



# **Coastal Resource Management Customer Survey:**

## **Sea Grant Summary Report**

**August 2001**



**NOAA Coastal Services Center**  
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY



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## **Introduction**

The NOAA Coastal Services Center (Center) is committed to serving the technology, information, and management needs of its customers in the coastal resource management community. To achieve this goal, the Center solicits input from the management community using a variety of mechanisms, including the Coastal Resource Management Customer Survey. The Center conducts this national survey every three years to help the Center and NOAA understand the customers' priority issues, to plan effectively for new projects and training programs to address these issues, and to create products that are compatible with customers' hardware, software, and management needs. State coastal resource managers also benefit from the survey results as they work toward the development of common goals and partnerships.

This report discusses the responses for those Sea Grant offices participating in the survey. Responses for both Sea Grant directors and extension leaders are included. When reading this report, it is important to note that respondents often selected more than one item per question. Therefore, response rates for some questions may be greater than 100 percent. For detailed responses for each survey item, refer to the appendices of this report. Summaries of responses for other agencies involved with the survey are available on the Web at [www.csc.noaa.gov/survey/](http://www.csc.noaa.gov/survey/).

## **Methodology**

The Coastal Resource Management Customer Survey, approved by the Office of Management and Budget and conducted in the summer of 1999, was sent to 270 offices representing state resource and environmental protection agencies, coastal zone management programs, Sea Grant programs (both extension leaders and directors), National Estuarine Research Reserves, National Estuary Programs, and National Marine Sanctuaries. Sea Grant directors and extension leaders were surveyed separately because, in many Sea Grant programs, the extension leaders work in offices separate from their directors and, thus, have access to different resources and support services.

The survey was conducted in two parts. Part 1 focused on technology, including the use of spatial and other digital data, geographic information systems (GIS), remote sensing, environmental models, metadata, and training. This portion of the survey was sent to technology managers in each office targeted for this survey. Part 2 of the survey focused on resource management issues, including the roles and approaches of agencies in addressing coastal issues, needed resources for managing the coast, and interest in non-technological training. The overall managers for each office were asked to complete this portion of the survey.

Respondents had two options for completing the survey – either by hard copy or electronically through a Web site. The use of the Internet as an option for survey completion was a first-time effort for the Center, and approximately 25 percent of total survey respondents elected to use this method. Once the hard-copy surveys were received, they were entered into the same database that housed the electronic responses.

## Response Rate

The Sea Grant response rates for the survey are provided in Table 1. Each office that received the survey was asked to complete both Part 1 and Part 2, with Part 1 to be completed by the technology manager and Part 2 to be completed by the overall manager. However, in some instances, only one part of the survey was completed and returned. As Table 1 shows, the response rate for Part 2 was higher than for Part 1 for both Sea Grant extension leaders and Sea Grant directors.

Table 1. Sea Grant Responses to Part 1 and Part 2 of the Survey

Agency	Number Sent Out	Surveys Completed:		Response Rate:	
		Part 1	Part 2	Part 1	Part 2
Sea Grant Extension	32	15	18	47%	56%
Sea Grant Directors	31	11	13	35%	42%
All Sea Grant	63	26	31	41%	49%

The survey was sent to Sea Grant directors and extension leaders in each of the Sea Grant regions. The response rate for each region was close to 50 percent, with the exception of the Pacific Region. As Table 2 illustrates, the response rates for this region were relatively low – of the 13 surveys that were sent out, only 2 usable responses were returned for Part 1, and only 3 for Part 2.

Table 2. Responses to Part 1 and Part 2 of the Survey by Sea Grant Region

Region	Number Sent Out	Usable Responses:	
		Part 1	Part 2
<b>Great Lakes</b> Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin	11	5	7
<b>Northeast</b> Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island	14	6	6
<b>Mid-Atlantic</b> Delaware, Maryland, New Jersey, North Carolina, Virginia	10	5	6
<b>Southeastern Atlantic and Gulf of Mexico</b> Florida, Georgia, Puerto Rico, South Carolina, Louisiana, Mississippi, Alabama, Texas	15	8	9
<b>Pacific</b> Alaska, California, Hawaii, Oregon, Washington	13	2	3

## Part 1 Results and Discussion: Technology Applications to Coastal Management

Part 1 of the survey was directed toward research directors and managers of information systems and technology. The subjects addressed in Part 1 include the use of spatial data, geographic information systems (GIS), remote sensing, environmental modeling, metadata, internet and data exchange, and technology training. There were 26 respondents for this portion of the survey, and the percentages provided below were computed using  $n = 26$ .

### Data Uses and Needs

Respondents were asked about their use of spatial and other digital data for coastal management issues. For the majority of coastal issues, most respondents indicated that their offices currently use spatial data that is collected, derived, or managed by others. However, several Sea Grant offices do not collect, derive, manage, or use spatial data in any capacity. These findings are presented in Figure 1.

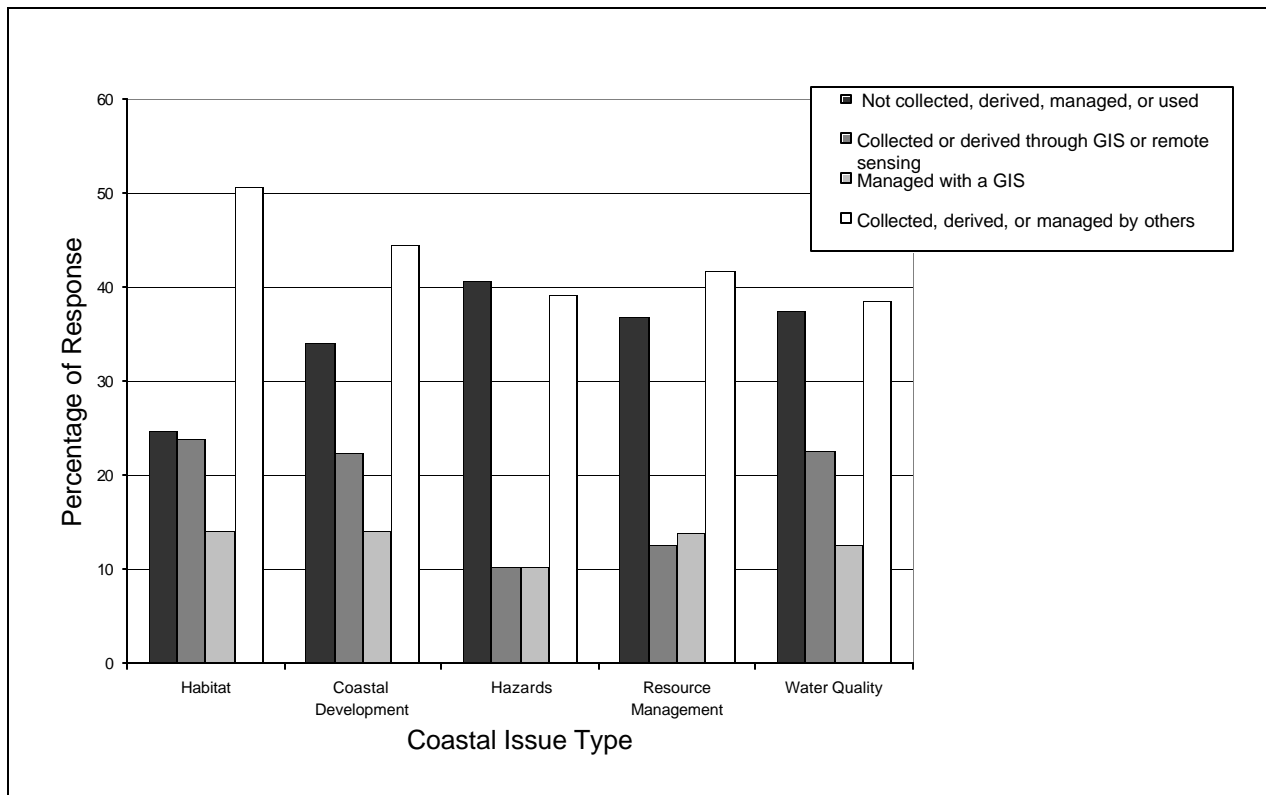


Figure 1. Use of Spatial Data for Broad Coastal Issue Types

Several types of special purpose software are relied upon by those Sea Grant offices that use spatial data. As shown in Table 3, the majority of respondents (62 percent) indicated that they use geographic information systems. Many respondents (50 percent) also use visualization software for spatial data purposes.

Table 3. Special Purpose Software Used by Sea Grant

<b>Special Purpose Software</b>	<b>Percentage of Response</b>
Geographic Information Systems	62
Visualization	50
Database management systems	38
Remote sensing	38
Environmental process modeling	38
Decision support/decision analysis	19
Computer-aided design	15

A number of mechanisms are used by Sea Grant offices to exchange spatial and other digital data. Table 4 provides a list of the media used for data exchange. The most commonly used media among Sea Grant offices are 3¼ inch diskette, CD-ROM, and Zip disk, with 73 percent of respondents selecting each of these media. Respondents (69 percent) also indicated that Web browsers are commonly used for data exchange. This method is widely available to the Sea Grant offices because all of the offices have Internet access and several (35 percent) use lease lines, allowing for fast Internet connection.

Table 4. Media Used for Data Exchange

<b>Media</b>	<b>Percentage of Response</b>
3¼ inch diskette	73
CD-ROM	73
Zip disk	73
HTTP (Web browser)	69
File Transfer Protocol (FTP)	58
Jaz disk	15
4 millimeter tape	4
8 millimeter tape	4

In addition to the data sets already used by Sea Grant offices, respondents identified several other digital data sets that, if available, would be useful to their offices. Table 5 provides a list of these data sets by broad category. Data sets focusing on the human demographics of coastal areas were most frequently identified by respondents, with 77 percent indicating that this type of data set would be either “very useful” or “moderately useful” to their offices.

Table 5. Data Sets, by Broad Category, Considered to be Either "Very Useful" or "Moderately Useful"

<b>Broad Category</b>	<b>Data Set</b>	<b>Percentage of Response</b>
Human Use and Other	Human demographics of coastal areas	77
	Protected area boundaries	62
	Water use classification	57
	Marine transportation	50
	Marine boundaries	46

Table 5. Data Sets, by Broad Category, Considered to be Either "Very Useful" or "Moderately Useful" (Continued)

Habitat and Resources	Coastal land cover change maps	66
	Coastal land cover and land use maps	65
	Fish distributions	65
	Habitat suitability indices	65
	Wetland function	61
	Shellfish bed distribution maps	58
	High resolution aerial photography	54
	Benthic habitat maps in turbid waters	50
	Impervious surface maps	50
	Soft bottom distribution maps	50
	Seagrass distribution maps	46
	Live bottom distribution maps	38
	Coral distribution maps	8
	Bathymetry and Topography	Coastal topography
Shoreline		61
Estuarine and bay bathymetry		54
Shoreline erosion and accretion rates		53
Storm surge inundation zones		50
Nearshore bathymetry		46
Offshore bathymetry		27
Water Quality	Primary productivity for ocean waters	43
	Suspended sediments for ocean waters	38
	Salinity	31
	Sea surface temperature	30

### Geographic Information Systems

Respondents were asked several questions regarding the use of GIS in Sea Grant offices. The purpose of these questions was to determine the expertise, level of use, and application of GIS in the offices. Table 6 shows the combined level of GIS expertise for Sea Grant staff, which ranges from no expertise to an advanced level of expertise. The majority of respondents (38 percent) indicated that the staff in their offices had an intermediate level of expertise. Relatively fewer offices (19 percent) have a combined expertise that is at the advanced level.

Table 6. Combined GIS Capability or Expertise in Sea Grant Offices

Level of Expertise	Percentage of Response
None	31
Beginning	31
Intermediate	38
Advanced	19

The number of Sea Grant staff who regularly use GIS varies by office, with a range of zero to more than ten. Fifty percent of offices have one to two people who regularly use GIS. However, far fewer are trained in GIS. These findings are presented in Figure 2.

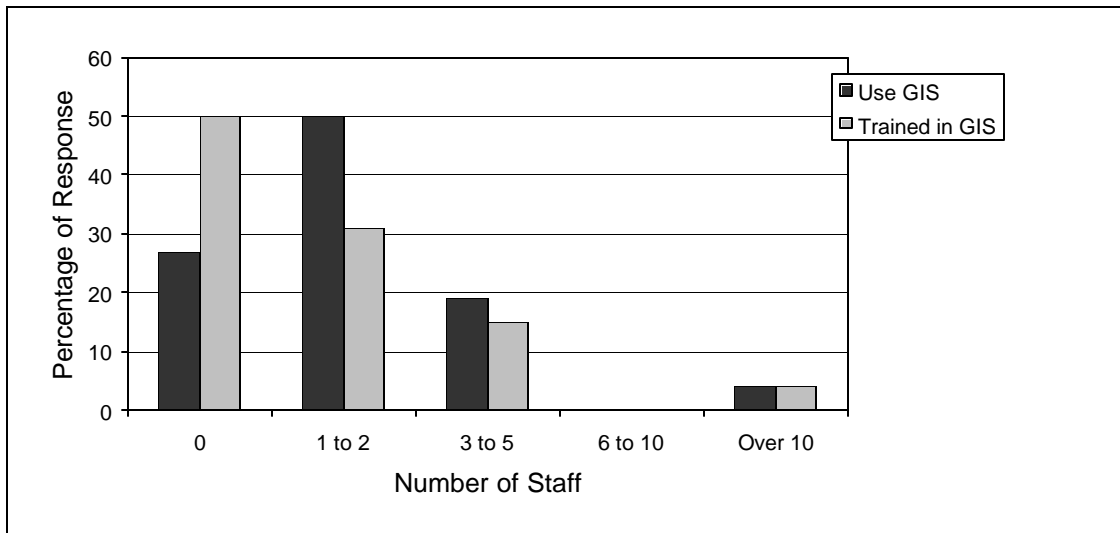


Figure 2. Number of Staff in the Office Who Regularly Use GIS and are Trained in GIS

Sea Grant offices use GIS for a number of purposes. Of these uses, the most popular application of GIS is for mapping activities, with 35 percent of Sea Grant offices using GIS primarily for this purpose. Several Sea Grant offices also rely on GIS for information management and static modeling activities. Figure 3 illustrates these and other uses of GIS by Sea Grant offices.

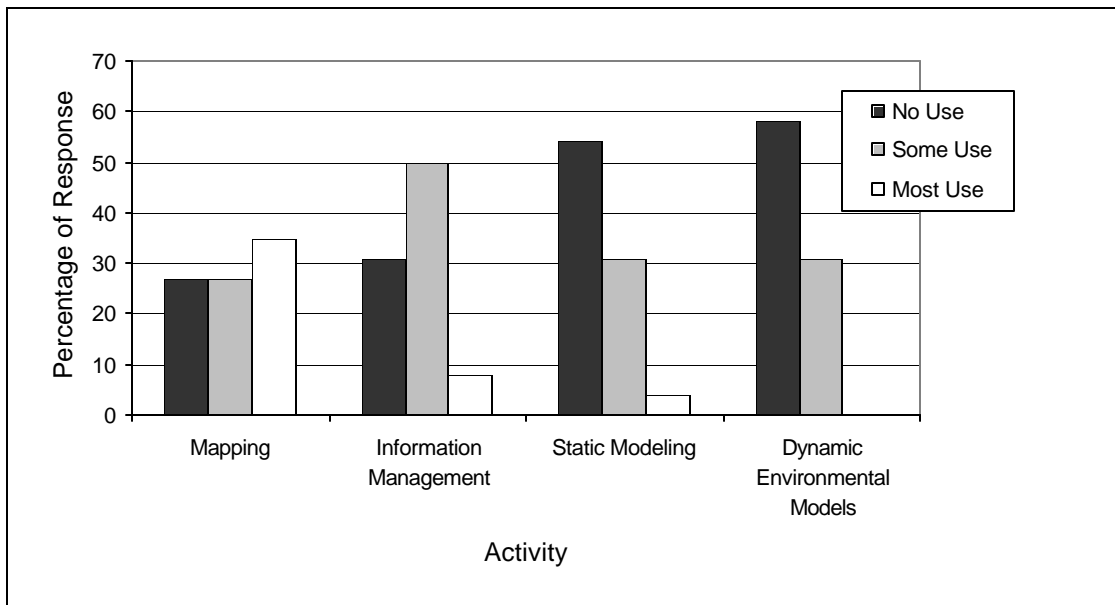


Figure 3. Use of GIS for Various Purposes

When engaging in the GIS activities listed above, Sea Grant offices target several specific issues. These issues include habitat, coastal development, water quality, and resource management-related subjects. As shown in Table 7, GIS use does not vary significantly across the specific issues, with the responses ranging from a use rate of 15 percent to 23 percent.



Table 7. Top Coastal Issues That Are Managed Within a GIS

Issue Type	Specific Issue	Percentage of Response
Habitat	Habitat mapping	23
	Habitat status and health	15
Coastal Development	Land use or changes in land use	23
	Cumulative impacts	15
Hazards	Coastal erosion or accretion	15
Water Quality	Nonpoint source pollution	23
Resource Management	Surface Water	23
	Ocean management	19
	Watershed management planning and assessment	19

### Remote Sensing

Respondents were asked to characterize remote sensing use in Sea Grant offices. As shown in Table 8, the majority of respondents (54 percent) indicated that their offices have no remote sensing expertise. In addition, as illustrated in Figure 4, most Sea Grant staff have not been trained in remote sensing nor do they regularly use remote sensing in their jobs.

Table 8. Combined Remote Sensing Expertise in Sea Grant Offices

Level of Expertise	Percentage of Response
None	54
Beginning	19
Intermediate	19
Advanced	12

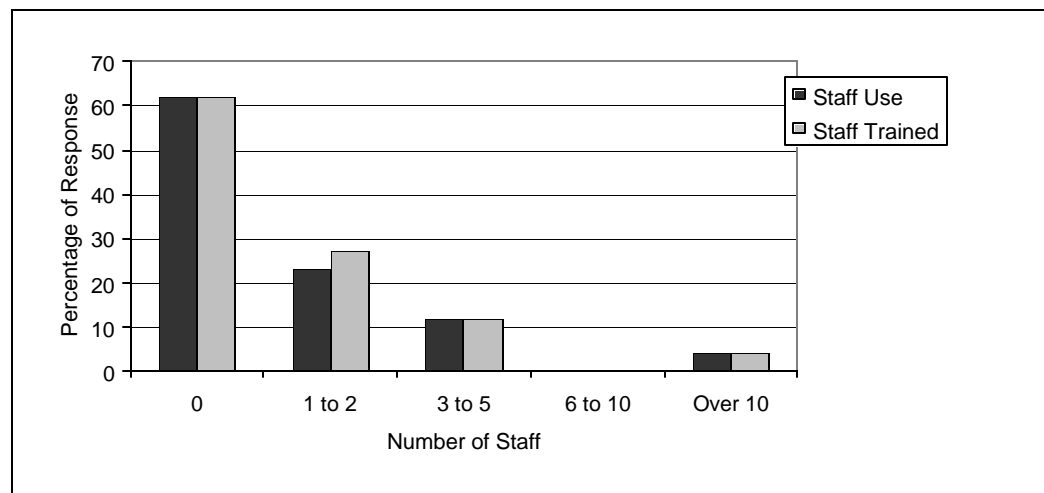


Figure 4. Number of Staff in the Office Who Regularly Use Remote Sensing Software and Who Are Trained in the Use of Such Software

## Environmental Models

Although 58 percent of respondents do not use environmental models, several Sea Grant offices employ such models for water quality, hydrologic, coastal hazard analysis, and chemical fate studies. The most popular models among Sea Grant offices are BASINS and SWMM, two models developed by the U.S. Environmental Protection Agency. Table 9 provides a list of other models that were selected by respondents.

Table 9. Environmental Models Used by at Least Five Percent of Respondents

<b>Environmental Model</b>	<b>Percentage of Response</b>
BASINS (water quality)	19
SWMM (hydrologic)	12
HEC-x (hydrologic)	8
HSPF (hydrologic)	8
QUAL2EU (water quality)	8
SLOSH (coastal hazard analysis)	8
SWAT (chemical fate)	8
Do not use environmental models	58

## Metadata

Respondents were asked whether they would be interested in establishing a Federal Geographic Data Committee (FGDC) clearinghouse node for their metadata holdings. This would enable groups outside of the Sea Grant offices to access Sea Grant data. As shown in Table 10, most respondents (58 percent) felt that they did not have sufficient information about clearinghouse nodes to ascertain the level of interest in establishing a node. No respondents indicated an interest in establishing a node without further information.

Table 10. Interest in Establishing an FGDC Clearinghouse Node for Metadata

<b>Interest</b>	<b>Percentage of Response</b>
Need more information to decide	58
Would not like to establish a node	31
Already have a node	4
Would like to establish a node	0

## Technology Training

Respondents expressed interest in several types of technology training for themselves and other staff in their offices. Training subjects for which respondents were interested include introduction to GIS (73 percent), ArcView GIS (70 percent), and introduction to coastal remote sensing (69 percent). Respondents were least interested in receiving training on how to train others in developing FGDC-compliant metadata, with no respondents indicating an interest unless this training were made available locally. Table 11 provides the interest levels for these and other training subjects.

Table 11. Interest in Technology Training

Training Subject	Percentage of Response	
	Interested*	Not Interested
Introduction to GIS	73 (35)	31
ArcView GIS	70 (35)	19
Introduction to coastal remote sensing	69 (31)	31
Information management technologies for coastal executives	62 (31)	15
Image processing techniques	53 (15)	35
Interpretation of aerial photography	50 (23)	31
Procedures and protocols of the Coastal Change Analysis Program	50 (19)	31
Avenue Programming for ArcView GIS	34 (15)	35
Developing FGDC-compliant metadata	27 (15)	35
How to train others in developing FGDC-compliant metadata	12 (12)	38

\*Number in parentheses indicates the percentage of "yes" respondents who were interested in training only if it were made available locally.

## Part 2 Results and Discussion: Coastal Management Activities and Training Needs

Part 2 of the survey was directed toward the overall managers of Sea Grant offices. The focus of this component of the survey was on coastal management approaches, roles, and resource needs. Thirty-one completed surveys were returned for Part 2, and the percentages provided below were computed using n = 31.

### Management Roles

Sea Grant offices assume various roles in managing coastal resources. As shown in Figure 5, the majority of offices take on an independent role with regard to each coastal issue type addressed in the survey – habitat, coastal development, hazards, water quality, and resource management. The specific issues that these offices manage for are listed in Table 12. The most common issues managed by those taking on an independent role are air deposition of nutrients (58 percent), waterfront planning and development (52 percent), fish and shellfish stocks (52 percent), and groundwater sources (52 percent).

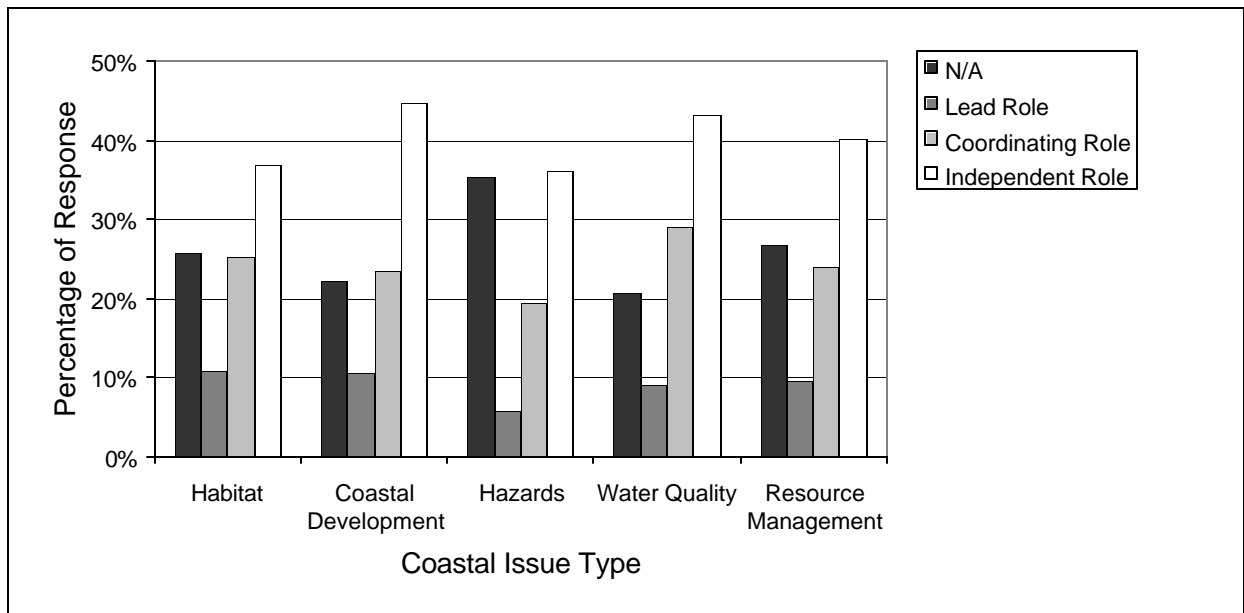


Figure 5. Roles of Sea Grant Offices in Managing Coastal Issues

Table 12. Top Specific Coastal Issues Where Sea Grant Offices Have an Independent Role

Issue Type	Specific Issue	Percentage of Response
Water Quality	Air deposition of nutrients	58
	Point source pollution	48
Resource Management	Fish and shellfish stocks	52
	Groundwater sources	52
	Surface water	48
Coastal Development	Waterfront planning and development	52
	Public access to the coast	48

Table 12. Top Specific Coastal Issues Where Sea Grant Offices Have an Independent Role (Continued)

	Cumulative impacts	45
	Growth management	45
Hazards	Coastal erosion and accretion	45
	Natural hazards	39
Habitat	Habitat status or health	42
	Habitat mapping	39
	Habitat restoration	39
	Protective area management	39

To manage for these specific issues, offices assuming an independent role apply a number of management techniques. The most preferred techniques, which are listed in Table 13, include GIS (used by 45 percent of respondents), environmental monitoring (used by 39 percent of respondents), and mapping for land use and resource characterization (used by 39 percent of respondents).

Table 13. Top Five Management Techniques Where Sea Grant Offices Have an Independent Role

Specific Issue	Percentage of Response
Geographic information systems (GIS)	45
Environmental monitoring	39
Mapping (land use and resource characterization)	39
Resource management planning	35
Regulation or permitting	32

### Approaches to Managing Coastal Habitats

Respondents were asked about the approaches they take for managing various habitats. The responses to this question are summarized in Table 14. Many offices (56 percent) rely on public education as a management approach, while relatively few offices use restoration (9 percent) or land use planning (6 percent) approaches. Permit actions are not part of any Sea Grant office's approach to managing coastal habitats.

Table 14. Approach Employed When Managing Coastal Habitats

Management Approach	Percentage of Response
Public education	56
Not applicable	39
Interagency coordination	15
Restoration	9
Land use planning	6
Permit actions	0

For each management approach employed by Sea Grant offices, there are several coastal habitats for which these approaches apply. As Table 15 illustrates, coastal waters are the primary target for all of

these approaches. In addition to coastal waters, benthic habitat is a major focus of public education and interagency coordination strategies, while beaches and dunes are a common focus for restoration and land use planning management approaches.

Table 15. Top Coastal Habitats Managed via Each Approach

<b>Management Approach</b>	<b>Coastal Habitat</b>	<b>Percentage of Response</b>
Public education	Benthic habitat	87
	Coastal waters	87
	Estuarine waters	84
	Beaches and dunes	81
Interagency coordination	Coastal waters	32
	Benthic habitat	29
	Estuarine waters	26
	Beaches and dunes	26
Restoration	Beaches and dunes	16
	Coastal waters	16
	Freshwater wetlands	16
	Shellfish habitat	16
Land use planning	Beaches and dunes	13
	Coastal waters	13
	Estuarine waters	13
	Tidal wetlands/marsh	10

### **Public Outreach and Education**

Almost all Sea Grant offices have public outreach and education responsibilities. Respondents indicated that their primary target audiences for public outreach and education include local governments, teachers, the general public, businesses, and industry. As shown in Table 16, each of these audiences was identified by at least 90 percent of respondents.

Table 16. Target Audiences for Public Outreach and Education

<b>Target Audience</b>	<b>Percentage of Response</b>
Local government	97
Teachers	94
General public	94
Businesses	90
Industry	90
Resource managers	87
State legislature	77
Kindergarten to 8th grade school children	74
9th to 12th grade high school children	74
State executive branch and/or governor's office	68
Not responsible for education	3

## Management Needs

Respondents were asked whether there were any technological or non-technological resources that would improve the operating performance of Sea Grant offices. Numerous technological resources were identified, with faster computer systems being the most commonly identified need (65 percent of respondents). Other technological resource needs are listed in Table 17. Many non-technological resource needs were identified, as well. As shown in Table 18, funding was thought to be the most important non-technological resource need, whether it be funding for outreach initiatives, demonstration/pilot projects, or research and data collection.

Table 17. Top Ten Technology Resource or Improvement Needs Identified as a "High" or "Medium" (Combined) Need

<b>Resource or Improvement Needs</b>	<b>Percentage of Response</b>
Faster computer systems	65
Geographic information systems (GIS)	58
Enhanced ability to interpret and apply spatial data and imagery for decision making	58
Resource inventory and assessment	52
Environmental modeling	52
Remote sensing technologies	48
Environmental remediation technologies	42
Environmental monitoring technologies	42
Mapping capability	35
Access to information about how other offices have applied information and technology solutions	29

Table 18. Top Ten Non-Technology Resource or Improvement Needs Identified as a "High" or "Medium" (Combined) Need

<b>Resource or Improvement Needs</b>	<b>Percentage of Response</b>
Funding for outreach initiatives	100
Funding for demonstration/pilot projects	94
Additional human resources	90
Funding for research or data collection	90
Access to information about how other offices have addressed similar issues, management options	81
Greater public support	77
Enhanced interagency coordination	74
Conflict resolution training for staff	71
Summary of case studies or Best Management Practices (BMPs)	65
Funding for training	61

### Non-technological Training

Many Sea Grant offices expressed an interest in participating in non-technological training, depending on the training subject. Seventy-one percent of respondents indicated an interest in receiving training in conflict resolution; however, 19 percent of these respondents would only participate if the training were made available locally. Relatively few respondents were interested in training on developing management plans and the fundamentals of coastal zone management. Table 19 presents the level of interest for each training subject.

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Table 19. Interest in Non-Technology Training

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<b>Training Subject</b>	<b>Percentage of Response</b>	
	<b>Interested</b>	<b>Not Interested</b>
Conflict resolution	71 (19)	26
Public outreach plans	71 (35)	23
Public involvement processes	65 (32)	29
Research methods for coastal management	65 (29)	32
Developing communication plans	58 (29)	32
Developing management plans	35 (13)	55
Introduction to coastal zone management	48 (32)	26

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## Appendix A. Part 1 Survey Questions and Aggregated Responses

Total Respondents = 26

Note: Added percentages may be greater than 100 because each question can have multiple answers. Percentages calculated using  $n = 26$ .

### 1. Does your office collect, derive, manage, or use spatial data for any of the following coastal issues? (Please circle appropriate letter(s) for each issue that applies.)

Coastal Issue	Spatial Data Not Collected, Derived, Managed, or Used	Spatial Data Collected or Derived Through GIS or Remote Sensing	Spatial Data Managed Within a GIS	Spatial Data Used That Has Been Collected, Derived, or Managed by Others
<b>Habitat Issues</b>				
Habitat mapping	23%	35%	23%	46%
Habitat status or health (characterization)	19%	23%	15%	62%
Habitat restoration	23%	27%	12%	54%
Protected area management	35%	19%	12%	38%
Invasive species	23%	15%	8%	54%
<b>Coastal Development Issues</b>				
Growth management	35%	19%	12%	42%
Land use or changes in land use	27%	27%	23%	50%
Dredging or port issues	38%	19%	12%	42%
Waterfront planning or development	38%	23%	12%	35%
Public access to coast	31%	23%	12%	46%
Cumulative impacts	42%	19%	15%	42%
Tourism and recreation	27%	27%	12%	54%
<b>Hazard Issues</b>				
Natural hazards	42%	12%	12%	42%
Coastal erosion or accretion	23%	23%	15%	46%
Beach nourishment	42%	4%	12%	42%
Hazardous material spill planning or response	50%	0%	0%	35%
Oil spill planning or response	46%	12%	12%	31%
<b>Water Quality Issues</b>				
Nonpoint source pollution	27%	35%	23%	46%
Point source pollution	27%	35%	12%	50%
Air deposition of nutrients	54%	4%	8%	35%

**1. Does your office collect, derive, manage, or use spatial data for any of the following coastal issues?**  
*(Please circle appropriate letter(s) for each issue that applies.)* (Continued)

Coastal Issue	Spatial Data Not Collected, Derived, Managed, or Used	Spatial Data Collected or Derived Through GIS or Remote Sensing	Spatial Data Managed Within a GIS	Spatial Data Used That Has Been Collected, Derived, or Managed by Others
<b>Water Quality Issues (Continued)</b>				
Eutrophication or hypoxia	38%	31%	8%	31%
Harmful algal blooms or <i>Pfisteria</i>	42%	8%	12%	31%
<b>Resource Management and Other Issues</b>				
Watershed management planning or assessment	8%	23%	19%	73%
Ocean management	46%	12%	19%	31%
Shoreline management planning	27%	15%	15%	54%
Land or property management	31%	8%	15%	46%
Protected, threatened, or endangered species	38%	4%	12%	46%
Fish and shellfish stocks	19%	23%	15%	58%
Aquaculture	35%	12%	8%	50%
Cultural resources	46%	19%	8%	23%
Groundwater sources	46%	8%	12%	35%
Surface water	35%	12%	23%	38%
Permit tracking	62%	0%	8%	19%
Competing uses of coastal waters	50%	15%	12%	27%

**2. Which of the following types of special purpose software does your office use to manage, analyze, or present spatial data?** *(Please circle all that apply.)*

62%	Geographic information systems, GIS (a computer-based system for input, storage, retrieval, and analysis of spatial or map data)
38%	Remote sensing (analyze or interpret satellite images, air photos, ground-based radar, side scan sonar, and other non-contact measurements or signals)
15%	Computer-aided design, CAD (drawing environment for designing or engineering systems)
38%	Database management system, DBMS (text or data management)
19%	Decision support/decision analysis (tools relating data or information and criteria to outcomes)
50%	Visualization (graphical rendering and visual data exploration)
38%	Environmental process modeling (e.g., simulating population, hydrodynamic, climate, landscape, or other changes through time)
23%	Do not use any of these software types

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**3. Which GIS software product(s) does your office now use?**

*(Please circle all that apply.)*

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38%	Do not use GIS software
42%	ARC/INFO (ESRI)
54%	ArcView (ESRI)
12%	Atlas GIS (ESRI)
0%	Backland GRASS (Texas A&M University)
15%	Imagine (ERDAS, Inc.)
0%	MapSheets (ERDAS, Inc.)
0%	Gena Map (Genasys)
8%	GRASS (USACOE - CERL)
0%	GRASSLANDS (Global Geomatics, Inc.)
4%	GeoMedia (Intergraph)
4%	IDRISI (Clark University)
0%	LandView (Census Bureau)
4%	MapInfo (MapInfo Corp.)
0%	MapObjects (ESRI)
0%	Marplot (NOAA)

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**4. If your office does not operate a GIS, which of the following describes your alternate GIS access?**

*(Please circle appropriate letter.)*

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19%	Operate GIS, not applicable
4%	No access available
12%	State GIS coordinating council or office
27%	Partnership with other local, state, or federal agency
38%	Academic institution
0%	Private sector company
0%	Non-governmental organization
31%	No response

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**5. How would you describe the combined GIS expertise or capability of the people in your office?**

*(Please circle all that apply.)*

---

31%	No expertise
31%	Beginning (able to input and view data or able to make simple queries and maps)
38%	Intermediate (able to analyze data using existing software applications)
19%	Advanced (able to develop or adapt custom software applications)

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**6. How many current staff members (permanent or temporary full-time equivalents) in your office use GIS regularly? (Please circle appropriate letter.)**

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27%	0
50%	1 to 2
19%	3 to 5
0%	6 to 10
4%	Over 10

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**7. How many current staff members (permanent or temporary full-time equivalents) have had formal GIS training (certified training or college/university courses)? (Please circle appropriate letter.)**

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50%	0
31%	1 to 2
15%	3 to 5
0%	6 to 10
4%	Over 10

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**8. What portion of GIS use in your office targets the following activities? (Please circle appropriate letter.)**

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<b>Activity</b>	<b>None of Our Use</b>	<b>Some of Our Use</b>	<b>Most of Our Use</b>
General and project specific mapping	27%	27%	35%
Information management tool for spatial analysis	31%	50%	8%
Tool for static modeling in a spatial context	54%	31%	4%
Supplying "state" of the system data sets to dynamic environmental process models	58%	31%	0%
Others	0%	0%	8%

---

**9. Which remote sensing software product(s) does your office now use to collect or process imagery? (Please circle all that apply.)**

---

65%	Do not use remote sensing software
0%	EASI/PACE (PCI)
4%	ELAS (NASA and USACOE)
0%	ENVI (Research Systems, Inc.)
0%	ER Mapper (Earth Resource Mapping)
0%	I <sup>2</sup> (International Imaging Systems)
4%	IDIMS, or other modules (Terra-Mar)

---

**9. Which remote sensing software product(s) does your office now use to collect or process imagery?**  
*(Please circle all that apply.) (Continued)*

---

4%	IDRISI (Clark University)
15%	Image Analyst (ESRI)
19%	Imagine (ERDAS, Inc.)
0%	Land Analysis System, LAS (NASA - UCGS)
0%	Meridian (McDonald Dettwiler)
0%	MicroStation (Intergraph)
0%	Resource (Decision Images)
8%	SeaWiFs Data Analysis System (NASA)
0%	TNTmips (MicroImages, Inc.)
8%	No Response

---

**10. If your office does not use the remote sensing software products listed in Question 9, does your office access these capabilities through any of the following?** *(Please circle all that apply.)*

---

4%	Use remote sensing software, not applicable
12%	No access available
15%	State remote sensing (or GIS) coordinating council office
23%	Partnership with other agency
62%	Academic institution
0%	Private sector company
0%	Non-governmental organization
15%	No response

---

**11. How would you describe the combined remote sensing expertise of the people in your office?**  
*(Please circle all that apply.)*

---

54%	No expertise
19%	Beginning (able to input and view data and perform simple processing)
19%	Intermediate (able to analyze data and perform routine processing using standard software applications)
12%	Advanced (able to develop and apply custom algorithms or image processing software applications)

---

**12. How many current staff members (permanent or temporary full-time equivalents) in your office use remote sensing software regularly? (Please circle appropriate letter.)**

---

62%	0
23%	1 to 2
12%	3 to 5
0%	6 to 10
4%	Over 10

---

**13. How many current staff members (permanent or temporary full-time equivalents) have had formal remote sensing training (certified training or college/university course)? (Please circle appropriate letter.)**

---

62%	0
27%	1 to 2
12%	3 to 5
0%	6 to 10
4%	Over 10

---

**14. Does your office use any of the following environmental models? (Please circle all that apply.)**

---

58%	Do not use environmental models
19%	No response

**For Water Quality Modeling**

19%	BASINS (EPA)
4%	WASP (EPA)
0%	EXAMS (EPA)
8%	QUAL2EU (EPA)
4%	ToxiRoute (EPA)

**For Hydrologic Modeling**

8%	HSPF (EPA)
8%	HEC-x (USACOE)
12%	SWMM (EPA)
4%	AGNPS (USDA/NRCS)

**For Chemical Fate Modeling**

0%	PRZM (USDA)
0%	GLEAMS (EPA)
0%	EPIC (USDA/NRCS)
8%	SWAT (USDA/NRCS)
4%	SWRBB-WQ (USDA/NRCS)

---

**14. Does your office use any of the following environmental models?**

*(Please circle all that apply.) (Continued)*

**For Coastal Hazard Analysis Modeling**

8%	SLOSH (NOAA)
0%	TAP (NOAA)
0%	HAZUS (FEMA)
0%	HurrEvac (NOAA)

---

**15. Does your office have Internet access?**

*(Please circle appropriate letter.)*

---

0%	No access
85%	Yes, please indicate dial-in speed. <i>(Circle all that apply.)</i>
0%	14.4 (Kb)
8%	28.8 (Kb)
4%	32 (Kb)
4%	56 (Kb)
4%	ISDN (64 Kb)
12%	ISDN (128 Kb)
35%	Lease Line - connection speed (e.g., T1, 1.54 Mbs.)

---

**16. What Web browser and version do you use?**

*(Please select all that apply.)*

---

0%	Lynx
19%	Microsoft Internet Explorer
38%	Netscape

---

**17. Which of the following media does your office prefer to use to exchange data?**

*(Please select all that apply.)*

---

73%	3 1/2-inch diskette
73%	CD-ROM
15%	Jaz disk
73%	ZIP disk
4%	4 millimeter tape
4%	8 millimeter tape
58%	File Transfer Protocol (FTP)
0%	Digital Versatile Disk (DVD)
69%	HTTP (Web browser)
12%	No response

---

**18. If your office creates or edits metadata (descriptions of data), what format do you use?**  
*(Please circle appropriate letter.)*

---

73%	Do not create metadata
15%	Federal Geographic Data Committee (FGDC)
0%	State standard
8%	Academic institution standard
4%	No response

---

**19. Do you want to establish an FGDC Clearinghouse Node for your metadata holdings?**  
 The Clearinghouse is a decentralized database providing access to digital spatial data. Creating a node would allow your data to be used by groups outside your agency.  
*(Please circle appropriate letter.)*

---

58%	Need more information to decide
4%	Already have an established FGDC node
0%	We would like to establish a node
31%	We would not like to establish a node
8%	No response

---

**20. Would you or your staff participate in the following technology training if it were made available?**  
*(Please circle one letter for each subject.)*

---

Subject	Likely to Participate		
	Yes	No	Only If It Were Available Locally
Introduction to Coastal Remote Sensing	38%	31%	31%
Introduction to GIS	38%	31%	35%
ArcView GIS	35%	19%	35%
Avenue Programming for ArcView GIS	19%	35%	15%
Information Management Technologies for Coastal Executives	31%	15%	31%
Developing FGDC-Compliant Metadata	12%	35%	15%
How to Train Others in Developing FGDC-Compliant Metadata	0%	38%	12%
Image Processing Techniques	38%	35%	15%
Interpretation of Aerial Photography	27%	31%	23%
Procedures and Protocols of the Coastal Change Analysis Program	31%	31%	19%



**21. Which of the following types of digital data would be useful to your office or agency?**

*(Please circle appropriate letter.)*

Type of Data Set	Usefulness of Data Sets				
	Not Useful	Already Have Data	Very Useful	Moderately Useful	Minimally Useful
<b>Bathymetry or Topography Data Sets</b>					
Estuarine and bay bathymetry	4%	19%	35%	19%	12%
Nearshore bathymetry (0 to 3 miles)	0%	23%	38%	8%	19%
Offshore bathymetry (3 to 200 miles)	12%	8%	15%	12%	35%
Shoreline	0%	23%	38%	23%	8%
Coastal topography	0%	12%	38%	23%	12%
Shoreline erosion or accretion rates	0%	19%	38%	15%	12%
Storm surge inundation zones	8%	12%	27%	23%	12%
<b>Habitat and Resource Data Sets</b>					
Benthic habitat maps in turbid waters	12%	0%	27%	23%	12%
Coral distribution maps	42%	0%	8%	0%	12%
Seagrass distribution maps	15%	15%	42%	4%	12%
Live bottom distribution maps	8%	8%	23%	15%	15%
Soft bottom distribution maps	8%	4%	23%	27%	15%
Shellfish bed distribution maps	12%	12%	50%	8%	8%
Coastal land cover and land use maps	4%	23%	50%	15%	8%
Coastal land cover change maps	4%	19%	58%	8%	8%
Wetland function	0%	4%	42%	19%	15%
Habitat suitability indices	4%	0%	38%	27%	12%
High resolution aerial photography	0%	23%	27%	27%	8%
Impervious surface maps	8%	12%	38%	12%	12%
Fish distributions	12%	8%	46%	19%	8%
<b>Water Quality Data Sets</b>					
Sea surface temperature	4%	19%	15%	15%	19%
Suspended sediments for ocean waters	19%	4%	19%	19%	15%
Primary productivity for ocean waters	19%	8%	31%	12%	12%
Salinity	23%	19%	27%	4%	12%
<b>Human Use and Other Data Sets</b>					
Marine boundaries (e.g., jurisdictional)	12%	15%	23%	23%	12%
Human demographics of coastal areas	0%	12%	54%	23%	4%
Water use classification	0%	8%	42%	15%	15%
Protected area boundaries	4%	12%	27%	35%	12%
Marine transportation	4%	8%	23%	27%	23%

## Appendix B. Part 2 Survey Questions and Aggregated Responses

Total Respondents = 31

Note: Added percentages may be greater than 100 because each question can have multiple answers. Percentages calculated using n = 31.

### 1. Which role does your office play in addressing the following coastal issues?

(This question will help the Center and others understand the issues of importance to your office. If your office does not address the issue at this time, please circle “a” for not applicable. If your office has the lead role in the state or territory for addressing the issue, circle “b.” If your office coordinates this issue with another office or agency, circle “c.” Circle “d” if your office has no formal responsibility for the activity, yet it has some interest in tracking this issue.)

Type of Data Set	Role Played by Your Office			
	Not Applicable	Lead Role	Coordinating Role	Independent Role
<b>Habitat Issues</b>				
Habitat mapping	39%	6%	16%	39%
Habitat status or health (characterization)	23%	16%	16%	42%
Habitat restoration	19%	10%	29%	39%
Protected area management	45%	0%	16%	39%
Invasive species	3%	23%	48%	26%
<b>Coastal Development Issues</b>				
Growth management	23%	10%	26%	45%
Land use or changes in land use	19%	16%	26%	42%
Dredging or port issues	35%	0%	23%	42%
Waterfront planning or development	23%	6%	16%	52%
Public access to coast	23%	10%	26%	48%
Cumulative impacts	19%	13%	19%	45%
Tourism or recreation	13%	19%	29%	39%
<b>Hazard Issues</b>				
Natural hazards	19%	10%	32%	39%
Coastal erosion or accretion	16%	6%	26%	45%
Beach nourishment	42%	3%	13%	35%
Hazardous material spill planning or response	48%	3%	13%	32%
Oil spill planning or response	52%	6%	13%	29%
<b>Water Quality Issues</b>				
Nonpoint source pollution	10%	10%	45%	35%
Point source pollution	13%	3%	35%	48%
Air deposition of nutrients	29%	10%	6%	58%
Eutrophication or hypoxia	23%	13%	29%	42%
Harmful algal blooms or <i>Pfisteria</i>	29%	10%	29%	32%

**1. Which role does your office play in addressing the following coastal issues?**  
(Continued)

Type of Data Set	Role Played by Your Office			
	Not Applicable	Lead Role	Coordinating Role	Independent Role
<b>Resource Management and Other Issues</b>				
Watershed management planning or assessment	10%	10%	42%	42%
Ocean management	42%	6%	26%	29%
Shoreline management planning	19%	10%	26%	45%
Land or property management	48%	6%	6%	39%
Protected, threatened, or endangered species	32%	3%	26%	35%
Fish and shellfish stocks	10%	13%	29%	52%
Aquaculture	13%	29%	26%	32%
Cultural resources	39%	10%	23%	32%
Groundwater sources	39%	3%	10%	52%
Surface water	26%	0%	23%	48%
Competing uses of coastal waters	16%	16%	29%	35%

**2. What role does your office play in addressing management issues listed in Question 1 by using or developing the following management techniques?**

*(This question examines the ways in which your office addresses coastal management issues. If your office does not address issues with the technique at this time, please circle "a" for not applicable. If your office has the lead role in the state or territory for addressing the management technique, circle "b." If your office coordinates this management technique with another office or agency, circle "c." Circle "d" if your office has no formal responsibility for the activity, yet uses or aids in developing this management technique.)*

Management Technique	Role Played by Your Office			
	Not Applicable	Lead Role	Coordinating Role	Independent Role
Regulation or permitting	58%	0%	0%	32%
Enforcement	81%	0%	0%	13%
Resource management planning	23%	10%	39%	35%
Public outreach and education	0%	48%	45%	16%
Demonstration and pilot projects	3%	35%	42%	29%
Land acquisition	81%	0%	0%	13%
Leasing public trust lands and resources	77%	0%	3%	10%
Land use planning	42%	6%	26%	23%
Critical area delineation and management	55%	6%	13%	29%
Research	3%	42%	32%	26%
Environmental monitoring	29%	6%	26%	39%
Mapping (land use and resource characterization)	45%	6%	13%	39%

**2. What role does your office play in addressing management issues listed in Question 1 by using or developing the following management techniques? (Continue d)**

Management Technique	Role Played by Your Office			
	Not Applicable	Lead Role	Coordinating Role	Independent Role
Geographic information systems (GIS)	23%	13%	23%	45%
Technical assistance (provide advice to resource users)	0%	52%	39%	16%
Interagency coordination/clearinghouse	13%	19%	42%	23%
Federal consistency	58%	0%	6%	26%

**3. Your office takes which approach(es) when managing coastal resources?**

*(This question examines the ways in which your office specifically manages or addresses habitat types. Please circle any letters that apply.)*

Habitat Type	Approach Taken by Your Office					
	Not Applicable	Permit Actions	Land Use Planning	Interagency Coordination	Restoration	Public Education
Estuarine waters	13%	0%	13%	26%	13%	84%
Coastal waters	10%	0%	13%	32%	16%	87%
Freshwater wetlands	29%	0%	6%	16%	16%	68%
Submerged aquatic vegetation	26%	0%	6%	10%	10%	74%
Tidal wetlands/marsh	26%	0%	10%	16%	13%	74%
Shellfish habitat	23%	0%	6%	19%	16%	74%
Benthic habitat	10%	0%	6%	29%	13%	87%
Marine outcrops/hard bottoms	42%	0%	6%	16%	6%	52%
Coral reefs	71%	0%	0%	3%	0%	19%
Kelp beds	74%	0%	0%	3%	0%	19%
Rocky shorelines	52%	0%	3%	13%	3%	45%
Beaches and dunes	16%	0%	13%	26%	16%	81%
Maritime forest	74%	0%	3%	3%	3%	16%
Upland forest	84%	0%	3%	3%	3%	10%

**4. What non-technical resources or improvements would help your office address its responsibilities?**

*(Please indicate the expected benefit of the following resources by circling the appropriate letter.)*

Non-Technical Resource or Improvement	Expected Benefit			
	None	Low	Medium	High
Additional human resources	3%	6%	26%	65%
Conflict resolution training for staff	6%	23%	45%	26%
Public participation training	3%	39%	29%	26%

---

**4. What non-technical resources or improvements would help your office address its responsibilities?**  
(Continued)

---

<b>Non-Technical Resource or Improvement</b>	<b>Expected Benefit</b>			
	<b>None</b>	<b>Low</b>	<b>Medium</b>	<b>High</b>
Enhanced interagency coordination	0%	26%	39%	35%
Clearer authorities	39%	32%	19%	3%
Stricter enforcement mechanisms	71%	16%	6%	6%
Greater public support	10%	10%	29%	48%
Planning tools	6%	35%	42%	13%
Summary of case studies or Best Management Practices (BMPs)	3%	29%	52%	13%
Access to information about how other offices have addressed similar issues, management options	3%	16%	61%	19%
Funding for research or data collection	3%	3%	10%	81%
Funding for demonstration/pilot projects	0%	3%	29%	65%
Funding for outreach initiatives	0%	0%	16%	84%
Funding for training	10%	23%	32%	29%

---

**5. What information or technical resources would help your office better address its responsibilities?**  
(Please indicate the expected benefit of the following resources by circling the appropriate letter.)

---

<b>Information or Technical Resource</b>	<b>Expected Benefit</b>			
	<b>None</b>	<b>Low</b>	<b>Medium</b>	<b>High</b>
Faster computer systems	6%	26%	48%	16%
Geographic information systems (GIS)	10%	29%	29%	29%
Mapping capability	23%	39%	23%	13%
Remote sensing technologies	23%	26%	29%	19%
Resource inventory and assessment	19%	23%	32%	19%
Environmental monitoring technologies	16%	35%	23%	19%
Environmental remediation technologies	26%	29%	29%	13%
Environmental modeling	13%	32%	39%	13%
Enhanced ability to interpret and apply spatial data and imagery for decision making	13%	26%	32%	26%
Software applications	19%	23%	10%	6%
Access to data sources	16%	26%	10%	3%
Technical training	16%	19%	10%	16%
Access to information about how other offices have applied information and technology solutions, please specify	23%	19%	19%	10%

---

**6. If your office has responsibility for public outreach or education, what is your target audience?**  
*(Please circle all letters that apply.)*

---

- 3% Not responsible for education. Skip to Question 8.
- 74% Kindergarten to 8th grade school children
- 74% 9th to 12th grade high school students
- 94% Teachers
- 97% Local government
- 77% State legislature
- 68% State executive branch and/or governor's office
- 94% General public
- 90% Businesses
- 90% Industry
- 87% Resource managers

---

**7. Has your office developed education curricula or programs for any of its audiences?**

---

- 16% No
- 81% Yes
- 3% No response

---

**8. Does your office operate volunteer programs to accomplish education, monitoring, stewardship, or research goals?**

---

- 39% No
- 58% Yes
- 3% No response

---

**9. Would you or your staff participate in any of the following training subjects if they were made available? *(Please circle one letter for each subject.)***

---

Subject	Likely to Participate		
	Yes	No	Only If It Were Available Locally
Developing management plans	23%	55%	13%
Developing communication plans	29%	32%	29%
Public involvement processes	32%	29%	32%
Conflict resolution	52%	26%	19%
Public outreach plans	35%	23%	35%
Research methods for coastal management	35%	32%	29%
Introduction to coastal zone management	16%	26%	32%

---

**10. Would your interest in any of the training topics listed in Question 9 change if such training were delivered via the World Wide Web or other distance education technologies (such as public television and video conferencing)?**

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71%	Would increase
6%	Would decrease
23%	No response