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Ecological Impacts of Beach Grooming on Exposed Sandy Beaches

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Background

Almost half of California's 36 million residents live in one of the five coastal counties of Southern California. The economic value of this sun-kissed stretch of shoreline is staggering, generating an estimated $17 billion in direct revenues in 1998. Ecologically, the region is just as rich. More species inhabit California's natural, sandy beaches than anywhere in similar climes of Chile, South Africa and Australia. The state is truly golden.

Because of the coast's huge value, municipalities often choose to manicure their sandy beaches regularly, grooming them sometimes twice daily in high season. Sandy beaches are groomed by "sanitizing" tractors that pull giant metal rakes or sieves through the top six inches or so of sand, gathering trash left by beachgoers and seaweeds washed ashore by tides and waves. More than 100 miles of sandy shoreline between Santa Barbara and San Diego is manicured in this manner.

Because grooming is so prevalent, conservationists and scientists have expressed concerns the practice could be harmful to birds and other wildlife species that reproduce and forage on the coast. Many of these coastal species, particularly shorebirds, have already lost a great majority of their native coastal and wetland habitats to development.

A tractor pulls a large metal rake to pick up trash left by littering beachgoers and kelp washed ashore by tides and waves. Photo: Karen Martin, Pepperdine University

Project

Sea Grant funded marine ecologist Jenifer Dugan of the Marine Sciences Institute at the University of California, Santa Barbara to investigate the ecological consequences of beach grooming in Southern California. Besides collecting ecological data, she is developing a set of science-based suggestions for improving beach management in densely populated areas such as Southern California.

Her Sea Grant research focuses on evaluating the effects of grooming on invertebrate communities and shorebirds, work that complements and furthers her ongoing studies of more than 40 groomed and ungroomed beaches in California.

Findings

Dugan's results suggest that grooming has significant repercussions for the natural ecology of sandy beaches. She has found that grooming significantly reduces the richness, abundance and biomass of many species of invertebrates, including crustaceans and insects. Many species of shorebirds, including the federally protected Western Snowy Plover, feed on these tiny invertebrates. For this reason, groomed beaches support fewer birds in absolute numbers and species diversity.

Not just animal life but also plant life is destroyed by beach grooming. Grooming strips beaches of native plants and "embryo dunes," making the shoreline more vulnerable to erosion, Dugan reported. The root systems of native plants, she explained, hold dunes in place, increasing their resistance to wind and wave action. Natural beaches have, on average, 30 times more native plants than groomed ones. Dugan speculates that removing kelp may also be depleting seed banks for native plants.

Many managers believe grooming helps control fly populations, since flies swarm around kelp piles. Frequent grooming, however, eliminates many beetle species, the

natural predators of flies. Ironically, beach grooming could thus increase fly problems, Dugan said.

Impacts

In the fall of 2002, Dugan presented her research findings to members of the San Diego City Council, and is now planning to collaborate with the city's park and recreation department to conduct a large-scale field experiment to examine the "recovery" of beaches groomed for 40 years. From this study, she hopes to develop recommendations on how to improve beach management policies without significantly impacting the tourist and recreation value of the coast.

"We don't know how long it will take to restore the natural consumers, predators and ecological balance of the beach community after years of grooming impacts," she said. "We need to know this to make realistic recommendations and predictions for the recovery of natural function in these damaged ecosystems."

The results to date have been shared directly with numerous interested agencies and groups including NOAA Office of Response and Restoration and Office of Habitat Conservation; U.S. Fish and Wildlife Service; Minerals Management Service; California Department of Fish and Game and its office of Oil Spill Prevention and Response; California State Parks; the cities of San Diego, Goleta and Santa Barbara; Santa Barbara County; San Luis Port Authority; Project Pacific; Audubon Society; and Point Reyes Bird Observatory.

The results were shared and will be considered in endangered species management and recovery plans, specifically for the Western Snowy Plover.

The Principal Investigator, Jenifer Dugan, is a member of the panel of scientists, agencies and city personnel convened in 2001 by Project Pacific and the City of San Diego to investigate the effects of beach grooming on California grunion in San Diego. The group meets regularly and was tasked with advising the City of San Diego with regard to the possible impacts of beach grooming on incubating grunion eggs on city beaches. A subgroup of the panel is working with the researchers on the broader ecological effects of beach grooming and facilitating the experimental examination of the recovery of beach ecosystems from grooming in San Diego.

The researchers are working with the Santa Barbara Museum of Natural History on educational displays about this study.

International Implications

Beach grooming is a widespread practice throughout the world's coastlines, and these results have international implications for the management of beach ecosystems. The researchers are working with colleagues in northern Spain, Mariano Lastra and Rosario de la Huz, to initiate investigations of the effects of beach grooming on Galician beaches.

Collaborations

Audubon Society, California State Department of Parks and Recreation, Camp Pendleton Marine Base, City of San Diego Park and Recreation, Coastal Marine Institute, Minerals Management Service, Project Pacific, Santa Barbara Coastal Long-Term Ecological Research Site.

Publications

J.E. Dugan, D.M. Hubbard, M.D. McCrary, and M.O. Pierson. 2003. The response of macrofauna communities and shorebirds to macrophyte wrack subsidies on exposed sandy beaches of southern California. *Estuar. Coastl. Shelf Sci.* 58S:133–148.

D.M. Hubbard and J.E. Dugan. 2003. Shorebird use of an exposed sandy beach in southern California. *Estuar. Coastl. Shelf Sci.* 58S:169–182.

Presentations

Ecological effects of grooming on exposed sandy beaches in southern California. 2002. Paper presented at California and the World Ocean, Santa Barbara, California.

Ecological effects of grooming on exposed sandy beaches in southern California. 2002. Invited Seminar, California State University Northridge.

Effects of beach grooming on sandy beaches in California. 2002. Presented to San Diego City Council Natural Resources and Culture Committee, San Diego, California.

Response of sandy beach ecosystems to macrophyte wrack subsidies. 2002. Presented at NOAA Hazardous Materials Response Division annual meeting, Santa Barbara, California

Ecological effects of grooming on exposed sandy beaches in southern California. 2002. Studies Presentation, Minerals Management Service, Camarillo, California

Ecological impacts of grooming on exposed sandy beaches in southern California. 2001. Invited symposium presentation, Western Society of Naturalists, Ventura, California.

Conservation and restoration of sandy beaches and coastal dunes. 2001. Lecture. EEMB 186, MSE Habitat Restoration Seminar, University of California, Santa Barbara, California.

Publicity

Newspaper articles discussing the study results and goals have appeared in the *Los Angeles Times*, *San Diego Union-Tribune*, *Santa Barbara News Press*, *San Luis Obispo Tribune*, *The Press-Enterprise* (inland Southern California), and the *Herald Tribune* in southwestern Florida.

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