

UC San Diego

Research Summaries

Title

Kelp Wrack: Hopping with Life in San Diego County

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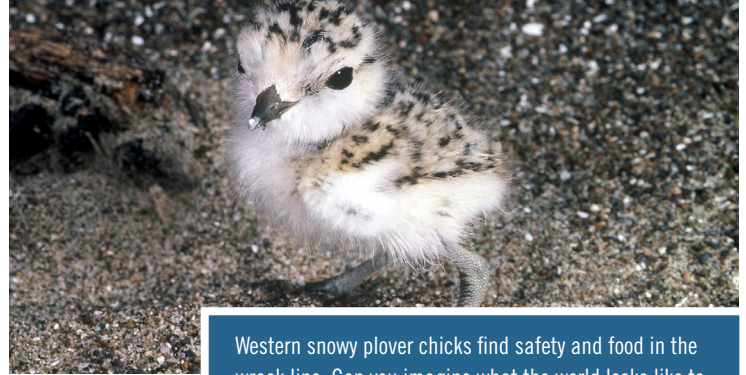
SUMMARY

The same waves that pound the shore off California also tear large amounts of seaweed from the region’s giant kelp forests and rocky reefs. Much of this drift seaweed, known as wrack, is eventually washed ashore. On many of Southern California’s beaches, tractors will remove this wrack (along with trash and litter) and rake the sand, in a process known as beach grooming.

With California Sea Grant support, biologists at the University of California and Pepperdine University have been studying wrack’s role in coastal ecosystems and the ecological consequences of mechanically removing it from sandy beaches.

Results from multiple studies show that beach grooming practices, even seasonal schemes, can have major impacts on the ecology and sustainability of sandy beaches, many of which are already under stress from sea level rise and coastal development. Heavy equipment on the beach also destroys nesting habitats for shorebirds such as the Western snowy plover and can crush clutches of grunion eggs that female fish bury in intertidal nests in the sand.

In peer-reviewed research, biologists show that leaving wrack on the beach helps maintain foraging opportunities for shorebirds and benefits native coastal strand plants that trap sand and create sand dunes. In recent work, biologists estimate that about 40 percent of the animal species living on sandy beaches depend on wrack. In an ongoing project, they are studying the importance of decomposing wrack in supplying nutrients to coastal ecosystems.



Western snowy plover chicks find safety and food in the wrack line. Can you imagine what the world looks like to this tiny chick? www.westernsnowyplover.org



A tractor outfitted with a large metal rake removes wrack from the beach. Karen Martin



This beautiful beach primrose is a common coastal strand plant, living in the zone between the foredune and high-tide line. David Hubbard



Black’s Beach in San Diego County, a natural beach with intertidal wrack brought ashore by waves and tides. Jenifer Dugan

GROOMED VS. NATURAL BEACHES

The scientists report that groomed beaches have significantly lower biodiversity, with:

- Dramatically fewer beach hoppers, predatory beetles and other small creatures that hide under and feed on wrack
- Fewer native plants that trap windblown sand
- Fewer hummocks (low mounds of sand formed by wind)
- Fewer shorebirds, such as black-bellied plovers, snowy plovers and marbled godwits
- Conversion of coastal strand habitat to barren sand with loss of dune formation
- Loss of nutrients to plants such as surfgrass from the breakdown of wrack

Check out the differences at these beaches in San Diego County:

GROOMED	UNGROOMED
La Jolla Shores Beach Park	Torrey Pines State Beach
Mission Beach	Black’s Beach
Coronado City Beach	Silver Strand State Beach (south end)
Imperial Beach	Borderfields State Beach

David Hubbard



Jenifer Dugan



David Hubbard



Many people have probably never seen a beach hopper (left), intertidal pillbug (middle) or flightless rove beetle (right) because they are no longer found on groomed beaches in Southern California. These tiny critters are, though, essential components of a healthy beach ecosystem. For example, beach hoppers help clean the beach by eating kelp and, along with other tiny invertebrates, are a key food source for shorebirds, and a reason birds forage at the beach. UC biologists report that some wrack-associated invertebrates could easily go extinct without protection from grooming and other human activities.

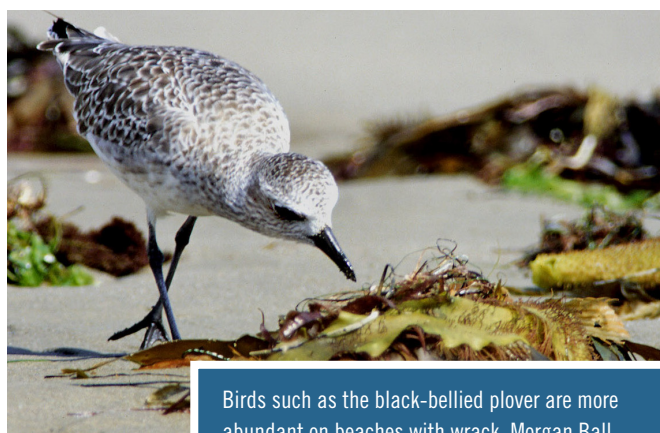
RECOMMENDATIONS FOR MANAGERS

To help restore beaches, scientists recommend that managers consider:

- Hand grooming to selectively remove trash and improve beach aesthetics, while enhancing beach ecology by allowing wrack to remain on the beach.
- Creating no-grooming zones, within which wrack can remain on some sections of beach year-round.
- Public education to teach residents, visitors and decision-makers about beach ecosystems and the value of wrack to coastal wildlife and ecology.

WHAT YOU CAN DO

- Leave only footprints. Take your trash home.
- Respect areas set aside for wildlife restoration.



Birds such as the black-bellied plover are more abundant on beaches with wrack. Morgan Ball

PEER-REVIEWED SCIENCE ON BEACH WRACK

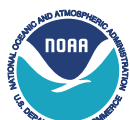
Dugan, J.E., D.M. Hubbard, H.M. Page and J.P. Schimel. 2011. Marine Macrophyte Wrack Inputs and Dissolved Nutrients in Beach Sands. *Estuaries and Coasts*. doi:10.1007/s12237-011-9375-9.

Dugan, J.E., O. Defeo, E. Jaramillo, A.R. Jones, M. Lastra, R. Nel, C.H. Peterson, F. Scapini, T. Schlacher and D.S. Schoeman. 2010. Give Beach Ecosystems Their Day in the Sun. *Science*. 329 (5996): 1146.

Dugan, J.E. and D.M. Hubbard. 2010. Loss of Coastal Strand Habitat in Southern California: The Role of Beach Grooming. *Estuaries and Coasts* 33(1): 67-77.

Dugan, J.E., D. M. Hubbard, M. McCrary and M. Pierson. 2003. The Response of Macrofaunal Communities and Shorebirds to Macrophyte Wrack Subsidies on Exposed Sandy Beaches of Southern California. *Estuarine, Coastal and Shelf Science*. 58S: 133-148.

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