

March 12, 2008

Mr. Stuart Drown, Executive Director
Little Hoover Commission
ATTN: Mr. Mark Martin
925 L Street, Suite 805
Sacramento, California 95814

Dear Mr. Drown:

Thank you for inviting me to participate in the Little Hoover Commission's hearing to be held on March 27, 2008. Attached are my written responses to questions provided to me by Mr. Mark Martin.

The Central Valley Regional Water Quality Control Board, as well as the other eight Regional Water Boards, has a very complex mission that is reflected in the very large number of its mandated programs some of which do not have the resources necessary for their full implementation.

I am looking forward to participating in your hearing on March 27, 2008.

Sincerely,

Dr. Karl Longley, PE
Chair
Central Valley Regional Water Board

Encl: as

MEMORANDUM

March 12, 2008

To: Little Hoover Commission

From: Dr. Karl Longley, PE, DEE
Chair, Central Valley Regional Water Quality Control Board

Subject: Reply to Questions Submitted by the Little Hoover Commission

The Little Hoover Commission has asked for my ideas on the water quality issues and the successes and challenges/barriers of the Central Valley Water Board. Before I provide my ideas, I believe it is important that I point out that the satisfactory resolution of the issues confronting the waterboards, including both technical and organizational issues, cannot fully be realized without the resolution of the basin plan issue. In short, basin plans are very much out of date primarily due to the lack of the necessary funding for updating these plans. The basin plans provide the regulatory framework for water quality programs. In fact, to refer to them as basin plans may be a misnomer. They, in fact, go far beyond being plans. The basin plans are truly the primary basin regulatory document setting forth the beneficial uses and the water quality objectives for the basin. The success of water quality programs in California require basin plans that are current and based upon sound science. This requires funding that is not now provided. The new strategic plan being prepared by the waterboards addresses the basin planning dilemma by stating "...Inadequate Basin Plans also result in delays in major needed regulatory activities, timely issuance of permits, and achievement of water quality objectives, as well as possible inconsistent or inequitable application of regulatory approaches."

Below are my replies to the questions that were provided to me:

1. *What are your region's most pressing water quality and water supply issues, and does the state have the appropriate governance structure to respond properly to current and future issues? What changes are needed?*

1.1 Regarding the Central Valley's most pressing water quality and water supply issues.

The following is a brief summary of water quality issues:

- Salinity – increasing salinity is generally not a health issue, but makes the groundwater less usable as a community water supply, giving the water an unpleasant taste, causing mineral deposits, increasing soap usage, and other factors. Depending on the location, high salt concentrations can be either naturally occurring, or caused by agricultural, sewage, dairy, industrial, or other human sources. The Central Valley Regional Water Board has initiated a major policy and technical effort to address salt in the Region.
- Nitrates – high nitrates, a special component of salinity, threaten the health of fetuses and infants. High nitrate concentrations can also impact the desired

growth of certain crops. Nitrates are naturally occurring in some areas, with human activities including agriculture, septic systems, dairies, and many other activities adding to groundwater nitrates. Increasing nitrates is the largest cause for closure of drinking water wells in the San Joaquin Valley. Nitrates are addressed in municipal and industrial wastewater discharge permits, and recently adopted permits for dairies also address nitrates.

- Arsenic and uranium – extensive portions of the groundwater basins have high concentrations of naturally occurring arsenic and uranium that exceed newer, more stringent drinking water standards. New, expensive drinking water treatment systems are needed to remove these constituents or alternative, safe water supplies should be used.
- Pesticides – agricultural soil fumigants and other pesticides are present in shallow groundwaters in some areas. The Department of Pesticide Regulation has identified areas with a high groundwater threat and has instituted changes in pesticide use to eliminate further pollution, but some legacy pollution exists.

Development of a Comprehensive Program in the Delta to Protect Water Quality

The Delta is a complex system that supports a unique ecosystem, provides a critical water supply that powers the California's economy, and supports an important local economy. The Delta's unique ecosystem is now in a critical state with many factors under consideration as having a role in its decline. The Delta has hundreds of miles of levees that are ranked as possibly being the most unstable levee system in the United States.

In December 2007 and January 2008 the State Water Resources Control Board, the San Francisco Regional Water Quality Control Board, and the Central Valley Regional Water Quality Control Board adopted identical resolutions titled "Water Boards' Actions to Protect Beneficial Uses of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary." These waterboards have formed the "Delta Team" that is charged with a large number of actions set forth in the resolutions. The Delta Team is developing strategy and preparing a strategic workplan that will guide their efforts addressing the actions set forth in the resolutions and other actions that may become necessary as more information becomes available. Information is currently being sought from stakeholders to assist in the preparation of the strategy and workplan.

Salinity Impacts on Groundwater and Surface Water

Salts in soils and surface and ground waters of the Central Valley are increasing to concentrations that have or threaten to significantly diminish the availability of high quality water supplies. As surface and groundwater supplies dwindle, and as wastewater streams become more concentrated, our waters are becoming less usable as a result of salts at a greater frequency and magnitude. Failure to control salts will result in a decline of Central Valley water quality at an enormous cost to all

water users of Central Valley waters, both within and outside of the Central Valley. Failure to control salts eventually creates greater hardship for the environment, agriculture, industry, municipal utilities, and the entire economy of the Valley and the State through the stagnation and/or decline of the Valley economy with loss of jobs and opportunity for many, many Valley residents.

Current solutions to provide a water supply, now and into the distant future, with acceptable salinity concentrations can result in treatment technologies and other engineered solutions that treat high salinity waters and produce a concentrated brine stream that currently must be disposed within the Central Valley. Treatment also results in increased demand on energy through treatment and/or pumping that will increase the production of greenhouse gases and the carbon footprint of the Central Valley.

The need to control and abate the impacts from increasing salinity through the development of a Long-term Salinity Management Policy for the Central Valley is an important priority for the State of California and is consistent with the goals and objectives of the California Strategic Growth Plan.

Groundwater Contamination in the Southern San Joaquin Valley

Most communities and homes in the southern San Joaquin Valley depend primarily on groundwater as their source of drinking water. Groundwater quality is highly variable, ranging from very good quality to very poor quality throughout the area. The quality varies with location and depth, often with deep waters being naturally saline, mid-depth waters being of good quality, and shallow waters again of poor quality. Water supply issues have impacted water quality in the region. Heavy extraction of groundwater, primarily for irrigation usage, has depleted good quality water in some locations and drawn poorer quality waters to water supply wells. Irrigation projects that have moved large volumes of surface water around the valley have changed natural groundwater movement patterns, also impacting groundwater quality. Increasing population and industrial activity in the Valley results in increased volumes of wastewater that must be treated and disposed either through municipal treatment systems or individual treatment systems (typically septic tanks). The Southern San Joaquin Valley lies within the Tulare Lake Basin, a closed basin with no outlet. Therefore, salts and nitrates discharged as a result of wastewater discharges, as a result of irrigation, or resulting from other activities is stored in the soil profile and eventually is carried to the groundwater. There is no significant transport of salts or nitrates out of the Tulare Lake Basin.

Many small communities have inadequate funds, and many of the drinking water systems are not up to current standards. Water supply wells are often shallow and not constructed to exclude poor quality water even when better quality water may be available. The drinking water treatment systems are often not state-of-the-art, particularly in rural, economically disadvantaged communities that are also oftentimes plagued with failing septic tanks. Many communities have drilled deeper water supply wells that avoid shallow water quality problems caused by human activity, but still have water quality problems from deeper, natural water quality problems.

Relationship of water quality with water quantity.

Many water quality problems are directly related to water quantity. Additional water sources will be necessary in the Central Valley to resolve water quality issues. Conjunctive use of water coordinating groundwater storage and surface storage is imperative. Additional use and recycling is also an imperative to make better use of the available water.

Importation of lower quality water into the Southern San Joaquin Valley

California water projects are the largest importer of salt into the Central Valley. With restrictions imposed by Court order on Delta exports, a critical issue of importance is water supply and improved water quality for the Valley. A structural solution to convey water around the delta is necessary if water delivered south of the Delta is to have significantly lower salt concentrations.

Coordination with California Water Plan

Requiring the California Water Plan (CWP) to be a joint effort between DWR and the SWRCB is an action that would prove beneficial to overall water planning. DWR is placing significantly more emphasis on water quality in the 2009 update to the CWP. An advantage that would result from the implementation of a joint effort, an integrated DWR and SWRCB CWP, is that it would more closely link water quality policy to water supply policy. This is a needed and very beneficial outcome.

1.2 Regarding whether the state has the appropriate governance structure to properly respond to current and future issues.

The current structure can respond appropriately to both current and future issues. It is critically important that water quality and water supply be linked and their functions be retained in one agency. This necessary link cannot be assured and properly addressed if the responsibilities for water quality and water supply reside in different agencies (i.e., SWRCB and DWR). In order to minimize conflict and the time required for critical decisions regarding the interlinking issues of water supply and water quality that these two critical aspects of a comprehensive water regulatory program reside in the same agency, the State Water Resources Control Board (State Board).

All state agencies involved in water supply and quality should be required unambiguously by law to work cooperatively and collaboratively in developing state policies and water project. The roles, responsibilities, and interrelationships of each agency should be clearly delineated. Currently different agencies have similar responsibilities resulting in some duplication in the expenditure resources from two or more agencies working on the same issue. This is a waste of state resources.

1.3 Regarding needed governance.

The State Board currently has the responsibility for providing oversight of the programs and actions of the regional boards. The tools the State Board has available to carry out the oversight function are many ranging from the ability to amend basin plans on its own cognizance to controlling the budgets of the regional boards. An essential key to good governance is good communication. The State Board promotes effective communication among management through the monthly meetings of the State Board Executive Director and the regional board executive officers; the monthly meetings of the State Board Chair and the regional board chairs; the biannual Water Quality Coordination Committee meetings; and a number of similar events where exchange of information and the development of actions to promote consistency and accountability are emphasized.

The emphasis on good communication is essential to promote consistency on the widely varied water quality programs throughout the state. Local conditions vary greatly throughout the state from high alpine areas with high precipitation and significant surface water sources to desert areas with little precipitation and minimal to no surface water sources. Human activity with its impacts on local water resources also vary greatly throughout the state. Each of these areas has its own unique problems that oftentimes cannot be addressed by a one size fits all solution. Local regional water boards bring to their region a good understanding of its water quality issues and the types of solutions that are workable. Also, local water boards have established strong relationships with the stakeholders within their respective regions thereby bringing about a high level of stakeholder involvement in the water quality programs of the various regional boards.

Various organizational models are now being evaluated to determine if a more optimal organizational structure exists for the waterboards. Regardless of the organizational model that eventually emerges from this evaluation, the strategic plan now being developed for the waterboards under the direction of the State Board is an essential element to the successful future of the waterboards. Some of the important elements of the strategic plan are:

- The development of a process whereby regional waterboards have the responsibility of collaboratively reviewing their programs for the purpose of eliminating inconsistencies.
- The identification and implementation of new or revised policies that promote consistency among the waterboards and promote accountability.
- The creation of a readily accessed inventory of the programs and functions of the waterboards.
- The implementation of performance-based work plans for waterboards' programs that have measurable outcomes and are tied to resources..
- The development and implementation of a program review process for the regional waterboards.

The implementation of the above strategic plan elements will greatly promote consistency among the waterboards and provide for increased accountability of the waterboards.

2. *Should the state board have more authority to hold regional boards accountable for ensuring the protection and improvement of water quality? What is the appropriate relationship?*

- 2.1 Regarding state board authority to hold regional boards accountable.

See paragraph 1.3, above.

- 2.2 Regarding the appropriate relationship between the state and regional boards.

As stated in paragraph 1.3, above, the State Board currently has the responsibility for providing oversight of the programs and actions of the regional boards. The tools the State Board has available to carry out the oversight function are many ranging from the ability to amend basin plans on its own cognizance to controlling the budgets of the regional boards.

The existing relationship between the State Board and the regional waterboards is one that possesses great flexibility. To address Delta water quality issues a joint task force, the Delta Team, has been organized. It consists of staff members of the State Board and the San Francisco Bay and Central Valley Regional Boards. The Delta Team is a good example of bringing together individuals having varied and critical expertise that, in the performance of their duties, insure significant stakeholder participation thereby insuring a transparent process.

3. *How can the state and regional boards improve consistency, timeliness, and transparency in performing duties such as basin planning, adopting Total Maximum Daily Load projects, and permitting? How can the boards increase revenues or resources to improve performance?*

- 3.1 Regarding improvement in state and regional board consistency, timeliness, and transparency in performing their various duties.

See paragraph 1.3.

- 3.2 Regarding increasing revenues to improve performance.

All individuals need and greatly benefit from the use of water and all approaches that hold promise for providing the funding required to support strong water quality programs should be investigated.

4. *Are there structural issues within regional boards that should be changed, such as the composition of the regions, number of board members, role and duties of the executive officer, etc.?*

4.1 Composition of regions.

Within the existing regions there is often considerable difference in water and population needs throughout the extent of the existing regions (i.e., particularly in at least Regions 2, 5, 6, and 8). Furthermore, population representation is also uneven among the various regional boards (i.e., each has nine board members but the populations served by the regional boards varies considerably). To partially resolve the issues of different water and population needs could require many more regional boards, hardly an action that would lead to better accountability and consistency.

To address effective water quality program and regulatory needs, watershed and water basin boundaries must lie within the boundaries of a single regional board. Also, many of California's regional boards effectively manage two or more water basins within their respective boundaries.

4.2 Number of board members.

I do believe reducing the number of regional board members to 7 would simplify appointments, confirmations, and other support activities for regional board members since a slightly smaller pool of applicants would be required and fewer board members would be processed. However, reducing the number of board members to 5 could result in difficulty in consistently having a quorum for Board meetings given that the regional board members typically must have other employment and sometimes are not available.

4.3 Roles and duties of the executive officer.

Regardless of the governance structure that is adopted for the regional boards, the executive officers will continue to be the individuals to whom staff report and who serve as the focal point of the activities of the regional boards. Their role should be further strengthened. Some recommendations are provided below:

- If NPDES and permit approval authority is given to the executive officers the NPDES conflict issue, as set forth in the Clean Water Act, would be further resolved. In the event the NPDES approval authority is given to the executive officers and the regional board were to retain appellate authority, a provision that a member(s) of another regional board without NPDES conflict would serve for the hearing in the event of a caucus issue would further resolve this issue.
- Other waste discharge permit authority should also be given to the executive officers.

5. *What are some of the water quality successes and challenges/constraints in your region?*

In response to the request from the Little Hoover Commission for information on Central Valley Water Board successes and challenges/constraints, I am providing a brief overview of the Central Valley Water Board followed by a discussion of actions

taken by the Central Valley Water Board shown in Attachment 1 (Successes and Challenges/Constraints).

Two very important physical factors characterize the Central Valley Water Board:

- The Delta is the largest west coast estuary, and supplies over two-thirds of the drinking water for communities throughout California.
- The second largest contiguous groundwater basin in United States is situated in the Central Valley.

The Central Valley Water Board staff implements a significant number of various regulatory programs:

- Groundwater Protection: 47% of the technical staff is allocated to our various groundwater protection programs which include Waste Discharge Regulatory Program, Title 27 Land Disposal Program, Site Cleanup Program, Department of Defense Program, Underground Storage Tank Program and the Dairy Program.
- Surface Water Protection: 23% of the technical staff is allocated to our various surface water protection programs which include NPDES Regulatory Program, Storm Water NPDES Regulatory Program, Timber Harvest Program and the Irrigated Lands Regulatory Program.
- Water Quality Planning: 11% of our technical staff is allocated to our various water quality planning programs which include Total Maximum Daily Loads Program and Basin Planning, and
- Grants, Nonpoint Source and State Ambient Water Management Program: 9% of our technical staff is allocated to the remaining water quality programs which include grants, nonpoint source and the ambient water monitoring program.

The Central Valley Water Board has many successes. However, there are many challenges and constraints faced by staff and the Board that may impede the Board's ability to sometimes implement its programs. These include lack of adequate data and science, new or improved data, information or science not previously known, court challenges and decisions, and political constraints to name a few. Given the resource constraints of the Central Valley Water Board, similar to most governmental agencies, the Central Valley Water Board has had far more successes in its programs than Challenges/Constraints as illustrated in the following table:

Successes	Challenges/Constraints
<ul style="list-style-type: none"> • Number of Mine Closures and Cleanup • Wastewater treatment facilities. Increased number of tertiary treatment plant facilities. • Number of successful cleanup activities at brownfield development sites • Successful remediation efforts in military base closures • Improved Timber Harvest Regulatory Program • Development of the Tulare Lake Basin Plan to manage degradation and provide salt management • Number of complex TMDLs developed and being implemented • Creation of an enforcement section to improve compliance and enforcement activities by the Board. • Implementation of a complex and stringent Dairy Program to address 1600 existing dairies • Implementation of the irrigated lands regulatory program to address over 5 million acres of irrigated lands 	<ul style="list-style-type: none"> • Onsite Septic Systems – Resource constraints results in significant number of onsite private septic systems not being directly addressed by Water Board staff. • Aerojet • Wastewater Treatment Plant Upgrades – Infrastructure and treatment facilities improvements needed to meet new standards. • Water Quality Control Plan (Basin Plan) Program – Water Quality Control Plans for Central Valley have not been comprehensively updated and revised since 1970’s. • Hilmar Cheese - Water Board resource constraints results in delayed permitting and enforcement of largest cheese manufacturer in San Joaquin Valley. • Lake Davis (1997) – Department of Fish and Game Standard Practices violating Water Board permit results in significant downstream impacts. • MTBE - Nearly all of the 1180 open Underground Storage Tank (UST) cases in Region 5 are contaminated with MTBE. • Tulare Lake Groundwater - Legacy domestic and industry activities, projected population growth, increased agricultural industry and dynamics of state water distribution system impacts Tulare Lake Basin. • Delta Crash – the pelagic organism decline continues, resulting in additional water quality control programs and measures being implemented

Successes	Challenges/Constraints
<ul style="list-style-type: none"> • Successful implementation of the Title 27 Program to close and adequately regulate landfills • Significantly reduce rice farm pesticides discharged to the Sacramento River • Successfully reduce Selenium discharged to the San Joaquin River • Successful restoration of habitat and improved water quality through the Nonpoint Source Watershed Restoration Projects • Groundwater quality protected through removal of oil field sumps. • Significant improvement in compliance at construction sites through strong enforcement of the Construction Stormwater Program • Tough regulations on 70 municipalities for storm water discharges through comprehensive MS4 Permitting Program • Strong and adequate spill responses to protect water quality. • Effective regulations to protect water quality while eradicating pike from Lake Davis (2007) and protecting the downstream Delta from an invasive species 	

ATTACHMENT 1
SUCSESSES AND CHALLENGES/CONSTRAINTS
Central Valley Regional Water Quality Control Board
March 12, 2008

The following provides a brief description of some of the water quality successes and challenges/constraints highlighted above.

SUCSESSES

ENFORCEMENT AND COMPLIANCE PROGRAM

Reorganization to Improve Compliance and Enforcement Activities

In February 2008 the Rancho Cordova and Fresno offices reorganized to create separate compliance and enforcement work from permitting activities. The new structure allows better focus and prioritization for both compliance and permitting work, and will increase the overall efficiency of the office. Separate compliance and permitting sections mirror the structure used by USEPA, the State Water Resources Control Board (State Water Board), and many other regulatory agencies. Creating a separate group solely responsible for enforcement activities will result in increase our enforcement actions that will improve compliance with the Water Board's regulatory programs.

Storm Water Construction Program – Over \$4million in penalties collected by the Central Valley Board has led to significant improvements in implementation of BMPs to protect water quality. The Central Valley Water Board currently regulates nearly 6700 construction sites and our aggressive Storm Water Enforcement Program is yielding improved compliance with the Statewide General Permit. The enforcement program implements a progressive approach beginning with education and outreach and progresses to fines for the more egregious offenders. Weekly training sessions are held to provide outreach and education. Inspections and Notices of Violation have also been very successful in achieving compliance. However, Administrative Civil Liabilities (ACLs) have been very effective in delivering the message that storm water compliance is important. Over the past five years over \$4 million in ACLs issued by the Central Valley Board have led to significant improvements in compliance with the Construction Storm Water permit through implementation of appropriate and adequate erosion and sediment control measures and other BMPs to ensure runoff from construction sites do not ultimately pollute waters of the state.

SITE CLEANUP PROGRAM

Aerojet-General Corporation - Cleanup efforts results in removal of over 692,000 pounds of pollutants to-date from groundwater and improve groundwater protection measures. Past discharges from rocket testing and chemical manufacturing have caused the release of contaminants into the subsurface soils and groundwater, which have migrated offsite. Investigation and cleanup continues to protect water quality. Containment (preventing further plume migration) is being completed on approximately 20 square miles of groundwater pollution plumes extending off-site from Aerojet to ensure water supply protection for over 50,000 residents. This

has included the recent completion of three off-site groundwater extraction and treatment systems. Seventeen water supply wells have been shut down due to the off-site pollution. Aerojet has replaced the lost supplies with the construction of new wells and expansion of surface water treatment capacity for the affected entities. In addition, in 2005 Aerojet reached an agreement with Sacramento County whereby treated groundwater (over 30,000 acre-feet per year) is provided to the County for beneficial reuse. Since commencement of remediation in 1983, over 692,000 pounds of pollutants have been removed from the groundwater, with a current daily removal rate of over 80 pounds. A water supply replacement contingency is in place to assure that if water supply wells are shut down due to pollution associated with the Aerojet site, they are replaced in a timely manner.

AmeriPride Services, Inc - Cleanup efforts result in over 3000 pounds of PCE from soil vapor and 450 pounds of PCE from groundwater having been removed to date. A 2,000-foot long and 200-foot deep PCE plume emanates from a commercial laundry facility in Sacramento. AmeriPride is operating a soil gas extraction and a treatment system and two groundwater extraction and treatment systems. More than 3000 pounds of PCE from soil vapor have been removed since soil cleanup started in late 2004. More than 450 pounds of PCE have been removed from groundwater since the startup of the on-site treatment system in 2005. Construction of a second groundwater extraction and treatment system near the toe of the plume was completed in late 2007, and the system has begun operation. The Board required AmeriPride to clean up the PCE plume and replace and abandon the polluted supply wells. AmeriPride provided compensation for the loss of the municipal supply wells. In addition, as a result of a mediated court settlement, AmeriPride provided Huhtamaki with compensation for replacement of the two supply wells which Huhtamaki used for drinking and process water at its paper plate manufacturing plant.

Oilfield Sump Program – Water Board collaborative efforts with the Oil and Gas Industry prevents billions of gallons of wastewater from impacting groundwater and adequately closes over 200 oilfield wastewater sumps. Within the Tulare Lake Basin, there are over 100 oil fields and approximately 40,000 producing wells. More “produced” water than oil is pumped from these wells. Some of the pumped water is fair in quality and can be discharged to surface waters under NPDES Permits. Poor quality water has been discharged to unlined sumps for decades. In the late 1960s and early 1970s studies showed that the unlined sumps were affecting useable groundwater. Policies were adopted that established salinity limits for disposal of produced water in unlined sumps.

In 1996 an estimated 13 billion gallons of oil field wastewater was discharged to sumps, which resulted in a salt load discharge of about one million tons. Staff was redirected to address this issue and hundreds of sumps have been closed. Much of the produced water is now discharged back into the oil producing formations through deep injection wells. Regional Water Board staff work very closely with staff of the California Department of Oil, Gas and Geothermal Resources and US Bureau of Land Management, and major representatives of the industry to ensure sumps are closed in a manner that protects water quality. This cooperative effort was recognized by US BLM Director Kathleen Clarke in 2004 with the presentation of the Director’s National Four C’s (“Consultation, Cooperation and Communication all in the service of Conservation”) award.

MILITARY BASE CLOSURE SITE PROGRAM

Former Mather Air Force Base - Cleanup efforts result in an estimated 8 billion gallons of groundwater treated and 3600 lbs of contaminants removed. Mather Air Force Base is a closed military base. Active environmental cleanup efforts are underway at this facility. Three pump-and-treat systems, 38 active extraction wells, and more than 500 monitoring wells have been installed since cleanup of the groundwater began in 1995. Approximately 1,850 gallons of groundwater are treated per minute. An estimated 3600 lbs of contaminants have been removed and 8 billion gallons of groundwater have been treated to date. Continued reuse and redevelopment have transformed the former base into a thriving business park, residential community, park land and air cargo airport. More than 5,000 jobs have been created and 68 companies or agencies are doing business at Mather Commerce Center. The Final Record of Decision document was signed in 2006. The remaining groundwater in need of cleanup will continue to be remediated until it meets requirements agreed to by the USEPA and State of California.

Former McClellan Air Force Base - Cleanup efforts have removed more than 65,000 pounds of VOC contamination to date from the groundwater approximately, and approximately 1.4 million pounds of petroleum hydrocarbon contamination and 160,000 pounds of VOC contamination to date from the soil. McClellan Air Force Base is a closed military base. Active environmental cleanup efforts are underway at this facility. Subsequent to the discovery of volatile organic compounds (VOCs) in groundwater in the early 1980s, numerous actions have been taken to characterize the nature and extent of contamination, protect human health and the environment, and remediate the contamination. Among these actions are connecting 550 off-base residents to a municipal water supply and starting the groundwater extraction and treatment system, installing soil vapor extraction systems and expanding the groundwater extraction and treatment system in three phases. The groundwater extraction and treatment system has removed more than 65,000 pounds of VOC contamination from groundwater since 1987. Over 500 monitoring wells ensure protection of drinking water supplies and monitor the effectiveness of the treatment system. The McClellan soil vapor extraction systems have removed approximately 1.4 million pounds of petroleum hydrocarbon contamination and 160,000 pounds of VOC contamination from the soil since 1995. The McClellan groundwater and soil vapor extraction treatment systems have successfully contained the spread of contamination, reduced the size and concentrations of contaminant plumes, and prevented significant VOC soil contamination from reaching groundwater.

In August 2007, the Air Force Real Property Agency (AFRPA) at McClellan completed the early transfer of a 62-acre parcel to a local entity, McClellan Business Park. This was the first early transfer in the nation at a federal Superfund site using a privatized cleanup agreement. Using this early transfer with privatized cleanup as a template, the AFRPA has begun to prepare early transfer documents for much larger parcels at the former base.

BROWNFIELDS REDEVELOPMENT PROGRAM

Brownfield Development Downtown Sacramento Railyard – Cleanup efforts result in removal of 500,000 tons of contaminated soil and treating 400,000 gallons of polluted groundwater a day. The Downtown Sacramento Railyard is an approximately 240-acre site used for heavy industrial activities to maintain and repair trains. Groundwater is polluted with solvents (chlorinated VOCs), metals and petroleum hydrocarbons in a plume that currently measures approximately a half-mile long. Approximately 500,000 tons of impacted soil has been removed from the site, and as much as 230,000 cubic yards of moderately impacted soil has been approved for consolidation in an on-site landfill. Approximately 400,000 gallons a day of polluted groundwater is pumped and treated to control migration and reduce concentrations, and soil vapor extraction of the major VOC source areas is effectively removing significant volumes of chlorinated solvents. The Central Valley Water Board is supporting the DTSC in the oversight of this cleanup.

Brownfield Development Raley Field -Cleanup efforts result in improved soil and groundwater quality and the development of affordable recreational amenity for a community, and provides 700 seasonal and 100 permanent jobs. A real example of combining long term groundwater cleanup and economic development is the Raley Field Stadium, home of the River Cats in West Sacramento, where with oversight by the Central Valley Water Board, cleanup systems for soil and groundwater were incorporated into the stadium design and installed during the construction of Raley Field in 2000. Currently a groundwater remediation system continues to operate, to complete cleanup of a PCE groundwater plume. The Raley Field baseball stadium provides a variety of benefits to the surrounding region. In addition to an affordable recreational amenity, the stadium generates sales tax revenue and provides 700 seasonal and 100 permanent jobs.

Corning Flying J Development - Cleanup efforts result in improved soil and groundwater quality and provided the Corning community an additional 100 paying jobs and a tremendous increase in its sales tax income. For about 40 years, Dudley and Petty (and predecessors) operated a truck stop on 12 acres in Corning. In 1986, Dudley and Petty filed for bankruptcy and abandoned the truck stop. After bankruptcy, the property deteriorated into an eyesore with dilapidated structures, broken paving, and rusting aboveground storage tanks.

Petroleum and chlorinated solvent pollution prevented redevelopment. In 1988, the bankruptcy trustee removed two underground storage tanks (USTs) and discovered petroleum pollution in the soil and groundwater. Subsequently, Regional Water Board staff discovered chlorinated solvents in several off-site private domestic wells and ultimately traced the pollution source to the truck stop.

In 1996, Regional Water Board staff issued Dudley and Petty a Cleanup and Abatement Order requiring investigation and cleanup of the site. While bankruptcy proceedings were pending, the City of Corning (City) recognized the blight and took action to help the community. Regional Water Board staff assisted the City with their efforts to prepare the site for redevelopment. The State Water Board funded the project using the UST Cleanup Fund and Cleanup and Abatement Account.

About 18 years after Dudley and Petty filed bankruptcy, the court authorized sale of the tax-defaulted property. In June 2004, Corning Flying J purchased the property at

auction with full knowledge of the previous 8 years of investigation and cleanup. The information allowed CFJ to redevelop the property while assessing appropriate site cleanup for the remaining pollution. The new Flying J facility has provided the Corning community an additional 100 paying jobs and a tremendous increase in its sales tax income. The City of Corning reports, “the gross taxable sales from the businesses located at the South Avenue interchange of Interstate 5 now exceeds \$100,000,000! Most of the sales tax from those taxable sales goes directly to the State General Fund therefore the City, the County and the State have benefited from the effort.”

Humboldt Road Burn Dump – Cleanup efforts results in approximately 389,600 cubic yards of hazardous and nonhazardous waste removed from the environment. The Humboldt Road Burn Dump (HRBD) is a group of fifteen properties in the City of Chico used in the past for waste disposal. The HRBD, as a whole, consists of one primary disposal area that formerly operated as the City of Chico Burn Dump, and fourteen other waste disposal areas on adjacent properties. The primary disposal area operated from the early 1900’s until approximately 1965 when the Butte County Neal Road Landfill opened. Wastes from the City of Chico and the unincorporated portions of Butte County were historically dumped, burned, and then leveled at the primary disposal area. Approximately 70 of 157 total acres were impacted by waste disposal operations.

Regional Water Board staff investigated HRBD and issued Cleanup and Abatement Orders and additional enforcement action requiring cleanup of the waste. In 1997, CalEPA designated the Regional Water Board administering agency for cleanup and, between 2004 and 2006, four separate remediation projects occurred to clean up the waste. About 9,600 cubic yards of waste were removed from 3 parcels and dispose at off-site landfills. The remaining 380,000 cubic yards of identified waste were removed from 12 parcels, consolidated, and capped in 2 separate on-site waste management units (Units). The Regional Water Board regulates the closed Units through Waste Discharge Requirements.

ABANDONED MINE PROGRAM

Abandoned Walker Mine -Board action results in a 98 percent reduction in mass loading of copper to surface water and the return of aquatic life to Little Grizzly Creek. Walker Mine is an abandoned copper mine on 800 acres of private land in Plumas County. Producing 5.3 million tons of ore, the mine was one of California’s largest copper producers until it closed in 1941. Acidic, copper and zinc-laden water discharged from the mine has long affected aquatic life the nearby Dolly Creek and Little Grizzly Creek, which are tributary to the Feather River. The site also has a long history with water quality actions, spanning many decades. In 1983, the Regional Water Board sued the property owner in order to gain access to abate the pollution and recover costs. In 1987, the court granted the Regional Water Board access to the site to construct a concrete mine seal to stop the mine discharge. Installation of the mine seal resulted in a 99 percent reduction in mass loading of copper to surface water and the return of aquatic life to Little Grizzly Creek. In 1991, the Regional Water Board reached a settlement with the property owner where the state was paid \$1.5 million for costs at the site.

The property is now abandoned and it is unknown if another party will purchase the land, given its environmental liability. The Regional Water Board continues to monitor and maintain the mine seal and is working to reduce the amount of water entering the mine. The cost for this work is estimated at about \$100,000 annually, including annual maintenance and monitoring (inspections, water quality sampling), periodic maintenance (surface water diversion ditches, timber support replacement, concrete seal testing), and long-term maintenance (concrete seal repair/replacement).

Abandoned Penn Mine -Cleanup efforts result in a 99 percent reduction in copper and an approximate 92 to 95 percent reduction in zinc discharged to surface water and has significantly reduced the impacts to aquatic life in downstream waters. In November 1999, the Central Valley Regional Water Quality Control Board, in cooperation with East Bay Municipal Utility District, completed a major environmental restoration project at Penn Mine. Penn Mine is an abandoned copper and zinc mine that operated from 1861 to 1956. It is located along the shore of the Mokelumne River and Camanche Reservoir in Calaveras County. The project was necessary to provide a long-term solution for discharges of copper laden acid mine drainage to the river that had historically caused fish kills. EBMUD and the Regional Water Board shared costs and responsibilities for the environmental restoration. The project involved landfill construction, excavation and landfilling of 360,000 cubic yards of mine waste, landfill closure, revegetation, and monitoring well construction with costs totaling about \$11 million. The project has resulted in a significant reduction of the amount of metals discharged to the reservoir: copper was reduced by 99 percent, and the amount of zinc by 92 to 95 percent. By reducing the discharge levels of these metals, this highly successful project has significantly reduced the impacts to aquatic life in downstream waters. EBMUD conducts long-term site maintenance and monitoring to ensure performance of the remedy.

Abandoned Abbott and Turkey Run Mercury Mines - Clean up efforts result in stabilizing an estimated 20,000 pounds of mercury and preventing 400,000 cubic yards of mine waste from entering surface waters. The Abbott and Turkey Run mercury mines are at the headwaters of Harley Gulch, a tributary to Cache Creek. Mercury from these and other mines has contaminated many miles of Cache Creek, ultimately causing elevated levels of mercury in fish that are consumed by humans and wildlife. In addition, mercury from the Cache Creek watershed contributes to methylmercury production in wetlands in the Yolo Bypass. In 2005, the Regional Water Board adopted a TMDL and mercury cleanup plan for the Cache Creek watershed. This action led to the cleanup of the Abbott and Turkey Run mercury mines in the summer of 2007. Staff involved USEPA in the cleanup, and USEPA worked with the discharger and its construction contractor to complete the work.

The project stabilized an estimated 20,000 pounds of mercury and 400,000 cubic yards of mine waste by grading the surface to remove very steep slopes and by relocating wastes. Mine wastes were pulled back from Harley Gulch. The wastes were covered with two feet of clean material and the contractor built surface water run-on and run-off controls to protect the cap and reduce erosion and slope failure. The old mill processing buildings, 30-ton rotary furnace, bricks, and other hazardous materials were removed from the site and either shipped to a disposal site in Nevada or sent to mining museums. In addition, runoff from a spring at Turkey Run was diverted around mine wastes.

Iron Mountain Mine - Remedial efforts have reduced the metal loadings to the Sacramento from IMM by approximately 95 percent and have prevented further fish kills in the Sacramento River. Iron Mountain Mine, a large inactive copper mine, was listed as a Federal Superfund site in 1983 for discharges of metals to the Sacramento River below Shasta Dam. These discharges were responsible for massive fish kills in the river over the years. Regional Water Board staff has worked closely with the USEPA in developing and implementing the remedial measures to reduce the discharges. Staff was instrumental in the decision to abandon the “dilution is the solution” proposal by the USEPA and support the construction of a lime neutralization treatment plant to remove the metals from the discharge before they entered the Sacramento River. The remedial efforts have reduced the metal loadings to the Sacramento from IMM by approximately 95 percent and have prevented further fish kills in the Sacramento River.

West Squaw Creek Mines – Remediation efforts have reduced metal concentrations by approximately 90 percent in West Squaw Creek. Mining Remedial Recovery Company (MRRC) owns five inactive copper mines in the West Squaw Creek drainage that is tributary to Shasta Lake and the Sacramento River. The discharge of metals from the mine portals along with other non-point sources has eliminated fish in the affected reach of West Squaw Creek and historically resulted in annual fish kills at the confluence with Shasta Lake. The mines are in very steep, rugged terrain with limited access and infrastructure, making use of a typical lime neutralization plant impractical.

Regional Water Board staff has been working with MRRC in developing and implementing alternative technologies, including installation of concrete bulkhead seals to plug the mine portals, surface water drainage controls to reduce infiltration of water in the mine workings, construction of artificial wetlands and sulfate reducing bio-reactors to treat the remaining discharges and reduce the metal loading to surface waters. Currently the metal concentrations in West Squaw Creek have been reduced by approximately 90 percent; however, fish still cannot inhabit the affected reach, and probably will not do so in the foreseeable future, due to the residual metals concentrations from non-point sources.

Bully Hill and Rising Star Mines – High risk involved in mine cleanup activities to achieve improved water quality. The Bully Hill and Rising Star Mines are inactive copper mines on the northeast side of Shasta Lake. Discharges of metal laden mine drainage, referred to as Acid Mine Drainage (AMD) from the mine portals and waste rock piles has severely impacted the beneficial uses of the receiving waters. Current

remedial activities include moving and cap waste rock piles, surface water diversions to reduce infiltration into the underground mine workings, reopening the mine portals and installing four concrete bulkhead seals to reduce and control leakage of AMD, and installation of a pilot scale wetlands treatment system to remove metals from the remaining discharge. Access to the Bully Hill Mine underground workings took two years of effort to open the portal due to dangerous caving conditions. With the mine portal discharges under control, passive treatment systems can be implemented to reduce the metals concentrations in the discharges and receiving waters.

SPILL RESPONSE PROGRAM

Union Pacific Trestle Fire - Spill response efforts results in ensuring the American River and a drinking water intake structure were protected from over 6,120 tons of debris and contaminated soil. On March 15th, 2007, the trestle supporting the Union Pacific Railroad's southern approach to the American River Bridge in Sacramento caught fire. The State's Standardized Emergency Management System (SEMS) was activated and the Sacramento City and County Fire Department and later the Department of Fish and Game operated the Incident Control Center at the site to coordinate all the agencies and personnel responding to the emergency. Impacts of the fire including smoke inhalation, debris runoff into the American river and public access were managed immediately. Throughout the event the Regional Board and Fish and Game guided management of debris and fire water to minimize the impact on the American River, a municipal water intake, and the adjacent sensitive habitat. The Federal EPA, Air Resources Control Board, Department of Toxic Substances Control and the County of Sacramento Hazardous Materials Department were on-site to monitor and address the impacts of the smoke on down-gradient residences. The fire was extinguished after 1 ½ day and rebuilding of the trestle started immediately, along with debris cleanup. The rail line was operational again seven days later through successful cooperation of Union Pacific and the many agencies. Union Pacific removed over 4,080 yards, or 6,120 tons, of debris and contaminated soil from the area under and adjacent to the trestle and transported to Forward Landfill, a Class II facility near Stockton, for disposal. Regional Water Board staff, in coordination with Department of Fish and Game personnel, approved backfilling the area with clean fill.

1991 Cantara Train Derailment and Spill – Water Board response and follow-up results in significant enforcement and improved water quality protection programs. The 1991 Cantara Spill was the worst toxic spill to inland waters in California history. The train derailment resulted in the spill of 14,500 gallons of metam sodium (a fumigant) into the Sacramento River above Dunsmuir. The spill killed all aquatic species for 45 miles from the Cantara Loop to Shasta Lake. Redding staff worked nonstop for several weeks following the spill (over 4000 personnel hours) monitoring water quality, issuing enforcement orders, and performing other Incident Command duties. Following the incident Redding staff was heavily involved with enforcement against the railroad that resulted a \$30,000,000+ consent decree and the establishment of the Cantara Trust Council. Regional Water Board staff continues to serve as a member of the five-person council allocating spill settlement funds to assist in recovery of lost aquatic species and other habitat impacted by the spill and in-kind efforts in other rivers and streams.

Central Valley Water Board Redding Office designated as CalEPA primary emergency response personnel for hazardous and non-hazardous incidents and a participating member in the Local Emergency Planning Committee (LEPC Region 3) and USEPA's Sacramento River and Feather River Emergency Response Planning Group. Following the Cantara Train Derailment and Spill, the Redding office emergency response team has been involved and at the forefront of numerous other highway and rail incidents that have affected waters of the north state. Following a recent train derailment that spilled thousands of gallons of alcohol and oil in the Feather River Canyon, Regional Water Board staff oversaw monitoring and issued an order for long-term cleanup of contaminated groundwater. The Redding office has been designated as CalEPA primary emergency response personnel for hazardous and non-hazardous incidents and a participating member in the Local Emergency Planning Committee (LEPC Region 3) and USEPA's Sacramento River and Feather River Emergency Response Planning Group. The Redding office currently has three highly trained hazardous material specialists who assist local emergency response teams and provide expertise in water quality, chemistry, incident command, and enforcement.

LAND DISPOSAL PROGRAM

Regulatory program results in closure of the majority of unlined landfills in the Central Valley and the implementation of groundwater cleanup activities. Approximately 285 facilities are regulated by the Land Disposal Program. This program regulates municipal solid waste disposal, hazardous and nonhazardous liquid and solid industrial waste discharges to surface impoundments, mines and other discharges to land. Approximately 285 facilities are under waste discharge requirements in accordance with Title 27 and Chapter 15 of Title 23 of the California Code of Regulations. The requirements specify stringent requirements including double or single composite liners and financial assurances for reasonably foreseeable releases to ensure water quality protection. Within the Central Valley Region, the majority of the unlined landfills are now closed and capped, many with groundwater cleanup in progress. Waste discharge requirements for existing landfills require appropriate waste containment designs to protect groundwater and surface water. The challenges in this program include increasingly complex engineering issues and waste containment designs, and an increasing workload as more information becomes available about the threat to groundwater from industrial discharges.

Kiefer Landfill - Cleanup efforts result in removal of over 700 pounds of volatile organic compounds from the groundwater. Discharges to the 165-acre unlined portion of the landfill caused contaminants to enter groundwater, primarily through the migration of landfill gas. Groundwater is currently extracted from 14 wells at a combined average rate of about 800 gallons per minute. Since 1995, groundwater extraction has removed over 700 pounds of solvents from the groundwater.

NPDES PERMIT REGULATORY PROGRAM

Lake Davis Pike Eradication Project (2007) – Water Board regulatory permit together with collaborative efforts with Department of Fish and Game results in eradication of pike from Lake Davis, protects downstream water quality from impacts of eradication efforts, and protects Delta from invasive species. In the fall

of 2007 the Department of Fish and Game (DFG) began a second attempt to eradicate the non-native Northern Pike from Lake Davis. Due to the failure of the previous attempt in 1997, several changes were made in the project to help assure a successful operation. The Rotenone formulation was applied to the lake with more accurate metering systems, GPS location tracking was employed to assure complete and adequate coverage, and Regional Water Board staff was brought into the project early to work with DFG to assure discharge requirements would be met.

In response to concerns voiced by Regional Water Board staff of a repeat of the downstream fish mortality experienced in the 1997 attempt, DFG agreed to shut off releases from Lake Davis to Big Grizzly Creek until all chemical constituents of the Rotenone formulation had degraded. Springs and side flows downstream of the dam were adequate to maintain the downstream fishery. After four months, all chemical residues from the Rotenone formulation had dissipated and releases from Lake Davis to Big Grizzly Creek resumed. No violations of the permit were observed during implementation of the 2007 project.

DFG collected as many dead fish as possible within the reservoir with hand crews, estimating they picked up 48,900 pounds of fish. By fish count, 6% of the collected fish were Northern Pike (estimated weight 10,493 pounds or 5.2 tons), 82% were brown bullheads, 0.4% were rainbow trout, and the remainder included large-mouth bass (0.1 %), golden shiner (2%), and pumpkinseed sunfish (10 %).

MUNICIPAL STORM WATER PROGRAM

Regulatory Program establishes stringent requirements on 60 Central Valley communities to improve storm water runoff quality and protect creeks, rivers and streams. The Municipal Separate Storm Sewer System (MS4) Program consisted of two phases to regulated large, medium and small communities. The Central Valley Phase I Program, which regulates larger municipalities, started in the late 1990s and is a mature program with 32 cities, districts and agencies being regulated under third generation MS4 permits. Phase II of the program regulates small MS4s and was implemented in 2003 and regulates 48 communities to date. Phase I municipalities are required to implement programs to control and reduce pollutants being discharged with storm water runoff to our surface waters from various activities within a community including construction, industrial, commercial and residential sources. Recent permits have significantly raised the bar for Phase I cities to address TMDLs and conduct additional monitoring. New development standards have been significantly increased to require Low Impact Development (LID). Phase II MS4s are regulated under a statewide general permit and also implement comprehensive storm water management programs. Phase II communities are not yet required to implement monitoring programs. The Water Boards are reevaluating this requirement.

WATER QUALITY PLANNING

Tulare Lake Basin Water Quality Control Plan- Water quality document results in limiting degradation and managing salts management in the closed Tulare Lake Basin. Due to the closed nature of the Tulare Lake Basin, there is little subsurface outflow of water. Thus, salt accumulates within the Basin due to importation and evaporative use of the water. The paramount water quality problem in the basin is the accumulation of salt. This is

compounded by groundwater overdraft, export of fresher water, and a decline in quality of imported water.

When the Basin Plan for the Tulare Lake was first written in 1975, it recognized that degradation would occur. Policies were included in the Basin Plan to control the degradation and protect the beneficial uses for as long as possible. The Regional Water Board takes this very seriously. When it considers waste discharge requirements, it reviews them to assure that salt is controlled to the extent practicable. The Regional Water Board also takes very seriously the policies that encourage recycling and reuse of wastewater. Fresh water should not be used if recycled water can be used. No one is allowed to percolate or evaporate water in the Region without a review of opportunities to recycle or reuse the water. Much of the wastewater from municipal waste treatment plants, the food processing industry, and oil production, and all of the wastewater from dairies, is recycled and reused in the Tulare basin. This water is used to irrigate several hundred thousand acres of farmland.

AGRICULTURAL REGULATORY PROGRAMS AND POLICIES

Regulatory action results in reduced pollution caused by agricultural practices. Agriculture is the largest economic sector of the Central Valley and the largest generator of wastes. Dealing with the wastes usually involves hundreds or thousands of owners over millions of acres of land. In each of the following cases (with the exception of salt), the Board developed a working relationship with other agencies and agricultural organizations that has resulted in a program that does not rely entirely on Regional Water Board regulatory efforts. The Board's role in the process, however, has been critical in setting limits and timetables for water quality control. Continuing the effort to develop a joint effort is critical, but is unique in each situation and a description of the process would be nearly impossible to add to the Water Code.

- **Rice Pesticides -Regulatory program reduces pesticides in discharges and eliminates nearly all fish kills and taste complaints.** In the early 1980's, pesticides being discharged from Sacramento Valley rice fields were found to be responsible for fish kills in agricultural drains and taste complaints regarding the City of Sacramento drinking water supply. The Water Board adopted a Basin Plan prohibition of pesticide discharges. The Regional Water Board worked with Department of Fish and Game, Department of Food and Agriculture (CDFA), county Agricultural Commissioners, the rice industry and numerous other organizations to evaluate the situation and develop management practices that would keep the pesticides on the treated fields, and ultimately new restrictions were imposed on pesticide use on rice. Fish kills and taste complaints have virtually been eliminated.
- **Selenium -Regulatory program effectively reduces selenium in discharges and protects wildlife.** In the early 1980's, selenium flushed from soils by agricultural irrigation built up to levels that caused deformities in waterfowl chicks at Kesterson Reservoir in western Merced County. This prompted a valley-wide assessment of surface and ground waters to determine where selenium and other trace element may pose a threat to beneficial uses. The study determined that discharges of subsurface agricultural drainage are the primary controllable

sources of selenium. The Board adopted waste discharge requirements for evaporation basins used for disposal of the drainage, with one of the primary goals being the protection of migrating waterfowl. A Basin Plan amendment and waste discharge requirements are in place to control selenium discharges from subsurface drains on the west side of the San Joaquin River Basin. The drainage can not enter wetland water supplies and there is a timetable for reducing loads of selenium discharged to the San Joaquin River. In conducting the effort in the San Joaquin Basin, the Board has worked with numerous state and federal agencies as well as water agencies that serve farmers in the Grassland Watershed (a project known as the Grassland Bypass Project). Significant progress has been made, but new control measures are still being installed, and this effort will need continuous Board oversight to ensure compliance.

- **Dairies - Regulatory program to reduce a significant source of nitrate discharges to land.** The Board has worked with the dairy industry since the 1970's, but until the end of 2002 most facilities operated under a conditional waiver of waste discharge requirements. In May of 2007 the Board adopted a general WDR for the 1550 existing milk cow dairies in the Central Valley. At this time, the Board is working closely with the California Dairy Quality Assurance Program to provide information to dairy operators on the steps that need to be taken to be in compliance with the Order. The Order requires preparation of reports to determine if current waste management meets conditions of the Order. These reports will address waste management in the production area and nutrient management on the cropland where animal waste is applied. Any necessary changes to management or facilities will have to meet timetables set in the Order. Monitoring is also required to verify that surface water and groundwater quality are protected.
- **Salt - Regulatory programs begin to tackle increasing salinity in Central Valley Waters.** Salt poses a management challenge and economic threat throughout the Central Valley. All water contains salt and concentrations vary significantly, but waters in many areas reflect the high levels of natural salts present in soils formed by material from the Coastal Range. Consumptive use of water for irrigation and addition of salts through industrial and municipal use can result in waste streams that are a threat to the uses of receiving waters.

The Board has initiated the development of a Central Valley Salinity Management Plan with the intent of controlling salinity before salt becomes a major threat to the water supplies needed for anticipated growth of municipal, industrial and agricultural operations in the valley. Since the Board's authority under the Water Code is limited to regulation of waste, the initial approach is to work with other agencies and organizations to develop a program for protecting water quality through improved water resource management and taking other steps that are outside the Board's oversight. Where needed, the Board will consider adoption of Basin Plan amendments to support these efforts. If this approach does not result in an effective salinity control effort, the Board will develop Basin Plan amendments that rely on the traditional regulatory tools.

TMDL PROGRAM

Regulatory Program to restore Central Valley waters is now being implemented.

The TMDL program addresses widespread water quality problems. It has three main elements: developing the impaired water body list to identify waterbodies that do not meet water quality standards, developing TMDLs that include a plan for achieving compliance, and implementing TMDLs. The Central Valley Region currently has over 100 water bodies listed as impaired (over 250 water body pollutant combinations), including 1,500 miles of streams and rivers (including most of the major rivers and the Delta), 18 lakes or reservoirs (including Clear Lake and other high priority waters), and wetlands totaling more than 80,000 acres. We have adopted TMDLs for selenium in Salt Slough, the Grassland Marshes and the San Joaquin River; salinity and boron in the San Joaquin River, diazinon and chlorpyrifos in the Sacramento River, Delta, San Joaquin River and urban creeks; dissolved oxygen in the Stockton Deep Water Ship channel; mercury in Clear Lake and Cache Creek; and nutrients in Clear Lake. We are in the process of developing TMDLs for mercury in the Delta; pesticides in thousands of valley floor creeks, streams and sloughs; bacteria and dissolved oxygen in Stockton area sloughs and creeks; and salinity in the San Joaquin River, upstream from Vernalis. Implementing adopted TMDLs is a significant and increasing workload. The TMDL program has done several things that have made the program an overall success, including utilizing the TMDL roundtable effectively to coordinate and promote efficiency, adopting TMDLs for our most significant impairments and actually achieving significant measurable water quality improvements. On the downside, the statewide budget for TMDLs has not increased in the past five years and no resources have been secured to support the massive work load associated with implementing adopted TMDLS.

IRRIGATED LANDS REGULATORY PROGRAM

Regulatory Program to control discharges from over five million acres of irrigated lands requires the agricultural industry to implement first-of-its-kind monitoring and waste management practices.

The Irrigated Lands Regulatory Program (ILRP) is a new program addressing the discharge of pollutants from over 5 million acres of irrigated agriculture to surface waters in the Central Valley. There are 28,000 participants in agriculture water quality coalitions. The initial focus of the program was to monitor surface waters to determine the impacts of irrigated agriculture, generating 100,000 water quality data points, and identifying a number of water quality problems that are clearly related to irrigated agriculture (e.g., pesticides). Other water quality problems (e.g., dissolved oxygen, pathogens) will require further investigation to determine which of the possible sources (e.g., agriculture, dairies, urban stormwater runoff) are causing or contributing to the problem. The Coalitions are developing management plans to correct the water quality problems attributed to agriculture. Approval of the first suite of management plans is expected by the end of this fiscal year.

The ILRP is currently examining the regulatory framework for addressing irrigated agriculture and is engaging stakeholders in a process to develop the long-term program.

Per direction from the Regional Water Board and State Water Board, the long-term program will address discharges to ground water, as well as surface water. Other challenges include ensuring that the Coalitions and their participant growers implement their management plans to protect water quality and addressing the two million acres of

irrigated agriculture that are not currently in the program. As we move forward with this evolving program, we will be critically examining the program to maintain those components that have been successful and making changes where areas for improvement are identified.

TIMBER HARVEST REGULATORY PROGRAM

Collaborative efforts between State and Federal agencies improve water quality protection efforts at timber harvest sites in Central Valley. The Regional Water Board regulates approximately 45% of the State's harvested timber and the program has evolved over the years resulting in increased water quality protection from timber harvest operations. On industrial forest lands focus has shifted over the past 8 years from general sediment production from the entire operation to the proven culprits of sediment discharges: roads and watercourse crossings. We are seeing more roads being upgraded from sediment-generating in-sloped configurations to more environmentally sound out-sloped configurations. Inside ditches are being removed and the concentration of water from road surfaces is being reduced significantly. There is more concern with and attempts to hydrologically disconnect roads from watercourses (as much as is feasible). Roads that are in poor locations in the watershed (in relation to water quality this generally means low in the watershed or paralleling and/or infringing on tributary streams) are being more commonly replaced with roads located higher on the slopes. More road segments are being rocked to reduce sediment generation and more crossings are being upgraded each year. Class I crossings (those watercourses that support fish) are being upgraded frequently to provide unlimited passage for all life stages of fish. Rocking of haul roads has become the common answer at challenging watercourse crossings (instead of using more culverts). Rock reduces the scour related to crossings, armors freshly disturbed fill and armors road surfaces in the case of overflow conditions. All of these improvements reduce sediment generation and aid in preventing sediment impacts to water quality.

Perhaps the most important water quality improvement resulting from Regional Water Board policies is the initiation of visual monitoring and reporting. Before the Regional Water Board began regulating timber operations, the timber industry either did not conduct monitoring at all, or conducted monitoring but did not provide monitoring results to the Regional Water Board. The imposition of monitoring requirements has enabled staff to focus on sites that are in need of mitigation, thus providing an efficient feedback loop for protecting water quality.

The Regional Water Board's Timber Harvest Review Program staff began looking closely at rural roads on USFS, BLM, and various County lands in 2006. This action has led to the development of cooperative relationships with the various public agencies, as well as to the implementation of many needed mitigation measures to reduce impacts to water quality. Mitigating sediment sources on old public rural roads is a critical factor in restoring and protecting our upland watersheds.

WATERSHED RESTORATION PROGRAM

Grant monies successful in restoring habitats and protected aquatic life in waters of state. Nonpoint source pollution issues are often not readily addressed by traditional Water Board regulatory programs and tools. In those circumstances, we rely heavily on the actions of locally directed watershed management programs. Over the past 20 years, and with the support of State Water Bond funds and federal Clean Water Act Section 319 funds, local watershed management programs have grown and expanded. Local programs are now operating in virtually every individual river basin in the Central Valley Region. In the Sacramento River basin alone there are over 40 individual programs (e.g., resource conservation districts and nonprofit organizations). While these programs vary in organization type and size, they all focus on the following activities: 1) conduct watershed assessments (including water quality monitoring), 2) prepare watershed management plans, 3) implement on-the-ground projects to improve water quality and other watershed conditions, and 4) conduct education and promote better management practices throughout the watershed community. This extensive level of grass roots activity is managed and supported by a small handful of Regional Water Board staff.

With regard to watershed restoration (and water quality improvements), in the past 20 years several hundred million dollars have been awarded to local programs for project work (funds from Proposition 204, 13, 40, 50 and Section 319 monies). Typical project activities include erosion control, stream channel stabilization, floodplain and wetland restoration, livestock management improvements, fish screens and ladders, eradication of invasive species, and riparian/aquatic habitat improvements. In the upper Feather River basin alone (source water for the State Water Project), the Feather River Coordinated Resource Management Program has implemented with Regional Water Board oversight over 50 individual restoration projects since the mid-1980s. While it is difficult to quantify the pollutant load reduction from these kinds of projects (e.g. pounds of sediment controlled, degree of lowered water temperature, amount of reduced bacteria concentrations), in many (probably most) of the individual watersheds where these programs are operating, surface water quality is better today as compared to 20 years ago. As the state expands its ambient water quality monitoring programs, this trend should become more evident and more quantified in future years.

CHALLENGES/CONSTRAINTS

The Perchlorate Challenge - Aerojet-General Corporation, Rancho Cordova Site – Regulatory decision-making challenges and the unintended negative impacts to water quality as a result of regulatory decisions based on inadequate risk evaluations and detection levels. Perchlorate is a major component of solid rocket propellant. Aerojet used vast quantities of the chemical commencing in the mid-1950's as it manufactured and tested solid rocket motors. Spillage and intentional ground disposal of a multitude of chemicals, including perchlorate, caused extensive pollution of the underlying groundwater. In 1976 the Board issued the first of several cleanup and abatement orders to Aerojet, requiring correction of violations of waste discharge requirements. The chemicals of concern were primarily volatile organic compounds (solvents). At the time, perchlorate was not believed to be a health risk unless it was in concentrations near 40 mg/L, similar to the level at which nitrate is known to be a potential health problem. The detection level for perchlorate was 0.40 mg/L and the concentrations known to be in the groundwater were around 8 mg/L. Thus, cleanup of the groundwater pollution initially focused on the solvents. In addition, there was no

known treatment for perchlorate. Polluted groundwater was extracted, the solvents removed, and the water still containing perchlorate was recharged back to aquifer. In 1995 USEPA completed its risk evaluation of perchlorate and released the value of 0.004 to 0.018 mg/L as being the safe level for perchlorate. Perchlorate at concentrations greatly exceeding the risk value had been recharged as part of the groundwater remediation causing a perchlorate plume extending several miles off the Aerojet property. This led to the closing of eight water supply wells. Since 1995, methods to treat perchlorate have been developed and instituted at Aerojet, the first site in the country to deal with perchlorate. Now the issue of perchlorate has turned into a nation-wide problem. This example shows the challenge in dealing with chemicals for which adequate risk evaluation methodology and detection levels are not available, and how changing science can affect the outcomes of decision-making. Another chemical within the Aerojet plumes, n-nitrosodimethylamine (NDMA), has similar problems with a historically elevated detection level and difficulty in cost-effectively removing it from extracted groundwater. Lowering the detection level for NDMA led to the discovery of additional pollutant plumes off the Aerojet property and resulted in the need for additional extraction wells and treatment plants in the residential neighborhoods of Carmichael.

The Legacy of MTBE - Nearly all of the 1180 open Underground Storage Tank (UST) cases in the Central Valley Region are contaminated with MTBE. Methyl tert-butyl ether (MTBE) was first introduced to gasoline in 1979 and widespread use at much higher concentrations began in the early 1990's to fulfill the oxygenate requirements set by Federal Clean Air Act amendments. In the late 1980's, MTBE began to be detected more frequently in municipal and domestic wells, and in 1995 high levels of MTBE were discovered in Santa Monica's municipal water supply wells. California began phasing out MTBE in 1999 with effective elimination occurring in 2005. However, the effects of the MTBE are expected to be felt for decades to come. Of the 1180 open Underground Storage Tank (UST) cases in the Central Valley Region, only 58 are free of MTBE contamination (primarily heating oil and other heavy fuel oil releases). Virtually all sites where a release of gasoline occurred have reported the presence of MTBE. Due to its high mobility and slow natural degradation, MTBE is the most common chemical of concern at UST cleanup sites.

Wastewater Treatment Plant Upgrades – Infrastructure and treatment facilities improvements needed to meet new standards. Increasingly stringent regulations, evolving science, and rising population necessitate expansion and upgrading of many municipal wastewater treatment plants. In the 1970's and 1980's, during the nation-wide push to achieve "secondary treatment", there were massive federal and state grant and loan programs to fund infrastructure improvements. These treatment facilities are now aging and were never designed to comply with many new discharge standards needed to protect aquatic life and human health. The costs for construction and operation of new treatment facilities are enormous, and are particularly a financial and institutional burden on small communities. Existing grant and loan funding is far less than the community's need. The Central Valley Region has been very successful at getting many treatment facilities upgraded, reducing overall pollutant loadings addressing many specific water quality problems. However, many communities are under time schedules to upgrade treatment facilities and funding is either not available, or substantial sewer rate increases are placing a severe financial burden on the public.

The Water Code mandates that the Regional Water Boards impose large daily penalties when treatment facilities cannot meet certain permit requirements (primarily numeric effluent limits). The Regional Water Board has no discretion to adjust the mandatory penalties based on site-specific circumstances.

Small communities are challenged by the increased regulatory requirements being imposed and this is a real issue for many Central Valley communities. Representatives of the small communities all indicate they want to comply with the Clean Water Act requirements and are not requesting relaxed standards; however, they need additional time without incurring significant mandatory minimum penalties and require financial assistance. State grant monies are becoming less and less available. The State Water Board's State Revolving Fund loan program provides low-interest loans, but many small communities cannot afford the loans, do not have available matching funds or need longer repayment terms than the Clean Water Act and current State Water Board policies allow. Providing communities time schedules to comply is an option, but the amount of time the Board can provide is limited. The result is that small communities are treated the same as large facilities that have far greater resources available to them to meet the schedules and pay for facility upgrades. Many of the larger facilities have significantly greater flows than smaller communities and therefore are a greater risk to the environment. The Central Valley Water Board has been criticized by the environmental groups and others for providing the maximum time schedules allowed to small communities, despite the communities' inability to obtain financing for the upgrades and their relatively lower environmental impacts.

The State and Regional Water Board's staff has been working with a Small Community Coalition group in an intensive effort to find administrative solutions to help small communities comply with Water Board requirements. However, without additional options the small communities in the Central Valley Region may be impacted significantly by the state and federal regulatory requirements.

Water Quality Control Plan (Basin Plan) Program – Water Quality Control Plans for the Central Valley Region have not been comprehensively updated and revised since 1970s. Section 13240 of the Water Code requires each Regional Water Board to formulate and adopt water quality control plans (known as Basin Plans) for all areas within the Region. The Central Valley Region has two Basin Plans, one for the Sacramento River/San Joaquin River Basins and one for the Tulare Lake Basin. The Basin Plans prescribe water quality standards, and programs and schedules to implement federal and state water quality control laws. Since the adoption of the first edition of the Basin Plans in 1975, the Regional Water Board has held regular reviews of the Basin Plans as required by state and federal laws. These triennial reviews identify and prioritize basin planning activities that the Regional Water Board should undertake. Since 2000, the Regional Water Board has adopted ten amendments implementing TMDLs. The Board has adopted ten additional amendments that are not related to TMDLs, that address beneficial uses, water quality objectives and basin plan language corrections. There is a structured process for amending the Water Quality Control Plan. The structured process is thorough but also time and resource intensive. Basin planning resources are limited, so the Regional Water Board is not able to address most of the issues identified through the Triennial Review. The process needs to be streamlined so we can make better use of our limited resources.

Onsite Septic Systems – Resource constraints result in significant number of onsite private septic systems not being directly addressed by the Regional Water Board. There are approximately 540,000 equivalent individual onsite wastewater treatment systems (each system equivalent to a single family home) in the Central Valley Region. There is an additional unknown number of commercial and business systems. Although California Water Code Section 13260 requires any person discharging waste or proposing to discharge waste to file a report of waste discharge (an application for waste discharge requirements), the Regional Water Board has traditionally waived the filing of reports of discharge from individual sewage disposal systems in those counties having satisfactory local regulation. A local ordinance is satisfactory if it is compatible with the Basin Plan’s 1976 “Guidelines for Waste Disposal from Land Developments,” which contain criteria for the location, and site constraints for onsite wastewater treatment systems. Historically, the Regional Water Board has not had adequate staff to carry out the implementation program envisioned in the Guidelines. As a result of this lack of oversight, most counties in the Region do not have programs that fully comply with the Guidelines.

Lake Davis Pike Eradication Project (1997) – Department of Fish and Game Standard Practices allowed by Water Board permit results in significant downstream impacts. As mentioned above, in 1997, the Department of Fish and Game attempted to eradicate the non-native Northern Pike in Lake Davis. The project was implemented in an attempt to prevent the highly predacious fish from entering the Feather River system and moving into the Sacramento River Delta system. If the pike become resident in the Delta, there is a high possibility they could seriously impact the current Delta and Sacramento/San Joaquin River fisheries, including salmon and stripped bass, which would have a significant economic impact, and further impact endangered species in the area. The chemical Rotenone, which is highly toxic to fish and other gill bearing organisms, was applied to Lake Davis. In an effort to prevent the Rotenone from discharging from Lake Davis and killing fish downstream in Big Grizzly Creek, DFG implemented its standard practice of adding the neutralizing agent, potassium permanganate, into the stream channel in an effort to reduce its toxicity. DFG was unable to adequately monitor the concentrations of Rotenone and potassium permanganate in the stream and control the concentration of each chemical, resulting in fish mortality for several miles downstream to the Feather River in violation of the Regional Water Board’s requirements. The Regional Water Board pursued enforcement actions against DFG, including the imposition of an administrative civil liability, for the unnecessary fish kill beyond the boundaries of Lake Davis.

Tulare Lake Groundwater – Legacy domestic and industry activities, projected population growth, increased agricultural industry and dynamics of state water distribution system impacts Tulare Lake Basin. The closed nature of the Tulare Lake Basin has created its challenges. With no natural outlet for drainage, shallow water on the west side of the Basin builds up to the point that it affects the crops. The quality of the shallow groundwater is poor and unusable for normal crops or domestic use.

At one time, the Northern part of the Tulare Basin and the Southern part of the San Joaquin Basin were draining to the federal San Luis Drain. This drainage water was held in the Kesterson flow equalization reservoirs prior to discharge to the San Joaquin River. The salt load on the river had its own challenges, but when the US Fish and

Wildlife Service found that the selenium in the water stored in the reservoir had effects on wildlife, the State Water Board in 1985 stepped in and declared the waste “Functionally Hazardous” and ordered that the drain be closed.

There are still drainage problems on the west side of the Valley. In Westlands Water District alone, over 100,000 acres of farmland has been taken out of production, and 200,000 more is expected. South of the area served by the federal drainage project, farmers or drainage districts serving farms have discharged to evaporation ponds to evaporate the poor-quality drainage water and keep land in production. At one time, there were 6,000 acres of evaporation basins for disposal of this drainage water and an additional 4,000 acres planned, but currently there are around 4,000 acres. Because of the wildlife and water quality threat these basins pose, we have always considered them a temporary solution to a bigger problem.

The east side of the Tulare Lake Basin is also experiencing impacts by increases in dissolved solids. There is overdraft of the groundwater under the municipalities. Much of the water from the east side steams is diverted from historical recharge areas. Increasing hardness has led to increasing water softener use, which in turn has led to increases in salt discharged to the sewage treatment plants. Industries that remove salt from their wastewater are faced with the challenge of where to dispose of it. There have been dischargers who have affected source control to keep the saltiest water out of their discharge, contracting with a third party to truck it offsite. In some cases this resulted in discharge to another part of the Basin. Population projections in California show that the Tulare Lake Basin is expected to grow greatly over the next 20 years, and these challenges will continue as well.

Hilmar Cheese – Regional Water Board resource constraints results in delayed permitting and enforcement of largest cheese manufacturer in San Joaquin Valley. Hilmar Cheese has the world’s largest single cheese manufacturing facility. It grew to its current level over a very short period of time. The waste Hilmar discharges to land is non-hazardous. The total dissolved solids of the discharge were very high, but much of it was organic (non-conservative) and treatable. For years, the waste was discharged to just 140 acres of company-controlled land, an inadequate disposal area that led to groundwater problems. The Regional Water Board issued very stringent Waste Discharge Requirements. When the discharger could not comply with the requirements, the Executive Officer issued a civil liability complaint which resulted in a settlement including a \$1,000,000 penalty payment and an additional \$1,850,000 to complete a Supplemental Environmental Project to study the impacts of food processing wastewater on groundwater and evaluate possible management solutions. The report was completed last fall.

Hilmar Cheese has added more land for wastewater reuse, has increased its treatment (including microfiltration and reverse osmosis treatment units), and received a permit from the US EPA for up to four deep (4000 feet) injection wells for waste with high salt concentrations. One well is in place and recently became operational.

Hilmar Cheese was also issued a cleanup and abatement order by the Executive Officer, requiring it to investigate the extent of the groundwater contamination and conduct a feasibility study of possible remedial actions. The groundwater is very

shallow (about 8 feet) and the investigation shows that it has been affected down to about 100 feet and off-site for up to 1,200 feet.

One of the action items of the cleanup and abatement order requires the discharger to replace any neighboring wells affected by its discharge. There are wells in the area high in nitrates, some even above drinking water action levels, but the investigation to date does not show that these wells are polluted by the discharger's wastewater. Further investigation is ongoing at this time.