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BAY AREA
Tiny plants that feed fish in bay bouncing back
But recovery of vital food chain ingredient could get out of hand

- Jane Kay, Chronicle Environment Writer
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Scientists used to worry that San Francisco Bay didn't have enough phytoplankton, the tiny plants at the base of the food web that support aquatic life like clams and fish and on up to the diving ducks and harbor seals.

But new studies from the U.S. Geological Survey show that phytoplankton has increased 75 percent since the early 1990s. From San Pablo Bay to the southern tip of the estuary, levels of the microscopic plants are at their highest since monitoring began 30 years ago, transforming the bay into a richer estuary for wildlife.

The reasons behind the increase remain a mystery. Some experts suspect a decline in the phytoplankton-grazing nonnative clams, a reduction in toxic chemicals and sediment, and a shift in ocean currents.

Yet there is a possibility of too much of a good thing. Some scientists worry that if the trend continues for another 10 years, San Francisco Bay could face the kind of problems from decaying phytoplankton that killed fish in the Chesapeake Bay, the northern Gulf of Mexico and the Baltic Sea. Dying plants suck oxygen out of the water as they decompose, robbing fish and other aquatic wildlife of oxygen.

"San Francisco Bay is a different place than it was 20 years ago," said Jim Cloern, a USGS aquatic ecologist in Menlo Park.

"When we started studying the bay in the 1970s and 1980s, it had a low productivity of phytoplankton. In the last five years, the level has increased to what is comparable to the estuaries of North America and Europe," Cloern said.

Cloern plans to present his findings today at the annual meeting of the San Francisco Estuary Institute, a nonprofit research group.

Meanwhile, ongoing studies are attempting to find out why the phytoplankton is doing well in the marine parts of the estuary, but isn't growing as fast in the fresher Suisun Bay and the delta of the Sacramento and San Joaquin rivers.

Michael Connor, executive director of the San Francisco Estuary Institute, which runs a regional monitoring program for the bay, called phytoplankton growth one of the most important environmental issues for the bay in the next two decades.

"That's why looking at trends and understanding the bay is so important," he said.

In 1980, USGS experts and other scientists estimated that the phytoplankton production in the bay was about 200,000 tons of organic carbon a year, equivalent to the biomass of 5,500 humpback whales or the calories to feed 1.8 million people.

Since the 75 percent increase of phytoplankton between 1993 and 2004, the tonnage has grown to between 300,000 and 400,000 tons a year, scientists say.

According to Cloern's study, there are several possible explanations:

-- For years, the proliferating Asiatic clam, a nonnative species, has grazed on the bay's phytoplankton. A few years ago, the clams south of the San Mateo Bridge disappeared, allowing the algae to grow. The bay bottom-feeding English sole, Dungeness crab, speckled sand dabs and bay shrimp are more abundant than they've been for decades, leading scientists to believe that they are feeding on the clams.

-- A new voracious predator, the nonnative mollusk known as the New Zealand sea slug, invaded the bay in 1993 and has been feeding on the Asiatic clam and other bivalves that eat phytoplankton.

-- Climate-driven shifts in Pacific Ocean currents could be influencing the tidal exchange with the bay, in turn affecting phytoplankton movement into the estuary. Upwelling off the coast, where nutrient-rich water rises to the ocean's surface, promotes tidal mixing and the growth of diatoms and other phytoplankton species. The upwelling increased steadily between 1992 and 2003.

-- Regulators have cracked down on discharges to the bay of such toxic chemicals as herbicides and heavy metals, which can impair phytoplankton growth.

-- Large dams have cut the sediment flowing into the bay. That makes the water less cloudy. A clearer bay allows more light to penetrate the waters, and promotes growth.

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