

BARRIER BEACHES: SPECIAL MANAGEMENT PROBLEMS

Paul Jeffrey Godfrey

By the 1950s the National Park Service had become the manager of large tracts of public land. Most of this acreage was inland, upland, more or less compact in shape, and not susceptible to frequent alterations of topography. Furthermore, most of the "classic" parks had been established in areas with no long history of use by non-native settlers, and most of them were far from large concentrations of people. Then, in 1953 the National Park Service took responsibility for its first barrier beaches, those constituting Cape Hatteras National Seashore. More National Seashores followed, consisting mostly of barrier islands and spits. With these interesting and beautiful landforms came a whole new set of dilemmas relating to the barrier's unique action, shape, geology, and human history. I will try to take an overview of these special problems of public management.

Barrier beaches have a unique position in that, where they exist, they form the boundary between the continent and the oceans. The East Coast barriers are thus downwind of all the polluted air and acidified precipitation generated by the entire contiguous 48 states. The East and Gulf Coast barriers are downriver of most of the dirty water emanating from the United States east of the Continental Divide. Barriers receive further polluting substances generated at sea, especially oil slicks and solid waste; this is especially true of barriers close to major ports. They also bear the brunt of oceanic storms.

By their special position, the barriers play a critical role in the lives of nesting and migrating coastal birds, and nesting sea turtles. They also make possible the existence of the estuaries and marshes whose economic importance to man is now generally recognized. At the same time, by being close to the urban East Coast and the major Gulf Coast cities, the eastern barriers are in vast demand as recreation sites.

The long, narrow shape of most barriers helps to confer their recreation potential; it also makes them ideal interceptors of pollution from land and sea, and of the maximum impact of storms. Management difficulties, especially the monitoring of human activities and the controlling of pollution, frequently are aggravated by the very high ratio of perimeter to total area intrinsic to a barrier beach.

Some barriers are rather inaccessible to visitors and National Park Service personnel alike: Portsmouth Island, N. C., and Wood End, Mass., are examples. This condition can reduce human impact, but it also makes it more difficult to supervise such activities as do take place. The National Park Service also may have to consider demands that accessibility be improved or restored. Sandy Hook in Gateway National Recreation Area, is about to become a case in point.

Hand in hand with the barriers' unique geography goes a set of geological processes very different from those obtaining in most upland parks. The wind and sea rearrange the barrier landscape more or less at will, in spite of man's efforts to prevent them from doing so. Catastrophic changes can occur literally over night. We have learned that these changes not only are hard to stop, but that they are essential to the maintenance of the barrier and estuarine ecosystems as we know them. We know that overwashes and inlet closures maintain the width and elevation of the barriers during their inevitable landward migration in the face of a rising sea level. Salt marshes are enlarged and rejuvenated by these same processes. The beach grasses fail to thrive without a steady input of wind-blown sand. In short, many barrier ecosystems are not only well adapted to constant change, but dependent upon it. We also know that barrier beaches come in a great variety of shapes and topographic profiles, and these features tell us a lot about the history of the barriers, their ecology, and their vulnerability to storm impacts. With this information we can recommend, when necessary, management approaches suitable to each barrier type.

The National Seashores containing the barrier beaches were established rather recently; the state and private holdings from which they were assembled had a long history of varied human use. Most evidence seems to indicate that the native Indians fished and hunted along the barriers, but had little ecological impact there since their permanent abodes were on the mainland. With European settlement came a change; people began to live on the barriers, in vacation cottages or permanent residences. By the 1950s mosquito control operations were well entrenched, and attempts to control coastal processes were legion. The most important economic activities of the past had been wood-cutting, grazing, haying, salvaging, and commercial fishing; and in some places the first two had a substantial ecological impact. More modern business ventures include all manner of services to recreationists, real estate development, and even the mining of sand.

While the barriers have seen economic activity for a long time, recreational use has burgeoned in this century. Sport fishing and hunting, swimming, boating, surfing, camping, and the use of off-road vehicles were all established uses of barrier beaches when the first National Seashores were created.

Small wonder, then, that establishment of National Seashores has been greeted with local political opposition where people have felt their living or enjoyment threatened by the new order. Two things made the National Park Service presence more palatable to local interests: extensive private inholdings were allowed, and the National Seashores were designated Recreation Areas rather than National Parks. The latter decision meant that numerous "traditional uses," unacceptable in a full-fledged National Park, would be permitted in the Seashore so long as they did not result in substantial ecological damage.

These concessions to past history and practice, necessary to local acceptance, have nevertheless placed Seashore managers on the horns of many a dilemma. Especially thorny conflicts have arisen when the demands of local residents or visitors have proved incompatible with the constraints imposed by the special geographic and geological setting of barrier beaches. Some conflicts could not have been foreseen at the time of National Seashore establishment, and several have not yet been resolved. I will examine a few representative cases.

A fundamental difficulty arises from the fragility of barrier beach vegetation: plants that can survive the onslaughts of the ocean are paradoxically unable to tolerate foot or vehicle traffic. With the cooperation of visitors, foot traffic can be controlled and its impact mitigated by means of fences, ramps, and walkways.

Vehicles are a more complicated matter. Their use on barrier beaches was established by the time the National Seashores were created, and their users are well-organized. Research in Cape Cod National Seashore has shown that off-road traffic can do extensive and in some cases long-lasting ecological damage. Consequently, vehicle use has been limited to a small fraction of the area previously open thereto in that Seashore: traffic is only allowed on the unvegetated ocean beach along parts of the Seashore's mainland coast and attached barrier spits, and on a few closely watched trails through the dunes. This new order is unpopular among vehicle users and among inholders whose property is made less accessible. Enforcement is difficult due to the long stretch of shoreline involved.

Even with the severe restrictions that have been imposed on off-road vehicles, and even if all drivers obey the rules, there are many who find any presence of motorized equipment esthetically unacceptable. They would ban all off-road vehicle traffic from the Seashore, and, in fact, the National Park Service has been involved in a law suit for the past year filed by a group who want to accomplish just that. This issue is far from resolution.

At the time of the establishment of Cape Hatteras National Seashore, a promise was made by the federal government to residents of the Outer Banks that every effort would be made to stabilize the barrier islands and protect the residents from inundation and overwash. Accordingly, a high and continuous artificial dune was built, and many buildings were erected on private land behind this apparently secure bulwark. Those who promised stability did so in good faith, and those who accepted the promise showed faith of another kind, but both parties were to be disappointed. It has since become apparent that it is simply not possible to stop the Outer Banks from retreating landward, however much of the taxpayers' money one might be willing to spend in the attempt.

The National Park Service has concluded that the best management of barrier beaches is the least management; nature will even-

tually take its course whatever we do, and to try to stop it is ecologically unsound as well as prohibitively expensive. Consequently, undeveloped barriers such as those of Cape Lookout National Seashore are being left in their natural state.

It has been easy for the National Park Service to adapt its policies to the preservation of undeveloped shores; but where there has been much investment in inholdings, as at Cape Hatteras, the situation is far more difficult. No one knows what will happen when the next really major hurricane strikes the Outer Banks. The road that runs along most of the length of the barrier chain and serves as a lifeline and escape route for residents, visitors, and National Park Service personnel alike, could be blocked by overwash at a number of points. At Cape Hatteras and in other National Seashores, a variety of circumstances exist in which one could argue strongly for an exception to the dictum "let nature take its course."

Examples could be multiplied in which demands for mosquito control, water withdrawal, mining rights, the continuation of traditional businesses, and the desires of recreationists have come into conflict with the National Park Service mandate to protect the resource first. It could well be argued that such fragile, unstable, and attenuated structures as barrier beaches should be managed as wilderness areas, but political considerations make such an approach impossible in most cases. The alternative is to reconcile conflicting demands as best one can.

When there is a question of the ecological soundness of a particular policy, it is helpful to a superintendent to have a sound body of data, and accurate interpretations, on which to base decisions. The scientific community has been able to provide such data in a number of cases. In the last decade we have made considerable progress toward the understanding of coastal systems (thanks in large part to research support from the National Park Service); we also have become more aware of the areas of our ignorance. It has become apparent that coastal systems are unique and idiosyncratic. Management recommendations painstakingly arrived at for a particular barrier may not apply at all to a neighboring one. Each small section of the coast must be studied and managed separately. It would be particularly beneficial to have information in anticipation of the emergence of certain coastal management problems, so that managers are not forced by circumstances to make hasty decisions without adequate information.

Some areas where more data are most needed are: (1) baseline surveys including profiles, transects, and so forth, from which future changes, both physical and ecological, can be monitored; (2) further site-specific research on human impacts, both pedestrian and vehicular—particularly in southern Seashores where such use has greater impact on the organisms of sand beaches; (3) development of a computerized information retrieval system for managers and scientists in the field; (4) development of a "phased with-

drawal" plan from those Seashore areas most likely to be severely damaged by future storms; (5) learning how to maintain "natural processes" along shorelines that already are manipulated or otherwise altered.

Even if all the ecological problems over which the National Park has some control could be resolved, there would remain undesirable anthropogenic influences from outside the Seashore: the polluted air and water, oil slicks, and solid waste that impinge upon the barriers, and the coastal changes resulting from interruption of sand movement updrift of the Seashore. In these cases the natural scientist can give the Seashore manager little direct assistance, except perhaps to help devise a cleanup contingency plan, as in the case of oil spills. The scientist can, however, work with Superintendents to inform the public about the effects of such inputs as acid rain upon Seashore ecosystems. The political constituency for attacking the problem at its source may thus be broadened.

Finally, the natural scientist cannot, of course, solve the political problems that may result from the implementation of his or her recommendations; that is a job for often much-harassed administrators. Nor can science address esthetic or emotional conflicts, as opposed to ecological ones. Esthetic environmentalism and ecological environmentalism are certainly both valid concerns, but each should be addressed in its own terms. The scientist cringes to see the credibility of ecological arguments debased by attempts to apply them to non-ecological issues.

PAUL JEFFREY GODFREY, Associate Professor of Botany, University of Massachusetts-Amherst, and Research Biologist WAE, U. S. National Park Service.
