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Statement of

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on

Addressing Diffuse-Source Pollution of U.S. Coastal Waters

Admiral Watkins and members of the Commission, thank you for the opportunity to provide some perspectives related to our nation's ocean policies. I know many of you well, so I have the utmost confidence that the Commission will do an excellent job in completing its very important mission. Your task is daunting in its scope and complexity, however, and there are many others you need to hear from, so I will try to emphasize some key points succinctly.

I have made available a number of background resource links for you and your staff on my website (<http://www.umces.edu/president/oceancommission.htm>). Many of the points I will make are included in a report my colleagues and I prepared for the Pew Oceans Commission (the first of a series) entitled *Marine Pollution in the United States: Significant Accomplishments, Future Challenges* (<http://www.pewoceans.org/reports/022701report.pdf>).

The nation's efforts over the past 30 years under the Clean Water Act (CWA) and other federal statutes have been successful in reducing water pollution resulting from sewage treatment plants, industrial facilities, ships, and the at-sea dumping of sewage sludge and other wastes. As the U.S. population and economy grew, we were able to offset increases in the volume of wastes through advances in waste treatment technology. Direct discharges into the Southern California Bight, for example, have decreased by 50% in terms of suspended solids and biological oxygen demand and 90% for trace metals. Some persistent, toxic pollutants, such as DDT and PCBs, were banned and others more carefully controlled. Although these toxicants still pose problems due to legacy contamination, their concentrations in the environment are decreasing in many U.S. coastal environments.

On the other hand, pollution from land runoff and the atmosphere went largely unabated during this period; in some cases it has increased. As a result, diffuse (or nonpoint) sources now contribute a larger portion of many pollutants, such as trace metals, than the more thoroughly regulated direct discharges. While provisions in both the CWA and the Coastal Zone Management Act (CZMA) address diffuse sources of pollution, neither law has been very effective in

controlling these sources. **New approaches to reduce diffuse source pollution of our nation's coastal waters must be a key facet of a new U.S. ocean policy.**

While toxic substances, including legacy contamination, remain a concern, overenrichment of coastal ecosystems by nutrients—nitrogen and phosphorus, but particularly nitrogen—has emerged as the most widespread and measurable effect of pollution on living resources and biodiversity in U.S. coastal waters. This was the subject of an excellent National Research Council report, *Clean Coastal Waters: Understanding and Reducing the Effects of Nutrient Pollution* (<http://www.nap.edu/books/0309069483/html/>). Excessive nutrient loading results in what is referred to as *eutrophication*, potentially causing serious depletion of dissolved oxygen supplies needed by marine organisms (or *hypoxia*), loss of seagrass and coral reef habitats, and algal blooms. Of the 138 estuaries and bays included in a NOAA assessment, 64% had moderate to high levels of eutrophication. Fully two-thirds of the surface area of estuaries and bays in the conterminous U.S. suffers one or more symptoms of nutrient overenrichment. Even some large portions of our continental shelf waters are affected. The largest and most notable of these, of course, is the so called “Dead Zone,” an area of seasonal hypoxia on the continental shelf of Louisiana and Texas off the Mississippi River. Hypoxia in bottom waters can extend over an area the size of New Jersey or even Massachusetts.

Not all coastal waters are equally susceptible to nutrient pollution. For example, South Carolina estuaries do not show severe signs of eutrophication because of their large tidal range and flushing. Just up the coast in North Carolina, however, the microtidal estuarine environments of the Pamlico Sound system are very susceptible to eutrophication and receive high nutrient loading from rivers draining regions of intense animal agriculture as well as atmospheric fallout of ammonia. Research has, however, shown that diffuse sources of pollution are important even in South Carolina waters, where they are greatly affected by changes in surface water runoff due to development.

Although coastal environmental and resource managers must struggle with an array of problems that include habitat loss and modification, the effects of overfishing, invasive species, and, on the horizon, climate change, nutrient pollution is seen as the most serious and pervasive problem in many regions, both at present and into the future. Major management efforts are under way, not only in the U.S. but also in Europe and Japan, to reduce nutrient loading in order to rehabilitate and protect sensitive ecosystems. Tomorrow, you will hear about the Chesapeake Bay Program, in which significant reduction of nutrient loading is the central goal. Last year, nine states and eight federal agencies agreed to a goal for reduction of the Gulf of Mexico hypoxic zone that would require reduction in nitrogen loading by 30%.

These and other efforts require reduction of diffuse sources that originate far beyond the typical domain of ocean and coastal management—for the Chesapeake in the upper reaches of the Susquehanna in New York State, the Midwestern Corn Belt 1000 miles up the Mississippi River, and power plant emissions that originate outside of the coastal watersheds. Multiple sources from agriculture, stationary and mobile combustion emissions, waste treatment facilities, and urban runoff must be addressed. **Thus, our national ocean policy in the 21st century must reach out and influence national agricultural policy, energy policy, transportation policy and land use policy.**

A current example of how ocean environmental quality should be taken into account in these seemingly separate and unrelated policies is the current debate in Congress on the Farm Bill. Decisions will be made on how tens of billions of dollars of agricultural subsidies will be applied, including how much will be allocated to land and water conservation measures. This presents a major opportunity to use this tremendous leverage to achieve a public benefit—improved coastal environmental quality—in a way that also sustains economically viable agriculture. The University of Maryland recently convened a Common Ground Summit involving leading agricultural and marine scientists from across the nation, which concluded that with appropriate public investments these mutual goals are technically achievable. National policies that promote such win-win solutions are also required for truly integrated management within the coastal zone. For example, properly designed diversions of Mississippi River water into rapidly deteriorating wetlands in Louisiana could rebuild marshes and at the same time reduce nutrient loading to the Gulf.

Other speakers today will document the many consequences of rapid development of the coastal zone, particularly in the Southeast. I will only say that land development, particularly the proliferation of impervious surfaces on the landscape, and associated increased vehicular transportation are major factors driving increases in diffuse source pollutants, both toxicants and nutrients. Unconstrained growth will undo the gains made in reducing point source and agricultural diffuse source loadings of pollutants.

In the urban-suburban core stretching from Baltimore through Washington and Richmond onto Hampton Roads the rate of land conversion to development has been nearly three times greater than the population growth. This is unsustainable for numerous environmental and socio-economic reasons, including pollution of Chesapeake Bay waters. Clearly, we need to accommodate population growth and economic development in a much smarter way. Well-publicized efforts are under way in Maryland and elsewhere in the region to reduce harmful sprawl development. Although land use policy is generally regarded as the responsibility of local and state governments, there clearly is a national interest here. Many existing federal policies, including transportation funding and flood insurance, for example, can be adjusted to promote smarter growth in the coastal zone.

As a scientist actively engaged in coastal environmental management, I must point out to you that in contrast to the national importance of diffuse-source pollution and of eutrophication, in particular, and to the scale of public and private expenditures that are being made and will be made to correct these problems, the nation's investment in the science needed to guide these efforts is extremely paltry. At best, we have a patchwork of programs divided among different bays, sources, environmental media, and agencies that presents an obstacle to success and to achieving national efficiency. There is a modest interagency program on harmful algal programs, but no coordinated national science and technology program on abatement of eutrophication of coastal waters. **The U.S. needs a coordinated, strategic research program on diffuse source pollution, and nutrients in particular, that spans air, land and water; focuses on effective solutions; and predicts and observes outcomes. This should be integrated with greatly expanded research and development programs that address coastal ecosystem management from a national perspective.** Unfortunately, because of budgetary pressures, political parochialism and ineffective interagency coordination we seem to be ever retreating from rather than advancing on meeting this need.

Finally, I want to point out that because of the complex environmental processes influencing eutrophication, the high variability of its symptoms and the practical need to forecast and monitor outcomes, there is compelling value of coastal observation and prediction systems in our efforts to reduce nutrient pollution. **This is an important reason for implementing a sustained, integrated ocean observing system for the United States that includes a network of coastal subsystems.** Imagine having a nexus of continuous environmental sensors of the kind that Harvey Seim will speak about tomorrow that are associated the oil and gas platforms in the northern Gulf of Mexico and assists energy extraction operations, enables more effective forecasting of storm hazards, empowers fishery management, and keeps track of the dynamics of the Dead Zone. The universities and research institutions of the Southeast, united through the Southeastern University Research Association (SURA), are working to make that happen consistent with the efforts of the Consortium for Ocean Research and Education (CORE) and the national ocean science community, federal agencies and Ocean.US, and the private sector. I sincerely hope that the recommendations of the U.S. Commission on Ocean Policy help to make a powerful and effective national ocean observing system a reality.