

South Carolina Department of Natural Resources



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October 21, 2002

Public Comment for the Record
U.S. Commission on Ocean Policy
1120 20th St. NW
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Washington, DC 20036

Dear Admiral Watkins and members of the Commission:

I would like to offer a few comments to the Commission regarding my views on monitoring and protecting the quality of our nation's coastal waters. This issue has been discussed at many of the Commission's regional meetings and is clearly an important concern that requires more effort at both the federal and state level. My comments represent my personal views as a scientist with a very strong interest in this subject rather than a formal statement from our agency.

Long-Term Monitoring Needs and Recommended Approach:

Both the Environmental Protection Agency and the National Oceanic and Atmospheric Administration have implemented numerous monitoring programs over the years designed to collect data on the quality of our nation's estuarine and coastal habitats and conditions of associated biota. Other federal agencies have also conducted similar studies to a lesser extent. I recently had the opportunity to serve on an expert panel convened by the EPA as part of their effort to develop a "State of the Environment Report". This panel reviewed existing databases that provided measures of coastal and freshwater habitat quality. It was clear from our review that there is a serious lack of comprehensive, long-term monitoring programs that can provide consistent data at appropriate spatial scales and temporal frequency. Without these data, it will be difficult for the EPA, or any other agency, to definitively characterize the "state of our nation's coastal waters" or properly evaluate change in coastal condition over time. Among the databases we reviewed, the panel noted that the Environmental Monitoring and Assessment Program (EMAP) provided some of the best data available for estuarine waters; however, even that program is limited to only a few years per region and the data were only good for characterization at a regional scale, which is not how coastal waters are managed.

Regardless of which agency, or combination of agencies, are charged with monitoring our coastal habitats, two things are clear:

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- First, the federal government needs to establish and maintain a long-term, consistent, and comprehensive monitoring effort throughout our nation's estuarine and coastal waters that is designed to adequately evaluate existing conditions and changes that occur over time with respect to current and future anthropogenic threats. Some emphasis should be placed on those water bodies and coastal areas within each region that are most threatened, but the monitoring effort should be spatially extensive enough to provide data for most, if not all, of the estuarine drainage systems in each region, and with enough sites to be useful for management purposes. For some water quality and biological measures, it also should include sufficient temporal sampling frequency to ensure a good understanding of condition during different seasons, or at least critical seasons.

Almost without exception, both the EPA and NOAA have initiated large-scale programs with limited time horizons that ensure failure to adequately evaluate how conditions are changing over long (e.g. decadal) periods. Additionally, with the exception of the new National Coastal Assessment (NCA) program being conducted by the EPA, national monitoring program data are generally only useful at regional scales at best, which is inadequate to assist states in the management of coastal waters. Imagine how ineffective our weather service predictive capabilities would be if monitoring efforts were limited to five-year initiatives with little to no consistency in data collection between initiatives and there were only a few weather stations located in each region collecting the basic data needed. That is how I view our status with respect to federal initiatives on coastal habitat monitoring.

- Second, the above monitoring effort should be planned and conducted as a true cooperative partnership with the states that includes sampling designs that meet both state and federal needs, and incorporates sampling efforts that ensures state participation. Too often, programs have been developed with only limited external input and, in some cases, little to no "buy in" by the state agency(ies) and scientific community. In my opinion, a "top-down" federal monitoring approach that does not involve state management agencies (or appropriate academic / private expertise working for those agencies) is doomed to failure and is probably unaffordable. Neither the states nor the federal agencies alone can afford to conduct adequate monitoring initiatives that are sustainable on a long-term basis. True partnerships and cost-sharing is the only viable solution. States must also have an integral role in the synthesis and interpretation of the data, and development of management policies to address problems identified.

The most successful programs I am aware of have (1) provided significant funding to the states (thereby ensuring "buy-in") to conduct the work, (2) have allowed some flexibility to meet state needs, but (3) have maintained standard requirements for consistency in variables measured, sample collection and analysis protocols, data quality control, and reporting. This ensures the federal government gets data that are useful and consistent throughout a region or the nation and it provides the greatest value to the states. EPA's National Coastal Assessment Program is making a good attempt to do this in estuarine waters, but the program is only tentatively funded through 2004 and it does not include nearshore coastal waters in most states or sampling at sites more than once per year, which many consider to be inadequate for some of the measures collected.

While the EPA does not specifically dictate how or what monitoring the states do, their Clean Water Act Section 106 grants do provide funding to the states, with greater funding going to areas where greatest problems are observed. NOAA has also used this model with respect to much of the fisheries collection data, and some habitat quality monitoring efforts.

The Commission has asked for input on how the federal agencies or coastal management process can be improved. I don't have any specific recommendations regarding how the existing Federal agencies should be restructured, but combining large agencies (or portions of those agencies) into a super-agency for ocean and coastal management is not a good idea in my opinion. The Federal bureaucracy is already too cumbersome. However, I do feel that the agency(ies) charged with regulating coastal habitat protection should be the agency(ies) that conduct or fund the necessary monitoring to determine whether management goals are being achieved. If more than one agency is recommended to be responsible for monitoring the health of our coastal habitats and biotic resources, then it is essential that there be a clear mandate and mechanism to ensure adequate communication and coordination between those agencies and the coastal states. One possible approach is for the Commission to recommend establishment of multi-agency (federal and state) task forces, with adequate representation within each region, that are charged to (1) evaluate existing monitoring programs and (2) provide recommendations either for expansion or continuation of those programs where appropriate, or implementation of new programs that meet the needs I've identified above. In my opinion, separate task forces should be established for estuarine versus coastal and offshore waters, but linkages between any such groups are needed.

Sampling Designs:

There has been considerable debate in the scientific community regarding the best sampling design(s) to monitor coastal habitat quality. These can generally be separated into probability-based versus fixed-station sampling approaches.

- First, there is no “perfect” monitoring scheme. The probability-based versus fixed (index) station sampling designs generally address two distinctly different goals and neither design does a great job at both. The ideal approach in my opinion is a blend of both methods – which is currently being done in South Carolina for many of the water and sediment quality measures.
- The primary goal of a good probability-based sampling design is to sample an unbiased, spatially extensive array of stations representing particular areas of concern (for EMAP it was by region and type of water body such as large estuary, small estuary, etc). If the design is properly used, it can do a good job of providing estimates of the areal extent, or proportion of overall habitat type sampled, that represents a certain condition (e.g. high sediment contaminant levels). Unless the approach includes thorough sampling (sufficient replication of measures at each site), it does not adequately allow the user to make definitive statements about any one site – rather it relies on the collective representation of data collected from many sites representing a particular habitat type as the best estimate of overall condition. This is especially true for the EMAP and NCA approach, which generally have not included repeated sampling at the same locations over time. Therefore, the design is not as well suited as the “fixed station” approach for trend analyses. However, the probability-based approach does allow the user (federal or state management agency)

to evaluate whether the areal extent of a condition is changing over time and where that change is occurring.

A criticism of the EMAP approach is that it was not conducted at a level of spatial intensity that was useful to the states and it only involved sampling each site once (annual assessment only of estuarine condition during summer period). The NCA program (outgrowth of EMAP) attempts to resolve many of the spatial intensity issues by including a larger number of stations within each state. While that may still be too limited in the minds of some, it largely “fixes” the spatial limitation problem in my opinion. Sampling only one time per year is still a problem with respect to characterizing those parameters that are highly variable over time, but the cost of repeatedly sampling a large, spatially extensive array of stations can be prohibitive and is not possible within EPA’s current budget to the best of my understanding. Regardless, more temporal sampling is clearly needed to adequately assess some of the parameters being measured.

- The fixed-station sampling design is better for evaluating long-term trend data at particular sites of concern. It is especially useful if the sampling frequency is sufficient to adequately characterize seasonal variability for those parameters where this is important.

Most often, fixed-station sites are picked in a biased manner to represent a particular region of an estuary or proximity to possible sources of change. Unless the design includes a large spatial array of stations, it does a relatively poor job of evaluating the overall condition of an estuary in an unbiased manner, and in many cases, the stations are not located in areas everyone would agree are the “best” representative sites.

A fixed-station, temporally-intensive sampling program that adequately represents the major gradients of a particular watershed may be a good design for many water quality and related biotic measures that are likely to change considerably during different seasons and years. However, this type of monitoring must continue for long time frames to understand cause and effect relationships and to build predictive models that could ultimately be used to forecast change. It must also be done at an adequate spatial scale to represent the important habitats within a system. Too often, the fixed-station monitoring is done along the main axis of an estuarine water body with insufficient measurements collected in peripheral areas that are often more affected by land use change. Measures of loading (e.g. riverine and atmospheric) also need to be included in the effort to develop predictive capabilities, but these loading data could be provided by agencies that do not have direct responsibility for assessing and managing our estuarine and coastal systems.

In summary, I believe that a combination of both methods should be incorporated into any comprehensive monitoring program supported by the Federal government, and that the large existing programs, such as NCA and the relatively new coastal ocean observing systems, should be expanded and improved, rather than being terminated after only a few years of effort.

Most Important Issues Affecting Coastal Habitats:

In looking over the agendas and comments made at the various Commission meetings, you have repeatedly heard the major concerns related to anthropogenic effects on our natural coastal habitats. The big three “pollution-related” issues, which differ in priority dependent on

the coastal region are: organic and inorganic contaminants, nutrient enrichment, and hypoxia. Other important “non-pollution” concerns include habitat modification, alterations in freshwater flow into our estuaries, and over-harvesting of fishery stocks. While many states and federal agencies are collecting data to evaluate these issues, much work still needs to be done to better define appropriate “thresholds of concern” related to both the environmental (physical, chemical) and biological measures used. Furthermore, these thresholds must be adjusted for natural differences among regions. “One size does not fit all” for many of the water, sediment, and biotic measures collected, and yet some of the federal programs and indicator measures I am familiar with have not adequately accounted for regional differences.

In conclusion, the lack of consistent, long-term monitoring programs that adequately characterize the changing condition of our nation’s estuaries and coastal waters is a serious concern that the Commission should address in its recommendations to the President and Congress. I urge the Commission to make strong recommendations to rectify this problem by expanding and improving existing programs to ensure adequate, long-term collection of environmental and biological data throughout the coastal zone of this nation. These programs should involve real partnerships among the appropriate federal and state agencies with respect to effort, cost-sharing, and implementation of management policies.

Thank you for considering my comments on these subjects.

Sincerely,

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Acting Director
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cc. P. Sandifer, Director, SCDNR

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