CENTRAL VALLEY REGIONAL
WATER QUALITY CONTROL BOARD

Groundwater Quality Protection Strategy A "Roadmap" for the Central Valley Region

***August* 2010**

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Arnold Schwarzenegger, Governor

California Environmental Protection Agency
Linda S. Adams, Secretary for Environmental Protection

REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

Katherine Hart, Chair
Cheryl K. Maki, Vice-Chair
Julian Isham, Member
Karl E. Longley, Member
Sandra O. Meraz, Member
Dan Odenweller, Member
Robert Walters, Member

Pamela C. Creedon, Executive Officer

11020 Sun Center Drive #200
Rancho Cordova, CA 95670

Phone: (916) 464-3291
email: info5@waterboards.ca.gov
Web site: http://www.waterboards.ca.gov/centralvalley/

DISCLAIMER

This publication is a technical report by staff of the California Regional Water Quality Control Board, Central Valley Region. No policy or regulation is either expressed or intended.

Groundwater Quality Protection Strategy Central Valley Region

"Roadmap"

***August* 2010**

REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

ACKNOWLEDGEMENTS:
The Regional Water Quality Control Board, Central Valley Region would like to acknowledge all the stakeholders who participated in the development of this document by giving of their time to attend workshops, provide written comments and information.

The Central Valley Water Board's internal Groundwater Focus Group provided considerable input and assistance.

Table of Contents:

	Acronyms and Abbreviations	2
1	Executive Summary	5
2	Introduction	8
3	Background	12
	3.1 Agencies & Organizations	13
	3.2 Legislative Actions, Bond Initiatives, & Stakeholder Driven Initiatives	14
	3.3 Hydrologic Regions	18
	3.4 Primary Constituents of Concern	21
4	Groundwater Quality Protection Programs	28
5	Stakeholder Concerns and Issues	50
6	Roadmap	63
	Table 1 Primary Constituents of Concern and Sources	27
	Table 2 Groundwater Quality Protection – Regulatory Programs	29
	Table 3 Groundwater Quality Protection – Non-regulatory Programs	31
	Table 4 Groundwater Protection Programs	32
	Table 5 Stakeholders Issues and Concerns	51
	Table 6.4 Central Valley Region-wide Overarching Actions	65
	Table 6.5.1 Confined Animal Facilities	71
	Table 6.5.2 Irrigated Lands Regulatory Program	73
	Table 6.5.3 Site Cleanup Program	75
	Table 6.5.4 Waste Discharge Requirements Program	76
	Table 6.6 Future Actions – Concerns Addressed	79
	Appendix A	81
	Appendix B	93
	Figure 1 Central Valley Region	4
	Figure 2 Integrated Regional Water Management Groups	17

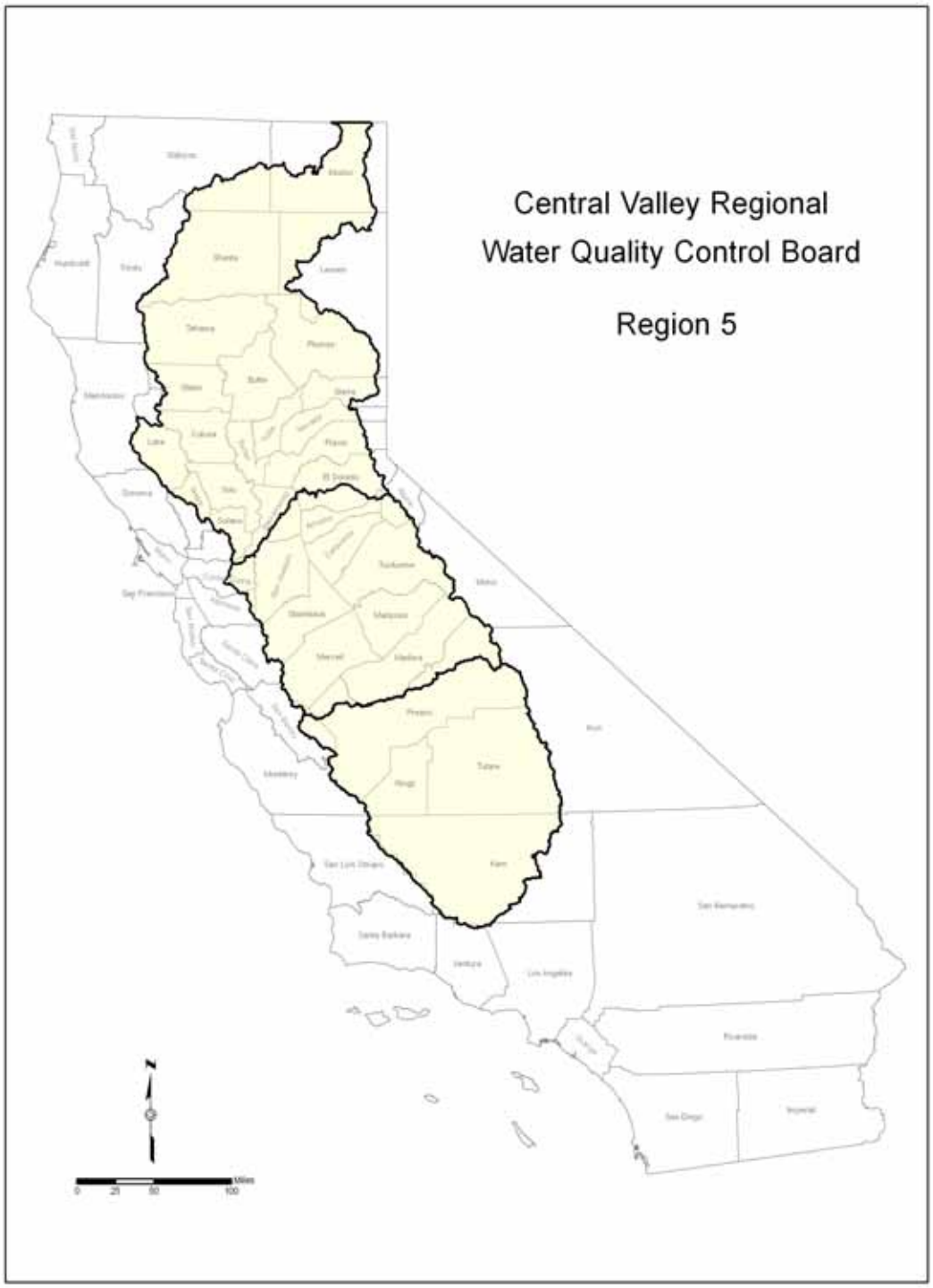
DRAFT

Acronyms and Abbreviations

ASR	Aquifer Storage and Recovery
Basin Plan	Water Quality Control Plan
BLM	United States Bureau of Land Management
BMP	Best Management Practice
BOR	United States Bureau of Reclamation
CAFO	Confined Animal Feeding Operation
Cal/EPA	California Environmental Protection Agency
CalRecycle	Formerly California Integrated Waste Management Board
CCR	California Code of Regulations
CDFA	California Department of Food & Agriculture
CGC	California Government Code
CDQAP	California Dairy Quality Assurance Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CESA	California Endangers Species Act
CHSC	California Health and Safety Code
Comprehensive Water Package	Safe, Clean, and Reliable Drinking Water Supply Act of 2010
CUPA	Certified Unified Program Agencies
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
CWC	California Water Code
DBCP	Dibromochloropropane
DCE	Dichloroethylene
DFG	California Department of Fish and Game
DOC	California Department of Conservation
DoD	Department of Defense
DoE	Department of Energy
DOGGR	California Division of Oil, Gas, and Geothermal Resources
DPH	California Department of Public Health (formerly Department of Health Services)
DPR	California Department of Pesticide Regulations
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
Forest Service	United States Department of Agriculture Forest Service
FREP	Fertilizer Research and Education Program
GAMA	Groundwater Ambient Monitoring and Assessment Program
ILRP	Irrigated Lands Regulatory Program
IWMB	California Integrated Waste Management Board (now under CalRecycle)
IRWM	Integrated Regional Water Management
JPA	Joint Powers Authority
LIA	Local Implementing Agency
LOP	Local Oversight Program

MCL	Maximum Contaminant Level
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MRP	Monitoring and Reporting Program
National Park Service	United States Department of Interior National Parks Service
NMP	Nutrient Management Plan
NOI	Notice of Intent
NRCS	Natural Resource Conservation Service
OEHHA	Office of Environmental Health Hazard Assessment
PCE	Tetrachloroethylene
PHG	Public Health Goal
PRC	Public Resources Code
RCRA	Resource Conservation and Recovery Act
Roadmap	Groundwater Quality Protection Strategy for the Central Valley Region
ROWD	Report of Waste Discharge
RWMG	Regional Water Management Groups
State Water Board	State Water Resources Control Board
TBA	tert-Butyl Alcohol
TDS	Total Dissolved Solids
USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VC	Vinyl Chloride
WBCC	Water Board Cleanup Council
WDR	Waste Discharge Requirements
WMU	Waste Management Units

Figure 1


Central Valley Regional
Water Quality Control Board
Region 5

1. Executive Summary

The California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) recognizes that past regulatory approaches have not protected all groundwater from historical and current practices associated with land applications of waste. For example, in some areas of the Central Valley Region groundwater produced from some aquifers that serve individual and community drinking water systems have been polluted and are unsafe to drink. In response, the Central Valley Water Board adopted Resolution R5-2008-0181 directing staff to develop a Groundwater Quality Protection Strategy (Roadmap) through an active stakeholder process.

Developing a Roadmap for the Central Valley Region is not initiating a new regulatory program. This Roadmap is intended to be an overarching framework or an outline for long range planning. By presenting it to the Central Valley Water Board it allows the Board review and approval of the overarching plan as well as an opportunity to provide direction to staff. Further, it defines the regulatory programs to be enhanced, and identifies ways to expand on all partnering opportunities with other federal, state, and/or local agencies to protect groundwater quality. Following approval of the Roadmap, workplan(s) will be developed for the higher priority future actions to provide a more detailed description of tasks, timelines, and resources required to implement those actions.

In order to make this Roadmap useful to the public, policy-makers, and the Central Valley Water Board; a starting point to map a course for the future had to be identified. The starting point for the Roadmap is the background (Section 3) information on agencies and organization, the Central Valley Region's basins, and primary constituents of concern. Current Groundwater Quality Protection Programs (Section 4) being implemented by the Central Valley Water Board describe how groundwater quality is being protected now. To assist in the evaluation of existing groundwater quality protection programs and identification of future actions Stakeholder's Concerns and Issues (Section 5) were also considered.

The final section of the Strategy is the "Roadmap" (Section 6) which focuses on future actions that can be implemented within the next five to twenty years. To illustrate the Roadmap, a description is provided of three basic elements: a) future actions; b) how the actions are prioritized; and c) resource needs to implement the actions. Implementation of future actions, are not limited to the Central Valley Water Board. Future actions may be implemented by: the Central Valley Water Board; other agencies or organization; or through a partnership between agencies.

Table 6.6 lists future actions to be implemented. Future actions were identified through the culmination of reviewing current activities and numerous stakeholder comments. Table 6.6 lists the future actions that may be initiated over the next five years but may not be completed in that time frame.

As water quality is dynamic, so is this roadmap will be too: additional actions or changes in prioritization may occur. The Strategy will be evaluated annually to identify appropriate adjustments to the roadmap's course with approval of the Central Valley Water Board.

Table 6.6 Future Actions - Concerns Addressed

		CONCERNS ADDRESSED											
		5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	5.10	5.11	5.12
	Future Actions	**Communication & Coordination**	**CAFO**	**Education, Outreach, Research**	**Groundwater Cleanup Programs**	**Groundwater Database**	**Groundwater Monitoring**	**IRWM Planning**	**ILRP - Groundwater**	**Land Use Planning**	**Legacy Pollutants**	**Water Sustainability**	**Well Design & Destruction Program**
6.4.1	Develop Salt & Nutrient Management Plan	X	X	X	X	X	X	X	X	X	X	X	
6.4.2	Implement Groundwater Quality Monitoring Program	X	X	X	X	X	X	X	X	X	X		
6.4.3	Implement Groundwater Protection Programs Through IRWM Plan Groups	X					X	X	X	X		X	X
6.4.4	Broaden Public Participation for all programs	X		X									
6.4.5	Coordinate with local agencies to implement Well Design & Destruction Program	X		X				X		X	X		X
6.4.6	Groundwater Database	X		X	X		X			X	X		X
	Alternative Dairy Waste Disposal	X	X								X		
6.5.1	Develop Individual & General Orders for Poultry, Cattle Feedlots, other types CAFOs	X	X	X							X		
	Implementation of Long-term ILRP	X		X					X		X		
6.5.2	Coordinate with CDFA to identify methods to enhance fertilizer program	X		X					X		X		
6.5.3	Reduce Site Cleanup Backlog	X			X						X		
	Draft Waiver following new regulation adoptioned based on AB885	X				X				X	X		
	Updated Guidelines for Waste Disposal from Land Developments	X						X		X	X		
	Develop methods to reduce backlog and increase facilities regulated	X		X		X	X				X		

2. INTRODUCTION

The California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) recognizes the importance of groundwater within the Central Valley. Groundwater is a critically important resource that accounts for almost 50 percent of the domestic (private) and public drinking-water supply in the Central Valley. Groundwater also provides a large part of the irrigation supply for agriculture, especially during times of drought. Some groundwater supplies throughout the Central Valley have been degraded or polluted which, in part, may be due to historical practices of the agriculture and dairy industries; commercial, industrial, and military discharges; failing septic systems; and other discharges to land. With the population of the Central Valley expected to grow, groundwater's importance to the Central Valley Region will not diminish.

The Central Valley Water Board currently dedicates nearly 50% of its technical staff to a number of groundwater quality protection regulatory programs. Groundwater quality programs have historically focused on discharges that could be associated with an individual or easily identifiable source, and has not directly regulated non-point sources such as agricultural practices. Regulations established in Title 27 of the ~~Water Code~~ California Code of Regulations (CCR) have historically been used to regulate dairies. A study conducted in 2004 determined these regulations may not be adequate to be fully protective of groundwater quality in all cases. Therefore, based on current data and information the Central Valley Water Board recognizes that past regulatory approaches have not protected all water from historical and current practices associated with agriculture and other land application practices. In response the Central Valley Water Board adopted Resolution R5-2008-0181 directing staff to develop a Groundwater Quality Protection Strategy (Roadmap) through an active stakeholder process.

Developing a Roadmap for the Central Valley Region is not initiating a new regulatory program. The intent of developing a Roadmap is to provide a long range planning document that defines the regulatory programs to be enhanced, improved or developed, and implemented by the Central Valley Water Board to protect groundwater quality, abate degradation, and improve and restore water quality in central valley groundwater. The Central Valley Water Board recognizes that there are other state, federal, and local agencies that have regulatory or other interests in maintaining groundwater quality. This Roadmap is not intended to duplicate other agencies efforts; it is intended to identify ways to enhance all partnering opportunities. If any new regulatory programs are proposed, in this or future updates of this Roadmap, it will require the Central Valley Water Board to go through a thorough rule-making process.

The Roadmap will also serve as an information document for the public and policy-makers on the Central Valley Water Board's groundwater quality protection programs. Through this Roadmap other federal, state, and local agencies groundwater quality protection programs are identified to illustrate where interagency coordination is ongoing or will occur.

This Roadmap has been drafted to include stakeholder input and will be presented to the Central Valley Water Board for approval. Following the approval of this Roadmap, Central Valley Water Board staff will draft a workplan that identifies actions and resources required to implement it. To keep stakeholders and the Central Valley Water Board informed on implementation of the Roadmap, annual reports will be provided to the Board.

2.1 Strategy (Roadmap) Purpose

The purpose of developing this Strategy is to serve as the Central Valley Water Board's Roadmap to move forward with a comprehensive, consistent, and coordinated groundwater protection program for the Central Valley Region. The Roadmap is intended to provide an over-arching framework describing how the Central Valley Water Board will implement the basin plans to protect and restore groundwater quality. Protection and restoration of groundwater quality is the mission of the Central Valley Water Board but other organizations and agencies share this responsibility. The Roadmap will identify existing and new partnerships with organizations and agencies that can be enhanced or developed to further protect and restore groundwater quality.

To develop this roadmap, existing groundwater quality and regulatory program conditions have been identified, Central Valley Water Board groundwater quality protection programs have been evaluated, and recommendations from stakeholders have been considered to form this document that identifies:

- background of the hydrologic regions, primary constituents of concern, and agencies with groundwater oversight that make up the Central Valley Region
- a summary description of the Board's existing groundwater quality protection programs and how they are implemented
- areas where existing programs may need to enhance or improve protection efforts
- areas where the Board can coordinate with other agencies and enhance coordination to leverage resources
- concerns and issues in protection of groundwater quality
- future actions to protect groundwater quality

2.2 Strategy (Roadmap) Development

In August 2009, four public workshops were held to solicit information from stakeholders on groundwater quality protection needs. The workshops included a brief introduction and then small group breakout sessions to gather information from stakeholders. Working in small groups of mixed interests stakeholders responded to breakout session questions, and then reported out to all workshop stakeholders. Workshops were attended by stakeholders representing a variety of interests including: food processors, water purveyors, irrigation districts, conservation districts, rural communities, agricultural interests, federal and state agencies, cities, counties, elected officials, environmental groups, non-profit organizations, and other interested parties.

Following the August 2009 public workshops, Central Valley Water Board staff compiled comments and found that there were several recurrent ideas. These recurrent ideas have been combined into twelve like elements and are addressed in Section 5 Stakeholders Concerns and Issues.

2.3 Strategy (Roadmap) Approach

The approach to developing the Roadmap was to identify and merge the concerns and issues identified in current Central Valley Water Board groundwater quality protection programs and raised by stakeholders. With the identification of the concerns and issues, current and future actions to address them could be laid out, along with a method of prioritizing actions, and identifying resources needed to implement those actions, in Section 6, the Roadmap.

Following the Central Valley Water Board's approval of the Roadmap workplan(s) for the higher priority future actions (identified in Section 6) will be developed. The Roadmap will be re-evaluated annually to allow for adjustments based on new information and identification of needs for new or revised workplans.

2.4 Organization of Document

The introduction (Section 2) describes some of the factors leading to the resolution to adopt the Roadmap. The purpose, development, and approach of the Roadmap are also described.

The background (Section 3) provides a summary of groundwater quality in the three hydrologic regions of the Central Valley Region, Sacramento River, San Joaquin River, and Tulare Lake Basins. Primary constituents of concern and potential sources impacting groundwater quality are described. This section also describes those factors that the Central Valley Water Board can regulate versus the activities that impact groundwater outside its direct regulatory control.

Contained in the Groundwater Quality Protection Programs (Section 4) is a summary description of each of the Central Valley Water Board's regulatory programs. Within each of the program sections is a description of how the Central Valley Water Board implements the program and indicates how interagency coordination occurs. Concerns and issues for each of the programs were also identified through internal discussions. The tables in Section 4 were used to identify where gaps in regulation may exist and areas where agency coordination could occur. These tables may also serve as a resource for those interested in obtaining more information on the various regulatory authorities. To provide the reader with further resources, Appendix A provides an overview of local, state, and federal agencies and organizations that have an interest in protection of groundwater quality.

Stakeholders Concerns and Issues (Section 5) were developed by categorizing the recurrent ideas identified through stakeholder workshops. These concerns and issues are related to possible conflicts between agencies authorities, potential gaps, or

overlaps in the protection of groundwater quality. Within this section we have identified current activities in place that are addressing some of the issues raised.

The Roadmap (Section 6) considered the concerns and issues identified in Sections 4 and 5 to identify future actions the Central Valley Water Board will implement to protect groundwater quality. The Roadmap provides criteria for prioritization of the future actions and resource needs for implementation of the Roadmap for the short term and into the future.

3. BACKGROUND

3.1 Agencies & Organizations

The Central Valley Water Board is not the only public agency in the Central Valley Region with a responsibility to protect groundwater quality. There are federal, state, and local agencies, cities, counties, and special districts that have regulatory or other interests with respects to groundwater quality. Each of these agencies has responsibilities that can impact groundwater quality whether through formal regulations, laws or legislative mandates, policies, permitting, or planning programs. The following information provides a description of the Central Valley Water Board's responsibilities along with general description of the other state, federal, and local agencies the Board coordinates with.

Through this brief description of some of the many agencies, federal, state, and local it is easy to see how some inherent overlaps of regulatory authority can exist. It is part of the intent of this Roadmap to identify where these overlaps may exist and initiate or improve agency coordination to reduce any duplicative efforts.

3.1.1 Central Valley Water Board Responsibilities

The mission of the Central Valley Water Board is to protect, preserve, and enhance the quality of California's water resources for the benefit of present and future generations. **The Central Valley Water Board does not have any water right authority and this Roadmap will not address any issue involving groundwater rights, including water use or the volume or quantity of groundwater associated with that use.** Specific responsibilities and procedures of the regional boards and the State Water Board are contained in the Porter-Cologne Water Quality Control Act (California Water Code [CWC], Section 13000 et. seq.).

The Central Valley Water Board implements the CWC through the regulation of waste discharges. The Board regulates discharges through a variety of tools afforded them in the CWC, including waivers, basin plan prohibitions, enforcement orders and waste discharger requirements. The most common of these tools is the adoption of Waste Discharge Requirements (WDRs) that contain conditions intended to ensure the discharge conforms to the CWC. Central Valley Water Board staff confirms compliance of WDRs through review of technical or monitoring reports of discharges and by performing inspections. If a discharger is found to be in violation of CWC an appropriate level of enforcement is taken following the State Water Board's Enforcement Policy. If necessary to protect groundwater quality the CWC, section 13243 allows for the Central Valley Water Board to prohibit certain types of discharges.

While the Central Valley Water Board acknowledges its mandate to protect the quality of groundwater within the Central Valley Region, it also recognizes other state, federal, and local agencies also have regulatory or other responsibilities and/or interests in maintaining groundwater quality. The Central Valley Water Board must develop and enhance all partnering opportunities possible to enhance and leverage its resources to address the significant groundwater quality issues throughout the Central Valley.

3.1.2 State Agencies

Within California multiple agencies or departments are part of the Executive Branch. To more effectively coordinate protection of the environment, the California Environmental Protection Agency (Cal/EPA) was created in 1991 by Governor's Executive Order. The six Boards, Departments, and Office were placed within the Cal/EPA "umbrella" to create a cabinet-level voice for the protection of human health and the environment and to assure the coordinated deployment of State resources. Cal/EPAs mission is to restore, protect and enhance the environment, to ensure public health, environmental quality and economic vitality. The Boards, Departments, and Office that make up Cal/EPA are: Air Resources Board (ARB), Department of Pesticide Regulations (DPR), Department of Toxic Substances Control (DTSC), Integrated Waste Management Board (IWMB), Office of Environmental Health Hazard Assessment (OEHHA), State Water Board, and the nine Regional Water Quality Control Boards, which includes the Central Valley Water Board. Recently the Department of Resources Recycling and Recovery (CalRecycle) was created and the regulatory responsibilities of the IWMB have been moved to the newly-formed department.

The Central Valley Water Board coordinates not only with sister agencies under the Cal/EPA umbrella, but also with State of California departments under the Natural Resources Agency, including the Department of Water Resources (DWR), Department of Fish and Game (DFG), Department of Forestry and Fire Protection (CAL FIRE), and Department of Conservation (DOC). Since groundwater is also a source for drinking water, staff of the Central Valley Water Board also coordinates with the California Department of Public Health (DPH), which is part of the Health and Human Services Agency. All of these State agencies and departments either directly regulate or have some form of authority over groundwater resources throughout California, and it is imperative that the Central Valley Water Board identify partnering opportunities with these agencies and departments.

3.1.3 Federal Agencies

Coordination with federal agencies is also necessary to carry out the Central Valley Water Board's mission. While historically focused on surface water, under the Federal Clean Water Act, the Central Valley Water Board has coordinated with the United States Environmental Protection Agency (USEPA) on several programs such as Impaired Water Body listing, Nonpoint Source Program, and National Pollution Discharge Elimination System (NPDES) permitting. Coordination with USEPA also occurs during site cleanup of Federal Superfund Sites. Staff coordinate on permitting with the U.S. Army Corps of Engineers (USACE) for streambed alternations and with the Bureau of Land Management (BLM) or United States Forest Service (USFS) for timber and mining operations. Under this proposed Roadmap, coordination will continue. The Central Valley Water Board will also continue to work closely with the U.S. Geological Survey (USGS) utilizing water quality data, maps, and related water resources studies.

3.1.4 Local Agencies

Throughout the Central Valley Region there are many local agencies and special districts that have an interest in groundwater quality. Local agencies such as county environmental health agencies implement onsite wastewater treatment system permitting and installation and also oversee assessment and cleanup of underground storage tank sites through a memorandum of understanding with the State Water Board. Under CWC Section 13801(c) local governments, counties, cities, and some water districts are responsible for enforcing well standards that meet or exceed the well standards pursuant to DWR Bulletins 74-81 and 74-90.

3.1.5 Cities and Counties

Government Code Section 65300 requires every city and county to draw up and adopt "a comprehensive, long term general plan for the physical development" of the community. A general plan is a set of long-term goals and policies that guide local land use decisions. At a minimum, such a plan must cover specified provisions addressed by each of the seven elements listed in California Government Code Section 65302: land use, circulation, housing, conservation, open space, noise, and safety. Currently, water resources are considered an optional element in a general plan. Through the Governor's Office of Planning and Research, cities and counties can find the 2003 General Plan Guidelines which are currently being updated. Even though water resources is still considered an optional element of a General Plan, many cities and counties are or have incorporated water into their General Plans in mandatory elements such as conservation and open space or the optional environmental element.

Through the CWC the State and Regional Water Boards have certain responsibilities. CWC section 13225(j) encourages coordinated regional planning and action for water quality control. Coordinating with cities and counties to educate them on the Central Valley Water Board's Water Quality Control Plans (Basin Plans) is important to insure water quality is considered in land use planning. This type of coordination may lead to more robust water quality protection elements in city and county General Plan updates.

3.1.6 Special Districts

Some Special Districts created through special acts of the Legislature have authority to manage and deliver groundwater. Management and delivery of groundwater may have an impact on groundwater quality; therefore, the Central Valley Water Board provides input to these Special Districts.

3.2 Legislative Actions, Bond Initiatives, and Stakeholder Driven Initiatives

Groundwater quality protection is influenced by legislative actions, bond initiatives, and stakeholder driven initiatives. An integral part of groundwater quality projection takes place through groundwater management, which is implemented by local agencies and special districts with authority to deliver water. To provide more effective or efficient government services or to solve a service delivery problem, the Government Code allows for two or more public agencies to join together, under a joint powers authority (JPA).

Through recent legislation there has been a growing emphasis not only on groundwater management, but integrated water resource management. Encouragement through financial incentives for public and private entities that provide water service to work together through joint powers agreements to implement Integrated Regional Water Management plans. An important element of Integrated Regional Water Management planning is the emphasis on involving all affected parties into the planning process. Basically any organization, governmental entity, agency, or individual who has a "stake" in or may be impacted should be a part of the planning process.

Water delivery and supply is a function of DWR. To assist with development of water management plans, DWR provides guidance documents that address required and recommended planning elements. As evidenced by legislative requirements and DWR guidance, water quality is an important element in water resource planning.

Some examples of water management planning that include water quality elements are:

3.2.1 Groundwater Management Plans (AB3030 and SB1938)

In 1992, the State Legislature passed AB3030 (CWC § 10750 et seq.), which provided for more formal groundwater management. With the passage of AB3030, numerous water agencies developed groundwater management plans and counties passed groundwater ordinances. In 2002, SB1938 was passed that amended CWC § 10750 et seq. SB 1938 required that groundwater management plans adopted by local agencies must have certain components to be eligible for public funds administered through the DWR. (DWR 2003)

Developing a Groundwater Management Plan is voluntary; however, if an agency adopts a plan it must adhere to CWC § 10750 et seq. Many agencies throughout the Central Valley Region have developed Groundwater Management Plans since 1992 and/or updated these plans following the passage of SB1938. To learn more on the required and recommended components of a local groundwater management plan see Appendix B. To search for Groundwater Management Plans in an area see DWR's Integrated Water Resources Information System at: http://www.water.ca.gov/iwris/

3.2.2 Integrated Regional Water Management (IRWM)

In November 2002 Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, was passed by California voters. It amended the CWC to add, among other articles, § 79560 *et seq.* authorizing the Legislature to appropriate $500 million for Integrated Regional Water Management projects. Since 2002 additional legislation has been enacted including the rewrite of CWC § 10530 et seq. Integrated Regional Water Planning Act to further define standards for an Integrated Regional Water Management Plan.

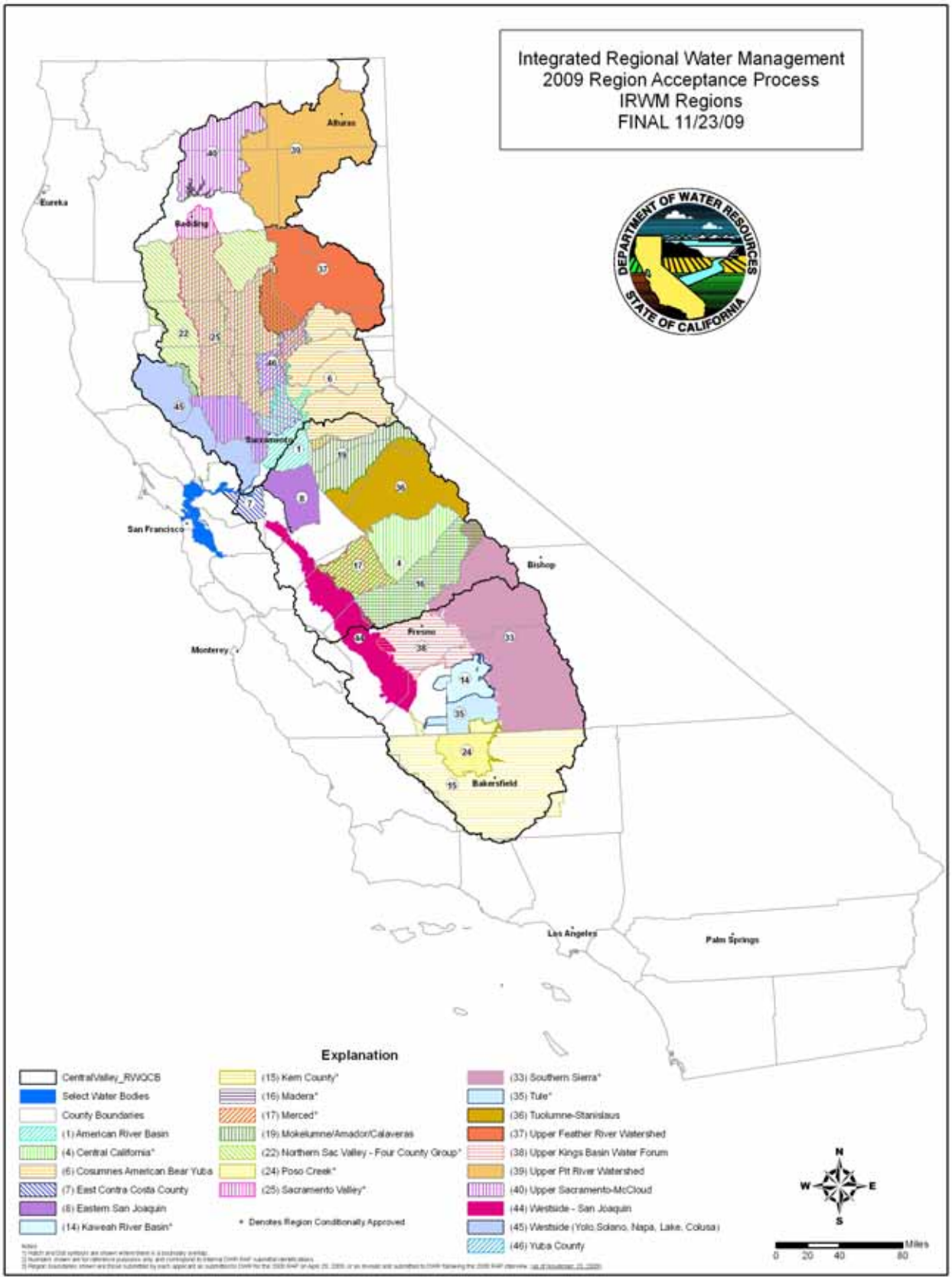
These and other legislative initiatives are using financial incentives to promote Integrated Water Management. The DWR describes Integrated Water Management as a multi-objective approach that encourages using a mix of resource management strategies to provide broad benefits particularly to regions. These strategies include water use efficiency, water recycling, desalination, and storage as well as strategies for

protecting and improving water quality; managing floodplains, runoff, and watersheds; and restoring ecosystems. (DWR 2009) Through DWR's development of guidance for IRWM Plans, work previously undertaken in development of Groundwater Management Plans has not been overlooked. Groundwater Management Plans developed based on AB3030 and/or SB1938 are an integral component of an IRWM Plan.

With the passage of Proposition 50 and Proposition 84 the IRWM Plan requirements have evolved. In September 2008, Senate Bill 1(Perata, Stats.2008, Ch. 1; eff. March 1, 2009) was signed which contains the "Integrated Regional Water Management Planning Act", CWC 10530 et seq. This provided a general definition of an IRWM Plan as well as guidance to DWR as to what IRWM program guidelines must contain. The IRWM program guidelines were to include standards for identifying an IRWM region for the purposes of developing or modifying an IRWM Plan. Since the passage of Senate Bill 1, there have been 23 IRWM regions within the Central Valley which have been approved or conditionally approved through DWR's Region Acceptance Process, (Figure 2 – IRWM Regions)

As with the Groundwater Management Plan an IRWM Plan is a voluntary planning program. With 23 IRWM regions within the Central Valley, it is apparent that a large number of agencies and organizations that are active members of IRWM regions see the value in devoting a considerable amount of time and effort in the participation in this type of regional water management efforts. The IRWM funding program is currently implemented by the DWR in coordination with the State and Regional Water Boards. More information on the IRWM Program is available at:
http://www.water.ca.gov/irwm/index.cfm

FIGURE 2


Integrated Regional Water Management
2009 Region Acceptance Process
IRWM Regions
FINAL 11/23/09
DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA
Eureka
Redding
Alturas
Sacramento
San Francisco
Monterey
Fresno
Bishop
Bakersfield
Los Angeles
Palm Springs
Explanation
CentralValley_RWQCB
Select Water Bodies
County Boundaries
(1) American River Basin
(4) Central California*
(6) Cosumnes American Bear Yuba
(7) East Contra Costa County
(8) Eastern San Joaquin
(14) Kaweah River Basin*
(15) Kern County*
(16) Madera*
(17) Merced*
(19) Mokelumne/Amador/Calaveras
(22) Northern Sac Valley - Four County Group*
(24) Poso Creek*
(25) Sacramento Valley*
* Denotes Region Conditionally Approved
(33) Southern Sierra*
(35) Tule*
(36) Tuolumne-Stanislaus
(37) Upper Feather River Watershed
(38) Upper Kings Basin Water Forum
(39) Upper Pit River Watershed
(40) Upper Sacramento-McCloud
(44) Westside - San Joaquin
(45) Westside (Yolo,Solano, Napa, Lake, Colusa)
(46) Yuba County
N
W
E
S
Miles
0 20 40 80

3.2.3 Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS)

The Central Valley Water Board is engaged in developing a significantly new regulatory program that will result in the development of a Salinity and Nitrate Management Plan that will be implemented throughout the entire Central Valley. This effort is referred to as the CV-SALTS Initiative.

The goal of CV-SALTS is to develop a comprehensive region-wide Salt and Nitrate Management Plan (Plan). The Plan will be developed and implemented through amendments to the three Basin Plans that cover the Central Valley Region, which include the Sacramento River and San Joaquin River Basin Plan, the Tulare Lake Basin Plan and the Sacramento/San Joaquin Rivers Bay-Delta Plan. This comprehensive basin plan amendment will involve, 1) the review of all surface and groundwater basins through the region to expand the listed water bodies and to confirm, revise, or add designated beneficial uses of water bodies currently listed or added, 2) the review and establishment of applicable water quality objectives to meet the beneficial uses, and 3) to establish a comprehensive implementation plan to achieve the water quality objectives. The stakeholder CV-SALTS Initiative is the Central Valley Water Board's primary mechanism to conduct the necessary studies, research and develop technical and science reports to formulate all components of the basin plan amendment and to implement the Plan once it's adopted by the Board. Work to be done includes data collection, database development, modeling, monitoring, research, studies and pilot project programs.

Since its inception, CV-SALTS has worked with affected stakeholders on many strategic activities related to the nature of salinity and nitrate and their effects on the environment including significant public outreach, the development of a detailed work plan, and a study conducted by UC Davis on the economic impacts of salinity in the Central Valley

Due to the complexity and far-reaching impacts of salt and nitrates the Central Valley Water Board has determined that any and all users of Central Valley waters, within and outside of the Central Valley Water Board's jurisdictional area are considered stakeholders for this Plan. The Central Valley Water Board believes all stakeholders should be very involved in the development of basin plan amendments that could affect the use designation and quality of Central Valley waters they use.

3.3 Hydrologic Regions - Sacramento River, San Joaquin River, Tulare Lake Basin

The Central Valley region encompasses approximately 60,000 square miles of land area or nearly 40 percent of the total land area of the State of California. Thirty-eight of California's 58 counties are either completely or partially within the Central Valley Water Board's boundaries. Over 18 percent of the State's population is within the Central Valley. Population is expected to increase over the next decade/century as growth is focused in the Central Valley. The second largest contiguous groundwater basin in the United States is situated in the Central Valley. Almost the entire Sacramento/San Joaquin Delta (Delta) is within the Central Valley Water Board's jurisdiction. The Delta is the largest west coast estuary, and it supplies over two-thirds of the water supply for

California. Nearly 50 percent of all facilities regulated for discharges to land, and over 42 percent of all septic systems in the State, are situated in the Central Valley.

For the purposes of this Roadmap, the focus is on groundwater quality issues. However, it is important to recognize that there is an interconnection between groundwater and surface water through the hydrologic cycle. To assist the reader in understanding the groundwater quality issues a general background of the Sacramento River, San Joaquin River, and Tulare Lake Basin hydrologic regions within the Central Valley Region follows.

3.3.1 Sacramento River Hydrologic Region (Sacramento River Region)
The Sacramento River Region includes the entire drainage area of the state's largest river and its tributaries, extending from the Oregon border downstream to the Sacramento-San Joaquin River Delta. The region covers 27,246 square miles including all or a portion of 23 predominately rural Northern California counties, and extends from the crest of the Sierra Nevada Mountains in the east to the summit of the Coast Range in the west.

The Sacramento River Region also encompasses all or a portion of six of the state's 18 national forests. Lassen, Mendocino, Modoc, Plumas, Shasta-Trinity, Eldorado, and Tahoe Basin national forests are contained or contiguous to the region. In these areas, high quality groundwater largely occurs in fractured metamorphic and igneous rocks. Fractured bedrock aquifers can be highly vulnerable to pollution. Agriculture is the region's largest industry, contributing a wide variety of crops including rice, grain, tomatoes, field crops, fruits, and nuts. The southern portion of the Sacramento River Region has been experiencing rapid population growth and urbanization.

3.3.2 San Joaquin River Hydrologic Region (San Joaquin River Region)
The San Joaquin River Region is in California's Great Central Valley and is generally the northern portion of the San Joaquin Valley. The region is southerly of the Sacramento River Hydrologic Region and northerly of the Tulare Lake Hydrologic Region. Approximately half of the Sacramento-San Joaquin River Delta (Delta) is included in the region. Those portions of the Delta exist in Contra Costa, Alameda, and San Joaquin counties. The region contains a portion of Sacramento County and extends south from just below the northeastern corner of Sacramento County and east to include the southern third of El Dorado County; almost all of Amador County; the western slope of Alpine County; the remainder of San Joaquin County; all of Calaveras, Tuolumne, Stanislaus, Mariposa, Merced, and Madera counties; a portion of Fresno County; and a sliver of San Benito County.

The hydrologic region is bordered on the east by the Sierra Nevada mountains and on the west by the coastal mountains of the Diablo Range. It includes all of the San Joaquin River drainage area extending south from the southern boundaries of the Delta to include the northern drainage of the San Joaquin River in Madera County and its southern drainage in Fresno County. The San Joaquin River Region is hydrologically

separated from the Tulare Lake Hydrologic Region by a low broad ridge that extends across the San Joaquin Valley between the San Joaquin and Kings rivers.

The valley portion of the region constitutes about 3.5 million acres, the eastern foothills and mountains total about 5.8 million acres, and the western coastal mountains comprise about 900,000 acres.

Agriculture remains the dominant economic sector of the San Joaquin River Region. Agricultural production, processing, packaging, handling, shipping, and the sales of goods and services supporting agriculture represent a major economic and land use activity.

Urban activities have increased over the last two decades from significant population growth in cities such as Stockton, Tracy, Manteca, Galt, Lodi, Modesto, Turlock, Merced, Los Banos, and Madera, which have expanded into the surrounding agricultural lands. Pacheco and Altamont passes serve as commuting corridors into the Bay Area and contribute to the growth of valley communities. There has also been increased population growth in the Sierra Nevada foothills.

3.3.3 Tulare Lake Hydrologic Region (Tulare Lake Region)

The Tulare Lake Region covers approximately 10.9 million acres (17,050 square miles) and includes all of Kings and Tulare counties and most of Fresno and Kern counties. The southern portion of the San Joaquin Valley is subdivided into two separate basins, the San Joaquin and the Tulare Lake, by a rise in the valley floor resulting from an accumulation of alluvium between the San Joaquin River and the Kings River fan. The valley floor in this region has a complex series of interconnecting natural sloughs, canals, and marshes.

The economic development of the region is closely linked to the surface water and groundwater resources of the Tulare Lake Region. Major rivers draining into the Tulare Lake region include the Kings, Kaweah, Tule, and Kern rivers. The original ecological character of the area has been changed dramatically, largely from the taming of local rivers for farming and flood control. Significant geographic features include the Buena Vista/Kern Lake and Tulare Lake, comprising the southern half of the region; the Coast Range to the west; the Tehachapi Mountains to the south; and the southern Sierra Nevada Mountains to the east.

The Tulare Lake Region has 12 groundwater basins and seven subbasins of the San Joaquin Valley Groundwater Basin, which crosses north into the San Joaquin River. These basins underlie approximately 5.33-million acres (8,330 square miles) or 49 percent of the entire hydrologic region. Groundwater has historically been important to both urban and agricultural uses, accounting for 41 percent of the region's total annual supply and 35 percent of all groundwater use in the state. Groundwater use in the region represents about 10 percent of the state's overall water supply for agricultural and urban uses.

The Tulare Lake Region is one of the nation's leading agricultural production areas, growing a wide variety of crops on about three million irrigated acres. The region also contains about 37 percent of the state's total dairies; however, these dairies account for more than 56 percent of the total number of cows. Agricultural production has been a mainstay of the region since the late-1800s. However, since the mid-1980s, other economic sectors, particularly the service sector, have been growing. Most of the urban growth has occurred adjacent to the agricultural towns along Highway 99. Cities such as Fresno, Visalia, and Bakersfield have become major urban centers, with between 100,000 and 500,000 residents. Based on population estimates by the California Department of Finance, Fresno is the fifth largest city in California.

A broader description of the regional water conditions of the three hydrologic regions (Sacramento River, San Joaquin River, and Tulare Lake Basins), can be found in the Department of Water Resources' California Water Plan. Regional water conditions including discussion on water for environmental uses, supplies, quality, and governance are included in the California Water Plan update.

3.4 Primary Groundwater Quality Constituents of Concerns and Sources

Throughout the Central Valley Region there are several constituents of concern that are found in all three of the hydrologic regions discussed above. As this Roadmap covers the entire Central Valley Region this discussion is on primary constituents of concern that may occur throughout the region and is not an all inclusive list of constituents that have been found in groundwater.

The 2003 update of the Department of Water Resources Bulletin 118 includes a summary of water quality from public supply water wells sampled from 1994 to 2000. The most frequently-exceeded constituents were nitrates, volatile/semi-volatile organic compounds, and inorganic chemicals. [DWR 2003] Volatile/semi-volatile organic compounds including perchlorate, inorganics include metals, such as arsenic and hexavalent chromium, and other constituents may include pesticides, salinity, pathogens, or legacy pollutants. Some of these constituents can be attributed to anthropogenic sources, while some are naturally occurring.

3.4.1 Salinity

Over the years, the Central Valley Water Board has been aware of the growing problem of increasing salinity in the Central Valley. Salinity is an issue that prevails throughout all three of the Central Valley Region's basins; with some localized areas with high impacts. The salinity impairment of surface and groundwater in the Central Valley is a subset of a more far-reaching problem shared by most of California, other arid western states, and much of the developed world. When water is used, salts are left behind. Many products contain some form of salt (e.g. home water softeners, filler in laundry soap, or plant fertilizers) and use of these types of products results in the addition of salts. But even when no salts are added to the system, evaporation and consumptive use act to concentrate unused salts. Additionally, salts move with water; so salts originating in one basin will turn up in another. Salinity increases can affect municipal,

agricultural, and industrial beneficial uses of water. Salinity increases in municipal use can affect the ability to recycle and reuse municipal wastewater.

The Tulare Lake Basin is usually a closed basin that does not have an outlet. Almost all of the salt loading introduced from outside of the basin concentrates in the underlying aquifers. The crucial problem for the Tulare Lake Basin groundwater is the salts brought in with irrigation water and leached out of soils. Evaporation and crop transpiration remove water from soils, which can result in an accumulation of salts in the root zone of the soils at levels that retard or inhibit plant growth. Additional amounts of water often are applied to leach the salts below the root zone. The leached salts eventually enter ground or surface water.

Impacts from salts can also be the result of a natural occurrence as in the Sacramento River basin where historic, greater than 65 million years and older, marine sedimentary rocks containing brackish to saline water are near the surface. Recharge of groundwater by stream flow originating from Coast Range marine sediments also affects water quality in the western portion of the Tulare Lake Basin.

3.4.2 Pesticides

Agricultural pesticides and herbicides have been detected in groundwater throughout the region, but primarily along the east side of the San Joaquin Valley where soil permeability is higher and depth to groundwater is shallower. [DWR 2003]

The most notable agricultural contaminant found in groundwater is dibromochloropropane (DBCP), a now-banned soil fumigant and known carcinogen once used extensively on grapes. [DWR 2003] DBCP is still found in municipal wells in the Central Valley Region. Other pesticides detected in groundwater in the San Joaquin and Tulare Lake Basins include diuron, ethylene dibromide, simazine, and their degradation products.

Some of the pesticide impairments to surface water are from legacy pesticides, such as DDT, which are now banned from use. Many of the pesticide impairments to surface water are due to chlorpyrifos and diazinon.

Pesticide use is not limited to agriculture. There are other potential sources such as residential landscape use and commercial use in right of way maintenance, golf courses, and parks.

3.4.3 Nitrates

Groundwater is a primary water supply in many instances. However, in many places it is impaired or threatened because of elevated levels of nitrates and salts. The primary sources of nitrate in groundwater are application of fertilizers (nitrogen based commercially available and organic), animal waste from confined animal production facilities by disposal or reuse as organic fertilizer and disposal of human sewage to community sewer systems or individual sewer systems.

A 1988 State Water Board report to the State Legislature on Nitrate in Drinking Water (SWRCB, 1988) reported that 10 percent of the samples in STORET (the USEPA database) were above the primary Maximum Contaminant Level (10 mg/L nitrate as nitrogen). A geographical depiction of wells with levels of nitrate above background (greater than 4.5 mg/L nitrate as nitrogen) showed the highest densities in the Central Valley are close to the Highway 99 corridor and primarily around population centers (e.g. Yuba City, Modesto, Fresno, and Bakersfield) and concentrated animal confinement areas (e.g. feedlots and dairies). During May through June 2006, staff from the State Water Board's Domestic Well Project sampled private domestic supply wells in Tulare County. Among the 181 wells tested in Tulare County (most are to the east of Highway 99), 41 percent (75 of 181) had nitrate levels at or above the drinking water standard. [SWRCB 2007] As noted above in Bulletin 118, nitrate is one of the most frequently exceeded constituents in public supply wells.

In California the use of fertilizers, a source of nitrates, and the number of acres of productive farm land increased dramatically after the 1950s. Research has shown that fertilizer application rates at the surface may take up to 60 years for soil leachate to reach groundwater. Areas of intensive crop production in highly permeable soils, especially of crops with a high nitrogen demand (e.g., vegetables, citrus, and silage corn), are known or suspected of causing elevated nitrate levels in the groundwater (e.g., Salinas Valley, the Chico non-urban area and Hilmar Area of Merced County). (State Water Board 1988)

Groundwater in crop production areas can become contaminated with nitrate when nitrogen fertilizers or animal waste as a soil amendment are applied at rates in excess of crop utilization and inefficient irrigation or high rainfall leach the nitrate to groundwater. Other factors that put groundwater at risk are a shallow aquifer, the absence of a restricting layer to vertical migration of nitrate, permeable soils, and poor well construction.

In 1993, the Central Valley Water Board conducted a survey of groundwater beneath five typical well operated dairies in the vicinity of Hilmar. The average nitrate-nitrogen concentration beneath these dairies was 49 mg/L with a maximum value of 250 mg/L. This far exceeds the drinking water standard of 10 mg/L. Conditions were conducive to migration of nitrates to groundwater as soils are highly permeable (sandy) and the water table is shallow (4 to 25 below ground surface).

Within the Tulare Lake Basin, Tulare County is the largest dairy county in the state. Bulk milk production was 10,585,433 pounds in 2007, nearly twice that produced in Stanislaus County, the second largest dairy county in California. In the Central Valley Region the average number of cows per dairy is 1,678 that is 76 percent higher than the state average.

With increased development in the foothills of the Central Valley Region nitrate impairments associated with onsite wastewater disposal development in shallow unconfined portions of aquifers or in fractured hard rock areas where insufficient soil

depths are available to properly treat effluent before it reaches the local groundwater supply.

3.4.4 Pathogens

Pathogens can be found in the intestines of warm blooded animals. Sources of pathogens in the environment can be attributed to wildlife as well as the waste from humans and animals.

The Central Valley has approximately 600,000 individual onsite wastewater disposal systems within its boundaries. Collectively, these systems discharge approximately 120 million gallons per day to the subsurface. Pollutants of concern in these discharges consist primarily of nutrients (discussed above) and pathogens.

The use of onsite wastewater disposal systems, especially in foothill areas that have shallow soil cover and sloping surfaces, have the potential to impact beneficial uses including drinking water and human health concerns from contact. Fractured rock wells supply groundwater to much of the self-supplied homes and purveyor-supplied small communities in the Sierra Nevada foothills and mountains. The fractured rock is also an avenue for pathogens from onsite wastewater disposal to rapidly pass through areas of source water supplies.

In 2000, the legislature passed Assembly Bill 885, which required the State Water Board to develop regulations for onsite wastewater systems, which are still under development.

Animal wastes are often used as a source of nutrients, or soil amendments, for agricultural crops. If not appropriately applied impacts to groundwater may occur.

3.4.5 Emerging Constituents of Concern

An area of important research is on pharmaceuticals and personal care products (PPCPs) these emerging constituents of concern include:

- Prescription and over-the counter therapeutic drugs
- Veterinary drugs
- Fragrances
- Cosmetics
- Sun-screen products
- Diagnostic agents
- Nutraceuticals (e.g., vitamins)

These PPCPs can potentially impact groundwater through discharges of waste from onsite wastewater disposal systems and other wastewater disposal sources from both human activities and confined animal facilities. As these are emerging constituents of concern more research is necessary to determine what type of impacts may occur and the development of appropriate laboratory methods of analysis.

3.4.6 Volatile Organic Compounds

Of chief concern are chlorinated ethenes. These include Tetrachloroethene (Perchloroethene, PCE), Trichloroethene (TCE), Dichloroethenes (DCE), and Vinyl Chloride (VC). Chlorinated ethenes are recalcitrant, resistant to bacterial breakdown, and mobile in groundwater.

While relatively least mobile, PCE nonetheless impacts comparatively more supply wells, and is highly toxic. Numerous municipal water wells have PCE, warranting costly water treatment, well retrofits, and, in many cases, well shut-offs. Dry-cleaners, typically with limited financial resources to fund cleanups, often historically discharged PCE to leaky sanitary sewers. This in turn caused widespread distribution in groundwater. In some cases, pollution became severe, because pure-phase PCE, found in dry-cleaning solvent, tends to sink in water.

TCE, DCE, and VC, can be breakdown products of PCE, but are also common industrial solvents used in metal de-greasing and de-painting operations. These are also toxic, with greater mobility in groundwater and threats to indoor air quality than PCE. Due to relatively long transport distances in groundwater, correlation of detections in wells to a potentially responsible party is often challenging.

Also of concern are fuel oxygenates, for example Methyl tert-Butyl Ether (MtBE) and tert-Butyl Alcohol (TBA). These were added to reformulated gasoline at high concentrations to reduce air pollution following the Clean Air Act Amendments of 1990. While less toxic and recalcitrant than chlorinated ethenes, these can cause objectionable tastes and odors at dilute concentrations, and are highly mobile in groundwater. Fuel oxygenates have been reported in numerous private domestic and municipal wells near leaking underground storage tank (UST) sites. While in 2002 the petroleum industry began to phase out MtBE and similar oxygenates in California, remaining pollution has resulted in costly groundwater cleanups, often due to threatened or impacted wells.

3.4.7 Perchlorate

Industrial use of perchlorate and its salts has been recognized for decades. However, not until 1997 was it recognized as a drinking water contaminant and only recently, October 2007 was an MCL adopted. In the Central Valley Region the impacts from the use of perchlorate is generally associated with the aerospace industry for use in solid rocket fuel, but it was also used in fireworks, explosives, fertilizers, and possibly air-bag deploying agents. Perchlorate has been detected and has been detected in the Sacramento River Region.

3.4.8 Arsenic

The primary source of arsenic in groundwater in the Central Valley Region is naturally occurring mineral substances within the sediments that compose the groundwater aquifers. Arsenic becomes soluble and occurs in groundwater when favorable physical and chemical conditions exist, such as reducing conditions (low dissolved oxygen), or alkaline conditions (pH 8 or greater) with elevated bicarbonate levels. Concentrations of

naturally occurring arsenic in groundwater vary throughout the Central Valley in response to area climate, geology, and groundwater chemistry. Although elevated levels of arsenic can be found in wells throughout the Central Valley, specific areas with elevated levels have been found in eastern Sacramento County and in wells in the western part of the county along the Sacramento River. In the southern portion of the region elevated levels appear to be associated with lakebed sediments in the Tulare Lake, Kern Lake, and Buena Vista Lake areas. Arsenic also can be present in groundwater as a result of specific releases, such as from mine tailings, wood treating, pesticide or herbicide use, or chemical spills.

3.4.9 Hexavalent Chromium

An emerging issue that will impact water purveyors and how DPH regulates them is hexavalent chromium. In March 1999, hexavalent chromium was added to the unregulated chemicals requiring monitoring. Over the last ten years much research has been conducted and in August 2009 OEHHA released a new draft Public Health Goal (PHG) of 0.06 µg/L for hexavalent chromium. When the PHG becomes final, DPH will begin the process to revise the MCL.

3.4.10 Legacy Pollutants

The terminology legacy pollutant is generally considered pollution that is the result of historical contributions of constituents that are no longer in use or from activities not traditionally regulated such as ~~agriculture~~ historic mining operations and burn dumps. Already mentioned above is the pesticide, DDT, which was used for mosquito abatement. Other legacy pollutants include polychlorinated biphenyls (PCBs) used in many industrial applications and mercury which is closely linked to the Sierra Nevada's historic mining. Generally these legacy pollutants are more frequently found in surface water than groundwater. In this document salts and nitrates are also considered legacy pollutants due to impacts from past as well as current practices.

3.4.11 Uranium

The primary source of uranium found in groundwater in the Central Valley Region is naturally occurring uranium bearing minerals found in small amounts in Sierran granitic rocks. Sediments eroded from the granitic rocks and deposited in the Central Valley through geologic time also contain uranium bearing minerals. Uranium becomes soluble and occurs in groundwater when favorable physical and chemical conditions exist. These conditions are similar to those that favor the dissolution of arsenic bearing minerals in aquifers. Uranium has been detected in wells that draw water from the alluvial aquifers on the eastern side of the Central Valley, where young, bicarbonate-rich water interact with alluvial sediments to release uranium in a dissolved form. Uranium is also found in wells that tap directly into Sierran granitic rocks in the eastern foothills of the Central Valley. Uranium is included as a primary constituent of concern since it has been found in drinking water sources in many communities along the eastern side of the Central Valley.

Table 1 Primary Constituents of Concern and Sources

Constituents of Concern	Potential Sources									
	Industrial	Naturally Occurring	Mining Operations	Irrigation	Storm water	Improper Usage[1]	Fertilizers & Pesticide Application	Animal Waste Disposal or Reuse	Disposal Human Waste	Spills
Salinity	X	X	X	X	X		X	X	X	X
Pesticides				X	X	X				X
Nitrates[2]		X		X	X	X	X	X	X	X
Pathogens				X	X			X	X	X
Perchlorate	X			X		X	X			X
PPCPs[3]				X	X	X		X	X	
VOCs[4]	X				X	X				X
Arsenic	X	X	X	X	X	X	X			X
Hexavalent Chromium	X									
Uranium		X	X							
Legacy Pollutants	X		X	X	X	X	X	X	X	X

[1] Includes off label usage or over application
[2] Includes Fertilizers
[3] Pharmaceuticals and Personal Care Products
[4] Volatile Organic Compounds

4. GROUNDWATER QUALITY PROTECTION PROGRAMS

To protect groundwater quality, both regulatory and non-regulatory programs are implemented by a variety of federal, state, and local agencies. The Central Valley Water Board coordinates not only with sister agencies under the Cal/EPA umbrella but also with departments under the Natural Resources Agency, including the DWR, DFG, CalFire, and the DOC. Since groundwater is also a source for drinking water, staff of the Central Valley Water Board also coordinates with the DPH, which is part of the Health and Human Services Agency.

The primary duty of the Central Valley Water Board is to protect the quality of the waters within the Region for all beneficial uses. The Central Valley Water Board does not have any water right authority and this Roadmap will not address any issue involving groundwater rights, including water use or the volume or quantity of groundwater associated with that use. Specific responsibilities and procedures of the regional boards and the State Water Board are contained in the Porter-Cologne Water Quality Control Act (California Water Code [CWC], Section 13000 et. seq.). As a regulatory agency, the Central Valley Water Board has a mandate to implement certain regulatory programs. However, groundwater quality protection programs also include non-regulatory programs which are voluntary, with participation through incentives such as grants or education.

There are multiple activities that can impact groundwater quality which require regulatory authorization or permitting through a number of different federal, state, and local agencies (Table 2).

Table 2 Groundwater Quality PROTECTION — REGULATORY Programs

Agency	Program Type or Name	**Authority to Implement Program***
Central Valley Water Board	◘ Waste Discharges to Land	**CCR Title 27 CCR Chap 15/Title 23**
	◘ Landfills and Mining	**CCR Title 27**
	◘ Underground Storage Tanks	**CCR Chap 16/Title23, CHSC Chap 6.7, Div 20**
	◘ Wastewater Permitting	**CWC §13290-13291.7**
	◘ Site Assessment & Cleanup	**CWC Div 7, CCR Title 23 §2550.4**
	◘ Confined Animal Facilities	**CCR Title 27 §22560-22565**
	◘ Irrigated Lands Regulatory Program	**CWC Div 7**
	◘ Nonpoint Source Control	**CWC §13369**
State Water Resources Control Board	◘ Establishes Water Quality Standards	**CCR Title 23 §13140, 13164**
	◘ Groundwater Ambient Monitoring Program (GAMA)	**CWC §10780 et seq.**
	◘ Operator Certification Program	**CCR Title 23/Chap 26**
Dept of Conservation	◘ Div. of Oil, Gas and Geothermal Resources	**PRC Title 14/Chap 4 §3000**
Dept of Public Health	◘ Public Water Systems ◘ Water Recycling	**CCR Titles 22 and 17** **CCR Titles 22 and 17**
Dept of Pesticide Regulations	◘ Restricted Materials Use	**CCR Title 3, Div 6 §14001 et seq.**
	◘ Groundwater Protection Areas	**CCR Title 3, Div 6 §6800 et seq.**
Dept of Toxic Substances Control	◘ Hazardous Waste Management	**CCR Title 22, Div 4.5**
Dept of Fish & Game	◘ Lake or Streambed Alteration	**Fish and Game Code §1600-1616**
	◘ Timber Harvest	**CESA §2081(b) & (c), Title 14 CCR, §783.4(a) & (b)**
CalRecycle	◘ Active & Closed Solid Waste Facilities	**CCR titles 14 and 27, PRC § 45000 & 45200**
Dept of Food & Agriculture	◘ Milk & Dairy Food Safety Branch ◘ Feed, Fertilizer, Livestock Drugs, and Egg Regulatory Services	**CCR Title 3**
Dept of Water Resources	◘ Groundwater Management Program (AB3030 and SB1938)	**CWC § 1070 et seq.**
US Environmental Protection Agency	◘ Hazardous Waste Management (RCRA) ◘ Hazardous Waste Cleanup (CERCLA)	**42 U.S.C. §6901 et seq. (1976),** **42 U.S.C. §9601 et seq. (1980)**
County Environmental Health	◘ Well Drilling/Abandonment	**CWC §13800 et seq.**
	◘ On-site Waste Disposal	**CWC §13291**
County Ag Commissioners	◘ Pesticide Use Enforcement	**CCR Title 3, Div 6 § 6140 et seq.**
Cities & Counties	◘ General Plans ◘ May have water related ordinances	**CGC § 65300**

*Laws and Regulations cited are for informational purposes only. Contact the specific agencies for details on regulatory authorities. See Appendix A for more information on agencies and links to websites.

Non-regulatory programs for the protection of groundwater quality are implemented by many agencies and organizations. Non-regulatory programs may take the form of education and outreach, data collection, land use planning, resource conservation, and technical assistance. These types of programs can be incentive based and generally have more emphasis on education and outreach. Incentives may take the form of financial assistance through grants and low interest loans, or technical assistance. Many regulatory agencies also include education and outreach through coordination with academia and industry or stewardship organizations.

Technical assistance is also an important groundwater quality protection tool. Technical assistance is provided by many regulatory agencies and non-regulatory agencies such as non-profit groups, professional organizations, resource conservation districts, University Cooperative Extension, and third-party coalitions. Technical assistance may take the form of fact sheets, field training days, monitoring, best management practice guidance manuals, and much more. Collaborative stakeholder efforts have become an important part of implementing water quality protection programs. An example of this type of collaborative effort is the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) which is a collaborative basin planning effort aimed at development and implementation of a comprehensive salinity and nitrate management program. The Central Valley Water Board and State Water Board have initiated a comprehensive effort to address salinity and nitrate problems in the Central Valley Region and adopt long-term solutions that will lead to enhanced water quality and economic sustainability. CV-SALTS is a strategic initiative to address salinity, including nitrates, throughout the region in a comprehensive, consistent and sustainable manner and its members include public agencies, business, associations, and others.

CV-SALTS engage stakeholders for more efficient and effective salinity and nutrient management from both regulated discharges and unregulated sources. Examples of regional collaborative projects might include: regional salt storage or conveyance systems, treatment facilities, real-time management, water or salt trading, or other actions that the Central Valley Water Board can't require but which could facilitate sustainable salinity management.

Table 3 below describes a sampling of the numerous non-regulatory groundwater quality protection programs but is not an exhaustive list.

Table 3 Groundwater Quality PROTECTION — NON-REGULATORY Programs

Agency or Group	Program Type or Program Name	Authority to Implement *
California Dairy Quality Assurance Program	◘ Voluntary Partnership between dairy producers, government agencies, and academia to promote health of the environment	
CalRecycle	◘ Zero Waste California	
California Rural Water Association	◘ On-site Technical Assistance & Specialized Training for Rural Water and Wastewater Systems	
Dept. of Food and Agriculture	◘ Fertilizer Research and Education Program (FREP)	**Food & Ag Code §14611(b)**
Dept of Pesticide Regulations	◘ Consumer Fact Sheets	
Dept of Public Health	◘ Drought Preparedness and Water Conservation	
Dept of Toxic Substances Control	◘ Office of Pollution Prevention ◘ Drinking Water Protection Team (P2dw)	
Dept of Water Resources	◘ California Water Plan	**CWC§10004-10013**
	◘ Groundwater Management Plan (AB3030 & SB1938)	**CWC§10750 et seq.**
	◘ Integrated Regional Water Management Plan	**CWC§10530 et seq., PRC**
	◘ California's Groundwater Bulletin 118	**CWC§ 229**
Local Agencies	◘ Groundwater Management Plans	**CWC§10750 et seq.**
	◘ Integrated Regional Water Management Plan	**CWC§10530 et seq., PRC**
Natural Resources Conservation Service	◘ Conservation Technical Assistance	**Soil & Water Resources Conservation Act 1977**
	◘ Environmental Improvement	
	◘ Water Resources	
	◘ Stewardship	
	◘ Environmental Quality Incentives Program– financial assistance conservation practices	
Resource Conservation Districts	◘ Special Districts formed to address local conservation needs	**CA Public Resources Code Div 9**
Rural Community Assistance Corp	◘ Technical Assistance & Training for Environmental Infrastructure	
Self Help Enterprises	◘ Community Development Program seeks funding and technical assistance for developing water and wastewater systems	
State Water Resources Control Board	◘ GAMA Domestic Well Project	**CWC §10780 et seq.**
	◘ California Water Quality Monitoring Council	**CWC§13167 & 13181**
	◘ Grants and Loans programs	
	◘ Pollution Prevention materials	
U. S. Geological Survey	◘ Groundwater Ambient Monitoring Program	

***Laws and Regulations cited are for informational purposes only. Contact the specific agencies for details on regulatory authorities. See Appendix A for more information on agencies and links to websites.**

Table 4 Groundwater Protection Programs

	Federal Agencies	BLM	BOR	Corps	Forest Service	National Parks Service	NRCS	US Fish and Wildlife Service	USEPA	USGS	State & Local Agencies	Academia	CalRecycle	CDFA	Central Valley Water Board	Cities	Counties	CUPAs	DFG	DOGGR	DPH	DPR	DTSC	DWR	IRWM Groups	Resource Conservation Districts	Special Districts	State Water Board	Water Districts	Coalitions & Associations	Association of California Water Agencies	California Groundwater Assn	California Rural Water Assn	California Urban Water Agencies	CV-SALTS	Groundwater Resource Association	Irrigated Lands Coalitions	Rural Community Assistance Corporation
Groundwater Monitoring*				a					a/c	a		a		c	c	c/d	c/d				d	a	c	a	a		a	a	a								c	
Confined Animal Facilities									R					R	R																							
Drinking Water									R												R																	
Education & Outreach					N	N						N	N	N	N				N		N	N	N	N				N							N	N		N
Groundwater Recharge																																						
Hazardous Waste									R						R		R	R					R															
Irrigation Runoff															R		R																				R	
Land Use Planning						R																				N												
Landfills													N		R		R																					
Mining		R			R										R																							
Pesticide Sales & Use																R	R					R					N		N		N								
Reclamation & Recycling																					R							R										
Research						N				N		N		N		R	R					N			N													
Septic Systems															R		R											R										
Site Assessment & Cleanup				R					R						R								R															
Storm water & Erosion Control					R	R			R						R													R										
Technical Assistance							N			N		N				N	N								N								N					N
Timber Harvest					R										R																							
Underground Injection Control Program									R											R						N					N				N			
Underground Storage Tanks															R			R																				
Waste Discharges to Land															R																							
Water Conservation		R							R															N				R										
Water Delivery			R	R													R							R										N				
Water Quantity & Quality Planning																R	R							N														
Water Well Permitting																								R														
Wetland Protection				R				R							R				R						N			R										

***Groundwater monitoring key**
a = ambient monitoring
c = compliance monitoring
d = drinking water monitoring

R = regulatory
N = non-regulatory

Table 4 is provided to graphically display the various agencies and organizations that have authority or roles in the management of groundwater quality. The following section provides a summary of each of the Central Valley Water Board's groundwater quality programs, how these programs are structured and implemented to protect groundwater quality, and how coordination occurs with other agencies.

4.1 Central Valley Water Board Groundwater Quality Programs

To protect the quality of the waters within the Region for all beneficial uses the Central Valley Water Board formulates and adopts water quality plans (Basin Plans) for specific ground or surface water basins. The Basin Plans serve as the regulatory references for meeting State and Federal water quality control requirements and identifies beneficial uses[5] for waters within the Central Valley Regions basins. The Central Valley Water Board prescribes and enforces requirements on agricultural, domestic, and industrial waste discharges through the adoption of Waste Discharge Requirements (WDRs). Relying on guidance within the Basin Plans these WDRs specify acceptable levels of pollutants that may be discharged, require special studies to be conducted, and sets a monitoring program to assess compliance, often including groundwater monitoring.

Incorporated into each Basin Plan are statewide plans and policies adopted by the State Water Board that direct the Central Valley Water Board actions or clarify intent. One policy in particular that provides specific guidance in developing each WDR issued is the State Water Resources Control Board Resolution No. 68-16, Statement of Policy with Respects to Maintaining High Quality of Water in California ("anti-degradation policy"). An anti-degradation analysis must be completed prior to adoption of WDRs.

Other policies that guide the Central Valley Water Board with respects to groundwater quality protection programs are Resolution 92-49 Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code Section 13304, Resolution 93-62 is the Policy for Regulation of Discharges of Municipal Solid Waste, and Resolution 88-62 Sources of Drinking Water, copies of all can be found in the appendix of the Basin Plans.

The Water Boards have regulatory programs to protect groundwater quality by controlling discharges of wastes from wastewater treatment facilities, industrial facilities, urban areas, irrigated agricultural lands, and other discharges of waste to land. Regulatory programs deal with both protection of groundwater quality and also cleanup as a result of unauthorized releases that threaten groundwater quality. Generally, if activities or discharges from a property or business affect, or threaten to affect, surface or ground waters, a permit is required from the Central Valley Water Board.

For specified situations or types of discharges, the discharge is regulated through enrollment in an existing general permit, also known as a general order. An example is

[5] Title 40, Code of Federal Regulations, Part 131 requires each State to adopt water quality standards by designating water uses to be protected and adopting water quality criteria that protect the designated uses. In California, the beneficial uses and water quality objectives are the State's water quality standards.

the Waste Discharge Requirements, General Order for Existing Milk Cow Dairies, Order R5-2009-0029.

A description of each of the Central Valley Water Board's current programs includes the following: general program description; constituents of concern, regulatory approach, current program implementation and staff activities; agency coordination; and concerns and issues.

- **General Program Description**
- **Constituents of Concern** – provides a description of those parameters, constituents, or factors that could or have impacted groundwater quality associated with the regulated activity or industry.
- **Regulatory Approach** – describes the approach of the Central Valley Water Board in how it proceeded to regulate the activity or industry
- **Current Program Implementation/Staff Activities** – describes the current program as it is being implemented today
- **Agency Coordination** – describes other federal, state, and local agencies that regulate an activity or industry and how these are currently coordinated or not with Central Valley Water Board activities
- **Concerns and Issues** – describes activities, industries or constituents of concern that are not actively being regulated by the Central Valley Water Board or improvement to the regulated program is required

4.1.1 Confined Animal Facilities

The Central Valley Water Board regulates several types of confined animal facilities. Confined animal facilities are defined in Title 27 CCR Section 20164 as "… any place where cattle, calves, sheep, swine, horses, mules, goats, fowl, or other domestic animals are corralled, penned, tethered, or otherwise enclosed or held and where feeding is by means other than grazing." Designation as a confined animal facility under these state regulations is not based on facility size.

Due to the number and types of confined animal facilities within the Central Valley Region and the staff resources available the first priority for the Confined Animal Facilities Program was determined to primarily focus on dairy operations. This determination was based on the relative threat to groundwater quality that a dairy operation posed and the number of dairies, over 1,600, in the Central Valley.

Constituents of Concern

- ✓ Nitrates
- ✓ Salts
- ✓ Constituents of Emerging Concern
- ✓ Pathogens

Regulatory Approach
A study conducted in 2004 determined that regulations established in CWC Title 27 may not be adequate or fully protective of groundwater quality in all cases. High nitrate levels have been found in groundwater in areas of dairy operations. To address nitrate source reduction the Central Valley Water Board adopted Waste Discharge Requirements General Order for Existing Milk Cow Dairies (Dairy General Order). The Dairy General Order established a schedule for dischargers to develop and implement measures protective of water quality and confirm protection of groundwater quality through monitoring. Requirements of the General Order were phased to allow a systematic approach for implementation of regulatory measures recognizing available resources on behalf of dischargers, consultants, and the Central Valley Water Board. Measures required by the General Order are for both the dairy production area and land application area and include development of a Nutrient Management Plan by July 2009 with full implementation by 2012 and development of a Waste Management Plan by July 2010 and full implementation by 2012.

The Dairy General Order requires each Discharger to immediately begin sampling each of the domestic and agricultural wells present at the dairy and discharges from any subsurface (tile) drains. Groundwater monitoring at existing dairies is necessary to: determine background groundwater quality; determine existing groundwater conditions near retention ponds, corrals, and land application areas; determine the effect of the improved management practices required in the Dairy General Order on groundwater quality.

To determine groundwater conditions at each dairy within the shortest time period requires establishment of priorities. It is impractical to require all existing dairies to install monitoring wells within a short time period due to the limited number of professionals available to design and install groundwater monitoring systems and the limited staff to review Monitoring Well Installation and Sampling Plans. The General Order indicated that implementation of individual groundwater monitoring would occur in phases of approximately 100 to 200 dairies per year.

The first phase of dairies ordered to install groundwater monitoring wells will be those dairies where nitrate-nitrogen is detected at 10 mg/l or more in any one domestic well, agricultural well, or subsurface (tile) drainage system in the vicinity of the dairy.

Current Program Implementation and Staff Activities
Staff resources are focused on determination of compliance with the General Order through review and approval of Nutrient Management Plans and Waste Management Plans. Field inspections conducted by staff includes: reviewing dairy operation self-monitoring records, facility inspections, and review of annual monitoring reports. The Executive Officer began issuing orders to implement individual groundwater monitoring at dairies in the fall of 2009. It is anticipated the orders will be issued at the rate of 100 to 200 dairies per year. The first step of individual groundwater monitoring is to prepare a monitoring well installation and sampling plan. Staff is reviewing submitted plans with

implementation of the plans by dischargers to commence following Executive Officer approval.

Priority in the Confined Animal Facilities Program has been given to dairy operations; however, work related to other types of confined animal facilities includes:

- Reports of Waste Discharge for all new cattle feedlots are reviewed
- Complaints received on any type of confined animal facilities are investigated and appropriate action taken
- Technical review of waste pond design and nutrient application is provided at the request of Foster Farms for poultry facilities

Agency coordination
There are several agencies or organizations that have regulatory authority or are on site at confined animal facilities on a routine basis. These include CDFA certified milk inspection services, agricultural commissioner's staff, local land use compliance officers, and mosquito abatement districts applicators. There has been coordination with some of these agencies through the development and on going implementation of the California Dairy Quality Assurance Program (CDQAP) that is a voluntary partnership between dairy producers, government agencies, and academia to promote the health of consumers, the health of the environment, and the health and welfare of dairy animals. Dairy operator's participation in CDQAP provides them with information and assistance in complying with the Dairy General Order and other agencies regulatory requirements.

Due to the ratio of Central Valley Water Board staff to dairy facilities it is recommended that the Board fosters closer coordination with other agencies. By developing more formalized agreements with agencies and organizations routinely on dairy facilities their staff can alert the Central Valley Water Board to potential issues that could impact groundwater quality, such as inadequate backflow protection. This type of coordination would be beneficial for agencies that are on site at Poultry and Feedlots, especially when staffing doesn't allow the Central Valley Water Board to inspect these facilities regularly.

Concerns and Issues
Currently there is a need to develop a General Order (or group of orders) for poultry raising, egg laying facilities, and stock or feedlots which are not actively regulated.

4.1.2 Irrigated Lands Regulatory Program
The Central Valley Water Board has adopted regulatory requirements for discharge from irrigated lands (tailwater, water from underground drains, operational spills, storm water runoff) to surface waters through a Conditional Waiver of Waste Discharge Requirements. Although the following discussion on the Irrigated Lands Program addresses surface water the interface between surface water and groundwater cannot be overlooked.

Constituents of Concern
Based on the types of discharges from irrigated lands there are several constituents of concern including:

- ✓ pesticides
- ✓ nutrients
- ✓ sediment
- ✓ salts
- ✓ pathogens
- ✓ fertilizers

Over 550 surface water body / parameter combinations have exceeded objectives twice in a three year period and require management plans. Some of these constituents are clearly associated with agriculture (e.g., certain pesticides) and others may have sources other than or in addition to irrigated agriculture (e.g., pathogens). Due to the number of waterbody / parameter combinations related to agriculture that have exceeded objectives in surface waters the potential for impacts to groundwater must be addressed.

Regulatory Approach
The current regulatory requirements are considered part of an interim program for regulation of discharges from irrigated agricultural lands. Prioritization for developing the conditional waiver to address surface water first was due in part to the number of acres that would be regulated and staff resources. Following direction from the Central Valley Water Board, staff is currently drafting an Environmental Impact Report (EIR) to evaluate long-term regulatory program alternatives. Staff and a stakeholder advisory group developed five programmatic alternatives, four of which would include a program element to regulate discharges to groundwater from irrigated agriculture. Board adoption of the long-term irrigated lands program is anticipated in the spring of 2011.

Current Program Implementation/Staff Activities
Over 5 million acres of irrigated agriculture and 25,000 growers are regulated in the program. There are eight agricultural water quality coalitions that represent these growers for different geographic areas and for one commodity group (rice). Five irrigation districts have individual waivers of WDRs in the program. To comply with the waiver conditions, the coalitions conduct surface water monitoring, prepare management plans for waters and parameters that exceed objectives more than one in three years, and report on monitoring results and progress in complying with water quality objectives

Staff resources are focused on review and approval of coalition and discharger monitoring and reporting plans, compliance reviews of monitoring reports, data management, complaint investigations, and drafting the EIR to evaluate long-term regulatory program alternatives.

Agency Coordination
The Irrigated Lands Regulatory Program has a history of coordination with many agencies since its inception. Resource Conservation Districts, County Agricultural Commissioners, the UC Cooperative Extension, and water districts are a part of or directly engaged with the water quality coalitions. Irrigated lands staff and Coalitions work closely with the County Agricultural Commissioners and Department of Pesticide Regulation to address surface water quality issues related to pesticides. Central Valley Water Board staff participate in Water Board irrigated lands Round Table meetings to discuss issues of state-wide significance and promote inter-regional coordination and collaboration.

A pilot project implemented through an MOU with Butte and Glenn Counties has been very successful in assisting the Central Valley Water Board in implementing the current ILRP. This type of formalized coordination should be expanded.

Detailed information on the current Irrigated Lands Regulatory Program and the long-term program alternatives can be found at:
http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/index.shtml.

Concerns and Issues
Groundwater is not addressed in the current conditional waiver for irrigated lands.

4.1.3 Site Cleanup Program
The Site Cleanup Program regulates the cleanup of private sites and federal facilities. The Central Valley Water Board staff oversees the investigation and cleanup of sites with soil and groundwater pollution by numerous pollutants. The Program addresses exposures through all environmental pathways, including surface water, groundwater, soil, sediment, the vadose zone, and air, where vapor releases from polluted sites may affect public health.

Private sites include industrial and commercial facilities, pipeline leaks and spills, aboveground tank farms, and pesticide and fertilizer use and storage localities, ~~facilities,~~ among others all of which may or may not be Brownfield[6] sites. Federal Facilities consist of federally owned or previously owned Department of Defense (DoD) and Department of Energy (DoE) sites. Decades of defense and energy research activities have degraded water quality on and around many federally-owned facilities.

Constituents of Concern
Due to the many types of sites the Site Cleanup Program oversees, there are a number of constituents of concern, a partial listing includes:

- ✓ petroleum
- ✓ volatile organic compounds

[6] The federal Small Business Liability Relief and Brownfields Revitalization Act (federal Brownfields Act) defines Brownfield sites as "real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant."

- ✓ pesticides
- ✓ inorganic constituents
- ✓ hexavalent chromium
- ✓ arsenic

Regulatory Approach
The Central Valley Water Board's regulatory approach for site assessment and cleanup is based on the policies and procedures identified in the State Water Board Resolution #92-49. Roles of agencies with regulatory authority of site cleanup are defined in a Memorandum of Understanding (MOU) dated 1 August 1990. The principles of the MOU guide agencies in avoiding duplication and acting with consistency.

Current Program Implementation/Staff Activities
New sites come into the Site Cleanup Program by various ways. Sites are referred to the Site Cleanup Program by other State, and local Agencies, via complaints from private citizens, spills reported to the Office of Emergency Services and by assessments conducted for real estate transactions. As new sites come into the Site Cleanup Program they are evaluated for the amount of time that may be required to resolve concerns regarding protection of water quality and human health. If concerns cannot be resolved in 10–20 hours then the project becomes an official site and the process outlined in the MOU is followed to establish the lead agency. Agreements with the DoD provide for accelerated cleanups at military bases and other Defense sites scheduled for closure and reuse. These agreements can impact prioritization of site cleanup assignments, and also provide cost-recovery funding for State oversight activities.

Generally dischargers or responsible parties perform cleanup of private sites on a voluntary basis. The CWC allows the Regional Boards to recover reasonable expenses from responsible parties to oversee investigation and cleanup activities. The responsible parties must sign an acknowledgement form stating the intent to pay oversight bills. In cases where a Cleanup and Abatement Order is issued, that Order provides the basis for reimbursement of oversight cost.

Staff resources primary workload is managing/directing the investigation and cleanup of soil and groundwater at these facilities, while also addressing human health issues where necessary, such as vapor releases. Staff workload includes many federal Superfund sites which involve large, complex investigation and cleanup work requiring close cooperation with other state and federal agencies including the DTSC and the USEPA. Site investigation and cleanup procedures are consistent with state laws and regulations as well as applicable provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA).

As existing resources allow, staff continue investigations to identify responsible parties for orphaned, recalcitrant, and unknown sites.

Agency coordination
The Central Valley Water Board's agency coordination typically follows the coordination that is identified in the MOU and the Memorandum of Agreement (MOA) that exists to improve coordination between DTSC, the State Water Board, and regional boards regarding the oversight of cleanup activities at Brownfield sites. Agency coordination also includes working with USEPA on Superfund Sites, local Environmental Health Departments and DPH on sites where impacts to drinking water systems may occur or other public health concerns.

The Water Board Cleanup Council (WBCC) was formed in 2007 to coordinate cleanup related matters among the nine Regional Water Boards and with other agencies, in particular DTSC. The WBCC meets regularly to continue to support smooth implementation of the Brownfields MOA, further enhance consistency in cleanup, long term program development, and create training opportunities.

In 2008, the Joint Cleanup Council was formed by the WBCC membership and representatives of DTSC management. This is a group that meets monthly to coordinate implementation of the MOA, coordinate Brownfield activities, exchange program information, provide joint agency staff training, coordinate development of guidance documents and new initiatives, to clarify roles and responsibilities to leverage resources, and to resolve any issues with respect to site cleanup that may come up.

The Central Valley Water Board and DTSC are launching a pilot program to expand interagency collaboration and teaming regarding select sites involving chlorinated volatile organic constituents, specifically related to dry cleaners and solvent users. The pilot program is based in part on previous collaboration in the Visalia and Modesto areas. The pilot program will include the use of Discovery tactics already in use by DTSC and the USEPA to try and help address funding concerns.

Concerns and Issues
One of the most prevalent concerns in the Site Cleanup Program is the issue of backlog sites. An additional concern is identification of responsible parties particularly for unknown sites and orphaned sites. An unknown site is a property where impacts to groundwater have been documented but the source(s) of the impacts are unknown. An orphaned site is a property that needs to implement cleanup of soils and/or groundwater but no responsible party can be identified to fund the cleanup. Any of these types of sites can be impacted by legacy pollutants, those constituents that may no longer be in use, formerly unregulated, or past practices impacted groundwater quality as is seen in the number of PCE cases associated with the dry-cleaning industry.

Since the Site Cleanup Oversight is conducted through cost recovery there is need to identify funding support for responsible parties. The Central Valley Water Board is working with DTSC through the DTSC Drinking Water Protection Team (P2dw) and other avenues to explore an integrated approach to help identify source areas and funding channels.

4.1.4 Underground Storage Tanks

The Underground Storage Tanks (UST) Program covers USTs containing petroleum fuels and non-fuel constituents. Chapter 6.7, Division 20 of the Health and Safety Code and the California Code of Regulations Title 23, Division 3, Chapter 16 established a program for operation of USTs and their releases. There are two primary program elements, leak prevention and cleanup.

The Leak Prevention Program element includes published standards and requirements for tank installation, construction, testing, leak detection, spill containment, and overfill protection. The State Water Board has established regulations governing prevention of leaks from USTs. California UST laws and regulations give Certified Unified Program Agencies (CUPAs) authority throughout the State to issue permits for tank operation and to enforce tank testing requirements within their jurisdictions. CUPAs have typically been established as a function of local environmental health or fire departments.

Cleanup of leaking USTs often involves a soil and groundwater investigation and remediation, under the direction of a regulatory agency. Regulatory agencies directing cleanups include Regional Water Boards, Local Implementing Agencies (LIAs, usually a County Health Department or City Fire Department) and Local Oversight Programs (LOPs, which are LIAs under contract with the State Water Board). The various agencies coordinate to ensure that requirements from each agency are met and that the directed investigation and remediation work is consistent.

Constituents of Concern

- ✓ petroleum hydrocarbons
- ✓ MtBE
- ✓ waste oils [commonly contain motor oil/crankcase oil, hydraulic fluid, transmission fluid, brake fluid, antifreeze, metals (from engine wear)]
- ✓ polynuclear aromatic hydrocarbons (PAH)
- ✓ solvents
- ✓ chlorinated hydrocarbons
- ✓ transformer oil (which may have included PCB and dioxins)
- ✓ other liquid wastes of unknown origin

Regulatory Approach

Chapter 6.7, Division 20 of the Health and Safety Code and the California UST Regulations established the UST program. Central Valley Water Board staff relies on the authority under the Water Code to enforce the investigations and cleanup of UST sites. The Central Valley Water Board retains responsibility for protecting water quality regardless of whether the investigation and/or cleanup are being directed by the Board or another agency.

Higher priority for UST clean up is given to cases with imminent threat to public health and/or sensitive receptors, including impacts to domestic and municipal supply wells.

Current Program Implementation/Staff Activities
In 1990, to assist LIAs/LOPs, responsible parties (RPs), and consultants in conducting effective and cost-efficient investigations, staff from the North Coast, San Francisco Bay and Central Valley Regional Water Boards drafted the *Tri-Regional Board Staff Recommendations for Preliminary Investigation and Evaluation of Underground Storage Tank Sites* to provide uniform procedures for performing site investigations. In addition, Central Valley Regional Water Board staff developed and produced *Appendix A, Staff Recommendations for Reporting* as recommendations for consistently reporting site investigations, corrective actions, and no-further-action-required documentation associated with UST sites. The purpose of Staff *Recommendations for Reporting* is to provide a format for documents and consistent process for the regulated community, and to reduce the cost of reporting for them by providing information to develop complete workplans and reports. These documents continue to be utilized so the investigative phase can be completed in a timely, cost-effective and efficient manner, ensuring the appropriate remedial activities are completed as quickly as possible.

The primary workload for staff is managing/directing the investigation and remediation of Central Valley Water Board lead cases. Within the Central Valley Region as of November 2009, there were about 2,100 open UST cases. Of these, about 1,000 are under the direct supervision of Central Valley Water Board staff and about 1,100 are under the direction of LOP or LIA staff.

The Central Valley Water Board retains responsibility for protecting water quality regardless of whether the investigation and/or cleanup is being directed by the Central Valley Water Board or another agency. In all cases, Central Valley Water Board staff must be aware of the cases the LIAs/LOPs work on and must ensure that public health and current and future beneficial uses of water are protected before a “no further action” letter is issued by the LIA or LOP overseeing the case.

Agency Coordination
Coordination with other agencies is mainly with the LOPs and LIAs. Central Valley Water Board staff works closely with LIA and LOP staff by providing advice, guidance, direction, enforcement when needed, and training roundtables held at the Central Valley Water Board office. In addition, Central Valley Water Board staff meet frequently (multiple times per month) with many of the LOP and LIA program staff to discuss program and site-specific issues.

Concerns and Issues
A concern for the UST program similar to the Site Cleanup Program is orphaned sites and recalcitrant responsible parties. There are issues related to the slow rate of site closures, this is due in part to the fact that these types of impacts take time to assess and cleanup. Funding assistance for responsible parties to conduct assessment and cleanup can also be an issue. The Underground Storage Tank Cleanup Fund (USTCF) has provided assistance to UST owners for cleanup and closure of UST sites. With the increasing costs of UST cleanups and the UCSTCF program anticipated sunset in 2016 funding will continue to be a concern.

4.1.5 Land Disposal Program (Title27/Chapter 15)

The *Land Disposal Program* regulates the discharge of certain solid and liquid wastes to land for treatment, storage, and disposal in waste management units. State regulations applicable to these discharges are found in Title 23, California Code of Regulations, and Chapter 15 for hazardous wastes and Title 27 for wastes other than hazardous wastes. Waste management units (WMU) include landfills, waste piles, land treatment units, and surface impoundments. Discharged wastes include hazardous and nonhazardous wastes (excepting inert wastes and wastes from activities that have been specifically exempted, such as wastewater treatment plant effluent disposal) cannot be discharged directly to the ground surface without impacting water quality, and therefore must be contained. Nonhazardous wastes include municipal solid wastes, designated wastes, and inert wastes.

The regulations include both prescriptive and performance standards for waste containment, monitoring, and closure. The regulations are implemented through the issuance of WDRs by the Central Valley Water Board for the disposal facilities.

Landfills which are active or closed municipal solid waste disposal sites make up about half of the 300 facilities regulated by WDRs that implement Title 27 or Chapter 15. There are several hazardous waste disposal facilities, including two of the State's four active hazardous waste facilities. The remaining sites generally discharge inert or designated solid wastes, or designated liquid wastes (including salty-wastewaters) to WMUs. These include sites such as mines, oil field produced-water disposal sites, and industrial facilities.

Mine sites have their own classification scheme and specific regulations in Title 27. The mine regulations in Title 27 begin with §22470. Within the Central Valley Region, the Land Disposal Program primarily regulates active hard rock mining facilities and the closure of these sites. The industrial facilities include a broad variety of sources including energy production, manufacturing, refining, and certain food processing facilities. In addition, program staff also works on numerous sites not under WDRs such as abandoned and inactive legacy landfills that were not regulated by the Central Valley Water Board when they were operating.

Oil field processes include crude oil and wastewater that are separated in tanks, with the wastewater being discharged into Class II injection wells permitted by California Division of Oil, Gas, and Geothermal Resources (DOGGR), or surface impoundments where percolation and evaporation occur. Surface impoundments in oil fields (sumps), as designated by DOGGR, are historical in nature having existed since the 1950's. Generally, they are unlined areas of one to two acres, and contain non-hazardous wastewater co-produced with crude oil. Produced water may be subject to Title 27 requirements where the concentration of waste constituents threatens to impact the beneficial uses of good quality underlying groundwater. To comply with Title 27 regulations, the oil field sumps could be lined. However, the industry generally chooses to drill Class II injection wells and close the sumps.

Constituents of Concern
Due to the varied types of discharges that are regulated by the Land Disposal Program there aren't just one or two constituents of concern. Any of the constituents listed in Table 1, Primary Constituents of Concern, can be an issue if wastes are improperly handled or disposed of. A partial list of constituents generally associated with the Land Disposal Program includes:

- ✓ salts
- ✓ nitrates
- ✓ mercury
- ✓ pesticides
- ✓ pharmaceuticals and personal care products
- ✓ VOCs

Current Program Implementation/Staff Activities
In the Land Disposal Program staff resources for active landfills, mines, and oil fields are primarily focused on updating existing WDRs, writing new WDRs, inspecting sites, reviewing monitoring reports to verify compliance, and reviewing engineering, hydrogeology, design, and construction reports.

The cleanup of historic abandoned mines is also primarily regulated in the Land Disposal Program, with several mine cleanups regulated in the Site Cleanup Program.

For oil fields staff activities include compliance work associated with WDRs. The Central Valley Water Board is typically a responsible agency so staff has the responsibility of reviewing draft permits from the DOGGR on proposed Class II injection wells within oil fields. Not all areas of the Central Valley Region are underlain by groundwater that may be impacted by a discharge of produced water, due to widely varying groundwater quality, depth to groundwater, or where the first groundwater is within an oil producing zone. Each site must be evaluated independently.

Agency Coordination
Since the Land Disposal Program deals with multiple types of land disposal activities it means there are also multiple agencies staff coordinate with. Following is a listing of agencies along with a brief description of the type of coordination that occurs.

<u>CalRecycle</u> is designated under Public Resources Code §40508 as the state solid waste agency for all purposes stated in Subtitle D and any other federal act affecting solid waste. CalRecycle has responsibility for public health protection by regulating hazards from landfill gas migration and daily cover required to control vectors at landfills during the active life and post-closure. The Central Valley Water Board remains responsible for water quality protection measures including siting, liner systems, leachate collection systems, storm water controls, groundwater monitoring, seismic and slope stability, and corrective action.

A financial assurance section under CalRecycle reviews and approves the adequacy of financial resources of municipal solid waste disposal site operators. In conjunction with regional water board staff, CalRecycle staff reviews and approves financial assurance mechanisms used to demonstrate the adequacy of financial resources for municipal solid waste facility closures, post-closure maintenance, and corrective action. Currently, as a courtesy to the regional water boards, CalRecycle staff has offered to review financial assurance documents submitted by dischargers for Land Disposal Oil Field facilities.

Local Enforcement Agencies (LEAs) who are usually staff within county environmental health departments. LEAs conduct regularly scheduled inspections of solid waste facilities, perform solid waste facility permit reviews, and implement the CalRecycle promulgated regulations. Coordination by Central Valley Water Board staff with LEAs occurs on a regular basis. Due to regulations LEAs inspect the solid waste facilities at more frequent intervals and can provide permit compliance and operations information to Central Valley Water Board staff.

The Department of Toxic Substances Control (DTSC) enforces California's hazardous waste laws, issues permits to hazardous waste facilities, searches for contaminant sources and responsible parties, evaluates risk to human health and the environments and regulates and mitigates contaminated hazardous waste sites. DTSC regulates activities related to generating, transporting, using storing, treating, and disposing of hazardous substances and hazardous waste. Central Valley Water Board staff coordinate with DTSC on sites that have the potential to impact groundwater or present risk to human health and the environment including: Class I Landfills, historical burn dumps, brownfields, military facilities, school sites, emergency response, and clandestine drug lab cleanups.

DTSC has established the P2dw and also a Geographic Information System team specifically designed to integrate the use of geographic information systems in groundwater and drinking water protection. These teams offer a good opportunity to explore wider collaboration between the Central Valley Water Board and DTSC.

There are only a few facilities that discharge hazardous waste within the Central Valley Region. At each facility, DTSC is the primary regulatory agency, with the Central Valley Water Board acting as a supporting responsible agency overseeing construction of waste management units and groundwater monitoring activities.

The Land Disposal and Site Cleanup Programs staff also coordinates and communicate with DTSC on its various Voluntary Cleanup Program sites. The Voluntary Cleanup Program allows DTSC to provide oversight to motivated responsible parties to assess and clean-up sites included in the backlog. Recently, staff have provided input to DTSC for a number of voluntary cleanups at historic mine sites in the Sierra Nevada foothills.

Closed solid waste disposal sites where open burning was conducted prior to 1972 are known as Burn Dumps. Depending on site characteristics of burn dumps, CalRecycle, DTSC, or Regional Water Board may be the lead regulatory agency. Through coordination with these agencies guidance is followed from an MOU to determine the lead regulatory agency to avoid duplication of efforts. If oversight is assigned to the Central Valley Water Board site characteristics and workload are evaluated to determine whether the Land Disposal Program or Site Cleanup Unit will be to a burn dump.

California Division of Oil, Gas, and Geothermal Resources (DOGGR) regulates activities related to the exploration and production of hydrocarbons and geothermal energy. Regulated activities include drilling, waste disposal, well abandonment, and enhanced recovery activities. The DOGGR establishes the boundaries of oil, gas, and geothermal fields and it is the primary regulatory agency within said boundaries. The USEPA has granted authority to the DOGGR for the permitting of Class II injection wells for the disposal of liquids related to petroleum hydrocarbon exploration and production.

Cooperation between Central Valley Water Board staff and DOGGR staff is necessary in regards to the disposal of oil field wastes that have the potential to impact water quality. This is primarily concerned with closure/operation of drill mud sumps, produced water disposal, and the injection of produced water outside the boundaries of a field or into an aquifer that is not exempted due to its hydrocarbon production. DOGGR is the lead agency for injection of produced water into hydrocarbon producing zones (or depleted hydrocarbon producing zones) within an oil field boundary that has received an aquifer exemption.

California Oil and Gas Workgroup is an agency industry workgroup with membership consisting of federal and state agencies and industry representatives including; Bureau of Land Management, U. S. Fish and Wildlife, DOGGR, Department of Fish and Game, the Regional Water Boards, Western States Petroleum Association, Independent Oil Producers' Agency, and California Committee of California Oil and Gas Producers. The workgroup was formed over 15 years ago to improve communication and coordination between agencies and industry. With all regulatory agencies participating, open discussion of procedures and policies has eliminated duplication. The workgroup continues to meet quarterly and proactively address issues brought forward by industry and agencies.

Coordination of Mine Cleanups can involve multiple federal, state, and local agencies. The Central Valley Water Board's approach to the cleanup of mines varies depending on whether the mine is currently operating, or is a historic (abandoned) mine. Both Land Disposal Program and, to a much lesser extent, Site Cleanup Program staff work on mine cleanups.

If the mine is currently operating on federal public land and requires some cleanup, the Central Valley Water Board typically coordinates with the administering agency for the

public land (primarily the Bureau of Land Management [BLM] or United States Forest Service [USFS]) to require the operator of the mine to remediate the problem.

If a mine on federal lands has WDRs, then the administering agency is generally listed in the WDRs as the landowner, along with the mine operator. Although a mine operator on public lands is required to obtain a Special Use Permit from the administering Federal Agency, the administering agency is not always willing to aggressively pursue enforcement of the permit when it comes to compliance with state regulations. Often the administering agency (BLM or USFS) request that the Central Valley Water Board take action directly against the mine operator. Mines operating on private land are regulated under individual WDRs.

In the case of historic (abandoned) mines, the Central Valley Water Board is typically the lead state agency pursuant to a MOU with DTSC (then the Department of Health Services) dated 1 August 1990. If there is a human health issue, DTSC may be requested to assist in determining the risk to human health and if necessary, providing cleanup levels that are protective of human health.

If the historic mine is on federal lands, the coordination and cooperation between the Central Valley Water Board and the federal agency becomes cloudy. Commonly, the federal agency will refer to Executive Order 12580 citing its authorities under CERCLA. The federal agency interpretation has been that its authority under CERCLA exempts it from complying with State Water Board regulations, to provide plans and specifications, or incorporate any comments the Central Valley Water Board may have into its plans. The Water Boards disagree with this legal interpretation.

An MOU is being negotiated that will clearly state how the state and federal agencies will work together to prioritize abandoned mine sites for cleanup and to assure all appropriate environmental requirements are met.

Concerns and Issues
The Land Disposal Program regulations are probably the most prescriptive of all that the Central Valley Water Board works with; this reduces the types of concerns and issues that may arise for this program. Two issues related to mine clean up is the need to finalize the MOU being negotiated by state and federal agencies and identify funding sources to assist in assessment and cleanup of historic (abandon) mine sites.

4.1.6 Waste Discharge Requirements Program
The *Waste Discharge Requirements Program* regulates discharges of wastewater to land that are commonly called "Non-Chapter 15" or "Non-15" discharges, in reference to the group of wastes excluded from the full containment, prescriptive requirements of CCR Chapter 15/Title 27 that apply to hazardous, designated, and other wastes. Implementation of the program involves adopting WDRs which specify, among other things, acceptable levels of pollutants which may be discharged, special studies to be conducted, and a monitoring program to assess compliance. The “Non-15” program currently regulates nearly 1,500 individual dischargers in this region.

Non-15 waste discharge requirements are also included in National Pollutant Discharge Elimination System Permits for protection of groundwater from the treatment facilities (treatment ponds, sludge drying beds, storage ponds, etc.) that treat and/or store the wastewater prior to surface water discharge, and treat or store sludge prior to hauling offsite or reuse.

Constituents of Concern
Due to the varied types of discharges that are regulated by the Waste Discharge Requirements Program there aren't just one or two constituents of concern. Basically any of the constituents listed in Table 1 Primary Constituents of Concern, can be an issue if wastes are improperly handled or disposed of. A partial list of constituents includes:

- ✓ salts
- ✓ nitrate
- ✓ metals
- ✓ pharmaceuticals and personal care products
- ✓ volatile organic compounds
- ✓ pathogens

Regulatory Approach
For the Waste Discharge Requirement "Non-15" Program, priorities are very similar to that of the Land Disposal Program. Prioritization of workload is based on a number of considerations, including Administration policies, State and Regional Water Board direction, funding, legal mandates, statutory obligations, priority water quality issues, and public interest. Priority is placed on normal regulatory work which includes updating existing WDRs, writing new WDRs, inspecting sites, reviewing monitoring reports to verify compliance, and reviewing engineering, hydrogeology, design, and construction reports. Enforcement is a priority for sites that do not comply with Central Valley Water Board issued orders, the Title 27 regulations, or other overarching laws and policies, such as the Porter-Cologne Water Quality Control Act [CWC, Division 7, §13000 et seq.] and the Basin Plans.

Current Program Implementation/Staff Activities
Staff activities are primarily focused on writing new and updating existing WDRs; evaluation of compliance through field inspections and review of submitted monitoring reports; enforcement is a priority and can range from phone calls and letters to more formal enforcement actions. Work on drafting an update to Guidelines for Waste Disposal from Land Developments (septic tank/leachfield system design and siting criteria) for a basin plan amendment has begun. Assistance to Small Disadvantaged Communities through State Water Board's contract with Rural Community Assistance Corporation (RCAC) to provide wastewater-related training is on-going.

Agency Coordination
The Central Valley Water Board is the primary responsible agency to regulate waste disposal to land. However, there are instances of local coordination that would leverage resources and allow for a more localized oversight process for some types of discharges. The Central Valley Water Board should work with local agencies to encourage development of local programs similar to the Stanislaus County's guidance for land disposal of food processor waste. Programs like Stanislaus County's provide local oversight, and reduce the number of individual WDRs that would need to be developed.

Concerns and Issues
For the Waste Discharge Requirements "Non-15" Program the most pressing concern is the backlog of applications for new or expanding facilities, and backlog of existing facility WDRs with older requirements that need to be updated. Lack of groundwater monitoring in some locations is identified as an issue that would be addressed by developing and updating WDRs for new and existing facilities.

An issue related to groundwater monitoring is the need for a database that could house existing data as well as upload future monitoring data generated to satisfy WDR monitoring and reporting requirements.

5. Stakeholder Concerns and Issues

The Central Valley Water Board held workshops to solicit stakeholder's groundwater quality protection concerns and issues. In Section 4 the Central Valley Water Board's current regulatory programs concerns and issues were discussed. This section summarizes those concerns and issues raised by stakeholders during the workshops. The reader may note some redundancy between Section 4 and this section, this was intentional to acknowledge where stakeholders and the Board noted similar concerns and issues.

From the beginning stages, based on direction of the Central Valley Water Board, development of the Groundwater Quality Protection Strategy was to be through an active stakeholder process. It has been recognized that all users of groundwater in the Central Valley Region have a stake in protecting its groundwater quality. The Central Valley Water Board also acknowledged that there are many different agencies, local, state, and federal, that may have programs that address groundwater quality that the Board was not fully aware of.

In August 2009 four workshops were conducted in Rancho Cordova, Redding, Delano, and Fresno to gather information from stakeholders. The workshops were conducted to solicit information from stakeholders by presenting a set of questions that could be discussed in small breakout sessions. These breakout session discussions allowed the Central Valley Water Board staff to gain information on groundwater quality protection programs and concerns from a variety of interests including: food processors, water purveyors, irrigation districts, conservation districts, rural communities, agricultural interests, federal and state agencies, cities, counties, elected officials, environmental groups, non-profit organizations, and other interested persons.

During the stakeholder workshops over a thousand individual comments were recorded on a variety of concerns and issues. Some concerns were directly related to a Central Valley Water Board program while others were issues that crossed program or agency lines. An analysis of the comments indicated many of the concerns and issues fell into similar categories. The following twelve categories of stakeholder concerns along with current activities the Central Valley Water Board is taking to address the concerns are discussed further in the following sections and presented in a tabular format in Table 5. Future activities or actions to address the concerns and issues raised by the Central Valley Water Board and the stakeholders is addressed is Section 6.

Stakeholder Issues Categories

5.1 Communication and Coordination between Agencies
5.2 Confined Animal Feeding Operations
5.3 Education, Outreach, and Research
5.4 Groundwater Cleanup Program
5.5 Groundwater Databases
5.6 Groundwater Monitoring Network
5.7 Integrated Regional Water Management Planning
5.8 Irrigated Lands Regulatory Program – Groundwater
5.9 Land Use Planning
5.10 Legacy Pollutants
5.11 Water Sustainability
5.12 Well Design and Abandonment/Destruction Program

Table 5 Stakeholder Issues and Concerns

Regional Board Program	Stake holder Issue #	Issue	Concern	Current Activities
All	5.1	Communication & Coordination Between Agencies	Can result in duplication of efforts, lengthy permitting processes	Following direction on existing MAA, MOU, MOAs
				MOA between State and Central Valley Water Board for CV-SALTS
				State/Regional Boards negotiating new MOU with BLM and USFS for mine cleanups
				ILRP coordinating with DPR on alternatives for Long Term Program
4.1.1	5.2	Confined Animal Feeding Operations (CAFOs)	Focus currently on Dairies other types of CAFOs not being addressed	ROWDs required for new cattle feedlots
				All CAFO complaints are investigated
				Dry waste from CAFOs falls under oversight of ILRP
				Contract to develop EIR for dairy digesters
				CV-SALTS developing Basin Plan Amendment for salts and nitrates
All	5.3	Education, Outreach, & Research	Need for groundwater quality education outreach and research for:	Through stakeholder involvement in many of the CVWB programs there are education and outreach opportunities (e.g. Delta Methylmercury TMDL, ILRP Long Term Program Alternatives Development, CV-SALTS, Dairy program cooperation with CDQAP)
			1) Public	CV-SALTS Education & Outreach Committee
			2) Land Use Decision Makers	Facilitation skills training for staff
			3) Discharger Community	Education and Outreach efforts are regularly reported in Executive Officers Report

Table 5 Stakeholder Issues and Concerns

Regional Board Program	Stake holder Issue #	Issue	Concern	Current Activities
4.1.3 4.1.4 4.1.5	5.4	Groundwater Cleanup Programs	Resources lacking to address historic impacts to groundwater particularly impacts to Drinking Water	Site Cleanup program oversees hazardous waste release sites assessment and cleanup
				UST program oversees assessment and cleanup
				Land Disposal Program oversees site cleanup for historic mine sites
				CV-SALTS developing Basin Plan Amendment for salts and nitrates
				Collaborating with DTSC P2dw and Geographic Information System Team
All	5.5	Groundwater database	Identification of the need for a centralized groundwater quality database has been recognized since the first basin plans were written in 1975	Coordination with GAMA Program through State Water Board
				ILRP has compiled existing data for EIR
				Geotracker GAMA database enhancement allow for input of electronic laboratory results
				CV-SALTS initiating data collection, database coordination, modeling, research, studies
				Collaborating with DTSC P2dw and Geographic Information System Team
All	5.6	Groundwater monitoring	Need for groundwater monitoring for identification of background conditions	New and updated WDRs include expanded groundwater monitoring
				Groundwater Monitoring Advisory Group
				Phased approach to groundwater monitoring for dairies
				Coordination with Regional Water Management Groups to encourage groundwater monitoring in IRWM Plans
				CV-SALTS initiating data collection, database coordination, modeling, research, studies
				Collaborating with DTSC P2dw and Geographic Information System Team
All	5.7	Integrated Regional Water Management Planning	Increased emphasis on IRWM Planning that the Central Valley Water Board should be aware of	State/Regional Water Boards coordinating with DWR on IRWM funding
				Many CV-SALTS stakeholders are also participants in IRWM Planning Groups
				Coordination with IRWM Planning Groups as staffing allows
4.1.2	5.8	Irrigated Lands Regulatory Program - Groundwater	Stakeholders divided on incorporation of groundwater quality regulation by ILRP	Currently developing program alternatives for long-term ILRP program through EIR
				CV-SALTS developing Basin Plan Amendment for salts and nitrates

Table 5 Stakeholder Issues and Concerns

Regional Board Program	Stake holder Issue #	Issue	Concern	Current Activities
	5.9	Land Use Planning	Lack of consideration for Groundwater Quality in Land Use Planning	General Plan Guidelines developed by Governor's Office Of Planning and Research
				Grant funding to assist in educating land use planners of Ahwahnee Principles
All	5.10	Legacy Pollutants	Legacy pollutants impacted groundwater quality from past practices: pesticides, fertilizers, solvents, petroleum products and more	Site Cleanup Program oversees cleanup of releases from identified responsible parties
				UST Program oversees cleanup from underground tank releases
				Implementation of Dairy General Order to address source reduction of salts and nutrients
				Developing Long-Term ILRP
All	5.10a	Nitrates	Impacts from nitrates on groundwater quality and drinking water sources is human health issue	CV-SALTS developing Basin Plan amendments for salts and nitrate
				Salt and Nutrient Management Plans being required as part of Recycled Water Policy
				Source reduction through implementation of Dairy General Order
				New and updated WDRs address nutrients accordingly
				Contract to develop EIR for dairy digesters
All	5.10b	Salts	Salinity impacts to water can affect plant growth, drinking water, industrial uses and other beneficial uses	CV-SALTS developing Basin Plan amendments for salts and nitrate
				Salt and Nutrient Management Plans being required as part of Recycled Water Policy
				Stanislaus County developed guidance for land disposal of food processor waste
				Nutrient Management Plans through Dairy General Order Implementation
				Contract to develop EIR for dairy digesters

Table 5 Stakeholder Issues and Concerns

Regional Board Program	Stake holder Issue #	Issue	Concern	Current Activities
4.1.6	5.11	Water Sustainability-Conjunctive Use Projects	Must avoid impacting high quality groundwater with lesser quality recharge water	Evaluate each project and coordinates with DPH on a site specific basis as resources allow
			Important to water conservation permitting must not be onerous	
	5.12	Well Design & Destruction Program	Improper well construction, maintenance, destruction can lead to impacts of groundwater	Groundwater quality source protection through existing programs
				Local agencies authority to enforce California Well Standards

5.1 COMMUNICIATION AND COORDINATION BETWEEN AGENCIES

Stakeholders Concern

Communication and coordination between agencies was discussed during stakeholder workshops. Stakeholders provided comments that reflected a lack of communication and coordination among agencies that required permitting for a single activity.

Examples cited included DWRs encouragement of all types of conjunctive use projects and the Regional Water Boards permitting process for aquifer storage and recovery projects (ASR), and both DTSC and the Central Valley Water Board regulating cleanup on the same sites.

Current Activities Addressing Concern

Communication between agencies can take many forms. The Central Valley Water Board acts in accordance to several types of formalized agreements between agencies. The State Water Board has agreements in place with federal agencies and other State agencies in the form of Management Agency Agreements (MAAs), Memoranda of Understanding (MOUs), and Memoranda of Agreement (MOAs). These agreements are identified in the Plans and Policies section of each Basin Plan.

The Central Valley Water Board encourages water conservation and has requested that the State Water Board develop a statewide policy for ASR projects to streamline the permitting process.

In 2004, CalEPA, the DTSC, State Water Board and the Regional Boards signed a MOA regarding the regulatory oversight of voluntary cleanup sites. The purpose of the

MOA is to improve coordination and avoid duplication of efforts between DTSC, State Water Board, and the Regional Water Boards in their oversight of cleanup activities. The terms of the MOA are intended to eliminate or significantly reduce any apparent inconsistencies between the methodologies and standards used by the agencies and to limit oversight of each site to only one of the agencies. The MOA does not apply to existing sites which are those at which DTSC or a Regional Board is currently serving as lead or oversight agency. The MOA also does not apply to sites in specific programs where a statute designates a lead or oversight agency, where the statute authorizes actions by DTSC or a Regional Board, but not both, where a lead or oversight agency has been designated.

DTSC's P2dw and Geographic Information System team are specifically designed to integrate the use of geographic information systems in groundwater and drinking water protection. These teams offer a new opportunity to explore wider collaboration and a mechanism to reduce overlap between DTSC and the Central Valley Water Board.

5.2 CONFINED ANIMAL FEEDING OPERATIONS

Stakeholders Concern

The potential for groundwater quality impacts from Confined Animal Feeding Operations that are currently not regulated by the Dairy General Order. Specific example given by stakeholders was nitrate contaminated drinking water supplies and the need to make all confined animal facilities operate in a manner that protects groundwater resources.

Current Activities Addressing Concern

The Central Valley Water Board staff implement the Dairy General Order as described in section 4.1.1. Complaint investigations by the Confined Animal Unit staff are not limited to dairy facilities. A Report of Waste Discharge is required by any owner/operator starting a new cattle feedlot. Dry waste removed from confined animal facilities and applied as a crop amendment is regulated by the ILRP. Through implementation of the Dairy General Order groundwater monitoring is being phased in at all existing dairy facilities.

5.3 EDUCATION AND OUTREACH

Stakeholders Concern

Stakeholders emphasized that Education and Outreach to all users of groundwater was vital to the success of any groundwater quality protection program. An array of examples of education and outreach were given by stakeholders including programs focused to schools, specific pollution prevention and water conservation education programs for communities, and programs targeted to specific dischargers

Current Activities Addressing Concern

The California Department of Food and Agriculture's Fertilizer Research and Education Program (FREP) funds and coordinates research to advance the environmentally safe and agronomically sound use and handling of fertilizer materials. FREP serves growers, agricultural supply and service professionals, cooperative extension, public agencies, consultants and other interested parties.

The Central Valley Water Board recognizes the value in education and outreach. Examples of some ongoing programs that include stakeholder education and outreach as an integral component of the program are: the Delta Methylmercury TMDL development, Long-term ILRP Advisory Group, and CV-SALTS.

Through coordination with the State Water Board's Office of Public Participation the Central Valley Water Board continues to improve on its education and outreach efforts throughout all Board programs.

5.4 GROUNDWATER CLEANUP PROGRAM

Stakeholders Concern

Stakeholders identified impacts from nitrates on groundwater used as a primary source of drinking water. A gap stakeholders identified in groundwater quality protection was funding for cleanup, particularly in drinking water systems, where the source of the pollution is unknown, the result of a legacy pollutant, or the responsible parties are insolvent.

Current Activities Addressing Concern

The Central Valley Water Board's Groundwater Cleanup Programs (primarily Site Cleanup, UST, and Land Disposal Program) regulates many different types of sites that have had releases impacting soils and groundwater. Unauthorized releases at these sites may have occurred due to current or previous owners activities or the site is impacted by releases that have occurred off site. The Central Valley Water Board continues to staff these programs to effectively oversee site assessment and cleanup with a priority placed on groundwater quality.

Collaboration with the DTSC P2dw is evaluation the possibility of developing an interagency pilot program modeled after the Visalia and Modesto Dry Cleaners projects. This pilot project will be used to explore wider collaboration between the Central Valley Water Board and DTSC.

Source reduction to protect groundwater quality is also a part of many of the Central Valley Water Board programs including the Dairy Program through Nutrient Management Plan and Waste Discharge Program's WDR requirements.

Drinking water systems are regulated by DPH or local Environmental Health Departments. These agencies oversee the required drinking water quality monitoring and treatment if necessary.

5.5 GROUNDWATER DATABASES

Stakeholders Concern

The need for a centralized groundwater database that is publicly accessible was identified at the stakeholder workshops. Stakeholders noted that a centralized groundwater database should be able to capture monitoring that is occurring throughout the Central Valley Region by multiple sources. They also surmised that a centralized

groundwater database may reduce duplication of groundwater monitoring efforts or requirements by multiple agencies.

Current Activities Addressing Concern
There are statewide efforts to meet the needs for a centralized groundwater database that will make groundwater data more readily available. To avoid duplication of efforts, the Central Valley Water Board will not develop a separate groundwater database. Through cooperation between the Board and the following statewide efforts staff will work to identify methods to provide a regional component that would address the Central Valley Water Board's needs for a groundwater quality database.

GeoTracker
GeoTracker is a database and geographic information system (GIS) that provides online access to environmental data. In its pilot phase, Geotracker assembled public drinking water well and leaking underground fuel tanks (LUFT) data from two study areas, Santa Clara and Santa Monica. With enhancements GeoTracker now allows for electronic download of reports and data and tracks not only regulatory data about LUFT, but is also being enhanced to include data from the Site Cleanup Program, and Landfill sites. The database also contains information about public drinking water wells.

Geotracker allows one to obtain graphical and textual information about any LUFT, Underground Storage Tank (UST), Above Ground Tank (AGT), Site Cleanup Program, and Landfill site by entering a site address, partial site address, or site name. Other information that can be graphically displayed as a layer on Geotracker includes highways and roads, topographic maps, surface water boundaries, watershed boundaries, groundwater basins, and hydrologic vulnerability areas.

Groundwater Ambient Monitoring and Assessment Program
The Groundwater Ambient Monitoring and Assessment (GAMA) Program is California's comprehensive groundwater quality monitoring program. The GAMA Program was created by the State Water Board in 2000. It was later expanded by Assembly Bill 599 – the Groundwater Quality Monitoring Act of 2001. The main goals of GAMA are: to improve statewide groundwater monitoring; and, increase the availability of groundwater quality information to the public. One element of the GAMA program is the enhancement of GeoTracker to develop the GeoTracker GAMA system which provides internet access to groundwater quality data in California. To date GeoTracker GAMA has brought together and standardized data sets from DPH, DWR, DPR, as well as from the US Geological Survey, Lawrence Livermore National Laboratory, and the Water Boards. The State Water Board working in coordination with other agencies continues to enhance the capabilities of this database and add to the datasets available.

California Water Quality Monitoring Council
In 2006, the California legislature mandated coordination of water quality monitoring and assessment activities among organizations inside and outside California government, and that this information be made available to decision makers and the public via the internet. The Monitoring Council was formed in 2007 by a cooperative agreement

between the California Environmental Protection Agency and the Natural Resources Agency for this purpose.

The Monitoring Council has launched the *My Water Quality* web portal that is utilizing existing databases to answer surface water and groundwater quality related questions such as “Is it Safe to Swim?”. The Monitoring Council continues to work with multiple organizations to expand the web portal. The Monitoring Council’s Roadmap is to build on existing systems and data management capabilities which they are doing by utilizing statewide and other regional database efforts.

5.6 GROUNDWATER MONITORING NETWORK

Stakeholders Concern

The need for a groundwater monitoring network for the Central Valley Region was identified by stakeholders. There was recognition that there are many areas of the Central Valley Region that the quality of groundwater is unknown.

Current Activities Addressing Concern

Through the development of new and updated WDRs groundwater quality monitoring is considered and is required as appropriate. Implementation of the Dairy General Order also expands groundwater monitoring at dairy facilities in a phased approach. Through these existing programs groundwater monitoring is being expanded on a programmatic scale, not in a region-wide network.

5.7 INTEGRATED REGIONAL WATER MANAGEMENT PLANNING

Stakeholder Concern

Water agencies involved in Integrated Regional Water Management Planning voiced concern that the Central Valley Water Board was not aware of all the water management planning that was already occurring within the Central Valley Region.

Current Activities Addressing Concern

Staff of the Central Valley Water Board participated in the DWR Regional Acceptance Process in the spring of 2009. This participation served two purposes for the Central Valley Water Board to become more familiar with the various IRWM Planning efforts and to identify Central Valley Water Board staff contacts for the IRWM Regional Water Management Groups. The Central Valley Water Board along with the State Water Board continue to coordinate with DWR on Integrated Regional Water Management grant funding program.

5.8 IRRIGATED LANDS REGULATORY PROGRAM – GROUNDWATER

Stakeholders Concern

Stakeholders identified the lack of regulation of groundwater quality in the Irrigated Lands Regulatory Program as a concern.

Current Activities Addressing Concern
An Environmental Impact Report to assess alternatives for a Long-Term Irrigated Lands Regulatory Program is being finalized. Program alternatives to address groundwater quality are being considered.

5.9 LAND USE PLANNING

Stakeholders Concern
Stakeholders indicated a need for more water quality education for Land Use Planners that would result in stronger water quality protection elements in local plans.

Current Activities Addressing Concern
Through the CWC section 132225(j) the State and Regional Water Boards have certain responsibilities to encourage coordinated regional planning and action for water quality control. Central Valley Water Board's staff review and comment on water quality components of regional planning documents as resources allow.

5.10 LEGACY POLLUTANTS

Stakeholder Concerns
The primary concern for stakeholders with respects to legacy pollutants was the need for sustainable funding for cleanup. Stakeholders were particularly concerned with impacts from nitrates on small community water systems and private wells. The negative impacts from increasing saline waters on agricultural crops and costs to industrial processors were also noted concerns.

Current Activities Addressing Concern
The Central Valley Water Board has several programs that address legacy pollutants through regular oversight responsibilities through the Groundwater Cleanup Program (Site Cleanup, UST, and Land Disposal). Though not dealing with cleanup of legacy pollutants the Dairy General Order is addressing source reduction of salts and nitrates to prevent future degradation. The Irrigated Lands Regulatory Program is developing an EIR for a Long-Term program which is looking at groundwater program alternatives that will also prevent future degradation

Nitrates

Nitrates are a constituent that is addressed through Central Valley Water Board Programs in new and updated WDRs, the Groundwater Cleanup Programs, has several programs that address source reduction through Waste Discharge Requirement or General Orders, such as the General Order for Existing Milk Cow Dairies. Through the Nonpoint Source Program best management practices are identified for range and timber operations.

The Department of Public Health maintains regulatory oversight of public water systems to assure the delivery of safe drinking water. This oversight includes monitoring requirements for specific constituents that include nitrates. CDFA provides funding for studies to develop improved application practices for nitrogen based fertilizers.

Since 1990, the Department of Food and Agriculture provides annual funding for research and education projects that facilitate improved farming practices and reduce environmental effects from the use of fertilizer.

Salts

When developing or updating WDRs monitoring and reporting requirements are included for salts as appropriate. This allows for compliance and enforcement as necessary. However, salt limits identified in existing Basin Plans need to be reevaluated to ensure protection of groundwater quality. CV-SALTS will continue to be the primary tool for developing studies to inform the development of Basin Plan amendments and a Salt and Nutrient Management Plan for the Central Valley Region.

Pesticides

Pesticides are currently addressed through the Site Cleanup and Land Disposal programs. These programs deal mostly with releases of pesticides that have occurred at applicator or storage facilities. WDRs for landfills may also require monitoring for pesticides due to past disposal practices.

5.11 WATER SUSTAINABILITY

Stakeholder Concerns

During stakeholder workshops concerns were raised regarding permitting requirements for specific conjunctive use projects and potential impacts to groundwater quality. Although not directly related to all types of conjunctive use projects stakeholders were concerned about land subsidence related to increased groundwater pumping to meet the water needs of the state. As defined in DWR Bulletin 118 conjunctive use is the coordinated and planned management of both surface and groundwater resources in order to maximize the efficient use of the resource; that is, the planned and managed operation of a groundwater basin and a surface water storage system combined through a coordinated conveyance infrastructure.

For the context of this discussion the following describes the types of conjunctive use projects that were brought up during stakeholder workshops.

Aquifer Storage and Recovery

Long-term implementation of Aquifer Storage and Recovery (ASR) projects are designed and operated to inject water into the aquifer during times when water supplies are plentiful and to extract water when needed to augment domestic or municipal water supplies. ASR projects are being considered by a number of municipalities, in contrast to other types of conjunctive use projects, ASR projects utilize treated drinking water as the type of water injected into the aquifer.

Even though injected water may meet all current drinking water standards, chemicals may be present in excess of water quality objectives that apply to groundwater. The raw source waters for drinking water may contain pollutants such as salts, metals, pesticides, pharmaceuticals, and endocrine disruptors. ASR projects utilizing treated drinking water as project water may contain these pollutants as well as significant

concentrations of chlorine disinfection by-products. Discharge of such waste constituents could violate water quality objectives in the Basin Plans.

Recycled Water
The State Water Board is charged with setting statewide policy for pollution control. The Recycled Water Policy adopted February 2009, Resolution 2009-0011 and General Waste Discharge Requirements for Landscape Irrigation Uses of Municipal Recycled Water Order 2009-0006-DWQ will influence how recycled water is used. The purpose of the Policy is to increase the use of recycled water from municipal wastewater sources that meets the definition in the CWC, section 13050(n), in a manner that implements state and federal water quality laws. [Recycled Water Policy, 2009] Implementation of this policy relates to both water quality and quantity, will require coordination with stakeholders to develop salt/nutrient management plans, and interaction with DPH on permitting issues.

Conjunctive Use Projects
Water is stored in the groundwater basin for later and planned use by intentionally recharging the basin during years of above-average surface water supply. This type of recharge is slightly different than both ASR and Recycled Water projects in that treated water is not used, however, similar precautions must be taken to avoid impacting high quality groundwater with lesser quality surface water.

Current Activities Addressing Concern
Staff evaluates each water sustainability project on a site by site basis for impacts to beneficial uses. To meet the goals of the Recycled Water Policy the Central Valley Water Board adopted Resolution R5-2010-0024 which directs all parties developing salinity and nutrient management plans pursuant to the Policy to work in conjunction with the CV-SALTS initiative. By requiring this type of coordination parties may be able to leverage off of salinity and nutrient management plans already developed. CV-SALTS is also in the process of developing a Salt and Nutrient Management Plan for the Central Valley Region.

The Central Valley Water Board does not have regulatory authority over usage of groundwater therefore the issue of subsidence must to be addressed by local water agencies.

5.12 WELL DESIGN AND DESTRUCTION (abandonment) PROGRAM

Stakeholder Concerns
Stakeholders were concerned about impacts to groundwater quality due to the lack of oversight of groundwater wells. The noted concerns included siting of wells, and the impacts to groundwater supply, from inactive wells that can act as conduits for pollution. Stakeholders suggested coordinated oversight of the identification and proper destruction of abandoned domestic, municipal, agricultural, or irrigation supply wells.

A unified well tracking and inspection program in California may help establish sustainable groundwater management practices. Well identification, mapping,

inspection, and enforcement of existing well ordinances can be improved to protect existing groundwater resources.

Current Activities Addressing Concern

Improper well construction, maintenance, abandonment, or destruction can lead to contamination of groundwater. The Department of Water Resources has developed Bulletin 74-81, "Water Well Standards for the State of California" and Bulletin No. 74-90, "California Well Standards". Under CWC Section 13801(c) local governments, counties, cities, and some water districts are responsible for enforcing well standards that meet or exceed the well standards. The Central Valley Water Board staff will work cooperatively with local agencies to identify problem wells observed during field inspections. For instance, information on improperly air gapped or inactive/abandon wells observed during dairy facility, ILRP, or other field inspections will be provided to the local agency for further action.

6. Roadmap

Throughout this document the Groundwater Quality Protection Strategy has been called the Central Valley Water Board's "Roadmap". In Section 4 the Central Valley Water Board existing programs were described. Concerns and issues for each of the programs described activities, industries, or constituents of concern that are not actively being regulated or require an improved regulatory approach. In Section 5 concerns and issues raised by stakeholders were grouped into twelve categories and described. Table 5 identified the stakeholder issues and concerns and the current activities being implemented to address the concerns.

In Sections 4 and 5 current activities underway by the Central Valley Water Board or others have been identified. For is section, the focus is on future actions and how they will be implemented over the short term and into the future to protect groundwater quality.

Through development of the Roadmap, it appears that current and future actions can be implemented through the existing programmatic structure of the Central Valley Water Board and through improved partnerships with other agencies or organizations. A need for new regulatory programs was not specifically identified.

To illustrate the Roadmap, a description is provided of three basic elements: a) future actions, b) how the actions are prioritized, and c) resource needs to implement the actions. Implementation of future actions are not limited to the Central Valley Water Board, but for ease of description the majority of future actions are described under the existing program headings that were detailed in Section 4.

> As water quality is dynamic, this roadmap will be too: additional actions or changes in prioritization may occur. The Strategy will be evaluated annually to identify appropriate adjustments to the roadmap's course.

6.1 Future Actions

Since this is a Roadmap focusing on where the Central Valley Water Board is moving into the future, this section will primarily focus on future actions. To implement this Roadmap, the Central Valley Water Board, through existing programs, may take actions to address the concerns and issues raised in Section 4 and 5. To protect and restore groundwater quality, future actions to be implemented are not limited to the Central Valley Water Board. Future actions may be constrained by funding and staffing resources and will require continued cooperation between the Central Valley Water

Board and other agencies or organization to leverage limited resources for the protection and restoration of groundwater...

6.2 Prioritization

The second element of the Roadmap is how the actions to protect groundwater quality will be prioritized for implementation. To prioritize actions, the Central Valley Water Board will use the following criteria: Criteria was identified to broadly prioritize future actions. These criteria were identified because they carry out the mission of the Central Valley Water Board and remain realistic with regulatory and resource constraints. The Central Valley Water Board recognizes these criteria may not be appropriate for other agencies. The Board will work in a cooperative manner to identify methods of prioritization for future actions to be implemented in partnership with other agencies or organizations.

- Protection and Enhancement Beneficial Uses[7]: The activity will result in the **significant positive progress** toward protection of beneficial uses.
- Anti-degradation: The **activity has been evaluated** against, and effectively implements, the anti-degradation policy (Resolution 68-16).
- Timely: The activity is ripe for prompt action because **sufficient information exists** to support taking the action.
- Complements Other Activities: The activity will **complement or add to existing efforts** by the Water Boards and other organizations.
- Existing Authority: The activity can be accomplished with **existing legal authorities, required by statute, policy, or direction by the Central Valley Water Board**
- Existing Commitment: The activity constitutes an existing commitment **(funding exists, staff resources available)** by the Central Valley Water Board.

Actions will be evaluated against the above listed criteria to determine whether that action should be prioritized as high, medium, or low for implementation.

High	Meets 5-6 Criteria
Medium	Meets 3-4 Criteria
Low	Meets 1-2 Criteria

6.3 Resources

Identification of resources is the third element to defining the roadmap. Resources are identified in broad measures and may include the need for staffing, contracts, or some form of interagency agreements.

[7] State law defines beneficial uses of California's waters that may be protected against quality degradation to include (and not be limited to) "...domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Water Code Section 13050(f)).

The Central Valley Water Board expends a significant portion of its annual budgets implementing groundwater quality protection programs identified in Section 4. The identification and prioritization of future actions may require some redirection of resources and acquisition of new resources to implement future actions and coordinate with other agencies.

This Roadmap is not intended to be a workplan, so resource needs are presented in broad measures. Following the Central Valley Water Board's approval of the Roadmap, a workplan for implementation will be developed.
In Sections 6.4 and 6.5 future actions to protect groundwater quality are identified. These future actions are the culmination of reviewing current activities and numerous stakeholder comments. Future activities that were not specific to any one existing Central Valley Water Board program are identified as overarching actions in Section 6.4. In Section 6.5, for ease of description, the majority of future actions are described under existing program headings that were detailed in Section 4. A table of future actions under each programmatic subsection is followed by a brief narrative of the future action, goal, objective, concern(s) addressed, background, and resources.

6.4 Central Valley Region-wide Overarching Actions

Table 6.4 Central Valley Region-wide Overarching Actions

Future Actions	Protect Beneficial Uses	Anti-Degradation Analysis *	Timely	Complements other Activities	Existing Authority	Existing Commitments	Priority
6.4.1 CV-SALTS – Develop a Salt and Nutrient Management Plan	X	X	X	X	X	X	H
6.4.2 Implement Consistent and Scientifically Sound Groundwater Monitoring Program	X		X	X	X	X	H
6.4.3 Implement Groundwater Quality Protection Programs through the Integrated Regional Water Management Plan Groups	X		X	X	X		M
6.4.4 Broaden public participation through enhanced communication, education, and outreach	X		X	X	X	X	H
6.4.5 Improve local implementation of Well Design and Destruction Programs.	X			X	X		M
6.4.6 Groundwater database	X		X	X	X	X	H

*Anti-degradation analysis will be completed for actions either on a site specific or programmatic basis

6.4.1 CV-SALTS Develop a Salt and Nutrient Management Plan (High)

Goal: Through the CV SALTS initiative, a collaborative stakeholder effort, develop a basin plan amendment to implement a comprehensive Salt and Nutrient Management Plan for the entire Central Valley Region.

Action(s): Amendment to the Basin Plans covering the Sacramento River, San Joaquin River, Tulare Lake and possibly the Bay Delta Plan. The amendment will address review and establishment of new water quality objectives for salts and nitrates as appropriate. The amendment will also establish a comprehensive implementation plan to protect water quality and achieve compliance where those water quality objectives are not met.

Objective: Insure that ground and surface waters within the Central Valley Region are protected from impacts of salt and nutrients and that all uses are attained. Through the implementation plan, the Central Valley Water Board in cooperation with IRWM groups that have developed approved Salt and Nutrient Management Plans will be able to address basins that are impacted, and adequately protect those that are not.

Concern(s) Addressed: This action will address growing concern over the frequency and magnitude of nitrate impairments, particularly in domestic and small public water systems. Impacts from elevated salinity levels can result in increased costs to agriculture and industry. 5.1 Communication, 5.2 CAFO, 5.3 Education & Outreach, 5.4 Groundwater Cleanup Program, 5.5 Groundwater Database, 5.6 Groundwater Monitoring, 5.7 IRWM Planning, 5.8 ILRP, 5.9 Land Use Planning, 5.10 Legacy Pollutants

Background: In 2006, the Central Valley Water Board, the State Water Board, and stakeholders began a joint effort, CV-SALTS, to address salinity and nitrate problems in the Central Valley and adopt long-term solutions that will lead to enhanced water quality and economic sustainability.

In July 2008, the Central Valley Salinity Coalition (CVSC) was formed. CVSC represents stakeholder groups working with the Central Valley Water Board in the CV-SALTS effort. The purpose of CVSC is to organize, facilitate, and fund efforts needed to fulfill the goals of CV-SALTS. On going efforts to coordinate the meetings of the CV-SALTS committees, maintains an independent web site, and manages the projects originating from this effort are coordinated y CVSC. Information and materials regarding the stakeholder committees and other activity, including the meeting schedule, are posted on their website: www.cvsalinity.org.

The stakeholder CV-SALTS Initiative is the Central Valley Water Board's primary mechanism to conduct the necessary studies, research, draft technical and science reports to develop all components of the basin plan amendment and to implement the Salt and Nitrate Management Plan once it's adopted by the Board. Work to be done

includes data collection, database development, modeling, monitoring, research, studies, and pilot project study programs.

Resources: Over $1 million dollars has been put towards the planning effort and $5 million has been allocated for the next three years. Resource needs are projected to be approximately $20 to $40 million for the development of the Salt and Nitrate Management Plan that will be funded by both public and private funds.

6.4.2 Implement Consistent and Scientifically Sound Groundwater Quality Monitoring Program (High)

Goal: Implement groundwater quality monitoring programs throughout the entire Central Valley that will yield water quality data that is based on sound science and technically and scientifically defensible techniques and approaches.

Action: Through an expert advisory committee, issue white papers on groundwater quality monitoring issues that provide guidance and consistency throughout the Central Valley Region on technical issues related to groundwater quality monitoring to staff. These white papers will improve the science that influences groundwater quality monitoring requirements for WDRs and keep the Central Valley Water Board current on methods of evaluation of groundwater quality monitoring data.

Objective: To bring together experts in the field of groundwater quality monitoring to advise and comment on technical issues. The workgroup will be an advisory panel to assist the Central Valley Water Board in evaluating how and why groundwater quality monitoring is conducted, to minimize the potential for collection of unreliable data, inefficient use of resources, and improper evaluation of data.

Concern(s) Addressed: Concern was the need for more data on groundwater quality within the Central Valley Region and to include appropriate groundwater quality monitoring requirements in new and updated WDRs based on “good science”. 5.5 GW Databases and 5.6 GW Monitoring Network

Background: The Central Valley Water Board invited experts in the field of groundwater quality monitoring to join the Groundwater Monitoring Advisory Workgroup to advise and comment on technical issues. Members are experts in groundwater monitoring representing: academia, USGS, State Water Board, USEPA, private consultants, and Central Valley Water Board staff.

Resources: The Groundwater Monitoring Advisory Group experts volunteer their time which represents a considerable amount of resources. For Central Valley Water Board staff involvement including organizational support of the Groundwater Monitoring Advisory Group and assist in development of white papers is anticipated to be approximately $200,000 for the next five years.

Implementation of groundwater quality monitoring will mainly occur through updates and new WDRs monitoring and reporting requirements. The Central Valley Water Board will

also work closely with the IRWM groups to identify existing and future groundwater monitoring data and identify potential methods to incorporate into a statewide groundwater database such as GeoTracker GAMA. Resource allocations will be approximately twenty percent, of the annual budget for existing Central Valley Water Board programs or approximately $1.5 to $2 million.

6.4.3 Implement Groundwater Quality Protection Programs through the Integrated Regional Water Management Plan Groups (Medium)

Goal: Leverage and expand groundwater protection program coverage through improved coordination and partnering with local regional groups that receive State funds through the Integrated Regional Water Management process.

Action: The Central Valley Water Board will become more formally engaged as an active stakeholder with IRWM Planning Groups to ensure plans include comprehensive water quality components. Through active involvement, the Central Valley Water Board will better utilize the IRWM Planning Groups as resources in groundwater quality protection.

Objective: Identify partnering opportunities to implement groundwater protection programs through the IRWM Plans. Through active participation, the Central Valley Water Board will obtain a better understanding of the water management planning that is underway within the Central Valley Region. The Central Valley Water Board's participation will also serve as a resource on water quality protection issues for the development or update of Integrated Regional Water Management Plans.

Concern(s) Addressed: Stakeholders concern was that the Central Valley Water Board was not aware of the level of groundwater planning taking place throughout the region. Through participation with the Department of Water Resources Region Acceptance Process, Central Valley Water Board and the Regional Water Management Groups agreed that coordination between them should be increased. 5.1 Communication, 5.7 IRWM Planning, 5.8 ILRP-Groundwater, 5.9 Land Use Planning, 5.11 Water Sustainability, 5.12 Well Design-Destruction

Background: The Integrated Regional Water Management Program is intended to promote and practice integrated regional water management to ensure sustainable water uses, reliable water supplies, better water quality, environmental stewardship, efficient urban development, protection of agriculture, and a strong economy. Proposition 50 Chapter 8 Integrated Regional Water Management (IRWM) Grant Program was a joint program between the Department of Water Resources and the State Water Board which provided funding for projects to protect communities from drought, protect and improve water quality, and reduce dependence on imported water. The IRWM Grant Program includes two separate grant types - Planning Grants and Implementation Grants.

With the passage of Proposition 84 Chapter 2 and Proposition 1E Article 4 additional funds were made available to the IRWM Grant Program. DWR became the

administrator of the program that provides funding for projects that assists local public agencies to meet long term water needs of the state including the delivery of safe drinking water and the protection of water quality and the environment. The Central Valley Water Board, along with the State Water Board, continues to coordinate with DWR on the grant guidelines and proposal review for the IRWM Grant Program.

Resources: Limited resources through a contract with the State Water Board are to be allocated for the Central Valley Water Board to participate in the IRWM grant program reviews for the next fiscal year. Resources to support the Central Valley Water Board in becoming more formally engaged as an active stakeholder with all of the IRWM Groups within the Central Valley Region is anticipated to be approximately $150,000 annually.

6.4.4 Enhance Public Participation Methods (High)

Goal: Ensure all interested parties have the opportunity to participate in the Central Valley Water Board's decision making processes.

Action: Increase number of Central Valley Water Board staff trained on public participation methods. Enhance public participation through such methods as increased video conferencing, translation services, and facilitation services.

Objective: Enhance public participation methods in all Central Valley Water Board programs to increase level of public participation.

Concern(s) Addressed: 5.1 Communication, 5.3 Education and Outreach

Background: Public participation is an important part of the Central Valley Water Board's decision making processes. Involving interested parties through a variety of methods improves their knowledge and support of the Central Valley Water Board's efforts to protect groundwater quality, it also can improve compliance.

Resources: To improve remote Board Meeting participation $500,000 in contract dollars are needed. Each of the Central Valley Water Board's programs will include some level of public participation. Therefore, during the development of annual workplans each of the Central Valley Water Board programs will designate a percentage of the annual budget for the level of public participation needed annually. Through fiscal year 2010-2011 funding for translation services will be provided through the State Water Board. Resources for translation services beyond fiscal year 2011-2012 will need to be assessed.

6.4.5 Well Design and Destruction (Abandonment) Programs (Medium)

Goal: Protect groundwater quality through improved local implementation of a Well Design and Destruction Programs.

Action: Working with DWR, DPH, and local agencies, identify what elements of well standards are not being actively enforced. Identify tools, methods, or resources to improve implementation of current well standard enforcement.

Objective: Through coordination with DWR, DPH, and local agencies, identify where all aspects of well standard enforcement is not occurring. Provide assistance to local agencies for education and outreach and identify funding sources to increase level of current well standard enforcement.

Concern(s) Addressed: 5.1 Communication, 5.3 Education and Outreach, 5.7 IRWM Planning, 5.9 Land Use Planning, 5.10 Legacy Pollutants, 5.12 Well Design & Destruction Program

Background: Improper well construction, maintenance, abandonment, or destruction can lead to contamination of groundwater. Under CWC Section 13801(c) local governments, counties, cities, and some water districts are responsible for enforcing well standards that meet or exceed the California Well Standards. Due to fiscal impacts many local agencies have been unable to maintain a robust well design and destruction program.

Resources: For Central Valley Water Board staff coordination with appropriate agencies approximately $50,000 annually will be required. Following coordination with the appropriate agencies additional resource needs for the local agencies will be identified.

6.4.6 Groundwater Database (High)

Goal: To develop a groundwater quality database that facilitates the compilation and assessment of data and allows for seamless integration with information from different Central Valley Water Board programs and other agencies.

Action: Through coordination with the State Water Board, work to expand existing databases such as CIWQS, GeoTracker, and GeoTracker GAMA to develop a Central Valley Region specific component to allow for improved data management and analysis. Central Valley Water Board program managers will identify staff to form a workgroup that will begin database expansion discussions with the State Water Board. Require electronic data submittals for all groundwater monitoring data required through MRPs, WDRs, Cleanup and Abatement Orders, and any other monitoring requirements.

Objective: By enhancing existing State Water Board databases, the Central Valley Water Board will leverage database development already completed. Require electronic data, submittal from dischargers in an effort to reduce errors in data reporting, improve data analysis capability, reduce staff time through electronic data transfer, and improve accessibility of data to the public and other agencies.

Concern(s) Addressed: 5.1 Communication, 5.2 CAFO, 5.3 Education and Outreach, 5.5 Groundwater Database, 5.6 Groundwater Monitoring, 5.9 Land Use Planning, 5.10 Legacy Pollutants, 5.12 Well Design & Destruction

Background: The need for a water quality centralized database has been recognized since adoption of the Tulare Lake Basin Plan in 1975.

Resources: Assessment of resource needs will be determined in steps. Initially a Central Valley Water Board and State Water Board staff database workgroup will need to identify the required elements for a database. Staff resources for the database workgroup will be approximately $150,000 annually for two years. Contract dollars to enhance GeoTracker or a similar database cannot be determined at this time. Based on the database workgroup input an assessment will be completed to determine the amount of contract dollars necessary to enhance an existing database. Once the database enhancements are in place a resource needs assessment would be completed to determine the level of data management support required for the Central Valley Region specific database enhancements.

6.5 Program Specific Actions

6.5.1 Confined Animal Facilities

Future Actions	Protect Beneficial Uses	Anti-Degradation Analysis *	Timely	Complements other Activities	Existing Authority	Existing Commitments	Priority
Alternative Dairy Waste Disposal – Dairy Manure Digester and Dairy Manure Co-Digester Facilities	X	X	X	X	X	X	H
Develop Individual and General Orders for Poultry, Cattle Feedlot , other types of CAFO Facilities	X			X	X		M

*Anti-degradation analysis will be completed for actions either on a site specific or programmatic basis

<u>Alternative Dairy Waste Disposal Project - Dairy Manure Digester and Dairy Manure Co-Digester Facilities (High)</u>

Goal: Find alternative wastewater disposal methods and processes that protect groundwater quality while providing multiple environmental media benefits.

Objective: Develop a programmatic EIR for Digester Facilities at dairies that use manure waste as a renewable energy source that will generate power and ensure

protection of groundwater quality. Develop and implement a General Order for digester facilities throughout the Central Valley that is based on the EIR. A General Order will substantially reduce the time required to issue water quality permits to these facilities for the Central Valley Water Board, and will reduce the time required for permits issued by other state and local permitting agencies.

Concern(s) Addressed: Source reduction of salts and nitrates to groundwater. Based on the potential impacts to the environment, these types of facilities require permits from several state and local agencies. By developing a programmatic document that is protective of groundwater quality it will substantially reduce the time required to permit facilities for the Central Valley Water Board and other state and local permitting agencies. This will address stakeholder concerns regarding lengthy permitting processes and will also promote the State's goal of reducing waste and supporting alternative energy sources. 5.1 Communication, 5.2 CAFO, 5.10 Legacy Pollutants

Background: The Central Valley Water Board will regulate the discharge of effluent and solid digestate generated from these facilities. Regulatory options under consideration for the program include WDRs, General Orders, and/or Conditional Waivers of WDRs. The Program EIR will provide CEQA compliance for the water quality permitting by the Central Valley Water Board to the owners and operators of these facilities. Other permitting agencies and districts may rely on, or tier off of, the Program EIR to satisfy CEQA requirements.

Resources: Existing contract dollars of $742,000 are in place to finalize the Program EIR. Contract and project management for the current and next fiscal year will be $140,000.

Develop General Order for Poultry, Cattle, or Other Confined Animal Facilities (Medium)

Goal: Protect groundwater from waste associated with the operation of confined animal facilities including poultry raising and egg laying, cattle feedlots, and other types of confined animal facilities not covered by the Dairy General Order. Develop a General Order (or group of orders) for the Central Valley Water Board's consideration for confined animal facilities not covered by the Dairy General Order.

Action: Begin expanding CAFO program through development of a General Order (or group of orders) for the poultry raising and egg laying industry.

Objective: Develop a General Order (or group of orders) that will address the different types of confined animal facilities including poultry raising and egg laying, cattle feedlots and their discharges. General Order(s) will be consistent with and exceed NPDES requirements in accordance with Federal Confined Animal Feeding Operation regulations.

Concern(s) Addressed: Stakeholders saw the need for expanded implementation of regulations to other confined animal facilities beyond dairies. 5.1 Communication, 5.2 CAFO, 5.3 Education and Outreach, 5.10 Legacy Pollutants

Background: The Central Valley Water Board focused its limited resources to Dairy operations due to potential impacts to groundwater quality. The Central Valley Water Board has acknowledged the need to expand the CAFO program to include general or individual orders of waste discharge for other types of CAFOs beyond dairy facilities. The poultry industry has continued to work closely with the Central Valley Water Board on discharge issues, and has requested that a General Order be developed.

Resources: To develop a General Order including supporting work for an EIR, if required, is estimated to be $950,000. It is anticipated that the General Order for Poultry Facilities would be completed during the fiscal year 2011-12.

6.5.2 Irrigated Lands Regulatory Program

Future Actions	Protect Beneficial Uses	Anti-Degradation Analysis *	Timely	Complements other Activities	Existing Authority	Existing Commitments	Priority
Implementation of Long-Term ILRP	X	X	X	X	X		H
Coordinate with CDFA to identify methods to ~~develop~~ enhance ~~a comprehensive~~ fertilizer research and education program[8]	X			X	X		M

*Anti-degradation analysis will be completed for actions either on a site specific or programmatic basis

Implementation of the Long-Term Irrigated Lands Regulatory Program (ILRP) (High)

Goals: Develop an irrigated lands program that establishes a groundwater protection program for wastes associated with agricultural practices.

Action: Adoption of a Long-Term ILRP that is protective of surface and groundwater quality.

Objective: Develop a long-term ILRP based on considerable stakeholder outreach through the CEQA process for the development of an EIR. The Central Valley Water

[8] CV-SALTS is currently looking at impacts from nutrients, including fertilizers

Board will consider recommendations of the Advisory Workgroup on program alternatives for implementation of a Long-Term ILRP.

Concern(s) Addressed: Address impacts to groundwater quality from agricultural sources. 5.1 Communication, 5.3 Education and Outreach, 5.8 ILRP-Groundwater, 5.10 Legacy Pollutants

Background: The Irrigated Lands Conditional Waivers (Resolution No. R5-2003-0105) is an interim program until a 10-year implementation program can be developed. During the interim period, the Regional Water Board has directed staff to (1) Develop a 10-year plan to meet water quality objectives and prepare an Environmental Impact Report in support of the plan; (2) Meet with watershed coalitions as needed; and (3) Update the Central Valley Water Board on the progress of this program every 6 months. The draft EIR for the Long-Term ILRP will be circulated for public review including public workshops prior to circulation of the final EIR. Following circulation of the final EIR, Economic Analysis, and Staff report the Recommended Long-Term Program will be presented to the Central Valley Water Board for consideration in early 2011.

Resources: Resource needs will differ depending on which program alternative is adopted. To support the Long-Term ILRP once adopted the State Water Board will determine fees based on staff effort to implement the program.

Coordinate with CDFA to identify methods to ~~develop~~ enhance outreach, education, and research through CDFA's ~~a comprehensive~~ fertilizer research and education program. (Medium)

Goal: Reduce groundwater quality impacts from use of nitrogen based fertilizing materials in agricultural, commercial, and residential applications.

Action: Initiate regular coordination meetings and work closely to reduce groundwater quality impacts from fertilizing materials, identify methods of tracking actual application rates through voluntary or potential regulatory changes.

Objective: Through increased coordination with CDFA, identify methods, to protect water quality such as but not limited to, application reporting, research transfer through allied industry professionals, improved fertilizer application methods, and alternative products that could be used to improve source reduction of nitrogen based fertilizing materials.

Concern(s) Addressed: Source reduction of nitrates impacting drinking water supplies. 5.1 Communication, 5.8 ILRP-Groundwater, 5.10 Legacy Pollutants

Background: Groundwater quality impacts due to high nitrate levels have impacted domestic and public drinking water systems. Nitrogen based fertilizers and soil amendments have long been used in agricultural, commercial, and residential applications. Application of these products is not tracked and application rates or

methods may result in levels that exceed plant needs resulting in impacts to groundwater.

Resources: Potential source of funding to support this action could include State Water Board Financial Assistance Program and CDFA ~~Fertilizer Mill Fee~~ FREP competitive research grant program

6.5.3 Site Cleanup Program

Future Actions	Protect Beneficial Uses	Anti-Degradation Analysis *	Timely	Complements other Activities	Existing Authority	Existing Commitments	Priority
Reduce site cleanup backlog	X			X	X		M

*Anti-degradation analysis will be completed for actions either on a site specific or programmatic basis

Reduce backlog of cleanup sites

Goal: Initiate assessment and cleanup on impacted sites not being actively worked.

Action: Working through the Water Board Cleanup Council, identify potential legislative or inter-agency agreements, such as collaboration with DTSC P2dw team, to implement assessment and cleanup of backlog sites.

Objective: Within the next two fiscal years reduce the backlog of cleanup sites by two percent.

Concern(s) Addressed: 5.1 Communication, 5.4 Groundwater Cleanup Program, 5.10 Legacy Pollutants

Background: As sites are discovered, the potential threat to soil and water quality is evaluated. Based on staffing resources, sites are prioritized and assigned for assessment and cleanup oversight. Based on the number of sites identified, existing staff workload, and cooperation of responsible parties to enter into cost recovery program, there remains a backlog of sites to be assessed.

Resources: The estimated resources needed to reduce the current backlog of sites, within the next five years, is approximately $360,000 per year.

6.5.4 Waste Discharge Requirements Program

Future Actions	Protect Beneficial Uses	Anti-Degradation Analysis *	Timely	Complements other Activities	Existing Authority	Existing Commitments	Priority
Draft Waiver once new regulations adopted based on AB 885	X	X		X			M
Update Guidelines for Waste Disposal from Land Developments	X	X	X	X	X	X	H
Develop methods to reduce backlog and increase facilities regulated	X		X	X	X	X	H
Actively coordinate with State Water Board on development of statewide ASR policy guidance	X		X	X	X		M

*Anti-degradation analysis will be completed for actions either on a site specific or programmatic basis

<u>Draft Waiver of Waste Discharge Following Adoption of New Regulations Based on AB 885 for Individual Waste Disposal Systems (Medium)</u>

Goal: The Central Valley Water Board will adopt a revised waiver of water discharge incorporating new regulations for septic systems (onsite wastewater treatment systems.)

Action: The Central Valley Water Board will adopt a waiver of waste discharge based on new regulations and will develop new Memorandum of Understanding with local Environmental Health Agencies to implement new regulations.

Objective: Within six months of new regulations based on AB 885 being finalized a draft waiver of waste discharge will be presented to the Central Valley Water Board for consideration.

Concern(s) Addressed: 5.1 Communication, 5.5 Groundwater Databases, 5.9 Land Use Planning, 5.10 Legacy Pollutants

Background: AB 885 requires the State Water Board to develop statewide onsite wastewater treatment systems regulations in consultation with the California Department of Public Health Services, California Conference of Directors of Environmental Health, California Coastal Commission, counties, cities, and other interested parties. Due to considerable input from stakeholders the timeline for development of the statewide regulations has been extended.
http://www.waterboards.ca.gov/water_issues/programs/septic_tanks/

Resources: Anticipate the need for $400,000 to complete this action over the next two fiscal years.

Update Guidelines for Waste Disposal from Land Developments (High)

Goal: Update the 15 December 1972 Guidelines for Waste Disposal from Land Developments and amend basin plans to reflect updated guidelines.

Action: Basin Plan Amendment will be completed for the inclusion of the updated Guidelines for Waste Disposal from Land Developments into the Basin Plans within the Central Valley Region.

Objective: Complete draft updated Guidelines for Waste Disposal from Land Developments for Central Valley Water Board consideration during fiscal year 2012-2013

Concern(s) Addressed: Waste discharge requirements program, 5.1 Communication, 5.7 IRWM Planning, 5.9 Land Use Planning, 5.10 Legacy Pollutants

Background: In December 1972 guidelines were modified and re-titled Guidelines or Waste Disposal from Land Developments and incorporated in the Central Valley Water Board's basin plans. Due to changes in available technology, increased population, and impending revised regulations these guidelines are being updated.

Resources: To complete this update it is anticipated that $150,000 will be required.

Develop methods to reduce backlog and increase facilities regulated (High)

Goal: Reduce backlog of existing WDRs to be updated and new WDRs to be developed.

Action: Identify like industrial facilities or operations that a General Order could be utilized. Rank these by potential threat to water quality and begin General Order development for the industrial facilities or operations that could have the highest potential to impact groundwater.

Objective: Develop general orders for like industrial facilities or operations that would allow for efficiency of permitting. General orders for operations such as sand and gravel wash water discharges to land.

Concern(s) Addressed: 5.1 Communication, 5.3 Education & Outreach, 5.5 Groundwater Database, 5.6 Groundwater Monitoring Network, 5.10 Legacy Pollutants

Background: The complexity of developing individual WDRs has increased tremendously and has partially lead to the backlog of existing WDRs with older

requirements that need to be updated. There has also been a growth in industries that has increased the number of new facilities applying for individual WDRs. In order to provide for efficiencies in permitting, developing General Orders for like industrial facilities or operations would allow for a larger number of like industries to be permitted with reduced staff resources. This type of backlog is not unique to the Central Valley Region. The State Water Board has recently formed a WDR unit to assist the Regional Water Board's in reducing backlogs.

Resources: No new resources have been included in the annual budget specifically for the Central Valley Region. However, the newly formed WDR Unit at the State Water Board will include five full time staff. This WDR Unit will assist the Regional Boards in reducing the backlog of WDRs. Since the Central Valley Region is the largest it is anticipated that considerable staff support will be provided by this unit.

Actively coordinate with State Water Board on development of statewide ASR policy guidance (Medium)

Goal: To continue direction of the Central Valley Water Board to coordinate with DWR and the State Water Board to develop a statewide approach for ASR projects.

Action: Commit resources for staff participation in development of a statewide approach for permitting ASR projects.

Objective: To provide statewide consistency for permitting of ASR projects.

Concern(s) Addressed: 5.1 Communication, 5.11 Water Sustainability

Background: An information item on ASR projects presented at the April 2008 Central Valley Water Board Meeting solicited Board input on regulation of ASR projects. During that meeting, the Central Valley Water Board suggested implementation of a non-regulatory approach to condition and control ASR Projects. A Unified Statewide ASR program would be developed through a collaborative effort of the State and Regional Water Boards, DWR, CDPH and USEPA. As long as a project proponent followed the guidelines, the Water Board would not impose additional conditions through a waiver or waste discharge requirements.

Resources: To participate in development of the statewide ASR policy guidance with the State Water Board it is anticipated that $12,000 will be required.

Table 6.6 Future Actions - Concerns Addressed

	Future Actions	CONCERNS ADDRESSED											
		5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	5.10	5.11	5.12
		Communication & Coordination	CAFO	Education, Outreach, Research	Groundwater Cleanup Programs	Groundwater Database	Groundwater Monitoring	IRWM Planning	ILRP - Groundwater	Land Use Planning	Legacy Pollutants	Water Sustainability	Well Design & Destruction Program
6.4.1	Develop Salt & Nutrient Management Plan	X	X	X	X	X	X	X	X	X	X	X	
6.4.2	Implement Groundwater Quality Monitoring Program	X	X	X	X	X	X	X	X	X	X		
6.4.3	Implement Groundwater Protection Programs Through IRWM Plan Groups	X					X	X	X	X		X	X
6.4.4	Broaden Public Participation for all programs	X		X									
6.4.5	Coordinate with local agencies to implement Well Design & Destruction Program	X		X				X		X	X		X
6.4.6	Groundwater Database	X		X	X		X			X	X		X
	Alternative Dairy Waste Disposal	X	X								X		
6.5.1	Develop Individual & General Orders for Poultry, Cattle Feedlots, other types CAFOs	X	X	X							X		
	Implementation of Long-term ILRP	X		X					X		X		
6.5.2	Coordinate with CDFA to identify methods to enhance fertilizer program	X		X					X		X		
6.5.3	Reduce Site Cleanup Backlog	X			X						X		
	Draft Waiver following new regulation adoptioned based on AB885	X				X				X	X		
	Updated Guidelines for Waste Disposal from Land Developments	X						X		X	X		
	Develop methods to reduce backlog and increase facilities regulated	X		X		X	X				X		

References:

Central Valley Regional Water Quality Control Board, Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition 1998

Central Valley Regional Water Quality Control Board, Water Quality Control Plan for the Tulare Lake Basin, Second Edition 1994

Central Valley Regional Water Quality Control Board, Watershed Management Initiative Chapter, 2004

Department of Water Resources, California's Groundwater, Bulletin 118 Update 2009, October 2003

Department of Water Resources, California Water Plan Update 2005, Bulletin 160-05, December 2005

Department of Water Resources, California Water Plan Update 2009 Pre-Final Draft, October 2009

State Water Resources Control Board, Nitrate in Drinking Water Report to the Legislature, Report No. 88-11WQ, Division of Water Quality, October 1988

State Water Resources Control Board, Policy for Water Quality Control for Recycled Water, May 2009

State Water Resources Control Board, GAMA Program, Groundwater Information Sheet, Arsenic, February 2008

APPENDIX A

Agencies and Organizations Protecting Groundwater Quality

Many different agencies have roles that directly, or indirectly, can affect the quality of groundwater. The roles of various agencies are defined by enabling legislation. Coordination of agencies with programs related to groundwater quality protection is necessary to focus attention on groundwater as a resource, to improve program implementation, and to prevent duplication or gaps in protection. As discussed in section IV Roles and Responsibilities the Central Valley Water Board's Programs coordinate with many agencies. By clearly defining the roles and responsibilities of agencies it will provide for improved coordination.

This appendix identifies agencies and organizations involved in groundwater quality protection activities; describes the general functions of these entities, and provides weblinks to various online resources to obtain more detailed information.

State Agencies

State Water Resources Control Board

The Dickey Water Pollution Act of 1949 created a State Water Pollution Control Board its duties included:

- ►Setting statewide policy for pollution control
- ►Coordinating the actions of those state agencies and political subdivisions in controlling water pollution.

In 1967 the Legislature created the "**State Water Resources Control Board**" (State Water Board). Today the five-member State Water Board allocates water rights, adjudicates water right disputes, develops statewide water protection plans, establishes water quality standards, and guides the nine Regional Water Quality Control Boards located in the major watersheds of the state.

The Legislature realized that California's water pollution problems were regional and depended on precipitation, topography, and population, as well as recreational, agricultural, and industrial development, all of which vary from region to region.

The *Dickey Act* established nine Regional Water Pollution Control Boards located in each of the major California watersheds. The Regional Boards have responsibility for overseeing and enforcing the state's pollution abatement program.

Regional Water Quality Control Board, Central Valley Region

The **Central Valley Water Board** is Region 5 of the 9 Regional Water Quality Control Boards. To specifically address water quality issues, in 1969, the State Legislature enacted the Porter-Cologne Water Quality Control Act. This Act contains a complete regulatory framework for the control of waste discharges to both surface waters and

groundwater of the state. The Central Valley Water Board's mission is to preserve and enhance the quality of California's water resources for the benefit of present and future generations.

The Central Valley Water Board carries out its mission by formulating and adopting water quality control plans (Basin Plans). It prescribes and enforces requirements on all agriculture, domestic, and industrial waste discharges through Waste Discharge Requirements (WDRs). The WDRs specify acceptable levels of pollutants that may be discharged, special studies to be conducted and monitoring programs to assess compliance. Groundwater programs have historically focused on discharges that could be associated with an individual or easily identifiable source. Traditionally, the Central Valley Water Board did not directly regulate diffuse sources such as agricultural practices; rather these activities were regulated through conditions established in Basin Plans until recently with the development of the Dairy and Irrigated Lands Regulatory (ILRP) Programs.

Department of Pesticide Regulation

The mission of the **Department of Pesticide Regulation** (DPR) is to protect human health and the environment by regulating pesticide sales and uses. DPRs programs address registration decision, environmental and worker monitoring, and enforcement. A portion of DPR's budget supports local pesticide enforcement by the County Agricultural Commissioners. Under DPR oversight, the Commissioners and the approximately 250 biologists that work for them serve as the local enforcement agents for pesticide laws and regulations in the state's 58 counties.

DPRs Environmental Monitoring Program monitors groundwater in response to reports of detections from state and local agencies, regulatory program requirements, or information provided by national or international research or government institutions. The Pesticide Contamination Prevention Act (PCPA), enacted in 1985 and subsequently amended, requires:

1. DPR to maintain a statewide database of wells sampled for pesticide active ingredients (AIs).
2. State and local agencies to submit results of well sampling for AIs to DPR.
3. DPR to post on its website specified data contained in the database and actions taken to prevent pesticide contamination.

Risk reduction is also an important component of DPRs programs, by encouraging less use of pesticides in favor of more natural pest controls.

Department of Toxic Substances Control

The mission of the **Department of Toxic Substances Control** (DTSC) is to provide the highest level of safety, and to protect public health and the environment from toxic harm. DTSC regulates those who handle hazardous waste, cleans up existing

contamination, and looks for ways to reduce the hazardous waste produced in California.

DTSC operates programs to:

- Deal with the aftermath of improper hazardous waste management by overseeing site cleanups.
- Prevent releases of hazardous waste by ensuring that those who generate, handle, transport, store and dispose of wastes do so properly.
- Take enforcement actions against those who fail to manage hazardous wastes appropriately.
- Explore and promote means of preventing pollution, and encourage reuse and recycling.
- Evaluate soil, water and air samples taken at sites, and develop new analytical methods.
- Practice other environmental sciences, including toxicology, risk assessment, and technology development.
- Involve the public in DTSC's decision-making.

DTSC regulates hazardous waste in California primarily under the authority of the federal Resource Conservation and Recovery Act of 1976, and the California Health and Safety Code. Other laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup and emergency planning.

Department of Public Health – Division of Drinking Water and Environmental Management

The Department of Public Health Services (CDPH) is responsible for the enforcement of the federal and California Safe Drinking Water Acts and regulatory oversight of public water systems to assure the delivery of safe drinking water. CDPHs Drinking Water Program regulates public water systems; promotes and provides information on drought preparedness and water conservation; oversees water recycling projects; certifies residential water treatment devices; certifies drinking water treatment and distribution operators; supports and promotes water system security; provides support for small water systems and for improving technical, managerial, and financial capacity; oversees the Drinking Water Treatment and Research Fund for MTBE and other oxygenates; and provides funding opportunities for water system improvements, including funding under Proposition 84, Proposition 50 and the Safe Drinking Water State Revolving Fund.

Department of Water Resources

The Department of Water Resources (DWR) authority is to manage the water resources of California in cooperation with other agencies. DWR works in cooperation with local agencies and stakeholders to increase water supply reliability through the planned, coordinated use of water resources. To support their role, activities include maintenance of the Integrated Water Resources Information System, responsible for updates to the California's Groundwater-Bulletin 118, and periodic updates to the California Water Plan.

DWR also administer grant funding for the Integrated Regional Water Management (IRWM) Program which is intended to promote and practice integrated regional water management to ensure sustainable water uses, reliable water supplies, better water quality, environmental stewardship, efficient urban development, protection of agriculture, and a strong economy. More information on the IRWM program including funding opportunities is found on DWRs website.

California Department of Food and Agriculture

The **California Department of Food and Agriculture** (CDFA) protects and promotes California's agriculture. California's farmers and ranchers produce a safe, secure supply of food, fiber, and shelter. These commodities are marketed fairly for all Californians and produced with responsible environmental stewardship. Through CDFAs many programs related to animal health, food safety, and pest prevention there is a connection to groundwater quality.

The purpose of CDFA's Fertilizer Research and Education Program (FREP) is to provide research and education regarding the use and handling of commercial and organic fertilizers, including, but not limited to, any environmental effects. FREP's vital role in defining farming practices that increase environmental performance will avoid regulatory costs.

Department of Conservation – Division of Oil, Gas, and Geothermal Resources

The **Division of Oil, Gas, and Geothermal Resources** (DOGGR) oversees the drilling, operation, maintenance, and plugging and abandonment of oil, natural gas, and geothermal wells. The regulatory program emphasizes the wise development of oil, natural gas, and geothermal resources in the state through sound engineering practices that protect the environment, prevent pollution, and ensure public safety.

Department of Conservation – State Mining & Geology Board

The Surface Mining and Reclamation Act (SMARA), Chapter 9, Division 2 of the Public Resources Code, requires the State Mining and Geology Board to adopt State policy for the reclamation of mined lands and the conservation of mineral resources. These policies are prepared in accordance with the Administrative Procedures Act,

(Government Code) and are found in California Code of Regulations, Title 14, Division 2, Chapter 8, Subchapter 1.

The Surface Mining and Reclamation Act of 1975 (SMARA, Public Resources Code, Sections 2710-2796) provides a comprehensive surface mining and reclamation policy with the regulation of surface mining operations to assure that adverse environmental impacts are minimized and mined lands are reclaimed to a usable condition. SMARA also encourages the production, conservation, and protection of the state's mineral resources. Public Resources Code Section 2207 provides annual reporting requirements for all mines in the state, under which the State Mining and Geology Board is also granted authority and obligations

California Department of Fish & Game

The Department of Fish and Game (DFG) maintains native fish, wildlife, plant species and natural communities for their intrinsic and ecological value and their benefits to people. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. The department is also responsible for the diversified use of fish and wildlife including recreational, commercial, scientific and educational uses. DFG has several divisions; Wildlife & Fisheries, Ecosystem Conservation, Law Enforcement, and the Regional offices.

The Water Branch is part of the Ecosystem Conservation Division within the DFG. In early 2007 DFG identified the need to more fully participate in water resource management efforts. The Water Branch was established to develop the Department's scientific expertise in water rights, water quality, water acquisition, ecosystem management, and statewide planning. Also a part of the Ecosystem Conservation Division is the Environmental Review and Permitting Programs that includes responsibilities to ensure compliance of the California Endangered Specific Act permitting (CESA), California Environmental Quality Act (CEQA) reviews, Lake and Streambed Alternation Program (LSA), and the Timberland Conservation program. All of which require varying levels of coordination with the Central Valley Water Board.

Department of Resources Recycling and Recovery--CalRecycle (formerly California Integrated Waste Management Board)

On Jan. 1, 2010 California's recycling and waste diversion efforts were streamlined into the new Department of Resources Recycling and Recovery--CalRecycle

CalRecycle promotes a zero waste California in partnership with local government, industry, and the public. This means managing about 93 million tons of waste generated each year by reducing waste whenever possible, promoting the management of all materials to their highest and best use, regulating the handling, processing and disposal of solid waste, and protecting public health and safety and the environment.

The Central Valley Water Board coordinates most frequently on groundwater quality issues with CalRecycle's compliance and enforcement unit that has responsibilities for the regulation of solid waste facilities.

Certified Unified Program Agencies

The **Certified Unified Program Agencies** (CUPA) is a unified program overseen by the California Environmental Protection Agency (CalEPA). CUPA consolidates, coordinates, and makes consistent the administrative requirements, permits, inspection, and enforcement activities of six environmental and emergency response programs. These programs include:

- Hazardous Materials Release Response Plans and Inventories
- California Accidental Release Prevention Program
- Underground Storage Tank Program
- Aboveground Petroleum Storage Act Program
- Hazardous Waste General and Onsite Hazardous Waste Treatment programs
- California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements

The state agencies responsible for these programs set the standards while local governments, such as Environmental Health Departments or Fire Departments, implement the standards.

Academia

Academia provides valuable research on many water quality related issues. The Central Valley Water Board utilizes contracts and grants to assist in funding various research projects needed to inform decisions on water quality protection programs.

The University of California (UC) system's fundamental missions are teaching, research, and public service. Public service has been a part of the UC's since its origins as a land grant institution in the 1860s. A land-grant college or university is an institution that has been designated by its state legislature or Congress to receive unique federal support. National Institute of Food & Agriculture conducts its programs primarily in partnership with land-grant university scientists and cooperative extension faculty. Today, through its public service programs and industry partnerships, UC disseminates research results and translates scientific discoveries into practical knowledge and technological innovations that benefit California.

Each U.S. state and territory has a state office at its land-grant university and a network of local or regional offices. Cooperative Extension System is a nationwide, non-credit educational network. These offices are staffed by one or more experts who provide useful, practical, and research-based information to agricultural producers, small business owners, youth, consumers, and others in rural areas and communities of all sizes.

The Central Valley Water Board has relied on academia to conduct studies such as evaluations of water quality of agriculture drains, evaluation of nutrient hold times, and

research on emerging contaminants. The UC Cooperative Extension also play a role in providing technical assistance to the agriculture community on various types of best management practices to protect water quality.

Local Agencies

Cities and Counties

Local governments such as cities and counties can manage groundwater through adopted ordinances. The majority of local ordinances have been passed since 1990 and in general most of these ordinances have been to hold project proponents accountable for impacts that may occur as a result of proposed export projects.

County General Plans are also a planning tool for groundwater management. A County General Plan may include a water component to inform local land use planning.

Local health or environmental health departments also implement programs that have an impact on groundwater quality including water well permitting and inspection programs that may address construction, reconstruction, or destruction. Many local health departments are also local primacy agencies for the DPH implementing permitting, monitoring, and inspection of public water systems serving fewer than 200 connections. Control of individual waste treatment and disposal systems is best accomplished by local county environmental health departments if these departments are enforcing an ordinance that is designed to provide complete protection to ground water and surface water.

Local Agencies and Special Districts

Greater authority to manage groundwater has been granted to a small number of local agencies or districts created through special acts of the legislature. Authority comes from the Government Code, Health and Safety Code, Water Code, Public Utilities Code, and Public Resources Code. Through the passage of AB 3030 (Stats. 1992, Ch. 947) greatly increased the number of local agencies authorized to develop a groundwater management plan and set forth a common framework for management by local agencies. Water Code section 10755.2 expands groundwater management opportunities by encouraging coordinated plans and by authorizing public agencies to enter into a joint powers agreement or memorandum of understanding with public or provide water services. However, there are neither mandates to prepare groundwater management plans nor reporting requirements when plans are implemented, so a comprehensive assessment of local planning efforts is not possible.

With the passage of the Integrated Regional Water Management Planning Act, CWC section 10530 et seq., IRWM planning has been expanding within the Central Valley Region. There are many Regional Water Management Groups that have either adopted IRWM plans or have plans in development. The IRWM efforts serve a vital role, in combination with local and statewide planning, to provide sustainable water use, water quality, and environmental function. Many of the Regional Water Management Groups

have websites with information on their IRWM plans. See the section on Department of Water Resources above for more information on the IRWM program.

Resource Conservation Districts

The Public Resources Code – Division 9 provides authorization for Resource Conservation Districts (RCDs) to be formed for the purpose of addressing local resource conservation needs. RCDs are "special districts" of the state that are locally governed agencies with their own locally appointed, boards of directors. RCDs place particular emphasis on the conservation of soil and water resources and achieve this by providing assistance to private landowners, and sponsoring educational efforts. Many RCDs also function as watershed groups such as Coordinated Resource management Planning (CRMP) groups.

Federal Agencies

United States Department of Interior - Bureau of Reclamation

The mission of the Bureau of Reclamation (BOR) is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. The BOR is a contemporary water management agency responsible for operation and management of the Central Valley Project.

United States Army Corps of Engineers

The United States Army Corps of Engineers (USACE) environmental programs include restoring degraded ecosystems, constructing sustainable facilities, regulating waterways and managing natural resources, and cleaning up contaminated sites from past military activities. The USACE regulates work in the nation's wetlands and waters, with a goal of protecting the aquatic environment while allowing responsible development.

United States Environmental Protection Agency

The United States Environmental Protection Agency (USEPA) was formed in 1970. USEPA was established to consolidate in one agency a variety of federal research, monitoring, standard-setting and enforcement activities to ensure environmental protection. USEPA's mission is to protect human health and to safeguard the natural environment—air, water, and land—upon which life depends.

Some of the laws and regulations USEPA administers that relate to groundwater include the Comprehensive Environmental Response, Compensation, and Liability Act also known as CERCLA or Superfund (Superfund). This act provided a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites, accidents, spills, and other emergency releases of pollutants into the environment. The Resource Conservation and Recovery Act (RCRA) gives the USEPA authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set

forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. The Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the United States. This law focuses on all waters actually or potentially designed for drinking use, whether from above ground or underground sources.

The Central Valley Water Board is within the EPA-Pacific Southwest Region 9 jurisdiction. Central Valley Water Board staff coordinate with USEPA staff on many projects related to the administration of Superfund sites and RCRA as well as the Non-Point Source (NPS) program.

United States Geological Survey

The United States Geological Survey (USGS) – Groundwater Resources Program provides the objective scientific information and develops the interdisciplinary understanding necessary to assess and quantify the availability of groundwater resources at the regional and national scale. Staff of the USGS are actively involved in many studies related to groundwater within the Central Valley Region. Including a recent publication on Groundwater availability of the Central Valley Aquifer, California, USGS Professional Paper 1766. USGS staff also work closely with the State Water Board's Groundwater Ambient Monitoring and Assessment Program (GAMA).

The USGS implemented the National Water-Quality Assessment Program (NAWQA) Program in 1991 to develop long-term consistent and comparable information on streams, rivers, ground water, and aquatic systems in support of national, regional, State, and local information needs and decisions related to water-quality management and policy. USGS scientists collect and interpret data about surface- and ground-water chemistry, hydrology, land use, stream habitat, and aquatic life in parts or all of nearly all 50 States using a nationally consistent study design and uniform methods of sampling analysis The NAWQA program provides an understanding of water-quality conditions; whether conditions are getting better or worse over time; and how natural features and human activities affect those conditions.

Tribal governments – Indian Health Service

Under the Indian Health Service the California Area Indian Health Service includes a comprehensive environmental health services program through its Office of Environmental Health and Engineering. The environmental health services program areas include water quality, waste management, food safety, air quality, industrial hygiene/occupational health, institutional environmental health, vector control, hazardous materials management, and emergency response.

Natural Resource Conservation Service

Since 1935, the Natural Resources Conservation Service (originally called the Soil Conservation Service) has provided leadership in a partnership effort to help America's private land owners and managers conserve their soil, water, and other natural resources.

NRCS employees provide technical assistance based on sound science and suited to a customer's specific needs. NRCS provides financial assistance for many conservation activities and participation in programs is voluntary. Examples of the types of technical assistance provided by NRCS covers a wide range of topics from erosion control, air quality, environmental compliance, nutrient and pest management, and water resources to name just a few.

United States Department of Interior - Bureau of Land Management

The Bureau of Land Management (BLM) manages 15.2 million acres of public lands in California. BLM California also administers 47 million acres of subsurface mineral estate underlying federal surface land, 2.5 million acres underlying privately owned land, and 592,000 acres of Native American tribal land where BLM has trust responsibility for mineral operations. Administration of these programs includes areas related to groundwater protection such as land use planning, grazing management, abandon mine lands, the national landscape conservation system, wildland fire protection, fuels management, and more.

United States Fish and Wildlife Service

The mission of the United States Fish and Wildlife Service (USFWS) is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for continuing benefit of the American people. Some of USFWS functions include enforcing federal wildlife laws, protection of endangered species, manage migratory birds, restore national significant fisheries, and conserve and restore wildlife habitat such as wetlands.

Within the Central Valley the USFWS programs are administered by the Pacific Southwest Region which includes California, Nevada, and the Klamath Basin.

National Park Service– United States Department of Interior

The **National Park Service** is responsible for protecting in perpetuity and regulating use of National Park areas. Preserving park resources unimpaired and providing appropriate visitor uses of parks requires a full understanding of park natural resource components, their interrelationships and process, and visitor interests that can be obtained only by the long term accumulation and analysis of information produced by science. The National Park Service has a research mandate to provide their management with that understanding, using the highest quality science and information.

Along with managing the natural resources of the National Parks research conducted within the parks can contribute to knowledge and protection of groundwater resources.

United States Forest Service – U.S. Department of Agriculture

The United States Forest Service (USFS) was established in 1905 and is an agency of the United States Department of Agriculture. The USFS manages public lands in national forests and grasslands. The USFS recognizes the importance of water within the forests. The USFS manages water resources with water and watershed resource specialist to promote healthy, sustainable watersheds. Research and Development is also an important program that informs policy and land management decisions on USFS managed lands. The information and technology produced through basic and applied science programs is available to the public for its benefit and use.

Non-Governmental Groundwater Quality Related Organizations

Groundwater Resource Association of California

The Groundwater Resource Association of California (GRA) is a professional organization dedicated to resource management that protects and improves groundwater through education and technical leadership.

Association of California Water Agencies

The Association of California Water Agencies (ACWA) is a coalition of public water agencies. ACWA's 450 public agency members are responsible for 90% of the water delivered to communities, farms, and businesses in California. ACWA's mission is to assist its members in promoting the development, management, and reasonable beneficial use of good quality water at the lowest practical cost in an environmentally balanced manner.

Rural Community Assistance Corporation

The Rural Community Assistance Corporation (RCAC) is a nonprofit organization; dedicated to assisting rural communities achieve their goals and visions by providing training, technical assistance, and access to resources. RCAC provides assistance to small municipal and nonprofit water systems, wastewater systems, and solid waste management programs in 11 western states.

California Urban Water Agencies

The California Urban Water Agencies (CUWA) is a non-profit corporation providing a forum for its member agencies to study and promote the need for a reliable, high quality water supply for the state's current and future urban water needs.

California Rural Water Association

The California Rural Water Association (CRWA) mission is to meet the needs of member water and wastewater systems by providing quality information, training and technical assistance, and legislative representation, to assist them in maintaining a high standard of service to their communities. CRWA is dedicated to providing on-site technical assistance and specialized training for rural water and wastewater systems.

California Groundwater Association

The California Groundwater Association (CGA) is a non-profit organization that has promoted protection of groundwater since 1948. Members of CGA include water well drilling and pump contractors, suppliers and manufacturers, geologists, engineers, hydrologists, government employees and others working in the groundwater field.

CGA is devoted to providing continuing education to its members and furnishing accurate information to the public regarding the quantity, quality, and availability of California's groundwater resources.

Self Help Enterprises

Self-Help Enterprises is an organization dedicated to self-help housing, sewer and water development, housing rehabilitation, multifamily housing and homebuyer programs in the San Joaquin Valley of California. The goal of Self-Help Enterprises is to help farm laborers and other low-income families to help themselves.

APPENDIX B

Required and Recommended Components of Local Groundwater Management Plans (DWR Bulletin 118, 2003)

Section 10750 et seq. of the Water Code, commonly referred to as Assembly Bill 3030, stipulates certain procedures that must be followed in adopting a groundwater management plan under this section.

Amendments to Section 10750 et seq. added the requirement that new groundwater management plans prepared under Section 10750 et seq. must include component 1 below (SB1938 (Stats 2002, Ch 603)).

In addition, the amendments mandate that if the agency preparing the groundwater management plan intends to apply for funding administered by the California Department of Water Resources (DWR) for groundwater or groundwater quality projects, the agency must prepare and implement a groundwater management plan that includes components 2, 3, 6, 7 and 9 below. DWR recommends that all the components below be included in any groundwater management plan to be adopted and implemented by a local managing entity.

Consideration and development of these components for the specific conditions of the basin to be managed under the plan will help to ensure effective groundwater management. In developing these criteria, DWR recognizes that the goal of a groundwater management plan and the goal of an ordinance to manage groundwater should be the same—assurance of a long-term, sustainable, reliable, good quality groundwater supply. Such efforts can benefit greatly from cooperative management within the basin or region.

None of the suggested data reporting in the components below should be construed as recommending disclosure of information that is confidential under State law.

1. Include documentation that a written statement was provided to the public "describing the manner in which interested parties may participate in developing the groundwater management plan," which may include appointing a technical advisory committee (Water Code § 10753.4 (b)).

2. Include a plan by the managing entity to "involve other agencies that enables the local agency to work cooperatively with other public entities whose service area or boundary overlies the groundwater basin."(Water Code § 10753.7 (a)(2)). A local agency includes "any local public agency that provides water service to all or a portion of its service area" (Water Code § 10752 (g)).

3. Provide a map showing the area of the groundwater basin, as defined by DWR Bulletin 118, with the area of the local agency subject to the plan as well as the boundaries

of other local agencies that overlie the basin in which the agency is developing a groundwater management plan (Water Code § 10753.7(a)(3)).

4. Establish an advisory committee of stakeholders (interested parties) within the plan area that will help guide the development and implementation of the plan and provide a forum for resolution of controversial issues.

5. Describe the area to be managed under the plan, including:

   a. The physical structure and characteristics of the aquifer system underlying the plan area in the context of the overall basin.

   b. A summary of the availability of historical data including, but not limited to, the components in Section 7 below.

   c. Issues of concern including, but not limited to, issues related to the components in Section 7 below.

   d. A general discussion of historical and projected water demands and supplies.

6. Establish management objectives (MOs) for the groundwater basin that is subject to the plan. (Water Code § 10753.7 (a)(1)).

7. Include components relating to the monitoring and management of groundwater levels, groundwater quality, inelastic land surface subsidence, and changes in surface flow and surface water quality that directly affect groundwater levels or quality or are caused by groundwater pumping. (Water Code § 10753.7 (a)(1)). Consider additional components listed in Water Code § 10753.8 (a) through (l).

8. For each MO, describe how meeting the MO will contribute to a more reliable supply for long-term beneficial uses of groundwater in the plan area, and describe existing or planned management actions to achieve MOs.

9. Adopt monitoring protocols for the components in Section 7 (Water Code § 10753.7 (a)(4)). Monitoring protocols are not defined in the Water Code, but the section is interpreted to mean developing a monitoring program capable of tracking changes in conditions for the purpose of meeting MOs.

10. Describe the monitoring program, including:

   a. A map indicating the general locations of any applicable monitoring sites for groundwater levels, groundwater quality, subsidence stations, or stream gages.

   b. A summary of monitoring sites indicating the type (groundwater level, groundwater quality, subsidence, stream gage) and frequency of monitoring. For groundwater level and groundwater quality wells, indicate the depth interval(s) or aquifer

zone monitored and the type of well (public, irrigation, domestic, industrial, monitoring).

11. Describe any current or planned actions by the local managing entity to coordinate with other land use, zoning, or water management planning agencies or activities (Water Code § 10753.8 (k), (l)).

12. Provide for periodic report(s) summarizing groundwater basin conditions and groundwater management activities. The report(s), prepared annually or at other frequencies as determined by the local management agency, should include:

    a. Summary of monitoring results, including a discussion of historical trends.

    b. Summary of management actions during the period covered by the report.

    c. A discussion, supported by monitoring results, of whether management actions are achieving progress in meeting MOs.

    d. Summary of proposed management actions for the future.

    e. Summary of any plan component changes, including addition or modification of MOs, during the period covered by the report.

    f. Summary of actions taken to coordinate with other water management and land use agencies, and other government agencies.

13. Provide for the periodic re-evaluation of the entire plan by the managing entity.

14. For local agencies not overlying groundwater basins, plans should be prepared including the above listed components and using geologic and hydrologic principles appropriate to those areas (Water Code § 10753.7 (a)(5)).

CALIFORNIA
Water Boards

STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

P.O. Box 100, Sacramento, CA 95812-0100
www.waterboards.ca.gov

Office of Public Affairs: **(916) 341-5254**
Office of Legislative Affairs: **(916) 341-5251**
Office of the Ombudsman **(916) 341-5254**

Water Quality information: **(916) 341-5455**
Water Rights information: **(916) 341-5300**
Financial Assistance information: **(916) 341-5700**

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARDS

NORTH COAST REGION (1)
www.waterboards.ca.gov/northcoast
5550 Skylane Blvd., Suite A
Santa Rosa, CA 95403
E-mail: info1@waterboards.ca.gov
(707) 576-2220 TEL • (707) 523-0135 FAX

SAN FRANCISCO BAY REGION (2)
www.waterboards.ca.gov/sanfranciscobay
1515 Clay Street, Suite 1400
Oakland, CA 94612
E-mail: info2@waterboards.ca.gov
(510) 622-2300 TEL • (510) 622-2460 FAX

CENTRAL COAST REGION (3)
www.waterboards.ca.gov/centralcoast
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401
E-mail: info3@waterboards.ca.gov
(805) 549-3147 TEL • (805) 543-0397 FAX

LOS ANGELES REGION (4)
www.waterboards.ca.gov/losangeles
320 W. 4th Street, Suite 200
Los Angeles, CA 90013
E-mail: info4@waterboards.ca.gov
(213) 576-6600 TEL • (213) 576-6640 FAX

CENTRAL VALLEY REGION (5)
www.waterboards.ca.gov/centralvalley
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670
E-mail: info5@waterboards.ca.gov
(916) 464-3291 TEL • (916) 464-4645 FAX

Fresno branch office
1685 E Street, Suite 200
Fresno, CA 93706
(559) 445-5116 TEL • (559) 445-5910 FAX

Redding branch office
415 Knollcrest Drive
Redding, CA 96002
(530) 224-4845 TEL • (530) 224-4857 FAX

LAHONTAN REGION (6)
www.waterboards.ca.gov/lahontan
2501 Lake Tahoe Blvd.
South Lake Tahoe, CA 96150
E-mail: info6@waterboards.ca.gov
(530) 542-5400 TEL • (530) 544-2271 FAX

Victorville branch office
14440 Civic Drive, Suite 200
Victorville, CA 92392
(760) 241-6583 TEL • (760) 241-7308 FAX

COLORADO RIVER BASIN REGION (7)
www.waterboards.ca.gov/coloradoriver
73-720 Fred Waring Dr., Suite 100
Palm Desert, CA 92260
E-mail: info7@waterboards.ca.gov
(760) 346-7491 TEL • (760) 341-6820 FAX

SANTA ANA REGION (8)
www.waterboards.ca.gov/santaana
3737 Main Street, Suite 500
Riverside, CA 92501-3339
E-mail: info8@waterboards.ca.gov
(951) 782-4130 TEL • (951) 781-6288 FAX

SAN DIEGO REGION (9)
www.waterboards.ca.gov/sandiego
9174 Sky Park Court, Suite 100
San Diego, CA 92123
E-mail: info9@waterboards.ca.gov
(858) 467-2952 TEL • (858) 571-6972 FAX

★ **State Water Resources Control Board** (Headquarters)
1001 I Street, Sacramento, CA 95814

State of California
Arnold Schwarzenegger, Governor

California Environmental Protection Agency
Linda S. Adams, Secretary

State Water Resources Control Board
Charles R. Hoppin, Chair

3/18/09
Printed on Recycled Paper