NICHOLAS SCHOOL
OF THE ENVIRONMENT
DUKE UNIVERSITY
forging a sustainable future

July 2009

COASTAL ENVIRONMENTAL MANAGEMENT (C.E.M.) PROGRAM

(Master of Environmental Management)

The Coastal Environmental Management program provides a scientifically rigorous understanding of global, national and local physical and biological coastal environments and processes and the human behaviors and policies that affect, and are affected by, those environments and processes. The specific aim of the program is to train scientifically informed professionals to fill coastal policy and management, research, or advocacy positions in federal and state agencies, industry, consulting firms, and nonprofit organizations. The program also provides a firm foundation for future Ph.D. studies.

The first year of the program is typically spent on the Durham campus fulfilling the required courses in areas such as natural resource economics, general environmental policy, ecology, and methodological skills. The second year is typically spent in residence at the Marine Laboratory in Beaufort taking courses in both the natural and the social and policy sciences specific to the coastal and marine environment, and focusing on the production of the master's project. The Marine Laboratory provides an ideal setting for the study of natural and social scientific phenomena in the coastal and marine environment, and for interaction with coastal and marine constituencies and policy makers in the application of science to policy. Potential opportunities for participation in the policy-making process are emphasized throughout the program.

The Coastal Environmental Management program is offered under the Master of Environmental Management degree. Students may emphasize subjects such as marine conservation biology and policy, fisheries management, marine protected area management, coastal zone management, water quality management or coastal sedimentary processes as part of the degree program. Each program is tailored to the interests of the student through the selection of electives and master's project topic. Students may use electives and additional coursework to accommodate a second emphasis in one of the other program concentrations offered within the school.

PREREQUISITES

Prerequisites for admission to the school are (1) some previous training in the natural sciences or the social sciences related to the student's area of interest in natural resources; (2) at least one introductory course in calculus; (3) a statistics course that includes descriptive statistics, probability distributions, hypothesis testing, confidence intervals; correlation, simple linear regression, and simple ANOVAs; and (4) a working knowledge of microcomputers for word processing and data analysis. The Coastal Environmental Management program also requires a microeconomics course or an introductory economics course with a substantial microeconomics component. Deficiencies must be made up during the first semester in residence; these courses do not count toward degree requirements. It is especially important for CEM students who plan to spend their second year in Beaufort to make up any missing prerequisites prior to enrolling in the NSOE. CEM students should be aware that many of the required courses have prerequisites; these are listed in the bulletin. We strongly encourage students to fulfill prerequisite requirements before matriculation.

CREDIT REQUIREMENTS

Students must complete 48 units of credit. These credits are distributed among the core courses required for the program, quantitative courses, elective courses, seminars, and a master's project. Students should develop a proposed program of study (listing courses and master's project topic) in consultation with their advisors by the end of the first semester. The proposed program can be amended with the advisor's approval. Students should work closely with their advisors to ensure that all requirements are met and elective courses are appropriate to the program. Special care should be taken in determining how to meet credit requirements between the two campuses (Durham and Beaufort). Selected courses may be teleconferenced between Durham and Beaufort.

CORE COURSES

All students in the program are required to take six core courses (at least 18 units of credit) distributed as follows (times in parentheses are when the course is normally offered):

(1) ENVIRON 270. Resource and Environmental Economics (3 units, fall, Durham)

(2) ENVIRON 276. Marine Policy (3 units, fall, Beaufort)

(3) One additional policy course* *such as:*

ENVIRON 271. Economic Analysis of Resource and Env. Policies (3 units, fall, Durham)
ENVIRON 273. Marine Fisheries Policy (3 units, spring, Beaufort)
ENVIRON 274. Environmental Politics (3 units, spring, Durham)
ENVIRON 285. Land Use Principles and Policy (3 units, fall, Durham)
ENVIRON 298.55. Ocean and Coastal Law and Policy (3 Units, fall, Durham)
LAW 235. Environmental Law (3 units, fall, Duke Law School)

**Or equivalent with advisor's approval*

(4) One ecology course* *such as:*

ENVIRON 219L. Marine Ecology (4 units, fall, spring, summer II, Beaufort)#
ENV 298.36. Fisheries Ecology (3 units, spring, Beaufort)
ENV 298.62. Urban Tropical Ecology (3 units, spring, Beaufort)

**Or equivalent with advisor's approval*
#Can serve as either ocean science or ecology but not both

(5) One ocean science course* *such as*:

EOS 215. Waves, Beaches, Coastline Dynamics (3 units, fall, Durham)
ENVIRON 219L. Marine Ecology (4 units, fall, spring, summer II, Beaufort)#
ENVIRON 292L. Biological Oceanography (4 units, spring, Beaufort)
ENVIRON 293. Analysis of Ocean Ecosystems (3 units, fall, Beaufort)

**Or equivalent with advisor's approval*
#Can serve as either ocean science or ecology but not both

(6) One science and policy synthesis course from the following:

ENVIRON 209. Conservation Biology and Policy (3 units, summer II, Beaufort)
ENVIRON 226. Marine Mammals (3 units, fall; 4 units, summer II, Beaufort)
ENVIRON 227. Biology and Conservation of Sea Turtles (3 units, spring; 4 units, summer II, Beaufort)
ENVIRON 324. Marine Conservation Biology (3 units, spring, Beaufort)
ENVIRON 322. Coastal Watershed Science and Policy (3 units, fall, Beaufort)
ENVIRON 360S. Political Ecology (3 units, fall, Beaufort)

QUANTITATIVE AND ANALYTICAL METHODS COURSES

Three courses (at least 9 units) in quantitative and analytical methods of resource analysis are required. One of the courses ***(or equivalent with advisor's approval)*** must be from list A and one course must be from list B below. The third may be from either list. Be SURE to check the online NS Course Advising web page http://www.nicholas.duke.edu/people/students/advising/fall09-quants.html and ACES for additional courses. ***Some of these courses are not offered every year, and this list is not all inclusive.***

List A

ENVIRON 210.001. Applied Data Analysis for Environmental Science (3 units, fall, Durham)
ENVIRON 231L. Ecological Models and Data (3 units)
ENVIRON 254. Qualitative Research Design (3 units, fall, Beaufort)
ENVIRON 255/STA 242. Applied Regression Analysis (3 units, spring, Durham)
ENVIRON 352. Spatial Analysis in Ecology (3 units)
ENVIRON 385. Environmental Decision Analysis (3 units, spring, Durham)
ECON 239. Econometrics (3 units, spring)
ECON 271. Economic Analysis of Resource & Environmental Policies (3 units) *cross-listed with ENVIRON 271; cannot fulfill both policy and quantitative requirements*
BMA 567. Modeling of Biological Systems (3 units, Fall, NCSU)
PUBPOL 313. Quantitative Evaluation Methods (3 units, spring)
SOCIOL 213. Social Statistics II (3 units, spring, Durham)
STA 216. Generalized Linear Models (3 units)
STA 221. Bayesian Inference and Decision (3 units)
STA 244. Introduction to Linear Models (3 units)
STA 293. Special Topics in Statistics (3 units, fall)
ST 512. Experimental Biological Statistics (3 units, NCSU)
ST 730. Applied Time Series Analysis (3 units, NCSU)
ST 711. Experimental Design (3 units, NCSU)

(*Other courses in quantitative and statistical methods with approval of the advisor*)

List B

ENVIRON 234L. Watershed Hydrology (4 units, fall, Durham)
ENVIRON 259. Fundamentals of Geospatial Analysis (3 units, fall, Durham)
ENVIRON 261. Geospatial Analysis for Conservation and Mgmt. (3 units, spring, Durham)
ENVIRON 265. Geospatial Analysis for Coastal and Marine Mgmt. (3 units, spring, Durham)
ENVIRON 280. Social Science Survey for Environmental Management (3 units, spring)
ENVIRON 303. Principles of Ecological Modeling (3 units, spring, even-numbered years)
ENVIRON 357. Satellite Remote Sensing for Environmental Analysis (3 units, fall)
SOCIOL 208. Survey Research Methods (3 units, spring, Durham)

(*Others as approved by program faculty*)

ELECTIVE COURSES

Students may take three or four courses (9 to 16 units of credit) as electives. Electives should be chosen to add depth to the area of specialization, to develop a second area of expertise, or to strengthen quantitative skills. Courses cannot be counted as both a required course and an elective. Suggested electives are listed below. Students may consult with their advisors concerning other acceptable courses.

Durham Courses

ENVIRON 212. Environmental Toxicology (3 units, fall)
ENV 217. Tropical Ecology (3 units, spring, Durham) ENVIRON 221. Soil Resources (3 units, fall)
ENVIRON 234L. Watershed Hydrology (4 units, fall)
ENVIRON 236. Water Quality Management (3 units, fall, Durham)
ENVIRON 240. Chemical Fate of Organic Compounds (3 units, fall)
ENVIRON 242. Environmental Aquatic Chemistry (3 units, spring)
ENVIRON 274. Environmental Politics (3 units, spring)
ENVIRON 275S. Protected Areas (3 units, fall, Durham)
ENVIRON 277. Professional Ethics for Environmental Practice (1 unit, fall, Durham)
ENVIRON 285. Land Use Principles and Policy (3 units, fall)
ENVIRON 296. Environmental Conflict Resolution (2 units, fall, Durham)
ENVIRON 309. Wetlands Restoration (3 units, spring, Durham) *prerequisite: ENV 312*
ENVIRON 312. Wetlands Ecology and Management (3 units, fall)
ENVIRON 320. Ecosystem Management (3 units, spring, Durham)
EOS 272. Biogeochemistry (3 units, fall) *cross-listed with BIOLOGY 272*
LAW 262. Environmental and Coastal Law (UNC Law School)

Beaufort Courses

(courses may change in Beaufort – consult ACES, the web site and your advisor)

ENVIRON 219L. Marine Ecology (4 units, summer II, fall)
ENV 298.36 Fisheries Ecology (3 units, spring)
ENVIRON 226L. Marine Mammals (4 units, summer II; 3 units, fall – no lab)
ENVIRON 228L. Physiology of Marine Animals (4 units, fall, spring; 6 units, summer I)
ENVIRON 229L. Biochemistry of Marine Animals (6 units, summer Session I)
ENV 243. Respiratory Proteins and the Environment (3 units, fall)
ENVIRON 251. Conservation and Development (3 units, spring)
BIOLOGY 254. Vertebrate and Invertebrate Endocrinology (3 units, fall)
ENVIRON 256S. Seminar in Ocean Sciences: Marine Tourism (2 units, spring)
ENVIRON 295L. Marine Invertebrate Zoology (4 units, fall, spring, summer II; 6 units, summer I)
ENVIRON 298.09. Professional Writing and Self-Editing (3 units, fall)
ENVIRON 298.46. Green By Design (3 units, fall)
ENV 298.62. Urban Tropical Ecology (3 units, spring)
ENVIRON 324. Marine Conservation Biology (3 units, spring)
ENVIRON 299. Independent Studies and Projects (limit 4 units)
BIOLOGY 207AL. Tropical Marine Ecology (2 units, fall)
BIOLOGY 207BL. Marine Ecology of the Pacific (2 units, fall)

Additional selected courses may be teleconferenced

SEMINARS

Students are required to take the Coastal Environmental Management seminar (ENVIRON 398.02) and present the results of their master's project in a school symposium in Durham and in Beaufort. First-year students are required to attend the presentations as well as the required skills modules. **Please note that students MUST register for the seminar credit EACH semester. The credit is for 1 unit total for all 4 semesters.**

RECOMMENDED SEQUENCE

Year 1, fall, Durham: ENVIRON 270, quantitative course (from list A), elective(s), ENVIRON 398.02
Year 1, spring, Durham: Quantitative and analytical methods courses, policy course, elective(s), ENVIRON 398.02
Summer: Internship or research or take required courses at Beaufort
Year 2, fall, Beaufort: ENVIRON 276, ENVIRON 398.02, elective(s)
Year 2, spring, Beaufort: ENVIRON 398.02, elective(s)

MASTER'S PROJECT

A master's project for 4 to 6 units of credit is required. The project should represent an in-depth analysis of a coastal environmental problem and emphasize the use of problem-solving methodologies. The master's project should include a practicum, and development of management recommendations should constitute a part of the project where possible. The project may be an individual or a group effort. Specific instructions for submission of the proposal and the final paper are available from the Office of Enrollment Services, A142 Levine Science Research Center.

Students must select a MP Advisor (if different from their Academic Advisor) and submit a project topic and prospectus by the end of the second semester of enrollment. Final proposals (approved and signed by the advisor) are due six weeks into the third semester of enrollment. Final MPs are due the Friday of Reading Week of the final semester of enrollment. All materials must be well written; most require several revisions to meet acceptable standards. Students should be sure to refer to the MP Advising timetable online at http://www.nicholas.duke.edu/people/students/advising/mpguidelines-timetable.html and consult regularly with their Advisors to meet necessary deadlines.

PARTICIPATING FACULTY MEMBERS

Faculty members serving as advisors in the Coastal Environmental Management program are listed below. Please consult the Nicholas School of the Environment and Earth Sciences website or the Bulletin of the Nicholas School of the Environment and Earth Sciences for a description of their research interests.

Xavier Basurto	Beaufort, 252-504-xxxx; xbasurto@duke.edu
Celia Bonaventura	Beaufort, 252-504-7591; bona@duke.edu
Lisa Campbell	Beaufort, 252-504-7628; lcampbe@duke.edu
Bruce Corliss	Durham, 919-684-2951; bruce.corliss@duke.edu
Larry Crowder	Beaufort, 252-504-7637; lcrowder@duke.edu
Richard B. Forward	Beaufort, 252-504-7610; rforward@duke.edu
Patrick Halpin	Durham, 919-613-8062; phalpin@duke.edu
Jim Hench	Beaufort, 252-504-xxxx; jim.hench@duk.edu
Zackary Johnson	Beaufort, 252-504-xxxx; zij@duke.edu
Dave Johnston	Beaufort, 252-504-7593; dwj2@duke.edu
Bill Kirby-Smith	Beaufort, 252-504-7577; wwks@duke.edu
M. Susan Lozier	Durham, 919-681-8199; s.lozier@duke.edu
Pat McClellan-Green	CMAST, 252-504-7635; pmcclell@duke.edu
Brad Murray	Durham, 919-681-5069; abmurray@duke.edu
Doug Nowacek	Beaufort, 252-504-7566; dpn3@duke.edu
Michael K. Orbach	***PROGRAM DIRECTOR***, Beaufort, 252-504-7606; mko@duke.edu
Andrew Read	Beaufort, 252-504-7590; aread@duke.edu
Daniel Rittschof	Beaufort, 252-504-7634; ritt@duke.edu
Tom Schultz	Beaufort, 252-504-7641; tfs3@duke.edu
Cindy Van Dover	Director of Marine Lab, Beaufort, 252-504-7655; c.vandover@duke.edu

Program Coordinator

Lauren Stulgis	Beaufort, 252-504-7531; lauren.stulgis@duke.edu