

## Environmental Considerations in Coastal Zone Management

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I am grateful for the opportunity to speak to the members of this Institute, and I regret that I cannot speak to you in the language of those who are our hosts. The barriers of language may, however, be far more easily bridged than are the barriers which separate those of us who view the living world as an intricate structure, a network whose parts can be damaged or deformed, and those who view it as indestructible and existing only for man's exploitation.

During the 1960s many young people in my country suddenly became aware of their physical environment; the word "ecology" became a part of their lives as if it were a new semantic invention. Amusing as it may seem today, that period resulted in a shift of interest that brought many talented young scholars into the biological sciences and related fields. We are the better for their discovery. Those scientists who knew the early ecologists – Allee, Cowle, the Leopolds and their associates – were not surprised at the interest of these new recruits. But the depth and breadth of this important discipline prompted one of its authors to call ecology the "subversive science" because of its broad ramifications.

There were some drawbacks, however, for as this unfamiliar science became more technical, the ordinary citizen found it more difficult to understand. But coming as it did on the heels of the nuclear discoveries, the jargon of science spread into common speech and all of the sciences gained. Ecology, even in its more technical aspects, emerged from the treatises and began to be understood as the study of living processes.

Probing those processes was a difficult task for the citizen, but students and scholars lent their efforts, coalitions were formed to challenged injudicious actions, and review committees aided the environmental spokesmen in the public arena. Scientists spent much time explaining the processes to those who sought political changes with the result that a host of measures were adopted which at least delayed some unwise operations.

Not all of the results of this coalition were happy, but as confidence grew on both sides, the layman became less the novice and the older scientists, retiring from onerous assignments, made public education a second profession. Today there is no shortage of scholars who are willing to guide and support the conscientious "citizen-environmentalist" who is willing to study before taking positions on environmental issues.

Among the disciplines represented in this gathering today, I assume that ichthyology is the most common, but judging from similar gatherings I am certain also that there are many who have other specialities. They reinforce our growing conviction that, as the naturalists claimed, every particle of the universe is hitched to every other particle. But I shall speak only of the ecology of the seashore and of the citizens' need for your help if we are to encourage wise legislation, if we are to adopt fair procedures, and tolerable international agreements.

It is not enough to note with regret the loss of the coastal dunes, hammocks, wetlands, and the animal and plant life that inhabited them. Eagles, sandhill cranes, red cockaded woodpeckers, and sea turtles were common when I first lived on the Gulf Coast. Not even the orchid bogs, the carnivorous plant swamps, and the *Ilex* marshes that were transformed to golf courses and camp grounds are the heart of the problem, much as we regret their loss. These losses may be unimportant to many citizens; the effect of the transformations upon the fisheries, however, is basic to the business of this conference.

The productivity of that small sea, on whose northern shore I live and on whose southwestern shore we meet today, is the focus of our concern. It is here that the concerned citizen needs your help if she is to act effectively in supporting coastal zone legislation, wetland protection, and acceptable river and harbor development. If we are convinced that the productivity we seek is dependent in large part upon the estuaries and the wetlands that feed the diverse biota, we will realize that we need much more explicit public education in support of shoreline preservation than we now have. Most of the people we meet on the coast look upon the sea as a prolific, indestructible, bottomless well where all who choose to do so may gather rich harvest. Many are certain that the treasures are inexhaustible. Only public education, *at all levels* including adult education, can disabuse us of these notions.

There are some innovative projects that are responding to this need. In one coastal village where a number of retired college professors now live, an institute offers classes to people 50 years of age. No credits are given; the assignments are difficult. Of the dozen or more courses offered, only the one describing the environments of the shoreline is oversubscribed. The students are mature, eager, well-educated, and determined to continue their efforts to understand their new environment. Buried in the proceedings of conferences such as this are documents needed by people seeking environmental education. Even judicious press releases would provide students and teachers with clues to local problems and possible solutions. Such releases are far too few, often poorly prepared, and likely to present only one viewpoint.

You, who are professional people, scientists, and administrators in a variety of disciplines all dealing with the sea, are not likely to have preconceptions that result in foolish and ill-conceived laws and regulations. Laws, however, are written largely by those who deal with the land. Agencies are created on land, often by those who have little acquaintance with the sea. They need technical advisors to help them understand the basic ecological principle, that all animal life ultimately depends upon the ability of plants to transform water, minerals, and gases into organic food through the energy of sunlight. They need specific knowledge of the way this life sustaining process operates effectively in the area where rivers meet the sea, where salt and fresh waters interplay, and diverse species are abundant. Such education cannot be limited to those who will become scientists, fishery specialists, or fishermen. It needs to become part of the education of those who will one day till the soil, cut the forests, or build shoreline structures. Perhaps the uninformed will even learn not to abandon wastes in the rivers and lakes where it has traditionally been dumped. Lastly, the citizen-educator needs to be prepared to promote and to support legislation that

will protect the intricate ecosystem of the sea itself. Legislation that will encourage such orderly harvest of the ocean resources, that no stocks are reduced beyond recovery, or wasted because of unreasonable prejudice or injudicious practices. Admitted, these are difficult tasks; few volunteers are willing to make such efforts and obligate themselves to the required discipline. Yet how, otherwise, can reasonable programs be adopted or universal policies and prejudices be changed?

The law of the sea which aroused such hopes of rational and humane decisions, when first proposed, now seems to have fallen on difficult days, although within this month a new ambassador to that effort has been named. The 200-mile limit seems to develop a life of its own, whose opportunities and restraints are difficult to assess. Marine sanctuaries, an appealing concept, has yet to be tried to its full capabilities. Mineral recovery will surely increase, in the case of oil, with significant effects both on and offshore. Solid minerals recovery still awaits decisions at the highest levels. Environmental concern is growing as the critical decisions come closer, but the focus of that concern remains. It involves protection of the narrow fringe of shoreline – the dunes, wetlands, bays, marshes, and estuaries where land and sea meet and mix.

It is fortunate that the troubador efforts of the 1960s' environmental movement have given way to more sophisticated efforts; however, with the plethora of laws, resolutions, agencies, and "understandings" even the alert, committed citizen must thread a winding course. For those who are not acquainted with United States environmental laws, I ask indulgence to name some cabinet-level agencies that are involved in decisions affecting fisheries production and regulation. The alert citizen must know those agencies, must know the law, the legal interpretation, and the required procedure if public representation is to be effective. The Department of Commerce manages the marine fisheries and related programs. Upstream the freshwater sports fisheries are the concern of the Department of the Interior. The Department of Defense, through the Corps of Engineers, manages permits to change the wetlands including swamps, marshes, and bogs, and assesses permit applications from those who seek to develop or change the way wetlands function. The Coast Guard also has some responsibility in navigable streams and estuaries. The Environmental Protection Agency, an independent agency, maintains jurisdiction over water and air pollution control, unless the states prove ability to manage their wastes. EPA supervises ocean dumping of hazardous wastes. Farm and forest practices, such as pesticide use and clear cutting as well as many other environment-related processes affecting fisheries, are under jurisdiction of the Department of Agriculture. These are but samples of the maze of agencies and actions with which environmentalists must learn to deal.

Regarding the problems and decisions of coastal waters, the credible witness has, it seems to me, three commitments: (1) to be willing to devote a great deal of time to study, to investigations on site, and to research; (2) to be willing to listen to those who oppose the environmental position, since compromises are certain to be required, the most acceptable compromise surely is one that has been developed by both sides; (3) to be willing to participate in full-scale public education regarding ecological principles – i.e., that the source of all animal

food depends upon plant growth, where the basic chemical building blocks are combined by the sun's energy.

Despite the discouraging aspects of these tasks, many capable citizens continue to work for better laws, for more citizen awareness, and participation in decisions. Unfortunately, few have the technical qualifications or the time to do the necessary research. Many who do have technical background find the expense of public participation far too great to pursue for an extended period. A year or two of participation often is all a family can afford unless it has independent income. For those who hold jobs, the embarrassment to the employer, if public involvement in controversy is frequent, often threatens that employment. Nevertheless, the committed citizen accepts the fundamental position of ecology – that all parts are related to the whole, that each is affected by the other parts. They share, to large extent the conviction that, as one proponent has put it – the fundamental principle “must be the protection of the source; the seed, the food species, the soil, the breeding stock, the memories, the records.” Without this commitment, to protection of natural systems with their cautious augmentation by agriculture and mariculture, we fear there may be scant hope of sustaining humankind.