

**State University System
Educational and General
2007-2008 Legislative Operating Budget Issue
Form I-c**

Strategic Planning Goal/Objective: Building World-Class Academic Programs and Research Capacity/Environmental, Climate, and Agricultural Research

University:	University of North Florida
Issue Title:	Coastal and River Ecological Research
University Priority Number:	1
Date Approved by Board of Trustees:	6/20/06

I. Needs Statement:

Never has coastal biology been more *relevant* than in this time and at this place. The Florida coast has been assaulted by man and nature in ways we are just beginning to understand. UNF is uniquely positioned to take a lead role in determining the impacts of many current risks to coastal systems, such as hurricanes, pesticide runoff, over fishing and invasive species. These impacts affect the aesthetics of the coast, recreation, development, and many commercial enterprises in both local and national communities. Recent algal blooms in the St. Johns River brought this to the attention of the Jacksonville community last summer, when recreational and commercial use of the river, and in some cases simply proximity, led to illness among some Jacksonville residents. Why did these blooms occur? Why now? What can we do to prevent or lessen their impact in the future? The recent high profile hurricane seasons have also brought attention to coastal issues. We currently have little idea as to what the short- and long-term impacts of past and inevitable future hurricanes have on local and regional plants and animals. Other recent high-profile news items include the discussion of drilling for oil closer to Florida's Gulf Coast and wetlands development, both locally and nationally. UNF faculty's day to day research and teaching efforts have a significant positive impact on the future of the State of Florida.

The central role of the St. Johns River and the First Coast in the life of our community in education, heritage, and commerce is often underestimated. Many citizens who are dependent on this unique environment are unaware of their many connections to the St. Johns River and estuarine system. This complicates consensus building in our region, and the lack of real time data hampers environmental management decisions while frustrating decision makers. The University of North Florida (UNF) has a responsibility to the regional community at large to programmatically foster science and engineering knowledge, and to enhance full public appreciation and use of our unique riverine environment. Much has been done with the designation of the St. Johns River as an American Heritage River and the River Navigator position (http://www.epa.gov/rivers/sor/sor_st_johns.pdf). There remains the need for "developing new and innovative partnerships with non-traditional partners such as schools, universities and private corporations." UNF has an important role as the local state university in enhancing the unique character of the St. Johns River that is so important to the northeast Florida

community. This proposal specifically addresses the education, engineering, and science issues for our region of the St. Johns River.

II. Justification:

A. Description of service or program to be provided: This initiative will build on the local core of cultural, historical, natural science and outdoor recreational appreciation of the St. Johns River and will support economic growth and opportunity for the region while striving to protect area resources and unique “river” community assets that create our regional identity. To accomplish these objectives, UNF will expand its current initiatives in education, environmental engineering and science with a quantum increase in effort and emphasis. This translates into action to integrate knowledge of the St. Johns River from the K-12 classroom continuously through multi-disciplinary undergraduate course work. Educational experiences provided by undergraduate and graduate research support through the new UNF Environmental Center and existing research programs will provide lifelong learning for the university’s most talented students, engage faculty expertise, and directly relate to current issues in the region. Engineering and science initiatives will include real-time monitoring of the environment by establishment of new long-term environmental monitoring stations (coordinated with NOAA and DEP/WMD) and their associated cyber- infrastructure, including the ability to track selected species over a broad area in near-real time and to develop biological assessments for use by area decision makers. A regionally focused public level archive and current assessment of the St. Johns River and associated estuarine system will be developed in conjunction with other professionals at the state and national level, but will be locally centered and hosted. This will be an extension of an existing local program proposal to evaluate the “State of the River.” Funds from this proposal will allow both new faculty (associated with the new degree programs) and current faculty in allied fields to focus their efforts on riverine research, including creating and enhancing undergraduate transformational learning opportunities in local field work for our students.

B. Description of current university initiatives, and their resources, that will strengthen the provision of this service/program: The UNF Environmental Center, with its diverse faculty and resources, will partner with the College of Education and Human Resources, College of Arts and Sciences, the School of Engineering and research programs like the Advanced Weather Information Systems Laboratory and Biology Department research labs to form the nucleus of this program. Computational resources will be located in the College of Computing, Engineering and Construction’s Complex Computing Center which will be augmented to support this program.

The University of North Florida Environmental Center and the University of North Florida Advanced Weather Information Systems Lab are collaborating for the development of a real-time, wireless, automated water quality monitoring system for the St Johns River to provide baseline water quality data and to enhance the density of the existing network currently maintained by NOAA, the USGS, and the SJRWMD. The intent of this system is to serve as an objective measure to aid decision makers with watershed management, wetland development decisions, and to be able to monitor individual drainage basin contributions to river water quality and enable potential correlations of turbidity events to localized land use practices.

a. Outcomes Anticipated:

With the institutionalization of this program, a long-standing thrust of UNF will become a core university effort. Specifically, education and information on the St. Johns River and its larger estuarine system will be made available at every level from kindergarten to high school through multi-disciplinary undergraduate studies. Emphasis, both in the cultural as well as commercial value of the river, and its broadly integrated impact on northeast Florida's regional heritage and future will be stressed, fostering local knowledge and pride. A multidisciplinary, transformational learning opportunity for UNF undergraduates based on the economic, political, geographical, biological and engineering aspects of the river will be a major product of this initiative. This program will interface well with the new Associate in Applied Science Degree in Environmental Sciences Technology at the Florida Community College's Cecil Education Center, especially in the hydrologic studies track.

Science-based coastal and riverine ecological information available to local and state decision makers will become a regional strength, including ecological assays, real-time data, mapping, and modeling of regional environmental systems. Baseline and long term data concerning various plant and animal populations associated with the coastal ecosystems of northeastern Florida are important to assessments and management strategies. Several UNF biology faculty are conducting investigations of a host of coastal plant populations with the goal of restoring the valuable water filtering properties of these species, while another is studying harmful algal blooms in the St. Johns River. A number of estuarine fish species are being monitored by trapping studies at a variety of locations within the intracoastal waterway. These results can be extrapolated in some cases to predict the health and population growth of other fish species as well. Other species such as diamondback terrapins are long-lived and territorial nesters, serving as long term indicators of the status of much of the estuarine habitat.

Coordination and integration within the region for both state and national agencies will improve. This includes support for emergency management in such areas as hurricane and storm surge forecasting, mitigation and regional public awareness programs. UNF expertise in instrumentation and transportation information systems will provide additional assets for port security.

With respect to the collaborative efforts of the UNF Environmental Center and the Advanced Weather Information Systems Lab on the St. John's River Initiative, the proposed scope of the project includes:

- The development of a communications infrastructure for Jacksonville waterways (RF Communication Network).
- Turbidity (and other sensor data) initial evaluation of the St Johns River Waterways for the development of a turbidity monitoring plan and needs assessment. Other data to be collected include turbidity, O2 saturation, temperature, conductivity, depth, pH, and chlorophyll, depending on the sensor suite selection and scientific requirements for the specific site.
- A survey of potential locations on Jacksonville waterways which satisfy the criteria to serve as a remote water quality monitoring site and which provide a suitable mounting location

(e.g. ownership, availability, navigation issues, communication linkage with the RF backbone, sufficient sunlight for the solar power system, etc.)

- The development of a wireless, real-time, water quality monitoring system and deployment of sensor stations at mutually agreed upon locations that meet the criteria contained in both the turbidity needs assessment and the potential site location assessment.
- Software development for the data ingest middleware system, communication system, data archival database and viewing systems including Internet maps and web-based database query systems, and automated alerts when data levels exceed preset thresholds.
- System maintenance, including sensor de-fouling and calibration every two weeks for the period of the contract.
- The establishment of a water quality rapid response team which will deploy, take field measurements, and identify the source of contamination in the event of episodically extreme water quality events.

b. Additional information:

Each university in the SUS has a distinct character. UNF has chosen to be known by the quality and character of its service to students and the regional community. This program clearly enhances that character and quality of service, while addressing community needs.

III. Budget Request for 2007-2008

		2006-07 Budget for Issue (A)	2007-08 State Funds Requested (B)	2007-08 Anticipated Reallocation (C)	Total Budget for Issue (D)
a.	Recurring Funds: Faculty Lines (6) Exec Asst. (Env. Ctr.) System Administrator Field Tech (instrumentation) Undergrad Research Stipends Graduate Research Stipends Operating Expenses Library Resources	\$784,000	\$503,100 \$ 70,950 \$100,620 \$150,000 \$180,000 \$330,000 \$400,000 \$125,000	(\$160,000) (\$40,000)	\$663,100 \$ 70,950 \$100,620 \$150,000 \$220,000 \$330,000 \$400,000 \$125,000
b.	Non-recurring Funds: Faculty Env. Research Env. field instruments Misc. (equipment) Cyberinfrastructure Multi-Dimensional undergrad Faculty search and start-up		\$220,000 \$600,000 \$150,000 \$410,000 \$ 50,000 \$600,000		\$220,000 \$600,000 \$150,000 \$410,000 \$ 50,000 \$600,000
c.	Total:	\$784,000*	\$3,889,670	(\$200,000)	\$4,089,670

*Flagship funding for Coastal Biology Program.

IV. Facilities

No new facilities are included other than a previously planned and internally funded expansion of the College of Computing, Engineering and Construction's Complex Computing Center.