Preserving sandy beach ecosystems – the way forward

The combined impacts of climate change and increasing population pressures on coastal areas for living and recreation have placed beach ecosystems under severe pressure. New research suggests efforts to preserve the biodiversity of sandy beach ecosystems should be undertaken within the framework of Integrated Coastal Management. The aim is to integrate the physical protection of coastlines with the conservation of threatened ecosystems.

As key recreational sites, sandy beaches are of prime social, cultural and economic importance and dominate the world’s coastlines. They also provide critical and irreplaceable ecosystem services and there is a growing recognition of the ecological value of beaches. However, current beach management is largely concerned with managing sand budgets and erosion, while ecological aspects are rarely considered.

Co-operation between beach managers and ecologists is therefore important, according to the researchers. They produced 50 ‘key statements’ summarising how essential features of sandy beach ecosystems function and are structured, which include defining the physical features of beaches, the functioning of beaches as ecosystems and incorporating the protection of beach ecosystems with wider management practices.

The researchers suggest that climate change will have a significant impact on the ecology of sandy beaches. It is anticipated that climate change will affect the following:

- Sea levels – Average sea levels have risen by 0.17 metres in the last century and there are more occurrences of damaging high seas during storms. Continued loss of beaches will severely impact on coastal habitats and communities.
- Extreme weather events – It is likely that changes in cyclone and storm behaviour will produce higher and more powerful waves, increasing beach erosion.
- Precipitation - the pattern of precipitation is changing with more incidences of floods and altered freshwater flow to the oceans and this will affect the ecology of the beaches.
- Changes in the ENSO (El-Niño-Southern Oscillation) events cause alterations to precipitation and this may affect beach ecosystems.
- Within decades, acidification of the oceans will negatively affect marine organisms that need calcium carbonate to form shells, such as urchins and snails.

Four principles have been proposed by the researchers to integrate the ecological and physical aspects of management strategies for sandy beaches, which will help beach ecosystems withstand the pressures of climate change. It is suggested that ecologists, managers and policy makers work together at all levels of decision making in implementing effective and enduring strategies to conserve coastal ecosystems. There is also a need for further development of modelling techniques to study the impacts of climate change on beach ecology and to combine this with the effects that various management strategies will have on beach systems.

A further issue highlighted by the study are the special difficulties caused by tidal conditions for scientists trying to study beach organisms. The researchers have consequently produced a code of ‘best practice’ which contains 11 recommendations to help ecologists develop the most appropriate methods when collecting samples.


Additional information: The EC’s LIFE programme co-fines a number of projects dealing with coastal areas. The most relevant and recent coast-related LIFE information can be found in the ‘LIFE by theme: Coasts, seas & fisheries’ section, including project lists, publications, videos and news features. It also includes also information on a project responding to the Risks from Climate Change in Coastal Zones.


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