

# OCEAN OBSERVATIONS USER CHARACTERIZATION SUMMARY

REVIEW DRAFT

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## A. Methodology:

The characterization of ocean observation information users began as an effort to better understand the relationship of various stakeholder groups to the data and information that is typically generated as part of an ocean observing system. This was a first step in the process to identify stakeholders for participation in the regional association development effort and to develop effective strategies for conducting detailed user needs assessment and prioritization. The methodology for collecting this information included a series of individual or small group interviews with representatives of the various stakeholder segments as they were recommended in initial IOOS planning documents provided by Ocean.US. Upon completion of these interviews and analysis of the results, the stakeholder groupings were modified to serve as a foundation for our planning efforts.

## B. Stakeholder Sectors:

Stakeholder sectors are loosely defined to help organize discussions around similar thematic interests. It is important to note that there are significant differences in the User Categories (as described in Section C below) within each sector, making it extremely difficult to categorize “stakeholder needs” using these broad definitions. Specific data and information product needs within each sector should be defined according to the User Category Continuum described below in Section C. Also, there is significant overlap between the stakeholder sectors. These are generalizations made to characterize the stakeholder constituencies for planning purposes. These characterizations do not apply universally as they are highly dependent on the mission and capabilities of individual organizations which can vary significantly. In the first phase of this planning effort, representatives from all sectors above have been interviewed to identify their initial priorities, concerns and issues related to ocean observations. Below are general descriptions of each sector along with some of the key issues identified by representatives of the group. Also included is a list of organizations identified within each sector to participate in the regional association governance and business planning efforts.

### *1. 1. Coastal Ocean Observing and Monitoring Systems*

- a. Description - This is the existing core group of stakeholders who currently collect, process, analyze, and/or distribute measurements on coastal ocean variables. Depending on the size and function of the system, these stakeholders may include any combination of modeling, outreach, research, education, or system operations as part of their overall mission. Currently in the southeast, this stakeholder group is predominantly in the public sector including federal observing/monitoring systems and programs including NOAA,

USGS, and EPA. Also included are numerous local, sub-regional, and regional university based marine science systems. This stakeholder group also includes a number of state and local resource management agencies responsible for operating long-term monitoring programs.

b. Highlighted Issues:

- Need to continue meeting the research and operational needs that drove the initial development of the systems.
- Want better linkages to full range of stakeholders – they know their information could be valuable to others but are not exactly sure how it can be used.
- Are concerned about how to establish and maintain long-term, operational capabilities.
- Need to develop better system redundancies, particularly for systems used in emergency response.
- Current incremental funding is not conducive to long-term consistency in observations.
- Need to develop and implement better data standards and interoperability.

c. Example Organizational Representatives:

- Southeast Atlantic Coastal Ocean Observing System(SEACOOS)
- North Carolina Coastal Ocean ObservingSystem (NCCOOS)
- Coastal Ocean Research and Monitoring Program(CORMP)
- FerryMon
- Carolinas Coastal Ocean Observing & PredictionSystem (Caro-COOPS)
- South Atlantic Bight Synoptic Offshore ObservationalNetwork (SABSOON)
- Sebastian Inlet Observations
- South Florida Ocean Measurement Center (SFOMC)
- East Florida Shelf Information System (EFSIS)
- Explorer of the Seas
- Seakeys/C-MAN
- Coastal Ocean Modeling and PredictionSystem (COMPS)
- Physical Oceanographic Real-Time System(PORTS)
- Institute for Marine Remote Sensing (IMaRS)
- Research Vessel Surface Meteorology Data Center (RVSMDC)
- Florida Inshore Marine Monitoring andAssessment Program (IMAP)
- Neuse River Remote Monitoring and DataAcquisition Project
- National Estuarine Research ReservesCentralized Data Management Office (CDMO)
- NOAA National Data Buoy Center
- NOAA CO-OPS National Water Level ObservationNetwork (NWLON)

## *2. 2. Observing Services, Products, and Technologies*

a. Description - This stakeholder group represents constituencies who develop, test, and/or provide observing system technologies including platforms, sensors, and information systems. It includes stakeholders who provide services for operating and maintaining observing system components. Also included are stakeholders who develop and provide value-added observation products and services to ocean users. This stakeholder segment is a critical link with the private sector and is a primary focus group for research technology transfer.

b. Highlighted Issues:

- Want to play a more active role in regional system development and in defining requirements.
- Want public sector to serve public safety and health interests or pilot new market opportunities but otherwise let private sector meet end-user needs.
- Want to participate in research for new sensor technologies and increase technology transfer from research sector.
- Want to see more user and economic driven focus on priorities rather than research focus.
- Want consistent, fully operational systems with open access to data.

c. Example Organizational Representatives:

- |                                     |   |
|-------------------------------------|---|
| - Alliance for Coastal Technologies | - Ocean Design, Inc.                            |
| - Applied Science Associates, Inc.  | - Ocean Numerics                                |
| - Boeing                            | - Raytheon                                      |
| - The Boeing Co.                    | - Institute for Global Environmental Strategies |
| - Coastal Operations Institute      | - Roffs Ocean Fishing Forecasting Service       |
| - Falmouth Scientific, Inc.         | - SAIC  |
| - Fugro GEOS                        | - Shell Global Solutions                        |
| - Harris Corporation                | - Weathernews Oceanroutes                       |
| - Horizon Marine                    | - WET Labs, Inc.                                |
| - MaCartney Offshore                |   |

### ***3. 3. Public Safety and Security***

a. Description - This stakeholder group represents public and private sector interests involved in weather, climate, hazards, emergency management, and maritime safety and security. They include weather and marine forecasting and information delivery, emergency preparedness and disaster response, marine search and rescue and port security.

b. Highlighted Issues:

- Want data to meet similar standards and formats as meteorological data.

- Want better access to quality model output.
- Need archived data for climatology development, event analysis, and baseline comparisons.
- Want better information in near-shore coastal interface.
- Need fully operational systems to support emergency response.
- Want obs data and information products to fit into existing decision processes.

c. Example Organizational Representatives

- |  |   |
|--|---|
| – North Carolina Division of<br>Emergency Management | – Coast Guard District Seven                            |
| – South Carolina Emergency<br>Management Division    | – Naval Atlantic Meteorology and<br>Oceanography Center |
| – Georgia Emergency<br>Management Agency             | – NOAA/NWS Regional, Miami                              |
| – University of Georgia                              | – Continental Weather Corporation                       |
| – Florida Division of<br>Emergency Management        | – Environmental Dynamics<br>Research, Inc.              |
| – American Meteorological Society                    | – Wxforecast Services                                   |
| – Accuweather  | – Florida Space and Atmospheric<br>Weather Institute    |
| – Oceanweather                                       | – Weathervision/WTVT Television                         |
| – Fleetweather                                       | – Hilkar Consulting Inc.                                |
| – Weather Flow                                       | – ClimaData Corp.                                       |
| – FEMA Region IV                                     | – Weather Wagon, Inc.                                   |
| – NOAA NWS Southern Region                           | – PC Weather Products, Inc.                             |
| – NOAA NWS Eastern Region                            | – Duke Power Company                                    |
| – NOAA AOML  | – Gateway Weather Consultants Inc.                      |
| – NOAA National Hurricane Center                     | – Jacksonville Weather Forecast Office                  |
| – Coast Guard District Five                          | – Charleston Weather Forecast Office                    |

**4. 4. Resource Management and Public Health**

a. Description - This stakeholder sector represents interests in coastal and marine resource management and public health protection as it relates to marine resources. This includes such things as fisheries management, ecosystem restoration, living marine resources, and beach management. Public health issues include things such as stormwater discharge management, shellfish closures, beach closures, and harmful algal blooms.

b. Highlighted Issues:

- Want to be able to easily learn what observations are available and how to use them.
- Want archived data for studies and analyses.
- Want information that fits into existing decision processes.

- Need to be able to make science-based policy recommendations.
- Want to approach issues from ecosystem based perspective.
- Want data compatible with widely used GIS formats.
- Need better agreement on scientific results to avoid conflicting messages to the public.
- Want more coastal and estuarine data.
- Want better understand of ocean dynamics in coastal zone.

c. Example Organizational Representatives

- |  |   |
|--|---|
| – North Carolina Department of Marine Fisheries      | – Sapelo Island Reserve                                       |
| – SC DNR Marine Resources Division                   | – Guana Tolomoto Matanzas National Estuarine Research Reserve |
| – Georgia Department of Natural Resources            | – Rookery Bay Reserve   |
| – Florida Department of Environmental Protection     | – Monitor National Marine Sanctuary                           |
| – Florida Fish and Wildlife Conservation Commission  | – Gray's Reef National Marine Sanctuary                       |
| – South Atlantic Fisheries Management Council        | – Florida Keys National Marine Sanctuary                      |
| – Gulf Coast Fisheries Management Council            | – NOAA National Coral Reef Conservation Program               |
| – Coastal States Organization (CSO)                  | – Southeast Fisheries Science Center/NMFS/NOAA                |
| – North Carolina Coastal Zone Management             | – USGS Coastal and Marine Geology                             |
| – South Carolina Coastal Zone Management             | – Florida Dept of Health                                      |
| – Florida Coastal Zone Management                    | – Florida Beaches & Coastal Systems                           |
| – North Carolina National Estuarine Research Reserve | – NC Sea Grant  |
| – North Inlet-Winyah Bay Reserve                     | – SC Sea Grant  |
| – ACE Basin Reserve                                  | – FL Sea Grant  |
|  | – FL Sea Grant  |
|  | – GA Sea Grant  |
|  | – St. Johns River Water Management District                   |

**5. 5. *Maritime Industries and Recreation***

- a. Description - This stakeholder group represents a broad range of coastal ocean constituencies. They include commercial fishing, commercial shipping, oil and gas, ocean engineering, and numerous other manufacturing, transportation, and service sector entities that constitute marine-dependent industries. Also included in this sector are significant recreational constituencies including boating, sports fishing, surfing, and diving, as well as tourism-related industries such as charter services and cruise lines.

b. Highlighted Issues:

- Want tailored information products to meet specific needs.
- Want information to fit into decision processes.
- Need education about what is available and why it is important.
- Want economic justification.
- Want system expansion priorities where highest population and traffic exists.
- Want better forecasting of weather and ocean conditions.

c. Example Organizational Representatives:

- |  |   |
|--|---|
| – American Association of Port Authorities | – South Carolina Marine Association               |
| – North Carolina Ports                     | – Marine Industries Association of South Florida  |
| – South Carolina State Ports Authority     | – Marine Technology Society                       |
| – Georgia Ports Authority                  | – American Waterways Operators                    |
| – Florida Ports Council                    | – American Sportfishing Association               |
| – Jacksonville Port Authority              | – Surfrider Foundation                            |
| – Harbor Pilots Association                | – U.S. Sailing                                    |
| – Florida State Pilots Association         | – Association of Diving Contractors International |
| – Boat U.S.                                | – Global Underwater Explorers                     |
| – National Safe Boating Council            | – Southeastern Fisheries Association              |
| – Association of Marina Industries         | – Recreational Fishing Alliance                   |
| – United States Power Squadrons            | – Recreational Fishing Alliance                   |
| – NC SBTDC Marine Trades Services          | – ICCL (Cruise Industry)                          |

**6. 6. Marine Science Research and Education**

a. Description - This stakeholder group represents a wide range of marine research interests including physical, chemical, and biological oceanography, fisheries, marine mammals, coastal geology, ocean and coastal engineering, meteorology, climatology, marine ecology, and many other related fields of science. Also included in this constituency is marine science education including K-12 undergraduate and graduate education, and informal public education such as museums and aquaria. This stakeholder group plays a key role in all other groups by providing underlying scientific understanding, advancing the state of science through research, and educating a skilled workforce to serve all the constituencies.

b. Highlighted Issues:

- Want more data and long-term consistency.
- Want better information about availability and limitations of data.
- Want better understanding of applicability to user needs.

- Need better coastal data.
- Want more focus on biological and ecosystem data.
- Want archived data.
- Want to utilize data in context of teaching science education principles.

c. Example Organizational Representatives:

- |  |  |
|--|--|
| – Elizabeth City State University              | – Florida Atlantic University                        |
| – University of Florida                        | – Florida International University                   |
| – Duke University                              | – Florida Institute of Technology                    |
| – North Carolina State University              | – Florida Wildlife Research Institute                |
| – University of North Carolina<br>Chapel Hill  | – Florida State University                           |
| – University of North<br>Carolina Wilmington   | – Center for Ocean-Atmospheric<br>Prediction Studies |
| – Elizabeth City State                         | – Harbor Branch<br>Oceanographic Institution         |
| – Coastal Carolina University                  | – Mote Marine Laboratory                             |
| – College of Charleston                        | – Nova Southeastern University                       |
| – South Carolina Marine<br>Research Institute  | – Whitney Marine Lab                                 |
| – University of South Carolina                 | – University of Florida                              |
| – Baruch Institute                             | – University of Miami                                |
| – Savannah State University                    | – University of South Florida                        |
| – Skidaway Institute of<br>Oceanography (SkIO) | – Florida Institute of Oceanography                  |
| – University of Georgia                        | – University of North Florida                        |
| – Georgia Tech                                 | – SECOSEE  |
|  | – FL COSEE   |

**C. User Categories Continuum:**

Very early in the user characterization interview process, it became apparent that the real value in the initial interactions was in discovering to what extent ocean observations data and products fit into the operations of the various stakeholder sectors. The stakeholder sectors do not adequately represent the varying degrees to which the user groups were dependent on or could benefit from ocean observation information. What resulted was the development of a “User Continuum” concept to help further categorize and target our observation efforts. Following are rough descriptions of the user categories.

**1. Super User:** Have the scientific and technical capabilities and resources to work directly with observation data information.

Super users require substantial information for analytical or research activities, development of value-added products, and/or distribution of products or services to others. Super users include most current ocean observing and coastal monitoring systems. Most existing systems originated in

response to specific research or operational requirements and continue to function in a manner that addresses these needs. Super users also include a wide range of public and private sector researchers, service providers and product developers from all stakeholder groups.

Some of the issues identified by super users across the sectors include:

- Want to know what data is available and how to get it.
- Need for consistent metadata.
- Need for data that is compatible with existing data formats.
- Need for QA/QC standards.
- Need for access to both operational real-time and archived data.
- Want increased data density.
- Need long term measurements.
- Want improved reliability and consistency of data.

**2. *Intermediate User.*** Directly accesses and utilizes limited observation data and/or information as a factor in research or decision-making.

Intermediate users include private and public sector entities with requirements for specific ocean data or information. These users generally have the capabilities and resources to work with ocean data, but they may also rely on the services or products of super users to help meet their needs.

Intermediate users can be the most difficult users to identify within the stakeholder sectors. Their needs are often limited to episodic requirements or very limited variables to support their decision processes. Although they may have the capabilities and general knowledge to utilize ocean data, they are more interested in the specific applications of the data.

Some of the issues identified by intermediate users across the sectors include:

- Want to know what data and information is available and where to get it.
- Want intuitive access to data and information.
- Need long-term, consistent, reliable data.
- Want increased measurement near-shore.
- Need better information and understanding of estuarine/coastal ocean mixing zones.
- Need better information and understanding of coastal ocean/deep water mixing zones.
- Need some general descriptive information about relationship of observation data to relevant physical processes.

**3. *End User.*** Conscious consumer of specific ocean observation information, often in the form of targeted, value-added products.

End users are interested exclusively in specific applications of ocean data. There is a very wide range of constituencies represented within the end user category. They include the vast majority of ocean users such as beachgoers interested in weather and beach currents, surfers interested in

waves, fishermen interested in water temperature and currents, boaters interested in weather and water conditions, etc. They also include a wide range of economic concerns including commercial shipping, sport and commercial fishing, and coastal tourism industries.

End users seek out and use information products that utilize ocean observations. In most cases these products are developed and provided by super users. Examples include weather service marine advisories for boaters, rip current forecasts for beachgoers, wave forecasts for surfers, or fish forecasts for fishermen. Knowledge of end user needs is critical in building an observations system, but those needs are usually expressed by the super users who are meeting them.

Some of the issues identified by end users across the sectors include:

- Primarily want information rather than data.
- Want to easily and intuitively access information products.
- Need to know what information is available, how to get it and how to use it (easily and quickly).
- Want increased information near-shore.
- Need better understanding of relationships between observation information and relevant physical processes.
- Want information to flow seamlessly into decision processes.
- Need access to information in non-traditional ways (eg - not just computers but also cell phones and other equipment used on water).

**4. *Direct Beneficiary:*** Directly benefits from ocean observation data and information through its use by others.

Direct beneficiaries are the same general group as end users but they are not conscious consumers of ocean observation information products. They do, however, directly benefit from the use of those products by others. Some examples of benefits are safer swimming beaches due to lifeguards' use of rip current forecasts or more successful recreational fishing due to charter service use of fish forecasts.

Some of the issues identified by direct beneficiaries across the sectors include:

- Some would become end users if they knew about benefits.
- Many are unaware of how information products are being used to their benefit.
- Some assume that existing capabilities are adequate for all needs.
- Want information to flow seamlessly into decision processes.

**5. *Societal Beneficiary:*** Peripherally benefits from ocean observation data and information through its use by others.

Societal beneficiaries are indirectly impacted by the use of ocean information. They are the general public beneficiaries of environmental and resource protection efforts, public safety and health improvements, and research applications such as climate and hazards forecasting. Societal beneficiaries include consumers of products such as those transported by the commercial shipping

industry and those impacted by other marine dependent industries including energy, fisheries, and tourism.

Societal beneficiaries were not adequately captured in the interview process for these characterizations. In talking with all interview participants, however, it was routinely recognized there is a significant need to increase the visibility of societal benefits associated with ocean observing systems.

#### **D. Stakeholder/User Matrix:**

This characterization study was a first step in defining the ocean observation stakeholder community for the purpose of developing an effective regional implementation strategy. The development of the Stakeholder/User (SU) Matrix provides an initial framework to engage stakeholders in the planning process, develop and deliver user-defined products, and evaluate effectiveness in meeting the full range of user needs. Additional detailed user characterizations or needs assessments within the SU framework can aid in developing key stakeholder partnerships, prioritizing system requirements, assessing economic benefits, and implementing effective outreach strategies.

Key questions and considerations that need to be incorporated into detailed assessments of user needs within the various categories include:

1. Information use or specific applications
2. Variables needed for applications
3. Variables desired to enhance applications
4. Spatial extent for which information is used and spatial resolution required
5. Time extent for which information is needed (real-time, episodic, archived)
6. Format for information used or required (data, maps, analytical products)
7. Information products needed for application
8. Information products desired to enhance applications
9. Information/Data Media/Provider used and desired (FTP, CD, Web, Media, cellular, etc.)
10. Education and training needs (technical assistance or education requirements)
11. Potential user contributions to accessible data and information products.

The following matrix contains some very general recommendations concerning strategies for future work with the various stakeholder groups:

<i>Stakeholder Sectors</i>	<i>Super Users</i>	<i>Intermediate Users</i>	<i>End Users</i>	<i>Direct Beneficiaries</i>	<i>Societal Beneficiaries</i>
<b>Coastal Ocean Observing and Monitoring Systems</b>	Seek to better understand how and why existing system operators routinely use their own data, as well as data from other systems. Investigate whether there is a need and/or significant benefit to developing tailored "products" for use by these stakeholders.				
<b>Observing Services, Products, and Technologies</b>	Seek to better understand how and why these groups routinely use obs data and who they serve. Target partnerships with these super-users in product development aimed at the end-users and beneficiaries across stakeholder sectors. Investigate whether there is a need and/or significant benefit to developing tailored "products" for use specifically by these super-users.				
<b>Marine Science Research and Education</b>	Identify and develop partnerships with existing super users in this sector who use ocean data, information, or products in K-12, undergraduate, and graduate education, informal education, and marine research.	Identify and explore potential partnerships with existing intermediate users in this sector.	Working with super and intermediate user partners, develop products that can directly meet end-user needs and serve as a foundation for successful communication of benefits for direct and societal beneficiaries.	Develop material that effectively communicates the benefits of obs to this constituency.	Develop material that effectively communicates the benefits of obs to this constituency.
<b>Public Safety and Security</b>	Seek to identify and better understand the needs of the super-users in this sector who regularly use ocean data, information, or products in weather forecasting, emergency planning & response, search & rescue, and homeland security. Investigate whether there is a need and/or significant benefit to developing tailored "products" for use specifically by these super-users.	Seek to better define and understand the needs of the intermediate users in this sector who periodically use ocean data, information, or products in weather forecasting, emergency planning & response, search & rescue, and homeland security. Investigate whether there is a need and/or significant benefit to developing tailored "products" for use specifically by these intermediate users or whether products serving both super users and intermediate users are feasible.	Working with product providers (either from this sector's super or intermediate user groups or from the observing services, products, & technologies stakeholders), seek to better understand the needs for end-user products in this category. Working through these partnerships, contribute to product development to meet end-user needs.	Develop material that effectively communicates the benefits of obs to this constituency.	Develop material that effectively communicates the benefits of obs to this constituency.
<b>Resource Management and Public Health</b>	Seek to identify and better understand the needs of the super-users in this sector who regularly use ocean data, information, or products in public health, coastal management, fisheries management, or other public resource issues. Investigate whether there is a need and/or significant benefit to developing tailored "products" for use specifically by these super-users.	Seek to better define and understand the needs of the intermediate users in this sector who periodically use ocean data, information, or products in public health, coastal management, fisheries management, or other public resource issues. Investigate whether there is a need and/or significant benefit to developing tailored "products" for use specifically by these intermediate users or whether products serving both super users and intermediate users are feasible.	Working with product providers (either from this sector's super or intermediate user groups or from the observing services, products, & technologies stakeholders), seek to better understand the needs for end-user products in this category. Working through these partnerships, contribute to product development to meet end-user needs.	Develop material that effectively communicates the benefits of obs to this constituency.	Develop material that effectively communicates the benefits of obs to this constituency.
<b>Maritime Industries and Recreation</b>	Seek to identify and better understand the needs of the super-users in this sector who regularly use ocean data, information, or products in maritime transportation, industries, or recreation. Investigate whether there is a need and/or significant benefit to developing tailored "products" for use specifically by these super-users.	Seek to better define and understand the needs of the intermediate users in this sector who periodically use ocean data, information, or products in maritime transportation, industries, or recreation. Investigate whether there is a need and/or significant benefit to developing tailored "products" for use specifically by these intermediate users or whether products serving both super users and intermediate users are feasible.	Working with product providers (either from this sector's super or intermediate user groups or from the observing services, products, & technologies stakeholders), seek to better understand the needs for end-user products in this category. Working through these partnerships, contribute to product development to meet end-user needs.	Develop material that effectively communicates the benefits of obs to this constituency.	Develop material that effectively communicates the benefits of obs to this constituency.

The issues highlighted in green are key initial steps needed to establish a solid ocean observing network within the region. The network should minimally consist of data providers and super-users who represent the most immediate constituency of stakeholders. It is through these super-users that relevant applications are defined and broader end-user constituencies are to be reached. In addition, the needs of intermediate users should also be defined and wherever possible, incorporated into implementation strategies aimed at super-users. Initial recommendations for these groups primarily involve identifying individual stakeholders, developing a better understanding of their specific ocean observation uses and needs, and identifying the potential for meeting those needs through data access or information “products” developed specifically at those super user audiences.

The issues highlighted in pink are focused on meeting end-user needs. While it might be tempting to jump in quickly with the development of an array of end-user focused products, it would not be the most efficient or sustainable approach to building an effective ocean observing network. Over the long-term, sustainability of an ocean observing system will be heavily dependent on the ability of a robust private and public sector super-user community to meet the diverse needs of ocean users. Given that most end-users are interested in information products that incorporate forecasts or value-added analyses, it is not realistic to attempt to build a “stand-alone” ocean observation system to directly meet such a wide range of end-user needs. The highest value to most end-users is generally in what the super-users *do* with the data rather than in the data itself. As a result, developing super-user partnerships and improving the capacity of super-users to effectively utilize ocean observation data is a key strategy in meeting end-user needs.

The issues highlighted in yellow are essential for justifying the significant public investment necessary to develop and support an operational coastal ocean observing system. The recommendations do not focus on providing or marketing observing system “products” to these constituencies but rather on developing awareness and educational strategies that can be used to effectively generate public interest, improve public understanding, and evaluate societal benefits.

## **E. Recommendations:**

It is clear that there is no reasonable “one size fits all” approach to meeting the needs of ocean observations users. The potential stakeholders are too diverse, the possible applications are too varied, and in many cases the observing system capabilities are still too conceptual. Regular interactions with users will need to continue in an iterative manner as the system evolves. It is, however, necessary to identify some stakeholders and user-focused applications as initial targets of opportunity. Since there are limited resources and a limited amount of time to demonstrate user-focused effectiveness, these targets of opportunity need to be determined based on some general criteria.

Ideally, selection criteria would consist of a high likelihood of broad applicability across the region and some consensus on the highest priority issues. The diversity of the users, however, presents two significant challenges in using such criteria. First, a widespread systematic assessment of user needs (or more accurately – potential users) can only go so far without deteriorating into a series of

generalized “wish lists” for more and better data, particularly when looking at this on a regional scale. Second, attempting to prioritize within stakeholder categories to select an appropriate starting point is an exclusionary process that conflicts with the inclusionary intent of the regional association formation.

In an effort to move beyond these challenges, the following recommendations were developed as strawman targets of opportunity based on input that was received during this assessment. A general theme has been identified for several stakeholder sectors. These were themes that came up regularly in individual and small group discussions, appear to have some broad regional appeal, and would potentially involve key super-users who seem most equipped for immediate partnership opportunities. The general recommendations identified earlier in the Stakeholder/User Matrix can be further developed into specific strategies to address the themes below:

### ***7. Education Stakeholders – Ocean Currents Theme***

Currents are a key underlying factor related to all other priority themes. A comprehensive education strategy focused on ocean currents should be designed and implemented to support K-16 formal and informal education, stakeholder capacity building, and public awareness needs. Ideally the strategy would define products and outcomes that would be relevant and useful in the context of the remaining themes.

### ***8. Research Stakeholders – Sediment Budget and Transport Theme***

There are many fields of research currently supported by ocean observations. With huge coastal economic impacts (dredging, beach nourishment, land loss, etc), sediment management relies heavily on a need to better understand coastal ocean dynamics. As super-users, coastal engineering researchers and managers are looking to partner with ocean observing systems to meet critical research needs.

### ***9. Public Safety and Security Stakeholders – Port Safety Theme***

Ports are very high visibility and high impact end-users. In partnership with key super-users such as the National Weather Service, NOAA CO-OPS, and the Coast Guard, pursuing the integration of regional ocean observations into a port safety initiative would provide an excellent target of opportunity with potential long-term implications.

### ***10. Resource Management & Public Health Stakeholders – Fisheries Management Theme***

There are numerous resource management and public health constituencies interested and engaged in ocean observations. While many are actively participating in regional system planning discussions, their primary objectives often relate to the eventual expansion of observations and models into the near-shore and estuarine environment. Still others are seeking to enhance ocean observing capabilities through future improvements in biological and chemical monitoring capabilities. One area of public health and resources, fisheries management, can benefit

immediately from the physical oceanographic measurements that currently exist. By focusing on the integration of fisheries management information with ocean observations, potential physical/biological relationships can be explored related to fisheries recruitment and other management issues.

### ***11. Maritime Industries & Recreation Stakeholders – Recreational Boater Safety Theme***

This is the largest stakeholder grouping with the most diverse constituencies of super-users and end users. Narrowing this group down to specific initial targets of opportunity primarily involved finding organizations and individuals across the user continuum who are interested and committed enough to participate in a long term initiative. Boater safety, while also a public safety and security theme, is a constant and high visibility issue throughout maritime industry and recreation. There are significant super-users from the public and private sectors to pursue as partners and there are various potential funding opportunities to help build an initiative that could reach large populations.

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#### **Supporting Documentation**

1. Interview Guide
2. Observations Variable List
3. Products Variable List