CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

Attachment A to Order R5-2012-XXXX
INFORMATION SHEET

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

This attachment to Waste Discharge Requirements General Order for Growers within the Eastern San Joaquin River Watershed that are Members of the Third-Party group, Order R5-2012-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.

Description of the Eastern San Joaquin Watershed Area[1]

The Eastern San Joaquin Watershed area includes portions of Stanislaus, Merced, Calaveras, Fresno, and Alpine Counties, as well as the entire counties of Madera, Tuolumne, and Mariposa. See Figure 1 of the Order for a map of the area. There are approximately 1,000,000 acres of irrigated agricultural land within the watershed area, although approximately 165,000 of these acres are regulated under the Central Valley Water Board's General Order for Existing Milk Cow Dairies. See Table 1 below for more detailed acreage information.

Surface water flows northward and out of the watershed area via the San Joaquin River. The San Joaquin drains watersheds on the east and west side of the San Joaquin Valley, though only east side watersheds are included in this Order's watershed area. In addition to the San Joaquin River, which forms the southern and western boundary of the Coalition region, there are five major rivers in the watershed: the Fresno River, the Chowchilla River, the Merced River, the Tuolumne River and the Stanislaus River. In addition, the Eastside Bypass is considered a major waterbody. These eastern tributaries of the San Joaquin River drain the Sierra Nevada range from east to west. The region also contains all or portions of seven groundwater basins; see Figure 5 for a map of the groundwater basins.

The Eastern San Joaquin River Watershed area includes portions of two geomorphic provinces: the Sierra Nevada 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).[2] Scattered throughout the sediment-filled trough in the subsurface exist many lenses at varying depths of fine-grained deposits, including Corcoran Clay deposits, which forms confining layer(s) (Figure 2, Bertold, Johnston, Evenson 1991).[3] Figure 3 from Thiros 2010 is a generalized diagram of the Central Valley, showing the basin-fill deposits and the components of the groundwater system under modern conditions.

[1] This section is adapted from the East San Joaquin Watershed Coalition's 20 October 2010 Monitoring and Reporting Program Plan.
[2] 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.
[3] Bertold, 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.

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

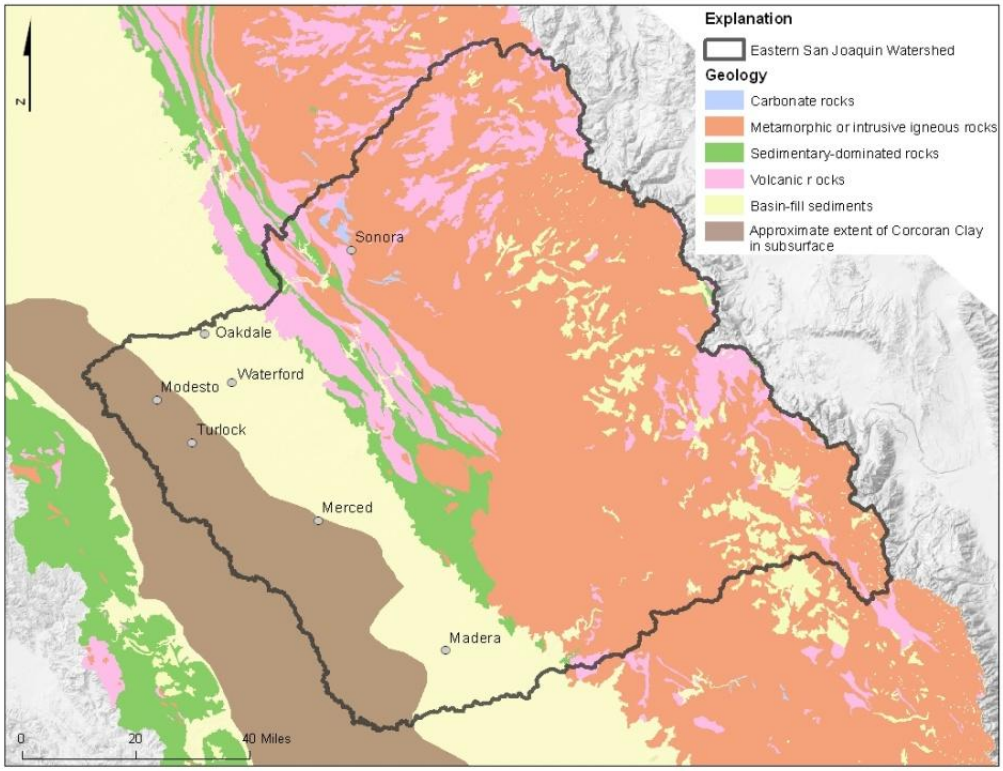
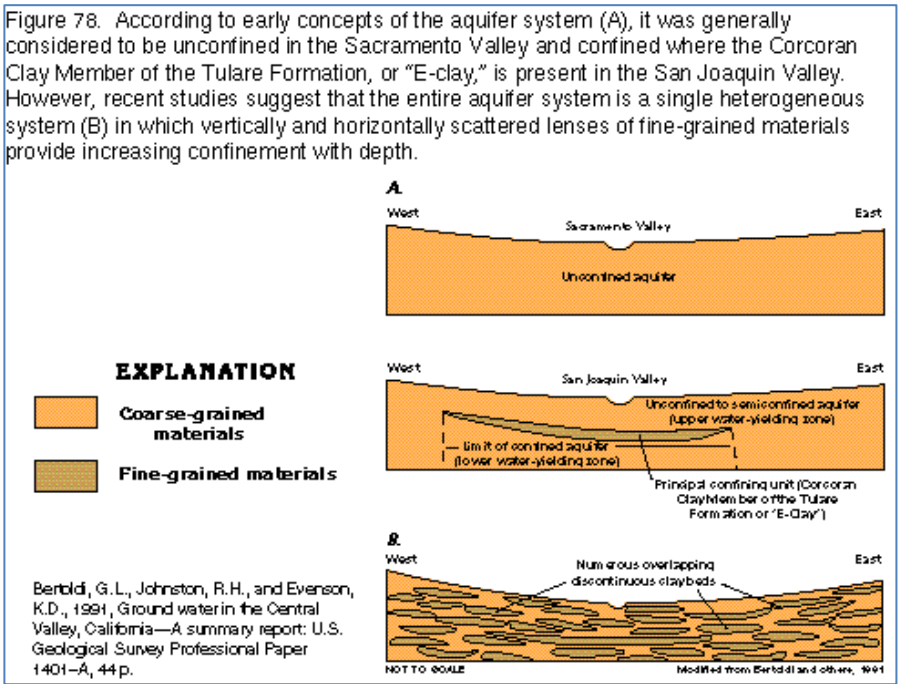


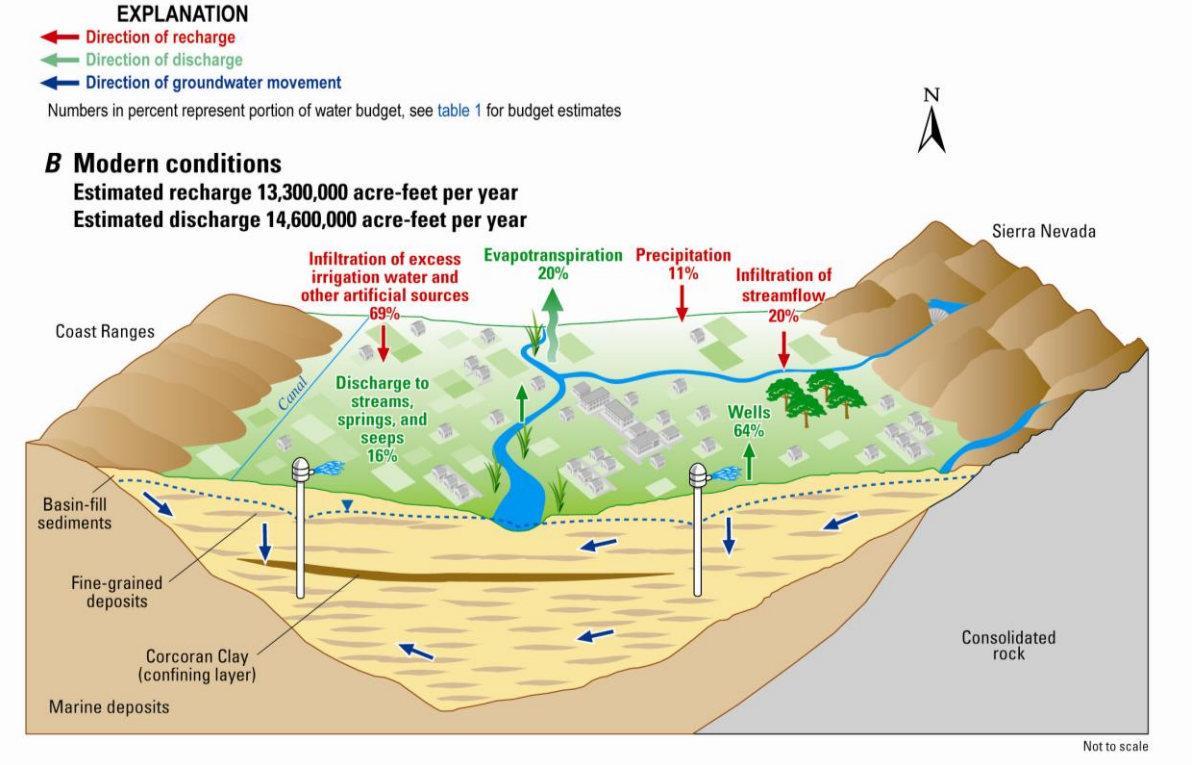
Figure 2. Cross-sectional Diagram of Groundwater Confining Layers in the San Joaquin Valley – Bertold, Johnston, and Evenson (1991)



From Tanji and Kielen (2002)[4]:

> The eastern side of the valley was formed from the alluvium of the Sierra Nevada, which consists mainly of granitic rocks. The soils derived from Sierran alluvium tend to be coarse textured and non-saline. The eastern groundwaters are characterized as low-salt calcium-bicarbonate-type water with total dissolved solids (*TDS*) typically in the 200-500 mg/litre range. In contrast, 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. A nearly water-impermeable clay layer known as the Corcoran clay, about 200 m deep, serves as the boundary between the unconfined and confined aquifer. The groundwaters in the confined aquifer contain from 500 to 1 000 mg/litre *TDS*. During the geologic past, plate tectonics caused the horizontal-lying Corcoran clay in the shallow sea to tilt upwards forming the Coast Range.

Figure 3. Generalized Diagram for the Central Valley, Showing the Basin-fill Deposits and Components of the Groundwater System under Modern Conditions – Thiros (2010)



Under Conditional Waiver Order R5-2006-0053, the East San Joaquin Water Quality Coalition (ESJ WQC) divided the area into six zones based on hydrology, crop types, land use, soil types, and rainfall. Zone names are based on the Core Monitoring location within that zone: 1) Dry Creek at Wellsford Zone, 2) Prairie Flower Drain at Crows Landing Zone, 3) Highline Canal at Hwy 99 Zone, 4) Merced River at

[4] 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.

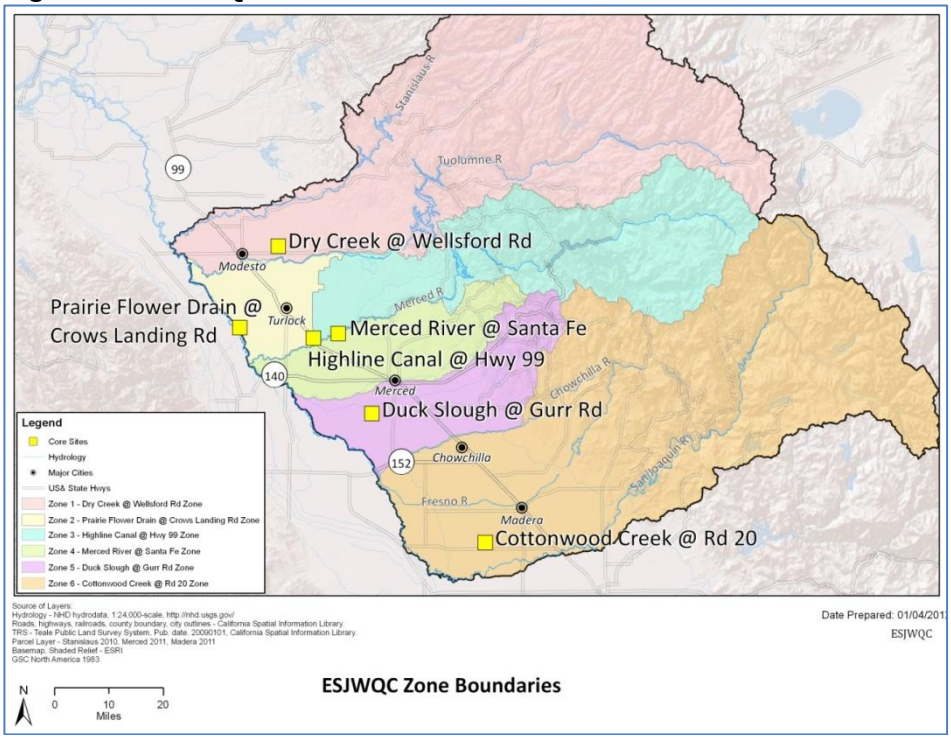
Santa Fe Zone, 5) Duck Slough at Gurr Rd Zone, and 6) Cottonwood Creek at Rd 20 Zone. See Table 1 for characteristics of each region. See Figure 4 for a map of the zones.

Table 1. Zone Characteristics in the Eastern San Joaquin River Watershed Area.

	Zone 1 Dry Creek	Zone 2 Prairie Flower Drain	Zone 3 Highline Canal	Zone 4 Merced River	Zone 5 Duck Slough	Zone 6 Cottonwood Creek
Irrigated Acres	134,307	164,633	88,617	121,746	142,686	335,069
Soil (average %):						
Sand	56	71	62	59	40	64
Silt	25	19	24	25	36	22
Clay	18	10	15	16	24	14
Land Use (% of irrigated acres):						
Deciduous Fruits/Nuts	39	38	61	38	19	32
Field Crops	16	23	16	22	33	15
Grains/Hay	1	1	2	4	6	4
Pasture	35	31	11	20	31	13
Vineyard	4	3	9	6	2	31
Dairies:						
% of irrigated acres	15	28	12	20	23	10
Number of operations	109	270	25	72	56	49
Depth to Groundwater:						
Weighted Average, feet	49	30	138	46	69	120
Annual average precipitation in the San Joaquin Hydrologic Region is 20 inches.[5]						

The top ten crops based on 2010 total harvested acreage in the San Joaquin River watershed are (listed in decreasing order): almonds, hay, silage, corn, grapes, tomatoes, irrigated pasture, wheat, cotton and walnuts. This list includes the acreage on both sides of the San Joaquin River, so does not necessarily represent the top ten crops for the Eastern San Joaquin River watershed area covered by this Order. There were over 100 crops grown in the Eastern San Joaquin River watershed in 2010.

Figure 4. ESJWQC Zone Boundaries.



[5] California Department of Water Resources, Division of Flood Management, Regional Climate Data. April 2012

EAST SAN JOAQUIN WATER QUALITY COALITION (ESJ WQC) ORGANIZATION

The ESJ WQC submitted a Notice of Intent in October 2003 and received a Notice of Applicability (NOA) from the Executive Officer in February 2004. The NOA approved the ESJ WQC's request to operate as a lead entity under the previous Conditional Waiver Orders (Order's R5-2003-0105 and R5-2006-0053) within its boundaries. Similar to the previous Conditional Waiver Orders, 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 ESJ WQC will continue to operate as the third-party lead entity under this Order.

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, as well as growers needing membership, will have a 90-day period 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 new Order's requirements. Other growers will submit a membership application to the third-party and will be notified by the third-party when their membership is approved. This will streamline the initial enrollment process for the bulk of the irrigated agricultural operations within the Eastern San Joaquin River Watershed.

Growers that do not enroll promptly within the 90-day enrollment period, 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 90-day deadline is 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. Board staff will conduct enforcement activities as needed using the list of revoked/pending revocations.

VULNERABILITY

The concept of higher and lower vulnerability areas was integrated into the Irrigated Lands Regulatory Program (ILRP) 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.

Low vulnerability areas do not have exceedances of water quality objectives for which irrigated agriculture waste discharges may be a contributing source and are not delineated as vulnerability areas by Department of Pesticide Regulation or the State Water Board. Because of low vulnerability, reduced monitoring and management requirements are justified for these areas.

High vulnerability areas have exceedances of water quality objectives for which irrigated agriculture waste discharges are a contributing source or are designated as vulnerable by the Department of Pesticide/State Water Board.[6]

Vulnerability designations may be refined or updated periodically during the Assessment Report Process (described in Attachment B, Monitoring and Reporting Program [MRP] Order R5-2012-XXXX). The Executive Officer will make the final determination regarding the irrigated lands waste discharge vulnerability areas.

SURFACE WATER AND GROUNDWATER MONITORING

Irrigated Lands Regulatory Program (ILRP) – Surface Water Quality Monitoring

The ESJ WQC has been operating under a Monitoring and Reporting Program Plan (MRP Plan) prepared according to the Monitoring and Reporting Program Order R5-2008-0005 (MRP) for Coalition Groups under the amended Coalition Group Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands Order R5-2006-0053. The MRP Plan, together with the ESJ WQC's Management Plan (described below), is the work plan 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 R5-2008-0005, the ESJ WQC conducted three types of water quality monitoring: Core, Assessment, and Special Project. Monitoring design was specific to each of the six zones designated in 2008 by the ESJ WQC within the Eastern San Joaquin River Watershed. The zone designations were based on hydrology, crop types, land use, soil types, and rainfall. Each zone contained one Core Monitoring site and one Assessment Monitoring site that would rotate every two years. Core Monitoring was designed to evaluate general water quality trends over time at the same set of sites. Assessment Monitoring rotated through sites/watersheds every two years, within each zone – this monitoring generally occurred at sites that had not been well characterized by previous monitoring. Assessment Monitoring included analyses for a large suite of constituents. Core Monitoring sites underwent Assessment Monitoring every three years. Special Project Monitoring occurred when the requirement for a management plan was triggered and additional data was 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 surface water quality monitoring program are similar to those established under the previous MRP Order (R5-2008-005):

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?[7] 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 in compliance with the provisions of the WDR?
5. Are implemented management practices effective in meeting applicable discharge limitations?
6. Are the applicable surface water quality management plans effective in addressing identified water quality problems?

[6] Areas deemed to be high vulnerability for groundwater include areas identified as high vulnerability areas by the State Water Board, or Groundwater Protection Areas (leaching and runoff) by the Department of Pesticide Regulation (DPR).
[7] "Water quality problem" is defined in Attachment E.

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

1. The "Core" and "Rotating" monitoring sites comprehensively cover the sections of the Eastern 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.
2. The monitoring and evaluation approach required as part of the surface water quality 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 "Core" 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 WDR.
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 R5-2012-XXXX (MRP) has been developed using the ESJ WQC'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 the relevance of the data collected.

The four primary changes were to: 1) eliminate the set frequency for monitoring metals and pesticides; 2) eliminate the set parameter list for metals and pesticides; 3) remove monitoring of "core" parameters for trend monitoring purposes; and 4) modify the approach monitoring at "Core" and "Rotating" sites.

The rationale for these 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 pesticides and metals that are unlikely to result in water quality problems. Also, pesticides that could cause or contribute to a water quality problem were not monitored at all. The third-party will be required to evaluate pesticide use patterns and properties (e.g., toxicity, physical-chemical characteristics) and propose a list of pesticides to monitor. A similar evaluation will be conducted for metals that may be discharged due to irrigated agricultural operations.
3) The parameters that were monitored as part of "Core" monitoring have been of generally 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 management plan monitoring and through more frequent monitoring at "Core" sites.

4) The previous requirement included monitoring a broad suite of parameters once every three years. The "trigger" for requiring preparation of a management plan is more than one exceedance every three years. This approach reduces the likelihood of identifying and addressing a problem, especially if a problem is primarily prevalent in a single month – a management plan could never be triggered. In addition, by not sampling a broad suite of parameters two out of three years, significant problems related to hydrology or climate could be missed – for example, heavy pest pressure in a non-monitored year could result in heavy pesticide use and higher discharge that would not be identified. The new requirements require two years of monitoring/two years off at the "Core" monitoring sites and two years of monitoring/four years off at the "Rotating" monitoring sites (any monitoring triggered by management plans would continue even if a site had an "off" year for assessment monitoring). This approach will ensure that each "zone" includes one or more sites in which comprehensive assessment monitoring is being conducted, which should allow the board to track and identify any significant changes, while not imposing an undue cost burden.

Surface Water Management Plans

Since 2004, the ESJ WQC has collected water quality monitoring data at 47 sites. 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[8] more than one time in a three year period. There are currently surface water management plans required for the following constituents: ammonia, arsenic, chlorpyrifos, copper, DDE, diazinon, diuron, dissolved oxygen, electrical conductivity, *E. coli*, lead, molybdenum, nitrate, pH, simazine, total dissolved solids, thiobencarb, algae toxicity, sediment toxicity, minnow toxicity, and water flea toxicity. The ESJ WQC's Management Plan, which covers all of these constituents, was approved on 25 November 2008 and is updated annually. Table 2 provides a brief summary of the water quality sampling results for these constituents. This Order requires the ESJ WQC's 2008 Management Plan to be implemented and updated.

Table 2. Summary of ILRP Surface Water Monitoring Data for Management Plan Constituents in the Eastern San Joaquin River Watershed, 2004 through 2010.

Constituent	No. of sites requiring a management plan	Range of detected levels	Number of exceedances	Trigger limit
Pesticides				
Chlorpyrifos	23	ND[1] to 3.7 ug/L	90	0.015 ug/L
DDE	1	ND to 0.022 ug/L	4	0.00059 ug/L
Diazinon	1	ND to 0.24 ug/L	3	0.1 ug/L
Diuron	5	ND to 68 ug/L	17	2 ug/L
Simazine	2	ND to 25 ug/L	5	4 ug/L
Thiobencarb	1	ND to 5.8 ug/L	3	Must not be detected (ND)
Toxicity				
Water, Algae	18	1.8% to 100% growth [2]	82	< 80% growth [2, 3]
Water, Minnow	3	0% to 100% survival [2]	12	< 80% survival [2, 3]
Water, Water flea	12	0% to 100% survival[2]	48	< 80% survival [2, 3]
Sediment, *Hyalella*	13	0% to 100% survival[2]	55	< 80% survival [2, 3]
Metals (total)				
Arsenic	4	ND to 30 ug/L	31	10 ug/L
Copper	17	0.4 to 120 ug/L	13	Variable[4]
Lead	11	ND to 24 ug/L	69	Variable[4]
Molybdenum	1	0.25 to 6.8 ug/L	5[5]	Variable[4]

[8] Trigger limits are discussed below under "Water Quality Objectives."

Constituent	No. of sites requiring a management plan	Range of detected levels	Number of exceedances	Trigger limit
Nutrients & Salts				
Ammonia	5	ND to 155.4 mg/L	27	Variable[6]
Nitrate as N	6	ND to 68 mg/L	63	10 mg/L
Total dissolved solids	8	<4 to 2,900 mg/L	126	450 mg/L
Electrical conductivity	12	<1 to 4,798 uS/cm	193	700 uS/cm
Other				
Dissolved oxygen	21	0 to 25.9 mg/L	335	>5 or >7 mg/L
E. coli	27	0 to 2,400 MPN/100mL	340	235 MPN/100mL
pH	15	5.02 to 9.7	81	6.5-8.5

[1] ND = Not detected at measurable levels
[2] Compared to the control sample
[3] And statistically significant
[4] Hardness-dependent water quality objectives
[5] This management plan and associated 5 exceedances occurred in 2011
[6] Water quality objectives are dependent on pH and temperature

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 of high quality surface water 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 Limitation III.A.

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 Monitoring

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 (aerial 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 primary constituents of concern related to agriculture's impacts to the beneficial uses of groundwater are nitrate (NO_3-N) and salinity. The board considered the above questions in developing the Eastern San Joaquin River Watershed Order's groundwater monitoring requirements.

Groundwater Monitoring Strategy Rationale

Groundwater monitoring needs to provide sufficient data to describe irrigated agricultural impacts on groundwater quality and to determine whether existing or newly implemented management practices are complying with the groundwater limitations of the Order. It should also provide sufficient data to answer the critical questions developed by the Groundwater Monitoring Advisory Workgroup (listed above). In order to accomplish these goals, the Order requires the third-party to prepare a Groundwater

Assessment Report which will analyze existing monitoring data and provide the foundation for implementing the Groundwater Monitoring Strategy.

The Groundwater Monitoring Strategy consists of two parallel tracks; 1) a Trend Monitoring Program and 2) a Representative Monitoring Program. The Trend Groundwater Monitoring Program is designed to determine baseline quality 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, alkalinity, nitrate, nitrite, total kjeldahl nitrogen, and once every five year monitoring for total dissolved solids, carbonate, bicarbonate, chloride, sulfate, arsenic, copper, iron, manganese, zinc, boron, calcium, sodium, and potassium.

The Order requires the third-party to prepare a Representative Groundwater Monitoring Program (RGMP) 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 objective of the RGMP is to identify whether site and/or commodity-specific existing 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 that are used or exist within the third-party's boundaries, it is anticipated that the third-party will rank or prioritize their high vulnerability areas and commodities, and present a phased approach to implement the RGMP. Representative monitoring has been designed to answer GMAW questions 2, 5, 6, and 7. Existing monitoring wells can be utilized where available for representative monitoring.

Existing shallow wells, such as domestic supply wells, may be used for the trend groundwater monitoring program. Representative monitoring requires monitoring wells completed into first encountered groundwater --this is not required for trend monitoring. 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. The third party may also look to and explore using existing monitoring networks such as those being conducted in accordance with AB 3030 and SB 1938 plans. Alternative approaches for evaluating discharge to groundwater, such as modeling or vadose zone monitoring, may be utilized, if those approaches include sufficient groundwater quality monitoring to validate the results of the alternative approach.

GMAW question 3, which seeks to differentiate sources of existing impact, cannot be easily answered by traditional groundwater monitoring. Representative 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 Eastern San Joaquin River Watershed Order. Representative monitoring will be used to help determine whether waste discharge at representative sites is of high enough quality to meet the groundwater limitations of Order.

Data Summary, Pesticides

Monitoring data collected for two studies conducted by the State Water Resources Control Board and the USGS in 2006 and 2008 showed detections of pesticides used by agriculture in groundwater within the Eastern San Joaquin River Watershed.[9] Pesticides and pesticide degradates were detected in 59 percent of wells in the Central-Eastside San Joaquin Basin in 2006 and 30 percent of wells in the Madera-Chowchilla Study Unit in 2008. Most frequently detected pesticides in the studies include

[9] Landon, M.K., and Belitz, Kenneth, 2008, Ground-water quality data in the Central Eastside San Joaquin Basin 2006: Results from the California GAMA Program: U.S. Geological Survey Data Series 325, 88 p. See also Shelton, J.L., Fram, M.S., and Belitz, Kenneth, 2009, Groundwater-quality data for the Madera–Chowchilla study unit, 2008: Results from the California GAMA program: U.S. Geological Survey Data Series 455, 80 p. Available at http://pubs.usgs.gov/ds/455.

deethylatrazine (degradate of triazine herbicides, e.g., atrazine), simazine, atrazine, metolachlor, DBCP, and deisopropylatrazine (degradate of triazine herbicides, e.g., atrazine). Most 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. 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 830 square-mile sections of land classified as DPR Groundwater Protection Areas within the third-party area. See Figure 5 for a map of the Groundwater Protection Areas within the Eastern 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 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 January 2012 there were 35,640 nitrate results in Geotracker GAMA within the Eastern San Joaquin River Watershed Area. These results were collected from environmental monitoring wells and water supply wells (94 percent of the samples were collected from water supply wells). The samples considered in this summary were collected from 1978 through 2011, although 84 percent of the samples were collected in years 2000 or later. There is only one nitrate sample in the GAMA database collected prior to 1978 (for the Eastern San Joaquin River Watershed area). Samples were collected within all 6 counties in the Eastern San Joaquin River Watershed, although most were collected in Stanislaus (62 percent), Merced (14 percent), and Madera (12 percent) Counties.

Sample collection depth information is not available for download from Geotracker GAMA. However, 86 percent (30,807) 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 35,640 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.

Six percent of sample results for all GAMA well data for the eastern San Joaquin River Watershed were greater than the nitrate drinking water standard of 45 mg/L (as nitrate). An additional 36 percent of results fell between the drinking water standard and half of the standard (22.5 mg/L).

Of the 5,601 samples collected 1979 through 1999, 9 percent were greater than the nitrate drinking water standard and an additional 29 percent fell between the drinking water standard and half of the standard. Of the 30,038 samples collected 2000 through 2011, 6 percent were greater than the nitrate drinking water standard and an additional 35 percent fell between the drinking water standard and half of the standard.

Analysis of nitrate results reported by groups other than DPH (4,833 out of the total 35,640 samples) showed that 13 percent were greater than the nitrate drinking water standard, more than twice the average of the entire dataset. Of this data set, an additional 19 percent of results fell between the drinking water standard and half of the standard (22.5 mg/L).

All nitrate results collected between 1979 and 1999 were reported by DPH. Of the 4,832 nitrate results reported by groups other than DPH that were collected 2000 through 2011, 14 percent were greater than the nitrate drinking water standard and an additional 17 percent fell between the standard and half of the standard.

There were 1,004 square-mile sections of land (township, range, and section or TRS) within the Eastern San Joaquin River Watershed Area with nitrate results in the Geotracker GAMA dataset. When data was analyzed per TRS, three percent of sampled sections had an average nitrate level above the drinking water standard and an additional 18 percent of sections had an average nitrate level between 45 and 22.5 mg/L. Twenty-two percent of sampled sections had a maximum nitrate level above 45 mg/L and an additional 28 percent of sampled sections had a maximum level between 45 and 22.5 mg/L. See Figure 6 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 5 for a map of the HVA areas within the third-party region.

Groundwater Quality Management Plans (GQMPs)
Under this Order, groundwater management plans will be required where there are exceedances of water quality objectives, where there is a trend of degradation of a high quality groundwater that threatens a beneficial use, as well as for “high vulnerability groundwater areas” (as defined by the third-party in the Groundwater Assessment Report). GQMPs will only be required for wastes that may be discharged by some or all of irrigated lands in the identified area. GQMPs are the key mechanism under this Order to help ensure that waste discharges from irrigated lands are meeting Groundwater Limitation III.B.

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 schedule and milestones to implement practices to ensure discharge from irrigated lands are meeting Groundwater Limitation III.B.1, 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 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.

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 .

Technical reports

The surface water and trend groundwater quality monitoring under the Order is regional in nature instead of individual field discharge monitoring. The benefits of regional monitoring include the ability to determine whether water bodies accepting discharges from numerous irrigated lands are meeting water quality objectives. Regional monitoring also allows the Central Valley Water Board to determine, at the watershed level, whether practices are protective of water quality. There are limitations to regional monitoring when trying to determine possible sources of water quality problems and individual compliance with the Order's requirements.

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.[10] The costs of individual monitoring would be much higher than regional surface and groundwater quality monitoring required under the Order. Regional monitoring provides a general measure of compliance over a large area, reducing the number of samples collected.

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

WATER QUALITY OBJECTIVES

Surface water and groundwater limitations in section III of the Order require that waste discharge from irrigated lands not cause surface water or underlying groundwater to exceed water quality objectives, unreasonably affect beneficial uses, or cause a condition of pollution or nuisance. For waste discharges

[10] The dairy program requires individual monitoring of surface water discharges and allows for regional groundwater monitoring.

to high quality waters, the Order imposes requirements that will result in implementation of the Best Practicable Treatment or Control (BPTC).

Water quality objectives that apply to surface water are described in the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (Basin Plan). 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 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 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 Plan includes 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, contains an implementation policy, "Policy for 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"), (40 CFR 122.44(d)(1)(vi)(A), (B) or (C)), 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 based on Basin Plan numeric water quality objectives. For constituents that are not assigned Basin Plan numeric water quality objectives, the MRP describes a process where numeric interpretation of narrative water quality objectives is developed by the third-party and the Central Valley Water Board as needed. Essentially, where there is sampling required for a constituent that does not have a numeric objective, e.g., pesticides for which no objectives exist, the third-party is required to propose a Trigger Limit for board consideration. Upon Executive Officer approval, the Trigger Limit will be considered the effective level to implement 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 below under the section titled "Goals and Objectives of the Irrigated Lands Regulatory Program."[11] 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 implemented 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[12] and evaluated in the Program Environmental Impact Report (PEIR)[13] for the long-term ILRP. This Order requires each

[11] 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.

[12] 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.

[13] 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.

individual operation to develop a Farm Evaluation that will describe and evaluate 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 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 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 (as part of Farm Evaluations, Sediment and Erosion Control Plans, and GQMPs/SQMPs). 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.

GOALS AND OBJECTIVES OF THE IRRIGATED LANDS REGULATORY PROGRAM

The goals and objectives of this Order, which implements the long term ILRP, are described below. These are the same goals described in the PEIR for the ILRP.

Understanding that irrigated agriculture in the Central Valley provides valuable food and fiber products to communities worldwide, the overall goals of the this Order 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 this Order 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 (i.e., financial assistance, monitoring reductions, certification, or technical help) for agricultural operations to minimize waste discharge to state waters from their operations.*
- *Coordinate with other Central Valley Water Board programs (e.g., the Grasslands Bypass Project WDRs for agricultural lands, efforts by the Westlands Water District to develop WDRs for agricultural lands, development of total maximum daily loads [TMDLs] for Central Valley Salinity Alternatives for Long-Term Sustainability [CV-SALTS], and WDRs for dairies).*
- *Promote coordination with other regulatory and non-regulatory programs associated with agricultural operations to minimize duplicative regulatory oversight while ensuring program effectiveness (e.g., U.S. Department of Agriculture [USDA] National Organic Program, State Water Board Groundwater Ambient Monitoring and Assessment Program)."*

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)[14] 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 described within the six alternatives or are within the range of actions and related impacts encompassed by the six alternatives. Furthermore, 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. 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 Eastern 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,

[14] 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

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 R5-2012-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; regional monitoring to determine whether trends in degradation are occurring; and regional planning and on-farm implementation when trends in degradation 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 water quality management goals. In addition, each Member whose farming operations have the potential to discharge sediment or cause erosion must prepare and implement a farm-specific sediment/erosion control plan. Each Member whose farming operations are located within high vulnerability groundwater areas must prepare and

implement a farm-specific nutrient management plan. Implementation of the sediment/erosion control plan should result in achieving best practicable treatment or control (BPTC) for sediment associated pollutants. Implementation of the nutrient management plan should result in achieving BPTC for nitrates discharged to groundwater.

Regional trend monitoring of surface water and groundwater is required to determine compliance with water quality objectives and determine whether any trends in degradation of high quality waters 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 their 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 a WDR 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.[15]

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,"[16] 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.[17] The Water Code directs the State Water Board and the Regional Water Boards to establish water quality objectives for the reasonable

[15] 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.

[16] 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.

[17] 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."

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. That background is generally determined based on current conditions of the water body. See SWRCB Order WQ-2000-07, WQ-86-8. 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 appropriate representation of background.[18] 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 still 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 and 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.[19] 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.

[18] 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 antidegration policy only, the relevant year would be 1975.
[19] See *Questions and Answers, State Water Resources Control Board, Resolution 68-16* (February 16, 1995).

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 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 to 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 Eastern 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 Eastern 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 is no comprehensive historic data.[20]

However, data collected by the Central Valley Water Board, dischargers, educational institutions, and others demonstrate that many water bodies within the Eastern 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, chlorpyrifos, copper, DDE, diazinon, diuron, dissolved oxygen, electrical conductivity, *E. coli*, lead, molybdenum, nitrate, pH, simazine, total dissolved solids, thiobencarb, algae toxicity, sediment toxicity, fathead minnow toxicity, and water flea toxicity. These surface water bodies within the watershed not meeting water quality objectives would not be considered "high quality waters" with respect to these constituents. 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, 22 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, 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 geophysical conditions within the Eastern San Joaquin River Watershed, identification of a specific technology or

[20]Irrigated lands discharges have been regulated under a conditional waiver since 1982, but comprehensive data as to trends under the waiver are not available.

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[21] (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 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 baseline set of universal farm water quality management goals combined with upfront evaluation, planning and implementation of management practices to attain those goals, and 2) additional planning and implementation measures where degradation trends in high quality waters 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 Water Quality Management 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 natural background levels,
c. minimize percolation of waste to groundwater,
d. minimize excess nutrient application relative to predicted crop need,
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 their 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

[21] California Regional Water Quality Control Board, Central Valley Region, and Jones and Stokes. 2008. *Irrigated Lands Regulatory Program Existing Conditions Report.* Sacramento, CA.

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 goals 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").[22] 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;),[23] "*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 water quality management goals required by 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 (goals 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 natural background levels. Those Members that have the potential to discharge sediment or cause erosion 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 goal d is consistent with this measure. The Order also requires nutrient management budgets be developed by Members in vulnerable groundwater areas. The budgets need to be approved by certified specialists. Where nutrients are causing exceedances of water

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

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.

Management measure 4, pesticide management. As described in the State's Agricultural Management Measures document, this measure "is intended to reduce contamination of surface 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, goals 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 natural 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." Goals 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), it is expected that effectively meeting 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 in high quality waters are observed that threaten to impair a beneficial use or where beneficial uses are impaired (i.e., water quality objectives are not being met). In the absence of such specific monitoring trends, the Central Valley Water Board does not have sufficient evidence to conclude that waste discharges authorized by the Order are causing degradation of a high quality water. Further, 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 of high quality waters. 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. Such additional costs could have adverse economic effects on the industry.

SQMPs/GQMPs include requirements to investigate sources, develop strategies to implement practices to ensure waste discharges are meeting the Orders surface and groundwater limitations, and develop a monitoring strategy to provide feedback on the effectiveness of the management plan. 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.

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 Eastern 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 ground water 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 for high quality waters.

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 will identify the practices they are implementing to achieve water quality protection goals as part of Farm Evaluations and SQMPs/GQMPs. Also, the Order requires water quality monitoring aimed to identify trends and evaluate effectiveness of management practices.

Requirements for individual Farm Evaluations, management practices tracking, and water quality monitoring will work to ensure that degradation is minimized. 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 of high quality waters is limited. The Order will work to achieve site-specific antidegradation and antidegradation-related requirements through implementation of BPTC/best efforts as appropriate and representative monitoring 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 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 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 water degradation of high quality waters; where waters are already degraded, the requirements will result in the pollution controls that reflect the "best efforts" approach;
- 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);
- the long-term ILRP would work to prevent further degradation of surface and groundwater;

The requirements of the Order are consistent with State Water Board Resolution 68-16 and the limited degradation that would be allowed is consistent with the maximum benefit to the people of the state.

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 (Basin Plan) identifies applicable beneficial uses of surface and groundwater within the Sacramento River 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 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 Plan and applicable policies, rather than a site specific evaluation that might be appropriate for WDRs applicable to a single discharger.

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

Environmental characteristics of the Eastern San Joaquin River Basin 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 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 of high quality waters that may lead to an exceedance of a water quality objective. 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.

One measure considered in the PEIR is the potential loss of Important Farmland[24] due to increased regulatory costs. This information has been used in the context of this Order to estimate potential loss of Important Farmland within the Eastern San Joaquin River Watershed. As described in Attachment D of this Order, it is estimated that approximately 59 thousand acres of Important Farmland within the Eastern San Joaquin River Watershed potentially would be removed from production under full implementation of the previous conditional waiver program (Conditional Waiver Order R5-2006-0053); it is estimated that an additional 4,400 acres of Important Farmland may be removed from production due to increased regulatory costs of this Order (total of approximately 64 thousand acres). As described in the Economics Report, most of the estimated losses would be to lower value crop land, such as irrigated pasture and forage crops.

(e) The need for developing housing within the region

This Order establishes waste discharge requirements for irrigated lands in the eastern San Joaquin River Basin. 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 Eastern San Joaquin River Basin.

[24] *Important Farmland* is defined in the PEIR as farmland identified as prime, unique, or of statewide importance by the California Department of Conservation, Farmland Mapping and Monitoring Program.

Figure 5. Groundwater Protection Areas and Hydrogeologically Vulnerable Areas within the Eastern San Joaquin River Watershed Area.

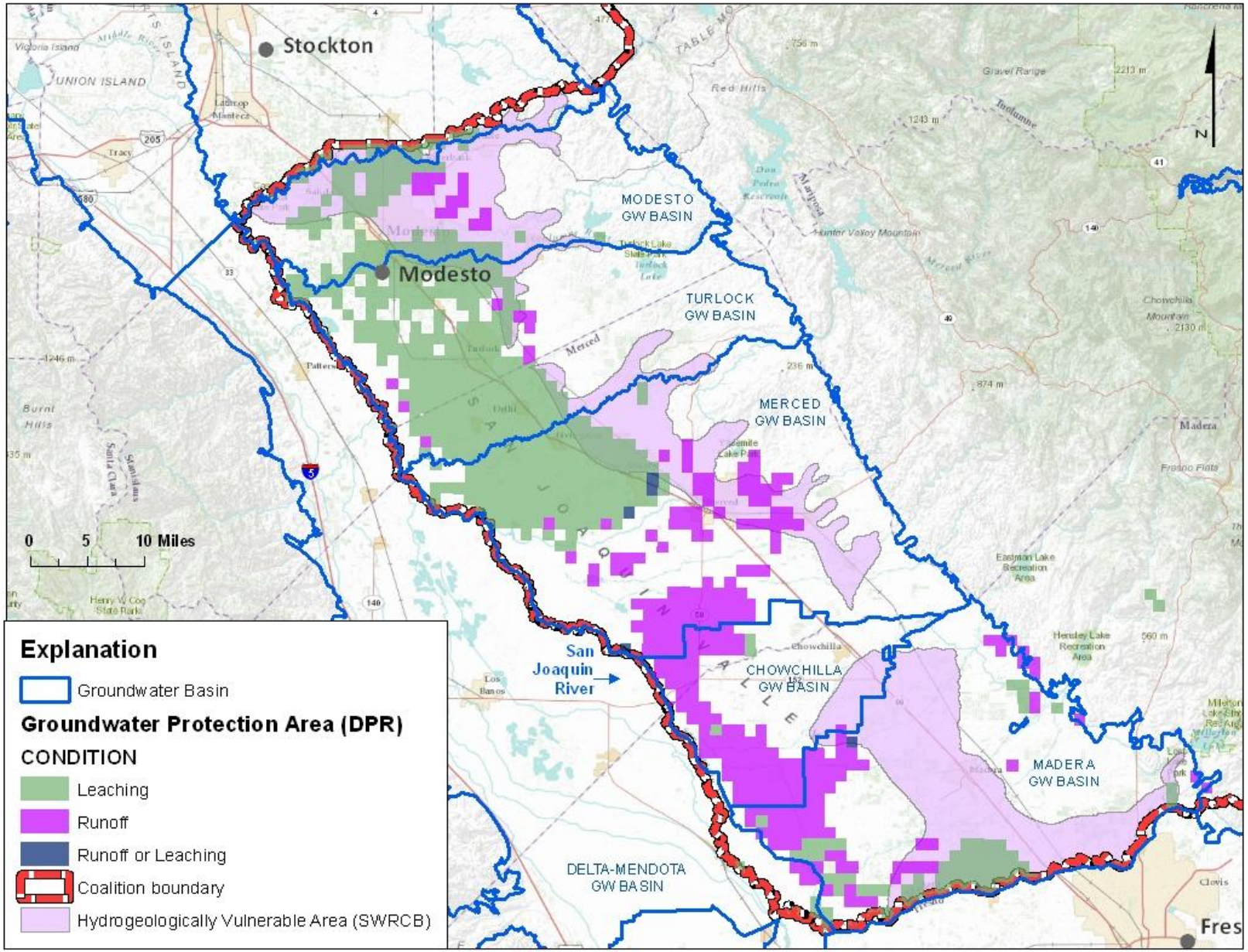


Figure 6. Maximum Nitrate Concentrations per Square Mile Section of Land for Samples with Nitrate Detections. GAMA Database, 1978-2011.