



A Systematic Review of the Needs and Issues of
the U.S. Coastal Resource
Management Community

Final Report

A Qualitative Meta Analysis

Submitted to
NOAA Coastal Services Center
Charleston, SC

April 3, 2009

MRAG Americas
10051 5th Street North, Suite 105
St. Petersburg, FL 33702
Tel. 727-563-9070
Fax. 727-563-0207
www.mragamericas.com

Table of Contents

1	Executive Summary	3
2	Introduction.....	5
3	Nature of the Study.....	5
4	Methodology.....	6
4.1	Step 1: Goals / Objectives	6
4.2	Step 2: Selection of Literature for Systematic Review.....	7
4.3	Step 3: Extracting and Synthesizing the Data.....	11
5	Findings	11
5.1	Select efforts designed to meet cross-cutting needs	14
5.2	Needs that address both a Center Thematic Area and an EBM framework	15
5.2.1	Coastal Conservation Needs.....	15
5.2.2	Coastal and Ocean Planning Needs	18
5.2.3	Hazards Resilience Needs	20
5.3	Needs for Center products and services that fit within an EBM framework (beyond those already mentioned under the three Center themes).....	23
5.4	Needs for Center products and services fit within a Center Thematic Area.....	25
5.5	Regional Priorities	26
5.6	Information Collection Methods and Target Audiences.....	29
6	References.....	34
7	Appendix A: Literature Evaluated (Attached, separate file)	37
8	Appendix B: Specific Needs Table (Attached, separate file)	37
9	Appendix C: Target Populations, Sample Sizes and Response Rates from Reviewed Literature (Attached, separate file)	37

1 Executive Summary

The customer for this qualitative meta-analysis of the coastal management community's needs is the National Oceanic and Atmospheric Administration's (NOAA) Coastal Services Center. This organization provides products and services for the nation's coastal resource management programs. To better understand constituent needs, NOAA employs many research tools, including reports such as this. Twenty-four documents were analyzed in the development of this document, which provides a base from which more detailed investigations can be developed if needed. The documents were selected using specific criteria, a process explained further in the Methodology section of the report.

The objectives of this review were to identify coastal management (CM) community needs as they relate to Center themes (Coastal Conservation, Coastal and Ocean Planning, Hazards Resilience), elements of ecosystem based management (EBM) (Bio-physical (natural), Social and Economic, Institutional / Governance) and Center products and services (Data, Tools, Training, Partnership Building, Technical Assistance); and to identify successful methodological components used to extract information (i.e. how the data were collected, sample size and response rate, etc.).

The analysis found that the priority issues continue to be land use and habitat change, though climate change and hazard resilience are gaining more attention. Overwhelmingly, priority needs were identified as data and tools to aid in decision making, more specifically on the human use dimension of ecosystems. Additionally, we encountered the needs for coordination, collaboration and communication repeatedly, relevant to all Center themes, products and services. The following provides more information about the results under the major issue areas addressed by the NOAA Coastal Services Center.

Coastal Conservation Needs

Resource managers identified needs for coastal conservation in every product and service category; primary needs are for data and tools pertaining to the biophysical/natural and institutional/governance elements and partnership building for the latter element. Within the coastal conservation theme, the most cited specific needs are for habitat restoration, protection, and monitoring, public outreach and education for stakeholder involvement and to engender a sense of stewardship, and integrated management and increased communication, coordination, and cooperation within and between agencies, NGOs, and other organizations and across jurisdictions.

Coastal and Ocean Planning Needs

Resource managers identified needs for coastal and ocean planning in every product and service category and each EBM element, with the majority of those needs being data and tools related to biophysical and natural issues. Again the need for partnership building was prevalent in the institutional/governance element of this theme. Within the coastal and ocean planning theme, the most cited specific needs are for enhanced mapping of key habitats, changes, and trends, technical support for GIS users in coastal communities, enhanced data sharing and access, communication and coordination among entities and research and implementation of SmartGrowth.

Hazards Resilience Needs

Resource managers identified needs for hazards resilience in every product and service category. The needs for data and tools related to biophysical and natural issues were again the most common. The majority of data and tools needs were for information relating to storm surge and sea level rise. Within the hazards resilience theme, the most cited specific needs are for research and planning for climate change effects, improved risk communication, vulnerability studies that focus on the socio-economic consequences of climate change effects, and improved communication, coordination, collaboration between agencies and organizations.

Other EBM Needs

Elements of EBM resound throughout the thematic areas, and there were few needs identified solely as related to EBM that were not captured in the themes. Some EBM specific needs identified in the source material include integrated ecosystem assessments, human dimension tools and constraints to using them, valuation studies of coastal and ocean resources, and training and technical support for EBM tools.

Regional Priorities

Regional priorities were collected from the source material, where available; therefore, this is not intended to represent a comprehensive analysis of priority issues in all regions. Land use, shoreline and habitat change and management and habitat mapping remain priority issues in all regions, followed closely by water quality. Coastal Hazards issues appeared to have priority for the West Coast and Pacific Islands compared with other regions; the Great Lakes regions priority issues related to Coastal Land Use Planning; the West Coast and the Northeast had the most references to issues of Ocean and Great Lakes Planning; and the Southeast and Caribbean and West Coast had the most references to issues of Coastal Conservation.

Data Collection and Target Audiences

Web-based surveys combined with literature reviews were the predominant methods employed for information collection in the reviewed literature. Given the demands of coastal resource managers, on-line surveys appear to be preferred as they generally require a smaller time commitment. Response rates are likely enhanced with additional actions, such as frequent communication with the target audience to increase their familiarity with the subject and survey provider, highlighting the relevance of the survey, keeping the survey simple and straightforward, minimizing the time requirement for completion, and familiarity with the audience and their issues. Surveys are valuable tools though they limit the collection of qualitative information. Among the audiences identified by the reviewed literature, the coastal management community was primary and well represented. There was limited interaction with the regional ocean observing system community, which would be valuable given the numerous ocean observing data needs identified. There was also considerable overlap in target audiences and type of information collected between the Coastal Services Center and Coastal States Organization's Surveys.

2 Introduction

The meta-analysis process is one step in the collection of information for the Resource Management Trends and Product and Service Assessment project being conducted by MRAG Americas. The project is intended to improve the programs and outputs of the Coastal Services Center (Center) for use by state and local resource managers to assist them in solving specific site issues and help identify useful and potential partner organizations and agencies. Outputs from this assessment, combined with the preceding literature review will aid in development of the Center's Coastal Resource Management Customer Survey and first ever Coastal Services Center Product and Services Evaluation and provide recommendations for future programs that the Center may consider along with modifications to existing products and services. The Program Evaluation Survey was previously combined with the Customer Survey and will be administered separately in the future.

This meta-analysis was informed by a preceding literature review and the methodology was adapted from existing methodologies and refined in consultation with the Center's internal project team. The findings are presented in a succession of tables below with brief discussion. In general the findings provide an indication of the primary needs, type of need (data, tools, training, technical assistance, partnership building), and issues of importance to national and regional management communities; through this we are able to draw some general inferences on where priority needs exist, and additionally what audiences the Center may choose to target in future surveys and assessments. This analysis does not provide a ranking of needs and issues nor should it be assumed that all needs and issues (both nationally and regionally) have been identified, as the review was conducted on a select list of literature. Care was taken to identify coastal resource management needs that are common among management communities, rather than isolating specific needs of distinct users, though in some cases specific needs are given. Given these limitations, the review can serve as a valuable tool to identify gaps in existing information to aid the Center in catering their products and services to meet the needs of the coastal management community. The results of the meta-analysis will inform the design of the data collection efforts and development of survey questions. In our assessment of the needs and issues relevant to the coastal management community, we have no doubt over-generalized some ideas and neglected to include those that may be of high priority to select audiences. However, our main goal was to determine needs relevant to the Center's themes and also of greatest priority to the largest number of user-groups.

3 Nature of the Study

This evaluation process was conducted as a qualitative meta-analysis or systematic review. Traditional meta-analysis is quantitative and combines the results of multiple studies to amalgamate, summarize, and review previous quantitative research. The purpose of a meta-analysis, to collect information aimed at answering specific questions, serves well for this study; however, the methodology is quantitative and therefore required adjustments. MRAG considered the methodologies used by the NOAA Southeast and Caribbean Region's (SECART) assessment team (NOAA 2008) and Rochford (2005) and worked in conjunction with the Center's internal project team to develop an appropriate method and goals for the evaluation of needs and issues

(both nationally and regionally) important to the coastal management community and elucidate methodological components of included documents and reports.

The adapted methodology involved 3 steps and is described in greater detail below. Briefly, the Center's internal project team developed the goals of the review that would serve to identify the needs of coastal managers in alignment with the basic elements of ecosystem based management (EBM) and Center themes; a list of literature provided by both the Center and MRAG was evaluated against inclusion criteria; information that met the goals of the review was extracted from the selected literature and the data were synthesized.

4 Methodology

A formal protocol was developed prior to initiation of this study. This included specification of the goals for investigation (Step 1), development of criteria for the studies that should be included in the analysis and evaluation of literature against the criteria (Step 2), and extraction and synthesis of information (Step 3). Quality of information and bias are important factors for consideration in any review of existing information. All reports that met inclusion criteria either provided original data or provided assessments of existing information that yielded additional findings. To our knowledge there is no formal assessment protocol for qualitative studies and no clear way to rank or weigh quality of studies and their findings; therefore, variation was not assessed beyond the inclusion/exclusion criteria that selected literature was evaluated against. This three step method is described in greater detail below.

4.1 Step 1: Goals / Objectives

The questions or goals of a meta-analysis provide a clear statement of the objectives of the review, and as such should be explicit to guide the process. The objectives of this review were to identify coastal management (CM) community needs as they relate to Center themes, elements of ecosystem based management (EBM) and Center products and services; and to identify methodological components used to extract information (i.e. how the data were collected, sample size and response rate, etc.). The goals are provided below and served as the basis for the matrices that were developed and populated during the extraction of information (Step 3).

Goal 1: To identify needs expressed by the CM community that addresses both a Center theme and an EBM element.

- Center themes: Coastal Conservation, Coastal and Ocean Planning, Hazards Resilience
- Elements of EBM: Bio-physical (natural), Social and economic, Institutional / Governance

Goal 2: To determine how the needs expressed by the CM community for Center products and services fit within an EBM framework.

- Center products and services: Data, Tools, Training, Partnership Building, Technical Assistance
- Elements of EBM: Bio-physical (natural), Social and economic, Institutional / Governance

Goal 3: To determine how the needs expressed by the CM community for Center products and services fit within the Center's thematic areas.

- Center products and services: Data, Tools, Training, Partnership Building, Technical Assistance
- Center themes: Coastal Conservation, Coastal and Ocean Planning, Hazards Resilience

Goal 4: To determine the priority issues by geographic region: Pacific Islands, West Coast, Great Lakes, Gulf of Mexico, Southeast and Caribbean, Mid-Atlantic, Northeast

- Coastal Land Use Planning – Land use planning / growth management; Public access; Recreation and tourism; *Port, harbor or marina development; *Permits and enforcement; Dredging; Waterfront and brownfield redevelopment; Infrastructure / utilities development; *Transport planning; Climate impacts
- Ocean and Great Lakes Planning – Shoreline change; Protected area; Nearshore and offshore habitat mapping; Submerged lands management; Marine jurisdictional boundaries; Energy development; Marine Transportation Planning; Climate Impacts
- Coastal Conservation Planning – Habitat restoration and monitoring; *Water quality monitoring; Nonpoint source pollution; Erosion and beach Nourishment; *Invasive species management; *Protected species management; *Fisheries management; Cultural and heritage resource management; *Pollutant transport and dispersion; *Coral reef management; Climate impacts
- Coastal Hazards – Flooding/inundation/storm surge; Erosion; Hurricanes; Sea Level Rise; *Public health concerns; *Oil/pollutant spill response; *Harmful algal blooms, Tsunami; *Beach safety related to rip currents; *Search and rescue; *Landslides; Climate Impacts
 - [*denotes secondary Center priorities]

Goal 5: To identify successful methodological components and target audiences for application in development and dissemination of Center surveys.

- Methods of information collection
- Target audiences and sample size and response rates

4.2 Step 2: Selection of Literature for Systematic Review

The selection of reports should be free from bias and possess commonalities for comparison. Inclusion and exclusion criteria that relate to goals of the review were modified from those developed by the SECART team (NOAA 2008) and further reviewed by the Center’s internal project team. Study selection began from the list of literature reviewed in the preceding step of this project. Those sources were then evaluated against the accepted inclusion and exclusion criteria (provided in **Table 1**); additional literature that was identified during the process supplemented the list. Only studies that met all inclusion criteria were retained for analysis in this review. This resulted in a total of 20 studies from 58 original sources, plus an additional four sources that were added by the Center project team (**Table 2**); the full table of evaluated literature is provided in Appendix A. The literature evaluated does not represent an exhaustive list of all the needs and issues of importance to the coastal management community. All evaluated sources were reviewed for both a national and regional focus, where available.

Inclusion criteria include the following:

- **Relevance to objective.** Is the information provided in the report relevant to the coastal management community? Does it identify needs and/or issues?
- **Timeframe.** Has the report been completed since 2001? A five year timeframe is typical for elucidating recent trends, however it was concluded that the results of the 2002 Center Customer Survey were valuable for this review, and the timeframe was adjusted accordingly.
- **Assessment design / tools.** What were the methods of information collection utilized? Who is the targeted population? Are they part of the coastal management community? What were the resulting response rates (if applicable)? Will that method be potentially useful in the future to the Center?
- **Level of evidence.** Is the information in the source material original or does it provide some additional assessment of existing information that provides new information?
- **User characteristics.** Is the target audience likely to interact with the Coastal Services Center and benefit from their products and services?

Table 1. Inclusion and exclusion criteria.

Criteria	Inclusion	Exclusion
Relevance to Objective	Focus on coastal management issues and priority needs	Focus on research Program evaluations
	Focus on elements of ecosystem based management	Planning documents (i.e. strategic plans) Informational and outreach materials
Timeframe	2001 to present	Prior to 2001
Assessment Design / Tools	Direct involvement of coastal management community	No direct involvement of coastal management community
	Telephone, mail, and/or web-based survey	
	User interviews (individual or groups)	
	Focus groups	Restricted to internal staff
	Stakeholder meetings and workshops	
	Expert panels, task force and advisory groups	
Literature review		
Level of evidence	Primary survey data directly applicable to the target population (coastal management community)	Extrapolated evidence from studies not directly applicable to the target population
	Extrapolation of survey data, but directly applicable to the target population	
	Assessment of exiting data, but directly applicable to the target population (that provides additional information)	
User characteristics	Primary (core) users – interact directly with NOAA	Negligible - occasional or low-priority users
	Secondary users - not intended to interact directly with NOAA but are intended consumers of the product/service, often in the form of output from targeted, value-added products	
	Affected - not direct users but may be affected by use	

Table 2a. Literature reviewed and abbreviations utilized herein.

Abbrev.	Study Reference	Author / Sponsor	Web location (if available)
CSC1	NOAA Coastal Services Center (NOAA CSC). 2002b. Coastal Resource Management Customer Survey. 2002 Results.	NOAA Coastal Services Center	www.csc.noaa.gov/survey/
CSC2	NOAA Coastal Services Center (NOAA CSC). 2006a. 2006 Coastal Resource Management Customer Survey Final Report. 65p.	NOAA Coastal Services Center	www.csc.noaa.gov/survey/
Heinz	Heinz Center. 2006b. Filling the gaps: Priority data needs and key management challenges for national reporting on ecosystem conditions. A report of the Heinz Center's State of the Nation's Ecosystem Project. 100p.	Heinz Center	http://www.heinzctr.org/Programs/Reporting/Working%20Groups/Data%20Gaps/Gaps_LongReport_LoRes.pdf
CSC3	National Oceanic and Atmospheric Administration Coastal Services Center (NOAA CSC). 2002a. Marine protected areas needs assessment: Final report. Charleston, SC. 95p	NOAA Coastal Services Center	http://www.csc.noaa.gov/mpa/M_PANAFINAL.pdf
NACo	National Association of Counties (NACo). 2008. Coastal county geospatial needs summary report. 27p.	National Association of Counties	http://www.naco.org/Content/ContentGroups/Programs_and_Projects/Information_Technology1/Coastal_County_Geospatial_Needs.pdf
CSC4	NOAA Coastal Services Center (NOAA CSC). 2007. Needs Assessment for the NOAA Gulf Coast Services Center. Final Draft. November 27, 2007. 72p.	NOAA Coastal Services Center	
CSC5	Desotelle Consulting, PLC, Community Growth Institute and Beaster Consulting. 2006a. Great Lakes Needs Assessment. Issue Area: Coastal Community Development. Produced July 2006 for the Great Lakes and NOAA Coastal Services Center. 106p.	NOAA Coastal Services Center	http://www.glc.org/regionalneeds/
CSC6	Desotelle Consulting, PLC, Community Growth Institute and Beaster Consulting. 2006. Great Lakes Needs Assessment. Issue Area: Data Information Integration and Distribution. Produced July 2006 for the Great Lakes and NOAA Coastal Services Center. 103p.	NOAA Coastal Services Center	http://www.glc.org/regionalneeds/
CSC7	NOAA Coastal Services Center (NOAA CSC). 2008. Needs Assessment of the New England Coastal Resource Management Community: Management of Ecosystems and Natural Hazards. August 28, 2008. 76p.	NOAA Coastal Services Center	www.csc.noaa.gov/bins/regions/FINAL_NE_Needs_Assessment.pdf
CSC8	NOAA Coastal Services Center (NOAA CSC). 2008d. Summary Report for the Coastal Ecosystem-Based Management Course Needs Assessment. NOAA/CSC/RPT 08-01. Charleston, SC: NOAA Coastal Services Center.	NOAA Coastal Services Center	
UHI1	Urban Harbors Institute (UHI). 2004b. Improving links between science and coastal management: Results of a survey to assess science and technology needs. Draft Report for the Coastal States Organization.	Urban Harbors Institute	http://www.uhi.umb.edu/pdf_files/FINAL_surveyreport_1004.pdf
COST	California Ocean Science Trust (COST). 2008. Literature Review for the West Coast Regional Needs Assessment. Prepared for the National Oceanic Atmospheric Administration Coastal Services Center. July 28, 2008. 61p.	California Ocean Science Trust	http://www.csc.noaa.gov/regions/documents/West_Coast_Literature_Review.pdf

Table 2b. Literature reviewed and abbreviations utilized herein (continued).

Abbr.	Study Reference	Author / Sponsor	Web location (if available)
CSC9	Safford, T., J. Thompson and P. Scholz. 2006. Storm Surge Tools and Information: A User Needs Assessment. NOAA Coastal Services Center. Storm Surge Tools and Information: A User Needs Assessment. NOAA Coastal Services Center.	NOAA Coastal Services Center	http://www.csc.noaa.gov/cms/human_dimensions/Final_StormSurge_ToolsAndInfoNeedsAssessment.pdf
EBM TN	EBM Tools Network. 2007. Needs for Tool Training for Coastal-Marine Ecosystem-Based Management: Results of a Practitioner Needs Assessment. Arlington, Virginia.	EBM Tools Network	http://www.ebmtools.org/sites/natureserve/files/EBM%20Tools%20Training%20Needs%20Assessment_1.pdf
UHI2	Urban Harbors Institute. 2004a. State Coastal Observations and Monitoring Needs: Results of a Survey to Assess Coastal Management Needs. Prepared for the Coastal States Organization and the SEACOOS Outreach and Education Workgroup with UHI Senior Associate Jeff Benoit and in cooperation the University of New Hampshire Survey Center. May 2004. 38p.	Urban Harbors Institute	http://www.uhi.umb.edu/pdf_files/draft_observation_report_0528.pdf
NRS	National Resources Services (NRS). July 2006. Linking Land and Sea: A northern California coastal conservation needs assessment for Mendocino, Humboldt and Del Norte Counties.	National Resources Services	http://groups.ucanr.org/HumboldtHabitatGoals/files/45644.pdf
SECART	NOAA Southeast and Caribbean Regional Team. 2008. NOAA User Needs in the Southeast and Caribbean Region (A Systematic Review of Existing Needs Assessments). DRAFT. NOAA Southeast and Caribbean Regional Team. November 2008.	NOAA Coastal Services Center	http://www.csc.noaa.gov/needsassessments/
MCPI	Maine Coast Protection Initiative (MCPI). 2005. Geographic information system needs assessment: Survey results for coastal land trusts in Maine. May 2005.	Maine Coast Protection Initiative	http://www.protectcoastalmaine.org/Grants/MCPI%20GIS%20Needs%20Assessment%20Report.pdf
CSO1	Coastal States Organization (CSO). 2007. The role of coastal zone management programs in adaptation to climate change. Climate Change Work Group. September 2007. 30p.	Coastal States Organization	
CSO2	Coastal States Organization (CSO). 2008. The role of coastal zone management programs in adaptation to climate change. Climate Change Work Group. September 2008. 51p.	Coastal States Organization	http://csor.mindfly.net/Publications/6.aspx
CSC10	Morrow, B. H. 2009. Improving Coastal Risk Communication: Guidance from the Literature. January 15, 2009. 28p.	NOAA Coastal Services Center	
CSC11	Morrow, B. H. 2007. NOAA Coastal Services Center Storm Surge Social Science Project, Final Report. April 29, 2007. 40p.	NOAA Coastal Services Center	
ELI	Environmental Law Institute (ELI). 2009. Expanding the Use of Ecosystem-Based Management in the Coastal Zone Management Act. January 2009. 17p.	Environmental Law Institute	http://www.elistore.org/reports_detail.asp?ID=11345
PSC	Philibotte, J. 2008. Pacific Services Center Needs Assessment for the U.S. Pacific Island Region: Literature Review. 101p.	NOAA Pacific Services Center	http://www.csc.noaa.gov/needsassessments/PSC%20PI%20Needs%20Assessment-1.pdf

4.3 Step 3: Extracting and Synthesizing the Data

All sources that met the inclusion criteria were retained for data extraction. Each source was systematically reviewed against the goals developed by the Center’s internal project team for this process. These goals guided the development of a suite of matrices to aid in comprehension and comparison. These tables cross compared the needs of the CM community with one of three Center themes or EBM elements by source. MRAG developed an additional table to identify specific needs, where they relate to both center theme and EBM element, type of need (data, tool, training, partnership building or technical assistance), if there is a regional aspect and source(s) that identified the need. This later table is lengthy but serves to identify specifics and is provided in Appendix B.

The data extracted included information directly linked to the above stated goals and objectives and the planned analysis, and included assessment methodology, type and number of participants, response rate and expressed needs. The data extraction often required a degree of subjective judgment with respect to expressed needs as information was often reported in a number of formats in the various reports. Therefore, it was important to maintain consistency in data extraction. Generally, we reported “priority needs” as prioritized by the source report; where focus groups and workshops were conducted, priorities were taken from group recommendations. In many cases it was easy to discern the type of need (data, tools, training, partnership building, technical assistance), but a degree of subjectivity was required in some instances. There were also many needs that were general in nature (i.e. GIS support), lending to variation in the need type (i.e., could be a need for tools, training and technical assistance), while still others were specific (i.e. wave, tide, water level, current, SST and wind data).

Population of the matrices allowed us to identify the main, recurrent themes across the multiple studies and to highlight the frequency of an expressed priority. This analysis does not provide a weighting or ranking of needs and issues (based on type of data collection, sample size, or range of participant types) nor should it be assumed that all needs and issues (both nationally and regionally) have been identified, as the review was conducted on a select list of literature. Care was taken to identify coastal resource management needs that are common among management communities, rather than isolating all specific needs of distinct users. Through this identification of common and priority needs, this review can serve the Center to identify gaps in their products and services.

5 Findings

The results provided below summarize the needs for products and services by the Center, and elsewhere. Needs identified in the selected literature are expressed by type of Center product and service that address Center thematic areas and elements of EBM. The tables below provide generalizations of the needs (where an X indicates at least one need identified with relation to a Center theme or EBM element as noted in the sources), which are more specifically identified in Appendix B. A level of subjectivity was required in determination of need type (i.e. whether a request for information was better satisfied through collection of data, use of a tool, partnership building, etc.), and which thematic area those needs relate to due to cross-cutting nature of many needs. With that, elements of EBM resound throughout the thematic areas, and there were fewer needs identified solely as related to EBM that did not relate to a theme as well (as identified in

Appendix B). Brief analysis of these results compared with existing efforts to address the needs is provided below. It is important to note that certain sources will be more heavily represented under particular Center themes, and if a source does not have an identified need in one table, that does not infer that needs of a specific type were not extracted from that source. Each table is designed to capture the needs that fit with the Center themes. Therefore there may not be biophysical or social/economic needs for a particular source under coastal conservation, for example, but there are likely needs within those EBM elements for coastal planning or hazards resilience.

In general, fewer reports identified the needs for training, partnership building and technical assistance compared with the need for data and tools. It is our conclusion that those former services are essential subsequent to attaining the data and tools for decision making; they will enhance decision making and should not be regarded as a lesser priority. Additionally, there was an overwhelming call for coordination and communication, much of which would be achieved through enhanced partnership building, though not specifically acknowledged by audiences. This is likely the case for needed data, training and resources, which in many instances could be achieved through enhanced partnership building. As identified in the literature review preceding this report, there is a resounding need for coordination and communication across resource management entities; enhanced coordination can improve access to shared data, and access to the tools and information required for planning activities (MRAG Americas 2009). Effective coordination will always pose a challenge given the number of agencies involved in coastal management; however, coordination, particularly at the regional level, would achieve many benefits, such as improved habitat restoration and sediment management, and should be fostered through a larger national agency (i.e. NOAA) (NOAA CSC 2007). The need for coordination is not new and has been identified repeatedly throughout needs assessments and other literature.

The goals of this analysis were to identify specific needs as they relate to Center products and services and fit with Center themes and EBM elements. As a result of this effort, the Center can specifically respond to some of the priority needs of the coastal management community. However, it is important to mention that there are more resounding and pressing umbrella needs that warrant identification. These needs are not novel, though they deserve consideration given their prevalence in the literature. These common recurring needs and issues include communication of risk accounting for how risk is perceived, translation of science into management, data access and sharing, tool use and applicability, coordination among entities, and improved outreach and communication to managers, policy makers and the public. Most of these topics are addressed at greater detail in a literature review prepared as a precursor to this meta-analysis (MRAG Americas 2009). Nearly all of the specific needs identified during this analysis fit within the boundaries of those topics. It will be essential for the Center to keep track of specific needs for data, tools and services, for example, and what initiatives exist outside the Center to help build partnerships to enhance coordination and work towards meeting the needs of coastal managers.

The studies evaluated are similar in that they met all the inclusion criteria, though there is a considerable amount of heterogeneity in the issues addressed. This heterogeneity is in the broad reach of issues and needs addressed by the studies (Table 3). Nearly all studies consider some aspect of EBM that relates to a Center thematic area. Of the 24 studies, 15 addressed all three of

the Center themes, five addressed two of the three themes, and four addressed only one theme. Additionally, 75% (18/24) of the studies addressed all three EBM elements within at least one theme and 46% (11/24) considered all three EBM elements of two or more themes. Only four references (17%) considered all three elements of all three themes.

Subsequent to identification of the needs of the CM community, this review considered additional literature (from the list of original sources) to identify select efforts underway or in planning to address certain needs. These efforts were primarily isolated from strategic planning and program evaluation documents and are listed below the needs for each thematic area. As noted, the identified efforts were gleaned from a select list of sources and are not intended to represent the entirety of initiative, products and services designed to meet the needs of coastal resource managers and do not imply that there is not additional requirement for similar efforts. The Center should take effort to cross compare the needs identified in this analysis with existing and planned Center efforts (of products and services) to work towards filling the major gaps for effective coastal management.

Table 3. Variation in needs and issues related to Center themes and EBM elements identified in the literature. An ‘X’ indicates that at least one need was specifically identified in the reviewed sources, the absence of an ‘X’ only implies that a specific need was not identified in the reviewed sources, not the absence of a need.

Source Abbreviation	Center Theme								
	Coastal Conservation			Coastal and Ocean planning			Hazards Resilience		
	EBM Element								
	Bio-physical, natural	Social and Economic	Institutional / Governance	Bio-physical, natural	Social and Economic	Institutional / Governance	Bio-physical, natural	Social and Economic	Institutional / Governance
CSC1	X	X	X	X	X	X	X		
CSC2	X	X	X	X	X	X	X	X	X
CSC3	X	X	X	X	X	X	X		
CSC4	X	X	X	X	X	X	X	X	X
Heinz	X	X	X	X	X	X	X		
CSC5	X	X	X	X	X	X			
NACo	X	X	X	X	X	X	X		X
CSC6			X	X		X			
CSC7	X	X	X	X	X	X	X	X	X
CSC8	X								
CSC9	X						X	X	X
SECART	X	X		X			X		
UHI1	X	X	X	X		X	X		X
COST	X	X	X	X	X	X	X	X	X
EBM TN	X	X	X	X	X	X			
UHI2	X		X	X			X		
NRS	X	X	X	X		X	X		
MCPI				X	X	X			
CSO1	X		X	X		X	X	X	X
CSO2	X			X	X		X	X	X
CSC10								X	
CSC11							X	X	X
ELI			X	X		X			
PSC	X	X	X	X	X	X	X		

In the following sections, the goals of the review are provided again with the resulting findings that address each goal. Tables provide an illustration of the needs for Center products and

services (data, tools, training, partnership building, technical assistance) identified that relate to a Center theme (Coastal Conservation, Coastal and Ocean Planning, Hazards Resilience) and EBM element (biophysical/natural, social and economic, institutional/governance), as interpreted from the sources (marked with an X). After each table summarizing this information is a list of the most common needs (and the number of times that need was cited), and some example efforts designed to address the needs.

5.1 Select efforts designed to meet cross-cutting needs

Additional literature (outside of the sources reviewed for this analysis) was considered for the identification of planned and existing efforts. As noted above, these efforts are listed under each of the following sections after the common needs. Some of these efforts, compared to others, seemed particularly designed to meet cross-cutting needs and issues identified under each Center theme; therefore, these particular efforts are provided here to avoid unneeded repetition in the sections below.

Select efforts related to common needs

That the National Sea Grant Program has identified three cross-cutting goals in their 2008 Strategic plan that aim to improve information collection and use, public education and coordination. These include

- The collection of sound scientific information to advance understanding of the nature and value of our coastal, ocean, and Great Lakes resources; identification of new ways to conserve and use these resources; and evaluation of the environmental impacts and socio-economic trade-offs involved in coastal decision-making;
- An informed public that understands the value and vulnerability of coastal, ocean, and Great Lakes resources, and demands informed science-based decisions about the conservation, use, and management of these resources, and a well-trained workforce that will make this a reality; and
- Use of decision-making processes that involve the full-range of coastal interests, that integrate efforts of public and private partners at the federal, regional, state, and local levels, and provide mechanisms for establishing common understandings and generating outcomes that balance multiple interests (NOAA NSG 2008).

The Coastal States Organization (CSO) aims to secure long-term fiscal support of the state and federal programs that restore, manage and protect the nation's coastal, ocean and Great Lakes resources. CSO has developed several strategic priorities related to management, including

- Re-evaluate the ocean, coastal and Great Lakes management needs for this nation and launch an effort to support new and existing management initiatives by facilitating communication, conducting national dialogue, supporting priorities identified by the U.S., Pew and Join Ocean Commissions, and advocating for federal support;
- Incorporate the needs and opportunities of state ocean and coastal management programs into the development and implementation of federal scientific research and monitoring programs to support coastal and ocean management;
- Harness the leadership and expertise of the CSO members to address issues important to the states, including: Water Quality and Land Use; Habitat Conservation; Coastal Hazards; Ocean Policy and Energy; and Island Affairs;

- Provide a forum for exchange of information so state coastal managers can discuss shared issues and potential solutions to management issues (CSO, 2006).

5.2 Needs that address both a Center Thematic Area and an EBM framework

Goal 1: To identify needs expressed by the CM community that addresses both a Center theme and an EBM element.

5.2.1 Coastal Conservation Needs

Resource managers identified Coastal Conservation needs in every Center product and service category (data, tools, training, partnership building and technical assistance). In Table 4, the “X” in each box indicates that the reference identified *at least* one need within that particular element/product and service category combination relating to Coastal Conservation, and could refer to multiple needs. For example, the X next to CSC2 under the Data category in the Biophysical/Natural element of Coastal Conservation represents four separate needs (water quality, habitat restoration/protection/monitoring, sensitive habitats/protected areas and fisheries predictions). It is important to note again that many sources have identified needs for products and services with each EBM element, though not necessarily for each Center Theme. Appendix B lists all individual needs cited in the literature we reviewed.

Twenty-one of the 24 references that we reviewed identified a need for at least one Center product or service within the Coastal Conservation theme (Table 4). Of those twenty-one, 13 reports identified needs within all three elements (biophysical/natural, social/economic, institutional/governance), three identified needs within two elements and five identified needs within only one EBM element of Coastal Conservation. One report (NRS) identified needs in every product and service category of every EBM element. Overall, the most needs were identified in the institutional/governance element of Coastal Conservation. The needs in this element were consistently strong across the board, with none of the product or service categories having considerably fewer needs than any other category. The primary product and service needs identified within the reviewed literature were for data and tools to inform the biophysical/natural and institutional/governance elements of Coastal Conservation.

Table 4. Coastal Conservation Needs. An ‘X’ indicates that at least one need for a product or service in that category was specifically identified in the reviewed sources, the absence of an ‘X’ only implies that a specific need was not identified in the reviewed sources, not the absence of a need.

Source Abbreviation	COASTAL CONSERVATION														
	Bio-physical, natural					Social and Economic					Institutional / Governance				
	Center Products														
	Data	Tools	Training	PB	TA	Data	Tools	Training	PB	TA	Data	Tools	Training	PB	TA
CSC1	X	X	X	X	X	X		X	X		X	X		X	X
CSC2	X	X	X	X	X	X		X	X		X	X	X	X	X
CSC3	X	X				X	X	X	X		X	X	X	X	X
CSC4	X	X	X	X	X	X		X	X		X	X	X	X	X
Heinz	X	X	X	X	X				X		X	X	X	X	X
CSC5	X					X		X	X		X	X		X	X
NACo	X	X	X	X	X	X		X	X		X	X	X	X	X
CSC6											X	X		X	
CSC7	X	X	X	X	X			X	X			X	X	X	
CSC8	X														
CSC9	X														
SECART	X	X						X	X						
UHI1	X	X	X	X	X	X	X				X	X	X	X	X
COST	X	X	X	X	X	X		X	X		X	X	X	X	X
EBM TN	X	X				X	X	X	X		X	X	X	X	X
UHI2	X	X									X	X	X	X	X
NRS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MCPI															
CSO1	X	X	X	X	X						X	X	X	X	X
CSO2	X	X													
CSC10															
CSC11															
ELI													X	X	X
PSC	X	X				X		X	X		X	X	X	X	X

PB = Partnership Building; TA = Technical Assistance

Common needs within Coastal Conservation

(Needs were considered common if they were cited by more than three references.)

Biophysical, Natural

- Habitat restoration/protection/monitoring, especially wetland (10 citations)
- Water quality monitoring (nitrogen in rivers, ocean acidification) (9 citations)
- Measure the extent and impacts of non-native species, early detection and rapid response systems (8 citations)
- Improved predictions for fisheries stock size, composition, recruitment, yield, fishing and ocean utilization patterns (4 citations)

Social and Economic

- Public outreach/education for stakeholder involvement and to engender a sense of stewardship (10 citations)
- Funding support, diversification and coordination (8 citations)
- Better public access to and education on data on marine resources and the land/sea link (6 citations)
- Review and feedback of stakeholder/community involvement, needs and cooperation, especially in decision making (5 citations)
- Socio-economic impact analyses (esp. of management actions) (4 citations)

Institutional / Governance

- Integrate management and increase communication/coordination/cooperation within and between agencies, NGOs, and other organizations and across jurisdictions (11 citations)
- Coordination of data collection and reporting; i.e. online data clearinghouse (7 citations)

Select efforts related to common needs within Coastal Conservation

Biophysical, Natural

- The National Estuarine Research Reserve System (NERRS) has identified Habitat and Ecosystem Coastal Processes and Habitat Conservation and Restoration as priority biophysical/natural research areas incorporated into the NERRS Research Plan (NERRS 2006).
- Biophysical/natural research goals outlined in the NERRS Research and Monitoring Plan (2006-2011) include
 - Characterizing and monitoring biological, chemical, physical, and ecological conditions of reserves to describe reference conditions and to quantify change
 - Conducting research at reserves that is relevant to coastal management needs and increases basic understanding of estuarine processes (NERRS 2006)

Social and Economic

- The National Center for Coastal and Ocean Science (NCCOS 2008) has a 5-year strategic plan devoted to human dimensions. The goals and objectives for the plan aim to align human dimensions with ecosystem management.
 - Goal: “Provide Critical Support for Human Dimensions Research”. One primary objective of this goal is expansion of their science program to address human dimension data needs; and enhanced communication o foster support for coastal decision making.
 - Goal: “Provide Human Dimension Understanding”. One primary objective of this goal is to help support coastal decision making through development and application of existing tools that integrate scientific analysis and stakeholder deliberation.
- NERRS has identified Anthropogenic Influences on Estuaries and Social Science and Economics as priority socio-economic research areas for the NERRS Research Plan (NERRS 2006).
- A major focus area of the National Sea Grant Program’s 2008 Strategic Plan is Safe and Sustainable Seafood Supply. Socio-economic goals within this focus area include: 1) a sustainable supply of safe seafood to meet public demand, 2) a healthy domestic seafood industry that harvests, produces, processes, and markets seafood responsibly and efficiently and 3) informed consumers who understand the importance of ecosystem health and sustainable harvesting practices to the future of our domestic fisheries, who appreciate the health benefits of seafood consumption, and who understand how to evaluate the safety of the seafood products they buy (NOAA NSG 2008).

Institutional / Governance

- NERRS has identified Species Management as a priority institutional/governance research area for the NERRS Research Plan (NERRS 2006).
- Institutional and governance related research goals outlined in the NERRS Research and Monitoring Plan (2006-2011) include

- Scientists, educators, and coastal managers obtaining access to NERRS datasets, science products and results.
- The use of data, products, tools, and techniques generated at the NERRS by the scientific, coastal management and education communities as well as the general public.
- New Hampshire, San Francisco and Michigan have had recent successes in wetland management and mitigation, while Louisiana, American Samoa, Georgia and Virginia have developed strategic plans to address wetland loss and conservation (NOAA OCRM 2006).
- Oregon, Wisconsin and Pennsylvania have demonstrated success in the management of ocean and Great Lakes resources; Maine and Indiana have also developed strategies to address high priority resource management issues facing ocean and Great Lakes resources (NOAA OCRM 2006).

5.2.2 Coastal and Ocean Planning Needs

Resource managers identified needs for Coastal and Ocean Planning in every product and service category (data, tools, training, partnership building and technical assistance). In Table 5, the “X” in each box indicates that the reference identified *at least* one need within that particular element/product and service category combination, and could refer to multiple needs. For example, the X next to CSC1 under the Data category in the Biophysical/Natural element of Coastal and Ocean Planning represents two separate needs (ecological/physical baselines and inventories; boundaries and spatial data for protected areas). Appendix B lists all individual needs cited in the literature we reviewed.

Twenty of the 24 references that we reviewed identified a need for at least one Center product or service within the Coastal and Ocean Planning theme (Table 5). Of those twenty, 12 reports identified needs within all three elements (biophysical/natural, social/economic, institutional/governance), six identified needs within two elements and two identified needs within only one EBM element of Coastal and Ocean Planning. One report (CSC3) identified needs in every category of every element.

Overall, the most needs were identified in the institutional/governance element of Coastal and Ocean Planning. Data, Tools and Partnership Building categories had the most needs within this element, but generally institutional/governance needs were consistently strong across the categories. The primary product and service needs identified within the reviewed literature were for data and tools to inform the biophysical/natural and institutional/governance elements of Coastal and Ocean Planning. The social/economic element had by far the fewest identified needs.

Table 5. Coastal and Ocean Planning Needs. An ‘X’ indicates that at least one need for a product or service in that category was specifically identified in the reviewed sources, the absence of an ‘X’ only implies that a specific need was not identified in the reviewed sources, not the absence of a need.

Source Abbreviation	COASTAL AND OCEAN PLANNING														
	Bio-physical, natural					Social and Economic					Institutional / Governance				
	Center Products														
	Data	Tools	Training	PB	TA	Data	Tools	Training	PB	TA	Data	Tools	Training	PB	TA
CSC1	X						X	X	X	X	X	X	X	X	X
CSC2	X	X				X	X	X	X	X	X	X	X	X	X
CSC3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CSC4	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Heinz	X	X							X	X		X	X	X	X
CSC5	X	X				X					X	X	X	X	X
NACo	X	X					X	X	X	X	X	X	X	X	X
CSC6	X	X		X	X						X	X	X	X	X
CSC7	X	X				X					X	X		X	
CSC8															
CSC9															
SECART	X	X													
UHI1	X	X									X	X		X	
COST	X	X				X					X	X	X	X	X
EBM TN	X	X							X	X	X	X		X	X
UHI2	X	X													
NRS	X	X		X	X						X	X	X	X	X
MCPI	X	X				X	X	X	X	X	X	X		X	X
CSO1	X	X									X	X	X	X	
CSO2	X	X				X									
CSC10															
CSC11															
ELI	X	X									X	X	X	X	X
PSC	X	X		X	X	X	X	X	X		X	X	X	X	X

PB = Partnership Building; TA = Technical Assistance

Common needs within Coastal and Ocean Planning

(Needs were considered common if they were cited by more than three references.)

Biophysical, Natural

- Enhanced mapping of key habitats, changes and trends (15 citations)
- High resolution remote sensing data (11 citations)
- Land use / land cover analyses of trends and change (9 citations)
- Ecological and physical baselines and inventories (8 citations)
- GIS data, layers, tools and technical assistance - specifically at local level (4 citations)

Social and Economic

- Training and outreach for socio-economic and GIS tools for users in coastal communities (5 citations)
- Technical support for community users of GIS in coastal communities (4 citations)
- Increased public access and better spatial data on public access areas (4 citations)

Institution / Governance

- Improve local, state and regional leadership in communication and coordination among entities (7 citations)
- Need increased data sharing, access, consistency and usability (7 citations)
- Research and implementation of SmartGrowth (5 citations)
- Data and tools to aid land use planning decisions with coastal management (5 citations)

- Improved access to geospatial data and tools (4 citations)

Select efforts related to common needs within Coastal and Ocean Planning

Biophysical, Natural

- None were specifically identified to address the needs of a biophysical / natural nature; that does not imply they don't exist. There are undoubtedly concerted research efforts across the nation aimed at the collection of data and development of tools.

Social and Economic

- A major focus area of the National Sea Grant Program's 2008 Strategic Plan is Sustainable Coastal Development. Socio-economic goals within this focus include 1) fostering healthy coastal economies that include working waterfronts, an abundance of recreation and tourism opportunities, and coastal access for all citizens, 2) coastal communities that make efficient use of land, energy and water resources and protect the resources needed to sustain coastal ecosystems and quality of life and 3) coastal citizens, community leaders, and industries that recognize the complex inter-relationships between social, economic and environmental values in coastal areas and work together to balance multiple uses and optimize environmental sustainability (NOAA NSG 2008).

Institution / Governance

- North Carolina, South Carolina and New York have experienced recent success with the management of impacts from stormwater, marinas and redevelopment. Maryland, the Commonwealth of the Northern Marianas Islands and American Samoa have created promising strategies to deal with impacts from development activities (NOAA OCRM 2006).
- Massachusetts and New Jersey have had recent successes with managing energy and facility siting, and Connecticut and Maine have developed strategies to do so in the near future (NOAA OCRM 2006).
- Florida and New Jersey have had implemented public access management strategies, and Virginia, Indiana, Maine, Massachusetts and Mississippi have also developed, or plan to develop similar strategies (NOAA OCRM 2006).
- Virginia and Rhode Island have demonstrated improvements in aquaculture management and siting. Maine, Washington and Connecticut have proposed similar strategies (NOAA OCRM 2006).
- Rhode Island and Delaware have implemented strategies to improve special area management planning (SAMP). Massachusetts and Guam have also developed strategies that they hope to implement in the near future (NOAA OCRM 2006).

5.2.3 Hazards Resilience Needs

Resource managers identified needs for Hazards Resilience in every product and service category (data, tools, training, partnership building and technical assistance). In Table 6, the "X" in each box indicates that the reference identified *at least* one need within that particular element/product and service category combination, and could refer to multiple needs. For example, the X next to CSC1 under the Data category in the Biophysical/Natural element of Hazards Resilience represents two separate needs (Research and planning for climate change effects; non-point source pollution). Appendix B lists all individual needs cited in the literature we reviewed.

Eighteen of the 24 references that we reviewed identified a need for at least one Center product or service within the Hazards Resilience (Table 6). Of those eighteen, eight reports identified needs within all three elements (biophysical/natural, social/economic, institutional/governance), two identified needs within two elements and eight identified needs within only one EBM element of Hazards Resilience.

The primary product and service needs identified within the reviewed literature were for data and tools to inform the biophysical/natural element of Hazards Resilience. Training was a consistent need across elements, and it was interesting to note that needs within the institutional/governance element were spread evenly among categories. The social/economic element had the fewest identified needs.

Table 6. Hazards Resilience Needs. An ‘X’ indicates that at least one need for a product or service in that category was specifically identified in the reviewed sources, the absence of an ‘X’ only implies that a specific need was not identified in the reviewed sources, not the absence of a need.

Source Abbreviation	HAZARDS RESILIENCE														
	Bio-physical, natural					Social and Economic					Institutional / Governance				
	Center Products														
	Data	Tools	Training	PB	TA	Data	Tools	Training	PB	TA	Data	Tools	Training	PB	TA
CSC1	X	X													
CSC2	X	X	X	X	X	X	X	X	X			X	X	X	X
CSC3	X	X													
CSC4	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Heinz	X														
CSC5															
NACo	X	X	X	X	X						X	X	X	X	
CSC6															
CSC7	X	X	X	X	X	X	X	X	X			X	X	X	X
CSC8															
CSC9	X	X	X		X	X	X	X	X		X	X	X	X	X
SECART	X	X	X		X										
UHI1	X	X	X		X							X	X	X	
COST	X	X	X	X	X	X	X	X	X					X	
EBM TN															
UHI2	X	X	X												
NRS	X	X													
MCPI															
CSO1	X	X	X	X	X	X						X	X	X	X
CSO2	X	X	X	X	X	X	X	X	X		X			X	
CSC10						X	X	X	X						
CSC11	X	X	X		X	X	X	X	X	X	X	X	X	X	X
ELI															
PSC	X	X	X												

PB = Partnership Building; TA = Technical Assistance

Common needs within Hazards Resilience

(Needs were considered common if they were cited by more than three references.)

Biophysical, Natural

- Research and planning for climate change effects; specifically scenario and vulnerability maps, forecasts, visualization tools (10 citations)
- Improve usability of storm surge data, models, and maps, improve forecast ability (storm surge forecasts to 48 hours is critical (9 citations)

- Model historical storm surge data and probabilistic storm surges; integrate multiple models (5 citations)
- Coastal Erosion/ Beach replenishment/ Alternatives to shoreline armoring (5 citations)
- Tools to identify sedimentation sources and impacts of sedimentation (5 citations)
- Include growth/development data and land-based threats/changes in hazard datasets (4 citations)
- Update storm surge data to account for changes in coastal conditions (4 citations)
- Integrate flood/inundation models to understand risks to built environment, update 100-year flood maps and consensus on sea level rise ranges (4 citations)
- Non-point source pollution (4 citations)

Social and Economic

- In general, the communication of risk to the general public needs to be improved, and numerous individual needs dealt with this issue including: training managers how to properly interpret storm surge and flood models, understanding how different user groups perceive risk, creation of better aids to communicate risk (eg., explaining both pros and cons, developing short videos), and creating a “high water mark” measurement in the forecast to avoid confusion between storm surge, flood zones, tidal and wave action. (7 citations; grouped across rows, not all in one row)
- Better awareness, outreach and education about storm surge, risk and vulnerability (8 citations)
- Vulnerability studies that focus on the socio-economic consequences of climate change effects, i.e. SLR, inundation, storm surge (5 citations)
- Visualization tools (esp. video) to display potential impacts to managers and the general public (4 citations)

Institutional / Governance

- Improved communication, coordination, collaboration between agencies and organizations related to storm surge, i.e. need to understand varying needs among agencies (5 citations)
- Improved disaster management, planning, mitigation and training (4 citations)

Select efforts related to common needs within Hazards Resilience

Biophysical, Natural

- Numerous individual state initiatives in the form of planning and policy are underway with regard to climate change and sea level rise adaptation. These initiatives vary in their level of detail and completion but speak to the fact that coastal states recognize the importance and potential implications of climate change, sea level rise and related hazards. There seems to be an apparent lack of coordination among these efforts (Rubinoff et al. 2008).

Social and Economic

- A major focus area of the National Sea Grant Program’s 2008 Strategic Plan is Hazard Resilience in Coastal Communities. A socio-economic goal within this focus area is the widespread understanding of the risks associated with living, working, and doing business along the nation’s coasts (NOAA NSG 2008).
- The NCCOS has identified a goal in their current strategic plan to “Promote Ecosystem Resilience”. Primary objectives of this goal are to assess the risk and vulnerability of

coastal communities to stress and communicate scientific information in ways that foster public understanding, trust, and risk-reducing behavior (NCCOS 2008).

- Numerous individual state initiatives in the form of planning and policy are underway with regard to climate change and sea level rise adaptation. These initiatives vary in their level of detail and completion but speak to the fact that coastal states recognize the importance and potential implications of climate change, sea level rise and related hazards. There seems to be an apparent lack of coordination among these efforts (Rubinoff et al. 2008).

Institutional / Governance

- The CSC Coastal Management Fellowship Program has provided states with personnel to work on a variety of technical and policy projects that were successfully completed that would have otherwise not have been undertaken at all, or would have proceeded at a much slower pace (GEARS 2007).
- CSO also partnered with the NOAA Coastal Services Center (CSC) to engage state coastal management programs and other relevant partners on issues related to coastal resilience.
 - Enhance states' understanding of coastal resilience.
 - Explore whether coastal resilience could be used as a tool for measuring the effectiveness of the Coastal Zone Management Act (CZMA).
 - Increase states' knowledge on the opportunities to incorporate coastal resilience into state and federal legislation.
 - Serve as a liaison between CSO, coastal states, and CSC on activities related to coastal resilience (CSO 2008).
- Maryland, Washington and Hawaii have all experience success in managing coastal hazards such as shoreline erosion and storms while Michigan, San Francisco, Texas and Ohio have developed strategies to manage coastal hazards in the coming years (NOAA OCRM 2006).
- California, South Carolina and North Carolina have had success managing marine debris, and Mississippi is developing a strategy to address post-storm submerged debris (NOAA OCRM 2006).
- A major focus area of the National Sea Grant Program's 2008 Strategic Plan is Hazard Resilience in Coastal Communities. Institutional/governance goals within this focus area are 1) community capacity to prepare for and respond to hazardous events, and 2) effective response to coastal catastrophes (NOAA NSG 2008).

5.3 Needs for Center products and services that fit within an EBM framework (beyond those already mentioned under the three Center themes)

Goal 2: To determine how the needs expressed by the CM community for Center products and services fit within an EBM framework.

The needs for center products and services that fit within an EBM framework (Table 7), organized by need type (data, tools, training, etc.), have fewer citations than the other tables, which are grouped by center theme. This is because elements of EBM resound throughout the thematic areas and very few citations were specific to EBM while not also referring to a center theme (as identified in Appendix B).

Table 7. Needs for Center Products and Services that fit within an EBM Framework. Note that select sources focused on EBM needs without any specificity to coastal conservation, planning or hazards. Those sources are represented largely in this table. An ‘X’ indicates that at least one need for a product or service in that category was specifically identified in the reviewed sources, the absence of an ‘X’ only implies that a specific need was not identified in the reviewed sources, not the absence of a need.

Source Abbreviation	EBM Element														
	Bio-physical, natural					Social and Economic					Institutional / Governance				
	Center Products														
	Data	Tools	Training	PB	TA	Data	Tools	Training	PB	TA	Data	Tools	Training	PB	TA
CSC1															
CSC2													X		X
CSC3														X	
CSC4	X	X			X							X	X	X	X
Heinz	X														
CSC5															
NACo															
CSC6															
CSC7	X	X			X	X	X	X	X			X	X	X	X
CSC8	X	X	X			X	X	X	X			X	X	X	X
CSC9															
SECART	X	X			X										
UHI1		X													
COST	X	X													
EBM TN	X	X				X	X	X	X			X	X	X	X
UHI2															
NRS															
MCPI													X		X
CSO1															
CSO2															
CSC10															
CSC11															
ELI		X											X	X	
PSC													X	X	X

PB = Partnership Building; TA = Technical Assistance

Common needs within elements of Ecosystem Based Management

(For common needs within elements of EBM, we lowered the number of citations needed for inclusion, as there were fewer citations overall. For this section, needs were considered common if they were cited at least three times, as opposed to more than three times.)

Biophysical, Natural

- Integrated ecosystem assessments at a regional level (3 citations)
- Accessible ocean observing data to maximize the accuracy of forecast information (3 citations)
- Accurate and verifiable predictive models and spatial tools for EBM (3 citations)

Social and Economic

- Lack of trust among stakeholder groups, need to engage stakeholders in the process (3 citations)

Institution / Governance

- Training and technical support for EBM tools (5 citations)
- Increased coordination and collaboration across state and jurisdictional boundaries (4 citations)
- Training on how to develop and implement an EBM approach; how to incorporate dynamic ecosystem processes or sustainability into EBM decision making (3 citations)
- Lack of resources (funding, training, and time) (3 citations)

Select efforts related to common needs within elements of Ecosystem Based Management

Biophysical, Natural

- The NCCOS has identified a goal in their current strategic plan to “Provide Human Dimension Understanding”. Primary objectives of this goal are to help decision makers assess human causes and socioeconomic drivers of ecosystem stress and evaluate ecosystem products and services (NCCOS 2008).
- A major focus area of the National Sea Grant Program’s 2008 Strategic Plan is Healthy Coastal Ecosystems. Biophysical/natural goals within this focus area include 1) the collection of sound scientific information to support ecosystem-based approaches to managing the coastal environment and 2) restored function and productivity of degraded ecosystems (NOAA NSG 2008).

Social and Economic

- The NCCOS has identified a goal in their current strategic plan to “Provide Integrated Ecosystem Understanding”. Primary objectives of this goal include providing ecosystem models and decision support tools to decision makers and produce and facilitate integrated ecosystem assessments (NCCOS 2008).

Institution / Governance

- The NCCOS has identified a goal in their current strategic plan to “Provide Human Dimension Understanding”. One primary objectives of this goal is to help support coastal decision making through development and application of existing tools that integrate scientific analysis and stakeholder deliberation (NCCOS 2008).
- A major focus area of the National Sea Grant Program’s 2008 Strategic Plan is Healthy Coastal Ecosystems. An institutional/governance goal within this focus area includes widespread use of ecosystem-based approaches to managing land, water and living resources in coastal areas (NOAA NSG 2008)

5.4 Needs for Center products and services fit within a Center Thematic Area

Goal 3: To determine how the needs expressed by the CM community for Center products and services fit within the Center’s thematic areas.

Resource managers identified needs related to all three Center themes in every product and service category (Table 8). The needs identified here were not explicitly separated out by relation to EBM element. Twenty-one sources identified needs for products and services to aid coastal conservation, twenty to aid coastal and ocean planning and eighteen to aid hazards resilience. Within all three themes, the needs for data and tools were the most prevalent. Four sources identified needs for every product and service category within each Center theme. While a number of these needs identified will require development of products and services and support, we believe that a considerable amount could be addressed through enhanced coordination and communication among entities, as supported in the source material and preceding literature review. Specific needs (Appendix B) are not reiterated in this section as all identified needs were related to an EBM element and therefore noted above. It is valuable to note that the Center thematic areas are of considerable concern to resource managers and comprise the priority issues that the management community must face.

Table 8. Needs for Center Products and Services that fit within a Center Theme. An ‘X’ indicates a need for a product or service was specifically identified in the reviewed sources, the absence of an ‘X’ only implies that no specific need was identified in the reviewed sources.

Source Abbreviation	Center Theme														
	Coastal Conservation					Coastal and Ocean planning					Hazards Resilience				
	Center Products														
	Data	Tools	Training	PB	TA	Data	Tools	Training	PB	TA	Data	Tools	Training	PB	TA
CSC1	X	X	X	X	X	X	X	X	X	X	X	X	X		
CSC2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CSC3	X	X	X	X	X	X	X	X	X	X	X	X			
CSC4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Heinz	X	X	X	X	X	X	X	X	X	X	X				
CSC5	X	X	X	X	X	X	X	X	X	X					
NACo	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CSC6	X	X		X		X	X	X	X	X					
CSC7	X	X	X	X	X	X	X		X		X	X	X	X	X
CSC8	X														
CSC9	X										X	X	X	X	X
SECART	X	X	X	X		X	X				X	X	X		X
UHI1	X	X	X	X	X	X	X		X		X	X	X	X	X
COST	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
EBM TN	X	X	X	X	X	X	X		X	X					
UHI2	X	X	X	X	X	X	X				X	X	X		
NRS	X	X	X	X	X	X	X	X	X	X	X	X			
MCPI						X	X	X	X	X					
CSO1	X	X	X	X	X	X	X	X	X		X	X	X	X	X
CSO2	X	X				X	X				X	X	X	X	X
CSC10											X	X	X	X	
CSC11											X	X	X	X	X
ELI			X	X	X	X	X	X	X	X					
PSC	X	X	X	X	X	X	X	X	X	X	X	X	X		

PB = Partnership Building; TA = Technical Assistance

5.5 Regional Priorities

Goal 4: To determine the priority issues by geographic region: Pacific Islands, West Coast, Great Lakes, Gulf of Mexico, Southeast and Caribbean, Mid-Atlantic and Northeast

Regional priorities were collected from the source material, where available; therefore, this is not intended to represent a comprehensive analysis of priority issues in all regions. These priority issues were marked by citation according to a list of primary and secondary issues known to be of concern to resource managers, provided by the Center (Table 9). The majority of the sources reviewed here were designed to collect information (i.e. via survey) on a subset of subjects and audiences were queried with a discrete set of possible answers. Given this, there is no surprise that some issues were not identified and other issues appeared more prominently in the literature. This review cannot conclude that unmarked sources are not important, but can confirm that certain issues were repeatedly identified as very important by regional coastal managers (e.g. land use and habitat change). In the list of source material, specific needs assessments and literature reviews for the Pacific Islands, West Coast, Great Lakes, Gulf of Mexico, Southeast and Caribbean and Northeast were reviewed; therefore it is not surprising that these regions have a higher number of issues noted when compared with the Mid-Atlantic. Additionally, many of the studies reviewed had a national focus, and regional representation may have been incomplete

or not isolated. It is important to note that this table does not capture issues that were identified to be of national importance in many sources without any regional specificity or more overarching issues without subcategories (i.e. coastal hazards).

Consistent with the preceding literature reviews (MRAG Americas 2009), land use, shoreline and habitat change and management remain priority issues in all regions, followed closely by water quality. Coastal Hazards issues appeared to have priority for the West Coast and Pacific Islands compared with other regions; the Great Lakes regions priority issues related to Coastal Land Use Planning; the West Coast and the Northeast had the most references to issues of Ocean and Great Lakes Planning; and the Southeast and Caribbean and West Coast had the most references to issues of Coastal Conservation.

Additional useful conclusions that are not specifically classified in the issues identified in Table 9:

- Land use management and habitat change were the most noted issues of importance across the regions.
- UHI2 identified the lack of aerial and satellite imagery as a major issue for every region and relating to each Center theme.
- Other issues for the West Coast include access to data, communication/coordination, incentives for BMPs, and fostering stewardship.
- Other issues noted in the Northeast include GIS capacity, training, technical support, staff and data availability.
- Other issues noted for the Great Lakes include coordination among entities, improved access to data and usability of data.
- Capacity and resources (staff, funding) were repeatedly identified as major issues for resource managers in most regions.

Table 9a. Regional priority issues identified in the reviewed sources. Information not captured in this table is issues that were identified to be of national importance in many sources without any regional specificity; and general issues without subcategories (i.e. coastal hazards).

Issues	Pacific Islands	West Coast	Great Lakes	Gulf of Mexico	Southeast and Caribbean	Mid-Atlantic	Northeast
Coastal Land Use Planning							
Land use planning/growth management	UHI1, UHI2, PSC	UHI1, COST, UHI2, NaCO	CSC5, UHI1, UHI2, CSC6, NaCO	UHI1, UHI2, CSC4, NaCO	UHI1, SECART, NaCO, UHI2	UHI1, UHI2, NaCO	UHI1, UHI2, NaCO, CSC7
Public access	PSC	COST	CSC5	CSC4			MCPI, CSC7
Recreation and tourism	PSC		CSC5				
Dredging	PSC						
Waterfront and brownfield redevelopment	PSC		CSC5				
Infrastructure/utilities development		COST	CSC5, CSC6	CSC4			
Climate impacts	PSC	COST, CSO1		CSO1	SECART	CSO1	CSC7, CSO1
*Port, harbor or marina development	PSC						
*Permits and enforcement	PSC		CSC5				
*Transportation planning							
Ocean and Great Lakes Planning							
Shoreline change management	UHI1, UHI2, PSC	UHI2, CSO1, COST	CSC5, CSC6, UHI2, UHI1	UHI1, UHI2, CSO1, CSC4	SECART, UHI2, UHI1, CSO1	UHI1, UHI2, CSO1	UHI1, UHI2, CSO1
Protected area management	PSC	COST	CSC5				
Near shore and off shore habitat mapping	UHI2, UHI1	COST, UHI2, NRS, CSO1, UHI1	CSC6, UHI2, UHI1	UHI2, CSO1, CSC4, UHI1	SECART, CSO1, UHI2, UHI1	UHI2, CSO1, UHI1	UHI2, MCPI, CSO1, CSC7, UHI1
Submerged lands management	PSC	UHI2, NRS, COST	UHI1, CSC6		UHI2	UHI2	UHI1, UHI2
Marine/Great Lakes jurisdictional boundaries			CSC5				
Energy development		COST	UHI1				CSC7
Marine transportation planning							
Climate impacts		COST			SECART		CSC7

* denotes secondary Center priorities

Table 9b. Regional priority issues identified in the reviewed sources (continued). Information not captured in this table is issues that were identified to be of national importance in many sources without any regional specificity; and general issues without subcategories (i.e. coastal hazards).

Issues	Pacific Islands	West Coast	Great Lakes	Gulf of Mexico	Southeast and Caribbean	Mid-Atlantic	Northeast
Coastal Conservation Planning							
Habitat restoration and monitoring	UHI1, UHI2	UHI1, COST, UHI2, NRS	UHI1, UHI2, CSC5	UHI1, UHI2, CSC4	UHI1, UHI2, SECART	UHI1, UHI2	UHI1, UHI2, CSC7
Nonpoint source pollution (includes environ contam)	UHI1, UHI2, PSC	COST, UHI1	UHI1, UHI2	UHI1	UHI1	UHI1	UHI1
Erosion and beach nourishment		COST		NACo	SECART		
Cultural and heritage resource management	PSC						
Climate impacts		COST			SECART		CSC7
*Water quality monitoring (includes nut. enrichment)	UHI2, UHI1, PSC	COST, UHI1	UHI1, CSC5	UHI1, CSC4	SECART, UHI1	UHI1	UHI2, UHI1, CSC7
*Invasive species management	UHI1, PSC	COST	UHI1, UHI2	UHI1, CSC4	UHI1, SECART	UHI1	UHI1
*Protected species management		COST					
*Fisheries management		COST			SECART		
*Pollutant transport and dispersion					UHI1		
*Coral reef management	PSC				SECART		
Coastal Hazards							
Flooding/inundation/storm surge	PSC	COST		CSC9	SECART	CSO1	CSC7, CSC9
Erosion		COST	UHI1				CSC7
Hurricanes	PSC			CSC4	CSC9		
Sea level rise		COST, CSO1		CSC4, CSO1	SECART, CSO1	CSO1	CSC7, CSO1
Tsunami	CSC2, PSC	COST					
Climate impacts		COST			SECART		CSC7
*Public health concerns							
*Oil/pollutant spill response	PSC	COST					
*Harmful algal blooms		COST		CSC4			
*Beach safety related to rip currents							
*Search and rescue							
*Landslides	PSC						

* denotes secondary Center priorities

5.6 Information Collection Methods and Target Audiences

Goal 5: To identify successful methodological components and target audiences for application in development and dissemination of Center surveys.

Table 10 below provides a summary of information collection methods utilized in the source literature, also illustrated in Figure 1. Web-based surveys combined with literature reviews were the predominant methods employed. Mail surveys are becoming far less frequent to due the added time and expense required; however, mail surveys do allow for more accurate statistical

analysis since there is more control in the number of surveys sent out (i.e. email invitations for web-based surveys can be forwarded and this can increase the potential respondent pool to an unknown number). Given the demands of coastal resource managers, on-line surveys appear to be preferred and the administration of them will result in improved response rates (Donahue 2007). Additional actions likely to improve response rate include frequent communication with target audience, highlighting the relevance of the survey, keeping the survey simple and straightforward, minimizing time requirement and familiarity with the audience and their issues (Donahue 2007).

Significant findings of a 2007 CSO workshop for coastal managers revealed that surveys are on the rise, pointing to their inherent value as a information collection method, though the duplication of effort and “survey response overload” are concerns that are compromising response rates and survey impacts, targeted audiences find these multiple efforts confusing, survey administrators should consider elimination or consolidation of surveys (noting that this may not be appropriate where goals are disparate), and there should be a concerted effort among survey administrators to coordinate the design, administration and application of multiple surveys and needs assessments (Donahue 2007).

Given this the Center may consider phasing out the use of mail surveys and coordinating efforts with other organizations. For example, the Coastal States Organization conducts similar surveys on a national level aimed at better understanding the science and technology needs of state coastal resource managers. This survey, along with the Center’s Customer survey, both aim to identify the priority issues of coastal resource managers and target many overlapping audiences. It may serve both organizations well to combine their efforts which would alleviate repetition to targeted audiences. The Center would then retain the smaller, more specific Coastal Services Center Product and Services Evaluation (to be conducted for the first time this year) independently.

It is important to note that surveys are valuable tools, but often cannot capture qualitative information necessary for many programs. For example, understanding risk and how to effectively communicate it is a challenge to resource managers, and an issue that the Center regularly considers in their social science efforts and particularly within the Hazards Resilience theme. In a literature review on improving risk communication, Morrow (2009) noted that “questionnaire-based research alone does not capture the complexity of risk perception in specific hazard locations” and therefore alternative methods may be necessary to collect qualitative data on a community.

Table 10. Methods of information collection.

Source Abbreviation	Survey			Interviews		Focus Groups	Workshops	Expert Panel	Literature Review	Notes
	Web	Phone	Mail	In Person	Phone					
CSC1			X							
CSC2	X									
CSC3					X	X			X	Also used computer assisted content analysis of media, attended meetings and monitored an electronic discussion list
CSC4				X	X	X		X	X	
Heinz	X							X		
CSC5	X				X			X	X	Telephone interviews conducted with planning team members
NACo	X					X				
CSC6	X		X		X		X	X	X	Web-based survey conducted to identify local level needs, paper survey conducted at Data Exchange Workshop
CSC7				X	X	X		X	X	
CSC8	X									
CSC9	X			X (not sure which)		X			X	
SECART									X	
UHI1	X									
COST									X	
EBM TN	X	X								
UHI2	X									
NRS	X (During facilitated meetings)			X		X		X	X	
MCPI	X									
CSO1			X							
CSO2	X									
CSC10									X	
CSC11		X		X	X				X	
ELI								X	X	ELI conducted research on the practical implementation of EBM and a study of existing coastal management programs in four selected states (CA, MA, VA, WA)
PSC									X	



Figure 1. Methods of information collection used in the source material reviewed.

The target audiences from which information was collected in each report are identified in Appendix C. This table was adapted from one developed by the SECART team (NOAA 2008). In general, there was considerable variation in response rates, and no clear trend crediting enhanced response rate to coordinated efforts (i.e. surveys combined with interviews, literature reviews, etc) in the source material. Two of the three most well responded surveys (CSC6 and NRS, at 60% and 73%, respectively) did enhance their survey design and audience identification with additional information collection methods. Undoubtedly, response rates can be improved when the appropriate audience is targeted, the survey is specific enough to address the interests of the audience and brief so that the time required can be limited.

Not all source literature explicitly identified target audience affiliation and a degree of inference was required. Among the audiences identified by the 24 citations, the coastal management community was primary and well represented (Figure 2). There is considerable repetition among that group, though given their needs are the focus of Center activities it would not be appropriate to remove them from future information collection; but perhaps coordinate efforts with other surveys. There was limited interaction with the regional ocean observing system community, which would be valuable given the data needs identified that this community may be in position to provide. Other limited contact occurred with the emergency management, water quality and National Weather Service audiences, all of whom would be valuable to communicate with given the increasing importance climate change and hazard resilience needs and issues.

It is worthwhile to note that depending on the specificity of survey questions, where more specific questions are likely to result in a longer survey, a high number of survey respondents may not result in the collection of new information and will likely reduces response rate dues to

repetition among surveyed audiences. Though this is complicated when regional perspectives in a national survey are desired.

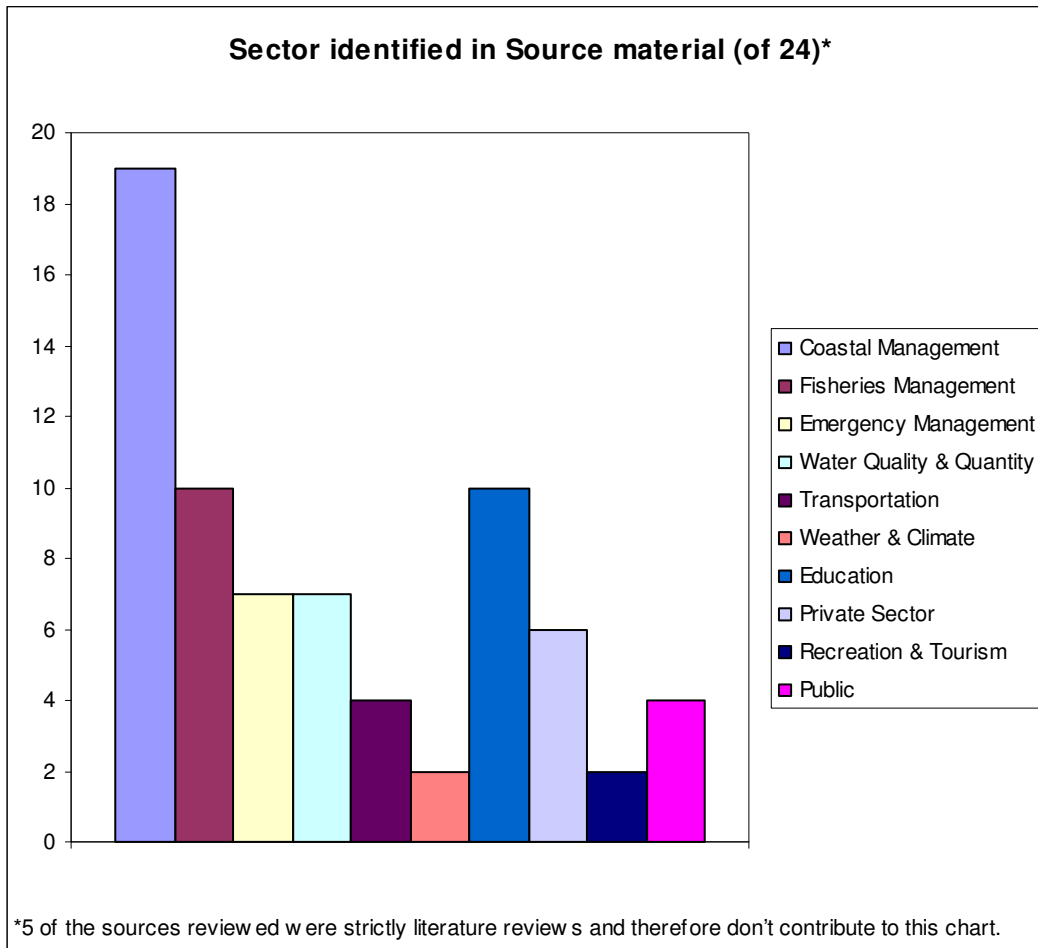


Figure 2. Number of classifications identified for the various sectors targeted for information collection.

6 References

- California Ocean Science Trust (COST). 2008. Literature Review for the West Coast Regional Needs Assessment. Prepared for the National Oceanic Atmospheric Administration Coastal Services Center. July 28, 2008. 61 p.
- Coastal States Organization (CSO). 2006. Coastal States Organization Strategic Priorities 2006-2008. <http://csor.mindfly.net/uploads/PDFs/CSO%20Strategic%20Plan%2006-08.pdf>
- Coastal States Organization (CSO). 2007. The role of coastal zone management programs in adaptation to climate change. Climate Change Work Group. September 2007. 30p.
- Coastal States Organization (CSO). 2008. Coastal community resilience: An evaluation of resilience as a potential performance measure of the Coastal Zone Management Act. July 2008. 22p.
http://csor.mindfly.net/uploads/PDFs/final_resilience%20white%20paper_25july08.pdf
- Coastal States Organization (CSO). 2008. The role of coastal zone management programs in adaptation to climate change. Climate Change Work Group. September 2008. 51p.
- Desotelle Consulting, PLC, Community Growth Institute and Beaster Consulting. 2006a. Great Lakes Needs Assessment. Issue Area: Coastal Community Development. Produced July 2006 for the Great Lakes and NOAA Coastal Services Center. 106p.
- Desotelle Consulting, PLC, Community Growth Institute and Beaster Consulting. 2006. Great Lakes Needs Assessment. Issue Area: Data Information Integration and Distribution. Produced July 2006 for the Great Lakes and NOAA Coastal Services Center. 103p.
- Donahue, M.J. 2007. Final Report: Strengthening the application of science in coastal decision-making. Prepared for the Coastal States Organization. 305p.
http://ciceet.unh.edu/news/releases/cso_report/pdf/cso_report_07.pdf
- EBM Tools Network. 2007. Needs for Tool Training for Coastal-Marine Ecosystem-Based Management: Results of a Practitioner Needs Assessment. Arlington, Virginia.
- Environmental Law Institute (ELI). 2009. Expanding the Use of Ecosystem-Based Management in the Coastal Zone Management Act. January 2009. 17p.
- Global Evaluation & Applied Research Solutions (GEARS) Inc. 2007. Evaluation of the coastal management fellowship program: Final report. October 2007. 105p.
<http://www.csc.noaa.gov/cms/fellows/evaluation.pdf>
- Heinz Center. 2006. Filling the gaps: Priority data needs and key management challenges for national reporting on ecosystem conditions. A report of the Heinz Center's State of the Nation's Ecosystem Project. 100p.
- Maine Coast Protection Initiative (MCPI). 2005. Geographic information system needs assessment: Survey results for coastal land trusts in Maine. May 2005.
- Morrow, B. H. 2007. NOAA Coastal Services Center Storm Surge Social Science Project, Final Report. April 29, 2007. 40p.
- Morrow, B. H. 2009. Improving Coastal Risk Communication: Guidance from the Literature. January 15, 2009. 28p.
- MRAG Americas. 2009. Trends in Resource Management Needs and Issues: A Literature Review. Report to the NOAA Coastal Services Center. February 2009.
- National Association of Counties (NACo). 2008. Coastal county geospatial needs summary report. 27p.
- National Centers for Coastal Ocean Science (NCCOS). 2007. National Centers for Coastal Ocean Science Human Dimensions Strategic Plan (FY2009-FY2014). Silver Spring, MD.

- National Oceanic and Atmospheric Administration, National Ocean Service, National Centers for Coastal Ocean Science.
<http://coastalscience.noaa.gov/human/strategy/NCCOSHDPlan.pdf>
- National Estuarine Research Reserve System (NERRS). 2006. Research and monitoring plan: 2006-2011. 44p. http://nerrs.noaa.gov/pdf/Research_Monitoring.pdf
- National Oceanic and Atmospheric Administration Coastal Services Center (NOAA CSC). 2002. Marine protected areas needs assessment: Final report. Charleston, SC. 95p
- National Resources Services (NRS). July 2006. Linking Land and Sea: A northern California coastal conservation needs assessment for Mendocino, Humboldt and Del Norte Counties.
- NOAA Coastal Services Center (NOAA CSC). 2002b. Coastal Resource Management Customer Survey. 2002 Results.
- NOAA Coastal Services Center (NOAA CSC). 2006a. 2006 Coastal Resource Management Customer Survey Final Report. 65p.
- NOAA Coastal Services Center (NOAA CSC). 2007. Needs Assessment for the NOAA Gulf Coast Services Center. Final Draft. November 27, 2007. 72p.
- NOAA Coastal Services Center (NOAA CSC). 2008. Needs Assessment of the New England Coastal Resource Management Community: Management of Ecosystems and Natural Hazards. August 28, 2008. 76p.
- NOAA Coastal Services Center (NOAA CSC). 2008d. Summary Report for the Coastal Ecosystem-Based Management Course Needs Assessment. NOAA/CSC/RPT 08-01. Charleston, SC: NOAA Coastal Services Center.
- NOAA OCRM. 2006. Program Enhancement National Summaries.
<http://coastalmanagement.noaa.gov/nationalsummary.html>
- NOAA, National Sea Grant Program (NOAA NSG). 2008. Strategic plan 2009-2013: Meeting the challenge. 19p.
- NOAA Southeast and Caribbean Regional Team. 2008. NOAA User Needs in the Southeast and Caribbean Region (A Systematic Review of Existing Needs Assessments). DRAFT. NOAA Southeast and Caribbean Regional Team. November 2008.
<http://www.csc.noaa.gov/needsassessments/>
- Philibotte, J. 2008?. Pacific Services Center Needs Assessment for the U.S. Pacific Island Region: Literature Review. 101p.
- Rochford, JA. 2005. A Qualitative Meta Analysis of Literature on the Six Elements in the Safe Schools/Healy Students Grant of the Canton City Schools. Stark Education Partnership.
www.edpartner.org.
- Rubinoff, P., N.D. Vinhateiro and C. Picuch. 2008. Summary of Coastal Program Initiatives That Address Sea Level Rise as a Result of Global Climate Change. Rhode Island Sea Grant/Coastal Resources Center, University of Rhode Island. February 2008.
http://seagrant.gso.uri.edu/ccd/slr/SLR_policies_summary_Mar6_final.pdf
- Safford, T., J. Thompson and P. Scholz. 2006. Storm Surge Tools and Information: A User Needs Assessment. NOAA Coastal Services Center. Storm Surge Tools and Information: A User Needs Assessment. NOAA Coastal Services Center.
- Urban Harbors Institute (UHI). 2004b. Improving links between science and coastal management: Results of a survey to assess science and technology needs. Draft Report for the Coastal States Organization.

- Urban Harbors Institute. 2004a. State Coastal Observations and Monitoring Needs: Results of a Survey to Assess Coastal Management Needs. Prepared for the Coastal States Organization and the SEACOOS Outreach and Education Workgroup with UHI Senior Associate Jeff Benoit and in cooperation the University of New Hampshire Survey Center. May 2004. 38p.
- US Government Accountability Office (GAO). 2008. Coastal Zone Management: Measuring Program's Effectiveness Continues to be a Challenge. September 2008.
<http://www.gao.gov/new.items/d081045.pdf>

- 7 Appendix A: Literature Evaluated (Attached, separate file)**

- 8 Appendix B: Specific Needs Table (Attached, separate file)**

- 9 Appendix C: Target Populations, Sample Sizes and Response Rates from Reviewed Literature (Attached, separate file)**

Appendix A. Literature Evaluated

Full citation	Meets All Inclusion Criteria	Timeframe		Relevance to Objective		Assessment and Design Tools		Level of Evidence		User Characteristics	
		2001 to present	Prior to 2001	CM or EBM	Research, planning docs, program evaluations, outreach materials	Information collection methods used	No involvement of CM comm, restricted to internal staff	survey or related data	extrapolated evidence	Interaction with NOAA	Occasional or low-priority users
NOAA Coastal Services Center (NOAA CSC). 2002b. Coastal Resource Management Customer Survey. 2002 Results. www.csc.noaa.gov/survey/	YES	X		X		X		X		X	
NOAA Coastal Services Center (NOAA CSC). 2006a. 2006 Coastal Resource Management Customer Survey Final Report. 65p. www.csc.noaa.gov/survey/	YES	X		X		X		X		X	
Heinz Center. 2006. Filling the gaps: Priority data needs and key management challenges for national reporting on ecosystem conditions. A report of the Heinz Center's State of the Nation's Ecosystem Project. 100p. http://www.heinzctr.org/Programs/Reporting/Working%20Groups/Data%20Gaps/Gaps_LongReport_LoRes.pdf	YES	X		X		X		X		X	
National Oceanic and Atmospheric Administration Coastal Services Center (NOAA CSC). 2002. Marine protected areas needs assessment: Final report. Charleston, SC. 95p http://www.csc.noaa.gov/mpa/MPANAFINAL.pdf	YES	X		X		X		X		X	
National Association of Counties (NACo). 2008. Coastal county geospatial needs summary report. 27p. http://www.naco.org/Content/ContentGroups/Programs_and_Projects/Information_Technology1/Coastal_County_Geospatial_Needs.pdf	YES	X		X		X		X		X	
NOAA Coastal Services Center (NOAA CSC). 2007. Needs Assessment for the NOAA Gulf Coast Services Center. Final Draft. November 27, 2007. 72p.	YES	X		X		X		X		X	
Desotelle Consulting, PLC, Community Growth Institute and Beaster Consulting. 2006a. Great Lakes Needs Assessment. Issue Area: Coastal Community Development. Produced July 2006 for the Great Lakes and NOAA Coastal Services Center. 106p.	YES	X		X		X		X		X	
Desotelle Consulting, PLC, Community Growth Institute and Beaster Consulting. 2006. Great Lakes Needs Assessment. Issue Area: Data Information Integration and Distribution. Produced July 2006 for the Great Lakes and NOAA Coastal Services Center. 103p.	YES	X		X		X		X		X	
NOAA Coastal Services Center (NOAA CSC). 2008. Needs Assessment of the New England Coastal Resource Management Community: Management of Ecosystems and Natural Hazards. August 28, 2008. 76p.	YES	X		X		X		X		X	
California Ocean Science Trust (COST). 2008. Literature Review for the West Coast Regional Needs Assessment. Prepared for the National Oceanic Atmospheric Administration Coastal Services Center. July 28, 2008. 61 p.	YES	X		X		X		X		X	
Safford, T., J. Thompson and P. Scholz. 2006. Storm Surge Tools and Information: A User Needs Assessment. NOAA Coastal Services Center. Storm Surge Tools and Information: A User Needs Assessment. NOAA Coastal Services Center.	YES	X		X		X		X		X	
EBM Tools Network. 2007. Needs for Tool Training for Coastal-Marine Ecosystem-Based Management: Results of a Practitioner Needs Assessment. Arlington, Virginia.	YES	X		X		X		X		X	

Full citation	Meets All Inclusion Criteria	Timeframe		Relevance to Objective		Assessment and Design Tools		Level of Evidence		User Characteristics	
		2001 to present	Prior to 2001	CM or EBM	Research, planning documents, program evaluations, outreach materials	Information collection methods used	No involvement of coastal manag comm, restricted to internal staff	survey or related data	extrapolated evidence	Interaction with NOAA	Occasional or low-priority users
NOAA Coastal Services Center (NOAA CSC). 2008d. Summary Report for the Coastal Ecosystem-Based Management Course Needs Assessment. NOAA/CSC/RPT 08-01. Charleston, SC: NOAA Coastal Services Center.	YES	X		X		X		X		X	
Urban Harbors Institute (UHI). 2004b. Improving links between science and coastal management: Results of a survey to assess science and technology needs. Draft Report for the Coastal States Organization. http://www.uhi.umb.edu/pdf_files/FINAL_surveyreport_1004.pdf	YES	X		X		X		X			
Urban Harbors Institute. 2004a. State Coastal Observations and Monitoring Needs: Results of a Survey to Assess Coastal Management Needs. Prepared for the the Coastal States Organization and the SEACOOS Outreach and Education Workgroup with UHI Senior Associate Jeff Benoit and in cooperation the University of New Hampshire Survey Center. May 2004. 38p. http://www.uhi.umb.edu/pdf_files/draft_observation_report_0528.pdf	YES	X		X		X		X		X	
National Resources Services (NRS). July 2006. Linking Land and Sea: A northern California coastal conservation needs assessment for Mendocino, Humboldt and Del Norte Counties. http://groups.ucanr.org/HumboldtHabitatGoals/files/45644.pdf	YES	X		X		X		X		X	
NOAA Southeast and Caribbean Regional Team. 2008. NOAA User Needs in the Southeast and Caribbean Region (A Systematic Review of Existing Needs Assessments). DRAFT. NOAA Southeast and Caribbean Regional Team. November 2008.	YES	X		X		X		X		X	
Maine Coast Protection Initiative (MCPI). 2005. Geographic information system needs assessment: Survey results for coastal land trusts in Maine. May 2005. http://www.protectcoastalmaine.org/Grants/MCPI%20GIS%20Needs%20Assessment%20Report.pdf	YES	X		X		X		X		X	
Coastal States Organization (CSO). 2007. The role of coastal zone management programs in adaptation to climate change. Climate Change Work Group. September 2007. 30p.	YES	X		X		X		X		X	
Coastal States Organization (CSO). 2008. The role of coastal zone management programs in adaptation to climate change. Climate Change Work Group. September 2008. 51p.	YES	X		X		X		X		X	
Morrow, B. H. 2009. Improving Coastal Risk Communication: Guidance from the Literature. January 15, 2009. 28p.	YES	X		X		X		X		X	
Morrow, B. H. 2007. NOAA Coastal Services Center Storm Surge Social Science Project, Final Report. April 29, 2007. 40p.	YES	X		X		X		X		X	
Environmental Law Institute (ELI). 2009. Expanding the Use of Ecosystem-Based Management in the Coastal Zone Management Act. January 2009. 17p.	YES	X		X		X		X		X	
Philibotte, J. 2008?. Pacific Services Center Needs Assessment for the U.S. Pacific Island Region: Literature Review. 101p.	YES	X		X		X		X		X	

Full citation	Meets All Inclusion Criteria	Timeframe		Relevance to Objective		Assessment and Design Tools		Level of Evidence		User Characteristics	
		2001 to present	Prior to 2001	CM or EBM	Research, planning documents, program evaluations, outreach materials	Information collection methods used	No involvement of coastal manag comm, restricted to internal staff	survey or related data	extrapolated evidence	Interaction with NOAA	Occasional or low-priority users
Global Evaluation & Applied Research Solutions (GEARS) Inc. 2007. Evaluation of the coastal management fellowship program: Final report. October 2007. 105p. http://www.csc.noaa.gov/cms/fellows/evaluation.pdf	NO	X			X		X		X		
Donahue, M.J. 2007. Final Report: Strengthening the application of science in coastal decision-making. Prepared for the Coastal States Organization. 305p. http://ciceet.unh.edu/news/releases/cso_report/pdf/cso_report_07.pdf (co-funded by CICEET) http://ciceet.unh.edu/news/releases/cso_report/	NO	X			X	X		X			
National Centers for Coastal Ocean Science (NCCOS). 2007. National Centers for Coastal Ocean Science Human Dimensions Strategic Plan (FY2009-FY2014). Silver Spring, MD. National Oceanic and Atmospheric Administration, National Ocean Service, National Centers for Coastal Ocean Science. http://coastalscience.noaa.gov/human/strategy/NCCOSHDPan.pdf	NO	X			X		X		X		
National Estuarine Research Reserve System (NERRS). 2006. Research and monitoring plan: 2006-2011. 44p. http://nerrs.noaa.gov/pdf/Research_Monitoring.pdf	NO	X			X		X		X		
Coastal States Organization (CSO). 2008. Coastal community resilience: An evaluation of resilience as a potential performance measure of the Coastal Zone Management Act. July 2008. 22p. http://csor.mindfly.net/uploads/PDFs/final_resilience%20white%20paper_25july08.pdf	NO	X			X		X		X		
NOAA, National Sea Grant Program (NOAA NSG). 2008. Strategic plan 2009-2013: Meeting the challenge. 19p.	NO	X			X		X		X		
Coastal States Organization (CSO). 2006. Coastal States Organization Strategic Priorities 2006-2008. http://csor.mindfly.net/uploads/PDFs/CSO%20Strategic%20Plan%2006-08.pdf	NO	X			X		X		X		
Rubinfoff, P. N.D. Vinhateiro and C. Piecuch. 2008. Summary of Coastal Program Initiatives That Address Sea Level Rise as a Result of Global Climate Change. Rhode Island Sea Grant/Coastal Resources Center, University of Rhode Island. February 2008. http://seagrant.gso.uri.edu/ccd/slr/SLR_policies_summary_Mar6_final.pdf	NO	X			X		X		X		
US Government Accountability Office (GAO). 2008. Coastal Zone Management: Measuring Program's Effectiveness Continues to be a Challenge. Septemner 2008. http://www.gao.gov/new.items/d081045.pdf	NO	X			X		X		X		
NOAA OCRM. 2006. Program Enhancement National Summaries. http://coastalmanagement.noaa.gov/nationalsummary.html	NO	X			X		X		X		
NOAA Coastal Services Center (NOAA CSC). 1996. Coastal Resource Management Customer Survey. 1996 Nationwide Survey Results.	NO		X	X		X		X		X	
NOAA Coastal Services Center (NOAA CSC). 1999. 1999 Coastal Resource Management Customer Survey.	NO		X	X		X		X		X	

Full citation	Meets All Inclusion Criteria	Timeframe		Relevance to Objective		Assessment and Design Tools		Level of Evidence		User Characteristics	
		2001 to present	Prior to 2001	CM or EBM	Research, planning documents, program evaluations, outreach materials	Information collection methods used	No involvement of coastal manag comm, restricted to internal staff	survey or related data	extrapolated evidence	Interaction with NOAA	Occasional or low-priority users
Coastal States Organization (CSO). 2004. Improving links between science and coastal management: Results of a survey to assess state coastal management science and technology needs.	UHI is final report	X		X		X		X		X	
National Oceanic and Atmospheric Administration (NOAA). 2008. Economic statistics for NOAA. Program Planning and Integration, Office of the NOAA Chief Economist. April, 2006. 90p. http://www.docstoc.com/docs/985268/2008-Economic-Statistics-NOAA	NO	X			X		X		X		
National Estuarine Research Reserve System (NERRS). 2008. Climate change: Science, education and stewardship for tomorrow's estuaries. July 2008. 16p. http://nerrs08.elkhornslough.org/files/NERRS_Climate_Change_Strategy_Paper_7.30.08.pdf	NO	X			X		X		X		
Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET). 2006. Draft White Paper: Land use planning tools to support coastal environmental health: What are the bottlenecks, and where are the opportunities?	NO	X			X		X		X		
Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET). 2007. Collaborative Research Planning for a Special Funding Opportunity to be Released as Part of its July, 2007 Request for Proposals. "Restoring Habitat to Address Erosion at Sheltered Shorelines" Phase I Report.	NO	X			X		X		X		
Matso, KE, M O'Donovan Dix, B Chicoski, DL Hernandez, and JR Schubel. 2008. Establishing a Minimum Standard for Collaborative Research in Federal Environmental Agencies. Integrated Environmental Assessment and Management. Volume 4, Number 3, pp. 362-368.	NO	X			X		X		X		
NOAA Coastal Services Center (NOAA CSC). 2008b. NOAA Coastal Services Center Regional Coastal Services Logic Model Narrative. September 19, 2008.	NO	X			X		X		X		
NOAA Coastal Services Center (NOAA CSC). 2008c. NOAA Coastal Services Center Regional Coastal Services Logic Model Narrative Power Point. September 19, 2008.	NO	X			X		X		X		
Center for Sponsored Coastal Ocean Research (CSCOR) Website. 2007. Ecological effects of sea level rise.	NO	X			X		X		X		
Gray, S. 2008. Ecosystem-based Management, Recreational Fishermen and Fishery Managers: What do they know and what do they need to know? NOAA NERR Social Science Fellowship. Rutgers University. Conference Call April 1st 2008	NO	X			X		X		X		
NOAA Coastal Services Center (NOAA CSC). 2008f. Products and Services Bulletin. Fall 2008.	NO	X			X		X		X		
Urban Harbors Institute (UHI). 2004c. Translating science into management - Best practices for using the natural and social sciences to develop meaningful solutions to coastal management problems. http://www.uhi.umb.edu/pdf_files/Translating_Science_to_Management.pdf	NO	X			X		X		X		

Full citation	Meets All Inclusion Criteria	Timeframe		Relevance to Objective		Assessment and Design Tools		Level of Evidence	
		2001 to present	Prior to 2001	CM or EBM	Research, planning documents, program evaluations, outreach materials	Information collection methods used	No involvement of coastal manag comm, restricted to internal staff	survey or related data	extrapolated evidence
Weisberg, S, W. Covell, M O'Donovan Dix, D Hernandez, K Matso, C Moore, J Reutter, J. Schubel. 2007. Best practices for increasing the impact of research investments: a report by the Research to Applications task force of the Ocean Research and Resources Advisory Panel. http://www.nopp.org/Dev2Go.web?id=207773	NO	X			X	X			X
National Science and Technology Council (NSTC). 2005. Grand Challenges for Disaster Reduction. A report of the Subcommittee on Disaster Reduction. 28p. http://www.sdr.gov/GrandChallengesSecondPrinting.pdf	NO	X			X		X		X
National Research Council (NRC). 2000. Ecological Indicators for the Nation. http://books.nap.edu/openbook.php?record_id=9720&page=R1	NO		X		X		X		X
US Environmental Protection Agency (EPA). 2007. National Estuary Program: Coastal Condition Report. June 2007. http://www.epa.gov/owow/oceans/nepccr/index.html	NO	X			X		X		X
Surfrider Foundation. 2008. State of the Beach Report. http://www.surfrider.org/stateofthebeach/home.asp	NO	X			X		X		X
US Environmental Protection Agency (EPA). 2008. National Coastal Condition Report III. December 2008. http://www.epa.gov/owow/oceans/nepccr/index.html	NO	X			X		X		X
National Research Council (NRC). 2004. A Geospatial Framework for the Coastal Zone: National Needs for Coastal Mapping and Charting. http://www.nap.edu/catalog.php?record_id=10947#toc	NO	X			X		X		X
The Nature Conservancy (TNC). 2008. Sea Level Rise Learning Network: preliminary Needs Assessment. January 2008. 28p.	NO	X		X			X	X	
Rappaport, E. and Franklin, J. 2008. A White Paper Recommending The National Weather Service Establish Storm Surge Warnings. September 2008. tp://ftp.nhc.noaa.gov/users/franklin/White_Paper_on_Storm_Surge_Warnings-Sep_29.pdf	NO	X			X		X		X
National States Geographic Information Council (NSGIC). 2008a. Addressing Coordination Issues (Aug 18, 2008; 4 pp). http://www.nsgic.org/hottopics/whats_hot.cfm	NO	X			X		X		X
National States Geographic Information Council (NSGIC). 2006. FGDC Future Directions - Fifty States Initiative (March 6, 2006; 4 pp). http://www.nsgic.org/hottopics/whats_hot.cfm	NO	X			X		X		X
National States Geographic Information Council (NSGIC). 2008b. Criteria for Federal Coordination of Geographic Information Technology - A State Perspective (May 1, 2008; 11 pp). http://www.nsgic.org/hottopics/whats_hot.cfm	NO	X			X		X		X
E-Gov Website. 2008. Presidential Initiatives: Geospatial Line of Business. http://www.whitehouse.gov/omb/egov/c-6-8-glob.html	NO	X			X		X		X
NOAA CSC 2008g. Coastal Services Magazines and Coastal Connections Newsletters from 2008. http://www.csc.noaa.gov/publications.html	NO	X			X		X		X

Appendix B: Specific Needs Identified

Center Theme	EBM Element	SPECIFIC NEEDS or ISSUES	Center Product / Service	Region(s)	# of Citations	Citation
Coastal Conservation	Bio-physical, natural	Water quality monitoring (nitrogen in rivers, ocean acidification)	Data	National, SE, PI, NE, GL, WC	9	Heinz, NACo, SECART, CSO1, CSC2, PSC, CSC7, CSC5, COST
		Measure carbon storage in ecosystems	Data	National	1	Heinz
		Identification of sources of environmental contamination and nutrient enrichment	Data	National	2	UHI2, UHI1
		Air quality	Data	National	1	NACo
		Better wave, tide, water level, current, SST and wind data	Data	National, GoM, SE	3	CSC4, CSC9, SECART
		Species level data (local environmental data, land use, population, local resource inventories, baseline data, and site-specific data)	Data	National, WC	3	CSC8, Heinz, NRS
		Assess condition of riparian, stream and estuarine habitats	Data	National, WC	3	Heinz, NRS, COST
		Measure the extent and impacts of non-native species (early detection and rapid response systems)	Data, Tools	National, SE, PI, WC	8	Heinz, SECART, UHI2, CSO1, PSC, UHI1, COST, CSO2
		Saltwater intrusion	Data	National	1	NACo
		Habitat restoration/protection/monitoring (esp wetland); remediation options; improved treatment or removal technologies; watershed assessments	All	National, GoM, WC, NE	10	Heinz, NACo, NRS, CSO1, CSC2, CSC1, CSC4, UHI1, COST, CSC7
		Data, analysis and modeling of ecosystem processes	Data, Tools	National	2	EBM TN, CSC3
		Cost-effective sampling equipment	Tools	National	1	UHI1
		GIS mapping of Essential Fish Habitat, and GIS tools for Ecosystem-based Fisheries Management	Tools	Southeast	1	SECART
		Catalog and measure impacts to coastal habitats (from development, vessels, anchors, fishing, dredging, coral mining, debris, construction, etc.)	Data	PI, NE, GL	3	PSC, UHI1, CSC5
		Coral disease and bleaching	Data	PI	1	PSC
	Sensitive habitats, protected areas	Data	National, GoM	2	CSC2, CSC4	
	Improved predictions for fisheries stock size, composition, recruitment, yield, distribution, fishing and ocean utilization patterns	Data, Tools	National, SE, GoM	4	CSC2, SECART, EBM TN, CSC4	
	Social and Economic	Need funding support, diversification and coordination	PB	National, WC, GoM, SE, PI	8	Heinz, CSC3, NACo, SECART, EBM TN, NRS, CSC4, PSC
		Socio-economic impact analyses (esp of management actions)	Data, Tools	National, GL, WC	4	CSC3, EBM TN, UHI1, NRS
		Data on historical and cultural values	Data	National, GoM	2	CSC3, CSC4
		Data on human communities	Data	National	1	EBM TN
		Public opinion data	Data	National	1	CSC3
		Public outreach / education for stakeholder involvement and to engender a sense of stewardship (incl. fishermen, indigenous peoples, rural counties, etc)	Training, PB	National, WC, GoM, SE, PI, NE	10	CSC3, NACo, SECART, EBM TN, NRS, CSC2, CSC1, CSC4, PSC, CSC7
		Review and feedback of stakeholder/community involvement, needs and cooperation (esp in decision making)	Data	National, WC, PI	5	CSC3, NACo, EBM TN, NRS, PSC
		Better public access to and education on data on marine resources and the land/sea link	Data, PB, Training	National, WC, GoM, GL	6	NRS, CSC1, CSC2, CSC4, COST, CSC5
		Improved access to and understanding of conservation plans	Tools, PB, TA	WC	1	NRS
Create public regional resource centers/networks		PB, TA	WC	1	NRS	

Center Theme	EBM Element	SPECIFIC NEEDS or ISSUES	Center Product / Service	Region(s)	# of Citations	Citation
Coastal Conservation	Institutional / Governance	Regional marine conservation planning	Data, Tools, PB	WC, GL	2	NRS, CSC5
		Increased capacity for biodiversity conservation	All	National	2	EBM TN, Heinz
		Need staffing support	Training, PB, TA	National, PI, WC	3	CSC2, PSC, NRS
		Integrate management and increase communication/coordination/cooperation within and between agencies, NGOs, and other organizations and across jurisdictions	PB, TA	National, WC, GoM, PI, GL	11	CSC3, NACo, EBM TN, NRS, CSO1, CSC2, CSC1, CSC4, ELI, PSC, CSC5
		- Specifically coordination of data collection and reporting (online data clearinghouse)	Data, Tools, PB	National, GL, GoM, WC	7	Heinz, CSC3, NRS, CSO1, CSC1, CSC4, CSC6
		- Specifically smooth the transition between research and monitoring (science/mgt translation)	PB, TA	National, GoM	3	Heinz, CSC3, CSC4
		- Specifically, timely access to data	Tools, Training, PB	NE	1	CSC7
		New and different tools/strategies for varied audiences (technical, management, stakeholder/public)	Tools, Training, PB	National, WC	2	NACo, NRS
		Best management practices (BMPs) for habitat restoration	Data, Tools	GL, MA	1	UHI1
		Effectiveness and/or cost-benefit analyses of BMPs	Data, Tools	National, GL, WC	1	UHI1
		Need cost-effective, long-term monitoring plans (indicators, etc.)	Tools	National	2	UHI1, CSC3
		Mitigation strategies for greenhouse gas emissions	Tools	National	1	CSO1
		Increase incentives, decrease disincentives for coastal conservation and use of BMPs	Tools	WC	1	NRS
		Increased MPA management capacity, management of impacts and enforcement; explicit MPA goals and definition of terminology	All	National	3	EBM TN, CSC2, CSC3
		Update statutory definitions (for inland boundaries - to be based on ecosystem assessments, NOAA's Coastal Assessment Framework or USGS watershed; and for "land use" and "water use" - to include conservation as an "acceptable use")	Training	National	1	ELI
		Awareness and training on appropriate decision support tools, (conducting needs assessments, facilitation, conflict management, project design and evaluation)	Tools, Training, PB	National, PI	3	CSO1, CSC2, PSC
		Training / understanding of data limitations (esp wrt EBM tools)	Training, Data, Tools, TA	National, GoM	3	NACo, EBM TN, CSC4
		Invasive species management (priority issue requiring needs)	All	National	1	CSC2
		Protected species management (priority issue requiring needs)	All	National	1	CSC2
		Acquisition or adjudication of water rights	TA, PB	WC	1	COST
Sediment management (priority issue requiring needs)	All	National, WC	3	UHI1, UHI2, COST		
Insufficient management (incl. planning and preparedness, data, regulations, enforcement, permitting processes)	All	PI	1	PSC		

Center Theme	EBM Element	SPECIFIC NEEDS or ISSUES	Center Product / Service	Region(s)	# of Citations	Citation
Coastal and Ocean Planning	Bio-physical, natural	Land use / land cover analyses of trends and change (incl impervious surfaces)	Data, Tools	National, MA, SE, GoM, WC, PI, GL, NE	9	UHI1, UHI2, Heinz, NACo, SECART, CSC2, CSO2 , CSC5, COST
		Need better visualization of development and resource use scenarios	Data, Tools	National	1	EBM TN
		Local climate research to help community level planning	Data	NE, WC	2	CSC7, COST
		Ecological and physical baselines and inventories	Data	National, WC	8	UHI1, COST, CSC3, CSO1, CSC2, CSC1, ELI, NRS
		Cumulative impact assessments (esp for land use effects on water quality), including risk and vulnerability assessments	Data, Tools	National, NE, GL, MA, SE, GoM, WC,	3	CSC4, UHI1, ELI
		High resolution remote sensing data (including digital parcel data; will alleviate land use conflicts)	Data, Tools	National, NE, SE, GoM, PI	11	UHI1, Heinz, SECART, UHI2, CSC3, NACo, MCPI, CSO1, CSC2, CSC4, PSC
		Affordable remote sensing	Tools	National, GoM, WC	2	UHI1, CSO1
		More aerial/satellite imagery	Data, Tools	National	2	UHI2, MCPI
		Specific geospatial data needs: Ortho-imagery, elevation data, hydrologic features and network, underwater classification, national wetland inventory, land cover and land use, soils, zoning, historical imagery, benthic maps, jurisdictions)	Data, Tools	National, GL	3	CSC6, UHI1, PSC
		- Specifically, protected area boundaries/spatial data	Data	National	2	CSC2, CSC1
		- Specifically, enhanced mapping of key habitats (bathymetry, topography, land cover, species, shoreline), changes and trends	Data, Tools	National, WC, NE, GoM, GL, WC, SE, PI	15	Heinz, CSC3, NACo, SECART, UHI2, NRS, MCPI, CSO1, CSC2, CSC4, CSC6, COST, CSO2, CSC7, UHI1
		- Specifically, mapping of aquaculture sites, dump/discharge sites	Data, Tools	National, GoM	2	CSC2, CSC4
		- Specifically, integration of GPS onto maps	Data, Tools	NE, GoM	2	MCPI, CSC4
		MPA inventory and monitoring	All	National	1	CSC3
	GIS data and layers; Tools and technical assistance specifically at local level to utilize GIS in decision making and produce meta-data	Data, Tools, PB, TA	National, GL, GoM, WC	4	CSC6, CSC4, NRS, PSC	
	Social and Economic	Coastal demographic data and human use maps	Data	National, GoM, NE	3	CSC2, CSC4, CSC7
		Data on development rates in urban growth areas as compared to rates outside of urban areas	Data	WC	1	COST
		Stakeholder/community involvement	Data, Tools, Training, PB	National	2	CSC3, PSC
		Funding to implement GIS, train and hire GIS staff	Tools, Training, TA	NE	2	MCPI, CSC2
		Tools to educate the public on land use policies	Tools	National	1	NaCO
Training and outreach for socio-economic and GIS tools, how to use and their benefits		Tools, Training, PB, TA	National, GoM, WC, NE	5	NACo, MCPI, CSC2, CSC1, CSC4	
Technical support for GIS-users (especially public or non-profit organizations)		PB, TA	National, GoM, NE	4	EBM TN, MCPI, CSC2, CSC4	
Lack of resources (staff, funding, training, and time) is a major impediment to program management and using social science tools (esp. existing software)		TA, PB	National	2	CSC2, Heinz	
Increased public access and better spatial data on public access areas	Data	National, NE, GL	4	MCPI, CSC2, CSC5, CSO2		

Coastal and Ocean Planning	EBM Element	SPECIFIC NEEDS or ISSUES	Center Product / Service	Region(s)	# of Citations	Citation
	Institutional / Governance		Improve local, state and regional leadership in communication and coordination among entities, utilize existing networks (i.e. wrt agency MPA policy and legal issues, coastal community development and data information, integration and dissemination)	Tools, PB	National, GL, GoM, WC	7
		Integration of environmental monitoring efforts	Tools, Training, TA, PB	National	2	Heinz, NRS
		Energy Development	Data, Tools, PB	WC, GL, NE	3	COST, UHI1, CSC7
		Watershed planning	Data, Tools, PB	National, WC	3	CSC1, CSC2, NRS
		- Specifically, increase regional awareness from a watershed perspective at the local government level	Training	GL	1	CSC5
		Lack of staff and resources at the local government level	PB	National, GL	3	PSC, CSC5, CSC6
		Training for mapping, shoreline delineation, etc	Training	National	2	CSO1, CSC2
		Increased data sharing, access, consistency and usability (esp wrt geospatial data)	All	National, GL, WC, GoM	7	CSC1, CSC3, CSC5, CSC6, CSC4, COST, NaCO
		Better definition of mapping terminology	Tools	NE	1	CSC7
		Data and tools to aid land use planning decisions with coastal management	Data, Tools	National, GoM	5	NACo, CSC2, CSC1, UHI1, CSC4
		- Specifically, to account for land-sea interactions in land-use decisions	Data, TA	National	1	EBM TN
		Improved access to geospatial data (ie internet mapping services)	Data, PB, TA	National, GL	4	MCPI, CSC1, PSC, CSC6
		Design land-use regulations to protect public resources in the face of development pressures	Tools	WC	1	COST
		Develop indicators that link land use with ecosystem health and evaluate project effectiveness	Data, Tools	SE, GoM, WC	2	UHI1, COST
		Better management of MPAs (including planning and zoning)	Data, Tools, PB	National	2	EBM TN, CSC3
		Use the Special Area Management Program to enable ecosystem-based management (allow at state and local scales, incorporate into other sections of the CZMA)	All	National	1	ELI
		Site-specific terrestrial and estuarine plans	Data, Tools, PB	WC	2	NRS, CSO1
		Better marine jurisdictional boundary data (used frequently)	Data, Tools, PB	National	1	CSC2
		Research and implementation of SmartGrowth	Data, Tools, PB	National, GoM, NE	5	NACo, MCPI, CSC2, CSC1, CSC4
		Create long-term coastal zone plans based on ecosystem assessments	Data, Tools	National	1	ELI
	Develop explicit mechanisms for evaluating, recommending, and deciding trade-offs among different sectors and competing uses	Tools, Training	National, PI	2	ELI, PSC	
	Maintain and encourage federal consistency within the CZMA	Training, PB	National	1	ELI	
	New policies for siting public infrastructure	Data, Tools, PB	National, WC	2	CSO1, COST	

Center Theme	EBM Element	SPECIFIC NEEDS or ISSUES	Center Product / Service	Region(s)	# of Citations	Citation
Hazards Resilience	Bio-physical, natural	Research and planning for climate change effects (i.e. SLR, storm surge, changing SST). Specifically scenario and vulnerability maps, forecasts, visualization tools	Data, Tools	National, NE, GoM, SE, WC	10	CSC3, CSC7, NACo, SECART, CSC1, CSC2, CSC4, UHI1, COST, CSO1
		SLR Assessments: Develop a standard methodology to measure and report sea level rise; Map and model sea-level rise inundation and vulnerability using LIDAR and other methods; Reassess coastlines each decade as sea level rises	Data, Tools	National, NE	3	CSC7, CSO1, CSO2
		Increased certainty in future SLR predictions	Data, Tools	NE, WC	3	CSC7, COST, CSO2
		Habitat data for shoreline change modeling based on SLR projections, historic shoreline position maps and erosion rates, inventories of shoreline features and conditions	Data, Tools	National, WC	3	CSC2, COST, CSO2
		Need topographic and geologic data for sea level rise adaptation plans (i.e. LIDAR, sand resource areas; geologic map/bathymetric maps of shallow water areas)	Data	National	1	CSO2
		Coastal Erosion/ Beach replenishment/ Alternatives to shoreline armoring	All	National, WC	5	NACo, CSC2, CSO1, CSO2, COST
		Update storm surge data to account for changes in coastal conditions, integrate into GIS layers	Data, Tools	National, NE	4	CSC7, CSC9, CSO1, CSC2
		Model historical storm surge data and probabilistic storm surges; integrate multiple models; historical data on coastal hazards	Data, Tools	National, SE	5	CSC9, SECART, CSO1, CSC7, PSC
		Improve usability of storm surge data, models, and maps, improve forecast ability (storm surge forecasts to 48 hours is critical)	Data, Tools, Training, TA	National, SE	9	CSC4, CSC9, SECART, CSO2, CSC7, CSC2, UHI1, COST, CSC11
		Integrate flood/inundation models to understand risks to built environment (update 100-year flood maps and consensus on sea level rise ranges)	Data, Tools	National, NE	4	NACo, CSC7, CSC2, CSO2
		Update and maintain Flood Insurance Rate Maps	Data, Tools	NE	1	CSC7
		Improved coordination of erosion data collection	Data, PB	NE	1	CSC7
		Tools to identify sedimentation sources and impacts of sedimentation	Data, Tools	National, PI, GoM, WC	5	NACo, NRS, PSC, CSC4, CSO2
		Include growth/development data and land-based threats/changes in hazard datasets	Data	National, SE	4	CSC3, NACo, CSC9, SECART
		Better information on long term recovery from hazards (esp hurricanes, tsunamis)	Data, Tools, PB, Training	National, GoM, PI	2	CSC2, CSC4
		Non-point source pollution	Data	National, PI	4	CSC2, CSC1, PSC UHI1
		Measure contaminants related to human exposure (shellfish/fish toxins, urban soil comp)	Data	National, PI	2	Heinz, PSC
		Define appropriate levels of resilience	Data	GoM	1	CSC4
		Use remote sensing to find septic failure	Data, Tools	National	1	NACo
		Improved information on currents, winds, tides, waves	Data, Tools	National	2	CSC2, CSC4
Risk maps and assessments, trends, forecasts and warnings, remote sensing data	Data, Tools	National, SE	3	CSC4, SECART, UHI1		
Marine debris and debris removal technology	Data, Tools, Training	National, PI	3	UHI1, UHI2, PSC		

EBM Element	SPECIFIC NEEDS or ISSUES	Center Product / Service	Region(s)	# of Citations	Citation
Social and Economic	Better awareness, outreach and education (at appropriate grade levels, to local planning boards and elected officials) about storm surge, SLR, risk and vulnerability; especially risk communication	Data, Tools, Training, PB	National, NE, GoM, WC	8	CSC9, CSC4, CSC7, CSO2, CSC2, CSC10, COST, CSC11
	Could be beneficial to package outreach materials by user groups (based on income level, expertise, etc.).	Training, PB	National	1	CSC10
	- Specifically, vulnerability studies that focus on the socio-economic consequences of climate change effects (ie SLR, inundation, storm surge)	Data	National, GoM, WC	5	COST, CSC9, CSO1, CSO2 CSC4
	- Specifically, visualization tools (esp. video) to display potential impacts to managers and the general public and understand their risk associated with events	Tools	National, NE	4	CSC7, CSC9, CSC10, CSC11
	- Specifically, assess the vulnerability of coastal infrastructure and critical facilities: Map all nearshore critical infrastructure important to the economy and develop inventories of coastal structures	Tools, PB	National, NE	2	CSC7, CSO2
	Better understanding about perception of risk (including how people weigh options and make decisions), how the public and experts often differ in their perception, and what will motivate people to take mitigating action	Data, Training	National	2	CSC2, CSC10
	May be beneficial and more effective to explain both the pros and cons of a risk decision	Training, PB	National	1	CSC10
	Need better qualitative data on local cultures and community structure and function to inform risk communication	Data, PB	National	1	CSC10
	Need an in depth assessment of stakeholders affected by a particular hazard	Data	National	1	CSC10
	Marine and coastal economic data, esp. value and potential lost revenue due to sea level rise/lake level change (ie coastal tourism); value and cost of replacement/relocation of vulnerable infrastructure	Data	National, GoM	2	CSO2, CSC4
	Identification of communities/residences most at risk	Data	National	1	CSO2
	Information on socio-economic benefits of forecast and decision support tools	Data	National	1	CSC9
	Incentives to foster socio-economic improvements in community resilience to hazards	PB, Training	GoM	1	CSC4
	Institutional / Governance	Increased local planning capacity and resources for greater community resilience	PB	National, NE, WC	3
Improved training for all managers and planners wrt storm surges especially understanding models and forecasts		Training	National	2	CSC9, CSC11
Community plans for resettlement absorption in case of hazard or other disaster		Data, Tools, PB	National	1	NACo
Improved linkages between state and local emergency and land use planning agencies (eg regional venue to share information related to coastal hazards; regional dialogue to identify practical adaptation strategies)		PB	National, NE	3	CSC7, CSO1, CSO2
Federal guidance for BMPs for trainings, workshops and tools for assessing and adapting to SLR		Tools, Training, PB, TA	National	1	CSO1
Federal guidance for modeling and monitoring SLR		Tools, Training, PB, TA	National	1	CSO1
Restoration projects need to plan for impacts of SLR and climate		Training, TA, PB	National	1	CSC4
Better communication, coordination, collaboration between agencies and organizations related to storm surge (ie need to understand varying needs among agencies)		PB	National, NE, WC, GoM	5	CSC9, CSC4, CSC7, COST, CSC11
Forecasters should add a "high-water mark" to the forecast, as this is something that the public can easily grasp, and is the only thing they are really interested in.		Tools	National	1	CSC11
Standards for shoreline management technologies		Tools, PB, Training	National	1	UHI1
Improved siting criteria for public infrastructure that considers SLR		Data	National	1	CSO2
Better disaster management, planning, mitigation and training		Tools, Training	National, GoM	4	NACo, CSC9, CSC2, CSC4
Staffing support		Training, PB, TA	National	1	CSC2
Coastal managers need better access to and understanding of storm surge data and how to interpret forecasts		All	National, GoM	3	CSC4, CSC11, CSC9
Develop better visuals for outreach and education to highlight destructive forces and methods to share these materials; ensure that policy makers and the public understand the threats and risks associated with coastal flooding from storm surge		Tools, Training, PB, TA	National, GoM, NE	3	CSC9, CSC11, CSC7
Need training and standardization on how to define and label evacuation zones (EZs are often tied to storm categories which do not correlate well with storm surge)		Training, PB, TA	National	1	CSC11
Need training on the relationship between FEMA flood maps and surge models		Tools, Training, TA	National	1	CSC11

Center Theme	EBM Element	SPECIFIC NEEDS or ISSUES	Center Product / Service	Region(s)	# of Citations	Citation
EBM Element without Specific Relation to Center Theme	Bio-physical, natural	Integrated ecosystem assessments at a regional level	Tools	WC, National	3	COST, EBM TN, ELI
		Ecosystem data (information regarding systems and their function, processes, services, and the linkages between them)	Data	National	2	CSC8, EBM TN
		Accurate and verifiable predictive and visualization models and spatial tools for EBM	Tools	National	3	CSC8, EBM TN, UH11
		Accessible ocean observing data to maximize the accuracy of forecast information, specifically wind, waves, and water level	Data, Tools, TA	GoM, NE	3	CSC4, CSC7, SECART
		Tools and technologies to support IOOS	Tools, Data	WC	1	COST
		Development of ecosystem indicators, collection of monitoring data (long-term monitoring data and data necessary to make accurate assessments)	Data, Tools	National	2	CSC8, UH11
		EBM training specific to systems - i.e. estuarine, wetland, river catchment/watershed, protected area management	Training	National	1	CSC8
		Groundwater level data	Data	National	1	Heinz
	Social and Economic	Human dimensions tools and constraints to using them	Data, Tools	National, NE	2	CSC7, CSC8
		Economic and social impacts of management actions	Data, Tools	National	1	EBM TN
		Valuation of coastal and ocean resources and cost-benefit analysis information	Data, Tools	National, NE	2	CSC7, CSC8
		Lack of understanding about human uses of the ecosystem	Data, PB	National	2	EBM TN, CSC8
		Lack of trust among stakeholder groups, need to engage stakeholders in the process	Tools, Training, PB	National, NE	3	EBM TN, CSC7, CSC8
	Institutional / Governance	Increased coordination and collaboration across state and jurisdictional boundaries	PB	National, NE	4	CSC3, CSC8, CSC7, PSC
		Engagement within the complex institutional structures of local, state, and federal government	PB	NE	1	CSC7
		Methods for marine spatial planning	Tools, Training	National	1	EBM TN
		Better understanding and navigation of political processes and policy	PB, Training	NE	2	CSC7, CSC8
		Training on how to develop and implement an EBM approach; how to incorporate dynamic ecosystem processes or sustainability into EBM decision making	Training, Tools, TA, PB	National, GoM	3	EBM TN, CSC4, CSC8
		Established, standardized methods to implement EBM and multiple use marine zones	PB, Training	National	2	EBM TN, ELI
		Training and technical support for decision support tools	Training, TA	National, GoM, NE	5	EBM TN, MCPI, CSC2, CSC4, PSC
		Lack of resources (funding, training, and time) is a major impediment to EBM	PB, Training	National	3	EBM TN, CSC8, PSC
		Timely access to ecosystem data	Tools, PB	GoM, NE	2	CSC4, CSC7
		Ability to apply available data and information	Tools, Training, TA	NE	1	CSC7

Appendix C: Target Populations, Sample Sizes and Response Rates from Reviewed Literature

Source	Sample Size (# indiv responses)	Response Rate	COASTAL MANAGEMENT										
			Local Gov (including county, city and township)	OCRM	Other NOS	NEP / NERRs	MPAs / NMS	Regional OOS	State CZ	Other State Mar. Resource	Co. / Muni planners	NGO	Other Fed Land Mgmt
CSC1	1324 (indiv. Surveys) 223 (separate offices)	442 surveys (33%) 165 offices (74%)				X	X		X	X			
CSC2	434	<50%		X	X	X	X	X	X	X	X	X	X
CSC3	49 focus group, 28 phone interview	ND		X	X	X	X		X	X	X	X	X
CSC4	45 (focus groups) 73 (interviews)	ND	X	X (2 ^o)	X (2 ^o)	X	X		X	X	X	X	X
Heinz	278	21% (out of 1300)		X	X	X	X		X	X		X	
CSC5	41	25% (out of 162)	X						X	X	X		
NACo	79	12.7% (out of 621, rate is inclusive of coastal and non-coastal counties, coastal country response rate higher)	X						X	X	X		
CSC6	67 (Regional Data Exchange Survey)	60% (out of 111)	X	X					X	X	X		X
	41 (Local Level Survey)	25% (out of 162)	X						X		X		
CSC7	Survey was not conducted - X markets target audiences (11 interviews)		X		X	X			X	X	X	X	X
CSC8	212; add'l 42 from EBM Tools Network	33% (out of 647); ND				X	X		X			X	
CSC9	254 survey, 61 focus group	48.7% (out of 522)	X	X	X		X		X	X		X	
SECART	37 reports	NA											
UHI1	230	ND				X			X				
COST	Lit review; > 80 documents	NA											
EBM TN	91 web survey; 12 phone survey	30.3% (out of 300 web surveys)	X	X	X	X	X		X			X	
UHI2	230	ND				X			X				
NRS	Focus Groups: 62 Survey: 45 Questionnaire: 46	Focus Groups: 36.5% (out of 170) Survey: 73% (out of 62) Questionnaire: 74% (out of 62)	X	X	X				X	X		X	X
MCPI	28	60% (out of 47)									X (coastal land trusts)		
CSO1	18	51% (out of 35)							X				
CSO2	27	0.79							X	X	X		
CSC10	Lit Review, ~90 documents	NA											
CSC11	Lit Review, ~70 docs; 13 inperson interview with CM planners; 33 phone interviews with EM; 811 Phone Surveys	NA or Unknown				X			X		X (Regional Planning Council Members)		
ELI	Lit and Program Review	NA											
PSC	Lit Review, 142 documents	NA											

Source	Sample Size (# indiv responses)	Response Rate	FISHERIES MANAGEMENT				EMERGENCY MANAGEMENT			WATER QUALITY & QUANTITY					
			NMFS	USFWS	Mgmt. Councils	State Fish. Mgrs	FEMA	State Floodplain Mgrs	State / Co. / Local EM Mgrs	USGS	EPA	State Hydro	Water District Mgrs	State Public Health Mgrs	State Water Quality Mgrs
CSC1	1324 (indiv. Surveys) 223 (separate offices)	442 surveys (33%) 165 offices (74%)									X				
CSC2	434	<50%		X		X		X	X				X	X	X
CSC3	49 focus group, 28 phone interview	ND	X	X	X	X									
CSC4	45 (focus groups) 73 (interviews)	ND	X (2°)	X	X	X		X	X		X		X		
Heinz	278	21% (out of 1300)	X	X		X					X	X	X		X
CSC5	41	25% (out of 162)													
NACo	79	12.7% (out of 621, rate is inclusive of coastal and non-coastal counties, coastal country response rate)													
CSC6	67 (Regional Data Exchange Survey)	60% (out of 111)													
	41 (Local Level Survey)	25% (out of 162)													
CSC7	Survey was not conducted - X markets target audiences (11 interviews)		X	X											
CSC8	212; add'l 42 from EBM Tools Network	33% (out of 647); ND		X											
CSC9	254 survey, 61 focus group	48.7% (out of 522)					X	X	X						
SECART	37 reports	NA													
UHI1	230	ND			X			X					X		X
COST	Lit review; > 80 documents	NA													
EBM TN	91 web survey; 12 phone survey	30.3% (out of 300 web surveys)	X		X	X									
UHI2	230	ND			X	X		X							X
NRS	Focus Groups: 62 Survey: 45 Questionnaire: 46	Focus Groups: 50.5% (out of 170) Survey: 73% (out of 62) Questionnaire: 74%	X	X	X (Native Tribes...?)	X									
MCPI	28	60% (out of 47)													
CSO1	18	51% (out of 35)													
CSO2	27	0.79						X			X				
CSC10	Lit Review , 93 documents	NA													
CSC11	Lit Review, ~70 docs; 13 inperson interview with CM planners; 33 phone interviews with EM; 811 Phone Surveys	NA or Unknown					X			X					
ELI	Lit and Program Review	NA													
PSC	Lit Review, 142 documents	NA													

Source	Sample Size (# indiv responses)	Response Rate	TRANSPORTATION					WEATHER & CLIMATE	EDUCATION	
			USCG	USACE	State DOTs	Ports	Comm. shipping	NWS WFOs	University	Sea Grant
CSC1	1324 (indiv. Surveys) 223 (separate offices)	442 surveys (33%) 165 offices (74%)							X	X
CSC2	434	<50%		X						X
CSC3	49 focus group, 28 phone interview	ND								
CSC4	45 (focus groups) 73 (interviews)	ND	X	X	X	X	X		X	X
Heinz	278	21% (out of 1300)							X	X
CSC5	41	25% (out of 162)								
NACo	79	12.7% (out of 621, rate is inclusive of coastal and non-coastal counties, coastal country response rate higher)								
CSC6	67 (Regional Data Exchange Survey)	60% (out of 111)							X	X
	41 (Local Level Survey)	25% (out of 162)								
CSC7	Survey was not conducted - X markets target audiences (11 interviews)		X		X	X			X	X
CSC8	212; add'l 42 from EBM Tools Network	33% (out of 647); ND							X	X
CSC9	254 survey, 61 focus group	48.7% (out of 522)	X	X		X		X	X	X
SECART	37 reports	NA								
UHI1	230	ND								
COST	Lit review; > 80 documents	NA								
EBM TN	91 web survey; 12 phone survey	30.3% (out of 300 web surveys)							X	X
UHI2	230	ND								
NRS	Focus Groups: 62 Survey: 45 Questionnaire: 46	Focus Groups: 36.5% (of 170) Survey: 73% (of 62) Questionnaire: 74% (of 62)							X	X
MCPI	28	60% (out of 47)								
CSO1	18	51% (out of 35)								
CSO2	27	0.79								
CSC10	Lit Review , 93 documents	NA								
CSC11	Lit Review, ~70 docs; 13 inperson interview with CM planners; 33 phone interviews with EM; 811 Phone Surveys	NA or Unknown						NWS, National Hurricane Center	X	
ELI	Lit and Program Review	NA								
PSC	Lit Review, 142 documents	NA								

Source	Sample Size (# indiv responses)	Response Rate	PRIVATE SECTOR / INDUSTRY					RECREATION & TOURISM		PUBLIC	
			Marine Tech	Energy	Insurance / re-ins	Local weather services	Fisheries	State / Local Tourism	Rec Users	Residents / Citizens	
CSC1	1324 (indiv. Surveys) 223 (separate offices)	442 surveys (33%) 165 offices (74%)									
CSC2	434	<50%									
CSC3	49 focus group, 28 phone interview	ND					X				
CSC4	45 (focus groups) 73 (interviews)	ND		X	X		X			X (Media; public)	
Heinz	278	21% (out of 1300)	X (Business/Industry)					X		X	
CSC5	41	25% (out of 162)									
NACo	79	12.7% (out of 621, rate is inclusive of coastal and non-coastal counties, coastal country response rate higher)									
CSC6	67 (Regional Data Exchange Survey)	60% (out of 111)									
	41 (Local Level Survey)	25% (out of 162)									
CSC7	Survey was not conducted - X markets target audiences (11 interviews)						X	X	X		
CSC8	212; add'l 42 from EBM Tools Network	33% (out of 647); ND									
CSC9	254 survey, 61 focus group	48.7% (out of 522)			X	X				X (Media)	
SECART	37 reports	NA									
UHI1	230	ND									
COST	Lit review; > 80 documents	NA									
EBM TN	91 web survey; 12 phone survey	30.3% (out of 300 web surveys)									
UHI2	230	ND									
NRS	Focus Groups: 62 Survey: 45 Questionnaire: 46	Focus Groups: 36.5% (of 170) Survey: 73% (of 62) Questionnaire: 74% (of 62)	X (Private Business)								
MCPI	28	60% (out of 47)									
CSO2	18	51% (out of 35)									
CSO3	27	0.79									
CSC10	Lit Review , 93 documents	NA									
CSC11	Lit Review, ~70 docs; 13 inperson interview with CM planners; 33 phone interviews with EM; 811 Phone Surveys	NA or Unknown								Media (CBS4 broadcast meteorologist)	
ELI	Lit and Program Review	NA									
PSC	Lit Review, 142 documents	NA									