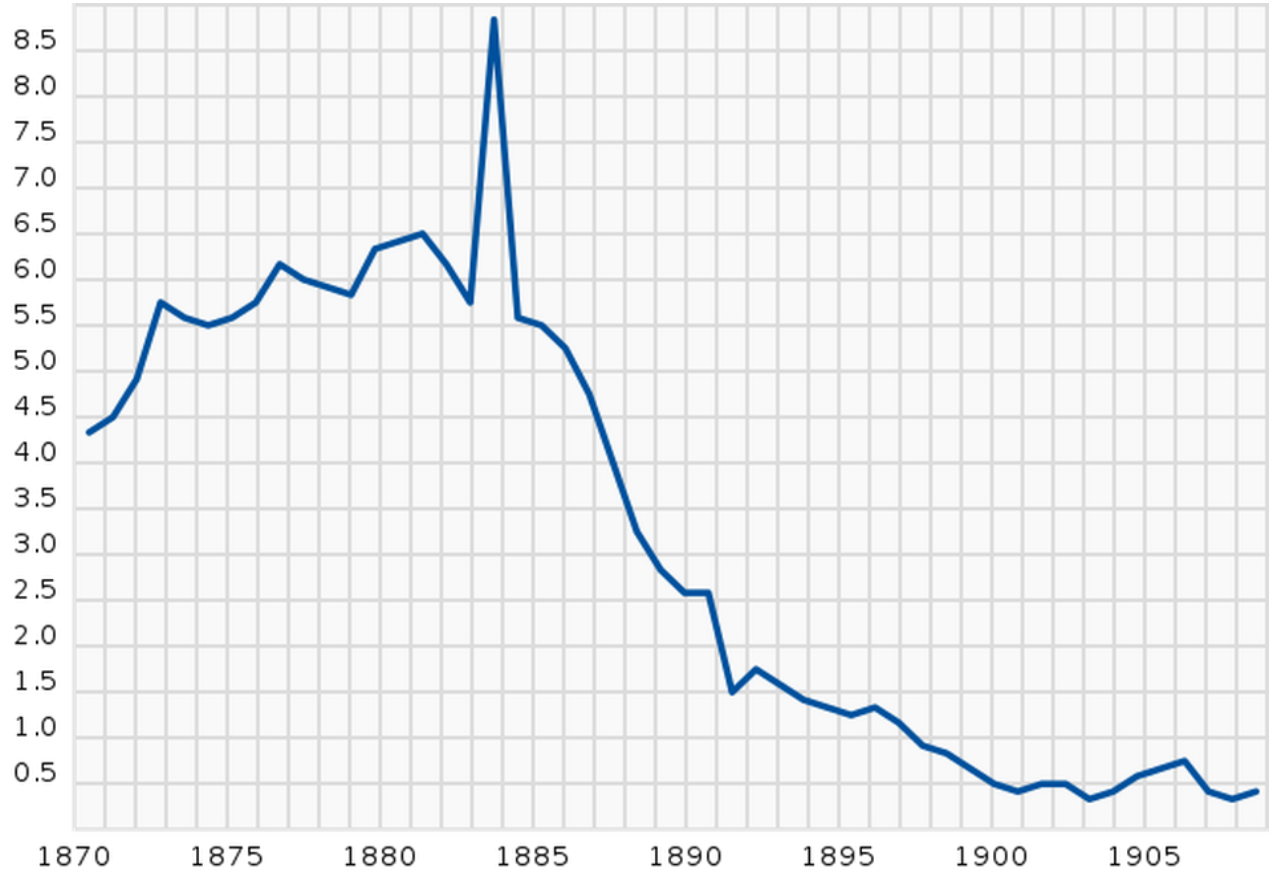
Sea Stars And Sea Otters Work Together To Maintain Canadian Kelp Forests

Priya Shukla Contributor
Science
I write about the ocean, climate change, and the future of our planet.

An Alaskan sea otter swims holding a heart-shaped block of ice, presented by his keeper in the... [+]

The North American Fur Trade began in the 16th century when European colonizers arrived on the shores of what would later become Canada and the United States. While pelts were initially acquired by exchanging goods with indigenous peoples, a thriving industry emerged after the publication of The Voyages of Captain Cook in the mid-18th century and continued through the 19th century until sea otter populations spanning California, the Aleutian Islands and Japan, crashed along with the sales of their pelts. By the early 1900s, sea otter populations were in the hundreds, but through active recovery efforts, their populations are now in the thousands. It became clear during these recovery efforts that sea otters play a critical role in kelp forests as "keystone predators". However, a new study by PhD Candidate Jenn Burt indicates that in the waters of British Columbia, sea otters are not the only important players - sunflower stars are also responsible for maintaining kelp forest habitats.



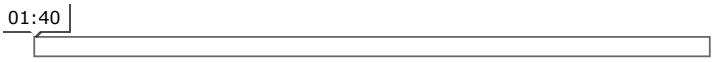
Graph of London Sea Otter pelt sales (1871—1910). Vertical axis is measured in thousands of fells. KALAN, BASED ON GRAPH FROM BRASS E. AUS DEM REICHE DER PELZE, BD III, BERLIN, 1911 (WIKIMEDIA COMMONS)

Along the coast of British Columbia, Canada, researchers have been able to document the impacts of sea otters on the ocean environment as their populations recover and move north (in what the researchers call "rafts of foraging otters"). Despite their low numbers, sea otters consume voracious kelp-eating sea urchins at a high enough rate that kelp forests continue to persist and provide habitat for numerous species. Without sea otters, sea urchins devour kelp forests and remove the high-quality habitat they provide, creating "barrens" in their place. Interestingly, Burt and colleagues found that sea otters only ate larger urchins, while sunflower stars specialized on medium-sized urchins. Therefore, kelp forests in British Columbia rely on both sea otters and sea stars to keep urchins at bay.

Sunflower Sea star (Pycnopodia Helianthoides). It is among the largest sea stars in the world and... [+]

When the sea star wasting epidemic hit the waters of British Columbia, 96% of the sunflower star population was wiped out in 2015 and 2016. While sea otters were unaffected by wasting disease and continued to eat large urchins, the populations of medium-sized urchins exploded by over 300% and the density of kelp forests declined by 30%. Despite their consumption of the largest urchins, the sea otters alone could not control urchin populations. Sunflower stars play an integral role in these kelp forest communities by preying upon medium-sized urchins.

As our oceans warm, sunflower stars will likely continue to be susceptible to wasting (the densovirus that causes wasting is facilitated by higher temperatures) and kelp forests that thrive in cool temperate waters will also degrade. If sunflower stars cannot keep urchin populations in check, these threatened kelps will become increasingly vulnerable to urchin consumption and the habitat they provide may no longer be suitable for the wide range of sea life they currently support.



* Writing this post was an opportunity to gratuitously watch sea otters frolick via the Monterey Bay Aquarium's Live Sea Otter WebCam and look at pictures of sea otters are holding hands.

Follow me on Twitter. Check out my website.

Priya Shukla

I am an ocean and climate scientist interested in how human activity is altering our coastal oceans. I am currently a PhD student at the University of California, Davis ... **Read More**