



2015 Annual Membership Meeting

Kings River Water Quality Coalition



COALITION OVERVIEW

David Orth
General Manager, KRCD



How We Got Here

- Central Valley Regional Water Quality Control Board has responsibility to protect surface and groundwater resources – “Waters of the State”
- Protection occurs through regulation – Waste Discharge Permits, Waivers, General Orders
- Legislative action in 2002 initiated a review of ag impact on water quality by the Regional Board
- Contaminated drinking water elevated water quality issue politically



Coalition Formation

- Conditional Waivers adopted in 2006, addressed surface water quality only
- Allowed Coalitions to be formed so that individuals did not need to be directly regulated
- KRCD already conducting surface water quality monitoring
- Formation of a Coalition authorized by water agencies in the Kings River watershed



Original Coalition Under Waiver

- Southern San Joaquin Valley formed to be the Coalition
 - Members included lead water agencies on the Kings, Kaweah, Tule and Kern watersheds
 - KRCD provided staffing to run the organization for entire Tulare Lake Basin



Expansion to Groundwater Quality

- Regional Board has always intended to include regulation of groundwater quality in addition to surface water quality
- Extensive public process over several years to develop the expanded program (ILRP)
- Upon Waste Discharge Regulations adoption in 2013, each sub-watershed in Southern San Joaquin Valley decided to implement separately



Current Coalition Structure

- Kings River Water Quality Coalition formed in 2009 with 27 participating entities with elected directors appointed to the Board
- Coalition contracts with KRCD for management and staffing of the organization
- Separate bylaws, financials, purpose



WATER QUALITY MONITORING

Richard Hoelzel
Manager of Water Resources



KRWQC Plans/Report

- Surface Water Monitoring Plan
- Groundwater Assessment Report (5 year update)
- Comprehensive Groundwater Management Plan
- Sediment Discharge and Erosion Assessment Report
- Management Practices Evaluation Program
- All are Coalition requirements under the WDR



Surface Water Monitoring Plan

- Monthly monitoring of selected sites along the Kings River system
- Monitor for agricultural materials
 - Pesticides
 - Nutrients
 - Metals
- Monitor physical parameters
 - Dissolved Oxygen
 - Electrical Conductivity
 - pH
 - Temperature
 - Bacteria



Groundwater Assessment Report (GAR)

- Required study to assess the regions within the Coalition's boundaries where groundwater is more vulnerable to activities from irrigated ag
- Compiled all "readily available" data
 - Depth to Groundwater
 - Soil Types
 - Irrigation Practices
 - Cropping Patterns
 - Known Water Quality Test Results
 - Groundwater Modeling data



Groundwater Assessment Report (GAR)

- Follow up studies are proposed as part of Comprehensive Groundwater Management Plan
- Initial Analysis showed areas where exceedances occurred but were not considered vulnerable from current irrigated agriculture
- Initial technical analysis is complete and was submitted on November 20th
- Currently in the negotiation phase with the Regional Board
 - Update on this process later in the Policy Update



Isotope Study (Phase 1)

- A component of the Comprehensive GW Quality Plan
- Contracted with Lawrence Livermore National Laboratory to test advance Isotopic methods
- Sampling to occur in March 2015
- Attempt to determine both age and source of the nitrates in drinking water supply wells
 - Irrigated agriculture, dairy, septic, other?
- Project has potential for expansion to other areas in the Coalition if methods are proven effective.



GW Trend Monitoring

- New Requirement of the WDR
- Use existing ag wells
- Must have at least 1 trend monitoring well per township in Low Vulnerable Areas
- High Vulnerable Areas will need between 1 and 4 wells per township
- Volunteers will be needed
- Isotope Project has potential for expansion to other areas in the Coalition if methods are proven effective.



Summary of Implementation Issues for 2015

- Getting approvals from the Regional Board on our submitted plans
- Implementing the approved plans
- Developing Groundwater trend monitoring program
- Developing systems to ease reporting for our membership



GROWER REPORTING REQUIREMENTS

Eric Athorp
Program Manager



GROWER REPORTING REQUIREMENTS

Three Major Obligations are Mandated by the General Order

1. Sediment and Erosion Control Plan
2. Farm Evaluation Reports
3. Nitrogen Management Plan



Sediment Discharge & Erosion Assessment Report

- Identifies areas in the Coalition that need to have a Sediment and Erosion Control Plan
- Conducted an evaluation of the potential for sediment discharges to affect surface waters
- Analysis similar to approach taken in other coalition areas
- Plan has not been approved by the Regional Board
- Timeline for implementation tied to approval date

Part C – Field Specific Evaluation

Grassland Monitoring Sheet

Observer Name _____

- Identify the Parcel(s) and indicate that this survey addresses all on the block below. Fill out a separate survey for the parcels that have different practices.
 - Site high vulnerability is where a parcel is within an area specified by a 5 ac buffer. Watershed Management Plan.
 - SHF High vulnerability is an area housing potential for groundwater contamination.

High Vulnerability 500' Buffer	SHF	SHF Buffer	Area	Percent SHF/SHF Buffer
() 1.0				
() 1.1				
() 1.2				
() 1.3				
() 1.4				
() 1.5				
() 1.6				
() 1.7				
() 1.8				
() 1.9				

- Irrigation Practices (If secondary system could be used for crop penetration, frost protection, crop cooling, etc.)

Practices (check all that apply)	Frequency of use (check all that apply)	Not irrigated
() FCK	() Daily	() Follow
() Wheel-Spreaders	() Weekly Spreader	() Dry Farming
() Sprinklers	() Nighttime	
() Bunker Strip	() Backfill Water	
() Furrows	() Rainfall	
() Flood (overland flow)	() Flood (over drain)	

- Irrigation Efficiency Practices (check all that apply)

() Lower Irrigation	() Sub-Irrigation (Incentive Program)
() Use of ET in scheduling practices	() Prohibit runoff on other adjacent land (Incentive Program)
() Water application scheduled to avoid	() Other
() Use of soil moisture probes	() Other
() Irrigation on Incentive	

- Nitrogen Management Methods to Minimize Leaching From the Root Zone (check all that apply)

() Cover Crops	() Irrigation Water to Soak
() Split Fertilizer Applications	() Fertilization
() Soil Testing	() Other
() Unconventional Testing	() Other
() Variable Rate Applications using GPS	() Do not apply nitrogen
() Nitrate in Irrigation	

[illegible]

Nitrogen Management Plans

- Worksheet Required of every member regardless of vulnerability
- Summary Reports required from High Vulnerability Areas only
- Coalition will summarize reports by Township and submit to the Regional Board
- Individual member information will not be submitted
- Dan Munk will go through the worksheet

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NMP Worksheet Dates

Report	Vulnerability	Farm Size	Due Date	Renewal Frequency
Nitrogen Management Plans (on-farm)	High	Large Farm	March 23, 2015	Annually
		Small Farm	March 1, 2017	Annually
	Low	All Farms	March 1, 2017	Annually

Large farm = 60 acres or greater Small farm = less than 60 acres



NMP Summary Dates

Report	Vulnerability	Farm Size	Due Date	Renewal Frequency
NMP Summary Report	High	Large Farm	March 1, 2017	Annually
		Small Farm	March 1, 2018	Annually
	Low	Does Not Apply		

Large farm = 60 acres or greater Small farm = less than 60 acres



NITROGEN MANAGEMENT PLAN

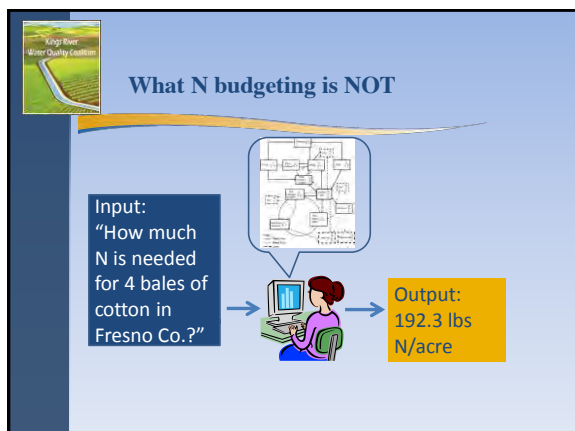
Dan Munk, Farm Advisor
UC Cooperative Extension



Plan or a Budget?

Purposes of farm/field-scale crop N budgeting

- Planning tool for crop management
- Encourages a systematic approach
- Tool for adaptive management: What is working? What needs to be changed?
- Long-term tracking of crop N use efficiency
- Use for USDA conservation plans and cost share programs
- Provides data for use in reports required under environmental regulations




N Budgeting

Budget or balance

$$A + B = C$$

$$A + B + C + D = E$$



Definitions

Crop N requirement:

1. Amount of N plants must take up to achieve maximum yield.
2. Amount of N that must be applied to achieve maximum yield.

Related terms:

- crop N demand
- crop N need

**Better:
Crop N fertilizer requirement**



Definitions

Crop N uptake:
Amount of N taken up or absorbed by plants during a specified time period (also **crop N consumption** or **absorption**).

Crop N harvest removal:
Amount of N in harvested parts

N harvest index:
 $\text{N harvest removal} / \text{N uptake}$



The Worksheet

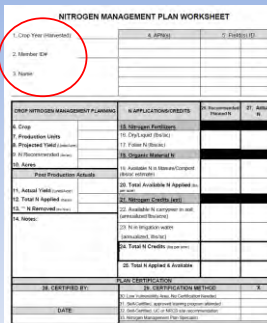
Complete a Nitrogen Management Plan (NMP) Worksheet for every crop management unit in your membership. A **crop management unit is any field or group of fields with like crops and nitrogen fertilization practices**. A NMP Worksheet must be kept on farm for all fields/parcels and available upon request for inspections by the Central Valley Regional Water Quality Control Board. Summary information from this NMP (yet to be determined) must be submitted to the coalition on request.

Who needs to prepare this form?



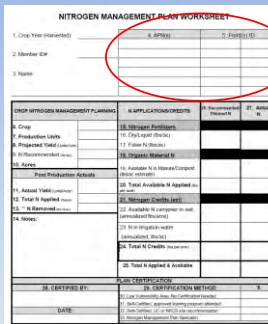

The Worksheet

1. Enter the calendar year for which this report is based upon. Information in NMP Worksheets should be based upon the calendar year a crop is harvested (i.e. winter cereal grains and some citrus should report information based on the year they are harvested even if fertilization is in the previous year). Newly planted trees or vines should report amount of nitrogen applied even if no crop is harvested.
2. Enter the membership identification number (Member ID#) issued by your water quality coalition.
3. Enter the name of the person completing the form. This needs to be the owner or manager of the farm or the individual certifying the plan (if certification is necessary).

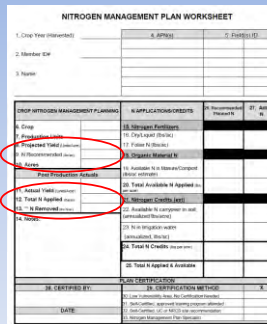



The Worksheet

4. Enter the Assessor's Parcel Number (APN) and
5. Field Identification (ID) for each unique management unit; the field ID can be an alpha/numeric, your internal field identifier, or the site number used on your pesticide use permit. If the same crop and same nitrogen application is used on more than one field, enter all APN's and/or field numbers where the information applies.




The Worksheet



[illegible]

NITROGEN MANAGEMENT PLAN WORKSHEET				
1. Crop Type (watermelon)		4. OFFICE		5. District (C)
2. Irrigation SW				
3. Irrigator				
GROUP OPERATOR MANAGEMENT PLAN		NUTRIENT MANAGEMENT		
6. Crop		8. Application Methods	9. Incorporated	10. About A
7. Application Method		11. Organic Fertilizers		
8. Fertilizer Type		12. Crop Aged (Days)		
9. Fertilizer Rate (lb/acre)		13. Fertilizer Source		
10. Incorporated (Yes/No)		14. Organic Material M		
11. Acre		15. Available N in Water/Compost		
12. Soil Production Methods		16. Available N in Soil		
13. Available N in Soil		17. Total Available N Applied (lb/acre)		
14. Total N Applied (lb/acre)		18. Nitrogen Credits (lb/acre)		
15. A. Additional N		19. Total N Credits (lb/acre)		
16. Notes		20. Total N Credits (lb/acre)		
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		98. Total N Credits (lb/acre)		

- **Maximum yield**
- **Average yield**
 - Using a rolling average
 - Adjusting the past average by dropping exceptional years
 - Adjusting the past average by a fixed percentage
- **Using yields from variety trials or county averages**

NITROGEN MANAGEMENT PLAN WORKSHEET				
1. Crop Year (month/year)		2. APN(s)	3. Parcel(s) ID	
2. Manager CW				
3. Region				
4. GROUP APPLICATION MANAGEMENT PLAN(s)		5. APPLICATIONS/ORDERS		6. Recommended Period
4.1 Crop 4.2 Production Units 4.3 Projected Yields 4.4 Recommended Period 4.5 Acres		5.1 All crops/Activities 5.2 Crop Labels (NPKs) 5.3 Chemicals/Inputs (NPKs) 5.4 Application to be Applied/Approved 5.5 Total Available N Applied/Approved		27. Actual N
7. Application/Order Comments		8. N Application/Order Comments		
10. Actual Applied N 10. Total N Applied/Approved 11. N Applied 12. Acres		13. N Application/Order Comments 14. Available N compared to soil 15. N in irrigation water 16. Total N N Credits 17. Total N Applied/Approved		
18. Certified By:		19. Certified By Title:		20.
DATE		DATE		

NITROGEN MANAGEMENT PLAN WORKSHEET			
1. Crop Year (interviewed)		2. SPDES#	3. Facility ID#
4. Member ID#			
5. Name:			
Local Agriculture Management Plan/Issues		6. APPLICATIONS/ISSUES	
1. Crop 2. Production Type 3. N Management Plan 4. Ns 5. Total Production Reduction 6. Annual Total N 7. Total N Applied 8. Ns 9. Ns	10. Ns 11. Ns 12. Ns 13. Ns 14. Ns 15. Ns 16. Ns 17. Ns 18. Ns 19. Ns 20. Ns 21. Ns 22. Ns 23. Ns 24. Ns 25. Ns 26. Ns 27. Ns 28. Ns 29. Ns 30. Ns 31. Ns 32. Ns 33. Ns 34. Ns 35. Ns 36. Ns 37. Ns 38. Ns 39. Ns 40. Ns 41. Ns 42. Ns 43. Ns 44. Ns 45. Ns 46. Ns 47. Ns 48. Ns 49. Ns 50. Ns 51. Ns 52. Ns 53. Ns 54. Ns 55. Ns 56. Ns 57. Ns 58. Ns 59. Ns 60. Ns 61. Ns 62. Ns 63. Ns 64. Ns 65. Ns 66. Ns 67. Ns 68. Ns 69. Ns 70. Ns 71. Ns 72. Ns 73. Ns 74. Ns 75. Ns 76. Ns 77. Ns 78. Ns 79. Ns 80. Ns 81. Ns 82. Ns 83. Ns 84. Ns 85. Ns 86. Ns 87. Ns 88. Ns 89. Ns 90. Ns 91. Ns 92. Ns 93. Ns 94. Ns 95. Ns 96. Ns 97. Ns 98. Ns 99. Ns 100. Ns	101. Ns 102. Ns 103. Ns 104. Ns 105. Ns 106. Ns 107. Ns 108. Ns 109. Ns 110. Ns 111. Ns 112. Ns 113. Ns 114. Ns 115. Ns 116. Ns 117. Ns 118. Ns 119. Ns 120. Ns 121. Ns 122. Ns 123. Ns 124. Ns 125. Ns 126. Ns 127. Ns 128. Ns 129. Ns 130. Ns 131. Ns 132. Ns 133. Ns 134. Ns 135. Ns 136. Ns 137. Ns 138. Ns 139. Ns 140. Ns 141. Ns 142. Ns 143. Ns 144. Ns 145. Ns 146. Ns 147. Ns 148. Ns 149. Ns 150. Ns 151. Ns 152. Ns 153. Ns 154. Ns 155. Ns 156. Ns 157. Ns 158. Ns 159. Ns 160. Ns 161. Ns 162. Ns 163. Ns 164. Ns 165. Ns 166. Ns 167. Ns 168. Ns 169. Ns 170. Ns 171. Ns 172. Ns 173. Ns 174. Ns 175. Ns 176. Ns 177. Ns 178. Ns 179. Ns 180. Ns 181. Ns 182. Ns 183. Ns 184. Ns 185. Ns 186. Ns 187. Ns 188. Ns 189. Ns 190. Ns 191. Ns 192. Ns 193. Ns 194. Ns 195. Ns 196. Ns 197. Ns 198. Ns 199. Ns 200. Ns	201. Ns 202. Ns 203. Ns 204. Ns 205. Ns 206. Ns 207. Ns 208. Ns 209. Ns 210. Ns 211. Ns 212. Ns 213. Ns 214. Ns 215. Ns 216. Ns 217. Ns 218. Ns 219. Ns 220. Ns 221. Ns 222. Ns 223. Ns 224. Ns 225. Ns 226. Ns 227. Ns 228. Ns 229. Ns 230. Ns 231. Ns 232. Ns 233. Ns 234. Ns 235. Ns 236. Ns 237. Ns 238. Ns 239. Ns 240. Ns 241. Ns 242. Ns 243. Ns 244. Ns 245. Ns 246. Ns 247. Ns 248. Ns 249. Ns 250. Ns 251. Ns 252. Ns 253. Ns 254. Ns 255. Ns 256. Ns 257. Ns 258. Ns 259. Ns 260. Ns 261. Ns 262. Ns 263. Ns 264. Ns 265. Ns 266. Ns 267. Ns 268. Ns 269. Ns 270. Ns 271. Ns 272. Ns 273. Ns 274. Ns 275. Ns 276. Ns 277. Ns 278. Ns 279. Ns 280. Ns 281. Ns 282. Ns 283. Ns 284. Ns 285. Ns 286. Ns 287. Ns 288. Ns 289. Ns 290. Ns 291. Ns 292. Ns 293. Ns 294. Ns 295. Ns 296. Ns 297. Ns 298. Ns 299. Ns 300. Ns
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[illegible]

23. Nitrogen in Irrigation Water is estimated by analyzing an irrigation water sample to determine the nitrogen content. This estimate should be reported in pounds per acre available throughout the crop season based on the amount of irrigation water applied to the crop.



Crediting Nitrate in Irrigation Water: Tomato Example

- Count only the $\text{NO}_3\text{-N}$ contained in water transpired by the crop

Processing tomato transpires about 25 inches of water
 If irrigation water $\text{NO}_3\text{-N}$ is 6 PPM, the 'fertilizer credit' would be:
 $6 \text{ PPM } \text{NO}_3\text{-N} \times 0.23 = 1.4 \text{ lb } \text{NO}_3\text{-N per acre-inch}$
 $1.4 \text{ lb } \text{NO}_3\text{-N per acre-inch} \times 25 \text{ inches} = 35 \text{ lb } \text{NO}_3\text{-N per acre}$

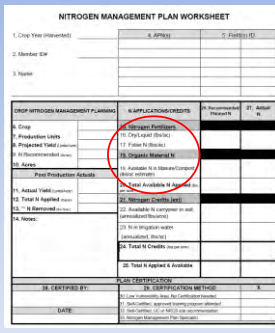



Credits and adjustments

- Residual soil nitrate-N
- Nitrate-N in irrigation water
- N mineralized during growing season
 - From soil organic matter
 - From this year's cover crop, manure and compost applications



The Worksheet




N Budgeting

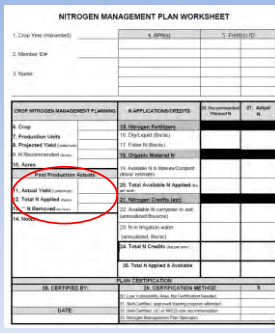
Budget or balance

$$A + B = C$$

$$A + B + C + D = E$$

$$A(+10\%) + B(+3\%) + C(+2\%) + D(+6) = E+-$$


The Worksheet



11. Actual Yield is the total amount of crop harvested in units per acre. This total should be an average of the production from a management unit covered by this Nitrogen Management Plan. Compare the Actual Yield to the total amount of N that was available for the crop. Assess if your N applications were appropriate for the yield achieved. Use available resources or site experience to determine the appropriate amount compared to the yield.

12. Total N Applied is the amount of nitrogen applied in pounds per acre.

13. A Technical Work Group is in place to develop tools to better estimate nitrogen removal by a crop. This information will be used to estimate the amount of N being removed each year to assist tracking of nitrogen after application to a crop. Your Coalition will provide you with the most up to date information on how to estimate N removed.



Right Rate: Fruit Nutrient Demand: lbs of N per 1000 lbs of fruit produced

Species	N lbs per 1000 lbs of fruit produced	Source
Apple	0.5-0.6	IFA, 1992; USDA, 1963
Citrus	1.1-1.6	Rocuzzo, 2013; Krueger/Arpaia 2010
Cherry (Sweet)	2-2.35	Huguet, 1980
Table Grape	1.3-1.9	Lohnertz, 1991; USDA 1963
Wine Grape	0.8-2	Coombe, 1992; Mullins, 1992
Kiwifruit	1.3-1.8	Smith et al., 1988; Paily 1992
Walnut (in-shell)	15-20	Weinbaum 1991
Peach	0.8-1.2	Maragoni and Rombola 1994; USDA 1963
Pistachio	28 (CPC yield)	Siddiqui et al (2013)
French Prune	3 (1000 fresh), 9 (1000 Dry)	Weinbaum, et al., 1994, USDA, 1963
Olives	8	Angelo Rodrigues et al., 2012
Almond	68 (1000 lb kernel), ~ 16 lb per 1000 lb whole fruit	Muhammad, Saa, Brown et al (2013)



Nitrogen Application/Removal Ratio is critical for nutrient and water management improvements

$$\text{AR Ratio} = \frac{\text{Applied Nitrogen}}{\text{Removed Nitrogen}}$$

Applied N =
all sources

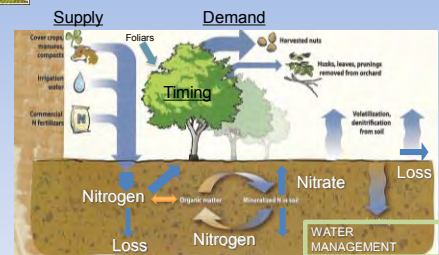
Removed N =
harvest + sequestered in the permanent wood of perennial crops

This is a very partial mass balance

- o Focuses on a few key variables
- o Does not try to estimate the many chemical reactions, mineralization rates, changes in storage
- o Does not calculate mass emissions below the root zone



Nitrogen Systems are Complex- Proxy metrics like the A/R can provide good comparative estimates of NUE



Kathy Kelley-Anderson et al. ANR Pub # 21623



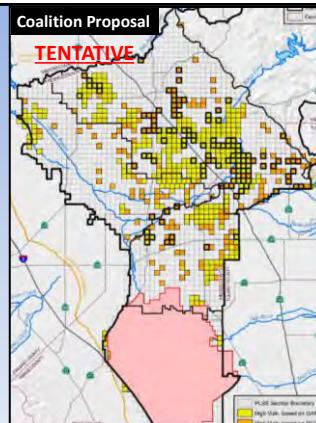
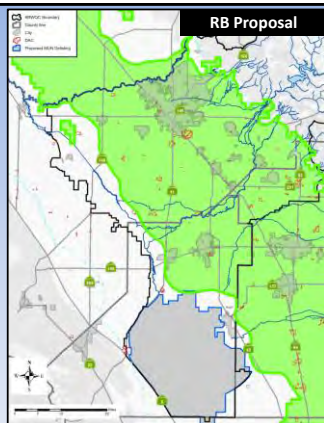
POLICY UPDATE

Casey Creamer
Coordinator



Groundwater Assessment Report

- Yet to be approved by the Regional Board
- Coalition approach is to rely on available data to make a technical determination
- Regional Board interpretation is that the area is much larger than our proposal
- Negotiations will continue in order to keep the HVA as small as possible



Legend

- Yellow – HVA Intrinsic
- Orange – HVA Exceedance
- Red – Delisting Area



NMP Summary Report

- NMP Worksheet approved on December 23rd
- Summary reporting information still in limbo
- Expert Panel and CDFA weighed in on the reporting
- State Board may take action to standardize reporting statewide
- Regional Board initiating a Technical Workgroup



Tulare Lake Basin WDR

- Revised on December 4, 2014
- Delayed Farm Evaluation and Nitrogen Management Plan Summary Reporting by one year for most
- Northern Coalitions will be reporting at least one year sooner than Southern Coalitions



Southern San Joaquin Valley Water Quality Coalition

- No longer the implementing Coalition group
- Amended MOU on October 1, 2014
- Coordination for groups under the TLB WDR
- Unify on areas of mutual interest/concern
- Signatories: Kings, Kaweah, Tule, and Kern



MPEP

- Management Practices Evaluation Program
- Replaced first encountered groundwater representative monitoring program
- Coordination agreement between Kings, Kaweah, Tule, Kern and Cawelo WDC signed.
- Implement as a group instead of individually to save significant costs
- Will be the most significant requirement of the WDR
- Potential to affect the way in which we farm!



CV-SALTS

- Central Valley Salinity Alternatives for Long Term Sustainability
- Includes Nitrogen as well
- Current regulatory structure not developed with irrigated agriculture in mind
- Litigation and political climate not in Ag's favor
- Trying to solve drinking water issues and maintain agriculture viability at the same time
- Opportunity to have a say in modifying the regulations



Summary of Policy Issues for 2015

- Nitrogen Management Plan Summary Report
- NMP Grower Certification
- MPEP implementation
- Petitions before the State Board
 - ESJ Appeal
 - TLB Appeal
 - Could get worse, not better (Central Coast, Dairy)



Coalition Outlook

- Program requirements phasing in
- Additional grower involvement is needed (time and expense)
- Outreach and Education will be critical
- Close coordination with the commodity groups, farm bureaus, CDFA, NRCS, and UCCE
- Kings is taking an active role to lead and shape the discussions for the benefit of our members



COMMUNICATIONS UPDATE

Cristel Tufenkjian
Outreach Coordinator



Outreach Requirements

- Each Member shall participate in third-party outreach events, at least annually, if any of the Member's parcels are in a designated "high vulnerability" area or governed by a SQMP/GQMP.
- The Member shall review outreach materials to become informed of any water quality problems to address and the management practices that are available to address those issues.



Outreach Requirements

- The Member shall provide annual confirmation to the third-party that the Member has attended an outreach event during the previous year and reviewed the applicable outreach materials.



Outreach Events

- February 5, 2015 Annual Meeting and subsequent Annual Meetings
 - Attendance certificate in your packet
- Local Workshops (advertised separately)
 - Irrigation Districts, Farm Bureau's, etc.
 - World Ag Expo on February 11th
 - Additional as requested
- Nitrogen Management Plan Workshops/Template Workshops



NMP Workshops

- Upcoming Events: March 10 - Nitrogen Management Plan Template Workshops at the Energy Education Center in Tulare
 - 8:30 am – 10:00 am – Session 1
 - 10:30 am - 12:00 pm – Session 2
 - 1:30 pm - 3:00 pm – Session 3
 - 3:30 pm - 5:00 pm – Session 4



Website

- Video Instructions for Templates
- Templates posted on website
- Video of Annual Membership Meeting
- Sign-up for e-mail distribution list
- www.kingsriverwqc.org



Contact Information

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- Ombudsman: Cristel Tufenkjian
Telephone (559) 237-5567 ext. 118



Question and Answer Session

CERTIFICATE OF ATTENDANCE



Kings River Water Quality Coalition Outreach Event

Member Name: _____

Please print out this certificate, fill in your name, and keep in your files for your records.

February 5, 2015