

The Pelagic Organism Decline (POD)

What is the POD?

Annual fish surveys conducted since 1967 by the California Department of Fish & Game previously revealed long term declines in four species of fish that occupy the open waters of the upper San Francisco Bay estuary: Delta smelt, longfin smelt, age-0 striped bass, and threadfin shad. However, since 2000, record and near-record low numbers of these fishes were found in Suisun Bay and the Delta. Because these fishes use open water habitat more than the near-shore environment they are referred to as pelagic fishes. The abrupt decline in abundance of the four species is now widely recognized and referred to as the *Pelagic Organism Decline*, or “POD.”

What are the core issues?

As more detailed information becomes available for each of the POD species, there is growing recognition that while some environmental factors potentially explain fish trends during the decades preceding the POD, they do not explain more recent events. The fact that large numbers of Delta smelt (a federal and state-listed species) are drawn into the water pumps supplying the California Aqueduct and the Delta-Mendota Canal led a federal court to order decreases in water exports by the State Water Project (SWP) and the federal Central Valley Project (CVP) starting in December 2007. The prospect of decreased water exports from the Delta, and widespread recognition of the need for new strategies to manage Delta resources, has intensified public debate about the underlying causes of the POD.

What may be causing the POD?

It is widely understood that the chief culprit in the POD are reduced flow and fish entrainment caused by increasing water transfers out of the Delta to other parts of the state. Several environmental factors associated with those water diversions and other issues are being investigated by state regulators, including:

Invasive Species. Non-native species of clams, plants, and zooplankton may be contributing to fish declines in many ways. For example, massive filtration of water by non-native overbite clams profoundly altered the food web of the upper estuary starting in the late 1980s. Invasive plants, such as the Brazilian waterweed, are now providing cover for predatory fish that eat the smaller pelagic fishes.

Food Supply/ Food Quality. Pelagic fishes eat zooplankton and other aquatic invertebrates during all or part of their life spans. The relative abundance of zooplankton species has changed since the mid 1970s. This may have altered the nutritional value of these prey, or made them harder to catch. While POD fishes do not eat phytoplankton, they are a critical component of the food web. Abrupt declines in phytoplankton biomass in the upper estuary after the arrival of the overbite clam may be linked to long term fish declines. Changes in phytoplankton species, or the frequency of spring blooms, may also affect the pelagic food web.

Toxic Algae. Blooms of a toxin-producing species of phytoplankton, *Microcystis aeruginosa*, have been observed in the western and central Delta since 1999, which may be contributing to the POD.

Predation. Large mouth bass and adult striped bass are predators of the POD fishes. Although age-0 striped bass are in severe decline, adult striped bass (3+ years old) have not decreased in recent years. Infestations of invasive water weeds are expanding the available habitat for large mouth bass.

SRCS D's Policy Principles

Any proposed Delta solution must:

- ✓ Be conclusively supported by science to identify relevant and cost effective solutions.
- ✓ Ensure everyone who benefits pays their fair share.
- ✓ Provide real and measurable benefits to the Delta ecosystem.
- ✓ Be developed through transparent public processes and robust stakeholder involvement.

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Contaminants and Disease. Pesticides and other potential toxicants in river water and water pumped from Delta islands may be contributing to the POD. Municipal discharges contribute nutrients, and may be introducing endocrine disruptors or other emerging contaminants. Viral and parasitic infections have been observed in some samples of Delta smelt and striped bass.

Entrainment. Collectively, millions of fish per year are drawn into SWP and CVP pumping facilities, cooling water intakes for two power plants, and numerous unscreened in-Delta diversions. Fish mortality may be more problematic during winter when adult fish migrate into fresher water habitat in the Delta prior to spawning.

Salinity and Water Clarity. The four POD fish species exhibit strong preferences for specific ranges of salinity and water clarity. During the last four decades, the proportion of open water habitat best suited to the POD species in terms of salinity and water clarity has declined. Responsible factors may include changes in the amount of fresh water that flows out of the Delta, and trapping of sediment by upstream reservoirs and by beds of non-native aquatic weeds.

What about ammonia?

Several issues have been raised regarding ammonia impacts to the ecosystem; however, none of these hypotheses have been adequately studied, and certainly none have been confirmed. In fact, no existing data demonstrates that, under current conditions, discharges from SRCSD's treatment facility is adversely impacting Delta fish - but SRCSD supports more research to yield definitive answers.

According to the Central Valley Regional Water Quality Control Board (CVRWQCB), "current Delta ammonia concentrations are far lower than concentrations that US EPA guidance indicates would be toxic." However, in response to ammonia impact hypotheses, the CVRWQCB has sponsored two studies in the Delta in 2008 to determine:

- (1) Whether Delta smelt are especially sensitive to ammonia toxicity and are being directly impacted by ammonia in the Delta. Results from this study indicate that SRCSD's effluent is ***not*** acutely toxic to Delta smelt even at concentrations four times greater than that found in the Sacramento River.
- (2) Whether the levels of ammonium in the Delta are inhibiting phytoplankton growth, or altering the species composition of phytoplankton, which might affect the Delta fishes' food chain. Results are expected in 2009.

SRCS D's Position

- We must focus first on the largest issues impacting the Delta – and not allow our attention to be diverted and millions of more dollars spent on "solutions" that will not fix the problem.
- Prudent policy and fiscal management dictate the largest impacts be tackled first, instead of expending significant resources to nibble around the edges of the problem.
- Many factors have contributed to the decline of the Delta – and all must be scrutinized thoroughly and equally.
- Sacramento residents and businesses should not have to subsidize new water supply infrastructure, or bear the costs of ammonia removal at SRCSD's wastewater plant, simply because water agencies from other parts of the state, including Southern California, Bay Area and South Central Valley, want to move their intake facilities further north up the Sacramento River.