CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ATTACHMENT A TO ORDER R5-2013-xxxx
INFORMATION SHEET

WASTE DISHARGE REQUIREMENTS GENERAL ORDER
FOR
GROWERS WITHIN THE WESTERN SAN JOAQUIN RIVER WATERSHED
THAT ARE MEMBERS OF THE THIRD-PARTY GROUP

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Overview

This attachment to Waste Discharge Requirements General Order for Growers within the Western San Joaquin River Watershed that are Members of the Third-Party group, Order R5-2013-xxxx (referred to as the "Order") is intended to provide information regarding the rationale for the Order, general information on surface and groundwater monitoring that has been conducted, and a discussion of this Order's elements that meet required state policy.

Introduction

There are numerous irrigated agricultural operations within the boundaries of the Central Valley Water Board on over 7 million acres. Common to all types of these operations is the use of water to sustain crops. Depending on irrigation method, water use, geography, geology, climate, and the constituents (e.g., nutrients, pesticides, pathogens) present or used at a site, water discharged from the site may carry these constituents as waste off site and into groundwater or surface waters.

The Central Valley Regional Water Quality Control Board Irrigated Lands Regulatory Program (ILRP) was initiated in 2003 with the adoption of a conditional waiver of WDRs for discharges from irrigated lands. The 2003 conditional waiver was renewed in 2006. The conditional waiver's requirements are designed to reduce wastes discharged from irrigated agricultural sites (e.g., tailwater, runoff from fields, subsurface drains) to Central Valley surface waters (Central Valley Water Board 2006).

In addition to providing conditions, or requirements, for discharge of waste from irrigated agricultural lands to surface waters, the Central Valley Water Board's conditional waiver included direction to board staff to develop an environmental impact report for a long-term ILRP that would protect waters of the state (groundwater and surface water) from discharges of waste from irrigated lands. Although the requirements of the conditional waiver are aimed to protect surface water bodies, the directive to develop a long-term ILRP and environmental impact report is not as limited, as waters of the State include ground and surface waters within the State of California (CWC, Section 13050[e]).

The Central Valley Water Board completed an Existing Conditions Report (ECR) for Central Valley irrigated agricultural operations in December 2008. The ECR was developed to establish baseline conditions for estimating potential environmental and economic effects of long-term ILRP alternatives in a program environmental impact report (PEIR) and other associated analyses.

In fall 2008, the Central Valley Water Board convened the Long-Term ILRP Stakeholder Advisory Workgroup (Workgroup). The Workgroup included a range of stakeholder interests representing local government, industry, agricultural coalitions, and environmental/environmental justice groups throughout the Central Valley. The main goal of the Workgroup was to provide Central Valley Water Board staff with input on the development of the long-term ILRP. Central Valley Water Board staff and the Workgroup developed long-term program goals and objectives and a range of proposed alternatives for consideration in a PEIR and corresponding economic analysis. In August 2009 the Workgroup generally approved the goals, objectives, and range of proposed alternatives for the long-term ILRP. The Workgroup did not come to consensus on a preferred alternative.

The Central Valley Water Board's contractor, ICF International, developed the Program Environmental Impact Report (PEIR)[1] and Economics Report[2] for consideration by the board. The PEIR analyzed the range of proposed alternatives developed by the Workgroup. The Draft PEIR was released in July 2010, and the Final PEIR was certified by the board in April 2011 (referred to throughout as "PEIR"). In June 2011, the board directed staff to begin developing waste discharge requirements (orders) that would implement the long-term ILRP to protect surface and groundwater quality. During 2011, the board reconvened the Stakeholder Advisory Workgroup to provide additional input in the development of the orders. Also, during the same time, the board worked with the Groundwater Monitoring Advisory Workgroup to develop an approach for groundwater monitoring in the ILRP.

The board's intent is to develop seven geographic and one commodity-specific general waste discharge requirements (general orders) within the Central Valley region for irrigated lands owners/operators that are part of a third-party group. The first of these orders was adopted in 2012 for the Eastern San Joaquin River Watershed.

The geographic/commodity-based orders will allow for tailoring of implementation requirements based on the specific conditions within each geographic area. At the same time, the board intends to maintain consistency in the general regulatory approach across the orders through the use of templates for grower reporting, as well as in the focus on high vulnerability areas and areas with known water quality issues. The Order includes provisions to reduce the reporting requirements for small farming operations and areas of low vulnerability.

Goals and Objectives of the Irrigated Lands Regulatory Program

The goals and objectives of this Order, which implements the long term ILRP in the Western San Joaquin River Watershed, are described below. These are the goals described in the PEIR for the ILRP.[3]

> *"Understanding that irrigated agriculture in the Central Valley provides valuable food and fiber products to communities worldwide, the overall goals of the ILRP are to (1) restore and/or maintain the highest reasonable quality of state waters considering all the demands being placed on the water; (2) minimize waste discharge from irrigated agricultural lands that could degrade the quality of state waters; (3) maintain the economic viability of agriculture in California's Central Valley; and (4) ensure that irrigated agricultural discharges do not impair access by Central Valley communities and residents to safe and reliable drinking water. In accordance with these goals, the objectives of the ILRP are to:*
>
> - *Restore and/or maintain appropriate beneficial uses established in Central Valley Water Board water quality control plans by ensuring that all state waters meet applicable water quality objectives.*
> - *Encourage implementation of management practices that improve water quality in keeping with the first objective, without jeopardizing the economic viability for all sizes of irrigated agricultural operations in the Central Valley or placing an undue burden on rural communities to provide safe drinking water.*
> - *Provide incentives for agricultural operations to minimize waste discharge to state waters from their operations.*

[1] ICF International. 2011. Irrigated Lands Regulatory Program, Program Environmental Impact Report. Draft and Final. March. (ICF 05508.05.) Sacramento, CA. Prepared for Central Valley Regional Water Quality Control Board, Sacramento, CA.
[2] ICF International. 2010. Draft Technical Memorandum Concerning the Economic Analysis of the Irrigated Lands Regulatory Program) (Economics Report).
[3] PEIR, page 2-6

- *Coordinate with other Central Valley Water Board programs, such as the Grasslands Bypass Project WDRs for agricultural lands total maximum daily load development, CV-SALTS, and WDRs for dairies.*
- *Promote coordination with other regulatory and non-regulatory programs associated with agricultural operations (e.g., DPR, the California Department of Public Health [DPH] Drinking Water Program, the California Air Resources Board [ARB], the California Department of Food and Agriculture, Resource Conservation Districts [RCDs], the University of California Extension, the Natural Resources Conservation Service [NRCS], the USDA National Organic Program, CACs, State Water Board Groundwater Ambient Monitoring and Assessment Program, the U.S. Geological Survey [USGS], and local groundwater programs [SB 1938, Assembly Bill [AB] 3030, and Integrated Regional Water Management Plans]) to minimize duplicative regulatory oversight while ensuring program effectiveness."*

Description of the Western San Joaquin Watershed Area[4]

The Western San Joaquin Watershed encompasses most of the Delta-Mendota Canal Watershed, and includes portions of Stanislaus, Merced, Madera, Fresno, San Joaquin and San Benito Counties. The general Watershed boundaries include the San Joaquin River on the east and the Coast Ranges on the west; some refuges and portions of water districts span areas east of the River and are also included. To the north lies the Delta, and to the south is the Grasslands Drainage Area (Figure 1 of the General Order shows a map of the area[5]). There are approximately 530,000 acres of irrigated agricultural land within the watershed area, although approximately 30,000 of these acres are regulated under the Central Valley Water Board's General Order for Existing Milk Cow Dairies (Table 1). Around 60 different varieties of crops are grown in the Western San Joaquin River Watershed. The top ten crops based on 2010 total harvested acreage in the San Joaquin River Watershed (listed in decreasing order) are: almonds, hay, silage, corn, grapes, tomatoes, irrigated pasture, wheat, cotton and walnuts. The list of top ten crops includes the acreage on both sides of the San Joaquin River, so does not necessarily represent the top ten crops for the Western San Joaquin River Watershed area covered by this Order.

Table 1. Primary crops grown and approximate acreages within the Delta-Mendota subbasin (Existing Conditions Report, page 4-241).

Land Use	Approximate Acreage
Rice	8,000
Deciduous Fruits and Nuts	52,500
Field Crops	207,500
Grain and Hay	18,500
Pasture	104,500
Truck, Nursery, and Berry Crops	81,500
Vineyards	2,500
Dairies	30,000
	505,000

The San Joaquin flows northward and drains watersheds on the east and west side of the San Joaquin Valley, though the main focus of this Order is on the west side watersheds. The drainages in the Watershed from north to south are Ingram Creek, Hospital Creek, Del Puerto Creek, Boundary Drain, Salado Creek, Marshal Road Drain, Ramona Lake, Westley Waterway, Orestimba Creek, Main Canal, Garzas Creek, Los Banos Creek, Mud Slough, San Luis Drain, Newman Wasteway, Salt Slough, and Island Field Drain. The unaltered hydrology of the Watershed is dominantly ephemeral, however most of

[4] This section is adapted from the Existing Conditions Report, Westside San Joaquin River Watershed Coalition 2008 Monitoring and Reporting Program Plan, and from Mathany et al. U.S. Geological Survey Data Series 706.
[5] Some individual parcels that are outside the general Watershed boundary but are enrolled in the Westside San Joaquin River Watershed Coalition may also be included in the third-party area in this Order.

the tributaries contain regular flow during the growing season, typically spring through summer due to agricultural return flows. During the storm season, the small drainages contain intermittent flows that reflect the intensity and duration of storms. The Watershed is highly manipulated, with many canals delivering water to agricultural operations and back to the natural drainages. Water is imported into the watershed from the Sacramento-San Joaquin Rivers Delta to the north through the Delta-Mendota Canal, which runs the length of the watershed from northwest to southeast, and through the San Luis Canal, which runs along the western edge of the San Joaquin Valley. Water is also imported from the San Joaquin River at the southeast corner of the watershed by way of the Outside, Main, and Chowchilla canals.

The Western San Joaquin River Watershed area includes portions of two geomorphic provinces: the Coast Range and Great Valley provinces. The San Joaquin Valley, part of the Great Valley, is a large sediment-filled trough, thousands of feet thick in some locations (Figure 1, Thiros 2010).[6]

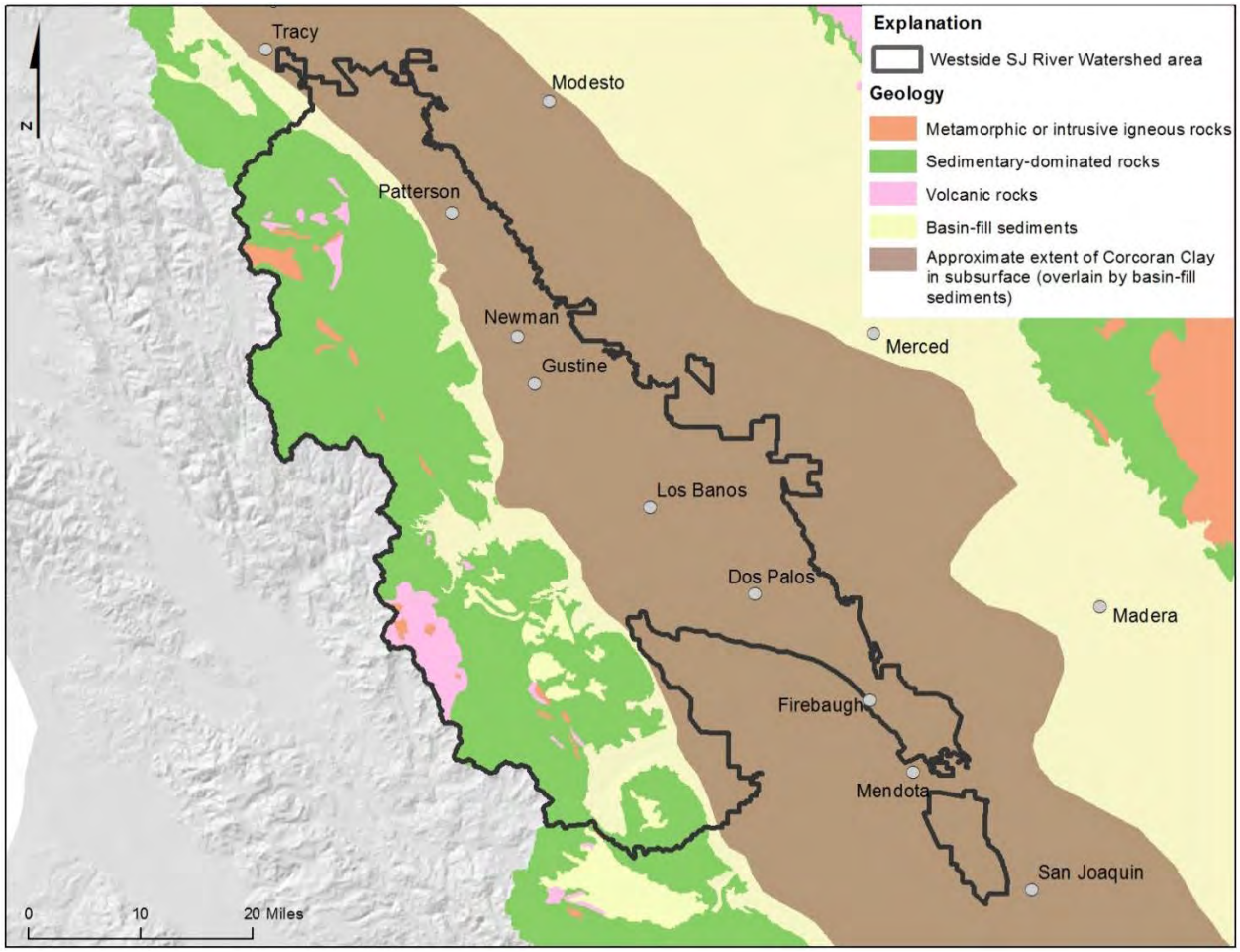

Figure 1. Generalized Geology of the Western San Joaquin River Watershed (adapted from Thiros 2010).

The primary aquifer system in the subbasin occurs in unconsolidated alluvial and continental deposits, comprised of interbedded tongues and lenses of clay, sand and gravel that were deposited in alternating oxidizing and reducing environments. The major restrictive structure to vertical groundwater are lenses of fine-grained deposits, including Corcoran Clay, that occur at a depth ranging from 100 to 500 feet and act as the confining layer that separates the underlying confined from the overlying unconfined aquifers

[6] Thiros, S.A., 2010. Section 13. Conceptual Understanding and Groundwater Quality of the Basin-Fill Aquifer in the Central Valley, California *in* Conceptual Understanding and Groundwater Quality of Selected Basin-Fill Aquifers in the Southwestern United States. United States Geological Survey Professional Paper 1781.

(Figure 2, Bertoldi, Johnston, Evenson 1991).[7] The region contains most of the Delta-Mendota groundwater subbasin and marginal portions of adjacent groundwater basins (groundwater basins are shown in Figure 6).

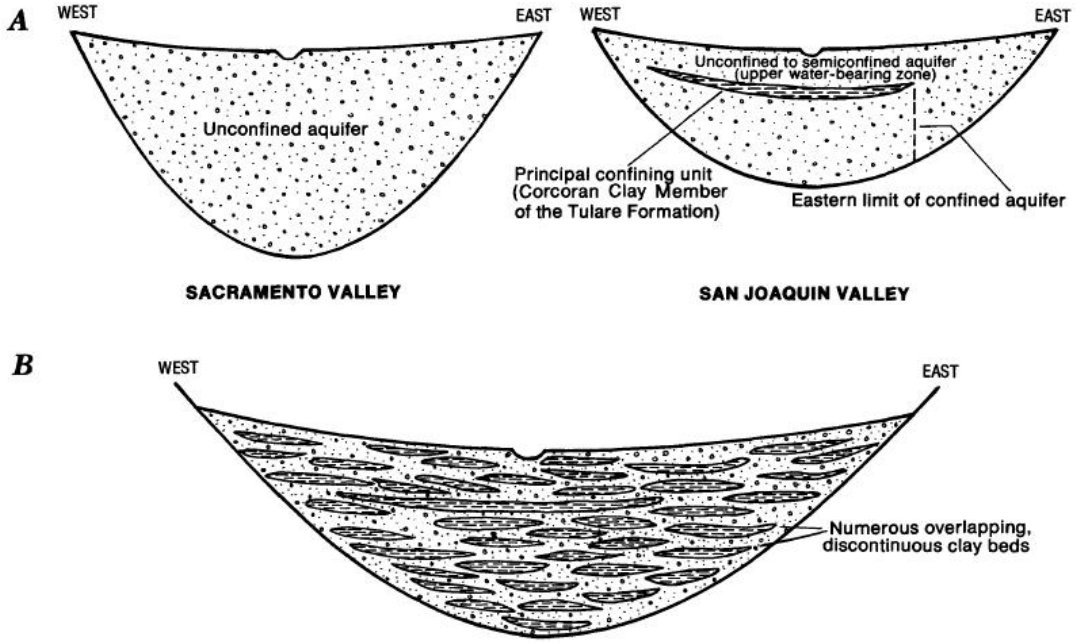

Figure 2. Cross-sectional Diagram of Groundwater Confining Layers in the San Joaquin Valley. According to early concepts of the aquifer system (A), it was generally considered to be unconfined in the Sacramento Valley and confined where the Corcoran Clay Member of the Tulare Formation, or E-clay" is present in the San Joaquin Valley. However, recent studies suggest that the entire aquifer system is a single heterogeneous system (B) in which vertically and horizontally scattered lenses of fine-grained material provide increasing confinement with depth – Bertoldi, Johnston, and Evenson (1991).

Groundwater in the subbasin is typically a mixed sulfate to bicarbonate type water. Localized areas of the subbasin have groundwater with elevated concentrations of iron, fluoride, nitrate (Figure 7), and boron.[8] According to Tanji and Kielen (2002)[9], "the soils on the western side were formed from alluvium of the Coast Range made up of uplifted marine sedimentary rocks. The soils on the western side tend to be finer textured and saline. The groundwaters on the western side are characterized as moderately saline sodium-sulphate-type waters with *TDS* typically in the 1 000-10 000 mg/litre range. The unconfined aquifer in both sides of the valley is gradually being filled up with decades of irrigation deep percolation. The soils in the valley and lowest part of the alluvial fans in the western side are waterlogged and salt affected. […] The groundwaters in the confined aquifer [below the Corcoran clay] contain from 500 to 1 000 mg/litre TDS…"

The natural patterns of groundwater movement and the rates of recharge and discharge throughout the Central Valley have been substantially altered by groundwater development and the diversion and redistribution of surface water for irrigation. Streams that naturally would have recharged the aquifer are now diverted to irrigate crops in other areas or the water is stored for seasonal release (Figure 3, Thiros 2010). The primary sources of groundwater recharge in the subbasin are from deep percolation of

[7] Bertoldi, G.L., Johnston, R.H., Evenson, K.D. 1991. Groundwater in the Central Valley, California—A summary report. United States Geological Survey Professional Paper 1401-A.
[8] Existing Conditions Report, p. 4-243
[9] Tanji, K. and N. Kielen, 2002. Agricultural drainage water management in arid and semi-arid areas. FAO Irrigation and Drainage Paper 61, Food and Agriculture Organization of the United Nations, Rome.

applied irrigation water and from canals and water storage facilities. To a lesser extent, ambient recharge also occurs from seepage losses along the San Joaquin River and infiltration of runoff from the Coast Ranges into tributary streams. Groundwater discharge from the study area is primarily due to groundwater pumping and subsurface outflow to other parts of the San Joaquin Valley (California Department of Water Resources, 2006a, b; Faunt, 2009).

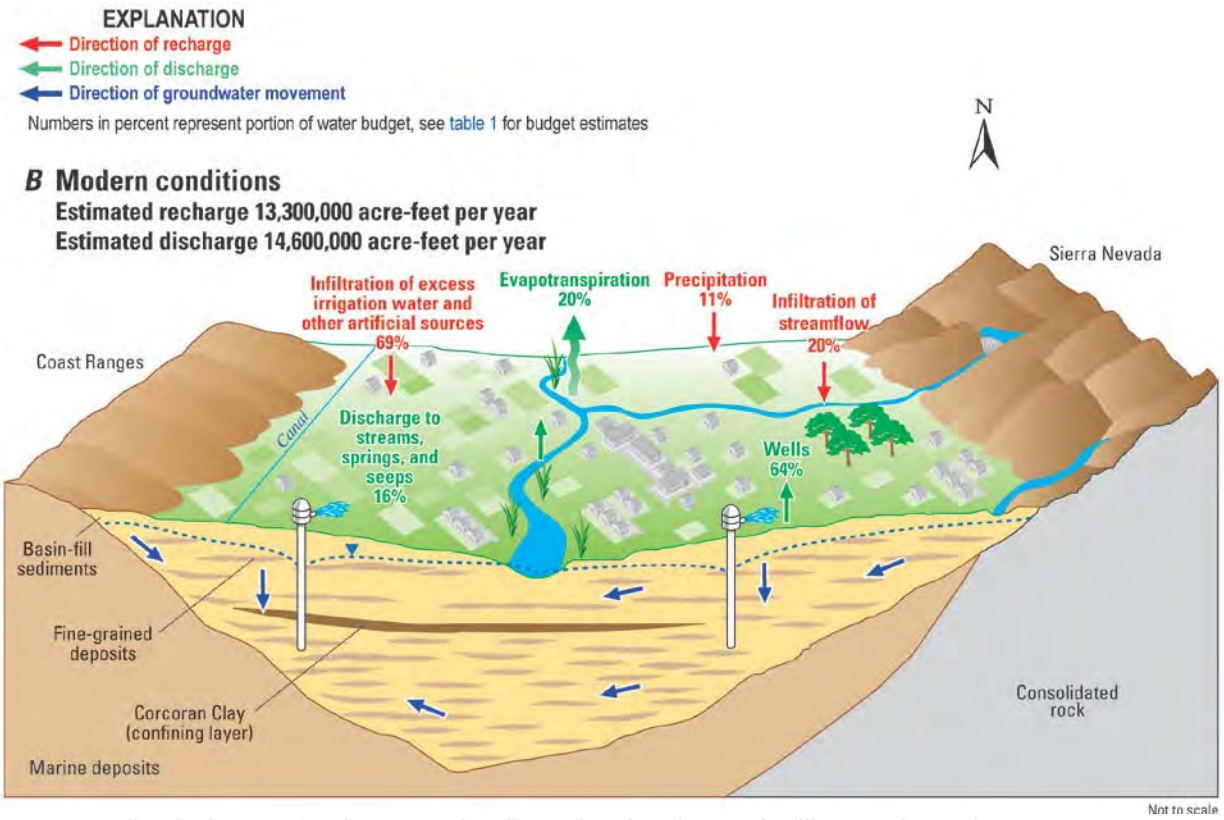

Figure 3. Generalized Diagram for the Central Valley, Showing the Basin-fill Deposits and Components of the Groundwater System under Modern Conditions. The drilling of thousands of large-diameter irrigation wells through and perforated above and below the Corcoran Clay has connected the upper and lower zones, resulting in a substantial increase in downward leakage. The natural patterns of groundwater movement and the rates of recharge and discharge throughout the Central Valley have been substantially altered by groundwater development and the diversion and redistribution of surface water for irrigation. Recharge from excess irrigation water and discharge from wells for irrigation and public supply are much larger than natural sources of recharge and discharge. – Thiros (2010)

Westside San Joaquin River Watershed Coalition (Westside Coalition) Organization

The Westside San Joaquin River Watershed Coalition (Westside Coalition) submitted a Notice of Intent in October 2003 and received a Notice of Applicability (NOA) from the Executive Officer in January 2004. The NOA approved the Westside Coalition's request to operate as a lead entity under the previous Coalition Group Conditional Waiver within its boundaries. Similar to the Coalition Group Conditional Waiver, this Order has been written for a third-party to provide a lead role in conducting monitoring, educating member growers (Members), developing water quality management plans, and interacting with the Central Valley Water Board on behalf of Members. Due to a substantial number of new requirements, this Order requires that the third-party submit a new application to serve as a third-party representing growers under this Order. The Central Valley Water Board anticipates that the Westside Coalition will continue to operate as the third-party lead entity under this Order.

The Westside Coalition is organized under the San Joaquin Valley Drainage Authority, a California joint powers authority. Governance, budgeting and administration are implemented through an activity

agreement between the Authority and public agency participants within the boundaries of the Drainage Authority, all under the general supervision of the Board of Directors. Public agencies and mutual water companies outside the boundaries of the Drainage Authority and Individual Members participate through standardized memoranda of agreements spelling out their rights and obligations. Westside Coalition participants and Members outside the boundaries of the Drainage Authority have the opportunity to participate during the public meetings of the steering committee and Board of Directors. The public entity and mutual water company participants in the Westside Coalition include: the Del Puerto Water District, Patterson Irrigation District, the San Joaquin River Exchange Contractors Water Authority (which includes the Central California Irrigation District, San Luis Canal Company, Henry Miller Reclamation District, Firebaugh Canal Water District, and Columbia Canal Company), Tranquillity Irrigation District/Fresno Slough Water District, Twin Oaks Irrigation District, West Stanislaus Irrigation District, Oak Flat Water District, San Luis Water District, Stevinson Water District, White Lake Mutual Water Company, Lone Tree Mutual Water Company, Turner Island Water District, Grassland Water District/Grassland Resource Conservation District, State Refuges managed by the California Department of Fish and Wildlife, and Federal Refuges managed by the US Fish & Wildlife Service. The Westside Coalition relies on the public entity participants as the key entities for enrolling and communication with individual Members within their boundaries and for collection of fees. The various public entities may also provide outreach to individual Members outside their boundaries, but the primary engagement with Westside Coalition Members located outside Drainage Authority boundaries is through the Regional Watershed Coordinator and other staff and consultants.

Grower Participation under the Conditional Waiver and Compliance/Enforcement Activities
The irrigation districts within the Coalition have typically facilitated grower participation in the Irrigated Lands Regulatory Program. Consequently, the Westside Coalition has a relatively high participation rate (see Finding 12 in the General Order), and compliance and enforcement action by the Central Valley Water Board related to non-participating growers has not been necessary.

Since 2009, there have been three water quality complaint investigations in the Westside Coalition area. In one case, the Central Valley Water Board staff investigated a complaint of sediment in the San Joaquin River for which the discharger(s) could not be identified. A second complaint of a sediment discharge to Ingram Creek resulted in the identification of a discharger and issuance of a Notice of Violation and a Water Code section 13267 Order. This Order required submittal of a corrective action technical report; the discharger complied with the Order. Finally, staff investigated complaints of sediment discharges to Orestimba Creek in May and July 2011. The investigations resulted in the board's issuance of a fine in the amount of $50,600 (R5-2012-0071; Del Mar Farms, Jon Maring and Lee Del Don).

Grower Enrollment Process
The enrollment process whereby growers obtain membership in the third-party group under this Order is designed to incentivize speedy enrollment by increasing both submittal requirements and fees due for those that wait to obtain regulatory coverage. Members in good standing when the Order is adopted will have by 15 December 2014 (or approximately 330 days after the NOA is issued by the Executive Officer for the third-party) to complete enrollment before additional requirements are initiated. Members in good standing will submit a one-page Notice of Confirmation (NOC) to the third-party, confirming that they would like to continue membership in the third-party and that they are familiar with the Order's requirements. The additional time provided is to allow the third-party to combine the Farm Evaluation submittal with the NOC submittal, which should streamline its outreach efforts and increase compliance rates for both requirements.

Other growers who are not members of the third-party will submit a membership application to the third-party and will be notified by the third-party when their membership is approved. A grace period to allow direct enrollment with the Coalition will streamline the initial enrollment process for the bulk of the irrigated agricultural operations within the Western San Joaquin River Watershed. Due to the limited number of farming operations that are not currently enrolled in the existing program, less time (90 days after issuance of the NOA to the third-party) is being provided for current non-Members to enroll with the third-party.

Growers that do not enroll or confirm enrollment within the allowable timeframe, or are prompted to apply due to Central Valley Water Board enforcement or inspection, will be required to submit (1) a Notice of Intent (NOI) to comply with the terms and conditions of the Order to the Central Valley Water Board, (2) an administrative processing fee for the increased workload associated with the grower outreach (as applicable), and (3) a Membership application to the third-party group. These additional steps of submitting an NOI and fee directly to the board after the initial enrollment deadline are intended to provide an incentive for growers to enroll promptly.

The third-party will provide an annual Membership List to the Central Valley Water Board that will include everyone who enrolled. The Membership List will specify Members in good standing as well as revoked memberships or pending revocations. Because third-party pending and revoked memberships could be associated with grower non-compliance with the Order, this type of information is key for the board to prioritize follow-up activities. Board staff will conduct enforcement activities as needed using the list of revoked/pending revocations.

Groundwater Quality Vulnerability

The concept of higher and lower vulnerability areas was integrated into the Order to allow the board to tailor requirements to applicable waste discharge conditions. Resources can be focused on areas that need enhanced water quality protection, because the third-party has the option to identify low vulnerability areas where reduced program requirements would apply.

Vulnerability may be based on, but is not limited to, the physical conditions of the area (soil type, depth to groundwater, beneficial uses, etc.), water quality monitoring data, and the practices used in irrigated agriculture (pesticide permit and use conditions, label requirements, application method, etc.). Additional information such as models, studies, and information collected may also be considered in designating vulnerability areas.

High vulnerability areas for groundwater are those areas that meet the requirements for preparing a Groundwater Quality Management Plan or areas identified in the Groundwater Assessment Report, where available information indicates irrigated lands could cause or contribute to an exceedance of water quality objectives or degradation of groundwater quality that may threaten applicable beneficial uses. The Groundwater Assessment Report may rely on water quality data to identify high vulnerability areas and on assessments of hydrogeological conditions and other factors (e.g., areas of high fertilizer use) to identify high vulnerability areas. The third-party is also expected to review readily available studies and assessments of groundwater quality to identify those areas that may be impacted by irrigated agricultural operations. Examples of assessments that the third-party should review include: the Department of Pesticide Regulation (DPR) Ground Water Protection Areas and the State Water Resources Control Board (State Water Board) Hydrogeologically Vulnerable Areas.

In general, low vulnerability areas for groundwater are areas that do not exhibit characteristics of high vulnerability groundwater areas (as defined in the MRP).

Vulnerability designations will be proposed by the third-party, based on the high and low vulnerability definitions provided in Attachment E of the Order. Vulnerability designations will be refined and updated periodically per the Groundwater Assessment Report and Monitoring Report processes (described in Attachment B, Monitoring and Reporting Program [MRP] Order R5-2013-xxxx). The Executive Officer will make the final determination regarding the irrigated lands waste discharge vulnerability areas.

Surface Water and Groundwater Monitoring

Surface Water Quality Monitoring

Irrigated Lands Regulatory Program (ILRP) – Surface Water Quality Monitoring
The Westside Coalition has been operating under a Monitoring and Reporting Program Plan (MRP Plan) prepared according to the Monitoring and Reporting Program Order R5-2008-0831 for Westside San Joaquin River Watershed Coalition under Amended Coalition Group Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands Order R5-2006-0053. The MRP Plan, together with the Westside Coalition's Management Plan (described below), is the workplan for the monitoring and reporting program, including environmental monitoring, quality assurance and quality control, outreach, and tracking and reporting on progress.

Under previous MRP Order R5-2008-0831, the Westside Coalition conducted Assessment Monitoring for the condition of the water body, Core Monitoring for trends, Rain Event monitoring and Special Project monitoring for source identification and other in-depth studies. Monitoring design included Discharge sites, and Source Water sites. Discharge sites were monitored comprehensively on an ongoing basis to track trends in surface water quality and to identify water quality problems. Source Water monitoring occurred at three sites to evaluate potential contributions of measured parameters in the source irrigation water. Core and Assessment Monitoring were conducted at Discharge sites on a three-year cycle. Monthly Core monitoring for two years included general physical parameters, nutrients, and pathogens. Assessment Monitoring was conducted for twelve consecutive months every third year, and included metals, pesticides and water and sediment toxicity, in addition to the core suite of constituents. Rain events were monitored twice per year, and included the full suite of assessment constituents. Special Project Monitoring occurred when the requirement for a management plan was triggered and additional data were needed to identify sources of the exceedances, as well as to assess water quality improvement due to implementation of management practices. Special Project Monitoring also occurred in areas where total maximum daily load (TMDL) studies are required by the Basin Plan.

The basic questions to be answered by the updated surface water quality monitoring program are similar to those established under the previous MRP Order (R5-2008-0831):

1. Are receiving waters to which irrigated lands discharge meeting applicable water quality objectives and Basin Plan provisions?
2. Are irrigated agricultural operations causing or contributing to identified water quality problems?[10] If so, what are the specific factors or practices causing or contributing to the identified problems?
3. Are water quality conditions changing over time (e.g., degrading or improving as new management practices are implemented)?
4. Are irrigated agricultural operations of Members in compliance with the provisions of the Order?
5. Are implemented management practices effective in meeting applicable receiving water limitations?
6. Are the applicable surface water quality management plans effective in addressing identified water quality problems?

The questions are addressed through the following monitoring and information gathering approaches:

1. The "Discharge" monitoring sites cover represented sections of the Western San Joaquin River Watershed with irrigated agricultural operations. The requirement to evaluate materials applied to crops or constituents mobilized by irrigated agricultural operations will result in monitoring of those constituents in receiving waters.

[10] "Water quality problem" is defined in Attachment E.

2. The monitoring and evaluation approach required as part of the surface water quality monitoring and management plan development and implementation will address this question (see below and the requirements associated with surface water quality management plans).
3. Both "special project" monitoring associated with management plans and the monitoring conducted at "Discharge" monitoring sites should be sufficient to allow for the evaluation of trends. The requirements to gather information on management practices will provide additional information to help estimate whether any changes in trends may be associated with the implementation of practices.
4. The surface water monitoring required should allow for a determination as to whether discharges from irrigated lands are protective of beneficial uses and meeting water quality objectives. Other provisions in the MRP should result in the gathering of information that will allow the board to evaluate overall compliance with the Order.
5. The monitoring conducted as part of the implementation of a management plan, in addition to any special project monitoring required by the Executive Officer, should allow the board to determine whether management practices representative of those implemented by irrigated agriculture are effective. In addition, information developed through studies outside of these requirements can be used to evaluate effectiveness.
6. The "special project" monitoring associated with management plans will be tailored to the specific constituents of concern and the time period when they are impacting water quality. Therefore, the water quality data gathered, together with management practice information, should be sufficient to determine whether the management plans are effective.

The surface water monitoring required by this Order's Monitoring and Reporting Program R5-2013-xxxx (MRP) has been developed using the Westside Coalition's August 2008 MRP Plan as a foundation. However, a number of changes were made to improve the cost-effectiveness of the surface water monitoring effort and ensure the data collected are the most appropriate for answering the monitoring questions.

The primary changes were to: 1) eliminate the set frequency for monitoring; 2) eliminate the set parameter list for metals and pesticides; and 3) change approach to trend monitoring to focus on parameters associated with irrigated agricultural waste discharges.

The rationale for the above changes are:

1) The previous requirement to monitor monthly resulted in monitoring during months in which no problems would be expected and infrequent monitoring during peak periods when potential problems could occur. The third-party will be required to evaluate pesticide use patterns and peak times when metals from irrigated agriculture operations may cause problems in surface water. Based on that evaluation, they will propose a frequency and time period to conduct monitoring that will adequately characterize surface waters receiving irrigated agricultural waste discharges.
2) The set list of parameters resulted in monitoring of some pesticides and metals that are unlikely to result in water quality problems. Also, in some cases pesticides that could cause or contribute to a water quality problem were not monitored. The third-party will be required to evaluate use patterns and properties (e.g., physical-chemical characteristics) and propose a list of metals to monitor. Board staff will work with DPR, third-party groups, and engage the ILRP Technical Issues Committee (TIC) to develop a process for selecting the list of pesticides and specific pesticides for monitoring by the third-party.
3) The general parameters that were monitored as part of previous core monitoring have been of limited value for monitoring trends related to irrigated agricultural waste discharge. Rather than requiring monitoring of general parameters to try to determine trends, trend monitoring will occur as part of site-specific monitoring at Discharge sites.

Surface Water Management Plans

Since 2004, the Westside Coalition has monitored water quality at 37 sites. Out of more than 95,000 generated data points, about 80% of the results (76,348) could be compared to the defined water quality objectives[11] (for some constituents, the water quality objective has not been defined yet and evaluation is not possible). The majority of results were below defined water quality trigger limits; fewer than 7.5% of all evaluated results exceeded the applicable trigger limits (a total of 5,628 exceedances). Two-thirds of reported exceedances were for field measurements, drinking water and general physical parameters (Figure 4).

Under Conditional Waiver Order R5-2006-0053, surface water quality management plans (SQMPs) were required for watersheds where there was an exceedance of a water quality objective or trigger limit more than one time in a three year period. Currently surface water management plans are required for 30 constituents. In addition to field and general chemistry constituents that frequently exhibit exceedances, pesticides, metals, and aquatic and sediment toxicity emerged as parameters of special concern in the Westside Coalition region (Table 2).

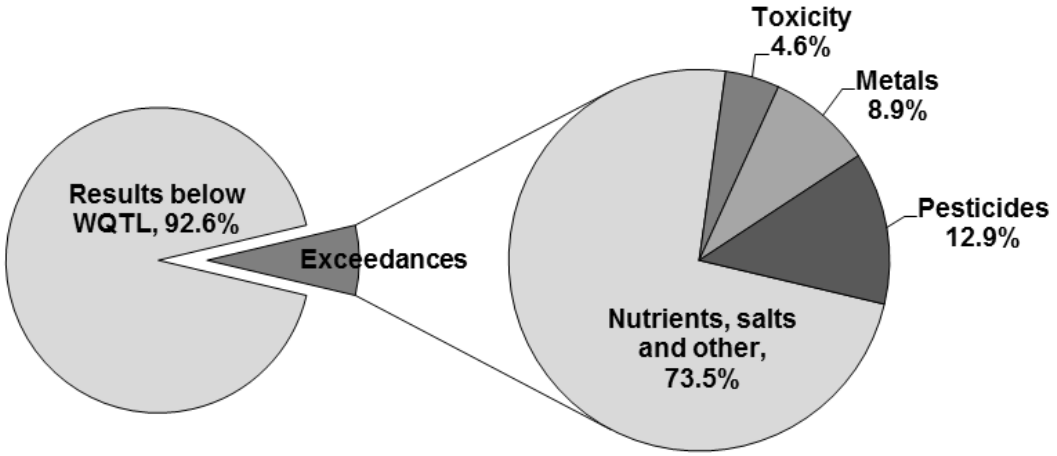

Figure 4. Proportion of exceedances out of all results that could be evaluated against a defined water quality trigger limit (WQTL), and relative contribution of various categories of analytes to the total number of exceedances.

The Westside Coalition developed a General Approach Management Plan for all subwatersheds to address water quality issues identified by the monitoring program. In addition to creating a management practice inventory, and conducting general outreach and education, a tiered approach was developed to allow focus on high priority water quality issues. Focused Watershed Plans (Focused Plans) describe intensified efforts within specific subwatersheds to address the highest tier of management plan priorities - aquatic toxicity, pesticides, sediment toxicity, and sediment discharge. Management Plan General Approach, and the Focus Plan addressing Ingram and Hospital Creeks were approved on 18 November 2008; Focus Plans for additional seven subwatersheds were developed: Westley Wasteway, Del Puerto Creek, and Orestimba Creek (Focus Plan II, approved in 2010), Poso Slough and Salt Slough (Focus Plan III, approved in 2013), Blewett Drain and Marshall Road drain (Focus Plan IV[12]). This Order requires the Westside Coalition's 2008 Management Plan and accompanying Focus Plans to be implemented.

[11] Trigger limits are discussed below under "Water Quality Objectives."
[12] The Focus Plan IV is expected in summer 2013, and would be in place by the anticipated adoption of this Order.

Table 2. Summary of ILRP Surface Water Monitoring Data for Management Plan Constituents in the Western San Joaquin River Watershed, 2004 through 2012. Only exceedances for constituents requiring a management plan are tallied (the sum of tabulated exceedances is not equal to the total number of exceedances).

Constituent	Number of Sites Requiring a Management Plan	Number of Exceedances	Number of Tests	Range of Detected Concentrations	Trigger limit
Pesticides					
Chlordane, trans-	1	7	729	ND to 0.043 µg/L	0.00057 µg/L
Chlorpyrifos	15	175	1333	ND to 1.8 µg/L	0.015 µg/L
DDD	1	6	783	ND to 0.014 µg/L	0.00083 µg/L
DDE	10	244	743	ND to 0.27 µg/L	0.00059 µg/L
DDT	8	67	783	ND to 0.13 µg/L	0.00059 µg/L
Diazinon	2	12	1335	ND to 3.6 µg/L	0.10 µg/L
Dieldrin	5	32	783	ND to 0.031 µg/L	0.056 µg/L
Dimethoate	5	23	1335	ND to 5 µg/L	1 µg/L
Diuron	11	73	909	ND to 46 µg/L	2 µg/L
Total HCH	1	2	728	ND to 0.031 µg/L	0.0039 µg/L
Malathion	7	29	1335	ND to 0.69 µg/L	Must not be detected (ND)
Parathion, Methyl	4	14	1335	ND to 1.4 µg/L	Must not be detected (ND)
Simazine	1	5	990	ND to 20 µg/L	4 µg/L
Toxicity					
Water, *Ceriodaphnia dubia*	15	82	1187	0% to 100% survival [2]	< 80% survival [2, 3]
Water, *Pimephales promelas*	3	12	787	20% to 100% survival [2]	< 80% survival [2, 3]
Water, *Selenastrum capricornutum*	12	67	926	0% to 100% growth [2]	< 80% growth [2, 3]
Sediment, *Hyalella azteca*	12	86	184	0% to 100% survival [2]	< 80% survival [2, 3]
Metals (total)					
Arsenic	6	45	834	0.88 to 22 µg/L	10 µg/L
Boron	11	262	972	8.9 to 31,000 µg/L	700 µg/L
Copper	10	82	819	0.38 to 170 µg/L	Variable[4]
Lead	9	74	834	ND to 60 µg/L	Variable[4]
Nickel	4	15	971	0.46 to 340 µg/L	Variable[4]
Selenium	1	13	689	ND to 12 µg/L	50 µg/L
Zinc	2	8	985	ND to 430 µg/L	Variable[4]
Nutrients and Salts					
Ammonia	9	36	1091	ND to 10 mg/L	Variable[5]
Total Dissolved Solids	20	1041	1674	22 to 6,500 mg/L	450 mg/L
Electrical Conductivity	22	1126	2143	<1 to 10,211 µS/cm	700 µS/cm
Other					
Dissolved Oxygen	26	1004	2141	<1 to 26.34 mg/L	>5[6] or >7 mg/L
E.coli	19	647	1621	1 to >2400 MPN/100 ml	235 MPN/100mL
pH	18	234	2179	2.02 to 17.77	<6.5 or >8.5

[1] ND = Not detected at measurable levels

[2] Compared to the control sample

[3] And statistically significant

[4] Hardness-dependent water quality objectives

[5] Water quality objectives are dependent on pH and temperature

[6] Cold freshwater and warm freshwater criteria

Summary of Implemented Management Plans

The Focused Plan strategy for aquatic toxicity and pesticide exceedances includes grower education and providing motivation and support to implement management practices that control application (reduced pesticide use, calibration of sprayers, vegetated buffer zones) and reduce tailwater discharges (high-efficiency irrigation, tailwater return/recirculation). The approach to address sediment toxicity, sediment and associated hydrophobic compounds (such as various pesticides) discharge focuses on identifying and promoting management practices that reduce sediment in tailwater and stormwater (use of polyacrylamide flocculent, settling ponds, drip irrigation) and management practices that reduce pesticide use (integrated pest management).

The implementation of various management practices at the farm-level is driven by a variety of factors, including availability of funds, water supply, crop values, soil quality, and regulatory pressures. As a mechanism to encourage and track the implementation of management practices, the Westside Coalition implemented an aggressive outreach program that included field meetings with individual growers, workshops, sponsorship of integrated pest management programs and a detailed management practice inventory survey to determine what management practices have already been implemented (Table 3 provides a summary of management practices reported for the Focus Plan I, II, and III subwatersheds[13]).

Since 2009, the Westside Coalition held over 90 meetings with growers. Based on information provided by individual irrigation and water districts, the Coalition estimated that the acreage of high efficiency irrigation systems increased approximately 17,000 acres Coalition-wide. Irrigation system improvements were estimated for the 2009 and 2010 Focus Plan subwatersheds (Table 4). A status update of management plan implementation and management practice inventory are included in each Westside Coalition's semi-annual monitoring report, Attachment 6 (reports are available at the Central Valley Water Board website[14]).

Table 3. Management practice inventory data for subwatersheds in the Westside Coalition region.

Subwatershed and Focus Plan Start Year	Hospital Creek 2009		Ingram Creek 2009		Del Puerto Creek 2010		Orestimba Creek 2010		Westley Waterway 2010		Poso Slough 2011/2012		Salt Slough* 2011/2012	
	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%
Survey Area	7,142		5,779		9,195		12,851		5,248		11,525		53,563	
Irrigated Area	5,193	73%	5,526	96%	7,926	86%	11,714	91%	4,565	87%	11,410	99%	52,568	98%
Land Use and Runoff Conditions (% Irrig. Area)														
Tree Crops					4,237	53%	5,481	47%	2,891	63%	196	2%	1,007	2%
Field Crops					3,678	46%	5,626	48%	1,670	37%	11,209	98%	51,561	98%
Tailwater leaves field	1,473	28%	4,393	79%	3,471	44%	4,134	35%	2,234	49%	9,274	81%	49,430	94%
Stormwater leaves field	4,118	79%	5,204	94%	5,050	64%	6,384	54%	2,517	55%	9,995	88%	47,495	90%
Irrigation Practices (% Irrig. Area)														
Furrow/Flood	1,678	32%	4,599	83%	3,210	40%	4,491	38%	1,489	33%	7,870	69%	41,699	79%
Drip/Micro/Sprinkler	3,515	68%	927	17%	3,952	50%	5,821	50%	2,891	63%	3,540	31%	10,869	21%
Discharge Control Practices (% Irrig. Area)														
Use of PAM	488	9%	4,375	79%	2,955	37%	3,408	29%	3,346	73%	39	<1%	671	1%
Sedimentation Ponds	1,085	21%	935	17%	3,331	42%	5,019	43%	1,092	24%	0	0%	370	<1%
Tailwater Return System	205	4%	828	15%	402	5%	2,154	18%	150	3%	0	0%	0	0%

* The Salt Slough subwatershed includes the Poso Slough Subwatershed. The data in the table represent practices exclusive to each subwatershed without any data overlap, that is the data reported for Salt Slough do not include lands in the Poso Slough subwatershed.

[13] San Joaquin River Chlorpyrifos and Diazinon 2012 Water Year Annual Monitoring Report. Prepared by the East San Joaquin Water Quality Coalition and the Westside San Joaquin River Watershed Coalition, 1 May 2013.
[14] http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/monitoring_plans_reports_reviews/monitoring_report_reviews/coalitions/westside/index.shtml

Table 4. Estimated change in area with high efficiency irrigation in Focus Plan I (Hospital and Ingram Creeks) and Focus Plan II subwatersheds (Westley Wasteway, Del Puerto and Orestimba Creeks) between the initial survey years 2010-2011 and 2012.

	Initial Survey			2012 Estimates		Percent Change between Intitial Survey and 2012
Subwatershed	Survey Year	Area with High Efficiency Systems (acres)	Proportion of Irrigated Acreage	Area with High Efficiency Systems (acres)	Proportion of Irrigated Acreage	
Hospital Creek	2010	3,515	68%	3,600	69%	2%
Ingram Creek	2010	927	17%	1,800	33%	94%
Del Puerto Creek	2011	3,934	50%	5,700	72%	45%
Orestimba Creek	2011	5,821	50%	6,300	54%	8%
Westley Wasteway	2011	2,891	63%	2,950	65%	2%

In addition to farm-level management practices, Westside Coalition districts are in the process of planning a number of regional projects that will help with drainage management and grower management practice implementation. One example of regional project includes reservoirs that will capture excess flows and recirculate drain water while improving delivery flexibility (Poso Canal and East Ditch Reservoirs). The reservoirs are expected to recover 4,000 acre feet per year of drain water and the improved delivery operation will help encourage growers to convert to high efficiency irrigation systems that will reduce tailwater volumes. A similar project that is still in the planning stage could potentially reduce drainage discharges to the San Joaquin River by additional 5,000 acre feet annually (Marshall Road and Spanish Land Grant Drain Return System).

The overall trend in the proportion of exceedances of the highest tier management plan constituents indicates a positive trend of water quality improvement since the development and implementation of the 2008 Management Plan (Figure 5). However, several high priority constituents remain a concern in the region, and the Westside Coalition is in the process of assessing the effectiveness and revising the Focus Plan I.

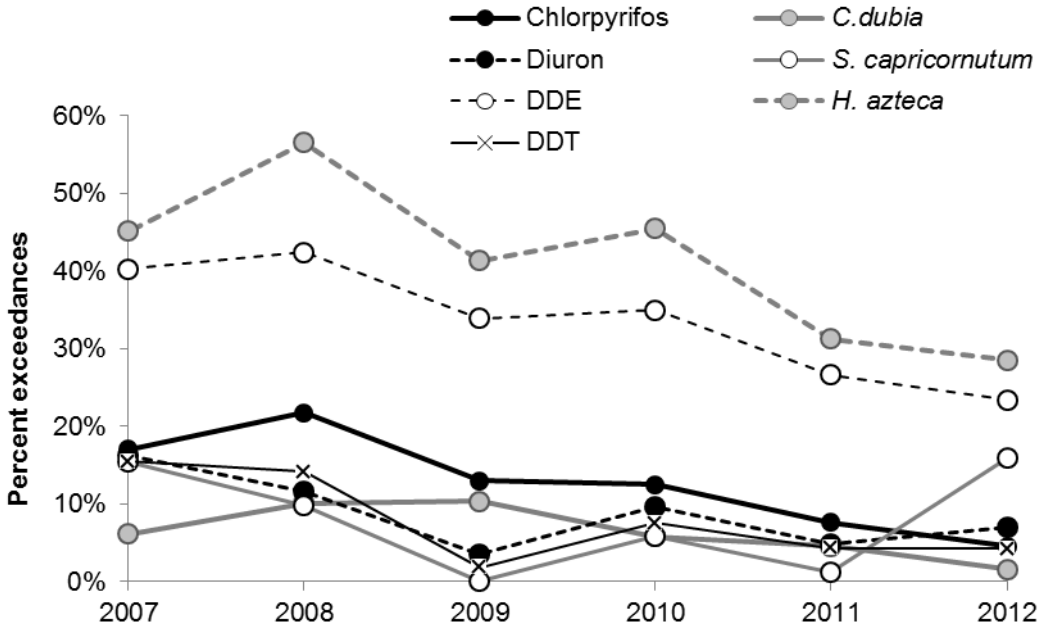

Figure 5. Percent exceedances of chlorpyrifos (from 2007 to 2012 the number of samples ranged from n=129 to n=224), diuron (n=120-188), DDE (n=94-184), DDT (n=94-184), aquatic toxicity to *C. dubia* (n=129-175) and *S. capricornutum* (n=71-171), and sediment toxicity to *H. azteca* (n=23-40) in the Westside Coalition area summarized by year (only constituents prioritized as the highest tier of management plan priorities with the overall frequency of exceedances above 5% are included).

Similar to the previous Order (Coalition Group Conditional Waiver), this Order requires the third-party to develop SQMPs for watersheds where there is an exceedance of a water quality objective or trigger limit more than one time in a three year period. SQMPs may also be required where there is a trend of degradation that threatens a beneficial use. SQMPs will only be required for wastes that may be discharged by some or all of irrigated lands in the identified area. SQMPs are the key mechanism under this Order to help ensure that waste discharges from irrigated lands are meeting Surface Water Receiving Water Limitation III.A. The limitations apply immediately unless the Member is implementing the SQMP in accordance with the approved time schedule. The SQMP will include a schedule and milestones for the implementation of management practices (see Appendix MRP-1). The schedule must identify the time needed to identify new management practices necessary to meet the receiving water limitations, as well as a timetable for implementation of identified management practices. The SQMP will include a schedule for implementing practices that are known to be effective in partially or fully protecting surface water quality. The SQMP must also identify an approach for determining the effectiveness of the implemented management practices in protecting surface water quality.

The main elements of SQMPs are to A) investigate potential irrigated agriculture sources of waste discharge to surface water; B) review physical setting information for the plan area such as existing water quality data; C) considering elements A and B, develop a strategy with schedule and milestones to implement practices to ensure waste discharges from irrigated agriculture are meeting Surface Water Limitation III.A.1; D) develop a monitoring strategy to provide feedback on SQMP progress; E) develop methods to evaluate data collected under the SQMP; and F) provide annual reports to the Central Valley Water Board on progress.

Elements A – F are necessary to establish a process by which the third-party and Central Valley Water Board are able to investigate waste sources and the important physical factors in the plan area that may impact management decisions (elements A and B), implement a process to ensure effective practices are adopted by Members (element C), ensure that adequate feedback monitoring is conducted to allow for evaluation of SQMP effectiveness (elements D and E), and facilitate efficient board review of data collected on the progress of the SQMP (element F).

The SQMPs required by this Order require the third-party to include the above elements. SQMPs will be reviewed and approved by the Executive Officer. Also, because SQMPs may cover broad areas potentially impacting multiple surface water users in the plan area, these plans will be circulated for public review. Prior to plan approval, the Executive Officer will consider public comments on proposed SQMPs.

The burden of the SQMP, including costs, is reasonable. The Central Valley Water Board must be informed of the efforts being undertaken by irrigated agricultural operations to address identified surface water quality problems. In addition, a regional SQMP is a reasonable first step to address identified surface water quality problems, since the monitoring and planning costs are significantly lower, when undertaken regionally by the third-party, than requiring individuals to undertake similar monitoring and planning efforts. However, if the regional SQMP does not result in the necessary improvements to water quality, the burden, including costs, of requiring individuals in the impacted area to conduct monitoring, describe their plans for addressing the identified problems, and evaluate their practices is a reasonable subsequent step. The benefits and necessity of such individual reporting, when regional efforts fail, include, but are not limited to: 1) the need of the board to evaluate the compliance of regulated growers with applicable orders; 2) the need of the board to understand the effectiveness of practices being implemented by regulated growers; and 3) the benefits to all users of that surface water of improved water quality.

Groundwater Quality

Groundwater Monitoring Advisory Workgroup

The Groundwater Monitoring Advisory Workgroup (GMAW) consists of groundwater experts representing state agencies, the United States Environmental Protection Agency (USEPA), the United States Geological Survey (USGS), academia, and private consultants. The following questions were identified by the GMAW and Central Valley Water Board staff as critical questions to be answered by groundwater monitoring conducted to comply with the ILRP.

1. What are irrigated agriculture's impacts to the beneficial uses of groundwater and where has groundwater been degraded or polluted by irrigated agricultural operations (horizontal and vertical extent)?
2. Which irrigated agricultural management practices are protective of groundwater quality and to what extent is that determination affected by site conditions (e.g., depth to groundwater, soil type, and recharge)?
3. To what extent can irrigated agriculture's impact on groundwater quality be differentiated from other potential sources of impact (e.g., nutrients from septic tanks or dairies)?
4. What are the trends in groundwater quality beneath irrigated agricultural areas (getting better or worse) and how can we differentiate between ongoing impact, residual impact (vadose zone) or legacy contamination?
5. What properties (soil type, depth to groundwater, infiltration/recharge rate, denitrification/ nitrification, fertilizer and pesticide application rates, preferential pathways through the vadose zone [including well seals, abandoned or standby wells], contaminant partitioning and mobility [solubility constants]) are the most important factors resulting in degradation of groundwater quality due to irrigated agricultural operations?
6. What are the transport mechanisms by which irrigated agricultural operations impact deeper groundwater systems? At what rate is this impact occurring and are there measures that can be taken to limit or prevent further degradation of deeper groundwater while we're identifying management practices that are protective of groundwater?
7. How can we confirm that management practices implemented to improve groundwater quality are effective?

The workgroup members reached consensus that the most important constituents of concern related to agriculture's impacts to the beneficial uses of groundwater are nitrate (NO_3-N) and salinity. In addition to addressing the widespread nitrate problems, the presence of nitrates in groundwater at elevated levels would serve as an indicator of other potential problems associated with irrigated agricultural practices. Central Valley Water Board staff utilized the recommended salinity and nitrate parameters and added general water quality parameters contained within a majority of the groundwater monitoring programs administered by the board (commonly measured in the field) and some general minerals that may be mobilized by agricultural operations (general minerals to be analyzed once every five years in Trend wells). The general water quality parameters will help in the interpretation of results and ensure that representative samples are collected. The board considered the above questions in developing the Order's groundwater quality monitoring and management practices assessment, and evaluation requirements.

Groundwater Quality Monitoring and Management Practice Assessment, and Evaluation Requirements

The groundwater quality monitoring, assessment, and evaluation requirements have been developed in consideration of the critical questions developed by the Groundwater Monitoring Advisory Workgroup (listed above). The third-party must collect sufficient data to describe irrigated agricultural impacts on

groundwater quality and to determine whether existing or newly implemented management practices comply with the groundwater receiving water limitations of the Order. The strategy for evaluating groundwater quality and protection consists of: 1) a Groundwater Quality Assessment Report (GAR), 2) a Management Practices Evaluation Program, and 3) a Groundwater Quality Trend Monitoring Program.

The general purpose of the Groundwater Quality Assessment Report is to analyze existing monitoring data and provide the foundation for designing the Management Practices Evaluation Program and the Groundwater Quality Trend Monitoring Program, as well as identifying high vulnerability groundwater areas where a groundwater quality management plan must be developed and implemented.

A Management Practices Evaluation Program (MPEP) is to be developed where known groundwater quality impacts exist for which irrigated agricultural operations are a potential contributor or where conditions make groundwater more vulnerable to impacts from irrigated agricultural activities (high vulnerability areas). The purpose of the MPEP is to identify whether existing site-specific and/or commodity-specific agricultural management practices are protective of groundwater quality in the high vulnerability areas and to assess the effectiveness of any newly implemented management practices instituted to improve groundwater quality. Given the wide range of management practices/commodities within the third-party's boundaries, it is anticipated that the third-party will rank or prioritize its high vulnerability areas and commodities, and present a phased approach to implementing the MPEP. The MPEP must be designed to answer GMAW questions 2, 5, 6, and 7. Where applicable, management practices identified as protective of groundwater quality through the MPEP (or equivalent practices) must be implemented by Members, whether the Member is in a high or low vulnerability area (see section IV.B.21 of the Order).

Since the focus of the MPEP is answering the questions related to management practices, the method or tools to be used are not prescribed by the board. The third-party is required to develop a workplan that describes the tools or methods to be used to associate management practice activities on the land surface with the effect of those activities on underlying groundwater quality. The board anticipates that the MPEP workplan will likely propose using a variety of tools, such as vadose zone monitoring, modeling, and groundwater monitoring. The third-party has the option of developing the workplan as part of a group effort that may include other agricultural water quality coalitions and commodity groups. Such a joint effort may avoid duplication of effort and allow collective resources to be more effectively focused on the highest priority studies, while ensuring the goals of the MPEP are met. Existing monitoring wells can be utilized where available for the MPEP.

The trend monitoring program is designed to determine current water quality conditions of groundwater in the third-party area, and to develop long-term groundwater quality information that can be used to evaluate the regional effects (i.e., not site-specific effects) of irrigated agriculture and its practices. Trend monitoring has been developed to answer GMAW questions 1 and 4. At a minimum, trend monitoring must include annual monitoring for electrical conductivity, pH, dissolved oxygen, temperature, nitrate as nitrogen (N), and once every five year monitoring for total dissolved solids, carbonate, bicarbonate, chloride, sulfate, boron, calcium, sodium, magnesium, and potassium. Existing shallow wells, such as domestic supply wells, will be used for the trend groundwater monitoring program. The use of existing wells is less costly than installing wells specifically designed for groundwater monitoring, while still yielding data which can be compared with historical and future data to evaluate long-term groundwater trends.

As the management practices identified as protective of groundwater quality through the MPEP are implemented, the trend monitoring, together with other data included in updates to the GAR, should show improvements in water quality. The trend monitoring and GAR updates will, therefore, provide a regional view as to whether the collective efforts of Members are resulting in water quality improvements. If groundwater quality trends indicate degradation in low vulnerability areas, then a Groundwater Quality Management Plan must be developed and implemented. Negative trends of groundwater quality in high

vulnerability areas over time would be an indicator that the existing Groundwater Quality Management Plan is not effective or is not being effectively implemented.

The third-party may also look to and explore using existing monitoring networks such as those being conducted in accordance with local groundwater management plans (e.g., AB 3030, SB 1938, Integrated Regional Water Management Plans).

GMAW question 3, which seeks to differentiate sources of existing impact, cannot be easily answered by traditional groundwater monitoring. The MPEP and trend monitoring will help to answer this question, but other methods such as isotope tracing and groundwater age determination may also be necessary to fully differentiate sources. The MRP does not require these advanced source methods because they are not necessary to determine compliance with the Order. The MPEP will be used to help determine whether waste discharge at represented sites is of high enough quality to meet the groundwater limitations of the Order.

Data Summary, Pesticides

Monitoring conducted by the USGS in 2010 showed detections of 16 pesticides and pesticide degradates in groundwater within the Western San Joaquin River Watershed.[15] Pesticides and pesticide degradates were detected in 34% percent of wells in the Delta-Mendota subbasin study area. The most frequently detected pesticides in the studies include simazine, atrazine, deethylatrazine (degradate of triazine herbicides), hexazinone, EPTC, dichloronailine (degradate of diuron), and DBCP. All pesticide detections were below health-based thresholds and applicable water quality objectives. Analyses were not run for all pesticides used in the study areas.

The California Department of Pesticide Regulation (DPR), as part of its regulatory requirements under the Pesticide Contamination Prevention Act (PCPA) enacted in 1985, is required to maintain a statewide database of wells sampled for pesticide active ingredients and, in consultation with the California Department of Public Health (DPH) and the State Water Resources Control Board (State Water Board), provide an annual report of the data contained in the database and the actions taken to prevent pesticides contamination to the Legislature and other state agencies. These data will be evaluated by the third-party as part of its Groundwater Quality Assessment Report.

DPR also initiated the Ground Water Protection Program that focuses on evaluating the potential for pesticides to move through soil to groundwater, improving contaminant transport modeling tools, and outreach/training programs for pesticide users. There are approximately 17,000 acres of irrigated lands in the Western San Joaquin River Watershed within DPR Groundwater Protection Areas (GWPAs). Of the 17,000 acres, approximately 7,000 acres of the irrigated lands are within DPR GWPAs that are characterized as vulnerable to leaching of pesticides (leaching areas), approximately 9,000 acres are within GWPAs that are characterized as vulnerable to movement of pesticides to groundwater by runoff from fields to areas were they may move to groundwater (runoff areas), and 1,000 acres of irrigated lands are characterized as both leaching and runoff areas. See Figure 6 for a map of the Groundwater Protection Areas within the Western San Joaquin River Watershed.

DPR's current groundwater quality monitoring program should be sufficient to identify any emerging pesticides of concern and to track water quality trends of identified pesticides of concern. However, the presence of pesticides in groundwater indicates a discharge of waste subject to Water Board regulation. Therefore, should the board or DPR identify groundwater quality information needs related to pesticides in groundwater, the board may require the third-party to conduct studies or implement a monitoring plan

[15] Mathany, T.M., Landon, M.K., Shelton, J.L., and Belitz, K., 2013. Ground-water quality data in the Western San Joaquin Valley study unit, 2010 – Results from the California GAMA Program: U.S. Geological Survey Data Series 706, 102 p. Available at http://pubs.usgs.gov/ds/706/

to address those information needs. Where additional information collected indicates a groundwater quality problem, a coordinated effort with DPR to address the identified problem will be initiated and the board may require the third-party to develop a GQMP.

Data Summary Nitrates – GeoTracker GAMA

The State Water Board's GeoTracker GAMA (Groundwater Ambient Monitoring and Assessment) online information system integrates groundwater data from multiple sources, such as GAMA, DPR, Department of Water Resources (DWR), USGS, Department of Public Health (DPH), and Lawrence Livermore National Laboratory. Staff queried GeoTracker GAMA. In April 2013 there were 6,318 nitrate results in GeoTracker GAMA within the Western San Joaquin River Watershed Area. These results were collected from environmental monitoring wells and water supply wells (84 percent of the samples were collected from water supply wells). The samples considered in this summary were collected from 1947 through 2012, although 84 percent of the samples were collected in years 1998 or later. The majority of samples were collected in Stanislaus (65 percent) and Merced (29 percent); only 6% of the data were from Fresno, Madera, and San Joaquin Counties.

Sample collection depth information is not available for download from GeoTracker GAMA. However, 70 percent (4,429) of the samples were collected by DPH from water supply wells. DPH monitors water quality in public supply wells, which are typically hundreds to thousands of feet deep and pump large volumes of water from deeper aquifers. This indicates that this particular set of nitrate results focuses primarily on conditions in deeper groundwaters. Since DPH primarily monitors active municipal supply wells, wells that have excessive nitrates (that are not treated or blended with better quality water) are generally taken out of water supply service, so monitoring ceases. Therefore, DPH data for active municipal wells generally do not include nitrate-contaminated wells. Additional data collected at shallower depths (where applicable) may be needed to adequately assess current groundwater quality conditions in the area.

Seventeen percent of sample results for all GAMA well data for the Western San Joaquin River Watershed were greater than the nitrate drinking water standard of 45 mg/L (as nitrate). An additional 35 percent of results fell between the drinking water standard and half of the standard (22.5 mg/L).

Of the 1,021 samples collected from 1947 through 1997, 10 percent were greater than the nitrate drinking water standard and an additional 31 percent fell between the drinking water standard and half of the standard. Of the 5,297 samples collected 1998 through 2012, 19 percent were greater than the nitrate drinking water standard and an additional 36 percent fell between the drinking water standard and half of the standard.

All nitrate results collected between 1947 and 1997 were reported by DPH or USGS. Of the 1,360 nitrate results reported by groups other than DPH and USGS that were collected 1998 through 2012, six percent were greater than the nitrate drinking water standard and an additional seven percent fell between the standard and half of the standard.

There were 333 square-mile sections of land (township, range, and section or TRS) within the Western San Joaquin River Watershed Area with nitrate results in the GeoTracker GAMA dataset. When data were analyzed per TRS, seven percent of sampled sections had an average nitrate level above the drinking water standard and an additional 13 percent of sections had an average nitrate level between 45 and 22.5 mg/L. Fifteen percent of sampled sections had a maximum nitrate level above 45 mg/L and an additional 18 percent of sampled sections had a maximum level between 45 and 22.5 mg/L. See Figure 7 for a map showing the maximum nitrate result per square mile section of land with detections.

Hydrogeologically Vulnerable Areas

In 2000, the State Water Resources Control Board created a map showing locations where published hydrogeologic information indicated conditions that may be more vulnerable to groundwater contamination. They termed these areas "Hydrogeologically Vulnerable Areas." The map identifies areas where geologic conditions allow recharge to underlying water supply aquifers at rates or volumes substantially higher than in lower permeability or confined areas of the same groundwater basin. The map does not include hydrogeologically vulnerable areas (HVAs) where local groundwater supplies occur mainly in the fractured igneous and metamorphic rocks which underlie the widespread mountain and foothill regions of the Sierra Nevada, or in permeable lava flows which may provide primary recharge for extensive but sparsely populated groundwater basins. See Figure 6 for a map of the HVA areas within the third-party region.

Groundwater Quality Management Plans (GQMPs)

Under this Order, groundwater quality management plans will be required where there are exceedances of water quality objectives, where there is a trend of degradation[16] that threatens a beneficial use, as well as for "high vulnerability groundwater areas" (to be designated by the third-party in the Groundwater Assessment Report based on definitions provided in Attachment E). Instead of development of separate GQMPs, the Order allows for the submittal of a comprehensive GQMP along with the Groundwater Assessment Report. GQMPs will only be required if irrigated lands may cause or contribute to the groundwater quality problem. GQMPs are the key mechanism under this Order to help ensure that waste discharges from irrigated lands are meeting Groundwater Receiving Water Limitation III.B. The limitations apply immediately unless the Member is implementing the GQMP in accordance with the approved time schedule. The GQMP will include a schedule and milestones for the implementation of management practices (see Appendix MRP-1). The schedule must identify the time needed to identify new management practices necessary to meet the receiving water limitations, as well as a timetable for implementation of identified management practices. The MPEP will be the process used to identify the effectiveness of management practices, where there is uncertainty regarding practice effectiveness under different site conditions. However, the GQMP will also be expected to include a schedule for implementing practices that are known to be effective in partially or fully protecting groundwater quality. For example, the ratio of total nitrogen available to crop consumption of nitrogen that is protective of water quality may not be known for different site conditions and crops. However, accounting for the amount of nitrate in irrigation supply water is known to be an effective practice at reducing the amount of excess nitrogen applied.

The main elements of GQMPs are to A) investigate potential irrigated agricultural sources of waste discharge to groundwater, B) review physical setting information for the plan area such as geologic factors and existing water quality data, C) considering elements A and B, develop a strategy with schedules and milestones to implement practices to ensure discharge from irrigated lands are meeting Groundwater Receiving Water Limitation III.B, D) develop a monitoring strategy to provide feedback on GQMP progress, E) develop methods to evaluate data collected under the GQMP, and F) provide reports to the Central Valley Water Board on progress.

Elements A – F are necessary to establish a process by which the third-party and Central Valley Water Board are able to investigate waste sources and the important physical factors in the plan area that may impact management decisions (elements A and B), implement a process to ensure effective practices are adopted by Members (element C), ensure that adequate feedback monitoring is conducted to allow

[16] A trend in degradation could be identified through the required trend monitoring or through the periodic updates of the Groundwater Quality Assessment Report.

for evaluation of GQMP effectiveness (elements D and E), and facilitate efficient board review of data collected on the progress of the GQMP (element F).

This Order requires the third-party to develop GQMPs that include the above elements. GQMPs will be reviewed and approved by the Executive Officer. Also, because GQMPs may cover broad areas potentially impacting multiple groundwater users in the plan area, these plans will be circulated for public review. Prior to plan approval, the Executive Officer will consider public comments on proposed GQMPs.

In accordance with Water Code section 13267, the burden of the GQMP, including costs, is reasonable. The Central Valley Water Board must be informed of the efforts being undertaken by Members to address identified groundwater quality problems. In addition, a regional GQMP is a reasonable first step to address identified groundwater quality problems, since the monitoring and planning costs are significantly lower when undertaken regionally by the third-party than requiring individual Members to undertake similar monitoring and planning efforts. However, if the regional GQMP does not result in the necessary improvements to water quality, the burden, including costs, of requiring individual Members in the impacted area to conduct monitoring, describe their plans for addressing the identified problems, and evaluate their practices is a reasonable subsequent step. The benefits and necessity of such individual reporting, when regional efforts fail, include, but are not limited to: 1) the need of the board to evaluate the compliance of regulated Members with applicable orders; 2) the need of the board to understand the effectiveness of practices being implemented by Members; and 3) the benefits of improved groundwater quality to all users.

Farm Evaluations

The Order requires that all Members complete a farm evaluation describing management practices implemented to protect surface and groundwater quality. The evaluation also includes information such as location of the farm, surface water discharge points, location of in service wells and abandoned wells and whether wellhead protection practices have been implemented.

The Order requires all members (except Small Farming Operations in low vulnerability areas) to complete the Farm Evaluation and submit it with the Notice of Confirmation. Concurrent due date for the Notice of Confirmation and Farm Evaluation will allow the third-party to more efficiently outreach to its growers and ensure timely submittal of both documents. The schedule for completing subsequent Farm Evaluations will be based on whether the operation is within a high or low vulnerability area. Farm evaluations must be maintained at the Member's farming operations headquarters or primary place of business and submitted to the third-party for summary reporting to the Central Valley Water Board.

The farm evaluation is intended to provide the third-party and the Central Valley Water Board with information regarding individual Member implementation of the Order's requirements. Without this information, the board would rely solely on representative surface and groundwater monitoring to determine compliance with water quality objectives. The representative monitoring cannot determine whether all Members are implementing protective practices, such as wellhead protection measures for groundwater. For groundwater protection practices, it may take years in many areas (even decades in some areas) before broad trends in groundwater may be measured and associated with implementation of this Order. Farm evaluations will provide assurance that Members are implementing management practices to protect groundwater quality while trend data and management practices evaluation program (MPEP) information are collected.

The reporting of practices identified in the farm evaluation will allow the third-party and board to effectively implement the MPEP. Evaluating management practices at representative sites (in lieu of farm-specific monitoring) only works if the results of the monitored sites can be extrapolated to non-monitored sites. One of the key ways to extrapolate those results will be to have an understanding of which farming operations have practices similar to the site that is monitored. The reporting of practices

will also allow the board to determine whether the GQMP is being implemented by Members according to the approved schedule.

In addition, reporting of practices will allow the third-party and board to evaluate changes in surface water quality relative to changes in practices. The SQMP will include a schedule and milestones for the implementation of practices to address identified surface water quality problems (e.g., identified through monitoring at representative sites). The reporting of practices will allow the board to determine whether the SQMP is being implemented by Members according to the approved schedule. Absent information on practices being implemented by Members, the board would not be able to determine whether individual Members are complying with the Order.

The focus of the reporting is on parcels in high vulnerability areas. The Central Valley Water Board needs to have an understanding of whether Members are improving practices in those areas where surface or groundwater quality are most impacted (or potentially impacted). Reporting frequency is annual for all sizes of farming operations in high vulnerability areas. The reporting frequency is every five years for all farming operations in low vulnerability areas. The Executive Officer is given the discretion to reduce the reporting frequency for Members in high vulnerability areas, if there are minimal year to year changes in the practices reported. This discretion is provided, since the reporting burden would be difficult to justify given the costs if there were minimal year to year changes in the information provided.

While the focus of the reporting is on high vulnerability areas, the MPEP requirement affects management practices implemented in both high and low vulnerability areas. Management practices identified as protective of groundwater quality through the MPEP (or equivalent practices) must be implemented by Members, where applicable, whether the Member is in a high or low vulnerability area (see section IV.B.21 of the Order).

Nitrogen Management Plans

Nitrate derived from both agricultural and non-agricultural sources has resulted in degradation and/or pollution of groundwater beneath agricultural areas in California's Central Valley.[17] As shown in Figure 7, there are a number of wells within the Western San Joaquin River Watershed area with nitrate concentrations that are higher than drinking water quality objectives. To address these concerns, the Order requires that Members implement practices that minimize excess nitrogen application relative to crop consumption. Proper nutrient management will work to reduce excess plant nutrients, such as nitrogen, from reaching state waters. Nitrogen management must take site-specific conditions into consideration in identifying steps that will be taken and practices that will be implemented to minimize nitrate movement through surface runoff and leaching past the root zone.

All Members will be required to complete a nitrogen management plan according to the schedule in the Order. Growers in low vulnerability areas are required to prepare nitrogen management plans, but do not need to certify the plans or provide summary reports to the third-party. Should the groundwater vulnerability designation change from "low" to "high" vulnerability, those Members in the previously designated low vulnerability area would then need to have their nitrogen management plan certified and submit summary reports in accordance with a schedule issued by the Executive Officer.

Members with small farming operations must maintain the plan at the Member's farming operations headquarters or primary place of business.

[17] ICF International. 2011. *Irrigated Lands Regulatory Program - Program Environmental Impact Report*. Final and Draft. March. (ICF 05508.05.) Sacramento, CA. Prepared for Central Valley Regional Water Quality Control Board, Sacramento, CA. Appendix A, page 46.

For Members located within a high vulnerability groundwater area, for which nitrate is identified as a constituent of concern, the plan must be certified in one of the following ways:

- Self-certified by the Member who attends a California Department of Food and Agriculture or other Executive Officer approved training program for nitrogen plan certification. The Member must retain written documentation of their attendance in the training program; or
- Self-certified by the Member that the plan adheres to a site-specific recommendation from the Natural Resources Conservation Service (NRCS) or the University of California Cooperative Extension. The Member must retain written documentation of the recommendation provided; or
- Certified by a nitrogen management plan specialist as defined in Attachment E of this Order. Such specialists include Professional Soil Scientists, Professional Agronomists, Crop Advisors[18] certified by the American Society of Agronomy, or Technical Service Providers certified in nutrient management in California by the National Resource Conservation Service (NRCS).
- Certified in an alternative manner approved by the Executive Officer. Such approval will be provided based on the Executive Officer's determination that the alternative method for preparing the nitrogen management plan meets the objectives and requirements of this Order.

The Order requires nitrogen management reporting (nitrogen management plan summary reports) for Members in high vulnerability groundwater areas. The first nitrogen management plan summary report must be submitted one year after the first nitrogen management plan must be developed. The nitrogen management plan summary report provides information based on what was actually done the previous crop year, while the plan indicates what is planned for the upcoming crop year. Therefore, the first summary report is due the year following the implementation of the first nitrogen management plan. This reporting will provide the third-party and the Central Valley Water Board with information regarding individual Member implementation of the Order's requirements. Without this information, the board would rely primarily on groundwater monitoring to determine compliance with water quality objectives. Groundwater monitoring alone would not provide a real-time indication as to whether individual Members are managing nutrients to protect groundwater. Improved nitrogen management may take place relatively quickly, although it may take many years before broad trends in nitrate reduction in groundwater may be measured. Nitrogen management reporting will provide assurance that Members are managing nutrients to protect groundwater quality while trend data are collected.

Spatial Resolution of Nitrogen Management Plan and Farm Evaluation Information

The Order requires reporting to the Central Valley Water Board of nitrogen management information and management practices identified through the farm evaluation. These data are required to be associated with the township (36 square mile area) where the farm is located. The spatial resolution by township provides a common unit that should facilitate analysis of data and comparisons between different areas.

Although the data collected by the third-party from individual Members will be reported to the board, those data will only be associated with the township where the enrolled parcel is located and will not be associated with the Member or their enrolled parcel. For example, the third-party may have information submitted for 180 different parcels in a given township. The board would receive 180 different data records for that township, but the individual data records would not be associated with a specific parcel or Member.

In order to determine whether growers in a given township are improving their practices, the third-party will need to assess the data and evaluate trends. The third-party's assessment and evaluation, along

[18] Should the California Department of Food and Agriculture and the California Certified Crop Adviser's establish a specific nitrogen management certification, any Certified Crop Adviser who certifies a nitrogen management plan must have a nitrogen management certification.

with the data used to make the evaluation, will be provided in the third-party's annual monitoring report. Since a report on management practice information and nitrogen management summary reports will be provided annually, the board will be able to determine whether trends are positive. If the data suggest that growers are not improving their practices, the Executive Officer can require the third-party to submit the management practice or nitrogen management plan summary information for individual Members.

Sediment and Erosion Control Plans

The Order requires that Members with the potential to cause erosion and discharge sediment that may degrade surface waters prepare a sediment and erosion control plan. Control of sediment discharge will work to achieve water quality objectives associated with sediment and also water quality objectives associated with sediment bound materials such as pesticides. To ensure that water quality is being protected, this Order requires that sediment and erosion control plans be prepared in one of the following ways:

- The sediment and erosion control plan must adhere to the site-specific recommendation from the Natural Resources Conservation Service (NRCS), NRCS technical service provider, the University of California Cooperative Extension, the local Resource Conservation District; or conform to a local county ordinance applicable to erosion and sediment control on agricultural lands. The Member must retain written documentation of the recommendation provided and certify that they are implementing the recommendation; or

- The plan must be prepared and self-certified by the Member, who has completed a training program that the Executive Officer concurs provides necessary training for sediment and erosion control plan development; or

- The plan must be written, amended, and certified by a qualified sediment and erosion control plan developer possessing one of the registrations shown in Table 5 below; or

- The plan must be prepared and certified in an alternative manner approved by the Executive Officer. Such approval will be provided based on the Executive Officer's determination that the alternative method for preparing the plan meets the objectives and requirements of this Order.

Table 5. Qualified Sediment and Erosion Control Plan Developers

Title/Certification	Certifier
Professional Civil Engineer	State of California
Professional Geologist or Engineering Geologist	State of California
Landscape Architect	State of California
Professional Hydrologist	American Institute of Hydrology
Certified Professional in Erosion and Sediment Control™ (CPESC)	EnviroCert International Inc.
Certified Professional in Storm Water Quality™ (CPSWQ)	EnviroCert International Inc.
Certified Soil Scientist	American Society of Agronomy

The sediment and erosion control plan will: (1) help identify the sources of sediment that affect the quality of storm water and irrigation water discharges; and (2) describe and ensure the implementation of water quality management practices to reduce or eliminate sediment and other pollutants bound to sediment in storm water and irrigation water discharges. The plan must be appropriate for the Member's operations and will be developed and implemented to address site specific conditions. Each farming operation is unique and requires specific description and selection of water quality management practices needed to address waste discharges of sediment. The plan must be maintained at the farming operations headquarters or primary place of business.

The Order establishes prioritization for Member completion of the plan based on farm size. Small farming operations will have additional time to complete the plan.

To assist Members in determining whether they need to prepare a sediment and erosion control plan, the third-party must prepare a sediment and erosion control assessment report that identifies the areas susceptible to erosion and the discharge of sediment that could impact receiving waters. In addition, the Executive Officer may identify areas requiring such plans based on evidence of ongoing erosion or sediment control problems.

Small Farming Operations

In counties within the Western San Joaquin River Watershed, small farming operations are operated by approximately 63 percent of the growers, but account for approximately 6% of the total irrigated lands.[19] During the development of the Order, concerns were raised regarding the ability of small farms to comply with the requirements of the Order. Although there were recommendations to exempt small farms from this Order, no evidence was provided to demonstrate that small farms could not affect water quality and, therefore, justify an exemption from being governed by waste discharge requirements. In addition, there was no evidence presented to suggest that, on a per acre basis, small farming operations would have a reduced impact on water quality then larger farmers.

However, the board recognizes that small farming operations have more limited resources and access to technical experts. The additional time provided for small farming operations to initially prepare applicable farm evaluations, nitrogen management plans, and sediment and erosion control plans (Table 8) should allow small farmers to more feasibly access available technical resources, such as their third-party, the Natural Resources Conservation Service, University of California Cooperative Extension, and local resource conservation districts.

These changes should not impact the board's ability to determine progress for the watershed as a whole, since most of the irrigated acreage in the watershed is managed by large farming operations. However, small farming operations may prove to have significant localized impacts, so this Order does not preclude the Executive Officer from obtaining information from small farming operations to address such impacts.

To accommodate differing requirements for small farming operations, the board needs to know who is farming a given parcel. Although the landowner can be the Member of the third-party, the landowner must still identify the lessee, if the landowner is not also the farmer. This requirement is necessary to avoid a situation in which multiple parcels of less than 60 acres are farmed by the same farming operation, but are incorrectly identified as associated with "small farming operations" based on the individual landowners being the Members rather than the farm operator.

Technical Reports

The surface water and trend groundwater quality monitoring under the Order is representative in nature instead of individual field discharge monitoring. The benefits of representative monitoring include the ability to determine whether water bodies accepting discharges from numerous irrigated lands are meeting water quality objectives (e.g., through selection of representative sampling locations and representative MPEP studies). Representative monitoring also allows the Central Valley Water Board to determine whether practices are protective of water quality. There are limitations to representative monitoring when trying to determine possible sources of water quality problems.

[19] Data are for Merced, Stanislaus, and Fresno Counties; United States Department of Agriculture. 2007. *Census of Agriculture*.

Therefore, through the Management Practices Evaluation Program and the Surface Water Quality Management Plans and Groundwater Quality Management Plans, the third-party must evaluate the effectiveness of management practices in protecting water quality. In addition, Members must report the practices they are implementing to protect water quality. Through the evaluations and studies conducted by the third-party, the reporting of practices by the Members, and the board's compliance and enforcement activities, the board will be able to determine whether a Member is complying with the Order.

An effective method of determining compliance with water quality objectives is water quality monitoring at the individual level. Individual monitoring may also be used to help determine sources of water quality problems. Individual monitoring of waste discharges is required under many other Water Board programs. Examples of such programs include regulation of wastewater treatment plants and the Central Valley Water Board's Dairy Program.[20] The costs of individual monitoring would be much higher than representative surface and groundwater quality monitoring required under the Order. This is because representative monitoring site selection may be based on a group or category of represented waste discharges, assessing compliance for represented Members, reducing the number of samples needed to evaluate compliance with the requirements of this Order. The third-party is tasked with ensuring that selected monitoring sites are representative of waste discharges from all irrigated agricultural operations within the Order's boundaries.

This Order requires the third-party to provide technical reports. These reports may include special studies at the direction of the Executive Officer. The Executive Officer may require special studies where representative monitoring is ineffective in determining potential sources of water quality problems or to identify whether management practices are effective. Special studies help ensure that the potential information gaps described above under the Order's representative monitoring requirements may be filled through targeted technical reports, instead of more costly individual monitoring programs.

Reports and Plans

All plans and reports that require approval by the Executive Officer will be posted on the board's website upon approval.

Water Quality Objectives

Surface water and groundwater receiving water limitations in section III of the Order specify that waste discharge from irrigated lands may not cause or contribute to an exceedance of water quality objectives in surface water or underlying groundwater, unreasonably affect beneficial uses, or cause a condition of pollution or nuisance.

Water quality objectives that apply to surface water are described in the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* and the *Water Quality Control Plan for the Tulare Lake Basin* (Basin Plans). Applicable water quality objectives include, but are not limited to, (1) the numeric objectives, including the bacteria objective, the chemical constituents objective (includes listed chemicals and state drinking water standards, i.e., maximum contaminant levels (MCLs) promulgated in Title 22 California Code of Regulations (CCR) Division 4, Chapter 15 sections 64431 and 64444 that are applicable through the Basin Plan to waters designated as municipal and domestic supply), dissolved oxygen objectives, pH objectives, the salinity objectives, and the turbidity objectives; and (2) the narrative objectives, including the biostimulatory substances objective, the chemical constituents objective, and

[20] The dairy program requires individual monitoring of surface water discharges and allows for a "representative" groundwater monitoring in lieu of individual groundwater monitoring.

the toxicity objective. The Basin Plan also contains numeric water quality objectives that apply to specifically identified water bodies, such as specific temperature objectives. Federal water quality criteria that apply to surface water are contained in federal regulations referred to as the California Toxics Rule and the National Toxics Rule. See 40 CFR sections 131.36 and 131.38.

Water quality objectives that apply to groundwater include, but are not limited to, (1) numeric objectives, including the bacteria objective and the chemical constituents objective (includes state MCLs promulgated in Title 22 CCR Division 4, Chapter 15 section 64431 and 64444 and are applicable through the Basin Plan to municipal and domestic supply), and (2) narrative objectives including the chemical constituents, taste and odor, and toxicity objectives.

The requirements that waste discharge not unreasonably affect beneficial uses or cause a condition of pollution or nuisance are prescribed pursuant to sections 13263 and 13241 of the California Water Code. Section 13263 of the California Water Code requires Regional Water Boards, when establishing waste discharge requirements, to consider the need to prevent nuisance and the provisions in section 13241 of the California Water Code. Section 13241 requires Regional Water Boards to consider several factors when establishing water quality objectives including prevention of nuisance and reasonable protection of beneficial uses.

Implementation of Water Quality Objectives

The Basin Plans include numeric and narrative water quality objectives. The narrative toxicity objective states: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The narrative chemical constituent objective states that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At a minimum, *"…water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs)*" in Title 22 of the California Code of Regulations (CCR). The Basin Plan further states that, to protect all beneficial uses, the Regional Water Board may apply limits more stringent than MCLs. The narrative tastes and odors objective states: "*Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.*"

The Sacramento-San Joaquin Basin Plan at page IV-16.00, and the Tulare Lake Basin Plan on page IV-21, contain an implementation policy, "Application of Water Quality Objectives," that specifies that the Central Valley Water Board "*will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives*." With respect to narrative objectives, the Regional Water Board must establish limitations using one or more of three specified sources, including: (1) USEPA's published water quality criteria, (2) a proposed state criterion (i.e., water quality objective) or an explicit state policy interpreting its narrative water quality criteria (i.e., the Regional Water Board's "Policy for Application of Water Quality Objectives"), or (3) an indicator parameter. For purposes of this Order, all three sources will be used as part of the process described below.

Implementation of numeric and narrative water quality objectives under the Order involves an iterative process. The Order's MRP establishes management plan trigger limits that are equivalent to the applicable Basin Plan numeric water quality objectives. For constituents that are not assigned Basin Plan numeric water quality objectives, Central Valley Water Board staff will develop trigger limits in consultation with the Department of Pesticide Regulation (for pesticides) and other agencies as appropriate. Central Valley Water Board staff will provide interested parties, including the third-party representing Members, with an opportunity to review and comment on the trigger limits. The Executive Officer will then provide the trigger limits to the third-party. Those trigger limits will be considered the

numeric interpretation of the applicable narrative objectives. In locations where trigger limits are exceeded, water quality management plans must be developed that will form the basis for reporting which steps have been taken by growers to achieve compliance with numeric and narrative water quality objectives.

Non-Point Source (NPS) Program

This Order regulates waste discharges from irrigated agricultural lands to state waters as an NPS program. Accordingly, the waste discharge requirements must implement the provisions of the State Water Board's *Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program* (NPS Policy). Under the NPS Policy, the Regional Water Board must find that the program will promote attainment of water quality objectives. The nonpoint-source program also must meet the requirements of five key structural elements. These elements include (1) the purpose of the program must be stated and the program must address NPS pollution in a manner that achieves and maintains water quality objectives and beneficial uses, including any applicable antidegradation requirements; (2) describe the practices to be implemented and processes to be used to select and verify proper implementation of practices; (3) where it is necessary to allow time to achieve water quality requirements, include a specific time schedule, and corresponding quantifiable milestones designed to measure progress toward reaching specified requirements; (4) feedback mechanisms to determine whether the program is achieving its purpose; and (5) the consequences of failure to achieve the stated purpose.

This Order addresses each of the five key elements, as described below.

(1) The purpose of the long-term irrigated lands regulatory program, of which this Order is an implementing mechanism, is stated above under the section titled "Goals and Objectives of the Irrigated Lands Regulatory Program."[21] The program goals and objectives include meeting water quality objectives. The requirements of this Order include requirements to meet applicable water quality objectives and the requirements of State Water Board Resolution 68-16 (antidegradation requirements). Further discussion of this Order's implementation of antidegradation requirements is given below under the section titled "State Water Board Resolution 68-16."

(2) The board is prevented by Water Code section 13360 from prescribing specific management practices to be implemented. However, it may set forth performance standards and require dischargers to report on what practices they have or will implement to meet those standards. Examples of the types of practices that irrigated agricultural operations may implement to meet program goals and objectives have been described in the Economics Report[22] and evaluated in the Program Environmental Impact Report (PEIR)[23] for the long-term ILRP. This Order requires each individual operation to develop a farm evaluation that will describe their management practices in place to protect surface water and groundwater quality. This Order also requires the development of surface/groundwater quality management plans (SQMPs/GQMPs) in areas where there are exceedances of water quality objectives. The requirements for SQMPs and GQMPs include that

[21] The goals and objectives were developed as part of the ILRP Program Environmental Impact Report, ICF International. 2011. *Irrigated Lands Regulatory Program - Program Environmental Impact Report*. Final and Draft. March. (ICF 05508.05.) Sacramento, CA. Prepared for Central Valley Regional Water Quality Control Board, Sacramento, CA.

[22] ICF International. 2010. *Draft Technical Memorandum Concerning the Economic Analysis of the Irrigated Lands Regulatory Program.* July. (ICF 05508.05.) Sacramento, CA. Prepared for: Central Valley Regional Water Quality Control Board, Sacramento, CA.

[23] ICF International. 2011. *Irrigated Lands Regulatory Program - Program Environmental Impact Report*. Final and Draft. March. (ICF 05508.05.) Sacramento, CA. Prepared for Central Valley Regional Water Quality Control Board, Sacramento, CA.

the third-party identify management practices and develop a process for evaluating the effectiveness of such practices. The requirements of this Order are consistent with Key Element 2.

(3) This Order requires the development of SQMPs/GQMPs in areas where water quality objectives are not met. SQMPs/GQMPs must include time schedules for implementing the plans and meeting the surface and groundwater receiving water limitations (section III of the Order) as soon as practicable, but within a maximum of 10 years for surface and groundwater. The time schedules must be consistent with the requirements for time schedules set forth in this Order. The time schedules must include quantifiable milestones that will be reviewed by the Executive Officer and the public prior to approval. The time schedule requirements in this Order are consistent with Key Element 3.

(4) To provide feedback on whether program goals are being achieved, this Order requires surface and groundwater quality monitoring, tracking of management practices, and evaluation of effectiveness of implemented practices. This feedback will allow iterative implementation of practices to ensure that program goals are achieved. This feedback mechanisms required by this Order are consistent with Key Element 4.

(5) This Order establishes the following consequences where requirements are not met:

(a) The third-party or Members will be required, in an iterative process, to conduct additional monitoring and/or implement management practices where water quality objectives are not being met;
(b) Appropriate Central Valley Water Board enforcement action where the iterative management practices process is unsuccessful, program requirements are not met, or time schedules are not met;
(c) Require noncompliant Members, or all Members where the third-party fails to meet the requirements of this Order, to submit a report of waste discharge to obtain individual waste discharge requirements from the Central Valley Water Board (i.e., revoke coverage under this Order).

This Order describes consequences for failure to meet requirements and is consistent with Key Element 5.

California Environmental Quality Act (CEQA)

For the purposes of adoption of this Order, the Central Valley Water Board is the lead agency pursuant to CEQA (Public Resources Code sections 21100 et seq.). The Central Valley Water Board has prepared a Final Program Environmental Impact Report (PEIR)[24] that analyzes the potential environmental impacts of six program alternatives for a long term ILRP. As described more fully in Attachment D, this Order relies upon the PEIR for CEQA compliance. The requirements of the Order include regulatory elements that are also contained in the six alternatives analyzed in the PEIR. Therefore, the actions by Members to protect water quality in response to the requirements of this Order are expected to be similar to those described for Alternatives 2-6 of the PEIR (Alternative 1 does not include groundwater protection).

The PEIR describes that potential environmental impacts of all six alternatives are associated with implementation of water quality management practices, construction of monitoring wells, and impacts to agriculture resources (e.g., loss of production of prime farmland) due to increased regulatory costs.

[24] ICF International. 2011. *Irrigated Lands Regulatory Program Final Program Environmental Impact Report.* Final and Draft. March. (ICF 05508.05.) Sacramento, CA. Prepared for: Central Valley Regional Water Quality Control Board, Sacramento, CA

Under this Order, Members will be required to implement water quality management practices to address water quality concerns. The PEIR describes and evaluates potential impacts of practices likely to be implemented to meet water quality and other management goals on irrigated lands. These water quality management practices include:

- Nutrient management
- Improved water management
- Tailwater recovery system
- Pressurized irrigation
- Sediment trap, hedgerow, or buffer
- Cover cropping or conservation tillage
- Wellhead protection

These practices are examples of the types of practices that would be broadly applied by irrigated agricultural operations throughout the Central Valley and are considered representative of the types of practices that would have potential environmental impacts. It is important to note that the evaluated practices are not required; operators will have the flexibility to select practices to meet water quality goals. This Order represents one order in a series of orders that will be developed, based on the alternatives evaluated in the PEIR for all irrigated agriculture within the Central Valley. The requirements of this Order would lead to implementation of the above practices within the Western San Joaquin River Watershed to a similar degree as is described for Alternatives 2-6 analyzed in the PEIR. Also, the requirements of this Order will require installation of monitoring wells (with the extent depending on the adequacy of existing wells for water quality monitoring).

As described in the PEIR for Alternatives 2-6, the combination of an operator's choice of management practice and where that practice is implemented (i.e., located within a sensitive resource area) may result in significant environmental impacts for the following resource areas:

- Cultural resources: Potential loss of resources from construction and operation of management practices and monitoring wells.
- Noise and vibration: Exposure of sensitive land uses to noise from construction and operation of management practices (e.g., construction of tailwater return system, pump noise) and monitoring wells.
- Air quality: Generation of construction and operational emissions from management practices and monitoring wells (e.g., equipment and pump emissions generated during construction and continued operation of practices).
- Climate change: Cumulative, from a potential increase in greenhouse gas emissions.
- Vegetation and wildlife: Loss of habitat, wildlife, and wetland communities from reduced surface water discharge and construction and operation of practices and monitoring wells (e.g., loss of habitat if a practice is sited in a previously undisturbed area). Cumulative loss of habitat.
- Fisheries: Loss of habitat from construction of management practices, monitoring wells, and toxicity attributable to coagulant additives.
- Agriculture resources: Loss of farmland from increased regulatory cost. Cumulative loss of agriculture resources.

* The above is a generalized summary of affected resource areas. The reader is directed to the Attachment D, Findings of Fact and Statement of Overriding Considerations, of this Order for specific impacts and discussion. Attachment D provides a listing of the above impacts, the written findings regarding those impacts consistent with § 15091 of the CEQA Guidelines, and the explanation for each finding.

Mitigation Measures

The impacts described above, except for agriculture resources, cumulative climate change, and cumulative vegetation and wildlife can be reduced to a less than significant level through the employment of alternate practices or by choosing a location that avoids sensitive areas (e.g., installing a sedimentation basin in a portion of the property that is already developed rather than in an area that provides riparian habitat). Where no alternate practice or less sensitive location for a practice exists, this Order requires that the third-party and Members choosing to employ these practices to avoid impacts to sensitive resources by implementing the mitigation measures described in Attachment C. A CEQA Mitigation Monitoring and Reporting Program is included in Attachment B of this Order, Monitoring and Reporting Program R5-2013-xxxx.

Statement of policy with respect to maintaining high quality waters in California (State Water Board Resolution 68-16)

This section of the Information Sheet first provides background on State Water Board Resolution 68-16 *Statement of Policy with Respect to Maintaining High Quality of Waters in California* (Resolution 68-16). Following the background discussion, the Information Sheet describes how the various provisions in the WDR and MRP collectively implement Resolution 68-16. In summary, the requirements of Resolution 68-16 are met through a combination of upfront planning and implementation at the farm level; representative monitoring and assessments to determine whether trends in degradation are occurring; and regional planning and on-farm implementation when degradation trends are identified.

Initially, all Members will need to conduct an on-farm evaluation to determine whether their practices are protective of water quality and whether they are meeting the established farm management performance standards. Through the process of becoming aware of effective management practices; evaluating their practices; and implementing improved practices; Members are expected to meet the farm management performance standards and, thereby, achieve best practicable treatment or control (BPTC), where applicable. All Members must prepare and implement a farm-specific nitrogen management plan. In addition, each Member with the potential to cause erosion and discharge sediment that may degrade surface waters must prepare and implement a sediment and erosion control plan. Implementation of the sediment/erosion control plan should result in achieving BPTC for sediment associated pollutants. Implementation of the nitrogen management plan should result in achieving BPTC for nitrates discharged to groundwater.

Representative monitoring of surface water and groundwater together with periodic assessments of available surface water and groundwater information is required to determine compliance with water quality objectives and determine whether any trends in water quality (improvement or degradation) are occurring. If trends in such degradation are identified that could result in impacts to beneficial uses, a surface (or groundwater) quality management plan must be prepared by the third-party. The plan must include the identification of practices that will be implemented to address the trend in degradation and an evaluation of the effectiveness of those practices in addressing the degradation. The third-party must report on the implementation of practices by its Members. Failure to implement practices or address the degradation by individual Members will result in further direct regulation by the board, including, but not limited to, requiring individual farm water quality management plans; regulating the individual grower directly through WDRs for individual farmers; or taking other enforcement action.

As discussed further below, the combination of these requirements fulfill the requirements of Resolution 68-16 for any degradation of high quality waters authorized by this Order.

Background

Basin Plan water quality objectives are developed to ensure that ground and surface water beneficial uses are protected. The quality of some state ground and surface waters is higher than established

Basin Plan water quality objectives. For example, nutrient levels in good, or "high quality" waters may be very low, or not detectable, while existing water quality standards for nutrients may be much higher. In such waters, some degradation of water quality may occur without compromising protection of beneficial uses. State Water Board Resolution 68-16 *Statement of Policy with Respect to Maintaining High Quality of Waters in California* (Resolution 68-16) was adopted in October of 1968 to address high quality waters in the state. Title 40 of the Code of Federal Regulations, Section 131.12—Antidegradation Policy (40 CFR 131.12) was developed in 1975 to ensure water quality necessary to protect existing uses in waters of the United States. Resolution 68-16 applies to discharges to all high quality waters of the state, including groundwater and surface water (Water Code section 13050[e]); 40 CFR 131.12 applies only to surface waters.

The requirement to implement the Antidegradation Policy is contained in Resolution 68-16 (provision 2 presented below) and in the Basin Plan. The Basin Plan states that the Central Valley Water Board actions must conform with State Water Board plans and policies and among these policies is Resolution 68-16, which requires that:

1. *"Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies."*
2. *"Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."*

For discharges to surface waters only, the Federal Antidegradation Policy (Section 131.12, Title 40, CFR) requires:

1. *"Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.*
2. *Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control.*
3. *When high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.*
4. *In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with section 316 of the Act."*

The State Water Board has interpreted Resolution 68-16 to incorporate the Federal Antidegradation Policy in situations where the policy is applicable. (SWRCB Order WQ 86-17.). The application of the

Federal Antidegradation Policy to nonpoint source discharges (including discharges from irrigated agriculture) is limited.[25]

Administrative Procedures Update 90-004, Antidegradation Policy Implementation for NPDES Permitting, provides guidance for the Regional Water Boards in implementing Resolution 68-16 and 40 CFR 131.12, as these provisions apply to NPDES permitting. APU 90-004 is not applicable in the context of this Order because nonpoint discharges from agriculture are exempt from NPDES permitting.

A number of key terms are relevant to application of Resolution 68-16 and 40 CFR 131.12 to this Order. These terms are described below.

High Quality Waters: Resolution 68-16 applies whenever "existing quality of water is better than quality established in policies as of the date such policies become effective,"[26] and 40 CFR 131.12 refers to "quality of waters [that] exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation." Such waters are "high quality waters" under the state and federal antidegradation policies. In other words, high quality waters are waters with a background quality of better quality than that necessary to protect beneficial uses.[27] The Water Code directs the State Water Board and the Regional Water Boards to establish water quality objectives for the reasonable protection of beneficial uses. Therefore, where water bodies contain levels of water quality constituents or characteristics that are better than the established water quality objectives, such waters are considered high quality waters.

Both state and federal guidance indicates that the definition of high quality waters is established by constituent or parameter [State Water Board Order WQ 91-10; USEPA Water Quality Handbook, Chapter 4 Antidegradation (40 CFR 131.12) ("EPA Handbook")]. Waters can be of high quality for some constituents or beneficial uses but not for others. With respect to degraded groundwater, a portion of the aquifer may be degraded with waste while another portion of the same aquifer may not be degraded with waste. The portion not degraded is high quality water within the meaning of Resolution 68-16. See State Water Board Order WQ 91-10.

In order to determine whether a water body is a high quality water with regard to a given constituent, the background quality of the water body unaffected by the discharge must be compared to the water quality objectives. If the quality of a water body has declined since the adoption of the relevant policies and that subsequent lowering was not a result of regulatory action consistent with the state antidegradation policy, a baseline representing the historically higher water quality may be an

[25] 40 CFR 131.12(a)(2) requires that the "State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and *all cost-effective and reasonable best management practices for nonpoint source control.*" The EPA Handbook, Chapter 4, clarifies this as follows: "Section 131.12(a)(2) does not mandate that States establish controls on nonpoint sources. The Act leaves it to the States to determine what, if any, controls on nonpoint sources are needed to provide attainment of State water quality standards (See CWA Section 319). States may adopt enforceable requirements, or voluntary programs to address nonpoint source pollution. Section 40 CFR 131.12(a)(2) does not require that States adopt or implement best management practices for nonpoint sources prior to allowing point source degradation of a high quality water. However, States that have adopted nonpoint source controls must assure that such controls are properly implemented before authorization is granted to allow point source degradation of water quality." Accordingly, in the context of nonpoint discharges, the BPTC standard established by state law controls.

[26] Such policies would include policies such as State Water Board Resolution 88-63, Sources of Drinking Water Policy, establishing beneficial uses, and water quality control plans.

[27] USEPA Water Quality Handbook, Chapter 4 Antidegradation (40 CFR 131.12) , defines "high quality waters" as "those whose quality exceeds that necessary to protect the section 101(a)(2) goals of the Act [Clean Water Act], regardless of use designation."

appropriate representation of background.[28] However, if the decline in water quality was permitted consistent with state and federal antidegradation policies, the most recent water quality resulting from permitted action constitutes the relevant baseline for determination of whether the water body is high quality. See, e.g., SWRCB Order WQ 2009-0007 at 12. Additionally, if water quality conditions have improved historically, the current higher water quality would again be the point of comparison for determining the status of the water body as a high quality water.

Best Practicable Treatment or Control: Resolution 68-16 requires that, where degradation of high quality waters is permitted, best practicable treatment or control (BPTC) limits the amount of degradation that may occur. Neither the Water Code nor Resolution 68-16 defines the term "best practicable treatment or control."

Despite the lack of a BPTC definition, certain State Water Board water quality orders and other documents provide direction on the interpretation of BPTC. The State Water Board has stated: "one factor to be considered in determining BPTC would be the water quality achieved by other similarly situated dischargers, and the methods used to achieve that water quality." (See Order WQ 2000-07, at pp. 10-11). In a "Questions and Answers" document for Resolution 68-16 (the Questions and Answers Document), BPTC is interpreted to additionally include a comparison of the proposed method to existing proven technology; evaluation of performance data (through treatability studies); comparison of alternative methods of treatment or control, and consideration of methods currently used by the discharger or similarly situated dischargers.[29] The costs of the treatment or control should also be considered. Many of the above considerations are made under the "best efforts" approach described later in this section. In fact, the State Water Board has not distinguished between the level of treatment and control required under BPTC and what can be achieved through "best efforts."

The Regional Water Board may not "specify the design, location, type of construction, or particular manner in which compliance may be had with [a] requirement, order, or decree" (Water Code 13360). However, the Regional Water Board still must require the discharger to demonstrate that the proposed manner of compliance constitutes BPTC (SWRCB Order WQ 2000-7). The requirement of BPTC is discussed in greater detail below.

Maximum Benefit to People of the State: Resolution 68-16 requires that where degradation of water quality is permitted, such degradation must be consistent with the "maximum benefit to people of the state." Only after "intergovernmental coordination and public participation" and a determination that "allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located" does 40 CFR 131.12 allow for degradation.

As described in the Question and Answers Document, factors considered in determining whether degradation of water quality is consistent with maximum benefit to people of the State include economic and social costs, tangible and intangible, of the proposed discharge, as well as the environmental aspects of the proposed discharge, including benefits to be achieved by enhanced pollution controls. Closely related to the BPTC requirement, consideration must be given to alternative treatment and control methods and whether lower water quality can be abated or avoided through reasonable means, and the implementation of feasible alternative treatment or control methods should be considered.

USEPA guidance clarifies that the federal antidegradation provision "is not a 'no growth' rule and was never designed or intended to be such. It is a policy that allows public decisions to be made on important environmental actions. Where the state intends to provide for development, it may decide

[28] The state antidegradation policy was adopted in 1968, therefore water quality as far back as 1968 may be relevant to an antidegradation analysis. For purposes of application of the federal antidegradation policy only, the relevant year would be 1975.
[29] See *Questions and Answers, State Water Resources Control Board, Resolution 68-16* (February 16, 1995).

under this section, after satisfying the requirements for intergovernmental coordination and public participation, that some lowering of water quality in "high quality waters" is necessary to accommodate important economic or social development" (EPA Handbook for Developing Watershed Plans to Restore and Protect Our Waters, Chapter 4). Similarly, under Resolution 68-16, degradation is permitted where maximum benefit to the people of the state is demonstrated.

Water Quality Objectives and Beneficial Uses: As described above, Resolution 68-16 and Section 40 CFR 131.12 are both site-specific evaluations that are not easily employed to address large areas or broad implementation for classes of discharges. However, as a floor, any degradation permitted under the antidegradation policies must not cause an exceedance of water quality objectives or a pollution or nuisance. Furthermore, the NPS Policy establishes a floor for all water bodies in that implementation programs must address NPS pollution in a manner that achieves and maintains water quality objectives and beneficial uses.

Waters that are Not High Quality: The "Best Efforts" Approach: Where a water body is at or exceeding water quality objectives already, it is not a high quality water and is not subject to the requirements of the antidegradation policy. As stated previously, data collected by the Central Valley Water Board, dischargers, educational institutions, and others demonstrate that many water bodies in the Central Valley Region are already impaired for various constituents associated with irrigated agricultural activities.

Where a water body is not high quality and the antidegradation policies are accordingly not triggered, the Central Valley Water Board should, under State Water Board precedent, set limitations more stringent than the objectives set forth in the Basin Plan. The State Water Board has directed that, "where the constituent in a groundwater basin is already at or exceeding the water quality objective, . . . the Regional Water Board should set limitations more stringent than the Basin Plan objectives if it can be shown that those limitations can be met using 'best efforts.'" SWRCB Order WQ 81-5; *see also* SWRCB Orders Nos. WQ 79-14, WQ 82-5, WQ 2000-07. Finally, the NPS Policy establishes standards for management practices.

The "best efforts" approach involves the Regional Water Board establishing limitations expected to be achieved using reasonable control measures. Factors which should be analyzed under the "best efforts" approach include the effluent quality achieved by other similarly situated dischargers, the good faith efforts of the discharger to limit the discharge of the constituent, and the measures necessary to achieve compliance. SWRCB Order WQ 81-5, at p. 7. The State Water Board has applied the "best efforts" factors in interpreting BPTC. (See SWRCB Order Nos. WQ 79-14, and WQ 2000-07).

In summary, the board may set discharge limitations more stringent than water quality objectives even outside the context of the antidegradation policies. The "best efforts" approach must be taken where a water body is not "high quality" and the antidegradation policies are accordingly not triggered.

Application of Resolution 68-16 Requirements to this Order

The determination of a high quality water within the meaning of the antidegradation policies is water body and constituent-specific. Very little guidance has been provided in state or federal law with respect to applying the antidegradation policy to a program or general permit where multiple water bodies are affected by various discharges, some of which may be high quality waters and some of which may, by contrast, have constituents at levels that already exceed water quality objectives. Given these limitations, the board has used readily available information regarding the water quality status of surface and ground waters in the Western San Joaquin River Watershed to construct provisions in this Order to meet the substantive requirements of Resolution 68-16.

This Order regulates discharges from thousands of individual fields to a very large number of water bodies within the Western San Joaquin River Watershed. There is no comprehensive, waste

constituent–specific information available for all surface waters and groundwater aquifers accepting irrigated agricultural wastes that would allow site-specific assessment of current conditions. Likewise, there are no comprehensive historic data.[30]

However, data collected by the Central Valley Water Board, dischargers, educational institutions, and others demonstrate that many water bodies within the Western San Joaquin River Watershed are already impaired for various constituents that are or could be associated with irrigated agricultural activities. As described above, there are surface water quality management plan requirements for the following constituents and indicators: ammonia, arsenic, boron, chlordane, chlorpyrifos, copper, DDT/DDD/DDE, diazinon, dieldrin, dimethoate, diuron, dissolved oxygen, electrical conductivity, *E. coli*, HCH, lead, malathion, methyl parathion, nickel, pH, selenium, simazine, total dissolved solids, zinc, sediment toxicity, and water column toxicity to algae, fathead minnow, and water flea (Table 2). Those same data collection efforts also indicate that surface water bodies within the watershed meet objectives for particular constituents and would be considered "high quality waters" with respect to those constituents.

Similarly, as described above in the "Groundwater Quality Monitoring" section, 15 percent of sampled square mile sections (i.e., sections containing wells for which sampling information is available) had a maximum nitrate level above applicable water quality objectives. The groundwater represented by these wells may not be considered "high quality" with respect to nitrates. However, it is unknown when the degradation occurred. Available data show that currently existing quality of certain water bodies is better than the water quality objectives; for example, deeper groundwaters, represented by municipal supply wells, are generally high quality with respect to pesticides and nitrates. Degradation of such waters can be permitted only consistent with the state and federal antidegradation policies.

Given the significant variation in conditions over the broad areas covered by this Order, any application of the antidegradation requirements must account for the fact that at least some of the waters into which agricultural discharges will occur are high quality waters (for some constituents). Further, the Order provisions should also account for the fact that even where a water body is not high quality (such that discharge into that water body is not subject to the antidegradation policy), the board should, under State Water Board precedent, impose limitations more stringent than the objectives set forth in the Basin Plan, if those limits can be met by "best efforts."

Consistency with BPTC and the "Best Efforts" Approach

Due to the numerous commodities being grown on irrigated agricultural lands and varying geological conditions within the Western San Joaquin River Watershed, identification of a specific technology or treatment device as BPTC or "best efforts" has not been accomplished. By contrast, there are a variety of technologies that have been shown to be effective in protecting water quality. For example, Chapter 5 of the Irrigated Lands Program Existing Conditions Report[31] (ECR) describes that there are numerous management practices that Members could implement to achieve water quality protection goals. The Central Valley Water Board recognizes that there is often site-specific, crop-specific, and regional variability that affects the selection of appropriate management practices, as well as design constraints and pollution-control effectiveness of various practices.

Growers need the flexibility to choose management practices that best achieve a management measure's performance expectations given their own unique circumstances. Management practices developed for agriculture are to be used as an overall system of measures to address nonpoint-source

[30]Irrigated lands discharges have been regulated under a conditional waiver since 1982, but comprehensive data as to trends under the waiver are not available.
[31] California Regional Water Quality Control Board, Central Valley Region, and Jones and Stokes. 2008. *Irrigated Lands Regulatory Program Existing Conditions Report.* Sacramento, CA.

pollution sources on any given site. In most cases, not all of the practices will be needed to address the nonpoint sources at a specific site. Operations may have more than one constituent of concern to address and may need to employ two or more of the practices to address the multiple sources. Where more than one source exists, the application of the practices should be coordinated to produce an overall system that adequately addresses all sources for the site in a cost-effective manner.

There is no specific set of technologies, practices, or treatment devices that can be said to achieve BPTC/best efforts universally in the watershed. This Order, therefore, establishes a set of performance standards that must be achieved and an iterative planning approach that will lead to implementation of BPTC/best efforts. The iterative planning approach will be implemented as two distinct processes, 1) establishment of a baseline set of universal farm water quality management standards combined with upfront evaluation, planning and implementation of management practices to attain those goals, and 2) additional planning and implementation measures where degradation trends are observed that threaten to impair a beneficial use or where beneficial uses are impaired (i.e., water quality objectives are not being met). Taken together, these processes are considered BPTC/best efforts. The planning and implementation processes that growers must follow on their farms should lead to the on-the-ground implementation of the optimal practices and control measures to address waste discharge from irrigated agriculture.

1. Farm Management Performance Standards

This Order establishes on farm standards for implementation of management practices that all Members must achieve. The selection of appropriate management practices must include analysis of site-specific conditions, waste types, discharge mechanisms, and crop types. Considering this, as well as the Water Code 13360 mandate that the Regional Water Board not specify the manner of compliance with its requirements, selection must be done at the farm level. Following are the performance standards that all Members must achieve:

a. minimize waste discharge offsite in surface water,
b. minimize or eliminate the discharge of sediment above background levels,
c. minimize percolation of waste to groundwater,
d. minimize excess nutrient application relative to crop consumption,
e. prevent pollution and nuisance
f. achieve and maintain water quality objectives and beneficial uses,
g. protect wellheads from surface water intrusion.

BPTC is not defined in Resolution 68-16. However, the State Water Board describes in its 1995 Questions and Answers, Resolution 68-16: "To evaluate the best practicable treatment or control method, the discharger should compare the proposed method to existing proven technology; evaluate performance data, e.g., through treatability studies; compare alternative methods of treatment or control; and/or consider the method currently used by the discharger or similarly situated dischargers." Available state and federal guidance on management practices may serve as a measure of the types of water quality management goals for irrigated agriculture recommended throughout the state and country (e.g., water quality management goals for similarly situated dischargers). This will provide a measure of whether implementation of the above performance standards will lead to implementation of BPTC/best efforts.

- As part of California's Nonpoint Source Pollution Control Program, the State Water Board, California Coastal Commission, and other state agencies have identified seven management measures to address agricultural nonpoint sources of pollution that affect state waters (*California's Management Measures for Polluted Runoff*, referred to below as "Agriculture

Management Measures").[32] The agricultural management measures include practices and plans installed under various NPS programs in California, including systems of practices commonly used and recommended by the USDA as components of resource management systems, water quality management plans, and agricultural waste management systems.

- USEPA's National Management Measures to Control Nonpoint Source Pollution from Agriculture (EPA 841-B-03-004, July 2003;),[33] "*is a technical guidance and reference document for use by State, local, and tribal managers in the implementation of nonpoint source pollution management programs. It contains information on the best available, economically achievable means of reducing pollution of surface and ground water from agriculture."*

Both of the above guidance documents describe a series of management measures, similar to the farm management performance standards and related requirements of the Order. The agricultural management measures described in the state and USEPA reference documents generally include: 1) erosion and sediment control, 2) facility wastewater and runoff from confined animal facilities, 3) nutrient management, 4) pesticide management, 5) grazing management, 6) irrigation water management, and 7) education and outreach. A comparison of the recommendations with the Order's requirements is provided below.

Management measure 1, erosion and sediment control. Practices implemented to minimize waste discharge offsite and erosion (performance standards a) and b) are consistent with this management measure to achieve erosion and sediment control. The Order requires that all Members implement sediment discharge and erosion prevention practices to minimize or eliminate the discharge of sediment above background levels. Those Members that have the potential to cause erosion and discharge sediment that may degrade surface waters must develop a farm-specific sediment and erosion control plan.

Management measure 2 is not applicable, as this Order does not address waste discharges from confined animal facilities.

Management measure 3, nutrient management. As described in the State's Agricultural Management Measures document, *"this measure addresses the development and implementation of comprehensive nutrient management plans for areas where nutrient runoff is a problem affecting coastal waters and/or water bodies listed as impaired by nutrients."* Nutrient management practices implemented to meet performance standard d are consistent with this measure. The Order also requires nitrogen management plans to be developed by Members within both high vulnerability and low vulnerability groundwater areas. Nitrogen management plans require Members to document how their fertilizer use management practices meet performance standard d. Finally, where nutrients are causing exceedances of water quality objectives in surface waters, this Order would require development of a detailed SQMP which would address sources of nutrients and require implementation of practices to manage nutrients. Collectively, these requirements work together in a manner consistent with management measure 3.

Management measure 4, pesticide management. As described in the State's Agricultural Management Measures document, this measure *"is intended to reduce contamination of surface*

[32] *California's Management Measures for Polluted Runoff* (<http://www.waterboards.ca.gov/water_issues/programs/nps/docs/cammpr/info.pdf>)
[33] (<http://water.epa.gov/polwaste/nps/agriculture/agmm_index.cfm>)

water and groundwater from pesticides." Performance standards a, c, e, f, and g are consistent with this management measure, requiring Members to implement practices that minimize waste discharge to surface and groundwater (such as pesticides), prevent pollution and nuisance, achieve and maintain water quality objectives, and implement wellhead protection measures.

Management measure 5, grazing management. As described in the state Agriculture Management Measures document, this measure is "*intended to protect sensitive areas (including streambanks, lakes, wetlands, estuaries, and riparian zones) by reducing direct loadings of animal wastes and sediment.*" While none of the Order's farm management goals directly address grazing management, performance standards a, b, e and f, when considered by an irrigated pasture operation would lead to the same management practices, e.g., preventing erosion, discharge of sediment, and ensuring that animal waste loadings do not cause pollution, nuisance, and achieve water quality objectives. The Order also requires that all Members implement sediment discharge and erosion prevention practices to minimize or eliminate the discharge of sediment above background levels.

Management measure 6, irrigation water management. As described in the state Agricultural Management Measures document, this measure "*promotes effective irrigation while reducing pollutant delivery to surface and ground waters.*" Performance standards a and c, requiring Members to minimize waste discharge to surface and groundwater will lead to practices that will also achieve this management measure. For example, a Member may choose to implement efficient irrigation management programs (e.g., timing, uniformity testing), technologies (e.g., spray, drip irrigation, tailwater return), or other methods to minimize discharge of waste to surface water and percolation to groundwater.

Management measure 7, education and outreach. The Order requires that third-party groups conduct education and outreach activities to inform Members of program requirements and water quality problems.

Implementation of practices to achieve the Order's water quality requirements described above is consistent with the state and federal guidance for management measures. Because these measures are recommended for similarly situated dischargers (e.g., agriculture), compliance with the requirements of the Order will lead to implementation of BPTC/best efforts by all Members.

2. Additional Planning and Implementation Measures (SQMP/GQMPs)

This Order requires development of water quality management plans (surface or groundwater) where degradation trends are observed that threaten to impair a beneficial use or where beneficial uses are impaired (i.e., water quality objectives are not being met). SQMPs/GQMPs include requirements to investigate sources, develop strategies to implement practices to ensure waste discharges are meeting the Orders surface and groundwater receiving water limitations, and develop a monitoring strategy to provide feedback on the effectiveness of the management plan. In addition, the SQMPs/GQMPs must include actions to "Identify, validate, and implement management practices to reduce loading of COC's [constituents of concern] to surface water or groundwater, as applicable, thereby improving water quality" (see Appendix MRP-1). Under these plans, additional management practices will be implemented in an iterative manner, to ensure that the management practices represent BPTC/best efforts and that degradation does not threaten beneficial uses. The SQMPs/GQMPs need to meet the performance standards set forth in this Order. The SQMPs/GQMPs are also reviewed periodically to determine whether adequate progress is being made to address the degradation trend or impairment. If adequate progress is not being made, then the Executive Officer can require field monitoring studies,

on-site verification of implementation of practices, or the board may revoke the coverage under this Order and regulate the discharger through an individual WDR.

In cases where effectiveness of practices in protecting water quality is not known, the data and information gathered through the SQMP/GQMP and MPEP processes will result in the identification of management practices that meet the performance standards and represent BPTC/best efforts. Since the performance standards also apply to low vulnerability areas with high quality waters, those data and information will help inform the Members and board of the types of practices that meet performance standard requirements.

It is also important to note that in some cases, other agencies may establish performance standards that are equivalent to BPTC and may be relied upon as part of a SQMP or GQMP. For example, the Department of Pesticide Regulation (DPR) has established Groundwater Protection Areas within the Western San Joaquin River Watershed that require growers to implement specific groundwater quality protection requirements for certain pesticides. The practices required under DPR's Groundwater Protection Program are considered BPTC for those pesticides requiring permits in groundwater protection areas, since the practices are designed to prevent those pesticides from reaching groundwater and they apply uniformly to similarly situated dischargers in the area.

The State Water Board indicates in its Questions and Answers, Resolution 68-16: "To evaluate the best practicable treatment or control method, the discharger should…evaluate performance data, e.g., through treatability studies..." Water quality management plans, referred to as SQMPs/GQMPs above, institute an iterative process whereby the effectiveness of any set of practices in minimizing degradation will be periodically reevaluated as necessary and/or as more recent and detailed water quality data become available. This process of reviewing data and instituting additional practices where necessary will continue to assure that BPTC/best efforts are implemented and will facilitate the collection of information necessary to demonstrate the performance of the practices. This iterative process will also ensure that the highest water quality consistent with maximum benefit to the people of the state will be maintained.

Resolution 68-16 does not require Members to use technology that is better than necessary to prevent degradation. As such, the board presumes that the performance standards required by this Order are sufficiently achieving BPTC where water quality conditions and management practice implementation are already preventing degradation. Further, since BPTC determinations are informed by the consideration of costs, it is important that discharges in these areas not be subject to the more stringent and expensive requirements associated with SQMPs/GQMPs. Therefore, though Members in "low vulnerability" areas must still meet the farm management performance standards described above, they do not need to incur additional costs associated with SQMPs/GQMPs where there is no evidence of their contributing to degradation of high quality waters.

3. Management Practices Evaluation Program (MPEP) and Other Reporting and Planning Requirements

In addition to the SQMPs/GQMPs, the Order includes a comprehensive suite of reporting requirements that should provide the board with the information it needs to determine whether the necessary actions are being taken to achieve BPTC and protect water quality, where applicable. In high vulnerability groundwater areas, the third-party must develop and implement a Management Practices Evaluation Program (MPEP). The MPEP will include evaluation studies of management practices to determine whether those practices are protective of groundwater quality (e.g., that will not cause or contribute to exceedances of water quality objectives) for identified constituents of concern under a variety of site conditions. If the management practices are not protective, new practices must be developed,

implemented, and evaluated. Any management practices that are identified as being protective of water quality, or those that are equally effective, must be implemented by Members who farm under similar conditions (e.g., crop type, soil conditions) (see provision IV.B.21 of the Order).

Farm management performance standards are applicable to both high and low vulnerability areas. The major difference in high and low vulnerability areas is the priority for action. High vulnerability areas may contain both high and low quality waters with respect to constituents discharged by irrigated agriculture, and the MPEP and other reporting, planning, and implementation requirements will determine and require actions to achieve BPTC and best efforts for high and low quality waters, respectively. Because low vulnerability areas present less of a threat of degradation or pollution, additional time is provided, or a lower level of review and certification is required, for some of the planning and reporting requirements. Also, while an MPEP is not required for the low vulnerability areas, the actions required by the MPEP must be implemented as applicable by Members in both high and low vulnerability areas, and will therefore result in the implementation of BPTC and best efforts in high and low vulnerability areas, and will inform evaluation of compliance with performance standards in all areas. The Order requires implementation of actions that achieve BPTC and best efforts for both high and low quality waters, respectively.

To determine whether a degradation trend is occurring, the Order requires representative surface water monitoring of specific “discharge” monitoring sites. The data gathered from the surface water monitoring effort will allow the board to determine whether there is a trend in degradation of water quality related to discharges from irrigated agriculture. For groundwater, a trend monitoring program is required in both “low vulnerability” and “high vulnerability” areas. The trend monitoring for the low vulnerability areas is required to help the board determine whether any trend in degradation of groundwater quality is occurring. For pesticides in groundwater, the board will initially rely on the information gathered through the Department of Pesticide Regulation’s (DPR) monitoring efforts to determine whether any degradation related to pesticides is occurring. If the available groundwater quality data (e.g., nitrates, pesticides) in a low vulnerability area suggest that degradation is occurring that could threaten to impair beneficial uses, then the area would be re-designated as a high vulnerability area.

The third-party is required to prepare a Groundwater Quality Assessment Report (GAR) and update that report every five years. The GAR will include an identification of high vulnerability and low vulnerability areas, including identification of constituents that could cause degradation. The initial submittal of the GAR will include a compilation of water quality data, which the board and third-party will use to evaluate trends. The periodic updates to the GAR will require the consideration of data collected by the third-party, as well as other organizations, and will also allow the board and third-party to evaluate trends. The GAR will provide a reporting vehicle for the board to periodically evaluate water quality trends to determine whether degradation is occurring. If the degradation triggers the requirement for a GQMP, then the area in which the GQMP is required would be considered “high vulnerability” and all of the requirements associated with a high vulnerability area would apply to those Members.

All Members will also need to report on their management practices through the farm evaluation process. In addition, all members will need to prepare nitrogen management plans prepared in accordance with the nitrogen management plan templates approved by the Executive Officer. The plans require Members to document how their fertilizer use management practices minimize excess nutrient application relative to crop consumption. The planning requirements are phased according to threat level such that members in low vulnerability areas have more time to complete their plans than those in high vulnerability areas. Members in high vulnerability areas will need to submit nitrogen

management plan summary reports. Through the farm evaluation, the Member must identify "…on-farm management practices implemented to achieve the Order's farm management performance standards." (as described in Monitoring and Reporting Program R5-2012-0116, section VI.A).[34] In addition, the nitrogen management plan summary reports required in high vulnerability areas will include, at a minimum, information on the ratio of total nitrogen available for crop uptake to the estimated crop consumption of nitrogen. Nitrogen management plans and nitrogen management plan summary reports provide indicators as to whether the Member is meeting the performance standard to minimize excess nutrient application relative to crop consumption of nitrogen. The MPEP study process would be used to determine whether the nitrogen consumption ratio meets the performance standard of the Order.

Summary

Members are required to implement practices to meet the above goals and periodically review the effectiveness of implemented practices and make improvements where necessary. Members in both high and low vulnerability areas will identify the practices they are implementing to achieve water quality protection goals as part of farm evaluations and nitrogen management plans. Members in high vulnerability areas have additional requirements associated with the SQMPs/GQMPs; preparing sediment and erosion control plans; implementing practices identified as protective through the MPEP studies; and reporting on their activities more frequently.

Also, the Order requires water quality monitoring and assessments aimed to identify trends, evaluate effectiveness of management practices, and detect exceedances of water quality objectives. The process of periodic review of SQMPs/GQMPs provides a mechanism for the board to better ensure that Members are meeting the requirements of the Order, if the third-party led efforts are not effective in ensuring BPTC is achieved, where applicable.

Requirements for individual farm evaluations, nitrogen management plans, sediment and erosion control plans, management practices tracking, and water quality monitoring and reporting are designed to ensure that degradation is minimized and that management practices are protective of water quality. These requirements are aimed to ensure that all irrigated lands are implementing management practices that minimize degradation, the effectiveness of such practices is evaluated, and feedback monitoring is conducted to ensure that degradation is limited. Even in low vulnerability areas where there is no information indicating degradation of a high quality water, the farm management performance standards act as a preventative requirement to ensure degradation does not occur. The information and evaluations conducted as part of the GQMP/SQMP process will help inform those Members in low vulnerability areas of the types of practices that meet the performance standards. In addition, even Members in low vulnerability groundwater areas must implement practices (or equivalent practices) that are identified as protective through the MPEP studies (where these practices are applicable to the Members site conditions). The farm evaluations and nitrogen management plan requirements for low vulnerability areas provide indicators as to whether Members are meeting applicable performance standards. The required monitoring and periodic reassessment of vulnerability designations will allow the board to determine whether degradation is occurring and whether the status of a low vulnerability area should be changed to high vulnerability.

[34] Farm evaluations will be developed using templates approved by the Executive Officer. Because the ILRP-wide templates have been developed under the East San Joaquin River Watershed WDRs (R5-2012-0116), the requirements for the template content is included in the East San Joaquin River Watershed WDRs and referenced in this Order. Farm Evaluations conducted under this Order utilizing the approved templates will achieve the requirement stated here.

The Order is designed to achieve site-specific antidegradation and antidegradation-related requirements through implementation of BPTC/best efforts as appropriate and monitoring, evaluation, and reporting to confirm the effectiveness of the BPTC/best efforts measures in achieving their goals. The Order relies on implementation of practices and treatment technologies that constitute BPTC/best efforts, based to the extent possible on existing data, and requires monitoring of water quality and evaluation studies to ensure that the selected practices in fact constitute BPTC where degradation of high quality waters is or may be occurring, and best efforts where waters are already degraded. Because the State Water Board has not distinguished between the level of treatment and control required under BPTC and what can be achieved through best efforts, the requirements of this Order for BPTC/best efforts apply equally to high quality waters and already degraded waters.

This Order allows limited degradation of existing high quality waters. This limited degradation is consistent with maximum benefit to the people of the state for the following reasons:

- At a minimum, this Order requires that irrigated agriculture achieve and maintain compliance with water quality objectives and beneficial uses;
- The requirements implementing the Order will result in use of BPTC where irrigated agricultural waste discharges may cause degradation of high quality waters; where waters are already degraded, the requirements will result in the pollution controls that reflect the “best efforts” approach. Because BPTC will be implemented, any lowering of water quality will be accompanied by implementation of the most appropriate treatment or control technology;
- Central Valley communities depend on irrigated agriculture for employment (PEIR, Appendix A);
- The state and nation depend on Central Valley agriculture for food (PEIR, Appendix A);
- Consistent with the Order’s and PEIR’s stated goal of ensuring that irrigated agricultural discharges do not impair access to safe and reliable drinking water, the Order protects high quality waters relied on by local communities from degradation of their water supplies by current practices on irrigated lands. The Order is designed to prevent irrigated lands discharges from causing or contributing to exceedances of water quality objectives, which include maximum contaminant levels for drinking water. The Order also is designed to detect and address exceedances of water quality objectives, if they occur, in accordance with the compliance time schedules provided therein;
- The Order prohibits degradation above a water quality objective and establishes representative surface water monitoring and groundwater monitoring programs to determine whether irrigated agricultural waste discharges are in compliance with the Order’s receiving water limitations, local communities should not incur any additional treatment costs associated with the degradation authorized by this Order. In situations where water bodies are already above water quality objectives and communities are currently incurring treatment costs to use the degraded water, the requirements established by this Order will institute time schedules for reductions in irrigated agricultural sources to achieve the Order’s receiving water limitations; therefore, this Order will, over time, work to reduce treatment costs of such communities; and
- The Order requires Members to achieve water quality management practice performance standards and includes farm management practices monitoring to ensure practices are implemented to achieve these standards. The iterative process whereby Members implement practices to achieve farm management performance standards, coupled with representative surface and groundwater monitoring feedback to assess whether practices are effective, will prevent degradation of surface and groundwater quality above water quality objectives.

The requirements of the Order and the degradation that would be allowed are consistent with State Water Board Resolution 68-16. The requirements of the Order will result in the implementation of BPTC necessary to assure the highest water quality consistent with the maximum benefit to the people of the state. The receiving water limitations in section III of the Order, the compliance schedules in section XII, and the Monitoring and Reporting Program’s requirements to track compliance with the Order, are

designed to ensure that the authorized degradation will not cause or contribute to exceedances of water quality objectives, unreasonably affect beneficial uses, or cause a condition of pollution or nuisance. Finally, the iterative process of reviewing data and instituting additional management practices where necessary will ensure that the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

California Water Code Sections 13141 and 13241

The total estimated annual average cost of compliance with this Order, e.g., summation of costs for administration, monitoring, reporting, tracking, implementation of management practices, is expected to be approximately $6.95 per acre greater than the cost associated with the protection of surface water only under the Coalition Group Conditional Waiver. The total estimated average cost of compliance associated with continuation of the previous Coalition Group Conditional Waiver within the Western San Joaquin River Watershed is expected to be approximately 55 million dollars per year ($109.64 per acre annually). The total average estimated cost of this Order is 58 million dollars per year ($116.60 per acre annually).

Approximately $109.55 of the estimated $116.60 per acre annual cost of the Order is associated with implementation of water quality management practices (see discussion below for a breakdown of estimated costs). This Order does not require that Members implement specific water quality management practices.[35] Many of the management practices that have water quality benefits can have other economic and environmental benefits (e.g., improved irrigation can reduce water and energy consumption, as well as reduce runoff). Management practice selection will be based on decisions by individual Members in consideration of the unique conditions of their irrigated agricultural lands; water quality concerns; and other benefits expected from implementation of the practice. As such, the cost estimate is an estimate of potential, not required costs of implementing specific practices. Any costs for water quality management practices will be based on a market transaction between Members and those vendors or individuals providing services or equipment and not based on an estimate of those costs provided by the board. The cost estimates include estimated fees the third-party may charge to prepare the required reports and conduct the required monitoring, as well as annual permit fees that are charged to permitted dischargers for permit coverage. In accordance with the State Water Board's Fee Regulations, the current annual permit fee charged to members covered by this Order is $0.56/acre. The combined total estimated average costs that include third-party and state fees are estimated to be $4.99 /acre annually or less than 5% of the total estimated average cost of $116.60 per acre. There are a number of funding programs that may be available to assist growers in the implementation of water quality management practices through grants and loans (e.g., Environmental Quality Incentives Program, State Water Board Agricultural Drainage Management Loan Program). Following is a discussion regarding derivation of the cost estimate for the Order.

This Order, which implements the long-term ILRP within the Western San Joaquin River Watershed, is based mainly on Alternatives 2 and 4 of the PEIR, but does include elements from Alternatives 2-5. The Order contains the third-party lead entity structure, regional surface and groundwater management plans, and regional surface water quality monitoring approach similar to Alternative 2 of the PEIR; farm planning, management practices tracking, nitrogen tracking, and regional groundwater monitoring similar to Alternative 4 of the PEIR; sediment and erosion control plan (under Alternative 3, "farm plan") recommendation/ certification requirements similar to Alternative 3; prioritized installation of groundwater monitoring wells similar to Alternative 5; and a prioritization system based on systems described by Alternatives 2 and 4. Therefore, potential costs of these portions of the Order are estimated using the costs for these components of Alternatives 2-5 given in the *Draft Technical Memorandum Concerning the*

[35] Per Water Code section 13360, the Central Valley Water Board may not specify the manner in which a Member complies with water quality requirements.

Economic Analysis of the Irrigated Lands Regulatory Program (Economics Report).[36] Table 6 summarizes the major regulatory elements of the Order and provides reference to the PEIR alternative basis.

Table 6. Summary of regulatory elements

Order elements	Equivalent element from Alternatives 2-5
Third-party administration	Alternative 2
Farm evaluation Sediment and erosion control plan Nitrogen management plans	Alternative 4: farm water quality management plan and certified nutrient management plan
Recommended/ certified sediment and erosion plans	Alternative 3: certification of farm water quality plans
Surface and groundwater management plans	Alternative 2 surface and groundwater management plans
Regional surface water monitoring	Alternative 2 regional surface water monitoring
Regional trend groundwater monitoring	Alternative 4 regional groundwater monitoring
Management practices evaluation program	Alternative 4 regional groundwater monitoring, targeted site-specific studies to evaluate the effects of changes in management practices on groundwater quality and Alternative 5 installation of groundwater monitoring wells at prioritized sites
Management practice reporting	Alternative 4 tracking of practices
Nitrogen management plan summary reporting	Alternative 4 nutrient tracking
Management practices implementation	Alternative 2 or 4 management practice implementation

The administrative costs of the Order are estimated to be similar to the costs shown for Alternative 2 in Table 2-19 of the Economics Report. Additional costs have been included for third-party preparation of: notice of applicability, sediment and erosion assessment report, monitoring report. Farm evaluation, sediment and erosion control plan and nitrogen management planning (farm planning) costs are estimated using the costs for farm planning (page 2-22, Economics Report, $2,500 per Member plus an additional annual cost for updating farm planning documents and associated reporting). Alternative 3's cost estimate for certification of individual farm water quality plans is included to estimate the potential cost of recommended/certified sediment and erosion control plans (Table 2-20, Economics Report). Total surface water monitoring and reporting costs are estimated to be similar to the costs shown for Alternative 2 –essentially a continuation of the current regional surface water monitoring approach. Total trend groundwater monitoring and reporting costs are estimated using regional groundwater monitoring costs and planning costs given on page 2-20 and Table 2-14 of the Economics Report, respectively. Additional cost estimates have been included for the groundwater assessment report and management practices evaluation program. Costs for installation of groundwater monitoring wells are estimated using the costs shown in Table 2-15 of the Economics Report. Tracking costs of management practices and nitrogen management plan information are estimated to be similar to the costs shown for Alternative 4 in Table 2-21 of the economics report –under "tracking." Management practices costs have been estimated for the Delta Mendota Canal Watershed (pages 3-60 to 3-65, Existing Conditions Report) generally using the methodology outlined in pages 2-6 to 2-16 of the Economics Report.[37] Estimated average annualized costs per acre of the Order relative to full implementation of the current waiver program in the Western San Joaquin River Watershed are summarized below in Table 7.

[36] ICF International. 2010. *Draft Technical Memorandum Concerning the Economic Analysis of the Irrigated Lands Regulatory Program.* Draft. July. (ICF 05508.05.) Sacramento, CA. Prepared for: Central Valley Regional Water Quality Control Board, Sacramento, CA

[37] The estimation for management practice costs does not include a potential cost for installation of tailwater return systems at irrigated pasture operations. Source studies for observed water/sediment toxicity in the watershed point to pesticides not used by irrigated pasture (see pg 3-65, Existing Conditions Report and Table 2-6, Economics Report).

Table 7. Estimated annual average per acre cost* of the Order relative to full implementation of the current program (PEIR Alternative 1) in the Western San Joaquin River Watershed.

	Order	Current program	Change
Administration	1.28	0.89	0.38
Farm planning	2.06	--	2.06
Monitoring/reporting/tracking	3.71	1.18	2.54
Management practices	109.55	107.57	1.97
Total	116.60	109.64	6.95

* Costs are an estimate of *potential*, not required costs of implementing specific practices.

The Basin Plans include an estimate of potential costs and sources of financing for the long-term irrigated lands program. The estimated costs were derived by analyzing the alternatives evaluated in the PEIR using the cost figures provided in the Economics Report. The Basin Plans cost estimate is provided as a range applicable to implementation of the program throughout the Central Valley. The Basin Plans' estimated total annualized cost of the irrigated lands program is $216 million to $1.3 billion, or $27 to $168 per acre.[38] The estimated total annual cost of this Order of $58 million dollars ($116.60 per acre) falls within the estimated cost range for the irrigated lands program as described in the Basin Plans when considering per acre costs ($27-$168 per acre).

The estimated total average annual cost per acre of Alternative 4 in the San Joaquin River Watershed is $121 (generally applicable to the Western San Joaquin River Watershed). The Order, based substantially on Alternative 4, has a similar cost and is expected to have similar overall economic impacts, as described in the Economics Report.[39]

California Water Code Section 13263

California Water Code section 13263 requires that the Central Valley Water Board consider the following factors, found in section 13241, when considering adoption of waste discharge requirements.

(a) Past, present, and probable future beneficial uses of water

The Central Valley Water Board's Water Quality Control Plan for the Sacramento and San Joaquin River Basins, and Water Quality Control Plan for the Tulare Lake Basin (Basin Plans) identify applicable beneficial uses of surface and groundwater within the Sacramento River Basin and within the Tulare Lake Basin. The Order protects the beneficial uses identified in the Basin Plan. Applicable past, present, and probable future beneficial uses of Sacramento and San Joaquin River Basin, and Tulare Lake Basin waters were considered by the Central Valley Water Board as part of the Basin Planning process and are reflected in the Basin Plans themselves. The Order is a general order applicable to a wide geographic area. Therefore, it is appropriate to consider beneficial uses as identified in the Basin Plans and applicable policies, rather than a site specific evaluation that might be appropriate for WDRs applicable to a single discharger.

[38] Per acre average cost calculated using an estimate for total irrigated agricultural acres in the Central Valley (7.9 million acres, Table 3-3, Economics Report).

[39] The estimated average cost of this Order is less than the cost estimated for Alternative 4. It is expected that the costs will not be exactly the same because the Order is based on components of alternatives other than Alternative 4 alone. Utilization of Alternative 4's potential economic impacts provides a conservative measurement of the Order's potential economic effects.

(b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto

Environmental characteristics of the Western San Joaquin River Basin and of the Tulare Lake Basin Area have been considered in the development of irrigated lands program requirements as part of the Central Valley Water Board's 2008 *Irrigated Lands Regulatory Program Existing Conditions Report* and the PEIR. In these reports, existing water quality and other environmental conditions throughout the Central Valley have been considered in the evaluation of six program alternatives for regulating waste discharge from irrigated lands. This Order's requirements are based on the alternatives evaluated in the PEIR.

(c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area

This Order provides a process to review these factors during implementation of water quality management plans (SQMPs/GQMPs). The Order requires that discharges of waste from irrigated lands to surface water and groundwater do not cause or contribute to an exceedance of applicable water quality objectives. SQMPs and GQMPs are required in areas where water quality objectives are not being met –where irrigated lands are a potential source of the concern, and in areas where irrigated agriculture may be causing or contributing to a trend of degradation that may threaten applicable beneficial uses. GQMPs are also required in high vulnerability groundwater areas. Under these plans, sources of waste must be estimated along with background water quality to determine what options exist for reducing waste discharge to ensure that irrigated lands are not causing or contributing to the water quality problem. The SQMPs and GQMPs must be designed to ensure that waste discharges from irrigated lands do not cause or contribute to an exceedance of a water quality objective and meet other applicable requirements of the Order, including, but limited to, section III.

(d) Economic considerations

The PEIR was supported by the *Draft Technical Memorandum Concerning the Economic Analysis of the Irrigated Lands Regulatory Program* (Economics Report). An extensive economic analysis was presented in this report to estimate the cost and broader economic impact on irrigated agricultural operations associated with the five alternatives for the irrigated lands program, including the lands regulated by this Order. Staff was also able to use that analysis to estimate costs of a sixth alternative, since the sixth alternative fell within the range of the five alternatives. This cost estimate is found in Appendix A of the PEIR. This Order is based on the alternatives evaluated in the PEIR, which is part of the administrative record. Therefore, potential economic considerations related to the Order have been considered as part of the overall economic analysis for implementation of the long-term irrigated lands program. This Order is a single action in a series of actions to implement the ILRP in the Central Valley region. Because the Order has been developed from the alternatives evaluated in the PEIR, economic effects will be within the range of those described for the alternatives.

(e) The need for developing housing within the region

This Order establishes waste discharge requirements for irrigated lands in the Western San Joaquin River Basin, and in the Tulare Lake Basin Area. The Order is not intended to establish requirements for any facilities that accept wastewater from residences or stormwater runoff from residential areas. This Order will not affect the development of housing within the region.

(f) The need to develop and use recycled water

This Order does not establish any requirements for the use or purveyance of recycled wastewater. Where an agricultural operation may have access to recycled wastewater of appropriate quality for application to fields, the operation would need to obtain appropriate waste discharge requirements from the Central Valley Water Board prior to initiating use. This need to obtain additional waste discharge requirements in order to recycle wastewater on agricultural fields instead of providing requirements under this Order may complicate potential use of recycled wastewater on agricultural fields. However, the location of agricultural fields in rural areas generally limits access to large

volumes of appropriately treated recycled wastewater. As such, it is not anticipated that there is a need to develop general waste discharge requirements for application of recycled wastewater on agricultural fields in the Western San Joaquin River Watershed, and in the Tulare Lake Basin Area.

Table 8. Summary of third-party and grower deliverables, required timelines, and approximate due date based on the anticipated adoption of the Waster Discharge Requirements for growers within the Western San joaquin River Watershed on 6 December 2013

Third-party Requirements			**Approximate Due Date**
Notice of Intent		30 days after adoption of WDR's	6-Jan-2014
	EO will issue Notice of Applicability (NOA) to the third-party		
Management Practices Evaluation Program (MPEP) Group Agreement		Group Option per R5-2012-0116	13-Jan-2014
Provide notice of requirements and Notice of Confirmation to members		30 days after NOA	14-Feb-2014
Template modification proposal		60 days after NOA	17-Mar-2014
Groundwater Quality Assessment Report (GAR) outline		90 days after NOA	16-Apr-2014
Comprehensive Groundwater Quality Management Plan		1 year after NOA	15-Jan-2015
Groundwater Quality Assessment Report (GAR)		1 year after NOA	15-Jan-2015
Sediment Discharge and Erosion Assessment Report		1 year after NOA	15-Jan-2015
	EO will review Groundwater Assessment Report (GAR) and Sediment Assessment Report		
Inform members required to prepare Sediment Plans		30 days from Sediment Report approval	15-Mar-2015
Trend Monitoring Workplan		1 year from GAR approval	15-Feb-2016
Groundwater QAPP		1 year from GAR approval	15-Feb-2016
Management Practices Evaluation Program (MPEP) Group Workplan		Group Option per R5-2012-0117	15-Feb-2016
Monitoring Plan Update		each year	15-January
Semi-Annual Report (with summary of grower reports)		each year	15-June
Semi-Annual Report (SAMR)		each year	15-November
Membership List		each year	31-July
Grower Requirements			**Approximate Due Date**
Enrollment	Non-members (sign up)	90 days after NOA	16-Apr-2014
	Members (complete Notice of Confirmation)		15-Dec-2014
Farm Evaluations	Small Farming Operations, Low Vulnerability Areas	updated every 5 years on 1-March	1-Mar-2017
	Large Farming Operations, Low Vulnerability Areas	updated every 5 years on 1-March	15-Dec-2014
	All others, High Vulnerability Areas	updated 1-Mar-2016 and annually thereafter	15-Dec-2014
Nitrogen Management Plan	Large Farming Operations, High Vulnerability Areas	each year	1-Mar-2015
	Small Farming Operations, High Vulnerability Areas	each year	1-Mar-2017
	All others, Low Vulnerability Areas	each year	1-Mar-2017
NMP Summary Report	Large Farming Operations, High Vulnerability Areas	each year	1-Mar-2016
	Small Farming Operations, High Vulnerability Areas	each year	1-Mar-2018
	All in Low Vulnerability Areas	not required	-
Sediment Plans	Small Farming Operations, High Vulnerability Areas	1 year from Sediment Report approval	15-Feb-2016
	Large Farming Operations, High Vulnerability Areas	180 days from Sediment Report approval	15-Aug-2015
	All in Low Vulnerability Areas	not required	-

Figure 6. Groundwater Protection Areas and Hydrogeologically Vulnerable Areas within the Western San Joaquin River Watershed Area.

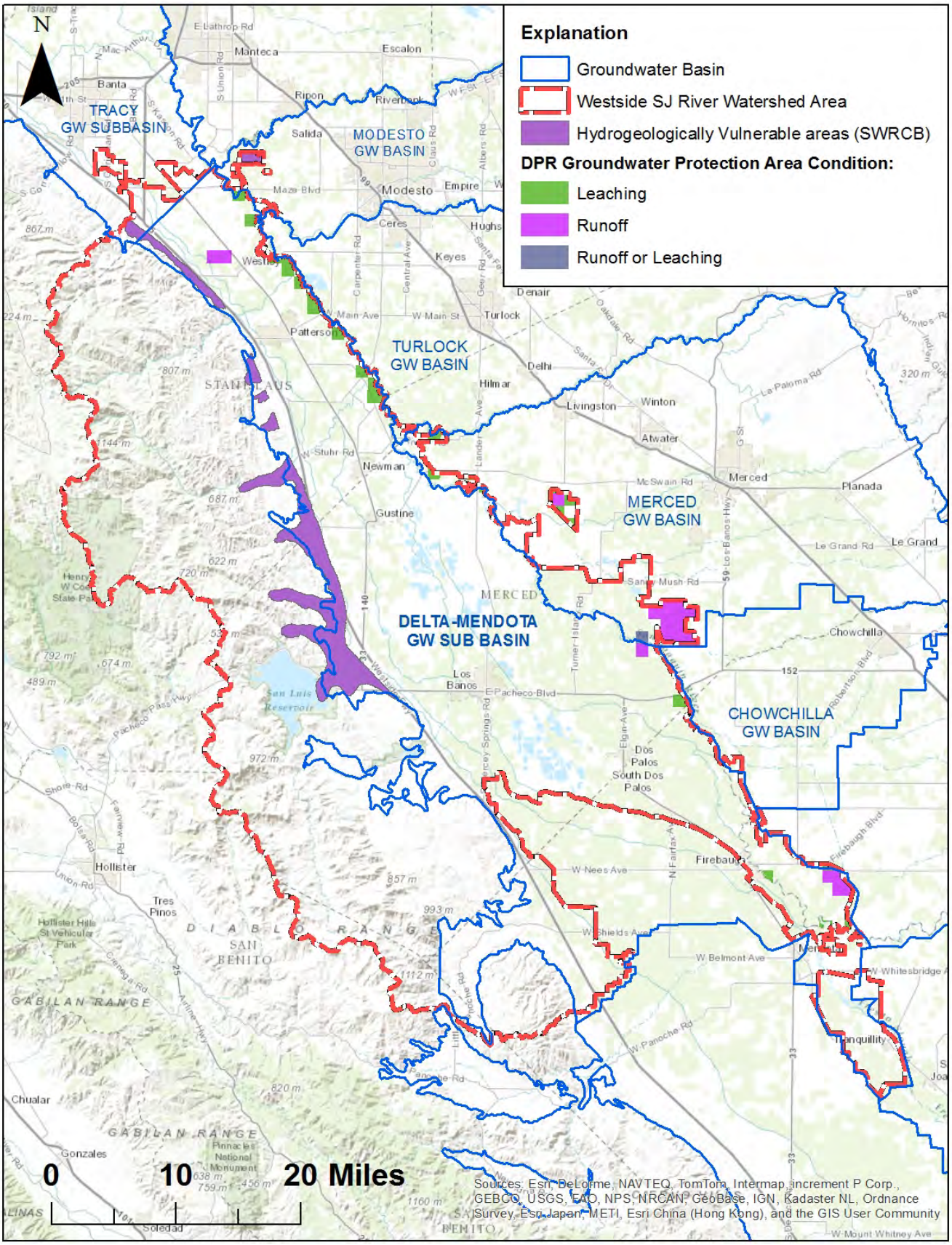

Figure 7. Maximum Nitrate Concentrations per Square Mile Section of Land for Samples with Nitrate Detections. GAMA Database, 1947-2012.