

WHAT HAPPENS TO DEAD WHALES?



WHAT IS A WHALE FALL? A whale fall is a dead whale sinking and transporting nutrients (food) to the sea floor. In 1989, the remains of a dead whale were investigated and the scientists were most surprised to see that many animals had set up home on and around the decomposing carcass and, finally, the bones. The most surprising thing was that some of these animals were found to be related to animals from hydrothermal vents and cold seeps – how could this be?

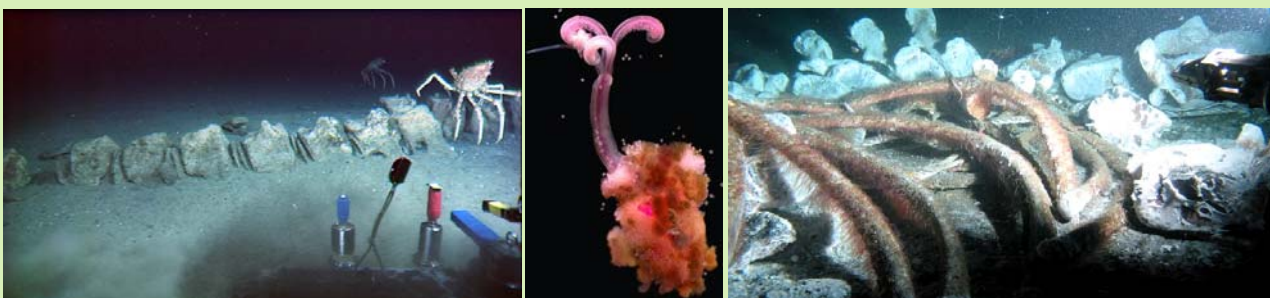
A FEAST IN THE DEEP: The deep sea floor is somewhat lacking in food with only a very slow supply of nutrients raining down from the surface waters, most of which is consumed en route. Therefore, the arrival of a massive input of organic matter in the form of a dead whale has, as you can imagine, a huge impact on the area of seafloor where it lays to rest. A single whale fall can supply up to 160 tons of food. This is equivalent to several thousand years worth of the normal supply of nutrients expected in the deep sea!

Just a short time after arriving at its final resting place, the whale carcass will be surrounded by a succession of animals, eager to begin feeding on the unexpected feast. When you consider the fact that there are tens of thousands of marine mammals each year that die and end up on the sea floor, you can see that their impact is likely to be very significant in some regions. For example, dead whales are more likely to be found along their migratory routes and around feeding grounds.



Artists impressions of a whale fall showing the three main stages of degradation over time, and colonisation by different animal communities. Artist: Mike Rothman, USA

WHAT ANIMALS ARE ATTRACTED TO WHALE FALLS? When the whale first arrives at the sea floor, animals known as scavengers move in rapidly to take advantage of all the soft whale tissue. These animals include hagfish, squat lobsters, crabs, amphipods, rattail fish and sleeper sharks. They take from between a few months to a couple of years to remove most of the tissue (depending on the size of the whale). As time moves on, the surrounding few meters of sediment are infested by dense communities of bristle worms, small crustaceans and sometimes snails and bivalves. These animals feast upon food in the bones and in the surrounding sediment. They may also use the bone for somewhere to settle. Finally, the whale bones begin to leak out chemicals – hydrogen sulphide – as they start to be decomposed by bacteria feeding on the bone marrow. Specialised bacteria are able to use these chemicals to produce food, and then they are consumed by other animals. Here is the link to hydrothermal vent and cold seep animals – they have the same chemical energy source. The bacteria may form special symbiotic relationships with some of the other animals, providing food for the animal and shelter for the bacteria. Mussels, clams and tubeworms have been found at this final stage of whale fall decomposition. In fact, more than 40,000 animals were found on a single whale skeleton! It seems that these animals can hang around the whale food source for tens of years and in some cases up to a century.



Photos courtesy of Craig Smith, University of Hawaii, Adrian Glover, NHM and Lisa Levin, Scripps Institute of Oceanography