have taken her from the west Florida shelf to the upper Texas coast. Smaller boats (a variety of 14–30-foot outboard boats, a pontoon boat, an airboat, and canoes) provide research and educational visitors access to swamps, rivers, freshwater, brackish and saltwater marshes, and coastal bays as well as fringing barrier islands and open bay habitats.

The DeFelice Marine Center serves as the focal point for LUMCON's marine research and education activities, but another lesser-known LUMCON facility also serves an important role. The Port Fourchon Laboratory (Fig. 8) was built in 1973 for the Nicholls State University (NSU) biology program with funding from the Wisner Foundation. At that time, this field laboratory near Grand, Isle with access to the Gulf through Belle Pass, was the only marine science station on the Louisiana Gulf Coast. In 1979, NSU sub-



Fig. 8. The Fourchon Lab.

leased the building to LUMCON, providing Consortium members with a research and education base for trips to nearby beaches, lakes, bays, and the Gulf of Mexico.

RESEARCH PROGRAMS

The mission of Louisiana Universities Marine Consortium is twofold: to conduct research and education programs relevant to Louisiana's needs in marine science, and to serve as a resource facility for all Louisiana schools with interests in marine research and education. Thus, LUMCON fosters understanding of the economic and cultural value of Louisiana's coastal and marine environments. LUMCON has major research programs in coastal marine science ranging from basic to applied science in areas including aquaculture, coastal ecosystems, hypoxia, phytoplankton ecology, biogeochemistry, fisheries production, coastal processes, coastal restoration, and river–ocean interactions. The external research funds average \$3.75 million per year (5-yr average).

The LUMCON faculty, although small, has over the years established critical research programs:

- Michael J. Dagg, professor, 1979–present, zooplankton ecology
- Nancy N. Rabalais, professor, 1983–present, benthic ecology, coastal ecosystem studies, eutrophication and hypoxia
- Denis J. Reed, associate professor, 1986–97, coastal geomorphology
- Quay Dortch, associate professor, 1986–2004, phytoplankton ecology and community dynamics
- Edward J. Chesney, associate professor, 1987–present (2011), fisheries ecology
- Brent A. McKee, associate professor, 1988–96, sedimentary processes
- Paul J. Sammarco, professor, 1991–present (2011), coral reef ecology

Rodney A. Powell, associate professor, 1998–2009, trace metal chemistry
 Christopher W. Finelli, associate professor, 1999–2006, interaction of physics and biology
 Brian J. Roberts, assistant professor, 2007–present (2011), biogeochemistry
 Alexander Kolker, assistant professor, 2008–present (2011), sedimentary processes
 Geoff Sinclair, assistant professor, 2008–present (2011), phytoplankton ecology.

EDUCATION PROGRAMS

LUMCON provides assisted and unassisted hands-on field trip experiences to a variety of local, state, regional, and national visitors. Field trip visitors are welcome throughout the year. Aside from the 2,415 in-state 2- and 4-yr university students on 170 field trips in the most recent 5 yr, LUMCON hosted 733 students on 41 field trips. From 2005 to 2009, approximately 10,000 precollege students and 1,134 public organization members, including the students from the Louisiana School for the Deaf and the U.S. Environmental Protection Agency mentoring program for the visually impaired, participated in day and overnight field trips. Approximately 14,500 visitors participated in educational field trips from 2005 to 2009. In addition to field trips, public display areas of LUMCON are designed to allow walk-in visitors to learn about LUMCON and the surrounding environment and community any time of year.

LUMCON also conducts many workshops, symposia, training exercises, and special summer camps. Examples include teacher workshops: H-2-O Water Quality Workshop (allows teachers to work with a community of partners that are incorporating water sampling into their science curriculum using the LUMCON Bayou-side Classroom, <http://www.lumcon.edu/bayousideclassroom/>); Students and Teachers as Educational Partners in Science (STEPS — to introduce science teachers to hands-on science enquiry), and Bay Watershed Education and Training (B-WET) program (to fuse the Louisiana Sea Grant Discovery Camp, the Coastal Roots program with LUMCON's Bayou-side Classroom, and the LUMCON Estuarine and Awareness Discovery Camp).

A notable program originating from LUMCON is BC, which was developed as part of an National Science Foundation (NSF) Early Career Grant to Chris Finelli and which received an NSF education award. BC combines over 50 teachers at 41 locations measuring water quality and entering data into the publicly accessible database housed at LUMCON since 2001 ([http://](http://www.lumcon.edu/education/StudentDatabase/)

www.lumcon.edu/education/StudentDatabase/). The data have been and are still used by many teachers from other states interested in comparing BC data. BC serves as a service-learning project at Tulane University and is incorporated into the curriculum for Terrebonne Parish middle school advanced biology classes. It is also part of one of few National Oceanic and Atmospheric Administration-funded BWET programs in the Gulf of Mexico, a partner in the Gulf of Mexico Alliance Ocean Literacy project, and a mechanism for involving under-represented students in marine science.

For university students, LUMCON offers semester distance-learning courses and summer field courses. Registration, credit, and tuition are through a member university, and the courses are taught at or from the LUMCON Marine Center. The distance-learning video conference classroom is used for the spring semester Changing Coastal Oceans class, which broadcasts to up to six universities. LUMCON offers regular introductory and upper-level summer undergraduate and graduate field courses that alternate between even and odd years: Coastal Landscape Photography, Bottlenose Dolphin Population Biology, Introductory to Marine Science, Introductory to Marine Zoology, Coral Reef Ecology, Coastal Field Geology, Marine Field Ecology, Marine Invertebrate Ecology, Marine Fish Ecology, and Wetland Vegetation. In the most recent five years, an average 45 students per year participated. The summer courses offer exposure to the coastal and marine environment through field and lab work, traditional classroom lectures, discussion with our research faculty, and occasionally discussion with instructors from outside institutions.

In addition to university-level courses, the LUMCON intern program gives qualified undergraduate students the opportunity to conduct an 8-wk field intensive research project during the summer. Students reside at the DeFelice Marine Center and work under the supervision of a faculty advisor and the university education coordinator. A National Science Foundation, Research Experiences for Undergraduates (REU) program began in summer 2011.

Graduate education is supported by LUMCON faculty who are adjunct faculty at member universities or others across the nation. Since 1987, 47 students (17 Ph.D. and 31 Masters) have graduated under the direction of LUMCON faculty. Currently there are eight Ph.D. and four Masters graduate students working with LUMCON faculty. Fifteen postdoctoral associates have been mentored by LUMCON faculty.

LUMCON is an institutional member of the American Association of Underwater Scientists (AAUS) and follows its diver safety guidelines. LUMCON's Scientific Dive Officer teaches SCU-BA classes through the instructor level as well as First Aid, Artificial Resuscitation, and Divers Alert Network (DAN) O₂ classes, and certifies divers for AAUS qualifications. LUMCON accepts letters of reciprocity from member AAUS institutions.

tion facility with a fleet of sought-after vessels and a top-notch staff, LUMCON has clearly come a long way. No matter what surprises lay ahead, the Consortium will continue to chart forward as long as it has the strength and support of its employees and of those members throughout the state who utilize its many resources.

END NOTE

From a few trailers clustered on the side of a harbor to a world-renowned research and edu-

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