

**Five-Year Program Review**

**Master of Science**

**in**

**Marine and Environmental Biology**

**Department of Biological Sciences**

**Nicholls State University**

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## NARRATIVE

### 1. Program Mission

#### 1.1 Mission Statement for the Program

The Master of Science in Marine and Environmental Biology (MMEB) at Nicholls State University prepares students for marine and environmental scientific careers that support economic development of the unique and vital natural resources of coastal Louisiana and beyond. The faculty of the Department of Biological Sciences is committed to developing students with knowledge, skills, experience, and confidence consistent with twenty-first century scientific careers.

#### 1.2 Relationship to Institutional Mission

The mission of the MMEB Program is aligned with and supportive of the more comprehensive University mission to meet the needs of Louisiana and beyond. The Department of Biological Sciences supports the needs of Louisiana through the teaching, research, and service of its faculty and staff.

Located in the center of the Barataria-Terrebonne National Estuary, and with its proximity to the Louisiana Universities Marine Consortium (LUMCON), the Department of Biological Sciences fosters and facilitates collaborations and partnerships with regional industries, state and national agencies, and other academic institutions. The Department will continue to develop and apply the science of the twenty-first century to the unique needs of the region's economy and its communities.

### 2. Program Curriculum

#### 2.1 Most Recent Curriculum Study

##### 2.1.a. Most Recent Curriculum Study.

As of January 2011 semester, the MMEB Program is 8.5 years old. The MMEB curriculum was developed and approved by the graduate faculty of Biological Sciences and the University administration at the time of program proposal submittal to the Board of Regents (BOR). This is the second five-year program review.

##### 2.1.b. Changes in Past Five Years.

The MMEB Program has incurred four minor curriculum changes in the past five years. (1) BIOL 465 (Marine Conservation and Management) was available for undergraduate and graduate credit. However, it was upgraded to Biology 565 due to lack of undergraduate participation. BIOL 565 consisted of a lecture and a laboratory component, and these components were recently redesigned and separated into two lecture courses: (a) BIOL 566 (Population Dynamics) incorporated a lecture component and maintained the laboratory aspect of the original BIOL 565 course, and (b) BIOL 567 (Marine Conservation and Management)

maintained the original lecture components of BIOL 565 and incorporated additional lecture topics.

(2) The MMEB program has created an additional internship course, BIOL 573 (Academic/Non-Profit Internship). BIOL 571 (Industry Internship) and BIOL 572 (Agency Internship) provided our graduate students with real world experience by having them work alongside agency and industry professionals. However, several graduates continue their education by entering Ph.D. programs. Also, several graduates have gone to work for non-profit organizations after completing their degree requirements. Therefore, we created the new internship course to provide our students to increase opportunities for real-world experience.

(3) BIOL 568 (Professional Scientific Writing Laboratory) was first offered in Fall 2002 but not again until Spring 2008. The course was redesigned from a 6-3-3 course to a 3-3-0 course.

(4) BIOL 537 (Applied Ecology) was added to the program to provide our students with practical experience in collecting, analyzing, and interpreting data sets. The students get a firm foundation in using statistical software (particularly SAS).

## 2.2 Major/Minor

### 2.2.a. Hours Constituting Major.

Students studying for the MMEB must complete a minimum of 17 credit hours in core courses and 18 credit hours in elective courses. Only six hours of selected electives at the 400 (senior-level undergraduate) level can be applied as elective requirements. The curriculum consists of lectures, laboratories, seminar, and internship courses. The curriculum is summarized below as follows:

Marine and Environmental Biology I	3 hrs
Marine and Environmental Biology II	3 hrs
Marine and Environmental Policy Workshop	1 hr
Marine and Environmental Internship I (Industry)	1 hr
Marine and Environmental Internship II (Agency)	1 hr
Graduate Seminar	1 hr
Thesis Research	6 hrs
Thesis	1 hr
Electives	18 hrs
TOTAL	35 hrs

### 2.2.b Does this curriculum require or provide a minor?

The MMEB Program does not require a minor.

## 2.3 Student Learning Outcomes and Assessment

### 2.3.a. Student learning outcomes

Students earning the MMEB degree will:

- (1) evaluate and discuss ecosystem processes from local to global scale, including concepts relating to biogeochemical cycles, population ecology, and environmental energy.
- (2) compare and contrast historical and contemporary conservation and preservation practices as applied to management of renewable natural resources.
- (3) design, implement, and evaluate scientific experiments and then communicate results in oral and written formats.
- (4) observe and assess daily practices and challenges associated with both environmental regulatory agencies and private industries involved with natural resources.
- (5) assimilate major environmental issues confronting coastal environments, specifically those of Louisiana, and synthesize solutions to these issues.

### 2.3.b. Assessment of Student Learning Outcomes.

The fundamental assessment of MMEB students is successful completion of the graduate research thesis, oral public defense, and private thesis committee defense. Two core courses which codify these assessments are BIOL 501 (Graduate Seminar), which assesses the public defense and preliminary oral presentations, and BIOL 599 (Thesis), which assesses the thesis document as scientific report.

Assessment of student work also occurs on a continual basis through interaction with a major professor and thesis committee members (a minimum of two) as thesis research progresses. More specific assessments of student learning outcomes result from assessments in core and elective courses. Minimum assessment requirements are successful completion of the following core courses:

- BIOL 551 (Marine and Environmental Biology I)
- BIOL 552—Marine and Environmental Biology II)
- BIOL 591-594—Thesis Research
- BIOL 571—Marine and Environmental Internship I—Industry
- BIOL 572—Marine and Environmental Internship II—Agency
- BIOL 560—Environmental Workshop

Each of these courses when completed with a minimum grade of C is applicable toward the Master of Science Degree. However, consistent with School of Graduate Studies guidelines, no more than six hours of C-graded courses can be applied to the MMEB degree.

### 2.3.c. What are the results of those assessments and how have these results been used to improve the academic program? (e.g. pedagogy, learning outcomes, classroom experiences).

In general, thesis and defense assessments have been satisfactory since inauguration of the program. In a few cases, MMEB students with unsatisfactory performance have left the program.

2.3d. List any recommendations from the University Assessment Committee (beginning with 2007 reviews). How have these recommendations been addressed?

Not applicable.

## **2.4 General Education Requirements**

2.4a. List those courses in your curriculum which may be completed to fulfill general education requirements. Describe faculty participation in General Education Requirements (if applicable), for example, Service Core Courses.

Not applicable.

2.4b. Explain how courses in your curriculum which are NOT designated as General Education Courses reinforce or supplement the General Education goals and learning outcomes (see web page - [http://www.nicholls.edu/gened/goals\\_objectives.html](http://www.nicholls.edu/gened/goals_objectives.html).) (Appendix B provides a matrix you may use to respond to this question.)

Not applicable.

## **2.5 Anticipated Changes**

What changes, if any, are planned in the program curriculum during the next several years? Be specific. Why are these changes planned? How will these changes affect its enrollment, staffing and costs?

The department has planned to institute an area of elective concentration in the MMEB Program in response to both the growing industrial need and the interests of our undergraduate students. This new Environmental Health Concentration, which is currently in the planning stages, will incorporate the existing MMEB core curriculum with elective courses more suited to addressing the impact of the environment on the health of human and wildlife. Because our department experiences a large queue of pre-professional healthcare undergraduates waiting 1-2 years for acceptance to professional school (medical, dental, physical therapy, occupational therapy, pharmacy, physician assistant, clinical laboratory science) following graduation with the baccalaureate, there has been a traditional interest from these students for graduate study from our department (as well as science departments from other universities). Such an Environmental Health Concentration would not only satisfy the needs of these students but also increase the MMEB graduation rate, further protecting it against climbing minimum BOR rates. To eliminate added costs related to staffing, the department plans to offer this concentration in a cohort fashion, with students taking traditional MMEB core courses in Fall and Spring semesters and then taking electives during summer session as offered by existing faculty. This new concentration is schedule to be offered for the first time in Summer 2012.

### 3. Program Rationale

#### 3.1 Similar Programs Nearby

List similar programs and the names of institutions (public and private) offering the same or a similar program within a 100-mile radius.

The MMEB Program was specifically designed as a unique program, which was a fundamental requirement of Board of Regents approval. Although related programs focusing on aspects of marine biology or environmental biology exist at Louisiana institutions, there are no Master of Science programs with the specific and unique, multi-faceted focus of marine and environmental biology at other Louisiana institutions. Within the curriculum, the MMEB Program is unique in integrating career internship with academic instruction. Further, as a curriculum at Nicholls, the Louisiana university in closest proximity to the Louisiana coast, the MMEB Program provides unique experiences to its graduates that prove to be invaluable in their careers.

Below are brief descriptions of the most closely related programs in a 100-mile radius of Nicholls:

- LSU (Baton Rouge): The School of Coast and Environment houses the Department of Environmental Studies that offers graduate degrees in Environmental Toxicology, Environmental Planning and Management, and Wetland Science and Management. Also within the School is the Department of Oceans and Coastal Science with masters and doctoral curricula divided among four institutes: Coastal Ecology, Coastal Fisheries, Coastal Studies and Coastal Biogeochemistry.
- LSU (Baton Rouge): The Biology Department, a component of the College of Basic Sciences, offers the M.S. and Ph.D. degrees in Biology with the following curricular concentrations: Genetics, Plant Physiology, Systematics, Ecology and Evolution, and Toxicology.
- LSU (Baton Rouge): The School of Renewable Resources offers M.S. and Ph.D. degrees in Aquaculture, Freshwater Ecology, and Natural Fisheries.
- UNO (New Orleans): The Department of Biological Sciences offers the Ph.D. in Conservation Biology and the M.S. in Biological Sciences.
- Southeastern Louisiana University (SELU, Hammond): The Department of Biological Sciences offers an M.S. in Biological Sciences.
- University of Louisiana—Lafayette (ULL): The Department of Biological Sciences offers M.S. and Ph.D. degree programs with emphases on conservation biology, environmental toxicology and restoration, or ecological processes in selected environments.

#### 3.2 Relationship with These Programs

How does your program compare with program outcomes in other universities? What are the similarities and differences in your curriculum and credit hours to these universities?

Master of Science program outcomes in other graduate institutions, as stated on their web sites, indicate that the Master of Science degree at Nicholls is similar with focus on developing students to meet contemporary scientific challenges in the discipline.

Similarities between programs center on a sequence of foundation courses similar in design to the MMEB core courses, BIOL 551 and BIOL 552 (Marine and Environmental Biology I and II), which develop fundamental critical thinking skills and aptitudes in the discipline. The most significant curricular difference is the MMEB requirement to complete two internships—one in industry and one in a regulatory agency.

#### **4. Assessing Demand for Program**

##### **4.1 List the types of jobs in which graduates with this degree could be expected to be employed**

The following paragraphs list the job types for which our graduates can expect to compete. These lists are based on actual placements of our graduates, together with assessed trends in the field.

- *Microbiology*—state laboratory biologist (e.g., LDEQ, DHH, LDWF), federal laboratory or field technician (e.g., USDA, FDA, EPA, CDC, DOD), wastewater treatment technician.
- *Environmental*—state laboratory or field biologist (e.g., LDWF, DNR, DEQ), federal laboratory or field biologist (e.g., NMFS, EPA, USFWS, NOAA, FEMA, USGS, USDA, DOD), zoo or aquarium biologist, environmental or biological consultant, governmental lobbyist, non-governmental organization biologist (e.g.; World Wildlife Foundation, Nature Conservancy, Ducks Unlimited, Trout Unlimited, Audubon Society), biological supply company collectors, various positions in private environmental companies (including technical writer).
- *Marine Biology*—state laboratory or field biologist (e.g., LDWF, DNR, DEQ), federal laboratory or field technician or biologist (e.g., NMFS, EPA, USFWS, NOAA, FEMA, USGS, USDA, DOD), environmental consulting companies and engineering companies (e.g., SHAW, CH2MHill, T-Baker Smith, ES&H), non-governmental organization.

##### **4.2 Specify national, state and area need for graduates and indicate source(s) of data**

A wide variety of job openings from across the country, including many of the jobs listed in Section 4.1, are posted on websites of various government agencies, as well as those of specific biological sciences societies. These include employment listings from USA JOBS—official website of United States Federal Government, American Fisheries Society, the Wildlife Society, American Society for Microbiology, American Medical Association Fellowship and Residency Electronic Interactive Database, World Aquaculture Society, eJobs (environmental jobs and careers), environmentalcareer.com, Society of Environmental Toxicology and Chemistry, the Society for Conservation Biology, Restore America's Estuaries Restoration Marketplace, and the Society of Wetland Scientists.

##### **4.3. Degrees awarded, number currently employed, and projected demand**

The first MMEB graduates occurred on schedule, two years after inception of the graduate program. From Spring 2004 to December 2010, the MMEB program has experienced 41 graduates. Initially, the Board of Regent's minimum graduation rate for maintenance of a



graduate program was five graduates per year averaged over a five year period (i.e., 25 graduates per five year period). In the early years of the MMEB Program, average graduates per year was 4.6, and for this reason the MMEB Program was provisionally listed as a low-completer program by the BOR. Since 2009, the Board of Regents minimum graduation rate has risen to eight averaged over a three years period (i.e., 24 graduates per three year period). When these new rules for minimum graduation rate went into effect, our three-year rate was only four (4). The low rate at that time was primarily due to an abnormally low year for graduates (two only). As of Fall 2010, our three year graduation rate had increased to 6.3, and, based on our Summer and Fall 2010 graduates, we are on track to reach a three year graduation rate of eight (8).

<b>MMEB GRADUATES</b>				
<b>N</b>	<b>Name</b>	<b>Date</b>	<b>Advisor (*=Adjunct)</b>	<b>Thesis Title</b>
1	Leith Adams	Spring 2004	Dr. Raj Boopathy	Chemical Control of the Gut Microbial Population of the Formosan Subterranean Termite, <i>Coptotermes formosanus</i> and Isolation and Identification of Facultative Bacteria from the Gut
2	Angie Corbin	Spring 2004	Dr. Marilyn Kilgen	Recovery of F+ RNA specific Bacteriophage for the Evaluation of a Marsh Land Upwelling System in Low Saline Waters
3	Mark Doolittle	Spring 2005	Dr. Raj Boopathy	Use of Natural Products and Lytic Peptides to Control the Formosan Subterranean Termite, <i>Coptotermes formosanus</i> , and the Isolation, Identification, and Characterization of <i>Klebsiella pneumoniae</i> sub. <i>pneumoniae</i> from the Hindgut of the Formosan Subterranean Termite
4	Letha Dawson	Fall 2005	Dr. Raj Boopathy	Optimization of Chemical Pretreatment of Post-Harvest Sugarcane Residue for Fuel Alcohol Production
5	Jennifer Lasseigne	Fall 2005	Dr. Gary LaFleur	Development of Reproductive Biomarkers in Fish and Amphibians
6	Laurie Rodrigue	Fall 2005	Dr. Chris Finelli*	Characterization of Water Quality Along Bayou Terrebonne and Bayou Little Caillou, Louisiana
7	Ronnie Self	Fall 2005	Dr. John Doucet	Isolating Genomic Biomarkers from the Louisiana Red Swamp Crawfish <i>Procambarus clarkii</i>
8	Cassie Addison	Spring 2006	Dr. Earl Melancon	Temporal and Spatial Oyster Recruitment Patterns and Growth from Spat to Seed in the Barataria Estuary
9	Chris Bonvillain	Spring 2006	Dr. Quenton Fontenot	The use of a low-water refuge in the Atchafalaya River Basin by adult spotted gar <i>Lepisosteus oculatus</i>
10	Perry Boudreaux	Spring 2006	Dr. Quenton Fontenot	Acute Ammonia Toxicity and Chloride Inhibition of Nitrite Uptake in Non-Teleost Actinopterygian Fishes
11	Brandon Clark	Spring 2006	Dr. Raj Boopathy	Bioremediation of Explosive-Contaminated Soil
12	Rhongzon Ye	Spring 2006	Dr. Enmin Zou	The Impact of Hypoxia on Bioaccumulation and Metabolism of Polycyclic Aromatic Hydrocarbon
13	Johnathan Davis	Fall 2006	Dr. Allyse Ferrara	Reproductive Biology, Life History, and Population Structure of a Bowfin <i>Amia calva</i> population in Southeastern Louisiana
14	Jacques Fontenot	Fall 2006	Dr. Quenton Fontenot	Seasonal Abundance, GSI, and Age Structure of Gizzard Shad <i>Dorosoma cepedianum</i> in the Upper Barataria Basin

15	Chris Lyles	Fall 2006	Dr. Raj Boopathy	Biological Treatment of Shrimp Aquaculture Wastewater Using a Sequencing Batch Reactor Pilot Plant Study
16	Matti-Lynn Dantin	Spring 2007	Dr. Quenton Fontenot	Distribution and Relative Abundance of Blue Crabs <i>Callinectes sapidus</i> in the Upper Barataria Estuary
17	Michael Wiley	Spring 2007	Dr. Allyse Ferrara	Estimation of Over-Wintering, Population Density, and Distribution of an Exotic Lizard, the Brown Anole <i>Anolis sagrei</i> , in Southeastern Louisiana Using a Novel Tagging Method
18	Heather Dyer	Fall 2007	Dr. Allyse Ferrara	Seasonal Fish Assemblages of Bayou Lafourche Upstream and Downstream of the Thibodaux Weir
19	Marcel Estay	Spring 2008	Dr. Quenton Fontenot	Assessment of Water Quality in the Upper Barataria Estuary
20	Ronnie Duke	Spring 2008	Dr. Earl Melancon	Temporal and Spatial Oyster Survival and Growth Patterns from Seed to Market in the Barataria Estuary
21	Nicholas Gaspard	Spring 2008	Dr. Earl Melancon	Comparison of Intertidal Oyster Populations Between a Rock Breakwater and a Natural Reef in Lower Barataria Estuary
22	Olivia Smith	Spring 2008	Dr. Allyse Ferrara	Reproductive Potential and Life History of Spotted Gar <i>Lepisosteus oculatus</i> in the Upper Barataria Estuary, Louisiana
23	Yanling Meng	Fall 2008	Dr. Enmin Zou	Impacts of molt-inhibiting organochlorine compounds on epidermal ecdysteroid signaling in the fiddler crab, <i>Uca pugnator</i>
24	Sean Jackson	Spring 2009	Dr. Quenton Fontenot	Distribution and Abundance of Larval and Juvenile Fishes in the Upper Barataria Estuary
25	Dhritikshama Roy	Summer 2009	Dr. Raj Boopathy	Performance of Sequencing Batch Reactor (SBR) in Treating Synthetic and Shrimp Aquaculture Production Wastewater
26	Trevis Olivier	Fall 2009	Dr. Allyse Ferrara	Effects of Temperature and Storage Regimes on the Germination Rates of Three Native Warm-Season Grasses
27	Jeremy Dunn	Fall 2009	Dr. Paul Sammarco*	Effects of Phosphate on Growth in the Reef Coral <i>Acropora formosa</i>
28	Nicole Broussard	Fall 2009	Dr. Gary LaFleur	Stage Specific Potency and Phylogenetic Sensitivity of Gar Toxin
29	Komi Hassan	Fall 2009	Dr. Raj Boopathy	Optimization of a Sequencing Batch Reactor (SBR) for the Treatment of Shrimp Aquaculture Wastewater
30	Mark Suchy	Fall 2009	Dr. Quenton Fontenot	Effects of Salinity on Growth and Survival of Larval and Juvenile Alligator Gar, <i>Atractosteus spatula</i> , and on Plasma Osmolality of Non-teleost Actinopterygian Fishes
31	Nicole Eddlemon	Fall 2009	Dr. Raj Boopathy	Water Quality and Microbial Ecology of the Upper Barataria Estuary
32	Tim Clay	Fall 2009	Dr. Quenton Fontenot	Growth Survival and Cannibalistic Rates of Alligator Gar <i>Atractosteus spatula</i> in Recirculating Aquaculture Systems
33	Kelsey Adkisson	Spring 2010	Dr. Allyse Ferrara	Temporal and Spatial Distribution of Native and Invasive Bivalves in Bayou Lafourche, Louisiana
34	Sara Shields	Spring 2010	Dr. Raj Boopathy	Evaluation of Energy Cane for Lignocellulosic Ethanol Production

35	Cynthia Fox	Spring 2010	Dr. Quenton Fontenot	Seasonal Abundance, Age Structure, Gonadosomatic Index, and Gonad Histology of Yellow Bass <i>Morone mississippiensis</i> in the upper Barataria Estuary, Louisiana
36	E.J. Raynor	Spring 2010	Dr. Aaron Pierce	Understanding the Use of Barrier Islands as Nesting Habitat for Louisiana Waterbirds
37	Susan Doty	Summer 2010	Dr. Brian Roberts*	Benthic Respiration and Nutrient Fluxes in the Atchafalaya River Delta Estuary
38	Saori Mine	Summer 2010	Dr. Raj Boopathy	Effects of Organic Acids on Shrimp Pathogen, <i>Vibrio harveyi</i>
39	Siva Nunna	Fall 2010	Dr. Enmin Zou	Assessing ethoxyresorufin-O-deethylase activity in <i>Uca pugilator</i> during the molting cycle
40	Mark Linson	Fall 2010	Dr. Earl Melancon	Initial Oyster Reef-Building Potential on Constructed Shoreline Structures used for Erosion Control in a Louisiana Salt Marsh
41	Tabitha Owen	Fall 2010	Dr. Aaron Pierce	Habitat Requirements and Productivity of Colonial Waterbirds Nesting on the Isles Dernieres Barrier Island, Refuge

In addition, enrollment in the MMEB program is currently 25. (Note: ABT = “All But Thesis”)

Current MMEB Students (Spring 2011)				
N	Name	Status	Expected Graduation	Advisor
1	Clint Troxler	ABT	Spring 2011	Dr. Dave Schultz
2	Jenny Ledet	ABT	Spring 2011	Dr. Gary LaFleur
3	Sam Wise	ABT	Spring 2011	Dr. Marilyn Kilgen
4	Justin Merrifield	Full	Spring 2011	Dr. Raj Nathaniel
5	Rachel Ianni	Full	Spring 2011	Dr. Quenton Fontenot
6	Jordan Bell	Full	Fall 2011	Dr. Aaron Pierce
7	Stephen Byrne	Full	Fall 2011	Dr. Dave Schultz
8	Billy Finney	ABT	Fall 2011	Dr. Quenton Fontenot
9	Benoit Lussier	ABT	Fall 2011	Dr. Allyse Ferrara
10	Kenny King	ABT	Fall 2011	Dr. Earl Melancon
11	Dan O'Malley	Full	Fall 2011	Dr. Earl Melancon
12	Amada Playter	Full	Fall 2011	Dr. Gary LaFleur
13	Danielle Richardi	ABT	Spring 2012	Dr. Marilyn Kilgen
14	Victoria Bachelor	Full	Spring 2012	Dr. Earl Melancon
15	Parika Bandyopadhyay	Full	Spring 2012	Dr. Raj Nathaniel
16	Kent Bollfrass	Full	Spring 2012	Dr. Quenton Fontenot
17	Lisa Breaux	Full	Spring 2012	Dr. Quenton Fontenot
18	David Curtiss	Full	Spring 2012	Dr. Aaron Pierce
19	Taren Manley	Full	Spring 2012	Dr. Allyse Ferrara
20	Emily Rombach	Full	Spring 2012	Dr. Quenton Fontenot
21	Justin Sancho	Full	Spring 2012	Dr. Earl Melancon
22	Allyssa Sanders	Full	Spring 2012	Dr. Raj Boopathy
23	Blaine Adams	Full	Spring 2013	Dr. John Doucet
24	Jordan Percle	Full	Spring 2013	Dr. John Doucet
25	Justin Duke	Full	Fall 2012	Dr. Allyse Ferrara

MMEB graduates demonstrate 100% placement (employment or doctoral school) within one year of graduation.

<b>Status of MMEB Graduates</b>			
<b>No.</b>	<b>Name</b>	<b>Graduation Date</b>	<b>Current Status</b>
1	Leith Adams	Spring 2004	NSU Instructor
2	Angie Corbin	Spring 2004	NSU Instructor
3	Mark Doolittle	Spring 2005	Air Emission Specialist, Texas Air Commission, Beaumont, TX
4	Letha Dawson	Fall 2005	Secondary Educator, Mississippi
5	Jennifer Lasseigne	Fall 2005	Admitted to Ph.D. Program at LSU, Baton Rouge, LA
6	Laurie Rodrigue	Fall 2005	Coastal Resource Scientist, LA DNR, Thibodaux
7	Ronnie Self	Fall 2005	Admitted to LSU Medical School
8	Cassie Addison	Spring 2006	Employed by Oyster Consulting Firm
9	Perry Boudreaux	Spring 2006	Deputy Liaison Officer, FEMA
10	Chris Bonvillain	Spring 2006	Admitted to Ph.D. program at LSU, Baton Rouge, LA
11	Brandon Clark	Spring 2006	Environmental Specialist, FEMA
12	Rhongzong Ye	Spring 2006	Admitted to Ph.D. program at University of Florida, Gainesville, FL
13	Johnathan Davis	Fall 2006	Admitted to Ph.D. program at Tennessee Tech, Cookeville, TN
14	Jacques Fontenot	Fall 2006	Deep Water Production Chemist, Baker Hughes
15	Chris Lyles	Fall 2006	Admitted to Ph.D. program at Oklahoma
16	MattiLynn Dantin	Spring 2007	Biologists, LA DWF
17	Michael Wiley	Spring 2007	Secondary Educator, Lafourche Parish
18	Heather Dyer	Fall 2007	Wetland Research Center, USGS
19	Marcel Estay	Spring 2008*	Environmental Consultant, ES&H Consultant and Training Group
20	Ronnie Duke	Spring 2008	T. Baker Smith, Inc.
21	Nicholas Gaspard	Spring 2008	T. Baker Smith, Inc.
22	Olivia Smith	Spring 2008	Admitted to Ph.D. Program at Un. of Maryland
23	Yanling Meng	Fall 2008	Admitted to Ph.D. Program at LSU, Baton Rouge, LA
24	Sean Jackson	Spring 2009	Employed by LDWF
25	Dhritikshama Roy	Summer 2009	Admitted to Ph.D. Program at U. of North Dakota
26	Trevis Olivier	Fall 2009	T. Baker Smith, Inc.
27	Jeremy Dunn	Fall 2009	Biologist, Shaw Inc.
28	Nicole Broussard	Fall 2009	Secondary Educator, Lafourche Parish
29	Komi Hassan	Fall 2009	Industry
30	Mark Suchy	Fall 2009	Idaho Fish and Game
31	Nicole Eddlemon	Fall 2009	Industry
32	Tim Clay	Fall 2009	Admitted to Ph.D. Program at Un. of Central Arkansas
33	Kelsey Adkisson	Spring 2010	Oregon Fish and Game
34	Sara Shields	Spring 2010	Research Associate at Nicholls State University
35	Cynthia Fox	Spring 2010	Admitted to Ph.D. Program at Mississippi State University
36	E.J. Raynor	Spring 2010	Admitted to Kansas State University Ph.D.
37	Susan Doty	Summer 2010	USGS - Great Lakes Research Center
38	Saori Mine	Summer 2010	Admitted to PhD Program at Southern Mississippi University
39	Siva Nunna	Fall 2010	Research Associate at Nicholls State University
40	Mark Linson	Fall 2010	ES&H
41	Tabitha Owen	Fall 2010	Agency

### Projected Demand for M.S. Degree.

Demand for scientists with advanced degrees has been and has remained high since proposal of the MMEB Program at the turn of the century. Recent environmental catastrophes affecting Louisiana Gulf Coast environments, specifically the major Hurricanes Katrina, Rita, Gustav, and Ike, as well as the Deepwater-Horizon Oil Spill and remediation, argue that the demand will increase. Such was and remains the case in coastal Alaska, as appropriately-trained scientists have been monitoring environmental status for the past 20 years. Independent of these disasters, Louisiana continues to experience opportunities for graduate-level scientists due to persistent issues associated with historical coastal land loss. Finally, Master of Science graduates are continually sought by larger state institutions, such as LSU, UNO, ULL, and Louisiana Tech, to populate their doctoral programs. Since these doctoral programs are under similar BOR requirements for minimum graduates as the MMEB Program, the academic demand for Masters Degree-holding students in Louisiana will remain high.

## **5. Outside Interest in the Program**

### **5.1 Identify interest on the part of local groups, industry, research centers, other educational institutions, or state agencies (example: Hospitals, culinary institutes, business)**

The Department of Biological Sciences has a broad base of collaborative educational, research, and service activities with the following groups:

#### *Business and Industry*

- Seafood (processing technology, safety, marketing (LA Seafood Promotion and Marketing Board, Gulf Coast Oyster Council, National Fisheries Institute, Shellfish Institute of North America)
- American Sugar Cane League

#### *Educational Programs*

- LUMCON
- Louisiana Academy of Sciences

#### *State and National Agencies*

- Bayou Lafourche Fresh Water Management District
- Louisiana Department of Environmental Quality
- Louisiana Department of Wildlife and Fisheries
- Louisiana Department of Health and Hospitals, Office of Public Health
- Louisiana Department of Natural Resources
- Center for Molecular and Human Genetics
- LSU Health Sciences Center, New Orleans
- LSU Neuroscience Center
- United States Army Corps of Engineers
- United States Environmental Protection Agency
- United States Food and Drug Administration

- United States Department of Agriculture
- United States Department of Commerce (NOAA)
- United States Department of Defense
- United States Department of the Interior

*State, National, International Advisory Boards and Professional Organizations*

- World Health Organization, Food and Agriculture Organization, International Atomic Energy Agency
- National Academy of Sciences, Institute of Medicine and National Research Council
- Center for Acadiana Genetics and Hereditary Health Care
- State Sea Grant Agencies (Review grants)
- National Marine Fisheries Service (Review grants)
- National Advisory Committee for Microbiological Criteria of Foods
- Faculty serve as officers and journal editors in State and National Professional Organizations
- Barataria-Terrebonne National Estuary Program (office on campus)

## **5.2 Indicate the nature of contact made with these groups and results**

The teaching, research and service of the MMEB faculty in the Department of Biological Sciences are so integrated that the degree of interaction with the groups listed in Section 5.1 overlap considerably. Review of faculty vitae (on file in the department) will reveal a very strong relationship with all entities listed.

- *Business and Industry*  
MMEB faculty members have over 50 years of interaction with the seafood industry. Within the past five years, faculty have been involved with the oyster industry with research addressing seafood safety issues (e.g., identifying oyster harvest waters with bacterial contamination and market treatment to kill bacterial with high pressure water). Other faculty members have been involved with research documenting the ecology of oysters as it relates to coastal wetlands restoration and its fishery. Biology faculty have also been involved with the Agriculture industry in research focused on finding methods to ferment sugarcane leaf litter to produce an alcohol biofuel and in ways to increase the decomposition of the vast amount of leaf litter left in sugarcane fields. Additional research conducted by our faculty and students addresses shrimp, garfish, and crawfish aquaculture.
- *Educational Programs*  
MMEB faculty members continue to serve on educational committees, such as those of LaSip and LaCept, while others have helped to coordinate the Science Olympiad and the Region X Science Fair held on campus each spring. In addition, MMEB faculty as judges for the Louisiana Science and Engineering Fair held annually in Baton Rouge. Faculty members have given in-service teacher workshops on marine and environmental issues, as well as informal biological and environmental presentations to such civic groups across the state, such as Rotary International. Faculty members have been invited

to give lectures and presentations to students in programs at other universities, such as at the LSU Neuroscience Center and the LSU Fisheries Degree Program.

- *State and National Agencies*  
Research is a significant component of all graduate faculty members' academic involvement. Relationships with state and federal agencies have given MMEB Program much needed equipment and supply recourses for educational and research needs.
- *State, National and International Advisory Boards and Professional Organizations*  
MMEB faculty members belong to diverse scientific organizations, and many serve as officers. Faculty are members of editorial boards for professional journals such as *International Biodeterioration & Biodegradation*, *Shellfish Research*, *Pharmacological Research*, and *Proceedings of the Louisiana Academy of Sciences*, among many others. Additionally, faculty members are regular reviewers of articles submitted for publication to a diverse group of publishers, such as American Fisheries Society, Marine Environmental Research, and Louisiana Academy of Sciences, among many others. Many state and federal agencies ask faculty to review grant proposals, such as Louisiana Sea Grant, National Sea Grant, National Institute of Health, National Science Foundation, Environmental Protection Agency, among many others

### **5.3. Formal arrangements with industry, government, and other agencies outside of the academic community**

Nicholls State University, through the Department of Biological Sciences, has a ten year formal Memorandum of Understanding (MOU) with the Federal government's Natural Resources Conservation Service (NRCS). This MOU provides acreage at the University Farm for the cultivation and propagation of coastal wetlands plants to help promote coastal conservation. The MOU has given the Biology Program and Nicholls high visibility and publicity at the state and regional levels. The MOU has also allowed faculty to develop research projects and fund graduate research.

Nicholls State University is a member, through representation by faculty from the Department of Biological Sciences, of the Barataria-Terrebonne National Estuary Program (BTNEP) Environmental Management Conference. The conference is composed of industry, academia, and state and federal agencies (including National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, LA Office of Coastal Protection and Restoration, LA Department of Natural Resources, LA Department of Wildlife and Fisheries, LSU, and LUMCON).

## **6. Students**

### **6.1. Enrollment**

#### **6.1.a. What recruitment initiatives are in place other than the university recruitment program?**

The MMEB Program is regularly engaged in multiple extramural recruiting activities, which are summarized below:

- The Department has created and actively updates an MMEB Program web page at its university site, [www.nicholls.edu/biology](http://www.nicholls.edu/biology).
- The Department has created and published a tri-fold informational brochure describing the MMEB Program, which is distributed by mail to prospective students, in response to requests, and recruiting opportunities.
- The MMEB Program faculty have established “feeder” relationships with sister universities around the state. The most productive of these is with Northwestern Louisiana University in Natchitoches, which has provided the MMEB program with multiple MMEB candidates.
- The MMEB Program Faculty actively post program information to web-based information boards associated with professional organizations and conventions, such as those of the American Fisheries Society and the International Association for Astacology.

6.1.b. What are the qualities of students attracted to the program? (e.g., standardized test scores for admission, GPA, etc.)

Students attracted to the program generally (but not exclusively) have earned a Bachelor of Science degree in a science field (predominantly a biological science), have Louisiana residence and authentic interest in Louisiana environmental issues, and have a specific interest in undertaking thesis research under the mentorship of one or more MMEB faculty. Minimum requirements for admission include the following:

- Bachelor of Science degree in a science curriculum
- minimum undergraduate GPA of 3.00/4.00
- GRE score (combined verbal and quantitative) of 1000
- three letters of recommendation from professionals in the field
- interview with the MMEB Admissions Committee

6.1.c. Explain enrollment trends (number of majors) for the 5-year period under review (See Appendix A).

Consistent with the program’s initial five-year review, most MMEB graduates in the past five years received the baccalaureate from Nicholls. However, through more aggressive recruiting and publicity regarding MMEB faculty research, the program has attracted more out-of-state students in the current review period.

6.1.d. Provide a 5-year projected enrollment for the program.

The primary source of MMEB Program recruits is the university’s own baccalaureates in Biology. Historically, graduation rates from this concentration area fluctuate widely, but for multiple years now the department and university have experienced increased enrollment in these areas. This enrollment supports at minimum maintenance of a positive five-year enrollment projection. In addition, given the recent major disasters affecting the Louisiana Gulf Coast, the increased need for qualified, highly-trained environmental personnel will predictably translate to a need for higher academic degrees. For this reason, the MMEB Program is expected to increase in enrollment in the next five years.



To attract quality students, the university needs to have in place financial incentives for students to come to Nicholls, especially for out-of-state students. Initially, the University agreed to fund the MMEB program with 12 graduate teaching assistantships (GTAs) and at least minimally competitive with similar Master of Science programs at small, regional universities. Currently, the university funds nine GTAs at \$8,000 with tuition waivers for fall and spring semesters.

These nine GTAs represent a number three short of the number of university-funded GTAs agreed to in the initial university-approval and BOR-approved program proposal. This issue, together with the minimally-competitive value of university-funded GTAs, is a severe impediment to attracting qualified MMEB candidates from the university, the state, and beyond the state. Many qualified MMEB applicants reject acceptance in the MMEB Program, deciding to seek more lucrative stipends.

To minimally rectify these impediments, MMEB faculty have annually applied for Graduate Fellows Program support from the BOR. These competitive grants provide stipend support for graduate students to attract them to enroll at Louisiana universities. Although these grants are awarded traditionally to doctoral programs, the MMEB Program received a \$20,000 grant in 2009 that supported one graduate student at \$10,000 for two years. A subsequent grant proposal is currently under review with the BOR in which \$90,000 is requested to fund three graduate students for each of two years at \$15,000 per semester.

In addition, enrollment in the MMEB Program will be limited by the number of faculty qualified to serve as mentors for thesis research. Before the next five-year review, it is highly likely that three highly productive senior MMEB Program faculty will retire. These faculty have mentored multiple MMEB students and have earned multiple millions of dollars in research funds that have been applied in support of MMEB student thesis research. To maintain productivity and graduate rates of the MMEB Program, the university must commit replacing these faculty with qualified individuals. Likewise, if the university is to entertain program growth, a commitment must be made to increase the number of faculty qualified to direct thesis research.

## **6.2. Admissions Policies and Practices**

*Are there special admissions policies for students wishing to enter this program?*

No. The MMEB program follows the admission policies of the university Graduate Program, the university, and the Board of Regents.

## **6.3 Attrition and Graduation Record (See Appendix A)**

*6.3.a. Explain attrition record of candidates for degrees during the last 5 years. What strategies are in place to address attrition?*

In addition to full-time thesis-track students, the MMEB Program was designed (and with BOR approval) to accommodate both part-time thesis-track enrollment and enrollment for graduate elective credit without commitment to the thesis. For this reason, attrition rates calculated from MMEB Program enrollment data is artificially high and does not reflect a true graduation rate for thesis-track students. In addition, due to impacts from recent major disasters

(hurricanes, oil spill), many students are finding lucrative employment (e.g., with FEMA) prior to completing the thesis. These two factors contribute to the program's attrition rate.

6.3.b. Explain number of semesters to graduate. If average number of semesters to graduate exceeds university average, please explain.

The MMEB program is designed for ideal completion in two years and two summer sessions (about 2.5 years). In the event that no summer stipend support is available, students tend not to enroll in summer sessions and instead enroll in subsequent Fall or Spring semesters. In general, science graduate programs have expandable schedules to accommodate problems with addressing scientific objectives of the thesis. Thus, some MMEB Program students may not finish in the ideal time period, but this is not atypical in such science curricula. Furthermore, as mentioned above, some students are enrolled part-time to accommodate the requirements of outside employment. For these reasons, the average number of semesters to completion may be high.

6.3.c. Explain graduation data (trends or fluctuations in number of degrees awarded) for last 5 years.

The MMEB graduation rate is a function of the number of assistantships available. Because the vast majority of U.S. graduate programs in the sciences offer stipend support to students, it is rare to experience full-time student enrollment in the absence of stipends, and such is the situation at Nicholls. It is difficult to recruit new students at a time when the total number of available assistantships are awarded and not available for a 2.5-year (or greater) period. Therefore, the program experiences semesters of few or no new students, which translates several semesters later as minima in the graduation trend. However, through more aggressive recruiting and publicity regarding MMEB faculty research, as well as through the hire of a new assistant professor (Pierce) who has been active in mentoring MMEB students, the overall graduation trend shows an increase in recent years.

## **6.4 Career Counseling**

What advisement and counseling service, other than provided by the university, do you provide to students?

MMEB Program faculty work actively with students to help place them in jobs or doctoral programs. Faculty are aggressive in keeping government and industry contacts current, which, in turn, is compensatory asset to agency and industry groups seeking biologists at the master degree level. In addition, the inclusion of required internships in the MMEB curriculum has provided students with avenues to make contacts and relationships with potential employers. To date, and with the exception of one graduate, 100% of MMEB Program graduates find employment or doctoral program placement within one year of graduation.

## **6.5 Follow-up and Student Placement:**

6.5.a. Provide information with respect to former students in the program (job placement, continuing degree work, etc.) over the past five (5) years?

See section 4.3 above.

6.5.b. What percentage of graduates from this major has entered graduate or professional school?

Of 41 graduates, 15 have entered doctoral school (37.5%). See section 4.3 above for details.

## **7. Faculty**

### **7.1 Faculty Who Are Direct Participants in the Program Last 5 Years**

At the end of this review period, the MMEB Program faculty consisted of 11 faculty, including, four professors, six associate professors, and one untenured assistant professor. These 11 faculty are among a total of 18-23 departmental faculty in the current review period. (The difference of five faculty stems from elimination of three Agriculture positions and the departures of Soniat and Kryzcki.) All faculty, including MMEB faculty but excluding two of the Agriculture faculty, have taught undergraduate biology courses in past five years. The MMEB Program faculty (tabulated below) are those (1) with the terminal degree, (2) with research experience, (3) who serve as major professors and committee members in support of MMEB student theses, and (4) who teach one or more graduate courses. Administrative duties among these faculty include (1) Dr. Doucet in service to the university as both as interim Head of the Department of Biological Sciences and Director of the University Honors Program and (2) Dr. Fontenot in service to both the university as Coordinator of the MMEB Program and the department as Farm-Use Coordinator.

In 2000, as a condition of new program approval, the BOR mandated that a teaching load of no greater than six contact hours must be granted for a minimum of four MMEB Program faculty and that such course load reductions should be above and beyond those granted for administrative duties. This course reduction was necessary to accommodate the time required for intense mentorship of one or more graduate students among these four faculty, which would increase the probability of graduating the (then) minimum five students per year. Until this was achieved, the MMEB Program was granted “probational status.” Since the last five-year program review, the Department has achieved this goal (generally by rotating reduction between professors and between semesters according to curricular needs), and the program has subsequently realized “full status” by the BOR. Currently, however, no MMEB Program faculty is at a permanent course reduction to six contact hours.

FACULTY PROFILE AND TEACHING LOAD											
Name	Date of Employment	Present Rank	Full-Time / Part-Time		Tenured/ Non-Tenured		Highest Degree	Average Teaching Load		No. of Advisees Assigned by Program	
			FT	PT	T	NT		Credit Hr	Contact Hr	Grad	Undergrad
Doucet, John	08/17/1997	Assoc. Prof.	FT		T		Ph.D.	9	9	1	150
Melancon, Earl	01/01/1975	Prof.	FT		T		Ph.D.	7	9	3	10
Boopathy, Ramaraj	01/01/1999	Prof.	FT		T		Ph.D.	4	6	2	5
Kilgen, Marilyn	08/23/1971	Prof.	FT		T		Ph.D.	6	6	2	10
Lasseigne, Alex	08/25/1980	Prof.	FT		T		Ph.D.	9	9	0	5
Ferrara, Allyse	01/10/2002	Assoc. Prof.	FT		T		Ph.D.	6	6	3	5
Fontenot, Quenton	07/22/2002	Assoc. Prof.	FT		T		Ph.D.	7	9	3	5
Schultz, David	08/17/1992	Assoc. Prof.	FT		T		Ph.D.	7	9	1	5
Zou, Enmin	08/21/2001	Assoc. Prof.	FT		T		Ph.D.	7	9	1	10
Nathaniel, Rajkumar	01/11/2005	Assoc. Prof.	FT		T		Ph.D.	7	9	1	20
Pierce, Aaron	08/15/2006	Asst. Prof.	FT			NT	Ph.D.	7	9	3	10

## 7.2 Narrative of Faculty Accomplishments

The Department of Biological Sciences, particularly the MMEB Program faculty, has a long tradition of research and academic and industrial collaboration. In the past five years, graduate faculty have been awarded over \$13 million (M) in competitive research and facility improvement grants. This level of funding is comparable to competitive funding at larger, research-oriented universities. Graduate faculty members continue to be very active in publication, professional presentation, and in service to the university and state.

In the past five years, the university has recognized the outstanding accomplishments of MMEB Program faculty by awarding one Distinguished Service Professorships, one Presidential Award for Teaching Excellence, and four Apple Awards. In addition, several faculty members have been honored with appearances in *Who's Who Among America's Colleges and Universities*.

FACULTY RESEARCH / SCHOLARLY ACTIVITIES							
Name	Number of Refereed Publications	Number of Citations	Grants		Number of Presentations		Number of Exhibitions
			Number	Amount	Paper	Poster	
Doucet, John	22	-	13	0.819M	37	3	-
Melancon, Earl	7	-	7	0.375M	17		-
Boopathy, Ramaraj	20	-	20	5.9M	84		-
Kilgen, Marilyn	15	-	10	1.9M	7		-
Lasseigne, Alex	0	-	-	-	-	-	-
Ferrara, Allyse	7	-	23	1.6M	93		-
Fontenot, Quenton	6	-	10	0.620M	81		-
Schultz, David	0	-	1	0.135M	2		-
Zou, Enmin	15	-	17	0.613M	16	8	-
Nathaniel, Rajkumar	3	-	15	0.796M	23		-
Pierce, Aaron	7	-	5	0.309M	21	10	-
LaFleur, Gary	3	-	6	0.178M	5	1	-

FACULTY SERVICE AND AWARDS							
Name	Committees				National/ State Committees	Professional Committees	Awards / Recognition
	University	College	Program	Department			
Doucet, John	6	2	1	13	1	2	7
Melancon, Earl	1	1	1	0	6	0	0
Boopathy, Ramaraj	7	0	1	7	0	2	3
Kilgen, Marilyn	2	1	1	1	1	0	1
Lasseigne, Alex	0	0	1	0	0	0	0
Ferrara, Allyse	1	2	1	3	14	4	4
Fontenot, Quenton	2	2	1	6	5	1	2
Schultz, David	3	0	1	0	0	0	0
Zou, Enmin	1	0	1	3	0	0	4
Nathaniel, Rajkumar	0	0	1	0	0	0	0
Pierce, Aaron	3	0	1	5	4	3	0
LaFleur, Gary	4	1	1	6	0	0	3

### 7.3 Staffing Changes

#### 7.3.a. What staffing changes have occurred in the last five (5) years?

Several administrative changes have occurred in the Department in the past five years. (1) Coordination of the MMEB Program has changed from Boopathy to Fontenot. (2) Doucet's position with regard to the University Honors Program has changed from Coordinator to Director. (3) Head of the Department has changed from Melancon (interim and then full) to Doucet (interim). (4) A Farm Use Coordinator position has established in the department to oversee activities of the University Farm in the absence of a farm manager, as well as research usage and other oversight, and that position has been assumed by Fontenot.

A number of MMEB faculty and staff changes have also occurred in the past five years. (1) Since the summer of 2006, Dr. Tom Soniat retired from university service. Dr. Soniat was active in marine biology research and served as mentor to multiple MMEB students. Currently, the university has not replaced Dr. Soniat. (2) In summer 2009, Dr. Jill Kryzcki resigned as instructor to return to private veterinary practice. Although Dr. Kryzcki was not a member of the MMEB Program faculty, her departure nonetheless impacts the MMEB Program, as classes she taught are absorbed by other faculty. (3) The departmental level-3 administrative assistant resigned from employment, and this position has not yet been filled.

#### 7.3.b. Staffing Needs

To maintain the high level of faculty productivity and MMEB student training, the university must strongly consider replacing retiring and resigning faculty. In addition to departure of Dr. Soniat and Dr. Kryzcki as described in 7.3.a., three highly productive senior MMEB Program faculty have begun discussions regarding their respective retirement from university service, and it is nearly a certainty that these three faculty will have retired by the next program review in 2016. In addition, due to the unfortunate budgetary position of state colleges and universities in this review period, MMEB faculty may need to investigate employment opportunities in more stable academic environments. Replacing any component of the current departmental workforce is not crucial but *essential* to minimally maintaining the current,

competitive level of research and productivity, including and especially the number of MMEB graduates.

Further, given the long-term prospects for scientific opportunities consequent to coastal issues (land loss, hurricanes, oil spill), the demand for graduate-trained personnel will continue to increase, and the university must be ready to address this challenge by continuing and *growing* its support of the MMEB Program. Growth of the program will, in turn, help the university maintain its Tier status and help the university survive projected budget cuts through generation of indirect costs.

Further, maintenance of the 300-acre University Farm is an integral component of the MMEB Program. Since discontinuance of the Agriculture Program by the university in 2010, the Farm has rapidly transformed into a field research station wholly supported by sponsored research generated by the MMEB Program faculty. Unfortunately, with loss of that program, the university consequently eliminated funding for a Farm Manager, despite the reality that management and maintenance of that property is an inescapable reality. General maintenance of fields, repairs, and security are currently undertaken by a variety of persons, including personnel from MMEB faculty, MMEB students, university maintenance, and university police. Due to the full time position demands of these personnel, needs and the Farm are addressed reactively and not proactively. Without at minimum a part-time manager, these needs will continue and are likely to increase as the facility ages. Further, such a position is essential for program growth, the opportunity for which at this time in Louisiana has high potential.

### 7.3.c. Rationale for Staffing Needs.

The rationale for staffing needs is addressed in Section 7.3.b. In addition, the MMEB Program would benefit by complete fulfillment of the 2000 BOR mandate for full funding, which includes the following \$80,000 recurring expense:

- 1 instructor (\$35K + \$13K fringe)
- 3 GTAs to satisfy full commitment of 12 (\$24K)
- Increase salary of 4 GTAs to \$10K (\$8K)

## **7.4 Strengths or Specialists Not Existing in Present Faculty.**

Currently, the MMEB Program would strongly benefit from the expertise of a doctoral level wetlands plant physiologist capable of teaching MMEB and undergraduate courses and directing thesis research. This is a deficiency in the ability of the MMEB Program to offer a comprehensive educational and research agenda to students here in coastal Louisiana. With such state/national emphasis on coastal Louisiana, a wetlands plant physiologist is an integral addition to developing the M.S. program into a comprehensive educational unit.

## **7.5 Special Faculty Services**

### 7.5.a. What professional development program(s) or activities, other than provided by the university, does the department have for its faculty?

The department encourages its faculty members to attend professional meetings for research development and to stay current in their field. Many faculty members also attend meetings and workshops for pedagogical faculty development. Although the departmental travel

budget does not permit support of these extramural activities, all MMEB Program faculty integrate such costs for professional development into sponsored grants and contracts with no cost to the university.

MMEB Program faculty are actively involved in organizations such as the American Microbiology Association, the American Society for Human Genetics, the Federation of Associated Societies in Experimental Biology, the American Fisheries Society, the National Shellfisheries Association, and many others.

Graduate faculty members are also associated with research organizations and laboratories such as the National Institute of Health, the National Science Foundation, Oakridge National Laboratories, Louisiana Biomedical Research Network, and Cold Spring Harbor Laboratory.

The nature of the thesis process is inherently developmental for faculty by exposing them to alternative ideas and engaging them in discussions and challenged regarding new scientific results. Thus, the MMEB program provides professional development by faculty service on thesis committees, as well as by extending invitation to attend both undergraduate (BIOL 401) and graduate (BIOL 501) student seminars. Finally, MMEB Program faculty often deliver or sponsor presentations at the university for the benefit of faculty and students, notably the Speaking of Science lecture series (sponsored by the College of Arts and Sciences), the Doucet Memorial Biomedical Lecture series (sponsored privately), and Faculty Research Week presentations and other events associated with the university's annual *Jubilee—A Festival of Arts and Humanities*.

#### 7.5.b. What other services are the faculty members providing?

MMEB Program faculty are often called upon by colleagues at other institutions for dialogue or collaboration on research projects. Diverse civic organizations, such as Rotary Club and public schools, regularly call upon faculty to present research and educational topics. A number of special services involving MMEB students, as well as faculty providers, are listed below:

- Ferrara, Fontenot, and Lafleur have involved MMEB students in sponsored service learning projects.
- Doucet provides sponsored public health outreach across Louisiana and is the sole Certified Public Health Geneticist in the state.
- Kilgen leads the federally-funded Institute for Seafood Studies
- Melancon serves as Chair of the Barataria-Terrebonne National Estuary Foundation.

A comprehensive list of MMEB faculty expertise is tabulated below.

Faculty	Present Graduate Faculty Specialized Competency
Ramaraj Boopathy	environmental biotechnology, microbial ecology, microbiology, public health
John Doucet	human & molecular genetics, genomics, bioinformatics, technical writing, public health genetics, crustacean genomics
Allyse Ferrara	conservation ecology, fish age & growth, fisheries management, population modeling
Quenton Fontenot	aquaculture, fish age & growth, fish physiology, large river floodplain ecology
Marilyn Kilgen	cell biology, microbiology, virology, seafood safety
Gary Lafleur	cell and developmental biology, environmental physiology
Alex Lasseigne	legumes, Louisiana flora, weed, wetland plants
Earl Melancon	coastal restoration impacts, estuarine ecology, oyster ecology
Rajkumar Nathaniel	enteric pathogen virulence, host-pathogen interactions
David Schultz	ecology, evolution, fish ecology, life history evolution, mathematical biology
Enmin Zou	animal physiology, environmental toxicology
Aaron Pierce	coastal birds, bottomland hardwood ecology

## 8. Departmental Objectives Related to the Program (see Part 1 of Level III Annual Plans)

### 8.1 Annual Plans for Program

*What objectives related to your program has your Department achieved within the past five years? (As reflected in Part I of the Level III Annual Plan Assessments for past five years)*

- The department continues to hire faculty with potential for regional and national research and teaching eminence.
- The department continues to develop and assess its diversity of graduate courses offered to student to stay current with changing state and national needs for professional scientist in the job market.
- The department continues to replace outdated equipment for instructional and research purposes, mostly through aggressive grant writing.

### 8.2 Changes in Departmental/Program Objectives

*What changes, if any, have occurred in program objectives within the past five years?*

The most significant changes for the department have been associated with inclusion and then elimination of the Agriculture program. This process incurred loss of Dr. Tim Durham, a plant pathophysiologicalist who was employed for only one year and who could have eventually mentored one or more MMEB students in thesis research. The inclusion of Agriculture also placed the 300-acre University Farm under the supervision of the department, and the Farm is currently being transferred into a research station where MMEB faculty and students are and may continue to conduct field research.

Biology graduate (and undergraduate) faculty and department staff have been significantly challenged to balance the workload needs between the graduate and undergraduate programs, and the upkeep of the Nicholls farm as it becomes more integral to the development of the M.S. program.



### 8.3 Anticipated Changes in Departmental/Program Objectives

What changes, if any, in program objectives are being considered for the future (ex: expansion? downsizing? other?) Why? To what extent will the change in objectives affect changes in the program? How will these changes affect enrollment, staffing and costs?

The Department's objective of providing a sound education to students will not change. The challenge is to accomplish this with a high-achieving faculty and staff working at high teaching-research-service loads to maintain a graduate program together with a historically strong undergraduate program.

### 8.4 Do you believe the resources allocated to this academic program are adequate in proportion to other programs in your college? If not, provide data and information to justify your answer.

Curricular and research endeavors in the biological sciences face tremendous intellectual and financial challenges worldwide due to the unprecedented rate of scientific discovery and technological advancement of the twenty-first century. The MMEB Program is not different from other programs in this regard. For this reason, it is more useful to address resources directly rather than by comparative allocation.

Beyond these inherent financial and intellectual challenges, Louisiana provides additional challenges to biological education and research. Due to increased interest and attention to coastal issues consequent to recent disasters (major hurricanes, oil spill), the university and the program must remain competitive and take advantage of these unique opportunities not only to fulfill both its goals and the mission of the university but also for growth and eminence. The following specific resources should be considered for allocation to the MMEB Program for maintenance of competitiveness, abiding by BOR guidelines for course load and minimum number of graduates, and, as importantly, continued growth.

- **Faculty.** The university must prepare to replace MMEB faculty as they retire or resign, and before the next program review in 2016 this will likely involve hiring four replacement, research-level, Ph.D.-holding professors. Further, the university should anticipate program growth and prepare for enlarging the MMEB faculty with further research-level, Ph.D.-holding professors.
- **Classroom Space.** The university must facilitate growth of academics in the biological sciences by making more classroom space available, particularly in Gouaux Hall. This can easily be accommodated by dedicating areas currently occupied by the Culinary Arts program when they move to a new building in the next few years.
- **Publication Funds.** Print and online journals frequently require page charges to publish scientific reports, and these funds cannot regularly be procured through sponsored programs. For this reason, the university should consider dedicating secure funding on an annual basis to subsidize publication of MMEB work. This is a key element to competitiveness at the national level.

- **Research Space.** As MMEB faculty, the number of students, and instrumental capacity grows, the university must prepare to dedicate more space to the MMEB program to permit growth. This can easily be accommodated by dedicating areas currently occupied by the Culinary Arts program when they move to a new building in the next few years.
- **Maintenance and Preventive Maintenance.** The university must continue to support maintenance of instruments used for MMEB teaching and research. As research capacity grows, the number and complexity of instruments increase. While with few exceptions, new instrumentation has been procured through sponsored programs, nearly all sponsoring organizations insist that “maintenance” is the responsibility of the institution. Therefore, essential instrumentation cannot be maintained through sponsored funds. This is a key element to MMEB research and educational stability.
- **Travel.** There is a need for graduate faculty and students to have sufficient travel funds for professional meetings to maintain competitiveness. This is a key element to the development of collaborative and competitive research.
- **Sabbaticals.** The unprecedented rate of scientific discovery and technological advancement in the biological sciences make the need for current expertise crucial to an academic program in this discipline. For this reason, the university should support requests for faculty sabbaticals in the biological sciences. This is a key element to faculty development.
- **Farm Management.** There is a need to fund another position at the Nicholls farm; one staff member cannot maintain this facility. This is a key element to the development of the farm as a learning tool for students at the undergraduate and graduate levels.

A fundamental strength of the Biology Department is the way research-grade equipment and educational supplies are integrated at the undergraduate and graduate levels. This allows students the opportunity to become proficient in laboratory and field skills using state-of-the-art methods. Development of student’s proficiency with instrumentation prepares them for graduate work.

## 9. Informational Resources/Libraries

According to figures provided by Ellender Memorial Library, expenditures for biological sciences have increased since inception of the MMEB Program, likely due to the increased need for specific titles and resources associated with the MMEB program. These specific needs include subscription to Aquatic Sciences and Fisheries Abstracts (ASFA), which is an essential service for rapid assessment of literature in MMEB-associated fields. Library expenditures in biological sciences specifically for the past five years have remained relatively steady, with an academic year average of over 66K.

In addition to Ellender Memorial Library, the library at the facilities of Louisiana Universities Marine Consortium (LUMCON) is accessible to MMEB students and faculty. Although this library is located in Cocodrie, LA, which is 1-1.5 hours travel distance from the

Nicholls campus, faculty and students utilize this library and its marine-subject holdings as necessary.

Due to extensive need for reports from the scientific literature, MMEB students and faculty make extensive use of iLLiad and the electronic databases (including ASFA) available through Ellender Memorial Library as a member of the Louisiana Libraries Network (LOUIS). LOUIS is essential to academic literature investigations at all universities, and it is crucial in the face of budget cuts to higher education to fight to support this service, especially at Nicholls with regard to the MMEB Program.

To date, therefore, we believe that the holdings are adequate. However, because our discipline is the most rapidly changing in the sciences, particularly in the molecular and medical fields, expenditures commensurate with rises in publishing and subscription costs will be required to maintain the quality of the program. In addition, new fields like coastal restoration, in which the university is rapidly becoming involved, cannot be supported by deducting funds from existing subscriptions and will require new expenditures.

***Biological Sciences Library Expenditures,  
2005-2010: Books, databases and journals.***

*Data provided by Carol Mathis, Library Director.  
The five-year average for expenditures is \$66,546.*

2005-2006	\$70,545
2006-2007	\$53,041
2007-2008	\$70,631
2008-2009	\$70,025
2009-2010	\$68,489

## **10. Facilities and Equipment**

### **10.1 Current Facilities and Equipment**

The Department of Biological Sciences currently occupies space in both Gouaux and Beauregard Halls. This space is used for both undergraduate and MMEB instruction. Gouaux Hall is currently shared with the Department of Applied Sciences and the Chef John Folse Culinary Institute (JFCI). Until Fall 2010, all teaching and research laboratories for marine biology, as well as the Plant Taxonomy Laboratory and Herbarium, were located in Peltier Hall. With completion of its renovation in 2010, Beauregard hall became the new location of these rooms. A summary of spaces in the two buildings is summarized below.

***Gouaux Hall lecture rooms.*** Three rooms are traditionally dedicated to biology instruction, but they are also frequently used by other departments:

- 102 Gouaux Hall (100 seats)
- 301 Gouaux Hall (80 seats)
- 101 Gouaux Auditorium (300 seats)
- 

***Gouaux Hall teaching laboratories.*** Each laboratory has 24 stations and supports hands-on instruction for multiple laboratory courses:

- 201 Gouaux Hall
- 203 Gouaux Hall
- 204 Gouaux Hall
- 209 Gouaux Hall

- 211 Gouaux Hall
- 304 Gouaux Hall

***Gouaux Hall computer laboratories.*** Rooms 305 and 401 Gouaux Hall each have 24 computer stations and serve as computer teaching laboratories. Both labs are shared with the Department of Applied Sciences and are utilized for multiple courses in both departments.

***Gouaux Hall offices.*** Rooms 216, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, and 315 each provide office space one faculty member. In addition, one faculty member's office is located in the Honors Program Office in 111 Gouaux Hall. Rooms 115, 116, 212, 213, 214, and 215 Gouaux Hall each provide office space for 2-4 graduate students.

***Beauregard Hall classrooms.*** Each of these 30-station rooms, 105, 107, 149, 151, and 153 Beauregard hall, are specially-designed classrooms to accommodate both lecture and laboratory instruction. The university's Herbarium is also housed in 149 Beauregard Hall.

***Beauregard Hall offices.*** Biological sciences faculty currently occupy five office rooms in Beauregard hall, and an additional three each provide office space for 2-4 graduate students.

***Miscellaneous rooms.*** A number of small storage and preparation rooms are located in each building. These small rooms are typically located adjacent to 1-3 teaching laboratories. An unnumbered room in Beauregard Hall, between classrooms 105 and 107, houses the university's Natural History Collection.

***Research laboratories.*** Prior to 2002, Gouaux Hall had four laboratories used for research. With the growth of the MMEB Program, that number has doubled through 2004. In the past five years, the two marine biology laboratories formerly located in Peltier Hall have joined three others in the newly renovated Beauregard Hall, bringing the total number of research laboratories to 13. Each of these labs in the past five years has been home to one or more MMEB students. Descriptions of the major research / graduate student training laboratories are below:

*Molecular Genetics Laboratory (202 Gouaux Hall).* The University invested approximately \$54,000 in 1998-99 to complete construction and setup in Gouaux Hall of a "stage one" Molecular Biology core laboratory. This facility was established to support the research of Dr. John Doucet. Other faculty members who use similar techniques in teaching and research have full access to the facility, as it serves as a core lab for molecular biology. Several BOR LEQSF Enhancement Grants worth over \$200,000 were received and have greatly increased the capabilities of this laboratory. *Capacity* - 800 sq. ft. research space and 400 sq. ft. tissue culture space. *Pertinent capabilities*- supports research and education involving DNA, RNA, and protein chemistry, including gene discovery, cloning, comparative genomics, and bioinformatics, while housing the following instruments: manual DNA sequencing system with sequencing gel apparatus, automated DNA sequencing, real-time PCR, power supply, gel dryer, and cold trap; three thermocyclers, semi-dry electroblotter, 6 agarose and 4 acrylamide gel units, Eppendorf micro-centrifuge, Fisher micro-centrifuge, IEC refrigerated bench top centrifuge, shaker-incubator, electroporator, Analytical balance, BioRad Microplate reader, BioRad

Molecular Scanner, BioRad Gel Doc Electrophoresis Imaging System, BioRad Screen Eraser Kit, Biorad Real-Time Thermocycler, Cryosystem Cryogenic Freezer, three Dell desktop computers; fume hood, isolated biosafety hood, isolated plant and animal tissue culture room with independent climate control, backup emergency circuits for all major equipment.

*Environmental Physiology research laboratory (205 Gouaux Hall).* This laboratory is fully equipped for environmental physiology and biotechnology research. It is currently used by Dr. Gary LaFleur who uses the laboratory for work in characterizing biomarkers for environmental exposure to xeno-estrogens. *Capacity* -700 sq. ft of research space and 200 sq. ft. prep room. 4 research tables equipped with water, gas, and electricity. *Pertinent capabilities*- supports research and education in endocrine disruption including the development of biomarkers for reproductive health, toxicology assays using aquatic organisms, and immunohistochemistry. The lab houses the following instruments: Sorvall refrigerated centrifuge, EKG minigraphy, Mettler Analytical balance, 3 Lafayette Instruments physiographs, Capni-Con blood oxygen analyzer, Wescor vapor pressure osmometer, Dual-beam Spectrophotometer, Nikon upright Epifluorescent Microscope, Titanium water temperature control unit, 50 gal circulating Bead filter, (4) 400 gallon fiberglass tanks, 8 ft fiberglass pirogue.

*Microbiology and Virology research laboratory (208 Gouaux Hall).* This laboratory is fully equipped for microbiological and virological research and serves as the laboratory of Dr. Kilgen. *Capacity* - 800 sq. ft.; three research lab tables and front desk, 100 sq. ft. prep room, and 100 sq. ft. electron microscopy (EM) room; cabinets and shelves all around perimeter of main lab; *Pertinent capabilities*- complete virological, microbiological and tissue culture facility. JEOL scanning electron microscope with accessory preparation equipment is also in separate room in this laboratory; water, sinks, electricity and gas on lab tables.

*Bayosphere Research Laboratory (303 Gouaux Hall).* The University invested funds to complete the renovation of 303 Gouaux Hall. Renovations were complete by March 2004. This facility was established to support the research of Dr. Allyse Ferrara and Dr. Quenton Fontenot. The majority of research conducted in this lab is fish related, but also has included wetland plants and *Anolis* spp. lizards. Other faculty members that have an interest in fisheries research have access to this lab. *Capacity* – Approximately 800sq. ft. research space that includes a photoperiod controlled research space. *Pertinent Capabilities* – supports research and education involving fisheries, aquaculture, wetland plant husbandry, *Anolis* lizards, and general ecology. Housed within the Bayosphere Research Laboratory are two six-foot diameter tanks that are equipped with aeration and bead filters. There are also two 3 x 2 X 1 ft. square tanks connected to a common recirculating filter system. Four water chillers and four water heaters are kept in the Bayosphere Research Laboratory for temperature control studies. The Bayosphere Research Laboratory is also equipped with a spectrophotometer, pH meter, two YSI water quality meters, and a Secchi disc. A large (8 x 3 ft.) stainless steel necropsy table including drain allows samples to be worked up in the lab. There is also a chest freezer and an upright refrigerator/freezer to house samples and reagents. Within the photoperiod

control room, four wooden raceways have been installed, which allow replicated aquarium studies to be conducted

*Infectious Disease and Immunology Laboratory (302A Gouaux Hall).* Nicholls State University spent \$52,470 in renovating 450sq.ft. this of laboratory space for Dr. Nathaniel who was hired in Spring 2005. In 2006 Dr. Nathaniel received \$79,000 from the LA BoR to Enhancement Immunology education in the department. The laboratory currently houses several pieces of equipment that are used in both teaching and research. These include a high performance floor model Beckman Avanti centrifuge, tissue culture hood and incubator, thermal cycler, spectrophotometer, DNA and Protein gel electrophoresis equipment, X-ray film processor and small laboratory equipment such as pH meters, balances and refrigerators. *Pertinent Capabilities-* include isolation of bacterial pathogens, molecular characterization of environmental and clinical isolates by DNA extraction and analysis of virulence genes by restriction enzyme analysis and PCR. Quantification of protein expression profiles by immunoblotting, ELISA and Immunofluorescence techniques. Polyclonal antibody production and testing.

*Environmental Toxicology Research Laboratory (302B Gouaux Hall).*

This research laboratory was renovated in 2003 by the University to accommodate Dr. Zou's research needs in environmental toxicology. It has later been enriched with various research equipment using funds of BOR LEQSF enhancement grants and research grants. *Capacity* – 500 sq. ft. research space with one research table equipped with water, gas and electricity and one exhaust fume hood. *Pertinent capabilities* – The laboratory currently houses a number of instruments, including laminar flow hood, refrigerated Eppendorf centrifuge, 2 general-use Eppendorf centrifuges, Quantech digital filter fluorometer, carbon dioxide incubator, digital compound microscope, digital water bath, thermocycler, real-time thermocycler, Accumet AR40 DO meter, inverse microscope, and analytical balance. With these pieces of equipment this laboratory is capable of acute and chronic toxicity tests, biochemical analysis of environmental samples, cell and tissue culture, and RT-PCR.

*The Climate Control Wetlab (Gouaux 206).* This lab supports research and education using aquatic animals. *Capacity-* 800 sq. ft. *Pertinent capabilities-* the lab is used to house animals needed for various courses, as well as animals being used by students and faculty for individual experiments. The lab contains two small rooms each with four shelves of fiberglass coated wet tables, and independent photoperiod and climate control units. Two larger wet tables are housed in the main room, and these are currently supporting a titanium chiller unit, bead filter, and three large fiberglass tanks.

*The Environmental Biotechnology lab (Gouaux 210).* This lab was renovated in 2002 by the university and supports research and education in chemical analysis including bioremediation of contaminated soils, biodegradation of agricultural byproducts, and chemical assays of environmental sites. *Capacity-* 700 sq ft. with two large research workbenches and counters and cabinetry around the walls. It has a 100 sq. ft. prep and chemical storage room. *Pertinent capabilities-* has sinks, water, electricity and gas at lab benches. Major equipment includes gas chromatograph (GC), high performance liquid

chromatograph (HPLC), purge and trap unit, shaker table, spectrophotometer, sonication equipment, centrifuge, anaerobic gassing manifold, anaerobic chamber. The lab contains a large ventilated hood, and a large preparation room is adjoining. The lab houses the following instruments: Suprex Prepmaster, Suprex Modifier pump, Varian 1000 Hall Detector, Varian 9070 Fluorescence Detector, Varian 9050 Variable Wavelength UV-Vis Detector, Varian 9012 Solvent Delivery system, Varian 9100 Autosampler, Varian 3400 Gas Chromatograph, Dynatec Autosampler, Nalgene Desk-top hood, SRI Portable Gas Chromatograph, Tekmar LSC 2000, Beckman 640B Spectrophotometer

*Marine and Estuarine Biology Research Laboratory (109 Beauregard Hall).*

This facility supports research and education in freshwater, estuarine and marine fauna. *Capacity* - 650 sq. ft. of research space and 3 research lab tables. *Pertinent capabilities*- freeze dryer; an extensive collection of aquatic animals, Benchtop Freeze-dryer, Maxima Vacuum Pump, Cahn Microbalance, Mettler Analytical balance, Microbiological Chamber, Refrigerator incubator, Hirayama autoclave, two 100ft gillnets and a 40ft seine.

*Shellfish Research Laboratory (111 Beauregard Hall).* This is an aquaculture and analytical water quality room that is temperature controlled. *Capacity* - 500sq.ft. with two chemistry benches and a work table. *Pertinent capabilities* - The lab contains the following, equipment: a 250gallon capacity seawater recirculating system with bead filters and titanium water temperature control units, a Nanopure water purification system, fluorometer, spectrophotometer, digestal digestion apparatus, Hydrolab water quality field instrument, water demineralizer, Rudd Heat pump, IR spectrophotometer, computer, drying oven, convection oven and centrifuge.

*Microbiology and Molecular Biology Laboratory (204B Gouaux Hall).*

*Capacity*-800 sq. ft. and 100 sq. ft. prep and chemical storage room and 24 lab stations. *Pertinent capabilities*- All equipment required for microbiology, immunology, and molecular biology of the cell laboratories. Applied and Environmental Microbiology is taught in this room. Adjoining this lab are a very large preparation room with a ventilation hood and autoclave room with two AMSCO autoclaves and wash area. The room also houses the following instruments: Forma Ultra Freezer, Precision Scientific Water baths, Precision Scientific Model 6 Incubators, 2 AMSCO 2022 Autoclaves, JEOL T300 Scanning Electron Microscope and Support Equipment, Nikon Inverted Epifluorescence Microscope, Laminar Flow Isolation Chamber, Ultraspeed Refrigerated RC 5B centrifuge, Hirayama Table top Autoclave, Sample Dry Keeper, student grade Spectrophotometers, Phase contrast/ fluorescence microscope, light microscopes.

*Plant Taxonomy teaching/research laboratory and herbarium (105-107 Beauregard Hall).* The Plant Research Lab supports research and education on the systematics of plants and the distribution of non-indigenous species in Louisiana. This laboratory is used by Dr. Alex Lasseigne to teach Plant Taxonomy and as a research laboratory. It houses the Departmental herbarium, of which Dr. Lasseigne is the curator. *Capacity*- 1150 sq. ft. (including herbarium) lab space with 24 lab stations and 145 sq. ft. of prep room *Pertinent capabilities*- sinks, water, electricity and gas at lab tables. The lab

contains a large ventilated hood, a plant-drying chamber, two counter-height refrigerators; a large preparation room (145 sq. ft.) is adjoining. The herbarium contains 19 metal herbarium cases containing approximately 26,000 vascular plant specimens and the plant illustration collection; has two wood herbarium cases containing 6,500 seed collections, and shelf storage for 750 bulk seed collections, plant identification books and the reprint collection has sinks, water, electricity and gas at lab tables. The lab includes: plant tissue culture incubators, a computer imaging analysis system, a portable photosynthesis assay system, four Lane Herbarium cases, with a 800 sq foot greenhouse available for experimentation and grow out. The lab contains a large ventilated hood, and a large preparation room is adjoining.

***Gouaux Hall Greenhouse.*** An 800 sq. ft. greenhouse adjacent to Gouaux Hall supports research and education by providing space for culture of animals and plants. The greenhouse contains four thermostat controlled electric furnaces and four thermostat controlled cooling fans, 12 large culture tables, and a soil mixer. The greenhouse continues to provide desperately needed space for duplicate tanks, large culture vessels, and field equipment. After damage by Hurricane Katrina, it was renovated.

***Multi-Media Production Room.*** Room 215 Gouaux Hall houses a facility for scanning, presentation, slides, and poster production (110 sq. ft.), quipped with a PC, color scanner, HP large format Plotter, Xerox color phaser printer, and slide scanner.

***Animal Facility.*** Room 207 Gouaux Hall is a United States Department of Agriculture (USDA) licensed and inspected and National Institutes of Health (NIH)-compliant small animal care facility of 250 sq. ft. (207 Gouaux Hall). The facility includes 12 USDA approved stainless steel rabbit cages and frames, 12 stainless steel rat/guinea pig cages with frames, separate heating and air. The facility has two animal rooms and one large adjoining preparation room. It is used for immunological research and teaching.

***University Farm.*** The 300-acre Farm contains two concrete slab buildings (Sugar Lab [now a field research classroom] and a Farm Office), two greenhouses, a large tractor barn, and two greenhouses.

***Field Research Vehicles.*** These include:

- 24ft aluminum boat and trailer with electronics on console
- 16ft aluminum boat and trailer
- 16ft aluminum boat and trailer with electronics on console
- 4-wheel drive ATV with trailer
- 4-wheel drive ATV-mule
- Two Biology trucks received in the 2006-07 fiscal year

## **10.2. Needed Additional Facilities**

The immediate facilities needs of the MMEB Program are summarized as follows:

- *Metal Boat Shed with concrete slab and protective fencing*



*Cost: \$25,000 (one-time expense)*

Must maintain and adequately protect the Biology Department's new field vehicles. Presently spread out at Nicholls farm and at Maintenance building. All vehicles are out in the weather with no protection from the UV-damaging light and rain. See Section 10.1 above for list of field vehicles.

- *Acoustic Installation in 102 and 301 Gouaux Halls.*

*Cost (estimated): \$20,000 (one-time expense)*

Both these heavily used classrooms are sheetrock and concrete chambers with severe echo problems that have not been improved for sound since creation of the building over 20 years ago. To improve delivery of instruction, we suggest installing acoustical materials.

- *Ventilation systems in Gouaux Hall labs*

*Cost (estimated): \$20,000 (one-time expense; \$10K each)*

Biology has immediate need for ventilation systems for Gouaux Rooms 304 and Room 203. We currently have formalin-preserved specimens presenting a potential health hazard to students.

- *A Clean Room in Gouaux Hall.*

*Cost: unknown (one-time expense)*

Ultra sensitive techniques, such as mammalian cell culture and DNA amplification by PCR, are sensitive to contaminants common in old buildings, including bacteria, mold, mildew, and nonliving airborne particles. The department requires a dedicated room with non-seam surfaces, self-ventilation, and UV-irradiation to permit research with and instruction of these sensitive techniques.

### **10.3 Needed Additional Equipment:**

A list of graduate equipment required for continued by the department is annotated as follows:

- *Large air pumps to supply air to wetlab facilities.*

*Cost: \$3,000 (one-time expense)*

Currently we are using small aquaria air pumps to aerate fish tanks. These pumps have a short lifespan and take up valuable electrical resources. It would be more efficient to supply the Climate Control Wetlab, the Greenhouse, and any future wetlabs each with one large air pump that could be piped into all tanks.

- *3-person 350 hp airboat*

*Cost: \$40,000 (one-time expense)*

Allows access to substantial amount of ecosystems within Nicholls service area that is not accessible by conventional outboard motors. Airboat would be useful to students and faculty engaged in wetlands research.

The department has written and obtained several enhancement grants worth over \$5 million in the last five years. This has allowed us to purchase several pieces of essential

instrumentation for student and faculty research in microbiology, molecular biology, marine biology, and physiology. It also permitted us to purchase several pieces of equipment for modern teaching methods and digital delivery of lectures. Although these funds were extremely beneficial, our enhancement grants were generally only funded at 50% of the requested amount. Nonetheless, the high grantsmanship activity of MMEB faculty has saved the university from the need to subsidize instrumentation and infrastructure for teaching and research.

# Appendices

# APPENDIX A

## FACT SHEET for 5 YEAR PROGRAM REVIEW

Date: October 22, 2010

Program: Marine and Environmental Biology

Department: GRAS

Department Head: Dr. John Doucet

Degree Classification: Master

**References Section 6.1-b**

TERM	Number of First-Time Students	Avg. ACT of First-Time Students	Avg. High School GPA of First-Time
Fall 2005	6	25.00	2.93
Fall 2006	5	27.00	3.91
Fall 2007	2	21.00	
Fall 2008	11	26.17	3.96
Fall 2009	7	22.50	3.22
Fall 2010	10	25.00	3.87

Notes: Number of First-Time Freshmen with the Average ACT Composite Score and the Average High School GPA.

**References Section 6.1-c**

YEAR	Number of Majors		Avg. ACT of Majors	
	Fall	Spring	Fall	Spring
2005-2006	23	24	23.73	22.92
2006-2007	23	22	24.33	24.18
2007-2008	19	17	23.25	23.14
2008-2009	25	23	24.27	25.25
2009-2010	24	20	23.75	23.67
2010-2011	20		24.67	

**References Section 6.3-a**

Cohort Semester	First-Time Graduate Cohort		Graduation Rates - Year of Calculation	Graduates within 4 Years		4 Year Graduation Rate		# Still Enrolled After 4 years		Attrition Rate	
	Program	NSU		Program	NSU	Program	NSU	Program	NSU	Program	NSU
Fall 2002	5	42	2005-2006	1	21	20.0%	50.0%	0	2	80.0%	45.2%
Fall 2003	6	32	2006-2007	0	14	0.0%	43.8%	0	2	100.0%	50.0%
Fall 2004	4	48	2007-2008	2	32	50.0%	66.7%	0	1	50.0%	31.3%
Fall 2005	4	25	2008-2009	1	21	25.0%	84.0%	0	0	75.0%	16.0%
Fall 2006	4	39	2009-2010	0	22	0.0%	56.4%	0	0	100.0%	43.6%

Note: The Cohort is the number of Full-Time First-Time Graduate students (including all pre-masters programs) for a particular Fall term.

The Number of Graduates is the number of Cohort students who have graduated within 4 years of the cohort term.  
 The Graduation Rate = Number of Graduates / Cohort  
 The Number Still Enrolled is the number of Cohort students who were still enrolled in their program the Fall semester after the Graduation Rates Year.  
 The Attrition Rate = (Cohort - Number of Graduates - Number Still Enrolled) / Cohort.

Provided by the Office of Assessment and Institutional Research

# APPENDIX A

## FACT SHEET for 5 YEAR PROGRAM REVIEW

Date: October 22, 2010

Program: Marine and Environmental Biology

Department: GRAS

Department Head: Dr. John Doucet

Degree Classification: Master

### References Section 6.3-b

YEAR	Avg. # of Sem. to Graduate	
	Program	NSU
2005-2006	7.44	7.65
2006-2007	4.90	8.13
2007-2008	6.30	7.72
2008-2009	6.25	6.81
2009-2010	5.75	7.52
2010-2011		

Note: The Average Number of Semesters to Graduate is an average of the number of semesters it takes for students within the same graduation class to graduate.

### References Section 6.3-b

YEAR	Degrees Awarded	Avg. ACT of Graduates
2005-2006	9	24.00
2006-2007	5	26.50
2007-2008	5	23.75
2008-2009	2	
2009-2010	12	24.00
2010-2011	0	

## FACULTY PROFILE

Due to the nature of the data requested for this portion of the report, it is difficult for our office to identify faculty associated with a specific program. Attached is a listing of all faculty members listed in the budget for your department. This will enable you to choose the faculty members with teaching responsibilities specifically for the program under review.

To obtain the Number of Faculty Exceptions, please access the Rosters of Instructional Staff Report on our website at:  
<http://www.nicholls.edu/ir/Publications/rosters.html>



**APPENDIX C**  
**EVALUATION TEAM REPORT**

Program: \_\_\_\_\_

Department: \_\_\_\_\_ Department Head: \_\_\_\_\_

Date of this report: \_\_\_\_\_

1. Is program relevant to the university mission? Is it essential to the university? (Sec. 1)

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Is curriculum appropriately reviewed and revised to meet the needs of students and community? (Sec. 2.1)

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Are Student Outcomes Objectives measurable? Assessed appropriately? Are improvements/changes made for improved learning based on assessments? (Sec. 2.3)

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Based on data provided, does the program compare favorably with institutions within a 100 mile radius? (Sec. 3)

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Based on demand and interest in the program and a 5-year projection in graduates, how would you assess the future of the program? (Sec. 4, 5, 6)

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Is the faculty profile appropriate to accomplish the program's mission? How would you rate the Teaching, Research and Service of the faculty in the program? (Sec. 7)

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Is there a pattern of "continuous improvement" demonstrated over the past five years, as evidenced in the Annual Plans? (Sec. 8)

8. Are departmental support, equipment and facilities appropriate to meet the needs of the program? (Sec. 8, 9, 10)

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. Overall strengths and weakness of academic program based on report and presentation.

STRENGTHS	WEAKNESSES

Recommendations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**PROVIDE A WRITTEN RESPONSE (Form A) TO THIS REPORT TO ACADEMIC AFFAIRS WITHIN FOUR (4) WEEKS AFTER THE DATE OF THE PROGRAM REVIEW.**



APPENDIX D

Nicholls State University: **FORM A** (revised 2006)

**Use of Results of Program Review**

Date:

Name of Department:

Name of Degree Program:

Describe at least one improvement or change (action plan) that will be made in the degree program (listed above) as a result of the Academic Council's review.

NOTE: Progress towards the completion of this action plan should be documented in the departmental annual plan, Part 1.C. This evidence of action taken will be reviewed as part of the program's next five-year review.

Signature of Department Head \_\_\_\_\_

*NOTE: Forward one completed copy to the dean of the academic college, one completed copy to the Vice President for Academic Affairs, and one electronic copy to the Assistant VPAA within 4 weeks after the date of the Academic Review.*