

# TENTATIVE WASTE DISCHARGE REQUIREMENTS GENERAL ORDER FOR GROWERS WITHIN THE TULARE LAKE BASIN AREA THAT ARE MEMBERS OF A THIRD-PARTY GROUP



4/15/2013

## ESTIMATED COST OF COMPLIANCE TECHNICAL REPORT – KERN COALITION

**Prepared For:**

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The cost estimate presented in this Report was developed with significant detail by designating direct hourly costs and expenses to each of the required tasks in the March 2013 Tulare Lake Basin Area Tentative General Order.

An initial version of the cost spreadsheets and per acre costs were presented to the Water Board staff in Fresno on January 29, 2013.



## ESTIMATED COST OF COMPLIANCE

### TECHNICAL REPORT

#### KERN RIVER WATERSHED COALITION AUTHORITY

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- 1 – Cost Estimate Detailed Calculations

# 1

## OBJECTIVES, APPROACH & ASSUMPTIONS

### A. OBJECTIVES

The objectives of this Estimated Cost of Compliance Technical Report (Report/Study) include the following:

1. Provide a detailed assessment of the Kern River Watershed Coalition Authority's (KRWCA) Third Party and Member costs to comply with the March 2013 Tentative Waste Discharge Requirements General Order for Growers within the Tulare Lake Basin Area (Order).
2. Provide a comparative analysis of the \$1.90 per acre incremental cost estimate above the current surface water only program, provided under Finding No. 39 in the Order, to the costs determined in this Study. We are unaware of what detailed assumptions the Water Board staff used or specifically how the \$1.90/acre was determined, and are unaware if these assumptions were made public.
3. This Report is to provide concise explanations, coupled with detailed technical background.

### B. APPROACH

1. The Kern Coalition is a sub-watershed of the Tulare Lake Basin area. This Report assesses the cost impacts of the Order within the Kern Coalition area and its Members. The Kern Coalition irrigated area is approximately 1,040,000 acres in size with an estimate of 902 Members ultimately joining the Kern Coalition.
2. The primary approach is to designate specific hours, an hourly rate, consultant expenses, and administrative expenses, on a requirement-by-requirement basis as written in the Order. The Report is written to correlate with the Order's Sections.
3. The surface water quality requirements are currently being addressed by the Kern Coalition and therefore the Third-Party and Member costs to comply with the surface water quality sections of the Order were not included in this Report.
4. The costs associated with implementing management practices that might be indirectly triggered or required, were largely not included in the Report costs. Only direct compliance practices (i.e. nitrogen management plans) were estimated. Although these costs will be significant for some individual members, a large majority of Kern Coalition Members have already implemented pressurized irrigation systems, tailwater recovery systems, and other practices that have improved irrigation water distribution uniformity.

## C. ASSUMPTIONS

1. It is acknowledged that many of the specific requirements referenced and assumptions made in this Report are based on the information available at the time the Report was written. Future refinements of the costs are expected.
2. The Tentative Order's requirements are not well defined in numerous areas, thus assumptions were made in order to assign costs.
3. Numerical assumptions used in this Report are listed in Table 1 – 1 Kern Coalition Cost Analysis Assumptions.
4. Each Table in this report utilized data summarized from the corresponding detailed spreadsheet in the Appendix.

**Table 1 – 1. Kern Coalition Cost Analysis Assumptions**

Description	Tulare Lake Basin Area Tentative Order	Kern Coalition	Units
Total Irrigated Lands Area	2,890,000 <sup>1/</sup>	1,040,000	Acres
Acres to be Under the Order	850,000 <sup>1/4/</sup>	1,040,000	Acres
Growers with Irrigated Lands	10,700 <sup>1/</sup>	902 <sup>3/</sup>	Growers
Potential Members	7,200 <sup>1/</sup>	902 <sup>3/</sup>	Members
Current Members	--	350	Members
Members Needing to Enroll	--	552	Members
Small Farming Operation (<60 acres) Members	6,206 <sup>1/</sup>	182 <sup>3/</sup>	Small Farm Members
Small Farming Operation (<60 acres) Acres	133,000 <sup>1/</sup>	4500 <sup>3/</sup>	Small Farm Acres
Member Hourly Rate	\$120 <sup>2/</sup>	\$120	Per Hour
Coalition Staff Hourly Rate	--	\$120	Per Hour
Consultant Staff Hourly Rate	\$120 <sup>2/</sup>	--	Per Hour
Member Water Board Fee	\$0.56	\$0.56	Per Acre

1/ March 2013 Tentative Order - Findings No. 12

2/ July 2010 Draft Economic Analysis Technical Memorandum ICF International – Page 2-22

3/ Kern County Agricultural Commissioner Data

4/ This appears to be an error. The acres should match irrigated acres of 2,890,000.

# 2

## WASTE DISCHARGE REQUIREMENTS THIRD-PARTY GROUP COSTS (SECTIONS IV.C & VIII)

### A. SECTION IV.C PROVISIONS & REQUIREMENTS – THIRD PARTY

The costs associated with the Third-Party requirements to comply with the WDRs Section IV.C are described in this section. **Table 2 – 1 “Third Party Section IV.C Costs”** summarizes the estimated Kern Coalition costs.

**Table 2 – 1 Third-Party Section IV.C Costs**

Report Heading	WDR Section	Description	Third-Party One Time Costs			Third-Party Annual Costs		
			Total Hours	Expenses	One Time Upfront Costs <sup>1/</sup>	Total Hours	Expenses	Annual Costs
1.	IV.C.1	Organizational Documentation	72	\$7,000	\$15640	--	--	--
2.	IV.C.2	Prepare Annual Summaries	--	--	--	144	\$4,000	\$21,280
3.	IV.C.3	Response to Notice of Violation (NOV)	--	--	--	108	\$22,600	\$35,560
4.	IV.C.4	Develop, implement, track and evaluate effectiveness of GQMP	200	\$100,000	\$124,000	100	\$40,000	\$52,000
5.	IV.C.5	Submittals	--	--	--	100	\$5,000	\$17,000
6.	IV.C.6	Quality Assurance/Quality Control	--	--	--	100	\$1,000	\$13,000
7.	IV.C.7	Receipt of Notice of Applicability (NOA)	260	\$7,000	\$38,200	--	--	--
8.	IV.C.8	Conduct Education and Outreach activities			--	500	\$24,000	\$84,000
9.	IV.C.9	Annual Membership Participation Report			--	500	\$11,000	\$71,000
10.	IV.C.10	Ensure Requirements are Met			--	80	\$2,000	\$11,600
11.	IV.C.11	Fees			--	210	\$10,000	\$35,200
<b>Third-Party Subtotal</b>			<b>532</b>	<b>\$114,000</b>	<b>\$177,840</b>	<b>1,842</b>	<b>\$119,600</b>	<b>\$340,640</b>

*1/ One time costs can occur anytime within the first five years of implementation.*

## **1. Organizational Documentation (IV.C.1)**

One time upfront costs for:

- Hiring staff to manage the operations.
- Identify responsible persons for program fulfillment.
- Setting up an organizational system and office.
- Update website for Third-Party functionality, create database for contact emails, addresses, transmittals of hardcopies and recordkeeping for Members.
- Annual costs are built into the other ongoing tasks.

## **2. Prepare Annual Summaries (IV.C.2)**

Annual costs for:

- Utilizing accounting staff.
- Fee notices, collection of fees, and receipts.
- Prepare annual summaries of expenditures and revenue.
- Summaries mailed or made readily available to Members.
- First year fee notices and collections are higher in year one, but were annualized over 5 years.

## **3. Response to Notice of Violation (IV.C.3)**

Annual costs for responses to a Notice of Violation (NOV):

- Assume one NOV per year, with approximately 20 Members impacted.
- Notify affected Members within 30 days of receiving NOV.
- Provide confirmation to Water Board of each notification.
- Prepare an annual summary of NOVs for submission to the RWQCB.
- Retain and manage consultants to help respond to and resolve NOV items.
- The cost for a consultant is allocated to expenses.

## **4. Develop & Implement Plans to Track & Evaluate (IV.C.4)**

One time upfront costs for:

- The Third-Party is to develop and implement plans to track and evaluate the effectiveness of water quality management practices, pursuant to the Groundwater Quality Management Plan (GQMP).
- Requirements are identified in WDRs IV.C.4, VIII.I and portions of MRP-1.

Annual costs for:

- Annual updates to the GQMP due in May of each year,.

## **5. Submittals (IV.C.5)**

Annual costs:

Most submittal requirement costs are embedded in the costs for each report. However, additional administrative costs are required to track, schedule, meet the deadlines, and file on an annual basis.



## **6. Quality Assurance Quality Control (QAQC) (IV.C.6)**

Annual costs:

Annual costs are required to provide a fresh look at water quality monitoring and assessments in conformance with QA/QC.

## **7. Receipt of Notice of Applicability (NOA) (IV.C.7)**

Upfront costs:

- Up-front costs to inform Members and future Members (within 30 days) of approval of the NOA, and to provide Members information on the Order's requirements.
- Request and track return receipt of a notice of confirmation form to be completed by each Member.

## **8. Conduct Education and Outreach Activities (IV.C.8)**

Annual costs:

- a) Educate Members of program requirements:
  - Water quality problems.
  - Exceedances of water quality objectives.
  - Degradation of water quality.
- b) Maintain attendance lists for outreach events.
- c) Provide Members with information on:
  - Water quality practices.
  - Environmental impacts of water quality practices.
- d) Provide annual summary of education and outreach activities to Board, including:
  - Copies of educational and management practice information provided.
  - Report the total number of Members attended.
  - Describe the process used to provide information to non-attendees.

## **9. Annual Membership Participation Report (IV.C.9)**

Annual costs:

- a) Work with RWQCB to ensure all Members are addressing exceedances or degradation.
- b) As part of the Membership List submittal, identify growers who have failed to:
  - Implement improved water quality management practices as specified (GQMP).
  - Respond to an information request associated with the GQMP or this Order.
  - Participate in Third-Party studies where the Third-Party is the lead.
  - Provide confirmation in an outreach event.
  - Submit required fees to the Third-Party.

## **10. Requirements by Subsidiary Groups (IV.C.10)**

Annual costs:

- Ensure activities performed by subsidiary groups meet requirements.
- Assume 5 days of work per subsidiary group and up to 16 groups.

## 11. Fees (IV.C.11)

Annual costs:

- Collect RWQCB fees from Members and submit to Board.
- Collect fees from Members for reimbursement of Third-Party activities.
- Maintain records and/or reports for 5 years.

## B. SECTION VIII REQUIRED REPORTS AND NOTICES – THIRD PARTY

The costs associated with the Third-Party requirements to comply with the WDRs Section VIII are described below. **Table 2 – 2 “Third-Party Section VIII Costs”** summarizes the Kern Coalition costs.

**Table 2 – 2 Third-Party Section VIII Costs**

Report Heading	WDR Section	Description	Third-Party One Time Costs			Third-Party Annual Costs		
			Total Hours	Expenses	One Time Upfront Costs	Total Hours	Expenses	Annual Costs
1.	VIII.A	Third-Party Application	40	\$2,000	\$6,800	--	--	--
2.	VIII.B	Membership (Participant) List	720	\$3,100	\$89,500	90	\$600	\$11,400
3.	VIII.C	Templates	0	0	\$0	40	\$2,200	\$7,000
4.	VIII.D	Groundwater Quality Assessment Report and Evaluation/Monitoring Workplans	Included in Attachment B MRP					
5.	VIII.F	Sediment Discharge and Erosion Assessment Report	200	\$70,000	\$94,000	--	--	--
6.	VIII.H	Monitoring Report (Attachment B – V.C)	--	--	--	800	\$5,000	\$101,000
7.	VIII.I	Comprehensive Groundwater Quality Management Plans (GQMP)	Included in MRP-1					
8.	VIII.J	Technical Reports-Where monitoring in not effective, provide technical reports	--	--	--	350	\$2,000	\$44,000
9.	VIII.K	Notice of Termination	--	--	--	--	--	--
10.	VIII.L	Total Maximum Daily Load (TMDL) Requirements	300	\$5,000	\$41,000	--	--	--
<b>Third-Party Subtotal</b>			<b>1,260</b>	<b>\$80,000</b>	<b>\$231,300</b>	<b>1,280</b>	<b>\$9,800</b>	<b>\$163,400</b>

### 1. Third-Party Application (VIII.A)

Upfront costs:

- Submit request to Board within 30 days of Order effective date.

- Follow up actions.
- Formation costs in IV.C.1

## **2. Membership (Participant) List (VIII.B)**

Upfront costs of and annual costs :

- a) Submit list of Members to Board:
  - Within 180 days of reviewing NOA.
  - Annually by July 31 of each year.
- b) List shall contain, at minimum:
  - All parcel numbers covered under the membership.
  - County of each parcel.
  - Section, Township, and Range associated with each parcel.
  - Number of irrigated acres for each parcel
  - Member names, mailing addresses, and contact name and phone number (can use Third-Party) with annual updates.
  - Name of farm operator for each parcel if different from the Member.
  - Identification of the crops grown and acreage of each crop.
  - Identification of each parcel that is a part of the Small Farming Operation, if applicable.

## **3. Templates (VIII.C)**

The Kern Coalition costs were estimated with the assumption that the Eastern San Joaquin Coalition templates (yet to be approved) would be utilized. Costs for development of the templates have already been incurred, as part of the group option, and are not included in this estimate.

Upfront costs submitted to the RWQCB but and annual costs of \$7,000:

- a) Farm Evaluation Template:
  - Group Option to Water Board within 90 days of NOA.
  - Identification of on-farm management practices implemented to achieve the Order's farm management performance standards.
  - Specifically track which management practices recommended in management plans have been implemented on the farm.
  - Identification if movement of soil occurs during storm events and/or during irrigation drainage events (sediment and erosion risk areas) and a description of where this occurs.
  - Identification if water leaves the property and is conveyed downstream and a description of where this occurs.
  - Location of in-service wells and abandoned wells.
  - Identification if well-head and backflow protection practices have been implemented.

- b) Nitrogen Management Plan Template:
  - Costs for member compliance with the templates are captured in section C, Member Requirements below.
  - Nitrogen Management Plan Summary Report.
- c) Sediment and Erosion Control Plan Template:

#### **4. Groundwater Quality Assessment Report and Evaluation/Monitoring Workplans (VIII.D)**

Costs for this section are included in the MRP Attachment B of the Order and Section 3 of this Report.

#### **5. Sediment Discharge and Erosion Assessment Report (VIII.F)**

Upfront costs:

- Submit one year after receiving NOA (Attachment B, VI).
- Notify impacted Members to prepare plan.

#### **6. Monitoring Report (VIII.H)**

Annual costs:

- MRP Attachment B, V.C.
- Submit monitoring reports to State Board GeoTracker database by 1 May annually.

#### **7. Comprehensive Groundwater Quality Management Plan (GQMP) (VIII.I)**

- a) The costs for this item are estimated under Section 4 of the report, Management Plan Requirements.

#### **8. Technical Reports (VIII.J)**

Annual costs:

- Where monitoring is not effective, provide technical reports.
- One report per year.

#### **9. Notice of Termination (VIII.K)**

- Negligible costs are estimated to be associated with this item.

#### **10. Total Maximum Daily Load (TMDL) Requirements (VIII.L)**

Upfront costs:

- Implement approved TMDLs in the Basin Plan, as applicable.

## C. SECTION VII REQUIRED REPORTS & NOTICES – MEMBER

The costs associated with Member requirements to comply with the WDRs Section VII are described in this section. **Table 2 – 3 “Member Section VII Costs”** summarizes the Kern Coalition Costs.

**Table 2 – 3 Member Section VII Costs**

Report Heading	WDR Section	Descriptions	Member One Time Costs			Member Annual Costs		
			Total Hours	Expenses	One Time Upfront Costs	Total Hours	Expenses	Annual Costs
1.	VII.A	Notice of Confirmation (NOC) / Notice of Intent (NOI) / Membership Application	3,548	\$123,900	\$549,660			\$0
2.	VII.B	Farm Evaluation	5,548	\$22,933	\$688,633	920	\$0	\$110,354
3.	VII.C	Sediment and Erosion Control Plan	800	\$110,000	\$117,500	50	\$0	\$6,000
4.	VII.D	Nitrogen Management Plan (NMP)				90,920	\$2,637,246	\$13,547,646
5.	VII.E	Mitigation Monitoring – Certain Members required to implement mitigation measures in Attachment C	400	\$300,000	\$348,000	40	\$10,000	\$14,800
6.	VII.F	Notice of Termination				50	\$200	\$6,200
7.	XI	Annual Fees Paid by Member					\$582,500	\$582,500
<b>Member Subtotal</b>			<b>9,558</b>	<b>\$556,833</b>	<b>\$1,703,793</b>	<b>91,980</b>	<b>\$3,329,946</b>	<b>\$14,267,500</b>

### 1. Notice of Confirmation (NOC) / NOTICE OF INTENT (NOI) / MEMBERSHIP APPLICATION (VII.A)

- a) Member enrolled under Order R5-2006-00XX Southern San Joaquin Water Quality Coalition; 350 estimated Kern Members.
  - Within 150 days of NOA by Executive Officer.
  - Third-Party will provide NOC form from Member within 30 days of receiving NOA.

- b) All other Growers:
  - Growers not in Coalition, estimated 500 Members need to join.
  - Complete Third-Party membership application.
  - One-time fee of \$200.
  - Provide certification, written notice was provided of enrollment to non-Member parties.
  - Third-Party will confirm membership.
  
- c) 151 days after the Executive Officer's issuance of NOA to the Third-Party, Growers no yet members must:
  - Estimate 52 Growers will miss the deadline.
  - Complete NOI application to the Board.
  - NOI processing fee.
  - Membership application to Third-Party.
  - Alternatively, a Grower may submit to the Board a RWD or NOI as an individual discharger. These costs not accounted in the cost estimate.

## 2. Farm Evaluation (VII.B) Upfront

The costs for the Farm Evaluation were estimated based on the template provided to the RWQCB on April 11, 2013 by the East San Joaquin Water Quality Coalition, under the group option. If the template or other Farm Evaluation guidelines are ultimately revised, our cost estimate will need corresponding adjustment.

- a) Approximately \$19,400 in third party up-front cost were estimated for five grower outreach events to explain and provide clarification in filling out the forms.
  - Member time was included in the estimate for attending the outreach meetings.
  - A small amount of member time was allotted for gathering parcel information, doing research on management practices in preparation for the meeting.
  - Filling out part B for combinations of management practices by crop per farm.
  - Drawing a map of the farm for onsite inspection purposes.
  
- b) Assumptions for small vs large farms in low vs. high vulnerability are detailed in **Table 2 - 4 Farm Size and Vulnerability Areas** below.
  - Slightly more time and expense was estimated for filling out the farm evaluation for large farms than for small. (3 combinations of crops/management practices to detail in part B vs. 1 for small farms).
  - The time to fill out the farm evaluation on a recurring basis (annually in high vulnerability and every 5 years in low vulnerability) was estimated to be significantly less, once growers were familiar with it.

The following summarizes the major results of the Farm Evaluation cost estimate:

- c) Members in Low Vulnerability Areas:
  - Small Farming Operations cost to fill out the form of \$595 per member.

- Farming Operations greater than 60 acres: \$775 per member.
- Costs to fill out evaluations every five years were annualized. Costs to fill out the form on a recurring basis was estimated at \$162 per member.

d) Members in High Vulnerability Areas:

- Costs for large growers were used for all growers in high vulnerability.
- For more details, refer to the **WDR Member Requirements Attachment**.

### 3. Sediment and Erosion Control Plan (VII.C)

The costs for the Sediment and Erosion Control Plan were estimated based on the template provided to the RWQCB on April 11, 2013 by the East San Joaquin Water Quality Coalition, under the group option. If the template or other guidelines are ultimately revised, our cost estimate will need corresponding adjustment.

- a) Fifty (50) farms were assumed to be subject to the requirement for a Sediment and Erosion Control Plan in the Kern sub-watershed.
- Since the details of a self certification program are unknown at this point, and since a significant (and valuable) investment of time on the part of the grower would also be required for self certification, certification by a professional engineer was assumed.
  - We assumed a flat cost of approximately \$2200 to certify a plan based on the template.
  - The plan assumes a small amount of grower time to work with the certifying party.
  - The total cost estimated for each plan was \$2,338.
  - The estimated costs to implement management practices that would possibly be specified by the plans were not included.

### 4. Nitrogen Management Plan (NMP) (VII.D)

The costs for the nitrogen management plan were estimated based on the NMP template provided to the RWQCB on April 11, 2013 by the East San Joaquin Water Quality Coalition, under the group option.

- a) Given the definition of high vulnerability stated in the Tentative Order, it is assumed that the entire Westside and all areas with poor quality perched water and underlying high nitrates will be high vulnerability.
- b) It was assumed that only about 30% of the farms would be in the low vulnerability area, with corresponding lower regulatory requirements.

- c) According to Kern Ag Commissioner data, there are approximately 902 farms in Kern, and approximately 182 of those farms have less than 60 acres.
- d) **Table 2 - 4 Farm Size and Vulnerability Assumptions** summarizes the distribution of farm sizes assumed for the nutrient management cost analysis.

**Table 2 – 4 Farm Size and Vulnerability Assumptions**

	Small	Farms > 60 ac	Total
Low vulnerability	60	216	276
High vulnerability	122	504	626
<b>TOTAL</b>	<b>182</b>	<b>720</b>	<b>902</b>

- e) There are approximately 1,040,000 irrigated acres in the Kern sub-watershed. Small farms comprise approximately 4500 acres, which averages out to approximately 25 acres per farm. Our analysis assumed that the remaining farms averaged 1,438 acres per farm, so that the sum total of acres would match the sub-watershed total.
- f) Since the details of a self certification program are unknown at this point, and since a significant (and valuable) investment of time on the part of the grower would also be required for self certification, certification by a Certified Crop Advisor (**CCA**) was assumed. From our experience with the dairy order, we assumed a minimum flat cost of \$1,200 plus \$100 per field. Field size was assumed to be 25 acres on small farms and 80 acres on large farms. An irrigation well was assumed to exist on every small farm. On large farms, every well was assumed to serve 240 acres. Thus, large farms were assumed to have 6 wells.
- g) Lab analysis cost assumptions are summarized in **Table 2 – 5 Lab Analysis Cost and Frequency Assumptions**.

**Table 2 – 5 Lab Analysis Cost and Frequency Assumptions**

Analysis	Cost per sample	Sample frequency
Soil	\$20	One per field per year
Irrigation water	\$60	One per well per year
Manure/compost	\$33	One per field per year

- h) Approximately six hours of time was assumed to be required per field, per year, for nutrient and yield recordkeeping. Other small amounts of grower time per field were assumed to be necessary for the following:
- Review of yield history and preparation for nutrient planning at the beginning of the season;
  - Mid season review of yield potential and adjustments in nutrient planning;



- Ratio calculation;
  - Reporting (in high vulnerability only).
- i) Some expense is estimated for accomplishing grower outreach meetings in various parts of the sub-watershed, to help orient growers to the new requirements and to provide helpful information and guidance. This shows up as an up-front third party cost.

The following summarizes the major aspects of the results of the NMP cost analysis:

- j) High Vulnerability Groundwater Area costs to prepare, certify, and implement an NMP:
- Small Farming Operations: \$2,433 total cost per farm, or about \$97.30 per acre.
  - Farming Operations > 60 ac: \$19,314 total cost per farm, or about \$13.40 per acre.
- k) Low Vulnerability Groundwater Area costs to prepare and implement an NMP:
- Small Farming Operations: \$1,823 total cost per farm, or about \$72.90 per acre.
  - Farming Operations > 60 ac: \$15,774 total cost per farm, or about \$11 per acre.

## **5. CEQA Mitigation Monitoring (Attachment C) (VII.E)**

- a) Submit mitigation monitoring by an estimated 10 members per year for upfront and annual costs.
- Implementation of CEQA mitigation measures (cultural resources, veg & wildlife, fisheries, ag resources, GHG emissions)
  - Measures implemented
  - Potential environmental impact measures addressed
  - Location of measures (parcel number, county)
  - Steps taken to monitor success of measure

## **6. Notice of Termination (VII.F)**

Estimate 5 terminations per year, mostly due to change in ownership or consolidation of farms.

## **7. Annual Fees Paid by Member (XI)**

Tier 1 Water Board Fees at \$100 per group plus \$0.56 per acre.

# 3

## MONITORING AND REPORTING PROGRAM ATTACHMENT B OF GENERAL ORDER

### A. MONITORING AND REPORTING PROGRAM, SECTION IV

The costs associated with the Third-Party requirements to comply with the Monitoring and Reporting Program (MRP) in Attachment B, Section IV are described in this section. **Table 3 – 1 “Attachment B – MRP Section IV Low Estimate”** summarizes the Kern Coalition estimated costs.

**Table 3 – 1 Attachment B – MRP Section IV Low Estimate**

Report Heading	MRP Section	Description	Third Party-Upfront			Third Party-Annual		
			Total Hours	Expenses	One Time Upfront Costs	Total Hours	Expenses	Annual Costs
1.	IV.A	Groundwater Quality Assessment Report (GAR)	450	\$250,500	\$304,500			
2.	IV.B	Management Practice Evaluation Program (MPEP)	6,900	\$260,000	\$171,429			
3.	IV.C	Groundwater Quality Trend Monitoring IV.C	500	\$5,000	\$60,000	2,300	\$12,000	\$265,000
4.	IV.D	Management Practices Evaluation Workplan IV.D	880	\$7,000	\$171,429			
5.	IV.E	Trend Monitoring Workplan-following MRP IV.E	1,900	\$16,000	\$225,000			
<b>Section IV Subtotal</b>			<b>12,680</b>	<b>\$313,000</b>	<b>\$932,358</b>	<b>2,300</b>	<b>\$12,000</b>	<b>\$265,000</b>

**Table 3 – 2 Attachment B – MRP Section IV High Estimate**

Report Heading	MRP Section	Description	Third Party-Upfront			Third Party-Annual		
			Total Hours	Expenses	One Time Upfront Costs	Total Hours	Expenses	Annual Costs
1.	IV.A	Groundwater Quality Assessment Report (GAR)	2,500	\$25,000	\$300,000			
2.	IV.B	Management Practice Evaluation Program (MPEP)	6,900	\$260,000	\$1,500,000			
3.	IV.C	Groundwater Quality Trend Monitoring IV.C	500	\$5,000	\$60,000	2,300	\$12,000	\$265,000
4.	IV.D	Management Practices Evaluation Workplan IV.D	880	\$7,000	\$1,500,000			
5.	IV.E	Trend Monitoring Workplan-following MRP IV.E	1,900	\$16,000	\$225,000			
<b>Section IV Subtotal</b>			<b>12,680</b>	<b>\$313,000</b>	<b>\$3,585,000</b>	<b>2,300</b>	<b>\$12,000</b>	<b>\$265,000</b>

### 1. Groundwater Quality Assessment Report (GAR) (IV.A)

The proposed GAR outline must be submitted within 3 months after receiving the notice of applicability (NOA). The completed GAR must be submitted within 1 year after receiving the NOA. The following data and analysis are required:

- a) GAR Components from existing federal/state/county/local databases and documents:
  - Detailed land use information.
  - Depth to groundwater map.
  - Groundwater recharge information.
  - Soil survey information.
  - Shallow groundwater constituent concentrations (potential COCs).
  - Existing groundwater data collection and analysis efforts.
  - Discuss geological and hydrogeologic information.
- b) GAR data review and analysis:
  - Determine high vulnerability areas based on potential impacts from irrigated agricultural activities.
  - Determine merit of incorporating existing data collection efforts to achieve objectives.
  - Prepare ranking of high vulnerability area for prioritization of workplan activities.
  - Utilize GIS mapping applications, graphics, tables to convey data, analysis, and results.
- c) Groundwater vulnerability designations:

- Designate high/low vulnerability areas.
- Modify designations every 5 years after GAR approval.
- d) Prioritization of high vulnerability groundwater areas:
  - Identify exceedances of water quality objectives.
  - Proximity of high vulnerability area to areas contributing to recharge to urban and rural communities.
  - Identify existing irrigated agriculture field or operational practices.
  - Consider largest commodity types comprising up to at least 80% of irrigated agricultural acreage.
  - Consider legacy or ambient conditions of groundwater.
  - Identify groundwater basins currently or proposed to be under review by CV-SALTS.
  - Identify constituents of concern (e.g. relative toxicity, mobility).

Based on other prior detailed estimates of GAR cost that we have performed, we estimate the GAR cost for the sub-watershed to be approximately \$304,500. This estimate is in reasonable agreement with the reported initial contracted price of the East San Joaquin GAR.

## **2. Management Practice Evaluation Program (MPEP) (IV.B)**

The goal of the MPEP is to determine effects, if any, that irrigated agricultural practices have on groundwater quality. The following are requirements of the MPEP that are detailed in the Monitoring and Reporting Program of the Tentative Order.

- a) Objectives of MPEP:
  - Identify existing site and/or commodity specific practices protective of groundwater quality.
  - Determine if newly implemented management practices are improving or may improve groundwater quality.
  - Develop an estimate of the effected Members' discharges of COCs using a mass balance model.
  - Utilize results of evaluated management practices to determine if management practices need to be improved.
- b) Implementation on a watershed or regional commodity basis with other Third-Party groups. Prepare and submit a master schedule of the rank or priority for investigation of high-vulnerability areas.
- c) Reports of the MPEP – reports shall evaluate the data and make a determination whether groundwater is being impacted by activities at farms.
- d) Management Practices Evaluation Report (MPER):
  - No later than 6 years after implementation of each phase.
  - Identify management practices that are protective of groundwater quality.
  - Identify management practices that are appropriate for site conditions on farms.

- Include maps showing types of management practices that should be implemented in certain areas.
- MPEP to include adequate technical justification for identifying protective management practices.
- Propose and implement new/alternative management practices if existing are not protective.
- GQMPs are to be updated to be consistent with the findings of the MPEP.

The costs of the MPEP are variable at this point. There are two major options as noted above: perform the MPEP as a group, or just within the Kern area. Costs estimates can be refined once a decision is made on approach and once an MPEP workplan has been approved by the RWQCB. The following is our best estimate of the total cost of all activities associated with the MPEP options. Please refer to the following related areas of this report and the cost estimate spreadsheet:

- Management Practices Evaluation Workplan (item 4 below), and;
  - Monitoring Well Installation, Sampling Plan, And Completion Report (section 5 of this report. This estimates major monitoring well costs for a Kern only approach.)
- e) The Kern only option for executing the MPEP will be extremely expensive in Kern due to the significant depth to groundwater. Results will also be slow to reach monitoring wells, which may require monitoring over a longer period before conclusions can be made, probably incurring more cost. Nevertheless, growers in Kern may not choose to rely on conclusions that are derived in areas with much shallower groundwater. There is an argument for Kern doing its own MPEP, as Rob Gailey noted that 85% of the Kern area has groundwater deeper than what has been covered by existing studies. Areas with shallower groundwater may not have geology that is as protective, and may not benefit from natural attenuation or denitrification that Kern may benefit from due to its deeper groundwater.
- f) Clay Rodgers noted at the 8/21/12 Tulare workshop that the Representative Monitoring Program (now MPEP), will be expensive. The name has changed, and there will potentially be less reliance on first encountered groundwater monitoring and more reliance on vadose zone monitoring (potentially using lysimeters) and modeling; however, staff has expressed that monitoring well data will be necessary to validate conclusions. Mr. Rodgers approached the question of cost using the Dairy Representative Monitoring Program (RMP) as an example. Mr. Rodgers indicated that the Dairy RMP had spent \$2 million in two years and that it had a revenue stream of approximately \$1.25 million dollars per year to support it.

- g) As Mr. Rodgers noted, Central Valley irrigated agriculture, is much larger in scope than the dairy industry consisting of 33,000 farms on 7.5 million acres, with in excess of 250 crops. Mr. Rodgers emphasized that the management practices would likely be a bigger driver in determining the amount of work necessary for evaluating irrigated ag than the number of crops. Mr. Rodgers noted that there are fewer dairies with a smaller number of crops, but they have production areas in addition to cropland. Mr. Rodgers theorized that in the best case would be that the MPEP would be the same size as the dairy RMP, or a little larger. He theorized that the worst case the MPEP would be five times larger. This would result in a cost range of \$1.5 to \$7 million per year, or \$0.20 to \$1/acre a year. Using a cooperative approach, he estimated that costs would be on the low end. He noted that the disadvantages of representative monitoring include that after having agreed to representative monitoring, if results indicate that a grower needs to improve their management practices, they will be obligated to follow through and cannot at the end refuse to make prescribed improvements. Thus, growers must carefully consider their commitment to a monitoring program that proposes to monitor elsewhere, and make sure that all necessary variables are taken into account, to provide accurate results. This will be an important item for Kern's consideration, as it will be very expensive to monitor in Kern.
- h) Looking at the draft Farm Evaluation template submitted on 4/11/13, the management practices can be characterized in the following way:
- Pesticide practices: 15 practices noted.
  - Irrigation practices: 9 noted, which could fall into two broad categories of pressurized vs. surface irrigation systems.
  - Nitrogen management practices: 11 noted. These could be further classified as application methods vs. management tools.
    - At the simplest level, the application methods could be contrasted as fertigation vs. alternative delivery methods (foliar, split applications, variable rate/GPS).
    - Management tools can be classified as technical (lab testing) vs. simple advising (published guidelines, etc.)
    - Thus under management, there seems to be a minimum of 4 combinations to evaluate.
- i) If we consider only irrigation and nutrient practices and combinations therein, we could have a minimum of 2 irrigation x 4 nitrogen practices = 8 combinations of

practices. It would easily be conceivable to have up to 16 combinations or more that should be incorporated, if we were to add pesticide practices as a variable, or further resolution on irrigation or nitrogen practices.

- j) Mr. Rodgers noted that there are in excess of 250 crops grown in the Central Valley. At the simplest level these can probably be aggregated into three groups: field crops, vegetable crops, and fruit & nut crops. Knowing that there are many unique aspects about various crops, this may not be appropriate. It's very possible that there could be 25 or more crop groups that should be analyzed.
- k) Regarding site conditions, at the simplest level, there should probably be three variables: coarse or sandy soils, medium texture soils, and fine (clayey) soils. Looking at the soil triangle, there could easily be 9 or more variables for site condition. Depth to water and other variables could also be introduced here, adding more variables.
- l) Thus, looking at the possible combinations for a MPEP effort, we could have the following:
- Minimum: 3 crops groups x 8 management practices x 3 site conditions = 72 monitoring sites.
  - Middle scenario: 14 crops groups x 12 management practices x 6 site conditions = 1008 monitoring sites.
  - Possible maximum: 25 crops groups x 16 management practices x 9 site conditions = 3600 monitoring sites.
- m) If a Kern-only MPEP were to be undertaken, it would have less diversity than the whole Central Valley. It may be possible to aggregate Kern into 6 crop groups x 8 management practices x 3 site conditions. There has been a relatively uniform adoption of advanced practices in Kern, which may lend to analyzing something closer to the minimum number of management practice factors. Regarding site conditions, 3 factors may be appropriate, as noted in Dr. Kimmelshue's work, and characterization of the sub-watershed into 3 major texture categories.
- n) Given the above possibilities for combinations that may need to be analyzed, and using cost assumptions such as those noted in Section 5 regarding MWISP costs, we estimated the potential up-front and annual costs that may be incurred for MPEP programs at the various intensity levels. Assumptions used in the model included the following:
- Higher MPEP workplan costs for aggregation into fewer crop groups.

- Higher MPEP analysis and reporting work necessary to derive conclusion when crops were aggregated into fewer, larger groups.
  - 3 wells per monitoring site (as opposed to the 5 or 6 that were used in the Dairy RMP). This is in recognition of the changes made with the name change from RMP to MPEP, with the intent to reduce the number of wells and rely on alternative methods instead. While alternatives to groundwater monitoring can have considerable cost, we did not account for their cost in this analysis.
  - \$4000 monitoring well cost for group option work, assuming that wells will be constructed in places with shallower groundwater.
  - Kern share calculated by taking 1/7th of up-front and annual group option costs.
- o) Once a model was built, other scenarios were devised that would roughly match the dairy RMP cost and something that was close to Mr. Rodgers anticipated worst case scenario of 5 times the dairy RMP cost.

Calculations for a Kern-only MPEP were undertaken with similar assumptions, but using a \$17,000 well cost instead, to account for the deeper groundwater.

The data for all of these scenarios is summarized in **Table 3 - 3**. In addition, the percent of growers monitored is noted. As a reference, the dairy RMP proposes to ultimately monitor 65 out of 1250 dairies, a rate of approximately 5%



**Table 3 – 3 MPER Cost Grid**

Description	Crop groups	Management Practices	Site Conditions	Sites	% of growers monitored	Wells per site	Workplan cost per crop group	Analysis cost per crop group	Well drilling cost, ea	One time costs	Annual costs, \$	Annual costs, \$/ac	Annual, % of dairy RMP cost	Comments
Kern Only	6	8	3	144	16%	3	\$250,000	\$250,000	\$17,000	\$11,864,64	\$5,932,800	\$5.70	456%	There will doubtless be some duplication of effort with a Kern only MPEP. Is there a possibility for a hybrid option? Group option for certain crops, Kern only for other crops?
Group option														
Description	Crop groups	Management Practices	Site Conditions	Sites	% of growers monitored	Wells per site	Workplan cost per crop group	Analysis cost per crop group	Well drilling cost, ea	Kern share of one-time costs	Kern share of annual costs, \$	Annual costs, \$/ac	Group annual cost, % of dairy RMP cost	Comments
Match dairy RMP cost	3	4	3	36	0.1%	3	\$300,000	\$300,000	\$4,000	\$373,166	\$211,886	\$0.21	114%	Doubtful that we could cover the whole valley on this few combinations.
Minimum combinations	3	8	3	72	0.2%	3	\$300,000	\$300,000	\$4,000	\$489,189	\$423,771	\$0.42	228%	Risk being regulated on data that doesn't fit. This may not be enough combinations.
5x Dairy RMP	4	8	5	160	0.5%	3	\$300,000	\$300,000	\$4,000	\$858,514	\$941,714	\$0.94	507%	This was Clay Rodgers' worst case scenario. This may not be enough combinations to avoid bad conclusions.
Middle scenario for combinations	14	12	6	1008	3.1%	3	\$150,000	\$150,000	\$4,000	\$3,848,640	\$5,932,800	\$5.93	3195%	Cost goes up exponentially with increase in combinations. Dairy RMP monitored 65 dairies out of 1250 represented = 5%. This is closest scenario to the same ratio.
Possible max combinations	25	16	9	3600	10.9%	3	\$100,000	\$100,000	\$4,000	\$12,316,57	\$21,188,571	\$21.19	11409%	This is still a modest number of crop groups and management practices considering the Valley's diversity. Costs are astronomical.

MPEP Conclusions:

Based on inspection of table XX, we think that the MPEP cost will exceed close to the worst case scenario noted by Mr. Rodgers, approximately five times the cost of the dairy RMP. This is just above the minimum scenario, with 4 crop groups, 8 management practices, and 5 site conditions, resulting in 160 monitoring sites. While all of the coalitions want to minimize the cost of the MPEP and other compliance obligations, irrigated agriculture cannot afford to be regulated based on bad data. If derived conclusions are wrong, it will be much more costly to change management practices wrongly. Given the fact that the executive officer has all of the power in approving the MPEP workplan, and given how adding factors can increase the work and cost almost exponentially, it will be very important to secure some sort of maximum expenditure for the MPEP, perhaps at the worst case scenario level of five times the dairy RMP (or about \$1/acre/year), noted by the Assistant Executive Officer. Since irrigated agriculture can't afford to be regulated by bad data, additional time may be necessary to accomplish the MPEP, if the cost of work to be done on an annual basis needs to be limited.

As noted by the Kern-only MPEP scenario, if the Kern sub-watershed decides that it will not be able to abide by conclusions derived in shallower groundwater areas, the costs could be much higher. In addition, monitoring would have to be undertaken for a much longer period of time in order to get results. Monitoring for the Kern-only option, if undertaken at the intensity estimated, could cost close to \$6/acre/year. Until other assurances can be made, this contingency could also cover the possibility of the number of combinations to be analyzed in the group option getting closer to the level of the middle scenario (14 crop groups x 12 management practices x 6 site conditions = 1008 monitoring sites.) If undertaken on behalf of the whole Central Valley, this represents monitoring on approximately 3.1% of the grower farms, a ratio that is closest to the ratio exhibited in the dairy RMP. Our cost estimate summary thus reflects a range of costs, due to the uncertainty surrounding the cost of the MPEP.

### **3. Groundwater Quality Trend Monitoring (IV.C)**

a) Objectives:

- Determine baseline groundwater quality relevant to irrigated agriculture.
- Develop long-term groundwater quality info that can be used to evaluate regional effects of irrigated agriculture.

b) Implementation:

- a) Develop a groundwater monitoring network over high & low vulnerability areas.
- b) Employ existing shallow wells but not necessarily wells in the upper zone of the first encountered groundwater.
- c) Submit proposed Trend Groundwater Monitoring Workplan (MRP IV.E)

c) Reporting:

- a) Maps, tabulation of data, time of concentration charts, submitted electronically to GeoTracker.
- b) Evaluate data for trends as proposed in MRP IV.E.

#### **4. Management Practices Evaluation Workplan (IV.D)**

- a) Submit workplan within 2 years after GAR approval.
- b) Workplan approach:
  - a) Groundwater monitoring – must be first encountered groundwater.
  - b) Modeling of groundwater data.
  - c) Vadose zone sampling.
  - d) Other scientifically sound and technically justifiable methods for meeting objectives of the MPEP.
- c) Groundwater quality monitoring – constituent selection (when groundwater monitoring is proposed):
  - a) Constituents to be assessed.
  - b) Frequency of data collection for each constituent.
- d) Workplan implementation and analysis – explain how data at evaluated farms will be used to assess groundwater impacts on farms not evaluated.
- e) Master work plan prioritization:
  - a) If high vulnerability areas are ranked in GAR, prepare a workplan timeline, priority, for areas and/or commodity.
  - b) Submittal dates for addendums proposing the details of each area’s investigation.
- f) Installation of monitoring wells:
  - c) Upon approval of a workplan, prepare and submit a Monitoring Well Installation & Sampling Plan (MWISP) as described in MRP-2.

#### **5. Trend Monitoring Workplan – MRP IV.C (IV.E)**

- a) Submit workplan within 1 year after GAR approval.
- b) Workplan approach:
  - a) Discussion of rationale for number of proposed monitoring wells and locations.
  - b) Consider variety of agricultural commodities produced.
  - c) Consider conditions discussed/identified in GAR related to vulnerability prioritization.
  - d) Areas identified as recharge to urban and rural communities
- c) Well details for wells included in Trend Monitoring:
  - a) GPS coordinates, physical address of property, and CA State well number.
  - b) Well depth, top and bottom perforation depths.
  - c) Copy of the well drillers log, if available.
  - d) Depth to standing water (static), if available.
  - e) Well seal information (type of material, length of seal).
- d) Proposed sampling schedule:
  - a) Annual sampling.
- e) Workplan implementation and analysis:
  - a) Proposed method(s) to be used to evaluate trends in the groundwater monitoring data over time.

## B. MONITORING AND REPORTING PROGRAM, SECTION V

The costs associated with the Third-Party requirements to comply with the Monitoring and Reporting Program (MRP) in Attachment B – Section V are described in this section. **Table 3 – 2 “Attachment B – MRP Section V”** summarizes the Kern Coalition costs.

**Table 3 – 2 Attachment B – MRP Section V**

Report Heading	MRP Section	Description	Third Party-Upfront			Third Party-Annual		
			Total Hours	Expenses	One Time Upfront Costs	Total Hours	Expenses	Annual Costs
1.	V.A	Quarterly Submittal of Monitoring Results	\$0					
2.	V.B	Annual Groundwater Monitoring Results-Annually by May 1	\$0			44	\$16,000	\$21,280
3.	V.C	Monitoring Reports-Annually by May 1			\$0	410	\$80,000	\$129,000
4.	V.D	Surface Water Exceedance Reports	\$0					
5.	VII	Water Quality Triggers for Development of Management Plans	\$0					
6.	VIII	Quality Assurance Project Plan (QAPP)	\$5000					
<b>Section V Subtotal</b>						<b>454</b>	<b>\$96,000</b>	<b>\$150,480</b>

### 1. Quarterly Submittals of Surface Water Monitoring Results (V.A)

This program is actively being implemented. Therefore, no future costs are estimated here.

### 2. Annual Groundwater Monitoring Report (GWMR) (V.B)

This program is actively being implemented. Therefore, no future costs are estimated here.

### 3. Monitoring Reports (V.C)

The costs shown in the table above estimate the costs of prepare and submission of annual monitoring reports.

### 4. Surface Water Exceedance Reports (V.D)

This program is actively being implemented. Therefore, no future costs are estimated here.

**5. Water Quality Triggers for Development of Management Plans (VIII)**

This program is actively being implemented. Therefore, no future costs are estimated here.

**6. Quality Assurance Project Plan (QAPP) (XI)**

The QAPP will be modified from the present version. Approximately \$5000 in extra effort is anticipated to incorporate groundwater items.



# 4

## MANAGEMENT PLAN REQUIREMENTS MRP-1 OF GENERAL ORDER

The costs associated with the Third-Party requirements to comply with the Groundwater Management Plan in MRP-1 are described in this section. **Table 4 – 1 “MRP-1 –Groundwater MRP”** summarizes the Kern Coalition costs.

**Table 4 – 1 MRP-1 –Groundwater Management Plan Requirements**

Report Heading	MRP-1 Section	Descriptions	Third Party				Member	
			Up-front		Annual		Annual	
			Hours	Cost	Hours	Cost	Hours	Cost
1	A	Introduction and Background Section	24	\$2,880				
2	B	Physical Setting and Information	492	\$59,040				
3	C	Management Plan Strategy	210	\$25,200				
4	D	Monitoring Method	76	\$9,120				
5	E	Data Evaluation	72	\$8,640				
6	F	Records and Reporting- Management Plan Progress Report			285	\$34,200		
7	G	Source Identification Study Requirements	96	\$11,520				
8		Implementation Estimate	250	\$30,000	2000	\$240,000	1800	\$216,000
<b>MRP-1 Subtotal</b>			1220	\$146,400	2285	\$274,200	1800	\$216,000

There are many uncertainties regarding a groundwater management plan, including what constituents will need to be included, and the areal extent of the impacts. It is assumed that the major item to deal with will be nitrates, and that a Comprehensive Groundwater Management Plan will be issued with the GAR.

## 1. Introduction and Background Section (MRP-1.A)

Much of this work will be drawn from the GAR.

- Discussion of COCs, water quality objective(s), or trigger(s).
- Identification (narrative & map format) of boundaries to be covered by the management plan.
- Discussion how boundaries were delineated.

## 2. Physical Setting and Information (MRP-1.B)

- a) Land use maps – partially satisfied in GAR:
  - Crop information by square-mile section (TRS) level.
  - Maps in electronic format using ArcGIS format.
- b) Identification of potential irrigated agricultural sources of COCs:
  - If potential sources unknown, conduct source identification study (triggers MRP-1.G).
  - Or develop management plan for COCs (Triggers MRP-1.C).
- c) List of designated beneficial uses for impacted water.
- d) Baseline inventory of existing management practices with location to TRS level. Much of this will be drawn from the Farm Evaluations.
- e) Available surface and/or groundwater quality data – partially satisfied in GAR:
  - Summary, discussion, and compilation of available data.
  - For COCs in the management plan.
  - Acceptable sources of quality data include, but not limited to SWAMP, GAMMA, USGS, DPH, DPR, DWR, local groundwater management plans, and GAR prepared by the Third-Party.

### 2.1 Groundwater – Additional Requirements (MRP-1.B)

- a) Soil types and soil data as described by NRCS soil survey.
- b) Description of geology and hydrogeology for the area:
- c) Regional and area specific geology:
  - Groundwater basin and sub-basin in the area.
  - General water chemistry known.
  - Concentrations of major anions, cations, nutrients, TDS, pH, DO and hardness.
  - Provide Piper (tri-linear), Stiff, and/or Durov diagrams for the area.
- d) Hydrogeology information:
  - Known water bearing zones.
  - Areas of shallow and/or perched groundwater.
  - Areas of discharge and recharge to basin.
- e) Identify water bearing zones utilized for domestic, irrigation, and municipal water.
- f) Aquifer characteristics know from existing information:
  - Depth to groundwater.
  - Groundwater flow and direction.



- Hydraulic gradient and conductivity.
- g) Identification of irrigation water sources and general water chemistry.

### **3. Management Plan Strategy (MRP-1.C)**

- a) Description of approach and prioritization.
- b) Goals and objectives:
  - Compliance with water quality objectives.
  - Education and outreach.
  - Identify, validate, and implement management practices.
- c) Identify duties and responsibilities of individuals/groups:
  - Identification of key individuals.
  - Discussion of each individual's responsibilities.
  - Organizational chart with identified lines of authority.
- d) Strategies to implement Management Plan tasks:
  - Identify entities/agencies contacted to obtain data and assistance.
  - Identify management practices used to control COC.
  - Identify outreach to participants. Outreach is anticipated to deal with NMP training and accounting for N in well water. Meetings, website, and district correspondence is anticipated to be employed.
  - Schedule and milestones for implementation of management practices and tasks.
  - Establish measurable performance goals. Ratios will be monitored and progress will be tracked.

### **4. Monitoring Methods (MRP-1.D)**

- a) General requirements:
  - Designed to measure effectiveness at achieving goals and objectives.
  - Capable of determining management practices made in response to plan are effective.
- b) Groundwater – additional requirements:
  - May include commodity-based representative monitoring. We anticipate that we will rely on and tier off of MPEP efforts.
  - Conducted to determine effectiveness of management practices implemented.

### **5. Data Evaluation (MRP-1.E)**

- a) Methods utilized to perform data analysis.
- b) Identify information necessary to quantify program effectiveness.
  - Tracking of management practice implementation.
  - Describe approach used to determine effectiveness of management practices.
  - Describe process for tracking implementation of management practices.
  - Description of how information is collected from growers.

- Type of information collected.
- How information will be verified and reported.

## **6. Records and Reporting – Management Plan Progress Report (MRP-1.F)**

- a) This report is annual once management plan is implemented.
- b) Executive summary, location map(s), and front pages.
- c) Table with exceedances from the management plan.
- d) Status update on preparation of the new management plan.
- e) Summary and assessment of data collected during reporting period.
- f) Summary of grower outreach conducted.
- g) Summary of implementation of management practices.
- h) Results of evaluation of management practices.
- i) Evaluation of progress in meeting performance goals and schedules.
- j) Recommendations for changes.

## **7. Source Identification Study Requirements (MRP-1.G)**

- a) This is a triggered report; not always required/included.
- b) Evaluation of types of practices, commodities, and locations that may be a source. For nitrate, the NHI could be useful for this.
- c) Continued monitoring at site/area and increased monitoring, if appropriate. For nitrate, we will monitor ratios, primarily.
- d) Assessment of potential pathways through which discharge can occur.
- e) Schedule of conducting study
- f) Field studies:
  - Evaluate feasibility of field studies as part of their source identification study proposal. We anticipate that we will rely heavily on MPEP work.
  - Identify a reasonable number and variety of field study sites that are representative.
- g) Alternative source identification – if not performing a source ID study:
  - Demonstrate how method will produce data/information.
  - Determine contributions from irrigated agricultural sources.

## **8. Implementation**

- a) Registered pesticides. There are minimal Groundwater Protection Areas (GWPA's) in Kern. Some follow-up may be triggered, depending on what the data looks like.
- b) Toxicity.
- c) Contingency / as-required phase on high priority items (covers the first two years).
  - Quarterly progress reports.
  - Meetings with RWQCB staff.
  - Addressing issues that may arise.
- d) Legacy pesticides and trace metals.
- e) DO and pH.
- f) Salinity and pathogens.

- Quarterly progress reports.
  - Meetings with RWQCB staff.
  - Addressing issues that may arise.
- g) Nitrates – groundwater management plan items. This is assumed to require one person-year to monitor grower nitrogen ratios, research acceptable values, meet with growers, do outreach, interact with and support MPEP work, and provide support for growers and answer questions. We assumed that 600 growers would be in the high vulnerability area. Each grower or their representative would attend one outreach per year for their crop.

For more detail, see the corresponding cost estimation spreadsheet.

Our cost estimate does not include grower time or expense to implement practices. None of our costs include farm level management practices that may be indirectly triggered. (Direct compliance practices, such as the NMP were estimated).

# 5

## MONITORING WELL INSTALLATION, SAMPLING PLAN AND COMPLETION REPORT MRP-2 OF GENERAL ORDER

The costs associated with the Third-Party requirements to comply with Monitoring Well Installation, Sampling Plan, and Completion Report in MRP-2 are described in this section. **Table 5 – 1 “MRP-2 – MWISP”** summarizes possible Kern Coalition costs. The costs associated with monitoring wells are closely linked with the Management Practice Evaluation Program (MPEP). Please refer back to section 3 for a discussion of the MPEP. The costs estimated here are for a Kern only MPEP option (not the group option).

**Table 5 – 1 MRP-2 MWISP**

Report Heading	MRP-2 Section	Description	Third Party (Upfront)		Third-Party (Annual Costs)	
			Hours	Phase Cost	Hours	Phase Cost
B.	II	Per Phase Monitoring Well Installation and Sampling Plan (MWISP)	6480	\$777,600	0	0
C.	III	Monitoring Well Installation Completion Report (MWICR) and implementation, including well construction, monthly sampling and analysis, and quarterly reporting.	6192	\$8,087,040	0	\$5,932,800
<b>MRP-2 Subtotal</b>			<b>4,224</b>	<b>\$8,864,640</b>	<b>0</b>	<b>\$5,932,800</b>

### A. ASSUMPTIONS

- 6 crop groups, 8 management practices, and 3 site conditions will result in 144 combinations to monitor for first encountered groundwater quality as part of the MPEP. This is associated with the highest cost option for carrying out the MPEP. The MPEP can be done cooperatively with other coalition areas, representing the lower possible cost option. This was estimated separately in the MPEP section.
- A minimum of 3 wells are required to ascertain impacts up/down gradient of a potential source. Therefore, a total of 432 wells would be needed at an average depth to groundwater of 220 ft in Kern.

## **B. MONITORING WELL INSTALLATION AND SAMPLING PLANS (MWISP) (MRP-2.II)**

The following information is required in an MWISP.

### **1. Stipulations**

### **2. MWISP Required Elements:**

- a) General Information:
  - Topographic map, site plan.
  - Rationale for number of monitoring wells proposed.
  - Local permitting information.
  - Drilling details.
    - Health and safety plan.
- b) Proposed drilling details:
  - Drilling techniques.
  - Well/soil sample collection and logging method(s).
- c) Proposed monitoring well design.
- d) Proposed monitoring well development.
- e) Proposed surveying.
- f) Monitoring according to QAPP.

We estimated the cost of an MWISP at approximately \$5400 per site. For 144 sites, the cost is \$777,600.

## **C. MONITORING WELL INSTALLATION COMPLETION REPORT (MWICR) (MRP-2.III)**

The following information is required in an MWICR.

### **1. General Information**

- a) Brief overview of field activities.
- b) Site plan.
- c) Period of field activities and milestone events.

### **2. Monitoring Well Construction**

### **3. Monitoring Well Development**

We estimated the cost of an MWICR at approximately \$3480 per site. For 144 sites, the cost is \$501,120.

### **4. Monitoring Well Survey**

We estimated the cost of a monitoring well survey at approximately \$1680 per site. For 144 sites, the cost is \$241,920.

## 5. Implementation Costs

- a) Well construction, project management and oversight. With depths in the Kern sub-watershed, a direct rotary rig will be needed in most places. We estimated approximately \$17,000 per well with e-log, project management, and oversight. For 432 wells, the cost would be \$7,344,000.
- b) Sampling and analysis cost, assuming monthly sampling. We estimated \$1000 per site for sampling and \$1100/site for analysis, to include pesticides. Thus, the cost for 144 sites would be \$302,400 per month or \$3,628,800 per year.
- c) Quarterly reporting of results to RWQCB. We estimated \$4000 per site for reporting event. With 144 sites and quarterly reporting, the cost is estimated to be \$2,304,000 per year.

More detail regarding the calculations can be found on the MRP-2 sheet from the attached spreadsheet.

# 6

## CONCLUSIONS & SUMMARY

### A. COST SUMMARY

- a) This Report provides a vigorous and in-depth assessment of the Kern Coalition’s Third Party and Member costs to comply with the March 2013 Tentative Order. Upon request, additional background and information can be provided to the Water Board.
- b) The \$1.90 per acre incremental cost estimate provided under Finding No. 39 in the Order and in Attachment A Information Sheet are summarized in **Table 6-1 Water Board Estimated Costs**.

**Table 6-1**

**Water Board Estimated Costs.**

	Tulare Lake Basin Area Order	Current Surface Water Program	Change from Groundwater Program
Administration	\$1.19	\$0.91	<b>\$0.28</b>
Farm Plans	\$0.29	\$0.00	<b>\$0.29</b>
Monitoring/Reporting/Tracking	\$2.11	\$0.79	<b>\$1.31</b>
Management Practices	\$15.87	\$15.84	<b>\$0.02</b>
<b>Total</b>	<b>\$19.46</b>	<b>\$17.54</b>	<b>\$1.90</b>

- c) The Management Practice Evaluation Program and Workplan are subject to significant variation in costs. As stated in Section 3 of this Report, a lower and higher cost was determined.
- d) The upfront costs are expected to be a one-time cost that could be required in year one (1) or beyond year five (5). For comparative purposes, the upfront costs per acre were divided by five years to provide an annualized per acre cost. The actual year of upfront cost expenditures will vary.
- e) For the lower cost scenario, the upfront cost of \$3.65/acre divided by 5 years = \$0.73/acre/year + the annual cost of \$16.04/acre/year = \$16.77/acre/year for the first five years. After five years the annual cost would be \$16.04/acre/year.

- f) For the higher cost scenario, the upfront cost of \$14.23/acre divided by 5 years = \$2.85/acre/year + the annual cost of \$20.83/acre/year = \$23.68/acre/year for the first five years. After five years the annual cost would be \$20.83/acre/year.
- g) **Table 6-2 Kern Coalition Lower Estimated Costs** and **Table 6-3 Kern Coalition Higher Estimated Costs** depict the summary totals of costs.



**Table 6-2**

**Kern Coalition Lower Estimated Costs**

Costs	Up-Front Costs		Annual Costs	
	Third-Party	Member	Third-Party	Member
<b>Waste Discharge Requirements General Order</b>				
Third-Party - Provisions	\$177,840	--	\$340,640	--
Third-Party - Required Reports & Notices	\$247,200	--	\$163,700	--
Member - Notice of Confirmation/Intent/Application	--	\$549,660	--	\$0
Member - Farm Evaluation	\$19,400	\$688,633	--	\$110,354
Member - Sediment & Erosion Control Plan	\$8,200	\$117,500	--	\$6,000
Member - Nitrogen Management Plan (NMP)	\$19,400	--	--	\$13,547,646
Member - CEQA Mitigation Monitoring (Attachment C)	--	\$348,000	--	\$14,800
Member - Notice of Termination	--	\$0	--	\$6,200
Member - Annual Fees	--	\$0	--	\$582,500
<b>Attachment B - Monitoring &amp; Reporting Program</b>				
Groundwater Quality Assessment Report (GAR)**	\$304,500	--	--	--
Management Practice Evaluation Program (MPEP)	\$171,429	--	--	--
Groundwater Quality Trend Monitoring	\$19,400	--	\$288,000	\$31,200
Management Practices Evaluation Workplan	\$171,429	--	--	--
Trend Monitoring Workplan	\$244,000	\$48,000	--	--
<b>Attachment B - Groundwater Monitoring Report (GWMR)</b>	--	--	\$150,480	--
<b>MRP-1 Quality Management Plan Requirements</b>				
Groundwater Quality Management Plan (GQMP)	\$146,400	--	\$274,200	\$216,000
<b>MRP-2</b> Monitoring Well Installation, Sampling Plan, and Completion Report	\$515,657	--	\$941,714	--
<b>Total</b>	<b>\$2,044,854</b>	<b>\$1,751,793</b>	<b>\$2,158,734</b>	<b>\$14,514,700</b>
<b>Total</b>	<b>\$3,796,648</b>		<b>\$16,673,435</b>	
<b>Cost per Acre ***</b>	<b>\$1.97</b>	<b>\$1.68</b>	<b>\$2.08</b>	<b>\$13.96</b>
<b>Total Cost per Acre</b>	<b>\$3.65</b>		<b>\$16.04</b>	

\*\* Assumes workplan portion, not the alternative

\*\*\* Per acre cost is based on the total costs divided by the Kern Coalition irrigated acres

**Table 6-3**

**Kern Coalition Higher Estimated Costs**

Costs	Up-Front Costs		Annual Costs	
	Third-Party	Member	Third-Party	Member
<b>Waste Discharge Requirements General Order</b>				
Third-Party - Provisions	\$177,840	--	\$340,640	--
Third-Party - Required Reports & Notices	\$247,200	--	\$163,700	--
Member - Notice of Confirmation/Intent/Application	--	\$549,660	--	\$0
Member - Farm Evaluation	\$19,400	\$688,633	--	\$110,354
Member - Sediment & Erosion Control Plan	\$8,200	\$117,500	--	\$6,000
Member - Nitrogen Management Plan (NMP)	\$19,400	--	--	\$13,547,646
Member - CEQA Mitigation Monitoring (Attachment C)	--	\$348,000	--	\$14,800
Member - Notice of Termination	--	\$0	--	\$6,200
Member - Annual Fees	--	\$0	--	\$582,500
<b>Attachment B - Monitoring &amp; Reporting Program</b>				
Groundwater Quality Assessment Report (GAR)**	\$304,500	--	--	--
Management Practice Evaluation Program (MPEP)	\$1,500,000	--	--	--
Groundwater Quality Trend Monitoring	\$19,400	--	\$288,000	\$31,200
Management Practices Evaluation Workplan	\$1,500,000	--	--	--
Trend Monitoring Workplan	\$244,000	\$48,000	--	--
<b>Attachment B - Groundwater Monitoring Report (GWMR)</b>	--	--	\$150,480	--
<b>MRP-1 Quality Management Plan Requirements</b>				
Groundwater Quality Management Plan (GQMP)	\$146,400	--	\$274,200	\$216,000
<b>MRP-2</b> Monitoring Well Installation, Sampling Plan, and Completion Report	\$8,864,640	--	\$5,932,800	--
<b>Total</b>	<b>\$13,116,080</b>	<b>\$1,751,793</b>	<b>\$7,149,520</b>	<b>\$14,514,700</b>
<b>Total</b>	<b>\$14,802,773</b>		<b>\$21,664,520</b>	
<b>Cost per Acre ***</b>	<b>\$12.55</b>	<b>\$1.68</b>	<b>\$6.87</b>	<b>\$13.96</b>
<b>Total Cost per Acre</b>	<b>\$14.23</b>		<b>\$20.83</b>	

\*\* Assumes workplan portion, not the alternative

\*\*\* Per acre cost is based on the total costs divided by the Kern Coalition irrigated acres

## B. CONCLUSIONS

- a) The Kern Coalition’s upfront annualized costs plus the annual costs result in the following comparative values to the Tentative Order and summarized in **Table 6-4 Comparative Estimated Costs**.

**Table 6-4**

**Comparative Estimated Costs**

	<b>Tulare Lake Basin Area Order Groundwater Program</b>	<b>Kern Coalition Lower Cost Scenario</b>	<b>Kern Coalition Higher Cost Scenario</b>
	<b>(\$/acre/year)</b>	<b>(\$/acre/year)</b>	<b>(\$/acre/year)</b>
Total Cost - First 5 Years	<b>\$1.90</b>	<b>\$16.77</b>	<b>\$23.68</b>
Total Cost – Year 6+	<b>\$1.90</b>	<b>\$16.04</b>	<b>\$20.83</b>

- b) The Tentative Order (at \$1.90) is significantly lower than the results from this Report. The high cost scenario (at \$23.68) is over 12 times higher than the \$1.90.
- c) The Water Board must take into consideration the detailed costs of this Report and work with the Kern Coalition to reduce the cost burdens of the March 2013 Tentative Order.

## Kern Coalition ILRP - Lower Cost Estimate\*

### Assumptions:

Kern Third-Party Potential Members	902	members (estimate)
Kern Coalition Current Members	350	members (about 40%)
Members Needing to Enroll	552	members (about 60%)
Kern Coalition Irrigated Acres	1,040,000	acres
South San Joaquin Valley Irrigated Acres	2,640,000	acres
Member Hourly Rate	\$120	per hr
Coalition Hourly Rate (Coalition Staff)	\$120	per hr
Average Farm Acres	1,438	acres
Low vulnerability area (estimated)	300,000	acres
Member Water Board Fee	\$0.56	per acre

\*Based on Kern Coalition Acres and the March 2013 Tulare Lake Basin Area Tentative WDR's General Order (Groundwater only)

Costs	Up-Front Costs		Annual Costs	
	Third-Party	Member	Third-Party	Member
<b>Waste Discharge Requirements General Order</b>				
Third-Party - Provisions	\$177,840	--	\$340,640	--
Third-Party - Required Reports & Notices	\$247,200	--	\$163,700	--
Member - Notice of Confirmation/Intent/Application	--	\$549,660	--	\$0
Member - Farm Evaluation	\$19,400	\$688,633	--	\$110,354
Member - Sediment & Erosion Control Plan	\$8,200	\$117,500	--	\$6,000
Member - Nitrogen Management Plan (NMP)	\$19,400	--	--	\$13,547,646
Member - CEQA Mitigation Monitoring (Attachment C)	--	\$348,000	--	\$14,800
Member - Notice of Termination	--	\$0	--	\$6,200
Member - Annual Fees	--	\$0	--	\$582,500
<b>Attachment B - Monitoring &amp; Reporting Program</b>				
Groundwater Quality Assessment Report (GAR)**	\$304,500	--	--	--
Management Practice Evaluation Program (MPEP)	\$171,429	--	--	--
Groundwater Quality Trend Monitoring	\$19,400	--	\$288,000	\$31,200
Management Practices Evaluation Workplan	\$171,429	--	--	--
Trend Monitoring Workplan	\$244,000	\$48,000	--	--
<b>Attachment B - Groundwater Monitoring Report (GWMR)</b>	--	--	\$150,480	--
<b>MRP-1 Quality Management Plan Requirements</b>				
Groundwater Quality Management Plan (GQMP)	\$146,400	--	\$274,200	\$216,000
<b>MRP-2</b> Monitoring Well Installation, Sampling Plan, and Completion Report	\$515,657	--	\$941,714	--
<b>Total</b>	<b>\$2,044,854</b>	<b>\$1,751,793</b>	<b>\$2,158,734</b>	<b>\$14,514,700</b>
<b>Total</b>	<b>\$3,796,648</b>		<b>\$16,673,435</b>	
<b>Cost per Acre ***</b>	<b>\$1.97</b>	<b>\$1.68</b>	<b>\$2.08</b>	<b>\$13.96</b>
<b>Total Cost per Acre</b>	<b>\$3.65</b>		<b>\$16.04</b>	

\*\* Assumes workplan portion, not the alternative

\*\*\* Per acre cost is based on the total costs divided by the Kern Coalition irrigated acres

## Kern Coalition ILRP - Higher Cost Estimate\*

### Assumptions:

Kern Third-Party Potential Members	902	members (estimate)
Kern Coalition Current Members	350	members (about 40%)
Members Needing to Enroll	552	members (about 60%)
Kern Coalition Irrigated Acres	1,040,000	acres
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Member Hourly Rate	\$120	per hr
Coalition Hourly Rate (Coalition Staff)	\$120	per hr
Average Farm Acres	1,438	acres
Low vulnerability area (estimated)	300,000	acres
Member Water Board Fee	\$0.56	per acre

\*Based on Kern Coalition Acres and the March 2013 Tulare Lake Basin Area Tentative WDR's General Order (Groundwater only)

Costs	Up-Front Costs		Annual Costs	
	Third-Party	Member	Third-Party	Member
<b>Waste Discharge Requirements General Order</b>				
Third-Party - Provisions	\$177,840	--	\$340,640	--
Third-Party - Required Reports & Notices	\$247,200	--	\$163,700	--
Member - Notice of Confirmation/Intent/Application	--	\$549,660	--	\$0
Member - Farm Evaluation	\$19,400	\$688,633	--	\$110,354
Member - Sediment & Erosion Control Plan	\$8,200	\$117,500	--	\$6,000
Member - Nitrogen Management Plan (NMP)	\$19,400	--	--	\$13,547,646
Member - CEQA Mitigation Monitoring (Attachment C)	--	\$348,000	--	\$14,800
Member - Notice of Termination	--	\$0	--	\$6,200
Member - Annual Fees	--	\$0	--	\$582,500
<b>Attachment B - Monitoring &amp; Reporting Program</b>				
Groundwater Quality Assessment Report (GAR)**	\$304,500	--	--	--
Management Practice Evaluation Program (MPEP)	\$1,500,000	--	--	--
Groundwater Quality Trend Monitoring	\$19,400	--	\$288,000	\$31,200
Management Practices Evaluation Workplan	\$1,500,000	--	--	--
Trend Monitoring Workplan	\$244,000	\$48,000	--	--
<b>Attachment B - Groundwater Monitoring Report (GWMR)</b>	--	--	\$150,480	--
<b>MRP-1 Quality Management Plan Requirements</b>				
Groundwater Quality Management Plan (GQMP)	\$146,400	--	\$274,200	\$216,000
<b>MRP-2</b> Monitoring Well Installation, Sampling Plan, and Completion Report	\$8,864,640	--	\$5,932,800	--
<b>Total</b>	<b>\$13,050,980</b>	<b>\$1,751,793</b>	<b>\$7,149,820</b>	<b>\$14,514,700</b>
<b>Total</b>	<b>\$14,802,773</b>		<b>\$21,664,520</b>	
<b>Cost per Acre ***</b>	<b>\$12.55</b>	<b>\$1.68</b>	<b>\$6.87</b>	<b>\$13.96</b>
<b>Total Cost per Acre</b>	<b>\$14.23</b>		<b>\$20.83</b>	

\*\* Assumes workplan portion, not the alternative

\*\*\* Per acre cost is based on the total costs divided by the Kern Coalition irrigated acres

**WDRs - Third-Party Provisions**

Based on the March 2013 Tulare Lake Basin Area Tentative WDRs General Order

Hourly Costs

\$120

Third-Party Provisions - Costs WDR Section IV.C (Provisions, Requirements for the Third-Party)	Third-Party - Upfront Costs			Third-Party - Annual Costs			
	Hours	Expenses	Cost	Hours	Expenses	Cost	
<b>IV.C.1. Organizational Documentation</b>							
a. Documentation of organization or management structure	24	\$1,000	\$3,880	--	--	--	Water Board approval of new third party entity
b. Identify responsible persons	8	\$1,000	\$1,960	--	--	--	Hires, identify individuals, ranks
c. Documentation made readily available to members	40	\$5,000	\$9,800	--	--	--	Website updates, email, hardcopies for members
<b>IV.C.2. Prepare Annual Summaries</b>							
a. Expenditures of fees and revenue used to comply	--	--	--	120	\$3,000	\$17,400	Accounting staff Higher first year fee notices, collection, receipts, expenditures, but annualized over 5 years
b. Summaries made readily available to members	--	--	--	24	\$1,000	\$3,880	Summary and mailer
<b>IV.C.3. Response to Notice of Violation (NOV)</b>							
a. Provide members information regarding reason(s) of violation	--	--	--	20	\$500	\$2,900	Assuming 1 NOV per year Assume 20 members in violation
b. Provide notification to all Members in areas covered by the NOV	--	--	--	20	\$1,000	\$3,400	Within 30 days
c. Provide confirmation to Water Board of each notification	--	--	--	8	\$100	\$1,060	
d. Annual summary of all notices	--	--	--	20	\$1,000	\$3,400	Annual summary of notices
e. Respond and resolve NOV	--	--	--	40	\$20,000	\$24,800	Hire consultant/engineer
<b>IV.C.4. Develop, implement, track and evaluate effectiveness of:</b>							
a. Groundwater Quality Management Plans (GQMP)	200	\$100,000	\$124,000	100	\$40,000	\$52,000	Annually for 5 years      45,000 acres of 436,000 acres      May 1 each year May 1 each year
<b>IV.C.5. Submittals</b>							
a. Provide timely & complete submittal of any plans or reports required by this Order	--	--	--	100	\$5,000	\$17,000	
<b>IV.C.6. Quality Assurance/Quality Control</b>							
a. Conduct water quality monitoring & assessments in conformance with QA/QC	--	--	--	100	\$1,000	\$13,000	
<b>IV.C.7. Receipt of Notice of Applicability (NOA)</b>							
a. Inform members of NOA requirements within 30 days of receipt	60	\$2,000	\$9,200	--	--	--	
b. Send a notice of confirmation form to each Member	200	\$5,000	\$29,000	--	--	--	
<b>IV.C.8. Conduct Education and Outreach activities</b>							
a. Inform Members of program requirements							2 classes/yr and Qrt newsletter @ 4 d/class and 3 d/ltr
i. Program requirements	--	--	--	240	\$10,000	\$38,800	
ii. Water quality problems							
iii. Exceedances of water quality objectives							
iv. Degradation of water quality							
b. Maintain attendance lists for outreach events	--	--	--	40	\$1,000	\$5,800	
c. Provide Members with information on							
i. Water quality practices	--	--	--	160	\$10,000	\$29,200	
ii. Environmental impacts of water quality practices							
d. Provide annual summary of education and outreach activities to Board, including:							
i. Copies of educational and management practice information provided	--	--	--	60	\$3,000	\$10,200	
ii. Report the total number of Members attended							
iii. Describe the process used to provide information to non-attendees							
<b>IV.C.9. Annual Membership Participation Report</b>							
a. Work with RWQCB to ensure all Members are addressing exceedances or degradation				250	\$5,000	\$35,000	
b. As part of the Membership List submittal, identify growers who have failed to:							
1. Implement improved water quality management practices as specified (GQMP)							
2. Respond to an information request associated with the GQMP or this Order							
3. Participate in third-party studies where the third-party is the lead				250	\$6,000	\$36,000	
4. Provide confirmation in an outreach event							
5. Submit required fees to the Third-Party							
<b>IV.C.10. Ensure activities performed by subsidiary groups meet requirements</b>				80	\$2,000	\$11,600	5 days per group
<b>IV.C.11. Fees</b>							
a. Transmit RWQCB fees from Members and submit to Board				105	\$5,000	\$17,600	40% enrolled in surface water Coalition, need to enroll 60%
b. Collect fees from Members for reimbursement of Third-Party activities				105	\$5,000	\$17,600	21 Districts x 5 hours each
<b>Totals</b>	<b>532</b>	<b>\$114,000</b>	<b>\$177,840</b>	<b>1,842</b>	<b>\$119,600</b>	<b>\$340,640</b>	

**WDRs - Third-Party Requirements**

Based on the March 2013 Tulare Lake Basin Area Tentative WDRs General Order

Hourly Costs

\$120

Third-Party Requirement Costs WDR Section VIII (Required Reports and Notices - Third-Party)	Third-Party - One Time Cost			Third-Party - Annual Costs			
	Hours	Expenses	Cost	Hours	Expenses	Cost	
<b>VIII.A. Third-Party Application</b>							
1 Submit request to Board within 30 days of Order effective date & follow-up actions	40	\$2,000	\$6,800				Formation costs in IV.C.1.
<b>VIII.B. Membership (Participant) List</b>							
1 Submit list of Members to Board							
a. Within 180 days of receiving NOA	20	\$100	\$2,500	20	\$100	\$2,500	
b. Annually by July 31 of each year							
2 List shall contain, at minimum							
a. All parcel numbers covered under the membership							
b. County of each parcel							
c. Section, Township, Range associated with each parcel							
d. Number of irrigated acres for each parcel	700	\$3,000	\$87,000	70	\$500	\$8,900	Annual updates
e. Members names, mailing address, and contact name and phone number (can use Third-Party contact info)							
f. Name of farm operator for each parcel if different from the Member							Identification of the crops grown and acreage of each crop.
g. Identification of each parcel that is a part of a Small Farming Operation, if applicable							• Location of the farm.
<b>VIII.C. Templates</b>							
1 Farm Evaluation Template							
a. Farm Evaluation Template - Group Option, to Water Board within 90-days of NOA	40	\$500	\$5,300	20	\$250	\$2,650	• Identification of on-farm management practices implemented to achieve the Order's farm management performance standards. Specifically track which management practices recommended in management plans have been implemented at the farm.
b. Central Valley Water Board - Farm Evaluation Template			\$0			\$0	• Identification of whether or not there is movement of soil during storm events and/or during irrigation drainage events (sediment and erosion risk areas) and a description of where this occurs.
2 Nitrogen Management Plan Template							• Identification of whether or not water leaves the property and is conveyed downstream and a description of where this occurs.
a. Nitrogen Management Plan Template - Group Option	40	\$500	\$5,300	20	\$250	\$2,650	• Location of in-service wells and abandoned wells. Identification of whether wellhead protection and backflow prevention practices have been implemented.
b. Central Valley Water Board - Nitrogen Management Plan Template			\$0			\$0	
c. Nitrogen Management Plan Summary Report	20	\$250	\$2,650	10	\$100	\$1,300	
3 Sediment and Erosion Control Plan Template							
a. Sediment and Erosion Control Plan Template - Group Option	20	\$250	\$2,650	5	\$100	\$700	
b. Central Valley Water Board - Sediment and Erosion Control Plan Template			\$0			\$0	
<b>VIII.D. Groundwater Quality Assessment Report and Evaluation/Monitoring Workplans</b>							
1 Groundwater Quality Assessment Report (GAR), submitted 1 year after NOA (Attachment B, IV.A.)			\$0			\$0	Cost is included in MRP, Attachment B Sheet
2 Management Practice Evaluation Program (MPEP) Workplan (Attachment B, IV.B.)			\$0			\$0	Cost is included in MRP, Attachment B Sheet
a. Management Practices Evaluation Program - Group Option			\$0			\$0	
b. Third Party Only - Management Practices Evaluation Program			\$0			\$0	Cost is included in MRP, Attachment B Sheet
1 Objectives, Implementation, Report,			\$0			\$0	
2 Implementation			\$0			\$0	
3 Report			\$0			\$0	
4 Management Practices Evaluation Report - 6 years after implementation of MPEP			\$0			\$0	
3 Groundwater Quality Trend Monitoring Workplan - submit 1 year after approval of GAR (IV.E.)			\$0			\$0	Cost is included in MRP, Attachment B Sheet
<b>VIII.F. Sediment Discharge and Erosion Assessment Report</b>							
1 Submit 1 year after receiving NOA (Attachment B, VI), notify impacted Members to prepare Plan	200	\$70,000	\$94,000				
<b>VIII.H. Monitoring Report (Attachment B, V.C. by 1 May every year)</b>							
1 Submit monitoring reports to State Board GeoTracker database, due May 1st of each year 2014			\$0	800	\$5,000	\$101,000	Annually
<b>VIII.I. Groundwater Quality Management Plans (GQMP)</b>							
1 Newly triggered GQMP						\$0	
a. Submit to Board within 60 days						\$0	
b. Submit to CV-SALTS Chair if addresses salt or nitrate						\$0	
c. Implement outreach or monitoring before approval						\$0	
2 Ensure compliance and continued implementation of management plans until completed			\$0			\$0	
3 Comprehensive Groundwater Quality Management (CGQM) Plan			\$0			\$0	Assuming comprehensive option
a. Third-Party may submit CGQM plan instead of GQMP			\$0			\$0	Submitted with GAR
b. CGQM must be updated at same time as Management Plan Progress Report			\$0			\$0	
<b>VIII.J. Technical Reports - Where monitoring is not effective, provide technical reports</b>			\$0	350	\$2,000	\$44,000	1 report per year
<b>VIII.K. Notice of Termination</b>			\$0			\$0	Not applicable or expected.
<b>VIII.L. Total Maximum Daily Load (TMDL) Requirements</b>							
1 Approved TMDLs in the Basin Plan as applicable shall be implemented	300	\$5,000	\$41,000				
<b>Totals</b>	<b>1,380</b>	<b>\$81,600</b>	<b>\$247,200</b>	<b>1,295</b>	<b>\$8,300</b>	<b>\$163,700</b>	

**WDRs - Member Requirements**

Based on the March 2013 Tulare Lake Basin Area Tentative WDRs General Order

No. of Members	Small (<60 ac)		Other (60+ ac)		Total
	Low Vul	High Vul	Low Vul	High Vul	
Farm Evaluation	60	122	216	504	902
Nitrogen MP	60	122	216	504	902
Sediment & Erosion Mitigation Monitoring	10		40		50
	10				10

Member Requirement Costs WDR Section VII (Required Reports and Notices - Member)	Member Hourly Costs					Member Hourly Costs					
	Upfront Cost					Annual Cost					
	No. of Members	Hours/Member	Total Hours	Expenses	Cost	No. of Members	Hours/Member	Total Hours	Expenses	Cost	
<b>VII.A. Notice of Confirmation (NOC) / Notice of Intent (NOI) / Membership Application</b>											
1 NOC submitted to Third-Party within 120 days of Third-Party NOA by the Executive Officer (EO)											
a. If enrolled under Order R5-2006-00xx Southern San Joaquin Water Quality Coalition	350	2	700	\$9,000	\$93,000					Members in the 2006 Coalition (350 estimated)	
b. Third-Party will provide NOC form to Member within 30 days of receiving NOA											
c. Provide certification written notice was provided of enrollment to other parties											
2 All other growers must become Members within 120 days of Third-Party NOA by EO											
a. Complete Third-Party membership application	500	4	2,000	\$102,000	\$342,000					Growers who were not in the Coalition (estimate 500 will join within 120 days)	
b. Provide certification, written notice was provided of enrollment to non-Member parties	500	0.5	250	\$500	\$30,500						
c. Third-Party will confirm membership	500	0.0	0	\$0	\$0						
3 121 days after the EO's issuance of the NOA to the Third-Party, Growers not yet members must											
a. Completed NOI application to Board	52	6	312	\$11,000	\$48,440					Growers who miss the 120 day deadline (estimate 52)	
b. NOI processing fee	52	1.5	78	\$600	\$9,960						
c. Membership application to Third-Party	52	4	208	\$800	\$25,760						
4 Alternatively, a Grower may submit to the Board											
a. Report of Waste Discharge (RWD)	0	0	0	\$0	\$0					Costs for individual RWD (estimate \$0)	
b. NOI for coverage under applicable general waste discharge req for individuals	0	0	0	\$0	\$0						
<b>VII.B. Farm Evaluation</b>											
1 Members in Low Vulnerability Areas											
a. With Small Farming Operations (<60 ac) by 1 March 2017, update every 5 years	60	4.75	285	\$1,526	\$35,726	60	0.27	16	\$0	\$1,944	4.75 hrs per member plus 45 miles trip to meeting, recurring .27 hrs/yr annualize
b. Farming Operations not qualifying as Small by 1 March 2015, update every 5 years	216	6.25	1,350	\$5,492	\$167,492	216	0.27	58	\$0	\$6,998	6.25 hrs per member plus 45 miles trip to meeting, recurring .27 hrs/yr annualize
2 All Members in High Vulnerability Areas (Surface/Groundwater) by 1 March 2014											
a. Farm Evaluations and submit to Third-Party and update annually 1 March	626	6.25	3,913	\$15,916	\$485,416	626	1.35	845	\$0	\$101,412	6.25 hrs per member plus 45 miles trip to meeting, recurring 1.35 hrs/yr w/ no m
<b>VII.C. Sediment and Erosion Control Plan</b>											
Required Members in areas potential to cause erosion & discharge sediment to surface waters											
a. With Small Farming Operations (<60 ac) within one year of SDEAR	20	1.25	25	\$44,000	\$47,000	20	1.0	20	\$0	\$2,400	Assume 1.25 hrs per member and \$2160 consultant, 1 hr annually to review
b. Farming Operations not qualifying as Small within 180 days of SDEAR	30	1.25	38	\$66,000	\$70,500	30	1	30	\$0	\$3,600	Assume 1.25 hrs per member and \$2160 consultant, 1 hr annually to review Does not include costs to fix identified problems
<b>VII.D. Nitrogen Management Plan (NMP)</b>											
1 All Members within a High Vulnerability Groundwater Area must prepare, certify, and implement an NMP											
a. With Small Farming Operations (<60 ac) by 1 March 2016, update annually thereafter						122	8.5	1,037	\$172,386	\$296,826	Estimate 122 members, 8.5 hrs + consultant \$1,300 + testing \$113, annual
b. Farming Operations not qualifying as Small by 1 March 2014, update annually thereafter						504	125.0	63,000	\$2,174,256	\$9,734,256	Estimate 504 members, 125 hrs + consultant \$3,000 + testing \$1,314, annual
2 Members in Low Vulnerability Groundwater Areas											
a. Small farming operations						60	14.3	855	\$6,780	\$109,380	Estimate 60 members, 14.25 hrs + consultant \$0 + testing \$113, annual
b. Farming Operations not qualifying as small						216	120.5	26,028	\$283,824	\$3,407,184	Estimate 216 members, 120.5 hrs + consultant \$0 + testing \$1314, annual
<b>VII.E. Mitigation Monitoring - Certain Members required to implement mitigation measures in Attachment C</b>											
1 Submit mitigation monitoring by March 1 of each year to Third-Party	10	40	400	\$300,000	\$348,000	10	4	40	\$10,000	\$14,800	Estimate 10 members Year 1 (40 hrs+consultant \$30,000), Annually (4 hrs + cor
2 Shall include information on:											
a. Implementation of CEQA mitigation measures (cultural resources, veg & wildlife, fisheries, ag resources, GHG emissions)											
b. Measures implemented											
c. Potential environmental impact measures addressed											
d. Location of measures (parcel number, county)											
e. Steps taken to monitor success of measure											
<b>VII.F. Notice of Termination</b>						5	10	50	\$200	\$6,200	Estimate 5 terminations/year, mostly due to change in ownership
<b>XI. Annual Fees - Paid by Member</b>									\$582,500	\$582,500	Tier I - Water Board Fee \$100 per group + \$0.56/acre
<b>Totals</b>			9,558	\$556,833	\$1,703,793			91,980	\$3,229,946	\$14,267,500	



One time \$200 fee

rd w/ no meeting.

rd w/ no meeting.

eeeting.

nsultant \$1,000)

**Attachment B - MRP - Monitoring & Reporting Program Section IV**

These costs are totaled in WDR VIII.D.

Hourly Costs

\$120

Based on the March 2013 Tulare Lake Basin Area Tentative WDRs General Order

Groundwater Quality Assessment Report (GAR) MRP, Attachment B (Monitoring and Reporting Program) Section IV	Third-Party - Upfront		
	Hours	Expenses	Cost
<b>IV.A. Groundwater Quality Assessment Report (GAR)</b>			
- Submit proposed GAR outline within 3 months after receiving NOA	100	\$1,000	\$13,000
- Submit completed GAR within 1 year of receiving NOA	100	\$49,000	\$61,000
2 GAR components obtained by review of existing federal/state/county/local databases and documents:			
a Detailed land use information			
b Depth to groundwater map			
c Groundwater recharge information			
d Soil survey information	50	\$53,500	\$59,500
e Shallow groundwater constituent concentrations (potential COCs)			
f Existing groundwater data collection and analysis efforts			
g Discuss geological and hydrogeologic information			
3 GAR data review and analysis			
a Determine high vulnerability areas based on potential impacts from irrigated ag activities			
b Determine merit of incorporating existing data collection efforts to achieve objectives			
c Prepare ranking of high vulnerability areas for prioritization of workplan activities	50	\$43,500	\$49,500
d Utilize GIS mapping applications, graphics, tables to convey data, analysis and results			
4 Groundwater vulnerability designations			
a Designate high/low vulnerability areas			
b Modify designations every five years after approval of GAR	50	\$21,500	\$27,500
5 Prioritization of high vulnerability groundwater areas			
a Identify exceedances of water quality objectives			
b Proximity of high vulnerability area to areas contributing to recharge to urban and rural communities			
c Identify existing irrigated agriculture field or operational practices			
d Consider largest commodity types comprising up to at least 80% of irrigated ag acreage	100	\$82,000	\$94,000
e Consider legacy or ambient conditions of groundwater			
f Identify groundwater basins currently or proposed to be under review by CV-SALTS			
g Identify constituents of concern, e.g. relative toxicity, mobility			
<b>Subtotal</b>	<b>450</b>	<b>\$250,500</b>	<b>\$304,500</b>

Management Practice Evaluation Program (MPEP) MRP, Attachment B (Monitoring and Reporting Program) Section IV	Third-Party - Upfront		
	Hours	Expenses	Cost
<b>IV.B. Management Practice Evaluation Program (MPEP)</b>			
- Determine effects, if any, irrigated ag have on groundwater quality			
- MPEP is required in high vulnerability areas and must address CoCs described in the GAR			
1 Objectives of the MPEP			
a Identify whether existing site and/or commodity specific practices are protective of GW quality			
b Determine if newly implemented management practices are improving or may improve GW quality			
c Develop an estimate of the effect Members' discharges of CoCs using a mass balance model			
d Utilize results of evaluated to determine if management practices need to be improved			
2 Implementation - on a watershed or regional commodity basis with other third party groups			
a Prepare and submit a master schedule of the rank or priority for investigation of high-v areas			
3 Reports of the MPEP - Information to complete the MPEP schedule to meet deadline			
4 Management Practices Evaluation Report (MPEP)			
- No later than 6 years after implementation of each phase			
a Identify management practices that are protective of GW quality			
b Identify management practices that are appropriate for site conditions on farms			
c Include maps and types of management practices that should be implemented			
d MPEP to include adequate technical justification for identifying protective management practices			
e Propose and implement new/alternative management practices if existing are not protective			
f GOMPs are to be updated to be consistent with the findings of the MPEP			
<b>Subtotal</b>	<b>0</b>	<b>\$0</b>	<b>\$0</b>

Groundwater Quality Trend Monitoring MRP, Attachment B (Monitoring and Reporting Program) Section IV	Third-Party - Upfront			Third-Party - Annual		
	Hours	Expenses	Cost	Hours	Expenses	Cost
<b>IV.C. Groundwater Quality Trend Monitoring</b>						
1 Objectives						
a Determine baseline GW quality relevant to irrigated ag	120	\$5,000	\$19,400			\$0
b Develop long-term GW quality info that can be used to evaluate regional effects of irrigated ag						
2 Implementation						
a Develop a groundwater monitoring network over high & low vulnerability areas						
b Employ existing shallow wells but <u>not</u> necessarily wells in the upper zone of 1st encountered GW			\$0	2,000	\$10,000	\$250,000
c Submit proposed Trend Groundwater Monitoring Workplan (MRP IV.E)						
3 Reporting						
a Maps, tabulation of data, time of concentration charts, submitted electronically to GeoTracker			\$0	300	\$2,000	\$38,000
b Evaluate data for trends as proposed in MRP IV.E						
<b>Subtotal</b>	<b>120</b>	<b>\$5,000</b>	<b>\$19,400</b>	<b>2,300</b>	<b>\$12,000</b>	<b>\$288,000</b>

Board input to guide workplan.

Estimate 130 existing wells to be monitored

Management Practices Evaluation Workplan MRP, Attachment B (Monitoring and Reporting Program) Section IV	Third-Party - Upfront		
	Hours	Expenses	Cost
<b>IV.D. Management Practices Evaluation Workplan</b>			
- Submit workplan within 2 years after GAR approval			
1 Workplan approach			
a Groundwater monitoring - must be first encountered GW			
b Modeling			
c Vadose zone sampling			
d Other scientifically sound and technically justifiable methods for meeting objects of the MPEP			
2 Groundwater quality monitoring - constituent selection (when GW monitoring is proposed)			
a Constituents to be assessed			
b Frequency of data collection for each constituent			
3 Workplan implementation and analysis			
a Explain how data at evaluated farms will be used to assess GW impacts on farms not evaluated			
4 Master workplan - prioritization			
a If high vulnerability areas are ranked in GAR, prepare workplan timeline, priority, for areas/commodity			
b Submittal dates for addendums proposing the details of each area's investigation			
5 Installation of monitoring wells			
a Upon approval of workplan, prepare and submit a Monitoring Well Installation & Sampling Plan (MWISP) as described in MRP-2			
<b>Subtotal</b>	<b>0</b>	<b>\$0</b>	<b>\$0</b>

Trend Monitoring Workplan MRP, Attachment B (Monitoring and Reporting Program) Section IV	Third-Party - Upfront		
	Hours	Expenses	Cost
<b>IV.E. Trend Monitoring Workplan - following MRP IV.C.</b>			
- Submit workplan within 1 year after GAR approval			
1 Workplan approach			
a Discussion of rationale for number of proposed monitoring wells and locations			
b Consider variety of ag commodities produced			
c Consider conditions discussed/identified in GAR related to vulnerability prioritization	500	\$5,000	\$65,000
d Areas identified as recharge to urban and rural communities			
2 Well details for wells included in trend monitoring			
a GPS coordinates			
b Physical address of property			
c CA State well number (if known)			
d Well depth			
e Top and bottom perforation depths			
f A copy of the water well drillers log, if available			
g Depth of standing water (static), if available			
h Well seal information (type of material, length of seal)	1200	\$10,000	\$154,000
3 Proposed sampling schedule			
a Annual sampling (MRP Table 3)	100	\$500	\$12,500
4 Workplan implementation and analysis			
a Proposed method(s) to be used to evaluate trends in the GW monitoring data over time	100	\$500	\$12,500
<b>Subtotal</b>	<b>1,900</b>	<b>\$16,000</b>	<b>\$244,000</b>

1.00E+06 acres  
43.402778 townships  
4 wells per township  
174 wells total at above density

Estimate using data for 130 existing wells

<b>Total</b>	<b>2,470</b>	<b>\$271,500</b>	<b>\$567,900</b>	<b>2,300</b>	<b>\$12,000</b>	<b>\$288,000</b>
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<b>Low MPEP estimate (Group option, worst case per Clay Rodgers)</b>							
Crop groups	4			Workplan per crop	\$300,000		
Management Practices	8			Analysis per crop	\$300,000	More aggregation, higher cost per crop (or converse)	
Site Conditions	5						
Sites	160	0.5% of 33,000 growers					
Wells per site	3						
Dairy RMP cost	\$ 1,300,000	per year					
				<b>One time cost (front or back end)</b>		<b>Annual cost</b>	
				<b>Central Valley Coalitions</b>	<b>Kern Share (1/7th)</b>	<b>Central Valley Coalitions</b>	<b>Kern Share (1/7th)</b>
MWISP	\$ 5,400	per site		\$ 864,000	\$ 123,429		
MWICR	\$ 3,480	per site		\$ 556,800	\$ 79,543		
Survey	\$ 1,680	per site		\$ 268,800	\$ 38,400		
Wells	\$ 4,000	per well		\$ 1,920,000	\$ 274,286		
Monthly sampling	\$ 2,100	per site per instance				\$ 4,032,000	\$ 576,000
Quarterly reporting	\$ 4,000	per site per report				\$ 2,560,000	\$ 365,714
Workplan				\$1,200,000	\$ 171,429		
Analysis / MPEPR				\$1,200,000	\$ 171,429		
				\$ 6,009,600	\$ 858,514	\$ 6,592,000	\$ 941,714
						\$ 0.94	per acre
						507%	of dairy RMP cost
						5.1	times dairy RMP cost

<b>High MPEP estimate (Kern only option)</b>									
Crop groups	6			Workplan per crop	\$250,000	More aggregation, higher cost per crop (or converse)			
Management Practices	8			Analysis per crop	\$250,000				
Site Conditions	3								
Sites	144	16.0%	of 902 growers						
Wells per site	3								
Dairy RMP cost	\$ 1,300,000	per year							
				<b>One time cost (front or back end)</b>		<b>Annual cost</b>			
				<b>Kern Coalition</b>		<b>Kern Coalition</b>			
MWISP	\$ 5,400	per site		\$ 777,600					
MWICR	\$ 3,480	per site		\$ 501,120					
Survey	\$ 1,680	per site		\$ 241,920					
Wells	\$ 17,000	per well		\$ 7,344,000					
Monthly sampling	\$ 2,100	per site per instance				\$ 3,628,800			
Quarterly reporting	\$ 4,000	per site per report				\$ 2,304,000			
Workplan				\$1,500,000					
Analysis / MPEPR				\$1,500,000					
				\$ 11,864,640		\$ 5,932,800			
						\$ 5.70	per acre		
						456%	of dairy RMP cost		
						4.6	times dairy RMP cost		

# Attachment B - MRP - Monitoring & Reporting Program Section V

Based on the March 2013 Tulare Lake Basin Area Tentative WDRs General Order

Hourly Costs

\$120

Groundwater Monitoring Report (GWMR) MRP, Attachment B (Monitoring and Reporting Program) Section V	Third-Party - Upfront			Third-Party - Annual			
	Hours	Expenses	Cost	Hours	Expenses	Cost	
<b>V.B. Annual Groundwater Monitoring Results - Annually by May 1</b>							
1 Submit prior year's GW monitoring results in Excel and/or export into GeoTracker			\$0	40	\$15,000	\$19,800	
2 Explanation of why some data is missing			\$0	4	\$1,000	\$1,480	
<b>V.C. Monitoring Report - Annually by May 1</b>							
1 Signed transmittal letter			\$0	4		\$80,480	
2 Title page			\$0	2		\$240	
3 Table of contents			\$0	4		\$480	
4 Executive Summary			\$0	16		\$1,920	
5 Description of third-party geographical area			\$0	16		\$1,920	
6 Monitoring objectives and design			\$0	16		\$1,920	
7 Sampling site / monitoring well descriptions and rainfall records			\$0	16		\$1,920	
8 Location map(s) of sampling sites/monitoring wells, crops and land uses			\$0	16		\$1,920	
9 Tabulated results summary of analyses			\$0	40		\$4,800	
10 Discussion of data relative to water quality objectives and water quality management plan milestones			\$0	40		\$4,800	
11 Sampling and analytical methods used			\$0	16	\$80,000	\$1,920	
12 Summary of Quality Assurance Evaluation results (from QAPP)			\$0	24		\$2,880	
13 Specification of the method(s) used to obtain estimated surface water flow estimation, at each monitoring site during each monitoring event			\$0	16		\$1,920	
14 Summary of water quality objectives exceedances			\$0	24		\$2,880	
15 Actions taken to address water quality exceedances			\$0	24		\$2,880	
16 Evaluation of monitoring data to identify spatial trends and patterns			\$0	24		\$2,880	
17 Summary of Nitrogen Management Plan information			\$0	32		\$3,840	
18 Summary of management practice information collected as part of Farm Evaluations			\$0	24		\$2,880	
19 Summary of Mitigation Monitoring			\$0	16		\$1,920	
20 Summary of education and outreach activities			\$0	16		\$1,920	
21 Conclusions and recommendations			\$0	24		\$2,880	
<b>VIII. Water Quality Triggers for Development of Management Plans</b>			\$0	0		\$0	\$0
<b>XI. Quality Assurance Project Plan (QAPP)</b>	0	\$0	\$0				\$0
<b>Totals</b>	<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>454</b>		<b>\$96,000</b>	<b>\$150,480</b>

**MRP-1 - Groundwater Management Plan Requirements**

**Assumptions:**

The average hourly rate is meant to cover district staff time and consultant time in addressing management plan issues. There are many inherent uncertainties, most significant of which are details on what will actually be found to be in exceedance of water quality standards, and the areal extent of those exceedances. This assumes that Kern will submit a Comprehensive GW Management Plan with our GAR.

Average Hourly Costs \$120

MRP-1 Groundwater Management Plan Requirements Monitoring and Reporting Program R5-2013-XXXX	Groundwater Mgmt Plan								Notes	
	Third Party				Member					
	Up-front		Annual		Up-front		Annual			
	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost		
<b>A</b> Introduction and Background Section										
1 Discussion of COCs, water quality objective(s) or trigger(s)	8	\$960								Draw from GAR on a lot of this.
2 Identification (narrative & map format) of boundaries to be covered by the management plan <i>Can include all areas or separate management plans for each area where plans are req</i>	8	\$960								
3 Discussion how boundaries were delineated	0	\$0								
	8	\$960								
<b>B</b> Physical Setting and Information										
1 General Requirements										
a. Land use maps - partially satisfied in GAR	20	\$2,400								
i. Crop information by square-mile section (TRS) level	8	\$960								
ii. Maps in electronic format using ArcGIS format	8	\$960								
b. Identification of potential irrigated ag sources of COCs	20	\$2,400								See below under implementation
i. If potential sources unknown, conduct source identification study - <b>Triggers G</b>	0	\$0								
ii. <b>or</b> Develop management plan for COCs - <b>Triggers C</b>										
c. List of designated beneficial uses for impacted water	12	\$1,440								Draw from Farm Evaluation.
d. Baseline inventory of existing management practices	20	\$2,400								
i. Location of practices to TRS level	40	\$4,800								
e. Available surface and/or groundwater quality data - partially satisfied in GAR										While groundwater is a bigger job, assume that much of this information is available from the GAR.
i. Summary, discussion, and compilation of available data	20	\$2,400								
ii. For COCs in the management plan	20	\$2,400								
iii. Acceptable sources of quality data:	0	\$0								
CA State Water Board Groundwater Ambient Monitoring Assessment (GAMA) program	20	\$2,400								
US Geological Survey (USGS)	20	\$2,400								
CA Department of Public Health (DPH)	20	\$2,400								
CA Department of Pesticide Regulation (DPR)	16	\$1,920								
CA Department of Water Resources (DWR)	16	\$1,920								
Local groundwater management programs	0	\$0								
Groundwater Assessment Report (GAR) developed by Third-Party	40	\$4,800								
3 Groundwater - Additional Requirements										
a. Soil types and soils data as described by NRCS soil survey	20	\$2,400								
b. Description of geology and hydrogeology for area	20	\$2,400								
i. Regional and area specific geology	8	\$960								
ii. Groundwater basin and sub-basins in the area	16	\$1,920								
1 General water chemistry known	16	\$1,920								
2 Concentrations of major anions, cations, nutrients, TDS, pH, DO, and hardness	16	\$1,920								
3 Provide Piper (tri-linear), Stiff, and/or Durov diagrams for the area	16	\$1,920								
iii. Hydrogeology, including	8	\$960								
1 Known water bearing zones	8	\$960								
2 Areas of shallow and/or perched groundwater	8	\$960								
3 Areas of discharge and recharge to basin	8	\$960								
iv. Identify water bearing zones utilized for domestic, irrigation, and municipal water	8	\$960								
v. Aquifer characteristics known from existing information	8	\$960								
1 Depth to groundwater	8	\$960								
2 Groundwater flow direction	8	\$960								
3 Hydraulic gradient and conductivity	8	\$960								
c. Identification of irrigation water sources and general water chemistry	8	\$960								
<b>C</b> Management Plan Strategy - <i>this is probably the norm but can be short-circuited by performing a source ID study (G)</i>										
1 Description of approach and prioritization	4	\$480								
2 Goals and Objectives	4	\$480								
a. compliance with water quality objectives	2	\$240								
b. Education and outreach	2	\$240								
c. Identify, validate, and implement management practices	2	\$240								
3 Identify duties and responsibilities of individuals/groups	8	\$960								
a. Identification of key individuals	8	\$960								
b. Discussion of each individual's responsibilities	8	\$960								
c. Organizational chart with identified lines of authority	8	\$960								
4 Strategies to implement Management Plan tasks	8	\$960								
a. Identify entities/agencies contacted to obtain data and assistance	8	\$960								
b. Identify management practices used to control COC that are	32	\$3,840								
i. Technically feasible	8	\$960								
ii. Economically feasible	8	\$960								
iii. Proven to be effective at protecting water quality	8	\$960								
iv. Complies with Sections III.A. and B. of the Order	8	\$960								
v. Practices to be implemented by Members	16	\$1,920								NMP, outreach on accounting for N in well water
vi. Estimation of effectiveness and know limitation of implemented measures	16	\$1,920								
c. Identify outreach to participants	8	\$960								
i. Strategy for informing growers of water quality problems	8	\$960								
ii. Method for disseminating information on management practices	4	\$480								Websites, district correspondence, etc.
iii. Description of how effectiveness of outreach to be evaluated	8	\$960								Monitor ratios
d. Schedule and milestones for implementation of management practices and tasks	8	\$960								
i. time estimated to identify new management practices	4	\$480								
ii. Timetable for implementation of identified management practices	4	\$480								
e. Establish measurable performance goals	8	\$960								
<b>D</b> Monitoring Methods										
1 General Requirements										
a. Designed to measure effectiveness at achieving goals and objectives	8	\$960								
b. Capable of determining management practice made in response to plan are effective	4	\$480								
2 Surface Water - Additional Requirements										
a. Location(s) of monitoring site and schedule representative of COC discharges										
b. Monitoring data submitted electronically										
3 Groundwater - Additional Requirements										
a. May include commodity-based representative monitoring	40	\$4,800								Rely on MPEP efforts
b. Conducted to determine effectiveness of management practices implemented	20	\$2,400								
<b>E</b> Data Evaluation										
1 Methods utilized to perform data analysis	4	\$480								
2 Identify information necessary to quantify program effectiveness	4	\$480								
i. Tracking of management practice implementation	4	\$480								
ii. Describe approach used to determining effectiveness of management practices	12	\$1,440								
iii. Describe process for tracking implementation of management practices	12	\$1,440								
iv. Description of how information is collected from growers	12	\$1,440								
v. Type of information collected	8	\$960								
vi. How information will be verified	8	\$960								
vii. How information will be reported	8	\$960								



## MRP-2 - Monitoring Well Installation, Sampling Plan, and Completion Report

Crop groups	6
Management practices	8
Site conditions	3
Sites	144

Based on the March 2013 Tulare Lake Basin Area Tentative WDRs General Order

Hourly Costs \$120

MRP-2 Monitoring Well Installation, Sampling Plan, and Completion Report Monitoring and Reporting Program R5-2013-XXXX	Third-Party (up-front costs)		Third-Party (annual costs)		Notes
	Hours	Phase Cost	Hours	Phase Cost	
II. Per Phase Monitoring Well Installation and Sampling Plan (MWISP)	6480	\$777,600			This includes all of the below. Approximately \$5,400 per site.
A Stipulations					
B MWISP Required Elements					
1 General Information					
a. Topographic map					
b. Site plan					
c. Rationale for number of monitoring wells proposed					
2 Proposed Drilling Details					
a. Drilling techniques					
b. Well / soil sample collection and logging method(s)					
3 Proposed Monitoring Well Design					
4 Proposed Monitoring Well Development					
5 Proposed Surveying					
6 Monitoring according to QAPP					
III. Monitoring Well Installation Completion Report (MWICR)	4176	\$501,120			Includes A-C below. Approximately \$3,480/site
A General Information					
a. Brief overview of field activities					
b. Site Plan					
c. Period of field activities and milestone events					
B Monitoring Well Construction					
C Monitoring Well Development					
D Monitoring Well Survey	2016	\$241,920			Approximately \$1,680 per site
Implementation costs					
Well construction, project management and oversight		\$7,344,000			Direct rotary, approximately \$17k per well with e-log, project mgmt and oversight.
Sampling and analysis cost, assuming monthly sampling.				\$3,628,800	\$1000/site for sampling. \$200/site for normal analysis. \$900/site for pesticide analysis.
Quarterly reporting of results to RWQCB				\$2,304,000	\$4000/site for reporting event
<b>Totals</b>		<b>\$8,864,640</b>		<b>\$5,932,800</b>	