Position Paper on

Mechanical Beach Grooming

Board of Directors

2011

Position Mechanized Beach Grooming in Coastal Areas
Board of Directors
Lake Huron Centre for Coastal Conservation
2011

Beach grooming is a practice undertaken by some municipalities in an effort to provide beach users with a clean beach. While anthropogenic debris should rightfully be removed from beaches, natural organic debris is also removed, either purposefully or as a collateral consequence.

Beaches which have a fine-grained, low gradient beach are often high in moisture content (particularly during periods of high lake levels). Raking has the effect of aerating the sand and drying it out, thus making the fine sands vulnerable to wind erosion. Raking and grading also tend to obliterate sand binding beach vegetation which tends to populate the mid and upper beach. This undermines the critical relationship between lake levels and dune development.

During low lake levels, dune vegetation (Marram grass in particular) will migrate lakeward through its underground rhizome systems and colonizing areas of the upper beach. The extent of this colonization is confined by high lake levels and storm events. Beach grooming can undermine this process, leading to constricted dunes (dunes forced to stay a certain width) and thereby resulting in the vertical growth of dunes.

The practice of beach grooming can have profound long-term negative effects on beach erosion and shore ecology. Along many parts of the Lake Huron coastline, particularly north of Point Clark (including southern Georgian Bay and the south shore of Manitoulin Is.), beach and dunes are considered geologic relics—sand deposits which were deposited centuries ago when the coastal geologic conditions were much different than today. The beach and dunes should be regarded as a non-renewable resource that must be conserved in order to maintain this natural resource.

The process of beach grooming, which has been done at a number of beaches for aesthetic purposes, can make the erosion problem worse such that sand is lost from the dune system, interrupting the dune cycle. Sand blown beyond the foredune (or 'first dune') represents a permanent loss to the system.

Grooming alters beach ecology in the following ways:

First, the typically wet sand is drawn up and aerated, contributing to drying out of the sand and making the fine sands more vulnerable to wind erosion. This can result in greater sand migration and sand drifting, as well as the vertical growth of dunes if the dune system is artificially constricted by beach grooming.

Second, grooming can destroy new seedlings establishing at the leading edge of the dune. Although seedlings in this 'embryo' dune, or pioneer zone, often become buried by wind-blown sand or storm-deposited sand, they will usually grow through the new sand layer and continue to stabilize the area. In addition, these upper beach and foredune vegetation colonies expand lakeward during lower lake levels.

Third, the beach ecosystem is a habitat and feeding grounds for a mosaic of wildlife, including shorebirds, invertebrates, terrestrial insects and vegetation. Grooming with heavy machinery can have a detrimental impact on species and habitat. More subtly, beach raking removes organic debris that washes up on the beach forming a strand line (sometimes referred to as *wrack* line). This organic detritus typically releases valuable nutrients into the beach substrate.

Researchers in the US investigated the role of beach grooming in the loss of coastal strand ecosystems. On groomed beaches, unvegetated dry sand zones were four times wider, macrophyte strand cover was >9 times lower, and native plant abundance and richness were 15 and >3 times lower, respectively, compared to ungroomed beaches.

Rates of aeolian sand transport were significantly higher in groomed plots, while native plants or wrack placed in that zone reduced sand transport. Study results suggest beach grooming has contributed to widespread conversion of coastal strand ecosystems to unvegetated sand. Increased conservation of these threatened coastal ecosystems could help retain sediment, promote the formation of dunes, and maintain biodiversity, wildlife, and human use in the face of changing water levels.(Dugan and Hubbard, 2010).

Recommended Options:

The Coastal Centre recommends the following options as alternatives to conventional beach grooming. It is recommended that municipalities consider implementing a beach cleaning program that is more environmentally appropriate. Large raking machines in current use could be replaced by beach clean-up staff walking the beaches and picking up litter manually. In some municipalities, staff is already assigned to clean up waterfront litter, particularly on busy summer days or weekends, and so this could be a logical extension. Other alternatives could include working with local groups to develop an "Adopt-a-beach" program where volunteers look after a section of the waterfront.

Regularly scheduled beach grooming is indiscriminate, allowing for unnecessary raking to occur. There may be occasions when mechanical raking is considered unavoidable (e.g. excessive debris washing up on the beach, garbage accumulated after a holiday weekend), but generally it is unnecessary and can be harmful to the beach ecosystem. Municipalities should review what conditions constitute a need for raking and develop guidelines so that all field employees have a clear understanding of the limitations necessary on beach grooming.

It's important to manage people's expectations. Some of the alternatives to regular grooming that would help to protect beach ecology include:

- ***no grooming*** – beach is left completely natural;
- ***hand grooming*** – manual removal of debris with hand rakes;
- ***seasonal grooming***, zonal or rotational grooming – grooming is done once or twice over the year (spring and fall) or restricted to certain zones of the beach at specific times of the year, and;
- ***threshold grooming*** – where debris and strand line removal occurs beyond a certain pre-defined density or height. For example, the Township of Huron-Kinloss has a beach grooming policy based on threshold grooming (Township Bylaw 2008-59, amended)

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References:

Dugan, Jenifer E. and David M. Hubbard, 2010. "Loss of Coastal Strand Habitat in Southern California: The Role of Beach Grooming," in Estuaries and Coasts (2010) 33:67–77.

Dugan, J., 2004. Ecological Impacts of Beach Grooming on Exposed Sandy Beaches, University of California at Santa Barbara, Marine Sciences Institute.

Marshall, S.A., *et al* 2005, Insects of Ontario's Dune Grasslands, poster, Department of Environmental Biology, University of Guelph.

Nickling, W.G. and Davidson-Arnott, R.G.D., 1990. "Aeolian Sediment Transport on Beaches and Coastal Sand Dunes," in Proceedings of the Symposium on Coastal Sand Dunes. National Research Council Canada, September 12-14, 1990. Guelph, Ontario.

Peach, G.H., 2007. Conserving a Delicate Balance. Management Plan for the Dunes at Sauble Beach, Ontario. Prepared by the Lake Huron Centre for Coastal Conservation for Friends of Sauble Beach.

Stephenson, Gary, 1999. Vehicle impacts on the biota of sandy beaches and coastal dunes. Department of Conservation, Wellington, New Zealand.48pp.

Strayer, D. and Findlay, S., 2010. Ecology of Freshwater Shores, in *Journal of Aquatic Sciences* 72:127-163.

Township of Huron-Kinloss, 2011. Algae Clean Up Policy 2011-03, amending Bylaw 2008-59.