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IRRIGATION TRAINING & RESEARCH CENTER

California Polytechnic State University

San Luis Obispo, CA 93407-0730

Phone: (805) 756-2434 FAX: (805) 756-2433 www.itrc.org

Background Information for Expert Panel

April 22, 2014

The California State Water Resources Control Board (State Water Board) committed to convene a panel of experts (Expert Panel) to assess existing agricultural nitrate control programs and develop recommendations, as needed, to ensure that ongoing efforts are protective of groundwater quality (State Water Board, 2013). This memo is intended to:

- Provide background information to the Expert Panel
- Clarify what the Expert Panel is expected to address, and what it is not expected to address. This is discussed in detail at the end of this memo. Key points are:
 - The focus will be on nitrates, rather than sediment, pesticides, etc.
 - Groundwater is the main issue, although several questions for the Expert Panel are related to surface water monitoring.
 - The Expert Panel is expected to address questions related to:
 - Proper establishment of “risk” or “vulnerability” categories for large geographic areas, fields, crop types, or farms.
 - The type of above-groundwater data collection and computations that are needed for compliance, or to estimate impacts of practices.
 - Effectiveness of management practices that have been recommended for agricultural irrigators, which might affect nitrate leaching into the groundwater.
 - The Expert Panel questions are found at the end of this document as *Appendix 4*.

Waste Discharge Requirements (WDRs) and Conditional Waivers to WDRs

Under the California Water Code (CWC), anyone who discharges waste (other than community water systems) that affects waters of the state must file a Report of Water Discharge (ROWD) with their Regional Water Quality Control Board (Regional Water Board). The CWC requires that the Regional Water Board prescribe the Waste Discharge Requirements (WDRs) or waive the WDRs (called a "Conditional Waiver") to anyone who is determined to be a "discharger" of waste.

Definitions:

WDR (Waste Discharge Requirement) – For the Irrigated Lands Regulatory Program (ILRP) this is a permit issued by the Regional Water Boards to geographic areas or to groups of growers of identical crops. It requires certain water quality monitoring and reporting.

Conditional Waiver – A permit issued by the Regional Water Boards. It was originally intended to serve as a precursor to the issuing of a WDR. In some regions, the "Conditional Waiver" has the same status as a WDR.

Ag Waiver/Agricultural Order – Synonyms for Conditional Waivers and WDRs that have been adopted specifically to address agricultural discharges from irrigated lands.

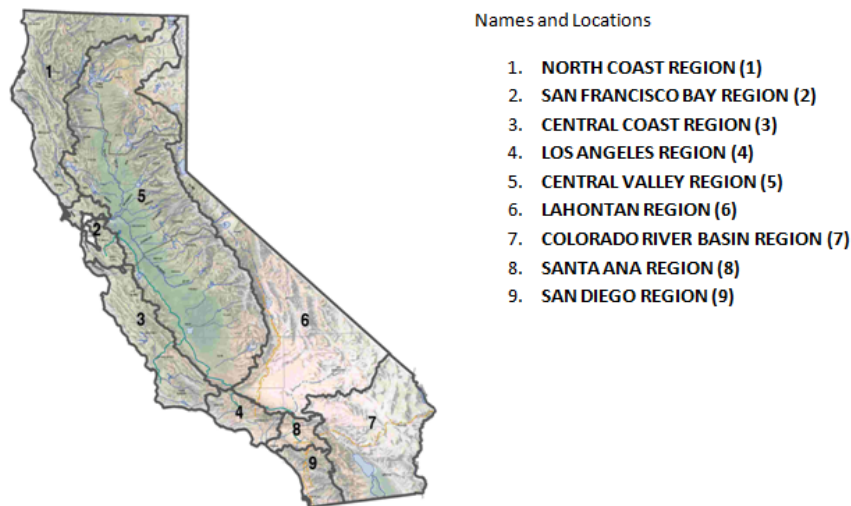


Figure 1. California regional water board locations

Conditional Waivers and WDRs are documents that serve as a type of permit that formalize regulatory actions taken by the Regional Water Boards. Typically, a Conditional Waiver or WDR includes a list of findings establishing the need for action, followed by a list of required actions. For the ILRP, the Conditional Waivers or WDRs allow for the formation of third-party representatives, commonly referred to as "coalitions", to represent farmers as a group to meet compliance requirements. A summary of the adopted Agricultural Orders and respective coalitions is provided in *Appendix 1*.

Through a series of events related to the passage of Senate Bill 390 (Alpert), the ILRP originated in 2003. Initially, the ILRP was developed for the Central Valley Regional Water Quality Control Board. As the Central Valley Water Board ILRP progressed, a groundwater quality element was added to the filing requirement for agricultural lands that had previously only been subjected to surface water discharge concerns. As of 2014, all nine Regional Water Boards in the state are in different stages of the Irrigated Lands Regulatory Program as described briefly below:

- The North Coast and San Francisco Regional Water Quality Control Boards (Regions 1 and 2 respectively) are in the process of developing agricultural discharge permits (i.e., either WDRs or Conditional Waivers of WDRs).
- The Lahontan Regional Water Quality Control Board (Region 6) has not begun developing an ILRP at this time, but will do so as agricultural-related TMDLs are implemented.
- The Santa Ana Regional Water Quality Control Board (Region 8) is working on a proposed Conditional Waiver of Waste Discharge Requirements for the Agricultural Discharges Program for Growers in the San Jacinto River Watershed.
- The Los Angeles and San Diego Regional Water Quality Control Boards (Regions 4 and 9 respectively) operate under Conditional Waivers, but these Regional Water Boards are not addressing groundwater quality; and, at this time, their respective Conditional Waivers *do not* include groundwater-specific requirements or actions.
- The Colorado River Regional Water Quality Control Board (Region 7) has a variety of situations. Most of the region is not covered by Conditional Waivers.
 - a. In 2012, Region 7 adopted a Conditional Waiver for the Palo Verde portion of the region that includes both groundwater and surface water requirements. Palo Verde Irrigation District serves as the third-party (coalition) for the Palo Verde Conditional Waiver.
 - b. In 2013, Region 7 adopted a Conditional Waiver for a separate part of the region for the Bard Unit of Reservation Division in Imperial County.
- The Central Coast Regional Water Quality Control Board (Region 3) has issued a new conditional waiver in 2012 for the entire region that *does* include groundwater. The Region 3 conditional waiver allows the use of a monitoring group to conduct monitoring and manage fees. The new conditional waiver includes a provision for the use of approved third-party certification groups. There are no other coalitions for this region.
- In the Central Valley (Region 5), seven out of eight planned Waste Discharge Requirements (geographically-based) have been adopted by the Central Valley Regional Water Board as of March 20, 2014, all of which consider groundwater. Sometimes multiple coalitions are covered by the same WDR.
 - a. Only one of the Region 5 coalitions (East San Joaquin Water Quality Coalition) has a Groundwater Quality Assessment Report (GAR) that has been adopted (approved) by the Regional Board. The GAR is the first work product related to groundwater that is required in the WDRs.
 - b. The California Rice Commission developed a GAR at the same time it was working with the Regional Board to develop its WDR. It is unclear when the GAR will be approved.

For reference, the process used in Region 5 is outlined in **Figure 2** on the next page. It is described in detail in *Appendix 3*. The groundwater compliance requirements for Region 5 that will be addressed by the Expert Panel are highlighted in yellow.

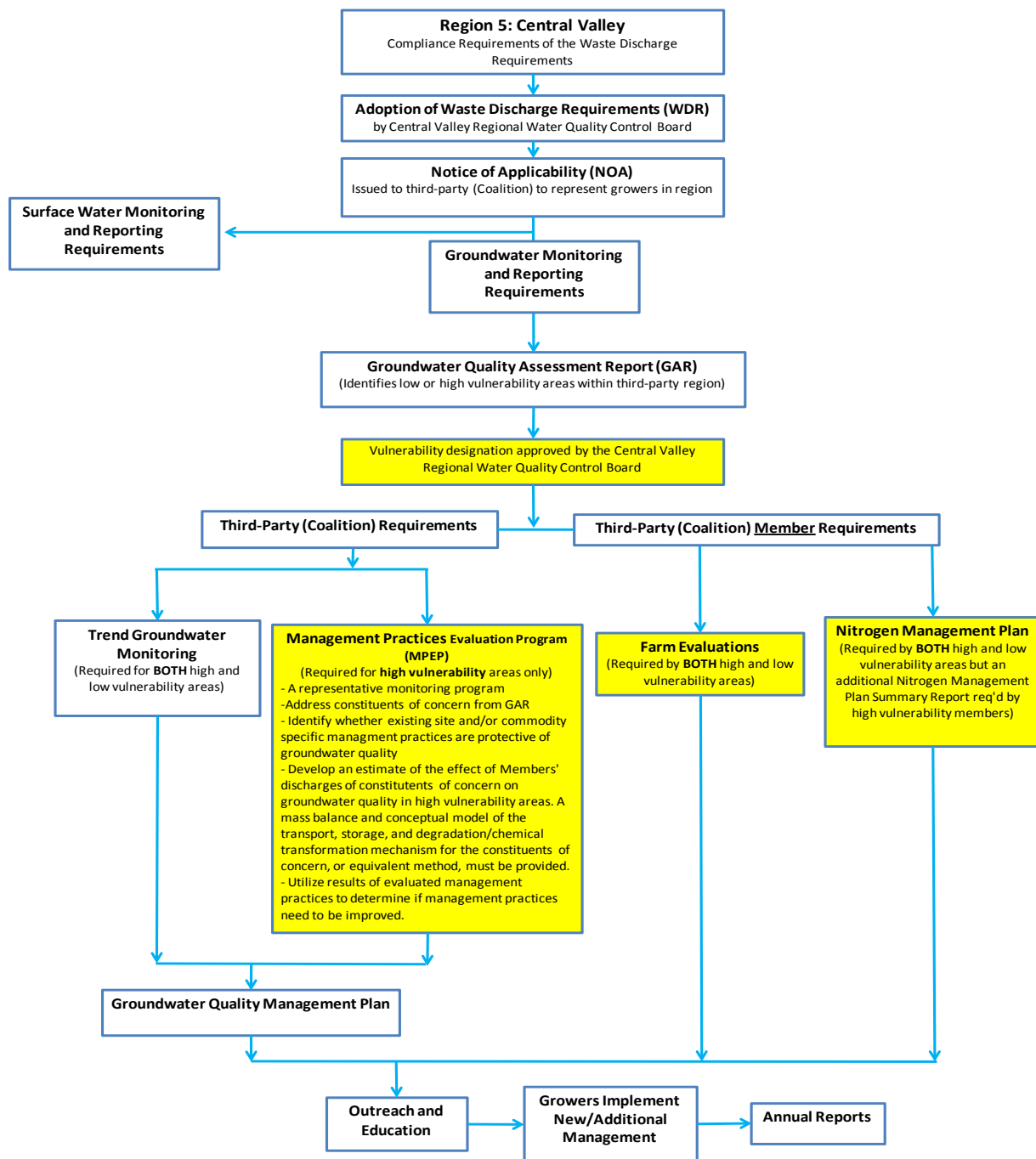


Figure 2. Outline of groundwater portion of the WDR process for Region 5. Region 5 stresses a coalition-based approach. Only two coalitions have completed the GAR step, in which they provide a “groundwater vulnerability designation” of “high” or “low” to areas within their coalition. The highlighted boxes indicate the areas for which questions will be asked of the Expert Panel.

Major Differences between Region 3 and 5 Approaches

Most of the actions (and controversy) with groundwater requirements have taken place in Region 5 (Central Valley) and Region 3 (Central Coast). The two Regional Water Boards have taken very different approaches toward compliance requirements. Descriptions of their approaches are found in *Appendix 2* and *Appendix 3* to this memo.

Directives to the Expert Panel

General Intent

All of the adopted Waste Discharge Requirements for the Central Valley Region (Region 5) contain the following excerpt that addresses the purpose of the Expert Panel:

“The Expert Panel will evaluate ongoing agricultural control measures that address nitrate in groundwater, and will propose new measures, if necessary. In its assessment of existing agricultural nitrate control programs and development of recommendations for possible improvements in the regulatory approaches being used, the Expert Panel will consider groundwater monitoring, mandatory adoption of best management practices, tracking and reporting of nitrogen fertilizer application, estimates of nitrogen use efficiency or a similar metric, and farm-specific nutrient management plans as source control measures and regulatory tools.” (Central Valley Regional Water Board, 2012).

Specifically, the Expert Panel will be asked to answer a number of questions that will be provided by the State Water Board. It is the intent of the State Water Board that the Expert Panel’s responses to these questions provide guidance to the Regional Water Boards as they continue to develop the requirements in their ILRPs.

It is understood that high nitrate levels in the groundwater cannot be lowered immediately, and that the proper management practices and evaluation techniques have uncertainties and costs. The Expert Panel is, however, expected to provide answers that will help regulators improve the likelihood that:

1. Nitrate contamination occurs less frequently than it would have without any changes to management practices of today.
2. The nitrate contamination that does occur is less than, and occurs more slowly than, it would have been without any changes to management practices of today.

The Expert Panel will focus on what can (and cannot) be done today “on the surface” to reduce nitrate discharges to both surface water and groundwater.

It is not within the scope of the Expert Panel’s assignment to:

1. Develop criteria that will result in clean drinking water in some specified number of years.
2. Address questions regarding methods for treating nitrates in surface water or groundwater to bring it to drinking water quality.
3. Address the question of whether it is possible to bring the groundwater quality to drinking water quality.

Furthermore, the Expert Panel is expected to provide answers and recommendations that are pragmatic and essential. Specifically, the Expert Panel must weigh all recommendations in light of the fact that the requirements within the WDRs are not meant to:

1. Answer scientific questions or uncertainties, such as the details of the nitrogen cycle with dairy effluent disposal.
2. Collect data that is only useful for creating statistics.
3. Serve as research projects.

The following sections explain some terms, and provide background for specific questions.

Vulnerability and Risk

The exact definitions of “vulnerability” and “risk” are somewhat fuzzy when one compares Region 5 and Region 3.

In regards to the term “**vulnerability**”:

1. The term is generally intended to distinguish large areas that already have “high” or “low” nitrate levels in the groundwater.
2. In Region 5, areas that have a “high” vulnerability to groundwater nitrates have special requirements for the coalitions (identified as “Management Practices Evaluation Program, MPEP” in Figure 2).
3. In Region 3, there are no special requirements for coalitions because:
 - a. There are no coalitions that administer programs (there are two coalitions of a different type, which are organized only to sample and analyze data).
 - b. The entire region was classified as “high” vulnerability.

The two regional approaches used to designate the “vulnerability” of groundwater bodies in regards to nitrates have been:

- Region 5 allows the individual coalitions to define the “low” and “high” vulnerable areas in their areas. The Region 5 Regional Water Board works with the coalitions to determine the criteria that will be used locally. As an example, the Rice Growers Association, in its proposed GAR, submits the argument that because rice fields are flooded and nitrogen fertilizer is exclusively ammonia-based, there will be no conversion to nitrate and therefore all the groundwater under rice fields is a “low” vulnerability classification.
- Region 3’s Regional Water Board staff determined that the complete Region 3 is “highly” vulnerable. There was no joint effort with formal coalitions; it was a unilateral decision by the Regional Board staff that did include input at public meetings.

In regards to the term “**risk**”:

1. The term is used to describe the relative likelihood of serious nitrate loading into the groundwater by a field or farm.
2. *Risk assessment categorization is the basis for the prescription of best management practices for individual fields or farms.*
3. Region 3 has four established procedures for assessing “risk” (only one of which is selected by an individual farmer).
4. The level of “risk” in Region 3 is assigned using a tiering system where individual fields are categorized into one of three “tiers”. Each tier requires a different level of monitoring, reporting, and best management practices.

It is not the mandate of the Expert Panel to determine, designate, or map vulnerability areas. However, the Expert Panel will be asked questions regarding how risk can best be determined.

Management Practices (MPs) and Data Collection

Currently Regional Water Quality Control Boards and/or coalitions (various regions) prescribe agricultural actions to farmers in their regions that have been deemed “management practices” (MPs). In general, the MPs that are prescribed to farmers were developed by the UC Cooperative Extension.

The MPs of interest to the Expert Panel are only those that pertain to nitrate application and control. The Expert Panel will assess existing MPs and may recommend others if desired.

As an example, a requirement of the WDRs adopted in the Central Valley is the Management Practices Evaluation Program (MPEP). The MPEP will include evaluation studies of management practices to determine whether those practices are protective of groundwater quality for identified constituents of concern under a variety of site conditions.

The Expert Panel is asked to recommend a “suite” of management practices that should be tried to complete the requirements of the MPEP. MPs might be related to flow measurement, irrigation system Distribution Uniformity, ET-based irrigation scheduling, fertigation, or other topics. However, the Expert Panel may decide that if it can be demonstrated that only a small amount (e.g., 10%) of nitrogen is applied, above what is removed from a field during harvest, there is no need to go into the details of irrigation and other practices.

Reporting

Definitions:

- **Reporting** – This term is used by regulatory agencies to designate information that must be officially reported to the agency.
- **Data Collection and Analysis** – Sometimes regulatory agencies require that data be collected and analyzed, but not officially reported. The result to farmers is still often the same: there is an expense to set up a monitoring system, collect data, and possibly analyze the importance of the data.

Per the mandate of the State Water Board, the California Department of Food and Agriculture (CDFA) convened the Nitrogen Tracking and Reporting Task Force to address the outcomes and benefits of a nitrogen mass balance tracking system. A report (referred to in this memo as the “CDFA Report”) was completed in the summer of 2013 (CDFA, 2013).

While the Expert Panel was not intended to focus on the “reporting” that is addressed in the CDFA Report, there is a definite linkage. For example, the Expert Panel may decide that certain types of data are interesting for statistics and reports, but they may not be economically (or practically) beneficial to significantly helping achieve the ultimate goal of reducing nitrate loading.

As an example, a variety of nitrogen computations have been proposed to be included in monitoring, identifying risk, and as BMPs. The Expert Panel will assess the relative importance of using field-level nitrogen computations such as those described below.

1. **Nitrogen mass balance** – The general idea is to have a spreadsheet or model which incorporates all nitrogen inputs to a field, along with extractions. In general, the deep percolation of nitrates is a mathematical “remainder”. Differences between various “mass balance” computations enter when one integrates factors such as:
 - a. Nitrogen transformation rates
 - b. Volatilization
 - c. Crop removal – measured or estimated?

- d. Carry-over between crops
 - e. Details of leaching factors, such as frequency and intensity of rainfall.
2. Ratio of [(Nitrogen In)/(Nitrogen Removed by the Crop)] – Again, there can be differences between the technique used to determine the “nitrogen removed”. There are also questions regarding what ratio might be acceptable. The applicability of this type of ratio may depend upon factors such as:
- a. The type of crop. For example, trees versus vines versus leafy greens.
 - b. The amount of rainfall.

Groundwater Monitoring

Definitions:

- **Trend monitoring** – Designates some type of groundwater monitoring on a regional scale.

The Expert Panel will not address trend monitoring.

- **Representative monitoring** – The “sampling” of techniques. Monitoring may be done on a “representative field”, but not on all fields, if the results from that “representative field” can provide conclusions for many similar fields.
- **Individual monitoring** – Generally indicates that discharges from every field or farm must be measured.

While all three types of monitoring are common with surface water, there are questions regarding the value of using any or all of these monitoring techniques to assess groundwater nitrate loading.

The Expert Panel will address whether or not it is reasonable to expect that groundwater monitoring will accurately assess agricultural management practice performances on individual fields.

Surface Water Monitoring

Definitions:

- **Discharge water monitoring** – Monitoring of the water quality and/or quantity at individual discharge points from fields, farms, etc. to creeks and other surface water bodies.
- **Receiving water monitoring** – Monitoring of the water quality and/or quantity in the creeks or other surface water bodies that receive water from farms or fields.

Two approaches have been taken to monitoring surface water. Region 3 has taken the approach of discharge water monitoring to surface water while Region 5 has taken the approach of receiving water monitoring.

The Expert Panel is asked to address a question regarding the value of both receiving water and discharge water monitoring regarding surface water monitoring (both receiving water and individual discharge).

Information to be Provided to all Expert Panel Members

The information will be provided to all members of the Expert Panel in advance of meetings.

1. This memo
2. Location of all reference material (www.itrc.org/swrcb/)
3. Organization/logics information regarding the Expert Panel
 - a. Purpose
 - b. Legal status
 - c. Rules of operation and meetings, including:
 - i. Rules regarding open meetings and quorums
 - ii. Ability to request outside input/testimony
 - d. Schedule of meetings
4. Background information about each member

References

California Department of Food and Agriculture. (2013). Nitrogen Tracking and Report Task Force Final Report.

Central Valley Regional Water Quality Control Board. (2012). Order R5-2012-0116-R1. Waste Discharge Requirements General Order for Growers within the Eastern San Joaquin River Watershed that are Members of the Third-Party Group.

State Water Resources Control Board. (2013). Recommendations Addressing Nitrate in Groundwater, Report to the Legislature.

Wu, L., Letey, J., French, C., Wood, Y. & Birkle, D. (2005) Nitrate leaching hazard index developed for irrigated agriculture. *Journal of Soil and Water Conservation*, 60, 90–95.

Appendix 1:

Adopted Conditional Waivers or Waste Discharge Requirements and Third-Party Coalitions for Each Water Board Region

Region 3: Central Coast

The adopted Conditional Waiver of Waste Discharge Requirements (Conditional Waiver) for the Central Coast Region is Order R3-2012-0011 and it applies to farms on the Central Coast.

There are no coalitions that represent growers' interests. There are two coalitions in Region 3 that perform only sampling for members:

1. Surface water sampling is performed by Central Coast Water Quality Preservation Inc.
2. Groundwater sampling is performed by the Central Coast Groundwater Coalition (CCGC)

Region 4: Los Angeles

The adopted Conditional Waiver of Waste Discharge Requirements (Conditional Waiver) for the Los Angeles Region is Order R4-2010-0186. The two coalition groups that dischargers can apply to join are:

1. Ventura County Agricultural Irrigated Lands Group (VCAILG)
2. Nursery Growers Los Angeles Irrigated Lands Group (NGA-LAILG)

Region 5: Central Valley

The adopted Waste Discharge Requirements (WDR) and their respective coalitions are:

1. WDR Order R5-2013-0100: Individual Growers
Coalition: Not Applicable
2. WDR Order R5-2012-0116-R1: Eastern San Joaquin River Watershed Order
Coalition: East San Joaquin Water Quality Coalition
3. WDR Order R5-2013-0120: Tulare Lake Basin Area
Coalitions:
 - Kings River Watershed Coalition
 - Kaweah Basin Water Quality Association
 - Tule Basin Water Quality Coalition
 - Kern River Watershed Coalition Authority
 - Buena Vista Coalition (**tentative**)
 - Westside Water Quality Coalition (**tentative**)
 - Cawelo Water District (**tentative**)
4. WDR Order R5-2014-0001: Western Tulare Lake Basin Area
Coalition: Westlands Water District
5. WDR Order R5-2014-0002: Western San Joaquin River Watershed
Coalition: Westside San Joaquin River Watershed Coalition
6. WDR Order: Sacramento River Watershed
Coalition: Sacramento Valley Water Quality Coalition
7. WDR Order: San Joaquin County and Delta Area
Coalition: San Joaquin county and Delta Water Quality Coalition
8. **Tentative** WDR Order: Rice Growers in the Sacramento Valley Area
Coalition: California Rice Commission

Region 7: Colorado River Basin

There are two adopted Conditional Waiver of Waste Discharge Requirements (Conditional Waivers) for the Colorado River Basin. The adopted Conditional Waivers and their respective coalitions are:

1. Conditional Waiver Order R7-2012-0047: The Palo Verde Valley and Palo Verde Mesa
Coalition: Palo Verde Irrigation District
2. Conditional Waiver Order R7-2013-0002: Bard Unit of Reservation Division (Imperial County)
Coalition: None at this time

Region 8: Santa Ana

This region has not adopted a Conditional Waiver, but is currently in the beginning stages of developing one. The group that has been representing growers' interests and working with Regional Board staff is Western Riverside County Agricultural Coalition.

Region 9: San Diego

The adopted Conditional Waiver of Waste Discharge Requirements (Conditional Waiver) for the San Diego Region is Order R9-2007-0104. The two coalition groups that dischargers can apply to join are:

1. San Diego Region Irrigated Lands Group
2. Upper Santa Margarita Irrigated Lands Group

Appendix 2: Region 3 Compliance Summary

Since the Central Coast Region (Region 3) identified all areas in the region as being “vulnerable”, all farms (dischargers) that are required to enroll in the Agricultural Order must comply with monitoring and reporting requirements. In Region 3, monitoring and reporting compliance requirements depend on the “tier” classification for each farm. Farmers determine their “tier” classification at the time of enrollment/update to the Central Coast’s Conditional Waiver of Waste Discharge Requirements R3-2012-0011 (Agricultural Order) by submitting the electronic Notice of Intent (eNOI).

Region 3 - Definition of Tiers

Tier 1 is the lowest-risk tier and applies to all dischargers whose individual farm meets all Criteria 1, 2, and 3 or whose individual farm meets Criterion 4.

- 1 – Discharger does not use chlorpyrifos or diazinon on farm.
- 2 – Farm is located more than 1000 feet from an impaired surface water body¹ listed for toxicity, pesticides, nutrients, turbidity or sediment.
- 3 – Discharger grows crop types with high potential to discharge nitrogen to groundwater. Discharger’s farm is less than 50 acres, and is not within 1000 feet of a well that is part of a public water system² (defined below) that exceeds the maximum contaminant level (MCL) for nitrate, nitrite, or nitrate + nitrite³.
- 4 – Discharger’s individual farm has Sustainability in Practice certification (SIP, certified by the Central Coast Vineyard Team) or other certification approved by the Central Coast Water Board.

Tier 2 applies to all dischargers whose individual farms do not meet the Tier 1 or Tier 3 criteria. In general, a Tier 2 discharger’s farm meets at least one of the following three criteria:

- 1 – Discharger applies chlorpyrifos or diazinon on farm.
- 2 – Farm is located within 1000 feet of an impaired surface water body listed for toxicity, pesticides, nutrients, turbidity or sediment.
- 3 – Discharger grows **crop types with high potential to discharge nitrogen to groundwater** (glossary). Discharger’s farm is greater than or equal to 50 acres and less than 500 acres, or the farm is within 1000 feet of a well that is part of a public water system (defined below) that exceeds the maximum contaminant level (MCL) for nitrate, nitrite, or nitrate + nitrite.

¹ The 2010 List of Impaired Waterbodies is available on the Central Coast Regional Water Quality Control Board’s Impaired Water Bodies website at

http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml.

² Public water system as defined by the California Health and Safety Code, section 116275.

³ California Department of Health Services (CDPH) has determined that public water system well location records are confidential and exempt from disclosure to the public. Until such time that public water system well location records become available to the public, the Central Coast Water Board will identify dischargers who are within 1000 feet of a public water system well that exceeds the maximum contaminant level (MCL) for nitrate, nitrite, or nitrate + nitrite. Dischargers should evaluate their tier for the purposes of the Agricultural Order (R3-2012-0011) based on all information available. In the case where a discharger should be placed into a different tier based on proximity to a public water system, the Central Coast Water Board will provide appropriate notice to the discharger.

Approximate locations for public water systems wells are available on the Water Board’s GeoTracker GAMA website at <http://geotracker.waterboards.ca.gov/gama/>.

Tier 3 is the highest risk tier and applies to dischargers whose individual farm meets either of the criteria.

- 1 – Discharger applies chlorpyrifos or diazinon on farm and the farm discharges irrigation or stormwater runoff to an impaired surface water body listed for toxicity or pesticides.
- 2 – Discharger grows **crop types with high potential to discharge nitrogen to groundwater** (glossary), and the farm has a total irrigated acreage of greater than or equal to 500 acres.

Region 3 - Compliance Requirements

The following chart describes the Region 3 compliance requirements for each farmer based on tier.

2012 Order Tier 1 (Lower Risk)	2012 Order Tier 2	2012 Order Tier 3 (Higher Risk)
<p>Tier 2 MINUS: Annual Compliance Information - Online Entry Form</p>	<ul style="list-style-type: none"> • File/ Update Electronic Notice of Intent (eNOI) • Farm Plan/ BMP Implementation: <ul style="list-style-type: none"> - Irrigation management - Pesticide management - Nutrient management - Erosion management - Schedules to implement • Surface Receiving Water Monitoring and Reporting • Groundwater Monitoring and Reporting • Backflow prevention and Proper Well Abandonment • Annual Compliance Information - Online Entry Form: <ul style="list-style-type: none"> - Nitrate Loading Risk Determination <ul style="list-style-type: none"> Option 1: Nitrogen Hazard Index Option 2: Nitrate Loading Risk Factor - Total Nitrogen Applied Reporting - Photo Monitoring 	<p>Tier 2 PLUS:</p> <ul style="list-style-type: none"> • Individual Farm Surface Water Discharge Monitoring • Irrigation and Nutrient Management Plan • Surface Water Quality Buffer Plan

Figure 2-1. Surface water and groundwater monitoring and reporting requirements for Region 3 – Central Valley Region.

Region 3 - Risk Assessment

Following the tier designation, dischargers classified as Tier 2 or Tier 3 must determine their nitrate loading risk to groundwater using one of two methods:

1. Nitrate Hazard Index (NHI), OR
2. Nitrate Loading Risk Factor

The Nitrate Hazard Index (NHI) was developed in 1995 by the University of California Center for Water Resources (Wu, 2005). It is a system that ranks factors on a farm that influence nitrate leaching. The NHI uses three categories to determine nitrate loading risk to groundwater: 1) irrigation type, 2) soil type, and 3) crop type.

The Nitrate Loading Risk Factor was developed by the Central Coast Regional Water Quality Control Board staff as an alternative to the using the NHI. For farmers that did not know the soil type of their farm, the Nitrate Loading Risk Factor instead looked at the nitrate concentration in irrigation water. The Nitrate Loading Risk Factor uses three categories to determine nitrate loading risk to groundwater: 1) irrigation type, 2) crop type, and 3) nitrate concentration in irrigation water.

Appendix 3:

Region 5 Compliance Summary (Not including Rice Growers Commission)

Region 5

Following the adoption of the Waste Discharge Requirements (WDRs), each coalition without a preexisting Groundwater Quality Assessment Report (GAR) will develop a GAR that will propose “vulnerability areas”. A farm can fall under either a “high” or “low” vulnerability area. Vulnerability designation (in addition to size of farming operation) affects the deadlines and requirements for compliance with the remainder of the WDRs. Definitions for high and low vulnerability are found below.

High vulnerability area (groundwater) – Areas identified in the approved Groundwater Quality Assessment report “...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 area (surface water) – Areas that meet any of the following requirements for the preparation of a Surface Water Quality Management Plan:

1. An applicable water quality objective or applicable water quality trigger limit is exceeded (considering applicable averaging periods) twice in a three-year period for the same constituent at a monitoring location and irrigated agriculture may cause or contribute to the exceedances.
2. The Basin Plan requires development of a surface water quality management plan for a constituent or constituents discharged by irrigated agriculture.
3. The Central Valley Water Board Executive Officer determines that irrigated agriculture may be causing or contributing to a trend of degradation of surface water that may threaten applicable Basin Plan beneficial uses.

Low vulnerability area (groundwater/surface water) – All areas not designated as high vulnerability.

The vulnerability designations that are identified by the coalitions in the GAR must be approved by the Central Valley Regional Water Quality Control Board.

Region 5 - Compliance Requirements

The groundwater portions of compliance requirements for Region 5 are outlined in the **Figure 3-1**. **Figure 3-2** contains the surface water portion of the compliance requirements for Region 5.

A key feature of the Region 5 – Central Valley approach is the formation of coalitions. To re-emphasize an earlier point, only two coalitions have completed GARs at this point in time.

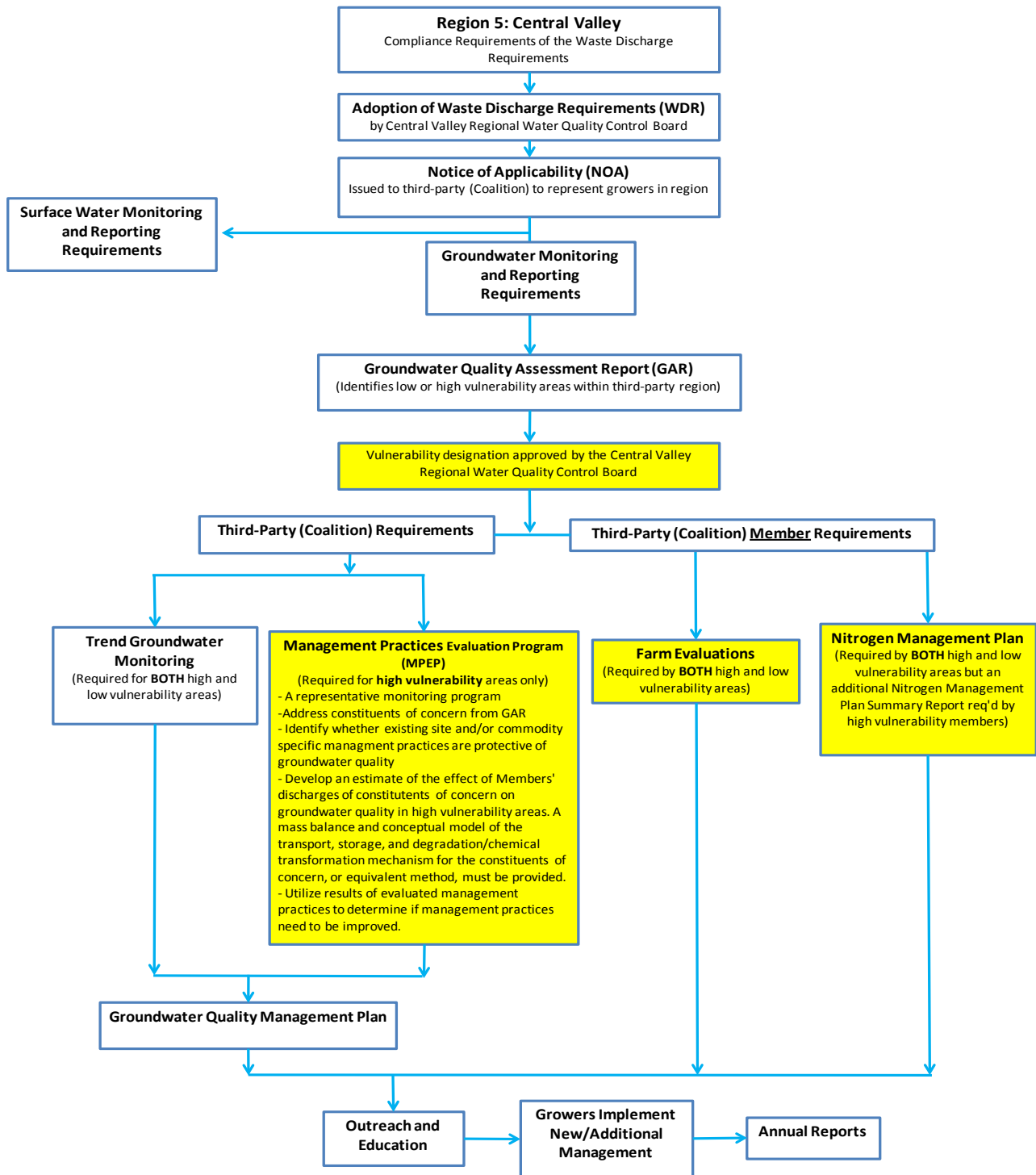


Figure 3-1. Groundwater portion of Central Valley Region’s Waste Discharge Requirements (WDRs). The highlighted boxes indicate the areas for which questions will be asked of the Expert Panel.

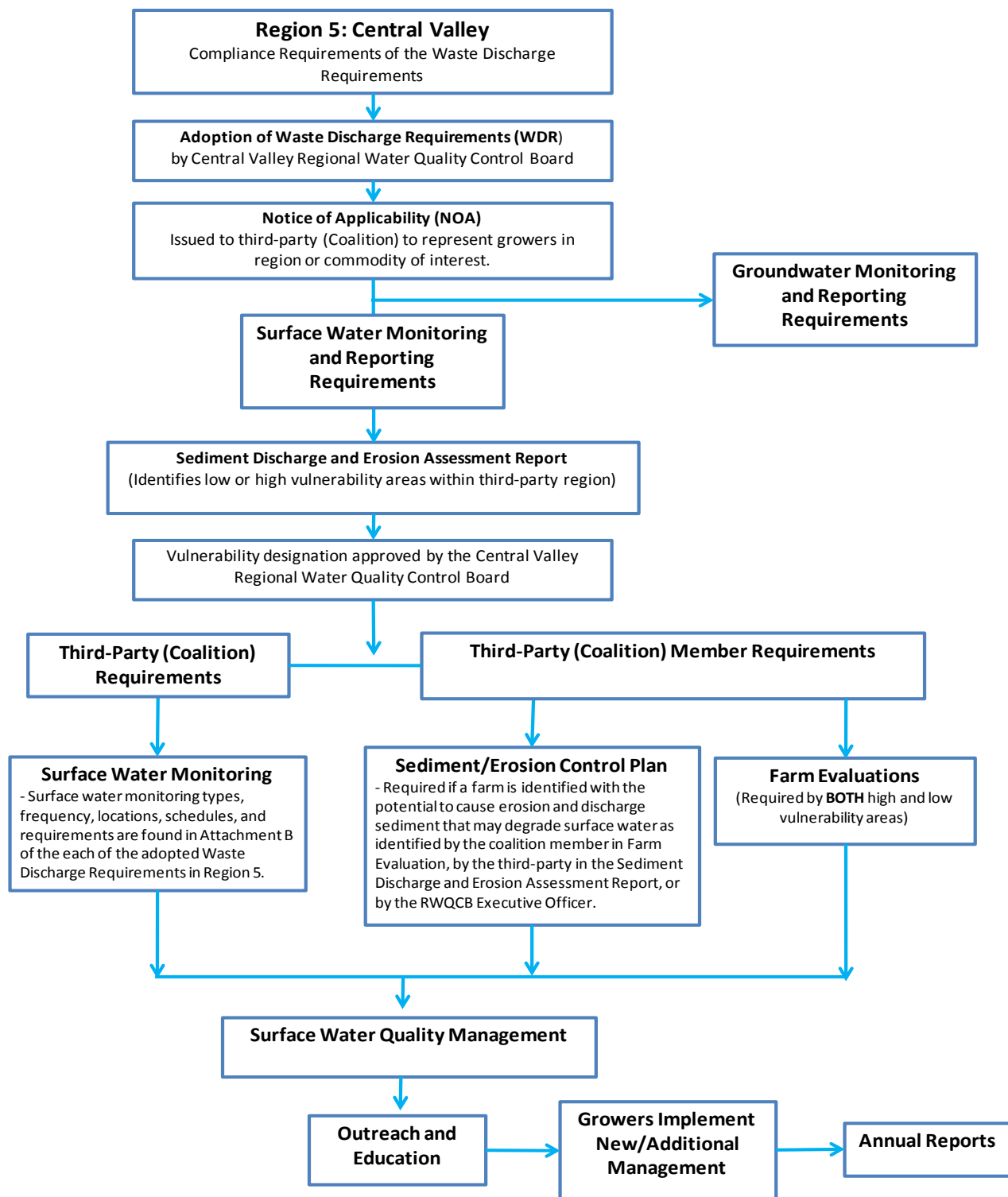


Figure 3-2. Surface water portion of Central Valley Region’s Waste Discharge Requirements (WDRs)

Appendix 4: Agricultural Expert Panel Questions

Call for an Expert Panel

Chapter 1 of the Second Extraordinary Session of 2008 (SBX2 1, Perata), required the State Water Board to develop pilot projects focusing on nitrate in groundwater in the Tulare Lake Basin and Salinas Valley, and to submit a report to the Legislature on the scope and findings of the pilot projects, including recommendations. The State Water Board made 15 recommendations in 4 key areas to address the issues associated with nitrate contaminated groundwater. The key areas to address these issues are:

1. Providing safe drinking water.
2. Monitoring, notification, and assessment.
3. Nitrogen tracking and reporting.
4. Protecting groundwater.

Recommendation 14 of the State Water Board's report to the Legislature was to convene a panel of experts to assess existing agricultural nitrate control programs and develop recommendations, as needed, to ensure that ongoing efforts are protective of groundwater supply quality. The State Water Board in its subsequent adoption of Order WQ 2013-0101 also tasked the Expert Panel with certain issues related to impacts of agricultural discharges on surface water.

Regulatory Context

The charge and questions below directed to the Agricultural Expert Panel are done so in the context of the State Water Resources Control Board's *Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program, May 20, 2004*, and Regional Water Quality Control Boards' Irrigated Lands Regulatory Programs as implemented through various separate orders.

Charges to the Expert Panel

Assess existing agricultural nitrate control programs and develop recommendations, as needed, to ensure that ongoing efforts are protective of groundwater quality. (Recommendations Addressing Nitrates in Groundwater, State Water Board's Report to the Legislature, February 20, 2013)

- and -

Provide a more thorough analysis and long-term statewide recommendations regarding many of the issues implicated in the Agricultural Order, including indicators and methodologies for determining risk to surface and groundwater quality, targets for measuring reductions in risk, and the use of monitoring to evaluate practice effectiveness. (State Water Board's Order WQ 2013-0101)

Questions for the Panel

Vulnerability and Risk Assessment

Regulatory programs are most effective when they are able to focus attention and requirements on those discharges or dischargers (i.e., growers) that pose the highest risk or threat because of the characteristics of their discharge or the environment into which the discharge occurs. The Irrigated Lands Regulatory Program (ILRP) orders issued throughout the state by the Regional Water Boards' have taken different approaches in their prioritization schemas, some using specific criteria or methodologies, others utilizing measurements of previous known impacts.

1. How can risk to or vulnerability of groundwater best be determined in the context of a regulatory program such as the ILRP?
2. Evaluate and develop recommendations for the current approaches taken to assessing risk to or vulnerability of groundwater:
 - a. Nitrate Hazard Index (as developed by the University of California Center for Water Resources, 1995),
 - b. Nitrate Loading Risk Factor (as developed by the Central Coast Regional Water Quality Control Board in Order R3-2012-0011),
 - c. Nitrogen Consumption Ratio,
 - d. Size of the farming operation,
 - e. High Vulnerability Areas Methodology (as developed by the Central Valley Regional Water Board in a series of Waste Discharge Requirements issued to agricultural coalitions in the ILRP).
3. How can risk to or vulnerability of surface water best be determined in the context of a regulatory program such as the ILRP?
4. Evaluate and develop recommendations for the current approaches taken to assessing risk to or vulnerability of surface water:
 - a. Proximity to impaired water bodies.
 - b. Usage of particular fertilizer or pesticide materials.
 - c. Size of farming operation.
 - d. High Vulnerability Areas Methodology (as developed by the Central Valley Regional Water Board in a series of Waste Discharge Requirements issued to agricultural coalitions in the ILRP)

Application of Management Practices

The application and use of management practices for the control of nonpoint source pollution is a fundamental approach taken by many Water Board orders, and considered a key element in the State Water Board's *Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program, May 20, 2004*. Management practices that are cost-effective and are easy to implement have the best chance of being adopted and successful. However, when comparing management practices, consideration should also be given to the likelihood that a management practice will be effective in reducing nitrogen loading to surface and groundwater. The Regional Water Boards have included specific management practices in their various orders, as well as requiring the growers to identify and implement management practices on their own.

5. What management practices are expected to be implemented and under what circumstances for the control of nitrogen?
6. What management practices are recommended for consideration by growers when they are selecting practices to put in place for the control of nitrogen?

7. Evaluate and make recommendations regarding the usage of the following management practices:
 - a. Nitrogen mass balance calculations and tracking of nitrogen applied to fields.
This should include consideration of measuring and tracking Nitrogen:
 - i. Applied to crops or fields.
 - ii. In soil.
 - iii. In irrigation water.
 - iv. Removed from field.
 - v. Estimation of losses.
 - b. Templates for determining nitrogen balance.
 - c. The usage of nitrogen balance ratios.
 - d. Nutrient management plans.
8. Evaluate and make recommendations regarding the most effective methods for ensuring growers have the knowledge required for effectively implementing recommended management practices. Consider the following:
 - a. Required training.
 - b. Required certifications.
 - c. Workshops sponsored by third parties such as: CDFA, County Agricultural Commissioners, Farm Bureau, UC Cooperative Extension.
 - d. Usage of paid consultants – e.g., CCAs/PCAs.
 - e. UC Cooperative Extension specialists.

Verification Measures

Utilization of verification measures to determine whether management practices are being properly implemented and achieving their stated purpose is another key element to the success of a nonpoint source control program. Because of the nature of nonpoint source discharges, direct measurements are often difficult or impossible to obtain and other means of verifications may be required.

9. What measurements can be used to verify that the implementations of management practices for nitrogen are as effective as possible?
10. Evaluate and make recommendations regarding the usage of the following verification measurements of nitrogen control:
 - a. Sampling first encountered groundwater via shallow monitoring wells.
 - b. Direct sampling of groundwater from existing wells, such as an irrigation well or domestic drinking water well, nearby the field(s) where management practice for nitrogen are being implemented.
 - c. Sampling of the soil profile to determine the extent to which nitrogen applied to a field moved below the root zone.
 - d. Representative sampling of a limited area and applying the results broadly.
 - e. Sampling water in surface water containment structures for their potential discharge to groundwater.
 - f. Estimating discharge to groundwater based on nitrogen balance model and measured irrigation efficiency.
11. Evaluate the relative merits, and make recommendations regarding the usage of, surface water measurement systems derived from either receiving water or a discharge monitoring approach to identify problem discharges.

Reporting

The ILRP orders issued by the Regional Water Boards require reporting to both determine compliance and inform overall management of the discharges associated with agriculture. Also specifically in regards to nitrogen, the California Department of Food and Agriculture convened the Nitrogen Tracking and Reporting System Task Force, called for by Recommendation 11 of the State Water Board's report to the Legislature, which makes recommendations on a potential reporting system.

12. Evaluate and make recommendation on how best to integrate the results of the Nitrogen Tracking and Reporting System Task Force with any above recommendation regarding management practices and verification measures.
13. Evaluate and make recommendations on the reporting requirements to report budgeting and recording of nitrogen application on a management block basis versus reporting aggregated numbers on a nitrate loading risk unit level. (Definitions of "management block" and "nitrate loading risk unit" per State Board Order WQ 2013-0101.)