

CALFED SCIENCE PROGRAM ISSUE SUMMARY

The role of ammonia/ammonium in the functioning of the Sacramento-San Joaquin Delta has garnered considerable recent attention as scientists search for the main causes for the collapse of native fish populations in the region.

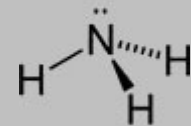
Crucial research efforts are underway to identify potential causes for the pelagic organism decline (POD) in the Delta. Pollutants are likely to be one of the contributing factors. Studies suggest that increasing ammonia/ammonium discharges in the lower Sacramento River and Delta due to increasing human population could have negative impacts on aquatic ecosystems, especially the food web, and potentially contribute to the decline. An immediate response to POD has been the court-ordered curtailing of water exports from the Delta—the source of water for two-thirds of Californians and three million acres of agricultural land.

To address concerns of various Delta interests, the CALFED Science Program convened a public workshop and tasked a panel of national experts to develop a research framework—which would focus studies and funding on the highest priority issues first—to assess the role of ammonia/ammonium in the Delta. The research framework recommends conducting research under an overarching conceptual model to coordinate the variety of disparate research efforts, synthesize information among disciplines to get at complex interwoven relationships, and to identify areas where critical information is missing. Key research priorities from 12 panel-identified topics include:

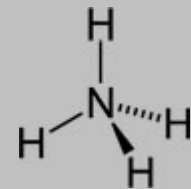
- Use models to explore the transport of ammonia/ammonium within the Delta and effects on the amount of, type of, and growth of algae, the base of the Delta food web
- Determine the main sources of ammonia/ammonium (and phosphorus) and trace the fate of these substances within the Delta
- Explore possible links between specific types of algae and aquatic plants and the amount of ammonium in the water
- Identify potential effects from toxins from harmful algae now blooming in the Delta

The research framework charts a pathway forward for addressing the potential roles of added ammonia/ammonium in the Delta and Suisun Bay. As multiple plausible causes for POD have been proposed, the impacts of ammonia/ammonium are one that deserves serious, coordinated study.

Definitions



Ammonia – a gas, like oxygen, that's dissolved in water. Ammonia is at least 100 times more toxic than ammonium to fish and invertebrates. (Chemical formula: NH_3)



Ammonium – an important nutrient for plants and a source of energy for some bacteria. Ammonium is found in fertilizer, is a byproduct of wastewater treatment, and is produced through decomposition. (Chemical formula NH_4^+)

The CALFED Science Program provides summaries on important scientific research relating to the California Bay Delta—the largest estuary on the Pacific Coast and habitat to more than 750 plant and animal species. The Science Program's mission is to provide the best possible, unbiased scientific information for water and environmental decision-making in the Bay-Delta system.

For more information, please visit the CALFED Science Program website (www.science.calwater.ca.gov) or contact CALFED Lead Scientist, Dr. Clifford Dahm at 916-445-0463.