

Patuxent Research Notes



The decline of canvasbacks in the Chesapeake Bay ecosystem

An **ecosystem** is defined as a place, such as a pond or a forest, together with all of the plants and animals that live there. Ecologists believe that to understand a plant or animal, it is necessary to understand how it interacts with soil, water, air, and other organisms. An ecologist understands the importance of seeing these connections. The canvasback population in Chesapeake Bay provides an excellent example of why we need to think about an entire ecosystem.

The canvasback is prized by sportsmen. It belongs to the group called bay ducks, which are known for their large webbed feet adapted for diving. Male canvasbacks are mainly white, with a reddish-brown neck and head, and black on the chest and rump. Female canvasbacks have tan heads and necks with a grayish-brown body. They are clumsy on land and spend most of their lives in water. They dive underwater to get tubers. Their bills are especially adapted for foraging wild celery tubers, a plant species especially associated with canvasbacks. Canvasbacks raise ducklings in the summer in the north central United States

and in Canada. They migrate to the west coast, the Gulf of Mexico, and the east coast for the winter. The Chesapeake Bay, on the coast of Maryland and Virginia, has been a particularly

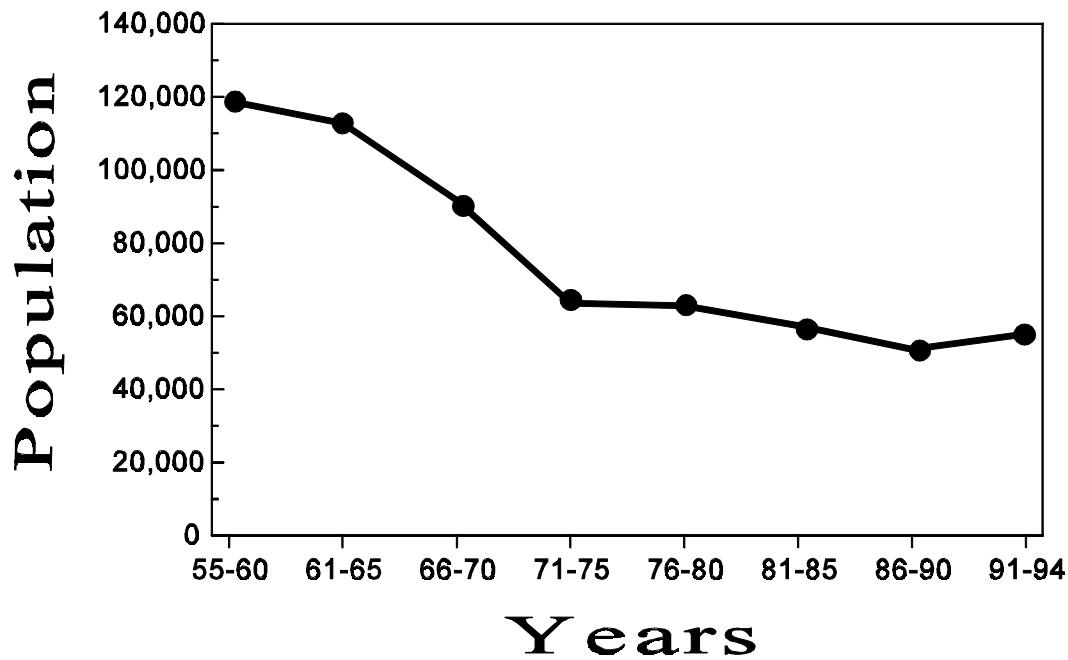


The canvasback

good area for canvasbacks in the winter. The graph on the next page shows that the population wintering in the Chesapeake Bay has declined greatly. The population from 1991 to 1994 was only about half of what it was from 1955 to 1960.

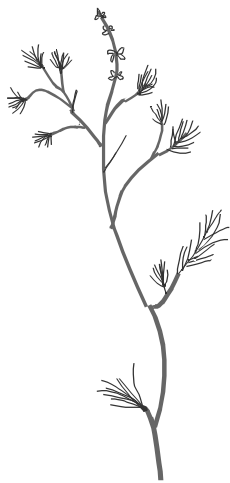
Biologists have been investigating the reasons for the decline. In the past, hunters harvested so many canvasbacks that populations decreased. However, in 1918 Congress passed the Migratory Bird Treaty Act, which allowed the federal government to regulate the hunting of migratory game birds. The recent decline shown in the graph was not caused by hunting. Most likely, the decline was caused by a change in Chesapeake Bay ecosystem or by a change on their breeding grounds..

Biologists learn what birds eat by patiently observing them in the wild and by carefully examining the contents of stomachs of birds that have been shot or found dead. In 1939, biologists found that four-fifths of the food eaten by canvasbacks in winter was plant material. Pondweed and wild celery are their favorite foods in the Chesapeake Bay. These plants



The population of canvasbacks wintering in the Chesapeake Bay has declined from about 120,000 in the late 1950's to about 55,000 in the 1990's.

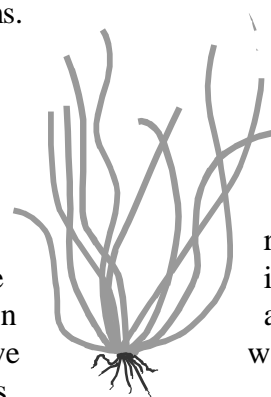
are rooted in the sediments and their leaves grow in the water. They are called **submerged aquatic vegetation** and are crucial to the health of the Bay.



Sago Pondweed

By the 1970's the food habits of canvasbacks had changed; more than four-fifths of the food eaten by canvasbacks was clams. Submerged aquatic vegetation had disappeared from most of the Bay and the canvasbacks had switched to another food, which was less nutritious for them. To understand the decrease in canvasback populations, we must also understand what has happened to their food. Submerged aquatic vegetation, like other green plants, needs sunlight. When nutrients are washed into the bay, algae grow and absorb the sunlight in the water. Less sunlight reaches the submerged aquatic vegetation. When soil erodes from

construction sites, steep slopes and farms, it makes its way to the Bay and becomes suspended, where it also shades the submerged aquatic vegetation.



Wild Celery

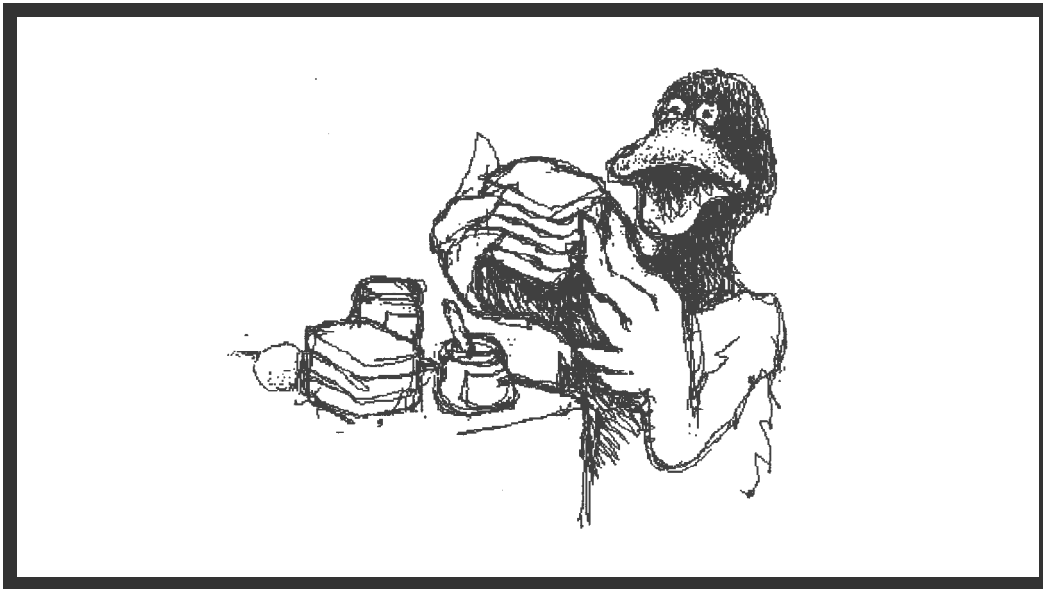
People did not realize just how important submerged aquatic vegetation was to the Bay until most of it had died. It helps keep the bottom of the Bay stable, provides cover for animals to hide from predators, provides food for many species, produces oxygen, and removes some contaminants from the water. Many species in addition to canvasbacks depend on submerged aquatic vegetation.

Now it is clear why we need to think about ecosystems rather than just one species at a time. Adding canvasbacks to the population already in the bay would not help increase the population in the long run,

because the problem is caused by a shortage of quality food.

The solution to the problem is to improve the Chesapeake Bay by reducing the amount of soil and pollutants entering it. These pollutants may come from

hundreds of miles away, from sewage, farming, city life, and industries. The fate of the canvasback in the Chesapeake depends on the health of the bay itself.



George Bernard Shaw described a basic ecological truth when he wrote that "there is no love sincerer than the love of food." Declines in populations of canvasbacks seem to be related to a decrease in their preferred diet of submerged aquatic vegetation.

*Nelson Beyer
Anna Morton
Sabra Niebur
Patuxent Wildlife Research Center*

*Albin Beyer
University of South Carolina*

*U.S. Geological Survey--Biological Resources, Patuxent Wildlife Research Center
and*

U. S. Fish and Wildlife Service, National Wildlife Visitor Center

