

Event 1- Brown moths in California are killed with pesticides.

California apple growers have started to find brown moths in their orchards. The brown moths feast on the apples, destroying the crop. To eliminate this moth from the orchards, farmers have decided to spray pesticides over the orchards every night for one week. Once on the trees, the pesticide kills the moths, but it is also eventually absorbed into the soil. In the soil, the pesticide reaches the groundwater, which joins with local rivers that run into the Pacific Ocean, the location of kelp forests. In the ocean the pesticide kills phytoplankton and zooplankton.

Event 2 – A new housing development is built along the Pacific Coast.

A town on the coast of the Pacific Ocean approved building permits five years ago. After the houses were built, the land along the coast started to erode in spots, transporting fine grains of soil, or sediment, into the ocean waters. This sediment clouded small areas of coastal waters where there were kelp forests. When waters inhabited by a giant kelp ecosystem become cloudy, smaller plants on the ocean floor, such as acid kelp, do not receive enough sunlight, and they die. The sea urchins are unable to filter the sediment and die as well.

Event 3 – Harbor seals die off.

A disease sweeps through the harbor seal population, killing a majority of them. Without seals hunting them, the rockfish and sea urchin populations begin to expand rapidly. Although the sea otters have plenty of food, there are not enough of them to eat the extra rockfish and sea urchins. Sea otter females do not normally give birth to more than one pup a year.

Event 4 –Nitrogen compounds in runoff water cause algal blooms.

Fertilizers used to treat lawns and farmland have introduced nitrogen compounds into groundwater. These nitrogen compounds travel to the ocean in the groundwater and release excess nitrogen into ocean water. Nitrogen is a key nutrient for cyanobacteria and phytoplankton, and, when there is an unusually large amount of it, cyanobacteria and phytoplankton grow rapidly. This period of rapid growth causes an algal bloom, and a mat of blue-green algae can be seen covering patches of the ocean's surface. The mat of algae reduces the amount of sunlight that can penetrate to the depths of the ocean below.