

## **Delta decline linked to Sacramento sewage treatment in new study**

*Other researchers welcome information but say conclusion too broad*

**Mike Taugher, Bay Area News Group, 5-17-10**

A new study that shows environmental problems in the Delta are primarily driven by toilet-flushing in Sacramento — and not the state's dams and pumps — is sure to get a lot of attention from water agencies that contend their effect on the Delta is exaggerated.

Discharges from the Sacramento Regional County Sanitation District and other sewer-treatment plants have profoundly changed the food web in ways that deprive Delta smelt and other native fish while favoring fish considered less desirable, the study says.

The paper, which has been peer-reviewed and will be published in *Reviews in Fisheries Science*, shifts focus from Delta pumping stations to another contributor of the Delta's problems.

Specifically, sewer discharges from Sacramento have dramatically increased the amount of ammonium in Delta waters, while another nutrient, phosphorus, has declined because of its phaseout from detergents.

That shift has changed the building blocks of the estuary's food web in ways that determine what kinds of fish can thrive, and which ones can't, according to the paper by Patricia Glibert, an ecologist at the University of Maryland's Center for Environmental Science.

The paper says the way to start fixing the Delta is to reduce the nutrient discharges from the Sacramento sewer system.

"Until such reductions occur, other measures, including regulation of water pumping or manipulations of salinity, as has been the current strategy, will likely show little beneficial effect," the paper concludes. "Without such action, the recovery of the endangered pelagic fish species is unlikely at best."

The research was funded mostly by the contractors who rely on water from Delta pumps.

Predictably, they trumpeted the results as proof that the influence of water diversions from the Delta have been overemphasized.

"This study reinforces how additional restrictions on water exports from the Delta will not provide for the recovery of the fish species. All the stressors harming the Delta need to be addressed," said Laura King Moon, assistant general manager for the State Water Contractors, a group of agencies from the Tri-Valley to Southern California that rely on the state's Delta pumps.

### **Source questioned**

Officials at the Sacramento sewer plant attacked the funding source.

"This has been a line of thinking they (water contractors) have been trying to draw for some time," said Stan Dean, director of policy and planning for the Sacramento regional sewer plant. "You have to be careful about seeing the relationships (in trend analyses) that you want to see."

Glibert, who has not previously published work on the Delta but has extensive experience studying other estuaries, is a member of a prestigious panel of scientists that recently concluded that restrictions on Delta pumping operations are for the most part scientifically justified.

Researchers who have spent years studying the Delta were critical of several aspects of the paper.

"It's really stretching it to say ammonium is the root cause of the Delta smelt decline," said Bill Bennett, an ecologist at UC Davis and the foremost expert on Delta smelt. "You can see a decline in the food and a decline in the fish, when something else could be causing the decline in both."

Several researchers said Glibert was a solid scientist whose paper adds to what is known about the Delta. But Bennett and others said the findings, which come close to fingering a silver bullet, went too far.

"I think she's taking things a little too far, a little premature," Bennett said.

Glibert compared long-term trends to find correlations between discharges from Sacramento, Delta water quality and the kinds of plants and animals that grow there.

"The statistical method she used exaggerates trends, and suppresses the very real effect of natural variability," said Wim Kimmerer, an estuarine ecologist at the Romberg Tiburon Center at San Francisco State University.

"The overall approach is also based mostly on correlation and ignores important influences that we have learned about through more detailed methods, such as the effects of clams and other introduced species on the food web of the estuary."

In early 2005, state biologists who track the Delta's fish populations noticed a sharp decline in several fish species, setting off alarms that the Delta was in a widespread and unexplained ecological decline.

### **Potential causes**

Since then, California's salmon population joined the collapse, for reasons that scientists have not untangled.

But in each case, most researchers agree that the state's system of delivering water through the Delta is at least part of the problem and other factors also contribute.

Ammonium from the Sacramento sewer plant, which discharges an average of 145 million gallons a day of treated sewage, has for few years been near the top of that list of other potential causes for the collapse, but most of the focus has been on whether ammonium discharges might be poisoning fish.

Glibert said the problem was more subtle.

The increase in ammonium changed the kinds of algae that thrive in the Delta, and that change rippled up the food web, she concluded.

Before 1982, the nutrients in the Delta were mostly nitrate and phosphorus, which fed algae called diatoms that in turn were eaten by zooplankton that made up the food that Delta smelt and other native fish eat.

That food web changed in the 1980s and 1990s, and in a third "era" identified by Glibert, since 2000 the base of

the Delta food web is mostly ammonium and blue-green algae, which in turn are favored by another kind of zooplankton that is in turn favored by non-native fish, like inland silversides.

While her paper focused on one potential source of stress on fish, Glibert acknowledged that the National Research Council panel of which she is a member would likely find other problems in the Delta by the time it completes its study of the Delta's problems in late 2011.

"There is no doubt that when we look at other stressors we will find additional effects," Glibert said.