Habitat Loss Leads to Diminished Coastal Protection and Lower Carbon Storage Capacity on U.S. West Coast

Loss of Dunes, Salt Marshes and Seagrasses Leaves West Coast More Vulnerable to Erosion and Reduces Natural Carbon Storage

Santa Barbara, Ca./Arlington, Va. USA (June 18, 2014) – The first regional assessment by the Ocean Health Index on United States waters showed that habitat destruction, particularly the loss of salt marshes and sand dunes, over the past several decades negatively impacted carbon storage and coastal protection, two of the 10 goals measured by the index.

The study, led by scientists from National Center for Ecological Analysis and Synthesis (NCEAS) at UC Santa Barbara and Conservation International was published today in the online journal PLOS ONE. The Ocean Health Index assesses ocean conditions in terms of how well the coastal waters deliver a range of benefits to people both now and in the future. The overall score for the west coast was 71 out of 100.

The Ocean Health Index scores 10 goals such as food provision, coastal protection, biodiversity, and clean waters from 0 to 100. A score of ‘100’ represents a specific target for each goal that is determined to be both attainable and sustainable. This regional assessment studied 5 regions on the west coast of the USA: Southern, Central & Northern California, Oregon State and Washington State.

“A score of 71 tells us that, as a whole, the west coast is doing a lot of things well in terms of the human impact and the benefits we derive from the ocean,” said the study’s principal investigator, Ben Halpern, professor at Bren School of Environmental Science and Management at University of California at Santa Barbara and associate with NCEAS. “There is, however room for improvement on several of the goals. The goal scores on the coastal and regional level for carbon storage and coastal protection are driven by the loss of key natural habitats and leave us vulnerable to serious problems in the future.”

The average scores for Carbon Storage and Coastal Protection were 59 and 58 respectively. The global Ocean Health Index study (Halpern et. al., 2012), which is not directly comparable because it uses only global databases, gave the entire USA coastline a score of 66 for Carbon Storage and 80 for Coastal Protection. Natural habitats are key to nearly all aspects of ocean health. In the Ocean Health Index, Carbon Storage and Coastal Protection, depend particularly heavily on their protection.

Carbon Storage assesses the ability of coastal vegetation to take up carbon dioxide from the atmosphere and store (sequester) it for long periods of time – decades to centuries – if
undisturbed. Salt marshes and seagrasses perform that function along the U.S. west coast. Oregon scored the highest of the five regions on Carbon Storage with 73 out of 100. The other regions had lower scores: Washington, 69; Southern California 61; Central California 54 and Northern California 46.

Coastal Protection assesses the ability of those two habitats, as well as sand dunes, to protect coastlines against flooding and erosion. Oregon again led the five regions, this time with a score of 71. Washington and Southern California scored 57; Central California 55; and Northern California 51.

The historic loss of all three habitats has contributed to low scores for these goals and lower benefits for human well-being. California has lost 91% of its salt marshes, about five million acres, since 1850. Oregon and Washington have lost about 35% of their salt marshes. By contrast, historical maps showed that the coast of New England, which has a much longer settlement history, has lost an estimated 37% of its historical salt marsh coverage.

Surprisingly, the Index reveals despite new policies and many restoration efforts, most of the habitats continued to lose ground from 2001 to 2006. Longer-term data available for the U.S. west coast showed that the status of these habitat-based goals and sub-goals has declined over the decade from 2000-2010. Despite these trends, near-term (5 year) future Index scores indicate that the status of salt marshes, sand dunes and seagrass is likely to improve owing to more effective management actions and other resilience measures.

The main causes for salt marsh loss have been residential, commercial, industrial or urban development; diking, filling, draining, pad building for oil exploration, road building, draining for mosquito control or livestock grazing, contamination, introduction of exotic species, sea level rise and excessive level of nutrient run-off from land.

Destruction of salt marshes reduces the amount of carbon that is being actively stored and also releases large amounts to the atmosphere when marshes are destroyed. In addition the loss of salt marshes also decreases nursery areas and food supplies for commercially important fish and invertebrates, reduces coastal protection from flooding and erosion, harms biodiversity, impacts some touristic and recreational activities and reduces water quality.

“The loss is a one-two punch in terms of ocean health, as their destruction releases carbon that had once been sequestered and reduces the natural protection they can provide,” said Sebastian Troëng, senior vice president of the Moore Center for Science and Oceans at Conservation International. “Conservation and restoration of coastal habitats should be a priority for the west coast, especially with the increase in major weather events, such as El Niño events and severe storms, that threaten extensive flooding and erosion.”

Regional assessment of the U.S. West Coast
This was the first comprehensive study of 5 regions along the US Coast that covers a broad spectrum of ocean health and productivity. Comparison of the performance in region is intended to inform further research and policy in the future.
The U.S. west coast, as a whole, scored highest in Tourism & Recreation (99); Marine Livelihoods and Economies (87); and Clean Water (87) and lowest in Sense of Place (48) and Artisanal Fishing Opportunities (57). The five west coast regions combined to have an average overall score of 71, indicating there are significant gains possible if certain issues are addressed and potential future problems are not.

The Index can be used at global or regional scales. The 2012 Global Ocean Health Index used databases with input from most of the world’s 221 Exclusive Economic Zones (EEZ’s). The regional study of the U.S. west coast used higher quality data that was specific to the region and applied it within the Ocean Health Index framework.

In the regional assessment of the U.S. west coast, the average of the 10 goal scores was 71 out of 100. Oregon was the highest scoring sub-region (74), followed by southern California (73), central California (71), northern California (67) and Washington (65). Though not strictly comparable, the overall regional score was slightly higher than the global score, 67, for the entire U.S. in 2012 and 2013, probably because the U.S. global score included all five of its EEZs: Alaska, Hawaii, US west coast, U.S. East Coast and Gulf of Mexico.

“Regional data improved our insight into the health of the waters along the rich and productive U.S. west coast,” said Steve Katona, managing director for the Ocean Health Index. “Allowing us to set region-specific targets that can guide managers and policy makers toward actions that best benefit both ocean life and human well-being.”

Other findings of note from this first U.S.-based regional study are:

• None of the five regions indicate the growth in aquaculture of shellfish necessary to meet NOAA’s mandate that US Shellfish production increase by 350% over 2005’s harvest before 2020. Aquaculture in saltwater (mariculture) is practically non-existent for finfish and at low levels for bivalves such as oysters, abalones, clams, mussels, and geoducks resulting in extremely low scores in this region. Currently, all of North America currently produces only 1.1% of the world’s aquaculture, which is valued at US$119 billion.
• Washington State and Northern California scores indicate a loss of revenues and jobs based on the marine sector over the past 5 years. The other 3 regions also lost jobs and revenues but at a lower rate.
• Though an exact comparison is not possible, all sub-region fisheries scores were higher than the U.S. score (33) in the 2013 global study, probably because the U.S. west coast is relatively healthy and generally well managed. However, the scores indicate that there remains room for improvement in fish stocks and management in all 5 regions.
• The U.S. west coast’s clean water score of 87 is high. However the future status is in question. Here and elsewhere global climate change will probably cause rainstorms of greater intensity and volume. New measures to prevent, sequester and treat pollution will be needed to meet the water quality challenges that our changing weather will present. Since clean water is a foundation upon which all other ocean benefits depend, the urgency of this task cannot be overestimated.
MEDIA RELEASE

Press Contacts:

Conservation International
Kevin Connor
703-341-2405
kconnor@conservation.org

Ocean Health Index
Jennifer Pettley
(831)-809-3088
jennifer.pettley@gmail.com

NCEAS – UC Santa Barbara
LeeAnne French
805-892-2529
french@nceas.ucsb.edu

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- Maps & Photos available for media use with correct credit information can be downloaded here: [http://bit.ly/1uBAldo](http://bit.ly/1uBAldo)
- PLOS ONE – Assessing the health of the U.S. west coast with a regional-scale application of the Ocean Health Index
- The US West Coast Ocean Health Index west coast regional assessment: [www.oceanhealthindex.org/regionals](http://www.oceanhealthindex.org/regionals)
- Nature, August 2012: “An index to access the health and benefits of the global ocean”

About the Ocean Health Index

The Ocean Health Index is the first assessment tool that scientifically compares and combines key elements from all dimensions of the ocean’s health – biological, physical, economic and social. The Index’s ten goals provide leaders with the portfolio of information they need to promote a more sustainable human-ocean ecosystem. The Index can be used globally, regionally or for an individual bay. It allows for direct comparison across different aspects of ocean health and different locations in a way that is not possible with current assessment tools.

The Ocean Health Index was developed with the contributions of more than 65 ocean experts including the National Center for Ecological Analysis and Synthesis and the University of British Columbia’s Sea Around Us project. The founding partners of the Index are Conservation International, National Geographic, and The New England Aquarium. The Founding Presenting Sponsor of the Ocean Health Index is the Pacific Life Foundation. The founding grant was provided by Beau and Heather Wrigley. For more information, please see [www.oceanhealthindex.org](http://www.oceanhealthindex.org) or visit us on [Facebook](http://www.facebook.com) or [Twitter](http://www.twitter.com).

Below is the global map of Index scores. To learn more about ocean health and to view and explore results of the Index, visit [http://oceanhealthindex.org](http://oceanhealthindex.org), and to download all data and results used in the project visit [http://ohi.nceas.ucsb.edu/data](http://ohi.nceas.ucsb.edu/data); both websites will launch at time of embargo lift.