

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION**

**INFORMATION SHEET
ORDER R5-2015-XXXX**

**WASTE DISCHARGE REQUIREMENTS GENERAL ORDER
FOR
GROWERS IN THE GRASSLAND DRAINAGE AREA**

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I. Overview

This document is an attachment to Waste Discharge Requirements General Order R5-2015-XXXX (referred to as “Order”) for Growers in the Grassland Drainage Area, and is intended to provide information regarding the rationale for the Order, general information on groundwater monitoring that has been conducted, and a discussion of this Order’s elements that meet required state policy. The Grassland Basin Drainage Steering Committee, under the Grassland Drainage Management Activity Agreement with the San Luis & Delta-Mendota Water Authority, has been recognized as the third-party entity representing growers (Members) in the Grassland Drainage Area. This Order regulates groundwater discharges from irrigated lands within the Grassland Drainage Area.

II. Introduction

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

The Central Valley Water Board’s Irrigated Lands Regulatory Program (ILRP) was initiated in 2003 with the adoption of a conditional waiver of Waste Discharge Requirements (WDRs) for discharges from irrigated lands. The 2003 conditional waiver was renewed in 2006, and again in 2011. The conditional waiver’s requirements are designed to reduce wastes discharged from irrigated agricultural sites (e.g., tailwater, runoff from fields, subsurface drains) to Central Valley surface waters (Central Valley Water Board 2011).

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

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

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

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The Central Valley Water Board's contractor, ICF International, developed the Program Environmental Impact Report (PEIR)¹ and Economics Report² for consideration by the board. The PEIR analyzed the range of proposed alternatives developed by the Workgroup. The Draft PEIR was released in July 2010, and the Final PEIR was certified by the board in April 2011 (referred to throughout as "PEIR"). In June 2011, the board directed Central Valley Water Board staff to begin developing waste discharge requirements (orders) that would implement the long-term ILRP to protect surface and groundwater quality. During 2011, the board reconvened the Stakeholder Advisory Workgroup to provide additional input in the development of the orders. Also, during the same time, the board worked with the Groundwater Monitoring Advisory Workgroup to develop an approach for groundwater monitoring in the ILRP.

The board's intent was to develop seven geographic and one commodity-specific general waste discharge requirements (general orders) within the Central Valley region for irrigated lands owners/operators that are part of a third-party group. The first of these orders was adopted in December 2012 for the Eastern San Joaquin River Watershed and the last of the orders (commodity-specific) for the California Rice Commission in March 2014. The board also adopted a general order for irrigated lands owners/operators that are not part of a third-party group in July 2013, and a third-party group general order for the Tulare Lake Basin in September 2013.

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

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A. Goals and Objectives of the Irrigated Lands Regulatory Program

The goals and objectives of this Order, which implements the long term ILRP for groundwater in Grassland Drainage Area, are described below. These are the goals described in the PEIR for the ILRP.³

"Understanding that irrigated agriculture in the Central Valley provides valuable food and fiber products to communities worldwide, the overall goals of the ILRP are to (1) restore and/or maintain the highest reasonable quality of state waters considering all the demands being placed on the water; (2) minimize waste discharge from irrigated agricultural lands that could degrade the quality of state waters; (3) maintain the economic viability of agriculture in California's Central Valley; and (4) ensure that irrigated agricultural discharges do not impair access by Central Valley communities and residents to safe and reliable drinking water. In accordance with these goals, the objectives of the ILRP are to:

- *Restore and/or maintain appropriate beneficial uses established in Central Valley Water Board water quality control plans by ensuring that all state waters meet applicable water quality objectives.*
- *Encourage implementation of management practices that improve water quality in keeping with the first objective, without jeopardizing the economic viability for all sizes of irrigated agricultural operations in the Central Valley or placing an undue burden on rural communities to provide safe drinking water.*

¹ ICF International. 2011. Irrigated Lands Regulatory Program, Program Environmental Impact Report. Draft and Final. March. (ICF 05508.05.) Sacramento, CA. Prepared for Central Valley Regional Water Quality Control Board, Sacramento, CA.

² ICF International. 2010. Draft Technical Memorandum Concerning the Economic Analysis of the Irrigated Lands Regulatory Program) (Economics Report).

³ PEIR, page 2-6

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

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B. Description of Waste Discharges from Irrigated Lands that may affect Water Quality

The definition of waste discharges from irrigated lands is provided in Appendix E as: “The discharge or release of waste to surface water or groundwater. This Order for the Grassland Drainage Area applies only for discharges to groundwater. Waste can be discharged to groundwater through pathways including, but not limited to, percolation of irrigation or storm water through the subsurface, backflow of waste into wells (e.g., backflow during chemigation), discharges into unprotected wells and dry wells, and leaching of waste from tailwater ponds or sedimentation basins to groundwater. A discharge of waste subject to the Order is one that could directly or indirectly reach waters of the state, which includes groundwater. Direct discharges may include, for example, percolation of wastes through the soil to groundwater. Indirect discharges may include stormwater runoff through an unprotected well.

As described in the definition, there exist multiple potential pathways for wastes from irrigated lands to waters of the state, where such waste discharge could affect the quality of waters of the state. Basic physical processes (e.g., contaminants going into solution in water and gravity) result in water containing waste to flow through soil or other conduits to underlying groundwater. In addition, material sprayed on the crop (such as pesticides) can drift in the wind and reach surface waters that may percolate through the soil to groundwater. Since farming takes place on landscapes connected to the surrounding environment (an open system), a farmer cannot prevent these physical processes from occurring. However, a farmer can take steps to limit the amount of wastes discharged and the subsequent effect on water quality.

If an operation believes it is not subject to the requirements of the Order, it may submit a report to the Central Valley Water Board describing the waste discharge (e.g., whether there is a potential to affect groundwater quality). Upon review of the report, the Central Valley Water Board may choose to waive the requirement to obtain WDRs, issue individual WDRs specific to the operation, or seek to enroll the operation under the Order.

III. Generalized Description of the Grassland Drainage Area⁴

The Grassland Drainage Area is within the Grassland watershed located in the western San Joaquin Valley. Located in Merced and Fresno Counties, the Grassland watershed is a valley floor sub-basin of the San Joaquin River Basin, covering an area of approximately 370,000 acres. The Grassland watershed overlies the Delta-Mendota subbasin which consists of the Tulare Formation, terrace deposits,

⁴ This section is adapted from the Department of Water Resources, *California’s Groundwater*, Bulletin 118, Update 2006, San Joaquin Valley Groundwater Basin: Delta-Mendota Subbasin. October 2014

alluvium, and flood-basin deposits (see Figure 1). The Grassland Drainage Area (Figure 2) primarily overlies the Tulare Formation.

The *Tulare Formation* is composed of beds, lenses, and tongues of clay, sand and gravel that have been alternately deposited in oxidizing and reducing environments. The Corcoran clay of this formation underlies the basin at depths ranging from 100 to 500 feet and acts as a confining bed.

The primary aquifer system occurs in unconsolidated alluvial and continental deposits of the Tulare Formation. Groundwater in the Delta-Mendota subbasin occurs in three water-bearing zones:

- the lower zone contains confined fresh water in the lower section of the Tulare Formation;
- the upper zone contains confined, semi-confined, and unconfined water in the upper section of the Tulare Formation and younger deposits; and
- a shallow zone which contains unconfined water within approximately 25 feet of the ground surface.

Shallow, saline groundwater occurs within about 10 feet of the ground surface over a large portion of the subbasin. There are also localized areas of high iron, fluoride, nitrate, and boron in the subbasin. Groundwater barriers do not appear to exist in the subbasin.

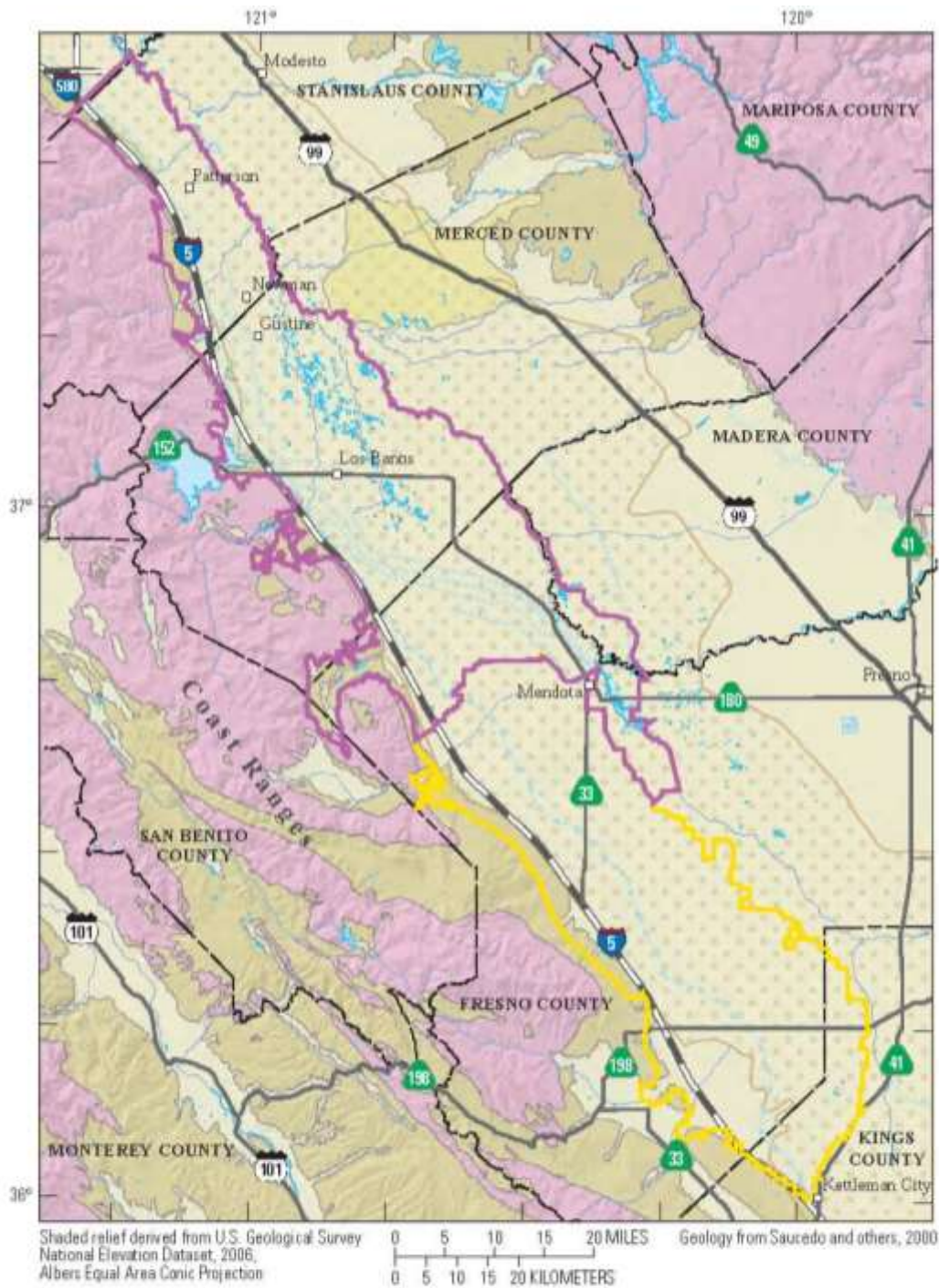
Groundwater movement has been substantially altered by pumping and the diversion and redistribution of surface water to irrigation. Streams that would naturally recharge groundwater have been diverted for crop irrigation. The primary sources of groundwater recharge in the subbasin are from the percolation of applied irrigation water and from canals and water storage facilities. Some recharge occurs due to seepage losses along the San Joaquin River and infiltration of runoff from the Coast Ranges into tributary streams.

Soils on the western side of the San Joaquin Valley were formed from alluvium of the Coast Range consisting of uplifted marine sedimentary rocks. The soils are fine-textured and saline. The groundwater is characterized as moderately saline sodium-sulfate-type waters with total dissolved solids (TDS) typically in the 1,000-10,000 mg/L range. The soils in the lowest part of the alluvial fans in the western side are waterlogged and salt affected.⁵

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⁵ 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. October 2014

Figure 1: Boundary of Delta-Mendota (DM) subbasin and geologic formations

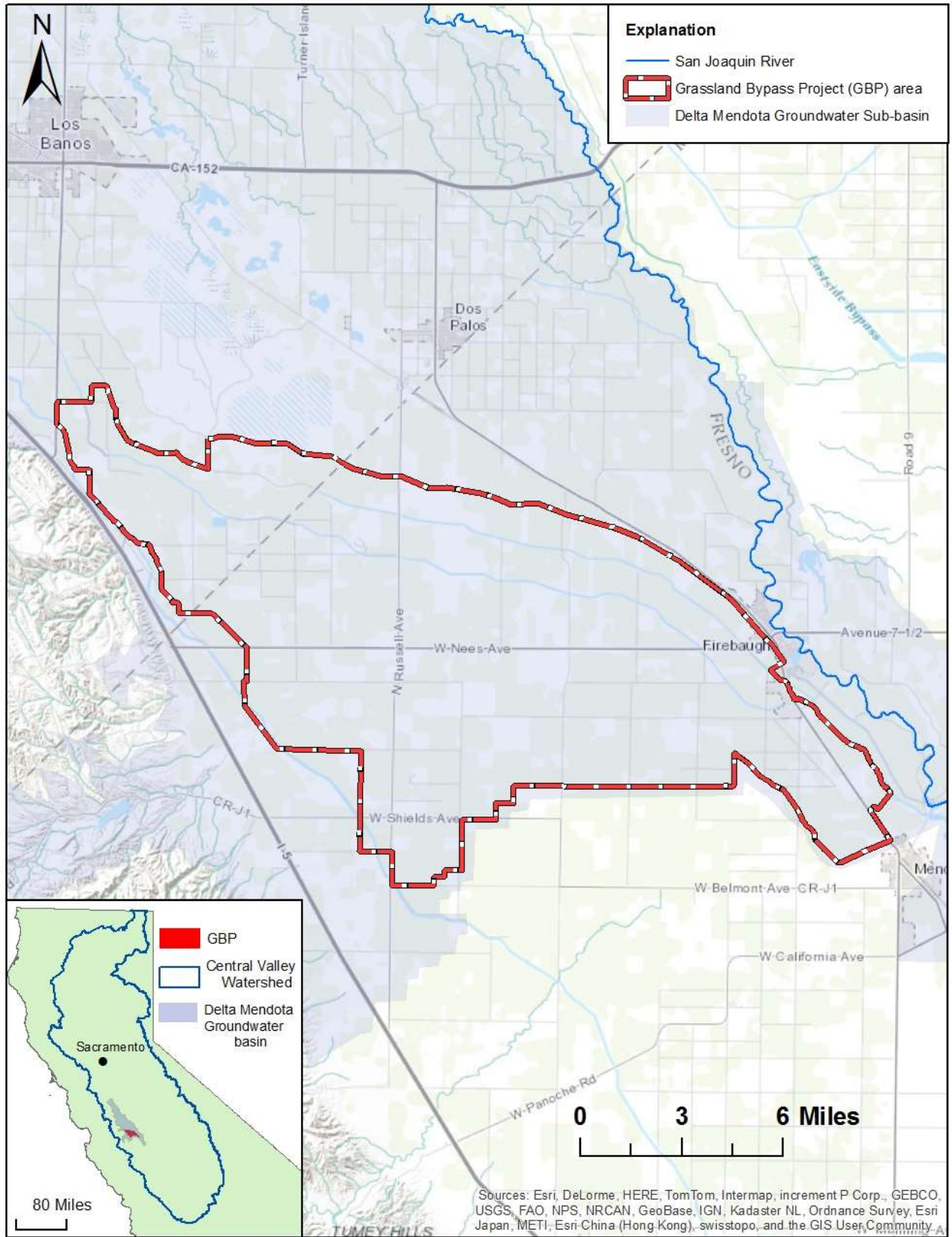


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EXPLANATION			
	Extent of the Pleistocene-age Corcoran Clay member of the Tulare Formation		Delta-Mendota subbasin study area
	Quaternary alluvium		Westside subbasin study area
	Quaternary other sediments		
	Tertiary deposits and sediments		
	Mesozoic and Paleozoic igneous and metamorphic rocks		

Figure taken from: Mathany, T.M., Landon, M.K., Shelton, J.L., and Belitz, Kenneth, 2013, Groundwater-quality data in the Western San Joaquin Valley study unit, 2010—Results from the California GAMA Program: U.S. Geological Survey Data Series 706, 102 p.

Figure 2: Delta-Mendota groundwater subbasin and location of Grassland Drainage Area



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IV. The Grassland Drainage Area and Grassland Area Farmers

The Grassland Drainage Area (GDA) is approximately 97,400 acres located within the Grassland watershed, roughly between Los Banos to the north and Mendota to the south. The GDA has approximately 87,000 acres of irrigated farmland within the Grassland watershed (see Figure 2). The GDA overlies the southern portion of the Delta-Mendota groundwater basin within the Tulare Formation.

The GDA has farming operations that utilize subsurface drains (also known as tile-drains) to remove shallow groundwater that are high in salts from the root zone of the irrigated crop. This subsurface drainage is discharged to surface drains that bypass wetland habitat and will be covered by the Grassland Bypass Project Order⁶. Since water districts within the GDA prohibit the discharge of tailwater return flows into the district-owned canals, no agricultural surface water discharge, other than from the subsurface drains, is normally transported from the GDA. During major stormwater events, general surface runoff, stormwater and agricultural drainage may be commingled and overwhelm the Grassland Bypass channel. The commingled flow may then be diverted temporarily to the Grassland Water District channels, ditches and sloughs that drain to wetlands prior to discharge to the San Joaquin River.

As part of the Grassland Bypass Project, the Grassland Basin Drainage (GBD) Management Activity Agreement, under the authority of the San Luis & Delta-Mendota Water Authority⁷, was established to implement the project. Water and drainage districts that transport irrigation water in the GDA and the growers in the GDA (known as the Grassland Area Farmers or GAF) are part of the GBD Management Activity Agreement. The GAF, represented by the Grassland Basin Drainage (GBD) Steering Committee, have been working with the water and drainage districts to control the release of selenium and other constituents from the GDA.

A. Discharges Covered by the Order

Of the 97,400 acres in the GDA, approximately 10,400 acres in the GDA have been permanently fallowed by the GAF to minimize and control the release of subsurface drainage to surface water. Of the remaining 87,000 acres, 33,100 acres (~38%) are utilizing subsurface drainage to remove saline groundwater from the root zone of the irrigated crops and discharging that drainage to the Grassland Bypass channel.

Discharges to groundwater may be from leaching of irrigation water, subsurface drain water, and/or stormwater from agricultural lands that are not captured by the subsurface drainage systems in the GDA. Also, within the GDA is approximately 6,000 acres used for the San Joaquin River Water Quality Improvement Project (SJRIP) that is discussed in a subsequent section.

Table 1 below shows the approximate acreage of the crops grown in the GDA in 2013.⁸ Permanent crops (nuts, grapes, and tree crops) make up about 12,000 acres (12%) of total acreage. Other crops grown in the GDA may vary from year to year due to economic factors, water availability, contractual requirements, and weather.

⁶ This Order will be issued to the U.S. Bureau of Reclamation and the San Luis & Delta-Mendota Water Authority for surface water discharges from the Grassland Bypass Project.

⁷ Participating districts in the GDA include the Broadview Water District, Charleston Drainage District, Firebaugh Canal Water District, Pacheco Water District, Panoche Drainage District, Widren Water District, and the Camp 13 Drainage District, located in part of the Central California Irrigation District.

⁸ Acreage estimates are from Summers Engineering based on the 2013 data in the USDA National Agricultural Statistics Service CropScape located at <http://nassgeodata.gmu.edu/CropScape/>

Table 1: Primary crops grown and approximate acreage in Grassland Drainage Area (2013 data)

Land Use	Approximate Acreage
Fallow/Barren*	19,000
Tomatoes	17,000
Wheat	16,000
Cotton	12,000
Alfalfa	10,000
Almonds	6,000
Barley	3,000
Grapes	3,000
Pasture	3,000
Miscellaneous Crops	3,000
Pistachios	2,000
Rice	2,000
Pomegranates	1,000
Total	97,000

* This includes 10,400 acres of permanently fallowed land.

B. San Joaquin River Water Quality Improvement Project

The San Joaquin River Water Quality Improvement Project (SJRIP) lies within the GDA (Figure 4). The area was constructed with a distribution system that allows no tailwater discharge from the SJRIP. Subsurface drainage is routed from adjacent fields to the SJRIP where it is reused or blended with “fresh” irrigation water and applied to salt tolerant crops such as pistachios and wheatgrass. Any subsurface drainage from the SJRIP is routed to the GBP.

Although not part of the SJRIP, the Panoche Drainage District Demonstration Treatment Facility is located on a portion of the SJRIP reuse area. The facility is testing various treatment processes to reduce selenium and salinity loads from the GAF. The pilot treatment processes are closed loop in that after evaluation for efficacy for salt and selenium removal, the output of the treatment process (usually an effluent with lowered selenium and salts concentrations and a concentrated byproduct) are blended together and recycled back into the SJRIP drainage system. During the pilot testing of these processes, there is no net increase in load or concentration.

If a long-term drainage treatment or disposal option is pursued within the SJRIP, the Order may need to be amended or a separate Order adopted to regulate the treatment or disposal of the subsurface drainage water. However, under this Order, tile drainage water can be treated and applied to the irrigated cropland in the SJRIP area, if 1) the mass load of the effluent is not greater than the influent; 2) the concentration of the effluent is not greater than the influent; and 3) there is no material in the effluent that was not present in the influent. Under such conditions, the treatment process would be considered in the same light as a management practice implemented to improve water quality – no separate permitting action by the board is needed, since the treatment process is being implemented to address the requirements of the Order.

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Future plans for the SJRIP are to construct additional subsurface drainage. Groundwater discharges in the SJRIP, including those areas utilizing subsurface drainage, will be covered by this Order, as will any ditches and distribution systems not constructed to prevent seepage.

Figure 3: San Joaquin River Water Quality Improvement Project



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V. Long-term ILRP Requirements

The Grassland Drainage Area received its first waste discharge requirements (WDRs) for surface water discharge of subsurface drainage water in 1998.⁹ Since there are no agricultural discharges to surface water other than the subsurface drain water, the Grassland Area Farmers were not members of a coalition group, as were other growers under the Irrigated Lands Regulatory Program (ILRP) conditional waiver that covered irrigated agricultural discharges to surface water. The long-term ILRP addresses the discharges from irrigated agricultural lands to groundwater as well as surface water. Therefore, the GAF will need to obtain coverage for agricultural discharges to groundwater through a third-party entity, or apply for individual coverage.

The GBD Steering Committee is representing the GAF under the umbrella of the San Luis & Delta-Mendota Water Authority, a joint powers agency organized pursuant to the California Government Code Section 6500 *et seq.*¹⁰ The GBD Steering Committee will assist the GAF in complying with the relevant terms and provisions of the Order, including required monitoring and reporting. The GBD Steering Committee has been recognized by the board as a third-party entity to represent the GAF.

⁹ WDR Order 98-171 issued 24 July 1998 to the U.S. Bureau of Reclamation and the San Luis & Delta-Mendota Water Authority.

¹⁰ A joint powers authority is an entity whereby two or more public authorities (e.g., local governments, or utility or transport districts), may jointly exercise any power common to all of them. The joint power authority has separate operating boards of directors that can be given any of the powers inherent in all of the participating agencies. In this case, the Grassland Basin Drainage Management Activity Agreement (Activity Agreement) between the water and irrigation districts in the GDA and the San Luis & Delta-Mendota Authority allows the GBD Steering Committee, a separate entity under the joint powers authority, to represent the GAF as participants in the ILRP. The GAF must apply to join the GDA Groundwater Quality Special Project, an activity that will be part of the Activity Agreement, which would allow the GBD Steering Committee to represent the GAF and implement the monitoring and reporting required for this Order. This situation parallels the authority of the Westside Coalition Group under the umbrella of the San Joaquin Valley Drainage Authority.

A. GAF Enrollment Process

Growers will have five months after the WDR approval to submit a completed application for membership under the GDA Groundwater Quality Special Project to the GBD Steering Committee and will be notified when their membership is approved.

Growers that do not enroll within the allowable timeframe, or are prompted to apply due to Central Valley Water Board enforcement or inspection, will be required to submit (1) a Notice of Intent (NOI) to comply with the terms and conditions of the Order to the Central Valley Water Board, (2) an administrative processing fee for the increased workload associated with the grower outreach (as applicable), and (3) an application for membership under the GDA Groundwater Quality Special Project to the GBD Steering Committee. These additional steps of submitting an NOI and fee directly to the board after the initial enrollment deadline are intended to provide an incentive for growers to enroll promptly. Board staff intends to provide the GBD Steering Committee with a courtesy copy of the NOA when issued to the grower, so the GBD Steering Committee has confirmation that their Member has received regulatory coverage under the Order.

By 31 July 2015 and every year thereafter the GBD Steering Committee will provide a Membership List to the Central Valley Water Board. The Membership List will specify Members in good standing as well as revoked memberships or pending revocations. The Membership List will also aid in identifying and reaching out to new owners in the case of ownership change. Because pending and revoked memberships could be associated with grower non-compliance with the Order, this type of information is key for the board to prioritize follow-up activities. Board staff will conduct enforcement activities as needed using the list of revoked/pending revocations.

VI. Vulnerability

The concept of higher and lower vulnerability areas was integrated into the Order to allow the board to tailor requirements to applicable waste discharge conditions. Resources can be focused on areas that need enhanced water quality protection, because the GBD Steering Committee 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.

Groundwater Quality Vulnerability

High vulnerability areas for groundwater are those areas that meet the requirements for preparing a Groundwater Quality Management Plan or areas identified in the Groundwater Assessment Report, where available information indicates irrigated lands could cause or contribute to an exceedance of water quality objectives or degradation of groundwater quality that may threaten applicable beneficial uses. The Groundwater Assessment Report may rely on water quality data to identify high vulnerability areas and on assessments of hydrogeological conditions and other factors (e.g., areas of high fertilizer use) to identify high vulnerability areas. The GBD Steering Committee is also expected to review readily available studies and assessments of groundwater quality to identify those areas that may be impacted by irrigated agricultural operations.

In general, low vulnerability areas for groundwater are areas that do not exhibit characteristics of high vulnerability groundwater areas (as defined in the MRP). Vulnerability designations will be proposed by the GBD Steering Committee, based on the high and low vulnerability definitions provided in Attachment E of the Order. Vulnerability designations will be refined and updated periodically per the Groundwater

Assessment Report and Monitoring Report processes (described in Attachment B, Monitoring and Reporting Program [MRP] Order R5-2015-XXXX). The Executive Officer will make the final determination regarding the irrigated lands waste discharge vulnerability areas.

A. Groundwater Quality

1. 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 ILRP¹¹.

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

The workgroup members reached consensus that the most important constituents of concern related to agriculture's impacts to the beneficial uses of groundwater are nitrate (NO₃-N) and salinity. In addition to addressing the widespread nitrate problems, the presence of nitrates in groundwater at elevated levels would serve as an indicator of other potential problems associated with irrigated agricultural practices. Central Valley Water Board staff utilized the recommended salinity and nitrate parameters and added general water quality parameters contained within a majority of the groundwater monitoring programs administered by the board (commonly measured in the field) and some general minerals that may be mobilized by agricultural operations (general minerals to be analyzed once every five years in Trend wells). The general water quality parameters will help in the interpretation of results and ensure that representative samples are collected. The board considered the above questions in developing the Order's groundwater quality monitoring and management practices assessment, and evaluation requirements.

¹¹ Groundwater Monitoring Data Needs for the ILRP (25 August 2011). Available at: http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/new_waste_discharge_requirements/stakeholder_advisory_workgroup/2011sept30_advrsy_wkgrp_mtg/gmaw_25aug_data_needs.pdf
October 2014

2. Groundwater Quality Monitoring and Management Practice Assessment, and Evaluation Requirements

The groundwater quality monitoring, assessment, and evaluation requirements have been developed in consideration of the critical questions developed by the Groundwater Monitoring Advisory Workgroup (listed above). The GBD Steering Committee must collect sufficient data to describe irrigated agricultural impacts on groundwater quality and to determine whether existing or newly implemented management practices comply with the groundwater receiving water limitations of the Order. The strategy for evaluating groundwater quality and protection consists of: 1) a Groundwater Quality Assessment Report (GAR), 2) a Management Practices Evaluation Program, and 3) a Groundwater Quality Trend Monitoring Program.

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

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

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

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

As the management practices identified as protective of groundwater quality through the MPEP are implemented, the trend monitoring, together with other data included in updates to the GAR, should show improvements in water quality. The trend monitoring and GAR updates will, therefore, provide a regional view as to whether the collective efforts of Members are resulting in water quality improvements. If groundwater quality trends indicate degradation in low vulnerability areas, then a Groundwater Quality Management Plan must be developed and implemented. Negative trends of groundwater quality in high vulnerability areas over time would be an indicator that the existing Groundwater Quality Management Plan is not effective or is not being effectively implemented.

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

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

Through the MPEP, the potential impacts of irrigated agriculture waste discharges to groundwater will be assessed for different types of practices and site conditions, representative of discharge conditions throughout the Grassland Drainage Area. In this way, the board will evaluate whether waste discharges from irrigated agricultural operations are protective of groundwater quality throughout the Grassland Drainage Area. Where the MPEP finds that additional “protective” practices must be implemented in order to ensure that Member waste discharges are in compliance with the Order’s receiving water limitations, the Order requires Members to implement such practices, or equivalent practices. This representative MPEP process will ensure that the effects of waste discharges are evaluated and where necessary, additional protective practices are implemented.

3. Data Summary, Pesticides

Monitoring conducted by the USGS in 2010¹² showed detections of 14 pesticides and pesticide degradates in groundwater within the Delta-Mendota subbasin. Pesticides and pesticide degradates were detected in 16 of the 18 wells¹³ in the Delta-Mendota subbasin study area. The most frequently detected pesticides in the studies for the Delta-Mendota subbasin include simazine, atrazine, deethylatrazine (degradate of triazine herbicides), hexazinone, EPTC, metachlor, and dichloroaniline (degradate of diuron). All pesticide detections were below health-based thresholds and applicable water quality objectives. Analyses were not run for all pesticides used in the study areas, nor in all wells within the Delta-Mendota subbasin.

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

¹² Mathany, T.M., Landon, M.K., Shelton, J.L., and Belitz, K., 2013. Ground-water quality data in the Western San Joaquin Valley study unit, 2010 – Results from the California GAMA Program: U.S. Geological Survey Data Series 706, 102 p. Available at <http://pubs.usgs.gov/ds/706/>

¹³ Thirteen of the eighteen wells monitored had depth to top perforation of less than 200 feet below level surface. October 2014

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pesticides contamination to the Legislature and other state agencies. These data will be evaluated by the GBD Steering Committee as part of its Groundwater Quality Assessment Report.

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 GBD Steering Committee 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 GBD Steering Committee to develop a groundwater quality management plan (GQMP).

4. Data Summary Nitrates –GAMA

The USGS 2010 report also analyzed nitrates for the Delta-Mendota subbasin wells. Maximum nitrate levels in the Delta-Mendota subbasin above the applicable water quality objective¹⁴ were found in production and monitoring wells that sampled groundwater at 200 feet or less below ground level.¹⁵ In the Grassland Drainage Area, there was limited groundwater monitoring, but a maximum nitrate concentration of 12.7 mg/L was found at a monitoring well. Additional information collected at shallower depths (where applicable) may be needed to adequately assess current groundwater quality conditions in the area.

5. Hydrogeologically Vulnerable and Groundwater Protection 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 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.

The Department of Pesticide Regulation (DPR) has developed a map of Groundwater Protection Areas (GWPA) that identifies areas vulnerable to groundwater contamination from the agricultural use of certain pesticides. The areas are based upon either pesticide detections in groundwater or upon the presence of certain soil types (leaching and/or runoff area) and a depth to groundwater shallower than 70 feet.

No areas in the GDA have been identified as being in the DPR Groundwater Protection Areas or the State Water Resources Control Board (State Water Board) Hydrogeologically Vulnerable Areas. Monitoring data from the San Luis Drain, which transports tile drainage from the GDA, shows nitrate levels averaging less than 9 mg/L (with a maximum of 19 mg/L) from 2008 to 2013 during the irrigation season from May through July. During this period, the tile drainage should be representative of groundwater.¹⁶

¹⁴ Maximum contaminant level (MCL) of 10 mg/L nitrate as nitrogen (N).

¹⁵ Depth to top of perforation was less than 200 feet below surface level. Nitrate as N concentrations ranged from 0.03 mg/L to 23.8 mg/L, with the mean concentration of 8.5 mg/L nitrates as N for those wells (total of 14).

¹⁶ Tile drains remove perched groundwater containing high salinity, from the root zone of the crop. As the crop is irrigated, the perched groundwater rises until it is removed through the tile drain system.

6. Groundwater Quality Management Plans (GQMPs)

Under this Order, groundwater quality management plans will be required where there are exceedances of water quality objectives, where there is a trend of degradation¹⁷ that threatens a beneficial use, as well as for “high vulnerability groundwater areas” (to be designated by the GBD Steering Committee in the Groundwater Quality Assessment Report based on definitions provided in Attachment E).

Instead of development of separate GQMPs, the Order allows for the submittal of a comprehensive GQMP along with the Groundwater Quality Assessment Report. GQMPs will only be required if irrigated lands may cause or contribute to the groundwater quality problem. GQMPs are the key mechanism under this Order to help ensure that waste discharges from irrigated lands are meeting Groundwater Receiving Water Limitation III.B. The limitations apply immediately unless the Member is implementing management practices consistent with an approved Groundwater Quality Management Plan (GQMP) for a specified waste in accordance with the time schedule authorized pursuant to section XII of this Order. The GQMP will include a schedule and milestones for the implementation of management practices (see Appendix MRP-1). The schedule must identify the time needed to identify new management practices necessary to meet the receiving water limitations, as well as a timetable for implementation of identified management practices. The MPEP will be the process used to identify the effectiveness of management practices, where there is uncertainty regarding practice effectiveness under different site conditions. However, the GQMP will also be expected to include a schedule for implementing practices that are known to be effective in partially or fully protecting groundwater quality. For example, the ratio of total nitrogen available to crop consumption of nitrogen that is protective of water quality may not be known for different site conditions and crops. However, accounting for the amount of nitrate in irrigation supply water is known to be an effective practice at reducing the amount of excess nitrogen applied.

The GQMPs are work plans describing how the GBD Steering Committee will assist their Members in addressing the identified water quality problem; the types of actions Members will take to address the identified water quality problem; how the GBD Steering Committee will conduct evaluations of effectiveness of implemented practices; and document consistency with Time Schedule for Compliance (Section XII of the Order). Executive Officer approval indicates concurrence the GQMP is consistent with the waste discharge requirements and that the proper implementation of the identified practices (or equivalently effective practices) should result in addressing the water quality problem that triggered the preparation of the GQMP. Approval also indicates concurrence that any proposed schedules or interim milestones are consistent with the requirements in section XII of the Order. If the Executive Officer is assured that the growers in the area are taking appropriate action to come into compliance with the receiving water limitations (as described in the GQMP), the growers will be considered in compliance with those limitations. Approval of GQMPs does not establish additional waste discharge requirements or compliance time schedule obligations not already required by these waste discharge requirements. Instead, the Executive Officer is approving a method for determining compliance with the receiving water limitations in the affected area. See *Russian River Watershed Committee v. City of Santa Rosa* (9th Cir. 1998) 142 F.3d 1136; *CASA v. City of Vacaville* (2012) 208 Cal.App.4th 1438.

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

¹⁷ A trend in degradation could be identified through the required trend monitoring or through the periodic updates of the Groundwater Quality Assessment Report.

Elements A – F are necessary to establish a process by which the GBD Steering Committee 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 GBD Steering Committee to develop GQMPs that include the above elements. GQMPs will be reviewed and approved by the Executive Officer. Also, because GQMPs may cover broad areas potentially impacting multiple groundwater users in the plan area, these plans will be circulated for public review. Prior to plan approval, the Executive Officer will consider public comments on proposed GQMPs.

In accordance with Water Code section 13267, the burden of the GQMP, including costs, is reasonable, since 1) the monitoring and planning costs are significantly lower when undertaken regionally by the GBD Steering Committee than requiring individual Members to undertake similar monitoring and planning efforts, and 2) the Central Valley Water Board must be informed of the efforts being undertaken by Members to address identified groundwater quality problems. A regional GQMP is, therefore, a reasonable first step to address identified groundwater quality problems.

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.

VII. Templates for Farm Evaluation, Nitrogen Management Plan, and Nitrogen Management Plan Summary Report

The Central Valley Water Board intends to provide templates (Farm Evaluation; Nitrogen Management Plan, Nitrogen Management Plan Summary Report) to all Members that must be used to comply with the applicable reporting requirements of this Order. The Central Valley Water Board allowed agricultural water quality coalitions and commodity groups to jointly propose templates to be used to satisfy the requirements of previous ILRP orders. The purposes of the templates are to collect information consistently across irrigated agricultural areas and commodities, and to minimize the costs for growers to provide that information. Consistent information collection will facilitate analysis within a geographic area and across the Central Valley. Those purposes may not be met if the Central Valley Water Board includes provisions that allows for submittal of proposed templates under each third-party order issued as part of the long-term irrigated lands regulatory program. However, the Central Valley Water Board recognizes that templates may require modifications for different geographic areas. Therefore, although the GBD Steering Committee will not have an opportunity to develop new templates under this Order, the GBD Steering Committee will have an opportunity to provide comments on the templates' applicability to its geographic area.

VIII. Member Reports

The Order requires that Members prepare farm plans and reports as described below. The Order establishes prioritization for Member completion and updating of the farm plans and reports based on farm size and whether the operation is within a high or low vulnerability area. The Central Valley Water Board intends to provide templates for Member reports to the GBD Steering Committee, who will have an opportunity to comment on the template applicability to its geographic area.

A. Farm Evaluations

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

The Order requires all members to complete the Farm Evaluation and submit it to the GBD Steering Committee by 15 December 2015. The schedule for completing subsequent Farm Evaluations is based on whether the operation is within a high or low vulnerability area. Farm evaluations must be maintained at the Member's farming operations headquarters or primary place of business and submitted to the GBD Steering Committee for summary reporting to the Central Valley Water Board.

The farm evaluation is intended to provide the GBD Steering Committee and the Central Valley Water Board with information regarding individual Member implementation of the Order's requirements. Without this information, the board would rely solely on representative surface and groundwater monitoring to determine compliance with water quality objectives. The board would not be able to determine through representative monitoring only whether all Members are implementing protective practices, such as wellhead protection measures for groundwater. For groundwater protection practices, it may take years in many areas (even decades in some areas) before broad trends in groundwater may be measured and associated with implementation of this Order. Farm evaluations will provide evidence that Members are implementing management practices to protect groundwater quality while Groundwater Quality Trend Monitoring data and Management Practices Evaluation Program (MPEP) information are collected.

The reporting of practices identified in the farm evaluation will allow the GBD Steering Committee and board to effectively implement the MPEP. Evaluating management practices at representative sites (in lieu of farm-specific monitoring) only works if the results of the monitored sites can be extrapolated to non-monitored sites. One of the key ways to extrapolate those results will be to have an understanding of which farming operations have practices similar to the site that is monitored. The reporting of practices will also allow the board to determine whether the GQMP is being implemented by Members according to the approved schedule.

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

While the focus of the reporting is on high vulnerability areas, the MPEP requirement affects management practices implemented in both high and low vulnerability areas. Management practices identified as protective of groundwater quality through the MPEP (or equivalent practices) must be implemented by Members, where applicable, whether the Member is in a high or low vulnerability area (see section IV.B.20 of the Order).

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B. Nitrogen Management Plans

Nitrate derived from both agricultural and non-agricultural sources has resulted in degradation and/or pollution of groundwater beneath agricultural areas in California's Central Valley.¹⁸ To address these concerns, the Order requires that Members implement practices that minimize excess nitrogen application relative to crop consumption. Proper nutrient management will work to reduce excess plant nutrients, such as nitrogen, from reaching state waters. Nitrogen management must take site-specific conditions into consideration in identifying steps that will be taken and practices that will be implemented to minimize nitrate movement through surface runoff and leaching past the root zone.

All Members will be required to complete a nitrogen management plan according to the schedule in the Order. A grower in a low vulnerability area is required to prepare nitrogen management plans, but does not need to certify the plans or provide summary reports to the GBD Steering Committee. Should the groundwater vulnerability designation change from "low" to "high" vulnerability, those Members in the previously designated low vulnerability area would then need to have their nitrogen management plan certified and submit summary reports in accordance with a schedule issued by the Executive Officer.

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

- Self-certified by the Member who attends a California Department of Food and Agriculture or other Executive Officer approved training program for nitrogen plan certification. The Member must retain written documentation of their attendance in the training program; or
- Self-certified by the Member that the plan adheres to a site-specific recommendation from the Natural Resources Conservation Service (NRCS) or the University of California Cooperative Extension. The Member must retain written documentation of the recommendation provided; or
- Certified by a nitrogen management plan specialist as defined in Attachment E of this Order. Such specialists include Professional Soil Scientists, Professional Agronomists, Crop Advisors¹⁹ certified by the American Society of Agronomy, or Technical Service Providers certified in nutrient management in California by the Natural Resources Conservation Service (NRCS).
- Certified in an alternative manner approved by the Executive Officer. Such approval will be provided based on the Executive Officer's determination that the alternative method for preparing the nitrogen management plan meets the objectives and requirements of this Order.

The Order requires nitrogen management reporting (nitrogen management plan summary reports) for Members in high vulnerability groundwater areas. The first nitrogen management plan summary report must be submitted one year after the first nitrogen management plan must be developed. The nitrogen management plan summary report provides information based on what was actually done the previous crop year, while the plan indicates what is planned for the upcoming crop year. Therefore, the first summary report is due the year following the implementation of the first nitrogen management plan. This reporting will provide the GBD Steering Committee and the Central Valley Water Board with information regarding individual Member implementation of the Order's requirements. Without this information, the board would rely primarily on groundwater monitoring to determine compliance with water quality

¹⁸ ICF International. 2011. *Irrigated Lands Regulatory Program - Program Environmental Impact Report*. Final and Draft. March. (ICF 05508.05.) Sacramento, CA. Prepared for Central Valley Regional Water Quality Control Board, Sacramento, CA. Appendix A, page 46.

¹⁹ Should the California Department of Food and Agriculture and the California Certified Crop Adviser's establish a specific nitrogen management certification, any Certified Crop Adviser who certifies a nitrogen management plan must have a nitrogen management certification.

objectives. Groundwater monitoring alone would not provide a real-time indication as to whether individual Members are managing nutrients to protect groundwater. Improved nitrogen management may take place relatively quickly, although it may take many years before broad trends in nitrate reduction in groundwater may be measured. Nitrogen management reporting will provide evidence that Members are managing nutrients to protect groundwater quality while trend data and Management Practices Evaluation Program (MPEP) information are collected.

Spatial Resolution of Nitrogen Management Plan and Farm Evaluation Information

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

Information collected from nitrogen management summary reports will be provided annually. The nitrogen management data collected by the GBD Steering Committee from individual Members will be aggregated by the township where the enrolled parcel is located and will not be associated with the Member or their enrolled parcel. For example, the GBD Steering Committee may have information submitted for 180 different parcels in a given township. At a minimum, the board would receive a statistical summary of those 180 data records describing the range, percentiles (10th, 25th, 50th, 75th, 90th), and any outliers for similar soil conditions and similar crops in that township. A box and whisker plot or equivalent tabular or graphical presentation of the data approved by the Executive Officer may be used. Based on this analysis, the Central Valley Water Board intends to work with the GBD Steering Committee to ensure that those Members who are not meeting the nitrogen management performance standards identified in the Order improve their practices. As part of its annual review of the monitoring report submitted by the GBD Steering Committee, the board will evaluate the effectiveness of GBD Steering Committee outreach efforts and trends associated with nitrogen management. The board intends to request information from the GBD Steering Committee for those Members who, based on the board's evaluation of available information, do not appear to be meeting nitrogen management performance standards. The reporting of nitrogen management data may be adjusted based on the outcomes of the efforts of the State Water Resources Control Board's Expert Panel and the California Department of Food and Agriculture's Nitrogen Tracking and Reporting System Task Force (see Finding 46 and the State Water Board's Report to the Legislature²⁰).

In order to determine whether growers in a given township are improving their practices, the GBD Steering Committee will need to assess the data collected from Farm Evaluations and evaluate trends. The GBD Steering Committee's assessment and evaluation, along with the data used to make the evaluation, will be provided in the GBD Steering Committee's annual monitoring report. By receiving the individual data records identified to at least the township level, the board will be able to determine whether individual Members are in compliance and the board will be able to identify specific data records for additional follow-up (e.g., requesting that the GBD Steering Committee provide the Member name and parcel associated with the data record). The board will be able to independently verify the assessments and evaluations conducted by the GBD Steering Committee. The board, as well as other stakeholders, can also conduct its own analysis and interpretation of the data, which may not be possible if only summary information for implemented management practices were provided. If the data suggest that growers are not improving their practices, the Executive Officer can require the GBD Steering Committee to submit the management practice or nitrogen management plan summary information in a manner that specifically identifies individual Members and their parcels.

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²⁰ State Water Board Resources Control Board. 2013. Report to the Legislature, Recommendations Addressing Nitrate in Groundwater <http://www.swrcb.ca.gov/water_issues/programs/nitrate_project/docs/nitrate_rpt.pdf> October 2014

IX. Technical Reports

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

Therefore, through the Management Practices Evaluation Program and Groundwater Quality Management Plans, the GBD Steering Committee must evaluate the effectiveness of management practices in protecting water quality. Since Members must report the practices they are implementing to protect water quality, the information from the management practice evaluation can be applied to individual Members to determine whether their implemented practices are protective of groundwater quality.

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. An example of such program is the Central Valley Water Board's Dairy Program.²¹ The costs of individual monitoring would be much higher than representative groundwater quality monitoring required under the Order. Representative monitoring site selection may be based on a group or category of represented waste discharges that will provide information required to assess compliance for represented Members, reducing the number of samples needed to evaluate compliance with the requirements of this Order. The GBD Steering Committee is tasked with ensuring that selected monitoring sites are representative of waste discharges to groundwater from all irrigated agricultural operations within the Order's boundaries.

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

X. Reports and Plans

This Order is structured such that the Executive Officer is to make determinations regarding the adequacy of reports and information provided by the GBD Steering Committee or Members and allows the Executive Officer to approve such reports. All plans and reports that require approval by the Executive Officer will be posted on the board's website upon approval. In addition, this Order identifies specific reports and Executive Officer's decisions that must be posted for public comment and review. It is the right of any interested person to request the Central Valley Water Board to review any of the aforementioned Executive Officer decisions.

XI. Approach to Implementation and Compliance and Enforcement

The board has been implementing the Irrigated Lands Regulatory Program since 2003. The implementation of the program has included compliance and enforcement activities to ensure growers have the proper regulatory coverage and are in compliance with the applicable board orders. The

²¹ The dairy program requires individual monitoring of surface water discharges and allows for a "representative" groundwater monitoring in lieu of individual groundwater monitoring.

following section describes the state-wide policy followed by the board, as well as how the board intends to implement and enforce the Order.

The State Water Board's Water Quality Enforcement Policy (Enforcement Policy) defines an enforcement process that addresses water quality in an efficient, effective, and consistent manner²². A variety of enforcement tools are available in response to noncompliance. The Enforcement Policy endorses the progressive enforcement approach which includes an escalating series of actions from informal to formal enforcement. Informal enforcement actions are any enforcement taken by staff that is not defined in statute or regulation, such as oral, written, or electronic communication concerning violations. The purpose of informal enforcement is to quickly bring an actual, threatened, or potential violation to the discharger's attention and to give the discharger an opportunity to return to compliance as soon as possible. Formal enforcement includes statutorily based actions that may be taken in place of, or in addition to, informal enforcement. Formal enforcement is recommended as a first response to more significant violations, such as the highest priority violations, chronic violations, and/or threatened violations. There are multiple options for formal enforcement, including Administrative Civil Liabilities (ACLs) imposed by a Regional Water Board or the State Water Board. A 30-day public comment period is required prior to the settlement or imposition of any ACL and prior to settlement of any judicial civil liabilities.

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A. Compliance/Enforcement Related to Grower Participation

To facilitate grower participation in the Irrigated Lands Regulatory Program (ILRP) under the Conditional Waiver, the Central Valley Water Board staff engaged in outreach and followed the progressive enforcement series of actions. For example, staff had sent outreach postcards informing non-participating landowners who potentially require coverage under the ILRP. Water Code Section 13267 Orders for technical reports had been issued to landowners who first received an outreach postcard and did not respond. Landowners were required to respond to postcards or 13267 Orders by obtaining the required regulatory coverage, or claiming an exemption from the ILRP requirements. The Central Valley Water Board staff routinely conducted inspections to verify landowner exemption claims; occasionally the outcome of inspections led to an enforcement action for failure to obtain appropriate regulatory coverage.

Upon the adoption of other ILRLP Orders, staff sent letters to thousands of landowners whose property may now require regulatory coverage. Parcels that potentially need regulatory coverage are identified from readily available information sources, such as county tax assessor records; aerial photography; and the California Department of Conservation's Farmland Mapping and Monitoring Program. The staff also conducts inspections in the field to verify that parcels have an irrigated agricultural operation. The Assistant Executive Officer sends Water Code Section 13260 Directives when inspections verify that parcels require coverage under the ILRP, when growers who used to be Members are no longer listed on the annual membership lists, or when growers who received Executive Officer approval to join a third-party have not done so. The 13260 Directives require growers to enroll or re-instate their membership with a third-party, obtain coverage for their discharges under other applicable general waste requirements, or submit a Report of Waste Discharge to the Central Valley Water Board. As the highest level of informal enforcement, Notices of Violation (NOV's) are sent to growers who fail to respond to Orders and Directives, and direct the recipients obtain the proper regulatory coverage for their waste discharges. The board intends to issue Administrative Civil Liability Complaints to those growers who do not respond to the NOV. In addition, the board may enroll those growers under the general WDRs for dischargers not participating in a third-party group (R5-2013-0100), after such growers are provided an opportunity for a hearing.

²² State Water Resources Control Board. 2010. Water Quality Enforcement Policy.
<http://www.swrcb.ca.gov/water_issues/programs/enforcement/docs/enf_policy_final111709.pdf>
October 2014

B. Compliance/Enforcement Related to Water Quality Violations

The board intends to respond promptly to complaints and conduct field inspections on a routine basis to identify potential water quality violations. Complaints will generally result from local residents contacting the board based on their observations of sediment plumes, fish kills, or odor problems. The board will generally contact and coordinate with the GBD Steering Committee, the California Department of Fish and Wildlife, and the local county agricultural commissioner depending on the nature of the problem.

In addition, the board staff will conduct field inspections of individual grower's operations to determine whether practices protective of groundwater are in place. Such practices include backflow prevention devices; well head protection; and those practices found protective through the Management Practices Evaluation Program. The informal and formal enforcement process described above will be used should any violations of the Order be identified through field inspections.

C. Compliance/Enforcement Related to Information Collected

As a part of field inspections, and with the consent of the Member, owner or authorized representative as required by applicable laws, staff may also review information and farm plans prepared by Members. The Executive Officer will request information, as necessary, from Members and the GBD Steering Committee to audit the quality and accuracy of information being submitted. The Executive Officer will regularly report to the board on the results of any audits of the information reported by the GBD Steering Committee, the outcome of any field verification inspections of information submitted by the Members, and make recommendations regarding changes to the reporting requirements and the information submittal process, if needed.

The findings of this Order provide a further description of the enforcement priorities and process for addressing violations.

XII. Water Quality Objectives

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.

A. Implementation of Water Quality Objectives

The Basin Plans include numeric and narrative water quality objectives. The narrative toxicity objective states: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The narrative chemical constituent objective states that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At a minimum, "*...water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess*

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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: “Ground waters shall not contain taste- or odor-producing substances in concentrations that cause nuisance, or otherwise adversely affect beneficial uses.”

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

Implementation of numeric and narrative water quality objectives under the Order involves an iterative process. The Order’s MRP establishes management plan trigger limits that are equivalent to the applicable Basin Plan numeric water quality objectives. For constituents that are not assigned Basin Plan numeric water quality objectives, Central Valley Water Board staff will provide interested parties, including the GBD Steering Committee representing Members, with an opportunity to review and comment on the trigger limits. The Executive Officer will then provide the trigger limits to the GBD Steering Committee. Those trigger limits will be considered the numeric interpretation of the applicable narrative objectives. In locations where trigger limits are exceeded, water quality management plans must be developed for reporting steps taken by growers to achieve compliance with numeric and narrative water quality objectives.

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XIII. 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)²³ that analyzes the potential environmental impacts of six program alternatives for a long term ILRP. As described more fully in Attachment D, this Order relies upon the PEIR for CEQA compliance. The requirements of the Order include regulatory elements that are also contained in the six alternatives analyzed in the PEIR. Therefore, the actions by Members to protect water quality in response to the requirements of this Order are expected to be similar to those described for Alternatives 2-6 of the PEIR (Alternative 1 does not include groundwater protection).

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

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

- 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 has been developed, based on the alternatives evaluated in the PEIR for all irrigated agriculture within the Central Valley.

The Grassland Area Farmers and water districts have implemented several management practices and activities to minimize subsurface drainage discharges into surface waters of the state. These practices and activities include the installation of tailwater recovery systems, isolation of tailwater from subsurface drainage, and lining canals and installing piping to reduce seepage. With the prohibition of tailwater discharge into water district canals and this Order regulating discharges to groundwater only, it is possible to further narrow the types of practices that may be implemented in response to the requirements in the Order. Of the types of management practices evaluated in the PEIR, only the following would be applicable to the Grassland Area Farmers with respect to discharges to groundwater:

- Improved water management
- Tailwater recovery system
- Pressurized irrigation
- Nutrient management
- Wellhead protection

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

- Cultural resources: Potential loss of resources from construction and operation of management practices and monitoring wells.
- Noise and vibration: Exposure of sensitive land uses to noise from construction and operation of management practices (e.g., 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 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 and monitoring wells.
- Agriculture resources: Loss of farmland from increased regulatory cost. Cumulative loss of agriculture resources.

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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 monitoring well that is already disturbed rather than in an area with undisturbed habitat). Where no alternate practice or less sensitive location for a practice exists, this Order requires that the GBD Steering Committee and Members choosing to employ these practices 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 R5-2015-XXXX.

XIV. Statement of Policy With Respect to Maintaining High Quality Waters in California (State Water Board Resolution 68-16)

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

Initially, all Members will need to conduct an on-farm evaluation to determine whether their practices are protective of water quality and whether they are meeting the established farm management performance standards. Through the process of becoming aware of effective management practices, evaluating their practices, and implementing improved practices, Members are expected to meet the farm management performance standards and, thereby, achieve best practicable treatment or control (BPTC), where applicable. All Members must prepare and implement a farm-specific nitrogen management plan. Implementation of the nitrogen management plan should result in achieving BPTC for nitrates discharged to groundwater.

Representative monitoring of groundwater together with periodic assessments of available groundwater information is required to determine compliance with water quality objectives and determine whether any trends in water quality (improvement or degradation) are occurring. If trends in such degradation are identified that could result in impacts to beneficial uses, a groundwater quality management plan must be prepared by the GBD Steering Committee. 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 GBD Steering Committee must report on the implementation of practices by its Members. Failure of individual Members to implement practices to meet farm management performance standards or address identified water quality problems will result in further direct regulation by the board, including, but not limited to, requiring individual farm water quality management plans, regulating the individual grower directly through WDRs for individual farmers, or taking other enforcement action.

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

A. Background

Basin Plan water quality objectives are developed to ensure that ground and surface water beneficial uses are protected. The quality of some state groundwater 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. Resolution 68-16 applies to discharges to all high quality waters of the state, including groundwater and surface water (Water Code section 13050[e]).

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 to 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.”*

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). A number of key terms are relevant to application of Resolution 68-16 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.”²⁴ Such waters are “high quality waters” under the state antidegradation policies. In other words, high quality waters are waters with a background quality of better quality than that necessary to protect beneficial uses.²⁵ The Water Code directs the State Water Board and the Regional Water Boards to establish water quality objectives for the reasonable protection of beneficial uses. Therefore, where water bodies contain levels of water quality constituents or characteristics that are better than the established water quality objectives, such waters are considered high quality waters.

State guidance indicates that the definition of high quality waters is established by constituent or parameter (State Water Board Order WQ 91-10). 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

²⁴ 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.

²⁵ 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.”

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 high quality water with regard to a given constituent, the background quality of the water body unaffected by the discharge must be compared to the water quality objectives. If the quality of a water body has declined since the adoption of the relevant policies and that subsequent lowering was not a result of regulatory action consistent with the state antidegradation policy, a baseline representing the historically higher water quality may be an appropriate representation of background.²⁶ However, if the decline in water quality was permitted consistent with state antidegradation policies, the most recent water quality resulting from permitted action constitutes the relevant baseline for determination of whether the water body is high quality (see, e.g., SWRCB Order WQ 2009-0007, page 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 high quality water.

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

Despite the lack of a BPTC definition, certain State Water Board water quality orders and other documents provide direction on the interpretation of BPTC. The State Water Board has stated: “one factor to be considered in determining BPTC would be the water quality achieved by other similarly situated dischargers, and the methods used to achieve that water quality” (see Order WQ 2000-07, pages 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.²⁷ 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 2000-07). The requirement of BPTC is discussed in greater detail below.

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

As described in the Question and Answers Document, factors considered in determining whether degradation of water quality is consistent with maximum benefit to people of the State include economic and social costs, tangible and intangible, of the proposed discharge, as well as the

²⁶ The state antidegradation policy was adopted in 1968; therefore water quality as far back as 1968 may be relevant to an antidegradation analysis. For purposes of application of the federal antidegradation policy only, the relevant year would be 1975.

²⁷ See *Questions and Answers, State Water Resources Control Board, Resolution 68-16* (February 16, 1995).
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environmental aspects of the proposed discharge, including benefits to be achieved by enhanced pollution controls. With reference to economic costs, both costs to the dischargers and the affected public are considered. 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.

Waters that are Not High Quality: The “Best Efforts” Approach:

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

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, page 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 policy. The “best efforts” approach must be taken where a water body is not “high quality” and the antidegradation policy is accordingly not triggered.

B. Application of Resolution 68-16 Requirements to this Order

The determination of 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 available information regarding the water quality status of groundwater in the Grassland Drainage Area to construct provisions in this Order to meet the substantive requirements of Resolution 68-16.

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This Order regulates discharges from thousands of individual fields to a groundwater underlying the Grassland Drainage Area. There is no comprehensive, waste constituent-specific information available for groundwater aquifers accepting irrigated agricultural wastes that would allow site-specific assessment of current conditions. Likewise, there are no comprehensive historic data.

As described in section IV.A.3 and IV.A.4, available monitoring conducted by the USGS GAMA in 2010 showed detections of 14 pesticides and pesticide degradates in groundwater within the Delta-Mendota subbasin that are or could be associated with irrigated agricultural activities. Groundwater quality in the Delta-Mendota subbasin same study showed maximum nitrate levels in the Delta-Mendota subbasin above the applicable water quality objective were found in production and monitoring wells that sampled groundwater at 200 feet or less below ground level. In the Grassland Drainage Area, there was limited groundwater monitoring, but a nitrate concentration of 12.7 mg/L was found at one monitoring well.

While the lack of historical data prevents the board from being able to determine whether the groundwater represented by these wells are considered “high quality” with respect to nitrates, because it is unknown when the degradation occurred, available data show that currently existing quality of certain water bodies is better than the water quality objectives. For example, deeper groundwaters, represented by municipal supply wells, are generally high quality with respect to pesticides and nitrates. Degradation of such waters can be permitted only consistent with the state and federal antidegradation policies.

Given the significant variation in conditions over the broad areas covered by this Order, any application of the antidegradation requirements must account for the fact that at least some of the waters into which agricultural discharges will occur are high quality groundwater (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.”

C. Consistency with BPTC and the “Best Efforts” Approach

Due to the numerous commodities being grown on irrigated agricultural lands and varying hydrogeologic conditions within the Grassland Drainage Area, identification of a specific technology or treatment device as BPTC or “best efforts” has not been accomplished. By contrast, there are a variety of technologies that have been shown to be effective in protecting water quality. For example, Chapter 5 of the *Irrigated Lands Program Existing Conditions Report*²⁸ (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.

²⁸ California Regional Water Quality Control Board, Central Valley Region, and Jones and Stokes. 2008. *Irrigated Lands Regulatory Program Existing Conditions Report*. Sacramento, CA.
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There is no specific set of technologies, practices, or treatment devices that can be said to achieve BPTC/best efforts universally in the watershed. This Order, therefore, establishes a set of performance standards that must be achieved and an iterative planning approach that will lead to implementation of BPTC/best efforts. The iterative planning approach will be implemented as two distinct processes, 1) establishment of a baseline set of universal farm water quality management performance standards combined with upfront evaluation, planning and implementation of management practices to attain those goals, and 2) additional planning and implementation measures where degradation trends are observed that threaten to impair a beneficial use or where beneficial uses are impaired (i.e., water quality objectives are not being met). Taken together, these processes are considered BPTC/best efforts. The planning and implementation processes that growers must follow on their farms should lead to the on-the-ground implementation of the optimal practices and control measures to address waste discharge from irrigated agriculture.

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1. Farm Management Performance Standards

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

- a. minimize percolation of waste to groundwater,
- b. minimize excess nutrient application relative to crop consumption,
- c. prevent pollution and nuisance,
- d. achieve and maintain water quality objectives and beneficial uses, and
- e. protect wellheads from surface water intrusion.

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

- As part of California's Nonpoint Source Pollution Control Program, the State Water Board, California Coastal Commission, and other state agencies have identified seven management measures to address agricultural nonpoint sources of pollution that affect state waters (*California's Management Measures for Polluted Runoff*, referred to below as "Agriculture Management Measures").⁴⁰ 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),⁴¹ "is a technical guidance and reference document for use by State, local, and tribal managers in the implementation of nonpoint source pollution management programs. It contains information on the best available, economically achievable means of reducing pollution of surface and ground water from agriculture."

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

Management measure 1, erosion and sediment control is not applicable, as this Order does not address waste discharges to surface water.

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

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

Management measure 4, pesticide management. As described in the State's Agricultural Management Measures document, this measure "*is intended to reduce contamination of surface water and groundwater from pesticides.*" Performance standards a, c, d, and e are consistent with this management measure, requiring Members to implement practices that minimize waste discharge groundwater (such as nitrates), prevent pollution and nuisance, achieve and maintain water quality objectives, and implement wellhead protection measures.

Management measure 5, grazing management is not applicable, as this Order does not address waste discharges, such as sediment, to surface water.

Management measure 6, irrigation water management. As described in the state Agricultural Management Measures document, this measure "*promotes effective irrigation while reducing pollutant delivery to surface and ground waters.*" Performance standards a and c, requiring Members to minimize waste discharge to 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., tailwater return), or other methods to minimize discharge of waste and percolation to groundwater.

Management measure 7, education and outreach. The Order requires that GBD Steering Committee conduct education and outreach activities to inform Members of program requirements and water quality problems.

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

2. Additional Planning and Implementation Measures (GQMPs)

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

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

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

The State Water Board indicates in its Questions and Answers, Resolution 68-16: “To evaluate the best practicable treatment or control method, the discharger should...evaluate performance data, e.g., through treatability studies...” Water quality management plans, referred to as GQMPs above, institute an iterative process whereby the effectiveness of any set of practices in achieving receiving water limitations will be periodically reevaluated as necessary and/or as more recent and detailed water quality data become available. The monitoring reports and management plan status reports submitted by the GBD Steering Committee on an ongoing basis will include information on the practices being implemented and, for practices implemented in response to GQMPs, an evaluation of their effectiveness. This process of reviewing data and instituting additional practices where necessary will continue to assure that BPTC/best efforts are implemented and will facilitate the collection of information necessary to demonstrate the performance of the practices. This iterative process will also ensure that the highest water quality consistent with maximum benefit to the people of the state will be maintained.

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

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

In addition to the GQMPs, the Order includes a comprehensive suite of reporting requirements that should provide the board with the information it needs to determine whether the necessary actions are being taken to achieve BPTC and protect water quality, where applicable. These reporting provisions have been crafted in consideration of Water Code section 13267, which requires that the burden, including costs, of monitoring requirements bear a reasonable relationship to the need for and the benefits to be gained from the monitoring. In high vulnerability groundwater areas, the GBD Steering Committee must develop and implement a Management Practices Evaluation Program (MPEP). The MPEP will include evaluation studies of management practices to determine whether those practices are protective of groundwater quality (e.g., that will not cause or contribute to exceedances of water quality objectives) for identified constituents of concern under a variety of site conditions. If the management practices are not protective, new practices must be developed, implemented, and evaluated. Any management practices that are identified as being protective of water quality, or those that are equally effective, must be implemented by Members who farm under similar conditions (e.g., crop type, soil conditions) (see provision IV.B.20 of the Order).

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

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

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

All Members will also need to report on their management practices through the farm evaluation process. In addition, all members will need to prepare nitrogen management plans prepared in accordance with the nitrogen management plan templates approved by the Executive Officer. The plans require Members to document how their fertilizer use management practices minimize excess nutrient application relative to crop consumption. The planning requirements are phased according to threat level such that members in low vulnerability areas have more time to complete their plans than those in high vulnerability areas. Members in high vulnerability areas will need to submit nitrogen management plan summary reports. Through the farm evaluation, the Member must identify “...on-farm management practices implemented to achieve the Order’s farm management performance standards” In addition, the nitrogen management plan summary reports required in high vulnerability areas will include, at a minimum, information on the ratio of total nitrogen available for crop uptake to the estimated crop consumption of nitrogen. Nitrogen management plans and nitrogen management plan summary reports provide indicators as to whether the Member is meeting the performance standard to minimize excess nutrient application relative to crop consumption of nitrogen. The MPEP study process would be used to determine whether the nitrogen consumption ratio meets the performance standard of the Order.

D. Summary

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

Also, the Order requires water quality monitoring and assessments aimed to identify trends, evaluate effectiveness of management practices, and detect exceedances of water quality objectives. The requirements were designed in consideration of Water Code section 13267. The process of periodic review of GQMPs provides a mechanism for the board to better ensure that Members are meeting the requirements of the Order, if the GBD Steering Committee-led efforts are not effective in ensuring receiving water limitations are achieved.

Requirements for individual farm evaluations, nitrogen management plans, management practices tracking and water quality monitoring and reporting are designed to ensure that degradation is minimized and that management practices are protective of water quality. These requirements are aimed to ensure that all irrigated lands are implementing management practices that minimize degradation, the effectiveness of such practices is evaluated, and feedback monitoring is conducted to ensure that degradation is minimized. Even in low vulnerability areas where there is no information indicating degradation of a high quality water, the farm management performance standards act as a preventative

requirement to ensure degradation does not occur. The information and evaluations conducted as part of the GQMP process will help inform those Members in low vulnerability areas of the types of practices that meet the performance standards. In addition, even Members in low vulnerability groundwater areas must implement practices (or equivalent practices) that are identified as protective through the MPEP studies (where these practices are applicable to the Members' site conditions). The farm evaluations and nitrogen management plan requirements for low vulnerability areas provide indicators as to whether Members are meeting applicable performance standards. The required monitoring and periodic reassessment of vulnerability designations will allow the board to determine whether degradation is occurring and whether the status of a low vulnerability area should be changed to high vulnerability, and vice versa.

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

- At a minimum, this Order requires that irrigated agriculture achieve and maintain compliance with water quality objectives and beneficial uses;
- The requirements implementing the Order will result in use of BPTC where irrigated agricultural waste discharges may cause degradation of high quality waters; where waters are already degraded, the requirements will result in the pollution controls that reflect the "best efforts" approach. Because BPTC will be implemented, any lowering of water quality will be accompanied by implementation of the most appropriate treatment or control technology;
- Central Valley communities depend on irrigated agriculture for employment (PEIR, Appendix A). Widespread to total elimination of farming would result in loss of these jobs, which would disproportionately impact already disadvantaged communities that depend on farm jobs and the farm economy. The total output of the agricultural sector, including support services, could be substantially reduced if no degradation were allowed;
- The state and nation depend on Central Valley agriculture for food (PEIR, Appendix A). As stated in the PEIR, one goal of this Order is to maintain the economic viability of agriculture in California's Central Valley. Failing to authorize degradation of high quality waters could result in a significantly loss of farmland;
- Consistent with the Order's and PEIR's stated goal of ensuring that irrigated agricultural discharges do not impair access to safe and reliable drinking water, the Order protects high quality waters relied on by local communities from degradation by current practices on irrigated lands. The Order is designed to prevent irrigated lands discharges from causing or contributing to exceedances of water quality objectives, which include maximum contaminant levels for drinking water. The Order imposes more stringent requirements in areas deemed "high vulnerability" based on threat to groundwater beneficial uses, including the domestic and municipal supply use. The Order also is designed to detect and address exceedances of water quality objectives, if they occur, in accordance with the compliance time schedules provided therein;
- Because the Order prohibits degradation above a water quality objective and establishes representative a groundwater monitoring program to determine whether irrigated agricultural waste discharges are in compliance with the Order's receiving water limitations, local communities should not incur any additional treatment costs associated with the degradation

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authorized by this Order. In situations where water bodies are already above water quality objectives and communities are currently incurring treatment costs to use the degraded water, the requirements established by this Order will institute time schedules for reductions in irrigated agricultural sources to achieve the Order's receiving water limitations; therefore, this Order will, over time, work to reduce treatment costs of such communities; and

- The Order requires Members to achieve water quality management practice performance standards and includes farm management practices monitoring to ensure practices are implemented to achieve these standards. The iterative process whereby Members implement practices to achieve farm management performance standards, coupled with representative groundwater monitoring feedback to assess whether the practices are effective, will prevent degradation of groundwater quality above water quality objectives. The requirement that Members not cause or contribute to exceedances of water quality objectives is a ceiling. Achieving the farm management performance standards will, in many instances, result in preventing degradation or degradation well below water quality objectives.

The requirements of the Order and the degradation that would be allowed are consistent with State Water Board Resolution 68-16. The requirements of the Order will result in the implementation of BPTC necessary to assure the highest water quality consistent with the maximum benefit to the people of the state. The receiving water limitations in section III of the Order, the compliance schedules in section XII, and the Monitoring and Reporting Program's requirements to track compliance with the Order, are designed to ensure that the authorized degradation will not cause or contribute to exceedances of water quality objectives, unreasonably affect beneficial uses, or cause a condition of pollution or nuisance. Finally, the iterative process of reviewing data and instituting additional management practices where necessary will ensure that the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

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XV. California Water Code Sections 13141 and 13241

The total estimated annual average cost of compliance with this Order, e.g., summation of costs for administration, monitoring, reporting, tracking, implementation of management practices, is approximately \$16.20 per acre. The total estimated average cost of compliance associated with this Order is \$1,572,000 per year. These estimates are based on the costs for the Western Tulare Lake Basin Order, since the GDA has similar farming crop types, management practices, and geohydrological features with the Westlands area.

Approximately \$11.82 of the estimated \$16.20 per acre annual cost of the Order is associated with implementation of water quality management practices (see discussion below for a breakdown of estimated costs). This Order does not require that Members implement specific water quality management practices.²⁹ Many of the management practices that have water quality benefits can have other economic and environmental benefits (e.g., improved irrigation can reduce water and energy consumption, as well as reduce runoff). Management practice selection will be based on decisions by individual Members in consideration of the unique conditions of their irrigated agricultural lands, water quality concerns, and other benefits expected from implementation of the practice. As such, the cost estimate is an estimate of potential, not required costs of implementing specific practices. Any costs for water quality management practices will be based on a market transaction between Members and those vendors or individuals providing services or equipment and not based on an estimate of those costs provided by the board. The cost estimates include estimated fees the GBD Steering Committee may charge to prepare the required reports and conduct the required monitoring, as well as annual permit fees that are charged to permitted dischargers for permit coverage. In accordance with the State Water Board's Fee Regulations, the current annual permit fee charged to members covered by this Order is

²⁹ Per Water Code section 13360, the Central Valley Water Board may not specify the manner in which a Member complies with water quality requirements.

\$0.75/acre. There are a number of funding programs that may be available to assist growers in the implementation of water quality management practices through grants and loans (e.g., Environmental Quality Incentives Program, State Water Board Agricultural Drainage Management Loan Program). Following is a discussion regarding derivation of the cost estimate for the Order.

This Order, which implements the Long-term ILRP within the Grassland Drainage Area, is based mainly on Alternatives 2 and 4 of the PEIR, but does include elements from Alternatives 2-5. The Order contains the groundwater management plans similar to Alternative 2 of the PEIR; farm planning, management practices tracking, nitrogen tracking, and regional groundwater monitoring similar to Alternative 4 of the PEIR; recommendation/certification requirements similar to Alternative 3; prioritized installation of groundwater monitoring wells similar to Alternative 5; and a prioritization system based on systems described by Alternatives 2 and 4. Therefore, potential costs of these portions of the Order are estimated using the costs for these components of Alternative 2 and Alternative 5 given in the *Draft Technical Memorandum Concerning the Economic Analysis of the Irrigated Lands Regulatory Program* (Economics Report).⁴⁶ Table 6 summarizes the major regulatory elements of the Order and provides reference to the PEIR alternative basis.

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Table 2: Summary of regulatory elements

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

The administrative costs of the Order are estimated to be similar to the costs shown for Alternative 2 in Table 2-19 of the Economics Report. Additional costs have been included for third-party preparation of the monitoring report. Farm evaluation and nitrogen management planning (farm planning) costs are estimated using the costs for farm planning (page 2-22, Economics Report, \$2,500 per Member plus an additional annual cost for updating farm planning documents and associated reporting). Total trend groundwater monitoring and reporting costs are estimated using regional groundwater monitoring costs and planning costs given on page 2-20 and Table 2-14 of the Economics Report, respectively.³⁰ Additional cost estimates have been included for the groundwater quality assessment report and management practices evaluation program. Costs for installation of groundwater monitoring wells are estimated using the costs shown in Table 2-15 of the Economics Report. Tracking costs of management practices and nitrogen management plan information are estimated to be similar to the costs shown for Alternative 4 in Table 2-21 of the economics report –under “tracking.” Management practices costs have been estimated for the Delta Mendota Canal Watershed (pages 3-60 to 3-65, Existing Conditions Report) generally using the methodology outlined in pages 2-6 to 2-16 of the Economics Report. Estimated average annualized costs per acre of the Order are summarized below in Table 3.

³⁰ Surface water monitoring costs were not included in the Order's estimates.
 October 2014

Table 3: Estimated annual average per acre cost* of the Order in the Grassland Drainage Area.

	Order
Administration	\$1.49
Farm planning	\$0.45
Monitoring/reporting/tracking	\$2.44
Management practices*	\$11.82
Total**	\$16.20

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

** Totals may not add up due to rounding.

The Basin Plans include an estimate of potential costs and sources of financing for the long-term irrigated lands program. The estimated costs were derived by analyzing the alternatives evaluated in the PEIR using the cost figures provided in the Economics Report. The Basin Plans cost estimate is provided as a range applicable to implementation of the program throughout the Central Valley. The Basin Plans' estimated total annualized cost of the irrigated lands program is \$216 million to \$1.3 billion, or \$27 to \$168 per acre.³¹ The estimated total annual cost of this Order of \$1,572,000 (\$16.20 per acre) falls below the estimated cost range for the irrigated lands program as described in the Basin Plans when considering per acre costs (\$27-\$168 per acre). The estimate is lower primarily due to the Order covering only groundwater rather than surface water and groundwater.

The estimated total average annual cost per acre of Alternative 4 in the Grassland Drainage Area is \$121 (generally applicable to the Western San Joaquin River Watershed). The Order based substantially on Alternative 4 but covering only groundwater, is expected to have a lower average annual cost to members and less overall economic impacts than described in the Economics Report.³²

XVI. 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 groundwater within the Sacramento and San Joaquin River Basins. 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 Plans and applicable policies, rather than a site specific evaluation that might be appropriate for WDRs applicable to a single discharger.

³¹ Per acre average cost calculated using an estimate for total irrigated agricultural acres in the Central Valley (7.9 million acres, Table 3-3, Economics Report).

³² The estimated average cost of this Order is less than the cost estimated for Alternative 4 because this Order is based on components of other alternatives in addition to alternative 4. Another reason for the reduced cost is due to an estimate of the existing level of advanced irrigation management practice implementation (e.g. pressurized systems, tailwater recovery systems, etc.). It is estimated that many Members within the Order's coverage area are already implementing these or similar advanced irrigation practices because the water districts in the GDA do not allow members to discharge tailwater. The use of Alternative 4's potential economic impacts provides a conservative measurement of the Order's potential economic effects.

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

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

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

This Order provides a process to review these factors during implementation of water quality management plans (GQMPs). The Order requires that discharges of waste from irrigated lands to groundwater do not cause or contribute to an exceedance of applicable water quality objectives. GQMPs are required in areas where water quality objectives are not being met –where irrigated lands are a potential source of the concern, and in areas where irrigated agriculture may be causing or contributing to a trend of degradation that may threaten applicable beneficial uses. GQMPs are also required in high vulnerability groundwater areas. Under these plans, sources of waste must be estimated along with background water quality to determine what options exist for reducing waste discharge to ensure that irrigated lands are not causing or contributing to the water quality problem. The 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 not 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. Central Valley Water Board 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 regulatory program. This Order is a single action in a series of actions to implement the ILRP in the Central Valley region. Because the Order has been developed from the alternatives evaluated in the PEIR, economic effects will be within the range of those described for the alternatives.

(e) *The need for developing housing within the region*

This Order establishes waste discharge requirements to groundwater for irrigated lands in the Grassland Drainage Area. The Order is not intended to establish requirements for any facilities that accept wastewater from residences or stormwater runoff from residential areas. This Order will not affect the development of housing within the region.

(f) *The need to develop and use recycled water*

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

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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 Grassland Drainage Area.

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