



Teacher/Student Resources

OSPREY

Pandion haliaetus

How Pesticides Contributed to the Decline of the Osprey Population

Vocabulary

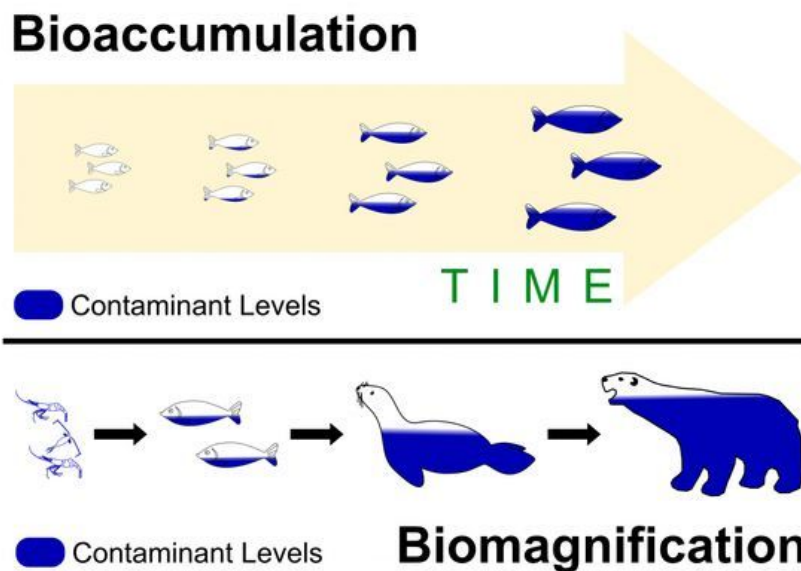
Primary producer - Organisms that make up the first level of the food web. They use the sun's energy to make food through photosynthesis.

Consumer - Any organism that must eat other organisms in order to survive.

Apex (Top) Predator - The highest trophic level in a food web, or top of the food chain. An apex predator plays a huge role in keeping the levels below balanced.

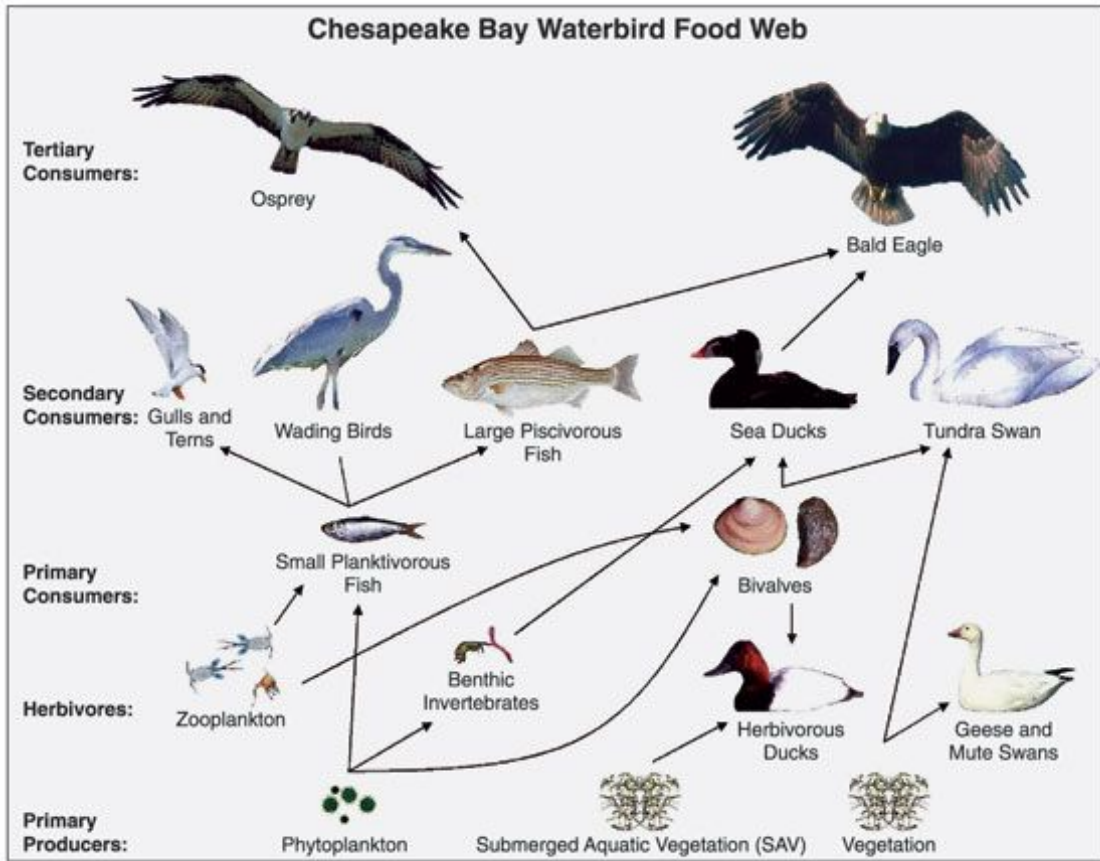
Bioaccumulation is the gradual build up of a chemical in an organism throughout its lifetime. Pesticides and chemicals that take a long time to break down, such as DDT, become stored in the tissues of an organism as they consume contaminated food.

Biomagnification, or bioamplification, is the increase in concentration of a chemical substance as it moves up the levels of the food chain.



Osprey in the marine food chain

Osprey are apex (top) predators along the freshwater and marine ecosystems they migrate through. Osprey feed on fish that live in the water, which in turn feed on smaller fish or invertebrates, which in turn feed on algae or aquatic plants, which get their energy from the sun through photosynthesis. The arrows in the diagram below indicate the direction of energy transfer in this food chain. They also show the direction that harmful chemicals move through the system.



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Osprey and DDT

DDT is a pesticide responsible for the decline of the osprey, but how did osprey become contaminated with such high levels of this toxin? If DDT gets into the water, the algae will become contaminated with small concentrations of DDT. Through **bioaccumulation**, the primary consumers that eat algae will build up even higher concentrations as they continue to feed throughout their lifetimes. The concentration of DDT will increase as it passes up each level of the food chain, through **biomagnification**. By this pattern, the osprey (top predator), will consume and accumulate the highest and most harmful concentrations of DDT. In ospreys, the accumulated DDT caused eggshell thinning, resulting in dramatic loss of chicks as parents sat on eggs during incubation. Thanks to the 1972 U.S. Ban on DDT, the osprey population has made a remarkable recovery.