

## COASTAL AND ESTUARINE PROBLEMS

By DR. JAMES A. TIMMERMAN, JR.  
*Charleston, South Carolina*

Being associated with MARINE RESOURCES in the State of South Carolina, I am here this morning to put a little salt in your program.

Perhaps the first thing that I need to do is give a general definition of an estuary and the coastal zone area. Many versions of an estuary have been published but the one given by Pritchard (1967) appeals to me, "An estuary is a semi-enclosed coastal body of water which has a free connection with the open sea and within which sea water is measurably diluted with fresh water derived from land drainage." The Coastal Zone has been defined as "a strip of geography where the land meets the ocean." It has also been defined by land-oriented individuals as "the location where the people meet the ocean." In any case, "it is where the action is." It is where extremists of the economic development movement meet extremists of the preservationist movement and get involved in a fight that I hope neither side wins. Most people already have an understanding of both the quality and quantity of activities which occur in the coastal zone. However, very few appreciate the tremendous complexity and significance of the potentials and challenges which are present in the coastal zone. The principle issue permeating the coastal zone problem is to provide for many diverse and conflicting demands, both public and private and still obtain the greatest long-term social and economic benefit.

In discussing Coastal and Estuarine Problems, I am going to concentrate on the Coastal State of South Carolina, but these problems would apply to most any Coastal State in the nation. Although we have a great marine resources potential in South Carolina, many demands are now being made upon our waters, marshlands, and open seas. We must have the proper research and management to insure the continued protecting of our estuarine areas.

Other regions of the Atlantic and Pacific coast have grown fat with prosperity but are in danger of dying slow and painful deaths from the poisons they have spewed into their air and flushed into their waters. Is it now possible for preciously poor regions to enjoy unpoisoned properties? The South Carolina Marine Resources Divisions plan to exploit this to the fullest.

Much of the coastal zone of South Carolina has not yet been properly planned for multiple-use development. The need for systematic intra-agency planning is most obvious in the coastal zone. The economic conflicts are intense: the social and political considerations are complex; and pollutants do not observe state boundaries. Competition for these resources will grow more intense, and many decisions once carried out, can never be undone.

Our role in the overall conservation of marine resources will be the expansion of capabilities for ecological evaluations of coastal construction projects. The conservation of our estuarine areas embraces two basic ideas which have direct bearing on the present and future economic benefits derived from these areas. In "conservation," maintenance and utilization are in fact not mutually exclusive. Again, the term "estuarine area" means an environmental system consisting of an estuary and those transitional areas which are constantly influenced or affected by water from an estuary such as but not limited to salt marshes, coastal and intertidal areas, sounds, bays, embayments, harbors, lagoons, in-shore waters and channels.

Recently, South Carolina's coastal zone area has been the focal point for many diversified opinions and appraisals. These appraisals have varied in the degree to which they take awareness of the biological, economic and political facts of life. On one extreme, misinformed enthusiasts describe an overflow of plenty and miscalculate the available estuarine

resources by immense proportions. At the other end, pessimists see less potential than we are currently utilizing. Consequently, the two extremes do not represent the actual magnitude of worth which would be presented as a median. Perhaps, the most effective method of assessing the present and potential economic benefits of our estuarine areas would be to take a casual look into just a few of the features of this complex zone. Our purpose will be three fold: (1) to obtain some idea of how much the estuarine areas can contribute to the economic well being of South Carolina; (2) to provide a very rough basis for comparing the anticipated economic results from the conservation of these areas; and (3) to comment on the various activities of the office of Marine Conservation, Management and Service which are vital in the future utilization of our marine resources.

There are many sources of figures relating to the value of fish life in our estuaries. The important thing to remember is that annual harvests of renewable natural resources can be perpetual; thus serving thousands of generations of Americans, providing we conserve them properly, whereas economic areas that degrade, spoil, and reduce estuaries and estuarine zones are transitory, perhaps serving only two or three generations at best. It therefore seems pertinent to consider in which circumstances the broad public interest will be served best. Eighty (80%) percent of the people of the United States live within a 50-mile range of the ocean and the Great Lakes. By the turn of the century, try to visualize the tremendous pressures that will be placed on the estuarine areas.

Dr. Eugene P. Odum, ecologist, University of Georgia has stated that estuaries rank among the most naturally fertile areas in the world and estimated that some Georgia marshes and estuaries taken together had a gross primary production of about 2500 grams of dry matter per square meter per year. This would compare to the world's average net production of wheat at 340 grams /M<sup>2</sup>/ year.

Consider also that approximately 98 per cent of commercial and sport fish and fisheries in South Carolina are dependent on the estuarine areas at one time or another in their life span. Among the more prominent features of these estuaries are the varieties of fish and shellfish which contribute directly to the state's economy through seafood production. A total of nine species of marine fish and shellfish are annually harvested in excess of 100 thousand pounds and four are consistently taken in quantities exceeding a million pounds per year. These seafood resources are dispersed in such a way as to provide an immediate source of livelihood in ten coastal counties in South Carolina. Commercial fishing occupies a much broader niche in South Carolina's economy when considering the many ramifications which stem from the industry. There are some 1,027 commercial fishing vessels and boats currently registered at home ports. Newer and larger vessels are now being constructed to facilitate future demands of the fishing industry. South Carolina's estuarine areas must also be credited with providing an abundance of the resources harvested in the neighboring South Atlantic states. Research has indicated that more post-larval menhaden per unit of water area are found here than elsewhere along the entire Atlantic coast. The menhaden industry is one of the most valuable marine resource found in many of the Atlantic and Gulf coasts states. The production of fish for sports and recreation in this state is just dependent upon the estuarine areas. The economic benefits derived from the sports fishing industry are perhaps greater than those commercial values assigned. There are many other economic benefits of the estuarine based resource. However, it is difficult, if not impossible, to interpret the total value in dollars. On the basis of the 1965 National Survey of Fishing and Hunting, \$80,485,000 was spent by hunters and fishermen in South Carolina. Biologists from Alabama have assigned a conservative value of \$200 per acre to estuarine areas per year in their state. Applying this to South Carolina, the total 516,000 acres of tidelands would be valued over \$100

million per year on an accumulative basis. The estuarine areas are worth more however, than just dollars. Scientists have utilized information on estuaries and their resources in conjunction with environmental factors to forecast future abundance by species. When these factors become more thoroughly understood, it should become possible to make reliably accurate long-range predictions of weather, climate, oceanographic changes, marine species changes and distribution. Students as well as professional workers also find a valuable source of data from the estuaries.

Activities in our division are directed towards the successful development, management and regulation of estuaries in South Carolina. These activities are consistent with the ecological and economic principles by which such systems operate with and without man. From this work, the state receives the yield of aesthetic, recreational, restoration, seafoods, services in processing wastes and many other profits from the estuarine areas and their components. During the past year tremendous progress has been accomplished towards setting an effective program of multi-purpose usage in motion. Coastal alteration projects are now being systematically reviewed with suggestions being made for a minimum of damage to the estuarine areas. The division, with good success, has been able to successfully cooperate with the various coastal developers in formulating revised plans of action. Plans have been separated into users and uses so that incompatibility is held at a minimum.

Even though progress has been made toward multi-purpose usages of the Coastal Zone in most coastal states, a coastal zone Management, Research, and Development Plan must be enacted and implemented by the Federal Government as well as each Coastal State. I am talking about a plan that covers a broad range of coastal and oceanic concerns. I am talking about a plan that would fight marine pollution. A plan that would apply new applications to marine science. I am talking about a plan that would help develop new growth in clean industry, in colleges and universities, in fisheries and in marine resources management.

The "hang-up" comes with the details of planning a good coastal zone management program. For instance, who does it, the Federal Government or the State? I believe that the Federal Government should provide the necessary funds and the State and Local Government should have the responsibility of implementing such a program. On September 30th I attended the Coastal States Organization meeting in Washington as a delegate from South Carolina. At this meeting we were happy to learn from our own U. S. State Senator Fritz Hollings of South Carolina that his Coastal Zone Management Bill (S-582) had gotten out of committee. This bill deals strictly with coastal and estuarine zones. If enacted and fully funded, the Secretary of Commerce (presumably NOAA) can pay up to two thirds the cost of administering a coastal and estuarine management plan with a possible expenditure up to \$50,000,000 per year. I am optimistic that the Federal Government will pass a Coastal Zone or Land-Use Bill by 1973 and that South Carolina will also pass a Coastal Zone Bill during the next legislative session. I also believe that the Federal Government will set up funds on a matching basis for the establishment and operation of a number of Coastal Zone Laboratories in the United States. South Carolina is establishing a Marine Research Center at Fort Johnson here in Charleston. This Center has been designated as The South Carolina Coastal Zone Laboratory for Marine Research and is being designed to execute a total conservation, management and research program.

To manage our marine resources wisely, the State of South Carolina, like any other coastal state, needs a Marine Resources Management, Research and Development Program. Of the State Agencies engaged in Marine Resources Research and Development in South Carolina, the South Carolina Wildlife Resources Department has assumed the major role in expansion of the State's Marine Resources Programs. A Division of Marine Resources was organized under the South Carolina Wildlife

Department. This division consist of an administrative office, an office of Conservation, Management and Services, and an office of Marine Research Laboratory and Education Programs. We now have under construction the first phase of our building program which consist of an administration building, an energy supply building, a laboratory building, a large boat slip, and a maintenance building. These facilities should be completed within about four months.

The Center is located at Fort Johnson which is in a southeast direction across the harbor from the peninsula of the city. While you are visiting with us in Charleston, we would like for you to see the progress we are making. Please contact Chief Howell or someone in the department so we can arrange transportation for you and show you our facility.

*By* DR. A. HEATON UNDERHILL

It's a pleasure for me to be here today. I had a prepared talk and last night I decided that isn't what I wanted to say, so I tore it up and got it down in notes, so I am going to talk off the cuff this morning.

I'd like to take issue with one point that the Mayor made when he said that the group here was primarily interested in fish and wildlife. I think that is only partially true, I think this group here is primarily interested in people and in people's relationship with fish and wildlife. I've got a tough act to follow—Governor West, I think, set the theme and said many of the things I wanted to say. I couldn't help but be tremendously impressed with his knowledge of the problems of environmental management and conservation and I couldn't help but feel how fortunate we are that the new breed of politicians, of public servants, have been so mindful of the importance of our resources and of man's relationship to them.

Secretary Reed and Dr. Timmerman have touched on many of the destructive forces that are within the scope of the subject that I have been asked to speak on and certainly there is no question that man does destroy natural areas. Almost everything he does modifies the environment. But in a sense, he must do this or how else is he going to support the increasing population in this country, and in the world as far as that goes. For the record, it has been estimated that approximately 420,000 acres a year go into urban expansion. Approximately 160,000 acres a year go into airports and highways and somewhere in the neighborhood of 400,000 acres a year go into reservoirs and various flood control structures. So that we have somewhere in the neighborhood of one million acres a year that you might say are being destroyed or removed from most wildlife products. Of course urbanization is continuing in this country, with over 70% of our population living on 3% of the land. This pressure has resulted in tremendous pollution loads and a disproportionate pressure on open space and various types of environmental habitat. History is replete with examples of civilizations which have risen, have exploited unwisely their resources and which have been destroyed. Part of this was moral decline, a lack of drive, a freak or fat fighter who has become soft and is overrun by a hungry fighter. But part of it also was misuse of the resources and destruction of the habitat on which man depended. I can't help but point out, however, that Man has the ability to resurrect even these habitats. I cite for you the example of Israel on the shores of the Mediterranean which developed a viable nation on land which was supposedly exhausted and yet by utilization of his mind, man has been able to do something about it. We're finding now, too, that we can do something about it in this country.

Previous speakers have discussed our increased public awareness of the importance of environmental quality, of ecology, and of our relationships with our environment. This awareness has resulted in a number of actions, environmental quality councils, environmental quality legislation, the requirements for environmental impact statements, and