ENVIRONMENTAL SCIENCE PROGRAM

Academic Program Review
Self-Study Report

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A. Mission and Purpose of the Environmental Science Program

The Environmental Science (ES) Program at Florida Atlantic University is a university-wide interdisciplinary program administered by the Charles E. Schmidt College of Science. A standing Program Committee composed of faculty representing colleges across the university is responsible for academic oversight of the ES Program. Courses in the ES Program curriculum are taught by faculty from multiple departments in every college of the university. Undergraduate ES students earn the Environmental Science Certificate in conjunction with a baccalaureate degree from any FAU college. Graduate students earn the Master of Science in Environmental Science degree under the supervision of ES Graduate Faculty appointed in a wide range of departments. The ES Program also administers a graduate certificate in Environmental Restoration, and the Environmental Science concentration of the Integrative Biology PhD degree.

Environmental Science Program Mission

The mission of the Environmental Science Program at Florida Atlantic University is to educate and support students who are motivated to reach the highest level of professional achievement in environmental science, and to facilitate a robust research climate for faculty and students.
The undergraduate program promotes a broad, integrated understanding of the interdependencies of humans and their environment and prepares students for diverse career paths related to environmental science. At the graduate level, the ES Program fosters leadership and provides students with in-depth knowledge and training in the natural and social sciences, preparing them to develop and implement solutions to complex environmental problems.

Environmental Science Program Academic Goals

The ES Program will provide students a foundational understanding of the inter-related disciplines that pertain to environmental issues through an interdisciplinary core curriculum at both the undergraduate and graduate level. To meet this goal, the ES Program requires all students to complete core courses that emphasize the inter-connectedness of the natural and social sciences. Upon completion of coursework, students should be able to form and identify conceptual linkages across disciplinary boundaries, and utilize multiple perspectives of diverse disciplines in addressing environmental issues.

The ES Program will develop students' professional skills in Environmental Science, through a flexible curriculum that accommodates a broad range of student goals and interests. To meet this goal, courses in the ES Program curriculum are organized around interdisciplinary focal areas in the natural and social sciences. Courses offered within this framework include: traditional lecture-style, e-learning lab, and field courses; special topics courses that introduce students to the latest theories, methods, and emerging issues; professional certifications; seminar series; experiential learning through thesis research, directed independent study (DIS), and internship programs. Through this framework, students will gain proficiency in the application of scientific principles such as, critical thinking, experimental design, synthesis, and quantitative analysis, as well as a sense of professional responsibility and integrity.

The ES Program will prepare students to meet the real-world challenges they will face as environmental professionals and citizens through experiential learning and faculty mentoring. To meet this goal, student education in the ES Program capitalizes on the research strengths and experience of the FAU faculty and the close connection to the diverse community of Environmental Scientists in South Florida. Students conduct and publish research in their field of interest under the guidance of experienced faculty. The ES Program supports both undergraduate and graduate student research that is relevant, novel and applicable to solving critical environmental problems. By fostering external partnerships (NGOs, local, state, federal agencies), the ES Program provides faculty and students access to sources of funding, specialized services and equipment, as well as the opportunity for direct engagement with the public, private organizations, and environmental decision-makers. By linking the practice and application of environmental science, The ES Program ensures students develop professional skills in: Communication of science to a variety of audiences; Development and maintenance of professional collaborations; Ethical obligations to the scientific community and society; Technical proficiency within the field.

The ES Program will produce students with the skills required for professional positions within the field of environmental sciences in the public or private sector and/or continued graduate education.

Undergraduate Student Goals

Undergraduate students will understand and be able to apply the following core concepts to the analysis of environmental issues; 1) Fundamental principles in the natural and social sciences; 2) Basic interactions between social and natural systems; 3) Processes and feedbacks that govern complex dynamic systems; 4) Major challenges in human-environment interactions. Using these core concepts, undergraduate students will be able to effectively communicate and apply critical thinking and analytic skills to problem solving in environmental science and demonstrate proficiency in practical skills related to environmental science.

Graduate Student Goals

Both thesis and non-thesis graduate students will demonstrate a broad understanding of the multidisciplinary field of environmental science and in-depth knowledge of their area of specialty. They will be able to use scientific research methods, perform analyses of scientific data and critically evaluate and communicate research findings. They will demonstrate professional skills in environmental science, as evidenced by scholarly interactions with professionals in the field, including participation in professional organizations, workshop and conference participation.

Graduate students enrolled in the thesis option will be able to conduct original research and perform in-depth analysis, as demonstrated by successful completion of a Master's Thesis. Specifically, students will demonstrate: 1) current knowledge of their field of study and the ability to critically review and interpret scientific literature 2) the ability to develop a hypothesis, design and execute scientific experiments, and draw logical conclusions from data and 3) the ability to write scientific reports and communicate effectively in scholarly presentations.

Student Goals in the Environmental Science Program are linked to the following elements of FAU's Strategic Plan:

Goal 1: Enrich the Educational Experience

Goal 1, Objective 2: Strengthen and expand graduate programs

Goal 1, Objective 4: Support an organizational culture in which all units are dedicated to student success

Goal 2: Inspire Research, Scholarship and Creative Activity

Goal 2, Objective 1: Increase scholarship and creativity

Goal 2, Objective 3: Enhance the regard and visibility of our research, scholarship and creativity

Goal 2, Objective 4: Strengthen and support interdisciplinary research and its visibility in the University

Goal 2, Objective 5: Involve students at all levels in research, scholarship and creative activity

Goal 3: Increase FAU's Community Engagement

Goal 3, Objective 1: Enrich the educational and cultural experiences for students, faculty and the surrounding communities

Goal 3, Objective 2: Increase the number of community partnerships

Goal 3, Objective 3: Focus on the unique opportunities of FAU's stewardship of place

Goal 3, Objective 4: Focus resources on increasing FAU's support to the communities it serves

B. Previous External Reviews

The last self-study and review of the Environmental Science Program was done in Spring 2009. At that time a total of 13 students were enrolled in the ES Master's Program and the ES Program was entering a phase of rapid growth spurred by a broad range of important changes that had been recently implemented by Dr. Dale Gawlik, who became Director of the ES program in 2007. These changes included: significant revisions of the graduate curriculum and the introduction of a non-thesis degree option; establishment of new partnerships and collaborations with outside organizations and agencies to provide support for student research, including a $500,000 Fellowship Initiative with the National Park Service; broadening faculty participation in governance through the formation of standing Admissions and Program committees; broadening the range of academic units from which faculty participating in the program are drawn, hosting of regular workshops and a seminar series; expanding and updating the ES web site to disseminate timely information and facilitate interaction of faculty and staff with prospective and current students. Beginning in 2009, the ES Program took on the additional responsibility for oversight and assessment of the undergraduate Environmental Science Certificate Program.

C. Instruction

Baccalaureate Programs: Undergraduate Certificate in Environmental Science

Prior to 2009, when the Environmental Science Program took on oversight of the Environmental Science Certificate, there were no student learning outcomes (SLOs). The Environmental Science Program Committee developed program goals, defined new student learning outcomes for the ES Certificate, and put in place a new assessment plan beginning in 2009-2010. Implementation of the new assessment plan proved problematic; the interdisciplinary nature of the Certificate program, and the procedures in place for awarding the ES Certificate, made it difficult to identify students until just before or after graduation, so reliable assessment results could not be obtained. In 2014 the ES Program Committee recommended major changes to the Certificate curriculum, adding a capstone course and introducing a core requirement in statistics. These changes, which will be effect for Fall 2015, will ensure that all ES Certificate students can meet the SLOs and facilitate the implementation of program assessment.

Student Learning Outcomes – Undergraduate Certificate Program

SLO 1: Critical Thinking and Communication

Students will be able to effectively communicate and apply critical thinking and analytic skills to problem-solving in environmental science, drawing on a broad understanding of the processes and feedbacks involved in the interaction of social systems and ecosystems.

Assessment Method

Students submit a paper that identifies a clear issue in environmental science, examines the relevant facts, and proposes a scientifically defensible solution. The paper is assessed using the attached rubric.

Implementing Strategy

All students must take a core course that emphasizes the interactions of social systems and ecosystems. As a requirement for the core course, students submit a written in-depth review and analysis, and propose a solution, to a problem related to the interaction between social systems and ecosystems. These written assignments are assessed by the instructor using a rubric to assess written communication, critical thinking, analysis and synthesis skills. The ES Program committee has also approved changes to the curriculum that include the introduction of a capstone course, beginning in Fall 2015, that will directly assess this outcome.

Criterion for Success
At least 75% of ES Certificate students will meet or exceed expectations for all communication and critical thinking/analysis skills, as specified in the assessment rubric.

SLO 2: Core Principles in Environmental Science
Students will understand and be able to apply the following core concepts to the analysis of environmental issues: 1) Fundamental principles in the natural and social sciences 2) Basic interactions between social systems and ecosystems 3) Processes and feedbacks that govern complex dynamic systems 4) Major problems and issues in human-environment interactions
Assessment Method
The map of assessment criteria addressed in individual courses offered in the ES Certificate curriculum will be compared with the actual courses chosen by ES Certificate students. Statistical analyses will be done to determine whether the courses taken by students are meeting outcome criteria.
Implementing Strategy
The ES Program has created a course map that links these outcome criteria to the course learning objectives that are assessed by individual courses in ES Certificate curriculum. Implementation of this strategy will be facilitated by changes in the ES Certificate curriculum, effective Spring 2015, that will allow the ES Program staff to identify students prior to graduation.
Assessment Method
The map of assessment criteria addressed in individual courses offered in the ES Certificate curriculum will be compared with the actual courses chosen by ES Certificate students. Statistical analyses will be done to determine whether the courses taken by students are meeting outcome criteria.
Criterion for Success
All students earning the ES Certificate will take one or more courses in which the outcome criteria are covered and assessed

SLO 3: Practical Skills
Students will demonstrate proficiency in practical skills related to a field of environmental science.
Implementing Strategy
Students are given the opportunity, through their academic courses and programs within the ES Program, to participate in laboratory classes, internships, academic service learning projects, professional conferences or workshops, or Directed Independent Study research, in the field of environmental science. The ES Program committee has also approved changes to the curriculum that include the introduction of a capstone course, beginning in Spring 2015 that will directly assess this outcome.
Assessment Method
The ES Certificate curriculum requires students to demonstrate practical academic experience (laboratory classes, internships, academic service learning projects, professional conferences or workshops, Directed Independent Study) in the field of environmental science.

Criterion for Success
All students will successfully complete at least one laboratory class, internship, academic service learning project, professional conference or workshop, or Directed Independent Study project, in the field of environmental science.

***Assessment of SLOs and Program Improvement* – Undergraduate Certificate Program, 2013-2014**

SLO 1: Critical Thinking and Communication

Data Summary: Analysis and Evaluation, 2013-2014
This element of the Undergraduate ES Certificate Assessment Plan has been eliminated as part of a major revamping of the Undergraduate ES Certificate Program. The previous structure of the program did not allow the ES Program to identify ES Certificate students at the time they were enrolled in the core course. Because these core courses were large, multi-section courses, each taught in different departments, tracking the very small percentage of students who eventually applied for and earned the ES Certificate was not practicable, and results are not available for 2013-2014.
Program Improvement, 2013-2014
In recognition of the need to ensure that all students in the ES Certificate Program achieve this outcome, a capstone course, that specifically addresses and assesses this outcome, has been added to the ES Certificate curriculum. This capstone course and the associated changes to the ES Certificate Program are expected to go into effect beginning Spring 2015.

SLO 2: Core Principles in Environmental Science
Data Summary: Analysis and Evaluation, 2013-2014
The procedures for assessing this element of the Undergraduate ES Certificate Assessment Plan have been revised as part of a program review that led to a major revamping of the Undergraduate ES Certificate Program. The previous structure of the program did not allow the ES Program to identify many ES Certificate students until the semester they graduated, or in some cases, after graduation. This meant that the course mapping for recipients of the Certificate could not practically be kept up-to-date, and results are not available for 2013-2014.
Program Improvement, 2013-2014
As part of major revisions to the undergraduate ES Certificate program made as a result of the program review of previous assessment results, a requirement for a capstone course has been added to the curriculum that will allow the ES Program to identify students prior to graduation. Revisions have also been made to the ES Certificate website and the ES Blackboard community, and the ES Program has worked with advisors in the College of Science to ensure that students understand the application and verification procedures.

SLO 3: Practical Skills
Data Summary: Analysis and Evaluation
Assessment of this element of the Undergraduate ES Certificate Assessment Plan will begin in Spring 2015, with the introduction of the new capstone course; results are not available for 2013-2014.
Program Improvement
As a result of the program review based on previous assessment results, a capstone course that specifically addresses and assesses this outcome has been added to the ES Certificate curriculum for Spring 2015 to ensure that all students in the ES Certificate Program achieve this outcome.

i. State-approved prerequisites
The Environmental Science Certificate is designed to enhance a student's major program of study and does not qualify as a degree. Therefore, lower level pre-requisites are not enforced by the Environmental Science Program but are instead enforced by the University and/or the students' major program or department. All of FAU's baccalaureate programs require core curriculum courses as specified by the Florida State University System's Intellectual Foundations Program (IFP). All of FAU's IFP courses are thoroughly reviewed by the University's Core Curriculum Committee for compliance with the State University Systems' requirements per regulation 6.017. A list of FAU's core curriculum requirements can be found at http://www.fau.edu/uas/pdf/2014_2015/IFP-Curriculum.pdf.

ii. Limited access

The Environmental Science Certificate program is open to all students who have the necessary pre-requisites to progress through the course requirements for the certificate. Course pre-requisites are specified in the University catalog (http://www.fau.edu/academic/registrar/FAUcatalog/scienceDES.php).

iii. Admissions criteria

There are no admission requirements for the Environmental Science Certificate Program. Any FAU student is eligible to participate in the program. The ES Certificate is awarded only in conjunction with a Baccalaureate degree from FAU.

iv. Enrollment information

Since the Environmental Science Certificate Program is not housed within a department or program and is open to all FAU students, it is challenging to track detailed enrollment statistics. Enrollment in the courses that lead to the certificate is tracked by the departments and programs that administer those courses. However, there are no courses that are open only to students who are participating in the Certificate Program and historically there have not been any courses that all certificate students are required to take; therefore, course enrollment does not directly correlate to enrollment in the certificate program.

We have also recently made curriculum changes that we believe will be helpful in this regard. Effective Spring 2015 all new Environmental Science Certificate students will be required to take a senior-level capstone course, Critical Thinking in Environmental Science (EVS 4021). This will be the first time the Environmental Science Certificate Program has included a course that is required for all students. Having this required course will enable us to clearly identify and assess students who are working toward the certificate.

v. Average class size and faculty/student ratio

Class size and faculty/student ratio are tracked by the departments and programs that offer courses which are part of the Environmental Science Certificate Program. Historically, the only core requirement for the Environmental Science Certificate was that students had to take either Environment and Society (EVR 2017) or Issues in Human Ecology (PCB3352). (As described below, beginning in Spring 2015 the core requirements for the certificate will change.) Between the spring of 2009 and the fall of 2014, the average enrollment for EVR 2017 was 43 students, and the average enrollment for PCB 3352 was 48 students.

vi. Curriculum

The Environmental Science Certificate curriculum draws from courses across multiple colleges and departments at FAU to ensure that students gain basic knowledge and skills in the interdisciplinary field of environmental science. The ES Certificate is awarded only in conjunction with a baccalaureate degree from FAU, and all students must complete a total of 18 credits from these areas:

<u>One course from each of three core areas</u>

1. Human Environmental Interactions
2. Statistics/Quantitative Methods
3. Environmental Science Capstone

<u>One course from three of five focus areas</u>

1. Biology
2. Chemistry,
3. Earth Science,

4. Human-Environmental Interactions,
5. Geographic Information Science.

This curriculum for the ES Certificate was approved for the 2015-2016 FAU Catalog. The full list of courses in the ES Certificate core areas and focus areas is in Appendix A.

Nationally, many universities offer an undergraduate certificate in Environmental Studies, but the undergraduate certificate in Environmental Science is much less common. The ES Certificate at FAU differs from a typical Environmental Studies Certificate in requiring a core course in quantitative methods and statistical analysis. Among state universities in Florida, only FAU offers an undergraduate Environmental Science Certificate. Florida International University offers an undergraduate certificate in Environmental Studies; other state universities in Florida, including FIU, offer baccalaureate degrees in Environmental Science or Environmental Studies but do not have an undergraduate certificate program. Nationally, several comparable and aspirational programs offer undergraduate certificates or minors in environmental science or environmental studies that are similar to the ES certificate; these programs also divide credit requirements between core and elective courses. The number of required core credits varies from 3-6, and total credits vary from 15-21.

Requirements for comparable and aspirational certificate programs listed below are shown in the following table.

- Ohio University, Environmental Studies Certificate
- University of Nevada, Las Vegas, Environmental Science Minor
- Florida International University; Environmental Studies Certificate
- University of Wisconsin, Madison; Environmental Studies Certificate
- University of Colorado, Boulder; Certificate in Environment, Policy and Society

Minimum credit requirements for similar undergraduate certificates at other institutions.

	FAU	Ohio U	UNLV	FIU	UW Madison	U Colorado Boulder
Certificate Type	Env. Science	Env. Studies	Env. Sci Minor	Env. Studies	Env. Studies	Env., Policy and Society
Comparable/ Aspirational		comp	comp	comp	asp	asp
Total	18	18	21	18	15	18
Core	6	3	3	6	6	6
Electives	9	12	18	12	9	12
Senior Capstone	3	3				

vii. Internships, practicum, study abroad, field experiences

Many undergraduates in the ES Certificate Program are introduced to internship opportunities through interaction with ES faculty who offer Directed Independent Study courses that are tied to internships with community partners. These include unpaid internships with Broward County Environmental Protection and Growth Management, Florida Fish and Wildlife Conservation Commission, Jonathan Dickinson State Park, South Florida Water Management District, and the Palm Beach County Department of Environmental Resources Management. Since 2013, three ES Certificate students have won paid summer internships with the Arthur R. Marshall Foundation for the Everglades.

Most students in the upper division ES Certificate core course take advantage of the opportunity to gain field experience and Academic Service Learning credit through practical collaborative projects with community partners including Boca Raton Housing Authority, Broward County Environmental Protection and Growth Management, Florida Fish and Wildlife Conservation Commission, Gumbo Limbo Nature Center, Jonathan Dickinson State Park, Palm Beach County Department of Environmental Resources Management, and Pine Jog Environmental Education Center.

viii. Pedagogy/pedagogical innovations

With the exception of the new senior capstone course, which will first be offered in the spring of 2015, the pedagogical methods employed in the various classes that are part of the Environmental Science certificate are monitored by the programs and departments offering those courses. However, the Environmental Science Program Committee reviews the syllabi of courses to make sure that both the course content and instructional methods are in keeping with the mission of the Environmental Science program before approving them as optional courses for the certificate.

Although we do not specifically track pedagogy or pedagogical innovations, the Environmental Science Program and its faculty are committed to providing students opportunities to engage in critical thinking, observation, and data thinking and analysis. The following are a few examples of teaching excellence and innovation in some of the courses that are part of the Environmental Science certificate.

- The following courses include an enhanced undergraduate research project. The instructors of these courses have received internal grants to develop and assess the success of these undergraduate research projects.
    - Issues in Human Ecology, PCB 3352
    - Critical Thinking in Environmental Science, EVS 4021 (the new ES capstone course)
    - Biogeography, GEO 4300
    - Human-Environment Interactions in South Florida, GEA 4275
    - Hydrogeology, GLY 4822
- The following classes include an academic service learning project.
    - Issues in Human Ecology, PCB 3352
    - Critical Thinking in Environmental Science, EVS 4021
    - Human-Environment Interactions in South Florida, GEA 4275
- The Environmental Science Program, together with the Department of Geoscience and the Department of Biology, has established environmental monitoring stations on the ecological preserve on our Boca Raton campus (https://www.sites.google.com/site/drtararootshomepage/reach). These environmental monitoring sites serve as a field lab for the following courses.
    - Issues in Human Ecology, PCB 3352
    - Critical Thinking in Environmental Science, EVS 4021
    - Human-Environment Interactions in South Florida, GEA 4275
    - Hydrogeology, GLY 4822

- Water Resources (GEOC 4280), which became a fully online course in 2013, received Quality Matters (QM) certification after being peer reviewed to ensure the course meets the QM benchmarks for quality online instruction. (https://www.qualitymatters.org/)

ix. Scope of institutional contributions

As an interdisciplinary program that does not have direct oversight for any courses except the new senior capstone course, this section of the self-study has only limited relevance to the Environmental

Science Certificate program. The new ES Certificate capstone course, Critical Thinking in Environmental Science, was created by the ES Program (in part as a means of identifying our students and assessing their progress) and is taught by ES faculty. The ES Program also provides research mentoring opportunities for undergraduates through its graduate-undergraduate mentoring program.

x. Student profile

The Environmental Science program does not track this information. Statistics about student diversity, age, gender, etc. are tracked by degree-offering departments and programs rather than interdisciplinary certificate programs.

xi. Advising procedures

All undergraduate students receive advising centrally through University Advising Services (UAS) in their first and second years (up to 45credits).

It is challenging to advise ES Certificate students who are matriculated in a variety of departments throughout several colleges. Currently, we rely heavily on the ES web page (http://www.science.fau.edu/biology/envirosci/undergraduate.html), the Program Coordinator and college-level academic advisors to advise students. Both the ES web page and college academic advisers encourage students to enroll in the Environmental Science Blackboard community, which we use to routinely to communicate with students. However, due largely to the interdisciplinary nature of the certificate program, a large proportion of students who are participating in the Environmental Science certificate program self-advise.

The ES web page (http://www.science.fau.edu/biology/envirosci/undergraduate.html) and college-level academic advisors inform students that they must ask an advisor or the ES Program Coordinator to enroll them in the Environmental Science Blackboard community. Students then submit the application for the ES Certificate through the Blackboard site. This procedure was developed to allow the ES Program to track students who are pursuing the ES Certificate. However, we have found that students still very frequently self-advise, complete all the courses required for the certificate, and submit the ES application during the semester they graduate. Thus many students earn the certificate without us being able to track their progress through the program. To improve communication with students and encourage students to participate in the Blackboard community and to submit their application early, we plan to 1) work with the departments/instructors of core courses to announce these procedures every semester, and 2) in addition to the college-level academic advisors, ask department-level academic advisors to inform students of these procedures.

xii. Licensure rates (if applicable)

Not applicable.

xiii. Placement rates/employment profile

Not applicable: This information is tracked by degree-offering departments and programs rather than by the Environmental Science certificate program.

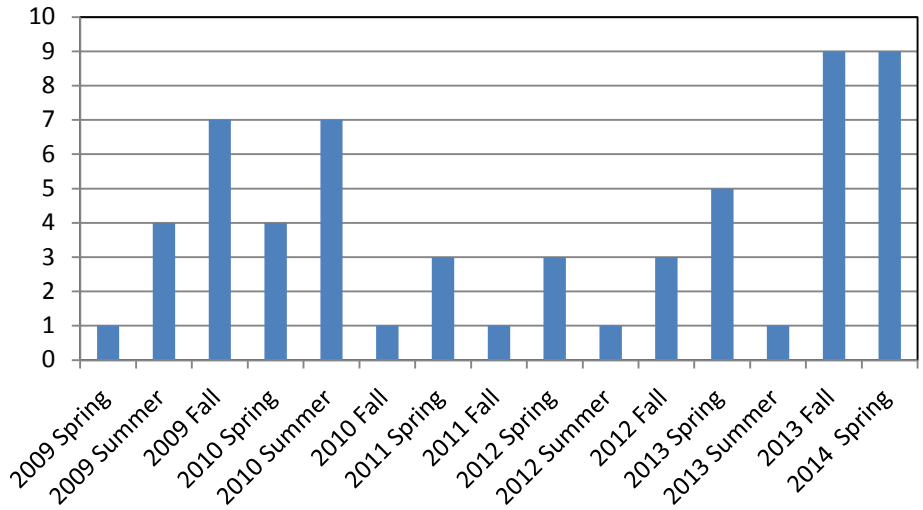
xiv. Retention rates

Not applicable; this information is tracked by degree-offering departments and programs rather than by the Environmental Science certificate program.

xv. Graduation rates

Figure 1 shows the number of students that have received the Environmental Science Certificate from Spring 2009 through Spring 2014.

Figure 1: Environmental Science Certificates Awarded



xvi. Student recruitment

The Environmental Science website and college and department academic advisors are the primary means used to recruit students into the Environmental Science Certificate Program. Students in colleges and departments across the university enroll in ES Certificate courses to meet the requirements for their major, and many instructors in these courses advise and recruit students. In 2014 the ES Program also began hosting a weekly graduate-undergraduate round table in collaboration with the FAU chapter of SEEDS, the undergraduate organization of the Ecological Society of America; this informal gathering held at the Boca Raton campus helps to enhance interaction between undergraduates and ES graduates students and helps to recruit students interested in the ES Certificate program.

Graduate Programs: Master of Science in Environmental Science

In 2010-2011 the Environmental Science Program Committee defined new student learning outcomes (SLOs) for ES graduate students that reflected the new program goals, particularly for non-thesis students, and developed a new assessment plan in the context of the new learning outcomes that used appropriate tools and methods and implemented sustainable practices. The ES Program Committee reviews SLOs and assessment results annually and makes recommendations for program improvement.

Student Learning Outcomes – Master's Program

SLO 1: Professional Activities

Students will demonstrate substantial professional skills in environmental science, as evidenced by scholarly interactions with professionals in the field, including participation in professional organizations and activities such as scholarly presentations, workshop participation, and conference attendance.

Implementing Strategy

Information on student participation in professional societies and organizations, scholarly interaction with faculty, and participation in professional workshops and conferences, is collected by means of an online survey that is completed by students each academic year.

Assessment Method

The analyses and summary of the percentage of students reporting participation in specific professional activities is reviewed annually by the Environmental Sciences Program Committee, which makes specific recommendations for improving students' acquisition of professional skills.

Criterion for success

1) Participation in professional organizations:
90% of MS students will participate in one or more professional organizations
2) Interaction with faculty:
90% of students will interact with faculty weekly or more often.
3) Participation in workshops and conferences:
90% of students will present their thesis or DIS research at one or more workshops or conferences

SLO 2: Original Thesis Research

Students enrolled in the thesis option will be able to conduct original research and perform in-depth analysis, as demonstrated by successful completion of a Master's Thesis. Specifically, students will demonstrate:

1)current knowledge of their field of study and the ability to critically review and interpret scientific literature.
2) the ability to develop hypothesis, design and execute scientific experiments, and draw logical conclusions from data.
3) the ability to write scientific reports and communicate same effectively in oral presentations.

Implementing Strategy

Overall evaluation of student thesis work in the ES Program is performed by the thesis committee and departmental graduate coordinator in accordance with the guidelines of the academic department of the faculty advisor. A thesis committee reviews the thesis proposal and thesis defense presentations, which are open to all faculty. The advanced procedural and technical skills of the student are evaluated and reported by the thesis committee in accordance with the guidelines of the academic department of each student's faculty advisor.

Each member of the Thesis Committee will submit a written evaluation of the thesis proposal and defense to the ES Program Coordinator, utilizing the assessment forms downloaded from the

Environmental Sciences website. The evaluations are reviewed by the ES Program Director and the standing Program Committee.

Assessment Method

Assessment of Thesis Proposal: During the first year, each student writes a thesis proposal and presents a proposal seminar that is open to all faculty. Each member of the Thesis Committee evaluates the proposal by a 3-pt scale (1=below expectation, 2= Meets expectation; and 3 = Exceeds expectation) for the following criteria:

1) Scientific Merit of Study
2) Adequacy of literature review
3) Ability to create testable hypothesis and define objectives
4) Soundness of research methods, including procedure for data analysis
5) Oral communication and seminar

Assessment of Thesis Defense: During the last semester of study, each student submits a final written thesis and presents a thesis defense seminar. Each member of the Thesis Committee evaluates the thesis by a 3-pt scale (1=below expectation, 2= Meets expectation; and 3 = Exceeds expectation) for the following criteria:

1) Scientific Merit of Study
2) Critical analysis of literature in the field
3) Hypothesis and extent to which objectives are accomplished
4) Scope and quality of data collected and its presentation
5) Intellectual merit of data interpretation and analysis
5) Potential for journal publication from the work

Criterion for success

Success criterion for thesis proposal:
100% of all students will achieve a score of 2.5 or better on the thesis proposal evaluation.
Success criterion for thesis defense:
100% of all students will achieve a score of 2.5 or better on the thesis defense evaluation.

<u>SLO 3: Employment after Graduation</u>

Students will demonstrate the skills required to successfully compete for professional positions in the workforce by gaining employment in a field of environmental sciences-related field in the public or private sector.

Implementing Strategy

The ES Program maintains contact with students after graduation through faculty advisors and annual email surveys.

Assessment Method

An system for collection and tracking post-graduation placement data (career path after leaving FAU) through email surveys is maintained by Environmental Science faculty and staff

Criterion for success

At least 90% of students that seek employment in the discipline are able to obtain appropriate employment within one year.

<u>SLO 4: Critical Thinking and Communication</u>

Students will demonstrate a broad understanding of the multidisciplinary field of environmental science and in-depth knowledge of their area of interest. They will be able to perform analyses of scientific data and research methods, critically evaluate research findings, and communicate effectively with colleagues in their field.

Implementing Strategy
All students must take the Environmental Sciences Colloquium course during two fall semesters. As a requirement for this course, students submit weekly summaries of the scientific seminar presentations and provide in-depth critical reviews of three presentations. These written assignments are assessed by the instructor according to rubric approved by the Environmental Sciences Program Committee.
Assessment Method
Students' written reviews of the seminar presentations will be assessed using a rubric that evaluates communication, critical thinking, and synthesis skills.
Criterion for success
At least 80% of students will meet or exceed all expectations, as specified in the assessment rubric.

Assessment of SLOs and Program Improvement – Master's Program, 2013-2014

SLO 1: Professional Activities
Data Summary: Analysis and Evaluation
Of the 10 students responding to the annual assessment survey:
1) 70% participated in one or more professional organizations. 10% participated in a professional club at FAU and 60% participated in a professional club outside FAU.
2) 70% interacted with their advisor weekly or more often.
3) 90% of students attended a workshop or conference. at FAU. Only 70% attended a workshop or conference outside FAU.
The success criteria were not met for two components of this outcome, however, the level of student compliance with the requirement to complete the annual survey was extremely low (45%), making it difficult to draw valid conclusions from the results. Since failure to complete the survey is in itself indicative of low student engagement in the program, the level of success for this outcome is likely to be even lower among the students who did not take the survey.
Program Improvement
The ES has implemented three program improvements to increase student success for this outcome:
1) Increase engagement of first-year students in professional interactions. Beginning in 2014-2015, all ES students will be required to present a poster at the ES Retreat. The ES Program now holds its Annual Retreat in conjunction with the Graduate and Professional Student Association Research Day at FAU. In the past, only second-year thesis students were required to present a poster at the ES Retreat. In the future, first-year non-thesis students will present a poster of their proposed DIS project, second-year non-thesis students will present a poster of their Directed Independent Study (DIS) project results, and first-year thesis students will present a poster of their proposed thesis research. ES faculty judge the posters in the thesis and DIS categories, and winners receive funding for travel to a scientific conference or membership in a professional society.
2) Increase student completion of the assessment survey. The low level of student compliance with email requests to complete the assessment survey has been a perennial problem. Currently, the survey is conducted by an email request to students explaining the purpose of the survey and providing a link to SurveyMonkey. In the future, completion of the survey will be a requirement in the ES Colloquium course that all ES students must take during the fall semester. The survey results will remain anonymous, but students must complete the survey through Blackboard as part of their grade for the course. ES staff will do a short in-class presentation about the objectives of the survey and its role in program improvement and student success.
3) Increase student interaction with faculty. The introduction in Spring 2014 of the requirement that non-thesis ES students complete a DIS project under the direction of an ES faculty member is expected to increase the interaction of non-thesis students with faculty.

SLO 2: Original Thesis Research

Data Summary: Analysis and Evaluation

1) 100% of 8 students achieved a score of 2.5 or better on their thesis proposal evaluation.
2) 100% of 4 students achieved a score of 2.5 or better on their thesis proposal evaluation.

Program Improvement

No specific program improvements are planned for this outcome.

SLO 3: Employment after Graduation

Data Summary: Analysis and Evaluation

100% of 12 students who graduated from Fall 2012 through Summer 2013 found employment in the field or entered a PhD or professional program within one year after graduation.
Among 15 students graduating less than one year ago (from Fall 2013 through Summer 2014), 10 students had found employment in the field, 2 had entered Ph.D. programs, and 3 were seeking employment. Of the students who had found employment, 3 were employed part-time by choice.

Program Improvement

No program improvement related to this outcome is planned at this time.

SLO 4: Critical Thinking and Communication

Data Summary: Analysis and Evaluation

100% of students met or exceeded expectations for communication, critical thinking and synthesis.
First-year students scored significantly lower ($p=0.045$) than second-year students in communications skills (5.0 ± 0.46 and 6.8 ± 0.60, respectively).
First-year students also scored significantly lower ($p=0.037$) than second-year students in communications skills (4.9 ± 0.58 and 6.7 ± 0.52, respectively).
These results support the expectation that the ES Program will improve students' critical thinking and communication skills.

Program Improvement

The introduction of the requirement that first-year students participate actively in the Annual ES Retreat by presenting a poster of their thesis or research proposal is expected to improve student skills in communication and critical thinking.

i. Limited access

To be considered for admission to the master's degree program in Environmental Sciences, applicants must meet the following minimal requirements:

- Have an earned bachelor degree from a regionally accredited college or university or the international equivalent.
- Have a cumulative grade point average of 3.0 or greater over the past 60 credit hours. This could include graduate-level coursework.
- Have a Graduate Record Examination (GRE) score of at least 151 on the verbal test and 148 on the quantitative test from the past five years. The admissions committee evaluates the scores on each test individually, not cumulatively. Prior to the change in the GRE test in 2011 a cumulative score of 1000 was the benchmark minimum standard.

ii. Admissions criteria

The Environmental Science (MS) graduate program seeks to provide advanced education to highly qualified graduate students. Admission to the ES master's program is competitive and applicants are evaluated on several factors that collectively indicate their potential for scholarly and professional

success. To be considered for full acceptance into the master's degree program in Environmental Sciences, applicants minimally must:

- Have an earned bachelor degree from a regionally accredited college or university or the international equivalent.
- Complete the Environmental Science graduate study application.
- Submit a 1-2 page typed personal statement of research/career objectives as they relate to environmental sciences.
- Have a cumulative grade point average of 3.0 or greater over the past 60 credit hours. This could include graduate-level coursework.
- Have a Graduate Record Examination (GRE) score of at least 151 on the verbal test and 148 on the quantitative test from the past five years. The admissions committee evaluates the scores on each test individually, not cumulatively. Prior to the change in the GRE test in 2011 a cumulative score of 1000 was the benchmark minimum standard.
- Have two letters of recommendation from previous professors, employers, or someone otherwise qualified to evaluate the applicant's potential for academic work in environmental science.
- Have a support letter from a sponsoring faculty member who is a member of the ES graduate faculty indicating his/her willingness to advise the applicant.

For applicants that are graduates of foreign colleges or universities they must provide an official certified transcript that indicates the nature/scope of his or her academic training.
For applicants with a native language other than English, they must submit a Test of English as a Foreign Language (TOEFL score of 500 or iBT score of 61).

Applicants are accepted as either Thesis or Non-thesis option. The minimum standards for the two options are the same, but the offer of teaching assistantships and fellowships (see **Student Recruitment**) is limited to students in the Thesis option. This creates some competition, making higher scores and support of a sponsoring faculty member of greater import.

The requirement for a sponsor letter makes it necessary for most students to communicate with a faculty member beforehand and secure their support. This process represents a type of pre-selection before the ES admissions committee considers an application. For students applying for the Thesis Option, that faculty-level pre-selection generally requires a mutual research interest between the faculty sponsor and the applicant as well as sufficient resources to initiate the research.

iii. Enrollment information

Enrollment in the ES graduate program increased from 2010 through to a peak of 36 students in 2012-2013. Enrollment has since declined to 26-27 students for the past two academic years (Figure 2). This decline in enrollment is not due to a decrease in the number of applicants, nor to any decrease in applicant quality. Applicant number, in fact, has remained relatively steady over the past 5 years, with a mean of 22 applications per year and 17 accepted for a mean rate of 77% of applicants accepted into the program. Applicants in 2014 in fact were a record 26. The disparity lies in the **declining number of students accepted who then choose to enroll at FAU** (Figure 3). Over the period 2010 – 2013, 64-74% of applicants accepted into the graduate program enrolled at FAU. In 2013 that fraction declined to 50% and was only 42% in 2014. Unfortunately, we are losing some of our top applicants, who are choosing other schools over FAU.

Figure 2: Total Graduate Program Enrollment

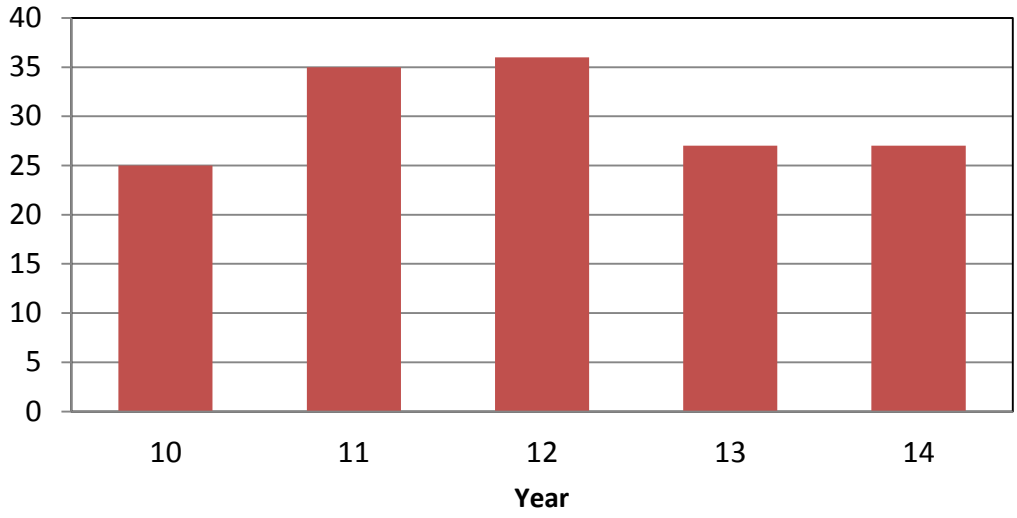
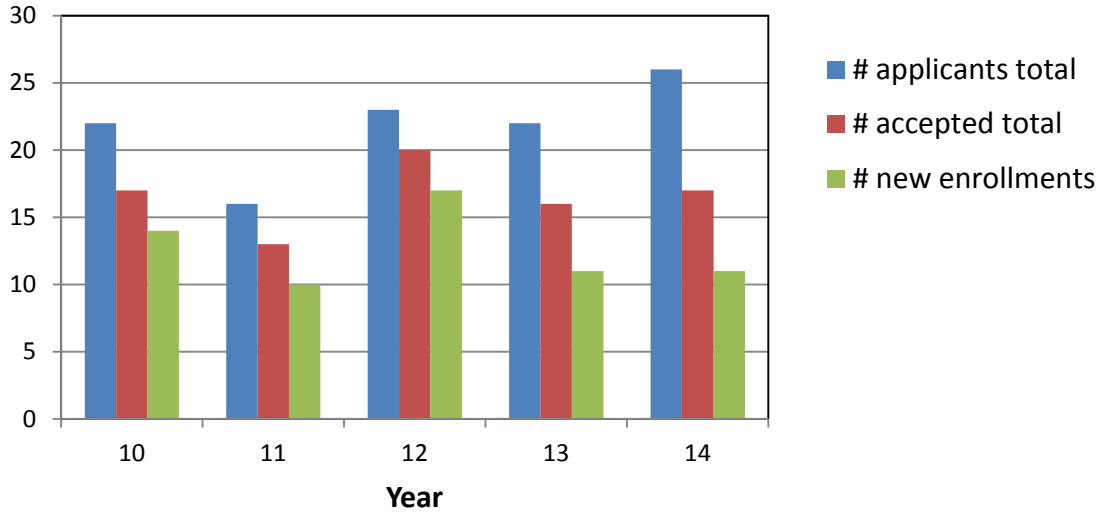


Figure 3: 5-yr trends in ES graduate applicants



Students have told their potential sponsors in the graduate program that teaching assistantships at other schools are more attractive, especially as the cost of living in Boca Raton is high. An investigation by the ES Program Committee into other state universities in Florida revealed that FAU is non-competitive neither with stipends nor benefits, and this shortcoming is considerably more pronounced for the MS stipends compared to College of Science PhDs.

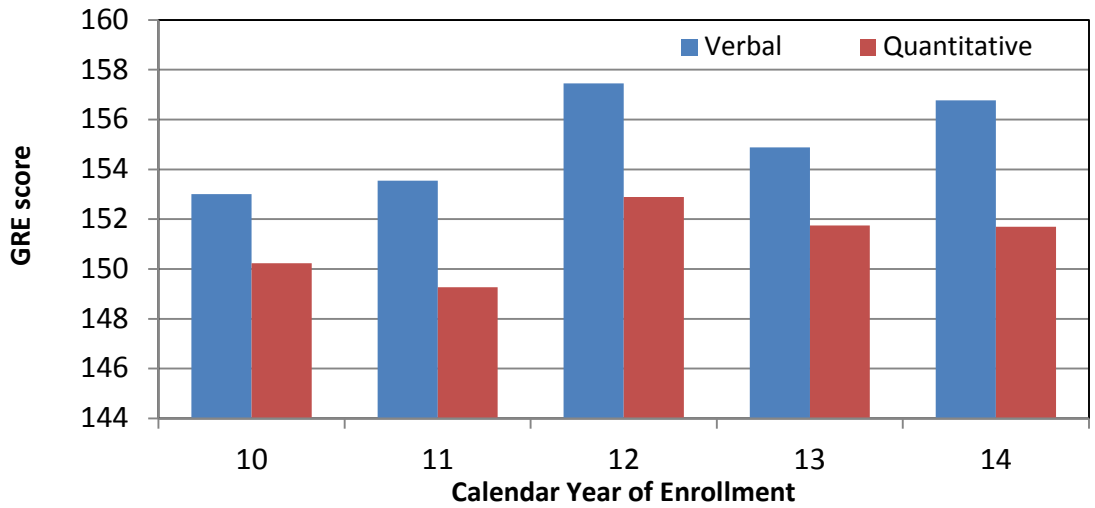
MS stipends, tuition waivers, and benefits at FAU compared to other state universities in Florida

University	MS Stipend	months	Tuition waiver	Health insurance
FAU	**9,636**	9	100% (in-state)	**No**
FIU	15,000	12	9cr/sem.	75% of cost
USF	18,600	9	100%	100%
UF	18,000	9	100%	100%
FSU	20,000	12	100%	$900 supp.
UCF	10,000	9	100%	Yes

The Center for Environmental Studies gave the ES Program an additional $20K for this academic year to disburse as the Program Committee saw fit. The Committee approved the division of the additional funds to supplement the three top students, with the remainder going to student recruitment. This was a onetime benefit however, and there is no guarantee that additional monies will be forthcoming.

The test scores of graduate students enrolling in the program have increased over the past five years as demonstrated by the average GRE scores of accepted and enrolled graduate students from 2010-2014 (Figure 4, all scores expressed on the newer GRE scale, 2014 concordance table). Over the past 5 years

Figure 4: Average GRE scores of incoming graduate students



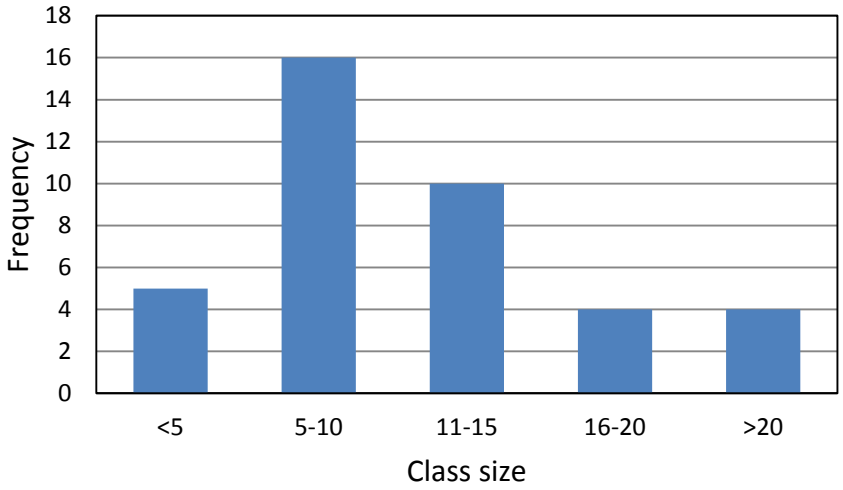
average GRE scores were 155 on the verbal test (67th percentile) and 151 on the quantitative test (44th percentile). The average undergraduate GPAs of accepted/enrolled cohorts for the 5 years ranged from 3.3 to 3.4. ES faculty have discussed raising the admission standards a bit further, but without

commensurate support we doubt that the program can continue to improve and sustain or increase enrollment numbers.

iv. Average class size and faculty/student ratio

Graduate classes at FAU are generally small, allowing for extensive interactions with students and enhancing discussion and student-faculty interactions. While Dashboard indicators for the ES Program class size and student/faculty ratio are not available, we obtained enrollment data for courses in the six core areas of the ES Program (Figure 5). Although class size ranges up to 27, most have 10-15 students, with an average of 11 students. The ES Colloquium, which is required of all students in the program, typically has 20-25 students.

Figure 5: Graduate course class sizes



v. Curriculum

The curriculum draws from courses across multiple colleges to ensure students receive broad training in the environmental sciences. The MS degree requires a minimum of 36 credits, with at least 22 from a set of core courses in six subject areas: Chemistry, Geographic Information Science, Modeling, Conservation and Ecology, and Policy and Planning. Students must take one course from at least four of these core subject areas. The detailed curriculum can be found in Appendix B. The expected duration of the program is two years.

Students must also take at least two semesters of Environmental Science Colloquium (EVS 6920, 1 credit per semester). The broad goals of the ES Colloquium are to develop critical thinking and communication skills in the context of a variety of topics in environmental research and management fields.

The MS Thesis program requires 6-12 thesis research credits (EVS 6971) in addition to presentation of a thesis proposal and defense. The non-thesis program requires the same minimum of 22 credits from core courses, and only 6 elective credits may be taken outside the core subject areas. Non-thesis students must also complete 3 directed independent study credits (EVS 6905).

Credit requirements for similar programs are listed in the table below. The specific degree programs are

- George Mason University, MS in Environmental Science & Policy
- University of Nevada Las Vegas, MS in Environmental Science
- Florida A&M University, MS in Environmental Sciences

- Florida Gulf Coast University, MS in Environmental Science
- University of Florida, MS in Interdisciplinary Ecology
- Louisiana State University, MS in Environmental Sciences

Comparable programs also divide credit requirements between core and elective courses; however, the number of required core courses varies widely (9-31 credits). FAU sits approximately in the middle of this distribution and is similar to our aspirational programs. Some programs (e.g., George Mason, UF) require all students to take a small number of specific courses in research methods and statistics. Like FAU, four of the six similar programs require at least one seminar/colloquium course.

Minimum credit requirements for FAU and comparable Environmental Science Masters programs

	FAU	George Mason	UNLV	FAMU	FGCU	UF	Louisiana State
Comparable/ Aspirational		comp	comp	comp	comp	asp	asp
Total	36	33	33	36	36	36	36
Core	22	21	9	31	16	18	24
Thesis/Research	6	3	6	6	0	0	6
Seminar/Colloquium	2	1	1	0	0	2	1

vi. Internships, practicum, study abroad, field experiences

The Environmental Science Program promotes internships for its students because internships are a form of experiential learning where students learn by doing. South Florida is rich in institutions involved in resource management and research so it is an ideal place to have students engaged in experiential learning as part of their academic studies. Since 2010, ES students have interned at private consulting companies, state agencies (the South Florida Water Management District and the FL DEP), national agencies (FWS, EPA), county resource management agencies (Palm Beach, Broward County) and nearby parks and wildlife reserves (Everglades, Big Cypress, state, local).

A new (summer 2014) study-abroad program will now be available to ES students. FAU recently concluded arrangements, originated by 2 members of the ES Graduate faculty, in which the Tropical Forestry Research Institute (TFRI) in Guangzhou, China will provide funds for students to conduct a portion of their research at the TFRI. This collaboration will benefit students at FAU who are interested in mangrove ecology.

Field experiences are an important part of the ES curriculum. The courses take advantage of the varied environment around South Florida, from the Everglades to the ocean, and from estuaries to urban areas and most are in the Conservation and Ecology core subject area (e.g. Flora of South Florida, Marine Ecology, Marine Invertebrate Zoology, Natural History of the Indian River Lagoon).

vii. Pedagogy/pedagogical innovations

The Environmental Science Program combines traditional classroom learning with experiential learning South Florida highly varied ecosystems and urban landscapes, in the form of field trips, field work and research experience for both thesis and non-thesis students. South Florida is rich in institutions involved in resource management and environmental research so it is an ideal place to engage students in experiential learning through internships as part of their academic studies; internships may also lead to future employment.

The Environmental Sciences Colloquium (seminar series), in turn, brings experts from both the surrounding areas and outside of South Florida to FAU, broadening students perspectives beyond that of the FAU faculty. For example, in the last two years the ES Colloquium has hosted speakers from various agencies with presentations on wildlife management (US Fish & Wildlife Service), science communication (Patricia & Philip Frost Museum of Science), and climate change impacts (Smithsonian Environmental Research Center). The ES Colloquium also sponsors academic research seminars by faculty from universities in Florida and out of state.

Several of our most highly attended core courses, including the ES Colloquium, must be taught by video conference due to the distributed campus environment at FAU. These courses are broadcast from the originating campus to the Davie, Boca, Jupiter, and Harbor Branch campuses, as needed and include both seminars and lecture format classes. Broadcasting courses allow students in the ES Program (and others) to schedule necessary courses despite the distances between campuses. The video conference system also provides an important link between students and faculty throughout the program. Recent updates to the system have made this more effective, though distance teaching still occasionally poses challenges. For example, sound quality and dropped connections are problems on the technology side; student reticence with microphones and lack of the instructor's physical presence are pedagogical challenges.

Special courses and workshops are also designed for ES students, though students, faculty, and professionals outside of FAU also may benefit. For example, in 2012, about 17 FAU ES and Biology students, most of whom are studying avian ecology, were trained on how to capture invasive Burmese pythons, common to the southern regions of the Everglades. Because many of the students conduct research in the Everglades, it's not unusual for them to encounter the non-venomous pythons; learning to safely remove these reptiles benefits both the students and the environment.
In an academic setting, the ES Program has run four, multi-day statistics and modelling workshops for researchers and students from throughout South Florida (2009-2013, another is currently in the planning stages). These workshops bring in outside experts to present an intensive workshop on a particular topic. In 2013 the ES workshop was presented by Dr. Robert M. Dorazio, US Geological Survey, on the use of Bayesian statistical methodologies in analyses of biological data using the R statistical program.

Where appropriate, e-learning is also a part of the ES curriculum; as the Geographic Information Systems courses are computer-intensive rather than field-oriented, they are taught exclusively on-line. Other courses, while not e-learning, provide practical instruction and experience in relevant computer programs and computer modeling, including statistics and hydrology courses.
At the end of each academic year, the ES Program sponsors an Annual Environmental Science Retreat. This is intended to develop a sense of collegiality among ES students, who are scattered across multiple campuses and thus rarely meet as a cohesive group. All ES master's students present posters of their work, and both an outside speaker and an alumnus are selected to present talks, thus allowing students to get additional perspectives on the professional world to which many ES graduates aspire.

viii. Scope of institutional contributions

The six core subject areas in the Environmental Science Program include courses from multiple schools/colleges/departments, including Biology, Chemistry, Geosciences, Urban and Regional Planning, Women's Studies, and Philosophy. Although most of these courses were not in general created by the ES Program, ES graduate students interact extensively across these departments. The Environmental Science Colloquium was created by the ES Program (in part as a means of assessing our students'

progress); however, this course also serves to fulfil seminar requirements for students in the Biological Sciences MS Program and the Integrative Biology PhD Program.

Two certificate programs are available to graduate students in the Environmental Science Program. The ES Program offers the **Environmental Restoration** certificate for graduate students who wish to pursue an environmental restoration position upon graduation or for professionals looking to increase their knowledge base, advance professionally or change careers. The certificate is interdisciplinary, drawing on courses from environmental science, geosciences, biology, urban and regional planning and civil engineering. The certificate also includes considerable opportunity for experiential learning in the form of course field trips to actual restoration projects; internship opportunities with local, state and federal agencies conducting restoration; and primary research experiences with future, ongoing and recent environmental restoration projects in South Florida. These opportunities also provide the prospect of meeting, networking and interacting with professionals from public and private environmental restoration organizations.

The certificate consists of a minimum of 21 credits, including three core courses, one internship or DIS resulting in the completion of a restoration-related project, completion of a manuscript of publishable quality and colloquium presentation based on the internship/DIS project, and three electives chosen from the two elective foci (both elective foci: Ecology, and Planning and Engineering, must be represented). The three core courses include Environmental Restoration, Restoration Implementation and Management and Conservation Biology. All courses must be completed with a grade of "C" or better to be counted toward the certificate.
As Geographic Information Science is one core subject area available to ES students, students in that core area may obtain the **Geographic Information Systems Certificate**. The Geographic Information Systems (GIS) certificate for graduate students is not an ES-specific certificate, but is offered jointly by the Department of Geosciences and the School of Urban and Regional Planning in the College for Design and Social Inquiry. Graduate students who complete the program with a grade of "B" or better in each course are entitled to receive the certificate. Nine credits (3 courses) of core material are required plus an additional 6 credits (2 of 3 possible courses) of the student's choosing. The GIS courses are taught exclusively on-line.

ix. Student profile

Demographics

FAU has long ranked as the most racially, ethnically and culturally diverse institution in Florida's State University System. In 2014, minority students make up 47 percent of the 30,000-member student body. FAU ranks 93rd in the nation for conferring graduate degrees to all minorities combined, who represent 35 percent of the total number of graduates; FAU ranks 90th in the nation for conferring graduate degrees to African-American students and 57th in the nation for conferring graduate degrees to Hispanic students, who account for 14 percent of the total number of graduates. Students in the ES Program are less ethnically diverse, with white students making up 80% and 83% of the ES graduate population in 2011 and 2012, respectively, the only years for which FAU provided Dashboard Indicators. Hispanic students comprised 17% and 14% of the student body in those years, with African-American and Asian/Pacific Islanders making up 3% each. The ES Program is thus comparable to or better than the overall graduate program in the College of Science, where 3% of the overall graduate student body was African-American and 6% Hispanic in 2012-2013 (the only year for which Dashboard Indicators were available). While this is positive in that it shows the ES Program is attractive on a national scale, it does suggest that more effort could be made to recruit from the highly diverse local student body, both from FAU and the surrounding urban areas.

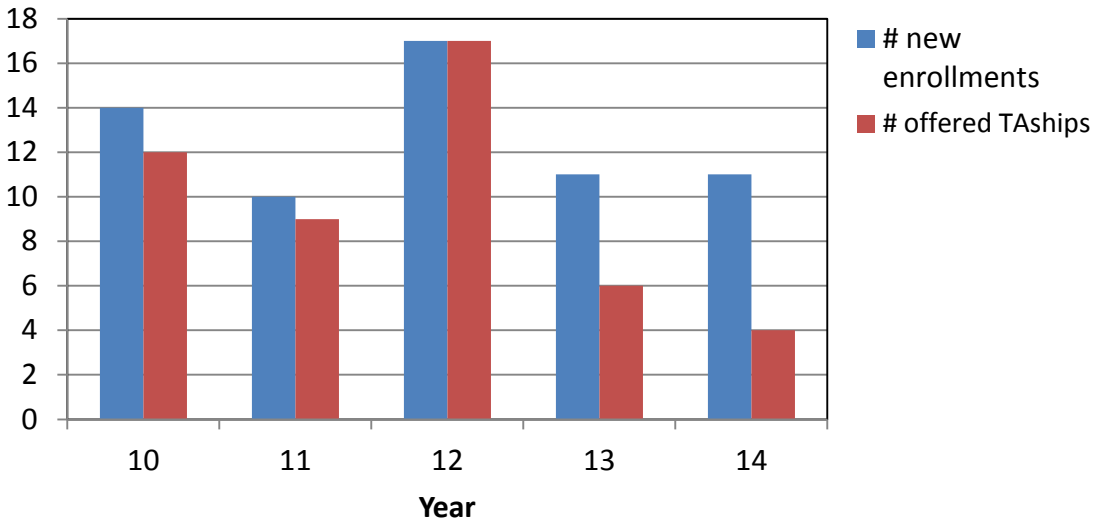
The male/female ratio for the COS in 2012-2013 was 50/50 overall. The ES graduate program is weighted slightly towards women; the graduate student body was 56% and 58% female in 2011 and 2012, respectively.

Support

Thesis students are supported primarily by way of graduate Teaching Assistantships (TAs); some ES students may also be supported by a Research Assistantship through their advisor. Two incoming students were supported by RAships in 2012, for example, while 4 of 15 incoming students in the fall of 2014 are on RAs. Not all incoming students request TA support, and students in the Thesis track are given priority for TAships while students admitted "conditionally" are also not offered guaranteed TA support initially (though if successful in the program they will be considered for future TA positions). The ES Program is now granted 11.5 positions per academic year and 4-5 each summer; this represents an increase from 9 that were available through most of the time prior to the 2010 academic year. Support has been augmented over the last few years by scrambling to find TA positions in Chemistry or Biology.

Teaching assignments are generally in the department of which the student's advisor is a member. Since FAU has multiple campuses with varying undergraduate populations (and thus differing numbers of TA opportunities), efforts are made to match the graduate student's primary campus with TA opportunities. To accommodate students at Harbor Branch Oceanographic Institution (HBOI), arrangements were made for teaching positions at the nearby Indian River State College (IRSC), where students are considered affiliate faculty and receive the same pay for a semester of teaching as they would at FAU. FAU has generally approved tuition waivers for those students in our program with support from IRSC.

Figure 6: 5-Yr Incoming Graduate Support



Recent efforts by the ES Program Director have resulted in additional RAships being made available through the Everglade Fellowships funded by the National Park Service. The first round of funding was $500,000 and established in 2009. A second round of funding was $100,000 and initiated in 2014. The FAU Environmental Science Everglades Fellowship Initiative is funded by the National Park Service to facilitate restoration of the Everglades ecosystem with the objectives of:

1. Producing high quality publishable scientific papers that provide guidance for the restoration of the Everglades ecosystem.
2. Provide support and training for outstanding fellows to conduct research that is pertinent to the science, management, or policy needs of National Park Service or other U.S. Department of Interior agencies in South Florida.
3. Fostering synergistic collaborations among faculty and students in the FAU Environmental Science Program and staff at the National Park Service.

While the work must be relevant to the restoration of the greater Everglades ecosystem, it can be done on any Department of Interior lands in South Florida including Everglades National Park, Big Cypress National Preserve, Biscayne National Park, Dry Tortugas National Park, and the A.R.M. Loxahatchee National Wildlife Refuge. The initial fellowship program offered a significant boost to the ES Program in terms of the quality of students that it attracted and the breadth of faculty that began their participation in the Program. The former College of Science Dean helped the Director secure the initial fellowship grant by meeting with National Park Service administrators and signaling that FAU was ready to invest in training and research for Everglades science. Surprisingly, within a year the upper university administration publically announced a shift in its environmental research emphasis to a climate science initiative, effectively ending the considerable momentum that had been achieved in making FAU known for developing a science initiative that closely matched the research needs of the $8 billion Everglades restoration effort. An attempt to regain this momentum has only recently emerged through efforts by the current Dean of the College of Science to signal a renewed interest by FAU in training students and conducting research that meets the needs of the Park Service and other agencies involved in the management and restoration of South Florida's aquatic ecosystems.

Scholarly Activity

Over the past 5 years, the ES Program has worked to increase student scholarly activity and in particular to increase interactions with ES professionals. To track scholarly activities, a Blackboard survey was developed that all students now take annually during the fall semester ES graduate colloquium. The analyses and summary of the percentage of students reporting participation in specific professional activities is reviewed annually by the Environmental Sciences Program Committee.
The ES Program Committee established the following criteria for success 1) Participation in professional organizations by at least 90% of MS students 2) 90% of students will interact with faculty weekly or more often. 3) Participation in workshops and conferences: 90% of students will present their thesis or DIS research at one or more workshops or conferences.

Originally, the criteria were not met successfully for two components; however, the level of student compliance with the requirement to complete the annual survey was extremely low (45%), making it difficult to draw valid conclusions from the results. Since failure to complete the survey is in itself indicative of low student engagement in the program, the level of success for this outcome may have been even lower among the students who did not take the survey.

Of the 10 students responding to the initial annual assessment survey:

1) 70% participated in one or more professional organizations. 10% participated in a professional club at FAU and 60% participated in a professional club outside FAU.
2) 70% interacted with their advisor weekly or more often.
3) 90% of students attended a workshop or conference at FAU. 70% attended a workshop or conference outside FAU.

Seven ES thesis students published their work in peer-reviewed journals during 2010-2014, and several more have submitted manuscripts currently under review. ES students have presented locally at the Florida Chapter of the Wildlife Society, Arthur R. Marshall National Wildlife Refuge Symposia and Greater Everglades Ecosystem Restoration conferences. Students attend national and international meetings as well, including the International Sea Turtle Symposium, the Ecological Society of America annual meeting, Wildlife Society Annual meeting, Society for Freshwater Science annual meeting, and the Society of Wetland Scientists annual meeting.

The ES has implemented three program improvements to increase student scholarly activity and engagement:

1) Increase engagement of first-year students in professional interactions. Beginning in 2014-2015, all ES students will be required to present a poster at the Annual ES Retreat. The ES Program now holds its Annual Retreat in conjunction with the Graduate and Professional Student Association Research Day at FAU. In the past, only second-year thesis students were required to present a poster at the ES Retreat. In the future, first-year non-thesis students will present a poster of their proposed DIS project, second-year non-thesis students will present a poster of their Directed Independent Study (DIS) project results, and first-year thesis students will present a poster of their proposed thesis research. ES faculty judge the posters in the thesis and DIS categories, and winners receive funding for travel to a scientific conference or membership in a professional society.

2) Increase student completion of the assessment survey. The low level of student compliance with email requests to complete the assessment survey has been a perennial problem. Previously, the survey was conducted by an email request to students explaining the purpose of the survey and providing a link to SurveyMonkey. Currently, completion of the survey will be a requirement in the ES Colloquium course that all ES students must take during the fall semester. The survey results will remain anonymous, but students must complete the survey through Blackboard as part of their grade for the course. ES staff do a short in-class presentation about the objectives of the survey and its role in program improvement and student success.

x. Advising procedures

Applicants who receive acceptance letters must sign and return offer letters indicating their acceptance of the offer to the ES Program and the Graduate College.
Throughout their degree students are expected to meet with their ES faculty advisor regularly, but also at the start of each semester to review the expectations for progress towards the degree. Specific semester-by-semester expectations and documentation requirements can be found online through the FAU Blackboard system.

All graduate students must develop and submit a Plan of Study by the end of their second semester. Students admitted to the Thesis Option are expected to form a thesis committee by the end of their first semester. In consultation with their major advisor the student is expected to submit and defend a Thesis Proposal by the end of their second academic semester. Students in the Non-Thesis Option must meet with their faculty sponsor and develop a plan for their independent research project by the end of the second semester.

Students are expected to maintain a GPA of 3.0 or higher throughout their course of study. Students falling below 3.0 will require evaluation by the ES Program Director and their major advisor. Students

may be required to complete an Academic Progression Plan to clarify the expectations given the deficiency. If sufficient improvement is not made the student may be dismissed from the program.

In the semester of intended graduation (the fourth academic semester), students must submit an application for degree and, when needed, a revision to the Plan of Study.

xi. Licensure rates (if applicable)

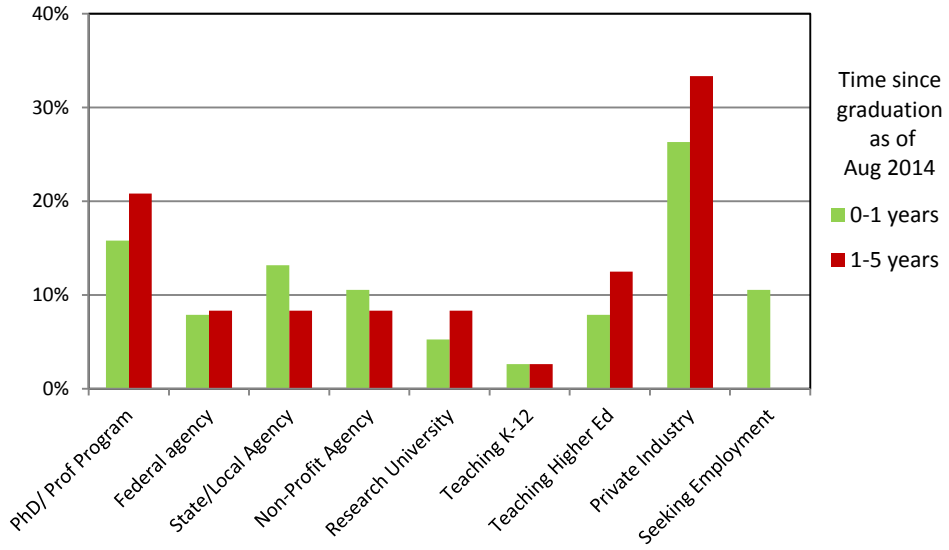
Not Applicable

xii. Placement rates/employment profile

The ES graduate program currently consists of thesis and non-thesis Masters degrees (an Environmental Science track as part of FAU's Integrative Biology PhD program is currently under consideration by the administration). Non-thesis students completing the program are qualified for positions in the environmental sciences related to permitting, regulation, monitoring, policy formulation or other duties that do not require experience in scientific research. Students who plan to pursue a career in research choose the thesis option, which qualifies them for research positions at various governmental and non-governmental agencies or for additional training in a doctoral program.

The 2009 assessment and program review identified student tracking as an area where improvement was needed in the ES Program, and the Program Committee has implemented a policy to enhance the tracking of students post-graduation. The ES Program Assistant and Coordinator collect Information on student employment after graduation by multiple means: direct communication with alumni who provide the ES Program with their email addresses, online sources (LinkedIn and Facebook), and student advisors who remain in contact with their former students. Information is maintained for five years after graduation and is compiled in a spreadsheet. Beginning in 2015, an alumni page will be maintained on the ES website.

Figure 7: ES MS Program Post-Graduation Employment



Over the past 5 years, students have been employed in federal, state, and local agencies, as teachers in primary and secondary schools, with private companies in related fields, and have gone on to doctoral or professional programs. The placement rates and employment profile are detailed in Figure 7.

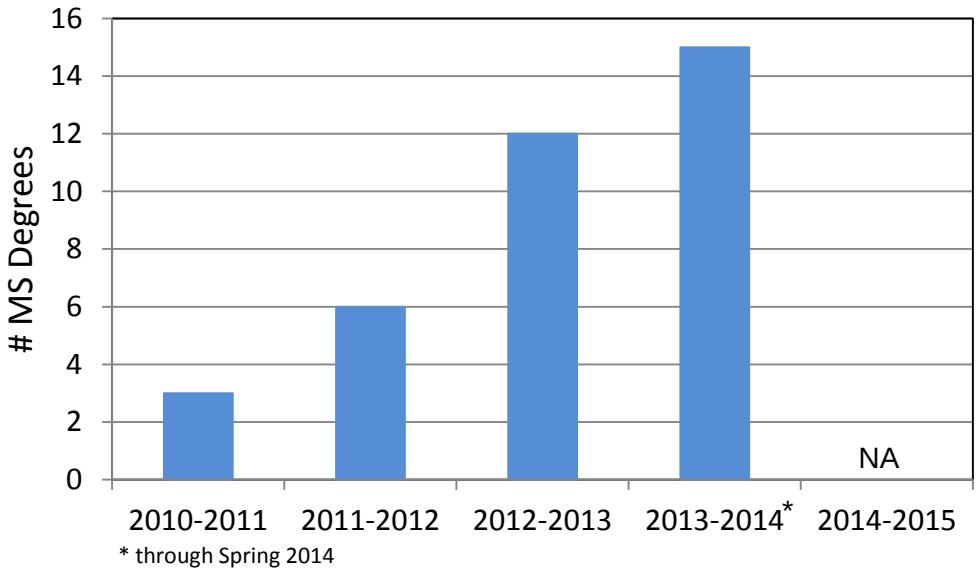
xiii. Retention rates

Forty-five graduate students were enrolled in the ES MS program that could have realistically graduated with MS degrees during this review period (i.e., enrollment from 2008-2012). Of the forty-five (45) students four (4) left the program for personal or medical reasons. The five year retention rate in the graduate program for the period was 91%.

xiv. Graduation rates

As of this review the ES Program offers two-year thesis or non-thesis Master of Science degrees. Of the 41 students first enrolled from 2008-2012, 39 had been awarded MS degrees as of Summer 2014, of which 30 were MS thesis degrees and 9 were MS non-thesis degrees, and 2 students had not yet graduated. Students can graduate in fall, spring or summer semesters. The number of degrees awarded has increased for four consecutive years (Figure 8) but the graduation data for the current academic year 2014-2015 is not yet available. The 39 graduates were advised by 20 different major professors housed in Biological Sciences (Boca, Davie, and Harbor Branch faculty), Geosciences, the Honors College, Chemistry and the Center for Environmental Studies.

Figure 8: MS degrees awarded by year



xv. Student recruitment

Passive recruitment of graduate students arises by use of the Environmental Science Program website, advertisement to FAU undergraduates through coursework/research in allied fields and the websites of individual faculty.

Active recruitment occurs as members of the faculty with active research programs search for graduate students nationally or internationally through discipline-specific channels. The ES Program has a limited number of teaching assistantships (11.5 academic year stipends with tuition waivers) to offer to the top applicants. Applicants must meet or exceed the minimum GRE and GPA standards and be deemed good prospects in other respects (letters, experience, personal statement) to receive committed support for two years.

Additional sources of support have been used to recruit top students, including Fellowship Programs from the U.S. National Park Service, internships with the South Florida Water Management District, a new Fellowship Program in partnership with the Center for Environmental Studies (FAU) and Research Assistantships offered by participating ES graduate faculty with their own grants. In addition, a Provost Fellowship consisting of a one-time offer of $2500 is offered to the top recruit each year when the fellowship is available.

A limited number of the top applicants that are not local are provided travel reimbursements for campus/lab visits with recruitment fellowship funds provided by the Provost's Office.

Faculty

i. Administrative structure

The administrative structure of the Environmental Science Program consists of a Program Director and a Program Coordinator with faculty appointments in the CES College of Science, and a part-time Program Assistant with a staff position in the CES College of Science

ii. Faculty profile

The Environmental Science Program is an interdisciplinary program. It is currently comprised of 42 faculty members representing approximately 12 different departments throughout FAU and other affiliate faculty. A central institutional database for ES faculty does not currently exist. Therefore, to the extent possible, ES staff track this information independently.
Faculty summary:
Biology: (18) 42%, Geosciences: (11) 25%, Harbor Branch: (3) 7%, Honors College: (3) 7%,
Others (1) 2.3% each: Chemistry, Anthropology, Mathematics, URP, CMS, CEGE, CES
30 Male: 70%
13 Female: 30%

Faculty in the Environmental Science Program
Bold type indicates faculty who have sponsored one or more ES MS students since 2009.

Last Name	First Name	Diversity	Rank	Department	Academic Specialties	Full-time /Part-time
Baldwin	**John**	M	Full	Biology	Conservation Biology	Full-time
Benscoter	**Brian**	M	Assistant	Biology	Plant ecology	Full-time
Brooks	Randy	M	Full	Biology	Behavioral/physiological ecology of marine organisms	Full-time
Comas	Xavier	M	Associate	Geosciences	Peatland Geophysics	Full-time

Last Name	First Name	Diversity	Rank	Department	Academic Specialties	Full-time /Part-time
Dawson-Scully	Kenneth	M	Associate	Biology	Neurobiology of cellular stress and neuroprotection	Full-time
Detwiler	**Kate**	F	Assistant	Anthropology	Primate hybridization and speciation	Full-time
Devlin	**Donna**	F	Assistant Research Professor	Biology	Plant-invertebrate interactions	Full-time
Dorn	**Nathan**	M	Associate	Biology	Freshwater ecology	Full-time
Esiobu	Nwadiuto	F	Full	Biology	Environmental microbiology	Full-time
Fadiman	**Maria**	F	Associate	Geosciences	Ethnobotany	Full-time
Frazier	**Evelyn**	F	Instructor	Biology	Terrestrial Ecology, Conservation Biology	Full-time
Gawlik	**Dale**	M	Full & Program Director	Biology	Avian Ecology, Wetland ecosystems & restoration ecology	Full-time
Haky	Jerry	M	Associate	Chemistry	Chemical education research	Full-time
Hanisak	Dennis	M	Research Professor	Harbor Branch	Ecology and physiology of marine plants	Full-time
Hanson	**Howard**	M	Full	Geosciences	Atmosphere-ocean interaction	Full-time
Hindle	**Tobin**	M	Associate Scientist	Geosciences	Ecological Regeneration	Full-time
Hughes	Colin	M	Associate	Biology	Evolutionary Genetics and its relationship to conservation	Full-time

Last Name	First Name	Diversity	Rank	Department	Academic Specialties	Full-time /Part-time
Ivy	Russ	M	Full	Geosciences	Transport Network Analysis	Full-time
Kajiura	Stephen	M	Associate	Biology	Functional morphology & sensory biology of fishes	Full-time
Koch	Margueri te	F	Full	Biology	Marine botany	Full-time
Lapointe	**Brian**	M	Research Professor	Harbor Branch	Algal physiology and biochemistry	Full-time
Markwith	**Scott**	M	Associate	Geosciences	Biogeography	Full-time
Meerhoff	Daniel	M	Full	CEGE	Solid Waste Management, Water Chemistry	Full-time
Milton	**Sarah**	F	Associate	Biology	Physiological responses to environmental stress	Full-time
Mitsova	**Diana**	F	Associate	URP	Environmental modeling, climate change,	Full-time
Moore	**Jon**	M	Full	Honors College	Ecology, evolution, and distribution of fishes	Full-time
Noonburg	**Erik**	M	Associate	Biology	Ecological modeling	Full-time
O'Corry-Crowe	**Greg**	M	Associate Research	Harbor Branch	Marine mammal population genetics	Full-time
Oleinik	Anton	M	Associate	Geosciences	Cenozoic stratigraphy	Full-time

Last Name	First Name	Diversity	Rank	Department	Academic Specialties	Full-time /Part-time
Owen	**Virginia**	F	Scientist, Program Coor-dinator	Biology	Landscape & Community Ecology, Invasion Biology	Full-time
Petuch	Ed	M	Full	Geosciences	The geology, biostratigraphy, and invertebrate paleontology of the Floridian Peninsula	Full-time
Polsky	Colin	M	Director CES Full	CES Geosciences	Human Dimensions of Global Environmental Change	Full-time
Proffitt	**Ed**	M	Associate	Biology	Ecology of marine & estuarine macrophytes & invertebrates	Full-time
Qian	Lianfen	F	Full	Mathematics	time series analysis and regression modeling, survival analysis, environmental statistics	Full-time
Roberts	Charles	M	Associate	Geosciences	Extracting thematic information from remotely sensed imagery	Full-time
Root	**Tara**	F	Associate	Geosciences	Ground water chemistry,water-rock interaction, groundwater sustainability	Full-time
Santaniello	Neil	M	Instructor	CMS	Environmental Journalism	Full-time

Last Name	First Name	Diversity	Rank	Department	Academic Specialties	Full-time /Part-time
Warburton	David	M	Associate	Honors Col	Environmental geochemistry	Full-time
Wetterer	James	M	Full	Honors Col	Biogeography, ecology, and environmental impact of ants,	Full-time
Wyneken	**Jeanette**	F	Associate	Biology	Integrative biology	Full-time
Xie	Zhixiao	M	Full	Geosciences	spatial temporal GIS analysis, environment health, invasive species	Full-time
Zhang	Xing-Hai	M	Associate	Biology	Plant molecular biology and biotechnology	Full-time

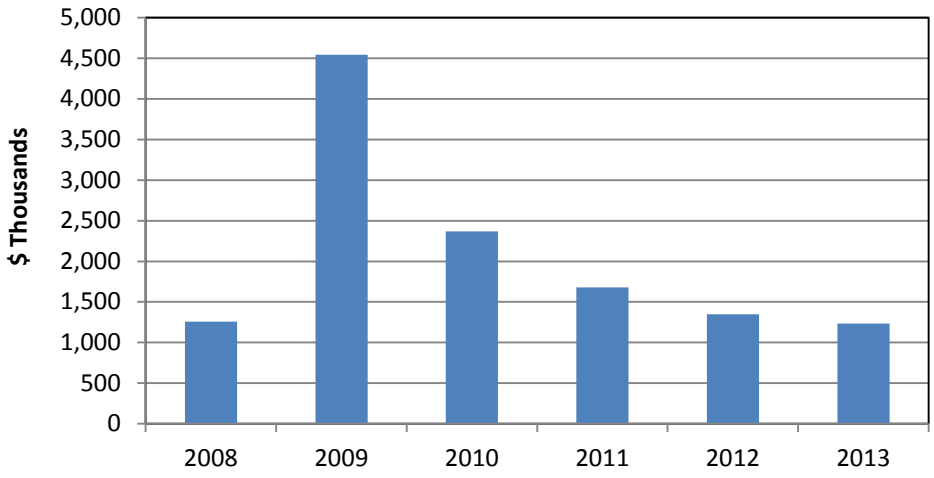
iii. Faculty teaching load

Not applicable; courses in the ES Program curricular are taught by faculty in the departments that offer these courses.

iv. Summary of faculty research productivity

The ES Program does not have faculty lines and there is no institutional-level tracking of grant funding awarded to ES faculty. ES staff independently tracks grant funding received by ES faculty (Figure 9) to understand their level of research activity and to identify research strengths that will shape the future directions of the program.

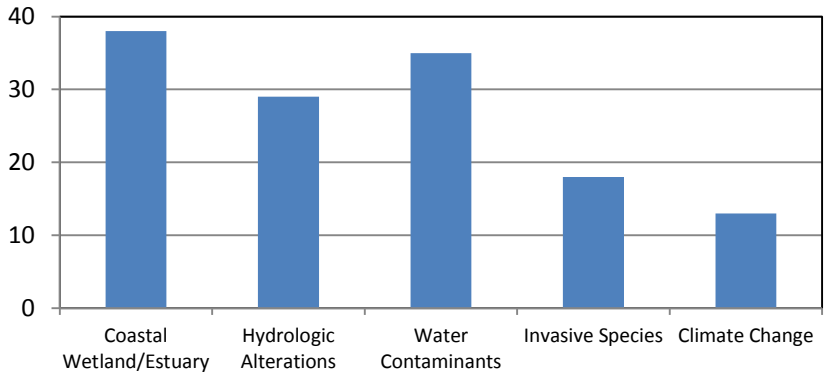
Figure 9: ES Faculty Extramural Grant Funding



ES faculty publications are heavily focused on research questions related to wetlands and estuaries. This area of strength was the basis for focusing research in the ES Program on the big questions related to restoration and management of wetland and estuarine ecosystems that closely match government funding mechanisms; wetland loss, hydrologic alterations, invasive species, contaminants including nutrients, and climate change.

In 2010, the ES Program established the Greater Everglades Research Initiative (GERI) based on an interdisciplinary framework that is now widely recognized as the most effective way to conduct research for ecosystem restoration and management. GERI brings together FAU faculty and collaborators based on their relevance to a problem at hand, not by the subject of their academic training. GERI offers one of the few tangible mechanisms for reaching across disciplines, agencies, and ecosystems to solve human-caused problems. The ecosystems addressed by GERI fall roughly along an elevation gradient from the human-wetland interface to freshwater wetlands, estuaries, coastal waters, and coral reefs.

Figure 10: ES Faculty GERI Publications, 2010-2014



v. Strategic planning for hires
Not applicable; the ES Program does not have faculty lines and does not influence hires.

vi. Abbreviated faculty CVs
Abbreviated CVs for ES faculty are in Appendix C.

D. Research

i. Review of Part II of the Department Dashboard Indicators
Not applicable; the ES Program does not have faculty lines.

ii. Interdisciplinary efforts and community engagement efforts
Environmental Science is an archetype of an interdisciplinary field, comprised of 42 FAU faculty from nine departments across six colleges, with the Davie campus as the core. Additionally, ES faculty actively collaborate with local, state and federal agencies and governments, and NGOs addressing critical environmental issues (listed below). External agency personnel also actively participate in the ES Program as affiliate faculty in supervising and participating on graduate student committees.
External Organizations Affiliated with FAU Environmental Science
<u>International</u>

Universidade Federal de Mato Grosso do Sul, Brazil

Tropical Forestry Research Institute, Guangzhou, China

National

A.R.M. Loxahatchee National Wildlife Refuge
Everglades National Park
Big Cypress National Preserve
US Environmental Protection Agency
US Fish & Wildlife Service
US National Park Service
US Geological Survey
US Army Corp of Engineers
US Department of Energy
US Bureau of Land Management
US Bureau of Indian Affairs
National Science Foundation
NOAA
NASA
SeaGrant

State

South Florida Water Management District
St. Johns River Water Management District
Florida Fish and Wildlife Conservation Commission
Florida Department of Environmental Protection
Jonathan Dickinson State Park

Regional & Non-Profit

Palm Beach County Department of Environmental Resources Management
Broward County Environmental Protection and Growth Management
Broward County Climate Change Task Force
Lee County Natural Resources Division
Loxahatchee River District
Martin County Utilities Department
Monroe County Department of Environmental Resources Management
Miami-Dade County Environmental Resources Management
South Plantation High School Everglades Magnet Program
Arthur R. Marshall Foundation
Everglades Foundation
The Nature Conservancy

Academic Institutions

Nova Southeast Oceanographic Center
University of Florida
University of South Florida
Florida International University
University of Central Florida
University of Miami
University of North Carolina Wilmington
University of Georgia (Odum School of Ecology)

Corporate

Coastal Education and Research Foundation, Inc.
Ecology and Environment, Inc.

Tetra Tech, Inc.
Ram Realty
Keith and Schnars, PA
CDM Smith, Inc.

iii. Establishment of goals for research

- Increase ES faculty external grant funding and support of ES students with RAs
- Better incorporate the marine researchers and marine topics into research focused on wetlands and estuaries, and coral reefs.
- Develop the Davie campus as an Everglades Research hub with a focus on restoration and management of coastal and wetland ecosystems and the coupled natural-human systems research.

To that end it is necessary to strengthen the depth of program expertise through targeted cluster hires, which will enhance the ES Program's value to external partners, research productivity, and academic programs.

iv. Assessment of how well goals are being met

The enhancement of research conducted by ES faculty is assessed by the levels of scientific publication, funding of external awards, and collaborative relationships with external partners.

E. Service/Community Engagement for Department/School

i. Community engagement

The ES Program is strongly committed to community service and outreach. Its primary goals in this area include knowledge dissemination and public service through internships, outreach, academic service learning, and mentoring. Over the years, the program has developed active and mutually beneficial relationships with government agencies and local and regional organizations providing FAU students with opportunities to gain hands-on learning and working experience. Service activities have also contributed to addressing various environment-related problems and needs in local communities and broader regions.

ii. Review of Part III of the Departmental Dashboard indicators for Department/School

Not applicable

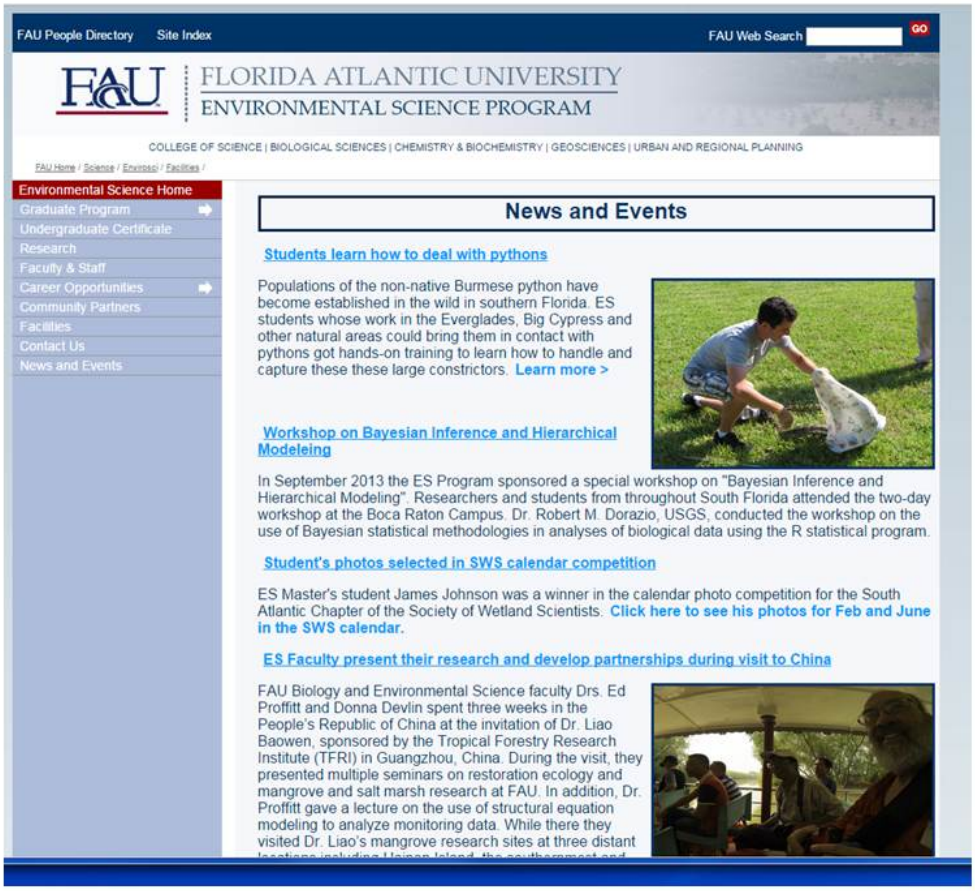
iii. Establishment of goals for service

The ES Program has established the following goals for service:

- Dissemination of research outcomes and activities to the public and decision-makers is a core component of the ES Program efforts in community service. The program has already established a strong record of organizing and hosting workshops and technical meetings on a variety of environmental topics including the restoration of the Everglades National Park. As part of these efforts, the program has built strong institutional relationships with local governments, regional authorities and federal agencies.
- The ES Program has a strong commitment to providing public service through student internships with federal, state and local agencies and organizations. The internships offer opportunities for FAU students to collect data, participate in research and monitoring efforts, learn new skills, obtain experience, and provide various type of support to environment-related institutions and projects. Thus, the ES Program, its faculty and students have become a resource

for local communities, government agencies, and local businesses in their efforts to find innovative environmental solutions.

- The ES Program also engages in community outreach efforts through volunteering of student and faculty time to meeting with the public and participating in community events.



- Academic service learning and community-based research
- Mentoring (K-12)
- Strong website presence

iv. Assessment of how well goals are being met

Faculty in the ES Program contribute to an extensive list of community engagement and service activities, including participation in community lecture series, serving on community advisory boards, mentoring K-12 students in environmental education programs, judging at science fairs, organizing community workshops, engaging K-12 and undergraduate students in Citizen Science Programs, contributing to the annual High School Science Olympiad at FAU, serving as officers and board members of professional societies. This culture of service is communicated in turn to ES students, who actively seek volunteer opportunities in government agencies and non-profit community organizations.

F. Other Program Goals for School or College

- Facilitate multi- and interdisciplinary environmental initiatives across the university and with external agencies to increase extramural funding for FAU faculty.

- Establish FAU as an institution of academic excellence in environmental research and outreach to engage stakeholders from local to international scales
- Provide a cohesive message and branding to increase the visibility of FAU environmental activities and attract high-caliber students and faculty that will advance the role of FAU in South Florida.
- Improve educational programs and learning outcomes that prepare our students for more advanced study and/or an increased rate of placement in environmental professions.
- Facilitate the growth of FAU's capacity for environmental initiatives by pooling intellectual and educational resources as well as facilities that can easily be shared, rather than duplicated, across multiple programs.
- Create a broader range of opportunities for undergraduate ES students to build research and inquiry skills through sustainable strategies tied to integration with a culture of community service:
  - develop a peer mentoring program for undergraduate ES research that engages graduate and advanced undergraduates
  - create long-term Community-Based Research Academic Service Learning (ASL) courses in Environmental Science
  - include a community-based research component in the ES Certificate capstone course
  - create standard requirements for Directed Independent Study (DIS) research for the ES Certificate curriculum that are directly linked to Distinction Through Discovery Student Learning Outcomes for undergraduate research

  Initial progress toward achieving this goal was enabled by an internal Distinction Through Discovery grant that funded stipends for graduate and advanced undergraduate peer mentors for 2013-2015. This grant enabled more than 80 undergraduate students in ES core courses to participate in community-based research with six community organizations during 2013-2014. Funding for laboratory and field supplies from the C.E.S. College of Science also increased the ability of ES faculty to offer undergraduates the opportunity to engage in experiential learning and conduct meaningful research in academic courses and through directed independent study, attracting undergraduates with an interest in Environmental Science at an early stage of their studies.

G. Strengths and Opportunities That Support Achievement of Program Goals

The Environmental Sciences program has a variety of strengths and opportunities to achieve program goals. These include:

Strengths:

- Faculty has considerable academic and research experience with the aquatic ecosystems in the Greater Everglades region, including Florida Bay, Caloosahatchee Estuary, Indian River Lagoon, the freshwater Everglades and the human interactions with these ecosystems
- A close connection to agencies involved in the restoration and management of the Greater Everglades ecosystem, including the estuaries and water quality issues
- Growing interest of undergraduate and graduate students in environmental issues
- Large and diverse urban population with interest in environmental issues
- Interdisciplinary curriculum of core courses at both undergraduate and graduate level

- Participation of faculty from a broad range of academic units (currently 11 colleges, centers, and institutes).
- Flexible curriculum allows for broad range of backgrounds and interests in natural and social sciences
- Wide variety of courses, including traditional, e-learning, and distance learning classroom and lab; seminar series, and courses with extensive field components.
- Experiential learning through MS thesis research and directed independent study (DIS), including an emphasis on undergraduate research (Office of Undergraduate Research and Inquiry, FAU-OURI)
- Already established relationships with local, state, and national governing bodies, including Water Management Districts, National and State Parks, and the US Geological Society
- Well-developed infrastructural support for research and education in environmental science at FAU facilities:
    - Boca Raton and Davie Campus Research Greenhouses
    - Boca Raton Campus Environmental Monitoring Field Sites used for teaching
    - Davie Everglades Research Center
    - Davie Water Quality Laboratory
    - DuPuis Environmental Management Area
    - Gumbo Limbo Environmental Complex
    - Harbor Branch Oceanographic Institute
    - Pine Jog Environmental Education Center
    - Riverwoods Field Laboratory

Opportunities:

- FAU strategic plan to increase research in environmental and coastal science
- FAU is reaching a critical mass of environmental activities in many academic units that could be reorganized to more effectively market its considerable, but currently diffuse, environmental research and education capabilities.
- Desire by federal and state agencies involved in restoration and management of wetlands and estuaries in the greater Everglades ecosystem for local universities to increase research expertise and workforce development that meets their needs.
- Expanding human population in South Florida generating need for more environmental professionals
- Unique opportunities for the study of coupled natural-human systems research in South Florida's extensive wetland, estuary and coral reef ecosystems.
- Opportunities to study aspects of restoration and management of aquatic ecosystems, including oceanography, water quality, hydrology, biogeochemical cycling, invasive species, harmful algal blooms, GIS, environmental chemistry, hydrology, urban and regional planning
- Cooperation with local, state and federal agencies and NGOs in addressing environmental issues and policy development
- Education and outreach to public through various media in South Florida
- Collaboration with researchers at other universities and institutions in South Florida, e.g. University of Miami, Florida International University, University of South Florida, Nova, Smithsonian Institution, as well as the wider Caribbean region (Bonaire, Bahamas, Bermuda, Martinique)
- Developing global collaborations including the Tropical Forestry Research Institute (TFRI) in Guangzhou, China, which will provide funds for students to conduct a portion of their research

at the TFRI and a recently developed agreement with the Universidade Federal de Mato Grosso do Sul, Brazil.
- Approval of Integrative Biology ES (IBES) track for doctoral students to emphasize environmental sciences within the FAU IB program will allow us to conduct more in depth, longer term research as well as attract high caliber students

H. Weaknesses and threats that impede program progress for School or College

- Small graduate stipends and lack of benefits (weak support) relative to the south Florida cost of living and compared to other Universities in the region make it difficult to attract and matriculate top graduate students.
- The relatively small number of ES faculty and breadth of expertise is a limitation to further growth and the ability of the program to build and maintain research relationships with non-university partners.
- The lack of input/authority over faculty hires in participating departments (e.g., Biology, Geosciences) limits the growth and research capacities of the ES Program; faculty are awarded to, and chosen by, departments rather than interdisciplinary programs.
- The dispersed campus structure and the dispersion of ES students from Fort Pierce to Davie limit interactions among students and do not allow for effective peer to peer mentoring.
- Upper division courses with labs (i.e., research/field experiences) for undergraduates interested in environmental science are lacking. Courses are often limited to summer sessions because the primarily tenure-track research faculty members offering the courses are teaching larger required lectures for their home department during their 9-month appointment. As a result, these course offerings are often unpredictable and fluctuate depending on faculty research obligations during the summer session.
- Insufficient number of administrative, research, and teaching support personnel. These limited positions are often shared among multiple departments with individual job descriptions that would more appropriately be allocated to multiple personnel.
- Excessive administrative burden placed on faculty.
- No administrative support or physical presence at central Boca campus
- Lack of understanding in Sponsored Research of funding modes and agencies other than major federal funding programs (e.g., NSF and NIH)
- The lack of proximate research facilities (especially experimental) limits the breadth of research avenues.
- Limited research facilities and faculty restricts availability and range of advanced course offerings, limiting opportunities for hands-on coursework for graduate and undergraduate students (*especially in Davie*).
- Lack of program-specific recurring funds to support preliminary studies in the development of larger research projects or programs.
- Lack of integration at the level of the University with other regional universities, research agencies, or educational venues.
- Lack of marketing of FAU as a destination for students interested in a career in environmental science at the BS, MS, and PhD levels, as well as the expertise at FAU as a resource for regional and national stakeholders.
- No undergraduate degree in Environmental Science that would meet the growing demand and could provide a conduit of top students into the ES graduate program.

Other Potential threats
In the past there has been a lack of coordination and shared focus between ES faculty and other environment-themed programs at FAU. Several satellite campuses, such as Davie and Harbor Branch Oceanographic Institute at FAU (HBOI), are becoming known primarily for their environmental emphasis; however, few of these units have cross connections and there is no core environmental unit around which all others are organized to project an accurate representation of the depth and diversity of environmental activities at FAU. As a result, outside agencies, which fund a great deal of FAU's environmental research, tend to underestimate the collective environmental capabilities of FAU.

There appears to be a bias against graduate education at the level of the Master program in favor of PhD programs, both in general among Universities nationally and specifically at FAU. While this may be unintentional and driven more by the proximate return on investment of time and resources on the part of the advisor and the metrics used for various institutional rankings and evaluations, it nonetheless has an ultimate detrimental effect on the potential for student success and its reflection on FAU. The labor market in environmental fields is oversaturated by an abundance of PhDs and a dearth of long-term employment opportunities for PhD level applicants. However, there is increasing demand for applicants with advanced training in the field without the need for a PhD. Master's degree programs produce these technically savvy personnel and provide both student and supervisor the opportunity to assess interest and potential success in future doctoral study. FAU should embrace the opportunity to produce this highly-sought workforce, which will benefit the University's reputation and facilitate greater future advancement.

Our society is increasingly environmentally conscious (and active!), but not more scientific. This produces pressure to become more of a general environmental studies program. Institutional movement towards a general education program in environmental issues would *weaken* our focus on practical and conceptual scientific training, placing our graduates at a disadvantage as they enter the workforce and diminish the value of the degree programs to the labor market and research partners.

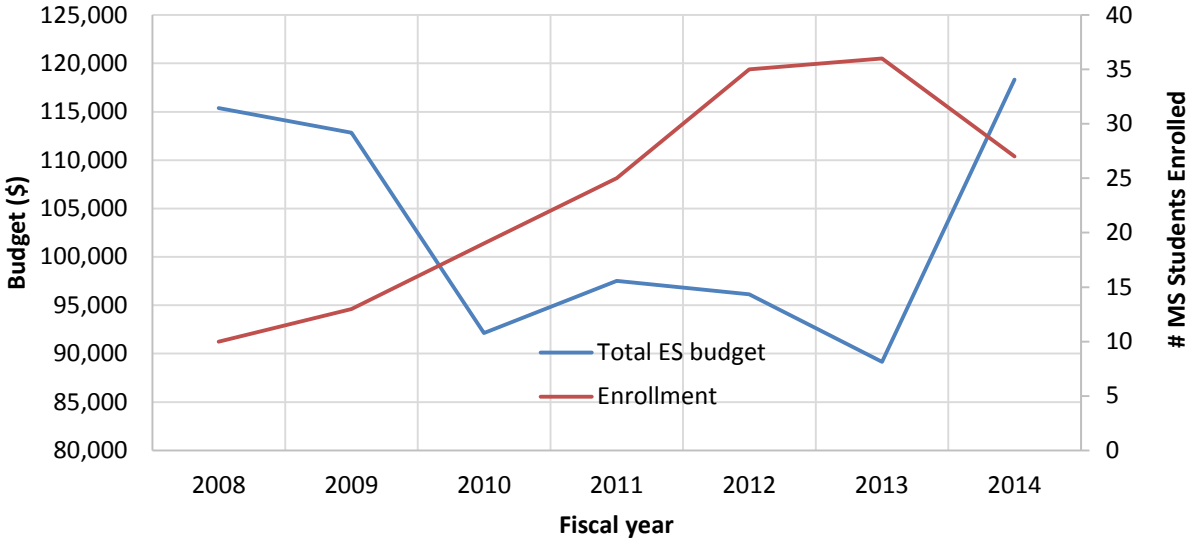
I. Resource analysis for School or College

The ES Program budget includes a half-time (12 month) for a Program Assistant at the Davie campus, and 11 months of support (9-month contract with 2 months supplement) for a Director, and 9 months of support for a Program Coordinator at the Boca Raton campus. In addition there are funds for Teaching assistantships (9-11.5) and general operating funds. The latter go toward an annual retreat to bring all ES students and faculty together in one place for one day per year, a statistics workshop, recruitment activities such as paying for student visitation of campus, and for Director travel to market the program locally and nationally.

In 2010 the university faced a budget shortfall (Fig. 11), which the Dean of the College of Science directed disproportionately toward Research Centers and Academic Programs, including the ES Program. By 2014 the funding for student teaching stipends was restored to pre-2010 levels but operational funds have continued to slide, despite the increase in student enrollment and need to offer increased student services. As the budget was reduced, the ES Program continued to grow to its current level as the second largest MS program in the College of Science and reportedly the largest interdisciplinary program at FAU. This has occurred with remarkably few direct resources to the ES Program because it is "value added" to faculty and administration in other departments. If FAU is interested in following its

strategic plan and enhancing interdisciplinary research, then the ES Program may offer a cost-effective way to launch that effort.

Figure 11: Trends in total budget and enrollment



Fiscal year	2008	2009	2010	2011	2012	2013	2014
$ Greenhouse	19,242	17,170	2,000	2,000	2,000	250	500
$ Operating	10,000	9,520	4,000	9,377	8,000	7,000	7,000
$ MS TAs Spr/Fall*	86,130	86,130	86,130	86,130	86,130	81,906	110,814
Total ES budget	115,372	112,820	92,130	97,507	96,130	89,156	118,314
# MS TAs Spr/Fall**	9	9	9	9	9	8.5	11.5
# MS TAs Summer	0	0	0	4	4	4	6
ProgDir	11 mo	11 mo	11 mo	11 mo	11 mo	11 mo	11 mo
ProgCoord	12 mo	12 mo	12 mo	12 mo	12 mo	9 mo	9 mo
ProgAsst	12 mo @ 0.5	12 mo @ 0.5	12 mo @ 0.5	12 mo @ 0.5	12 mo @ 0.5	12 mo @ 0.5	12 mo @ 0.5
Enrollment	10	13	19	25	35	36	27

*Summer TA support is not included in regular budget but funded by Dean depending on summer budget

**Support for a number of MS, PhD, Post-docs and interns was provided by a $500,000 grant to DEG from Nat. Park Service for Everglades Fellowship Program 2009-2011.

***The majority of students at HBOI are supported by TAs through Indian River State College.

Currently the size of the ES Program is limited by the number of faculty who can take on additional graduate students. The quality of the program is also becoming limited by the operational funds that have not kept up with enrollment and do not allow for activities that can provide ES students dispersed across multiple campuses with a sense of belonging to a cohort. Enriching the special events and providing offerings beyond courses and thesis research will help to alleviate that weakness.

Finally, the amount of time the Director devotes to the ES Program has steadily increased as the program has grown and matured. The initial notion of supplementing the Director's faculty contract with 2 months of salary is now out of line with the size and trajectory of the program. Given the amount of communication and coordination that must be done across departments in FAU and among the various government agency partners, the position is more suited to a 12-month contract with a 50% administration load.

J. Future directions for School or College

- ***Cross-list departmental courses contributing to the Environmental Science Program graduate and undergraduate degree/certificate programs.*** By providing a parallel 'EVS' course distinction, the contribution of existing environmental program students to course enrollment can be tracked and quantified to indicate targets for inclusion and the University-wide FTE impact of environmental programs without impacting performance metrics of the course host department.
- ***Work with the FAU Development Office to increase the visibility of the Environmental Science Program and FAU capabilities and achievements.*** Showcasing FAU environmental programs on the FAU homepage, and at meetings, workshops, and conference exhibits will increase the recognition of FAU locally and nationally. Development of existing and new contacts with regional stakeholders with shared values will establish FAU as an option for future collaboration, providing opportunity for external research funding, involvement of FAU faculty, staff and students with regional partners.
- ***Create incentives to increase faculty involvement in environmental initiatives.*** Internal funding programs for pilot research projects or professional development would spur collaboration among FAU participants, improve chances of external support, and improve the quality of educational opportunities at FAU. Continuing education or other fee-based activities by participating faculty can be developed to generate funds for these initiatives. Return of a portion of indirect costs from external funds secured through proposals initiated by ES and CES participants can also be a source for initiative funding, providing an incentivized, positive feedback between program participation and internal support.

Questions for Reviewers

- ***What kind of incentives can be created for departments to include interdisciplinary program needs when making strategic faculty hires?*** A mechanism for interdisciplinary programs like the ES Program to influence departmental faculty hires could provide a way to strategically build a faculty that meets the needs of a broader FAU environmental community.
- ***What are the most effective strategies for building deeper faculty expertise on wetland and estuary restoration and management?***
    - Align expertise of new faculty hires to research opportunities
    - Establish Visiting Fellows program
    - Seek cluster hires
    - Fund an Endowed Chair in Environmental Science
- ***How can the FAU administration most effectively help the ES Program attract top-tier graduate students?***
    - Increase graduate stipends
    - Fund prestigious Student Fellowships

- ***Should the ES Program evaluate the feasibility of a BS in Environmental Science?***
- ***Should the ES Program evaluate the feasibility of a PhD in Environmental Science, using the PhD in Integrative Biology with emphasis in Environmental Science as a model?***
- ***How can the FAU administration help the ES Program broaden faculty participation in the program?***

K. Student Feedback

The Environmental Science Program places a high value on student feedback for program improvement, and the Assessment Plan for student learning developed by the ES Program in 2010 for the graduate program explicitly seeks student feedback (Appendix D). Overall, ES graduate students who completed the survey have indicated that they are very satisfied or satisfied with their experience in the program. However, student surveys have helped to identify areas were improvement was needed. Since 2010 a number of program improvements have been initiated in response to student feedback:

Availability of Courses
Limited course offerings was a common student complaint. Since the ES Program does not have faculty lines, and does not determine course schedules, our ability to directly address this problem was limited. However, the Program Committee added a large number of regularly offered courses after 2010, and removed courses that were offered infrequently or irregularly in their departments. In addition, the ES website now offers a list of expected course availability for future semesters that students can use as a planning tool.

Multiple Campuses
In response to student concerns about the extensive commuting required to attend courses, the ES curriculum now includes a wide variety of courses, in addition to the ES Colloquium course, that are video-conferenced to all three campuses.

Oral Communication and Professional Networking
Many ES students indicated that they felt poorly prepared for oral communication and professional networking in their field. To address this shortcoming, the ES Program created the ES Colloquium course that brings together all ES students in a seminar setting where they have an opportunity to practice their oral communication skills and interact with their peers and guest speakers. An Annual ES Retreat, attended by ES faculty and students and invited speakers, was also established as a venue for students to present their own work and interact with faculty in an informal setting.

In the ES Certificate Program, obtaining student feedback was not possible in the past. However, this will be addressed as part of the assessment for the new ES Certificate Capstone course through a survey similar to the survey used for graduate student assessment.

FLORIDA ATLANTIC UNIVERSITY

ENVIRONMENTAL SCIENCE PROGRAM

Academic Program Review
Self-Study Report Appendices

Program:	Environmental Science Program
Program Director/ Coordinator Name:	Dale Gawlik / Dianne Owen
Program Self-Study Contact:	Dale Gawlik / Dianne Owen
Self-Study Contact Email:	dgawlik@fau.edu / dowen@fau.edu
Self-Study Contact Phone Number:	561-297-0873 / 561-297-0873

Appendix A: Undergraduate Environmental Science Certificate Curriculum
Appendix B: Master of Science in Environmental Science Curriculum
Appendix C: Abbreviated Environmental Science Faculty CVs
Appendix D: Environmental Science Graduate Student Survey; 2013-2014

APPENDIX A - UNDERGRADUATE ENVIRONMENTAL SCIENCE CERTIFICATE CURRICULUM

The certificate consists of 18 credits. All students must complete the following requirements:
1. All students must take one course from the three core areas below.

Human-Environmental Interactions Core (choose one of the following)		
Environment and Society	EVR 2017	3
Issues in Human Ecology	PCB 3352	3

Statistics Core (choose one of the following)		
Introductory Statistics	STA 2023	3
Introduction to Biostatistics	STA 3173	3
Experimental Design and Statistical Inference	PSY 3234	3
Quantitative Methods	GEO 4022	3

Environmental Science Core		
Critical Thinking in Environmental Science	EVS 4021	3

2. All students must take one course from three of the five focus areas listed below. These include Biology, Earth Science, Human-Environmental Interactions, Geographic Information Science and Chemistry.

Biology		
Vascular Plant Anatomy	BOT 3223	2
Vascular Plants Lab	BOT 3223L	2
Marine Botany	BOT 4404	2
Marine Botany Lab	BOT 4404L	2
Biodiversity	BSC 1011	3
Biodiversity Lab	BSC 1011L	1
General Microbiology	MCB 3020	3
General Microbiology Lab	MCB 3020L	1
Marine Biodiversity	OCB 4032	3
Marine Biodiversity Lab	OCB 4032L	1
Marine Biology	OCB 4043	2
Marine Biology Field Studies and Lab	OCB 4043L	2
Marine Microbiology and Molecular Biology	OCB 4525	3
Marine Microbiology and Molecular Biology Lab	OCB 4525L	1
Marine Ecology	OCB 4633	3
Marine Ecology Lab	OCB 4633L	1
Marine Science	OCE 4006	4
Genetics	PCB 3063	4
Principles of Ecology	PCB 4043	3
Evolution	PCB 4674	3

Comparative Animal Physiology	PCB 4723	3
Comparative Animal Physiology Lab	PCB 4723L	1
Invertebrate Zoology	ZOO 2203	3
Invertebrate Zoology Lab	ZOO 2203L	2
Functional Biology of Marine Animals	ZOO 4402	3
Functional Biology of Marine Animals Lab	ZOO 4402L	1
Ornithology	ZOO 4472	2
Ornithology Lab	ZOO 4472L	2
Comparative Vertebrate Morphogenesis	ZOO 4690	3
Comparative Vertebrate Morphogenesis Lab	ZOO 4690L	2

Earth Science		
The Blue Planet	ESC 2070	3
Environmental Issues in Atmospheric and Earth Science	ESC 3704	3
Introduction to Physical Geography	GEO 2200C	3
Biogeography	GEO 4300	3
Physical Geology/Evolution of the Earth	GLY 2010C	4
The History of the Earth and Life	GLY 2100	3
Geology of Florida	GLY 3155C	3
Water, Waves and Caves: The Geologic Formation of National Parks and Monuments	GLY 3165	3
Paleontology	GLY 3603C	3
Coastal and Marine Science	GLY 3730	3
Mineralogy and Crystal Chemistry	GLY 4200C	4
Environmental Geochemistry	GLY 4241	3
Petrology of Igneous and Metamorphic Rocks	GLY 4310C	4
Structural Geology	GLY 4400C	4
Solid Earth Geophysics	GLY 4451	3
Stratigraphy and Sedimentation	GLY4500C	4
Geomorphology	GLY 4700C	3
Field Methods	GLY 4750C	3
Hydrogeology	GLY 4822	3
Engineering Geology	GLY 4830	3
Earth Science, cont.		
Introduction to Hydrogeology Modeling and Aquifer Test	GLY 4832C	3
Field Experience	GLY 4948C	1
Weather and Climate	MET 2010	3

Human-Environmental Interactions		
American Environmental History	AMH 3630	3
Culture and Ecology	ANT 3403	3
Environment and Disease	ANT 4463	3

Anthropology of Nature	ANT 4419	3
Primate Behavior	ANT 4552	3
Economic Principles and Policies	ECO 3003	5
Environmental Economics	ECP 4302	3
Human-Environment Interactions in South Florida	GEA 4275	3
Water Resources	GEO 4280C	3
American Cultural Landscape	GEO 4422	3
Tourism and Commercial Recreation	GEO 4542	3
Urban Geography	GEO 4602	3
Field Experience	GEO 4948C	1
Global Environmental Politics and Policies	INR 4350	3
Literature and the Environment	LIT 4434	3
Environmental Ethics	PHI 3640	3
Principles and Methods of Environmental Education	SCE 3442	3
Justice, Health and the Environment	SYD 4513	3
Planning and Growth Management	URP 3000	3
Sustainable Cities	URP 4403	3
Environmental Planning Methods	URP 4420	3

Geographic Information Science		
Introduction to Mapping and GIS	GIS 3015C	3
Remote Sensing of the Environment	GIS 4035C	3
Digital Image Analysis	GIS 4037C	3
Principles of Geographic Information Systems	GIS 4043C	3
Geovisualization and GIS	GIS 4138C	3

Chemistry		
Biochemistry 1	BCH 3033	3
Biochemistry 2	BCH 3034	3
Contemporary Chemical Issues	CHM 1020C	3
General Chemistry 1	CHM 2045	3
General Chemistry 1 Lab	CHM 2045L	1
General Chemistry 2	CHM 2046	3
General Chemistry 2 Lab	CHM 2046L	1
Organic Chemistry 1	CHM 2210	3
Organic Chemistry 2	CHM 2211	3
Environmental Chemistry	CHM 3080	3

APPENDIX B - MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCE CURRICULUM

Thesis Option

A student curriculum consists of a minimum of 36 credits taken in the following four categories:

Core Subject Areas: 22-28 credits from the core subject areas with at least one course from four different core subject areas.

Electives: No more than 6 credits of electives taken outside the core areas will be counted toward the degree, and no more than 6 credits may be 4000-level courses. No more than 3 credits of Directed Independent Study may be counted toward this degree.

Thesis: 6-12 credits (EVS 6971).

Colloquium: 2 credits or more.

Non-Thesis Option

A student curriculum consists of a minimum of 36 credits taken in the following four categories:

Core Subject Areas: 25-31 credits from the core subject areas with at least one course from four different core subject areas.

Directed Independent Study: 3 credits (EVS 6905) required. Up to 3 additional credits may be taken as electives.

Electives: No more than 6 credits of electives taken outside the core areas will be counted toward the degree.

Colloquium: 2 credits or more.

Colloquium		
Environmental Sciences Colloquium Series (May be taken more than once.)	EVS 6920	1

Core Subject Areas		
Chemistry		
Chemistry for Environmental Scientists	CHS 6611	3
Environmental Geochemistry	GLY 5243	3
Geographic Information Systems		
Introduction to GIS in Planning	URP 6270	3
Principles of Geographic Information Systems	GIS 5051C	3
Applications in Geographic Information Systems	GIS 5100C	3
Programming in Geographic Information Systems	GIS 5103C	3
Remote Sensing of the Environment	GIS 5038C	3
Digital Image Analysis	GIS 5033C	3

Advanced Remote Sensing	GIS 6039	3
Hyperspectral Remote Sensing	GIS 6127	3
Topics in Geoinformation Science	GIS 6120	3
Modeling		
Modeling Groundwater Movement	GLY 6836	3
Ecological Modeling	EVR 6070	3
Ecological Theory	PCB 6406	3
Statistics		
Environmental Design and Biometry	PCB 6456	4
Conservation and Ecology		
Biogeography	GEO 5305	3
Plants And People	GEO 6317	3
Environmental Restoration	EVR 6334	3
Flora of South Florida	BOT 5155	2
Flora of South Florida Lab	BOT 5155L	2
Coastal Plant Ecology	BOT 6606	2
Coastal Plant Ecology Lab	BOT 6606L	2
Conservation Biology	PCB 6045	3
Marine Ecology	PCB 6317	3
Advanced Ecology	PCB 6046	3
Marine Ecology Lab and Field Studies	PCB 6317L	2
Scientific Communication	BSC 6846	3
Freshwater Ecology	PCB 6307	3
Freshwater Ecology Lab	PCB 6307L	2
Symbiosis	BSC 6365	3
Environmental Physiology	PCB 6749C	4
Marine Geology	GLY 5736C	3
Advanced Topics in Applied, Coastal and Hydrogeology	GLY 5934	3

Regolith Geology	GLY 6707	3
Coastal Environments	GLY 6737	3
Shore Erosion and Protection	GLY 5575C	3
Global Environmental Change	GLY 6746	3
Environmental Geophysics	GLY 6457	3
Methods in Hydrogeology	GLY 6838	3
Natural History of the Indian River Lagoon	OCB 6810	3
Marine Global Change	OCE 6019	3
Seminar in Ichthyology	ZOO 6459	1-2
Marine Invertebrate Zoology	ZOO 6256	3
Marine Invertebrate Zoology Lab	ZOO 6256L	2
Natural History of Fishes	ZOO 6456	3
Natural History of Fishes Lab	ZOO 6456L	2
Seminar in Avian Ecology	ZOO 6544C	1
Policy and Planning		
Human-Environmental Interactions	GEA 6277	3
Culture, Conservation and Land Use	GEO 6337	3
Geographic Analysis of Population	GEO 5435C	3
Coastal Hazards	GLY 6888	3
Introduction to Transportation Planning	URP 6711	3
Environmental Analysis in Planning	URP 6425	3
Environmental Policy and Programs	URP 6429	3
Sustainable Cities	URP 4403	3
Urban and Regional Theory	URP 6840	3
Women, Environment, Ecofeminism, Environmental Justice	WST 6348	3
Environmental Philosophy	PHM 6035	3

APPENDIX C - ABBREVIATED ENVIRONMENTAL SCIENCE FACULTY CVs

CURRICULUM VITAE

JOHN D. BALDWIN PH.D.

Professor
Department of Biological Sciences
Charles E. Schmidt College of Science
Florida Atlantic University – Davie Campus

Davie West Bldg. Rm. 438
3200 College Ave, Davie, FL 33314
Phone: (954) 236-1151
Email: jbaldwin@fau.edu
Webpage: www.science.fau.edu/biology/faculty/baldwin

Professional Preparation

Post-Doctoral Researcher, 1997 – 1998, Dept. Fisheries and Aquatic Sciences, School Forest Resources and Conservation, University of Florida, Gainesville, Florida
Ph.D., Cell and Developmental Biology, 1997. Div. Biological Sciences, University of California, Davis
B.S., Zoology, 1988. Department of Zoology, University of Maryland, College Park

Appointments

2014 – Present	*Professor*, Department of Biological Sciences, Charles E. Schmidt College of Science, Florida Atlantic University
2014 – Present	*Associate Director*, Center for Environmental Studies, Charles E. Schmidt College of Science, Florida Atlantic University
2004 – 2014	*Associate Professor*, Department of Biological Sciences, Charles E. Schmidt College of Science, Florida Atlantic University
2011– 2012	*Interim-Director*, Environmental Sciences Program, Charles E. Schmidt College of Science, Florida Atlantic University
2009 – 2010	*Research Fellow*, (Sabbatical), South Florida Natural Resource Center, Everglades and Dry Tortugas National Park, NPS, DOI, Homestead, FL
1998 – 2004	*Assistant Professor*, Department of Biological Sciences, Charles E. Schmidt College of Science, Florida Atlantic University

Selected Peer-Reviewed Publications

Ogden, J.C., J.D. Baldwin, O. Bass, J. Browder, M. Cook, S. Davis, P. Fletcher, P. Fredrick, P.E. Frezza, R. Galvez, A. Hodgson, K. Meyer, L. Oberhofer, A. Paul, and J. Lorenz. 2014. Waterbirds as Indicators of Ecosystem Health in the Coastal Marine Habitats of Southern Florida: 1. Selection and Justification for a Suite of Indicator Species. *Ecological Indicators* 44, 128-147.

Ogden, J.C., J.D. Baldwin, O. Bass, J. Browder, M. Cook, S. Davis, P. Fletcher, P. Fredrick, P.E. Frezza, R. Galvez, A. Hodgson, K. Meyer, L. Oberhofer, A. Paul, and J. Lorenz. 2014. Waterbirds as Indicators of Ecosystem Health in the Coastal Marine Habitats of Southern Florida: 2. Conceptual Ecological Models. *Ecological Indicators* 44, 148-163.

Theisen, T. and J.D. Baldwin. 2012. Movements and depth/temperature distribution of the ectothermic Scombrid *Acanthocybium solandri* (wahoo) in the western North Atlantic. *Marine Biology* 159 (10) 2249-2258.

Baldwin, J.D., J.W. Bosley, L. Oberhofer, and O.L. Bass. 2012. Long-Term Changes, 1958–2010, In the Reproduction of Bald Eagles of Florida Bay, Southern Coastal Everglades. *Journal of Raptor Research* 46(4) 336-348.

Green. M.L., D.L. Herzing, and J.D. Baldwin. 2011. Reproductive success of male Atlantic spotted dolphins (*Stenella frontalis*) revealed by noninvasive genetic analysis of paternity. *Canadian Journal of Zoology* 89 (3) 239-253.

Selected Other Publications or Products/Grants

Hanson, M. and J.D. Baldwin. (*Submitted)*. Diets of Bald Eagles Breeding in the Subtropical Estuary of Florida Bay. *Journal of Field Ornithology*. 30pp.

Green, M.L., D.L. Herzing, and J.D. Baldwin. *(Submitted)*. Blurring the lines: Social organization influences fine-scale genetic structure in Atlantic spotted dolphins (*Stenella frontalis*) *Molecular Ecology*. 38pp.

Green. M.L., D.L. Herzing, and J.D. Baldwin. (*In Revision)*. Molecular Evidence of Promiscuity Among Female Atlantic Spotted Dolphins: Implications for Multi-male Mating Strategies. *Behavioral Ecology and Sociobiology*. 26pp.

Baldwin, J.D. 2011. Evaluation of Bald Eagle Population Dynamics and Foraging Ecology: Current and Historical Trends in Florida Bay and the Southern Estuaries of Everglades National Park. Final Report for Everglades and Dry Tortugas National Park, National Park Service. 63pp.

Theisen, T.C., B.W. Bowen, W. Lanier, and J.D. Baldwin. 2008. Lack of global population structure in the pelagic wahoo, *Acanthocybium solandri* (tuna family Scombridae). *Molecular Ecology* 17 (19) 4233-4247.

Synergistic Activities

Baldwin, J.D. Wildlife Species as Ecological Indicators for Everglades Restoration. Rural Sustainable Development International Congress - Savannas and Wetlands, Universidade Federal de Mato Grosso do Sul, Campo Grande, Mato Grosso do Sul, Brazil. April 1-5, 2012. (*Invited speaker*)

Denton, M., K. M. Hart, A. Oleinik, J.D. Baldwin. Diet and foraging ecology of mangrove diamondback terrapins (*Malaclemys terrapin rhizophorarum*) in Everglades National Park, FL. 33rd Annual Symposium on Sea Turtle Biology and Conservation, Baltimore, Maryland, USA. February 2-8, 2013.

Bosley, J.W., J.D. Baldwin, and E. Noonburg. Fitting an occupancy model to a declining population of bald eagle, *Haliaeetus leucocephalus*, breeding territories. 5th North American Ornithological Conference (NAOC-V) in Vancouver, British Columbia, Canada. August 14-18, 2012.

Collaborators and Other Affiliations

2010 – pres. Technical Science Rep., South Florida-Caribbean Cooperative Ecosystem Studies Unit 2007 – pres. Science Coordination Group, South Florida Ecosystem Restoration Federal Task Force
2000 – pres. Courtesy Assoc. Professor, Dept. Fisheries and Aquatic Sciences, Univ. of Florida
2009– 2010 Research Fellow, Dry Tortugas and Everglades National Park, NPS, Dept. of Interior
2007 – pres. Affiliate Faculty Appointment: Dept. of Geosciences, FAU

Courses Taught

Undergraduate Courses Taught

BCH 3033 Biochemistry I, BCH 3034 Biochemistry II, BCH 3103 Biochemistry Laboratory, BSC 3036 Genetics, BSC 4930 Ichthyology, OCB 4043 Marine Biology, OCB 4043L Marine Biology

Field Studies, OCB 4633 Marine Ecology, OCB 4633L Marine Ecology Lab, ZOO 2203 Invertebrate Zoology, ZOO 2203L Invertebrate Zoology Lab, Directed Independent Studies

Graduate Courses Taught

ZOO 6456 Natural History of Fishes, ZOO 6456L Natural History of Fishes Lab, ZOO 6459 Seminar in Ichthyology, BSC 6936 Molecular Ecology 1

Community Engagement or Out-reach

2014 – pres. Board of Directors, South Plantation High School, Environmental Magnet Program

2007 – pres. Conservation and Research Advisory Board, The Florida Aquarium, Tampa Florida 2006 – pres. Math-Superstars Program Mentor, Broward County Public School System, Florida

ABBREVIATED FACULTY CV (MAXIMUM 2 PAGES)
BRIAN WILLIAM BENSCOTER

Professional Preparation

Southern Illinois University-Carbondale	Plant Biology	Ph.D., 2007
Villanova University	Biology	M.S., 2002
Villanova University	Biology	B.S., 2000

Appointments

2014-present	National Academies Education Fellow in the Life Sciences
2013-2014	Researcher of the Year (Asst. Professor), Florida Atlantic University
2014-present	Chair-Elect, Society of Wetland Scientists Peatland Section
2013-2014	Chair, Society of Wetland Scientists Biogeochemistry Section
2010-present	Assistant Professor of Plant Ecology, Florida Atlantic University
2008-2010	Post-Doctoral Associate, University of Guelph
2007-2008	Post-Doctoral Associate, Michigan State University
2003-2006	Science To Achieve Results (STAR) Fellow, US Environmental Protection Agency

Selected Peer-Reviewed Publications

Lauck, M and BW Benscoter. Non-destructive estimation of aboveground biomass in sawgrass communities of the Florida Everglades. Wetlands, *in press.*

Nungesser, M, C Saunders, C Coronado-Molina, J Obeysekera, J Johnson, C McVoy, BW Benscoter. Potential effects of climate change in the Florida Everglades. Environmental Management, *in press.*

Turetsky, MR, BW Benscoter, S Page, G Rein, G van der Werf, A Watts. Vulnerability of peatlands to fire and carbon loss. Nature-Geosciences (invited review), *in press.*

Meingast, KM, MJ Falkowski, ES Kane, LR Potvin, BW Benscoter, AMS Smith, LL Bourgeau-Chavez, and ME Miller. 2014. Spectral detection of near surface moisture content and water table position in northern peatland ecosystems. Remote Sensing of Environment, 152: 536-546.

Kettridge, N, DK Thompson, L Bombanato, MR Turetsky, BW Benscoter, JM Waddington. 2013 The ecohydrology of forested peatlands: simulating the effects of tree shading on moss evaporation and species composition. Journal of Geophysical Research-Biogeosciences, 118: 422-435.

Selected Other Publications or Products/Grants

US Department of Energy, Terrestrial Ecosystem Science 2012-2015. "Carbon dynamics of the Greater Everglades watershed and implications of climate change" ($845,554; PI: R Hinkle; Co-I: BW Benscoter ($570,915), X Comas, D Sumner, D DeAngelis) – *extension pending*

National Aeronautics and Space Administration (NASA), 2012-2015. "Fuel consumption and carbon cycling in northern peatland ecosystems: understanding vulnerability to burning, fuel consumption, and emissions via remote sensing of fuel moisture and radiative energy." ($815,133; PI: M Falkowski; Co-I: ES Kane, L Bourgeau-Chavez, N French, E Levin, ME Miller, R Kremens; Unfunded Collaborator: BW Benscoter, AMS Smith)

US Fish and Wildlife Service, 2012-2017. "Synergistic effects of invasive species (*Melaleuca quinquenervia*) and management practices on native plant community resilience in the Florida Everglades." ($45,000; PI: BW Benscoter)

US Geological Survey, 2011-2015. "Cooperative Agreement: Carbon Dynamics of the Greater Everglades" ($323,827; PI: L Berry; Co-I: BW Benscoter ($162,320), X Comas)

US Bureau of Land Management, Joint Fire Sciences Program, January 2012-2015. "Influence of fuel moisture and density on black carbon formation during combustion of boreal peat fuels" ($70,916; PI: BW Benscoter; Unfunded Co-I: ES Kane, M Falkowski)

Synergistic Activities

- Past-Chair, Society of Wetland Scientists, Biogeochemistry Section.
- Chair-Elect, Society of Wetland Scientists, Peatland Section
- Mentor, Society of Wetland Scientists, Undergraduate Diversity Program
- In the past 4 years, attendance at 17 technical workshops and 9 professional conferences, with over 28 presentations by members of my research lab.

Collaborators and Other Affiliations

Vanessa Bailey, Department of Energy
Ben Bond-Lamberty, Department of Energy
Laura Bourgeau-Chavez, Michigan Tech Research Institute
Rod Chimner, Michigan Tech University
Greg Corace, US Fish and Wildlife
William DeGroot, Canadian Forest Service
Mike Falkowski, Michigan Tech University
Michael Flannigan, University of Alberta & Canadian Forest Service
Nancy French, Michigan Tech Research Institute
Rebekah Gibble, US Fish and Wildlife
Evan Kane, Michigan Tech University
Eric Kasischke, University of Maryland
Robert Keane, US Forest Service
Paul Morris, McMaster University
Thomas Pipker, University of British Columbia
James Reardon, US Forest Service
Alistar Smith, US Forest Service
David Sumner, US Geological Survey
Tiffany Troxler, Florida International University
Merritt Turetsky, University of Guelph
Shawn Urbanski, US Forest Service
J. Michael Waddington, McMaster University
Jon Wallace, US Fish & Wildlife Service
B. Mike Wotton, University of Toronto & Canadian Forest Service

Courses Taught

Department of Biological Sciences, Florida Atlantic University

- BOT 5155 & 5155L Flora of South Florida & Lab, Spring 2011
- PCB 4355 Principles of Ecology, Spring 2012, Fall 2012, 2013, 2014
- BSC 6934 Plant Ecology & Lab, Spring 2013, 2014, 2015

BIOGRAPHICAL SKETCH

Xavier Comas
Department of Geosciences, Florida Atlantic University, 3200 College Ave, DW - 330
Davie, Florida 33314

A. PROFESSIONAL PREPARATION

- Postdoctoral:
  University of Maine(Orono, ME), Environmental Geophysics, September 2006-August 2007
- Postdoctoral:
  Rutgers University (Newark, NJ), Environmental Geophysics, September 2005-September 2006
- Graduate:
  Rutgers University (Newark, NJ), Environmental Geophysics, PhD, 2005
- Undergraduate:
  Universitat de Barcelona (Spain), Geology, BS, 2000

B. APPOINTMENTS

- *05/22/13-present:* Associate professor of Geophysics, Department of Geosciences, Florida Atlantic University, Boca Raton
- *08/01/07-05/22/13: Assistant* professor of Geophysics, Department of Geosciences, Florida Atlantic University, Boca Raton

C. SELECTED PEER-REVIEWED PUBLICATIONS

- **Comas, X**. and Wright, W. 2014. Investigating carbon flux variability in subtropical peat soils of the Everglades using hydrogeophysical methods. Journal of Geophysical Research-Biogeosciences, 119, doi:10.1002/2013JG002601.
- **Comas, X.**, Kettridge, N., Binley, A., Slater, L., Parsekian, A., Baird, A. J., Strack, M., and Waddington, J. M. 2013. The effect of peat structure on the spatial distribution of biogenic gases within bogs. *Hydrological Processes, 28 (22), 5483-5494, doi: 10.1002/hyp.10056.*
- **Comas, X.** and Wright,W. 2012. Heterogeneity of biogenic gas ebullition in subtropical peat soils is revealed using time-lapse cameras, Water Resources Research, 48, W04601, doi:10.1029/2011WR011654.
- **Comas, X**., Slater, L., and Reeve, A. 2011. Atmospheric Pressure Drives Changes in the Vertical Distribution of Biogenic Free-Phase Gasses in a Northern Peatland. Journal of Geophysical Research-Biogeosciences. *116, G04014, doi:10.1029/2011JG001701.*
- **Comas, X.** and Slater, L, 2009, Non-Invasive Field-Scale Characterization of Gaseous-Phase Methane Dynamics in Peatlands Using the Ground Penetrating Radar (GPR) Method: In, Baird, A., Belyea, L., Comas, X., Reeve, A. and Slater, L., Eds, *Carbon Cycling in Northern Peatlands*, Carbon Cycling in Northern Peatlands, *Geophysical Monograph* 184, American Geophysical Union (AGU), 159-172.

D. SELECTED OTHER PUBLICATIONS OR PRODUCTS/GRANTS

- Mount, G. and **Comas, X.** In Press. Estimating porosity and solid dielectric permittivity in the Miami Limestone using high frequency ground penetrating radar measurements at the laboratory scale. Water Resources Research, doi: 10.1002/2013WR014947.
- Pellicer, X., Linares, R., Gutiérrez, F. , **Comas, X**., Roqué, C., Carbonel, D., Zarroca, M., and Rodríguez, A. 2014. Morpho-stratigraphic characterization of a tufa mound complex in the Spanish Pyrenees using ground penetrating radar and trenching, implications for studies in Mars. Earth and Planetary Science Letters, 388: 197-210.
- Kettridge, N., Binley, A., **Comas X.**, Cassidy, N., Baird, A., Harris, A., van der Kruk, J., Strack, M., Milner, A., Waddington, J. M. 2012. Do peatland microforms move through time? Examining the developmental history of a patterned peatland using ground penetrating radar. Journal of Geophysical Research-Biogeosciences, 117, G03030, doi:10.1029/2011JG001876.
- **Comas, X**., Slater, L., and Reeve, A. 2011. Pool patterning in a northern peatland: geophysical evidence for the role of postglacial landforms. Journal of Hydrology, 399 (3-4): 173-184

- Edited book: Baird, A., Belyea, L., **Comas, X**., Reeve, A. and Slater, L., 2009, Carbon Cycling in Northern Peatlands, Geophysical Monograph 184, American Geophysical Union (AGU), Washington DC, 299 pp

E. SYNERGISTIC ACTIVITIES

- Fall Meeting Program Representative of the American Geophysical Union (AGU) Near-Surface (NS) Focus Group, January 2013-present.
- Near Surface Geophysics (FG) Fellows Committee, American Geophysical Union (AGU), February 2013-present
- Editor of the American Geophysical Union (AGU) Near-Surface (NS) Focus Group newsletter, January 2010-January 2013.
- Convener, "Near Surface Geophysics General Contributions", American Geophysical Union (AGU), Annual Fall Meeting 2013 and 2014, San Francisco, CA, USA
- Convener and co-convener of more than 10 sessions at the AGU Annual Fall Meeting in San Francisco, CA between 2007-2014.
- Reviewer for several panels including DOE's Terrestrial Ecosystem Science and NSF's hydrological Science.

F. Collaborators and other affiliations

- Collaborators and co-Editors: Dr. Andrew Baird (University of Leeds, UK); Dr. Lisa Belyea (Queen Mary, University of London, UK); Dr. Brian Benscoter (Florida Atlantic University); Dr. Ronnie Best (USGS); Dr. Andrew Binley (Lancaster University, UK); Dr. Nigel Cassidy (Keele University, UK); Dr. Jeff Chanton (Florida State University); Dr. Kevin Cunningham (USGS); Dr. Don DeAngelis (USGS); Dr. Vic Engel (Everglades National Park); Dr. Paul Glaser (Univ. Minnesota); Dr. Angela Harris (University of Manchester, UK) ; Dr. Ross Hinkle (University of Central Florida); Dr. Harry Jol (University of Madison-Wisconsin); Dr. Nick Kettridge (McMaster University); Dr. Agus Kristijono (BPPT, Indonesia); Dr. Randall Kolka (US Forest Service); Dr. Dimitrios Ntarlagiannis (Rutgers University); Dr. Andrew Reeve (University of Maine) ; Dr. Len Scinto (Florida International University); Dr. Nana Sudiana (BPPT, Indonesia); Dr Lee Slater (Rutgers University); Dr Michael Sukop (Florida International University); Dr. David Sumner (USGS); Dr. Maria Strack (University of Calgary); Dr. Jan van der Kruk (Forschungszentrum, Germany); Dr. Mike Waddington (McMaster University); Dr Matthew Warren (US Forest Service).
- Research affiliate , Carbonate Aquifer Characterization Laboratory (CACL), U.S. Geological Survey
- Faculty affiliate, Environmental Sciences Program, Florida Atlantic University

G. Courses taught

- FAU, Department of Geosciences: GLYC6934: Environmental Geophysics; GLYC6934: Ground Penetrating; GLYC6934: Wetlands Geosciences, GLYC4451: Solid Earth Geophysics, GLYC4700: Geomorphology; GLYC4400: Structural Geology; GLYC4790: Senior Field Camp; GLY 4750: Field Methods,
- Rutgers University, Department of Earth Environmental Sciences: 460:34186: Environmental Disasters; 460:103:01: Planet Earth,

H. Community Engagement or Out-reach

- Coordinator, Outstanding Student Paper Award, AGU Near Surface Focus Group; 2010, 2011, 2012, and 2013.
- Co-convener, "Peatland Geophysics" (workshop funded by the National Science Foundation), University of Maine, Orono, ME, June 11-15, 2007.
- Co-convener, "Collaborative Workshop: Developing a Carbon Budget for the Greater Everglades ecosystem in a Changing Climate", (partially funded by Department of Energy), Florida Atlantic University, Davie, FL, June 11-12, 2011.

ABBREVIATED FACULTY CV (MAXIMUM 2 PAGES)
KEN DAWSON-SCULLY

Professional Preparation

Post-Doctoral Fellow	**University of Toronto (UTM), Mississauga, Ontario**	**Completed 2008**
Ph.D.	**University of Toronto** Department of Physiology	**Completed 2003**
M.Sc.	**Queen's University** Department of Biology	**Completed 1998**
B.Sc. (Hon.)	**Queen's University** Department of Biology	**Completed 1996**

Appointments

2014-present
Associate Professor, tenured
Florida Atlantic University
Department of Biological Sciences
Jupiter, FL 33458 USA

2008-2014
Assistant Professor, tenure track
Florida Atlantic University
Department of Biological Sciences
Jupiter, FL 33458 USA

Selected Peer-Reviewed Publications (most recent five from the last 7 years)

19. Wang R, Palavicini JP, Wang H, Maiti P, Bianchi E, Xu S, Lloyd BN, Dawson-Scully K, Kang DE, Lakshmana MK, 2014 RanBP9 Overexpression Accelerates Loss of Dendritic Spines in a Mouse Model of Alzheimer's Disease. *Neurobiol Dis*. 2014 Sep;69:169-79.
Impact Factor (2010) 5.560

18. Palavicini JP, Lloyd BN, Hayes CD, Bianchi EB, Kang DE, Dawson-Scully K, Lakshmana MK, 2013 RanBP9 plays a critical role in neonatal brain development in mice. *PLoS ONE* 8(6), e66908.
Impact Factor (2010) 4.411

17. Milton SL, Dawson-Scully K, 2013 (Peer Reviewed Review). Alleviating brain stress: what alternative animal models have revealed about therapeutic targets for hypoxia and anoxia. 8 (3), 287-301, Future Neurology

16. Caplan, SL, Milton, SL., Dawson-Scully K, 2013. cGMP-dependent protein kinase G (PKG) activity controls synaptic transmission tolerance during acute oxidative stress 109(3):649-58, J. Neurophys.
Impact Factor (2010) 3.1

15. Ayyanathan, K, Kesaraju, S, Dawson-Scully, K, and Weissbach, H, 2012. Combination of Sulindac and Dichloroacetate Kills Cancer Cells via Oxidative Damage. PLoS ONE 7(7): e39949.
Times Cited: 3; Impact Factor (2010) 4.411

Selected Other Publications or Products/Grants

(MOST RECENT FIVE FROM THE LAST 7 YEARS)

Research Grants Received

Current:

Eco Neurologics Inc., Neuroprotection via the PKG Pathway (**2013-2018**)
$353,000
Lead Investigator: Ken Dawson-Scully

Synergistic Activities

Editorships and Editorial Boards

Review Editor: Frontiers in Genomic Physiology, 2012-2013

Journals

Genes, Brain and Behaviour
Integrative and Comparative Biology,
Journal of Comparative Physiology A
Journal of Insect Behavior
Journal of Neurogenetics
Journal of Neurophysiology
Journal of Neuroscience
Journal of Visual Experimentation
Neuroscience
PLoS ONE
Reproductive Toxicology

Agencies

Natural Science and Engineering Research Council of Canada **NSERC**, 2014
National Aeronautics and Space Administration **NASA**, 2013, 2014
Swiss National Science Foundation **SNSF**, 2012
Canadian Foundation for Innovation **CFI**, 2010
National Science Foundation **NSF**, 2008, 2009

COLLABORATORS AND OTHER AFFILIATIONS

2013-present	Affiliate Assistant Professor, Department of Chemistry and Biochemistry, FAU, Boca Raton, FL
2012-present	Visiting Investigator, The Scripps Research Institute, Dept. of Metabolism and Aging, Jupiter FL
2010-present	Affiliate Assistant Professor, Biomedical Sciences, College of Medicine, FAU, Boca Raton, FL

Courses Taught

BSC 6936: Advanced Neurophysiology, Spring 2012, 2013 (co-Instructor)
PSB 6345: Neuroscience 1, Fall 2010, Fall 2011, Fall 2012, Fall 2013 (co-Instructor)
PCB 4843C/BSC 6936: Practical Cell Neuroscience, Spring 2010, 2011, 2012, 2013, 2014 (Instructor)
BSC 6905: Neuroscience Journal Club, Summer 2010, Summer 2011 (co-Instructor)
BSC 6905: Neuroscience Seminar, Fall 2009, Fall 2010, Spring 2011 (co-Instructor)
BSC 4917/4918 Honors Research/Thesis Program: Spring 2009, Fall 2009, Spring 2010, Fall 2010, Spring 2011, Fall 2011 (co-Instructor)
BSC 4930/6936: Cellular Neuroscience and Disease, Fall 2008, Fall 2009 (co-Instructor)

H. Community Engagement or Out-reach

Community/Guest Non-Research Lectures

2013	Waterford Community Center, Jupiter, FL
2013	Academic Leadership Symposium, Scripps Research Institute, FL
2012	Choosing Academia over Industry, Scripps Research Institute, FL

2011	Protecting the effects of Stroke through the use of the fruit fly, Boca Raton Rotary Club.
2011	Protecting the effects of Stroke through the use of the fruit fly, The Boca Thinkers Club, Boca Raton FL.
2008-2012	Introduction to research in the Dawson-Scully lab, Biomedical Freshmen, FAU.
2008-2012	Introduction to research in the Dawson-Scully lab, Premedical Students, FAU.
2010	CMBB last minute class filler: Anoxia research and Drosophila, FAU.
2010	Cellular Neuroscience and Disease: 1 week of basic neurophysiology lectures, FAU.

Curriculum Vitae
Donna Jeanne Devlin
Florida Atlantic University
(772) 242-2206
ddevlin@fau.edu

Degrees Earned:

Ph.D.	2004	Biology. University of Louisiana at Lafayette, Lafayette, LA
B.S.	1993	Geology. University of South Florida, Tampa, FL

Professional Experience:

April 2005-Present. Research Associate Professor, Department of Biological Sciences, Florida Atlantic University

July 1996 – March 2005. Visiting Scientist conducting PhD research at the National Wetlands Research Center, Lafayette, LA

Jan. 1990 – 1995. Conservation Program Coordinator, Florida Office, Center for Marine Conservation, St. Petersburg, FL

1987-1990. Artificial Reef Program Coordinator. Collier County Natural Resources Management Department, Naples, FL.

1984-1986. Associate Scientist - polychaete ecology and systematics, Mote Marine Laboratory, Sarasota, FL.

Publications:

Ilka C. Feller, Emily M. Dangremond, Donna J. Devlin, and Catherine E. Lovelock, C. Edward Proffitt, and Wilfrid Rodriguez.Nutrient Enrichment Intensifies Hurricane Damage and Prolongs Recovery in Mangrove Ecosystems in the Indian River Lagooon. Submitted Ecology.

John Paul Kennedy, Maria W. Pil, C. Edward Proffitt, Walter A. Boeger, Alice M. Stanford and Donna J. Devlin.Postglacial Expansion of the red mangrove, *Rhizophora mangle* L., in the Caribbean Sea and Florida. In internal review.

Coldren G., C.E. Proffitt, D. J. Devlin Species Diversity And Life Stage Lead To Deviations From Predictions Of The Stress Gradient Hypothesis In A Mixed Mangrove - Salt Marsh System. In internal Review

Lin Y., U. Berger, D.J. Devlin, C. E. Proffitt, J. Bodart, and I. C. Feller.2013. Identity Recognition And Developmental Plasticity In Red Mangrove Saplings: Implications for Plant Cooperation. Submitted New Phytologist

KL McKee,, Beth A Middleton, CE Proffitt and DJ Devlin. 2009. Perspectives on mosquito impoundments in eastern Florida, USA: Reply to Rey et al. Mar Ecol Prog Ser, 2009 - int-res.com

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Middleton, B., Devlin, D., Proffitt, C.E., McKee, K.A.,and Foster, K. 2008. Characteristics of Mangrove Swamps Managed for Mosquito Control in Eastern Florida. Marine Ecology Progress Series 371:117-128.

Book Chapter

Upland Plants, Ferns *In* Rookery Bay Field Guide, Rookery National Estuarine Research Reserve, Florida Department of Natural Resources and National Oceanic and Atmospheric Administration

Grants

National Science Foundation EPSCoR 2010 Genetic Structure of Two Mangrove Species in the Virgin Islands and Florida. Collaborators Drs. Alice Stafford, C Edward Proffitt.

U.S. Fish and Wildlife Service, Mangrove Restoration Study 2006. This project with collaborators Drs. Edward Proffitt, Beth Middleton, and Karen McKee involved studies of the success of different methodologies of mangrove restoration in two south Florida estuaries.

Courses Taught

Ecology Seminar, Marine Invertebrate Zoology (Graduate and Undergraduate levels) Florida Atlantic University

Co-taught Marine Ecology (Graduate level) Florida Atlantic University

Co-taught Coastal Restoration and Conservation Ecology (Graduate level) Florida Atlantic University

Co-taught Community Genetics

Oceanography, Indian River State College

Synergistic Activities:

Reviewer:Climate Change, Hydrobiologia, Marine Environmental Research, Wetlands, Biological Journal of the Linnean Society

Journal of Tropical Plant Biology Mississippi-Alabama Sea Grant Consortium Grants, Louisiana Board of Regents Grants, National Science Foundation

Co-authored and promoted the Agreement of Cooperation between Florida Atlantic University and Research Institute for Tropical Forestry, China

Hosted two graduate students in 2012 supported by European Union Grants from Institute of Forest Growth and Computer Science, Technische Universitat Dresden at HBOI-FAU

Hosted one graduate student 2013 supported by a European Union Grant from Université Libre de Bruxelles – ULB, Campus du Solbosch at HBOI-FAU. .

Smithsonian Research Associate 2005-Present

Mentor Summer 2014 Miami Dade College STEM Summer Interns (8) in Forest Ecology at St. Thomas University

Treasurer, Southeastern Research Society (SEERS) (Affiliate Society of Coastal and Estuarine Research Federation: CERF) 2008-2010

Organized Special Session on Climate Change, SEERS Meeting 2009, Tampa Bay, Florida

Member, National Estuaries Program/Florida Department of Environmental Protection Indian River Lagoon Spoil Island Restoration Committee. This committee helps to guide restoration by DEP on spoil islands in the Indian River Lagoon.

Member, Environmental Protection Agency (EPA) Coastal Wetlands Review Team, SE Region

Experimental Design and Statistics Advisor to Indian River Lagoon Aquatic Preserve

Participated in COSEE Florida (NSF) Science Communication Boot Camp

Collaborators:

E. Proffitt, Florida Atlantic University, Uta Berger, Institute of Forest Growth and Computer Science, Technische Universitat Dresden, Ilka Feller, Smithsonian Environmental Reseearch Center, Sven Wagner, Institute of Silviculture and Forest Production, Technische Universitat Dresden, Franka Huth, Institute of Silviculture and Forest Production, Technische Universitat Dresden, Yue Lin Helmholtz Centere for Environmental Research, UFZ Dept of Ecological Modeling, Alice Stafford, University of the Virgin Islands, K. McKee, USGS National Wetlands Research Center, B. Middleton, USGS National Wetlands Research Center, R. Shatters, USDA Horticulture Research Lab, J. Beal, FWC. Fleur Van Nedervelde, Université Libre de Bruxelles – ULB, Campus du Solbosch, Baowen Liao, Research Institute of Tropical Forestry,CAF, People's Republic of China, Emily Dangremond, NSF Post Doc, Smithsonian Ecological Research Center.

Community Engagement Out-reach

Worked with teachers and students at Frances K. Sweet Elementary Magnet School, a predominantly **minority school** to teach students and teachers about mangrove ecology and research, including organizing field trips and teaching students to tag and measure plants and record data for field experiments.

Work with undergraduate students at Indian River State College instructing them in laboratory and field techniques.

Work with undergraduates from Miami Dade College

Work with undergraduates from St Thomas University

Teach Mangroves in the Indian River Lagoon, ORCA Outreach Program

Curriculum Vitae 2014

NATHAN J. DORN

Associate Professor
Department of Biological Sciences
Florida Atlantic University
Davie, FL 33314
ndorn1@fau.edu

PREPARATION:

Ph. D. 2003 Michigan State University, East Lansing, MI
Zoology and Ecology Evolution and Behavior (dual)

B. S. 1997 Calvin College, Grand Rapids, MI
Biology

APPOINTMENTS:

2005-2011 Assistant Professor
Department of Biological Sciences, Florida Atlantic University, Davie, FL

2004-2005 Visiting Research Associate
Southeast Environmental Research Center, FIU, Miami, FL

I. 2003-2004 Postdoctoral Researcher
Department of Biological Sciences, Florida International Univ. Miami, FL

RECENT PUBLICATIONS (*STUDENT AUTHORS):

Knorp*, N. E. & **N. J. Dorn**. 2014. Dissimilar numerical responses of macroinvertebrates to disturbance from drying and predatory sunfish. *Freshwater Biology* 59: 1378-1388.

Boyle*, R. A., **N. J. Dorn** & M. I. Cook. 2014. Importance of crayfish prey to nesting White Ibis (*Eudocimus albus*) populations. *Waterbirds* 37: 19-29.

Dorn, N. J. 2013. Consumptive effects of crayfish limit snail populations. *Freshwater Science* 32: 1298-1308.

Bransky*, J. W. & **N. J. Dorn**. 2013. Prey use of three wetland sunfishes: effects of ontogeny, gape size and seasonal prey variation. *Environmental Biology of Fishes* 96: 1329-1340.

Boyle*, R. A. **N. J. Dorn** & M. I. Cook. 2012. Dietary niche relationships of three species of wading birds nesting together in the Florida Everglades. *Waterbirds* 35: 154-159.

ADDITIONAL PRODUCTS (PUBLICATIONS & GRANTS):

Kellogg*, C. M. & **N. J. Dorn**. 2012. Consumptive effects of fish reduce wetland crayfish recruitment and drive species turnover. *Oecologia* 168: 1111-1121.

Dorn, N. J., M. I. Cook, G. Herring, R. Boyle*, J. Nelson* & D. E. Gawlik. 2011. Diet variation among White Ibis (*Eudocimus albus*) chicks: prey composition depends on recent hydrologic conditions*. Ibis* 153: 323-335.

Dorn, NJ. *Primary Investigator* - Wildlife and Nutrient Cycling Review. $6,000.00. (Jan. 2013- June 2013 South Florida Water Management District)

Dorn, NJ *Primary Investigator* - Experimental Examination of the Predator-Release Hypothesis on Wading Bird Supercolony formation in the Florida Everglades. $149,966.00. (2010-2013, South Florida Water Management District)

Dorn, NJ *Primary Investigator* - Habitat suitability models for Everglades and Slough Crayfish. $10,000.00

(2009-2010, United States Geological Survey: Joint Ecological Modeling lab).

SYNERGISTIC ACTIVITY:

Research/Scientific Community:

- Editorial Board Member for *Southeastern Naturalist* (2013-*present*)
- Peer Reviewer: 25 manuscripts (2008-2014)
- External Reviewer: NSF full proposal (2014)
- External Reviewer Environmental Change Initiative: University of Notre Dame (2012).
- External Reviewer for Restoration of Federal Forests in the Pacific NW: Strategies and Management Implications (administered by *The Wildlife Society* 2011)

University and College

- Member of Institutional Animal Care and Use Committee (2011-2014)
- Member of IACUC subcommittee; Wildlife use protocol development (2013-2014)
- Member of search committee for University Attending Veterinarian (2012)
- Chair of Graduate Admissions for the Environmental Sciences Program (2009-*present*)
- Member for Behavioral Ecologist faculty Search Committee (2014)
- Poster evaluator for College Research Day and ES Retreat (2014)
- Internal Review of Faculty Promotion Package (2013)

COLLABORATORS:

M. I. Cook, Ph.D. South Florida Water Management District
D. E. Gawlik, Ph.D. Florida Atlantic University

COURSES TAUGHT (2008-2014)

Undergraduate-level: Principles of Ecology (3 cr., 9X), Freshwater Ecology (3 cr., 1X), Freshwater Ecology lab (1 cr., 1X), Invertebrate Zoology (3 cr., 1X), Invertebrate Zoology lab (1 cr., 1X).

Graduate-level: Advanced Ecology (3 cr., 7X), Ecological Research Seminar (1 cr., 12X; co-led).

OUTREACH:

- Presentation/tour guide at the Loxahatchee Impoundment Landscape Assessment
- Constructed/edited Ecology questions for local Science Olympiad.

NWADIUTO ESIOBU Ph.D.
Professor of Microbiology and Biotechnology
Jefferson Science Fellow, US Department of State
Biological Sciences Department, Florida Atlantic University, Davie FL 33314; USA
Office: 954 236 1128 and 954 559 3369
Laboratory: 954 2361039; Fax: 954 236 1099
Email: nesiobu@fau.edu http://www.science.fau.edu/biology/faculty_staff/esiobu.htm

A. Professional Preparation

Post-Doctoral	Molecular biology and Biotechnology, Massachusetts Institute of Technology (MIT), Cambridge, MA USA. Boris Magasanik Laboratory.
Ph.D.	Microbiology, University of Louvain, Louvain-la-Neuve, Belgium. (Grand Distinction with Honors)
Post Grad Cert.	Agronomy (Tissue Culture & Plant pathology) University of Louvain, Belgium.
M.Sc.	Environmental Microbiology, University of Ife, Ile-Ife Nigeria. (Best graduating post-graduate student award)
B.Sc. (Hons.)	Microbiology, University of Benin, Benin City, Nigeria (Second Class Upper Division)

B. Appointments

Biotech Consultant	2013 Summer. National Biotechnology Development Agency (NABDA)
Professor	2013 - Microbiology and Biotechnology, Biological Sciences Department, Florida Atlantic University.
Senior Science Advisor	2011- Present, United States Department of State, Washington DC (Jefferson Science Fellow)
Director	2010 – Present, Microbial Biotechnology Lab., Florida Atlantic Univ.
Assoc. Professor	2003 – 2012, Dept. of Biological Sciences, Florida Atlantic University.
Professor	2009 – Present (Adjunct position) Nnamdi Azikiwe University, Nigeria
Chair	International Advisory Board, World Bank STEP B project in Nigeria.
Chair	2008 – 2012, Biological sciences department; Learning Assessment Committee, Florida Atlantic University.
Graduate Faculty	2005 – Present, Florida Atlantic University
Visiting Professor	Summer 2008, UNESCO / TWAS, Italy
Visiting Research Professor	2005-2006, Environmental Health Sciences Department, School of Public Health Dept., University of Georgia, Athens. (1 Term sabbatical)

C. Selected Peer-Reviewed Publications

Chakraborty, S. , Persaud, V. , Vanegas, S. , Gautier, G. and Esiobu, N. (2014), Analysis of the Human Oral Microbiome of Smokers and Non-Smokers Using PCR-RFLP and Ribotyping. *Advances in Microbiology*, **4**, 681-691. doi: 10.4236/aim.2014.410073.

Igwe Enerst C., N **Esiobu**, P. C. Ojimelukwe (2014) Variations in the Traditional Starter Culture for Production of a Nigerian Fermented Milk Product- (Kindirmo) Focusing on Modern Food Industry (FMFI) Volume 3 Issue 1, February 2014 www.fmfi-journal.org doi: 10.14355/fmfi.2014.0301.05

Esiobu N., Green M., Echeverry A., Bonilla T.D., Stinson C.M., Hartz A., Rogerson A. and McCorquodale D.S. (2013) High numbers of Staphylococcus aureus at three bathing beaches in South Florida. Int J Environ Health Res. 2013; 23 (1): 46 – 57. , DOI**:** 10.1080/09603123.2012.699027.

Mohammed R. L., Echeverry A., Stinson C.M., Green M., Bonilla T.D. Hartz A., McCorquodale D. S, Rogerson A. and N. **Esiobu** (2012) Survival trends of S*taphylococcus aureus*, *Pseudomonas aeruginosa*, and *Clostridium perfringens* in a sandy South Florida beach. Marine Pollution Bulletin 64 (2012) 1201–1209.

Yamazaki Koske and **Esiobu** Nwadiuto (2012) Environmental Predictors of Pathogenic Vibrios in South Florida Coastal Waters. The Open Epidemiology Journal, 2012, 5, 9-12

D. Selected Other Publications or Products/Grants

$1,478,514.00 2014 – 2016 (Co-PI) COMESA. Promotion and Improvement of Climate Smart Agriculture in Zambia through Optimized Legume-Based Agroforestry

$ 3000.00 2013- 2014 (PI) FAU Broward Undergraduate Research Grant and Faculty development (with Sarah Kudman undergraduate)

$ 50,000.00 2012 – 2013 (PI) World Bank through MAUTECH. Research skills in molecular biology, plant tissue culture and environmental biotechnology
A World Bank Funded Training for Scientists from the Center of Excellence forEnvironmental Biotech, University of Maiduguri and its affiliates.

$3000.00 2012 – 2013 (PI) FAU Broward Undergraduate Research Grant and Faculty development (with Hedson Desir)

$1000.00 2013 – 2014 Broward Mentor Professional Development Award: In recognition of of efforts to promote and mentor undergraduate research

$17,500.00 2012- 2014 (Co-PI) MAUTECH (World Bank), Nigeria. Enhancement of desirable agricultural traits through plant biotechnology. Zhang X. (PI): A collaboration between FAU and MAUTECH.

Project Reports

Esiobu N. 2008 Evaluation of sporicidal properties of novel antimicrobial formulations (A Report)
Esiobu N. 2008. Lab Manual on Molecular Biology and Applied Biotech Techniques, Covenant Univ.
Rogerson A., Esiobu N., and McCoquerdale D (2003). Prevalence and survival of microorganisms in shoreline interstitial waters: Final Report submitted to the USEPA.
Esiobu N. and Rosenkranz H. (2003) Hospital Hygiene Practices for Dealing with Biowarfare agents. Final report of funded research submitted t the CBD, Tampa. 40pp

E. Synergistic Activities

* World Bank funded Centre of Excellence for Sustainable Environmental University of Maiduguri, Nigeria
* COMACO, Zambia – Agroforestry and soil conservation
* Ebonyi State University – Multi-disciplinary research skill training

F. Collaborators and Other Affiliations

National Biotech Devt Agency, NABDA; University of Maiduguri, University of Ebonyi State etc

G. Courses Taught

BSC 6390 Integrative Biology (Co-Teach as needed)
BSC 6905 Directed Independent studies
BSC 6936 Advanced Microbiology
BSC 5936 Environment and Health
BSC 4905 Directed Independent Studies
BSC 4403L Biotechnology Labs 1
MCB 4203 Medical Bacteriology
MCB 4603 Microbial Ecology
MCB 4503 Virology
BSC 4303 Intermediate Microbiology Labs (now replaced by Biotech Lab 1)
MCB 3020(L) General Microbiology and Labs

H. Community Engagement or Out-reach

* Jefferson Science Fellow --- US State Department
* Senior Vice President, Palm Beach-Broward Chapter of US National Committee on UN Women
* American Society for Microbiology
* Faculty mentor
* Intl. Advisory Board member, FUTY and Technical Advisory Board, Biotech Center Ebonyi
* Editorial Board member and reviewer for grants and journal articles

BIOGRAPHICAL SKETCH

Dale E. Gawlik

Professional Preparation

University of Wisconsin Stevens Point	B.S.	1984
Winthrop College	M.S.	1988
Texas A&M University	Ph.D.	1994

Appointments

2007-present	Director, Environmental Science Program, Florida Atlantic University
2013-present	Professor, Department of Biological Sciences, Florida Atlantic University
2008-2013	Associate Professor, Department of Biological Sciences, Florida Atlantic University
2003-2008	Assistant Professor, Department of Biological Sciences, Florida Atlantic University
1994-2003	Senior Environmental Scientist, Everglades Division, South Florida Water Management District
1994	Tom Slick Senior Graduate Fellow, Texas A&M University
1993-1994	Postdoctoral Research Associate, Texas A&M University
1990-1993	Graduate Research Assistant, Texas A&M University
1990	Research Supervisor, Environmental Labs Inc.
1988-1989	Biologist, Environmental Labs Inc.
1987-1988	Biological Consultant, Savannah River Ecology Laboratory
1985-1987	Graduate Research Assistant, Winthrop College
1985	Wildlife Technician, U.S. Fish & Wildlife Service, Northern Prairie Wildlife Research Center

Selected Peer-Reviewed Publications (five recent)

- Herring, G., H. K. Herring, and D. E. Gawlik. *In press*. Social cues and environmental conditions influence foraging flight distances of breeding wood storks (*Mycteria Americana*). Waterbirds
- Herring, G., C. A. Eagles-Smith, D. E. Gawlik, J. M. Beerens, and J. T Ackerman. 2014. Physiological condition of juvenile wading birds in relation to multiple landscape stressors in the Florida Everglades: effects of hydrology, prey availability, and mercury bioaccumulation. PLoS ONE 9: e106447.
- Beck, T. J, D. E. Gawlik, and E. V. Pearlstine. 2013. Community patterns in treatment wetlands, natural wetlands, and croplands in Florida. Wilson Journal of Ornithology 125: 329-341.
- Lantz, S. M, D. E. Gawlik, and M. I. Cook. 2011. The effects of water depth and emergent vegetation on foraging success and habitat selection of wading birds in the Everglades. Waterbirds 34:439-447.
- Beerens, J. M., D. E. Gawlik, G. Herring, and M. I. Cook. 2011. Dynamic habitat selection by two wading bird species with divergent foraging strategies in a seasonally fluctuating wetland. Auk 128:651-662.

Other publications or grants (five recent)

- Everglades Fellowship Program at Florida Atlantic University. Dale E. Gawlik, funded $100,000 by National Park Service, 2013-2016.
- Wood stork use of roadway corridor features in South Florida. D. E. Gawlik, funded $462,855 by Florida Department of Transportation, 2013-2016
- Feasibility of modeling impacts of sea level rise on foraging habitat of the Little Blue Heron in the Great White Heron National Wildlife Refuge, Phase II: factors affecting habitat D. E. Gawlik and B. Lapointe, funded $50,000 by U.S. Fish and Wildlife Service, 2012-2013.

- Postdoctoral investigator program in marine science, engineering and technology: effects of nutrient enrichment on wading bird habitat in the Great White Heron National Wildlife Refuge, lower Florida Keys. B. Lapointe and D. E. Gawlik, funded $112,640 by Harbor Branch Oceanographic Institute at Florida Atlantic University, 2012-2014.
- Dry season prey concentrations. D. E. Gawlik, funded $608,064 by U.S. Army Engineer Corp of Engineers Research and Development Center, 2012-2015.

Synergistic Activities

- Program Committee, 2015 Greater Everglades Ecosystem Restoration Conference, 2013-2015.
- Panelist for evaluation of Society of Ecological Restoration International Primer on Ecological Restoration. Conference on Ecological and Ecosystem Restoration, New Orleans, 2014.
- Councilor, Association of Field Ornithologists, 2013-2016.
- Science Advisory Committee, Gulf Coast Bird Observatory, Lake Jackson, Texas, 2012 – present.
- Science Advisory Committee for the Whooping Crane Eastern Partnership, U.S. Fish and Wildlife Service, 2011-present.
- President, Florida Chapter of The Wildlife Society, 2011 – 2013.
- Reviewer, Biological Status Review of Florida's Threatened Species Program, Florida Fish and Wildlife Conservation Commission, 2010.
- Dissertation Reviewer, University of New South Wales, Sydney, Australia, 2010.
- Dissertation Reviewer, University of New England, Armidale, Australia, 2010.
- Co-organized symposium entitled System-wide Science: Translating a Trophic Hypothesis Foundation for Restoration. Greater Everglades Ecosystem Restoration Conference, 2010, Naples, FL.
- Panelist, Oil and Gas Impacts in the Big Cypress Ecosystem. The Everglades Foundation, 2009-2010

Collaborators and other affiliations

- Peter Frederick, University of Florida, Gainesville, FL
- Frank Mazzotti, University of Florida, Davie, FL
- Arnold van der Valk, Iowa State University, Ames, IA
- Joel Trexler, Florida International University, Miami, FL

Courses Taught

- Conservation Biology (PCB 6045) Developed new graduate course on the principles of Conservation Biology. Format is lecture, team projects, guest speakers, paper discussions, and a field trip.
- Seminar in Emerging Topics in Avian Ecology (Zoo 6544C) Developed new graduate course focusing on recent topics in the literature. Format is student-led discussion with introductory and synthesis lectures by the instructor.
- Principles of Ecology (PCB 4043). Taught this existing large enrollment undergraduate course required for biology majors. Format is lecture with three simulation model exercises done in teams.

Outreach

- Gawlik, D.E. 2014. Wading birds in the Everglades: graduate student research shaping the restoration of a global treasure. Jupiter High School Environmental Academy.
- Gawlik, D.E. 2013. Wading birds in Florida: cream skimmers and crumb pickers. Coastal Lecture Series, Florida Oceanographic Society, Fort Pierce, FL
- Gawlik, D.E. 2012. Habitat selection and behavior of Wood Storks and their kin in South Florida. Meeting of the South Florida Association of Environmental Professionals, Fort Lauderdale, FL.
- Gawlik, D.E. 2012. Wading birds in Florida: cream skimmers and crumb pickers. Treasure Coast Birding Festival, Vero Beach, FL.

- Gawlik, D.E. 2012. Wading birds in the Everglades: cream skimmers and crumb pickers. Pelican Island Audubon Society, Vero Beach, FL.

Tobin K. Hindle
FAU Geosciences, 777 Glades Rd., Boca Raton, FL. 33431
Phone: 561-297-2846, Email: thindle@fau.edu

Professional Preparation

Doctor of Philosophy, Comparative Studies, Environmental Studies concentration, Florida Atlantic University, Boca Raton, Florida. August 2006. Dissertation: The Regeneration of Nature: an alternative to ecological restoration. Advisor: Dr. Robin N. Fiore.

Graduate Certificate, Environmental Studies, Florida Atlantic University, Boca Raton, Florida. August 2006.

Master of Science, Biology, Geographical Information Systems emphasis, Florida Atlantic University, Boca Raton, Florida. G.P.A. 4.0/4.0, August 1997. Thesis: Determination of Wetland Impact Due to Groundwater Drawdown: the application of aerial photo-interpretation, GIS analysis, and groundwater modeling. Advisor: Dr. Alex Marsh.

Bachelor of Science, Limnology, Minor in Computer Science, University of Central Florida, Orlando, Florida. G.P.A. 3.4/4.0, December 1986.

Appointments

Associate Scientist and Faculty, Geosciences, FAU, Boca Raton, Florida. August 2013 to present.

Assistant Scientist and Faculty, Geosciences, FAU, Boca Raton, Florida. August 2006 to August 2013.

Graduate Program Director, Geosciences, FAU, Boca Raton, Florida. August 2011 to present.

Coordinator, Research Programs and Services, Geosciences, FAU, Boca Raton, Florida. May 1996 to August 2006.

Selected Peer-Reviewed Publications

Mulcan, A., Mitsova, D., **Hindle, T**., Hanson, H., and Coley, C. "Environmental Siting Suitability Analysis for Commercial Scale Ocean Renewable Energy Offshore Southeast Florida," Journal of Coastal Research, in review 2014.

Scholl, P., **Hindle, T**., Frazier, E., "Population Structure and Burrow Placement of Gopherus polyphemus in a Small, Declining Southeast Florida Conservation Area." FAU Undergraduate Research Journal, Vol. 1, No. 1, 2012

Raines, T., Ricci, P., Brown, S., Eggenberger, **T., Hindle**, T., and Schiff, M. "Cheating In Online Courses: The Student Definition," Journal of Effective Teaching 11.1 (2011): 80-89.

Selected Other Publications or Products/Grants

FAU QEP Distinction Through Discovery Curriculum grant, "Expanding the Student-Centered Undergraduate Research Culture Across the Curriculum". 2013.

Scholl, P., Calle, L., Frazier, E., **Hindle, T.,** "Distribution and habitat use of the gopher tortoise (Gopherus polyphemus) in a declining southeast Florida conservation area." 96th ESA Annual Meeting, Austin, TX. August 2011.

Lewis, S., **Hindle, T**., and Peterson, C. "Using GIS to investigate environmental factors contributing to the presence of an

endangered plant (*Campanula robinsiae*)." 75th Anniversary Meeting of the Florida Academy of Sciences Florida Institute of Technology, Melbourne, Florida. March 2011

Remote Education and Assessment of Critical Habitats (REACH), Florida Atlantic University technology grant, 2011-2014.

Hindle, T. "Everglades Restoration." Encyclopedia of Geography. 2010. SAGE Publications. 1 Oct. 2010. <http://www.sage-ereference.com/geography/Article_n401.html>.

FAU interdisciplinary Cross-College Research Pre-Proposal on Climate Change, FAU Division of Sponsored Research, 2010.

Earth System Science Education Alliance partnership, a National Science Foundation GEO-Teach project, funded through the Institute for Global Environmental Strategies. 2007 – 2009.

Synergistic Activities

CEL1001R: eLearning Designer/Facilitator and Quality Matters Certification
SEDAAG annual meeting, Southeastern Division of the Association of American Geographers
Teaching with Technology Showcase, FAU Center for Teaching and Learning
ESSEA annual meeting, Earth System Science Education Alliance
Faculty Learning Community, Advanced Topics Online Teaching/Learning, member
Citrix virtualization seminar "From Wow to How"
GIS Expo
Faculty Learning Community, Sustainable Pedagogy, Facilitator,
Web conference on developing a Carbon Action Plan for universities
Faculty Learning Community, Challenges and Opportunities to Distance Learning
Teaching Learning Center and The Center for Civic Engagement and Service workshop

Collaborators and Other Affiliations

SouthEastern Division of Association of American Geographers
Florida Society of Geographers' (FSG) webmaster
FAU Geosciences GIS Center
FAU Conservation committee
FAU Sustainability committee

Courses Taught

GEA 6931 – Thesis Seminar, 2013 to present.
GEA 6277 - Human-Environmental Interactions, 2009 to present.
GEA 4275 - Human-Environmental Interactions in South Florida, 2009 to present.
GEO 6920 - Geosciences Colloquium Series, 2009-2012.
ESC 2070 – The Blue Planet, 2007-present.
SLS 1412 - The Learning Community Experience, 2009-2012.
GLY 6934/ESC 6206 – Earth Science for Educators, 2007-2009.
GLY 3870 – Geoscience Computer Applications, 1998-2001.

Community Engagement or Out-reach

Science Olympiad judge

Graduate Research Day poster judge
Invited panel judge for student projects in EGN 2935,
Invited speaker for EGN 2935, Sustainability Leadership in Engineering
Focus the Nation conference steering committee,
Represented FAU at the non-profit organization Hurricane Warning! at the Disaster Survival House
Co–coordinator and presenter for the South Broward High School GIS field trip to FAU.
Coordinated and conducted a 5th grade

ABBREVIATED FACULTY CV

Stephen M. Kajiura, Ph.D. Associate Professor
Biological Sciences, Florida Atlantic University, Boca Raton, FL 33431 USA
www.science.fau.edu/sharklab

A. Professional preparation

University of California at Irvine	*Ecology & Evolution*	Postdoc, 2002-2003
University of Hawaii at Manoa	*Zoology*	PhD, 2001
Florida Institute of Technology	*Marine Biology*	MS, 1994
University of Guelph	*Marine Biology*	Honours BSc, 1991

B. Appointments

2010-present Associate professor, Biological Sciences, Florida Atlantic University
2003-2010 Assistant professor, Biological Sciences, Florida Atlantic University

C. Selected Peer-Reviewed Publications (5 most recent)

Macesic, LJ & SM Kajiura. 2014. Pelvic girdle shape predicts locomotion and phylogeny in batoids.
Journal of Morphology, 275: 100-110.

Siciliano*, AM, SM Kajiura, JH Long & ME Porter. 2013. Are you positive? Electric dipole polarity
discrimination in the yellow stingray, Urobatis jamaciensis. Biological Bulletin, 225: 85-91. (with cover).

Bedore, CN, ER Loew, TM Frank, RE Hueter, DM McComb & SM Kajiura. 2013. A physiological analysis of color vision in batoid elasmobranchs. Journal of Comparative Physiology-A, 199: 1129-1141.

McCutcheon, SM & SM Kajiura. 2013. Electrochemical properties of lanthanide metals in relation to
their application as shark repellents. Fisheries Research, 147: 47-54.

Bedore, CN & SM Kajiura. 2013. Bioelectric fields of marine organisms. Physiological and Biochemical
Zoology 86(3): 298-311. (with cover).

D. Selected Other Publications

Meredith, TL & SM Kajiura. 2010. Olfactory morphology and physiology of elasmobranchs. Journal of
Experimental Biology 213: 3449-3456.

McComb, DM, TC Tricas & SM Kajiura. 2009. Enhanced visual fields of hammerhead sharks. Journal of Experimental Biology 212: 4010-4018.

McGowan, DA & SM Kajiura. 2009. Electroreception in the euryhaline stingray, Dasyatis sabina. Journalof Experimental Biology 212: 1544-1552.

Kajiura, SM & KN Holland. 2002. Electroreception in juvenile scalloped hammerhead and sandbar
sharks. Journal of Experimental Biology 205(23): 3609-3621.

Kajiura, SM & TC Tricas. 1996. Seasonal dynamics of dental sexual dimorphism in the Atlantic stingray, Dasyatis sabina. Journal of Experimental Biology 199(10): 2297-9306.

E. Synergistic Activities (past 5 years)

Supervised 5 PhD students, 3 MS students, 2 non-thesis MS students, 2 post-doctoral researchers, 8 undergraduate DIS students. Served on 6 MS committees, 4 PhD committees. Presented 22 invited seminars, 9 conference presentations, 26 co-authored conference presentations. Peer-reviewed 61 journal manuscripts, invited to participate in 4 scientific workshops, have 1 patent pending.

F. Collaborators and Other Affiliations (past 5 years)

CN Bedore	Duke University	JH Long	Vassar College
J Caprio	Lousiana State University	LJ Macesic	Wheaton College
SP Collin	University of Western Australia	JW Mandelman	New England Aquarium
TP Fitzgerald	Environmental Defense Fund	DM McComb	Ocean First Institute
TM Frank	Nova Southeastern University	DA McGowan	University of Washington
MS Gordon	UCLA	TL Meredith	Florida Atlantic University
A Hansen	University of Colorado	ME Porter	Florida Atlantic University
LL Harris	Florida FWCC	AM Siciliano	Duke University
NS Hart	University of Western Australia	AP Summers	University of Washington
AZ Horodysky	Hampton University	IR Tibbetts	University of Queensland
RE Hueter	Mote Marine Laboratory	TC Tricas	University of Hawaii
LK Jordan	UCLA	BE Wueringer	University of Western Australia
ER Loew	Cornell University		

G. Courses Taught

Undergraduate	Graduate
Evolution	Sensory Biology & Behavior of Fishes
Evolution in Society	Computer Graphics for Biologists
Human Anatomy	Elasmobiology
Directed Independent Study	Integrative Biology I

H. Community Engagement or Out-reach (past 5 years)

Provided on-camera appearances or technical consultation for 8 television documentaries. Provided interviews for numerous print and online media outlets locally, nationally, and internationally.

CURRICULUM VITA MARGUERITE KOCH-ROSE

Florida Atlantic University; Department of Biological Sciences
Aquatic Plant Ecology Laboratory (APEL)
777 Glades Road, Boca Raton, FL 33431-0991
Phone: (561) 297-3325; Fax: (561) 297-2749; email: mkoch@fau.edu
http://www.science.fau.edu/biology/koch/
https://www.facebook.com/FauAquaticPlantEcologyLab

A. Professional Preparation

Ph. D., Marine Biology and Fisheries, 1996. Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Miami, Florida.
Graduate Exchange Scholar, 1988-1989. Geography Department, University of Exeter, Exeter, England.
M.S., Marine Sciences, 1988. Marine Sciences Department, Center for Wetland Resources, Louisiana State University, Baton Rouge, Louisiana.
Marine/Estuarine Ecology and Fisheries, 1985. University of Washington, Seattle, WA.
Coral reef ecology, 1983. West Indies Laboratory, Fairleigh Dickinson University, St. Croix, West Indies.
B.S., Biology, 1981. Biology Department, Tulane University, New Orleans, LA.

B. Appointments

C. 2008-present **Professor:** Biological Sciences Department, Florida Atlantic University, Boca Raton, FL.
D. 2001-2008 **Associate Professor:** Biological Sciences Department, Florida Atlantic University, Boca Raton, FL.
E. 1996-2000 **Assistant Professor:** Biological Sciences Department, Florida Atlantic University, Boca Raton, FL.
F. 1993-1996 **Research Associate:** Rosenstiel School of Marine and Atmospheric Sciences (RSMAS), University of Miami, Miami, FL.
G. 1989-1992 **Senior Research Scientist:** Everglades Systems Research Division, Research Department, South Florida Water Management District, West Palm Beach, FL.
H. 1988-1989 **Research Associate:** University of Exeter, England.
I. 1985-1988 **Research Assistant:** Center for Wetland Resources, Louisiana State University, Baton Rouge, LA.
J. 1985 **Research Assistant:** University of Washington, Seattle, WA.
K. 1984 **Biologist:** National Marine Fisheries Service, Bering Sea, AK.

C. Selected Peer-Reviewed Publications

Koch, M.S., C. Coronado, M.W. Miller, D.T. Rudnick, E. Stabenau, R.B. Halley, F.H. Sklar (2014) Climate Change Projected Effects on Coastal Foundation Communities of the Greater Everglades using a 2060 Scenario: Need for a New Management Paradigm. Journal of Environmental Management. DOI: 10.1007/s00267-014-0375-y

Strazisar, T., **Koch**, M., Madden, C. Seagrass (*Ruppia maritima* L.) (2014) Life history transitions in response to salinity dynamics along the Everglades-Florida Bay ecotone Estuaries and Coasts DOI 10.1007/s12237-014-9807-4.

Koch, M., Bowes, G., Ross, C., Zhang, Xing-Hai. (2013 electronic; 2014 print) Climate change and ocean acidification effects on seagrasses and marine macroalgae. Review paper: Global Change Biology 19, 103–132, doi: 10.1111/j.1365-2486.2012.02791.x

Koch, M.S., Kletou, D.C., Tursi, R. (2009) Alkaline phosphatase activity of water column fractions and seagrass in a tropical carbonate estuary, Florida Bay. *Coastal Estuarine and Shelf Science*. 83: 403‑413.

Koch, M.S., Schopmeyer, S.A., Nielsen, O.I., Kyhn-Hansen, C., Madden, C.J (2007) Conceptual model of seagrass die-off in Florida Bay: Links to biogeochemical processes. 350:73-88. *Journal of Experimental Marine Biology and Ecology*

D. Selected Other Publications or Products/Grants

Ocean acidification, temperature and light effects on carbon-use mechanisms, calcification, and growth of tropical macroalgae: Drivers of winners and losers. National Science Foundation (NSF**). PI: $423,000.** 2014-2018.

Ruppia maritima Seed Bank Reassessment Following Large Reproductive Events in the Mangrove Transition Zone and Florida Bay. SFWMD **PI: $20,000**. 2014.

Seagrass Studies in the Mangrove Transition Zone and Florida Bay in Support of Minimum Flows and Levels and Ecosystem Restoration. SFWMD. **PI:$140,000.** 2012-2014.

FAU Climate Change Initiative Priority Theme: Research, Engineering and Adaptation to a ChangingClimate: FAU. **PI: $500,000**. 2009-2014.

Seagrass research in Florida Bay in support of ecosystem models and restoration: 2009. SFWMD. **PI: $300,000**.

Germination Response of *Ruppia* seeds in Florida Bay: 2007. SFWMD. **PI: $49,600**.
Salinity, temperature, and light effects on germination success of *Ruppia maritima* in Florida Bay: 2007.
A mesocosm and field study. SFWMD. **PI: $49,000**.

E. Synergistic Activities

Developing seagrass ecosystem model with colleagues at South Florida Water Management District to define water regulation schedules to Florida Bay

F. Collaborators and Other Affiliations

Collaborating with the Central Caribbean Research Center (CCMI) to develop their ocean acidification coral reef research program.

G. Courses Taught

Undergraduate: Ecology, Marine Botany Graduate: Climate Change, Marine Ecosystem Management, Coastal Plant Ecology

H. Community Engagement or Out-reach

Actively giving oral presentations and seminars to local community organizations and educational institutions on Climate Change and Ocean Acidification to promote a greater awareness of this topic.

CURRICULUM VITAE: BRIAN EDWARD LAPOINTE

PROFESSIONAL PREPARATION

Boston University	Biology	B.S.	1973
University of Florida	Environmental Sciences	M.S.	1979
University of South Florida	Biology	Ph.D.	1982

APPOINTMENTS

2007-present	Research Professor, Harbor Branch Oceanographic Institute, Florida Atlantic University
2006-2007	Senior Scientist, Harbor Branch Oceanographic Institution
2004-2006	Adjunct Professor, Department of Oceanography, Florida State University
1999-present	Adjunct Research Scientist, Bigelow Laboratory for Ocean Sciences
1988-1990	Director of Marine Conservation, Florida Keys Land & Sea Trust
1986-1996	Adjunct Assistant Professor, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami
1985-2006	Associate Scientist, Harbor Branch Oceanographic Institution
1983-1985	Assistant Scientist, Harbor Branch Oceanographic Institution
1977-1982	Research Assistant, Skidaway Institute of Oceanography
1973-1977	Research Assistant, Woods Hole Oceanographic Institution

Selected Peer-Reviewed Publications

Lapointe, B. E., West, L. E., Sutton, T. T. and C. Hu. 2014. Ryther revisited: nutrient excretions by fishes enhance productivity of pelagic *Sargassum* in the western North Atlantic Ocean. J. Exp. Mar. Bio. Ecol. 458:46-56.

Lapointe, B. E., L. W. Herren and B. J. Bedford. 2012. Effects of hurricanes, land-use, and water management on nutrient and microbial pollution: St. Lucie Estuary, southeast Florida. J. Coastal Research 28(6):1345-1361.

Lapointe, B. E., and B. J. Bedford. 2011. Stormwater nutrient inputs favor growth of non-native macroalgae (Rhodophyta) on O'ahu, Hawaii Islands. Harmful Algae 10:310-318.

Sherwood, O. A., B. E. Lapointe, M. J. Risk , R. Jamieson. 2010. Nitrogen isotopic records of terrestrial pollution encoded in Floridian and Bahamian gorgonian corals**.** Environ. Sci. and Technol. 44 (3):874-880.

Lapointe, B. E., and B. J. Bedford. 2010. Ecology and nutrition of invasive *Caulerpa brachypus* blooms on coral reefs off southeast Florida. Harmful Algae 9:1-12.

SELECTED OTHER PUBLICATIONS OR PRODUCTS/GRANTS

Zhao, J., C. Hu, B. Lapointe, N. Melo, E. M. Johns, and R. H. Smith. 2013. Satellite observed black water events off southwest Florida: Implications for coral health in the Florida Keys National Marine Sanctuary. Remote Sensing *(Basel, Switzerland*) 5(1): 415-431. DOI: 10.3390/rs5010415.

Lapointe, B. E., K. Thacker, C. Hanson and L. Getten. 2011. Sewage pollution in Negril, Jamaica: effects on nutrition and ecology of coral reef macroalgae. Chinese Journal of Oceanology and Limnology 29(4): 775-789.

Lapointe, B .E., R. Langton, B. J. Bedford, A. C. Potts, O. Day, and C. Hu. 2010. Land-based nutrient enrichment of the Buccoo Reef Complex and fringing coral reefs of Tobago, West Indies. Mar. Poll. Bull. 60(3): 334-343.

Risk, M., B. E. Lapointe, 0. A. Sherwood, and B. J. Bedford. 2008. The use of $\delta^{15}N$ in assessing sewage stress on coral reefs. Mar. Poll. Bull. 58:793-802.

Yentsch, C. S., B. E. Lapointe, N. Pouleton, and D. A. Phinney. 2008. Anatomy of a red tide bloom off the southwest coast of Florida. Harmful Algae 7:817-826.

SYNERGISTIC ACTIVITIES

Editorial Board of *Harmful Algae* (2005-present)
Board of Advisors, Arthur Marshall Foundation (2006-present)
Reviewer for Journal of Experimental Marine Biology & Ecology, Marine Ecology Progress Series, Global Change Biology, Estuarine, Coastal and Shelf Science, Estuaries & Coasts, Aquatic Botany
Technical Advisory Committee, Florida Keys National Marine Sanctuary (1993-2000)
Technical Advisory Committee, Southeast Florida Coral Reef Initiative (2004-2013)

COLLABORATORS AND OTHER AFFILIATIONS

Peter Bell, University of Queensland; Bill Louda, Florida Atlantic University; Chuanmin Hu, University of South Florida; Brian Barnes, University of South Florida; Jun Zhao, University of South Florida; Mark and Diane Littler, Smithsonian Institution; Mike Risk, McMaster University; Owen Sherwood, University of California, Santa Cruz; Chris Langdon, University of Miami; Larry Brand, University of Miami; Michael Mallin, University of North Carolina; Chris Gobler, Stony Brook University; Mingshin Jiang, Florida Atlantic University; Dennis Hanisak, Florida Atlantic University.

Courses Taught

Marine Pollution

Community Engagement or Out-reach

Frequent public lectures, multi-media outreach

LOUDA, J. WILLIAM

PROFESSIONAL PREPARATION: B.S. (1971-WRIGHT STATE UNIVERSITY); M.S. (1978 -FLORIDA ATLANTIC UNIVERSITY), PH.D. (1993-SOUTH FLORIDA UNIVERSITY)

APPOINTMENTS: SCIENTIST EMERITUS (FAU; 4/14 – PRESENT); SENIOR SCIENTIST (FAU; 4/08-4/14); ASSOCIATE SCIENTIST (FAU - 1/03-4/08) ASSISTANT SCIENTIST (FAU- 7/99-1/03); ADJUNCT PROFESSOR / RESEARCH ASSOCIATE / SENIOR LABORATORY SPECIALIST (FAU-1/78-7/99)

SELECTED PEER-REVIEWED PUBLICATIONS:

Grant, C.S. and Louda, J.W. (2010) Microalgal pigment ratios in relation to light intensity– Implications for chemotaxonomy. *Aquatic Biology.* **11**: 127-138.

Khalesi (M.-R.)M. and Louda J.W., (2011), Hemisynthesis of 13^2,17^3 -Cyclomesopheophorbide-a-enol. *Tetrahedron Letters*. **52**: 1078-1081

Louda, J. W., Mongkhonsri, P., and Baker, E.W. (2011) Chlorophyll degradation during senescence and death-III: Three to ten year experiments, implications for ETIO-series generation. *Org. Geochem.* **42**: 688-699

West, M. and Louda, J.W. (2011) Effect of external pH on cyanobacterial pigment expression. *Florida Scientist*. **74(2):** 181-186.

Szymczak-Żyła, M., Kowalewska, G. and Louda J.W. (2011) Sedimentary Chlorophyll-*a* derivatives as indicators of marine eutrophication. *Marine Chemistry* **125**: 39-48

Pisani O., Louda J.W. and Jaffe R. (2013) Biomarker assessment of spatial and temporal changes in the composition of flocculent material (floc) in a subtropical wetland. *Environmental Chemistry*. **10**: 424–436

Grant C. and Louda J.W. (2013) Scytonemin-imine, a mahogany-colored UV/VIS sunscreen of cyanobacteria exposed to intense solar radiation *Organic Geochemistry* **65**: 29-36.

SELECTED OTHER PUBLICATIONS OR PRODUCTS/GRANTS:

Moretzaei-Rad, M. and Louda, J. W. (2007) Polystyrene-Divinylbenzene (PS-DVB), a mild stationary phase for the chromatographic purification of the unstable 13^2, 17^3-cyclopheophorbide-a-enol. *J. Liquid Chromatogr. & Rel. Technol*. **30**: 1361-1369.

Szymczak-Żyła, M., Louda, J. W. and Kowalewska, G. (2008) Influence of microorganisms on chlorophyll-a degradation in the marine environment. *Limnol. Oceanogr.* **58**: 851-862.

Louda, J. W. (2008) Pigment-Based Chemotaxonomy of Florida Bay Phytoplankton; Development and Difficulties. *J. Liquid Chromatogr. & Rel.Tech.* **31**: 295-323.

Szymczak-Żyła, M., Louda, J. W. and Kowalewska, G. (2008) Comparison of extraction and HPLC methods for marine sedimentary chloropigment-*a* determinations. *J. Liquid Chromatogr. and Rel. Tech.* **31**, 1162-1180.

Louda, J.W., Neto, R.R., Magalhaes, A. R. M., and Schneider,V.F. (2008) Pigment alterations in the brown mussel *Perna perna*. *Comparative Biochemistry and Physiology* **–B 150**: 385 – 394.

Biosketch:
Scott H. Markwith, Associate Professor

Professional Preparation:

- Ph.D., Biogeography, University of Georgia, May 2007.
- M.S., Biogeography, University of Georgia, December 2001.
- B.A., Physical Geography, University of Mary Washington, May 1997.

Appointments:

- Associate Professor, Department of Geosciences and Environmental Science Program, Florida Atlantic University, August 2007 – Present.

Selected Peer Reviewed Publications:

- de Souza, J. C., da Cunha, V. P., and Markwith, S. H. 2014. Spatiotemporal Variation in Human-Wildlife Conflicts Along Highway BR262 in the Brazilian Pantanal. *Wetlands Ecology and Management* DOI: 10.1007/s11273-014-9372-4.
- Markwith, S. H., Mezza, G., Kennard, S., and Bousquin, S. 2014. Intra-Floodplain Seed Dispersal Limitation and Wetland Community Restoration. *Ecological Restoration* vol. 32, no. 3, p. 249-259.
- Markwith, S. H. 2013. Stream Restoration and Hydrochory: Seed Dispersal Variation in Restored and Degraded Reaches of the Kissimmee River, Florida. *Papers in Applied Geography* vol. 36, p. 27-36.
- Monette, D. and Markwith, S. H. 2012. Hydrochory in the Florida Everglades: Temporal and Spatial Variation in Seed Dispersal Phenology, Hydrology, and Restoration of Wetland Structure. *Ecological Restoration*, vol. 30, no. 3, p. 180-191.
- Markwith, S. H. and Leigh, D. S. 2012. Comparison of Estimated and Experimental Subaqueous Seed Transport. *Ecohydrology,* vol. 5, p. 346-350.

Selected Other Publications:

- Markwith, S. H. 2011. Biogeography and Environmental Restoration: An Opportunity in Applied Research. *Geography Compass*, vol. 8, p. 531-543.
- Markwith, S. H. 2009. Temporal Change and Disturbance in a Mixed Hardwood Forest in Blood Mountain Wilderness Area. *Florida Geographer*, vol. 40, p. 14-30.
- Markwith, S. H., Davenport, L. J., Shelton, J., Parker, K. C., Scanlon, M. J. 2009. Ichthyochory, the Suwannee Strait, and Population Divergence in *Hymenocallis coronaria*. *Florida Scientist*, vol. 72, no. 1, p. 28-36.
- Markwith, S. H and Leigh, D. S. 2008. Subaqueous Hydrochory: Open-Channel Hydraulic Modeling of Non-Buoyant Seed Movement. *Freshwater Biology*, vol. 53, no. 11, p. 2274-2286.
- Parker, K. C. and Markwith, S. H. 2007. Expanding Biogeography's Horizons with Genetic Approaches. *Geography Compass*, vol. 1, no. 3, p. 246-274.

Synergistic Activities:

- Development and oversight of FAU's Environmental Restoration Certificate program.
- Organization of the Spring 2011 1st International Forum for Environmental Issues for the Encontro Regional de Estudantes de Engenharia Ambiental - EREEAMB, Marabá, Pará, Brazil, involving FAU and Universidade do Estado do Pará.

- Session Organizer and Chair for Biogeography and Geomorphology Specialty Groups Paper Session at the Association of American Geographers Annual Meeting in Washington D.C., Session Title: Environmental Restoration Research, Spring 2010 .
- Development of TETRASAT, a program specifically designed to analyze genetic diversity and differentiation among populations with allotetraploid microsatellite data.
- Editorial board membership of both Freshwater Biology and Southeastern Naturalist.

Collaborators and Other Affiliations:

Collaborators:

- Steve Bousquin, South Florida Water Management District
- Vanessa da Cunha, Universidade Federal de Mato Grosso do Sul
- Sharon Ewe, Ecology and Environment, Inc.
- Stevee Kennard, Kaiser University
- David Leigh, University of Georgia
- Garren Mezza, Patch Market Garden
- Dean Monette, Florida Atlantic University
- Julio de Souza, Universidade Federal de Mato Grosso do Sul

Graduate Advisor:

- Kathleen C. Parker, Emeritus Professor, University of Georgia

Thesis and Dissertation Advisees (Total advised = 4 Ph.D. and 2 Master's; Committees = 2 Ph.D. and 9 Master's**):**

Ph.D.

- Dean Monette, Fall 2009 – Present
- Danielle Romais, Fall 2012 – Present
- Alana Edwards, Fall 2012 – Present
- Anthony Planas, Fall 2014 – Present

Master's

- Stevee Norman, Environmental Sciences Program, Spring 2011 – Spring 2013
- Garren Mezza, Environmental Sciences Program, Fall 2010 – Fall 2012

Courses Taught:

- Environment and Society, EVR 2017, Spring 2009, 2010, Summer 2008, 2010, 2011, 2013.
- Introduction to Physical Geography, GEO 2200, Fall 2009 – 2013, Summer 2014.
- Biogeography, GEO 4300/5305, Fall 2007, 2008, 2009, Spring 2011, 2012, 2013, 2014.
- Seminar in Geographic Methodology, GEO 6117, Fall 2008, Spring 2010.
- Environmental Restoration, EVR 6334, Spring 2008, 2009, Fall 2010 – 2014.
- Restoration Implementation and Management, EVR 6358, Spring 2013, 2014.

Community Engagement or Outreach:

- Science Olympiad Judge, Spring 2008.

ABBREVIATED FACULTY CV (MAXIMUM 2 PAGES)
DANIEL E. MEEROFF, PH.D., E.I.

PROFESSIONAL PREPARATION

Undergraduate Institution

- *Florida Institute of Technology*, Bachelor of Science in Environmental Science (05/1995)

Graduate Institution

- *University of Miami*, Master of Science in Civil Engineering (08/1997)
- *University of Miami*, Ph.D. in Civil Engineering, Environmental Engineering Emphasis (12/2001)

Postdoctoral Institution

- *University of Miami*, Civil, Architectural & Environmental Engineering (01/2002 – 07/2003)

Professional Licensure

- Engineer Intern. *State of Florida Board of Professional Engineers*. License #: 1100003721 (09/1998)

APPOINTMENTS

- Professor (August 2014 – Present)
  Florida Atlantic University, *Dept. of Civil, Environmental & Geomatics Engineering*, Boca Raton, FL.
- Associate Chair of the Department (October 2013 – Present)
  Florida Atlantic University, *Dept. of Civil, Environmental & Geomatics Engineering*, Boca Raton, FL.
- Associate Professor with Tenure (August 2008 – Present)
  Florida Atlantic University, *Dept. of Civil, Environmental & Geomatics Engineering*, Boca Raton, FL.
- Assistant Professor (August 2003 – July 2008)
  Florida Atlantic University, *Dept. of Civil Engineering*, Boca Raton, FL.
- Director, Laboratories for Engineered Environmental Solutions (Lab.EES) (August 2003 – Present)
  Florida Atlantic University, *Dept. of Civil Engineering*, Boca Raton, FL.
- Post-Doctoral Research Fellow (Nov. 2001 – July 2003)
  University of Miami, Dept. of Civil, Architectural & Environmental Engineering, Coral Gables, FL.
- University Instructor (Jan. 2001 – July 2003)
  University of Miami, Dept. of Civil, Architectural & Environmental Engineering, Coral Gables, FL.
- Operations Consultant (Nov. 1999 – Dec. 2000)
  Florida Governmental Utility Authority, Tallahassee, FL.
- Engineering Consultant (Feb. 2000 – May 2000)
  Montgomery Watson, Inc., Sunrise, FL.

Selected Peer-Reviewed Publications (most recent five from the last 7 years)

[1] D. Chamley-Wiik, K. Dunn, P. Heydet-Kirsch, M. Holman, **D.E. Meeroff**, and J. Peluso. (2014). "Scaffolding the development of student research skills for capstone experiences: A multi-disciplinary approach." *CUR Quarterly,* 34(4):18-25.

[2] K. Tota-Maharaj and **D.E. Meeroff**. (2013). "Evaluation of Solar Photosensitised River Water Treatment in the Caribbean," *The International Journal of Photoenergy*, Volume 2013, Article ID 487890,10 pages.

[3] **D.E. Meeroff**, F. Bloetscher, S.C. Long, and T. Bocca (2013). "The Use of Multiple Tracers to Evaluate the Impact of Sewered and Non-Sewered Development on Coastal Water Quality in a Rural Area of Florida." *Water Environment Research*,

[4] J. Pire-Schmidt, F. Bloetscher, **D.E. Meeroff**, T.P. Carsey, J. Stamates, K. Sullivan, and J. Proni (2012) "Farfield modeling of the Boynton Inlet plume." *Environmental Management and Sustainable Development*, Volume 1, Number 2, 74–89.

[5] **D.E. Meeroff**, F. Bloetscher, D. V. Reddy, F. Gasnier, S. Jain, A. McBarnette and H. Hamaguchi (2012). "Application of photochemical technologies for treatment of landfill leachate," *Journal of Hazardous Materials*, Volume 209–210, pp. 299–307.

Selected Other Publications or Products/Grants (most recent five from the last 7 years)

[1] **D.E. Meeroff** (2013). "Environmental Engineering and Science Laboratory Manual, 1st edition," Kendall Hunt Publishing Company. With Forward by David Cowan Jr. ISBN: 978-1-4652-2086-8.

[2] **D.E. Meeroff** (2013). "Engineering Chemistry Laboratory Manual, 1st edition," Kendall Hunt Publishing Company. ISBN: 978-1-4652-1599-4.

[3] **D.E. Meeroff**, F. Gasnier, H. Hamaguchi, S. Jain, A. McBarnette, and R. Reichenbach (2011). "Technologies for Onsite Sustainable Leachate Management." Waste Advantage. February 2011: 20–24

[4] **D.E. Meeroff** (2011). "Engineering for Chemistry Students Laboratory Manual, 3rd edition," Cengage Learning Higher Education Publishing. ISBN-10: 1-133-4231-5; ISBN-13: 978-1-133-44231-8

SYNERGISTIC ACTIVITIES

- Development of middle school curriculum for STEM magnet schools, Broward County School Board.
- Expanding the student-centered undergraduate research culture across the curriculum.
- Development of learning-centered assessment tools in undergraduate engineering classes.
- Assessment of writing across the curriculum measures in junior level engineering laboratory coursework.
- Use of co-curricular activities to promote undergraduate research

COLLABORATORS AND OTHER AFFILIATIONS

Collaborators and Co-Editors:

Sharon Long, University of Wisconsin; Ali Zilouchian, FAU; Tim Townsend, University of Florida; John Schert, Hinkley Florida Center for Solid and Hazardous Waste Management; Kiran Tota-Maharaj, University of Dundee; F. Bloetscher, FAU; Tom Carsey, National Oceanographic and Atmospheric Administration; John Proni, Florida International University; D.V. Reddy, FAU, Jennifer Peluso, FAU; Kathy Dunn, FAU; Mirya Holman, FAU; Patrica Heydet-Kirsch, FAU; Donna Chamely-Wiik, FAU; Len Berry, FAU; Jim Murley, FAU

Graduate Advisors and Postdoctoral Sponsors

J.D. Englehardt, University of Miami; T.D. Waite, Ferrate Technologies; Helena Solo-Gabriele, University of Miami

Thesis Advisor and Postgraduate-Scholar Sponsor

Total 22 graduate students advised and 1 postgraduate scholar

F. Morin (Lyonnaise de Eaux), F. Gasnier (Lyonnaise de Eaux), T. Bocca (Cepemar Brasil), A. McBarnette (Montgomery Watson Harza), F. Youngman (Bohler Engineering), A. Albasri (2014), K. Kohn (2014), J. Bobsein (South Florida Water Management District), Amy Sirmans (St. Johns Water Management District)

Courses Taught

EGN2095-Engineering Chemistry (eLearning), EGN2095L-Engineering Chemistry Laboratory, ENV3011C-Environmental Science/Engineering with Laboratory, ENV4514-Water and Wastewater Technology, ENV3001L-Chemistry for Engineers Laboratory, CGN4803C-Civil Engineering Design 1, CGN4804C-Civil Engineering Design 2, ENV4001-Introduction to Environmental Engineering and Science, ENV6507-Wastewater Engineering (FEEDS), ENV6418-Water Supply and Treatment (FEEDS), ENV6668-Env. Systems and Processes (FEEDS)

Community Engagement or Out-reach

- FDEP Green Lodging Program Assessor (2006 – Present)
- Member, *FS/AWWA Research Advisory Committee*. (April 2006 – Present)
- Member, *FS/AWWA Biological Contaminants Committee*, (March 2006 – Present)

- Member, *FS/AWWA Water Quality Division Laboratory Services Steering Committee*, (November 2005 – Present)
- Committee Member, *Pollution Prevention Coalition Awards Committee* (August 26, 2005 – Present)

ABBREVIATED FACULTY CV
Sarah L. Milton, Ph.D.

PROFESSIONAL PREPARATION

Post-doctoral Fellow: Florida Atlantic University 1995-1996: Anoxia and Physiology
Ph.D.(1994), University of Miami Rosenstiel School of Marine and Atmospheric Science, Miami, Florida; Marine Biology and Fisheries (Biological Oceanography).
B.A. Biology (1988), magna cum laude, Cornell University, Ithaca, New York; Honors: With Distinction in all Subjects.

APPOINTMENTS

2011- Associate Professor, Biological Sciences, Florida Atlantic University
2006- 2011Assistant Professor, Biological Sciences, Florida Atlantic University
2005- Joint appointment, Assistant Professor, Dept of Biomedical Science, FAU
2005-2006 Visiting Assistant Professor, Biological Sciences, Florida Atlantic University
1996-2005 Research Assistant Professor and Adjunct Lecturer, Florida Atlantic University
1996-1997 Adjunct Lecturer, Palm Beach Community College
1995-1996 Postdoctoral Fellow, Florida Atlantic University
1994-1995 Senior Biologist, Evans Environmental and Geological Science and Management, Inc, Miami FL
1992 – 1996 Adjunct Lecturer, Florida Atlantic University

Selected Peer-Reviewed Publications

Larson J, Drew KL, Folkow LP, **Milton SL**, Park TJ. 2014. No oxygen? No problem! Intrinsic brain tolerance to hypoxia in vertebrates. J Exp Biol, 217(Pt 7):1024-39.

Sifuentes-Romero, I, Merchant-Larios, M**, Milton, SL**, Moreno-Mendoza, N, Díaz-Hernández, V, and García-Gasca, A. 2013. RNAi-mediated gene silencing in a gonad organ culture to study sex determination mechanisms in sea turtle. Genes, 4(2): 293 - 305.

Caplan SL, **Milton SL**, Dawson-Scully K. A cGMP-dependent protein kinase (PKG) controls synaptic transmission tolerance to acute oxidative stress at the *Drosophila* larval neuromuscular junction. J Neurophysiol. 2013 Feb;109(3):649-58.

Milton, SL, and Dawson-Scully, K. 2013. Alleviating brain stress: what alternative animal models have revealed about therapeutic targets for hypoxia and anoxia. Future Neurology, 8(3):287-301.

Nayak G, Prentice HM, **Milton SL**. 2011. Neuroprotective signaling pathways are modulated by adenosine in the anoxia tolerant turtle. J Cereb Blood Flow Metab. Feb;31(2):467-75.

GRANTS

National Oceanic and Atmospheric Administration Milton (PI) 9/1/11 – 8-31/15
ECOHAB: Brevetoxin metabolism and physiology - a freshwater model of morbidity in endangered sea turtles $643,000

American Federation of Aging Research Milton (PI) 7/1/08 – 12/31/10
Methionine sulfoxide reductase A and resistance to oxidative damage in an animal model of aging without senescence $60,000

NIH – NIA **Milton (PI)** **8/01/09-7/31/11**
Molecular mechanisms of oxidative stress resistance in an animal model of aging without senescence $213,413

Caribbean Conservation Corp Milton (PI) 6/1/10 – 5/31/11
Quantifying the energetic cost of disorientation in loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) hatchlings $15,957

Morris Animal Foundation Milton (PI) 12/1/10 – 11/30/12
Determination of Innate Immune Function in the Loggerhead (*Caretta caretta*) and Green (*Chelonia mydas*) Sea Turtle by Flow Cytometry $25,202

SYNERGISTIC ACTIVITIES

Symposium Chair: Anatomy, Physiology, and Health. 33rd, 34th, 35th Annual **Symposium** on Sea Turtle Biology, 2013, 2014, 2015
Reviewer: textbooks and numerous journals
2013 Univ. of Miami RSMAS: Coming Full Circle: Sea turtles to stroke research and back again. Invited talk
2012 Gordon Research Congress: Brain Energy Metabolism and Blood Flow, Colby College, ME (August 2012). Modulation of reactive oxygen species in the anoxia tolerant turtle. Invited talk
2011 Tenth International Congress of Neuroethology, University of Maryland, MD. Adaptations for long term anoxia tolerance reduce oxidative stress in the freshwater turtle *Trachemys scripta*. Invited talk

COLLABORATORS AND OTHER AFFILIATIONS

NOAA, Georgia Aquarium, Florida Fish and Wildlife Service, Mote Marine Laboratory

Courses Taught

Comparative Animal Physiology plus Lab (UG), Anatomy and Physiology (UG), Environmental Physiology (G), Marine Animal Physiology (G). Seminar in Marine Research (G), Seminar In Hypoxia (G). Respiratory Physiology (Med), Renal Physiology (Med)

Community Engagement or Out-reach

Classroom presentations on sea turtle biology: Morikami Elementary School, Boca Raton, FL, 2011.
Invited speaker Eco-Watch Lecture Series, Gumbo Limbo Nature Center, Boca Raton, FL, October 2011.
Classroom presentation (x2) on sea turtle biology and anoxia tolerance: Palmer Trinity High School, Miami, FL March, 2014

Jon A. Moore

Mailing Address: Florida Atlantic University
Wilkes Honors College
5353 Parkside Drive
Jupiter, FL 33458

Phone: (561) 799-8025
E-mail: jmoore@fau.edu

a. Education

Univ. Arizona	Geosciences	B.S., 1983
Univ. Arizona	Ecology & Evolutionary Biology	B.S., 1983
Yale University	Biology	M.S., 1987
Yale University	Biology	Ph.D., 1993

b. Appointments (*academic or professional appointments*)

2013-present, Professor of Biology, Wilkes Honors College, Florida Atlantic University
2005-2013, Associate Professor of Biology, Wilkes Honors College, Florida Atlantic University
2000-2005, Assistant Professor of Biology, Wilkes Honors College, Florida Atlantic University

1998-2000, NRC Post-doctoral Fellow, National Marine Fisheries Service, Woods Hole, MA.
1994-1997, Lecturer, Department of Ecology and Evolutionary Biology, Yale University

c. Research & Professional Experience

1995-pres. *Participant* on 22 oceanographic research cruises
2013-pres. *Consultant,* IUCN Caribbean Fishes Red List Assessment, Port of Spain, Trinidad
2012-pres. *Director at Large*, Board of Directors, Florida Native Plant Society
2011-pres. *Consultant*, Water Column Technical Working Group, NOAA Natural Resources Damage Assessment, New Orleans, LA
1995-pres. *Coordinator (no.158)*, Fishbase online database of fish taxonomy and ecology, expert for 8 families of Ateleopodiformes, Beryciformes, and Stephanoberyciformes fishes.
1994-pres. *Curatorial Affiliate*, Division of Vertebrate Zoology, Peabody Museum of Natural History, Yale University, New Haven, CT.
2011-2012 *Guest Editor*, Northeastern Naturalist journal
2000-2010 *Collaborator*, Census of Marine Life, Census of Seamounts and Gulf of Maine projects
2000-2009 *Board of Directors, Member*, Loggerhead Marinelife Center, Juno Beach, FL
2003-2005 *Contract Author*, United Nations Food and Agriculture Organization, for FAO Species Identification Guide for Fishery Purposes, Eastern Central Atlantic
2001-2004 *Associate Editor*, Journal of Northwest Atlantic Fishery Science.

d. Selected Publications *(undergraduate and graduate student names are in bold)*

Dornburg, A, J. A. Moore, J. M. Beaulieu, R. Eytan, and T. J. Near. In press. The impact of shifts in marine biodiversity hotspots on patterns of range evolution: evidence from the Holocentridae (squirrelfishes and soldierfishes). Evolution.

Dornburg, A., J. P. Townsend, B. Spriggs, R. I. Eytan, J. A. Moore, P. C. Wainwright, A. Lemmon, E. Lemmon, and T.J. Near. In press. Phylogenomic informativeness facilitates resolution of the sister lineage of percomorph fishes with an anchored hybrid enrichment dataset. Molecular Biology and Evolution.

Moore, J. A. and A. Dornburg. 2014. Ingestion of fossil seashells, stones, and small mammal bones by gopher tortoises (*Gopherus polyphemus*) in South Florida. Bull. Peabody Museum of

Natural History. 55(1):55-63.

Near, T. J., A. Dornburg, R. I. Eytan, B. C. Keck, W. L. Smith, K. L. Kuhn, J. A. Moore, S. A. Proce, F. T. Burbrink, M. Friedman, and P. C. Wainwright. 2013. Phylogeny and tempo of diversification in the superradiation of spiny-finned fishes. Proceedings of the National Academy of Sciences 110(31):12738-12743.

Near, T. J. R., I. Eytan, A. Dornburg, K. L. Kuhn, J. A. Moore, M. P. Davis, P. C. Wainwright, M. Friedman, and W. L. Smith. 2012. Resolution of ray-finned fish phylogeny and timing of diversification. Proceedings of the National Academy of Sciences 109(34):13698-13703.

Dornburg, A**,** J. A. Moore, R. Webster, D. L. Warren, M. C. Brandley, T. Iglesia, P. C. Wainwright and T. J. Near. 2012. Molecular phylogenetics of squirrelfishes and soldierfishes (Beryciformes, Holocentridae): reconciling more than 100 years of taxonomic confusion. Molecular Phylogenetics and Evolution 65:727-738.

Moore, J. A. 2012. Notes on the biology of the fragrant prickly apple cactus (*Harrisia fragrans*). Palmetto 28(4):4-7.

Moore, J. A. and K. Dodd. 2010. A new species of the roughy genus *Hoplostethus* (Teleostei: Trachichthyidae) from the Philippine Islands. Bulletin of Peabody Museum of Natural History (Yale University) 51(1):137-144.

Moore, J. A., **M. Strattan**, and **V. Szabo**. 2009. Evidence for year-round reproduction in a population of the gopher tortoise from southern Florida. Bulletin of Peabody Museum Natural History (Yale University) 50(2):387-392.

Moore, J. A. 2008. Arboreality in the northern curlytail lizard (*Leiocephalus carinatus armouri*). Journal of Kansas Herpetology 28:17-18.

Moore, J. A., P. J. Auster, D. Calini, K. Heinonen, K. Barber, and B. Hecker. 2008. The false boarfish, *Neocyttus helgae*, in the western North Atlantic. Bulletin of the Peabody Museum of Natural History (Yale University) 49(1):31-41.

Meshaka, W. E., Jr., H. T. Smith, E. Golden, J. A. Moore, S. Fitchett, E. M. Cowan, R. M. Engeman, **S. R. Sekscienski**, and H. L. Cress. 2007. Green iguanas (*Iguana iguana*): unintended consequence of sound wildlife management practices in a South Florida park. Herpetological Conservation and Biology 2(2):149-156.

Meshaka, W. E., H. L. Cress, **K. L. Kingsland**, H. T. Smith, S. A. Fitchett, J. A. Moore and E. M. Cowan. 2006. *Hemidactylus* (house gecko) assemblage dynamics on South Florida buildings. Journal of Kansas Herpetology 17:14-15.

Wetterer, J. K. and J. A. Moore. 2005. Fire ants on gopher tortoise burrows in southern Florida. Florida Entomologist 88(4):349-354.

Goethel, C. A., H. T. Smith, and J. A. Moore.2007. *Ophisaurus ventralis* (Eastern Glass Lizard). A review of road-kill mortalities and occurrence in Florida with notes on an unusual event. Journal of Kansas Herpetology 22:13.

Marti, D, W. O'Brien, H. Smith, J. Moore, and S. Fitchett. 2005 Endangered species, prescribed fires, and public resistance in a Florida scrub community. Endangered Species Update 22(1):18-28.

e. Mentoring *(undergraduate and graduate students)*

Honors thesis supervisor for 60 bachelors honors theses and second reader for additional 32 honors theses. Supervisor for 7 M.S. students, committee member for 5 others. Committee member for 3 Ph.D. students.

ERIK G. NOONBURG, ABBREVIATED FACULTY CV

PROFESSIONAL PREPARATION

A.B. 1994. University of Chicago. Biology (with honors).
Ph.D. 2000. University of California, Santa Barbara. Department of Biological Sciences.
2000-2003. Postdoctoral Fellow, University of Toronto, Dept. of Zoology.
2003-2005. Postdoctoral Fellow, University of Alberta, Centre for Mathematical Biology.
2005-2006. Research Associate, University of California, Santa Barbara, Dept. of Ecology, Evolution, and Marine Biology.

APPOINTMENTS

2006-2012. Assistant Professor, Dept. of Biological Sciences, FAU.
2012-present. Associate Professor, Dept. of Biological Sciences, FAU.

SELECTED PEER-REVIEWED PUBLICATIONS

Naudot, V., Noonburg, E.G. 2013. Predator-prey systems with a general non-monotonic functional response. *Physica* D, 253: 1-11.

Welicky, R.L., Wyneken, J., and Noonburg, E.G. 2011. A retrospective analysis of sea turtle nest depredation patterns. *Journal of Wildlife Management*, 76:278-284.

Noonburg, E.G., Nisbet, R.M., and Klanjscek, T. 2010. Effects of life history variation on vertical transfer of toxicants in marine mammals. *Journal of Theoretical Biology*, 264: 479-489.

Shima, J.S., Noonburg, E.G., and Phillips, N.E. 2010. Life history and matrix heterogeneity interact to shape metapopulation connectivity in spatially structured environments. *Ecology*, 91: 1215-1224.

Byers, J.E., and Noonburg, E.G. 2007. Poaching, enforcement, and the efficacy of marine reserves. *Ecological Applications*, 17:1851-1856.

SELECTED OTHER PUBLICATIONS OR PRODUCTS/GRANTS

Beerens, J., Noonburg, E.G., and Gawlik, D.E. 2013. Wading Bird Evaluation Team/Assessment Team Model Integration and Development. Final report to the U.S. Army Corps of Engineers.

Van der Heiden, S., Owen, D., and Noonburg, E.G. 2010. Tree Islands – Surrounding Marsh Eco-Hydrologic Relationship: Soil Thickness and Plant Species Composition on Tree Islands in the Central Everglades. Final Report to the South Florida Water Management District.

Volin, J., Noonburg, E.G., Volin, V. and Owen, D. 2008. Development of a Sampling Prioritization Model to Optimize the Selection of Tree Islands in WCA-3A and 3B for Surveying of *Lygodium microphyllum*. Final Report to the Florida Fish and Wildlife Conservation Commission.

SYNERGISTIC ACTIVITIES

Reviewer for: American Naturalist, Conservation Biology, Ecological Applications, Ecology, Ecology Letters, Journal of Animal Ecology, Oecologia, PLoS Biology, Proceedings of the Royal Society B, Theoretical Ecology, Theoretical Population Biology.

COLLABORATORS AND OTHER AFFILIATIONS

Recent collaborators:
V. Naudot, Dept. of Mathematical Sciences, FAU
J. Byers, Odum School of Ecology, U. of Georgia
J. Shima, School of Biological Sciences, Victoria University of Wellington, New Zealand
S. Swearer, Dept. of Zoology, U. of Melbourne, Australia

Courses Taught

EVS 6920 Environmental Sciences Colloquium
PCB 6406 Ecological Theory
BSC 6937 Ecology Research Seminar
STA 3173 Introduction to Biological Statistics

Community Engagement or Out-reach

Science Communication Fellow, Patricia & Phillip Frost Museum of Science

Curriculum Vitae
Virginia Dianne Owen

Environmental Science Program		Office:	(561)-297-0873
Department of Biological Sciences		Cell:	(954) 592-4280
Florida Atlantic University		FAX:	(561) 297-2749
777 Glades Road		E-mail:	dowen@fau.edu
Boca Raton, FL 33431			

PROFESSIONAL PREPARATION

• B.S. (1976) University of Florida, Department of Zoology, Gainesville, FL, Major: Zoology

• Ph.D. (1983) University of Lausanne, Department of Biochemistry, Lausanne, Switzerland
with Certification in Biochemistry (1979) and Human Physiology (1978)
Dissertation title: Integration and Expression of Mouse Mammary Tumor Virus

•Post-doctoral Fellow (1983-1984) Wistar Institute, University of Pennsylvania, Philadelphia, PA

PROFESSIONAL APPOINTMENTS

Florida Atlantic University, Boca Raton, FL
•Coordinator, Environmental Science Program, July 2006 – present.
Research Scientist, Biological Sciences, Florida Atlantic University, Boca Raton, FL, August 2014 – present.
• Research Associate, Department of Biological Sciences, May 2000 – June 2006.
• Visiting Professor of Biology, Division of Science, College of Liberal Arts, August 1999-May 2000.
Courses taught: Issues in Human Ecology, Vascular Plant Anatomy, Principles of Ecology, Genetics

Stranahan High School, Science Magnet Program, Broward County, FL
Biotechnology Instructor, July 1998 – May 1999.

Department of Wildlife Ecology and Conservation, University of Florida , Davie, FL
Research Manager, 1995 - 1998.

Securities Research and Management, Inc., Fort Lauderdale, FL
Vice-President of Research, 1990-1994.
Manager Information Systems, 1987-1989.

Swiss Institute of Experimental Cancer Research, Genetics Division, Lausanne, Switzerland
Research Associate, 1984-1987.

SELECTED PUBLICATIONS AND PRESENTATIONS

Owen, D., S. van der Heiden, J. Dee and E. Wood (2010). *The effect of hydrology, fire regime and exotic invasion on the post-burn successional trajectory of plant communities in the Big Cypress National Preserve.* Greater Everglades Ecosystem Restoration Science Conference, Naples, Florida.
Liu, Z., J. C. Volin, V. D. Owen, L. G. Pearlstine, J. R. Allen, F. J. Mazzotti, and A. L. Higer. 2009. Validation and ecosystem applications of the EDEN water-surface model for the Florida Everglades. *Ecohydrology.* 2:182-194.

Integrated Invasive Species Management Plan, Seminole Tribe of Florida (2009) Ferriter, A., Owen, D., Volin, J., Jacobs, A.

T. J. Givnish, J. C. Volin, V. D. Owen, V.C. Volin, J. D. Muss and P. H. Glaser. 2008. Vegetation differentiation in the patterned landscape of the central Everglades: importance of local and landscape drivers. *Global Ecololgy and Biogeography*. 17:384-402.

Jacobs, Alyssa, John C. Volin and Dianne Owen, (2006). *Nutrient Limitation in a Forested Wetland on the Big Cypress Seminole Indian Reservation*, Greater Everglades Ecosystem Restoration Science Conference, Orlando, Florida.

Volin, J.C., M.S. Lott, J.D. Muss and D. Owen. 2004. Predicting rapid invasion of the Florida Everglades by Old World Climbing Fern (*Lygodium microphyllum*). *Diversity and Distributions*. 10: 439-446.

FUNDED RESEARCH

Topographic Models of Everglades Tree Islands, $49,815. South Florida Water Management District, 2009-2010.

Paleoecological Analysis of Tree Islands $45,271. South Florida Water Management District, 2009-2010.

Role of invasive exotic species on post-fire succession in the Big Cypress. $7,555. National Park Service, FAU Everglades Fellowship Program, 2009.

Macrofossil Paleoecology of Everglades Tree Islands, $36, 978. South Florida Water Management District, 2008-2009.

Surveys of Lygodium microphyllum in Everglades Tree Islands. $144,650. Florida Fish and Wildlife Conservation Commission. 2008-2009

Hydrology of Everglades Tree Islands. $49,644. South Florida Water Management District, 2008-2009.

Setting Remote Monitoring Stations for the Everglades Depth Estimation Network. $5,000. U.S. Geological Survey. 2007-2008.

PROFESSIONAL AFFILIATIONS

Society of Human Ecology, Member 2011-present
Florida Exotic Pest Plant Council: Secretary 2004-2009, Treasurer 2009-present
The Wildlife Society, Member 2012-present

COMMUNITY ENGAGEMENT AND SYNERGISTIC ACTIVITIES

<u>Faculty Mentor, Academic Service Learning Courses and Volunteer Programs</u>
Elementary Student STEM Program in the Community Garden; 2011-present
Alternative Spring Break, Collier-Seminole State Park; 2014
Citizen Science Program Jay Watch, Jonathan Dickinson State Park; 2012-2013
Broward County Gopher Tortoise Monitoring; 2013-present
Pine Jog Environmental Education Center, Invasive Species Management, 2012-present

COLIN D. POLSKY, PHD

Professional Preparation

The University of Texas at Austin	B.S., B.A., 1994 (Mathematics, Humanities, French)
The Pennsylvania State University	M.S., 1998; Ph.D., 2002 (Geography)
Harvard University	Postdoctoral Fellow, 2001-03 (Science & International Affairs)

Appointments

Director, Center for Environmental Studies, and Professor of Geosciences, Florida Atlantic University, 2014 – present; Associate Professor, Clark University School of Geography, 2009 – 2014; Associate Dean for Undergraduate Research and Active Pedagogy, Clark University, 2010 – 2012; Assistant Professor, School of Geography, 2003 – 2009

Selected Relevant Products (five maximum)

- **Polsky, C.**, J. Morgan Grove, Chris Knudson, Peter M. Groffman, Neil Bettez, Jeanine Cavender-Bares, Sharon Hall, James Heffernan, Sarah Hobbie, Kelli Larson, Jen Morse, Christopher Neill, Kristin Nelson, Laura Ogden, Jarlath O'Neill-Dunne, Diane Pataki, Meredith Steele, and Rinku Roy Chowdhury, 2014. "Assessing the Homogenization of Urban Land Management with an Application to US Residential Lawncare." Proceedings, National Academy of Sciences 111(12) 4432-4437. DOI:10.1073/pnas.1323995111.
- Brown, D. G., **C. Polsky**, P. Bolstad, S. D. Brody, D. Hulse, R. Kroh, T. R. Loveland, and A. Thomson, 2014. "Ch. 13: Land Use and Land Cover Change." In: Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program. URL: http://nca2014.globalchange.gov/report/sectors/land-use-and-land-cover-change .
- Runfola[*], D., **C. Polsky**, C. Nicolson, N.M. Giner[*], R.G. Pontius, and A. Decatur[*], 2013. "A growing concern? Examining the influence of lawn size on residential water use in suburban Boston, MA." *Landscape and Urban Planning* 119:113-123. DOI: dx.doi.org/10.1016/j.landurbplan.2013.07.006.
- Harris[*], E. M., **C. Polsky**, K. Larson, R. Garvoille[*], D.G. Martin, J. Brumand[*], and L. Ogden, 2012. "Heterogeneity in Residential Yard Care: Evidence from Boston, Miami, and Phoenix." *Human Ecology* (40):735-749. DOI: 10.1007/s10745-012-9514-3.
- **Polsky, C.**, R. Neff, and B. Yarnal, 2007. "Building Comparable Global Change Vulnerability Assessments: The Vulnerability Scoping Diagram." *Global Environmental Change*, 17: 472-485.

Other Selected Products (five maximum)

- Larson, K.L, **C. Polsky**, P. Gober, H. Chang, and V. Shandas, 2013. "Vulnerability of water systems to climate change and urbanization: A comparison of Phoenix, Arizona and Portland, Oregon (USA)." Environmental Management 52(1): 179-195.
- Hill[*], T. and **C. Polsky**, 2007. "Development and drought in suburbia: A mixed methods rapid assessment of vulnerability to drought in rainy Massachusetts." *Global Environmental Change: Environmental Hazards,* 7:291-301.
- Schröter, D., **C. Polsky**, and A. Patt, 2005. Assessing Vulnerabilities to the Effects of Global Change: An Eight-Step Approach. *Mitigation and Adaptation Strategies for Global Change*, 10(4): 573-595.
- **Polsky, C.**, 2004. "Putting Space and Time in Ricardian Climate Change Impact Studies: The Case of Agriculture in the U.S. Great Plains." *Annals of the Association of American Geographers*, 94(3): 549-564.
- Turner, B.L., R.E. Kasperson, P. Matson, J.J. McCarthy, R.W. Corell, L. Christensen, N. Eckley, J.X. Kasperson, A. Luers, M. Martello, **C. Polsky**, A. Pulsipher & A. Schiller, 2003. A Framework For Vulnerability Analysis In Sustainability Science. *Proceedings, National Academy of Sciences*, 100 (14): 8074-8079.

[*]*Indicates student co-author*

Current and Recent Synergistic Activities

1. Co-Convening Lead Author, "Land-Use & Land-Cover Change" Chapter: U.S. Global Change Research Program.

2. PI, NSF projects: REU Site, CNH, LTER Social Science Supplement. Responsibilities include strategizing & executing research in multi-site, multi-disciplinary teams, and managing & recruiting local team of ~30 people per year, on topics of socio-ecological dimensions of suburbanization.
3. co-PI, NSF projects: ULTRA-ex, MACRO-BIO, PIE-LTER, DMUU, RCN: exploring Metro Boston current and future suburban ecologies in multiple US metropolitan areas.
4. Committee Member: National Academies of Science/National Research Council (NAS/NRC), Committee on Strategic Directions for the Geographical Sciences in the Next Decade, February 2008 – April 2010.
5. Associate Dean, Clark University, 2011–2012: co-leader for the development and implementation of new campus-wide, team-based undergraduate research programs.

Collaborators and Other Affiliations (past 48 months)

Alber, Merryl, U. of Georgia; Assefa, Sarah (undergrad co-author, present location unknown); Bettez, Neil, Cary Institute; Brumand, Jaleila, Arizona St U; Butler Harrington, Lisa, Kansas State U.; Cavender-Bares, J., U. Minnesota; Chang, Heejun, Portland St. U.; Christensen, L., current affiliation unknown; Clark, William C., Harvard University; Comrie, Andrew, U. of Arizona; Corell, Robert, American Meteorological Society/Heinz Center; Del Vecchio, Kate (undergrad co-author, present location unknown); DeLauer, Verna, Clark U.; Denhart, Lillie, Clark U; Easterling, William, The Pennsylvania State University; Eckley, N., current affiliation unknown; Garvoille, Rebecca, Florida International U; Giner, Nicholas, Clark U; Gober, Pat, Arizona St. U.; Groffman, P.M., Cary Institute; Grove, J. Morgan, US Forest Service; Hall, Sharon, Ariz. St. U.; Harrington, John, Kansas State U.; Harrington, Lisa, Kansas State U.; Harris, Edmund, Clark U.; Heffernan, J., Duke U.; Hill, Troy, Yale U.; Hobbie, Sarah, U. Minnesota; Hopkinson, Charles, University of Georgia; Kasperson, Roger, Clark University; Larson, Kelli, Arizona State University; Martin, Deborah, Clark U; Merner, Laura, U.-Maryland, Baltimore County; Morse, Jen, Cary Institute; Neff, Rob, University of Maryland-Baltimore County; Nehring, Abbie, Bard College at Simon's Rock; Neill, Chris, MBL; Nelson, Kristen, U. Minnesota; Nicolson, Craig, U. Mass.-Amherst; Ogden, Laura, Florida International University; O'Neil-Dunne, Jarlath, U. Vermont; Onsted, Jeff, Florida International University; Pataki, Diane, U. Utah; Patt, Tony, Potsdam Institute for Climate Impact Studies (Germany); Pontius, R. Gil, Clark U.; Pulsipher, A., current affiliation unknown; Rogan, John, Clark U.; Roy Chowdhury, Rinku, Indiana University; Runfola, Dan Miller, National Center for Atmospheric Research, CU-Boulder; Ryan, Robert, U. Mass.-Amherst; Schiller, Andrew, current affiliation unknown; Schroeter, Dagmar, Potsdam Institute for Climate Impact Studies (Germany); Shandas, Vivek, Portland St. U.; Sorrensen, Cindy, Texas Tech U.; Steele, Meredith, Duke U.; Strauss, Eric, Boston College; Tuler, Seth, Social and Environmental Research Institute; Turner, Billie, Arizona St. U.; Vorosmarty, Charles, University of New Hampshire; Warren, Paige, U. Mass.-Amherst; Webler, Tom, Social and Environmental Research Institute; Wollheim, Wil, University of New Hampshire; Yarnal, Brent, The Pennsylvania State University.

Graduate Advisor: Professor William E. Easterling, III, The Pennsylvania State University
Postdoctoral Advisors: Professor William C. Clark, Harvard University, Dr. Robert W. Corell, American Meteorological Society/Heinz Center

Theses Advised (last 5 years; 15 total):

N. Giner (PhD, Clark U. Geography); D. Runfola (PhD, Clark U. Geography; now at CU-Boulder); S. Danielson (PhD, Clark U. Geography; now at Slippery Rock U.); H. Pearsall (PhD, Clark U. Geography; now at Temple U.); C. Guido (MA, Clark U. Environmental Science & Policy); D. Greene (MA, Clark U. Environmental Science & Policy); J. Bowen (MA, Clark U. Environmental Science & Policy); M. Gonzales (MA, Clark U. Environmental Science & Policy); D. Gedenberg (MA, Clark U. Environmental Science & Policy); A. Guha (MA, Clark U. Geography); T. Hill (BA, Clark U. Environmental Science & Policy; now at Yale U.); K. Del Vecchio (BA, Clark U. Environmental Science & Policy); L. DeVeber (BA, Clark U. Geography); N. Rao (BA, Clark U. Economics; now at U. Maryland); S. Nelson (BA, Clark U. Geography)

C. Edward Proffitt

PROFESSIONAL PREPARATION

Ph.D., Biology, 1983. University of South Florida, Tampa, FL.
M.S., Biology, 1977. East Carolina University, Greenville, NC.
B.S., Biology. 1971. University of Miami, Coral Gables, FL.

APPOINTMENTS (MOST RECENT THREE)

April 2005 - Present. Associate Professor, Department of Biological Sciences, Florida Atlantic University located at Harbor Branch Oceanographic Institution campus, Ft. Pierce, FL.
July 1998 – March 2005. Chief, Wetlands Ecology Branch, National Wetlands Research Center (USGS, Biological Resources Discipline), Lafayette, LA
May 1995 – June 1998. Director, Louisiana Environmental Research Center, McNeese State University, Lake Charles, LA.

Selected Peer-Reviewed Publications

Aqunio-Thomas, J. and C.E. Proffitt. 2014. Oysters (*Crassostrea virginica)* on Red Mangrove (*Rhizophora mangle*) Prop Roots: Interactions among Foundation Species. Marine Ecology Progress Series 503: 177-194.

Proffitt, C.E. and S.E. Travis. 2014. Red Mangrove Fitness and Climate Change: Roles of Stress, Outcrossing, and Mutation Rate. Evolutionary Ecology.

Zettler, M.L. , C.E. Proffitt, P. Magni, G.V. Hoey, M. Frazier, A. Darr, H. Reiss, S. Degraer, G. Martin, D. Tagliapietra, T. Ysebaert, C. Greathead. 2013. On the myths of indicator species. PLoS ONE 8(10): e78219. doi:10.1371/journal.pone.0078219.

Proffitt, C.E. and S.E. Travis. 2010. Red Mangrove Seedling Survival, Growth, and Reproduction: Effects of Environment and Maternal Genotype. Estuaries and Coasts. 33(4):890-901.

SELECTED OTHER PUBLICATIONS OR PRODUCTS/GRANTS

FIO grant to study oysters in the wake of the BP Deepwater Horizon oil spill. Paper in prep. NOAA Stimulus funding through Martin County to study oyster population and associated invertebrate restoration in the St. Lucie estuary. Paper listed below currently in review. E. Salewski is former FAU ES grad student.

Salewski, E. and C.E. Proffitt. In review. Stress Gradients and Disturbance Interaction Influences Oyster Population Development on Restored Reefs. Estuaries and Coasts.

NSF-EpSCOR project with A. Stafford (University of Virgin Islands) and D. Devlin (FAU) to study population genetics of red mangroves using microsatellite markers. J.P. Kennedy (Devlin, major advisor) did work for masters degree on this topic. Journal article in prep.

SYNERGISTIC ACTIVITIES

I teach a graduate class in Experimental Design and Biometry and have organized several statistical Workshops for FAU, for example, Model Selection and Multi-model Inference [David Anderson, instructor]; and, Structural Equation Modeling [Jim Grace, instructor].I have consulted on biometry and design for Applied Biology, Inc. and aided numerous faculty and students with design and analysis.

I am one of two members of the Benthic Ecology Working Group of International Council for the Exploration of the Sea (ICES). The Zettler et al. journal article listed above comes from this association.

I was until recently an Associate Editor of the journal WETLANDS.

COLLABORATORS AND OTHER AFFILIATIONS

Affiliate Scientist with the Smithsonian Marine Station.

D.J. Devlin, Florida Atlantic University
I. Feller, Smithsonian Environmental Research Center
S. Chapman & A. Langley, Villanova University
K. McKee, USGS National Wetlands Research Center
B. Middleton, USGS National Wetlands Research Center
S. Travis, University of New England - Maine
E. Milbrandt, Marine Research Lab, Sanibel-Captiva Conservation Foundation
A. Stafford, University of the Virgin Islands

Courses Taught

Experimental Design and Biometry (graduate)
Advanced Analysis of Biological Data (graduate)
Marine Ecology (graduate & undergraduate [Semester-by-the-Sea program]
Scientific Communications (graduate)
Coastal and Marine Restoration Ecology (graduate)
Marine Community Dynamics (graduate)
Genetic Ecology (graduate)

Community Engagement or Outreach

Occasional lectures in HBOI Ocean Science Lecture Series for the general public
Seminar to the Florida Association of Environmental Professionals

ABBREVIATED FACULTY CV (MAXIMUM 2 PAGES)

LIANFEN QIAN

PROFESSIONAL PREPARATION

1996/08	Ph.D. in Statistics, Michigan State University, East Lansing, MI.
1989/05	M.S. in Statistics, Hangzhou University, Zhejiang, China.
1984/05	B.S. in Mathematics, Dept. of Math., Zhejiang University (Xixi Campus)

APPOINTMENTS

2002-present	Professor/Associate Professor, Dept of Mathematical Sciences and Environmental Science Program, FAU.
1996-2002	Assistant Professor, Department of Mathematical Sciences and Environmental Science Program, FAU.
1993-1996	Research, Teaching Assistant and Statistical Consultant, Department of Statistics and Probability, Michigan State University (MSU)
1991-1993	Teaching Assistant, Department of Mathematics, MSU.
1984-1991	Lecturer, Department of Mathematics, Zhejiang University (Xixi Campus).

(Selected) Publications (last 7 years)

2014 QIAN, L.F., WEI ZHANG AND ZHONGWEI LI, ESSENTIAL GENE IDENTIFICATION FOR A MICROARRAY DATA OF YERSINIA PESTIS, ACCEPTED BY *IEEE BIBE 2014*.

2014 QIAN, L.F. AND WEI ZHANG, MULTIPLE CHANGE-POINT DETECTION IN PIECEWISE EXPONENTIAL HAZARD REGRESSION MODEL WITH LONG-TERM SURVIVORS AND RIGHT CENSORING, *CONTEMPORARY DEVELOPMENTS IN STATISTICAL THEORY, A FESTSCHRIFT FOR HIRA LAL KOUL,SPRINGER PROCEEDINGS IN MATHEMATICS & STATISTICS*, VOLUME 68(2014), 289-304.

2014 WEI ZHANG, QIAN, L. F. AND YUNXIA LI, SEMIPARAMETRIC SEQUENTIAL TESTING FOR MULTIPLE CHANGE POINTS IN PIECEWISE CONSTANT HAZARD FUNCTIONS WITH LONG-TERM SURVIVORS. *COMMUNICATIONS IN STATISTICS – SIMULATION AND COMPUTATION*, 43 (2014), 1685-1699.

2014 LI, Y.X. AND QIAN, L.F., LIKELIHOOD RATIO TEST FOR A PIECEWISE CONTINUOUS WEIBULL MODEL WITH AN UNKNOWN CHANGE POINT, *JOURNAL OF MATHEMATICAL ANALYSIS AND APPLICATIONS*, 412(1) (2014), 498-504.

2013 CHANG, F.Z. AND QIAN, L.F., MAXIMUM LIKELIHOOD ESTIMATOR OF AUC FOR A BI-EXPONENTIATED WEIBULL MODEL, *ISRN PROBABILITY AND STATISTICS*, HTTP://DX.DOI.ORG/10.1155/2013/965972.

2013 Li,Y.X.; Qian,L.F. and Zhang,W., Estimation in a change-point hazard regression model with long-term survivors, *Statistics & Probability Letters*, 83 (2013), 1683-1691.

2013 Long, H.W. and Qian, L.F., Nadaraya-Watson estimator for stochastic processes driven by stable Levy motions, *Electronic Journal of Statistics*,7 (2013), 1387-1418.

2012 Qian, L.F. (Joint with Sara Schesser Bartra, et al.) The outer membrane protein A (OmpA) of Yersinia pestis promotes intracellular survival and virulence in mice. *Microbial Pathogenesis* 52 (2012), no 1. 41-46.

2012 Qian, L.F. Fisher information matrix for three-parameter exponentiated-Weibull distribution under type II censoring. *Statistical Methodology*. 9 (2012) 320-329.

2010 Qian, L.F., Yao, Q.C. and Khoshgoftaar, T.M. Dynamic two-phase truncated Rayleigh model for release date prediction of software. *Journal of Software Engineering and Applications*. 3 (2010), no. 6, 603-609.

2010 Wang, S.J., Qian, L.F. and Carroll, R.J. Generalized empirical likelihood methods for analyzing longitudinal data. *Biometrika*. 97 (2010), no. 1, 79-93.

2010 Liu, Z. and Qian, L.F. Change-point estimation in a segmented linear regression model via empirical likelihood. *Statistical Simulation and Computation*, Vol. 39, (2010), 85-100.

2008 Heilmayer, O., Digialleonardo, J., Qian, L.F. and Roesijadi, G. Stress tolerance of a subtropical Crassostrea virginica population to the combined effects of temperature and salinity. *Estuarine, Coastal and Shelf Scienc*e (2008), doi:10.1016/j.ecss.2008.03.022. In press. 79 (2008), 179-185.

2008 Diaz, N., Lizardi, H., Qian, L.F. and Liu, Z. The relationship between different types of childhood abuse and a history of major depressive disorder in a sample of Latino College students. *Journal of Aggression, Maltreatment and Trauma*. 17 (2008) no. 2, 175-196.

2008 Lai, T. L., Qian, L.F. and Shao, Q.M. *Asymptotic theory in probability and statistics with applications*, Advanced Lectures in Mathematics (ALM), 2. International Press, Somerville, MA; Higher Education Press, Beijing, 2008. vi+533 pp. ISBN: 978-1-57146-169-8

2007 Qian, L.F. Piecewise Regression Models: Estimation Theory and Applications. *Probability and Statistics with Applications* (editors: Lai, T.L, Qian, L.F. and Shao, Q.M.), 309-341. Adv. Lect. Math. (ALM), 2, Int. Press, Somerville, MA.

GRANTS (PROPOSALS AND FUNDED) (LAST 7 YEARS)

2014 Simons Foundation Collaboration Grants for Mathematicians, $35,000, rejected.

2013 FAU Technology Fee Project Proposal, jointly with Lee, Roger and Emily, $73,230.

2009 USA DOD contract grant for bacteria gene functionality classification project, $5,000.

2008 Helped on NCCI research fund for ¼ RA.

SYNERGISTIC ACTIVITIES

2013-2014 Proposal to build the undergraduate major in Statistics and working on international partner programs for both undergraduate and graduate students.

COLLABORATORS AND OTHER AFFILIATIONS

- Collaborators:
  - Statisticians: Drs. Hira Koul, Donatas Surgailis, Raymond Carroll, Suojing Wang, Zhongwu Cai, Qiman Shao, Tze-Leung Lai, Soyoung Ryu, Heirich Niederhausen, Wei Zhang, Yunxia Li, Hongwei Long, Jose Correa, Zhihua Liu, Fazhe Chang
  - Engineers: Taghi Khoshgoftaar, Qingchuan Yao, Mohammad Ilyas, Sam Hsu
  - Biologists: Guri Roesijadi, Zhongwei Li, Dan Austin
  - Social Scientist: Naelys Diaz.

(Selected) Courses Taught (last 7 years)

- Undergraduate Statistics Courses Taught:
  STA 2023 Introductory Statistics — STA 3173 Introduction to Biostatistics
  STA 4102 Computational Statistics 1 — STA 4234/4202L Applied Statistics 1
  STA 4442 Probability and Statistics 1 — STA 4443 Probability and Statistics 2
  STA 4032 Probability and Statistics for Engineers
- Graduate Statistics Courses Taught:
  STA 5195/4906 Biostatistics — STA 6326 Mathematical Statistics
  STA 6446 Regression Analysis — STA 6446 Computational Statistics
  STA 6857/4930 Applied Time Series — STA 6206 Stat. Methods for Environ. Sciences
  STA 6208/4930 Applied Statistical Methods
  STA 6907 Internship — STA 6907 Longitudinal Data Analysis (DIS)
  STA 6907 Analysis of Categorical Data (DIS)
  STA 6907 Survival Analysis and Clinical Trials (DIS)
- Others Courses: MAT 7978 Adv. Resch in Math. MAT 7980 Dissertation
  MAT 6971 Master's Thesis

Community Engagement or Out-reach

- Reviewer for the American Mathematics Reviews, Technometrics and many statistical journals.
- Statistical consultant for students and researchers from Florida Atlantic University and the community.
- Undergraduate advisor for Statistics minor and certificate programs

- Board Member of CASEC: Chinese Association of Science Economics & Culture of South Florida, 2011-Present
- Principal of CCSSF-PBC：The Contemporary Chinese School of South Florida -- Palm Beach Campus, 2011-Present

Vitae

Charles E. Roberts Date of Birth: April 3, 1953
Place of Birth: Houston, Texas

Degrees:

PhD. (Geography) The Pennsylvania State University, 1992.
"Textural Analysis of Urban Thematic Mapper Data."
M.A. (Geography) The Pennsylvania State University, 1987.
"From Parkway to Freeway: Roadside Design before the Interstate, 1858-1956".
A.B. (Geography/Anthropology) Vassar College, 1983.
"Farmland Preservation in the Northeast."

Appointments:

First Year at FAU: Fall 1990
Tenured and Promoted to Associate Professor, 1996
Promoted to Associate Dean of Graduate Studies,
Charles E. Schmidt College of Science, 2011
Appointed to Interim Chair, Geosciences, Fall 2013

Selected Peer Reviewed Publications

Zhang, C., D. Selch, Z. Xie, C. Roberts, H. Cooper, and G. Chen, 2013. Object-based Benthic Habitat Mapping in the Florida Keys from Hyperspectral Imagery. *Estuarine, Coastal and Shelf Science*, 134, 88-97. (2013)
Zhang, C., Z. Xie, C. Roberts, and L. Berry, 2012 Salinity Assessment for Northeastern Florida Bay Using Landsat TM Data. Southeastern Geographer, Vol. 52, Number 3.
Delahunty, J.L, Phelps, Jack, Roberts, Charles and Sawicki, Ben,
2010 Quantification of Historical Urban Growth in a Dallas Suburb
Southwestern Geographer.
Mary Beth Crile and Charles Roberts,
2009 Paleoterrain Model of the Yamato Marsh, Palm Beach County. Florida,
International Geoscience and Remote Sensing Symposium Proceedings of the IEEE.
J.l.Delahunty, Charles Roberts, Gullian Breary,
2009 Arvida and the Planned Sprawl of West Boca Raton,Florida
Florida Geographer,Vol. 40, 2009.
Xie, Zhou, Charles Roberts and Brian Johnson
2008 Object based target search using remotely sensed data: A case study in detecting the invasive exotic Australian Pine in south Florida. ISPRS Journal of Photogrammetry and Remote Sensing.
Edward J. Petuch and Charles E. Roberts,
2007 The Geology of the Everglades and Adjacent Areas, CRC Press; Boca Raton

Selected Other Publications or Products/Grants

2008 "Nearshore Reef Analysis and Quantification project" $58,000. Funded

Teaching Experience Undergraduate Courses:

Map Analysis and GIS (now online, both graduate and undergraduate versions)
Geovisualization and Geographic Information Systems
Remote Sensing of the Environment (online now, both undergraduate and graduate versions)
Digital Image Analysis (online now, both undergraduate and graduate versions)
Introductory Physical Geography, emphasizing water resource issues
Field methods in the Mapping Sciences
Geography Field Camp
Regional Geography of U.S. and Canada
Urban Geography (online now)
American Cultural Landscapes (online now)
Human-Environmental Interactions in south Florida
Art, Architecture and Environment: The Cultural Landscape of Venice

Graduate Courses:

Cultural Geography Seminar, Field Camp,Advanced Remote Sensing, Research in the Geoscience
Human-Environmental Interactions. Historical Preservation

Synergistic Activity
Department Level
GIS Lab and Center Director, 1992-1996, 2006-2011
Graduate Program Chair 1991-1999
Graduate Program Coordinator 2006-2011
Undergraduate curriculum chair, 1991-1997,2001-2006
Graduate curriculum chair 1991-1999,2006-2011
Chair, College of Science graduate programs committee, 2006-2013
Science representative of the University Graduate Programs committee, 2006-2013
Contributions to New Program Creation and Implementation
Development of a PSM in GIS (in process)
Development of an MS in Coastal and Marine Science (in process)
Updated the Environmental Science MS degree, University
Environmental Certificate, Biology
GIS certificate, Geography
Advanced GIS certificate, Geoscience
Medical Physics Minor, Physics
PSM in Medical Physics, Physics
PSM in Business Biotechnology, Biology-Business College
Neuroscience Graduate Certificate, Complex Systems program
Geoscience PhD , Geosciences
College Level Committee Membership
Public Intellectuals PhD committee, Arts and Humanities, 1999
Graduate Environmental Certificate committee, Arts and Humanities, 1999
Graduate curriculum committee chair, 2006-2008, College of Science
Undergraduate curriculum committee, 2001-2006, College of Science
Environmental Science MS degree (college wide) curriculum chair
Strategic Planning Committee, 2011-2012

University Level Committee Membership

Member and Chair University, Environmental Affairs Committee, 1992-1996
Science representative , University Graduate Council, 2006-present
Science representative, University Graduate Programs Council, 2006-present
Provost Committee on SACS Credentialing, 2012-2013
Provost Strategic Planning committee 2011-2012, 2012-2013
Graduate College Academic Affairs Committee, 2009-2014

TARA L. ROOT, PH.D.
Associate Professor, troot@fau.edu, https://www.sites.google.com/site/drtararootshomepage/

PROFESSIONAL PREPARATION

- *Ph.D. in Geology*, August 2005
  Minor in Environmental Chemistry and Technology
  University of Wisconsin-Madison
- *M.S. in Geology, December 2000*
  University of Wisconsin – Madison
- *B.S. in Geological Engineering, June 1998*
  Colorado School of Mines – Golden, Colorado

APPOINTMENTS

- *Associate Professor and supervisor of Water Analysis Lab,* August 2013– Present
  Department of Geosciences, FAU
- *Assistant Professor, August 2006 – August 2013*
  Department of Geosciences, FAU
- *Visiting Assistant Professor*, August 2005 – August 2006
  Department of Geosciences, FAU
- *Graduate Teaching Assistant/Research Assistant*, August 2002-August 2004
  Department of Geology and Geophysics, University of Wisconsin – Madison
- *Fellow, September 1999 – August 2002*
  U.S. Department of Energy, Office of Civilian Radioactive Waste Management Fellowship Program at the University of Wisconsin – Madison (included three months of research at Los Alamos National Laboratory, NM)

Selected Peer-Reviewed Publications (Bold font indicates student author)

Survis, F. and Root, T. 2012. Evaluating the effectiveness of water restrictions: A case study from southeast Florida. *Journal of Environmental Management* 112:377-383.

Root, T. and **Survis, F.D.** 2012. Human-climate-water interactions in the context of managing Florida's water supplies. *The Florida Geographer* 43:4-16.

Kuhn, T. and Root, T., 2012. Environmental controls on the distribution and vigor of an endangered grass (*Panicum abscissum* Swallen).

Root, T., Gotkowitz, M., Bahr, J., and Attig, J. 2009. Arsenic geochemistry and hydrostratigraphy in Midwestern U.S. glacial deposits. *Ground Water* 48:903-912.

Lakhan, S., Root, T., and Fadiman, M. 2009. Household water in northern Trinidad: Source, collection, storage, and socioeconomics. *The Florida Geographer* 40:48-61.

SELECTED OTHER PUBLICATIONS OR PRODUCTS/GRANTS

Root, Tara (2014) "Book Review: Review of Groundwater for the 21st Century: A Primer for Citizens of Planet Earth." *Groundwater*, 52: 647-648.

Berry, L., Bloetscher, F., Hernández Hammer, N., Koch-Rose, M., Mitsova-Boneva, D., Restrepo, J., Root, T., Teegavarapu, R., 2011: White Paper on Florida water management and adaptation in the face of climate change, Florida Climate Change Task Force.

Collaborator: Expanding the student-centered undergraduate research culture across the curriculum
Funding period: Fall 2013 – Spring 2015
Funding source: FAU Distinction through Discovery Program
Funding amount: $20,000

Co-Principle Investigator: Remote education and assessment of critical habitats
Funding period: 2010-2013
Funding source: FAU Technology Fee Program

Award amount: $74,155
Principle investigator: Earth systems science teacher education at FAU.
Funding period: June 2007 – October 2009
Funding agency: Institute for Global Environmental Strategies
Award amount: $40,000

SYNERGISTIC ACTIVITIES

Selected Service:
Chair, FAU Environmental Sciences Undergraduate Curriculum Committee (2013-present)
Member, FAU Environmental Sciences Program Committee (2011-present)
Member, FAU Dept. of Geosciences, Geology Curriculum Committee (2006 – present)
FAU excellence and innovation in undergraduate teaching award (2013)
President South Florida Hydrologic Society (2012-2013)
Faculty advisor for 1) FAU's Chapter of Sigma Gamma Epsilon, Earth Sciences Honor Society (2006-present), 2) FAU's student chapter of the American Institute of Professional Geologists (present)
Campus representative for Geologic Society of America (2008-present)

COLLABORATORS AND OTHER AFFILIATIONS (AFFILIATION = FAU UNLESS OTHERWISE NOTED)

***Collaborators and co-editors*:** Dr. Len Berry , Dr. Fred Bloetscher , Dr. Evelyn Frazer , Nicole Hernández Hammer , Dr. Tobin Hindle , Dr. Marguerite Koch-Rose , Tina Kuhn (unaffiliated), Dr. Dianna Mitsova-Boneva , Dr. Dianne Owen , Dr. Jorge Restrepo , Lisa Survis , Dr. Ramesh Teegavarapu , Dr. Caiyun Zhang
Graduate advisor: Dr. Jean Bahr (University of Wisconsin – Madison)
M.S. advisees and committee participation (15 total): Dominick Antolino (USGS), Brain Banks (USGS), Carrie Beaudreau (USGS & FAU), Keren Bolter , Eric Carlson (USGS), Heather D'Antonio , Michelle Infande (Palm Beach County Water Utilities) Siana Lakhan, Zach Mester, Garren Mezza (Patch Market), Elizabeth Quinn (SFWMD), Corrie Rainyn, (DDS Inc.), Lisa Survis , Richard Westcott (USGS & FAU), William Wright , Tania Leung
Ph.D. advisees and committee membership (5 total): Troy Bernier, Keren Bolter, Rachelle Grein, Greg Mount (Indiana University of Pennsylvania), Lisa Survis

Courses Taught

Hydrogeology (GLY 4822)
Benchmark Developments in Hydrogeology (GLY 6897)
Env. Issues in Atmos. & Earth Sci (ESC 3704)
Earth Science for Educators I (ESC 6206)
Engineering Geology (GLY 4830)
Hydrogeology Methods (GLY 6838)
Water Resources (GEOC 4280)
Geology Field Methods (GLY 4750)

Community Engagement or Out-reach

Suncoast High School, Riveria Beach, FL, Career Showcase (2013, 2014)
Volunteered for GetWet, a high school program designed to inform students about private well drinking water quality (2012, 2014)
Judge for Science Olympiad (2011, 2012)

Abbreviated C. V.

David Lewis Warburton

Professional Preparation

Undergraduate Study - UNIVERSITY OF CALIFORNIA, San Diego, California - B.A. degree awarded June, 1969.
Major: Chemistry Minor: History of Science/Economics

Graduate Study: UNIVERSITY OF CHICAGO, Chicago, Illinois - Ph.D. degree awarded June, 1978.
Major: Geochemistry
Major Professor: Professor Stefan Hafner

Appointments:

Assistant and Associate Professor of Geology, FLORIDA ATLANTIC UNIVERSITY, Boca Raton, Florida, September 1975- present.

Assistant Chairperson, Department of Geosciences, FLORIDA ATLANTIC UNIVERSITY, Boca Raton, Florida, January 2005 - present.

Selected Peer-Reviewed Publications

None

Selected Other Publications or Products/Grants

Registered Professional Geologist, State of Florida, 1989 - present, License # 1074.

Synergistic Activities

Academic Advisor, B.A. and B.S. Geology Degrees

Collaborators or Other Affiliations

Planning Committee, International Limnogeology Congress 6 (ILIC6)

Webmaster, GSA Limnogeology Division

Courses Taught (last 7 years)

Physical Geology/Evolution of the Earth (GLY 2010) -Su08, Su09, Su10, Su11, Su12, Su13, Su14

Geology of the National Parks - Water, Waves, and Caves (GLY 3165) - F11

Environmental Issues in Earth and Atmospheric Sciences (EVR 3019, later ESC 3704) - F08, F09, F10, S12, S12, F12

Mineralogy and Crystal Chemistry (GLY 4200C) - S09, F09, F10, F11, F12, F13, F14

Environmental Geochemistry (GLY 4240 or 4241) - F08, S11, F14

Petrology of Igneous and Metamorphic Rocks (GLY 4310) - S08, S10, S11, S12, S13, S14

Field Methods (GLY 4750) - S08, S09, S13

Environmental Geochemistry, graduate (GLY 5243) - S11, F14

Advanced Environmental Geochemistry (GLY 6246) - S10, F13

Global Environmental Change (GLY 6746) S14

Geosciences Colloquium Series (GEO 6920) - F12, S13

Legend: F = Fall, S = Spring, Su = Summer, digits refer to 20xx, where xx are digits shown

Community Engagement or Outreach

Liaison, Canaveral Mineral and Gem Society

James K. Wetterer

Wilkes Honors College, Florida Atlantic University , 5353 Parkside Drive, Jupiter, FL 33458
Phone: (561) 799-8648; FAX: (561) 799-8602; e-mail: wetterer@fau.edu

EDUCATION

UNIVERSITY OF WASHINGTON, Seattle, WA, 9/83 - 8/88
Ph.D., Zoology: Ecology and Evolution; Advisor: Gordon H. Orians.

MICHIGAN STATE UNIVERSITY, East Lansing, MI, 9/81 - 9/83
M.S., Zoology: Ecology; Advisors: Earl E. Werner and Donald J. Hall.

CORNELL UNIVERSITY, Ithaca, NY, 9/76 - 5/79
A.B., Biology: Ecology and Systematics.

WORK EXPERIENCE

FLORIDA ATLANTIC UNIVERSITY, Wilkes Honors College
8/04 - present: **Professor**
7/98 - 7/04: **Associate Professor**
9/03 - 1/04 & 5/04 - 8/04: Fulbright Scholar; Ants of Trinidad and Tobago

COLUMBIA UNIVERSITY, Department of Earth and Environmental Science
7/96 - 6/98: **Assistant Professor**

WHEATON COLLEGE, Department of Biology
8/94 - 6/96: **Visiting Assistant Professor**

HARVARD UNIVERSITY, Museum of Comparative Zoology
8/91- 6/94: **Post-doctoral Fellow**; Behavior, ecology, and evolution of fungus-growing ants
Advisors: Edward O. Wilson, Naomi Pierce, and Richard Lewontin

PRINCETON UNIVERSITY, Department of Ecology and Evolutionary Biology
7/89 - 7/91: **Research Associate**; Ecology and evolution of leaf-cutting ants
Advisor: Stephen Hubbell

VANDERBILT UNIVERSITY, Department of Psychology
9/88 - 7/89: **Post-doctoral Fellow**; Visual psychophysics of fish and horseshoe crabs
Advisor: Maureen K. Powers

CURRENT RESEARCH INTERESTS

Biogeography, ecology, and environmental impact of ants
Biogeography and ecology of West Indian ants
Distribution, impact, and control of exotic ants
Impact of exotic ants on hatchling sea turtles in Florida

RECENT GRANTS

National Science Foundation. Research Grant: $342,560. 10/05-9/11. “Ants of the Eastern Caribbean.” (Co-PI: R.R. Snelling).

RECENT PUBLICATIONS

109. Wetterer, J.K. 2013. Geographic spread of the samsum or sword ant, *Pachycondyla* (*Brachyponera*) *sennaarensis* (Hymenoptera: Formicidae). Myrmecol. News 18: 13-18.

110. Wetterer, J.K. 2013. Worldwide spread of the difficult white-footed ant, *Technomyrmex difficilis* (Hymenoptera: Formicidae). Myrmecological News 18: 93-97.

111. Wetterer, J.K. 2013. Exotic spread of *Solenopsis invicta* (Hymenoptera: Formicidae) beyond North America. Sociobiology 60: 53-63.

112. Wetterer, J.K. 2013. Worldwide spread of the little fire ant, *Wasmannia auropunctata* (Hymenoptera: Formicidae). Terrestrial Arthropod Reviews 6: 173-184.

113. MacGown, J.A. and **J.K. Wetterer**. 2013. Distribution and biological notes of *Strumigenys margaritae* (Hymenoptera: Formicidae: Dacetini). Terrestrial Arthropod Reviews 6: 247-255.

114. Wetterer, J.K. 2014. Worldwide spread of Alluaud's little yellow ant, *Plagiolepis alluaudi* (Hymenoptera: Formicidae). Myrmecol. News 19: 53-59.

115. Wetterer, J.K. 2014. A South American fire ant *Solenopsis* nr. *saevissima* in Guadeloupe, French West Indies. Biological Invasions 16: 755-758.

116. Wetterer, J.K. and S. Hugel. 2014. First North American records of the Old World ant cricket *Myrmecophilus americanus* (Orthoptera, Myrmecophilidae). Florida Entomol. 97: 126-129.

117. Wetterer, J.K., L. Davis, and G.L. White. 2014. Spread of the South American fire ant *Solenopsis invicta* (Hymenoptera: Formicidae) in Trinidad. Florida Entomol. 97: 238-241.

118. Wetterer, J.K. 2014. Worldwide spread of the lesser sneaking ant, *Cardiocondyla minutior* (Hymenoptera: Formicidae). Florida Entomol. 97: 567-574.

119. Wetterer, J.K., O. Davis, and J.R. Williamson. 2014. Boom and bust of the tawny crazy ant, *Nylanderia fulva*, on St Croix, US Virgin Islands. Florida Entomol. 97: 1099-1103.

120. Wetterer, J.K. 2014. Geographic distribution of *Strumigenys louisianae* (Hymenoptera, Formicidae). Terrestrial Arthropod Reviews, in press.

121. Wetterer, J.K. 2014. Geographic distribution of *Gnamptogenys hartmani* (Hymenoptera: Formicidae), an "agro-predator" that attacks fungus-growing ants. Terrestrial Arthropod Reviews, in press.

122. Wetterer, J.K., M.J. Liles, J.M. Sermeño, L. Serrano Cervantes, E.E. Echeverria, R.M. Estrada Hernández, A. Henriquez, D. Pérez, D. Pérez, D.A. Sánchez García, C.E. Gómez Peralta, R. López Sorto, and G. Melendez. 2015. Predaceous fire ants (Hymenoptera: Formicidae) at sea turtle nesting beaches and hatcheries in El Salvador. Florida Entomol., in press.

JEANETTE WYNEKEN

Department of Biological Sciences
Florida Atlantic University
777 Glades Road
Boca Raton, Florida 33431-0991USA http://www.science.fau.edu/biology/faculty/wyneken.html

Office Phone: (561) 297-0146
Fax: (561) 297-2749
E-mail: jwyneken@fau.edu

a. Professional Preparation

Institution	Major	Degree	Year
Illinois Wesleyan University	Biology	B.A.	1978
University of Illinois	Biology	Ph.D.	1988

b. Appointments

2014 - present Professor, Dept. of Biological Sciences, Florida Atlantic University, Boca Raton, FL
2006-2014: Assoc. Prof., Dept. of Biological Sciences, Florida Atlantic University, Boca Raton, FL
2000-2006: Assist. Prof., Dept. of Biological Sciences, Florida Atlantic University, Boca Raton, FL
2002-2005: Graduate Research Faculty, Duke University Marine Laboratory, Beaufort, NC
1996-2000: Res. Assist. Prof., Dept. of Biological Sciences, Florida Atlantic Univ., Boca Raton, FL

c. Products

RECENT PEER-REVIEWED PUBLICATIONS

Peer-Refereed Publications *51 papers published*

[1] Stacy B. A., C. J. Innis, P.-Y. Daoust, **J. Wyneken**, M. Miller, H. Harris, M. C. James, E. F. Christiansen, A. Foley. 2014. Solitary Large Intestinal Diverticulitis in Leatherback Turtles (*Dermochelys coriacea*). Vet Pathol. published online 19 September 2014 DOI: 10.1177/0300985814549211

[2] Mansfield, K.L., **Wyneken, J**., Porter, W.P., Luo, J., 2014. First satellite tracks of neonate sea turtles redefine the "lost years" oceanic niche. Proc. R. Soc. B Biol. Sci.

[3] Bovery CM, **J Wyneken**. 2013. Sea Turtles in Florida's Atlantic Waters. Marine Fisheries Review. 75(3):1-12.

[4] Mansfield KL, **J Wyneken**, D Rittschof, M Walsh, CW Lim, and P Richards, Satellite tag attachment methods for tracking neonate sea turtles. Marine Ecology Progress Series. 457: 181–192, 2012.

[5] **Wyneken J**, SV Madrak, M Salmon, and J Foote. Migratory activity by hatchling loggerhead sea turtles *(Caretta caretta L.*): evidence for divergence between nesting groups. Marine Biology 156:171–178, 2008.

[6] Gless JM, M Salmon, and **J Wyneken**. Behavioral responses of juvenile leatherbacks (*Dermochelys coriacea*) to 3 lights used in the longline fishery. Endangered Species Research 5: 239-247, 2008.

OTHER SIGNIFICANT PUBLICATIONS

[1] Rivera ARV, **J Wyneken** and RW Blob. Forelimb kinematics and motor patterns of swimming loggerhead sea turtles (*Caretta caretta*): are motor patterns conserved in the evolution of new locomotor strategies? The Journal of Experimental Biology 214:3314-3323, 2011.

[2] Conrad, JR, **J Wyneken**, JA Garner and S. A. Garner. 2011. Experimental assessment of aggressive dune vegetation impact and its control on leatherback sea turtle (*Dermochelys coriacea*) nest success. Endangered Species Research. 15: 13–27, 2011

[3] Salmon M, M Hamann, and **J Wyneken**. The development of early diving behavior by juvenile Flatback Sea Turtles (*Natator depressus*). Chelonian Conservation and Biology. 9(1):8-17, 2010.

- Sole-authored books (2)

[1] **Wyneken. J.** 2001 Guide to the Anatomy of Sea Turtles. NMFS Tech. Publication. NOAA Tech., Memo NMFS-SEFSC-470. 172 pp. (Black & White book and color CD)**.**

[2] **Wyneken. J.** 2004 Indique a la Anatomía de las Tortugas Marinas. NMFS Tech. Publication. NOAA Tech., Memo NMFS-SEFSC-470. 172 pp. (Black & White book and color CD).

- Co-edited books (3)

[3] **Wyneken J**, KJ Lohmann and J Musick eds. 2013. The Biology of Sea Turtles Volume III. CRC Press/Taylor and Frances Grp. Boca Raton, 457 pp**.**

[4] Lutz PL JA Musick and **J Wyneken**, (Eds). The Biology of Sea Turtles. Vol. II. CRC Press. Boca Raton, FL 496 pages, 2003.

[5] **Wyneken, J**., M. Godfrey, and V. Bels, eds. 2008. The Biology of Turtles. CRC Press/Taylor and Frances Grp. 389 pp.

- Book chapters (peer-reviewed - 9) 3 recent

[6] **Wyneken. J.** *accepted.* The structure and function of the leatherback, *Dermochelys coriacea*. The Biology and Conservation of the Leatherback Sea Turtle J. Spotila ed., Johns Hopkins University Press.

[7] **Wyneken. J.** 2013. Contemporary Computed Tomography and Magnetic Resonance Imaging of Reptile Anatomy. Chapter 9. *In*. Current Therapy in Reptile Medicine and Surgery. D.R. Mader and S. Divers, eds. Elsevier Health Sciences. St. Louis. Pp 93-106.

[8] **Wyneken, J.** 2013**.** The Skeleton – An In Vivo of Structure, Chapter 4. 79-95, in The Biology of Sea Turtles Volume III. Wyneken J, KJ Lohmann and J. Musick eds. CRC Press/Taylor and Frances Grp. Boca Raton.

d. Synergistic Activities

I have more than a decade of experience as advisor to graduate students (Masters and doctoral advisor) in Biological Sciences, and have served on graduate committees of students in Biological sciences, Integrative Biology, and Environmental Sciences at FAU; I served on a number of thesis and dissertation committees at other major US and foreign institutions, occasionally as co-advisor. I have more than 25 years of experience studying the morphology, ecology, behavior, and physiology of reptiles and particularly, marine turtles. These studies have resulted in a number of very successful collaborations.

I integrate my research into my classes including Biology of Sea Turtles, Comparative Vertebrate Morphogenesis, Research in Marine Biology seminar, and Marine Conservation Biology. Each year I give 4-8 general and professional lectures in reptile anatomy and physiology, sea turtle biology, oceans and climate, marine dispersal, and conservation. I provided my expertise as science advisor for *Turtle: Incredible Journey*, a feature length film, National Geographic Magazine's feature on leatherback turtles, and *Inside Nature's Giants* (TV4, UK).

e. Thesis Advising

Total graduate students 25 graduate students (1 Ph.D, [3 current Ph.D.], 24 M. Sci., and 1 Post-doctoral scholar. Recent graduates –Past 5 years: Justin Perrault Ph.D., 2013; Micah Rogers 2013 (environmental consulting, Reno, NV); Rachel Welicky M. Sci. 2010 (Arkansas State University); Erin Dougherty 2009 (Robeson Community College); Jeremy R. Conrad 2008 (U.S. Fish and Wildlife Service); Post doctoral associate: Angela Rivera 2011 (Harvard University).

ZHIXIAO XIE

PROFESSIONAL PREPARATION

Peking University	Geography	B.S. 1990
Chinese Academy of Sciences	Ecology	M.S. 1993
State University of New York at Buffalo & Engineering	Computer Science	M.S. 2002
State University of New York at Buffalo	Geography	Ph.D. 2002

APPOINTMENTS

2014-present	Associate Dean for Research and Partnership Initiatives, College of Science, Florida Atlantic University
2014-present	Professor, Department of Geosciences, Florida Atlantic University
2009-2014	Associate Professor, Department of Geosciences, Florida Atlantic University
2003-2009	Assistant Professor, Department of Geosciences, Florida Atlantic University,
2002-2003	Visiting Assistant Professor, Department of Geography and Urban Planning, Temple University,

Selected Peer-Reviewed Publications

1. **Xie, Z.** and J. Yan 2013. "Detect Traffic Accident Clusters with Network Kernel Density Estimation and Local Spatial Statistics: An Integrated Approach". *Journal of Transport Geography*, 31: 64-71.
2. Zhang, C., **Z. Xie**, and D. Selch, 2013. Fusing LiDAR and Digital Aerial Photography for Object-based Forest Mapping in the Florida Everglades. *GIScience and Remote Sensing*, 50 (5), 562-573.
3. **Xie., Z.,** Z. Liu, and Y. Li, 2013. "Validation of the Everglades Depth Estimation Network (EDEN) Water-Surface Models", *Papers in Applied Geography*, 36:98-106.
4. Zhang, C., D. Selch, **Z. Xie**, C. Roberts, H. Cooper, and G. Chen, 2013. Object-based Benthic Habitat Mapping in the Florida Keys from Hyperspectral Imagery. *Estuarine, Coastal and Shelf Science*, 134, 88-97.
5. Johnson,B.[‡] and **Z. Xie** 2013. "Classifying a high resolution image of an urban area using super-object information". *ISPRS Journal of Photogrammetry and Remote Sensing*, 83: 40-49.

SELECTED OTHER PUBLICATIONS OR PRODUCTS/GRANTS

1. Zhang, C. and **Z. Xie** 2013. "Data fusion and classifier ensemble techniques for vegetation mapping in the Everglades". *Geocarto International*, 1-16, DOI:10.1080/10106049.2012.756940.
2. Zhang, C. and **Z. Xie** 2013. "Object-based Vegetation Mapping in the Kissimmee River Watershed Using HyMap Data and Machine Learning Techniques". *Wetlands,* 33:233–244.
3. **Xie, Z**., L. Pearlstine, and D.E. Gawlik 2012. "Develop a Finer Resolution DEM to Support Hydrological Modeling and Ecological Study in the Northern Everglades Freshwater Wetland". *GIScience & Remote Sensing*, 49(5): 664-686.
4. Zhang, C. and **Z. Xie** 2012. Combining Object-based Texture Measures with a Neural Network for Vegetation Mapping in the Everglades from Hyperspectral Imagery". *Remote Sensing of Environment*, 124: 310-320.
5. **Xie, Z**. , Zhang, C., and L. Berry 2012. Geographically Weighted Modeling of Surface Salinity in Florida Bay Using Landsat TM Data. *Remote Sensing Letters,* **4(1), 76-84.**

SYNERGISTIC ACTIVITIES

- Extensive experiences in diverse large-scale spatial modeling. Started Cellular Automata modeling in early 1990s (won the best paper award in the 3rd Chinese National Land Resource Symposium), key modeler in a NGA funded image retrieval system, leading modeler in USGS

Everglades-wide surface water modeling system, and leading modeler in network-based cluster analysis and modeling system.

- PIs and Co-PIs for multiple interdisciplinary research and teaching grants, sponsored by USGS, NPS, FFWC,FHI, and etc. Established collaborations with scientists from diverse disciplines including Biology, Computer Science, Ecology, Environmental Sciences, and Urban Planning
- Associate Dean for Research and Partnership Initiatives, College of Science, Florida Atlantic University
- Director of Center of GIS sited in Geosciences Department, Florida Atlantic University
- Chair of Master Researcher Committee in the College of Sciences, Florida Atlantic University
- Chair of College Graduate Curriculum Committee in the College of Sciences, and College Representative in the University Graduate Program Committee and the University Graduate Council, Florida Atlantic University
- Editorial Advisory Board member of the *ISPRS Journal of Photogrammetry and Remote Sensing*.
- Served on and program committee of the Second and Third International Workshop on Earth Observation and Remote Sensing Applications (EORSA 2012, EORSA 2014). Served on program committee of Southeastern Division of AAG annual meetings in 2008 and 2009.
- An invited reviewer for NSF proposals, FFWC proposal, and reviewed papers for multiple national/international journals.

COLLABORATORS AND OTHER AFFILIATIONS

Brian Johnson, Florida Atlantic University
Dale Gawlik, Florida Atlantic University
Caiyun Zhang , Florida Atlantic University
Len Berry, Florida Atlantic University
Zhongwei Liu, University of Nevada
John W. Jones, the USGS
Aaron L. Higer, Florida Atlantic University
Pamela A. Telis, the USGS
L. Pearlstine, National Park Services

Courses Taught

- Advanced Topics in Geographic Information Systems
- Applications of Geographic Information Systems
- Programming in Geographic Information Systems
- Internet Geographic Information Systems
- Advanced Remote Sensing
- Principles of Geographic Information Systems
- Spatial Data Analysis

Community Engagement or Out-reach

2014	Participant in FAU Harbor Branch IRL Observatory Science and Technology Advisory Committee meetings, July 29, 2014. FAU HBOI, FL
2010	Participant in "Inundation Mapping and Vulnerability Assessment Workshop", Sept 2, 2010. Davie, FL
2009	Co-presenter in one of the UNESCO Lectures (organized by USGS), June 10- 11, 2009, Davie, FL

ABBREVIATED FACULTY CV

XING-HAI ZHANG

A. PROFESSIONAL PREPARATION

University of Calgary, Canada — Plant Molecular biology
Ph.D. 1994
Michigan Technological University, USA — Plant Molecular biology — Post-doctoral
1994-1996

B. APPOINTMENTS

2009-present Associate professor, Department of Biological Sciences, Florida Atlantic University, FL.
2003-2009 Assistant professor, Department of Biological Sciences, Florida Atlantic University, FL.
1997-2003 Research associate, USDA, Photosynthesis Unit/University of Illinois, Department of Crop Sciences, Urbana, IL.

C. SELECTED PEER-REVIEWED PUBLICATIONS

Zhang X.-H., Keating P., Wang X.-W., Huang Y.-H., Martin J., Hartmann J.X. and Liu A. (2014) Production of functional native human interleukin-2 in tobacco chloroplasts. **Molecular Biotechnology**, 56: 369–379.

Barone P., **Zhang X.-H.** and Widholm J.M. (2014) Tryptophan and Indole Analog Mediated Plastid Transformation. In *Chloroplast Biotechnology: Methods and Protocols* (Maliga P., ed). Methods in Molecular Biology, vol. 1132, Springer Science+Business Media New York, pp 187–203.

Webb J. and **Zhang X.-H**. (2013) Organ disparate allocation of plasticity in phosphorus response as an underlying mechanism for the sawgrass-to-cattail habitat shift in Florida Everglades wetlands. **International Journal of Plant Sciences**, 174: 779–790.

Koch M., Bowes G., Ross C. and **Zhang X.-H.** (2013) Climate change and ocean acidification effects on seagrasses and marine macroalgae. **Global Change Biology**, 19: 103–132.

Li Q., Lin Y.-C., Sun Y.-H., Song J., Chen H., **Zhang X.-H.**, Sederoff R.R. and Chiang V.L. (2012) Splice variant of the SND1 transcription factor is a dominant negative of SND1 members and their regulation in *Populus trichocarpa*. **Proceedings of the National Academy of Sciences, USA**. 109: 14699–14704.

Shi R., Sun Y.-H., **Zhang X.-H**. and Chiang V.L. (2012) Poly(T) adaptor RT-PCR. In *Next-Generation MicroRNA Expression Profiling Technology: Methods and Protocols* (Fan J.-B., ed). Methods in Molecular Biology, vol. 822, Humana Press, New York, pp 53–66.

D. SELECTED OTHER PUBLICATIONS OR PRODUCTS/GRANTS

*Sun Y.-H., *Shi R., ***Zhang X.-H.**, Chiang V.L. and Sederoff R. (2012) MicroRNAs in trees. **Plant Molecular Biology**, 80: 37–53. (*equal contribution)

Lin L., Webb J. and **Zhang X.-H.** (2011) Involvement of arbuscular mycorrhizal symbiosis in the distribution of sawgrass and cattail in Florida Everglades. **Wetlands**, 31: 263–272.

Zhang X.-H., Webb J., Huang Y.-H., Lin L., Tang R.-S. and Liu A. (2011) Hybrid Rubisco of tomato large subunits and tobacco small subunits is functional in tobacco plants. **Plant Science**, 180: 480–488.

Tsai F.-Y., **Zhang X.-H**., Ulanov A. and Widholm J.M. (2010) The application of the yeast N-acetyltransferase *MPR*1 gene and the proline analog L-1 azetidine-2-carboxylic acid as a selectable marker system for plant transformation. **Journal of Experimental Botany**, 61: 2561–2573.

Patent Widholm J.M., Barone P. and **Zhang X.-H.** (December 7, 2010) Use of Tryptophan Indole and Anthranilate Analogs as Plant Transformation Selection Agents, US Patent number 7,847,152 B2.

Grant PI: Koch M., Co-PIs: **Zhang X.-H.** and Bowes G., Ocean acidification, temperature and light effects on carbon-use mechanisms, calcification, and growth of tropical macroalgae: Drivers of winners and losers., National Science Foundation, $422,788; 2014-2017.

E. SYNERGISTIC ACTIVITIES

2007-present Mentor, NSF Undergraduate Research and Mentoring program at FAU.

2009 Judge, Science Olympiad (cell biology), regional, South Florida.

2007 Mentor, High School eCybermission Internship (US Army).

F. COLLABORATORS AND OTHER AFFILIATIONS

George Bowes, University of Florida, Gainesville, FL.
Vincent L. Chiang, North Carolina State University, Raleigh, NC.
C.C. Chinnappa, University of Calgary, Calgary, Canada.
Nwadiuto Esiobu, Florida Atlantic University, Davie, FL.
Marguerite Koch, Florida Atlantic University, Boca Raton, FL.
Shili Miao, South Florida Water Management District, West Palm Beach, FL.
Archie R. Portis, USDA, Urbana.
Cliff Ross, University of North Florida, Jacksonville, FL.
Ronald Sederoff, North Carolina State University, Raleigh, NC.
Herbert Weissbach, Florida Atlantic University, Jupiter, FL.
Jack Widholm, University of Illinois, Urbana, IL.

G. COURSES TAUGHT

Genetics (PCB 3603), 2014

Principle of Plant Physiology (BOT 4503/BSC 6936), 2004-2014

Plant Physiology Laboratory (BOT 4503L/BSC 6936), 2004-2014

Plant Biotechnology (BOT 4734C/BSC 6936), 2005, 2007, 2009, 2011-2014

H. COMMUNITY ENGAGEMENT OR OUT-REACH

2012-present adviser, Biotechnology program, Spanish River High School, Boca Raton, FL.

Reviewer for “Plant Molecular Biology Reporter”, “Applied Biochemistry and Biotechnology”, “Molecular Biotechnology”, “Plant Growth Regulation”, “Archives of Biochemistry and Biophysics”, “International Journal of Plant Sciences”, “Biological Invasions” and other journals.

APPENDIX D - ENVIRONMENTAL SCIENCE GRADUATE STUDENT SURVEY; 2013-2014

1) What is your overall assessment of your courses during the academic year?

- Answered: 10
- Skipped: 0

Answer Choices	Responses
Very satisfied	20.00% 2
Somewhat satisfied	60.00% 6
Somewhat disappointed	10.00% 1
Very disappointed	0.00% 0
NA	10.00% 1
Total	10

2) How often did you interact with your faculty advisor during the academic year?

- Answered: 10
- Skipped: 0

Answer Choices	Responses
Daily	10.00% 1
Weekly	60.00% 6
Monthly	20.00% 2
Once	0.00% 0
Never	10.00% 1
Total	10

3) What is your assessment of your overall interaction with your faculty advisor this academic year?

- Answered: 10
- Skipped: 0

Answer Choices	Responses
Very satisfied	70.00% 7
Somewhat satisfied	20.00% 2
Somewhat disappointed	10.00% 1
Very disappointed	0.00% 0
NA	0.00% 0
Total	10

4) Please rate how well your experience so far in the ES Program has prepared you to:

- Answered: 10
- Skipped: 0

	Very well	Fairly well	Adequately	Poorly	N/A	Total	Average Rating
Effectively convey information in writing	30.00% 3	50.00% 5	20.00% 2	0.00% 0	0.00% 0	10	1.90
Effectively convey information orally	30.00% 3	30.00% 3	30.00% 3	10.00% 1	0.00% 0	10	2.20
Think logically/resolve analytical problems	40.00% 4	30.00% 3	30.00% 3	0.00% 0	0.00% 0	10	1.90
Apply research skills	40.00% 4	30.00% 3	30.00% 3	0.00% 0	0.00% 0	10	1.90
Apply ethical standards of discipline	30.00% 3	50.00% 5	20.00% 2	0.00% 0	0.00% 0	10	1.90
Present work at conferences with confidence	50.00% 5	20.00% 2	20.00% 2	0.00% 0	10.00% 1	10	1.67
Submit work for publication with confidence	50.00% 5	10.00% 1	20.00% 2	0.00% 0	20.00% 2	10	1.63
Network with others in the profession	30.00% 3	30.00% 3	20.00% 2	20.00% 2	0.00% 0	10	2.30

5) How would you assess the following based on your experience so far in the ES Program?

- Answered: 10
- Skipped: 0

	Very satisfied	Somewhat satisfied	Somewhat dissatisfied	Very dissatisfied	N/A	Total	Average Rating
Availability of academic advising.	70.00% 7	20.00% 2	10.00% 1	0.00% 0	0.00% 0	10	1.40
Helpfulness of academic advising.	60.00% 6	30.00% 3	10.00% 1	0.00% 0	0.00% 0	10	1.50
Availability of career advising.	10.00% 1	50.00% 5	20.00% 2	0.00% 0	20.00% 2	10	2.13
Helpfulness of career advising.	11.11% 1	44.44% 4	33.33% 3	0.00% 0	11.11% 1	9	2.25
Opportunities to interact with ES Faculty.	50.00% 5	40.00% 4	10.00% 1	0.00% 0	0.00% 0	10	1.60
Opportunities for graduate assistantships.	50.00% 5	30.00% 3	10.00% 1	0.00% 0	10.00% 1	10	1.56
Availability of financial support.	50.00% 5	50.00% 5	0.00% 0	0.00% 0	0.00% 0	10	1.50
Adequacy of financial support.	40.00% 4	50.00% 5	0.00% 0	10.00% 1	0.00% 0	10	1.80
Availability of the courses you wanted.	10.00% 1	30.00% 3	50.00% 5	10.00% 1	0.00% 0	10	2.60
Availability of courses at the campus you wanted.	10.00% 1	20.00% 2	60.00% 6	10.00% 1	0.00% 0	10	2.70
Availability of courses at the times you wanted.	0.00% 0	50.00% 5	50.00% 5	0.00% 0	0.00% 0	10	2.50

	Very satisfied	Somewhat satisfied	Somewhat dissatisfied	Very dissatisfied	N/A	Total	Average Rating
Availability of research facilities.	30.00% 3	60.00% 6	10.00% 1	0.00% 0	0.00% 0	10	1.80
The quality of research done in the ES Program.	40.00% 4	50.00% 5	10.00% 1	0.00% 0	0.00% 0	10	1.70
Opportunity for research experience or application of practical skills.	40.00% 4	50.00% 5	10.00% 1	0.00% 0	0.00% 0	10	1.70

6) Please indicate:

- Answered: 10
- Skipped: 0

Answer Choices	Average Number	Total Number	Responses
Responses How many clubs or organizations do you participate in at FAU.	0	1	10
Responses How many outside professional organizations do you belong to.	1	12	10
Responses How many conferences and workshops have you attended this semester.	1	13	10
Total Respondents: 10			

7) What semester/year do you expect to graduate?

- Answered: 10
- Skipped: 0

Answer Choices	Responses
2014 Spring	60.00% 6
2014 Summer	20.00% 2
2014 Fall	10.00% 1
2015 Fall	10.00% 1
Total	10

8) After graduation, do you expect to be employed in:

- Answered: 10
- Skipped: 0

Answer Choices	Responses
a government agency	70.00% 7
a state or local corporation	50.00% 5
a national/multi-national corporation	20.00% 2
a non-profit organization	50.00% 5
K-12 education	10.00% 1
a teaching college	10.00% 1
a research college	0.00% 0
Total Respondents: 10	

9) What do you expect your annual salary to be after graduation?

- Answered: 10
- Skipped: 0

Answer Choices	Responses
Less than $30,000	30.00% 3
$30,000-45,000	50.00% 5
$46,000-60,000	20.00% 2
$60,000-80,000	0.00% 0
More than $80,000	0.00% 0
Total	10

10) Do you have any comments about how your experience so far in the ES Program could be improved?