Water quality management in California

As with storage and delivery, water quality is managed at the local, state and federal levels. The California Environmental Protection Agency (CalEPA) administers many of California’s water programs through the State Water Resource Control Board (SWRCB). The SWRCB operates through nine Regional Water Resources Control Boards (RWCBs) under authority from California’s main water quality law, the Porter-Cologne Water Quality Control Act. While the SWRCB and RWCBs (together “State Water Boards”) are the primary agencies enforcing water quality laws and regulations in California, literally hundreds of other agencies and authorities are involved with water quality issues at some level, collaborating to develop and manage programs aimed at understanding and improving water quality statewide. Major state agencies that manage key water quality programs include the CA Department of Public Health (CA DPH) which ensures the quality of public drinking water, and the CA Natural Resources Agency.

California’s multi-agency approach to water quality relies on delegated authority, which allows states to develop regulations and programs that meet or exceed applicable federal standards. For example, the federal Clean Water Act (CWA) and Safe Drinking Water Act (SDWA) apply to California waters, and the U.S. Congress authorized the U.S. Environmental Protection Agency (EPA) to set water quality based standards and develop programs and regulations to maintain and improve water quality over time. EPA delegated authority to CalEPA to enforce major aspects of the CWA and SDWA. CalEPA divides this authority further between the State Water Boards and CA DPH, which often work closely with other agencies and local authorities to understand issues and implement programs that are authorized and funded under both state and federal law.

California has several state laws in addition to Porter-Cologne that are more stringent than federal water quality requirements. The California Safe Drinking Water Act authorizes CA DPH to regulate public drinking water quality. A newly added section of the California Water Code known as the Human Right to Water is the first law in the U.S. to guarantee access to clean and affordable water for drinking, washing, and cooking. This requirement is not yet implemented, as evidenced by the ongoing lack of access to safe water in many California communities.

State and federal funding for water quality projects: Financial assistance from state and federal funds is essential for addressing local water quality issues in California, especially in cases where water infrastructure updates or other major projects are needed to prevent or address degraded water quality. In some areas, financial assistance supports projects and program development, in many others, funding must be used to address urgent community needs, e.g. providing immediate access to uncontaminated bottled water to meet basic human needs.

Regional Basin Plans: RWCBs develop and update Basin Plans, which are required by Porter-Cologne and the CWA and are important tools for implementing water quality regulations required by state and federal law. Basin plans determine beneficial uses, set water quality objectives, and identify actions needed to maintain and improve the quality of surface and groundwater in different regions. These plans contain detailed policy statements and set specific limits for activities that impact water quality, including control of both nonpoint and point source pollution. Through basin plans, RWCBs have the ability to regulate all pollutants that may degrade either surface or groundwater quality in the relevant region, and can prescribe specific practices to individual polluters and agricultural operations to limit ongoing water pollution. However, there is little consistency in applying pollutant discharge limits or other regulatory controls to protect water quality statewide.
Major water quality issues in rural California

Despite progress in reducing wastewater and industrial water discharges from point sources, water quality problems are common in California and many have worsened over time. Nonpoint pollution is not well managed and comes from many sources including cities, construction sites, mining and timber operations, and agricultural activities. In addition, lawmakers and regulators often lack authority to prevent newly developed chemicals and unknown contaminants from entering the environment. Other pollutants can accumulate and linger in the environment for many decades after being introduced to water bodies above or below ground.

Several serious pollutants have impacted California’s water quality for years or decades already, and are very likely to remain present in the environment for years to come. These include:

- **Nutrient pollution** causes algae blooms in surface waters, depleting dissolved oxygen and in severe cases resulting in “dead zones” where aquatic organisms cannot live. Nutrient “loading” to waterways can also contribute to increased salinity in surface and groundwater, and causes unsafe drinking water in severe cases.

- **Nitrates** are important agricultural nutrients, but are readily transported into water via surface runoff and percolation especially when fertilizers are over-applied or applied immediately before a precipitation event. Nitrate concentrations in drinking water are a major public health concern already, and the problem is projected to grow.

- **Salinity** refers to dissolved minerals in water, and can include hundreds of different ions. However, most salinization in water is caused by chloride, sodium, nitrate, calcium, magnesium, bicarbonate, and sulfate. Trace concentrations of boron, bromide, and iron can cause localized water quality issues. High salinity affects plant growth and damages crops as well as drinking water. Most salts can remain in groundwater for decades. In California, salts occur naturally but salinization is exacerbated by dissolution and evaporative enrichment (i.e. when irrigation water evaporates). When salinized water is pumped and used for additional irrigation, the evaporation cycle repeats and salinity levels rise.

- **Sedimentation** or siltation occurs when eroded soils and other sediments enter water. Water quality impacts are magnified when sediments transport pollution into waterways.

- **Pesticides** and other chemicals can completely alter the characteristics and quality of water bodies. Unfortunately, chemical pollution including compounds from pesticides are increasingly present in the environment. Many pesticides remain in the environment for decades once used; constituent chemicals can be contained in sediments and/or transported to water where they harm aquatic species and humans.

- **Heavy metals**, especially mercury/methylmercury, have been present in California’s waters for many years. During the gold rush era, miners imported and used millions of pounds of mercury in the Sierra mountains as a convenient bonding agent, losing approximately 10-30% to waterways. Mercury is especially harmful once introduced to water because it bioaccumulates in the tissues of exposed organisms, magnifying in concentration due to natural food chain dynamics. Heavy metal bioaccumulation and mercury poisoning threatens fish and other species, as well as humans exposed to these metals through contaminated water and through eating contaminated organisms.

Other groundwater quality issues: Nitrates, salts (including selenium and boron), heavy metals, and pesticides all degrade groundwater and drinking water quality, and are especially common in agricultural regions. California’s rural water is also commonly contaminated with hexavalent chromium and/or arsenic, and increasingly by pollution from the oil and gas industry (i.e. MTBE and other unknown chemicals). Areas with overdrafted groundwater and disadvantaged communities are especially vulnerable to groundwater and drinking water contamination.