SEVERAL THOUGHTS FOR THE OCEAN COMMISSION TO CONSIDER

Prof. Christopher N. K. Mooers
Ocean Prediction Experimental Laboratory (OPEL)
Division of Applied Marine Physics
RSMAS, University of Miami

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1. REGIONALIZATION OF NOAA.

Background. There is a strong regional component to most environmental issues. It is difficult to fully appreciate, let alone address, regional environmental problems from the seat of the central government. This situation has been recognized by various agencies; such as, EPA and NPS. Within NOAA, it has been recognized by only NWS and NMFS. While there is some regional distribution to the OAR laboratories, there is no clear regional mandate for even those laboratories with a regional sounding title. Their work generally consists of an eclectic and opportunistic (and often meritorious) mix of global and local topics, not a long-term investment (and leadership) in regional environmental expertise.

Discussion. Because NOS, NESDIS, and OAR have not followed the regionalization principle, there is poor coordination overall between NOAA "line offices" on the regional scale, which leads to inefficiencies and lost opportunities. Being closer to the working level, it is easier to achieve coordination at the regional level than the national level. As a corollary, NOAA is not positioned to provide a corporate approach to regional environmental awareness and leadership, in neither the operational mode (NOAA's primary mission) nor the research mode (its secondary mission which should support the primary one). Historically, the linkage between NOAA research and operations has been spotty at best, in part because of a lack of staff orientation and also because the management has not had a clear understanding either. All of that confusion probably stems from a lack of a strong, Congressionally-mandated mission statement for NOAA, which should include the regional and regionalization issues, as well as provisions for periodic performance reviews and mission updating.

Recommendation. Without expansion of the bureaucracy, NOAA should regionalize all five "line offices" and integrate them on a regional basis. (Indeed, it should be possible to reduce the size of the overall NOAA staff by eliminating redundancies and irrelevancies. However, a "smart" redesign of the NOAA components would be required.) All elements need not be collocated; i.e., a regional center may be a virtual center. The regions should be Northeast, Southeast and Caribbean, Southwest and Hawaii, Northwest and Alaska, and Midwest and Great Lakes. Of course, regionalization would not obviate the necessity of intra-agency and

inter-agency coordination on policy matters at the national level. In part, a "smart" redesign would consider the relationship between operations and research on the regional scale. It would also address the nightmarish quagmire of inter-agency rivalries that play out on a regional scale, and which must reflect flawed organizational development. Furthermore, it would stress the integrating roles NOAA can play in regional oceanic and atmospheric cognizance, coordination, and assessment that would help shift NOAA away from thinking in terms of performing most research and operations in-house. As a corollary, herein lie many opportunities to take NOAA's tradition of partnerships with academia to a new, higher level.

2. SPONSORSHIP OF REGIONAL R&D PROGRAMS.

Background. Logically, the USA has a need to cultivate environmental knowledge and expertise on a regional and long-term basis, especially in the proximity of the USA. The only USA-sponsored, long-term, regional R&D programs are those for the Arctic and Antarctic supported by the NSF Office of Polar Programs.

Discussion. The USA is impacted by the oceanic, atmospheric, and hydrologic regimes that adjoin it as well as those that are contained within it. There is presently no coordinated, sustained R&D effort on the regional scale to support the evolution of operational environmental information systems. Consequently, the USA is not as well informed as it could and should be of natural and anthropogenic upstream and downstream influences impacting and impacted by, respectively, the environment of the USA *per se.* Perhaps the single greatest failure along these lines was NOAA's massive failure to follow-up on President Reagan's Proclamation for the Exclusive Economic Zone approximately 20 years ago that asserted USA rights to resources in the 200NM EEZ with concomitant responsibility for the associated environmental conditions. An increased NOS effort in seafloor imaging was the only tangible response. As well as NOS, the other line offices still have large, unfulfilled responsibilities in the EEZ, which logically can be best addressed regionally.

Recommendation. NOAA, as the "national environmental information service", is the obvious agency to assume responsibility for managing and funding long-term, regional environmental R&D, as well as operational environmental information systems on the regional scale. Multidisciplinary regional studies should be performed by a combination of multi-agency governmental researchers and extramurally funded academic researchers. Examples of regions in this context are Alaska (including the Gulf of Alaska and the Bering Sea), North Atlantic (including the Gulf of Maine and Gulf Stream), and the Greater Gulf of Mexico (including the Caribbean Sea and the Straits of Florida), a region often referred to as the Intra-Americas Sea.

3. A NATIONAL ASSOCIATION OF COASTAL OCEAN OBSERVING SYSTEM CONSORTIA.

Background. A dozen or so academia-driven coastal ocean observing systems have sprung up around the USA from the "grass roots" level in the past several years. Due to uncertainties in continued funding, it is difficult to retain the engineers and technicians who are vital to the effort, and who have been difficult to recruit and train. This situation serves to identify the fact that the coastal ocean observing systems are operating without a national support system analogous to the one that exists for research vessel operations, called the University National Oceanographic Laboratory System (UNOLS).

Discussion. UNOLS is an association of academic institutions that operate or use research vessels in the so-called academic fleet. It promotes technical and safety standards, coordinates ship schedules, incorporates the needs of chief scientists, fosters the design of replacement vessels, provides for cross-fertilization of technical information between ship operators and marine technicians, and otherwise generally serves as a self-governance mechanism that ensures that the USA academic fleet is the best in the world. It functions as an interface between the sea-going community and the sponsoring agencies (e.g., NSF, ONR, and NOAA). As a corollary, UNOLS promotes the professionalism, morale, and welfare of the sea-going marine technician workforce. The activities of UNOLS, including a UNOLS Office and small staff situated in academia, are supported financially by NSF. In principle, UNOLS could oversee the needs of the coastal ocean observing system community, but it is saturated with addressing the issues associated with the academic fleet.

Recommendation. OCEAN.US should be charged with fostering and supporting an association of academic regional consortia that operate and/or use coastal ocean observing systems. The association would fulfill functions analogous to those that UNOLS does for research vessels. As UNOLS and NSF do with the sea-going marine technicians, funding would be provided to support engineers and technicians associated with coastal ocean observing systems.

4. FURTHER DEVELOPMENT OF THE PARTNERSHIP CONCEPT.

Background. With the inception of NOPP, "partnerships" between academia, governmental agencies, and the private sector were promoted, and even required, for R&D projects sponsored by NOPP. With NOPP's promising beginning, there is room for further development of these partnerships. For example, many fine projects have been funded but there are typical problems with transitioning research results to operations and sustaining support. Also, the human resource implications of the various initiatives in operational oceanography have usually not been explored or addressed.

Discussion. The community associated with coastal ocean observing systems would benefit from consideration of long-term infrastructure needs and developments, value-added industry opportunities and cultivation, and human resource requirements and recruitment strategies, all within the context of a science agenda.

Recommendation. Mechanisms are needed to periodically review the state of the partnership concept and look ahead a decade or so to ensure programs are in place to fulfill the visions and goals. A NAS panel may be required for this purpose.

5. IMPLEMENTATION OF OPERATIONAL COASTAL OCEAN PREDICTION.

Background. The academic R&D community is taking great strides in developing coastal ocean observing systems and associated modeling systems, and, in some cases, even nowcast/forecast systems. Often, there is participation by USN and/or NOAA research and/or operational personnel. There is a general movement within both NOS and NWS toward operational coastal ocean prediction systems: for example, they each have announced the inauguration of one operational coastal ocean prediction system within the past year. (By the way, the R&D forces of academia have not yet been mobilized to assess these pioneering products.) However, a robust architecture for operational coastal ocean prediction does not exist in the civil sector (NOAA). The USN is generally more advanced technologically, yet it is even less clear what its architecture will be.

Discussion. A robust architecture for the implementation of operational coastal ocean prediction would consist of a system design for the phased development of complementary observing and modeling systems, computational and communication facilities, product development, testing and assessment, and staffing.

Recommendation. An implementation plan is needed for operational coastal ocean prediction. It may need to be developed by a NAS panel together with NOAA and USN personnel. Some of it s ingredients would possibly include:

- NOAA and Navy graduate traineeships for American physical and mathematical science students
- links to coastal meteorological and hydrological predictions
- joint efforts between NWS and NOS
- links to FNMOC and NAVO
- the association of regional consortia mentioned in 3. above
- the participation of the value-added private sector.

A facilitating activity is needed to spur technology transfer. For example, a set of multi-year, regional coastal ocean prediction experiments could be organized so as to bring the R&D community together with the operational agencies and, thus, enabling rapid technology transfer.