Bayed A. (ed.). Sandy beaches and coastal zone management – Proceedings of the Fifth International Symposium on Sandy Beaches, 19th-23rd October 2009, Rabat, Morocco
Travaux de l'Institut Scientifique, Rabat, série générale, 2011, n°6, 119-120.

Beach grooming and the loss of coastal strand habitats in southern California

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BACKGROUND

Located on the boundary between a rising ocean and a growing populace, coastal strand ecosystems are losing ground to widespread activities, such as beach grooming, seaside development and reductions in sediment supply. The ecosystem services and functions provided by these dynamic coastal ecotones have no analogs, yet are profoundly threatened by the combination of sea level rise and ongoing losses to human activities. In California, coastal strand vegetation can act as an important ecosystem engineer by trapping windblown sand trapping and initiating dune formation. We used field surveys and experiments to investigate the role of beach grooming in the loss of these threatened coastal ecosystems.

RESULTS & DISCUSSION

Surveys of 29 southern California beaches in late summer indicated strong effects of grooming on beach zones, wrack and coastal strand vegetation. Unvegetated supralittoral zones were four times wider on groomed beaches (n=12) than on ungroomed beaches (n=17). The abundance (cover) of macrophyte wrack was nearly an order of magnitude lower on groomed beaches compared to ungroomed beaches. Native plant abundance and richness were 15 and >3 times higher, respectively, on ungroomed beaches than on groomed beaches.

To investigate grooming effects on the performance of native coastal strand plants, we seeded four replicate experimental plots in seasonally groomed (May to September) and un-groomed sections of San Buenaventura State Beach, Ventura, California, USA in January 2002. Seedlings of three species of native plants (*Atriplex leucophylla*, *Abronia maritima* and *Ambrosia chamissonis*) recruited in experimental plots in three annual cohorts during the rain seasons of 2002-03, 2003-04 and 2004-05 (Fig. 1). A small proportion of seedlings in each cohort in the ungroomed section reproduced and survived to the start of the next rain season. No plants reproduced and no plants survived beyond April in the seasonally groomed area (where grooming begins in May each year) in any of the years of our study (2002, 2003, and 2004) (Fig. 1).

Experimental comparisons of native plant performance were consistent with beach survey results for vegetation. Although initial germination rates were similar, seed bank, survival and reproduction of native plants were significantly lower in groomed compared to ungroomed plots. Introduction of coastal strand plants via seeds was sufficient to establish native vegetation in the ungroomed area, but not in the groomed area.

Physical processes also varied between our experimental plots in the groomed and ungroomed areas. Aeolian sand transport rates in seeded plots were ten to 1,000 times higher in groomed than ungroomed sections in short term field trials using sediment traps. Further, both native coastal strand plants and piles of fresh kelp wrack greatly reduced sand transport rates on short time scales (0.5 to 1 hour), causing a > 90% reduction of ambient rates in the center and immediately downwind of plants or wrack deposits.

Our results suggest beach grooming impacts result in widespread conversion of coastal strand and dunes to unvegetated unstable sand sheets and the loss of protective dune formation. Conservation of these threatened coastal ecosystems could help retain sediment and maintain biodiversity, wildlife and human use in the face of rising sea levels.

More details on this study are available in J.E. Dugan and D.M. Hubbard, 2010. Loss of coastal strand habitat in southern California: the role of beach grooming. Estuaries and Coasts 33(1): 66-77.

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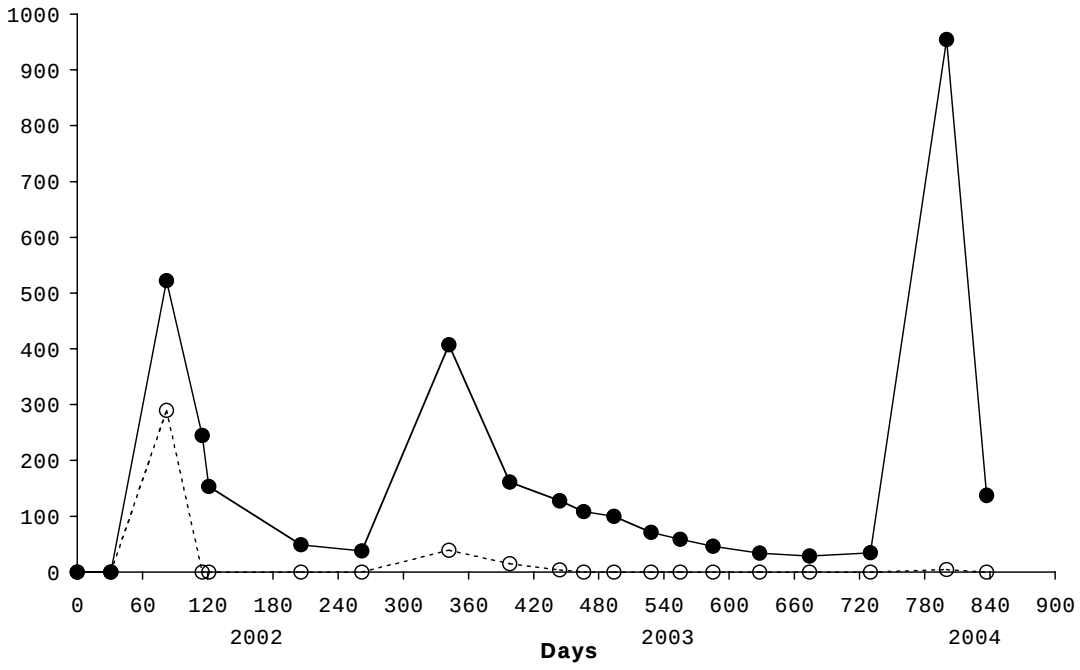

Figure 1: Mean number of live native plants (3 species combined) present in 19.6 m^2 experimental plots at San Buenaventura State Beach, Ventura County, California, USA between Jan 2002 and April 2004.
Solid circles = ungroomed area, open circles = groomed area.