The Economic Benefits of Coastal Zone Management an Overview

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A Report by
Research Division The Urban Land Institute

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I. INTRODUCTION

Public attention to coastal zone management issues has focused mainly on the preservation of the coastal environment, access to recreational areas and other quality of life issues. The economic dimensions of coastal zone management programs are less well understood or entirely overlooked, yet clearly both the potential benefits and the costs of such programs should be carefully considered in the program development process. The purpose of this report is to increase awareness of the types of economic benefits that can be gained through the use of good management techniques in coastal areas.

The Coastal Zone Management Act of 1972 states that it is national policy "to preserve, protect, develop and where possible to restore or enhance the resources of the nation's coastal zone for this and succeeding generations."[1/] Further, the Act requires States receiving assistance under the Act to give "full consideration to ecological, cultural, historic and esthetic values as well as to needs for economic development."[2/] The wording of the Act thus provides great flexibility in approaching coastal zone economic issues in the context of other public objectives and standards. Many States will take advantage of this flexibility by including in their coastal management programs provisions to improve the economic welfare of their citizens.

In order to illustrate the options which states and localities may have in respect to the latter point, the Urban Land Institute, at the request of the Administrator of the Federal Coastal Zone Management

Program, has undertaken a brief review of the potential economic benefits of coastal zone management. Readers should note that this is a report on the potential benefits of management and not a comprehensive analysis of both costs and benefits associated with the particulars of any one program. This review has been undertaken at this time because of the increasing interest in the economic impacts of coastal zone management, especially in California where the proposed state coastal zone plan is now under review.

While it is hoped that the general information provided here will be helpful and stimulating to public decision makers, planners and citizens in the formulation of objectives and evaluation of benefits for coastal zone management programs, so-called "bottom-line" judgments regarding the desirability of particular plans can only be made in the context of complete information on local conditions.

Moreover, it must be noted that there are no "universal" benefits or costs related to coastal zone management. Neither is it certain that all management programs will result in net positive impacts. On balance, however, it seems conceptually possible in most cases to use management techniques to generate more benefits than costs, but the extent to which that objective is realized will depend on the good judgment exercised in program development and implementation. Both benefits and costs are highly variable and only a systematic, complete analysis of conservation and development options will ensure a net benefit result. The following summary assessment of potential benefits is presented as an aide to such analytical efforts.

II. NATURAL RESOURCE VALUE PROTECTION, ENHANCEMENT, AND RESTORATION

Preservation and enhancement of natural resources within the coastal zone can generate a wide range of economic benefits to the 30 coastal states and 3 territories and to the total economy of the nation. A principal benefit of a coastal zone management program is the opportunity it provides the states to institute an efficient system's management program for the use of natural resources within the coastal zone. A management program facilitates application of an important ecological principal: an ecological system is comprised of many components, no one of which can be dealt with without implications to the total system since no one part functions independently. By including a full assessment of the total ecological system, coastal zone management programs can be designed to maximize the economic and social benefits represented in the natural resource element.

Economic returns from proper management programs can be recognized in the value of commercial and sport fisheries, and the recreation/ tourism industry; additional economic benefits can be realized from more efficient mineral extraction, fresh water mining, waste treatment absorption, and agricultural production.

Fisheries

The most easily quantifiable economic benefit associated with the natural resource element in the coastal zone is the production of commercial and sport fisheries.

Some 70 percent or more of Atlantic and Gulf Coast species of fish are dependent on coastal areas, such as the estuarine zone. In some

specific locations between 90 and 97 percent of locally valuable fish species are dependent on the coastal zone during one or more critical stages of life.[3/]

The value of the commercial harvest is variously estimated but generally figured at $900 million (1973 dollars).[4/] This is projected to increase to between 2 and 4 billion by the year 2000.[5/] Considering the U.S. move toward a 200 mile fisheries zone, these projections could well be exceeded. In addition to the dockside value, the economic worth of nearly 500,000 man-years of employment (1973) and the value added in processing, distribution, and marketing must be factored to calculate the full economic benefit of the commercial fishery.[6/] Some researchers place the total worth of commercial fisheries at $6.7 billion annually (1973 dollars).[7/]

The coastal fishery is a dominant economic influence in several coastal regions such as the Gulf Coast and sections of the Pacific Northwest, Northeast, and Atlantic states areas. In these regions commercial fishing is rated among the top five commercial activities.

The maintenance of a healthy, productive habitat is critical to the fisheries industry. Loss of important breeding, feeding, and protective areas, such as tidal wetlands, will destroy the majority of commercially valuable fish species faster and more irrevocably than intense competitive harvesting from foreign vessels. The decline of many important fisheries follows a parallel decline in the quantity and quality of specie-related coastal areas. An important benefit of planning in the coastal zone will be the maintenance and, where feasible,

the restoration of these fragile areas and, hence, the fisheries they support.

The sport fishing industry is closely related to commercial fishing in this regard. The majority of preferred species is coastal dependent and vulnerable to the near-shore or on-shore activities of man. It is estimated that sport fishing in the coastal zone stimulates (approximately) $5 billion in economic activity annually, and this is expected to increase substantially as more Americans seek water-based recreation.[8/]

Recreation

Sport fishing is but one form of recreation familiar to the coastal zone: swimming (the most popular water sport); boating (expected to account for $1 billion in coastal business in 1975), waterfowl hunting, camping, and leisure driving are other important activities. The total economic value of all these activities is variously estimated to be around $5.5 billion in 1975[9/] and expected to increase to $8 billion by 1985.[10/]

In many coastal regions, recreation and tourism are the most important industries. For example, it is estimated that these activities contribute at least $2.5 billion annually to the California economy and provide for over 280,000 jobs.[11/] By comparison, recreation and tourism, is the largest industry in the coastal region of New Jersey, generating approximately $3 billion annually in goods and services.[12/] This can only be expected to continue (and increase in many areas) given consumer trends toward water-based leisure.

Two major constraints on the recreational benefits of the coastal zone are public access to the shore and availability of recreational support facilities.

A major potential benefit of planning in the coastal zone, in terms of maximizing economic benefits of recreation, will be the further resolution of public versus private access issues. Likewise, the systematic provision of desired levels of recreational support facilities planned for in harmony with natural resource constraints is a potential benefit of coastal zone management.

Mineral Extraction

Of the mineral extraction industries in the coastal zone, oil and gas are by far the most important, constituting 90 percent of the total mineral extraction value.

A recent study of the oil and gas resources in the coastal zone estimated that between 10 and 48 billion barrels of oil and 33 to 191 trillion cubic feet of gas exist at off-shore locations.[13] According to estimates by Robert R. Nathan Associates, the value of offshore oil and gas production was $3.2 billion in 1973 and based on projections of future output, the production value will increase to $15.4 billion in 1985 and $18.8 billion by the year 2000. Cumulative production from 1973 to 2000 would amount to nearly $400 billion in 1973 dollars. These figures are subject to frequent changes given the nature of the market, however, it is unlikely that values will decrease given increasing demand and the unlikelihood of significant development of alternatives to oil and gas within principal markets.

So too, further extraction of minerals, such as magnesium and manganese modules, may be considered as alternative sources of supply dwindle. The potential adverse impacts on marine ecosystems or mineral extraction, however, places significant constraints on development of this industry. In the case of oil and natural gas production, overriding national concerns for development of domestic supplies could be a dominant influence in resource allocation decisions.

Waste Treatment

Further use of the coastal zone as a repository of municipal and industrial effluent is likely to be tightly controlled. The economic value of an acre of salt march in tertiary treatment is estimated to be $2,500.[15/] However, the ability of these areas to assimilate waste is decreasing in many areas because of overload. Hence, rather than contributing an absolute value, the presence of effluent in the coastal zone is regarded as causing a net loss in rent dollars when the negative impact on biomass productivity is considered. Some rent value can be realized, however, through proper measurement of absorption capacities and control of effluent levels.

Aquaculture

The aquaculture resources of the coastal zone that are of current economic significance are the giant kelp located along the Southern California Coast, and Irish moss, found mostly along the New England Coast. California Kelp has been harvested since 1910 and is used, in processed form (algin), by such industries as pharmaceuticals, textiles,

dairy products, adhesives, paper, and rubber. Kelp is also used as a blend in certain animal feeds. As an infant industry, the kelp harvest was valued at approximately $1 million in 1970. Added to that was the processed value of agar, algin, carrageenin and animal feeds worth nearly $28 million (1970). Considerable research is currently investigating other potential uses of these botantical resources and there is considerable potential for growth in harvesting activity.[16/]

Also of increasing importance is the "farming" of oysters, clams, and shrimp. These industries are expected to contribute an increasing percentage of the total harvest as technology develops. The decline of natural productivity, due to pollution and loss of habitat, is generating interest in the further development of these industries.

Summary

In sum, the level of economic activity, or output, represented by development of U.S. controlled ocean resources is roughly estimated at $23 to $26 billion (1973 dollars) for 1985 and $33 to $44 billion (1973 dollars) for the year 2000.[17/] Because many of the demands for coastal resources are competing demands for scarce non-priced and non-replaceable resources, however, the maximum net benefits can only be achieved through careful planning and regulation.

III. AGRICULTURE IN THE COASTAL ZONE

Agriculture is an important commercial activity in many coastal zone regions.

In California, for example, it is estimated that 3.5 million acres of agricultural land are located within the coastal counties. These acres provide for 350,000 jobs (within five miles of the coast) and the value of the 24 principal crops is placed at nearly $500 million (1969 dollars).[18/] The coast provides ideal soil and climate conditions for a number of specialty crops such as avocados, artichokes, cranberries, blueberries, and seed flowers.

The expansion of urban areas within the coastal zone has resulted in the loss of thousands of acres of prime agricultural land. California, has lost an estimated one out of 12 acres of cropland in the coastal zone in the 1960's.[19/] Concern over the disappearance of productive lands has spurred several coastal states to legislate programs designed to preserve farmland.

Actions to support coastal-dependent agriculture may be compatible with other natural resource maintenance goals of coastal zone management. Importantly, coastal zone management provides an opportunity for multi-jurisdictional consideration. The experience of many decades demonstrates that local governments have been relatively ineffective in preserving farmland for the benefit of the population as a whole. As described in the California Coastal Plan,[20/] "Retention of agricultural land, whether for specialty crops or less intensive grazing, not only helps provide

food but can also guide urban growth, reduce public expenditures for urban growth, reduce public expenditures for urban service extensions, preserve open space and wildlife habitats, provide beneficial use of land that is hazardous or inappropriate for other types of development, and maintain future land use options, such as conversion of grazing lands to more intensive crops."

IV. NATURAL HAZARDS AND THEIR MITIGATION

Coastal zones are particularly hazardous areas subject to damage from a variety of natural phenomena such as flooding, (including flooding induced by hurricanes) subsidence, erosion, land slides, earthquakes, tsunami, salt water encroachment, pollution of substraction and high levels of soil and atmospheric salinity. Damages and related economic costs include loss of life; rescue, emergency treatment and evacuation costs; replacement and rehabilitation costs; insurance premiums and losses; and the costs of protective works.

The extent of damages will vary greatly with the strength and duration of the phenomena. Hurricanes for example have an immediate and devastating effect. In Rhode Island a 1954 hurricane caused $200 million of damage, mostly in the immediate vicinity of the beaches.[21/] Hurricane Carla in 1961 caused $850 million in damages along the Texas Gulf Coast.[22/] Hurricane Agnes in 1972 caused over $3 billion in damage, much of it in coastal regions.[23/]

Earthquakes and tsunami (sea waves caused by seismic disturbances) are special problems along the Pacific coasts. Earthquake damages in California are estimated to be $21 billion between 1970 and 2000.[24/] Most of the fault lines and exposed population are located on the coast, thus much of this damage will occur in the coastal zone. Tsunami have a devastating effect on coast areas. Cresent City, California suffered extensive loss of life and $7 million in damages in 1964.[25/] Hawaii has had four major tsunami disasters. The probable frequency of these disasters is not well understood; however, limited data indicate California may experience a significant tsunami once every 25 years.[26/]

Landslides are a common problem especially along the west coast. The Portuguese Bend slide in Los Angeles in the 1960's caused an estimated $10 million in damage to improvements constructed in a known risk area.[27/]

The less dramatic phenomena of erosion and subsidence are no less important in economic terms. Erosion is estimated to cause damages up to $200 million annually along U.S. coasts.[28/] Erosion losses in the Long Island Sound coastal area will approach $14 million annually by 1990 without further remedial measures.[29/] Erosion losses for the entire State of California are estimated to be as high as $565 million over the next 30 years.[30/] With 86 percent of the California coast subject to significant erosion, it is probable that an important portion of the statewide loss estimate should be assigned to the coast.

Subsidence is also costly. Diking and drainage of land in the New Orleans area results in subsidence which in turn necessitate large expenditures for pumping and dike maintenance. Subsidence due to ground water removal is being experienced in Texas with the resulting inundation and flooding threatening high value land uses. In California subsidence due to oil and gas removal has cost millions in damages and remedial costs. Future subsidence costs for the state are expected to reach $26 million by the year 2000.[31/]

Much of the damage caused by hazardous, natural phenomena can be ameliorated through use of coastal zone management techniques. The major benefit of coastal zone management program is that it encourages and

facilitates a coordinated and comprehensive consideration of risks in relation to land use objectives. By considering all risk costs (to all persons, agencies and jurisdictions and all types of control and mitigation actions), the probability of making better land uses decisions from an economic point of view is greatly increased.

Coastal zone management can especially lead to effective use of land use controls to:

- reduce unnecessary occupancy of hazardous areas.
- reduce expenditures for evacuation, relief and rebuilding.
- reduce reliance on protective works.

The economic benefits of such actions are demonstrated in "a Plan for Long Island Sound". Plan measures would reduce flood losses by $1 billion over the next fifty years. Erosion and sedimentation losses would be reduced by $360 million over the same period.[32/]

Total elimination of risk and associated losses is not practical, however, many unnecessary losses could be avoided. The Portuguese Bend slide damage assessed at $10 million, for example, could have been prevented by proper application of land use controls. Multi-million dollar hurricane damages along the Gulf and Atlantic coasts can also be reduced by limiting unnecessary building in exposed areas. Earthquakes, tsunami, subsidence, and other hazard costs could be reduced by proper identification of risk areas and the imposition of land controls in combination with other measures. Given the high cost of damages and loss of life, the economic benefits of coastal zone management for damage control and mitigation can be substantial.

V. ENERGY FACILITY PLANNING BENEFITS

One of the more important set of potential benefits of CZM from a purely economic point of view are those which derive from the role that CZM can play in planning for and regulating the development of energy facilities in the coastal zone. Energy facilities pose particularly important management problems because of their importance to the general economy, high dependency on coastal locations, and their potential impact on the surrounding environment and coastal communities in which they are located.

There are a variety of energy facilities which often depend to some extend on coastal locations, including the following:

- Nuclear power plants (electricity)
- Fossil-fuel power plants (electricity)
- Oil and gas wells (Federal lands)
- Oil and gas wells (State lands)
- Onshore support facilities for offshore oil and gas exploration and production
- Oil terminals (onshore)
- Deepwater ports (for oil)
- Oil refineries
- Liquid Natural Gas (LNG) transfer facilities
- Transmission lines for electricity, oil and natural gas

The present system of decision-making on the siting, design and development of energy facilities generally consists of a highly organized set of producers who seek to develop facilities under a complex array of

federal, state and local agencies operating under a variety of objectives, rules, and regulations. The government agencies tend to be relatively independent of one another, single-purpose, and without a great deal of coordination. As a result the system generally tends to work against the broader public interest as well as the private interests involved in energy facility development.

Coastal zone management can be of significant benefit to both the private energy industry and the general public by introducing the comprehensive planning and management required to balance and coordinate the decision-making process for energy facility development. Generally, coastal zone management can have beneficial effects by:

1. reducing the chances that unnecessary energy facilities will be built;
2. reducing the demand for energy by encouraging more energy efficient land use patterns;
3. ensuring that energy facilities which have the most dependency on coastal sites are accommodated;
4. ensuring that facilities are sited at locations which maximize the economic benefits and minimize adverse effects;
5. reducing the uncertainties and delays associated with the regulatory process for energy facility development.

Influencing Decisions on Facility Needs

Currently projections of general energy needs and the derivative projections of facility needs are made by firms, utilities, or government agencies that tend to be development oriented because of the almost chronic "shortages" of energy supplies that have been experienced in

parts of the U.S. in recent years. Such projections need to be balanced by those who are likely to take a more conservative approach in assessing energy and energy facility requirements. Since the state coastal zone management programs must balance energy facility needs against other potentially conflicting needs, CZM agencies are likely to take a more conservative view of energy facility needs. The need for a cautious approach to energy-need projections is particularly accute at the current time because, as one economist has noted, "There are significant economic forces tending towards reducing the rate of growth in energy demand, and possibly even leading to declining consumption rates for a number of years."[33/] Since it may take some time for these forces (primarily the higher price of energy) to change the pattern of energy consumption, there is danger that facilities may be constructed which will be unnecessary at lower consumption levels.

Reducing Energy Consumption

Further, CZM programs can reduce the demand for energy by encouraging more energy efficient land-use patterns. Several recent studies have demonstrated that substantial energy savings can result from the clustered form of land development.[34/] The effectuation of such development patterns requires the application of planning and management processes such as those contemplated by the Federal CZM program.

Accommodating Coastal Dependent Facilities

The Coastal Zone Management Act of 1972 requires assisted states, as part of their management program, provide "for adequate consideration of the national interest involved in the siting of facilities necessary to meet requirements which are other than local in nature."[35/] Furthermore, the Act requires that coastal zone management programs provide "for a method of assuring that local land and water use regulations within the coastal zone do not reasonably restrict or exclude land and water uses of regional benefits." These sections of the Coastal Zone Management Act, and the programs the States create, should assure that suitable locations should be available without unreasonable and arbitrary constraints.

The new guidelines for the coastal area of New Jersey provide for the consideration of electric power plants, LNG facilities, onshore support facilities for offshore oil and gas exploration and production, and associated transmission lines. Oil refineries are excluded from the guidelines because the managed coastal area does not include the urbanized, industrialized portions of the New Jersey coast where oil refineries are currently located. The California Coastal Plan, proposed to the State

legislature this year, states that "the land and water of California coastal zone is now used, and can be used more to contribute to the State's energy supply in five principal ways:

- To provide sites and ocean cooling water for power plants that generate electricity;
- To provide sites for drilling, production, treatment, storage, and pipeline facilities for oil and gas operations onshore and on submerged lands beneath State and Federal offshore waters;
- To provide terminals to moor and offload tankers and barges bringing crude oil and refined products to California, the region, and the nation;
- To provide sites for oil refineries; and
- To provide special terminals and onshore plant facilities for liquefied natural gas imports."

Whether energy facilities should be located within the coastal zone can only be determined by considering and balancing the needs and benefits of all potential land and water uses against the environmental suitability for these uses and activities. The Coastal Zone Management Program provides a process, and in many cases the only process, to consider and balance this broad range of concerns.

Determining The Best Location for Needed Energy Facilities

Determining the suitability of lands and waters for any type of use requires a major effort to collect and analyze data on the entire coastal zone. This data collection and analysis is generally beyond the resources

of local governments, private companies, public interest groups and especially citizens to accomplish. By doing suitability analyses, CZM will assure that the entire coastal zone and indeed suitable inland areas as well, are considered at the same time and in the same format, and will provide substantial savings in time and money for local governments, citizen groups and energy companies who will have access to the findings of the suitability analysis.

CZM could, in principle, also direct energy facilities toward economically depressed areas which need the jobs and income and which have underutilized facilities.

Reducing Uncertainties and Delays in The Development Process

Under the current situation, the developers of energy facilities are faced with uncertain public policy and unclear public guidelines for development, yet with substantial public regulatory authority over siting and design decisions. As a result, much time and money is wasted in obtaining decisions on energy projects. Also, sponsors are never certain of the outcome regardless of the amount of planning that has gone with the project. CZM, on the other hand, can establish a public policy with regard to energy facility development that should result in clearer guidelines and increased predictability for such development. Thus, resources will not be wasted on projects which are not in accord with policy and guidelines and the review process on projects should be much shorter and less costly.

The benefits from reduction of delay can be substantial. It has been estimated that the cost of inflation and increased construction

prices - of one year's delay in the construction of a 1,000MW nuclear power plant is in the range of $50 million.[36/] The price of this delay, if the plant is ultimately approved and built, will be passed on to the consumer. CZM can provide a high economic benefit by reducing delay which is often caused by regulatory confusion, rather than the substance of the application.

VI. COST EFFICIENCIES IN DEVELOPMENT

An objective of coastal zone management should be the minimization of increases in the public and private costs of development in the coastal zone. Steps taken to protect natural resource values which would otherwise be reduced or destroyed by development will obviously reduce the environmental impact of development. Beyond this, however, CZM should lead to an increased clustering of development, both at the community and project scale.[37/]

There are several reasons to expect such clustering to result. First, the steps taken to protect natural areas (acquisition, TDR, conservation zoning) are likely to reduce the land available for urban use. Secondly, increased planning is likely to result in more attention to the general development pattern and action to increase the efficiency of the pattern. Increased planning and capital improvements programming should also lead to a better coordination of public facility development, which should also improve the efficiency of both public and private investment.

While it is difficult to estimate the probable development cost savings benefit from increased clustering of urban uses in the coastal zone, an idea of the potential scale of such benefits on the per unit basis is provided by a number of studies which have compared the costs of a clustered form of development to the costs of low density, spread form of development. The Real Estate Research Corporation in its "Costs of Sprawl" study found a capital cost savings of $14,600 per unit in clustered development versus a low density sprawl form of development.[38/]

Seventy-three percent of this savings ($10,620) was accounted for by a switch to a smaller and cheaper dwelling type (townhouse and garden apartments owner single-family detached). Another 19.7 percent ($2875) was accountable for by a savings in utility installation costs and 7.5 percent or $1090 was in reduced street construction costs.

A 1967 study[39] by Howard County, Maryland comparing selected public costs of low-density spread development versus a clustered form of development (for the same number of dwelling units) found that a planned clustered form of development saved the County $3000 per unit and resulted in the development of less than half of the land required under the more conventional approach to development.[40] A later study (1971) comparing the costs of cluster and existing forms of development in Charles County, Maryland, resulted in similar findings. Total public facility costs were found to be $9780 per unit under the existing form of development versus $6770 per unit in a clustered development form, for a savings of 30 percent, or roughly $3000 per unit.

Other studies have evaluated these forms of development from the point of view of the private developer and concluded that similar cost savings result to the private developer even when the private developer of clustered projects is required to invest more in amenities and other facilities than conventional projects.[41] One study estimated a savings of approximately $5000 per unit in site development costs for a 170 acre PUD developed at 8 units per acre as compared to a conventional subdivision development at 2 units per acre. Savings in land costs, utilities, and street more than offset higher cost for amenities, schools, and fees.

Another study estimated a savings of approximately $3000 per unit in land and site improvement costs.[42] Both of these studies assumed a substantial increase in density and a shift from single family to multi-family dwelling. The third study,[43] however, held density constant and compared a clustered lot pattern with a conventional pattern. Still there were substantial savings in street, sewer, and storm drain costs, although recreation facilities cost were substantially greater because of the cluster development included substantially more recreation facilities. Even with the higher recreation facility costs, overall site development costs were still lower in the cluster model by $1000 per unit.

CZM can also reduce development costs by reducing the waste and inefficiency associated with the present unpredicatble maze of regulatory authorities and policies which face the private developer. Although we do not have adequate information to assess the amount of resources which are wasted in either planning or regulatory delays, scattered information suggests that the waste runs into the millions of dollars each year.[44] One study of the costs of delay (holding costs of land, inflation in construction costs, and overhead costs) estimated that costs increase on the average by about 1.5 percent per month.[45] On a $30,000 house, this would amount to a $5500 increase if the project is delayed one year. To the extent that the issues that are raised in the current permitting process can be resolved through planning and the formulation of clear development guidelines, a substantial portion of the delay costs and costs of planning projects that do not prove feasible for policy reasons can be avoided.

VII. GENERAL ASSESSMENT

The coastal areas of the U.S. are rich in valuable resources in the form of moderate climates, dramatic scenic qualities, good soils, water, fish, wildlife and minerals. These resources are valuable for a variety of competing uses - active and passive recreation, habitation, manufacturing, mineral extraction, transportation,agriculture, aquaculture, natural processes, and other activities.

The private system of allocating coastal resources amongst these various uses is largely through private - market initiative and decisions which are regulated in a somewhat haphazard fashion by a complicated and uncoordinated array of federal, state, and local regulations. Individual regulations tend to address a fairly narrow scope of activities, purposes, and interests. Beyond regulations, government often takes a more direct role in coastal resource allocation by acquiring lands and dictating their use and by providing certain services.

The existing system fails to maximize the economic benefits of coastal resources for a number of reasons:

1. Many coastal resource users have a detrimental effect on other activities without considering the "costs" of these "external" effects in deciding whether or not to undertake their activity. Thus, the developer (public or private) of a facility which destroys or obstructs a scenic view, is not required to compensate all the people who would have otherwise received visual satisfaction In effect, the private market does not properly value such common property resources as wetlands, natural beauty, clean water or clean air.

2. The jurisdictional structure of regulations in many states enable local governments to obstruct projects which are beneficial from the state or national viewpoint. The city which refuses to accommodate energy or port facilities on sites which would facilitate the most efficient operation of those facilities may impose increased costs on the rest of the population.

3. The private market tends to value present consumption much higher than future consumption and thus places a high discount rate on future needs. This makes sense to the private consumer because in the long term future he will no longer be around. Thus, the present system tends to understate the value of scarce non-replaceable natural resources that will continue to be demanded by future generations.

4. The complexity of the inter-relationships among activities, the lack of comprehensive planning which attempts to correct the inadequacies of the private market allocating system, the uncoordinated regulations, and the conflicts in constitutional rights combine to create a confusing, uncertain, ineffective and inefficient decision process for both the general public and the private investor.

The only way to correct the misallocation of resources resulting from the present system is through carefully reasoned and coordinated public intervention. This essentially is the objective of the federal and state coastal zone program.

We have attempted in this brief paper to suggest the type and magnitude of the major economic benefits that are possible under a coastal zone management program. It is impossible to estimate or measure in

dollar terms the improvement in social welfare that will result from an improved allocation of coastal resources because many of the resources considered most valuable cannot be adequately priced. Nevertheless it is clear that the economic benefits should be substantial - on the order of many billions of dollars nationally over the next 25 years.

To repeat an earlier caution: these are potential benefits. Their attainment depends on the specific nature of state and local conditions and of the particular coastal zone management programs at issue. But given the magnitude of benefit potential it is reasonable to predict that programs can be designed to yield a net economic and social benefit, if sufficient care is given to the inclusion of fair and equitable means to allocate both the benefits and associated costs.

Footnotes

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34. See, for example, James S. Roberts, "Energy and Land Use: Analysis of Alternative Development Patterns," Urban Land, Sept. 1975.

35. Coastal Zone Management Act of 1972.

36. Interviews with U.S. Federal Energy Administration official, February, 1976.

37. For example, the proposed California Coastal Plan adopts a policy of concentrating additional development in existing urban areas. See California Coastal Zon Conservation Commission, California Coastal Plan, December, 1975, p. 79.

38. Real Estate Research Corporation, The Costs of Sprawl, (Washington, D.C.: U.S. Government Printing Office, 1974).

39. Howard County, Maryland, Howard County 1985, (Howard County Planning Commission, 1967).

40. Barton-Aschman Associates, Inc., Comparative Evaluation of New Community Growth versus Trend Development Growth, August, 1975.

41. Sachs, "The Zoning Scene," House and Home, June, 1971, p. 26.

42. Burchell, Planned Unit Development: New Community American Style, (New Brunswich, J.J.: Center for Urban Policy Research, 1972).

43. Lederman, "New Ideas in Land Planning--Cluster Plan Cuts Costs by One-Third," Journal of Home Building, May, 1962, p. 76.

44. See: (a) Bish, et al, Coastal Resoruce Use : Decisions on Puget Sound, (Seattle: University of Washington Press, 1975); (b) Thomas Muller, State-mandated Impact Evaluation: A Preliminary Assessment, (Washington, D.C.: The Urban Institute, February, 1976); (c) "Construction Delays Costing Developers (and public) Thousands," The Appraiser, January, 1976; (d) Construction Industry Research Board, "Cost of Delay Prior to Construction," Los Angeles, California, March, 1975.

45. Construction Industry Research Board, op. cit.