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Coastal Managers Users Needs for Ocean Observation Data and Prediction Information

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Talking Points

I. Opening remarks

- Introduction & affiliations
- Present coastal managers view
    i. water quality science and permitting staff;
    ii. fisheries management and marine environmental permitting;
    iii. marine geology mapping and permitting; and
    iv. coastal/marine planning
- Various user surveys exist and four are compiled/synthesized in "*Coastal and Ocean Observing System User Requirements: An Examination of User Surveys"* (NOAA/CSC, 2000). It identifies the most requested data (currents, winds, water levels/tides, water temperatures, weather/storms) by nearly 200 users that are organized into ten broad user groups – of which five (research, environment, building, food, and government management) contain elements of state coastal management. There are at least two caveats of this report. First, it identifies the data needs but not the uses of the data. Second, user data needs are described but not their willingness to pay for that data.
- Coastal managers are cautiously optimistic about the role of ocean observing in assisting us manage coastal and ocean resources.

II. Context Setting

A. Coastal management – long-term, continuous trend data; spatial coverage, density and temporal scales

Trend Data -- As pressures to use and develop the nation's shorelines and marine environment increase the coastal management community (e.g., local, state and federal) is required to make more precise policy and permitting decisions. Long-term continuous trend data about the health and status of shoreline resources are essential ingredients to these decisions.

Spatial Coverage, Density and Temporal Scales – The wide variety of decisions coastal management agencies need to make (e.g., water quality protection, habitat conservation, hazards management, dredge disposal, etc.) is mirrored by the varying coverage, densities and temporal scales of the data required to make informed decisions. In regard to the role of ocean observing data in coastal decision-making coastal managers commonly require intensive data when making decisions in the nearshore environment, estuaries and riverine systems. Thus the density and frequency of sampling are important factors in determining the utility of these systems to coastal managers.

B. Ocean observing data and products – the continuum of raw data to synthesis and state capacity

Raw data to synthesized products – The nation's coastal management programs are as diverse as the coastal ecosystems they are charged with managing. Similarly there is a continuum of need for raw data (i.e., real time, uniform, continuous, etc.) to synthesized products. For example, the data might be used by a water quality agency in state modeling efforts to understand mass-loadings and the role of offshore nutrient contributions to coastal ecosystems.

State capacity – The human infrastructure (e.g., technical abilities, availability of time, etc.) of the nation's coastal management agencies needs to be able to utilize the data and products developed from a national ocean observing system. To ensure this capacity exists an ongoing federal-state partnership is required. It would support the professional development and training of state personnel so that they can use the raw data, generate products specific to their coastal management issues, and assist others in accessing and using ocean observation materials.

C. State monitoring – integrating ocean observing with state/regional initiatives

Applicable sub-state, state and regional monitoring programs need to integrate the ocean observing data streams and products in a way that enhances our ability to manage coastal and ocean resources. This will require state and federal investments in the human infrastructure of state coastal management programs and other partners.

III. Coastal management decision-making – the role of ocean observing and prediction

Every day the nation's 35 coastal management programs, at the local and state level, are making policy, management, permitting and enforcement decisions that affect coastal resources. Examples of how ocean observing data and products can be used to support this decision-making include:

1. **Aquaculture promotion and management** – Many of the nation's state coastal management programs are involved in the development and implementation of aquaculture programs in response to the world's demand for protein. These programs address both the promotion and management/regulation of the many forms of aquaculture (e.g., bottom, suspended and raft culture, onshore and offshore net-pen finfish culture, etc.)
   - State promotional efforts – Ocean observing data collected from buoy mounted sensors can assist state coastal managers develop proactive ocean zoning programs that pre-identify coastal locations most suitable for aquaculture. In doing so they can streamline the permitting process, save proponents time and money, and help to reduce coastal user conflicts. Examples of ocean observing data that are needed to identify sites and assess the carrying-capacity of embayments and offshore locations include:
     a. Water chemistry – dissolved oxygen, nitrates and ammonia data allow managers to assessment the suitability of a site to accommodate increased waste loads;
     b. Physical characteristics -- local current direction and velocity information allow managers to assess the effect on potential raft culture operations.
     c. Biology -- phytoplankton species, abundance, and location data are essential to siting shellfish aquaculture operations
   - State management and regulation – States with established aquaculture permitting programs can use ocean observing data and products to improve the management and oversight of these operations. One example is how temperature or nutrient data allow managers to better react to changing circumstances.

2. **Right whale protection and management** – The precarious population levels of Right whales in the North Atlantic requires managers to maximize protection efforts. Aerial surveys combined with ocean observing data and prediction information produces ocean current and frontal boundary conditions (e.g., location of plankton patches) where these cetaceans are

known to feed and spawn. By locating these areas – both in real time and through predictions -- agencies can take proactive measures to notify mariners (e.g., avoid areas, modify operations, etc.), help users get the gear out of the water, and to generally heighten awareness. The Maine Department of Transportation "notice to mariners" is one proactive example.

3. **Oil spill prevention and recovery –** The prevention of oil spills is a priority and requires good physical (e.g., fog, temperature, wind speed, etc.) and oceanographic (e.g., currents, etc.). In addition, the availability of ocean observing current and wind data assists managers in understanding the directional movement of a spill along the coast and to proactively deploy oil spill cleanup equipment and personnel. These actions protect sensitive/critical resources and assist managers in protecting public health (e.g., shellfish closures due to spills, etc.). Further, since certain oil dispersants that control oil spills are dependent on water temperature and subsurface salinity levels additional ocean observing data help managers select the correct tools.

4. **Public health protection** – A primary role of state fishery managers is to ensure seafood is safe and healthful. The increasing occurrence of harmful algal blooms (HABs) and brown tide die-offs that consume DO requires timely and cost effective detection tools. Ocean observing data (e.g., currents, wind speed and direction, chlorophyll concentrations, etc.) and prediction information (e.g., bloom models, etc.) enable a state manager to tell coastal users that a bloom is coming. It allows a state to better target sampling and to make more informed decisions on shellfish openings and closures. Further, it provides users with time to get aquaculture products out of the water, to move finfish or shellfish products to another area and to target areas for harvesting before event occurs.

5. **Fisheries management** – State fishery management agencies focus significant resources on fisheries recruitment and habitat protection to maximize the occurrence of key species. Ocean observing data (e.g., wind speed and direction, currents & velocities, etc.) help managers understand where urchin larvae will settle on the bottom and when & where protection of these areas is needed. Similarly, to protect juvenile species managers need to know how eggs are transported and where they will settle out. Scallop enhancement efforts also benefit from physical data. It can be used to determine the timing for placement of bags to collect scallop spat for grow-out and enhancement of the wild fishery. Current information assists managers in identifying settlement areas that can be sampled to determine stock size. It also may assist in our understanding of population dynamics of species such as northern shrimp whose abundance seems to be closely linked to water temperature.

6. **Dredge management –** State transportation, environmental and fisheries managers routinely search for the "window" of time that dredging can occur with the least adverse impact to priority marine species present. Ocean observing data (e.g., wind speed and direction, surface and subsurface currents, temperatures & velocities, etc.) can better inform dredge permitting and management. This information can improve existing modeling capabilities and aid in the selection of ocean disposal sites for dredged materials.

   State managers are also managing beach systems and making multi-million dollar beach nourishment decisions. Ocean observing data (e.g., wind, directional waves, wave height & period, etc.) are needed to understand wave approaches to beach systems and to assess the volume of sand. Often, the fate of a beach nourishment project is based on the wind and wave data that allow managers to predict how long the sand will remain on the beach. These predictions are used by government agencies (local, state, & federal) to determine the cost-benefit of projects and to prioritize actions to manage coastal erosion.

7. **Emergency management** – A priority of state coastal emergency managers is public safety during coastal storms – in particular the effect and extent of coastal storm surges. Ocean observing data (e.g., wind, directional waves, and barometric pressure which affects water levels) are essential to improving wave run-up models and storm surge predictions. Managers need to know how high the water levels will be, how long flooding will last, which direction water is flowing, and how often it might occur in order to manage evacuation areas, determine properties at risk, and conduct hazard mitigation planning.

   Intensive analysis of these data (particularly wave directional data) are also needed to improve FEMA map products that state agencies, coastal communities and homeowners rely on for coastal decision-making. As sea levels rise, our coastal topography changes and the location of flood zones are altered. Shoreline lots and structures that were not in a flood zones 10 years ago are now in harms way. Further, there is increasing awareness that, while we have addressed flood risks, there is an increasing threat to shoreline structures from shoreline erosion that present insurance programs do not address.

8. **Marine water quality management** – State environmental quality agencies are responsible for permitting water quality discharges. Ocean observing biological data (e.g., dissolved oxygen, nutrients, etc.) combined with physical (e.g., flushing rates, currents, winds, etc.) allow state managers to better understand mass loadings to coastal waters. For example, in the Gulf of Maine region offshore fluxes of nutrients may overwhelm inshore land-based sources. Understanding these seasonal and interannual offshore fluxes by coastal region and comparing them other areas in the Gulf of Maine will assist managers in making more protective water quality permitting decisions. Marine aquaculture siting and permitting decisions can use these data as well.

IV. Recommendations for implementing a national ocean observing system that meets coastal managers needs

1. Engage CZM programs in the design and implementation – Governance mechanisms to design and manage ocean observing and prediction systems must provide for representation of state coastal managers among other users and be accountable for responding to these needs.

   > Action: National legislation that establishes an ocean observing system should contain criteria requiring that the national oversight board and subsequent regional boards provide for substantive and significant representation of the user community.

2. Make local, state and regional investments in ocean observing – The rationale for a national ocean observing system that addresses national needs is well documented and as a result the expenditure of federal funds makes sense. Given the variability of the nation's coastal zone and the need for data specific to a region it is appropriate to create mechanisms to collect local, state and regional investments that augment the federal expenditures. These investments would be additive and build on a sustained federal system.

   > Action: Federal funding should be used to leverage and incent the investment of state resources in a national ocean observing system.

3. Synthesize data into useful products – Ocean observing and prediction systems should be tasked with generating data and products for the primary purpose of making data products. Coastal managers need synthesized products to make informed decisions. The specific products will vary by region and should be developed in close consultation with the end users. A few examples of these products in the Gulf of Maine region might include:
   - A Harmful Algal Bloom 3-7 day forecast;
   - Improved emergency management flood models showing wave run-up and storm surge predictions;
   - Coastal maps identifying sites most physically suited for net-pen aquaculture; and
   - Larvae and egg-transport maps for priority marine species.

> Action: National legislation that establishes an ocean observing system should authorize annual funding levels that provide significant resources, in a separate line item, for data synthesize and product development. Further, this effort be coupled with other ocean data management programs.

4. Build state capacity – The federal-state partnership that is required to make a national ocean observing system functional and useful will require an ongoing shared investment in building and maintaining local and state user capacity. Examples to achieve this are workshops, training courses, development of software or printed materials, data processing models and hardware, technology transfer and state-level consultations.

> Action: National legislation that establishes an ocean observing system should contain statutory and authorization language that leverages and supports state efforts to use the intended data and products.

V. Concluding remarks – the “three truths”

In my backyard
The indispensable technology
The Price is Right