Whales as Marine Ecosystem Engineers

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Baleen and sperm whales, known collectively as the great whales, include the largest animals in the history of life on Earth. With high metabolic demands and large populations, whales probably had a strong influence on marine ecosystems before the advent of industrial whaling: as consumers of fish and invertebrates; as prey to other large-bodied predators; as reservoirs and vertical and horizontal vectors for nutrients; and as detrital sources of energy and habitat in the deep sea. The decline in great whale numbers, estimated to be at least 66% and perhaps as high as 90%, has likely altered the structure and function of the oceans, but recovery is possible and in many cases is already underway.

After surveying the role of whales in marine ecosystems, we will focus on the last of these roles. The sunken carcasses of great whales (i.e., whale falls) provide an important deep-sea habitat for more than 100 species that may be considered whale-fall specialists.

We use a metapopulation modeling approach to explore the consequences of whaling to the abundance and persistence of whale-fall habitats in the deep sea and to the potential for extinction of whale-fall specialists.

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