| Journal of Coastal Research | 1 | 4 | 383-388 | Fort Lauderdale | Autumn 1985 |
|---|---|---|---|---|---|

# Responses to Coastal Threats: Toward an Integrated Strategy[1]

**David W. Fischer**

Office of Coastal Studies
University of West Florida
Pensacola, Florida 32514, USA

**ABSTRACT**

Fischer, D.W., 1985. Responses to coastal threats: toward an integrated strategy. *Journal of Coastal Research*, 1(4), 383-388. Fort Lauderdale, ISSN 0749-0208.

**Coastal resource management strategies can fail. They fail sometimes from lack of integrating threats into existing coastal management strategies. This paper outlines a set of strategies coastal developers may take when confronted by coastal threats. Since a threat and its coastal impact area constitute a connected system, the promotive strategy sees the threat-impact area as interdependent. Such a strategy can turn threat impacts into an expansion of developer concern by promoting coastal threats as a new pathway to greater coastal conservation and management opportunities.**

**ADDITIONAL KEY WORDS:** *Coastal development, coastal resource management, coastal threats, conservation, management strategy, promotive strategy.*

## INTRODUCTION

Coastal threats include a variety of sources and situations for coastal residents, developers, regulators, and other parties interested in the coast. Natural sources of threats are hurricanes, tsunamis, and winter storms interacting with narrow barrier islands and low-lying coastal margins. Major rains saturating coastal cliffs can bring landslides as well. Technological sources of threats include stabilization of shorelines inducing erosion on-site and elsewhere; spills, outfalls, and runoff generating pollution; large-scale developments promoting sedimentation, congestion and loss of passive use areas. Of the two general sources of threat, technological sources offer greater opportunity of prevention and control. Natural threats cannot be prevented, although preparations can limit the extent of impact.

Coastal threats mean many things to the many different parties involved in activities that rely or locate on the coast. Developers defend additional structures on the coast as improving the coast, among other things. Existing residents see such structures as a loss in management capability and, in turn, call for greater preservation of the coastline as sound management. Engineers focus on the means to protect and preserve certain sections of coastline from erosion and stormwave energy. Biologists and other scientists find the coast a natural laboratory for their work and often become frustrated over developer and engineering solutions to coastal threats. Regulators are interested in the continuing integrity of their administrative systems of regulation as a basis for approaching threats. Recreationists, depending upon their preferences, may or may not be interested in coastal threats. Consultants foster coastal plans and other means to serve client interests which may include a concern for threats. In other words, coastal resource threats and approaches to such depend on who is defining them.

None of these different groups are in a good position to manage coastal threats alone, much less to expand their role to include coastal impacts perceived by others. Indeed, coastal impacts as seen by each party noted above can lead to losses in coastal opportunities for others. This set of conflicts gives rise to various coastal resource management strategies which, if not integrated, can lead to failure for all, as well as disrupting coastal processes. While money can buy a section of coastline, it cannot protect that portion of coast from external threats and

[1]*84030 received 10 October 1984; accepted in revision 9 January 1985.*

the impacts of others responding to such threats. Coastal resource management based on fully integrating the participation of all interests involved in major threats is a concept whose time has come. Just as the coast is an inter-dependent set of physical and biological processes, the set of users and their impacts combine as an inter-dependent unit in any coastal context.

One group stands out from the others in terms of generating major impacts on the coast and the subsequent shift in coastal opportunities for others — the developer. The developer can change the coast to such an extent that few could recognize its former character. For example, the development of Marcos Island in Florida cannot be reconciled with its former mangroves which pushed the land toward the sea. The loss of the dynamic character of that shoreline has placed these new residents at risk and allowed the sea greater access to the Everglades. When confronted with this type of impact coastal managers frequently call for new legislation to limit coastal development. However, another approach would be to pursue a strategy that provides incentives for developers to integrate their impacts into their decision-making processes. What is needed is a concept that promotes coastal resource management via developers.

A new concept passes through more than one stage before it is accepted by decision-makers. This paper suggests that natural and man-made forces impacting on the coast can generate the basis for a new management approach that can be resisted, ignored, downplayed, accepted, or promoted by coastal developers. To guide developers (and others) in making changes within their jurisdiction to correspond with threats and impacts elsewhere along the coast, an increasingly open set of strategies are required. The core belief or objective of developers toward the coast forms their dominant strategy for guiding specific responses to specific coastal threats. This paper defines and classifies a set of management strategies to coastal threats from coastal developers. As such, this paper is directed particularly to coastal developers.

## THEORETICAL BASE

The concern for development responses to coastal dynamics is not new. For example, JOLLIFFE (1983) focuses on five different coastal development strategies that can be employed to alter erosional situations as developers challenge the coastal environment. Another view is represented by a focus on the natural coastal environment which should dictate developer's responses completely. Here PILKEY (1981, 1983) has been prominent.

NORMANN (1977) has developed a business growth model that contains three elements: a firm's system of dominating ideas, a firm's organizational structure, and a firm's external situation. Each of these three spheres should interact to produce an overall consonance that will generate a favorable development situation for that firm. This model can be applied to coastal threat management.

Objectives such as profit maximization are essential to the success of a developer. Such are necessary for guiding the developer toward a need to be filled, developing a product for the need, penetrating or creating its market, and extending that market share. This objective in turn must be linked to an organizational structure that facilitates this process through the necessary practical arrangements to support the firm in its external situation. Over time this objective about the product and its market situation becomes the *raison d'etre* for the developer, *e.g.* it becomes integrated fully throughout the organizational structure as the firm's dominating idea. Thus, the firm's objective, its market situation, and its organizational structure are all necessary elements in defining and maintaining a development strategy. Matching these three elements over time becomes the major management concern for the firm.

When a demand for change in the developer's product due to adverse impacts occurs, there is a built-in resistance to the implications this situation can have for the developer. The developer can either change the development without shifting its objective or reorient its objective to encompass more far-reaching development changes. The former is simpler than the latter.

Changing social attitudes and environmental knowledge about coastal threats are not linked directly to a coastal developer. His coastal development impacts after a hurricane can surprise the developer when other coastal groups rise in response to such impacts and seek to codify their interests against him. Thus, high-risk residential areas, accelerated erosion, and pollution which may be caused by only one coastal developer can spark a movement against them all. Thus, the developer must respond in some way to his own coastal impacts just as he responds to market impacts. In particular, the developer can find his coastal opportunities severely restricted by not doing so.

## THE DEVELOPMENT PRESSURES

As coastal developers look to their futures they are faced with having to reconcile a basic conflict: the need to balance development markets with the associated threats to the coast. The firm's coastal situation can be divided into two components: the overall threat domain and his local threat impact area. Together the two comprise the firm's total coastal operating environment. Matching this expanded area with the firm's objective and organizational structure provides the basis for approaching coastal threat management.

The development and associated activities generate a set of coastal impacts that occur from the construction, existence, operation, maintenance, and use of the development. These forces can impact directly on the objectives of others such as regulators and citizen's groups. These groups seek to manage the coastal zone by limiting developers. These limits are created in part from impacts associated with the development and its use, whether the impacts are real or perceived, and in part from the total threat situation. Groups opposed to development are bound together even though they usually belong to different organizations. They are linked by being motivated through a set of common objectives, particularly a threat-free coastal environment. This set of ideas allows access across organizations and is the basis of forming their strategies to limit the developer. Thus, the coastal pressures faced by a developer can come from a wide spectrum of individual organizations including regulators, research institutions, legislators, courts, citizens groups, lobbies, etc. In total they exert a set of political pressures on the firm to meet their joint demands. Examples of demands include seawall and groin placement, pollution control, advertising taste, beach nourishment, public participation, zoning, set backs, bans, etc.

The demand pressures for threat reduction apply to the developer because of his capacity to exacerbate the impacts of a natural threat as well as generate a technological threat with its set of impacts. In this way political pressures introduce another set of costs and benefits for developers such as pollution control compliance or relief therefrom. These pressures are an additional set of threats, political threats, that can cause the development to be eliminated, replaced, reduced, held at a fixed level, or continued at a higher cost to the developer. Any of these political threats at some point would force the developer to respond in some fashion in order to secure his coastal position.

## A TYPOLOGY

The responses of coastal developers to threats limiting their development activity suggest the construction of a typology. Table 1 outlines the strategies which can be taken by developers to the threats inherent in coastal areas. Four types of strategy can be distinguished: preemptive, prescriptive, preventive, and promotive. The preemptive type refers to a strategy where the developer attempts to retain control of his coastal development position regardless of the threat situation and its impacts and demands for change by those potentially affected. Because the developer's resources are oriented to coastal development no attempt is made to secure knowledge of the threats and impact area, and they are preempted. Rather the objective is to maintain and enhance coastal development without considering its corresponding threat and impact areas. The preemptive developer employs approaches that center on avoiding change by ignoring, containing, or repelling demands for change. This view sees avoidance as the least cost approach. Whether the developer acts directly to thwart others or uses an intermediary to seek to protect its domain of operation is not important here.

The prescriptive strategy to coastal development attends only to certain high threat situations. Knowledge of the threat impact area is limited to *ad hoc*, one-time efforts to learn of certain repeated threats for a particular type of development. Here the objective is to prescribe ways to change coastal development to the minimum required or necessary to avert demands for future limits. The focus is on minimizing costs in the short run through discrete actions aimed at constraining demands for change. Such may involve *ad hoc* contact with affected parties and one-time studies or shifts in impacts.

The preventive strategy is meant to show that the developer is willing to change his coastal development in order to reduce its threats and impacts where practicable. An effort is made to accumulate some knowledge about the threat impact area to support the objective of preventing coastal development threats where applicable. This approach consists of minimizing costs in the long run by preventing technological threats at the source as well as treating those that cannot be prevented. Monitoring of impacts can also be done. A process to allow affected parties to convey their demands can be provided. Development technologies could be

Table 1. Stages of Dominating Ideas on Accepting and Integrating Coastal Impacts.

| | I. Preemptive<br>Traditional responses dominate in all situations (avoid change) | II. Prescriptive<br>Traditional responses dominate but reduced in high threat situations (least change after the fact) | III. Preventive<br>Traditional responses constrained through threat considerations in all situations (practical change before the fact) | IV. Promotive<br>Traditional and threat responses formed together in all situations (total interactive change) |
|---|---|---|---|---|
| **Objective** | Non-acceptance of threats<br>No service change<br>Avoid all new costs | Minimal acceptance of threats<br>Minimize service change<br>Minimize short run costs<br>Avoid long run costs | Acceptance and integration of threats<br>Minimize threats but retain service<br>Minimize total costs | Integration and promotion of threats<br>Maximize service-threat system<br>Maximize "profit" |
| **Strategies** | Ignore threat demands<br>Contain threat demands<br>Repel threat demands<br>No contact with sources | Symbolic change<br>One-shot change in threats<br>*Ad hoc* change in threats<br>Constrain threat demands<br>*Ad hoc* contact with sources | Monitor threats<br>Treat threat impacts<br>Prevent threats where can<br>Channel to sources | Service-threat trade offs<br>Enhance threatened areas, even outside<br>Invite threat demands<br>Monitor sources |

changed under this response type.

The promotive strategy refers to a dynamic interaction between the coastal development and threat impact area where these two areas are considered as one in all situations. Active promotion of information about the coastal threat impact area and processes rivals the research base of development information. Such knowledge is necessary to meet the objective of promoting the total coastal area whereby possible threats may be viewed initially as potential "profit" sources. Thus, affected parties previously opposing coastal development could become supporters. In this case the developer encourages changes in all aspects of the location, development, and technology to account for promoting the total coastal environment. The threat impact area is enhanced where possible, and those affected are regularly monitored or surveyed in order to elicit ideas for such enhancement. Shared decision-making for the coastal impact area may also be considered. The original development objective may be wholly transformed.

## THE PROMOTIVE STAGE

An important question is why not stop with the preventive strategy. It is unreasonable to think of coastal development as functioning in the absence of its threat impacts, whether in the immediate area or off-site since the coast is an indivisible system. Because coastal development and its impact area together consititute a connected system, the total coastline is a series of development-impact interactions capable of being managed. The narrow focus on coastal development that now serves as the basis for inquiry into coastal impacts has served to increase an understanding of coastal threats, but it biases the inquiry into the impact area. Threat and development are usually set apart as mutually exclusive (such as health and disease). Coastal resource management will see them together as mutually inter-dependent aspects of a situation: there is an environmentally integrated way to develop a coastline. This strategy is difficult because of the standard negative definitions of threats. To advance to the promotive type of idea is to design and construct a paradigm for coastal development using threats as part of its definition. Here threats can be the basis for a wider and integrated coastal resource management strategy. A key point is that the developer promotes a total coastal impact concern by acting as a coastal manager.

Another important question is why the promotive stage is not prevalent and pursued as normal practice. The basic answer is that past development success with a previous objective retards the introduction of a competing objective, even if the newer one could more readily support the existing one. Several reasons may be put forward for this stance: small changes to a development are often sufficient to account for a pressure in the short run; sunk costs are present in the existing way of doing things; the developer's original objective has filtered into middle management to generate organizational rigidity; the information sources of top managers are often dominated by peers inland; a hierarchical organization structure retards

experimentation; performance reports rarely include information on development impacts; changes in the coastal development market lead to an emphasis on profits in the short run; incremental decision-making is viewed as basic to dealing with unfamiliar pressures from coastal managers; searching for new information is often unfocused through lack of knowledge of the sources of data from coastal researchers; finally, as noted in the previous paragraph, integrated thinking is not a common mode of approaching political pressures created by coastal scientists and environmentalists.

## HURRICANE IMPACT

Hurricane impact management stems from a developer's need to sense the probable impact of a major storm or hurricane and to adapt to meet these expected yet unpredictable events. The suggested typology can be seen as one way to classifying the stages inherent in hurricane impact management.

The preemptive stage generates a capability for monitoring its expected impact environment in order to detect possible surprises. This effort is based on beginning to manage a hurricane's impacts just before or when they occur.

The promotive stage is the creative use of the hurricane threat both to alter the magnitude of its impacts on coastal development and to alter the development itself if necessary. This stance is based on developing the capability to reach out and assume a hurricane before it "naturally" occurs.

Coastal development advertisements suggest a lack of understanding by developers to hurricane threat. For example, photographs showing the nearness of the development to the shoreline, the narrowness of the fronting beach, and the kinds and designs of developments nearest to the beach all demonstrate a lack of hurricane preparation and management for its impacts. Comprehensive, adaptive and creative management approaches are important (HOLLING, 1978).

## THE LINKAGES

What are the links necessary to integrate coastal threats with coastal development? The preemptive strategy attempts to resist any link between a threat and its impacts on development by ignoring or repelling attempts at change. Here development feasibility and promotion do not include a role for threats. In the prescriptive type of response the attempts are toward short-term efforts to reduce coastal threats. This response may include the hiring of outside experts. The preventive strategy is oriented to a continuing effort to reduce threats and their impacts as well as generate *ad hoc* information for the developer. Coastal experts are hired by the developer, and they maintain ties to other experts and those affected.

The promotive strategy includes the developer who is redirecting himself to the total coastal environment including threats. All aspects of coastal threats are considered by the developer and contribute to the developer's objective. This consideration includes coastal experts at each stage of the developer's production process where the development(s) are redesigned and oriented to eliminate or minimize coastal threats and impacts. Even the immediate coastal location could be given up. Direct and continuous links are maintained with those previously and potentially affected just as is done for "traditional" developments and customers.

Including coastal threats as part of the developer's objective function can lead possibly to new profit sources. The preemptive approach only attempts to maintain its present development profit, regardless of the change pressures faced. The prescriptive approach only embraces immediate impacts on profits when forced to do so by a high level of threat from those affected. The preventive approach seeks to integrate certain threat impacts as part of its profit interest but they are few and *ad hoc*. The promotive stance is comprehensive in that it includes the full set of physical and social influences operating in its threat-impact area through being linked to the organizations concerned with coastal threats and development risks. Coastal resource management can then be the market rather than a development on the coast. Thus, those who attempted to thwart the development could become the purchasers or employees of the developer.

This "market" expansion toward threats is similar to a firm responding in a promotive way toward its products by being linked to the motivating factors influencing the scope of its market. Such links in its product domain would include marketing experts with direct links to potential customers. The payoff for the firm is not only the protection of its product market but the possibility of turning pending threats into product ideas for profits, including such non-market profits as coastal privileges and subsidies and thereby truly expanding its scope.

## IMPLEMENTATION

How the strategy of integrating coastal threats can be embedded into the thinking of developers is important. Two items are relevant here: the internal thinking process itself and the external issue selection process.

Incremental decision-making is often seen as a "norm" when facing uncertainty. Incrementalists argue that by thinking small and moving incrementally they can muddle through a problem (GOODIN and WALDNER, 1979). While the preemptive approach is a matter of ignoring or repelling demands for change, the prescriptive and preventive stages fall into the incremental category where change is met with growing forward steps as perceived necessary. Promotive thinking, however, is characterized by an investment in becoming a coastal manager. This kind of manager takes in the total coastal threat environment and relies on signals from coastal experts and the organizations concerned with threats for making whatever changes may be appropriate, even if radical in nature.

The greater the implicit consensus among developers the greater the uncertainty others may have over coastal development impacts. Countering this uncertainty with an open integrated questioning process with affected parties is important because the more fundamental the objective or threat the less the willingness to engage in self-examination. Promotive thinking involves confronting the developer's dominating objective with their coastal impacts in order to fashion integrated objectives based on a more explicit understanding of coastal threats. Incentives for making these radical changes in coastal development are paramount for eliciting promotive thinking.

However, even within this more comprehensive approach, by definition, a limited set of criteria could include the number of people affected, its physical nature, its economic implications, and its political setting (WISEMAN, 1978). A growing level of resource commitment to study one threat implies an increasing need for action since the effort may preempt opportunities for using the same resources for other threats. The large number of connections between coastal threats and their impacts requires a growing need to analyze how such complexity will affect each party. The implications of any study affect the need to innovate, invest resources, identify irreversibilities and determine the significance of the outcome for all coastal groups. In particular, the political setting involves the level of urgency, degree of advocacy and consistency among the affected parties. These factors can aid the promotive developer in his selection of coastal threat issues for creating the appropriate responses.

This promotive approach brings the developer into a new arena, that of becoming a coastal resource manager. As such, it puts him in a partnership with other coastal resource organizations toward integrated management and conservation of coastal resources in the face of threats internal and external to the coast.

## SUMMARY AND RECOMMENDATIONS

A typology classifying four types of developer response to coastal threats was presented: preemptive, prescriptive, preventive, and promotive. This typology is based on a gradual acceptance of coastal threats and a reorientation of the developer's dominating objectives. The primary goal has been to classify his responses to the coastal threats so that a coastal resource management stance can be integrated into development decision-making.

The strategy for integrating impacts into the developer's objective is important for reducing the risk associated with rising threats on the coastal resource as well as the risk of future political and legal limits. Planning efforts by developers should be directed toward their coastal development's impact area in order to integrate with all affected. Research efforts in universities and elsewhere could concentrate on studying developer behavior toward increased threat knowledge by conducting case studies of coastal development decision-making in the face of threats or just after disasterous events. Such efforts would lead to a refining of this typology, and point the way to improved coastal resource management by developers.

## LITERATURE CITED

GOODIN, R. and WALDNER, I., 1979. Thinking big, thinking small, not thinking at all. *Public Policy*, 27, 1-24.

HOLLING, C.S. (ed.), 1978. *Adaptive Environmental Assessment and Management*. New York: Wiley. 377p.

JOLIFFE, I.P., 1983. Coastal erosion and flood abatement: what are the options? *Geographical Journal*, 149, 62-67.

NORMANN, R., 1977. *Management for Growth*. New York: Wiley, 210p.

PILKEY, O.H.; HOWARD, J.D.; BRENNINKMEYER, B.; FREY, R.W.; HINE, A.C.; KRAFT, J.C.; MORTON, R.; NUMMEDAL, D., and WANLESS, H., 1981. Saving the American Beach: a Position Paper by Concerned Coastal Geologists. Skidway Institute of Oceanography, Savannah, Georgia.

PILKEY, O.H., 1983. Preserving our beaches — a reply. *Sea Grant Today*, 3, 8.

WISEMAN, C., 1978. Selection of major planning issues. *Policy Sciences*, 9, 71-86.