

Public Education & Participation



A Survey of Stakeholders to Determine Florida Sea Grant's 2006-2009 Programmatic Objectives for Coastal Communities and Water-Dependent Businesses

Habitat & Species



Recreation



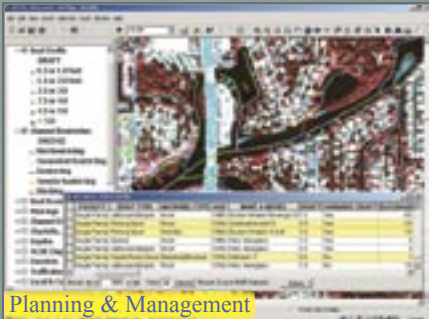
Working Waterfronts



Pollution Control



Planning & Management



Compiled and Edited by
Robert Swett and Susan Fann

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Florida Sea Grant's 2006-2009
Programmatic Objectives for
Coastal Communities
and
Water-Dependent Businesses**

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Introduction

The call of Florida's coasts is undeniable; people relish the opportunity to live, work, and play as close to her shorelines and waterways as possible. Indeed, the 35 coastal counties account for almost 80 percent of the State's population. Florida's coastal communities and water-dependent businesses face difficult, yet critical challenges: how to balance population growth, development pressure, recreational demands, and tourism with maintenance and enhancement of coastal environmental quality. There is a compelling need to foster strategies for community development and business growth that are equitable and sustainable. By the year 2020, the population of Florida's coastal counties is projected to approach that of the entire state in 2000. Water-dependent enterprises—traditionally small businesses engaged in recreation, tourism, and the marine trades—are at risk and need to increase their productivity and efficiency by adopting new technologies, adapting to changes in the regulatory environment, and maintaining access to coastal waters. For sustainable development to succeed, all stakeholders—including users, policymakers, regulators, and resource managers—need new methods and information sources to assess the individual and cumulative links between communities and industries and their physical, economic, and environmental impacts.

The mission of Florida Sea Grant (FSG) is to enhance the practical use and conservation of Florida's coastal and marine resources and thereby foster a sustainable economy and environment. FSG advances its mission through research, extension, and education. Every four years, with assistance from partners and stakeholders, FSG updates its strategic plan to insure that the goals and objectives underlying its mission are relevant and on-target. Ten goal areas encompass the current range of FSG programs (Appendix 1). The survey results presented in this report will guide the 2006-2009 program efforts and expenditures of one of these goal areas: "Coastal Communities and Water-Dependent Businesses." Survey respondents listed a number of topics that best fit within other Florida Sea Grant goal areas. These responses are presented in Appendix 2.

A 24-question Internet-based¹ survey was used to reach a broad spectrum of partners and stakeholders located throughout Florida (Appendix 3). This survey approach minimized the demand on each participant's time, yet maximized the guidance and knowledge that each provided to Florida Sea Grant. The sample represented a cross-section of audience groups (Table 1): 731 potential respondents were contacted and 151 completed the survey. The top respondent groups were agencies with statewide responsibility, institutions of higher education, municipal or county agencies, regional planning agencies or organizations with regional responsibility, and non-governmental organizations. Table 1 lists, by organization type or role, the number of persons invited to participate, the number who responded, and the response rate (percent). The last column represents the proportion of all survey responses contributed by each organization type/role. Figure 1 is a map that shows the business (office) location for all survey respondents (based on ZIP code); Appendix 4 provides a list of the various organizations with which respondents were associated.

¹ Commercial, online survey software at surveymonkey.com was used to operationalize the survey.

Table 1. Distribution of survey invitees and respondents by organization type or role.

Organization Type or Organization Role	Number of Persons Invited	Number of Persons Responding	Response Rate	Percent of All Responses
State Agency or Organization with Statewide Responsibility	91	32	35%	21%
Institution of Higher Education	52	21	40%	14%
Municipal/County Agency	71	19	27%	13%
Regional Planning Agency or Organization with Regional Responsibility	55	19	35%	13%
Non-Governmental Organization	65	17	26%	11%
Municipal and County Elected Official	246	14	6%	9%
Marine Industry	59	9	15%	6%
Federal Agency	33	6	18%	4%
Private Consulting Firm	24	6	25%	4%
K-12 Educational Institution	12	5	42%	3%
Print Media Organization	23	3	13%	2%
TOTALS	731	151	--	100%
AVERAGE RESPONSE RATE	-	-	21%	-

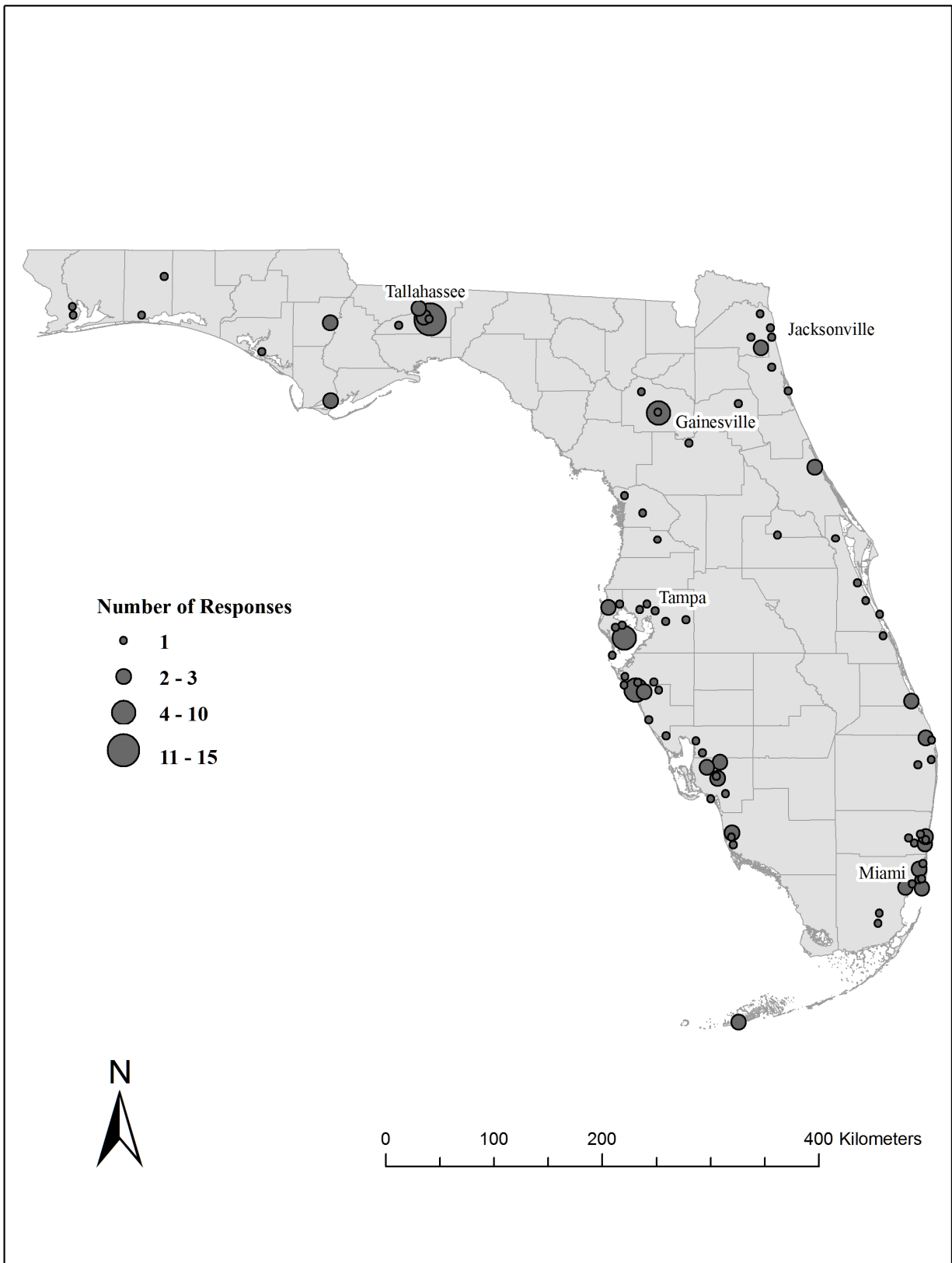


Figure 1. Business (office) locations of survey respondents in Florida based on ZIP code.

Survey Results

Ranking Principal Issues

Respondents were presented the following list of 12 issues that may affect the environmental and economic sustainability of coastal communities and water-dependent businesses. The items listed in parentheses after each numbered issue represent specific aspects of the overall issue.

1. Comprehensive, science-based, regional waterway planning and management to improve navigation and safety (channel maintenance, signage, boat traffic).
2. Coastal recreation/tourism planning and development (protection of natural habitats, artificial reefs, recreational boating, recreation/tourism facility siting analyses, carrying capacity).
3. Public access to coastal waterways (beach access, marina slips, boat launch locations, public to private conversion, land trusts).
4. Development of economic and environmental sustainability goals and indicators that measure progress toward their attainment (carrying capacity, reduced regulatory and permitting channel maintenance costs, total acreage of public recreation/conservation land).
5. Non-point source pollution (boat discharges and boat maintenance, marina operations, shoreline/yard maintenance).
6. Restoration and maintenance of aquatic habitat (seagrass, mangrove).
7. Assessment of environmental impacts on coastal waterways (channel maintenance, runoff derived shoaling and pollution, shoreline landscape/yard maintenance, waterfront development).
8. Public education to enhance meaningful participation in the creation, implementation, and monitoring of coastal policy (science-based knowledge).
9. Preserving historical and cultural resources (working waterfronts).
10. Protected/endangered species management (manatees, coral reefs).
11. Information to support management and decision-making (GIS spatial data, aerial and satellite imagery, local/regional impact assessments).
12. Balancing multiple “uses” of coastal waterways (recreational and commercial boating, protected species, habitat protection).

For each of the 12 issues presented, respondents were asked to indicate how important it is to them or to their organization that Florida Sea Grant makes it a research, extension, and education priority over the next 5-10 years. The rankings, based on survey responses for each of the 12 issues, are listed in Table 2 in descending order according to “High Priority” rank. (The issue number in the first column corresponds to the list above.) The five top-ranked high priority issues were coastal recreation/tourism planning and development (73%), followed by restoration and maintenance of aquatic habitat (65%), protected/endangered species management (64%), and information to support management and decision making (58%). The next four issues were tied at 54 percent: non-point source pollution, assessment of environmental impacts, public access to coastal waterways, and public education. The remaining four issues were balancing multiple “uses” (52%), development of sustainability goals and indicators (48%), comprehensive,

scientific waterway management (48%), and, finally, preserving historical and cultural resources (28%).

Respondents were given the opportunity to enter high priority issues not listed on the survey that they wanted to emphasize. Additional issues entered by respondents are presented later in the report.

Table 2. Priority rankings of economic and environmental sustainability issues.

Issue Number	Issue	Not a Priority	Low Priority	Medium Priority	High Priority	No Opinion
2	Coastal Recreation/Tourism Planning and Development	1%	3%	23%	73%	1%
6	Restoration and Maintenance of Aquatic Habitat	0%	6%	28%	65%	1%
10	Protected/Endangered Species Management	1%	7%	26%	64%	2%
11	Information to Support Management/Decisions	1%	11%	30%	58%	1%
5	Non-point Source Pollution	0%	7%	37%	54%	1%
7	Assessment of Environmental Impacts	1%	9%	34%	54%	1%
3	Public Access to Coastal Waterways	4%	8%	33%	54%	1%
8	Public Education	0%	7%	37%	54%	2%
12	Balance Multiple “Uses”	1%	7%	37%	52%	3%
4	Development of Sustainability Goals and Indicators	3%	9%	38%	48%	2%
1	Comprehensive, Science-based Waterway Management	3%	17%	30%	48%	2%
9	Preserving Historical and Cultural Resources	5%	21%	43%	28%	2%

Percentages across rows may not sum to 100 due to rounding.

Survey Respondents’ Top Issue

Survey respondents were asked to indicate which of the 12 issues presented to them on the questionnaire, or which issue they had added, they would rank as the MOST IMPORTANT issue to be addressed over the next 5-10 years. Previously, a respondent may have ranked several issues as high priorities (Table 2); however, the purpose of this question was to determine which issue a respondent considered to be the highest priority overall. The results are instructive, since the aggregated responses (Figure 2) do not mirror the rankings contained in Table 2. A majority (14.1%) identified public access to waterways as the single most important issue, followed by non-point source pollution (13.3%), coastal recreation/tourism planning (11.9%), and environmental and economic sustainability goals and indicators (10.4%). Balancing multiple “uses” of coastal waterways was identified by 8.9 percent, followed by restoration and maintenance of aquatic habitat (8.1%), environmental impact assessments (8.1%), public education on coastal issues (5.9%), information and data for resource management and decision-

making (5.9%), waterway management (5.2%), protected species management (4.4%), and historical and cultural resources (3.7%).

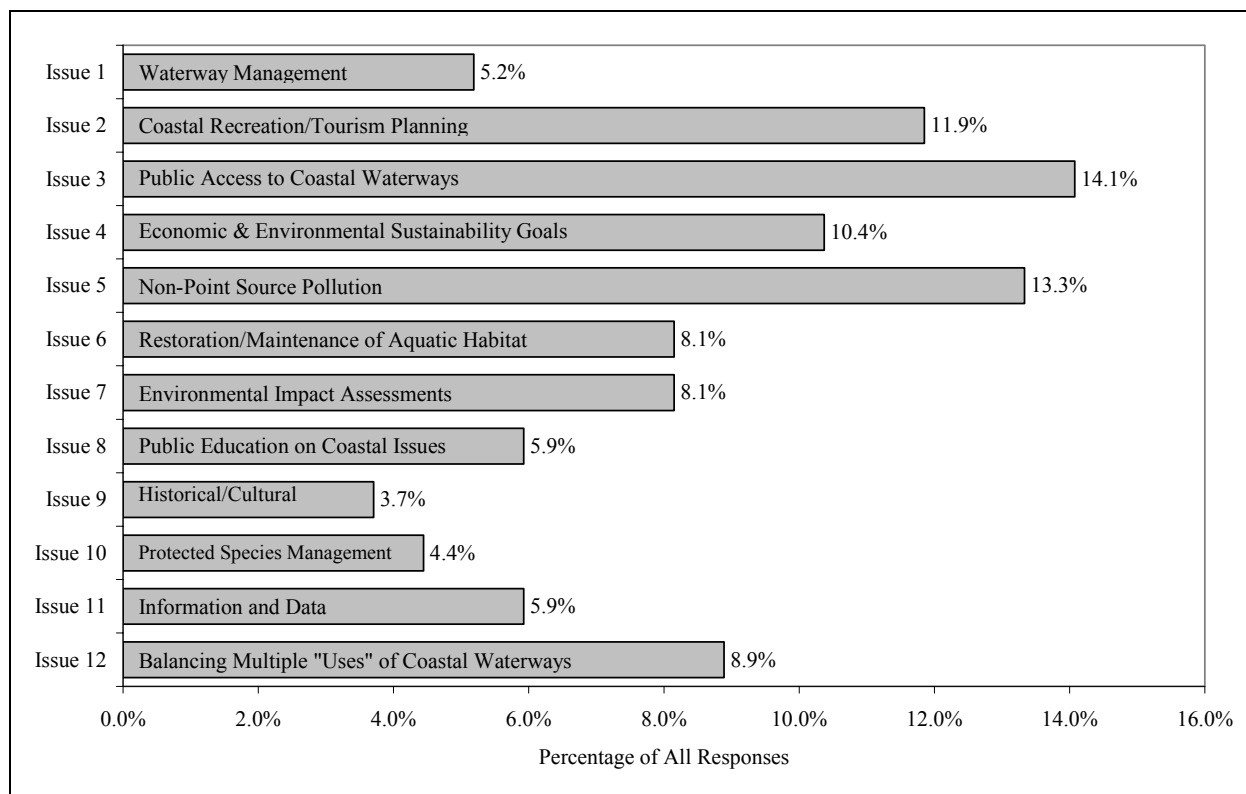


Figure 2. Survey respondents' top issue (135 responses).

Ranking the Main Aspects of Principal Issues

Respondents were asked to list which specific aspect(s) of each of the 12 principal economic and environmental sustainability issues, identified in Table 2, that Florida Sea Grant should make its HIGHEST research, extension, or education priority over the next 5-10 years (aspects are listed in parentheses for each issue below). Respondents were informed that the aspects listed on the questionnaire for each issue were not all-inclusive and, therefore, they were asked to enter any aspect not listed—if they felt it should be the foremost FSG research, extension, and education priority.

Below, for each of the 12 issues in turn, the priority aspects named by the respondents are ranked in descending order in an associated table. If more than two respondents mentioned an aspect that was not listed on the questionnaire, it is included in the relevant table; otherwise, additional aspects identified by respondents are listed following the table.

After survey respondents ranked issues and aspects, they were asked to propose the best strategy or action plan and to list the necessary resources (e.g., money) for addressing their MOST IMPORTANT issue. Respondents were further asked to describe up to three specific research

topics that they recommend Florida Sea Grant fund² to help resolve the issue that they ranked as most important.

Responses were edited only when clarity or broad categorization was an issue. Many responses were not delimited by a single survey category (i.e., action plan, necessary resources, or research topic), but rather provided overlapping discussion. All responses, taken together, provide a valuable glimpse into the collective mindset—an important element when considering the design and implementation of research, extension, and education activities to address the serious issues that Florida faces.

Issue 1: Comprehensive, science-based, regional waterway planning and management to improve navigation and safety (channel maintenance, signage, or boat traffic).

Respondents listed boat traffic as the most important aspect (45%) of comprehensive regional waterway management and planning, followed by channel maintenance (32%), and signage (18%). Speed zones (waterway, safety, and manatee) were an additional aspect identified by multiple respondents (5%).

Issue 1: Regional Waterway Management and Planning (65 responses)	
Boat Traffic	45%
Channel Maintenance	32%
Signage	18%
*Speed Zones (waterway, safety, and manatee)	5%

*Additional aspect cited by multiple respondents

Issue 1 concerns the design and maintenance of the water-based infrastructure (e.g., channels, canals, inlets and passes, ports, Intracoastal Waterway) that supports recreational and commercial boating activities on Florida's coastal waterways. Aspects of this issue include maintenance dredging, spoil disposal, on-water zoning (e.g., speed zones), and the design and placement of signage. Science must form the basis for the design and implementation of regulatory and management measures that are applied in coastal areas, whether it be the placement of waterway speed zones or the specifications for channels. For example, one question raised was whether (and how) the design, placement, and maintenance of boating infrastructure serves (or can serve) to protect adjacent aquatic habitats. Science must underpin the answer to this and other questions related to issue 1 (as well as to the other 12 survey issues). Necessarily, such analyses and evaluations require the collection of adequate data to inform the scientific and the decision-making processes. Examples of information needs mentioned by respondents include boat traffic estimates and determination of county-specific, recurring boating activities. Once regulatory and management measures are implemented, it is critical to determine their effectiveness, if the desired result is achieved and, if not, then how could it be achieved?

Many respondents echoed the need for economic analyses to determine the value derived from Florida's coastal resources, whether from recreational activities such as boating or from ecosystem functions such as fisheries habitat and pollution filtering. The results from these

² Each year Florida Sea Grant (www.flseagrant.org) awards approximately 1 million dollars to fund research projects that address issues within its 10 major goal areas (see Appendix 1).

analyses could provide the rationale and justification for requesting funding necessary for waterway planning and management. As can be expected, the inadequacy of funding sources to conduct projects and activities was a recurring concern in this and many other issues. For waterway management activities, one volunteered solution is for the U.S. Army Corps of Engineers to consider the economic benefits of recreational boating when conducting project cost/benefit analyses. For this to occur, however, political action is required, an arena and strategy suggested by many. In this case, for example, an action strategy is to alter the Rivers and Harbors Act and administrative rules to include recreational benefits as a priority public purpose for waterway maintenance and creation. The high cost of dredge material management may be offset by beneficial reuses, which should be evaluated and encouraged when effective and appropriate.

Federal, state, and local coordination of waterway management and maintenance activities could facilitate cost savings and provide for regionally-based comprehensive planning. Intergovernmental coordination could help streamline the channel maintenance permitting process (reduce complexity) and eliminate unnecessary duplication. One respondent suggested the need to revisit (1) the efforts of the Environmental Efficiency Commission, which was charged with consolidating and streamlining agency reviews and decisions, and (2) the State Programmatic General Permitting.³ One option to explore is whether results obtained from similar projects can be used to streamline the permitting process. Lastly, a question posed was whether waterways can be treated as rights-of-way and integrated into the land-side transportation planning system and, thus, accrue similar benefits.

More on-the-water law enforcement (and funding) is needed to improve waterway safety and boater compliance with regulations. Enforcement should be augmented with enhanced public education of boating rules and regulations, navigation and safety procedures, and environmental stewardship. All such efforts should include an assessment of their effectiveness.

Issue 2: Coastal recreation/tourism planning and development (protection of natural habitats, artificial reefs, recreational boating, recreation/tourism facility siting analyses, or carrying capacity).

Protection of natural habitats was the most often cited aspect (47%) of issue 2, followed by recreational boating (14%), artificial reefs (14%), recreation/tourism facility siting analyses (13%), and carrying capacity (13%).

Issue 2: Coastal Recreation/Tourism Planning and Development (102 responses)	
Protection of Natural Habitats	47%
Recreational Boating	14%
Artificial Reefs	14%
Recreation/Tourism Facility Siting Analyses	13%
Carrying Capacity	13%

³ <http://www.dep.state.fl.us/water/wetlands/erp/spgp.htm>.

Issue 2 considers the infrastructure that supports recreation and tourism activities within Florida, including, for example, the siting and management of recreational and boating facilities, beaches, and artificial reefs. Stated another way, this issue poses the following question: How can we make sure that enough water-related recreational destinations and activities exist for residents and tourists, without compromising the sustainability of Florida's environmental resources? One respondent stated that our natural resources need to be preserved because many habitats take decades to function properly and, therefore, it should not be acceptable to destroy a natural habitat even though a "new" one is being created (i.e., mitigation). One option suggested is to design and evaluate methods that enhance and stabilize Florida's ecotourism industry.

Better local, state, and federal interagency cooperation is needed, as well as adequate information to inform decision-making processes. Policy- and decision-makers at all governmental levels require detailed, accurate, and current assessments of the economic contributions and the environmental impacts of, for example, access facilities, artificial reefs, beach renourishment, and boating and supporting industries. The deployment of artificial reefs (e.g., shipwrecks/vessels) should be based on scientific guidelines that demonstrate increased productivity and/or decreased negative environmental impacts. For example, the sinking of the USS Oriskany off Pensacola is expected to generate high economic benefits, but environmental side-effects are undetermined. Once such projects have been implemented, they need to be monitored and any negative impacts mitigated.

Beach renourishment is widely practiced in Florida; however, there are unresolved questions as to its effects on natural and artificial reefs, near-shore fisheries, and hardbottom habitats due to, for example, storm-induced sand migration. Another concern mentioned was protection requirements for migratory and imperiled shorebirds that increase costs and delays for permitted renourishment projects yet, it was argued, there is insufficient documentation of project impacts. Associated issues include species tolerances to noise, movement, lights, and increased human activities and whether there are successful adaptation, avoidance, or mitigation techniques that can be employed.

Controversy often accompanies resource management issues, as exemplified by the polarization that surrounds current manatee protection efforts in Florida. The "my way or the highway" mentality that pervades both sides of such issues must be eliminated. Groups demanding more access and those demanding more protection must engage in productive dialog that results in effective pressure on our legislative bodies. In addition to better planning, consensus building and facilitation skills are required, as well as education efforts, to enhance public understanding of the issue.

Recreational boating in Florida is a major activity and, as such, deserves adequate attention. One fear expressed is that prevailing resource management attitudes are such that only passive, non-powered boating is promoted in shallow estuarine systems. A balanced approach is required to allay such fears, accompanied by development of methods and technologies to reduce harmful environmental impacts. Information that can assist includes spatial and temporal details on boat traffic patterns, analogous to studies conducted for vehicular traffic on land.

Issue 3: Public access to coastal waterways (beach access, marina slips, boat launch locations, public to private conversion, or land trusts).

The need for boat launch locations was the most often cited aspect (35%), followed by marina slips (25%), beach access (22%), public to private conversion (14%), and land trusts (4%).

Issue 3: Public Access to Coastal Waterways (90 responses)	
Boat Launch Locations	35%
Marina Slips	25%
Beach Access	22%
Public to Private Conversion	14%
Land Trusts	4%

The loss of public access to coastal waterways is a major issue in Florida, as evidenced by numerous media reports and by recent legislative activity.⁴ There are various facets to the access issue, such as boatyards, boat storage facilities, ramps, marina slips, residential docks, and beach and navigational access. While there is an apparent trend towards conversion of public access to private and more exclusive uses, the actual loss rate of commercial and recreational waterfront to more restrictive uses is unknown. Some believe, however, that the loss rate is such that immediate action is required to stem the tide of conversion. Factors that contribute to loss of access include the decline in financial viability of many water-dependent businesses due to increasing property values and rising taxes. Additionally, finding suitable sites to construct new facilities or to expand existing ones can be difficult due to high costs of coastal property, natural bathymetry limitations, and regulatory constraints (e.g., those related to water body designations).

Numerous questions underlie the public access issue, the answers to which will facilitate informed planning and decision-making. For instance, what are the economic, environmental, and social costs, benefits, and impacts associated with public waterfronts and the conversion of facilities to more exclusive uses? What primary factors encourage conversion of public waterfront access to private uses, and what regulatory and non-regulatory approaches exist to preserve public access? What is the recreational carrying capacity of our coastal areas? The answer can help determine where and how boat launch facilities are sited and their effects on natural habitats.

Survey respondents mentioned a number of possible solutions with respect to public access, some of which are mentioned in the Florida House Bill⁴ on the loss of working waterfront lands and public access. Any solutions broached should seek to balance environmental (species and habitat) protection and adequate public access to coastal resources. One suggestion is to analyze the effectiveness of regulatory and non-regulatory tools to prevent the conversion of water access

⁴ See HB 955 Waterfront Property (www.myfloridahouse.gov). The bill requires future land use plan element of local comprehensive plan for coastal county to include criteria to encourage preservation of recreational and commercial working waterfronts; provides requirements for shoreline use component of coastal management element re: recreational and commercial working waterfronts; provides for funding certain boating grant programs administered by the Florida Fish and Wildlife Conservation Commission.

facilities to more exclusive uses. The analysis could determine which public policy and regulatory changes, if implemented, would protect and enhance public use of the waterfront. Potential legislative solutions include (1) initiatives (e.g., similar to “Save Our Homes” property tax restrictions) to protect water-dependent businesses from redevelopment and (2) the designation and protection of a proportion of land for water-dependent uses, such as ramps, marinas, and working boatyards. These solutions, and others employed throughout the U.S., could be compiled in a handbook of successful community strategies to optimize public use of waterfronts and be made available to local Florida governments.

Potential financial solutions include the purchase of development rights from water-dependent businesses to ensure that future sales of such properties preserve their water-dependent uses. Tax incentives could serve to preserve and expand public access and to discourage “condo-creep.” Perhaps, as some communities are doing, it is time to “bite the bullet” and purchase suitable properties outright in order to stem the loss of public waterway access. To facilitate land purchases, the development of creative State programs that work with, or emulate, organizations such as Forever Wild, Nature Conservancy, and Ducks Unlimited might be warranted. Such programs could include mechanisms to increase grant and funding opportunities to local governments, as well as guidelines to encourage mixed-use facilities that require public access as part of the design, yet retain profitability.

The development and implementation of local and regional comprehensive plans to preserve and/or increase public access to coastal waterways should be fostered. Adequate plans would include demographic projections and “needs” standards for recreational marine facilities, such as the number of boat ramp lanes or marina slips needed per 1000 users. A comprehensive, statewide assessment should determine the supply and demand for public access at local and regional levels. The resulting information could then be incorporated within science-based decisions models—such as site suitability and economic impact analyses—developed for siting public access infrastructure.

One problem is the adversarial relationship that often exists between county, state, and/or federal agencies or between public parties (e.g., riparian landowners blocking beach access). One respondent asked, “Why can’t regulators proactively work with counties and cities to find boat ramp sites that will satisfy both environmental and user needs?” A potential solution is to facilitate meetings or partnerships that include the appropriate parties—such as regulators, industry, local decision-makers, commercial and recreational boaters, and homeowners—to develop local and/or regional access plans. Success stories from other communities can serve as examples: one respondent mentioned Ft. Lauderdale as a community that has been successful in maintaining both working boatyards and habitat.

Issue 4: Development of economic and environmental sustainability goals and indicators that measure progress toward their attainment (carrying capacity,⁵ reduced regulatory and permitting channel maintenance costs, or total acreage of public recreation/conservation land).

⁵ Carrying capacity refers to the number of individuals who can be supported in a given area within natural resource limits, and without degrading the natural, social, cultural, and economic environment for present and future generations. <http://www.carryingcapacity.org/whatis.html>.

The need to consider carrying capacity was the aspect most often cited (51%), followed by total acreage of public recreation/conservation land (39%), and reduced regulatory and permitting channel maintenance costs (10%).

Issue 4: Economic and Environmental Sustainability Goals (51 responses)	
Carrying Capacity	51%
Total Acreage of Public Recreation/Conservation Land	39%
Reduced Regulatory And Permitting Channel Maintenance Costs	10%

Sound economic and environmental goals need to be established or the other (11) issues listed in the survey will remain problematic and, inevitably, become more so. Feasible and defensible sustainability goals are required, as are ecological indicators to monitor environmental status and to reveal human impacts to coastal systems. Compliance with issue 4 requires that the status of Florida's coastal areas be determined in order to establish a baseline against which future change and/or progress can be measured. A statewide economic valuation of coastal resources would permit assignment of dollar amounts to trade-offs contemplated during resource-related decision-making processes.

Science should underlie growth management planning and the laws, rules, and regulations that are designed to counter negative development-related impacts on coastal resources. Clearly identified and agreed upon plans and milestones are needed to measure progress; "Otherwise, we are like a ship adrift with no ability to reach our goal." Growth management plans should be comprehensive, such that they can be applied by local, state, and federal permitting agencies in a coordinated and consistent manner and obtain similar outcomes. While sound planning and development practices are important, they must be accompanied by adequate statutory enforcement of standards adopted by local governments and by State regulatory agencies.

Respondents listed a number of specific research and planning objectives. One suggestion was to identify those aspects of growth that have the greatest adverse effects and then provide less damaging alternatives: once accomplished, expenditures and management activities can then be prioritized. A city commissioner opined that "land preservation and conservation is a key to managing growth" and that state and local protection programs should be accelerated and expanded. One way to accomplish this is through the establishment of land trust corridors using economic incentives. Greater impetus is needed to incorporate sustainability practices (e.g., greenroofs, permeable pavement) into the design of large-scale developments. Another suggestion was to require mandatory one-to-one offsets: i.e., setting aside one 'unit' of protected land for each 'unit' of development.

The need for adequate information, or data, was a concern mentioned by numerous survey respondents. One telling observation is the need for adequate time to collect data; often the pressure to make decisions in a 'timely' fashion does not allow adequate time to gather the necessary information to make the best or wisest decision. Economic data and analyses were a frequently mentioned requirement; for example, the need for cost-benefit analyses that include the 'true' value of wetland restoration or the impact of marine industries and water-dependent activities on local economies.

There is a need for leadership to bring together opposing sides of issues—to seek common ground. (Sea Grant was mentioned as playing a role in this capacity.) Processes are needed to build consensus among the competing interests: for instance, to preserve environmental quality while allowing development. Consensus building should target those audiences—businesses, local communities, mission-oriented scientists, elected officials—that are appropriate to the particular issue at hand. The goal should be to balance competing interests through partnerships, using scientific research and outreach to build (political) consensus.

Issue 5: Non-point source pollution (boat discharges and boat maintenance, marina operations, or shoreline/yard maintenance).

The most often cited aspect of non-point source pollution was boat discharges and boat maintenance (38%), followed by shoreline landscape/yard maintenance (35%), marina operations (22%), and storm water runoff (5%).

Issue 5: Non-Point Source Pollution (78 responses)	
Boat Discharges and Boat Maintenance	38%
Shoreline Landscape/Yard Maintenance	35%
Marina Operations	22%
*Storm water Runoff	5%

*Additional aspect cited by multiple respondents

Florida's is a tourist economy, and clean waters are imperative for residents and visitors alike. Numerous statements by respondents lamented Florida's status with regard to non-point (and point) source pollution. One respondent stated that Florida has invested 30 years in managing for environmental quality, but escalating water quality problems indicate a lack of success—as exemplified by TMDL⁶ requirements, which affirm that best management practices (BMP) have failed. Another respondent said that non-point source pollution would negatively influence nearly every issue listed in the survey, if not adequately controlled. Research has shown that our bays are not as healthy as in the past; the question we face is “what can be done, at what cost, and which bays need the most help now?”

Examples of specific problems mentioned by respondents include: nitrogen rich effluents entering waterways; bacterial pollution and sediment deposition near shellfish harvest areas (sediment re-suspension and transport can smother shellfish beds); beach closures due to local water pollution events; pesticide and fertilizer products in yard runoff; discharge of waste from large vessels (e.g., cruise ships) into coastal waters; and ocean dumping of all kinds. In addition, questions abound, such as what causes large-area pollution that leads to ecosystem changes (e.g., harmful algal blooms in the Gulf of Mexico); how do various pollutants affect biodiversity; and how does thermal pollution affect estuarine habitat and marine organisms?

Respondents mentioned many approaches to resolving pollution problems, which are listed in subsequent paragraphs. First, however, we should look to existing success stories or examples

⁶ Total Maximum Daily Load (TMDL) is the amount of a particular pollutant that a particular stream, lake, estuary, or other water body can “handle” without violating state water quality standards. www.dep.state.fl.us/water/tmdl

before duplicating efforts unnecessarily. For example, it was suggested that successes in Chesapeake Bay or in the Indian River Lagoon might be emulated; or that the Great Lakes might serve as a model for stronger boat waste laws.

Basic scientific information is required in order to guide the planning process, particularly since non-point source pollution is often a volatile political issue. One suggestion given was to develop a budget of (major) pollution sources and to prioritize remedial or preventative actions accordingly. Such a budget might specify, for instance, the relative contribution and impact of various pollution sources—e.g., storm water runoff, highway pollution, septic systems, lawn treatments, family-home practices, marinas, and vessels—on water quality and aquatic habitats. Included would be quantification of particular constituents, such as heavy metals and nutrients. Additional research is needed to better understand the sources and impacts of pollution and to provide quantification of the nutrient/pollutant carrying capacity of coastal ecosystems. With such information available, actions can be prioritized based on the scale and extent of impacts; the feasibility of solutions; the degree of intergovernmental cooperation; and the availability of local, state, and federal funding. Good information and ongoing assessments will require tracing and monitoring inputs (e.g., septic discharges) into our water bodies. This will necessitate improvements in the accuracy and cost-effectiveness of scientific methods, such as DNA testing.⁷ Lastly, there is a need to determine and prioritize new strategies and/or management practices that are best for minimizing and mitigating impacts that stem from various activities, such as development.

The design and emplacement of proper infrastructure can help eliminate many existing sources of pollution and guard against future occurrence. Needed are additional storm water control and treatment facilities, the means to retrofit or restore older systems and outfalls, and the design and construction of control/treatment systems for residential developments built without them. It must be recognized that tertiary storm water and sewer treatment facilities, though needed, are a tremendous financial burden for local governments to assume on their own and, thus, state and federal support is warranted.

Advanced technology can play an important role. For example, baffle-box type traps hold storm water runoff until harmful chemicals are broken down. Failing and inadequate septic systems⁸ are a significant pollution source and their management should be improved, including regular inspections to identify and replace failing systems. Such inspections should be tracked over time. Pumping of human waste from boats into pump-out facilities is not a viable long-range solution and, therefore, complete human-waste treatment systems for boats should be developed (e.g., Clivus Multrum-type⁹ composting). In addition, research is needed to determine if best management practices (BMP) are effective, such as those employed by the Clean Marina Program¹⁰ (i.e., is water cleaner as a result?).

⁷ <http://www.napa.ufl.edu/99news/ecoli.htm>.

⁸ A septic tank system serves as an on-site wastewater treatment system in places where public sewers are not available. One third of all Florida homes, about 1.6 million households, use septic tanks; <http://www.dep.state.fl.us/cmp/issues/septic.htm>.

⁹ A composting system that uses no water.

¹⁰ The Florida Department of Environmental Protection, Division of Law Enforcement, formed the Clean Boating Partnership to work with private organizations such as the Marine Industries Association of Florida in their

Alternate landscaping and lawn care techniques offer significant opportunities to reduce pollution. One example is the development and promotion of cost effective landscaping grasses that require less treatment with fertilizers and pesticides. Floritam, which is unsuitable for coastal areas, is still in high use; Zoysia varieties should be developed and marketed as proven sod replacements (not plugs). Additional gains can occur by developing and promoting lawn care products that are less harmful to the environment.

As with all issues, funding is a hurdle and potential sources to address prioritized actions need to be identified: examples include impact fees, vehicle/vessel registration fees, and federal cleanup dollars. “Pay your way” solutions can be implemented in some situations by identifying the short- and long-term economic and environmental costs or impacts that are associated with specific human activities. Appropriate costs can be added to user fees and/or surcharges and then earmarked to address resulting impacts. In addition, surcharges could be placed on products (insecticides, pesticides, fertilizer, gasoline) that contribute to pollution and the resulting revenues applied to mitigating activities, such as restoration or education. Collaboration may provide cost savings by combining the efforts of local, state, and federal agencies, as well as non-profits and volunteers, to provide person-hours, equipment, and funding. Collaborative funding could facilitate acquisition of sensitive property in undeveloped areas, particularly when communities, such as small towns, do not have the spare capital to purchase vacant land. Such acquisitions can protect essential habitats that also serve to filter runoff contaminants before they enter aquatic environments. Last, but not least, financial incentives could be provided to developments to reduce runoff and to improve treatment of non-point source pollution from residential areas.

Regulatory and legislative solutions to pollution problems will always play a role, although one respondent suggested that the U.S. Environmental Protection Agency and the Florida Department of Environmental Protection do not adequately address non-point sources of nutrient input into coastal waters. A respondent suggested that a process be instituted, equivalent to that used by Metropolitan Planning Organizations (MPO), that requires managing agencies to work from a common plan or face the prospect of losing state and federal fiscal resources. The respondent noted that competing agencies, seeking dominance, too often divert management efforts from planned goals or desired results. Another solution is to determine the developmental carrying capacity of watersheds and neighboring waters and then (1) establish growth threshold values for percent cover of impervious surface as well as storm water runoff nutrient thresholds (e.g., TMDL, PLRG: pollution load reduction goals) or (2) set development limits. More targeted approaches might include establishing limits on landscape companies that spray near shorelines or storm water drainage systems, or strictly enforcing compliance with existing laws for banned and restricted chemicals (e.g., pesticides, herbicides). Studies that gauge user compliance with existing codes and regulations can benefit a variety of purposes, including planning, development of education programs, and agency staffing decisions.

Education and recognition are important tools for helping to resolve pollution problems. Educational programs should be developed to inform people and businesses of their role in generating and controlling non-point source pollution, of the importance of beach water quality,

commitment to improve the health and cleanliness of our waterways.
<http://www.dep.state.fl.us/law/Grants/CMP/default.htm>.

and of the ocean’s inability to handle indiscriminate waste discharge. It was recommended that funding be secured to develop innovative K-12 educational programs that both teach children and create good environmental stewards. Public outreach efforts could serve to ensure that the economic basis of product-use decisions includes potential environmental impacts.

Funding, grants, or other rewards can be given to organizations that implement storm water best management practices, such as, in parking lots and landscaping. Shoreline volunteer programs that monitor water quality could suspend applications of particular substances—such as fertilizers or pesticides—for determined periods of time when water quality declines. Participating communities might be awarded grant funding and be designated ‘Clean Watersheds.’ Effective (scientifically proven to produce significant results) voluntary compliance strategies should augment regulatory and law enforcement mechanisms. In other words, a continuum of environmental protection tools is needed.

Issue 6: Restoration and maintenance of aquatic habitat (seagrass or mangrove).

The most often cited aspect of restoring and maintaining aquatic habitat was seagrass (59%), followed by mangrove (32%). Several respondents cited a need to consider all submerged aquatic vegetation (4%), coral reefs (2%), and oyster reefs (2%).

Issue 6: Restoration and Maintenance of Aquatic Habitat (100 responses)	
Seagrass	59%
Mangrove	32%
*All Submerged Aquatic Vegetation	4%
*Coral Reefs	2%
*Oyster Reefs	2%

*Additional aspects cited by multiple respondents

The answers to habitat restoration and maintenance (preservation) vary. Some habitats are large and can be acquired, some are private and entail education of owners, while others are marine and may require restriction of activities. Overall, land-use management is probably the most important option. Habitats easily damaged by human activities (e.g., shallow-water seagrass beds) need to be protected and may require the establishment of areas of limited or prohibited activity for sufficient durations to permit recovery and/or protection. Limitations assigned to such areas may include no-take zones for offshore habitats, no-motor (internal combustion engine) zones for shallow seagrass beds, or the restriction of both development and high-speed boat traffic for the stabilization of some shorelines. Science should provide the basis for deciding when and where such areas are established. For instance, the effectiveness of Marine Protected Areas¹¹ (MPA) and the optimization of their use around the Florida peninsula need to be better understood. Furthermore, Essential Fish Habitat¹² (EFH) for aquatic resources (e.g., high-value marine recreational fish species) needs to be better defined and understood; how does its loss,

¹¹ According to the World Conservation Union, marine protected areas (MPAs) consist of any area of the intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical, and cultural features, which has been reserved by law or other effective means to protect part or the entire enclosed environment.

¹² Congress defines Essential Fish Habitat as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802(10)).

degradation, or restoration affect aquatic living resource populations and communities? Hardbottom habitat in the near-shore is ephemeral, yet considered Essential Fish Habitat and protected. In all cases, it is best to conceive and coordinate conservation and protection measures at the ecosystem level.

Better science-based guidance is needed to protect and restore habitats (e.g., marine, benthic, seagrass, mangrove, coral reef, wetlands, nearshore hardbottom, and natural growth shoreline). On-going projects must be monitored and reviewed more closely to identify failure and success trends. Examples of needed guidelines include design and material options for nearshore hardbottom mitigation or the relevant criteria for defining setbacks (e.g., soil types, vegetation). A historical assessment of past activities that impact aquatic habitat—coverage, wildlife usage, materials, construction options, monitoring techniques, and success criteria—could help to reduce the planning and design costs for future projects (e.g., beach restoration, inlet maintenance, pipeline and cable installation, port channel construction) and any negative impact on habitat. In addition, the effects of waterway and navigation improvements on natural resources need to be determined; in particular, the influence of channel dredging, speed zones, and boat wakes.

Effective planning for habitat restoration and maintenance is required in the face of multiple and varied assaults on marine habitats. Comprehensive and detailed habitat mapping will facilitate better management and improve the capability to assess conservation, restoration, and maintenance potential. Efforts will be improved through long-term monitoring of habitat and environmental conditions in order to better understand spatial dynamics and to clearly track and understand changes. Improved methods (e.g., GIS) for tracking mitigation efforts may help to improve their success, as well as to lower costs. The benthic habitat work done in Puerto Rico and the Virgin Islands is the type of profile that may benefit Florida coastal user groups in their decision-making. Similar work in Florida would create benchmarks where none exist and provide for change analyses. A statewide effort should be launched to standardize coastal (underwater) mapping—a geographic (spatial) layer that is required for effective management and research. The same information would serve for other uses, such as identifying mitigation areas, development planning, or waterway management and maintenance.

The impacts of expanding coastal development on native aquatic environments are varied and include, among others, increased influx of nutrients, altered freshwater flows, and loss of buffering for upland and wetland habitats. Waterfront development should be planned and managed so that coastal environments are not overwhelmed or shallow habitat fragmented, destroyed, or degraded. This will require identifying, at local and regional scales, minimum required estuarine habitat space, structure, and size (minimum functional physical area); maximum reasonable human use levels; and strategies to eliminate pollution from various sources. The necessary resources to accomplish these tasks include long-term funding for monitoring efforts and focused, short-term (few years) research funding for specific solutions to pre-identified issues.

Responsible growth that balances water use and habitat conservation with low-impact development will require fundamental changes in attitudes and policy. Education is vital to bringing about these changes and, in concert with regulation and enforcement, can play an

important role in the restoration and maintenance of habitat and overall environmental quality. Educational programs can be designed for a variety of users groups, including elementary schools, marinas, boaters, and homeowners, and be targeted for specific purposes—such as reducing boat impacts on seagrass beds. Environmental education programs can teach recreational and commercial users about estuaries and oceans, the importance of protecting fish habitat, and the economic benefits derived from resources. Public acceptance (through education) of marine protected areas, including no-take and no-entry zones, is necessary to ensure their effectiveness. Education also can play a role in the early detection and prevention of marine invasive species, by developing and teaching best management practices to shoreline-dependent businesses with the potential to introduce marine invasive species (e.g., bait shops, fish houses, ports, boatyards, and marinas).

Public acceptance of and appreciation for the importance of services provided by aquatic ecosystems can be bolstered by studies that establish the economic value of those services and, thus, demonstrate the benefit of habitat protection. Furthermore, such studies might serve to establish the economic value of coastal resource conservation versus coastal development.

Media outlets (e.g., newspapers, TV, and radio stations) should be a high priority when seeking project partners. Public recognition can serve as a powerful incentive and teaching tool, and can consist of ceremonies that recognize private citizens and businesses that set the ‘best’ examples. Such ceremonies could be replayed on public access cable stations to reinforce the message. Another way to ‘broadcast’ messages is through multi-partner, interagency cooperation, with many people (e.g., public, private, state, federal, local, university) thereby delivering the same message. Interactive education can take the form of involving students and teachers in restoration projects with the additional benefit of lowering project costs while developing stewardship.

Numerous research questions remain to be answered. A broad question is how to reverse the decline of Florida's living coral reefs and reef-dependent fish and invertebrate communities. Other research topics listed by respondents included determining the impacts of the 2004 hurricanes on aquatic habitat; the role and importance of habitat interconnectivity (e.g., offshore natural and artificial reefs, seagrass meadows, mangroves) in the life histories of marine organisms; the resiliency of seagrass to disturbances (e.g., storms and prop scarring) and degree of re-colonization after such impacts; the impact of coastal construction and inland water quality on nearshore and offshore habitats; the degree of habitat (seagrass) loss from various sources, such as thermal pollution or overgrazing by manatee populations; the impacts of reduced vegetative buffers on aquatic ecosystems; the use of nearshore hardbottom habitat by fish and turtles (e.g., foraging). Lastly, a respondent suggested that more studies are needed of the range, abundance, and status of seagrass *H. johnsonii*, a major concern with permitting agencies tasked with port projects.

Issue 7: Assessment of environmental impacts on coastal waterways (channel maintenance, runoff derived shoaling and pollution, shoreline landscape/yard maintenance, or waterfront development).

The most often cited aspect for assessing environmental impacts on coastal waterways was waterfront development (45%), followed by runoff derived shoaling and pollution (22%),

shoreline landscape/yard maintenance (21%), channel maintenance (10%), and cumulative impacts (2%).

Issue 7: Assessment of Environmental Impacts on Coastal Waterways (82 responses)	
Waterfront Development	45%
Runoff Derived Shoaling and Pollution	22%
Shoreline Landscape/Yard Maintenance	21%
Channel Maintenance	10%
*Cumulative Impacts	2%

*Additional aspect cited by multiple respondents

There is a need for creative approaches that allow people to live and work near the water (coasts) without damaging or degrading natural ecosystems. When determining the potential environmental impacts that stem from human activities, credible scientific evidence must form the basis, not emotional arguments. Survey respondents listed numerous items they believe require environmental impact assessments, some quite specific and others much broader in scope. Items mentioned included impacts due to runoff pollution from new developments; poor storm water control; hydrologic alterations (mosquito ditches, canals); specific human activities (e.g., tourism, fishing); hydrocarbon contributions from airports near coastal areas; land use changes; and coastal overpopulation.

Remaining (pristine) estuaries that are most vulnerable to cumulative impacts need to be identified. Focused and coordinated federal, state, and local efforts might then be mounted to minimize impacts through policy, monitoring, and enforcement. More stringent regulations for habitat protection may be required. A strategy suggested is to design (waterfront) development to minimize impacts near (pristine) wetland areas, for example, by emulating the function and design of natural systems (e.g., flood control, water quality). Sea Grant research dollars should support the development of additional low impact strategies—such as community docks or mooring systems that protect coral reefs. A comprehensive statewide assessment should identify and prioritize specific areas to target. It was suggested that Sea Grant sponsor a workshop, to include all major agencies (e.g., Department of Environmental Protection, Fish and Wildlife Conservation Commission, National Marine Fisheries Service, water management districts), to identify specific problems and devise strategies to resolve them. The workshop could also serve to assess quantification (data/information) needs.

Respondents posed numerous research topics that included:

- Assessment of the cumulative impacts of water-based activities (e.g., development, point and non-point source pollution, waterway signage, boat traffic, waterway/navigation improvements) on resources (e.g., protected species, essential fish habitat)
- The effects of urban sprawl, waterfront development, and land use conversion on aquatic/marine resources—what is the “tipping point?”
- The impact of proposed large-scale, rapid development in rural coastal areas
- The source of hypoxia triggers in estuaries
- Impacts due to disruption of the natural hydrologic cycle (e.g., freshwater inflow to estuaries via surface and groundwater infiltration)

- Impacts of hard structure armoring of shoreline (e.g., bulkhead, seawall), particularly along protected water bodies
- The effects of boat live-aboards (i.e., long-term mooring) within aquatic preserves
- Identification and assessment of the true impacts of recreational boating and fishing on (Gulf of Mexico) fisheries
- The effectiveness of laws that require cumulative impact assessments
- Identification of essential activities with the greatest impact on sensitive coastal, tidal, and benthic ecosystems

Issue 8: Public education to enhance meaningful participation in the creation, implementation, and monitoring of coastal policy (science-based knowledge).

The most often cited aspect of public education to enhance participation in coastal policy was public education/science-based knowledge/increased participation (70%), followed by education/training for K-16 students and teachers (12%), and increasing public knowledge of codes and regulations (5%).

Issue 8: Public Education to Enhance Participation in Coastal Policy (51 responses)	
Public Education/Science-Based Knowledge/Increased Participation	70%
*Education/Training for K-16 Students and Teachers	12%
*Increase Knowledge of Codes and Regulations	5%

*Additional aspects cited by multiple respondents

Several statements made by respondents capture the tenor of this issue: that is, the importance of sound education (“knowledge is power”).

- People cannot be responsible land stewards if they have highly polarized beliefs regarding their relationship with coastal resources and management issues
- To the extent possible, politics must be removed from issues
- Loss of public faith in agenda-driven science jeopardizes responsiveness to resource management

The last statement suggests the following research question: What are the effects of agenda-driven science on public compliance with resource laws and environmental programs?

As stated by one respondent, a sustainable future depends on the education of young people—the ones who will be formulating future public policy. The formal K-16 educational system is the obvious vehicle for reaching young people. A primary need is adequate funding for student and (science) teacher education programs that emphasize a balance between economic growth and environmental sustainability. Today's world is business-driven and most students do not understand that environmental sustainability underpins a sound economy. Teachers statewide should be trained on environmental sustainability topics; “if you reach one teacher, you reach over 100 students.” Furthermore, environmental education programs in public schools and science organizations need to be enhanced, since, as one respondent stated, you only conserve what you love and only love what you know. Educational goals are best reached with balanced sets of lessons, labs, simulations, readings, case studies, and hands-on activities that match state science standards and that enable teachers to involve students in all aspects of coastal development issues.

Student instruction should extend beyond the formal classroom by including hands-on activities that address relevant topics, such as marine science. For instance, most students have knowledge of habitat restoration, but they do not understand how it works or why it is important; not only do students need to appreciate the monetary and non-economic values associated with habitat restoration, they also would benefit by participating in restoration projects. Other activities outside of the classroom might include education initiatives that, for instance, meld boating safety with environmental stewardship.

In addition to the K-16 community, the public obviously warrants targeted education efforts. In general, the goal of public education should be to foster conservation and stewardship in the shortest time possible, and to promote participation in coastal policy implementation by a diverse group, from homeowners to public agency staff to decision-makers. Public input should inform the decisions and strategies that guide NOAA and other federal, state, and local agency programs. There are, of course, innumerable topics to address, some specific, others quite general. One topic listed, for instance, was to increase public awareness and understanding of the importance (e.g., economic value) of coastal and marine resources.

Whatever the education topic, numerous methods are available to transmit the desired message; they include marketing, public service announcements, and/or information flyers. Another idea broached was to develop a citizen's guide to living on the coast that teaches how to reduce the environmental impacts due to residents and coastal development (e.g., reducing runoff, invasive species control, long-term impacts of developing in coastal areas).

Given Florida's status as a tourist destination, visitor education should be supported. Too many tourists come to the coast and do not understand the impact of their actions on natural resources. A suggested method is to air public service spots on airplanes. Recreational users should also be educated about best practices to follow when in sensitive management areas.

There is an obvious desire to boost the involvement of an educated public in the debate that surrounds issues. An informed and engaged citizenry can benefit policymaking and the legislative processes that occur at all levels of government. To achieve this end will require the design and implementation of methods to reach non-participants. An informed and engaged public will have many occasions to interact with various classes of professionals, such as lawyers, resource managers, and engineers. Instructional resources for professionals are therefore needed so that they (1) know the issues; (2) develop skills to assess, plan, and communicate; and (3) have the ability and opportunity to interact with the public.

Outreach programs, whether aimed at schools, community organizations, or other audiences, can be a cost effective way to increase public engagement and to elicit support. For instance, dedicated outreach programs might bridge gaps between coastal managers and public users, eliminating the 'us or them' mentality. The opposing sides of an issue often desire the same end, but frequently there is much distrust to overcome. For this reason, the science that supports particular management goals must be available to the public in a format that is understandable. Also required are effective ways to educate elected officials (e.g., municipal and county) and to advance science-based decision-making regarding coastal land use, development, and long-range

planning. Sea Grant is particularly suited to assist with education, by extending scientific research studies to public audiences.

Other suggestions include (Sea Grant) collaborating with the Centers for Ocean Science Education Excellence¹³ (COSEE) to address public education issues, and to build international capacity (education and training) by establishing strong links with academic, education, and science communities in developing nations. Social marketing¹⁴ tools could be used to develop comprehensive profiles of marine communities, stakeholders, and their interactions, and to determine resource requirements for developing and sustaining effective partnerships that foster a sense of community value.

Issue 9: Preserving historical and cultural resources (working waterfronts).

Issue 9: Preserving historical and cultural resources (29 responses)	
Working Waterfronts	100%

In addition to working waterfronts, respondents mentioned the need to consider water sports areas, marinas, and boat launch facilities. Mention was made of the loss of many such areas and facilities and the need for strategies to “get them back,” and how to maintain industries important to coastal communities, while protecting the environment.

A creative suite of incentives and strategies are needed to retain and/or expand recreational and commercial working waterfronts, while providing for environment protection. Government can provide incentives through property taxes, permit restrictions, or other government fees. A question posed by one survey respondent is whether state historical tax credits can be expanded to protect cultural resources on the waterfront. Besides the potential for historic designation, a variety of other examples and measures could serve to retain and/or conserve working waterfronts. These include the purchase of development rights, land trusts, model ordinances, or, simply, better access to grant money. Unfortunately, many communities are unaware of the various options available to them; Sea Grant should consider developing a guidebook to make this information widely available.

Additional strategies to retain and/or expand working waterfronts can come from facilitated sessions (e.g., statewide and regional) with stakeholders, or through tours. Either could serve to inform policymakers at all levels of government about (the loss of) working waterfronts. Also needed is an assessment of the economic impact and value of commercial fishing and boat construction facilities, as well as the cost-benefits of small and medium-sized ports and harbors to state and local economies. Lastly, planning requires better information to identify activities

¹³ The Centers for Ocean Sciences Education Excellence (COSEE) is a network of seven regional centers that act locally and regionally (www.cosee.net). The goals of COSEE are: to promote the development of effective partnerships between research scientists and educators; to disseminate effective ocean sciences programs and the best practices that do not duplicate but rather build on existing resources; and to promote a vision of ocean education as an interdisciplinary vehicle for creating a more scientifically literate workforce and citizenry.

¹⁴ Social marketing is the planning and implementation of programs designed to bring about social change using concepts from commercial marketing. <http://www.social-marketing.org/sm.html>.

that may adversely affect cultural and historical resources, thus affording the opportunity to deny their authorization.

Issue 10: Protected/endangered species management (manatees or coral reefs).

Manatees were mentioned most often (43%) followed closely by coral reefs (41%). Several respondents added “all endangered species” (5%), sea turtles (4%), habitat (4%), and water birds (2%).

Issue 10: Protected/Endangered Species Management (93 responses)	
Manatees	43%
Coral Reefs	41%
*All Endangered Species	5%
*Sea Turtles	4%
*Habitat	4%
*Water Birds	2%

*Additional aspects cited by multiple respondents

Actions to protect endangered species include the establishment and enforcement of no-take areas, Marine Protected Areas (MPA), and ocean zones set aside for protection. Species and habitat protection should be coupled with boater education, boating regulations, and adequate enforcement of existing laws. Once established, regional assessments are needed to determine the effectiveness of zones (e.g., affects of boater compliance within speed zones in reducing manatee deaths and injuries). The results could improve zone delineations and aid in the development or revision of educational programs. Furthermore, the effectiveness and design of waterway signs for manatee protection need to be improved and better methods developed to separate vessels from manatees (e.g., avoidance technology). One suggestion was to incorporate GIS layers of manatee protection zones with personal GPS units that are in wide use by recreational boaters. Assessments of protected species (sea turtles, dolphins, manatees) are needed to determine the effects of degraded estuaries on their health and, ultimately, on the health of the people living in and around these areas. Research tools should be developed to monitor protected species on broad temporal and spatial scales.

Lastly, a respondent indicated that the time between notification of violators and compliance with existing code regarding lighting requirements during turtle nesting season needs to be reduced—the current time period is too long to benefit the species.

Issue 11: Information to support management and decision-making (GIS spatial data, aerial and satellite imagery, or local/regional impact assessments).

Respondents cited GIS spatial data as the information most needed to support management and decision-making (38%), followed closely by local/regional impact assessments (37%), and aerial/satellite imagery (25%).

Issue 11: Information to Support Management and Decision-Making (87 responses)	
GIS Spatial Data	38%
Local/Regional Impact Assessments	37%
Aerial and Satellite Imagery	25%

Many areas of Florida are developing rapidly (e.g., urban sprawl) and regulatory tools—such as statutes and rules—are not always based on good science, but, rather, on personal judgment calls at the time of development. Similar to other professionals, regulators require sound, science-based information to be able to adequately assess environmental impacts and devise solutions, such as permitting criteria, which are appropriately targeted and sufficiently restrictive without being overly burdensome. The information requirements that underlie regulatory and management efforts and policymaking are substantial. It is prudent, therefore, to catalog, review, and consolidate existing information and data sources before initiating new collection efforts. Consultation with the community of marine and coastal users and managers can help to identify existing information as well as that which is lacking. This will require methods, including feedback mechanisms, to identify the appropriate sources, to collect input, and to distribute data.

Respondents frequently mentioned socioeconomic data as being necessary to adequately address several issues. For example, there was an expressed need for socioeconomic surveys related to (outstanding) protected areas, similar to those completed in Broward, Palm Beach, Miami-Dade, and Monroe counties for their reef systems.¹⁵ Also reiterated, was the importance of determining the value of coastal and ocean natural resources to various sectors of Florida's economy, such as tourism and marine industry. Exemplars of this type of work include the NOAA National Ocean Economics Program¹⁶ (Judith Kildow, Principal Investigator), which is designed to inventory ocean and coastal assets.

A number of suggestions were related to data collection methods. Required are new sensor technologies (e.g., real-time nutrient sensors)¹⁷ and low-cost tools—including remote sensing, in-situ monitors with telemetry capabilities, and analytical software—to monitor the health of waterways and thereby quickly pinpoint problem areas. Ideally, a network of real-time environmental monitoring stations could be installed and personnel trained to evaluate the resulting data. More generally, established standards for the capture and compilation of marine and coastal data would facilitate data sharing across projects. Mapped (GIS) information, such as habitat and other ecological data, compiled at the appropriate spatial and temporal scales, would help meet research and management needs.

Specific data needs mentioned included recurring aerial photography of all shorelines—both coastal and interior; continued collection of boat and boater information; SEACOOS and IOOS

¹⁵ “The Socioeconomic Study of Reef Resources in Southeast Florida and the Florida Keys.”

¹⁶ The objective of this project is to provide useful data on ocean-related economic activities and resource trends to government, businesses, and individuals to assist with investment and management decisions as they attempt to balance conservation and growth in coastal areas; <http://noep.csUMB.edu/>.

¹⁷ For example, see the Florida Fish and Wildlife Conservation Commission's in situ autonomous monitoring platform known as MARVIN, which transmits near real-time data via satellite uplink. Available data includes: water and air temperature, salinity, wind speed and direction, precipitation, barometric pressure, relative fluorescence (a proxy for chlorophyll a), current speed and direction, water depth, NO₃+NO₂, PO₄, pH, dissolved oxygen, and turbidity; <http://www.merhabflorida.org/calooHome.htm>.

data,¹⁸ and bathymetry; and GIS data and imagery that permits improved identification of natural resources and impacts. Information products are needed for both management and layperson audiences that provide comprehensive spatiotemporal perspectives of environmental and economic impacts that derive from different coastal development scenarios.

Once collected, data must be easily accessible to potential users. It is essential, for instance, that results from funded research be adequately documented and made widely available to the coastal zone management community. Florida ranks low among states in providing access to GIS spatial data for its communities and, therefore, significant effort should be focused on providing the necessary access. Development of a statewide Internet-based resource and associated services to make public the existing information and data would help.¹⁹ Sea Grant could become involved with the DLESE²⁰ program (Digital Library of Earth System Education) by, for example, funding graduate students to contribute Sea Grant-related information to the Web portal, greatly increasing exposure to a large, international audience.

Coping with prodigious information requirements and datasets requires better tools, such as models and computer applications that serve to better present (visualize) and interpret information. Examples include geographic information systems that integrate established models, such as hydrologic models or numerical modeling of hydrodynamics and water quality. Other important tools, such as imagery and remote sensing techniques, can help identify and adequately map locations and characteristics of sensitive aquatic resources (sea grass, oyster bars, mangroves, salt marshes, listed species habitats).

Issue 12: Balancing multiple “uses” of coastal waterways (recreational and commercial boating, protected species, or habitat protection).

Habitat protection was most often cited (39%), followed by recreational and commercial boating (34%), protected species (21%), and boating and other uses (6%).

Issue 12: Balancing Multiple “Uses” of Coastal Waterways (87 responses)	
Habitat Protection	39%
Recreational and Commercial Boating	34%
Protected Species	21%
*Boating and other uses	6%

*Additional aspect cited by multiple respondents

Numerous times throughout the survey, respondents either mentioned or alluded to a need for balance—the basic thrust of issue twelve. The frequent call was for balancing recreational use

¹⁸ The Southeast Atlantic Coastal Ocean Observing System (SEACOOS) is to be a part of the larger Integrated and Sustained Ocean Observations System (IOOS).

¹⁹ View any of the following Websites for exemplars of GIS information and other resources made available to local communities: www.wateratlas.org, www.sarasota.wateratlas.org, www.hillsborough.wateratlas.org, www.seminole.wateratlas.org, and www.polk.wateratlas.org.

²⁰ DLESE is the Digital Library for Earth System Education, a geosciences community resource that supports teaching and learning about the Earth system. DLESE is funded by the National Science Foundation and is being built by a distributed community of educators, students, and scientists to support Earth system education at all levels.

with the restoration and conservation of natural coastal resources: that is, ensuring fair access while safeguarding habitat. The multiple activities and functions associated with our waterways and waterfronts lead to use and user conflicts as in, for example, recreational versus commercial, boater versus non-boater, and fishing versus non-fishing. As growth explodes along Florida's coasts, balancing competing uses will only become more difficult. Balance, however, is vital to protecting valuable habitats.

Therefore, a question before us is how to preserve traditional waterway uses while enlisting citizen support for protection initiatives. Naturally, there are no easy solutions. However, the many ideas presented by respondents offer much hope. Sea Grant can continue to assist by enhancing its role as a conduit for science-based information, fostering dialogue between conflicting user groups, facilitating inter-agency collaboration, sponsoring community forums, and assisting local governments to evaluate economic and environmental impacts associated with alternate strategies.

Ranking Tools and Techniques

Survey respondents were asked to rate the importance of eight tools and techniques that could be used to address issues affecting coastal communities and water-dependent businesses (Table 3). The headings for columns 2 through 5 in Table 3 contain the levels of importance that a respondent could assign to each tool or technique. The values in parentheses within each of these four column headings were used to calculate the average rank (column 6) for each tool/technique (not important = 0, low importance = 1, medium importance = 2, and high importance = 3). In each cell located under columns 2 through 5, the quantity in parentheses corresponds to the number of respondents and the percentage to the proportion of respondents who ranked a tool/technique at that particular level of importance.

Partnerships and partnership building received the highest average rank (2.6): 65 percent of respondents (95 respondents) deemed it of high importance, 28 percent (41) of medium importance, and 7 percent (10) of low importance. The next highest average rank was received by science-based facilitation to enhance public involvement in coastal policy and management decisions (2.5), followed by the application of science-based models (2.5). Next came environmental/science education (2.4), decision support tools (2.4), technical training/professional development (2.2), online information search tools (2.1), and topical conferences/workshops (2.1).

Table 3: Survey respondents' rankings of tools and techniques to address issues that affect coastal communities and water-dependent businesses.

Tools And Techniques	Not Important (value of 0)	Low Importance (value of 1)	Medium Importance (value of 2)	High Importance (value of 3)	Average Rank
Partnerships and partnership building	0% (0)	7% (10)	28% (41)	65% (95)	2.6
Science-based facilitation to enhance public involvement in coastal policy/management decisions	1% (2)	6% (9)	36% (53)	57% (84)	2.5
Science-based models (e.g., social and environmental carrying capacity, risk vulnerability, supply/demand projections)	0% (0)	6% (9)	43% (63)	51% (76)	2.5
Environmental/Science education (e.g., in-service training for managers, policymakers, teachers)	0% (0)	8% (12)	41% (61)	51% (75)	2.4
Decision support tools (e.g., geographic information systems, remote sensing, imagery)	0% (0)	7% (11)	46% (69)	46% (69)	2.4
Technical training or professional development (e.g., content specific, process skills, technology tools)	0% (0)	14% (21)	53% (78)	33% (48)	2.2
Online information search tools (e.g., data, training, funding)	0% (0)	20% (30)	58% (74)	30% (44)	2.1
Topical conferences/workshops	1% (2)	14% (21)	58% (85)	26% (38)	2.1

In each cell, the quantity in parentheses corresponds to the number of respondents who ranked the tool/technique at that particular level of importance and the percentage indicates the proportion of respondents who ranked the tool/technique at that level of importance. Rankings with the greatest number of responses are highlighted in bold.

Respondents were given the opportunity to list three additional tools or techniques that were not listed on the survey. In many cases, they elaborated on the tools/techniques presented on the survey:

Partnerships and partnership building:

- Engage political entities and marine industry; use not-for-profit groups to gather data, conduct assessments and environmental rehabilitation; engage federal, state, regional, local entities in concerted planning and development
- Include coordination with professional societies, university research departments, civic organizations, civic watch dog groups, economic development community
- Better use of citizen volunteer groups/system
- Utilize information available from resource users who have been active in specific areas for long periods (e.g., up to half a century)

Science-based facilitation to enhance public involvement:

- Public projects (e.g. mangrove planting, reef ball deployment); publicize success stories
- Youth education programs that include field experience
- Field experiences for policymakers and the media
- Public outreach events; public service announcements

- Contests and idea competitions distributed via newspapers
- Provide information to non-English speaking citizens
- Education (e.g., environmental) modules for High School science classes, marine facility personnel, business leaders, and public (e.g., coastal residents)
- Cross-fertilize formal higher education programs (e.g., environmental science, engineering, and policy administration curricula)
- Sponsorship of specific coastal efforts by local organizations (e.g., similar to Adopt-A-Road); accomplish through direct funding, or via project monitoring
- Recognition of local governments that make efforts toward cleaner/safer waterways
- Establish community programs

Science-based models:

- Science-based models to demonstrate that growth can coexist with proper stewardship of natural resources
- Quantitative predictive models for ecosystem management (e.g., Carl Walters and Daniel Pauly)²¹
- Numerical models for hydrodynamics, water quality, sedimentation, quantitative fisheries
- Local/regional economic impact analyses of recreational boating and comprehensive waterfront planning
- Recreational boating and use-intensity projections and forecasts
- Input/output economic impact models
- Digital Elevation Model (DEM)

Environmental/science education:

- For homeowner associations and special districts not controlled by local government
- For the public: on benefits of resource enhancement
- Professional training for educators
- Information dissemination to local chambers of commerce
- Topical white papers for legislature
- Citizen referendums
- Insertion of relevant environmental information into professional/trades certification programs

Decision support tools:

- A Web-based clearing house of decision support tools
- Surveys of local communities to gauge knowledge of issues and where public support is lacking
- Anecdotal observations over time are missing from today's environmental programs
- Gap Analysis; water quality monitor; STORET/TMDL; NPDES (National Pollutant Discharge Elimination System); TSS-total suspended sediment; GPS technology; field research

²¹ For more information see: <http://www.fisheries.ubc.ca/members/cwalters/> or <http://www.fisheries.ubc.ca/members/dpauly>.

- Economic studies to inform political decisions, particularly with regard to habitat and resource valuations
- Geographic information (for GIS): bathymetric mapping, mapping of environmentally important resources; boat traffic service areas and traffic analyses

Technical training or professional development:

- Online training and DVD-based training procedures
- Grant/fund procurement training
- Train managers on statutes relevant to their duties (e.g., knowing and understanding laws regarding permitting and resource protection)
- The Court System – how to sue to carry out adopted plans
- State lobbying and engaging the political process
- Employ training that is low cost and targeted to local issues
- Training content specific to user groups
- Mandatory education classes for boat owners regarding safety, boater responsibility
- Fisheries training- remote (e.g. hydro-acoustic or radio tags) tag-and-monitoring systems for gauging fishing mortality of Florida's high value fish and invertebrate species

Topical conferences/workshops:

- Regular regional or local meetings
- University meetings and programs
- At marine trade shows
- County Commission meeting presentations
- Teleconferences
- Policy workshops
- Legal issues that affect water-dependent coastal communities and businesses

Miscellaneous ideas (Political process):

- Enhance visibility of extension agents within local government
- Maintain a presence in Tallahassee
- Interagency coordination
- Monitor (occupational) positions in county governments
- Hold environmental organizations to their mission: Why is Save the Manatee Club involved in growth management? Why is the Humane Society involved in waterway regulation? The public is losing trust in these groups
- Reign-in activist state and federal staffers; many are not held accountable for misrepresentation of facts

Ranking Information Delivery Formats

A role of Sea Grant extension is to disseminate information that helps clients and stakeholders resolve issues that affect coastal communities and water-dependent businesses. Respondents were shown 24 different methods or formats to disseminate information and were asked how likely they are to make use of each one (Table 4).

Of the 151 survey respondents, 150 answered this question. The headings for columns 2 through 6 in Table 4 indicate the degree to which a respondent would likely use a particular information format. The values in parentheses within each of these six column headings were used to calculate the average rank (column 8) for each format/method (least likely = 1, somewhat likely = 2, likely = 3, very likely = 4, and extremely likely = 5). In each cell located under columns 2 through 6, the quantity in parentheses corresponds to the number of respondents and the percentage to the proportion of respondents who ranked a format/method at that particular level of likelihood. For each format/method the rank receiving the greatest number of responses is highlighted in bold.

The two most likely sources of information selected by respondents were Web sites and one-on-one contact (the traditional extension mode); both sources were ranked at 3.8 (out of a maximum possible score of 5). The next five most likely sources of information selected by respondents were workshops and training (3.7), conferences and seminars (3.5), professional meetings (3.4), geographic information systems (3.3), and electronic newsletters (3.3). The five lowest ranked sources of information were posters (2.5), e-mail discussion groups (2.4), radio (2.3), distance learning (2.2), and audio tapes (1.8).

Table 4. Survey respondents' ranking of formats for disseminating information.

Information Formats	Least Likely (value = 1)	Somewhat Likely (value = 2)	Likely (value = 3)	Very Likely (value = 4)	Extremely Likely (value = 5)	No Opinion	Rank
Web sites	2% (3)	9% (14)	26% (38)	21% (32)	40% (60)	1% (2)	3.8
One-on-one contact	4% (6)	10% (14)	23% (33)	30% (43)	32% (46)	-	3.8
Workshops and training	2% (3)	12% (18)	29% (42)	28% (41)	28% (41)	1% (1)	3.7
Conferences and seminars	5% (7)	12% (17)	33% (49)	31% (45)	19% (28)	1% (1)	3.5
Professional meetings	5% (7)	14% (21)	31% (46)	27% (40)	22% (32)	1% (1)	3.4
Geographic Information Systems	7% (11)	11% (17)	30% (45)	22% (33)	25% (37)	4% (6)	3.3
Electronic newsletters	8% (12)	15% (23)	30% (44)	30% (44)	17% (25)	1% (1)	3.3
Journal articles	11% (16)	16% (24)	27% (40)	29% (42)	17% (25)		3.2
CD-ROMs	7% (11)	24% (36)	21% (31)	28% (41)	18% (27)	1% (2)	3.2
Extension fact sheets	7% (10)	23% (34)	28% (42)	24% (36)	17% (25)	1% (1)	3.2
Technical documents, government reports, proceedings	13% (20)	14% (21)	27% (41)	29% (43)	16% (24)	1% (1)	3.2
Newspapers	12% (17)	22% (33)	25% (37)	27% (40)	14% (20)		3.1
Scientific journals	13% (19)	22% (33)	27% (40)	16% (24)	20% (30)	1% (1)	3.1
Electronic journals (E-journals) and magazines (E-zines)	18% (26)	16% (24)	25% (37)	25% (37)	16% (23)	-	3.0
Demonstrations or exhibitions	9% (13)	26% (38)	32% (47)	26% (38)	7% (11)	1% (1)	3.0
Books	14% (21)	22% (32)	34% (50)	23% (34)	7% (11)	-	2.9
Television	18% (27)	21% (31)	33% (48)	16% (24)	12% (17)	-	2.8
Video tapes	15% (22)	31% (45)	27% (40)	23% (34)	3% (5)	-	2.7
Trade publications	21% (31)	26% (38)	27% (39)	21% (31)	5% (7)	1% (1)	2.6
Posters	22% (33)	35% (51)	24% (36)	8% (12)	10% (15)		2.5
E-mail discussion groups (list servers)	32% (48)	23% (34)	26% (38)	13% (19)	6% (9)	-	2.4
Radio	30% (44)	28% (41)	27% (40)	12% (17)	3% (5)		2.3
Distance learning	27% (40)	34% (50)	16% (24)	13% (19)	5% (8)	5% (7)	2.2
Audio tapes	52% (77)	28% (41)	15% (22)	4% (6)	1% (2)		1.8

Rankings with the greatest number of responses are highlighted in bold.

Respondents were given the opportunity to list three additional formats for disseminating information that were not specifically listed on the survey:

- Public Access Cable TV
- Celebrity spokesperson
- Infomercials
- Movie trailers and public service announcements (e.g., airplanes, tourist destinations)
- Internet Streaming Video
- DVD
- Internet mapping sites (i.e., Internet map servers)
- Mail outs—direct mail to targeted audiences for specific issues
- Printed fliers in utility bills
- E-mail snippets/announcements
- Hardcopy newsletters
- Newspapers, brochures
- Stakeholder-specific publication (e.g., ‘Sourcebook for the Marine Sciences’ by Florida Oceanographic Society)
- Commercial magazines (e.g., Readers Digest, Parade)
- Children publications
- Billboards/posters
- Boater operator course
- Demonstrations at boat shows and other public events (e.g., fairs, park programs, Earth Day, aquaria, museums)
- School programs
- Science teacher training programs
- Public hearings; local stakeholder meetings
- PowerPoint presentation (e.g., at conferences)
- Conferences for fishing guides, conservation groups, Florida Oceanographic Society, marine summits
- Civic organization sponsorships

Conclusions

Based on stakeholder input provided during the survey, Florida Sea Grant established 2006-2009 programmatic priorities for coastal communities and water-dependent businesses. In February 2005, there was a call for statements of interest for two-year research projects based on the following research objectives and priorities as determined from the survey.²²

Objective A. Foster Economically and Environmentally Sustainable Growth for Coastal Communities and Water-Dependent Businesses

1. Develop environmental and economic sustainability goals that assist public policy decision makers in managing coastal communities and water-dependent businesses; develop corresponding indicators that measure progress towards goal attainment.
2. Evaluate social and economic costs and benefits that derive from public to private conversion of waterfronts and waterway access points, examine the causes of decline/growth in recreational and working waterfronts, and analyze incentives to retain water-dependent and water-related facilities that serve public needs and reflect social values.
3. Evaluate public policy and regulatory and non-regulatory tools that increase/decrease the rate of public to private conversion of waterfronts and waterway access points.
4. Create and extend new technologies and products that meet emerging business opportunities, ranging, for example, from concepts that improve charts for recreational boaters, public access to ocean observation system information, and equipment modifications for vessels that reduce or eliminate environmental impacts.

Objective B. Develop Decision Support Tools and Information to Guide Public Policy and to Support Coastal Zone Management

1. Evaluate the cumulative and secondary impacts on coastal ecosystems due to development, tourism, and recreation; develop the capacity to forecast the long-range sustainability of coastal ecosystems; and provide comprehensive spatial/temporal perspectives on environmental/economic impacts of various coastal development scenarios.
2. Analyze the biophysical effects of navigational improvements and boating activity on waterways and adjacent habitats.
3. Link decision concepts—such as place-based management, growth management, and water surface zoning—with the application of geographic information technologies to plan for optimal use of coastal shorefronts and adjacent waterways.
4. Develop methods to characterize, map, and forecast recreational boating patterns and activities, both in time and geographic space.
5. Measure the economic value to coastal communities and water-dependent businesses of natural resources (“natural capital”) and develop and extend informational products for citizens and community decision makers.

²² Opportunities for Biennial Core Program funding normally occur every two years. The next opportunity will be in 2007.

Objective C. Create a Regulatory and Non-regulatory Framework for Sustainable Community Development and Business Growth

1. Determine the efficacy of best management practices (BMP) for water-dependent businesses, such as those employed in the Clean Marina Program; develop non-regulatory mechanisms that enhance voluntary compliance with environmental BMP; and examine empirical relationships between voluntary compliance strategies and actual results.
2. Determine how new technologies and decision concepts that pertain to nearshore waters fit into the complex federal, state, and local jurisdictional framework for marine waters.
3. Develop a legal concept for the most common issues that give rise to coastal and marine conflicts, and evaluate alternative dispute resolution mechanisms.
4. Assist coastal communities that have endured declines in their economic bases to refocus and utilize existing resources to their economic and environmental advantage.

Appendix 1.

Florida Sea Grant 2002-2005 Strategic Issues and Goals²³

Economic Leadership

Goal 1: Use Marine Biotechnology to Create and Enhance Products and Processes from Florida's Coastal Resources

Goal 2: Determine Production and Management Techniques That Make Florida's Fisheries Sustainable and Competitive

Goal 3: Develop the Food and Hobby Segments of Florida's Marine Aquaculture Industry

Goal 4: Improve the Product Quality and Safety of Florida's Seafood Products

Goal 5: Increase the Economic Competitiveness and Environmental Sustainability of Coastal Water-Dependent Businesses

Coastal Ecosystem Health and Public Safety

Goal 6: Protect, Restore, and Enhance Coastal Water Quality

Goal 7: Protect, Restore, and Enhance Coastal Habitats

Goal 8: Prepare for and Respond to Coastal Storms

Education and Human Resources

Goal 9: Produce a Highly Trained Workforce

Goal 10: Create Scientifically and Environmentally Informed Citizens

²³ www.flseagrant.org.

Appendix 2.

Survey Responses Related to Other Florida Sea Grant Goal Areas

Survey respondents listed a number of topics that best fit within other Florida Sea Grant goal areas. For a complete list of the goal areas see Appendix 1 or visit the Florida Sea Grant Web site (www.flseagrant.org) for a more detailed account of the activities that occur within these goal areas.

Goal 2: Determine Production and Management Techniques That Make Florida's Fisheries Sustainable and Competitive

Issues:

- The sustainability of marine fisheries is in question, according to findings of the Pew ocean commission—we need to focus some effort there
- Florida's recreational marine fisheries are valued at \$5.4 billion—what information and regulatory changes are needed to sustain them in face of tremendous population growth?
- Fisheries Management—need to maintain sustainable fisheries and associated habitats (spawning grounds)
- Over-fishing (both recreational and commercial)—need to balance population growth with sustaining resource; reduce by-catch
- Broward County controversy: extent of damage to inshore juvenile habitat stemming from renourished sand on local beaches; need to determine (i.e., long-term monitoring) the importance of this juvenile habitat
- Utilization of limited fisheries among competing groups
- Essential Fisheries Habitat identification
- Understanding the effectiveness of Marine Protected Areas and optimizing their use

Suggested Actions/Strategies/Needs:

- Start working on new directions in fisheries management that integrate Pew Ocean Commission suggestions (or at least explore options and make suggestions on improvements to begin the debate)
- Establish limits to fishing methods that destroy habitat and negatively impact recreational fishing and catch limits (e.g., shrimp trawlers in 40 to 100 feet of water drag and destroy bottom and catch dozens of grouper/snapper that are thrown away; define operation areas for trawlers, survey/map bottom habitat to define critical areas; prepare guidance maps and regulations to focus working areas and off-limit areas for trawlers; survey/document recovery of fishery as a tool to decide when to restore recreational take limits and catch size
- Education and implications: inform public about the importance of protecting juveniles and their habitat; Fish = food: a recent socioeconomic study in SE Florida produced staggering numbers; our economy depends on these resources and they must be

protected; more information is needed about where they live and how to enhance their survival

- Coordinate fisheries stock assessments with the fisheries management needs of the Florida Fish and Wildlife Conservation Commission
- Measure the economic impact/value of specific recreational fisheries
- Data on the effectiveness of fisheries management strategies
- Increased funds for research and education
- Sea Grant can play major role in protecting commercial and recreational fisheries through education and guidance (e.g., policies and take limits that reflect best available science)

Suggested Research:

- Better understanding of what constitutes Essential Fisheries Habitat (EFH) for high-value marine recreational fish species and how loss/degradation/restoration of EFH affects aquatic/coastal living resource populations/communities
- How to reverse the decline of living coral reefs and reef-dependent fish and invertebrate communities?
- Resolve critical uncertainties underlying effective use of marine stock enhancement/artificial reefs as fishery management tools
- Methods to reduce post-release mortality of recreationally caught fish by using de-hooking devices
- Post-release mortality studies with catch-and-release fishing efforts
- Identify the “true” impacts of recreational boating/fishing on Gulf of Mexico fisheries
- Interaction between the natural/artificial reefs; how proximity influences fish and coral recruitment
- Safer aquaculture practices, so that displacement of wild fisheries by aquaculture can take place at steady pace, not as a crash
- Economic changes in Florida fishing industry suggest that more research is needed regarding aquaculture and the public perception of recreational impact on the environment
- Bathymetry to understand habitat use—multi-beam/side-scan sonar mapping need to be incorporated into management strategies and real-time systems that include acoustics, video, and water quality

Goal 6: Protect, Restore, and Enhance Coastal Water Quality

Issues:

- Upstream watershed activities and impacts that affect freshwater inputs (timing, quality) to the estuary downstream
- Saltwater intrusion into the freshwater aquifer
- Dramatic impacts (e.g., on nature-based tourism) of altered water budget (e.g., altered flow regime) on coastal resources (e.g., degraded estuarine productivity)
- Water quality and quantity is a critical commodity given the growing population of coastal communities; the next decade may see demand exceed supply; Sea Grant should lead the charge to protect the resource before it becomes critical

Suggested Actions/Strategies/Needs:

- Comprehensive community-based water-supply plans (e.g., retention/storage demands, natural resource demands, water-table dependent natural communities)
- Develop watershed plans with input from all stakeholders (e.g., Apalachicola Bay)
- Find the cheapest way to desalinize brackish water for human consumption; use treated wastewater for commercial and residential uses (e.g., irrigation, car washes); recycle water
- Maintaining and improving the quality, quantity, and timing of freshwater flows (e.g., Apalachicola Bay)

Suggested Research:

- Develop region-specific water (hydrologic) budgets
- Ground and surface water quantities, availability, and budget for the ACF watershed and adjacent counties based on potential users over next 20 years (Apalachicola, Chattahoochee, Flint Rivers System and Watershed Basin)

Appendix 3.

Survey Questionnaire

The survey questionnaire on the following pages was designed online using tools provided by surveyMonkey.com. The survey was printed directly to a PDF from within a browser (Microsoft Internet Explorer), since that was the only method available on surveyMonkey.com. Links were provided in the questionnaire to the following definitions of terms used in the questions:

- Sustainability—meeting the needs of the present without compromising the ability of future generations to meet their own needs. World Commission on Environment and Development (WCED). *Our Common Future*. Oxford University Press: New York. 1987.
- Carrying Capacity—refers to the number of individuals who can be supported in a given area within natural resource limits, and without degrading the natural, social, cultural, and economic environment for present and future generations.
<http://www.carryingcapacity.org/whatis.html>.
- Non-point Source Pollution—pollution that occurs when rainfall, snowmelt, or irrigation runs over land or through the ground, picks up pollutants, and deposits them into rivers, lakes, and coastal waters or introduces them into ground water.
www.epa.gov/waterscience/biocriteria/glossary.html.



[Exit this survey >>](#)

Florida Sea Grant Strategic Planning

Water-Dependent Coastal Communities and Businesses

The [Florida Sea Grant](#) (FSG) mission is ***to enhance the practical use and conservation of coastal and marine resources to create a sustainable economy and environment***. FSG advances that mission through **research, extension, and education**. Every 4 years, with assistance from its partners and stakeholders, FSG updates its strategic plan to insure that goals and objectives that underlie its mission are relevant and on-target. That time has arrived and FSG seeks your input to guide 2006-2009 program efforts and expenditures.

As an incentive, the first 15 persons who complete the survey will receive a printed copy of the handsomely illustrated publication titled [A Historical Geography of Southwest Florida Waterways](#). Furthermore, an additional 15 persons who complete the survey will be randomly selected to receive a copy of the publication as well. We are implementing an Internet-based survey to minimize the demand on your time, yet maximize the guidance and knowledge that you provide to us. On average, the survey takes 30 minutes to complete and we ask that you complete it by August 31st.

Ten **goal areas** encompass the current range of FSG programs. The survey we ask you to complete applies to only one of those goal areas, titled "**Water-Dependent Coastal Communities and Businesses**." The current 2002-2005 goal area priorities that we are reviewing for possible revision can be found [HERE](#). Examples of current projects within this goal area can be found [HERE](#).

To insure a representative sample, we invited a select group of persons from a broad spectrum of entities to respond to this survey. Please do not invite other people to participate in the survey.

If you have any questions or if you want to provide additional feedback, then please E-mail [Robert Swett](#).

On behalf of [James Cato](#), Florida Sea Grant Director, thank you for participating!

1. Listed below are examples of issues (e.g., Public access to coastal waterways) that may affect the *environmental* and *economic sustainability* of water-dependent coastal communities and businesses. For each issue listed, please indicate how important it is to *you* and *your organization* that Florida Sea Grant make it a research, extension, and education priority over the next 5-10 years. (If **HIGH priority issues that you want to emphasize are not listed, you will have the opportunity to enter them in question 3 below.)**

	Not a Priority for Us	Low Priority	Medium Priority	High Priority	No Opinion
1. Comprehensive, science-based, regional waterway planning and management to improve navigation and safety (e.g., channel maintenance, signage, boat traffic)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Coastal recreation/tourism planning and development (e.g., protection of natural habitats, artificial reefs, recreational boating, recreation/tourism facility siting analyses, carrying capacity)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Public access to coastal waterways (e.g., beach access, marina slips, boat launch locations, public to private conversion, land trusts)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Development of economic and environmental sustainability goals and indicators that measure progress towards their attainment (e.g., carrying capacity, reduced regulatory and permitting channel maintenance costs, total acreage of public recreation/conservation land)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- | | | | | | |
|--|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 5. Non-point source pollution (e.g., boat discharges and boat maintenance, marina operations, shoreline landscape/yard maintenance) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 6. Restoration and maintenance of aquatic habitat (e.g., seagrass, mangrove) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7. Assessment of environmental impacts on coastal waterways (e.g., channel maintenance, runoff derived shoaling and pollution, shoreline landscape/yard maintenance, waterfront development) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 8. Public education (e.g., science-based knowledge) to enhance meaningful participation in the creation, implementation, and monitoring of coastal policy | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 9. Preserving historical and cultural resources (e.g., working waterfronts) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 10. Protected/endangered species management (e.g., manatees, coral reefs) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 11. Information to support management and decision-making (e.g., GIS spatial data, aerial and satellite imagery, local/regional impact assessments) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 12. Balancing multiple "uses" of coastal waterways (e.g., recreational and commercial boating, protected species, habitat protection) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

2. Please note that the issues listed in Question 1 are repeated for this Question.

For each issue (e.g., Non-point source pollution) that you ranked as a **HIGH** priority in Question 1, what specific aspect (e.g., **BOAT DISCHARGES** or **MARINA OPERATIONS** or **SHORELINE LANDSCAPE/YARD MAINTENANCE**) should Florida Sea Grant make its **HIGHEST** research, extension, and education priority over the next 5-10 years? Enter the aspect in the text box located to the right of the appropriate issue below. (*TIP: In Internet Explorer, you can use your mouse to select or highlight an aspect and then drag and drop it into the text box. Or, you can select the aspect, copy it, and then paste it into the box.*)

The list of aspects associated with each issue is **NOT** all inclusive. If your **HIGHEST** priority aspect is not listed, then enter it in the text box located to the right of the appropriate issue and explain why the aspect is important. (*TIP: Use your word processor or text editor to type your response and then copy and paste it into the text box. There is a 200 character limit.*)

1. Comprehensive, science-based, regional waterway planning and management to improve navigation and safety (e.g., **CHANNEL MAINTENANCE** or **SIGNAGE** or **BOAT TRAFFIC**)
2. Coastal recreation/tourism planning and development (e.g., **PROTECTION OF NATURAL HABITATS** or **ARTIFICIAL REEFS** or **RECREATIONAL BOATING** or **RECREATION/TOURISM FACILITY SITING ANALYSES** or **CARRYING CAPACITY**)
3. Public access to coastal waterways (e.g., **BEACH ACCESS** or **MARINA SLIPS** or **BOAT LAUNCH LOCATIONS** or **PUBLIC TO PRIVATE CONVERSION** or **LAND TRUSTS**)
4. Development of economic and environmental sustainability goals and indicators that measure progress towards their attainment (e.g., **CARRYING CAPACITY** or **REDUCED REGULATORY AND PERMITTING CHANNEL MAINTENANCE COSTS** or **TOTAL ACREAGE OF PUBLIC RECREATION/CONSERVATION LAND**)
5. [Non-point source pollution](#) (e.g., **BOAT DISCHARGES AND BOAT MAINTENANCE** or **MARINA OPERATIONS** or **SHORELINE LANDSCAPE/YARD MAINTENANCE**)
6. Restoration and maintenance of aquatic habitat (e.g., **SEAGRASS** or **MANGROVE**)
7. Assessment of environmental impacts on coastal waterways (e.g., **CHANNEL MAINTENANCE** or **RUNOFF DERIVED SHOALING AND POLLUTION** or **SHORELINE LANDSCAPE/YARD MAINTENANCE** or **WATERFRONT DEVELOPMENT**)
8. Public education (e.g., science-based knowledge) to enhance meaningful participation in the creation, implementation, and monitoring of coastal policy
9. Preserving historical and cultural resources (e.g., **WORKING WATERFRONTS**)
10. Protected/endangered species management (e.g., **MANATEES** or **CORAL REEFS**)
11. Information to support management and decision-making (e.g., **GIS SPATIAL DATA** or **AERIAL AND**)

SATELLITE IMAGERY or LOCAL/REGIONAL IMPACT ASSESSMENTS)

12. Balancing multiple “uses” of coastal waterways (e.g., **RECREATIONAL AND COMMERCIAL BOATING or PROTECTED SPECIES or HABITAT PROTECTION**)

In Questions 3, 4, and 5 below, please discuss up to three *economic* and *environmental* sustainability issues that are a HIGH priority to *you* and *your organization*, but were not listed in Question 1. The issues and aspects that you discuss should be ones that affect water-dependent coastal communities and businesses and ones that you believe that Florida Sea Grant should make a research, extension, or education priority over the next 5-10 years. **ENTER ONE ISSUE PER QUESTION.**

3. My First Issue (discuss only one issue)

4. My Second Issue (discuss only one issue)

5. My Third Issue (discuss only one issue)

6. Which of the 12 issues that you prioritized in Question 1 or that you added in Questions 3, 4, and 5 would you rank as the single *MOST IMPORTANT* issue that

must be addressed over the next 5-10 years?

1	2	3	4	5	6	7	8	9	10	11	12	My First Issue	My Second Issue	My Third Issue
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Please elaborate on what you consider the best strategy, action plan, and necessary resources (e.g., money) required to address the *MOST IMPORTANT* issue affecting water-dependent coastal communities and businesses that you identified in Question 6.

Each year Florida Sea Grant awards about 1 million dollars to fund research projects that address issues within its 10 major goal areas. In Questions 8, 9, and 10 below briefly describe up to three specific research topics that you recommend Florida Sea Grant fund to help resolve high priority issues within the goal area titled "Water-Dependent Coastal Communities and Businesses." ENTER ONE RESEARCH TOPIC PER QUESTION.

8. First Research Topic (enter only one research topic)

9. Second Research Topic (enter only one research topic)

10. Third Research Topic (enter only one research topic)

11. Please rate the importance of the following tools and techniques for addressing/resolving issues that affect water-dependent coastal communities and businesses.

	Not Important	Low Importance	Medium Importance	High Importance
Partnerships or partnership building	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technical training or professional development (e.g., content specific, process skills, technology tools)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decision support tools (e.g., geographic information systems, remote sensing imagery)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Topical conferences/workshops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental/Science education (e.g., in-service training for managers, policymakers, teachers, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Science-based facilitation to enhance public involvement in coastal policy/management discussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On-line information search tools (e.g., data, training, funding)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Science-based models (e.g., social and environmental carrying capacity, risk vulnerability, supply/demand projections)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In Questions 12, 13, and 14 below, please list up to three other tools or techniques not listed in Question 11 that you feel are important for addressing issues that affect water-dependent coastal communities and businesses. ENTER ONE TOOL/TECHNIQUE PER QUESTION.

12. First tool or technique (enter only one tool or technique)

13. Second tool or technique (enter only one tool or technique)

14. Third tool or technique (enter only one tool or technique)

15. The role of Sea Grant extension is to disseminate information that helps clients and stakeholders address/resolve issues that affect water-dependent coastal communities and businesses. Please rank how likely YOU are to make use of information offered in the following formats?

	Least Likely	Somewhat Likely	Likely	Very Likely	Extremely Likely	No Opinion
Extension fact sheets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-mail discussion groups (list servers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radio	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electronic newsletters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Scientific journals	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Books	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Technical documents, government reports, proceedings	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Audio tapes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CD-ROMs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Newspapers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Video tapes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Posters	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Professional meetings	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Demonstrations or exhibitions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Trade publications	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Journal articles	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Conferences and seminars	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Geographic Information Systems	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Distance learning	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Web sites	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Television	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Electronic Journals (E-journals) and magazines (E-zines)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
One-on-One contact	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Workshops and training	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

16. What other formats or methods do you suggest that Florida Sea Grant use to disseminate information to clients and stakeholders?

Format/Method: _____

Format/Method: _____

Format/Method:

17. How would you categorize the organization where you are employed or with which you are affiliated?

- Higher education
- Regional planning agency
- Private consulting
- Non-governmental organization
- Municipal agency
- County agency
- Marine industry
- K-12 education
- State agency
- Federal agency
- Other (please specify)

18. What is the name of your organization, work unit, or place of employment?

19. What is your title or position within your organization or work unit?

20. Please provide the following information.

What is the 5-digit ZIP code of your residence?

What is the 5-digit ZIP code of your place of employment?

21. How do you envision that your organization can best use the services and information that are available from [Florida Sea Grant](#)?



22. Please take this opportunity to provide any final comments or suggestions regarding the topics raised in this survey about water dependent coastal communities and businesses.



23. Would you like to receive a copy of the survey results?

Yes



No



24. May we contact you if we need to follow-up on any of your responses?

Yes



No



YOU HAVE COMPLETED THE SURVEY

Florida Sea Grant thanks you for your assistance during our strategic planning process.

If you have any questions or if you want to provide additional feedback, then please E-mail [Robert Swett](mailto:raswett@ifas.ufl.edu) (raswett@ifas.ufl.edu).

Done >>

Appendix 4.

Types of Organizations and Organizational Roles of Survey Respondents²⁴

State Agency or Organization with Statewide Responsibility (Aquatic Preserve Manager, Area Supervisor, Bureau Chief, Chief Economist, Director, Communications Director, County Extension Director, Environmental Administrator, Environmental Consultant, Environmental Specialist, Environmental Supervisor, Marine Extension Agent, Marine Fisheries Biologist, Marine Research Associate, Program Administrator, Program Manager, Project Coordinator, Section Leader, Rules Administrator):

- Bureau of Beaches and Coastal Systems, Florida Department of Environmental Protection
- Division of Law Enforcement, Florida Fish and Wildlife Conservation Commission
- Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission
- Florida Department of Environmental Protection
- Florida Fish and Wildlife Conservation Commission
- Florida Legislature (Office of Program Policy Analysis and Government Accountability)
- Florida Sea Grant
- Office of Coastal and Aquatic Managed Areas, Florida Department of Environmental Protection

Higher Education (Adjunct faculty, Assistant Director, Associate in Law, Assistant Professor, Associate Professor, Director of Programs, Executive Director, Instructor, Professor, Program Biologist, Educational Developer, Director):

- Florida Atlantic University, Catanese Center
- Florida Atlantic University, Center for Urban and Environmental Solutions
- Florida Gulf Coast University
- Florida Natural Resources Leadership Institute
- Florida State University
- Florida State University, Department of Oceanography
- Hillsborough Community College
- New College of Florida
- Nova Southeastern University
- Nova Southeastern University, Oceanographic Center
- University of Florida
- University of Florida, Center for Precollegiate Education and Training
- University of Florida, Levin College of Law
- University of Miami
- University of Miami, RSMAS

²⁴ To ensure confidentiality, only generic information is provided on the types of organizations and the organizational roles (in parentheses) of respondents.

- University of South Florida
- University of South Florida, Florida Center for Community Design and Research
- University of West Florida

Municipal/County Agency (Environmental Projects Manager, Marine Resources Program Manager, Extension Director, GIS Specialist, Science Coordinator, Environmental Specialist III, GIS Analyst, Reef Specialist, Smart Growth Program Director, Natural Resources Director, Staff Liaison, Marine Safety Program Coordinator, Inlet/Port District Manager, Engineering Manager, Natural Resources Program Supervisor, Director of Leisure Services, City Engineer):

- Aquatic Services Department
- Coastal Resources Department
- County Extension
- Department of Planning and Environmental Protection
- Department of Public Safety
- Engineering Department
- Inlet & Port District/Authority
- Leisure Services
- Marine Advisory Committee
- Natural Resources Department
- Port Authority
- Reef Construction Program
- Reef Research Team
- Smart Growth Department
- Watershed Management Department

Regional Planning Agency or Organization with Regional Responsibility (Coastal Training Program Coordinator, Communications Manager, Comprehensive Planning Director, Director, Engineer, Executive Director, Environmental Specialist, Manager, Park Biologist, Principal Planner, Public Outreach Coordinator, Regional Planner, Research Coordinator, Resource Management Coordinator, Scientist, Senior Environmental Specialist, Special Projects Director):

- Apalachee Regional Planning Council
- Apalachicola National Estuarine Research Reserve
- Biscayne Bay Aquatic Preserve
- Charlotte Harbor National Estuary Program
- Charlotte Harbor State Park
- Florida Inland Navigation District
- Guana Tolomato Matanzas National Estuarine Research Reserve
- Jupiter Inlet District
- Northeast Florida Regional Planning Council
- Rookery Bay National Estuarine Research Reserve
- Sarasota Bay National Estuary Program
- St. Johns River Water Management District

- Tampa Bay Estuary Program
- Tampa Bay Regional Planning Council
- West Florida Regional Planning Council

Non-Governmental Organizations (Assistant Vice President, Chief Scientist, Director, Environmental Scientist, Executive Director, Expedition Leader, Government Affairs Chair, Instructor, Marine Educator, Marine Wildlife Program Manager, Outreach Director, Policy Director, President, Program Coordinator, Public Programs Coordinator, Research Director, Staff Biologist, Staff Scientist, Webmaster):

- Audubon of Florida
- Boat Owners Association of the United States
- Charlotte Marine Research Team
- Earth 911
- Inwater Research Group
- Mote Marine Laboratory
- Reef Research Team
- Save the Manatee Club
- Southeastern Fisheries Association
- Standing Watch
- Tampa Bay Watch
- The Ocean Conservancy
- Volunteer Scientific Research

Municipal and County Elected Officials (Commissioner, Council Member, Mayor, Vice-Mayor, Mayor):

- Bay County Commission
- Brevard County
- City of Atlantic Beach
- City of Daytona Beach
- City of Dunedin
- City of Key West
- City of Miami Beach
- Okaloosa County
- Town of Jupiter
- Town of Melbourne Beach

Marine Industry (Captain, Director, Executive Director, General Manager, Owner, President):

- Boat Works (Inc.)
- Charter Boat Company
- Directed Shark Fisheries
- Guided Tours Company
- Marine Industries Association of Florida
- MarineMax
- Research Group

- Royal Caribbean Cruises
- Titusville Municipal Marina

Federal (District Conservationist, Information Technology Manager, Science Coordinator):

- USDA Natural Resources Conservation Service
- National Oceanic and Atmospheric Administration (NOAA)
- NOAA Coastal Services Center
- U.S. Geological Survey

Private Consulting (Director, President, Senior Scientist):

- Coastal Engineering
- Environmental Services
- Marketing

K-12 Education (Associate Director, Educator, Teacher, Science Department Chairman):

- Charlotte County Public Schools
- Durant High School
- Florida Space Grant Consortium
- Forest Lakes Elementary School
- Manatee County Schools

Print Media (Environmental Reporter, Outdoors Editor, President):

- Due to the limited number of respondents in this category, the participating organizations are unidentified to preserve confidentiality.