Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

December 2018

WBG121413063325SAC

Prepared for

California Rice Commission

California Rice

Prepared by

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CVRWQCB STAFF REVIEW VERSION

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Includes monitoring data from November 1, 2017 – October 31, 2018

Prepared for

Central Valley Regional Water Quality Control Board

On Behalf of

California Rice Commission

December 2018

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Executive Summary

The California Rice Commission (CRC) is a statutory organization representing approximately 2,500 rice farmers who farm approximately 550,000 acres of Sacramento Valley farmland. The California rice industry contributes significantly to the foundation of many rural economies, and rice fields provide an array of environmental benefits, including habitat for local and migrating birds and other aquatic and upland species.

The CRC performs water quality monitoring pursuant to the rice-specific Waste Discharge Requirements (Rice WDR) Order No. R5-2014-0032 (Central Valley Regional Water Quality Control Board [CVRWQCB], 2014) as amended by Order No. R5-2015-0115 (CVRWQCB, 2015). The Rice WDR Order implements the Long-term Irrigated Lands Regulatory Program for rice lands in the Sacramento Valley, and regulates landowners and operators of rice lands from which there are discharges of waste that could affect the quality of any waters of the state (CVRWQCB, 2014). 2018 is the second year that the CRC is reporting groundwater quality monitoring data, pursuant to the *Groundwater Trend Monitoring Workplan and Data Gap Assessment Plan* (Groundwater Trend Monitoring Workplan) (CRC, 2016), in addition to the usual surface water quality monitoring data.

Recommendations for 2019 include continued surface water and groundwater monitoring as well as educational outreach. The 2019 monitoring season is the last core monitoring season before repeating a cycle of assessment and modified assessment monitoring. Lessons learned from the first 4 years of Rice WDR implementation will be applied to continue a successful implementation of surface water and groundwater monitoring programs.

Surface water and groundwater monitoring results from 2018 are discussed briefly below.

Surface Water

The CRC completed four comprehensive surface water quality monitoring events during the 2018 rice growing season. Four project-specific drain locations were sampled during each event, providing a snapshot of water quality during the rice growing season. A suite of water quality parameters was monitored onsite at each event, including water temperature, pH, dissolved oxygen (DO), specific conductance (SC), and flow. In addition, water samples were collected during specific events for laboratory analysis of pesticides (including bensulfuron-methyl, penoxsulam, and benzobicyclon plus metabolite B). The following summarizes the 2018 Rice WDR surface water quality monitoring results:

- **Water Temperature:** As in prior years, temperature results indicate warm water conditions during the monitoring season. Water temperatures generally tracked with observed air temperatures, with the highest water temperatures recorded during sample event 4 (SE4), which was the last sampling event of 2018. All sampled sites had similar temperatures during that event, ranging from 78.8 to 80.1 degrees Fahrenheit.
- **Dissolved Oxygen:** DO generally decreased with each monitoring event, which is expected as water temperatures increase (DO is influenced by water temperature). DO values of less than 7 milligrams per liter (mg/L) (the COLD water quality standard) were observed at all sites and events during the 2018 season. DO values of less than 5 mg/L (the WARM water quality standard) were observed at all sites in 2018, with the exception of CBD5.
- **pH:** The majority of measured pH observations in 2018 were within the *Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region – The Sacramento River Basin and the San Joaquin River Basin* (Basin Plan) (CVRWQCB, 2016) water quality thresholds for pH (above a pH of 6.5 and below a pH of 8.5). The exceptions were two readings taken during SE1, at sites CBD5 and CBD1.

- **Specific Conductance:** Most SC observations were below the 700 microSiemens per centimeter (µS/cm) threshold for reporting in 2018. Two sites had SC readings greater than 700 µS/cm in 2018: CBD5 (during SE4), and CBD1 (during SE1, SE3, and SE4).
- **Pesticides – Benzobicyclon/Metabolite B:** Samples from SE1 and SE2 were analyzed for a newer rice pesticide, benzobicyclon, plus metabolite B. Benzobicyclon was not detected at any of the sampled monitoring sites or events. However, four detections of metabolite B were noted, all within the CBD sites. The detections were all just below the method reporting limit (MRL), and were more than 20 times lower than the acute toxicity limit (of 24.8 micrograms per liter [µg/L]) from U.S. Environmental Protection Agency (EPA) modeling.
- **Pesticides – Bensulfuron-methyl:** Samples from SE3 and SE4 were analyzed for bensulfuron-methyl; no detections were noted in any of the samples.
- **Pesticides – Penoxsulam:** Samples from SE3 and SE4 were also analyzed for penoxsulam. Penoxsulam was detected at all monitoring sites at both events, with concentrations ranging from less than 0.10 (the MRL) to 0.35 µg/L. Detections were similar over the two events, indicating that usage was similar across both weeks of sampling, and likely trended late because of the later planting attributable to the wet spring.
- **Pesticides –** Results for penoxsulam were well within the aquatic life benchmarks as defined by EPA and listed in the CRC Pesticide Evaluation. New EPA aquatic life benchmarks were released for benzobicyclon, metabolite B, and bensulfuron-methyl in 2018; all 2018 monitoring results were well within these benchmarks.

The monitored drains had low DO levels during the monitoring season, likely because of the warm temperatures, pesticide water holds, and water allotment management by the irrigation districts. These combined factors result in drains with decreased water volumes and higher in-stream water temperatures, both of which can lead to decreased DO. The recent trend of the irrigation and reclamation districts more closely managing the water flows in response to the drought driven allocations, throughout the crop growing season, is a consistent factor.

Groundwater

The CRC began groundwater monitoring in 2017, in coordination with the United States Geological Survey (USGS) and the California Department of Water Resources (DWR). The entire USGS Rice Wells network was sampled by the USGS in 2017, and sampling was taken over by the CRC in 2018. Ten of the selected USGS Rice Wells were sampled in August 2018 (in accordance with the Groundwater Trend Monitoring Workplan [CRC, 2016]), and field parameters were measured, including water temperature, pH, DO, and conductivity. Samples were collected and sent for laboratory analysis of total dissolved solids (TDS), nitrate + nitrite as N, and ammonia as N. Results for all parameters were generally consistent with 2017 results, with the majority of measured water quality parameters within the recommended maximum contaminant levels (MCLs).

One USGS Rice Well had high levels of TDS and conductivity, consistent with historical results, and likely attributable to natural upwelling of connate water in that geographic area. A different USGS Rice Well had an increase in nitrate from 2017 (and from historical levels), indicating that sources other than rice land use may be influencing the nitrate concentration at this well. Neither the salinity parameters nor the single elevated nitrate result are the result of rice agriculture, and the results below the MCLs at the remainder of the sampled wells demonstrate this.

Six wells in Yuba County typically sampled by DWR on a rotating basis were identified in the Groundwater Trend Monitoring Workplan (CRC, 2016) to fulfill areas of Yuba County under-represented in the USGS Rice Wells network. These wells were planned for 2018 sampling; however, DWR is currently reevaluating their groundwater quality sampling program, so none of the wells were sampled in 2018. Because of this change at DWR, no results for these wells are available to report in this Annual Monitoring Report.

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Acronyms and Abbreviations

°C	degree(s) Celsius
°F	degree(s) Fahrenheit
<	less than
µg/L	microgram(s) per liter
µS/cm	microSiemen(s) per centimeter
AMR	Annual Monitoring Report
Basin Plan	*Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin*
bgs	below ground surface
CAC	County Agricultural Commissioner
CACASA	California Agricultural Commissioners and Sealers Association
$CaCO_3$	calcium carbonate
CDEC	California Data Exchange Center
CEDEN	California Environmental Data Exchange Network
cfs	cubic feet per second
COC	chain-of-custody
CRC	California Rice Commission
CVRWQCB	Central Valley Regional Water Quality Control Board
CWFR	Conditional Waiver for Rice
DO	dissolved oxygen
DO Management	*Surface Water Quality Management Plan for Dissolved Oxygen Plan*
DPR	California Department of Pesticide Regulation
DWR	California Department of Water Resources
EPA	U.S. Environmental Protection Agency
FE	Farm Evaluation
GAR	Rice-Specific Groundwater Assessment Report
Groundwater Trend Monitoring Workplan	*Groundwater Trend Monitoring Workplan and Data Gap Assessment Plan*
ID	identification
L	liter(s)
LCS	laboratory control spike
LCSD	laboratory control spike duplicate
MCL	maximum contaminant level

MDL	method detection limit
mg/L	milligram(s) per liter
mL	milliliter(s)
MRL	method reporting limit
MRP	Monitoring and Reporting Program
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
ND	non-detect
NPS	nonpoint source
PCA	Pest Control Adviser
PPE	personal protective equipment
PUR	Pesticide Use Report
QA	quality assurance
QAO	quality assurance objective
QAPP	Quality Assurance Project Plan
QC	quality control
Rice WDR	rice-specific Waste Discharge Requirements
RPD	relative percent difference
SC	specific conductance
SE	sample event
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TOC	total organic carbon
TSS	total suspended solids
UCCE	University of California Cooperative Extension
UC Davis	University of California at Davis
USGS	United States Geological Survey
WDR	waste discharge requirements
WQO	water quality objective

SECTION 1

Introduction

The California Rice Commission (CRC) is a statutory organization representing approximately 2,500 rice farmers who farm approximately 550,000 acres of Sacramento Valley farmland. Rice is one of the top 20 crops produced in California, and adds nearly one-half billion dollars in revenue and thousands of jobs vital to the state's economy. The California rice industry contributes significantly to the foundation of many rural economies and the positive balance of international trade.

The CRC implements surface water and groundwater quality monitoring and reporting activities in compliance with the rice-specific Waste Discharge Requirements (Rice WDR) Order R5-2014-0032 (Central Valley Regional Water Quality Control Board [CVRWQCB], 2014) as amended by R5-2015-0115 (CVRWQCB, 2015). This Rice WDR implements the long-term Irrigated Lands Regulatory Program for rice lands in the Sacramento Valley, and regulates landowners and operators of rice lands from which there are discharges of waste that could affect the quality of waters of the state (CVRWQCB, 2014). The CRC acts as a third-party group representing and assisting the rice growers to ensure that the requirements of the Rice WDR are followed.

This report serves as the 2018 Annual Monitoring Report (AMR) for the Rice WDR, and describes CRC-conducted program activities for the 2018 calendar year.

1.1 Annual Monitoring Report Requirements

The AMR for the Rice WDR program covers surface water and groundwater quality monitoring activities conducted from November 1 of the previous year (2017) through October 31 of the current year (2018), and is reported on an annual basis. The list of required AMR components and their locations in this report are shown in Table 1-1.

Table 1-1. Location of Required AMR Information in this Report
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Required Information	Location in this Report
Signed Transmittal Letter	Included with transmittal
Title Page	Front cover
Table of Contents	iii
Executive Summary	ES-1
Description of the CRC geographical area	Section 2
Monitoring objectives and design	Section 3
Sampling site and monitoring well descriptions and rainfall records for the time period covered under the AMR	Section 4
Location maps of sampling sites, monitoring wells, crops, and land uses	Section 5
Summary of pesticides used on rice, including pounds of active ingredient applied and acreage, as well as any changes in label requirements	Section 6
Tabulated results of all analyses arranged in tabular form so that the required information is readily discernible	Section 7
Discussion of data relative to water quality objectives and trigger limits and water quality management plan milestones, where applicable	Section 7

Table 1-1. Location of Required AMR Information in this Report
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Required Information	Location in this Report
Proposed pesticide monitoring	Section 8
Electronic data submittal	Section 9
Electronic groundwater data provided as specified by the Executive Officer	Appendix G
Sampling and analytical methods used	Section 10
Summary of quality assurance evaluation results	Section 11
Specification of the method(s) used to obtain estimated flow at each surface water monitoring site during each monitoring event	Section 7
Evaluation of monitoring data to identify spatial trends and patterns (required every 3 years)	Section 12
Electronic or hard copies of photos obtained from all monitoring sites, clearly labeled with site identification and date	Appendix A
Summary of exceedances of water quality objectives and trigger limits occurring during the reporting period, and related pesticide use information	Sections 6 and 13
Actions taken to address water quality exceedances that have occurred, including but not limited to revised or additional management practices implemented	Section 13
Status update on preparation and implementation of all Management Plans and other special projects	Section 14
Summary of Management Practice information collected as part of Farm Evaluations	Section 15
Summary or updates of mitigation monitoring	Section 16
Summary of education and outreach activities	Section 17
Summary of nitrogen management plan reporting, if applicable	Section 18

SECTION 2

CRC Geographical Area

The CRC geographical area includes nine Sacramento Valley rice-growing counties: Butte, Colusa, Glenn, Placer, Sacramento, Sutter, Tehama, Yolo, and Yuba. Rice is also farmed in counties outside the Sacramento Valley; however, the acreages are generally small, and rice is not a significant crop in those areas. For the purpose of the rice-specific Monitoring and Reporting Program (MRP), the monitoring area is defined as the nine contiguous rice-producing counties in the Sacramento Valley.

The Sacramento Valley is surrounded by the Coast, Cascade, and Sierra Nevada mountain ranges, which have eroded through time to fill the valley with alluvial soils. The Sacramento Valley soils used for farming rice tend to have a high clay content, a duripan or claypan in the subsoil, or both. These soil features make flooding of the fields possible by restricting the downward flow of water through the soil. As a result, the soils of the Sacramento Valley are uniquely suited to growing rice.

Although rice fields are mostly irrigated via surface water, the Sacramento Valley overlies one of the largest groundwater basins in the state. The groundwater underlying the Sacramento Valley provides high-quality water for irrigation, municipal, industrial, and domestic uses. Changes in climate, rate of precipitation and runoff, and environmental regulation have increased reliance on groundwater in the Sacramento Valley. The current Rice WDR identifies rice acreage as low vulnerability for nitrates, and requires trend monitoring of groundwater quality under rice fields.

2.1 California Rice

Rice fields provide numerous environmental and commercial advantages unique to rice land use, including providing a variety of upland and shallow aquatic habitats. Rice farmers flood their fields in the winter to degrade the straw residue left over after harvest, reducing the need to burn the rice straw and providing important wildlife habitat. The routine flooding of rice fields during the growing season also contributes to favorable habitat conditions. More than 230 species of wildlife and millions of migratory waterfowl thrive in California rice fields. In 2003, California rice lands were designated as shorebird habitat of international significance by the Manomet Center for Conservation Sciences, in partnership with the Western Hemisphere Shorebird Reserve Network.

In 2018, the CRC estimates approximately 520,000 acres of rice were planted in the nine contiguous rice-growing counties of the Sacramento Valley. The County Agricultural Commissioners (CACs) estimate 2018 planted acreage at 511,546 acres based on pesticide use reporting. The CAC acreage numbers are preliminary and usually higher than actual planted acres because of accounting through pesticide applications; multiple applications on a single acre can result in double counting of acreage under the CAC method. In 2018, the CAC acreage is lower than the actual planted acres, likely attributable to increased accuracy from the newer electronic reporting format. Table 2-1 presents the 2018 planted acreage by county (as reported by the CACs), along with the change in acreage from 2017.

Table 2-1. 2018 Planted Acreage by County (as reported by the CACs)
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

County	Planted Acreage (percent change from 2017)
Butte	90,571 (down 8% from 98,175)
Colusa	135,000 (down 2% from 137,610)
Glenn	83,899 (up 0.8% from 83,212)
Placer	13,300 (up 103% from 6,550)
Sacramento	8,016 (up 38% from 5,798)
Sutter	107,152 (up 2% from 105,503)
Tehama	0 (same as 2017)
Yolo	34,966 (up 4% from 30,116)
Yuba	38,642 (up 4% from 37,000)
Total	**511,546 (up 2% from 503,964)**

SECTION 3

Monitoring Objectives and Design

This section provides an overview of the monitoring and reporting requirements of the Rice WDR MRP, including the overall purpose and objectives, an overview of requirements, and a discussion of sampling schedule and constituents.

3.1 Purpose and Objectives

The purpose of the Rice WDR MRP is to monitor the discharge of wastes in irrigation return flows and stormwater from irrigated rice lands. These objectives are consistent with the State of California's nonpoint source (NPS) policy, and include the following:

- Determine current water quality conditions of surface water and groundwater relevant to rice operations.
- Determine whether the discharge of waste from irrigated lands within the CRC Coalition boundaries causes or contributes to exceedances of applicable water quality standards or causes a nuisance.
- Provide information about the CRC Coalition area characteristics, including but not limited to land use, crops grown, and chemicals used.
- Monitor the effectiveness of management practices implemented to address exceedances of applicable water quality standards.
- Determine which management practices are most effective in reducing wastes discharged to surface waters from irrigated lands.
- Specify details about monitoring periods, parameters, protocols, and quality assurance (QA).
- Develop long-term groundwater quality information that can be used to evaluate the regional effects (i.e., not site-specific effects) of rice operations and its practices.
- Support the development and implementation of the Rice WDR.
- Verify the adequacy and effectiveness of the Rice WDR's conditions.
- Evaluate the CRC Coalition's compliance with the terms and conditions of the Rice WDR.

3.2 Overview of Monitoring Requirements

In March 2014, the CVRWQCB adopted Rice WDR Order No. R5-2014-0032, which outlines the requirements for water quality monitoring and reporting activities, and regulates landowners and operators of rice lands from which there are discharges of waste that could affect the quality of waters of the state (CVRWQCB, 2014). In October 2015, Order No. R5-2014-0032 was amended by Order No. R5-2015-0115 (CVRWQCB, 2015), which included additional outreach event requirements for rice growers.

In 2018, both surface water and groundwater monitoring results were reported per the Rice WDR. The following sections outline the requirements for each.

3.2.1 Surface Water Monitoring

Consistent with the requirements outlined in the Rice WDR MRP, the CRC's surface water monitoring program includes the following three types of monitoring, conducted on a 5-year rotation:

- Core monitoring at primary sites to track trends
- Assessment monitoring at primary and secondary sites to determine the condition of a water body
- Modified assessment monitoring at primary and secondary sites to provide additional pesticide information

In addition, special project monitoring may be used where monitoring identifies a specific water quality challenge. The following sections provide further details on each of these types of monitoring.

3.2.1.1 Core Monitoring

Core monitoring sites and constituents are used to measure trends at the selected representative sites over extended periods of time. The core monitoring component of the monitoring strategy was designed to do the following:

- Focus on a diversity of monitoring sites across the rice area (i.e., hydrology, size, and flow).
- Include sites that have been shown to be characteristic of rice farming areas within the CRC Coalition boundaries.
- Use existing monitoring projects or historical information to provide scientific rationale for the site selection process based on the assessment monitoring.
- Include water bodies that carry agricultural drainage, are dominated by agricultural drainage, or are otherwise affected by other irrigated agriculture activities.
- Establish status and trend relationships between management practice information and water quality monitoring information.
- In conjunction with assessment monitoring, demonstrate the effectiveness of management practices and implement new management practices as needed.
- Use established trend information about the effectiveness of the CRC Coalition's efforts to reduce or eliminate the impact of irrigated agriculture on surface waters.

3.2.1.2 Assessment and Modified Assessment Monitoring

Assessment monitoring is used to provide supporting data for sites that the CRC Coalition selects as core monitoring sites for trends. Supporting data also may allow some monitoring sites to be considered representative of other locations within the CRC Coalition study area. The assessment monitoring component of the monitoring strategy was designed to do the following:

- Focus on a diversity of monitoring sites across the CRC Coalition's area (i.e., hydrology, size, and flow).
- Evaluate different types of water bodies.
- Include a sufficient number of sampling sites to assess the entire CRC Coalition area and all drainages.
- Provide scientific rationale for the site selection process based on historical or ongoing monitoring (or both), drainage size, crop types and distribution, and topography and land use.
- Conduct the initial focus of monitoring on water bodies that carry agricultural drainage or are dominated by agricultural drainage.

- Identify priorities with respect to sampling of specific watersheds, subwatersheds, and water quality parameters.
- In conjunction with core monitoring for trends and special projects focused on specific problems, demonstrate the effectiveness of management practices, and identify locations for implementation of new management practices as needed.

3.2.1.3 Special Project Monitoring

Special project monitoring includes site-specific monitoring where a water quality problem has been identified. The purpose of special project monitoring is to monitor the effects of changes in management practices for the parameters of concern.

3.2.2 Groundwater Monitoring

Groundwater monitoring requirements are described in detail in the *Groundwater Trend Monitoring Workplan and Data Gap Assessment Plan* [Groundwater Trend Monitoring Workplan] (CRC, 2016). Consistent with that approach, the monitoring program includes annual monitoring at specific United States Geological Survey (USGS) Rice Wells. Additional monitoring in Yuba County was recommended in the data gap analysis of the Groundwater Trend Monitoring Workplan, and was also initiated in 2017.

The 20 active USGS Rice wells monitored for this program were selected based on the pertinent features of each of the wells, including the following:

- Location relative to rice fields
- Other land uses besides rice farming surrounding the well, such as agricultural uses other than rice, non-agricultural uses (e.g., riparian vegetation), and urban and rural residential development
- Relative location on the groundwater flow path

These wells were specifically identified to yield data that can be compared with historical and future data to evaluate long-term shallow groundwater quality trends in rice farming areas.

3.3 General Rice WDR Sampling Schedule

The Rice WDR-defined monitoring schedule and constituents vary between surface water and groundwater sampling. The schedule, approach, and required constituents for each type of sampling are outlined in the following sections.

3.3.1 Surface Water Monitoring

Surface water monitoring requirements defined by the Rice WDR MRP incorporate a 5-year cycle of assessment monitoring and core monitoring. The schedule began in 2015 with assessment monitoring, followed by 1 year of modified assessment monitoring (2016), then 3 years of core monitoring (2017, 2018, and 2019).

As described in Section 3.2, each type of monitoring has a different set of requirements. Table 3-1 shows the requirements for each type as specified under the Rice WDR. The 2018 monitoring season was a core monitoring year, and included the parameters outlined below.

Table 3-1. Monitoring Requirements by Monitoring Type
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

	Type of Monitoring		
	Assessment (2015)	**Modified Assessment (2016)**	**Core (2017, 2018, 2019)**
Monitoring sites	**Primary:** CBD5, BS1, CBD1, and SSB **Secondary:** F, G, and H	**Primary:** CBD5, BS1, CBD1, and SSB **Secondary:** F, G, and H	**Primary:** CBD5, BS1, CBD1, and SSB
Constituents to be monitored	Field and general parameters Nutrients Pesticides Water column toxicity Sediment toxicity, TOC, and grain size	Field and general parameters Nutrients Pesticides	Field parameters Pesticides

Note:

TOC = total organic carbon

3.3.1.1 Surface Water Monitoring Schedule Development Approach

The surface water monitoring schedule is based on the timing and frequency of discharge from rice fields and constituents specific to the crop. The current monitoring periods were developed based on the understanding of the rice growing season and an analysis of historical data, including data collected under the Conditional Waiver for Rice (CWFR).

The monitoring calendar was developed to focus sampling to match the rice growing season and the periods of peak pesticide application. Therefore, the monitoring schedule provides for water quality assessment during the period where peak rice-pesticide applications and potential releases occur. A typical monitoring calendar is established in the Rice WDR MRP, but annual weather conditions, water availability, and other factors may affect planting and pesticide application. The start date of monitoring is established each year to ensure that sampling activities bracket the actual pesticide use season. Table 3-2 shows the basic monitoring schedule, with parameters to be monitored.

Table 3-2. Rice WDR Basic Monitoring Schedule
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Rice Farming Calendar	Month	Parameters
Winter drainage	Mid-February through March	No monitoring.
Irrigation season	April through August	Field measurements concurrent with all sampling events. General physical parameter and nutrient monitoring at two monthly sampling events. Pesticides monitored twice during the month of peak application (assessment, modified assessment, and core monitoring), and twice in the month following peak application (assessment and modified assessment monitoring). Toxicity monitored for 3 months starting with pesticide monitoring (*Selenastrum*), and for 2 months starting with pesticide monitoring (*C. dubia*, *P. promelas*).
Fall drainage	Mid-August through September	Sediment toxicity, TOC, and grain size during assessment years.
Winter flood	October through mid-February	No monitoring.

3.3.1.2 Surface Water Required Constituents

The Rice WDR MRP specifies the constituents for which monitoring and laboratory analyses are to be conducted under each type of monitoring. Table 3-3 presents the required constituents and sampling frequency by monitoring type.

Table 3-3. Monitoring Constituents and Frequency for Each Monitoring Type
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Constituent	Type of Monitoring	Frequency
Field parameters: pH SC DO Temperature Flow	Core (primary sites only) Assessment and modified assessment (primary and secondary sites)	All sampling events
General physical parameters: Turbidity TSS TOC	Assessment and modified assessment (primary and secondary sites)	Two monthly sampling events
Nutrient analysis: Nitrate + nitrite as N Total ammonia as N	Assessment and modified assessment	Two monthly events during growing season
Photo monitoring (digital)	Assessment, modified assessment, and core	To be taken initially and as needed to document site changes that could affect monitoring results
Rice WDR pesticides (determined annually)	Assessment, modified assessment, and core	Core – two sampling events during the month of peak application Assessment – two sampling events during the month of peak application, and two sampling events in the month following peak application
Water column toxicity:[a] *Selenastrum capricornutum* *Ceriodaphnia dubia* *Pimephales promelas*	Assessment only	Three monthly events starting with pesticide monitoring (*Selenastrum capricornutum*) Two monthly events starting with pesticide monitoring (*Ceriodaphnia dubia* and *Pimephales promelas*)
Sediment toxicity: *Hyalella azteca*[b]	Assessment only	One sampling event during fall drainage
Sediment pesticides: Lambda Cyhalothrin (s)-Cypermethrin	Assessment only, if triggered	Required only if sediment toxicity is observed[b]
Sediment TOC	Assessment only	Taken with sediment toxicity
Grain size	Assessment only	Taken with sediment toxicity

[a] Water column toxicity analyses should be conducted on a 100 percent (undiluted) sample for the initial screening, with adequate sample volume collected to allow for the toxicity test and any subsequent analysis (dilution series, Toxicity Identification Evaluation, or pesticide analysis) required by the toxicity test results. See the Rice WDR for detailed information.

[b] Sediment samples that show statistically significant toxicity to *Hyalella azteca* at the end of an acceptable test, and that exhibit 20 percent reduction or greater in organism survival as compared to the control require pesticide analysis (for lambda cyhalothrin and (s)-cypermethrin) of the same sample to determine the possible cause of toxicity.

Notes:

DO = dissolved oxygen
SC = specific conductance
TSS = total suspended solids

3.3.2 Groundwater Monitoring

Groundwater monitoring requirements defined by the Rice WDR MRP and outlined in the Groundwater Trend Monitoring Workplan (CRC, 2016) include a rotating cycle of monitoring for the selected USGS Rice Wells. All 20 USGS Rice Wells selected for monitoring under this program were sampled by USGS in 2017 according to their long-term monitoring program (National Water Quality Assessment Program). In August 2018, the CRC sampled half of the Rice Well network; the other half will be sampled during August 2019, according to the schedule specified in the Groundwater Trend Monitoring Workplan (CRC 2016).

Groundwater monitoring parameters are shown in Table 3-4. Group A parameters will be monitored annually, while Group B parameters were monitored in 2017, and will be repeated once every 5 years. This rotating monitoring schedule will continue unless modified by the CVRWQCB Executive Officer. After the third monitoring year, the CRC may ask the Executive Officer to approve a reduction in groundwater monitoring.

Table 3-4. Groundwater Monitoring Parameters – USGS Rice Well Network
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Parameters	Field Measurement	Laboratory Measurement
Group A (annual)		
Conductivity (at 25°C) (µS/cm)	✓	
pH (standard units)	✓	
DO (mg/L)	✓	
Temperature (°C)	✓	
TDS (mg/L)		✓
Nitrate + nitrite as nitrogen (mg/L)		✓
Total ammonia as nitrogen (mg/L)		✓
Group B (initially, then once every 5 years)		
Anions (carbonate, bicarbonate, chloride, and sulfate)		✓
Cations (boron, calcium, sodium, magnesium, and potassium)		✓

Notes:

°C = degree(s) Celsius
µS/cm = microSiemen(s) per centimeter
mg/L = milligram(s) per liter
TDS = total dissolved solids

Annual sampling occurs in August, during the peak rice growing season and before the fields are drained, to assess the influence of rice field flooding on groundwater levels and potential nutrient migration to the water table.

In addition to the USGS Rice Wells, six California Department of Water Resources (DWR) wells were selected for reporting to fulfill the Yuba County data gap identified in the Groundwater Trend Monitoring Workplan (CRC, 2016). The selected Yuba County wells were historically sampled by DWR every other year on an even-/odd-numbered-year schedule, with a similar suite of parameters to the CRC-sampled USGS Rice Wells, which are outlined in Table 3-5. These wells were sampled by DWR in 2016 and 2017, and the results are reported in the 2017 CRC AMR (CRC, 2017). DWR did not sample these wells in 2018 because DWR is re-evaluating its groundwater quality sampling program. The CRC was not aware of the

change in monitoring schedule. Because the wells were not sampled in 2018, no results from DWR wells are reported in this AMR.

Table 3-5. Groundwater Monitoring Parameters – Yuba County DWR Wells
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Type of Parameter	Parameter Name(s)
Field parameters	Conductivity, pH, DO, water temperature
Major laboratory parameters	TDS, nitrate
Anions	Carbonate, bicarbonate, chloride, sulfate
Cations	Boron, calcium, sodium, magnesium, potassium

SECTION 4

Sampling Site Descriptions, Hydrology, and Weather

This section provides descriptions of the surface water sampling sites and groundwater monitoring wells, information on the hydrology of the Sacramento River, and weather in the Sacramento Valley during the 2018 monitoring season.

4.1 Surface Water Sampling Site Description

Surface water monitoring under the Rice WDR is conducted at primary and secondary sites. 2018 was a core monitoring year, so monitoring was only conducted at the primary sampling sites. Details about each site are provided in Table 4-1. Appendix A contains photos of each site taken at the first monitoring event in 2018.

Table 4-1. Rice WDR Primary and Secondary Monitoring Sites
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Site Code	Site Name	CEDEN Station Code	Latitude	Longitude
Primary Sites				
CBD1	Colusa Basin Drain above Knights Landing	520XCBDKL	38.81248 N	-121.77429 W
CBD5	Colusa Basin Drain #5	520XCBDWR	39.18354 N	-122.05136 W
BS1	Butte Slough at Lower Pass Road	520XBTTSL	39.18717 N	-121.90833 W
SSB	Sacramento Slough Bridge near Karnak	520XSSLNK	38.78518 N	-121.65439 W
Secondary Sites				
F	Lurline Creek; upstream site for CBD5	520CRCLCF	39.21833 N	-122.14323 W
G	Cherokee Canal; upstream site for BS1	520CRCCCG	39.36226 N	-121.86764 W
H	Obanion Outfall at DWR Pumping Plant on Obanion Road; upstream site for SSB	520CRCOOH	39.02550 N	-121.72179 W

Notes:

Coordinates are North American Datum of 1983 (NAD83).

CEDEN = California Environmental Data Exchange Network
N = north
W = west

4.2 Groundwater Monitoring Well Locations

Groundwater monitoring, as outlined in the Rice WDR MRP, is conducted at 20 of the active wells in the USGS Rice Wells network, with 10 wells sampled annually. The construction information for the USGS monitoring wells is shown in Table 4-2, along with monitoring year.

Table 4-2. Monitoring Well Information

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Monitoring Year	Well Type	DWR State Well Number	Mapping ID	USGS Well ID	Latitude	Longitude	Well Depth (feet bgs)	Top and Bottom Perforation Depths (feet bgs)	County
2018	USGS	012N003E18H001M	18H1M	385314121401701	38°53'12.90"N	121°40'21.88"W	50	40 to 45	Sutter
	USGS	012N002E09B002M	09B2M	385431121451401	38°54'30.56"N	121°45'18.24"W	29	19 to 25	Sutter
	USGS	014N002E10R001M	10R1M	390416121433601	39°04'15.43"N	121°43'39.14"W	44	34 to 39	Sutter
	USGS	018N001W27B001M	27B1M	392328121571501	39°23'27.50"N	121°57'19.11"W	33.5	23.5 to 28.5	Glenn
	USGS	018N002E09L001M	09L1M	392542121452501	39°25'35.40"N	121°45'41.96"W	35	25 to 30	Butte
	USGS	018N001E08D001M	08D1M	392604121531801	39°26'05.43"N	121°53'18.16"W	38.5	28.5 to 33.5	Glenn
	USGS	019N001E22B001M	22B1M	392924121504801	39°29'24.94"N	121°50'51.37"W	35	25 to 30	Butte
	USGS	019N001E09C002M	09C2M	393118121521401	39°31'18.1"N	121°52'14.1"W	45	35 to 40	Glenn
	USGS	020N002E35J002M	35J2M	393230121422202	39°32'29.6"N	121°42'27.1"W	35	25 to 30	Butte
	USGS	020N002E08A001M	08A1M	393630121455401	39°36'29.27"N	121°45'56.86"W	35	25 to 30	Butte
2019	USGS	015N002W16R001M	16R1M	390856122044301	39°08'54.05"N	122°04'45.38"W	35	25 to 30	Colusa
	USGS	015N002W03E001M	03E1M	391059122043601	39°10'59.40"N	122°04'41.10"W	35	25 to 30	Colusa
	USGS	017N003W35M001M	35M1M	391653122101401	39°16'54.46"N	122°10'18.83"W	35	25 to 30	Colusa
	USGS	017N002W14G002M*	14G1M	391947122094501	39°19'46.34"N	122°9'48.82"W	35	25 to 30	Colusa
	USGS	018N002W12G002M	12G2M	392545122015201	39°25'44.41"N	122°01'56.53"W	35	25 to 30	Glenn
	USGS	019N003W25R001M	25R1M	392810122080901	39°28'14.87"N	122°08'12.71"W	38.5	28.5 to 33.5	Glenn
	USGS	019N003W25E001M	25E1M	392824122091401	39°28'22.76"N	122°09'51.42"W	35	25 to 30	Glenn
	USGS	019N002W23E001M	23E1M	392931122031701	39°29'29.75"N	122°03'21.01"W	35.5	25.5 to 30.5	Glenn
	USGS	020N002W32J001M	32J1M	393235122055301	39°32'34.52"N	122°05'56.82"W	35	25 to 30	Glenn
	USGS	020N002W25A001M	25A1M	393353122013501	39°33'52.51"N	122°01'39.34"W	35	25 to 30	Glenn

* Verification of DWR State Well Number pending.

Notes:

bgs = below ground surface
ID = identification

4.3 Hydrology and Weather of the Sacramento Valley

Seasonal rainfall and weather conditions influence rice planting, harvest, and rice pesticide application. The wet spring of 2018 in most of the rice-growing areas south of Glenn County led to fields being planted later than typical, in May instead of mid-April, which shifted the pesticide use period later than usual as well. Fields were drained in September, and rice harvest began in late September and continued through October 2018.

Flow data for the Sacramento River at Colusa (Station COL) were acquired from the DWR California Data Exchange Center, and precipitation and air temperature data for a station in Williams (Station 250) were obtained from the California Irrigation Management Information System database. Data were collected for the 2018 Rice WDR monitoring period (November 1, 2017, through October 31, 2018). Flow and precipitation data for that time period are shown on Figure 4-1, and minimum and maximum air temperatures are shown on Figure 4-2.

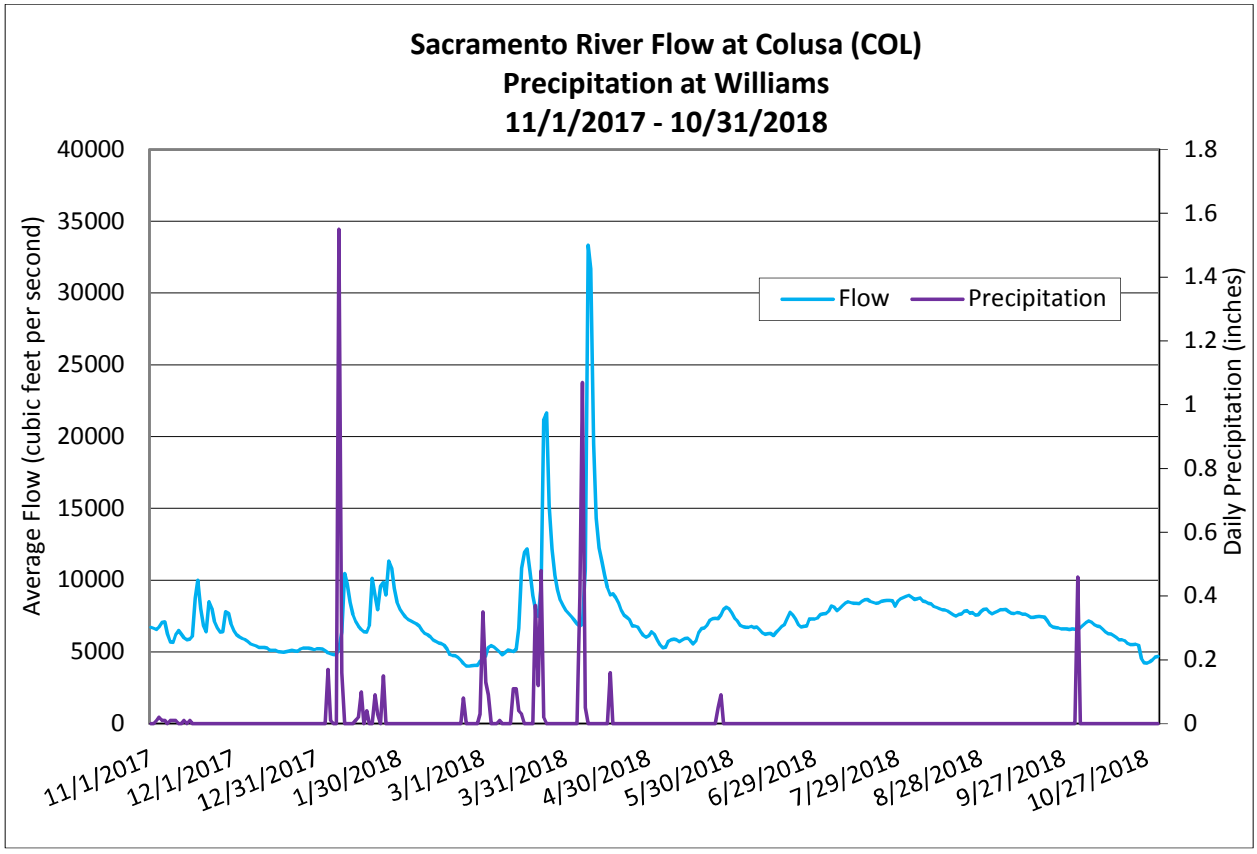


Figure 4-1. Flow and Precipitation Data, 2018

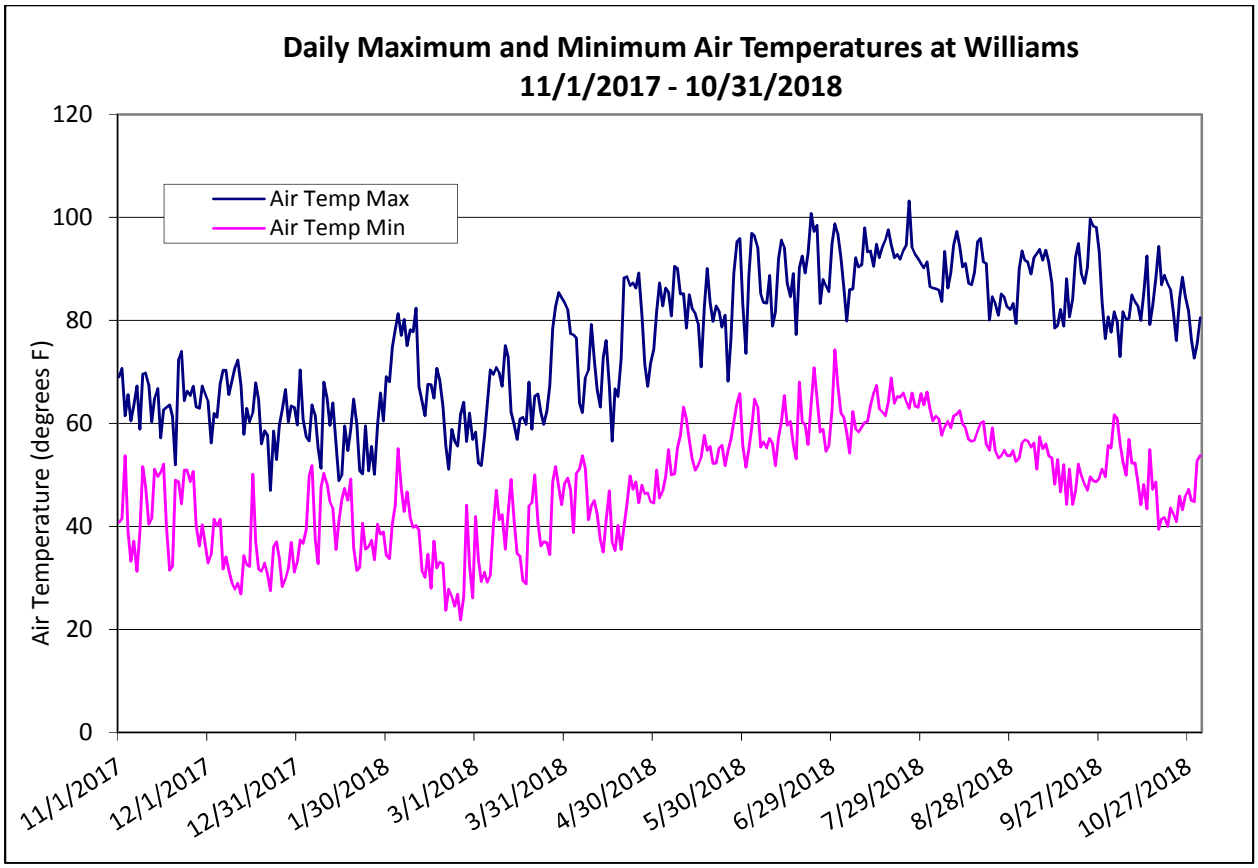


Figure 4-2. Daily Maximum and Minimum Air Temperatures, 2018

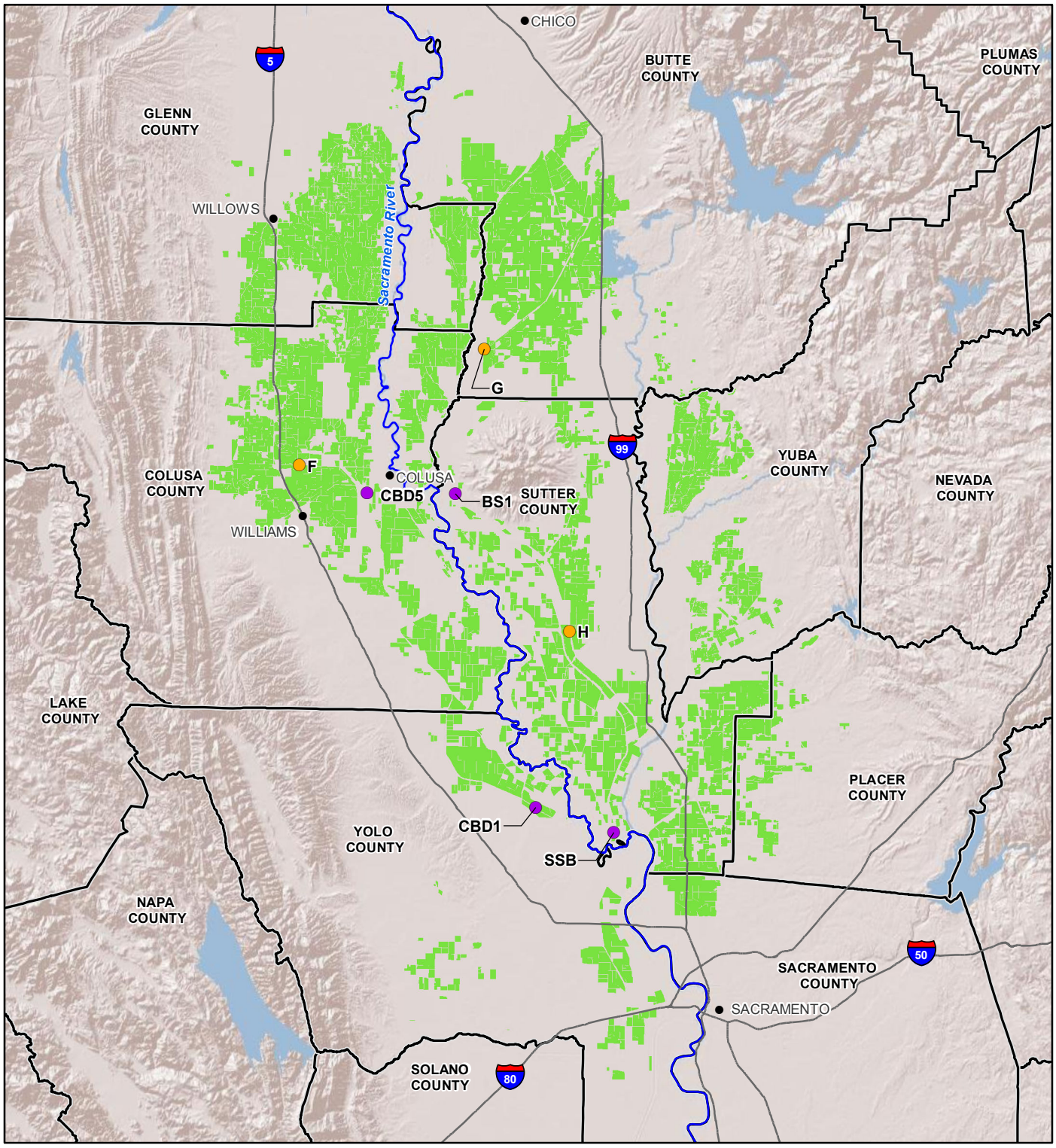
SECTION 5

Locations of Sampling Sites, Crops, and Land Uses

The extent of rice grown in the Sacramento Valley varies slightly from year to year, depending on crop prices, water availability, environment, and other factors. Figure 5-1 includes the locations of primary and secondary surface water and drain monitoring sites, and the extent of the rice crop grown in 2018. Figure 5-2 includes the locations of groundwater monitoring wells monitored in 2018 along with the extent of the rice crop grown in 2018.

The rice crop extent was compiled from the pesticide permit database (Cal Ag Permit) for the 2018 growing season. The 2018 rice extent map represents the active permits for rice growing and pesticide use for the 2018 growing season. Land use data from the Cal Ag Permit database is cross-referenced with the National Agricultural Statistics Service at the U.S. Department of Agriculture to correlate the land use with the planted acreage.

As shown on Figures 5-1 and 5-2, rice crops cover a large contiguous portion of land uses in the Sacramento Valley. Other land uses include crops other than rice, ranches, wildlife refuges, native vegetation, and small urban areas.



LEGEND

- CITY
- COUNTY

MONITORING SITES

- PRIMARY SITE
- SECONDARY SITE
- RICE LAND 2018 PERMIT AREA

NOTES:

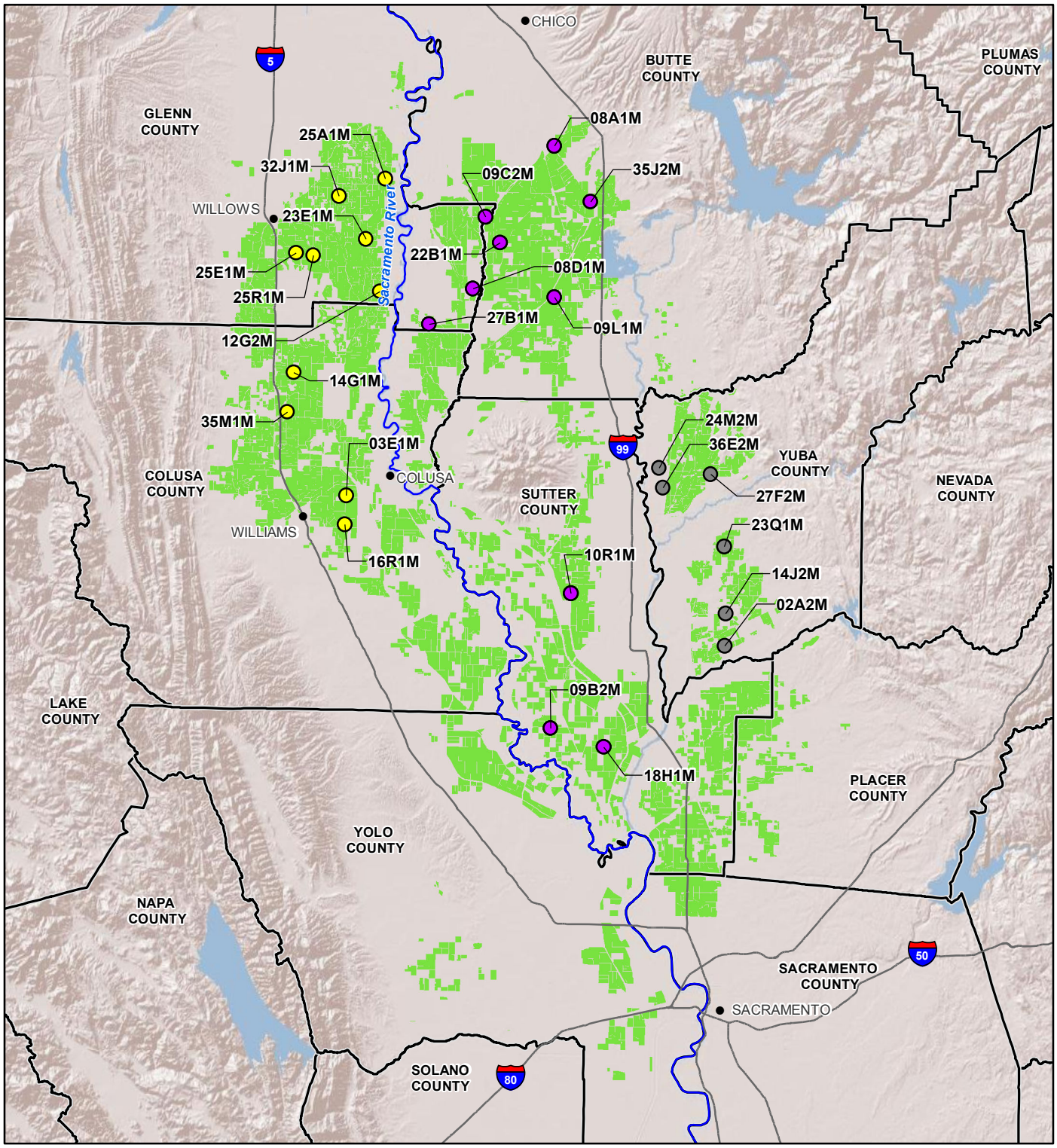
DATUM: NAD 1983.

SOURCES: BASEMAP (COPYRIGHT:© 2014 ESRI); RICE LANDS (CAL AG PERMIT, 2018); COUNTY (CAL FIRE 2007) ; HYDROLOGY (NHD ACCESSED JAN 2016).

California Rice

0 6 12
Miles
N

FIGURE 5-1
2018 Rice Lands Permit Areas and Surface Water Sampling Sites
2018 Annual Monitoring Report
California Rice Commission



LEGEND

- CITY
- COUNTY
- RICE LAND 2018 PERMIT AREA

Well Location

- USGS Wells – sampled August 2018
- USGS Wells – sampled July 2017
- DWR Wells - not sampled in 2018

NOTES:

DATUM: NAD 1983.

SOURCES: BASEMAP (COPYRIGHT:© 2014 ESRI); RICE LANDS (CAL AG PERMIT, 2018); COUNTY (CAL FIRE 2007) ; HYDROLOGY (NHD ACCESSED JAN 2016).
USGS RICE WELLS (USGS 2017).
DWR MONITORING WELLS (DWR 2017)

California Rice

0 6 12
Miles

N

FIGURE 5-2
2018 Rice Lands Permit Areas and Groundwater Sampling Wells
2018 Annual Monitoring Report
California Rice Commission

SECTION 6

Summary of Pesticide Use, Application, and Acreage

The California Department of Pesticide Regulation (DPR) regulates the sale and use of pesticides in California, and enforces the agricultural uses. Rice growers, pesticide applicators, Pest Control Advisers (PCAs), and pest control operators report pesticide use to the CACs, and these data are included in the DPR Pesticide Use Report (PUR). DPR provides the CRC with early review (draft) PUR data for inclusion in the annual report. Data presented in the following discussions of pesticide use are for the Sacramento Valley rice-growing counties.

6.1 Pesticide Use

The CACs report pesticide use information to DPR. All pesticide uses reported herein for 2018 are preliminary and have not been audited or quality control (QC) checked by DPR.

The pesticides with overall acreage increases in 2018 were azoxystrobin (+52,998 acres), benzobicyclon (+55,777 acres), bispyribac-sodium (+43,866 acres), carfentrazone-ethyl (+988 acres), clomazone (+286 acres), cyhalofop-butyl (+123,986), halosulfuron-methyl (+65,865 acres), propanil (+14,932 acres), propiconazole (+1,431 acres), and triclopyr TEA (+40,768 acres). Benzobicyclon is a new rice specific herbicide with acreage limitations of 50,000 acres in 2017. The acreage limitation was increased to allow for enough herbicide application to treat 100,000 acres in 2018. Acreage limitations are controlled by the amount of herbicide the registrant is allowed to formulate. Slight increases in the acreage limitation result from variances in the use rate. In 2019, there will be no changes to the acreage limitation.

The pesticides with acreage decreases in 2018 were *Bacillus thuringiensis* (Bt) (-735 acres), bensulfuron-methyl (-1,623 acres), carbaryl (-341 acres), clothianidin (-5 acres), (s)-cypermethrin (-9,564 acres), diflubenzuron (-8,747 acres), lambda cyhalothrin (-14,013 acres), methoxyfenozide (-12,191 acres), penoxsulam (-31,863 acres), and trifloxystrobin (-1,800 acres).

Thiobencarb and malathion uses and applications are discussed separately in the Rice Pesticide Program summary memo.

According to the preliminary CAC data, overall planted acreage in 2018 increased by 7,582 acres, or approximately 2 percent, from 503,964 acres (2017) to 511,546 acres (2018).

Tables 6-1 and 6-2 show the preliminary Sacramento Valley rice herbicide data, including acres treated and pounds applied, respectively. Tables 6-3 and 6-4 show the preliminary Sacramento Valley rice insecticide data, including acres treated and pounds applied, respectively. Tables 6-5 and 6-6 show the preliminary Sacramento Valley rice fungicide data, including acres treated and pounds applied, respectively.

Table 6-1. Herbicides: Acres Treated, Sacramento Valley, 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

	Acres Treated									
County	**Bensulfuron-methyl**	**Benzobicyclon**	**Bispyribac-sodium**	**Carfentrazone-ethyl**	**Clomazone**	**Cyhalofop-butyl**	**Halosulfuron-methyl**	**Penoxsulam**	**Propanil**	**Triclopyr TEA**
Butte	6,223	16,553	28,537	2,515	25,137	27,455	16,751	17,880	60,037	60,193
Colusa	572	29,012	35,845	5,004	21,016	45,624	36,217	19,404	87,165	90,328
Glenn	1,597	20,983	21,129	8,655	13,058	27,627	23,487	7,922	60,303	53,215
Placer	579	2,437	2,172	383	1,693	4,582	3,340	3,970	6,343	7,032
Sacramento	0	1,583	2,348	0	511	3,951	2,215	3,188	6,468	6,410
Sutter	2,962	26,856	38,347	4,956	36,369	42,465	30,945	35,322	70,873	74,515
Tehama	0	0	0	0	0	0	0	0	0	0
Yolo	847	6,968	11,756	1,314	4,140	8,667	7,530	5,540	14,002	20,473
Yuba	0	3,376	0	0	9,158	3,376	3,376	1,605	0	420
Total acres	**12,780**	**107,768**	**140,134**	**22,827**	**111,082**	**163,747**	**123,861**	**94,831**	**305,191**	**312,586**

Note:

Data are preliminary and have not been audited or checked for error by DPR. Data will be considered final when the PUR is updated at the end of 2020 (estimated).

Table 6-2. Herbicides: Pounds Applied, Sacramento Valley, 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

	Acres Treated									
County	**Bensulfuron-methyl**	**Benzobicyclon**	**Bispyribac-sodium**	**Carfentrazone-ethyl**	**Clomazone**	**Cyhalofop-butyl**	**Halosulfuron-methyl**	**Penoxsulam**	**Propanil**	**Triclopyr TEA**
Butte	367	3,785	998	337	10,348	4,372	817	684	312,070	9,790
Colusa	31	6,631	1,140	628	9,287	4,975	1,762	685	486,221	17,305
Glenn	91	4,736	778	1,103	5,840	2,563	1,152	296	302,508	10,276
Placer	20	562	104	44	661	574	159	142	33,653	1,351
Sacramento	0	359	82	0	259	704	102	134	36,207	1,808
Sutter	146	6,110	1,303	630	15,622	5,392	1,476	1,278	375,306	16,295
Tehama	0	0	0	0	0	0	0	0	0	3,862
Yolo	32	1,582	386	228	1,952	753	362	209	78,329	275
Yuba	0	768	0	0	3,238	164	164	53	0	0
Total acres	**687**	**24,533**	**4,791**	**2,970**	**47,207**	**19,497**	**5,994**	**3,481**	**1,624,294**	**60,962**

Note:

Data are preliminary and have not been audited or checked for error by DPR. Data will be considered final when the PUR is updated at the end of 2020 (estimated).

Table 6-3. Insecticides: Acres Treated, Sacramento Valley, 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

	Acres Treated							
County	**Bt**	**Carbaryl**	**Clothianidin**	**(s)-Cypermethrin**	**Diflubenzuron**	**Lambda Cyhalothrin**	**Malathion[a]**	**Methoxyfenozide[b]**
Butte	1,029	0	0	47	137	27,367	0	6,852
Colusa	123	0	0	1,340	717	40,374	0	1,064
Glenn	518	0	0	1,050	316	21,828	0	6,292
Placer	0	0	0	0	503	3,786	0	NA
Sacramento	0	0	0	0	0	2,180	0	2,287
Sutter	242	0	0	2,822	140	40,553	0	12,599
Tehama	0	0	0	0	0	0	0	0
Yolo	168	0	0	0	0	9,836	0	190
Yuba	0	0	0	0	0	9,879	0	0
Total acres	**2,080**	**0**	**0**	**5,259**	**1,813**	**155,803**	**0**	**29,284**

[a] Malathion use is addressed in the Rice Pesticides Program Summary Memo.

[b] Methoxyfenozide was issued as an emergency exemption to control armyworm in 2018, and was approved for use in Butte, Colusa, Glenn, Sacramento, Sutter, Yolo, and Yuba Counties. Placer County did not have an armyworm problem in 2018.

Notes:

Data are preliminary and have not been audited or checked for error by DPR. Data will be considered final when the PUR is updated at the end of 2020 (estimated).

Bt = *Bacillus thuringiensis*
NA = not applicable

Table 6-4. Insecticides: Pounds Applied, Sacramento Valley, 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

	Pounds Applied							
County	**Bt**	**Carbaryl**	**Clothianidin**	**(s)-Cypermethrin**	**Diflubenzuron**	**Lambda Cyhalothrin**	**Malathion[a]**	**Methoxyfenozide[b]**
Butte	1,312	0	0	2	14	801	0	1,196
Colusa	136	0	0	65	91	1,236	0	183
Glenn	660	0	0	51	40	759	0	1,108
Placer	0	0	0	0	103	113	0	NA
Sacramento	0	0	0	0	0	83	0	398
Sutter	309	0	0	138	18	1,294	0	2,052
Tehama	0	0	0	0	0	0	0	0
Yolo	181	0	0	0	0	359	0	30
Yuba	0	0	0	0	0	241	0	0
Total pounds	**2,598**	**0**	**0**	**256**	**266**	**4,886**	**0**	**4,967**

[a] Malathion use is addressed in the Rice Pesticides Program Summary Memo.

[b] Methoxyfenozide was issued as an emergency exemption to control armyworm in 2018, and was approved for use in Butte, Colusa, Glenn, Sacramento, Sutter, Yolo, and Yuba Counties. Placer County did not have an armyworm problem in 2018.

Notes:

Data are preliminary and have not been audited or checked for error by DPR. Data will be considered final when the PUR is updated at the end of 2020 (estimated).

Table 6-5. Fungicides: Acres Treated, Sacramento Valley, 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

	Acres Treated		
County	**Azoxystrobin**	**Propiconazole**	**Trifloxystrobin**
Butte	58,811	305	0
Colusa	74,706	1,142	0
Glenn	55,196	3,616	0
Placer	3,566	0	0
Sacramento	5,461	0	0
Sutter	35,468	0	0
Tehama	0	0	0
Yolo	10,299	220	0
Yuba	0	0	0
Total acres	**243,507**	**5,283**	**0**

Note:

Data are preliminary and have not been audited or checked for error by DPR. Data will be considered final when the PUR is updated at the end of 2020 (estimated).

Table 6-6. Fungicides: Pounds Applied, Sacramento Valley, 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

	Pounds Applied		
County	**Azoxystrobin**	**Propiconazole**	**Trifloxystrobin**
Butte	10,488	58	0
Colusa	13,343	185	0
Glenn	9,802	461	0
Placer	702	0	0
Sacramento	1,083	0	0
Sutter	6,840	0	0
Tehama	0	0	0
Yolo	1,929	3	0
Yuba	0	0	0
Total pounds	**44,187**	**707**	**0**

Note:

Data are preliminary and have not been audited or checked for error by DPR. Data will be considered final when the PUR is updated at the end of 2020 (estimated).

SECTION 7

2018 Monitoring Results and Data Discussion

This section provides the 2018 surface water sampling schedule, groundwater sampling schedule, and monitoring results, as well as a discussion of the data relative to water quality objectives (WQOs).

7.1 Surface Water Monitoring

2018 was again a core monitoring year for surface water. A rice-specific monitoring calendar was developed to sample water quality during the May through July irrigation season. Table 7-1 lists the monitoring dates for 2018 and the constituents sampled at each event. One resampling event was conducted in 2018 because of a faulty DO sensor on one of the multiparameter meters; this is discussed in more detail below.

Two multiparameter meters are used in monitoring field parameters to provide backup in case one meter fails. During Sample Event 1 (SE1), it was noticed that one of the meters was yielding DO results that were out of magnitude for the time of year and did not align with the other meter. After the inaccurate DO sensor was detected, both meters were sent in for factory recalibration. As an extra precaution, a third meter was rented for the next sampling event to ensure quality results. Factory recalibration brought the meters back in line with each other, and no problems arose at the remainder of the sampling events. The DO resample event occurred as soon as the meters returned from factory recalibration.

Table 7-1. 2018 Sampling Calendar and Constituents
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Event	Sample Date	Field Parameters	Pesticides (as noted)
May Event 1 (SE1)	5/22/2018	✓	Benzobicyclon, Metabolite B
May Event DO Resample	5/29/2018	DO only	NA
June Event 1 (SE2)	6/05/2018	✓	Benzobicyclon, Metabolite B
June Event 2 (SE3)	6/19/2018	✓	Penoxsulam, Bensulfuron-methyl
July Event 1 (SE4)	7/02/2018	✓	Penoxsulam, Bensulfuron-methyl

Notes:

Field parameters include pH, SC, DO, temperature, and flow.

The May DO Resample was performed to confirm DO results from SE1, where one of the meters had a faulty DO sensor.

7.1.1 Surface Water Sample Results – Field Parameters

As described previously, surface water field parameters collected in 2018 included pH, SC, DO, water temperature, and flow. Field parameter measurements are taken using two individual meters; the results of these measurements are reported as instrument 1 / instrument 2 in the following tables unless otherwise noted. Figures display the maximum value measured of the two instruments unless otherwise noted.

7.1.1.1 Surface Water Temperature Measurements

Figure 7-1 shows the results of the 2018 field water temperature measurements. Temperatures in water bodies are typically lowest in the winter and highest in the summer, and in 2018 that generally held true. SE4 had the highest average water temperature (79.5 degrees Fahrenheit [°F]); the highest observed

individual reading was at SSB during SE4 (80.1°F). Table 7-2 presents the water temperature results and ranges for each event and site.

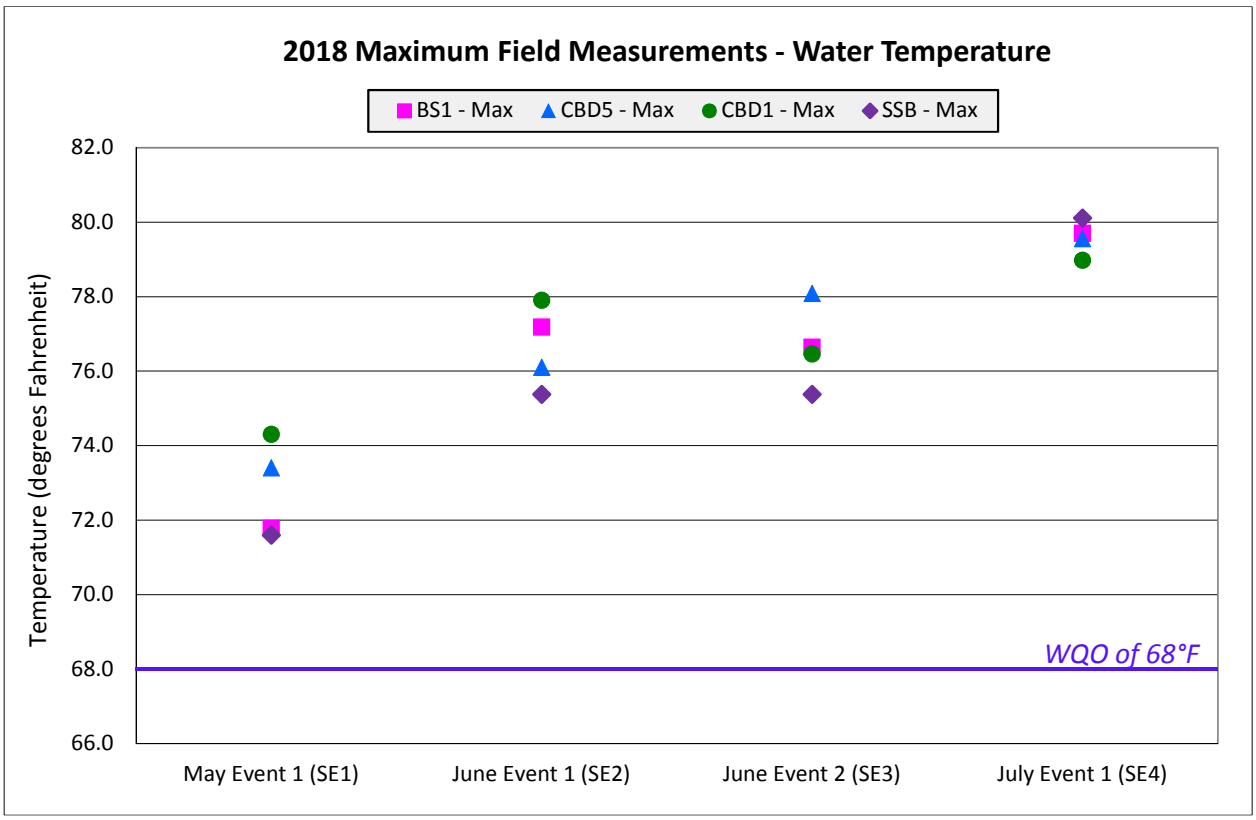


Figure 7-1. 2018 Maximum Field Measurements – Water Temperature

Table 7-2. Water Temperature Field Measurement Results, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Event	Sample Date	Water Temperature (°F)				Event Average (°F)	Event Range (°F)
		BS1	CBD5	CBD1	SSB		
May Event 1 (SE1)	5/22/2018	71.8 / 71.5	73.4 / 73.1	74.3 / 73.6	71.6 / 71.2	72.6	71.2 to 74.3
June Event 1 (SE2)	6/05/2018	77.2 / 77.0	76.1 / 75.9	77.9 / 77.5	75.4 / 75.2	76.5	75.2 to 77.9
June Event 2 (SE3)	6/19/2018	76.6 / 76.5	78.1 / 77.9	76.5 / 76.3	75.4 / 75.0	76.5	75.0 to78.1
July Event 1 (SE4)	7/02/2018	79.4 / 79.7	79.6 / 79.3	78.8 / 79.0	80.1 / 79.9	79.5	78.8 to 80.1
	Site Average (°F)	76.2	76.7	76.7	75.5		
	Site Range (°F)	71.5 to 79.7	73.1 to 79.6	73.6 to 79.0	71.2 to 80.1		

Note:

Two instruments were used for sampling. The results are reported as instrument 1 / instrument 2.

As in previous years, water temperature readings in these drains were above the *Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region – The Sacramento River Basin and the San Joaquin River Basin* (Basin Plan) (CVRWQCB, 2016) WQO for the lower Sacramento River (68°F). During peak temperatures, these drain sites would not provide habitat for cold-water fisheries. Warmer temperatures in the drains are expected during the irrigation season due to water

holding requirements, and when irrigation districts limit water allotments. The later-than-typical start to the monitoring season in 2018 likely influenced the warmer temperatures measured as well.

7.1.1.2 Dissolved Oxygen Measurements

The 2018 field DO measurements are shown on Figure 7-2. Table 7-3 presents DO results, ranges of values, and the percentage of field DO readings less than 5 mg/L (the WARM water quality standard) and 7 mg/L (the COLD water quality standard). As noted above and in Table 7-3, one of the field instruments had a faulty DO sensor during the first sampling event of the season; therefore, a resample event for DO was held the following week (once the meters were factory recalibrated). Primary results from Sample Event 1 (SE1), as well as primary and secondary results from the resample event, are included in the following tables and discussion.

DO values of less than 7 mg/L were observed at all sites and events during the 2018 sampling season (Table 7-3). DO values of less than 5 mg/L were observed at Site BS1 during SE2; at Site CBD1 during SE1, SE2, SE3, and SE4; and at SSB during SE4 (Table 7-3).

Consistent with prior years, DO values decreased at each sampling event, with DO less than 7 mg/L recorded during the later sampling events. As is typical, the warm water temperatures in the later sampling events coincide with the lower DO readings. Warm water temperatures contribute to low DO values because of the decrease in oxygen solubility with increasing temperature. Figure 7-3 shows oxygen solubility as a function of water temperature. Oxygen solubilities on the graph are approximate because additional factors, such as salinity, influence oxygen solubility.

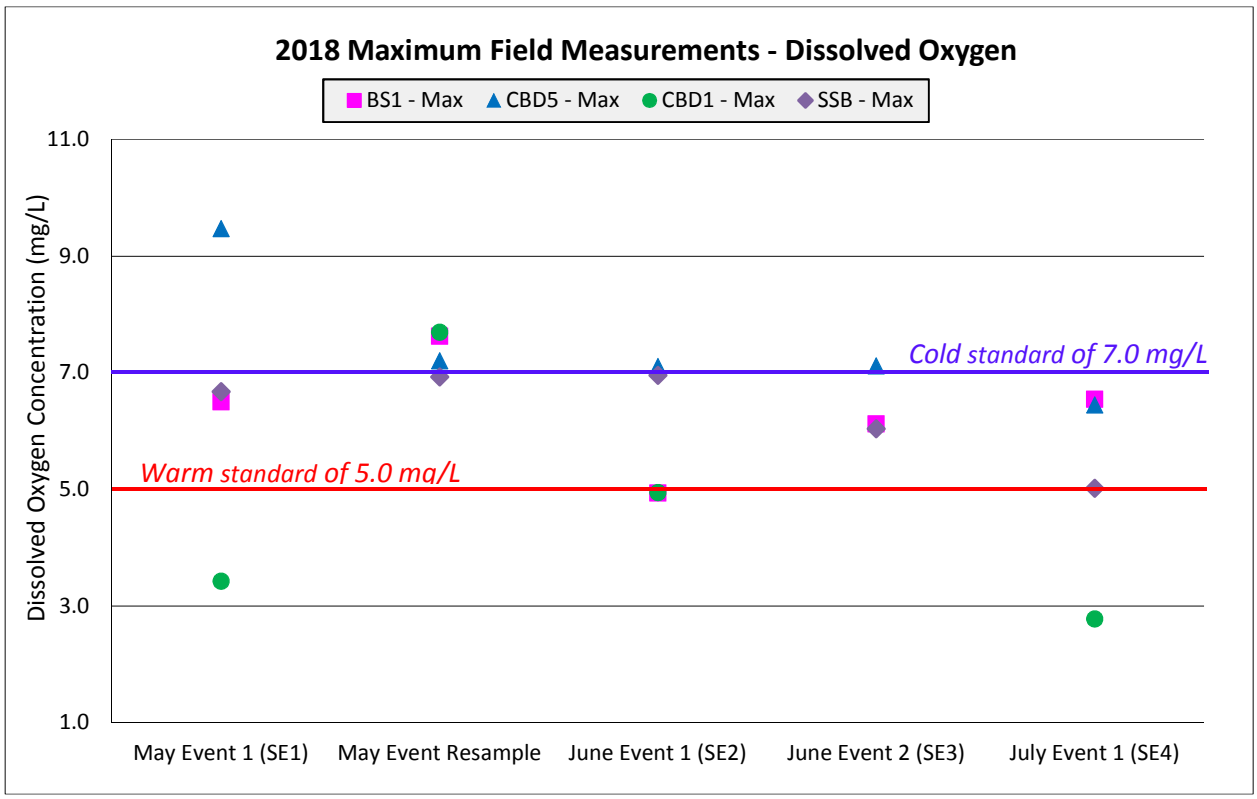


Figure 7-2. 2018 Maximum Field Measurements – Dissolved Oxygen

Table 7-3. Dissolved Oxygen Field Measurement Results, 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Event	Sample Date	Dissolved Oxygen Concentration (mg/L)				Event Average (mg/L)	Event DO Range (mg/L)	Percent of Observed DO < 7 (mg/L)	Percent of Observed. DO < 5 (mg/L)
		BS1	CBD5	CBD1	SSB				
May Event 1 (SE1)	5/22/2018	**6.51** / NA	9.48 / NA	**3.43** / NA	**6.68** / NA	6.53	3.43 to 9.48	75%	25%
May Event Resample	5/29/2018	7.60 / 7.63	7.21 / 7.15	7.67 / 7.70	**6.45 / 6.93**	7.29	6.45 to 7.70	25%	0%
June Event 1 (SE2)	6/5/2018	**4.24 / 4.94**	**6.57** / 7.11	**4.09 / 4.95**	**6.38 / 6.96**	5.66	4.09 to 7.11	88%	50%
June Event 2 (SE3)	6/19/2018	**5.90 / 6.13**	7.12 / **6.99**	**0.11 / 0.61**	**6.04 / 5.76**	4.83	0.11 to 7.12	88%	25%
July Event 1 (SE4)	7/2/2018	**5.70 / 6.55**	**6.02 / 6.45**	**2.13 / 2.78**	**4.56 / 5.02**	4.90	2.13 to 6.55	100%	38%
Site Average (mg/L)		6.13	7.12	3.72	6.09				
Site DO Range (mg/L)		4.24 to 7.63	6.02 to 9.48	0.11 to 7.70	4.56 to 6.96				
Percent of Observed DO < 7 mg/L		78%	44%	78%	100%				
Percent of Observed DO < 5 mg/L		22%	0%	78%	11%				

Notes:

Bold values are results less than the WQO of 7 mg/L.

Two instruments were used for sampling. The results are reported as instrument 1 / instrument 2.

The May DO Resample was performed to confirm DO results from the SE1 Event, where one of the meters had a faulty DO sensor.

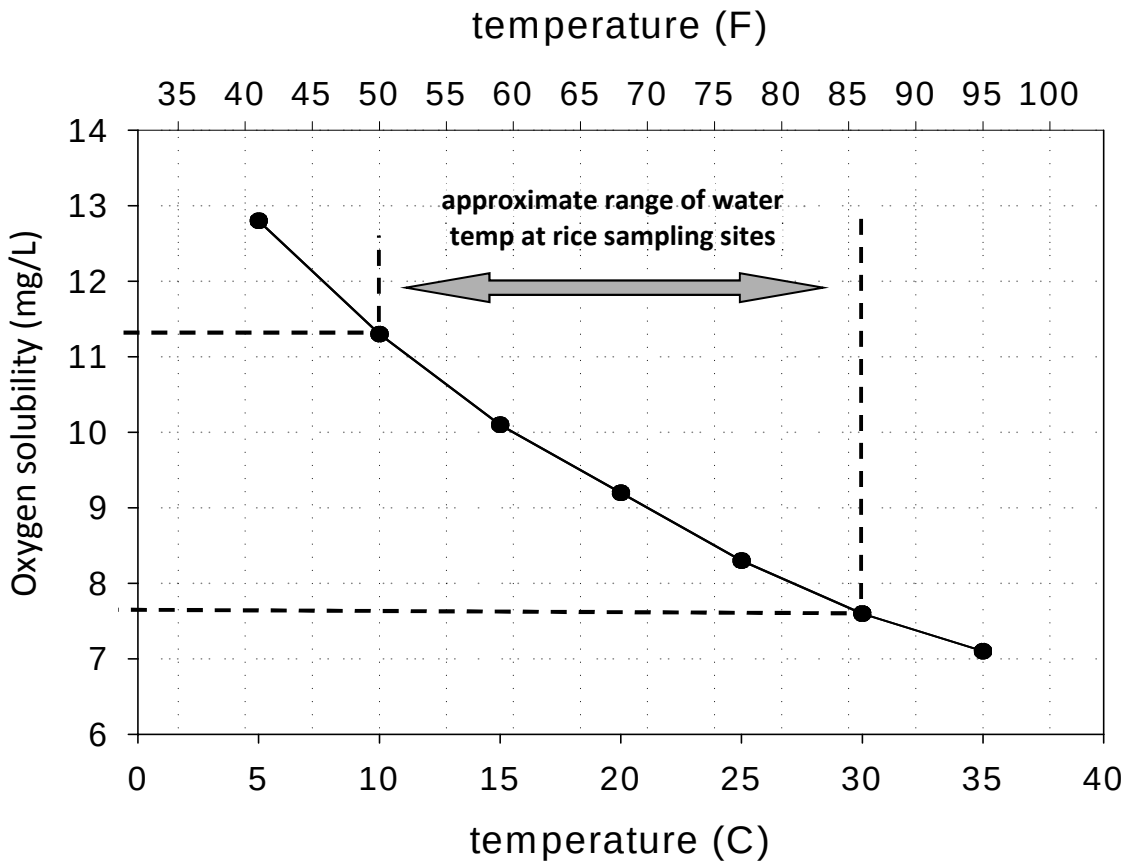


Figure 7-3. Oxygen Solubility as a Function of Temperature

As water temperature increases, oxygen solubility decreases and approaches the WQO of 7 mg/L DO (at approximately 95°F). As the oxygen solubility decreases, biological activity (such as microorganisms breaking down detritus or other organic matter) may consume enough oxygen to depress DO below the WQO, particularly under warm conditions. Water temperature is likely a main cause of the low DO in these water bodies; water hold times, elevated air temperatures, and irrigation district water management likely leads to higher in-stream water temperatures. As reported in the 2015 *Surface Water Quality Management Plan for Dissolved Oxygen* (DO Management Plan) (CRC, 2015a), this trend is likely to continue if drain flow volumes remain low. No additional management practices are available for implementation on rice fields to help remedy DO issues in drains under these conditions.

Other factors that may contribute to low DO include (1) in-stream biological oxygen demand from high organic loads and productive algal communities (resulting from available nutrients), and (2) the diurnal oxygen depletion resulting from nighttime algae uptake or uniform channel character that limits natural aeration.

7.1.1.3 pH Measurements

Figure 7-4 shows the results of the 2018 field pH measurements, and Table 7-4 presents pH results and site and event ranges, as well as the percentage of pH observations less than 6.5 or greater than 8.5, which are the Basin Plan (CVRWQCB, 2016) WQOs for pH. Two readings were above the WQO threshold of 8.5 in 2018: the SE1 readings from CBD5 and CBD1. Both sites had results within the thresholds for the remainder of the sampling season. High pH is occasionally experienced at these sites early in the season, with a rebounding to around pH 7.5 by the middle of the season.

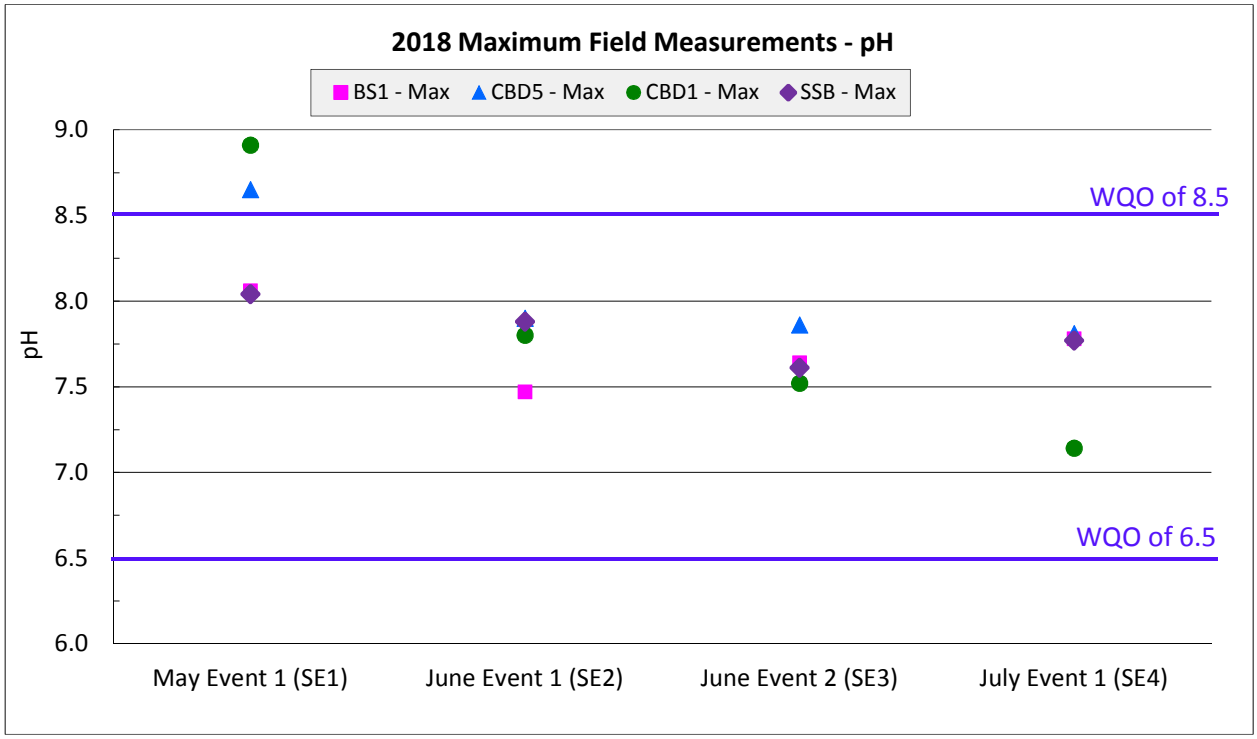


Figure 7-4. 2018 Maximum Field Measurements – pH

Table 7-4. pH Field Measurement Results, 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Event	Sample Date	pH				Event pH Average	Event pH Range	Percent of Observed pH < 6.5	Percent of Observed pH > 8.5
		BS1	CBD5	CBD1	SSB				
May Event 1 (SE1)	5/22/2018	7.78 / 8.06	7.98 / **8.65**	7.80 / **8.91**	8.04 / 8.03	8.16	7.78 to 8.91	0%	29%
June Event 1 (SE2)	6/5/2018	7.47 / 7.37	7.90 / 7.80	7.80 / 7.77	7.88 / 7.79	7.72	7.37 to 7.90	0%	0%
June Event 2 (SE3)	6/19/2018	7.64 / 7.64	7.86 / 7.83	7.45 / 7.52	7.61 / 7.59	7.64	7.45 to 7.86	0%	0%
July Event 1 (SE4)	7/2/2018	7.64 / 7.78	7.80 / 7.81	6.88 / 7.14	7.68 / 7.77	7.56	6.88 to 7.81	0%	0%
	Site pH Average	7.67	7.95	7.66	7.80				
	Site pH Range	7.37 to 8.06	7.80 to 8.65	6.88 to 8.91	7.59 to 8.04				
	Percent of Observed pH < 6.5	0%	0%	0%	0%				
	Percent of Observed pH > 8.5	0%	13%	13%	0%				

Notes:

Bold values are results < 6.5 or > 8.5.

Two instruments were used for sampling. The results are reported as instrument 1 / instrument 2.

7.1.1.4 Specific Conductance Measurements

Figure 7-5 shows the results of the 2018 SC measurements. Table 7-5 presents SC results, site and event ranges, and percentage of observations above 700 µS/cm, which has been cited by the CVRWQCB as a threshold for reporting. This threshold is an agricultural water quality goal (Ayers and Westcot, 1985), and is recognized in the State Water Resources Control Board (SWRCB) Water Quality Goals online database (SWRCB, 2016). Inclusion of this reference value is for screening purposes only, and does not imply that the CRC recognizes this value as an adopted salinity WQO.

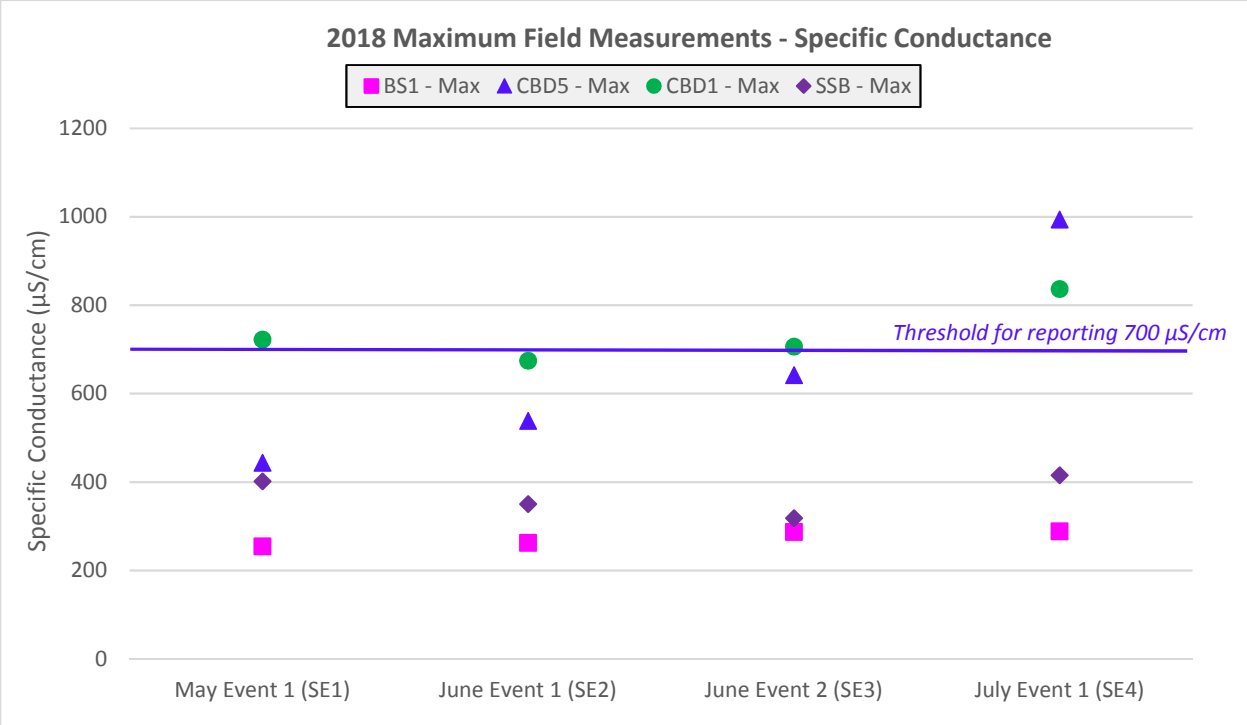


Figure 7-5. 2018 Maximum Field Measurements – Specific Conductance

Table 7-5. Specific Conductance Field Measurement Results, 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Event	Sample Date	Specific Conductance (µS/cm)				Event SC Average (µS/cm)	Event SC Range (µS/cm)	Percent of Observed SC > 700
		BS1	CBD5	CBD1	SSB			
May Event 1 (SE1)	5/22/2018	255 / 254	444 / 441	**708 / 723**	402 / 399	453	254 to 723	25%
June Event 1 (SE2)	6/5/2018	258 / 263	532 / 539	660 / 675	344 / 350	453	258 to 675	0%
June Event 2 (SE3)	6/19/2018	284 / 288	631 / 642	**704 / 707**	314 / 319	486	284 to 707	25%
July Event 1 (SE4)	7/2/2018	289 / 270	**994 / 989**	**837 / 832**	416 / 415	630	270 to 994	50%
Site SC Average (µS/cm)		270	651	731	370			
Site SC Range (µS/cm)		254 to 289	441 to 994	660 to 837	314 to 416			
Percent of Observed SC > 700		0%	22%	78%	0%			

Notes:

Bold values are results greater than 700 µS/cm.

Two instruments were used for sampling. The results are reported as instrument 1 / instrument 2.

Four SC values greater than 700 µS/cm were recorded during the 2018 sampling season: three readings at Site CBD1 (SE1, SE3, and SE4) and one reading at Site CBD5 (SE4). This is not surprising given the use and reuse of irrigation water throughout the Colusa Basin Drain, and the lack of flow during the end of the season. The remainder of the measurements were below the 700 µS/cm threshold.

7.1.1.5 Flow Measurements

Table 7-6 contains flow estimates derived from the flow measurements collected during the 2018 monitoring season. All flow measurements were taken with a flow meter, and were documented on the field sheets presented in Appendix B-1.

Table 7-6. Flow Measurement Results, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

		Estimated Flow (cfs)			
Sample Event	**Sample Date**	**BS1**	**CBD5**	**CBD1**	**SSB**
May Event 1 (SE1)	5/22/2018	0.2	318	72.4	0
June Event 1 (SE2)	6/5/2018	148	375	0	221
June Event 2 (SE3)	6/19/2018	18.6	279	0	313
July Event 1 (SE4)	7/2/2018	0	38.1	0	0

Note:
cfs = cubic feet per second

7.1.2 Surface Water Sample Results – Laboratory Results

Two pesticides, bensulfuron-methyl and penoxsulam, were selected for monitoring during the 2018 season. Bensulfuron-methyl is a rice-specific herbicide; penoxsulam is used primarily on rice, but is also registered for use on other crops. Both bensulfuron-methyl and penoxsulam are typically applied early season, with application in late May to early June. Benzobicyclon and metabolite B were again monitored in 2018 because of benzobicyclon's emergence as a newer rice pesticide. Samples taken during the May sampling events were tested for benzobicyclon plus metabolite B to coincide with timing of typical application. Monitoring results for the pesticides and metabolite B are provided in Table 7-7.

Benzobicyclon was not detected at any of the sampled monitoring sites or events during 2018. Four detections of metabolite B were reported in 2018, all in the CBD sites. The detections all fell between the method detection limit (MDL) and the method reporting limit (MRL), indicating low detections with estimated concentrations attributable to lower test accuracy below the MRL. Bensulfuron-methyl was not detected at any of the sampled monitoring sites or events during 2018. Penoxsulam was detected at all monitoring events and monitoring sites during the SE3 and SE4 events. Detections were similar between the two events, indicating that usage was similar across the weeks of sampling, and likely trended late because of the wet spring. Complete results from the pesticide monitoring are included in Appendix B-2.

Although no WQOs or numeric standards exist for bensulfuron-methyl, penoxsulam, benzobicyclon, or metabolite B, monitoring results can be compared to toxicological levels of concern to provide perspective. Aquatic Life Benchmarks published by the U.S. Environmental Protection Agency (EPA), Office of Pesticide Programs can be used as a means of comparison. The acute toxicological level of concern for the most sensitive receptor, vascular plants, is 1.475 micrograms per liter (µg/L) for benzobicyclon, 3 µg/L for penoxsulam, and 8.3 µg/L for bensulfuron-methyl (EPA, 2018). No aquatic life benchmarks exist for vascular plants for metabolite B; however, a benchmark exists for fish (2.3 µg/L), which is the lowest toxicological level of concern specified by the EPA for metabolite B (EPA, 2018). All monitoring results from 2018 were below the EPA levels of concern.

Table 7-7. Pesticide Monitoring Results, 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

		Bensulfuron-methyl (µg/L)				Penoxsulam (µg/L)				Benzobicyclon (µg/L)				Metabolite B (µg/L)			
Sample Event	**Sample Date**	**BS1**	**CBD5**	**CBD1**	**SSB**	**BS1**	**CBD5**	**CBD1**	**SSB**	**BS1**	**CBD5**	**CBD1**	**SSB**	**BS1**	**CBD5**	**CBD1**	**SSB**
May Event 1 (SE1)	5/22/2018									ND/ND	ND	ND	ND	ND/ND	0.88j	0.81j	ND
June Event 1 (SE2)	6/5/2018									ND	ND	ND	ND	ND	0.91j	0.85j	ND
June Event 2 (SE3)	6/19/2018	ND	ND	ND	ND/ND	0.056j	0.17	0.073j	0.35/0.35								
July Event 1 (SE4)	7/2/2018	ND	ND/ND	ND	ND	0.13	0.11/0.069j	0.15	0.097j								

*Events with duplicate samples have two results reported (primary result / duplicate result).

Notes:

Benzobicyclon – MDL = 0.08 µg/L, MRL = 1.0 µg/L
Metabolite B – MDL = 0.26 µg/L, MRL = 1.0 µg/L
Bensulfuron-methyl – MDL = 0.26 µg/L, MRL = 1.0 µg/L
Penoxsulam – MDL = 0.015 µg/L, MRL = 0.10 µg/L

ND = non-detect
j = EPA Flag; estimated value below the MRL.

7.2 Groundwater Monitoring

As described in Section 3.3.2, the CRC sampled half of the USGS Rice Wells selected for the Trend Monitoring Program in August 2018. Monitoring parameters in 2018 were the "Group A" parameters, as described in Table 3-4; the results are presented in Table 7-8, and are discussed below. Time concentration charts are included for the primary parameters of interest.

7.2.1 Groundwater Sample Results – Field Parameters

As described previously, groundwater field parameters collected in 2018 included water level, water temperature, pH, conductivity, and DO. Field parameter measurements are taken using a multiparameter water quality meter after purging the well. Results for these parameters are as follows:

- **Water Level –** Water level measurements recorded in 2018 are reported in Table 7-8. These measurements will be used to track long-term trends in groundwater levels. Groundwater levels beneath the rice fields are very shallow, with water levels measured at 1 to 10 feet below the land surface (2018 average depth = 2.72 feet). Many of the wells had slightly shallower depths in 2018 than in 2017, but the levels are generally consistent with the average depth to water levels reported in the Rice-Specific Groundwater Assessment Report (GAR) (CRC, 2013) and presented in the 2017 AMR.
- **Water Temperature –** Water temperature measurements are reported in Table 7-8. 2018 measurements were similar to those recorded in 2017, ranging from 63.3 to 68.0°F.
- **pH –** pH measurements are reported in Table 7-8. 2018 measurements were similar to those recorded in 2017, ranging from 6.93 to 7.58.
- **Conductivity –** Conductivity measurements are reported in Table 7-8 and are displayed on Figure 7-6. Measurements were similar to those recorded in 2017, and ranged from 237 to 12,798 µS/cm. All wells except two (18H1M and 09B2M) had measurements below the secondary maximum contaminant level (MCL) of 900 µS/cm. The measurement from Well 09B2M met the upper limit secondary maximum contaminant level of 1,600 µS/cm, and was consistent with readings from 2017 and historical readings presented in the GAR. The measurement from well 18H1M exceeded the conductivity MCLs; however, the result was consistent with the 2017 measurement and historical readings presented in the GAR. As explained in the GAR, this well is located south of the Sutter Buttes, in an area with likely natural upwelling of deeper connate saline water.
- **Dissolved Oxygen –** DO measurements are reported in Table 7-8. 2018 measurements were similar to those recorded in 2017, and ranged from 0.0 to 0.59 mg/L. These results demonstrate anaerobic conditions (less than 1 mg/L), which are expected under long-term flooded conditions.

Table 7-8. USGS Rice Well Network Groundwater Monitoring Results, 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

							Field Parameters				Laboratory Parameters		
DWR State Well Number	**Mapping ID**	**USGS Well ID**	**Latitude**	**Longitude**	**Sample Date**	**2018 Depth to Water Level (feet bgs)**	**Conductivity (µS/cm)**	**pH**	**DO (mg/L)**	**Water Temp (°F)**	**TDS (mg/L)**	**Nitrate + Nitrite as N (mg/L)**	**Ammonia as N (mg/L)**
012N003E18H001M	18H1M	385314121401701	38°53'12.90"N	121°40'21.88"W	8/15/2018	1.74	12,798	7.33	0.59	65.48	11000	2.2	0.33
012N002E09B002M	09B2M	385431121451401	38°54'30.56"N	121°45'18.24"W	8/15/2018	2.41	1,204	7.49	0	65.66	440	4.8	0.027j
014N002E10R001M	10R1M	390416121433601	39°04'15.43"N	121°43'39.14"W	8/16/2018	1.01	592	7.58	0	64.94	340	0.43	0.086j
018N001W27B001M	27B1M	392328121571501	39°23'27.50"N	121°57'19.11"W	8/16/2018	1.01	236.7	7.52	0	64.0	150	0.25j	0.035j
018N002E09L001M	09L1M	392542121452501	39°25'35.40"N	121°45'41.96"W	8/14/2018	3.38	736	7.19	0.41	64.4	450	0.88	0.050j
018N001E08D001M	08D1M	392604121531801	39°26'05.43"N	121°53'18.16"W	8/14/2018	2.00	389.4	7.45	0.01	63.9	240	ND<0.055	0.048j
019N001E22B001M	22B1M	392924121504801	39°29'24.94"N	121°50'51.37"W	8/14/2018	1.20	767	7.43	0.03	63.3	440	1.3	0.052j
019N001E09C002M	09C2M	393118121521401	39°31'18.1"N	121°52'14.1"W	8/13/2018	4.34	878	7.5	0.17	64.9	470	0.34j	0.086j
020N002E35J002M	35J2M	393230121422202	39°32'29.6"N	121°42'27.1"W	8/13/2018	4.32	858	7.1	0.31	68.0	530	10	0.11
020N002E08A001M	08A1M	393630121455401	39°36'29.27"N	121°45'56.86"W	8/13/2018	5.75	246.10	6.93	0.50	66.02	220	0.087j	0.041j
						MCL	**900 to 1,600**	**None**	**None**	**None**	**500 to 1,000**	**10**	**None**

Notes:

MRLs: TDS = 10 mg/L; nitrate+nitrite as N = 0.40 mg/L; ammonia as N = 0.10 mg/L

j = EPA flag; analyte detected but below the method reporting limit; therefore, the result is an estimated concentration

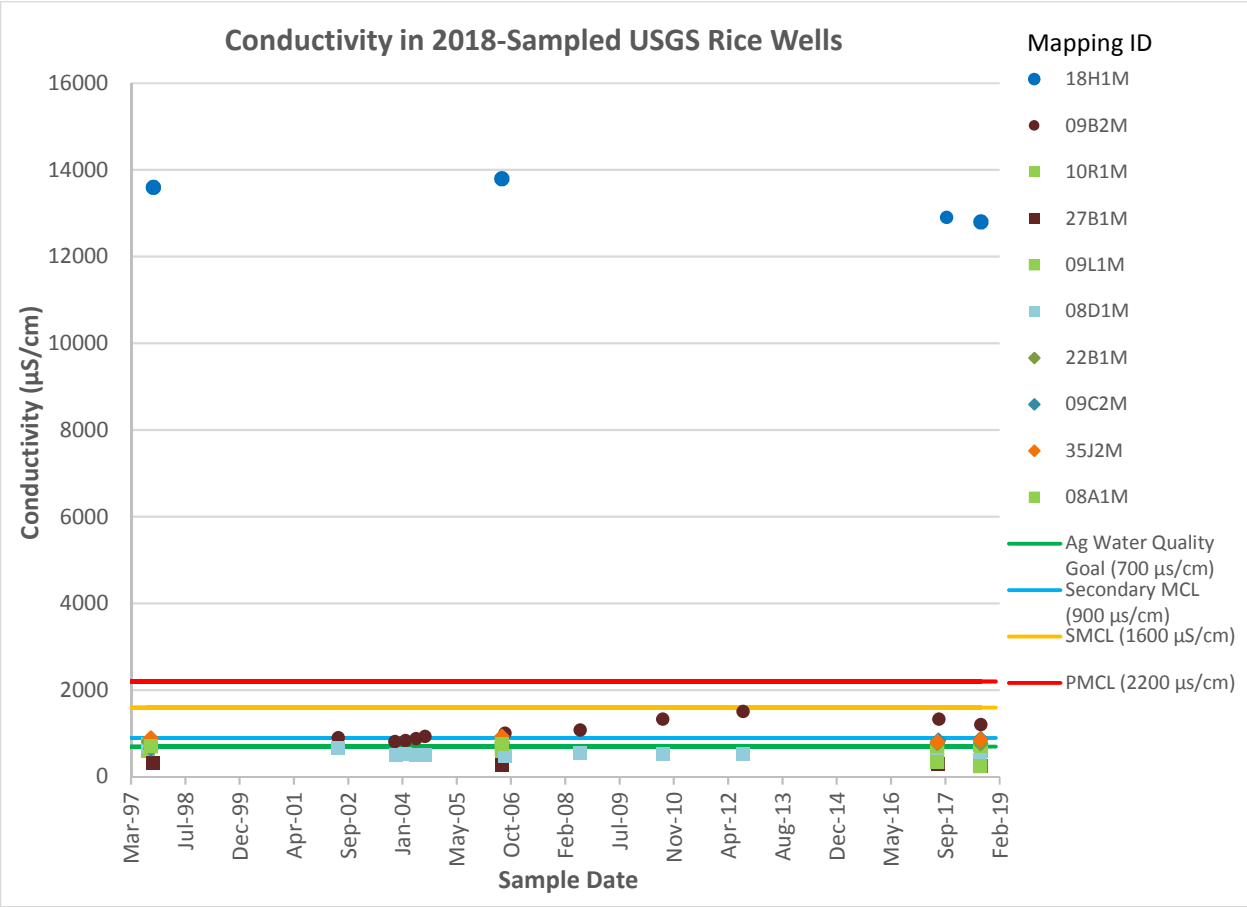


Figure 7-6. Conductivity in 2018-Sampled USGS Rice Wells

7.2.2 Groundwater Sample Results – Laboratory Parameters

Laboratory parameters measured in 2018 included TDS, nitrate, and ammonia[1]; results are presented in Table 7-8; and time concentration charts are provided and discussed below. Results were similar to 2017 and historical results reported in the GAR (CRC, 2013). Non-typical results are as follows:

- **TDS –** The majority of the TDS results in the sampled wells were below the MCLs with the exception of Well 18H1M, which had a TDS result several magnitudes higher than the rest of the sampled wells (Figure 7-7). The high result aligns with the high conductivity at this well (discussed above) and with the high TDS results reported for this well in the GAR. As described in the GAR, this well is located south of the Sutter Buttes, in an area where high TDS levels in deeper wells is common. Although the GAR stated that the source of the TDS was considered inconclusive, it was determined that it could not reasonably be attributed to rice land use (and near-surface irrigation).
- **Nitrate –** All of the sampled wells had results below the MCL with the exception of Well 35J2M. Well 35J2M had a nitrate result of 10 mg/L in 2018, which meets the MCL. This well had a higher nitrate result in 2017 as well, and has experienced an increase in concentration since the GAR publication of historical results (Figure 7-8). The GAR reported that this well might be influenced by land uses other than rice farming (see GAR Appendix E-3), and the increase in nitrate concentration in recent years supports this. This well is discussed in more detail in the following section.

[1] Ammonia values were very low to barely detectable (Table 7-8), and are therefore not discussed further in this section.

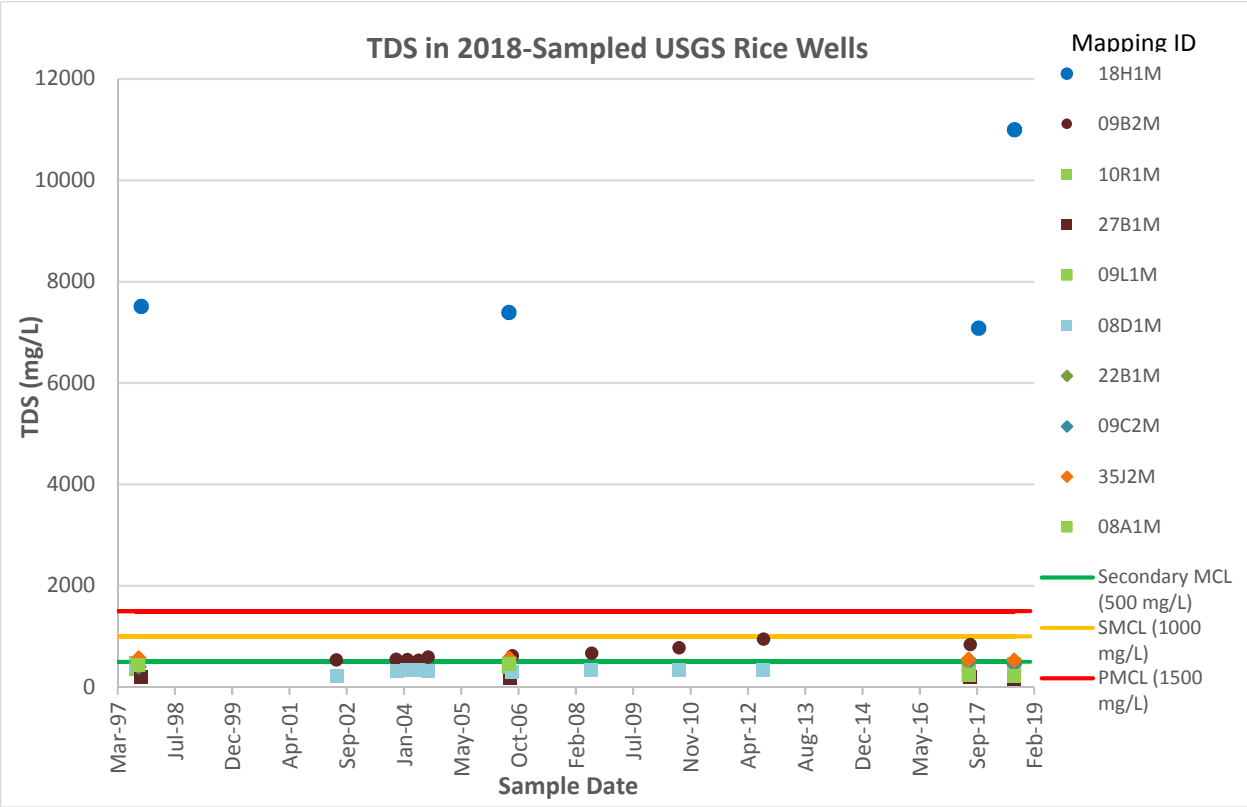


Figure 7-7. Total Dissolved Solids in 2018-Sampled USGS Rice Wells

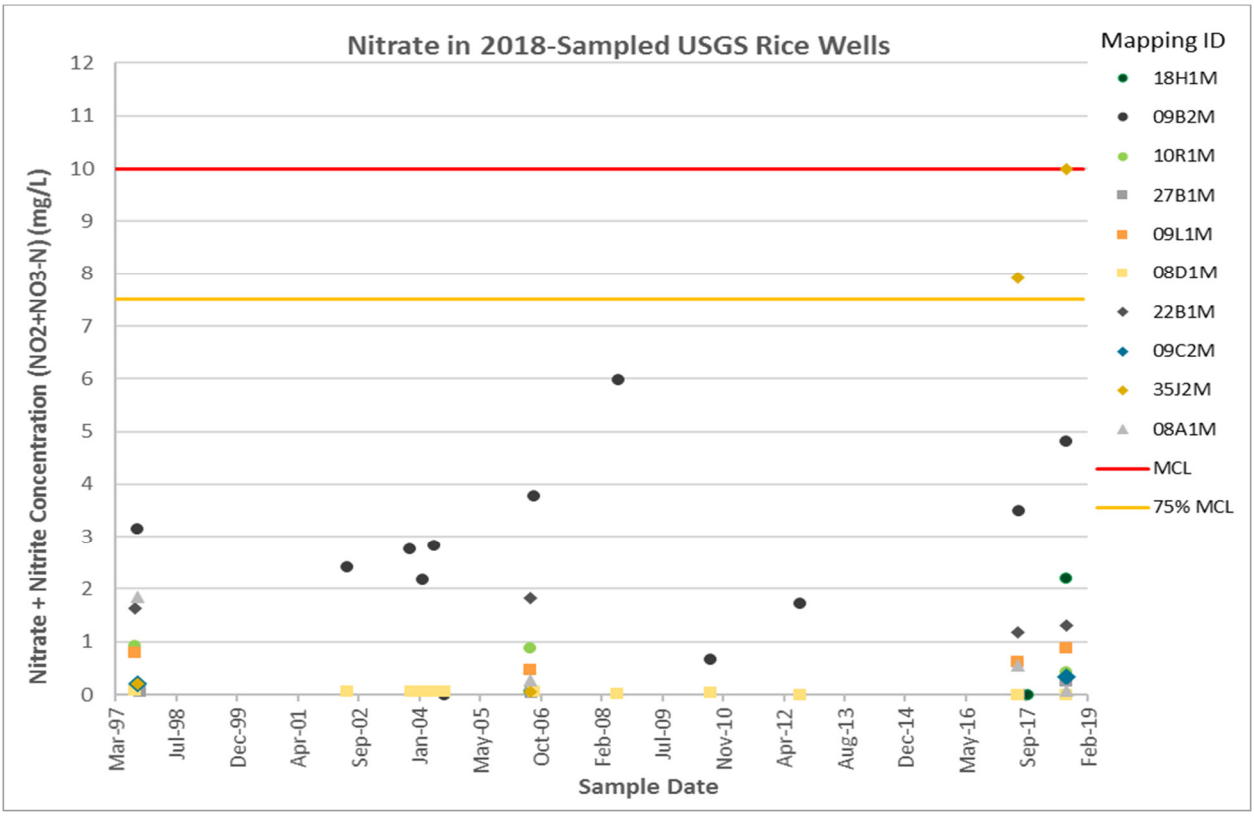


Figure 7-8. Nitrate Concentrations in 2018-Sampled USGS Rice Wells

7.2.3 Additional Information – Well 35J2M

The non-typical results measured at Well 35J2M during the 2017 and 2018 sampling seasons resulted in a deeper investigation into site-specific parameters at this well. A review of records for this well shows that it was re-drilled in 2013, approximately 50 feet east of the old well location. This new well (020N002E35J002M) replaced the damaged original Well 020N002E35J001M from the trend monitoring network (GAR Well 24). The old well was sampled twice (in 1997 and 2006) with nitrate values below 1 mg/L; however, the new well wasn't sampled until 2017, with nitrate concentrations in 2017 and 2018 much higher than at the old well (Table 7-9). A discussion with the USGS, who drilled the well, led to the conclusion that this new well may not be representative of rice land use impacts to shallow groundwater. Indeed, pictures from the USGS (Figure 7-9) show that the well is not located within or adjacent to rice fields, but within grass, which could be fertilized. Also, this well could receive runoff from the adjacent levee/berm such that nitrate values may increase in the shallow groundwater. This impact would be very different as compared to a rice field, where the nitrogen fertilizer would be reduced and denitrified below the flooded fields yielding very low nitrate measurements.

Table 7-9. Historic Nitrate Sampling Data for Well 35J2M
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Date	NO_3+NO_2 (filtered) (mg/L)	Notes
9/11/1997	0.21	Old well J001M sampled by USGS
7/19/2006	0.06	Old well J001M sampled by USGS
7/11/2017	7.92	New well J002M sampled by USGS
8/13/2018	10	New well J002M sampled by CRC

Note:

The first two well samples were from the original well; the last two well samples are from the new replacement well, which was built in 2013.

Figure 7-9. Pictures showing USGS Rice Well 35J2M Field Location
Source: Domagalski, 2018

7.2.4 Groundwater Quality Monitoring Discussion

Overall, the groundwater quality remains stable at the shallow rice wells, with sampled values within the range of values reported in the GAR, except at the wells specified. Site-specific influences outside of rice agriculture seem to be impacting these wells, and their results will be tracked closely in future monitoring. Note that the original GAR recommendation was to monitor seven carefully chosen representative wells of the USGS Rice Wells network, located in large rice areas, to better evaluate the impacts of rice on water quality in the valley on a regional basis. None of these wells have had high nitrate or salinity values since the groundwater trend monitoring sampling started in 2017. The wells with higher salinity and nitrate described above are located either at the margin of rice lands or in natural areas of poor water quality, and were not originally recommended to be included in the rice groundwater trend monitoring network. The final Rice WDR and associated MRP required monitoring of 20 USGS Rice Wells regardless of the GAR technical conclusions and recommendations. The results of the last 2 years of shallow groundwater monitoring in rice areas show that some of these wells do not yield results that can be reliably attributed to rice impacts.

Additionally, DWR did not monitor its Yuba County wells this year. The Yuba County DWR wells were recommended for monitoring in the rice Groundwater Trend Monitoring Workplan (CRC, 2016) to provide groundwater data in the Yuba County data gap area. However, the CRC was not aware that DWR was not planning to sample these wells in 2018, despite an initial bi-annual sampling schedule. Results from these wells in 2017 also showed them to be problematic for rice impacts assessments because they are deeper than the USGS rice wells and because they are located in areas non-typical of rice land use.

Given these challenges, the CRC proposes to re-assess the groundwater monitoring network in its 2020 GAR Update and make recommendations for the Groundwater Trend Monitoring Program moving forward. In addition, according to the MRP, “after the third year of monitoring [2019], the CRC may request a reduction in groundwater monitoring for approval by the Executive Officer” (CVRWQCB, 2014). At that time, CRC may recommend to return to the originally recommended seven USGS rice wells on the valley floor, if deemed appropriate.

In conclusion, CRC recommends to do the following:

1. Review all current rice trend monitoring wells for applicability in 2020 as part of the GAR Update.
2. Select the most representative wells for inclusion in the Groundwater Trend Monitoring Program given appropriate spatial and temporal distribution.
3. Evaluate the need to drill new shallow rice-specific monitoring wells where needed to supplement the rice Groundwater Trend Monitoring Program, specifically in the Yuba County area.

SECTION 8

Proposed Pesticide Monitoring

The CRC has developed a matrix of pesticides used on rice to facilitate its rice pesticide evaluation process. This matrix was developed with input from scientists and in consultation with the DPR. In fact, the CRC was involved in the Pesticide Evaluation Workgroup to provide assistance to other coalitions in identifying pesticides for monitoring.

Based on the rice pesticides matrix and other factors, the CRC proposes to monitor penoxsulam and bispyribac-sodium in 2019. Both herbicides were historically registered for use as rice-specific herbicides, but are now used on additional crops, with increasing acreage. This change in status makes them important to monitor so that trends in detections can be tracked.

SECTION 9

Electronic Data Submittal

All electronic data for the 2018 monitoring season will be submitted in the required electronic format. Electronic data required for the 2018 AMR and its location within this report or submittal method are as follows:

- Electronic copies of surface water site photos are included in Appendix A.
- Electronic copies of surface water field sheets are included in Appendix B-1.
- Electronic copies of surface water laboratory analytical reports are included in Appendix B-2.
- Electronic copies of surface water chemistry analytical reports (including QC narratives, chain-of-custody [COC] copies, and required QC results) are included with the laboratory results in Appendix B-2.
- Exceedance reports that were issued after each monitoring event in 2018 for DO, SC, or pH are included in Appendix C.
- Electronic copies of groundwater field sheets, calibration logs, and COC forms are included in Appendix D-1.
- Electronic copies of groundwater laboratory analytical reports are included in Appendix D-2.
- CEDEN workbooks for surface water field and chemistry data are included in Appendix E.
- The current eQAPP is included with the surface water CEDEN workbooks in Appendix E.
- Complete Farm Evaluation response information from growing years 2015, 2016, and 2017 is included in Appendix F.
- The spreadsheet of 2018 groundwater monitoring results is included in Appendix G.
- Educational outreach handout examples are provided in Appendix H.

SECTION 10

Sampling and Analytical Methods Used

This section provides the sampling and analytical methods used during the 2018 monitoring season.

10.1 Surface Water Sampling Procedures and Analytical Methods

Surface water sampling was conducted pursuant to the procedures described in the CRC's Quality Assurance Project Plan (QAPP) (CRC, 2015b), which are described briefly in the following sections.

10.1.1 Field Measurements

Field water quality parameters were measured before sample collection at each site, and flow was measured after samples were collected. At each site, the CEDEN field data sheet was completed; this information documents the surface water level, width of the waterway, sample depth at the middle of the water column, general weather observations, time arrived onsite, and field water quality measurements. Unless otherwise noted, field measurements were taken at a depth equal to approximately half the water column.

10.1.1.1 Method Used to Obtain Estimated Flow

Flow was measured using a flow meter. Flow measurements were taken at 10 cross sections at each site. The wetted width of the water body was measured, recorded, and divided by 10 to determine the width of each cross section. The midpoint of each cross section was calculated by dividing the cross-section width in half. Velocity was measured at the midpoint of each cross section at 0.2 and 0.8 of the total depth from the water surface, and was then averaged. Flow was then calculated using the following equation:

$$Q = \sum_{n=1}^{10} W_n D_n V_n$$

Where:

- Q = estimated flow at the site (cfs)
- W = section width (feet)
- D = depth of measurement (feet)
- V = velocity (feet per second)

10.1.2 Grab Samples

A qualified, trained crew of Kleinfelder technicians collected water grab samples using a Kemmerer water sampler (stainless-steel and Teflon model; approximately 1.5-liter volume) at a depth equal to one-half the water column. The Kemmerer was emptied into a stainless-steel container, and the process was repeated until the appropriate volume of water was acquired to split into the required number of samples. This process allowed for homogenization as additional sample volume was added to the container. Certified sample containers were filled with the composite sample using disposable Tygon tubing connected to a peristaltic pump.

10.1.3 Sample Custody and Documentation

Custody of samples was maintained and documented from the time of sample collection to completion of analysis. Each sample was considered to be in the sampler's custody, and the sampler was responsible

for the care and custody of the samples until they were delivered to the laboratory. Field data sheets and copies of COC forms were maintained in the project file for samples collected during each event.

A COC form, sample labels, and field documentation were crosschecked to verify sample identification, type of analyses, sample volume, and number and type of containers.

Field data sheets, COC forms, and calibration forms were scanned by Kleinfelder and submitted to the CRC and CH2M (now Jacobs Engineering Group Inc.). COC forms are included in Appendix B-1.

10.1.4 Sample Delivery and Analysis

After each sampling event, Kleinfelder submitted the samples under COC to the laboratories for analyses. Sample shipments were accompanied by the original COC form, which identified contents, and were transported to the laboratory within the sample holding time.

10.1.5 Sample Containers and Preservation

The sample containers and preservation methods used in 2018 are reported in Table 10-1.

Table 10-1. Surface Water Sample Analysis Sample Containers, Volume, Preservation, and Holding Time
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Parameters for Analysis in Water Samples	Specified Containers	Sample Volume	Initial Field Preservation	Maximum Holding Time (analysis must start by end of max)
Pesticides – bensulfuron-methyl and penoxsulam	1-L amber glass bottle, with Teflon lid-liner (per each sample type)	Each sample requires 1 L in a separate container	Cool to 4°C, dark	Keep at 4°C until analyzed. No official holding time for the method used for these pesticides. Recommend freezing samples if held beyond 14 days.
Pesticides – benzobicyclon and metabolite B	1-500 mL poly bottle	One container for both analyses	Cool to 4°C or frozen	Hold time at 4°C is 14 days; if frozen, samples may be held for up to 1 year.

Notes:

L = liter(s)
mL = milliliter(s)

10.1.6 Analytical Methods

The analytical methods used in analysis of the 2018 surface water samples are reported in Table 10-2.

Table 10-2. Surface Water Analytical Methods Used, by Parameter
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Matrix	Chemical	Method
Surface Water	Bensulfuron-methyl and penoxsulam	NCL ME 326*
	Benzobicyclon and metabolite B	NCL ME 337

*Method NCL ME 326 = Aquatic herbicides in water by LC-MS-MS

10.2 Groundwater Sampling Procedures and Analytical Methods

Groundwater sampling in 2018 was conducted pursuant to the procedures described in the CRC's QAPP (CRC, 2015b) and as outlined in the Groundwater Sample Collection Standard Operating Procedure

included as Appendix B of the Groundwater Trend Monitoring Workplan (CRC, 2016). Sampling procedures are described briefly in the following sections.

10.2.1 Field Measurements

A qualified, trained crew of Kleinfelder technicians collected groundwater samples and did in-field parameter measurements in 2018. Static water levels were measured with a conductivity sensing water level meter prior to purging and sampling, and were recorded on the field log sheets (Appendix D-1).

For sampling of field parameters, groundwater was pumped through a flow-through chamber fitted with a multiprobe meter (YSI PRO Plus meter) that simultaneously measured the water-quality indicators DO, temperature, pH, and conductivity. Odor and color were also recorded during purging. Parameters were recorded at 5-minute intervals for at least 30 minutes, and five consecutive readings were used as a stabilization criterion to be considered stable and ready to sample. After sampling, a final reading of parameters was recorded.

10.2.2 Sample Custody and Documentation

Custody of samples was maintained and documented from the time of sample collection to completion of analysis. Each sample was considered to be in the sampler's custody, and the sampler was responsible for the care and custody of the samples until they were delivered to the laboratory. Field data sheets and copies of COC forms were maintained in the project file for samples collected during each event.

A COC form, sample labels, and field documentation were crosschecked to verify sample identification, type of analyses, sample volume, and number and type of containers.

Field data sheets, COC forms, and calibration forms were scanned by Kleinfelder and submitted to the CRC and CH2M (now Jacobs Engineering Group Inc.). COC forms are included in Appendix D-1.

10.2.3 Sample Delivery and Analysis

After each sampling event, Kleinfelder submitted the samples under COC to the laboratory for analyses. Sample shipments were accompanied by the original COC form, which identified contents, and were transported to the laboratory within the sample holding time.

10.2.4 Sample Containers and Preservation

Sample handling and custody procedures are described in Section 12 of the Surface Water QAPP (CRC, 2015a) and were followed during groundwater sampling. Table 10-3 displays sample container, volume, preservation, and holding time information for the parameters sampled in 2018.

Table 10-3. Groundwater Sample Analysis Sample Containers, Volume, Preservation, and Holding Time
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Parameters for Analysis in Water Samples	Specified Containers	Sample Volume	Initial Field Preservation	Maximum Holding Time (analysis must start by end of max)
TDS	Polyethylene bottle	1 L	Cool to 6°C, dark	7 days at 6°C, dark
Nitrate + Nitrite (as N)	Polyethylene bottle	1 L	Cool to 6°C, dark	48 hours at 6°C, dark
Total Ammonia (as N)	Polyethylene bottle	500 mL	Cool to 6°C, dark	48 hours at 6°C, dark

10.2.5 Analytical Methods

The analytical methods used in analysis of the 2018 groundwater samples are reported in Table 10-4.

Table 10-4. Groundwater Analytical Methods Used, by Parameter
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Matrix	Analyte	Method
Groundwater	TDS	SM2540C
	Nitrate + Nitrate (as N)	EPA 300.0
	Ammonia (as N)	SM4500-NH_3F

SECTION 11

Summary of Quality Assurance Evaluation Results

The validity of water quality monitoring results relies on defining and rigorously following a QA/QC program. QA/QC requirements are specified in a QAPP, and the laboratory QA/QC requirements are specified in QA/QC plans for each laboratory.

The following sections discuss QA/QC requirements for both surface water and groundwater monitoring results. QA/QC requirements for Rice WDR surface water sampling is specified in the updated CRC QAPP (CRC, 2015b); groundwater QA/QC requirements are specified in the groundwater-specific QAPP attached as Appendix B of the Groundwater Trend Monitoring Workplan (CRC, 2016). It should be noted that the groundwater-specific QAPP heavily references the surface water QAPP; references given herein apply for both sets of QAPP requirements, unless otherwise noted. Both QAPPs were prepared in accordance with Attachment C (Quality Assurance Project Plan Guidelines for California Rice Commission) of the Rice WDR MRP (CVRWQCB, 2010).

Both the surface water and groundwater QAPPs specify several types of QA/QC samples, including the following:

- Field QA/QC samples
  - Field blanks
  - Field duplicates
- Laboratory QA/QC samples
  - Method blanks
  - Matrix spike and matrix spike duplicate (MS/MSD) samples
  - Laboratory control spike and laboratory control spike duplicate (LCS/LCSD) samples

Requirements for number of each type of sample are outlined by monitoring type (that is, surface water versus groundwater monitoring).

The QAPP also specifies numeric QA/QC objectives for precision, accuracy, representativeness, comparability, and completeness. This section briefly describes the QA/QC requirements for each program, QA/QC samples taken during 2018 monitoring, presents the quality assurance objectives (QAOs), and evaluates the 2018 Rice WDR QA/QC results against the objectives.

11.1 Quality Assurance Objectives

QAOs are the detailed QC specifications for precision, accuracy, representativeness, comparability, and completeness. QAOs are used as comparison criteria during data quality review to evaluate whether the minimum requirements have been met and the data can be used as planned. The basis for assessing each element of data quality for this project is discussed in the CRC QAPP (CRC, 2015b), and is introduced briefly in the following sections.

11.1.1 Precision

Precision is a measure of the reproducibility of analyses under a given set of conditions, and is assessed by replicate measurements of field and laboratory duplicate samples.

The maximum acceptable relative percent difference (RPD) for all duplicates, MS/MSD samples, and LCS/LCSD samples is 25 percent.

11.1.2 Accuracy

Accuracy is a determination of how close the measurement is to the true value. Accuracy can be assessed using the MS/MSD, LCS/LCSD, calibration standard, and spiked environmental samples, and it is presented as percent recovery.

Acceptable percent recovery for this project depends on sample type, as follows:

- Conventional constituents (TSS, TOC, nutrients) = 80 to 120 percent
- Synthetic organic analytes (pesticides) = 50 to 150 percent

In addition, laboratory method blanks were tested to determine levels of target compounds. If a target compound is found above the MDL in the method blank corresponding to a batch of samples, and if the same target compound is found in a sample, then the data will not be background subtracted but will be flagged to indicate the result in the blank.

11.1.3 Representativeness

Representativeness refers to the degree to which sample data accurately and precisely describe the characteristics of a population of samples, parameter variations at a sampling point, or environmental conditions. Representativeness is a qualitative parameter that is primarily concerned with the proper design of the sampling program or of the subsampling of a given sample. Representativeness will be assessed using duplicate field and laboratory samples because they provide information pertaining to both precision and representativeness.

Samples that were not properly preserved or were analyzed beyond acceptable holding times were not considered to provide representative data. Also, detection limits above applicable MCLs or screening criteria will not be considered representative.

11.1.4 Comparability

Comparability is a qualitative parameter expressing the confidences with which one data set can be compared with another. Sample data should be comparable for similar samples collected under like conditions. This goal is achieved using standard techniques to collect and analyze representative samples and reporting analytical results with appropriate units.

As comparability is limited by other analytical control parameters, data sets be compared with confidence only when precision and accuracy are known. Using standard operating procedures promotes comparability.

11.1.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount as expected to be obtained under normal conditions. To be considered complete, the data set must contain all analytical results and data specified for the project. In addition, all data are compared to project requirements to ensure that specifications are met.

The requirement for completeness is 90 percent for each individual analytical method for all QC parameters except holding times. These QC parameters include the following:

- Initial calibration
- Continuing calibrations
- LCS/LCSD
- MS/MSD
- Field duplicate RPDs
- Surrogate percent recoveries

The requirement for holding times is 100 percent.

11.2 QA/QC Sample Results

One QC set is required for each analytical method batch per sampling event. The minimum required samples for chemical analysis include the following:

- Field blank
- Field duplicate
- MS/MSD
- LCS/LCSD
- Laboratory blank
- Laboratory duplicate (MS/MSD or LCS/LCSD pair may serve this function)

Surface water – Field duplicate and field blank samples were not required for events where only field parameters were collected.

Groundwater – Field duplicate and field blank samples required at a rate of one field blank/duplicate pair for every 10 samples (that is, if 10 samples are collected, one field blank/duplicate pair is needed; if 11 samples are collected, two pairs are needed).

11.2.1 Surface Water QA/QC

11.2.1.1 Surface Water Field QA/QC Samples

Field QA/QC samples collected during 2018 sampling events included field blanks and field duplicates. The dates, events, and sites of these samples are shown in Table 11-1.

Table 11-1. Surface Water Field QA/QC Samples, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Event	Sample Date	QA/QC Sample Type(s)
May Event 1 (SE1)	5/22/2018	Field blank and field duplicate at BS1
May Event 2 (SE2)	6/5/2018	Field blank and field duplicate at CBD1
June Event 1 (SE3)	6/19/2018	Field blank and field duplicate at SSB
July Event 1 (SE4)	7/2/2018	Field blank and field duplicate at CBD5

Surface Water Field Blanks. Field blank samples were collected and analyzed for the same constituents as the environmental samples. The results for the field blanks were less than the MRLs for all analytes (Table 11-2).

Table 11-2. Surface Water Field Blank Results, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

		Analyte			
Sample Event	Sample Location	Benzobicyclon (MRL = 1.0 µg/L)	Metabolite B (MRL = 1.0 µg/L)	Bensulfuron-methyl (MRL = 1.0 µg/L)	Penoxsulam (MRL = 0.10 mg/L)
May Event 1 (SE1)	BS1	ND	ND	-	-
May Event 2 (SE2)	CBD1	ND	ND	-	-
June Event 1 (SE3)	SSB	-	-	ND	ND
July Event 1 (SE4)	CBD5	-	-	ND	ND

Note:

ND = non-detect above the MRL

Surface Water Field Duplicates. Field duplicate samples were collected and analyzed for the same constituents as the primary environmental samples. The majority of the primary and duplicate samples had similar results, as expected (Table 11-3). The RPD for the SE4 penoxsulam sample was outside of the limit; however, the results hovered around the MRL, where accuracy is reduced. The remainder of the samples had RPD percentages within the acceptable range.

Table 11-3. Surface Water Field Duplicate Results, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Event	Sample Location	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	RPD (%)	RPD Limit (%)
May Event 1 (SE1)	BS1	Benzobicyclon	ND	ND	NA	25
		Metabolite B	ND	ND	NA	25
May Event 2 (SE2)	CBD1	Benzobicyclon	ND	ND	NA	25
		Metabolite B	0.85j	0.81j	4.8	25
June Event 1 (SE3)	SSB	Bensulfuron-methyl	ND	ND	NA	25
		Penoxsulam	0.35	0.35	0	25
July Event 1 (SE4)	CBD5	Bensulfuron-methyl	ND	ND	NA	25
		Penoxsulam	0.11	0.069j	**46**	25

Notes:

Bold values are outside recovery limits.

j = EPA flag; result falls below the MRL, and is therefore considered an estimated value
NA = not applicable
ND = non-detect above the MRL

Benzobicyclon: MDL = 0.08 µg/L, MRL = 1.0 µg/L
Metabolite B: MDL = 0.26 µg/L, MRL = 1.0 µg/L
Bensulfuron-methyl: MDL = 0.26 µg/L, MRL = 1.0 µg/L
Penoxsulam: MDL = 0.015 µg/L, MRL = 0.10 µg/L

11.2.1.2 Surface Water Laboratory QA/QC Samples

Laboratory QA/QC samples used during the 2018 season included method blanks, MS/MSDs, LCS/LCSDs, and surrogate standards. The results for each are as follows.

Surface Water Method Blanks. Method blank samples were prepared by the laboratory and tested for the same analytes as the environmental samples. The results of all the method blank samples were below the MRL (ND) except for the method blank sample for metabolite B at the first sampling event (Table 11-4). After the detect in the method blank, the lab decided to add a second rinse vial after running standards to ensure that future method blank samples would be true blanks.

Table 11-4. Surface Water Method Blank Results, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

	Analyte			
Sample Event	**Benzobicyclon (MRL = 1.0 µg/L)**	**Metabolite B (MRL = 1.0 µg/L)**	**Bensulfuron-methyl (MRL = 1.0 µg/L)**	**Penoxsulam (MRL = 0.10 µg/L)**
May Event 1 (SE1)	ND	0.5771	NA	NA
May Event 2 (SE2)	ND	ND	NA	NA
June Event 1 (SE3)	NA	NA	ND	ND
July Event 1 (SE4)	NA	NA	ND	ND

Notes:

NA = not applicable
ND = non-detect above the MRL

Surface Water MS/MSD Samples. MS and MSD samples were prepared and analyzed for each sampling event (Table 11-5). All MS/MSD recoveries for all analytes were within QAPP limits.

Table 11-5. Surface Water MS/MSD Results, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Event	Analyte	Spike Level (mg/L)	Spike Recovery (%)	Duplicate Recovery (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
May Event 1 (SE1)	Benzobicyclon	10.0	104	109	50 to 150	5	25
	Metabolite B	10.0	120	130	50 to 150	8	25
May Event 2 (SE2)	Benzobicyclon	10.0	71.7	78.8	50 to 150	9	25
	Metabolite B	10.0	93.7	94.6	50 to 150	1	25
June Event 1 (SE3)	Bensulfuron-methyl	10.0	118	134	50 to 150	13	25
	Penoxsulam	1.00	65.2	71.7	50 to 150	9	25
July Event 1 (SE4)	Bensulfuron-methyl	10.0	65.2	78.5	50 to 150	18.5	25
	Penoxsulam	1.00	66.6	83.4	50 to 150	22.4	25

Surface Water LCS/LCSD Samples. LCS and LCSD samples were prepared and analyzed for each sampling event. The LCS/LCSD recoveries and RPD percentages for all samples were within the QAPP limits (Table 11-6).

Table 11-6. Surface Water LCS/LCSD Results, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Event	Analyte	Spike Level (mg/L)	Spike Recovery (%)	Duplicate Recovery (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
May Event 1 (SE1)	Benzobicyclon	10.0	92.8	81.9	50 to 150	12.5	25
	Metabolite B	10.0	103	95.9	50 to 150	7	25
May Event 2 (SE2)	Benzobicyclon	10.0	71.1	80.2	50 to 150	12	25
	Metabolite B	10.0	93.3	88.5	50 to 150	5	25
June Event 1 (SE3)	Bensulfuron-methyl	10.0	107	118	50 to 150	10	25
	Penoxsulam	1.00	56.5	59.2	50 to 150	5	25
July Event 1 (SE4)	Bensulfuron-methyl	10.0	79.3	77.0	50 to 150	3	25
	Penoxsulam	1.00	98.1	89.0	50 to 150	10	25

Surface Water Surrogate Standard Samples. Surrogate standard samples were prepared for analysis with each pesticide sample batch (Table 11-7). The majority of the surrogate standard samples had acceptable recoveries, with the exception of the recoveries for SE1, and one site from SE4. The lab determined that the high surrogate recoveries were attributable to matrix interference with the samples.

Table 11-7. Surface Water Surrogate Standard Samples, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

		Surrogate Recovery Results (%)
Sample Event	**Sample Location**	**Atrazine-d5 (65 to 135)***
May Event 1 (SE1)	SSB	105
	BS1	105
	BS1-Dup	103
	BS1-FBL	106
	BS1-MS	105
	CBD5	106
	CBD1	104
May Event 2 (SE2)	SSB	95
	BS1	114
	CBD5	111
	CBD1	125
	CBD1-Dup	125
	CBD1-FBL	129
	CBD1-MS	121

Table 11-7. Surface Water Surrogate Standard Samples, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

		Surrogate Recovery Results (%)
Sample Event	**Sample Location**	**Atrazine-d5 (65 to 135)***
June Event 1 (SE3)	SSB	121
	SSB-MS	**138**
	SSB-F	**142**
	SSB-Dup	**160**
	BS1	**139**
	CBD5	**150**
	CBD1	**143**
July Event 1 (SE4)	SSB	103
	BS1	83.5
	CBD5	**139**
	CBD5-M	128
	CBD5-FBL	121
	CBD5-Dup	121
	CBD1	120

* Control limits

Notes:

Atrazine-d5 was the surrogate for all four pesticides analyzed in 2018.

Bold values are outside recovery limits.

11.2.2 Groundwater QA/QC

11.2.2.1 Groundwater Field QA/QC Samples

One groundwater sampling event was conducted in August 2018, with samples taken from 10 of the USGS Rice Wells groundwater monitoring wells (Table 11-8). The sampling event spanned four dates because of the large geographical distribution of the groundwater wells to be sampled, as well as the time required for sampling at each well. Because only 10 locations were sampled, only one set of a field blank/field duplicate was collected, per QAPP requirements.

Table 11-8. Groundwater Field QA/QC Samples, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Event	Sample Dates	QA/QC Sample Type(s)
August Groundwater Sampling Event	8/13, 8/14, 8/15, 8/16	One field blank, one field duplicate

Groundwater Field Blank. The groundwater event field blank was collected and analyzed for the same constituents as the environmental samples (sample collected in the field). The results for the field blank were less than the MRLs for all analytes (Table 11-9). There was a detection above the MDL (but below the MRL) in the ammonia field blank; potential contamination sources and corrective actions were discussed with the lab to ensure that this doesn't occur in the future.

Table 11-9. Groundwater Field Blank Results, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

		Analyte		
Sample Event	**Sample Location**	**Ammonia (MRL = 0.10 mg/L)**	**Nitrate (MRL = 0.40 mg/L)**	**Total Dissolved Solids (MRL = 1.0 mg/L)**
August Groundwater Sampling Event	10R1M	0.041j	ND	ND

Notes:

ND = non-detect above the MRL

j = EPA flag; result falls below the MRL, and is therefore considered an estimated value

Groundwater Field Duplicate. The groundwater field duplicate was collected and analyzed for the same constituents as the primary environmental samples. The majority of the primary and duplicate samples had similar results, as expected (Table 11-10). The RPD for the nitrate sample was outside of the limit; however, the results hovered around the MRL, where accuracy is reduced. The remainder of the samples had RPD percentages within the acceptable range.

Table 11-10. Groundwater Field Duplicate Results, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Event	Sample Location	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	RPD (%)	RPD Limit (%)
August Groundwater Sampling Event	10R1M	Ammonia	0.086j	0.087j	1	25
		Nitrate	0.43	0.25j	**53**	25
		Total dissolved solids	340	330	3	25

Notes:

Bold values are outside recovery limits.

j = EPA flag; result falls below the MRL, and is therefore considered an estimated value

11.2.2.2 Groundwater Laboratory QA/QC Samples

Groundwater laboratory QA/QC samples used during the 2018 season included method blanks, MS/MSDs, and LCS/LCSDs.

Laboratory duplicates were run for the TDS analysis; however, the QA/QC samples analyzed were non-project samples, so the results are not individually reported here. All duplicate sample results for the non-project TDS results were within acceptable ranges. The remainder of the laboratory QA/QC results, run on project samples, are reported in the following sections.

Groundwater Method Blanks. Method blank samples were prepared by the laboratory and tested for the same analytes as the environmental samples. Method blanks were created for each date of sampling, as each date's samples were run immediately to ensure compliance with method hold times. Method blanks for each sampling date are provided in Table 11-11. The results of all the method blank samples were below the MRL (ND) for all three analytes.

Table 11-11. Groundwater Method Blank Results, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

	Analyte		
Sample Date	**Ammonia (MRL = 0.10 mg/L)**	**Nitrate (MRL = 0.40 mg/L)**	**Total Dissolved Solids (MRL = 10 mg/L)**
8/13/2018	ND	ND	ND
8/14/2018 and 8/15/2018	ND	ND	ND
8/16/2018	ND	ND	ND

Note:

ND = non-detect above the MRL

Groundwater MS/MSD Samples. MS and MSD samples were prepared and analyzed for each sample date for nitrate and ammonia (Table 11-12). The majority of the MS/MSD recoveries and all of the RPD percentages were within QAPP limits. The MS/MSD recoveries for several of the ammonia samples were below the acceptable ranges; the lab accepted the batch results because of acceptable LCS/LCSD recoveries.

Table 11-12. Groundwater MS/MSD Results, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Date	Analyte	Spike Level (mg/L)	Spike Recovery (%)	Duplicate Recovery (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
8/13/2018	Nitrate	4.00	98	99	80 to 120	1	25
	Ammonia	0.500	**68**	**64**	80 to 120	4	25
8/14/2018 and 8/15/2018	Nitrate	4.00	95	91	80 to 120	4	25
	Ammonia	0.500	100	93	80 to 120	7	25
8/16/2018	Nitrate	4.00	93	99	80 to 120	6	25
	Ammonia	0.500	**78**	80	80 to 120	3	25

Note:

Bold values are outside recovery limits.

Groundwater LCS/LCSD Samples. LCS and LCSD samples were prepared and analyzed for each sample date for nitrate and ammonia (Table 11-13). The LCS/LCSD recoveries and RPD percentages for all samples were within the QAPP limits.

Table 11-13. Groundwater LCS/LCSD Samples, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Sample Date	Analyte	Spike Level (mg/L)	Spike Recovery (%)	Duplicate Recovery (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
8/13/2018	Nitrate	4.00	99	99	80 to 120	0	25
	Ammonia	0.500	99	102	80 to 120	3	25
8/14/2018 and 8/15/2018	Nitrate	4.00	103	99	80 to 120	4	25
	Ammonia	0.500	105	104	80 to 120	1	25
8/16/2018	Nitrate	4.00	99	98	80 to 120	1	25
	Ammonia	0.500	90	91	80 to 120	1	25

11.3 QA/QC Sample Analysis

11.3.1 Surface Water

11.3.1.1 Analysis of Precision

Field duplicate samples were collected during every sampling event and were analyzed for each primary analyte (Table 11-3). The majority of the duplicate samples had results consistent with the original matrix results with the exception of the SE4 samples for penoxsulam, which exceeded the RPD.

MS/MSD sample sets were prepared and analyzed for every sampling event (Table 11-5). The RPD percentages for all samples were within acceptable limits.

LCS/LCSD samples were prepared and analyzed for every sampling event (Table 11-6). The RPD percentages for all samples were within the acceptable limits.

11.3.1.2 Analysis of Accuracy

Field blank samples were used during every sampling event and were analyzed for each primary analyte (Table 11-2). All field blank samples were found to have detectable analyte levels below the MRLs.

Method blank samples were run with every batch of analytical samples. The majority of the method blank samples were found to have analyte levels below the MRLs with the exception of the SE1 metabolite B method blank (Table 11-4).

MS and MSD samples were prepared and analyzed for every sampling event (Table 11-5). All MS/MSD results were within the QAPP recovery limits.

LCS/LCSD samples were prepared and analyzed for every sampling event (Table 11-6). All LCS/LCSD results were within the QAPP recovery limits.

Surrogate standard samples were prepared and analyzed for all events where pesticide sampling occurred (Table 11-7). The majority of the surrogate standard results fell within QAPP recovery limits except for those from SE3 and one site during SE4.

11.3.1.3 Analysis of Completeness

Field and transport completeness refers to the complete event process of all field activities and successful transport of samples to the receiving agencies. In 2018, all field and transport activities were successful; therefore, field completeness was greater than 90 percent.

Laboratory completeness refers to the complete event process, from sample reception to analysis, at the laboratory. In 2018, all samples were transported and received by the laboratory under COC (Appendix B-1), all storage times were met, and in-house preservation methods were correctly applied. Extraction and analysis of samples were completed successfully, with the majority of laboratory QC samples with results within acceptable ranges.

A calculation of laboratory completeness based on the QC samples (Table 11-14) yields a result of 89 percent. This coupled with the acceptable COC process, storage times, in-house sample preservation, and extraction and analysis of samples yields total laboratory completeness of greater than 90 percent.

Table 11-14. Surface Water Laboratory Completeness, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

		Number of QC Samples		
Sample Event	**Analyte**	**Acceptable QC**	**Unacceptable/Incomplete**	**% Completeness**
May Event 1 (SE1)	Benzobicyclon	6	0	100
	Metabolite B	5	1	83
May Event 2 (SE2)	Benzobicyclon	6	0	100
	Metabolite B	6	0	100
June Event 1 (SE3)	Bensulfuron-methyl	5	1	83
	Penoxsulam	5	1	83
June Event 2 (SE4)	Bensulfuron-methyl	5	1	83
	Penoxsulam	5	1	83
Overall laboratory completeness		**43**	**5**	**89**

11.3.1.4 Analysis Summary

The following is a summary of the results of the QA/QC analysis performed on the 2018 sampling data:

- All field blank samples had analyte levels below the MRLs.
- The majority of the field duplicate sample results were consistent with primary sample results with the exception of the penoxsulam sample from SE4.
- The majority of the method blank samples had results below the MRLs with the exception of the metabolite B sample from SE1.
- All MS/MSD samples had analyte recoveries and RPD values within QAPP limits.
- All LCS/LCSD samples had analyte recoveries and RPD values within QAPP limits.
- Field and laboratory completeness were calculated and determined to be greater than 90 percent.

11.3.2 Groundwater

11.3.2.1 Analysis of Precision

Field duplicate samples were collected during each sampling event and were analyzed for each primary analyte. The majority of the duplicate samples had results consistent with the original matrix results with the exception of the duplicate nitrate sample, which exceeded the RPD (Table 11-10).

MS/MSD sample sets were prepared and analyzed for nitrate and ammonia for each sampling date. The RPD percentages for all samples were within acceptable limits (Table 11-12).

LCS/LCSD samples were prepared and analyzed for nitrate and ammonia for each sampling date. The RPD percentages for all samples were within acceptable limits (Table 11-13).

11.3.2.2 Analysis of Accuracy

Field blank samples were used during the groundwater sampling event and were analyzed for each primary analyte. All field blank samples were found to have detectable analyte levels below the MRLs (Table 11-9).

Method blank samples were run with analytical samples for each sampling date. All groundwater method blank samples had analyte levels below the MRLs (Table 11-11).

MS and MSD samples were prepared and analyzed for nitrate and ammonia for each sampling date. The majority of MS/MSD samples were within QAPP recovery limits; however, recoveries for three samples were below acceptable limits (Table 11-12).

LCS/LCSD samples were prepared and analyzed for every sampling event. All LCS/LCSD results were within the QAPP recovery limits (Table 11-13).

11.3.2.3 Analysis of Completeness

Field and transport completeness refers to the complete event process of all field activities and successful transport of samples to the receiving agencies. In 2018, all field and transport activities were successful; therefore, field completeness was greater than 90 percent.

Laboratory completeness refers to the complete event process, from sample reception to analysis, at the laboratory. In 2018, all samples were transported and received by the laboratory under COC (Appendix D-1), all storage times were met, and in-house preservation methods were correctly applied. Extraction and analysis of samples were completed successfully, with only a small percentage of the laboratory QC samples having results outside of acceptable ranges.

A calculation of laboratory completeness based on the QC samples (Table 11-15) yields a result of 93 percent. This coupled with the acceptable COC process, storage times, in-house sample preservation, and extraction and analysis of samples yields total laboratory completeness of greater than 90 percent.

Table 11-15. Groundwater Laboratory Completeness, 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

		Number of QC Samples		
Sample Date	**Analyte**	**Acceptable QC**	**Unacceptable/Incomplete**	**% Completeness**
8/13/2018	Ammonia	9	2	81
	Nitrate	10	1	91
	TDS	5	0	100
8/14/2018 and 8/15/2018	Ammonia	11	0	100
	Nitrate	10	1	91
	TDS	5	0	100
8/16/2018	Ammonia	10	1	91
	Nitrate	10	1	91
	TDS	5	0	100
Overall laboratory completeness		**75**	**6**	**93**

11.3.2.4 Analysis Summary

The following is a summary of the results of the QA/QC analysis performed on the 2018 sampling data:

- All field blank samples had analyte levels below the MRLs.
- The majority of the field duplicate sample results were consistent with primary sample results with the exception of the nitrate sample.
- All method blank samples had analyte levels below the MRLs.
- The majority of the MS/MSD samples had analyte recoveries and RPD values within QAPP limits with the exception of three ammonia samples, which were below QAPP limits.
- All LCS/LCSD samples had analyte recoveries and RPD values within QAPP limits.
- Field and laboratory completeness were calculated and determined to be greater than 90 percent.

11.4 Chain-of-custody Forms

COC forms documented sample possession from the time of field sampling until the time of laboratory analysis. A COC form was completed after sample collection at each sample event and before sample shipment or release. The COC forms were completed with indelible ink. Unused portions of the form were crossed out and initialed by the sampler. The COC form, sample labels, and field documentation were cross-checked to verify sample identification, type of analyses, sample volume, and number and type of containers.

COC forms for the Rice WDR surface water sampling are included in Appendix B-1, and COC forms for groundwater sampling are included in Appendix D-1.

SECTION 12

Monitoring Data Trend Evaluation

An evaluation of monitoring data to identify spatial trends and patterns is required every 3 years. The evaluation of surface water sampling trends is provided on the fourth year because of decreases in acreage from the drought (in 2015), for consistency with timing of the Farm Evaluation Summary, and because the Rice WDR Order requirement started in 2018. This represents the first monitoring data trend evaluation performed under the Rice WDR, and includes surface water data collected in monitoring years 2015, 2016, 2017, and 2018. This timespan includes three different types of monitoring (assessment, modified assessment, and core monitoring), which are outlined in Table 3-1. This evaluation takes into account sampled field and nutrient data for both primary and secondary sites. Parameters collected during only one Rice WDR monitoring season are not included in this trend analysis (including toxicity, TOC, and sediment grain size). A more robust evaluation for the secondary sites will be appropriate after additional assessment / modified assessment monitoring, which will provide additional results for comparison. Pesticide monitoring rotates every few years, so trend monitoring is not appropriate. However, pesticide monitoring results and trends are reviewed with the pesticide matrix every 5 years to assist in determination of annual pesticide monitoring.

12.1 Surface Water Field Parameters

The surface water field parameters collected under the Rice WDR include water temperature, pH, SC, DO, and flow. These parameters are collected each season at the primary and secondary sites. The results presented are the average values of both meters at each site for the date sampled to reduce potential variability between sampling meters used.

12.1.1 Surface Water Temperature Trend Results

Figures 12-1 and 12-2 show the surface water temperature measurements at primary monitoring sites from 2015 through 2018 and at secondary monitoring sites in 2015 and 2016. Overall, measured water temperatures tracked with ambient air temperatures, as described in the annual AMR reports. This is especially evident in the 2015 and 2016 results, which included a longer duration of monitoring.

The surface water temperatures observed over the years show a consistent average temperature above the Basin Plan (CVRWQCB, 2016) WQO for the lower Sacramento River (68°F). This is a result of longer water hold times in the shallow flooded fields, which yield higher water temperatures. Water temperatures are generally above 68°F by the end of May in the primary sites, and by early June in the upstream, secondary sites. These sites do not support cold water fisheries, especially during peak temperature months.

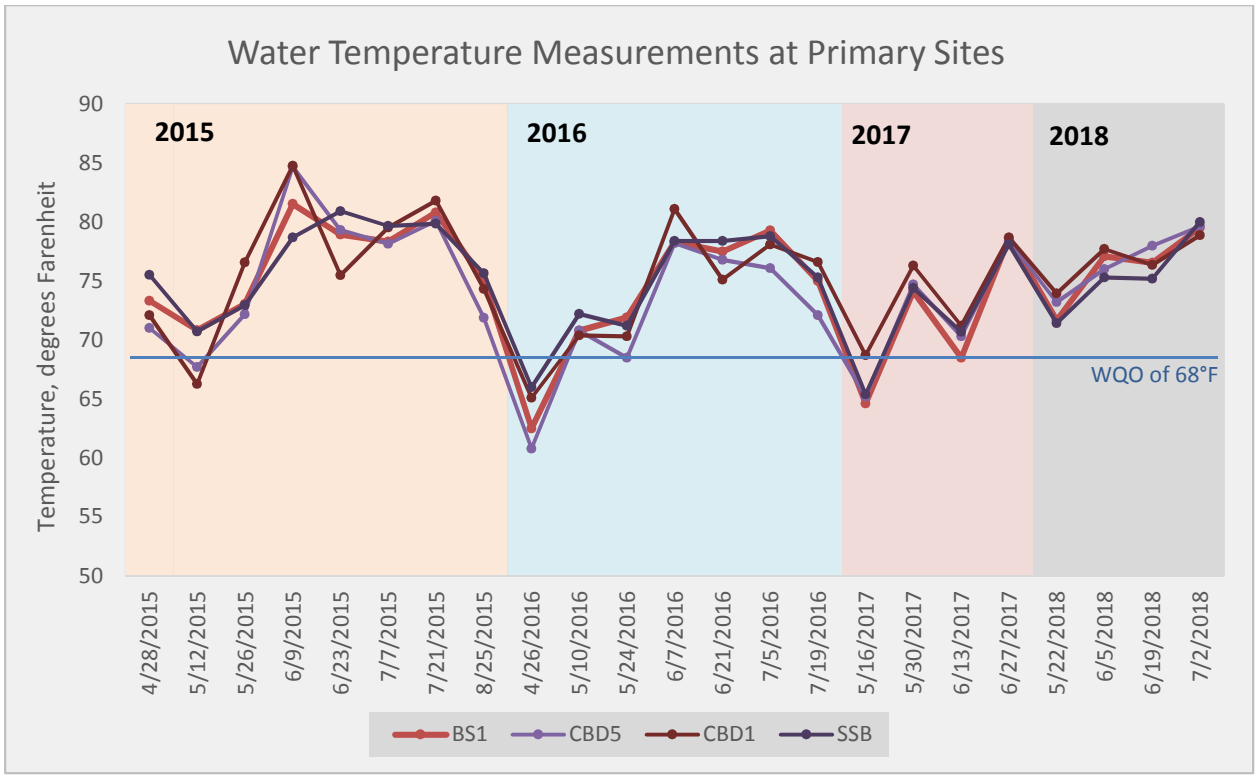


Figure 12-1. Water Temperature Measurements at Primary Sites

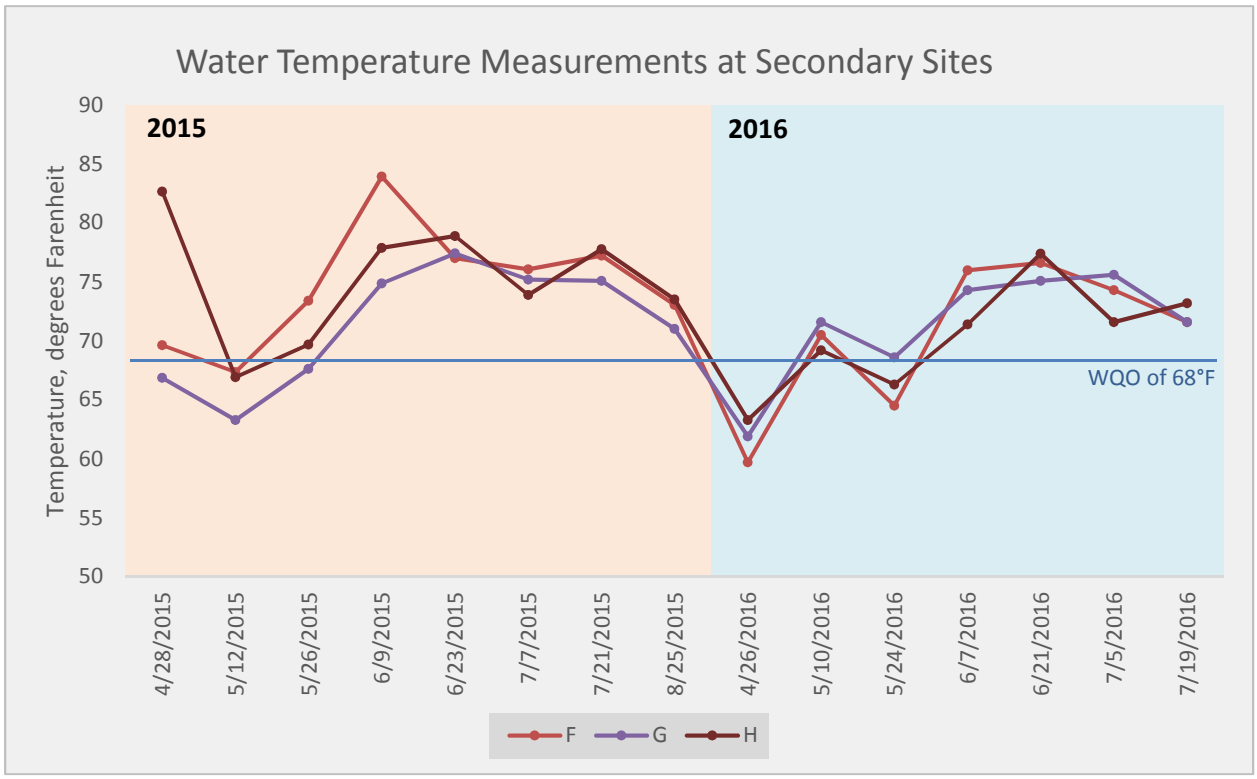


Figure 12-2. Water Temperature Measurements at Secondary Sites

12.1.2 Surface Water pH Trend Results

Figures 12-3 and 12-4 show the pH measurements at primary monitoring sites from 2015 through 2018 and at secondary monitoring sites in 2015 and 2016. The majority of the measurements were between the Basin Plan WQOs of 6.5 and 8.5 for the duration of monitoring. Site H had a high pH at the start of 2015 monitoring, but the pH dropped to within acceptable ranges for the rest of that monitoring year. Site CBD1 was the primary site with the most variable pH across each season, starting at a higher pH and dropping as the season progressed.

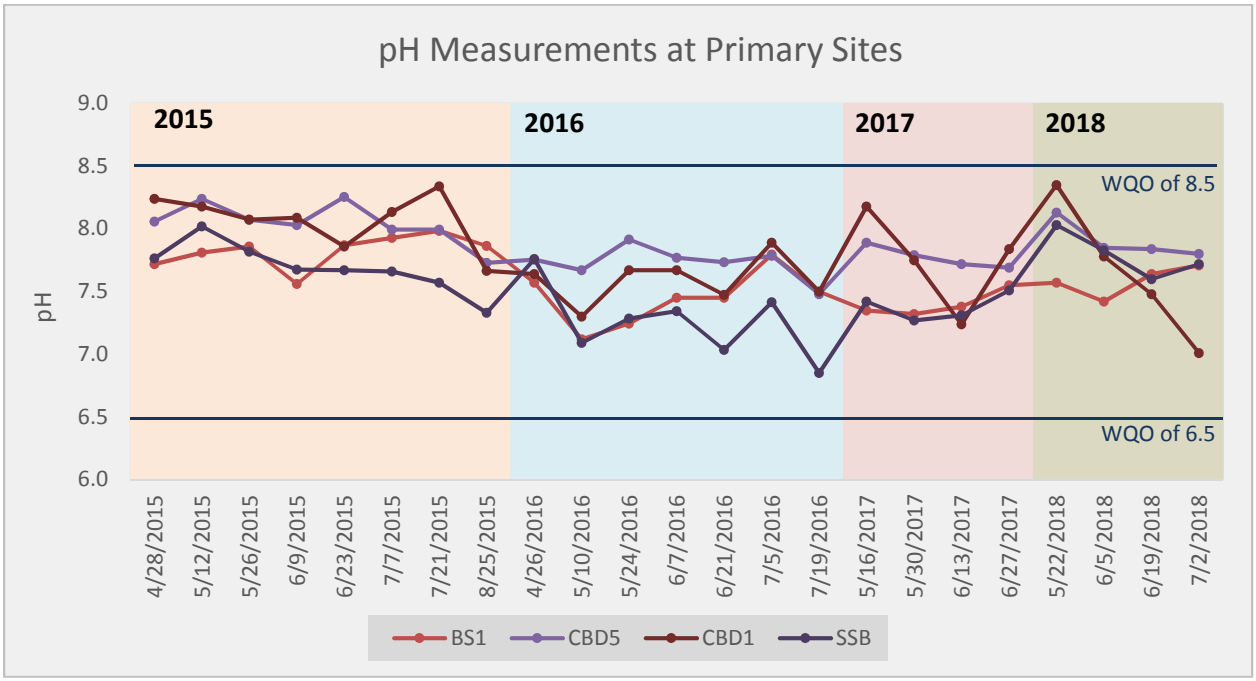


Figure 12-3. pH Measurements at Primary Sites

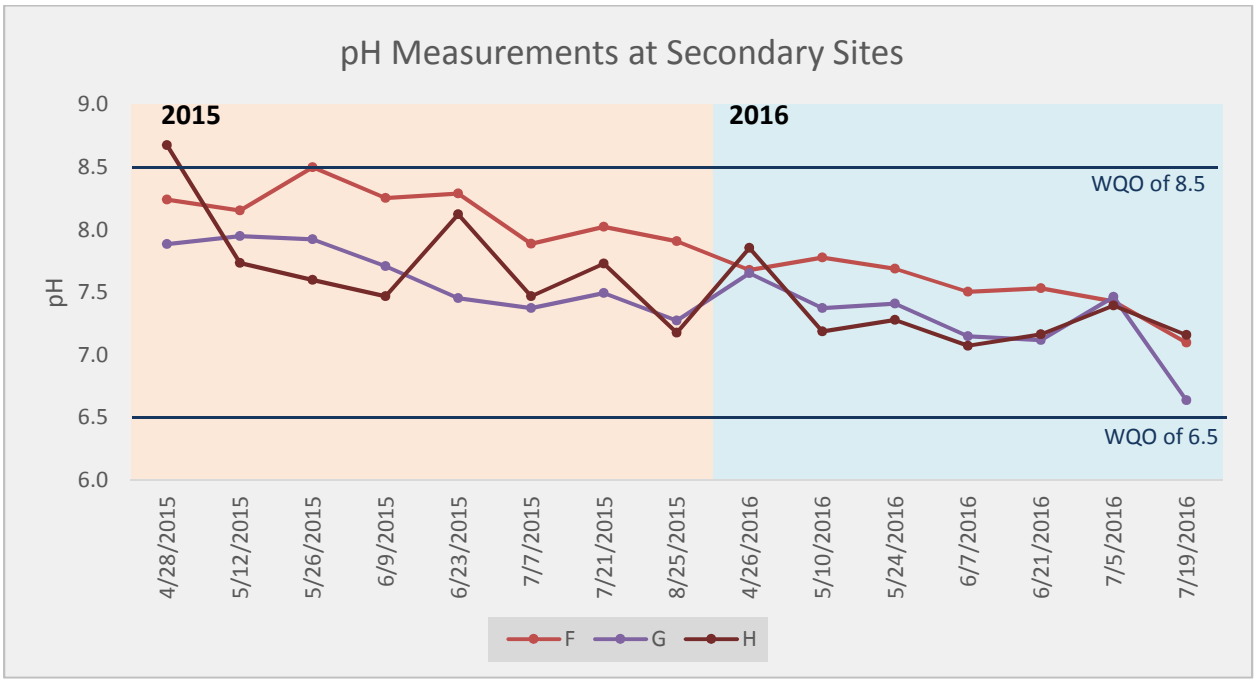


Figure 12-4. pH Measurements at Secondary Sites

12.1.3 Surface Water Specific Conductance Trend Results

Figures 12-5 and 12-6 show the SC measurements at primary monitoring sites from 2015 through 2018 and at secondary monitoring sites in 2015 and 2016. SC generally tracked with water year type (Figure 12-5) (California Data Exchange Center [CDEC], 2018), with wetter years generally having lower SC readings. The combination of more rainfall during the season and more water available for irrigation (therefore reducing concern about water availability/shorter holds) was leading to more dilution. This is especially evident at site CBD1, where the "critical" water year 2015 had the highest and most variable SC readings. 2016 was considered a "below normal" water year, and 2017 was considered a "wet" year; sites CBD5, BS1, and SSB generally had more stable SC throughout the season during these years. The water year type for 2018 has not been released as of this writing.

The majority of the SC readings were below the 700-µS/cm threshold for reporting, with the exception of several readings at CBD1. Site CBD1 is located at the southern portion of the Colusa Basin Drain, and receives water that has been used and reused by several crop types. In contrast, the SC readings at the secondary, upstream sites were lower overall, with all readings at all sites well below the 700-µS/cm threshold.

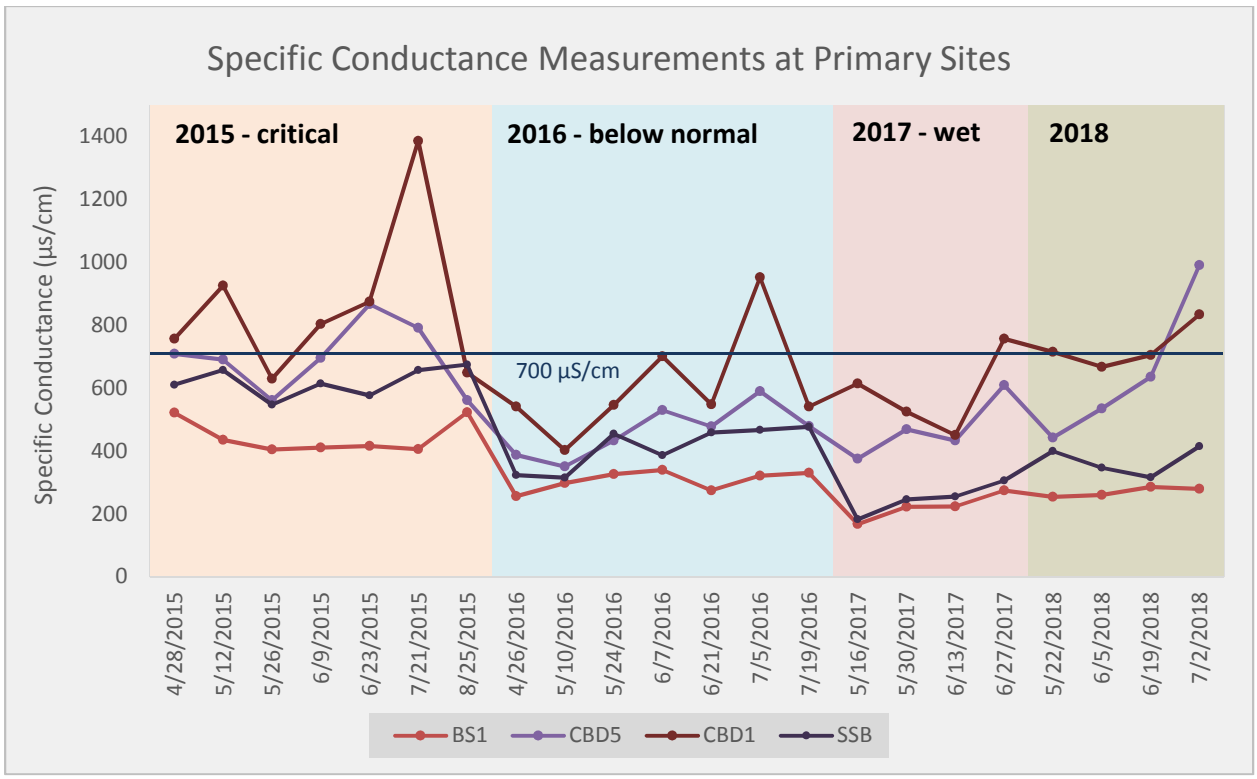


Figure 12-5. Specific Conductance Measurements at Primary Sites

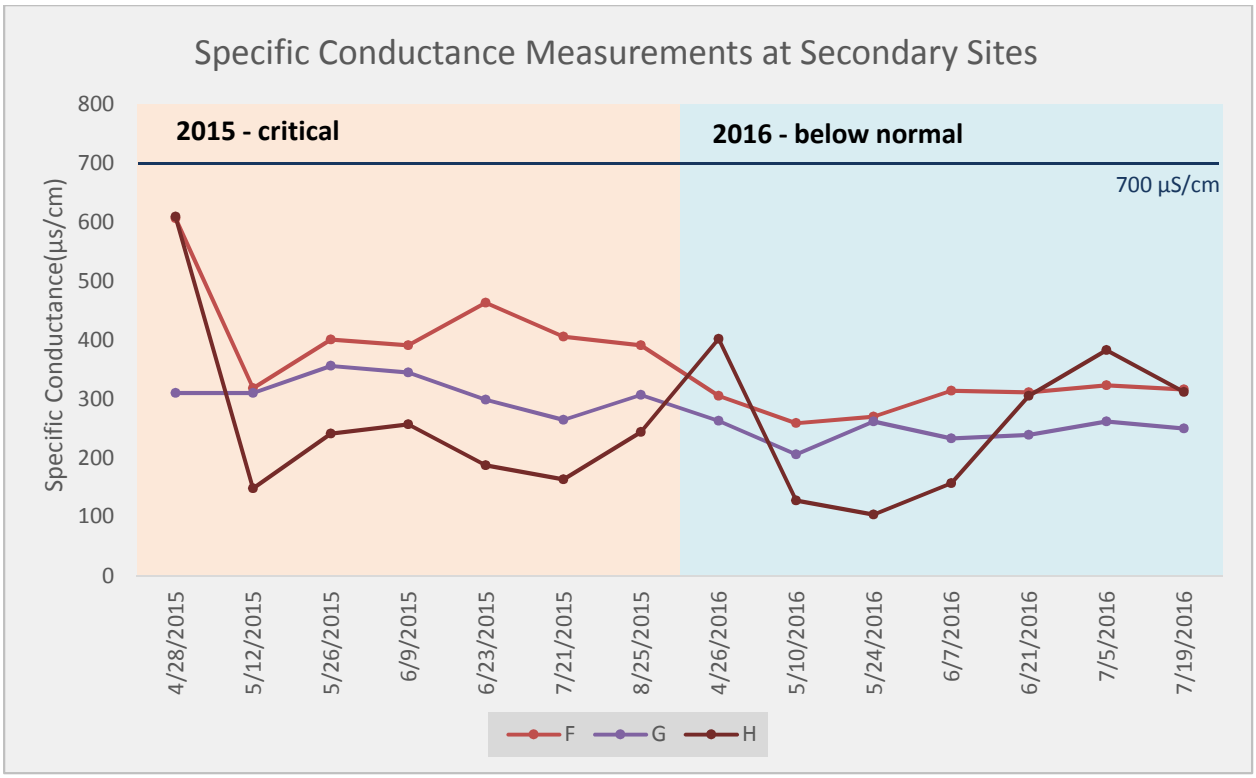


Figure 12-6. Specific Conductance Measurements at Secondary Sites

12.1.4 Surface Water Dissolved Oxygen Trend Results

Figures 12-7 and 12-8 show the DO measurements at primary monitoring sites from 2015 through 2018 and at secondary monitoring sites in 2015 and 2016. Sites CBD5 and F (which is the upstream assessment site for CBD5) consistently met the 7-mg/L COLD water quality standard, with values at most of the other sites generally around the 5-mg/L WARM water quality standard.

Sites G (2015), SSB (2016), and CBD1 (2018) each had a late-season reading that was well below the WARM standard. This demonstrates the influence of site-specific characteristics on DO; while warmer temperatures caused a decrease in DO at all sites, the warm temperatures coupled with an increase in biological activity and decreased flow can cause very low DO at specific sites. For both Sites CBD1 and G (assessment site), a rebounding effect occurred during the following event, likely because of changing site conditions (increased flow). As long as low flow conditions persist in these drain systems, low DO will persist during the warm summer months.

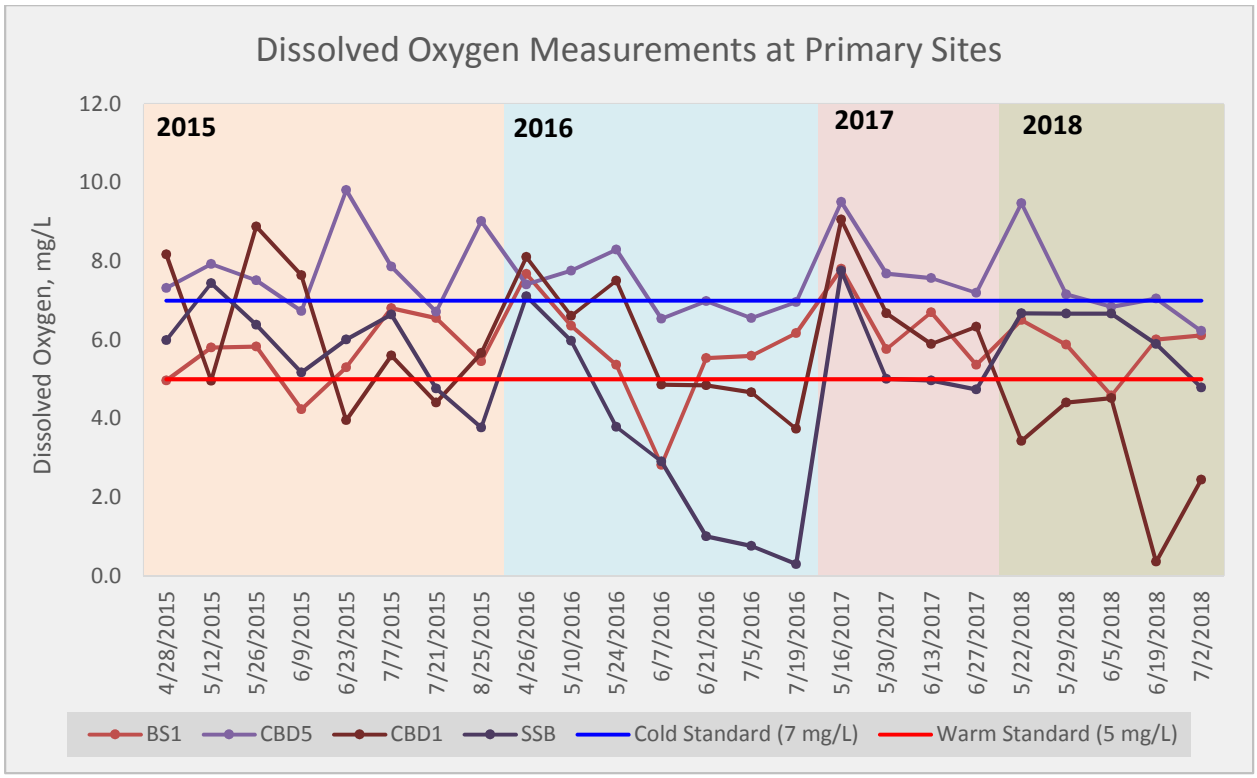


Figure 12-7. Dissolved Oxygen Measurements at Primary Sites

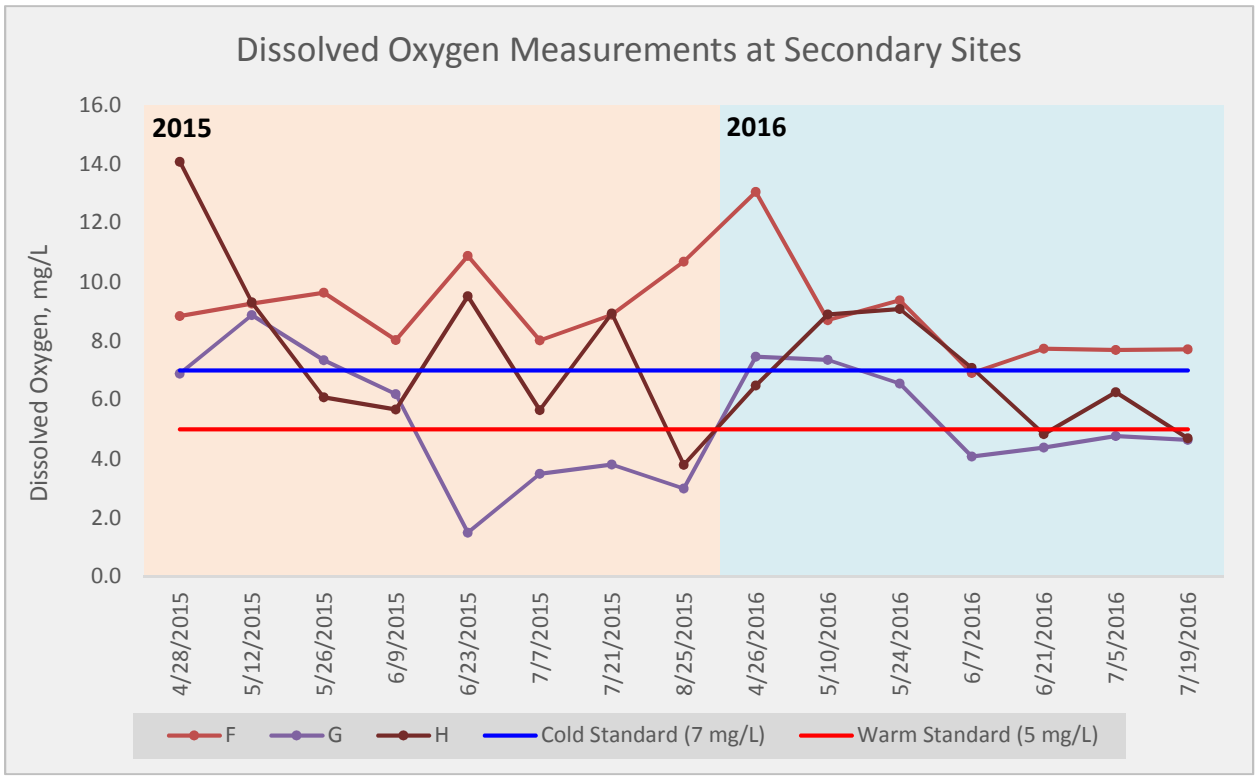


Figure 12-8. Dissolved Oxygen Measurements at Secondary Sites

12.1.5 Surface Water Flow Trend Results

Surface water flow at each sampling location varied between seasons and sites depending on the water year type, water delivery trends, and water holds. Figure 12-9 shows flow measurements for both primary and secondary sites, along with the CDEC water year types for 2015, 2016, and 2017 (CDEC, 2018). The water year type for 2018 has not yet been determined. The irrigation and reclamation districts are more closely managing the water flows in response to the allocations throughout the crop growing season.

Flow at all sites was low during 2015, which was a "critical" water year. Although 2016 was considered a "below normal" water year, flow rebounded as water deliveries increased. 2017 was considered a "wet" year, and had moderate flow as water deliveries returned to normal; pesticides requiring longer water hold times became the preference during the drier years, with the use persisting and resulting in a reduction in volume of return water to the drains. The water year type for 2018 is yet to be determined, but flow remained lower at most of the measured drain sites. Flow is one of the main factors influencing field parameters in rice drains.

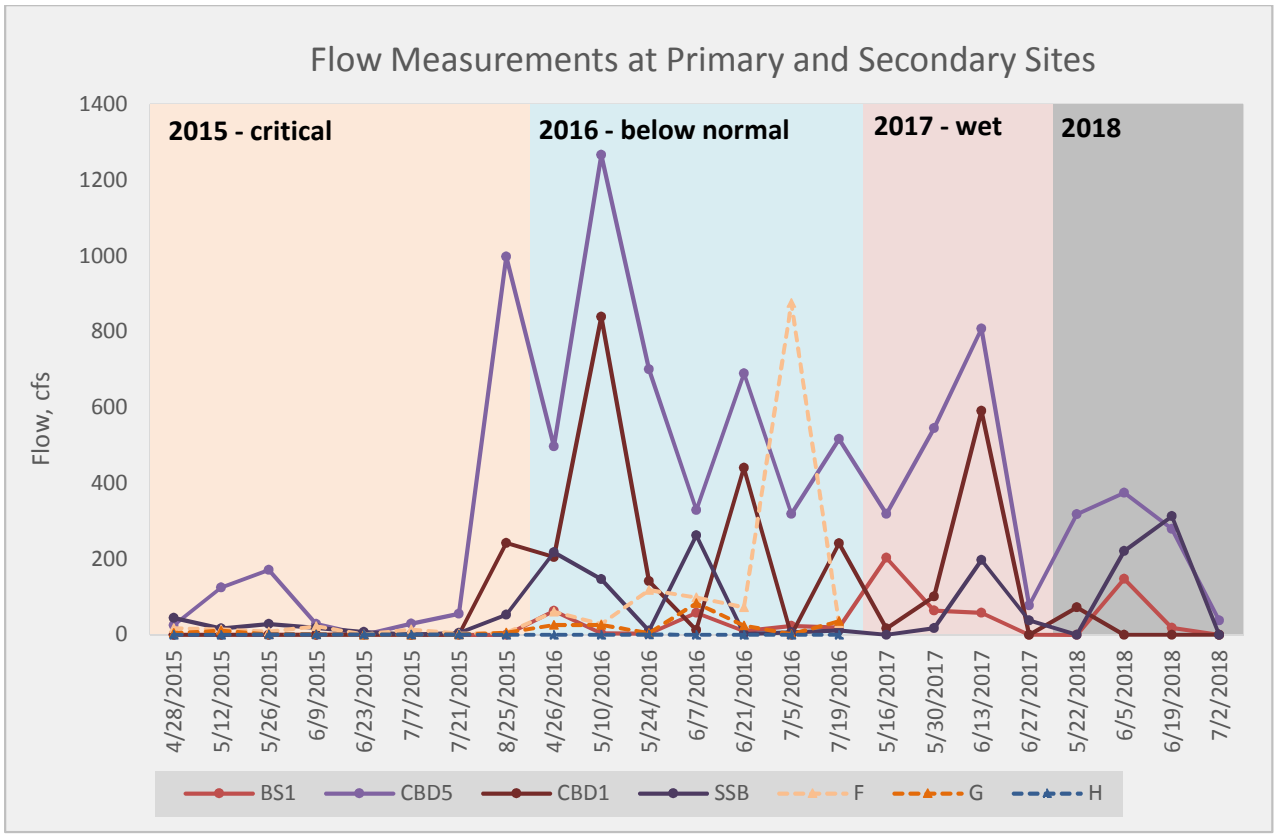


Figure 12-9. Flow Measurements at Primary and Secondary Sites

12.2 Surface Water Laboratory Parameters

Although several laboratory parameters have been monitored as part of the Rice WDR requirements, only nutrients and pesticides were monitored for more than one season since 2015. Pesticide parameters rarely stay the same for several monitoring seasons, and trends in use and detection are reviewed during pesticide selection. Therefore, nutrient parameters are the only laboratory parameters discussed in this monitoring data trend evaluation.

12.2.1 Surface Water Nutrients Trend Results

Figures 12-10 and 12-11 show the results of ammonia and nitrate samples taken at the primary and secondary monitoring sites in 2015 and 2016. Ammonia results were well below the 1.5-mg/L taste and odor threshold for drinking water, and nitrate measurements were consistently below 1 mg/L, which is well below the 10-mg/L primary MCL. In addition to being below the WQOs for both parameters, no significant variations in concentration were observed across the sites and years.

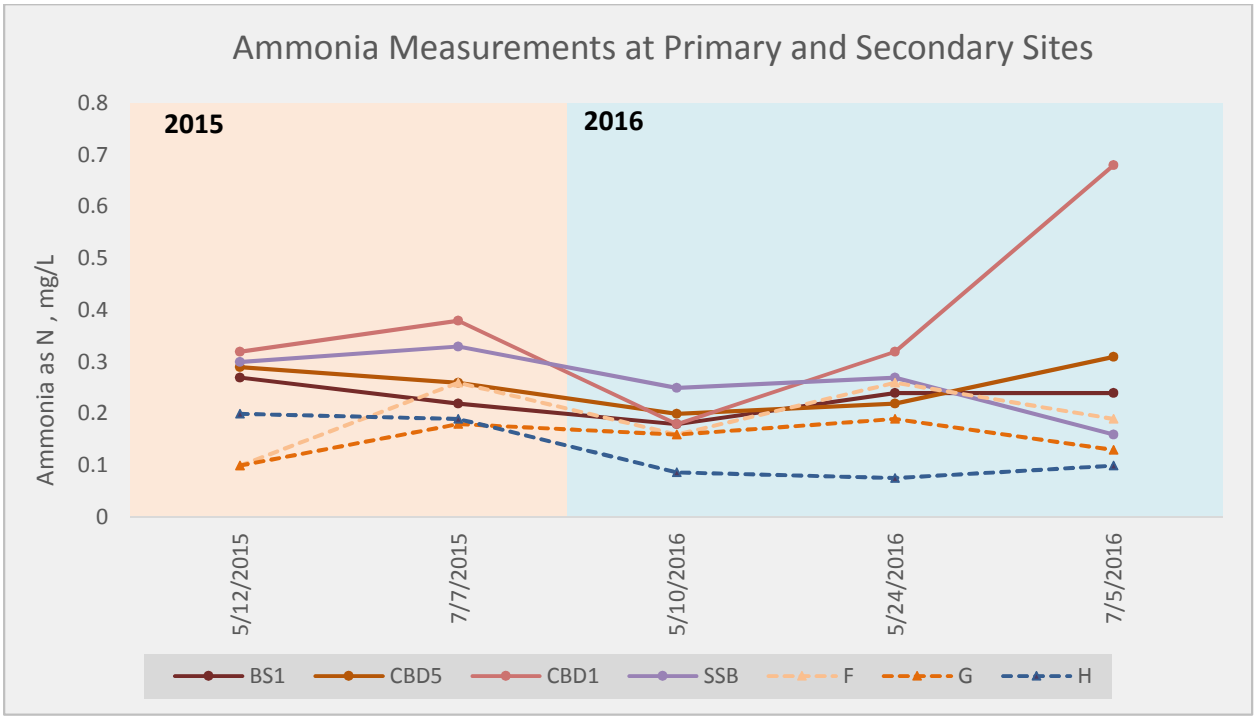


Figure 12-10. Ammonia Measurements at Primary and Secondary Sites

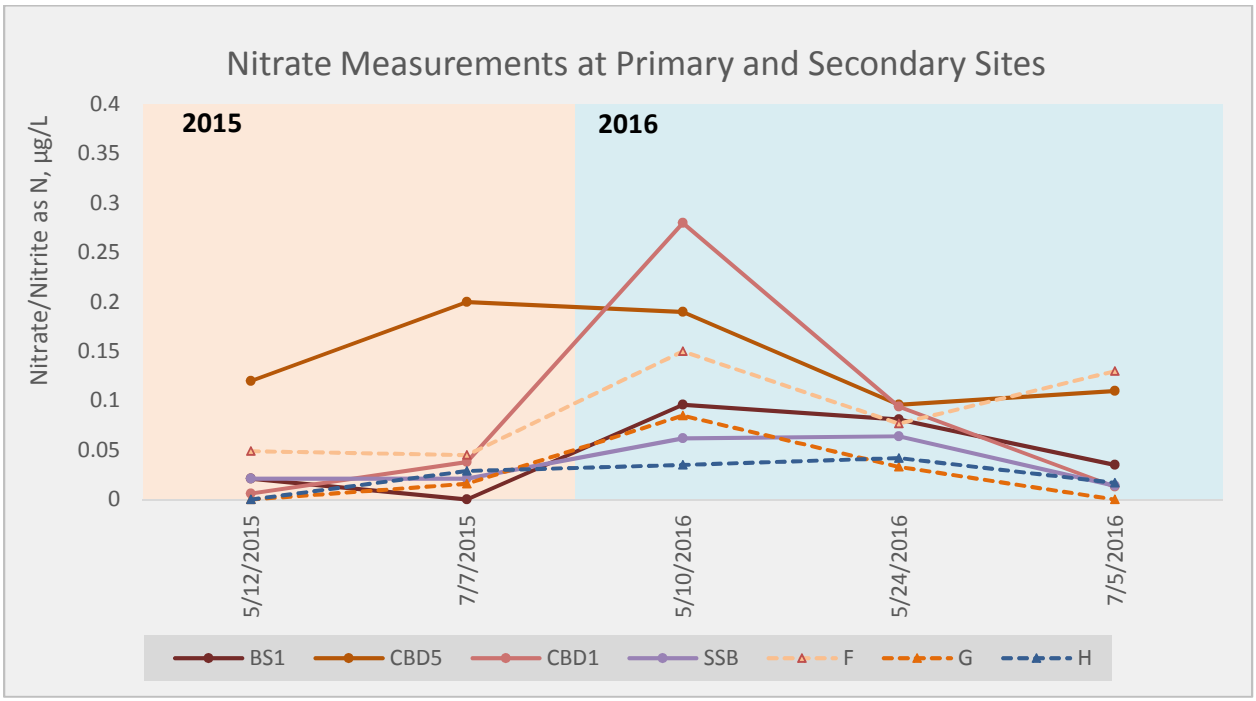


Figure 12-11. Nitrate Measurements at Primary and Secondary Sites

12.3 Summary

A robust sampling system of surface water monitoring in rice drains was developed prior to the Rice WDR and has been followed consistently for the last 4 years under the Rice WDR. Although several parameters remain near the WQOs, the influence of water deliveries, flow, and trends in rice culture (that is, water hold times for pesticides) strongly impacts these parameters. The system of core, assessment, and modified assessment monitoring under the Rice WDR allows for monitoring of parameters of interest and tracking of trends across varied water year types to monitor discharges from rice lands. The data reviewed above do not show any signs of trends in surface water quality degradation attributable to rice agriculture. At this time, no additional parameters are proposed for monitoring, and the system of monitoring at primary and secondary sites is considered inclusive of typical conditions in rice drains.

SECTION 13

Summary of Water Quality Exceedances and Actions Taken

This section summarizes surface water quality exceedances measured during the 2018 monitoring season, and describes the actions taken to prevent future exceedances.

13.1 Summary of 2018 Exceedance Reports

Exceedance reports are required after each event if a parameter exceeds water quality standards. For DO, the COLD (cold water habitat) beneficial use standard is 7.0 mg/L, and the WARM (warm water habitat) standard is 5.0 mg/L. For SC, the CVRWQCB threshold for reporting is 700 micromho(s) per centimeter (µS/cm). The water quality standard for pH is 6.5 to 8.5.

Exceedance reports were issued after all monitoring events in 2018 (Appendix C). A resample event for DO occurred after the first event; exceedances from the resample event were included with the SE1 exceedance report. Exceedances for DO were reported at all monitoring events, with exceedances for SC occurring at three of the four events (SE1, SE3, and SE4) (Table 13-1). High pH was noted only during the first monitoring event, at both locations on the CBD. Low DO persisted at Sites BS1, CBD1, and SSB throughout the monitoring period; this is typical of these sites, which experience low DO as water temperatures rise.

Table 13-1. Exceedance Reports Issued, 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

	Site with Exceedance and Reading			
Sample Event	**BS1**	**CBD5**	**CBD1**	**SSB**
DO (mg/L)				
May Event 1 (SE1)*	6.51	-	3.43	6.68
May Event DO Resample	6.22 / 5.55	-	4.81 / 4.01	6.89 / 6.46
June Event 1 (SE2)	4.24 / 4.94	6.57 / 7.11	4.09 / 4.95	6.38 / 6.96
June Event 2 (SE3)	5.90 / 6.13	7.12 / 6.99	0.11 / 0.61	6.04 / 5.76
July Event 1 (SE4)	5.70 / 6.55	6.02 / 6.45	2.13 / 2.78	4.56 / 5.02
SC (µS/cm)				
May Event 1 (SE1)	-	-	708 / 723	-
June Event 1 (SE2)	-	-	-	-
June Event 2 (SE3)	-	-	704 / 707	-
July Event 1 (SE4)	-	994 / 989	837 / 832	-
pH				
May Event 1 (SE1)	-	7.98 / 8.65	7.80 / 8.91	-
June Event 1 (SE2)	-	-	-	-
June Event 2 (SE3)	-	-	-	-
July Event 1 (SE4)	-	-	-	-

* Results from instrument 1 only, as instrument 2 was malfunctioning during this event.

Note:

Two instruments were used for sampling; results are shown as instrument 1 / instrument 2.

The monitored drains had low DO levels during the monitoring season, likely because of the warm temperatures, use of rice pesticides with required water holds, and water allotment management by the irrigation districts. These combined factors result in drains with decreased water volumes and higher in-stream water temperatures, both of which can lead to decreased DO. The recent trend of the irrigation and reclamation districts more closely managing the water flows in response to the drought driven allocations, throughout the crop growing season, is a consistent factor.

13.2 Actions Taken to Address Water Quality Exceedances

A DO Management Plan was developed in 2007 and was updated in May 2015 (CRC, 2015a). Section 14 discusses the plan in more detail.

SECTION 14

Management Plan and Other Special Projects Update

The CRC has a current DO Management Plan, which was submitted in May 2015 (CRC, 2015a). The history and status of this Management Plan is discussed in the following sections. Monitoring results in 2018 did not identify the need for special project monitoring in 2019.

14.1 Dissolved Oxygen Management Plan History and Status

The original CRC DO Management Plan was submitted to CVRWQCB staff in December 2007. The DO Management Plan recognized the University of California at Davis (UC Davis) edge-of-field study (which sampled field outflows and peripheral drains) as the appropriate plan to identify rice-farming practices that might contribute to DO issues in drainages. This study was conducted in 2006-2008, and results were summarized as part of the source identification analysis within the DO Management Plan.

It was determined that because a detailed analysis of field outflows and peripheral drains was conducted and because the CRC continued to rigorously monitor discharge to surface waters from rice fields, a new DO Management Plan was not warranted. Rather, the information contained in the DO Management Plan provided sufficient evidence that no additional management practices were available for rice fields to help remedy DO issues in drainages.

The updated DO Management Plan submitted in May 2015 included detailed analysis of 10 years of monitoring data. The 2015 DO Management Plan determined that low flow attributable to the drought allocation of irrigation water was a factor in the more recent low DO readings. The two versions of the submitted DO Management Plan for rice fields are in review by CVRWQCB staff.

14.2 Special Project Updates

Monitoring results in 2018 did not identify the need for special project monitoring in 2019.

SECTION 15

Summary of Farm Evaluation Management Practice Information

The CRC submitted a complete summary of Farm Evaluation Management Practice information in the 2015 Rice WDR AMR (CRC, 2015c). This information is required to be updated every 3 years per the Rice WDR; this section discusses the Farm Evaluation Management Practice information collected from Growers during growing seasons 2015, 2016, and 2017. The complete dataset, organized by growing year, is included in Appendix F.

15.1 Background on Farm Evaluation Data Collection

The CRC developed a web-based Farm Evaluation (FE) template that was approved by the CVRWQCB. The web-based template provides a convenient and streamlined approach to completing the FE, with easy navigation between various sections.

To complete this web-based form, Growers enter a personalized number represented by their pesticide use permit. The FE database is pre-populated with the individual Grower's field information to simplify the data entering process and avoid data redundancies and discrepancies between various programs. The Cal Ag Permits online database is a new electronic reporting database that was created and put online about 1 year before the rice-specific online FE template was developed. The same pesticide use permit number is used for both the Cal Ag Permits database and the rice-specific FE template.

Prior to the Growers entering their farm information, the FE database is prepopulated using data from Cal Ag Permits. The Cal Ag Permits data are requested each year from the California Agricultural Commissioners and Sealers Association (CACASA) for the nine counties of Butte, Colusa, Glenn, Placer, Sacramento, Sutter, Tehama, Yolo, and Yuba. The data are downloaded from CACASA, and contain all commercial crops for these counties. Rice fields are extracted based on the criteria provided by CACASA for the year of interest, including the crop grown is listed as rice, the permit number is active, the permit status is either "Issued" or "In Progress," and the permit effective date corresponds with the growing season for the FE. This innovative approach ensures that rice-related programs and field information are kept intact throughout the process. This process is new and is not perfect, but it is the only one of its kind and is being refined annually to incorporate data reporting improvements.

Once the FE is filled out with all the required information, Growers can print a summary report of the information provided for their records. Per the Rice WDR requirements, a copy of the rice-specific FE shall be maintained onsite or be available electronically at the rice Grower's farming headquarters or primary place of business. A hard copy of the FE must be produced, if requested, should CVRWQCB staff conduct an inspection of the rice operation.

All FE data are submitted electronically to the CRC for summarizing into a report to the CVRWQCB every 3 years. Reporting in an electronic format allows rice Growers to submit in one step without follow-up confirmation for verification. The electronic data submission also provides for more streamlined data review and interpretation for the data reporting by CRC before submitting it to the CVRWQCB.

15.2 Types of Data Collected and Summarized

The primary datasets collected in the FE are the acreage of rice grown on each field during the respective growing season and the management practices employed on each field. Other information, including the Landowner Rice WDR Acknowledgement, Locations Water Leaving Property, Well Information, and Farm Maps, is also collected. This information is maintained by the Grower for their

records, for the CRC to summarize into this report, to facilitate identification of a target area for a Surface Water/Groundwater Quality Management Plan (should an exceedance of the WQOs occur), and for potential review by CVRWQCB staff during an inspection of the rice operation.

15.2.1 Rice Acres Grown

The field acreages available in the pesticide permit database for each growing year are available for review by the grower in the FE template; if the entire field is planted in rice, that acreage is used for the acreage number reporting. If that acreage is incorrect or if the field was not entirely planted in rice during the reported growing season, the number can be corrected by the Grower. For the rice acreage summary, the total acreage was aggregated for each township in which rice was grown, for each growing year (Appendix D). A summary of acres by growing year is provided in Table 15-1.

Table 15-1. Summary of Total Rice Acreage Reported in FE Templates
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Growing Year	Acres Reported
2015	346,422
2016	428,349
2017	370,091

Note:

Rice acreage is summarized from Grower input into the FE template.

15.2.2 Farm Management Practices

The Grower requirements of the Rice WDR (Section IV.B.18) include the following:

- Growers shall, at a minimum, implement water quality management practices that meet the following farm management performance standards:
  - Minimize waste discharge offsite in surface water.
  - Minimize percolation of waste to groundwater.
  - Protect wellheads from surface water intrusion.

The rice industry has used vetted farming practices for over three decades to implement management practices that address these performance standards. Therefore, the FE template was developed to include the regulatory and non-regulatory (voluntary) practices that the rice Growers employ to comply with water quality management practices. Growers were asked to check each practice used on their fields. The farm management practices were split into 13 regulatory practices and 13 voluntary practices. A summary of the farm management practices used on rice fields during the 2015, 2016, and 2017 growing seasons is shown by township in Appendix F. The average responses for all townships for regulatory and voluntary practices are provided in Tables 15-2 and 15-3, respectively.

15.3 Reported Rice Acreage Summary

The aggregated rice acreage grown, as reported by the Growers in the web template, is summarized by growing year in Table 15-1. The acreage grown reflects the acreage reported by growers in their completed FE templates. When comparing this acreage to the actual acreage of rice grown, it is somewhat lower for all years. Discrepancies can arise if there is incorrect field data within the rice permit database that is not corrected by the Grower in the FE template, if the Grower fills out the acreage incorrectly, or if there are errors in the Cal Ag Permit database that are carried over to the FE template database. CRC is evaluating the acreage discrepancies and will follow up with CVRWQCB staff if any non-compliance with the reporting requirement is identified.

Table 15-2. Regulatory Farm Management Practices Summary, Growing Years 2015-2017

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

	Percent Response from Farm Evaluation												
Growing Year	**Follow Label Restrictions**	**Follow County Permit Conditions**	**Water-holding Requirements**	**Monitor Wind Conditions**	**Use Appropriate Buffer Zones**	**Attend Mandatory Trainings**	**Use Low-Drift Nozzles**	**Use PCA Recommendations**	**End of Row Shutoff When Spraying**	**Avoid Surface Water When Spraying**	**Compliance with PPE**	**Use Drift Control Agents**	**Provide Employee Safety Training**
2015	99	98	97	95	95	94	88	96	82	83	93	88	89
2016	100	99	98	97	95	98	92	98	84	80	94	90	93
2017	100	99	98	97	95	98	91	96	84	79	93	88	91

Note:

PPE = personal protective equipment

Table 15-3. Voluntary Farm Management Practices Summary, Growing Years 2015-2017

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

	Percent Response from Farm Evaluation												
Growing Year	**Land Leveling/ Precision Technology**	**Use Tailwater Return**	**Utilize Peripheral Drains**	**Monitor Rain Forecasts**	**Crop Rotation (organic)**	**Cover Cropping (organic)**	**Strip Cropping (organic)**	**Compacting Levees**	**Variable Timing of Water Release (Pre-field prep)**	**Variable Timing of Water Release (Pre-harvest)**	**Slow Release of Water from Fields**	**Crop Rotation (non-organic)**	**Voluntary Trainings (Spray Safe, etc.)**
2015	96	41	45	84	8	8	3	63	63	75	86	14	72
2016	97	47	58	85	5	6	3	70	69	78	91	11	70
2017	96	48	63	87	6	5	2	74	61	80	89	12	72

15.4 Regulatory Farm Evaluation Management Practices Summary

The Regulatory Farm Evaluation Management practice data for growing years 2015, 2016, and 2017 are summarized in Table 15-2 and displayed graphically on Figure 15-1. Participation for each regulatory farm management practice ranged from 79 to 100 percent. At least 99 percent of Growers reported that they followed the label restrictions, and at least 95 percent followed county permit conditions, monitored wind conditions, and used PCA recommendations. In addition, at least 97 percent of fields followed the water-holding requirements, which is high considering the condition is not necessary for all rice pesticides. Across the industry, Growers in at least 79 percent of fields avoided surface water when spraying, and where applicable. Note that some Growers might not report on practices because the majority of pesticide applications are contracted out, and Growers do not perform the applications themselves. The contracted-out practices are performed by professionals within their specialty with appropriate training and licenses to perform the work.

Most of the regulatory farm practices had the same or greater reporting across the three growing seasons, with the majority of the fields being managed to all the regulatory practices. In addition, the 3 years of reporting show that rice farming management practices generally stay consistent from year to year.

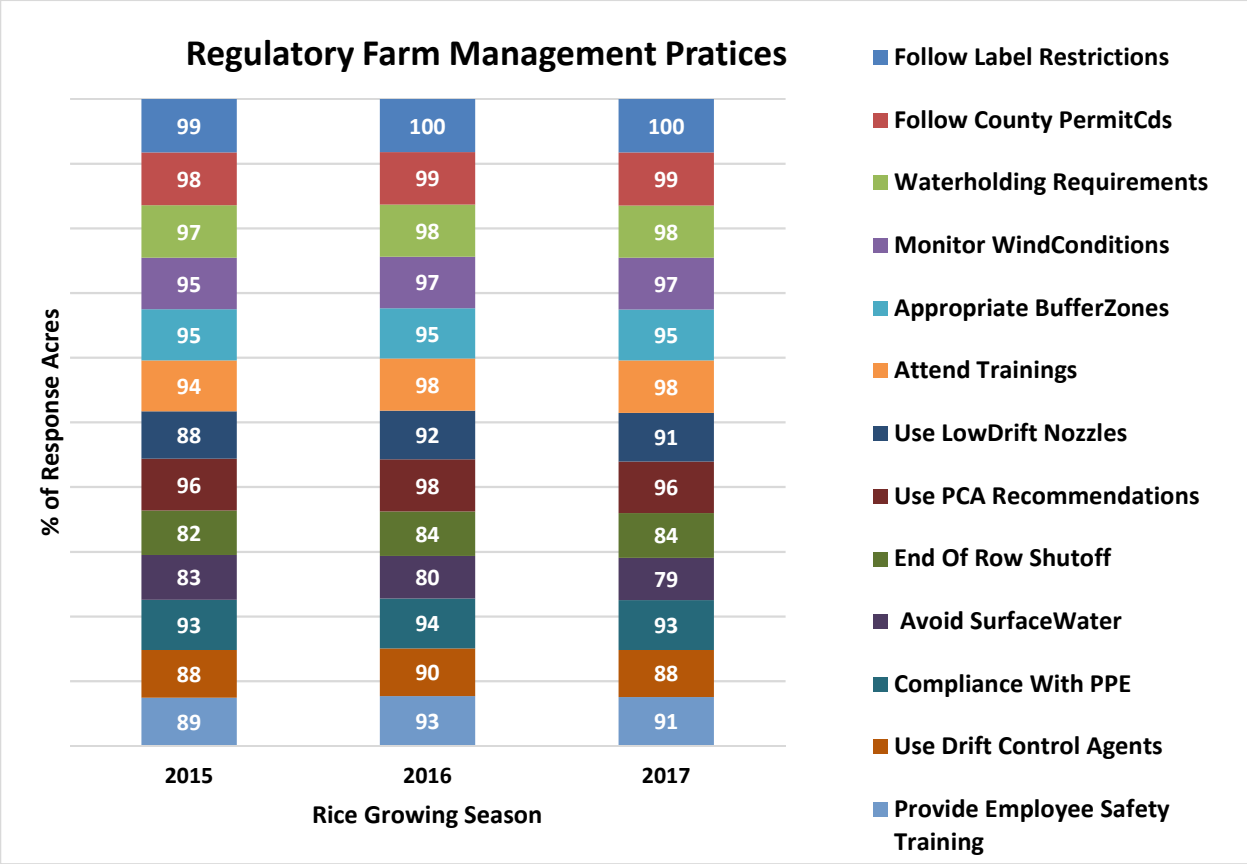


Figure 15-1. Regulatory Farm Management Practices, Growing Years 2015-2017

15.5 Voluntary Farm Evaluation Management Practices Summary

The Voluntary Farm Evaluation Management practice data for the growing years 2015, 2016, and 2017 are summarized in Table 15-3 and are displayed graphically on Figure 15-2. Although these practices are not regulatory, the percent participation range for each voluntary farm management practice was between 41 and 97 percent, not including organic-specific practices. At least 96 percent of fields were land leveled and/or used precise technology, which increases the irrigation efficiency of the field and allows the farmer to have greater control of water application. There was at least a 75 percent participation in variable timing of water release before harvest and at least an 86 percent participation in slow release of water from fields. A few voluntary practices are not used very widely (for example, cover cropping and strip cropping for organic farming [less than 10 percent reported], and crop rotation in non-organic crops [less than 15 percent].

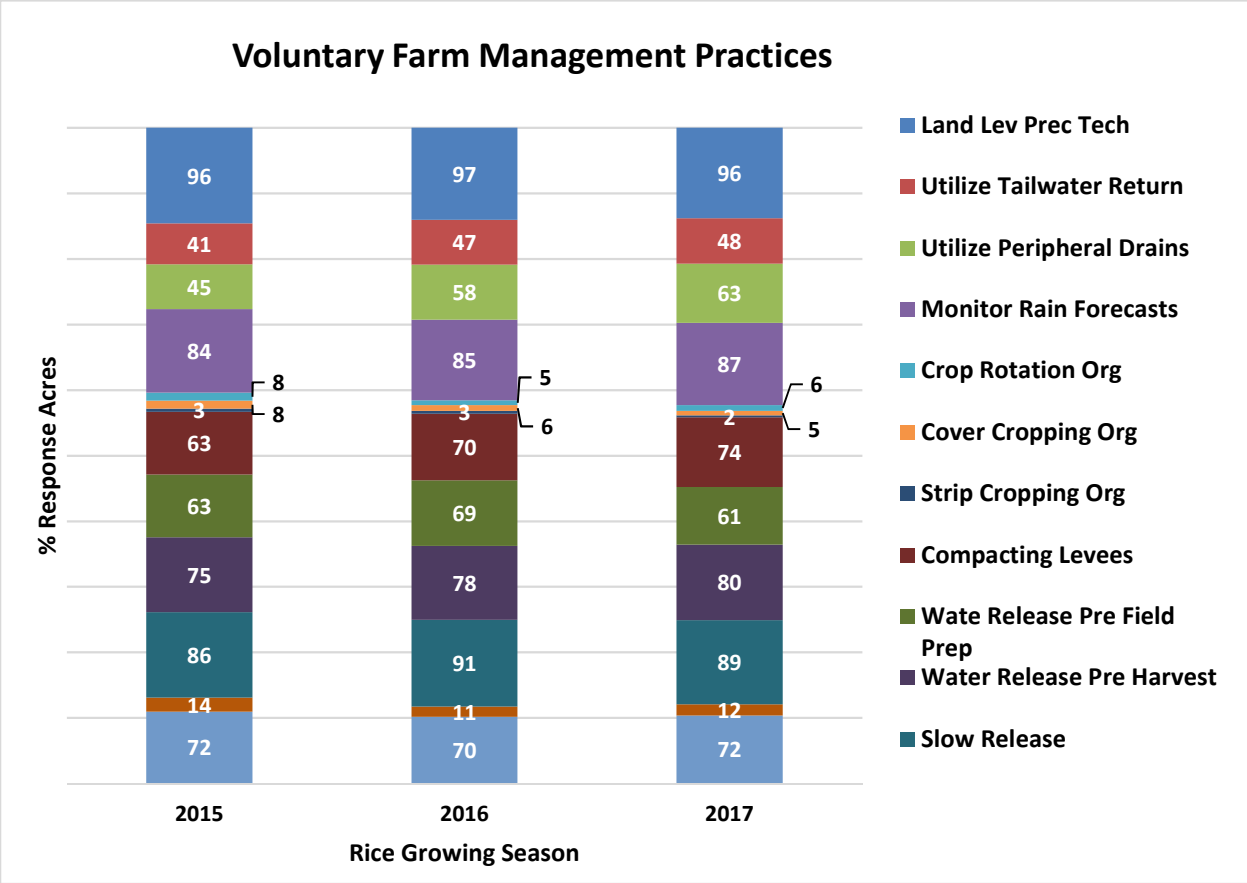


Figure 15-2. Voluntary Farm Management Practices, Growing Years 2015-2017

15.6 Quality Assessment of the Collected Information

When a Grower enters their individual pesticide permit number into the web-based FE, the field level information they provided with their pesticide permit information is shown. The rice Grower is responsible for verifying whether the information is correct because the CRC is not responsible for editing the submitted information. However, an evaluation of Grower-submitted FE data from growing years 2015, 2016, and 2017 revealed the following minor data quality issues:

- The pesticide permits have been issued year after year for approximately 30 years. The Rice WDR FE template requirement has prompted the rice growers to more carefully review and update their permits for increased accuracy. The CACs comment that the rice pesticide permits are the most accurate of all crops. This may help address the minor data quality issues in the future as the pesticide permits get refined by Growers.
- Some of the inaccuracies may be attributable to last-minute changes regarding whether the land is farmed by the owner or is leased because of weather conditions and rice prices.
- In growing years 2016 and 2017, the township-level summary rounded township acreage of Grower-reported acres to the nearest acre. This caused a slight rounding issue when comparing the total rice acreage from the FE data and from the township total. For example, in 2017 township summary total rice is 370,091 acres, and the FE total is 370,085 acres.
- In a few instances (10 to 20 percent of total acres), Growers reported the number of rice acres grown on a field as zero, but completed the rest of the FE sections. In some cases, rice may not have been grown on some of the Growers' fields.

There were instances in 2017 where there were missing permits in the FE database; those data anomalies were because of an outdated permit in the Cal Ag Permit database, or because of one not showing rice as the crop grown that year, per the Cal Ag Permit database. These permits were not initially included in the FE database because of these reasons. When the Grower brought this to the attention of the CRC, the missing records were located in the Cal Ag Permit source data and were manually inserted into the FE database so that the affected Growers could complete their individual FE. The reason for these missing permits could also be a timing issue; the CRC requests the Cal Ag Permit data in October, and any Grower-initiated changes after the data are processed into the database will not be reflected in the FE.

Corrective actions and database updates have been completed over the last three growing seasons to improve the Growers' experience and the quality of the data. These improvements have included the following:

- FE database design updates to improve year-over-year workflow, data management, and reporting
- Workflow enhancements (forcing Growers to evaluate each field instead of selecting all when changing acreage values, which greatly reduced over-reporting issues)
- Improved data validation on data entry pages, such as ensuring that no negative values can be entered
- Enhanced the Grower Dashboard to add value for the Growers, including giving the ability to access completed FE PDFs after the reporting season, adding in report status information, and so on

Potential corrective and continuing actions for future growing seasons include the following:

- Communicating with Growers, CACs, and PCAs on the pesticide permit database data issues and quality control suggestions
- Continuing to implement Grower outreach and education, such as the best timing for updating pesticide permits for the following year's reporting
- Continuing to update and enhance the FE tool to improve user experience and data management and quality

SECTION 16

Summary or Update of Mitigation Monitoring

The CRC was not required to implement mitigation measures in 2018.

SECTION 17

Education and Outreach Activities

Education and outreach requirements for the CRC are outlined in the Rice WDR, and include the following requirements:

- Conduct education and outreach activities to inform Growers of program requirements and water quality problems (including exceedances of WQOs or trends in degradation of water quality) identified by the CRC or CVRWQCB.
- Maintain attendance lists for outreach events specifically sponsored by the CRC for the purposes of the Rice WDR Order.
- Provide Growers with information on water quality management practices that will address water quality problems and minimize the discharge of wastes from rice lands.
- Provide informational materials on potential environmental impacts of water quality management practices to the extent known by the CRC.
- Provide an annual summary of education and outreach activities to the CVRWQCB to include copies of the educational and management practice information provided to the Growers, report the number of Growers who attended the outreach events, and describe how Growers could obtain copies of the materials presented at events.

The CRC attended 17 education and outreach meetings in 2018, reaching approximately 1,000 rice growers, applicators, and PCAs. Meeting locations and dates are provided in Table 17-1. Information is presented at these meetings either via PowerPoint presentations or through verbal communications, and is available to attendees via e-mail if requested. In addition, template information and extensive additional education and outreach information is available via the CRC's website at www.calricenews.org. Presentations at the rice grower meetings included information about thiobencarb (monitored under a separate program) exceedances and information on completion of the FE, and focused on requirements of the Nitrogen Management Plan program. Handout information is included in Appendix E.

Table 17-1. Education and Outreach Activities in 2018

Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Meeting Date	Audience and location
January 16	UCCE Annual Rice Winter Grower Meeting – Woodland
January 17	UCCE Annual Rice Winter Grower Meeting – Richvale UCCE Annual Rice Winter Grower Meeting – Willows
January 18	CRC Annual Grower Meeting – Yuba City CRC Annual Grower Meeting – Colusa
January 19	UCCE Annual Rice Winter Grower Meeting – Colusa UCCE Annual Rice Winter Grower Meeting – Yuba City
February 6	Dow DuPont Grower Meeting – Colusa
February 7	Dow DuPont Grower Meeting – Yuba City
February 8	Dow DuPont Grower Meeting – Chico
February 13	Dow DuPont Grower Meeting – Woodland

Table 17-1. Education and Outreach Activities in 2018
Waste Discharge Requirements for Sacramento Valley Rice Growers 2018 Annual Monitoring Report

Meeting Date	Audience and location
February 27	Thiobencarb Stewardship Meeting – Willows Thiobencarb Stewardship Meeting – Yuba City
March 1	Thiobencarb Stewardship Meeting – Colusa Thiobencarb Stewardship Meeting – Woodland
March 20	Helena Grower Meeting – Colusa
August 29	Rice Field Day, Rice Experiment Station – Richvale

Note:
UCCE = University of California Cooperative Extension

In addition to the grower meetings and field days conducted in 2018, education and outreach activities included 15 e-communications and mailers, and coordination with the University of California Cooperative Extension, UC Davis, and the Rice Research Board. The CRC has the ability to contact each of its members directly, and is committed to using its outreach capabilities to address water quality concerns when they are identified.

SECTION 18

Summary of Nitrogen Management Plan Reporting

Nitrogen Management Plan reporting information is not currently required for rice growers because (1) there are no identified areas of high vulnerability to nitrate, and (2) Nitrogen Management Plan reporting was not a requirement in the Rice WDR for 2018.

SECTION 19

Conclusions and Recommendations

The CRC implemented water quality monitoring and reporting activities in compliance with the Rice WDR (CVRWQCB, 2014) as amended by Order No. R5-2015-0015 (CVRWQCB, 2015), as specified in the MRP. 2018 marked the second year of groundwater monitoring, as specified in the Groundwater Trend Monitoring Workplan (CRC, 2016), in addition to the traditional surface water monitoring. Surface water and groundwater monitoring results from 2018 are discussed briefly in the following sections.

19.1 Surface Water

In 2018, surface water monitoring under the Rice WDR included assessment of field parameters, including water temperature, DO, pH, SC, and flow. Laboratory analysis of samples for the pesticides benzobicyclon, metabolite B, penoxsulam, and bensulfuron-methyl were completed as required. Following is a summary of the 2018 Rice WDR surface water quality results:

- **Water Temperature:** As in prior years, temperature results indicate warm water conditions during the monitoring season. Water temperatures generally tracked with observed air temperatures, with the highest temperatures recorded during SE4, which was the last event of 2018.
- **Dissolved Oxygen:** DO generally decreased with each monitoring event, which is expected as water temperatures increase (DO is influenced by water temperature). DO values of less than 7.0 mg/L (the COLD water quality standard) were observed at all sites and events during the 2018 season. DO values of less than 5.0 mg/L (the WARM water quality standard) were observed at all sites in 2018, with the exception of CBD5.
- **pH:** The majority of measured pH observations in 2018 were within the Basin Plan (CVRWQCB, 2016) Water Quality Thresholds for pH (above a pH of 6.5 and below a pH of 8.5). The exceptions were two readings taken during the first sampling event, at sites CBD5 and CBD1.
- **Specific Conductance:** Most SC observations were below the 700 µS/cm threshold for reporting in 2018. Two sites had SC readings greater than 700 µS/cm in 2018: CBD5 (during SE4) and CBD1 (during SE1, SE3, and SE4).
- **Pesticides – Benzobicyclon:** Samples from SE1 and SE2 were analyzed for benzobicyclon; no detections were reported for either event.
- **Pesticides – Metabolite B:** Samples from SE1 and SE2 were analyzed for metabolite B; four detections of metabolite B were noted, all within the CBD sites.
- **Pesticides – Bensulfuron-methyl:** Samples from SE3 and SE4 were analyzed for bensulfuron-methyl; no detections were reported for either event.
- **Pesticides – Penoxsulam:** Samples from SE3 and SE4 were also analyzed for penoxsulam. Penoxsulam was detected at all monitoring sites at both events, with concentrations ranging from less than 0.10 (MRL) to 0.35 µg/L. Detections were similar between the two events, indicating that usage was similar across the weeks of sampling and likely trended late because of late planting attributable to the wet spring.

19.2 Groundwater

Groundwater monitoring under the Rice WDR continued in 2018. Ten of the selected USGS Rice Wells were sampled for field parameters, including water temperature, DO, pH, and SC, and samples collected for laboratory analysis for nitrate, ammonia, and TDS. Results for all parameters were generally

consistent with 2017 results, with the majority of measured water quality parameters within the recommended MCLs. One well had high levels of TDS and conductivity, although in magnitude with historical levels, and likely attributable to natural upwelling of connate water. A different well had an increase in nitrate from 2017 (and from historical levels); a review of location yielded the likelihood of this well being impacted by factors outside of rice agriculture, specifically because it was a re-drilled USGS Rice Well from its original location. Neither the salinity parameters nor the single nitrate result that met the MCL are the result of rice agriculture, and the results below the MCLs at the remainder of the sampled wells demonstrate this.

Monitoring year 2018 was similar to 2017 in that late spring rains delayed planting in much of the rice-growing area. The late storms did not reach Glenn County; therefore, planting started there 1 week before the rest of the rice growing area. Low flows persisted and lead to low DO in many of the rice drains. Annual monitoring by the CRC allows for tracking trends and changes in the water bodies attributable to environmental challenges. Irrigation districts continue to favor rice because the field water is used and then recycled to the benefit of other crops, providing clean water to be reused in the irrigation system.

19.3 Assessment of the 2018 Program

This year represents the fourth full year of monitoring under the Rice WDR, after 10 years of CWFR monitoring and program implementation. It also represented the second year of groundwater monitoring under the Rice WDR. The key successes and challenges faced during 2018 program implementation are summarized as follows:

- Monitoring and assessment were conducted in accordance with the requirements of the Rice WDR MRP.
- Surface water sampling included primary site analysis for field parameters (i.e., water temperature, DO, pH, SC, and flow) and pesticides (i.e., bensulfuron-methyl, penoxsulam, benzobicyclon, and metabolite B).
- Groundwater sampling included sampling of selected wells from the USGS Rice Wells network. Analysis included field parameters (i.e., water temperature, conductivity, DO, and pH) and laboratory parameters (i.e., TDS, nitrate, and ammonia). DWR wells in Yuba County were not sampled this year.
- The CRC implemented a CEDEN-compliant electronic data submittal system, including laboratory-prepared CEDEN-compliant electronic data reports for field and chemistry analyses.
- Review of field and laboratory QA/QC samples from surface water monitoring indicates substantial achievement of the following quality objectives:
  - All surface water and groundwater field blank samples were found to have analyte levels below the MRLs. Field duplicate samples were generally consistent with primary sample results.
  - Laboratory QA/QC substantially achieved data quality objectives. Method blanks achieved data quality objectives, with results below the MRL. The majority of MS/MSD and LCS/LCSD samples achieved data quality objectives, with the majority of recoveries and RPD values within the target range.
- Primary monitoring sites for the surface water monitoring of rice impacts continue to be appropriate because of the uniformity of rice farming practices across the valley. Rice water quality management practices are relatively consistent throughout the valley; similar methods of field preparation, irrigation, and harvest practices are implemented by rice growers. In addition, the water-holding requirements apply to all rice growers, leaving little variation in the methods of rice farming from the various drainage areas.

- Implementation of management practices continued in 2018, including water-holding requirements, education and outreach (e-communications and rice grower meetings), and coordination with the University of California Cooperative Extension, UC Davis, and the Rice Research Board. In addition, the CRC can contact each of its members directly, and is committed to using its outreach capabilities to address water quality concerns when they are identified.
- The CRC continues to be engaged in the CVRWQCB's efforts to refine the Irrigated Lands Regulatory Program (1) through its regular consultation with CVRWQCB staff, (2) through its development of technical documentation in support of the Long-term Irrigated Lands Program, and (3) through participation in the CV-SALTS Salinity Coalition and previous involvement in the CVRWQCB's Technical Issues Committee, Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment, the Drinking Water Policy Workgroup, and the Pesticide Evaluation Workgroup.

19.4 Recommendations for 2019

Activities for the 2019 monitoring year will include the final year of core-year surface water sampling and sampling of 10 USGS Rice Wells (the remaining 10 wells in the Groundwater Trend Network that were not sampled this year). Lessons learned from the first 4 years of the Rice WDR implementation will be applied to continue a successful implementation of surface water and groundwater monitoring programs, which will be taken into consideration in the March 2020 GAR Update, following the third year of groundwater quality sampling and the pending revisions to the Rice WDR Order and MRP.

SECTION 20

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Appendix A
Monitoring Site Photos

Monitoring Site BS1, Butte Slough (CEDEN Station Code 520XBTTSL)

Photo taken on 5/2/2018

Photo 1. Approximate Sampling Location, BS1

Monitoring Site CBD1, Colusa Basin Drain #1 (CEDEN Station Code 520CBDKL)

Photo taken on 5/2/2018

Photo 2. Approximate Sampling Location, CBD1

Monitoring Site CBD5, Colusa Basin Drain #5 (CEDEN Station Code 520XCBDWR)

Photo taken on 5/2/2018

Photo 3. Approximate Sampling Location, CBD5

Monitoring Site SSB, Sacramento Slough Bridge (CEDEN Station Code 520XSSLNK)

Photo taken on 5/2/2018

Photo 4. Approximate Sampling Location, SSB

Appendix B
Surface Water Field Data Sheets, Chain-of-Custody Forms, and Laboratory Results

Appendix B-1
Surface Water Field Data Sheets and Chain-of-Custody Forms

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC			Date: 5/22/2018
StationID & Name : **SSB**			FIRST SAMPLE TIME: 0937
Project ID: **20154800.004A 02-0000 Rice WDR 2017**	Arrival Time: 0927	Departure Time: 1040	Target Lat. & Long.:
Sampling Crew (and Agency): L Short/ M Doolittle			Actual Lat & Long:
			Datum: / Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk., Other		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:

Water Column Thickness: 4' **Sample Depth:** 2'

PHYSICAL PARAMETERS	~~SAC~~ SPP	SR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	22.0	21.80	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	70's		OCCUPATION METHOD:	Walk-in, Bridge, Other
*pH>8.5 or <6.5 pH:	8.04	8.03	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other Kemmerer
*DO<7.0 DO (mg/L):	6.68	4.88	SAMPLE LOCATION:	Bank, Near Bank, Thalweg, Midchannel, Open Water
*SC>700 SC (µS/cm):	402.1	399	HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other
Turbidity (NTU):	Not Applicable**		HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	5/22/2018
StationID & Name : **SSB**		FIRST SAMPLE TIME:	0937
Project ID: 20154800.003A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ M Doolittle	Start Time (24 hr): 1000	Discharge (cfs):	
Right Edge Water (REW):	End Time (24 hr): 1036	Discharge calculated by:	

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes
1		5.6	<0.5	0.2 / 0.8 or 0.6	+		Wetted Channel length: 118.8'
2		16.8	1.5	0.2 / 0.8 or 0.6	0.00		
3		28	3.75	0.2 / 0.8 or 0.6	0.00	0.00	
4		39.2	6	0.2 / 0.8 or 0.6	0.00	0.00	
5		50.4	6	0.2 / 0.8 or 0.6	0.00	0.00 X	
6		61.6	7	0.2 / 0.8 or 0.6	0.00	0.00	10 sections @ 11.2'
7		72.8	7	0.2 / 0.8 or 0.6	0.00	0.00	
8		84	6.5	0.2 / 0.8 or 0.6	0.00	0.00 X	Mid section @ 5.6'
9		95.2	7	0.2 / 0.8 or 0.6	0.00	0.00	
10		106.4	1	0.2 / 0.8 or 0.6	0.00		
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			+ : too shallow for flow measurement
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			no observed flow
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			X next to bridge pillar
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC			Date: 5/22/2018
Station ID & Name : **BS1**			FIRST SAMPLE TIME: 1140
Project ID: **20154800.004A 02-0000 Rice WDR 2017**	Arrival Time: 1125	Departure Time: 1253	Target Lat. & Long.:
Sampling Crew (and Agency): L Short/ M Doolittle			Actual Lat & Long:
			Datum: / Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk., Other		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:

Water Column Thickness: 9 **Sample Depth:** 4.5

PHYSICAL PARAMETERS	~~SAC~~ SPP	SR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	22.1	21.97	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	70's		OCCUPATION METHOD:	Walk-in, Bridge, Other
*pH>8.5 or <6.5 pH:	7.78	8.06	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other kemmerer
*DO<7.0 DO (mg/L):	6.51	3.48	SAMPLE LOCATION:	Bank, Near Bank, Thalweg, Midchannel, Open Water
*SC>700 SC (µS/cm):	255	254	HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other
Turbidity (NTU):	Not Applicable**		HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years
					QC - Dup, MS/MSD, FB

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	5/22/2018
StationID & Name : **BS1**		FIRST SAMPLE TIME:	1140
Project ID: 20154800.003A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ M Doolittle	Start Time (24 hr): 1210	Discharge (cfs):	
Right Edge Water (REW):	End Time (24 hr): 1245	Discharge calculated by:	

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes
1		5.75	3	0.2 / 0.8 or 0.6	0.0	0.0	
2		17.25	6.5	0.2 / 0.8 or 0.6	0.0	0.0	Wetted Channel Length,
3		28.75	6	0.2 / 0.8 or 0.6	0.0	0.0	115'
4		40.25	6	0.2 / 0.8 or 0.6	0.0	0.0	
5		51.75	9	0.2 / 0.8 or 0.6	0.0	0.0	
6		63.25	9.5	0.2 / 0.8 or 0.6	0.0	0.0	10 Sections: 11.5'
7		74.75	8	0.2 / 0.8 or 0.6	0.01	0.0	
8		86.25	10.5	0.2 / 0.8 or 0.6	0.0	0.0	Midpoint: 5.75
9		97.75	9	0.2 / 0.8 or 0.6	0.0	0.0	
10		109.25	4	0.2 / 0.8 or 0.6	0.0	0.0	
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC	**Date: 5/22/2018**
StationID & Name : **CBD5**	FIRST SAMPLE TIME: 1345
Project ID: **20154800.004A 02-0000 Rice WDR 2017** — Arrival Time: 1327 — Departure Time: 1445	Target Lat. & Long.:
Sampling Crew (and Agency): L Short/ M Doolittle	Actual Lat & Long:
	Datum: — Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk., Other: _____		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other: _____	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other: Truck tire	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other: _____	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other: ____
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:

Water Column Thickness: 9.5' **Sample Depth:** 4'

PHYSICAL PARAMETERS	SPP	SR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	23.0	22.83	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	80's		OCCUPATION METHOD:	Walk-in, Bridge, Other: _____
*pH>8.5 or <6.5 pH:	7.98	8.65	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other: Icommerce
*DO<7.0 DO (mg/L):	9.48	7.34	SAMPLE LOCATION:	Bank, Thalweg, Midchannel, Open Water
*SC>700 SC (µS/cm):	443.9	441	HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other: _____
Turbidity (NTU):	Not Applicable**		HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years

isolated ponds in adjacent water ways

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	5/22/2018
StationID & Name : **CBD5**		FIRST SAMPLE TIME:	1345
Project ID: 20154800.003A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ M Doolittle	Start Time (24 hr): 1400	Discharge (cfs):	
Right Edge Water (REW):	End Time (24 hr): 1415	Discharge calculated by:	

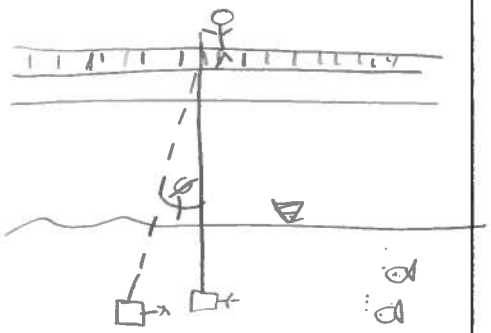
#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes
1		3.5	3	0.2 / 0.8 or 0.6	0.00	0.00	X
2		10.4	6.25	0.2 / 0.8 or 0.6	0.00	0.1	
3	10°	17.3	8	0.2 / 0.8 or 0.6	0.4	0.6	
4	10°	24.2	9	0.2 / 0.8 or 0.6	0.9	1.2	
5	25°	31.1	11	0.2 / 0.8 or 0.6	1.6	1.8	
6	15°	38	9.5	0.2 / 0.8 or 0.6	0.9	1.1	
7		44.9	7	0.2 / 0.8 or 0.6	0.2	0.2	
8		51.8	5	0.2 / 0.8 or 0.6	0.0	0.0	
9		58.7	4	0.2 / 0.8 or 0.6	0.0	0.0	
10		65.6	2.5	0.2 / 0.8 or 0.6	0.0		
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

Wetted Channel l: 69'

10 sections: 6.9'

Midpoint: 3.5'

X tree branch in flow path



*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC			Date: 5/22/2018
StationID & Name : **CBD1**			FIRST SAMPLE TIME: 1655
Project ID: **20154800.004A 02-0000 Rice WDR 2017**	Arrival Time: 1530	Departure Time: ~~1630~~ 1650	Target Lat. & Long.:
Sampling Crew (and Agency): L Short/ M Doolittle			Actual Lat & Long:
			Datum: / Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk., Other		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments: Sunken Boat

Water Column Thickness: 7' **Sample Depth:** 3.5

PHYSICAL PARAMETERS	~~SAC~~ SPD	SR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	23.5	23.11	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	80'>		OCCUPATION METHOD:	Walk-in, Bridge, Other
*pH>8.5 or <6.5 pH:	7.80	8.91	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other Kemmerer
*DO<7.0 DO (mg/L):	3.43	1.91	SAMPLE LOCATION:	Bank, Near Bank, Thalweg, Midchannel, Open Water
*SC>700 SC (µS/cm):	708	723	HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other
Turbidity (NTU):	Not Applicable**		HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	5/22/2018
StationID & Name : **CBD1**			FIRST SAMPLE TIME:
Project ID: 20154800.003A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ M Doolittle	Start Time (24 hr): ~~1410~~ 1600		Discharge (cfs):
Right Edge Water (REW):	End Time (24 hr): ~~1450~~ 1640		Discharge calculated by:

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes
1		8.1	2	0.2 / 0.8 or 0.6	0.0		Wetted Channel @: 16.5
2		24.3	7.5	0.2 / 0.8 or 0.6	0.0	0.0	
3		40.5	11	0.2 / 0.8 or 0.6	0.0	0.0	
4		56.7	7	0.2 / 0.8 or 0.6	0.0	0.0	
5		72.9	7	0.2 / 0.8 or 0.6	0.0	0.8	
6		89.1	9	0.2 / 0.8 or 0.6	0.0	0.0	10 sections @ 16.2
7		105.3	10.5	0.2 / 0.8 or 0.6	0.0	0.0	
8		121.5	7.5	0.2 / 0.8 or 0.6	0.0	0.0	Mid point @ 8.1
9		137.7	5	0.2 / 0.8 or 0.6	0.0	0.0	
10		153.9	1.5	0.2 / 0.8 or 0.6	0.0		
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			# Shifted due to Sunken boat
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

KLEINFELDER
Bright People. Right Solutions.

COC# 209970

Project No.	Project Name
20154800.004A Task 02	WDR SE-1

L.P. No. (PO No.):

Samplers: (Signature/Number): Short

Receiving Lab:
North Coast Laboratories
5680 West End Rd., Arcata CA 95521
Attn: Roxanne Moore (707) 822-4649

Instructions/Remarks:
CEDEN EDD
EXCEL EDD
MDL Report
Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers	Analysis: Benzobicyclon	Analysis: Metabolite B										Instructions/Remarks
1	05/22/18	0937	SSB-NCL-SE-1	W	1	500 mL	X	X										
2	05/22/18	1140	BS1-NCL-SE-1	W	1	500 mL	X	X										
3	05/22/18	1141	BS1-NCL-SE-1-D	W	1	500 mL	X	X										
4	05/22/18	1210	BS1-NCL-SE-1-F	W	1	500 mL	X	X										
5	05/22/18	1142	BS1-NCL-SE-1-M	W	2	500 mL/ 1L	X	X										MS/MSD, LCS/LCSD,lab blank, lab dup
6	05/22/18	1345	CBD5-NCL-SE-1	W	1	500 mL	X	X										
7	05/22/18	1605	CBD1-NCL-SE-1	W	1	500 mL	X	X										
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		

Relinquished By:	Date/Time	Received By:
[signature]	5/22/18 1900	KLF Sample Control
KLF Sample Control	5/24/18 1700	[signature]
[signature]	5/24/18 1900	FEDEX

Instructions/Remarks
Please send invoice to GOWAN

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

CHAIN-OF-CUSTODY

KLEINFELDER
INSTRUMENT CALIBRATION LOG

Sampler Name/No.: M. DOOLITTLE

Date: 5.22.18

Project No.: 20154800.004A-01

Job Name: RPP 2018

Calibration Start Time: 0553

pH Meter: ~~SPP~~ SR								EC Meter: ~~SPP~~ SR	
	Time	Temp. via Thermometer	Temp. via YSI Meter	pH7	mVpH (pH 7)	pH10	mVpH (pH10)		1413 umho
Reading (initial)	0610		22.44	6.70		9.52		Reading (initial)	1419
Calibration (initial)				7.00	-74.2	9.99	-145.9	Calibration (initial)	1413
Reading (intermediate)								Reading (intermediate)	
Calibration (intermediate)								Calibration (intermediate)	
Reading (end of day)								Reading (end of day)	

Comments:

Turbidity Meter (make/number): _____

	____NTU	____NTU	____NTU	Battery Check	
Reading (Initial)					
Calibration					

D.O. Meter: ~~SPP~~ SR

Barometric Pressure: 755.6 mmHg

	mg/L	%
Reading (initial):	8.89	
Reading (adj.):	9.53	
Intermediate Reading (initial):		
Intermediate Reading (adj.):		

KLEINFELDER
INSTRUMENT CALIBRATION LOG

Sampler Name/No.: 0 12535 M. DOOLITTLE

Date: 5.22.18

Project No.: 20154800.004A-01

Job Name: RPP 2018

Calibration Start Time: 0553

pH Meter: ~~SR~~ SPP								EC Meter: ~~SR~~ SPP	
	Time	Temp. via Thermometer	Temp. via YSI Meter	pH7	mVpH (pH 7)	pH10	mVpH (pH10)		1413 umho
Reading (initial)	0612		22.7	7.02		9.99		Reading (initial)	1417
Calibration (initial)				7.00	2.6	10.00	-179.2	Calibration (initial)	1413
Reading (intermediate)								Reading (intermediate)	
Calibration (intermediate)								Calibration (intermediate)	
Reading (end of day)								Reading (end of day)	

Comments:

Turbidity Meter (make/number):	____NTU	____NTU	____NTU	Battery Check	
Reading (Initial)					
Calibration					

D.O. Meter: ~~SR~~ SPD			
Barometric Pressure: 756.0 mmHg			
0630		mg/L	%
	Reading (initial):		96.5
	Reading (adj.):	9.32	99.9
Intermediate Reading (initial):			
Intermediate Reading (adj.):			

Rice Pesticides Program - Field Data Sheet - Water Sample Collection

Coalition Name: CRC	Date: **5/29/2018**
StationID & Name : **SSB**	FIRST SAMPLE TIME: 11:11
Project ID: **20154800.003A-01** Arrival Time: 10:31 Departure Time: 11:25	Target Lat. & Long.:
Sampling Crew (and Agency): ~~Lauren Short~~ J. CROWLEY, M. DOOLITTLE	Actual Lat & Long:
	Datum: Accuracy (ft / m):

OBSERVATIONS			
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk., Other	WADEABLE: YES / NO	PICTURE NAME/S:
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:
Photo of rented YSI (to get cable length)
PrO DSS TdS mg/L

Water Column Thickness: 10'

Sample Depth: 5'

PHYSICAL PARAMETERS	SPP	SR
Water Temp (Celsius):	24.7	24.7
Air Temp (°F):	80's	
*pH>8.5 or <6.5 pH:	7.72	7.76
*DO<7.0 DO (mg/L):	6.45	6.93

SAMPLE COLLECTION Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)

STARTING BANK: LB / RB/ NA

OCCUPATION METHOD: Walk-in, Bridge, Other: _____

SAMPLING EQUIPMENT: Indiv bottle by hand, By pole, Other: kemmerer

SAMPLE LOCATION: Bank, Thalweg, Midchannel, Open Water

HYDRO-MODIFICATION: None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other: _____

HYDROMODLOC: US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value From Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				

Rice Pesticides Program - Field Data Sheet - Water Sample Collection

Coalition Name: CRC	Date: **5/29/2018**
StationID & Name : **BS1**	FIRST SAMPLE TIME: 12:36
Project ID: **20154800.003A-01** — Arrival Time: 12:18 — Departure Time: 12:44	Target Lat. & Long.:
Sampling Crew (and Agency): ~~Lauren Short~~ M. DOOLI	Actual Lat & Long:
	Datum: — Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk., Other		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:

TDS: 168.6 mg/L

Water Column Thickness: 10'

Sample Depth: 5'

PHYSICAL PARAMETERS	SPP	SR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	24.1	24.0	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	85		OCCUPATION METHOD:	Walk-in, Bridge, Other: _____
*pH>8.5 or <6.5 pH:	7.60	7.63	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other: Kemmerer
*DO<7.0 DO (mg/L):	5.73	6.22	SAMPLE LOCATION:	Bank, Thalweg, Midchannel, Open Water
			HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other: _____
			HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value From Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				

Rice Pesticides Program - Field Data Sheet - Water Sample Collection

Coalition Name: CRC	Date: **5/29/2018**
StationID & Name : **CBD5**	FIRST SAMPLE TIME: 13:34
Project ID: **20154800.003A-01** Arrival Time: 13:19 Departure Time: 13:50	Target Lat. & Long.:
Sampling Crew (and Agency): ~~Lauren Short~~ M. DOOLITTLE, J. CROWLEY	Actual Lat & Long:
	Datum: Accuracy (ft / m):

OBSERVATIONS	**WADEABLE: YES / NO**	**PICTURE NAME/S:**
DOMINANT SUBSTRATE: Concrete, Cobble, Gravel, Sand, Mud, Unk, Other		
SITE ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE: clear, partly cloudy, overcast, fog, hazy	
OTHER PRESENCE: Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION: None, Foggy, Drizzle, Rain, Snow	
WATER ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	
WATER CLARITY: Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR: colorless, green, yellow, brown, other	
OBSERVED FLOW: NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:

TDS 337.00

Water Column Thickness: 8'

Sample Depth: 4'

PHYSICAL PARAMETERS	**SPP**	**SR**	**SAMPLE COLLECTION** Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	25.5	25.4	STARTING BANK: LB / RB/ NA
Air Temp (°F):	95		OCCUPATION METHOD: Walk-in, Bridge, Other: _____
*pH>8.5 or <6.5 pH:	7.89	7.96	SAMPLING EQUIPMENT: Indiv bottle by hand, By pole, Other: Kammerer
*DO<7.0 DO (mg/L):	7.21	7.15	SAMPLE LOCATION: Bank, Thalweg, Midchannel, Open Water
			HYDRO-MODIFICATION: None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other: _____
			HYDROMODLOC: US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value From Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				

Rice Pesticides Program - Field Data Sheet - Water Sample Collection

Coalition Name: CRC	Date: **5/29/2018**
StationID & Name : **CBD1**	FIRST SAMPLE TIME: 14:58
Project ID: **20154800.003A-01** Arrival Time: 14:35 Departure Time: 14:46	Target Lat. & Long.:
Sampling Crew (and Agency): ~~Lauren Short~~ M. DOOLITTLE, J. CROWLEY	Actual Lat & Long:
	Datum: Accuracy (ft / m):

OBSERVATIONS			
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk, Other	WADEABLE: YES / NO	PICTURE NAME/S:
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:

TDS 308.7 mg/L

Water Column Thickness: 9'

Sample Depth: 4.5'

PHYSICAL PARAMETERS	SPP	SR
Water Temp (Celsius):	24.4	24.3
Air Temp (°F):	96	
*pH>8.5 or <6.5 pH:	7.67	7.70
*DO<7.0 DO (mg/L):	4.25	4.81

SAMPLE COLLECTION	
Sample Depth (circle one):	0.1 m (subsurface grab) -88 (integrated)
STARTING BANK:	LB / RB/ NA
OCCUPATION METHOD:	Walk-in, Bridge, Other: _____
SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other: Kemerer
SAMPLE LOCATION:	Bank, Thalweg, Midchannel, Open Water
HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other: _____
HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value From Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				

KLEINFELDER
INSTRUMENT CALIBRATION LOG

Sampler Name/No.: J. COWLEY 12850

Date: 5/29/2018

Project No.: 20154800.004A-01

Job Name: RPP 2018

Calibration Start Time: 0603

pH Meter: SPP								EC Meter: SPP	
	Time	Temp. via Thermometer	Temp. via YSI Meter	pH7	mVpH (pH 7)	pH10	mVpH (pH10)		1413 umho
Reading (initial)	0624		28.5	7.03	1.0	10.02		Reading (initial)	1428
Calibration (initial)				7.00		10.02	-183.9	Calibration (initial)	1413
Reading (intermediate)								Reading (intermediate)	
Calibration (intermediate)								Calibration (intermediate)	
Reading (end of day)								Reading (end of day)	

Comments:

Turbidity Meter (make/number): _____

	____NTU	____NTU	____NTU	Battery Check	
Reading (Initial)					
Calibration					

D.O. Meter: SPP			
Barometric Pressure: 754.5 mmHg			
		mg/L	%
	Reading (initial):		103.5
	Reading (adj.):	8.26	99.3
	Intermediate Reading (initial):		
	Intermediate Reading (adj.):		

geotech
Calibrated at Geotech's California North service center
4620 Northgate Blvd; Suite 170
Sacramento, CA 95834
Fax: (916) 648-7766

YSI Pro Series Calibration Certificate

Unit Number: 5838
Serial Number: 17C102741

Calibration Date 5/29/2018
Technician: Nick Robello

Installed Probes
- ☑ Conductivity
- ☑ PH
- ☑ ORP
- ☑ DO

- ☑ Display is clear, and free of damage
- ☑ Cable and accessories are free of damage
- ☑ Firmware version is up to date.

Display Battery	5.5 V	Pass
Spare Battery	6 V	Pass
Cable Flex Test:	Pass	

Cable Length	4M	pH Probe Lot #	17A
Cable Lot #	17D100615	ORP Probe Lot	17C
Cond Probe Lot #	17D100425	DO Probe Lot #	17C100644
Bath Temp	19.9 °C		
Meter Temp	20.1 °C		
Variance	-0.20	Pass	

Cond

Calibration	Reading		Buffer Lot #	Exp. Date	
1.413 mS	1.413 mS	Pass	7GF513	6/18	Pass

pH

Point Test	Calibration	Reading	mV	Slope		Buffer Lot #	Exp. Date	
2 Point	pH 7	pH 7	-28 mV			7GC1079	3/19	Pass
	pH 10	pH 10	-202.1 mV	174.1	Pass	7GD255	4/19	Pass

ORP

Calibraition	Reading		Buffer Lot #	Exp. Date	
220 mV	220 mV	Pass	7GH163	5/18	Pass

DO

Barometer	Calibration	Reading	Variance		Test Fluid
769.7 mmHg	101.3 %	100.7 %	-0.6%	Pass	Water Saturated Air

Time:	Min.	Sec.	Reading		Nitrogen Lot #
	2	40	2 %	Pass	15182N2

Geotech Environmental Equipment, Inc. takes pride in ensuring this instrument is tested to function as specified by the manufacturer and was calibrated in accordance to manufacturer specifications. All calibration standards used are NIST traceable. With the provided lot numbers we can provide NIST documents on request. Call us at (800) 833-7958 and we will be glad to help.

geotech
Calibrated at Geotech's California North service center
4620 Northgate Blvd; Suite 170
Sacramento, CA 95834
Fax: (916) 648-7766

YSI Pro DSS Calibration Certificate

Unit Number: 5411
Serial Number: 16B103528

Calibration Date 5/21/2018
Technician: Nick Robello

Installed Probes
- ☑ Conductivity
- ☑ PH/ORP
- ☑ DO
- ☑ TURB

- ☑ Display is clear, and free of damage
- ☑ Cable and accessories are free of damage
- ☑ Firmware version is up to date.

Display Battery 100 % **Pass**
Cable Flex Test: **Pass**

Cable Length	10M	pH/ORP Serial #	16B104023
Cable Lot #	16C100642	DO Probe Serial #	17K104779
Cond Probe Lot #	16B103789	Turb Probe Serial #	16B103992
Bath Temp	22.5 °C		
Meter Temp	22.3 °C		
Variance	-0.20	**Pass**	

Cond

Calibration	Reading		Buffer Lot #	Exp. Date	
1.413 mS	1.413 mS	**Pass**	8GA635	1/19	**Pass**

pH

Point Test	Calibration	Reading	mV	Slope		Buffer Lot #	Exp. Date	
2 Point	pH 7	pH 7	-8.9 mV			7GC1079	3/19	**Pass**
	pH 10	pH 10	-187.8 mV	178.9	**Pass**	7GD255	4/19	**Pass**

ORP

Calibraition	Reading		Buffer Lot #	Exp. Date	
220 mV	220 mV	**Pass**	7GH163	5/18	**Pass**

Turbidity

Zero	Reading	Variance		Cal	Reading	Variance		Buffer Lot #	Exp. Date	
0 ntu	0 ntu	0 ntu	**Pass**	124 ntu	124 ntu	0.0%	**Pass**	17F797417	6/18	**Pass**

DO

Barometer	Calibration	Reading	Variance		Test Fluid
755.9 mmHg	99.5 %	98.5 %	-1.0%	**Pass**	Water Saturated Air

Time:	Min.	Sec.	Reading		Nitrogen Lot #
	3	50	1 %	**Pass**	15182N2

Geotech Environmental Equipment, Inc. takes pride in ensuring this instrument is tested to function as specified by the manufacturer and was calibrated in accordance to manufacturer specifications. All calibration standards used are NIST traceable. With the provided lot numbers we can provide NIST documents on request. Call us at (800) 833-7958 and we will be glad to help.

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC			Date: 6/5/2018
StationID & Name : CBD1			FIRST SAMPLE TIME: 14:45
Project ID: 20154800.004A 02-0000 Rice WDR 2017	Arrival Time: 1420	Departure Time: 1544	Target Lat. & Long.:
Sampling Crew (and Agency): L Short, J Cowley - KLF			Actual Lat & Long:
			Datum: / Accuracy (ft / m):

OBSERVATIONS		
DOMINANT SUBSTRATE: Concrete, Cobble, Gravel, Sand, Mud, Unk, Other	WADEABLE: YES / NO	PICTURE NAME/S:
SITE ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE: Clear, partly cloudy, overcast, fog, hazy	
OTHER PRESENCE: Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION: None, Foggy, Drizzle, Rain, Snow	
WATER ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	
WATER CLARITY: Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR: colorless, green, yellow, brown, other	
OBSERVED FLOW: NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments: Sunken boat

Water Column Thickness: 8.5' Sample Depth: 4'

PHYSICAL PARAMETERS	SAC	GTR
Water Temp (Celsius):	25.5	25.3
Air Temp (°F):	80's	
*pH>8.5 or <6.5 pH:	7.80	7.77
*DO<7.0 DO (mg/L):	4.09	4.95
*SC>700 SC (µS/cm):	660	675
Turbidity (NTU):	Not Applicable**	

SAMPLE COLLECTION	
Sample Depth (circle one):	0.1 m (subsurface grab) -88 (integrated)
STARTING BANK:	LB / RB/ NA
OCCUPATION METHOD:	Walk-in, Bridge, Other
SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other Kemerer
SAMPLE LOCATION:	Bank, Near Bank, Thalweg, Midchannel, Open Water
HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other
HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
					** Only collected during assessment and modified assessment years
	See Attached Chain of Custodies				QC collected Time
					Dup 14:47
					MSD 14:48

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	6/5/2018
StationID & Name : CBD1		FIRST SAMPLE TIME:	
Project ID: 20154800 004A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ J Cowley	Start Time (24 hr): 1510	Discharge (cfs):	
Right Edge Water (REW):	End Time (24 hr): 1530	Discharge calculated by:	

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes
1		8	3	0.2 / 0.8 or 0.6	0.0	0.0	Wetted Channel Width 161.5'
2		24.1	7	0.2 / 0.8 or 0.6	0.0	0.0	
3		40.7	11	0.2 / 0.8 or 0.6	0.0	0.0	
4		56.3	4	0.2 / 0.8 or 0.6	0.0	0.0	10 sections @ 16.1'
5		72.4	7	0.2 / 0.8 or 0.6	0.0	0.0	
6		89.5	4.5	0.2 / 0.8 or 0.6	0.0	0.0	midpoint: 8'
7		104.6	8	0.2 / 0.8 or 0.6	0.0	0.0	
8		120.7	7	0.2 / 0.8 or 0.6	0.0	0.0	
9		136.8	6	0.2 / 0.8 or 0.6	0.0	0.0	
10		152.9	4	0.2 / 0.8 or 0.6	0.0	0.0	Shift 4 feet river left due to sunken boat
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC	Date: 6/5/2018
StationID & Name : CBD5	FIRST SAMPLE TIME: 12:44
Project ID: 20154800.004A 02-0000 Rice WDR 2017 — Arrival Time: 1227 — Departure Time: 1330	Target Lat. & Long.:
Sampling Crew (and Agency): L Short, J. Cowley - KLF	Actual Lat & Long:
	Datum: — Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk., Other: _____		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other: _____	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other: _____	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other: _____	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other: ____
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:

Water Column Thickness: 7' Sample Depth: 3.5'

PHYSICAL PARAMETERS	SPP	GTR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	24.5	24.4	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	80's		OCCUPATION METHOD:	Walk-in, Bridge, Other: _____
*pH>8.5 or <6.5 pH:	7.90	7.80	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other: Kemmerer
*DO<7.0 DO (mg/L):	6.57	7.11	SAMPLE LOCATION:	Bank, Thalweg, Midchannel, Open Water
*SC>700 SC (µS/cm):	532	539	HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other: _____
Turbidity (NTU):	Not Applicable**		HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	6/5/2018
StationID & Name : CBD5		FIRST SAMPLE TIME:	12:44
Project ID: 20154800.004A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ J Cowley	Start Time (24 hr): 12:38	Discharge (cfs):	
Right Edge Water (REW):	End Time (24 hr): 1322	Discharge calculated by:	

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes
1		3.5	7.5	0.2 / 0.8 or 0.6	0.0	0.0	Wetted Channel width: 70.25
2		10.52	6	0.2 / 0.8 or 0.6	0.0	0.0	
3		17.54	8	0.2 / 0.8 or 0.6	0.2	0.5	
4		24.56	9.5 15°2	0.2 / 0.8 or 0.6	1.2	1.3	
5		31.58	11 25°2	0.2 / 0.8 or 0.6	1.5	2.1	10 sections @ 7.02
6		38.60	9 15°2	0.2 / 0.8 or 0.6	.3	1.3	midpoint 3.5
7		45.62	7	0.2 / 0.8 or 0.6	.3	.5	
8		52.64	5	0.2 / 0.8 or 0.6	.1	.6	
9		59.66	5	0.2 / 0.8 or 0.6	0.0	0.0	
10		66.68	2	0.2 / 0.8 or 0.6	0.2		in eddy
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC	Date: 6/5/2018
StationID & Name : BS1	FIRST SAMPLE TIME: 11:10
Project ID: 20154800.004A 02-0000 Rice WDR 2017 — Arrival Time: 1050 — Departure Time: 1140	Target Lat. & Long.:
Sampling Crew (and Agency): L Short, J. Cowley - KLF	Actual Lat & Long:
	Datum: — Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk, Other		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments: 2 fishermen trash = water bottles

Water Column Thickness: 11' Sample Depth: 5.5'

PHYSICAL PARAMETERS	SAC	GTR	SAMPLE COLLECTION	
Water Temp (Celsius):	25.1	25.0	Sample Depth (circle one):	0.1 m (subsurface grab) -88 (integrated)
Air Temp (°F):	~~75~~	70's	STARTING BANK:	LB / RB/ NA
*pH>8.5 or <6.5 pH:	7.47	7.37	OCCUPATION METHOD:	Walk-in, Bridge, Other
*DO<7.0 DO (mg/L):	4.24	4.94	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other Kemerer
*SC>700 SC (µS/cm):	258.2	263.2	SAMPLE LOCATION:	Bank, Near Bank, Thalweg, Midchannel, Open Water
Turbidity (NTU):	Not Applicable**		HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other
			HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
					** Only collected during assessment and modified assessment years
	See Attached Chain of Custodies				

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	6/5/2018
StationID & Name : BS1			FIRST SAMPLE TIME:
Project ID: 20154800.004A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ J Cowley	Start Time (24 hr): 11:17		Discharge (cfs):
Right Edge Water (REW):	End Time (24 hr):		Discharge calculated by:

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes
1		5.9	3	0.2 / 0.8 or 0.6	0.0	0.0	Wetted Channel Width 118
2		17.7	6	0.2 / 0.8 or 0.6	0.0	0.0	
3		29.5	8	0.2 / 0.8 or 0.6	0.1	0.0	10 sections @ 11.8
4		41.3	8	0.2 / 0.8 or 0.6	0.0	0.0	
5		53.1	10	0.2 / 0.8 or 0.6	0.2	0.2	Midpoint : 5.9'
6		64.9	11	0.2 / 0.8 or 0.6	0.0	0.2	
7		76.7	10	0.2 / 0.8 or 0.6	0.0	0.2	
8		88.5	13	0.2 / 0.8 or 0.6	0.3	0.6	
9		100.3	10	0.2 / 0.8 or 0.6	0.0	0.0	
10		112.1	6	0.2 / 0.8 or 0.6	0.0	0.0	
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC	Date: 6/5/2018
StationID & Name : SSB	FIRST SAMPLE TIME: 9:45
Project ID: 20154800.004A 02-0000 Rice WDR 2017 — Arrival Time: 9:25 — Departure Time: 1010	Target Lat. & Long.:
Sampling Crew (and Agency): L Short, J. Cowley - KLF	Actual Lat & Long:
	Datum: — Accuracy (ft / m):

OBSERVATIONS	WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE: Concrete, Cobble, Gravel, Sand, Mud, Unk., Other		
SITE ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE: clear, partly cloudy, overcast, fog, hazy	
OTHER PRESENCE: Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION: None, Foggy, Drizzle, Rain, Snow	
WATER ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	
WATER CLARITY: Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR: colorless, green, yellow, brown, other	
OBSERVED FLOW: NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments: Sawed log in Channel, vegetation

Water Column Thickness: 6' Sample Depth: 3'

PHYSICAL PARAMETERS	SAC	GTR	SAMPLE COLLECTION	
Water Temp (Celsius):	24.1	24.0	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)	
Air Temp (°F):	70's		STARTING BANK: LB / RB/ NA	
*pH>8.5 or <6.5 pH:	7.88	7.79	OCCUPATION METHOD: Walk-in, Bridge, Other	
*DO<7.0 DO (mg/L):	6.38	6.96	SAMPLING EQUIPMENT: Indiv bottle by hand, By pole, Other Kemerer	
*SC>700 SC (µS/cm):	343.7	350.4	SAMPLE LOCATION: Bank, Near Bank, Thalweg, Midchannel, Open Water	
Turbidity (NTU):	Not Applicable**		HYDRO-MODIFICATION: None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other	
			HYDROMODLOC: US / DS / NA	

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
					** Only collected during assessment and modified assessment years
	See Attached Chain of Custodies				

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	6/5/2018
StationID & Name : SSB		FIRST SAMPLE TIME:	945
Project ID: 20154800 004A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ J Cowley	Start Time (24 hr): 610	Discharge (cfs):	
Right Edge Water (REW):	End Time (24 hr): 643	Discharge calculated by:	

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)	
1		5.5	1.5	0.2 / 0.8 or 0.6	0.0	
2		16.8	2.5	0.2 / 0.8 or 0.6	0.0	
3		28.1	4	0.2 / 0.8 or 0.6	0.0	0.3
4		39.4	6	0.2 / 0.8 or 0.6	0.0	0.6
5		50.7	9	0.2 / 0.8 or 0.6	0.3	0.8
6		62.0	7	0.2 / 0.8 or 0.6	0.7	0.6
7		73.3	8	0.2 / 0.8 or 0.6	0.0	0.6
8		84.6	7	0.2 / 0.8 or 0.6	0.1	0.2
9		95.9	8	0.2 / 0.8 or 0.6	0.0	0.0
10		107.2	2.5	0.2 / 0.8 or 0.6	0.0	
11				0.2 / 0.8 or 0.6		
12				0.2 / 0.8 or 0.6		
13				0.2 / 0.8 or 0.6		
14				0.2 / 0.8 or 0.6		
15				0.2 / 0.8 or 0.6		
16				0.2 / 0.8 or 0.6		
17				0.2 / 0.8 or 0.6		
18				0.2 / 0.8 or 0.6		
19				0.2 / 0.8 or 0.6		
20				0.2 / 0.8 or 0.6		
21				0.2 / 0.8 or 0.6		
22				0.2 / 0.8 or 0.6		
23				0.2 / 0.8 or 0.6		
24				0.2 / 0.8 or 0.6		
25				0.2 / 0.8 or 0.6		
26				0.2 / 0.8 or 0.6		
27				0.2 / 0.8 or 0.6		
28				0.2 / 0.8 or 0.6		
29				0.2 / 0.8 or 0.6		

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

Notes

Channel width 113'

+3' to river right due to obstacle

10 sections @ 11.3'

mid point: 5.5'

10:00 - levee maintenence conducting a controlled burn on levee. (part of exit route) Crew departs due to safety concerns. Returned to site to take flow measurements after CBDI.

KLEINFELDER
INSTRUMENT CALIBRATION LOG

Sampler Name/No.: LShort

Date: 6/5/2018

Project No.: 20154800.004A-01

Job Name: RPP 2018

Calibration Start Time: ~~557~~ 545

pH Meter: SPP								EC Meter: SPP	
	Time	Temp. via Thermometer	Temp. via YSI Meter	pH7	mVpH (pH 7)	pH10	mVpH (pH10)		1413 umho
Reading (initial)	0607		28.7	7.03	-2.2	10.60	-185.5	Reading (initial)	1419
Calibration (initial)	0612		27.3	7.01	-2.3	10.00	-185.4	Calibration (initial)	1413
Reading (intermediate)								Reading (intermediate)	
Calibration (intermediate)								Calibration (intermediate)	
Reading (end of day)								Reading (end of day)	

Comments:

Turbidity Meter (make/number): _____

	___NTU	___NTU	___NTU	Battery Check	
Reading (Initial)					
Calibration					

D.O. Meter: SPP

Barometric Pressure: 756.1 mmHg

	mg/L	%
Reading (initial):	—	100.1
Reading (adj.):	8.90	99.4
Intermediate Reading (initial):		
Intermediate Reading (adj.):		

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC			Date: 6/19/2018
StationID & Name : **SSB**			FIRST SAMPLE TIME: 0900
Project ID: **20154800.004A 02-0000 Rice WDR 2017**	Arrival Time: 0840	Departure Time: 1010	Target Lat. & Long.:
Sampling Crew (and Agency): L Short, J. Cowley - KLF			Actual Lat & Long:
			Datum: / Accuracy (ft / m):

OBSERVATIONS		WADEABLE YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE: Concrete, Cobble, Gravel, Sand, Mud, Unk, Other			
SITE ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE: clear, partly cloudy, overcast, fog, hazy		
OTHER PRESENCE: Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION: None, Foggy, Drizzle, Rain, Snow		
WATER ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None		
WATER CLARITY: Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR: colorless, green, yellow, brown, other		
OBSERVED FLOW: NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs			

Comments:

Log in Channel

Water Column Thickness: 7' **Sample Depth:** _____

PHYSICAL PARAMETERS	SAC	GTR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	24.1	23.9	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	70's		OCCUPATION METHOD:	Walk-in, Bridge, Other
*pH>8.5 or <6.5 pH:	7.61	7.59	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other Kemerer
*DO<7.0 DO (mg/L):	6.04	5.76	SAMPLE LOCATION:	Bank, Near Bank, Thalweg, Midchannel, Open Water
*SC>700 SC (µS/cm):	314.4	318.9	HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other
Turbidity (NTU):	Not Applicable**		HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years
					Dup, MS/MSD, F. Collected.

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	6/19/2018
StationID & Name : **SSB**			FIRST SAMPLE TIME:
Project ID: 20154800.004A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ J Cowley	Start Time (24 hr): 0920		Discharge (cfs):
Right Edge Water (REW):	End Time (24 hr): 1005		Discharge calculated by:

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes 110'
1		5.5	1.5	0.2 / 0.8 or 0.6	0.3		
2		16.6	2	0.2 / 0.8 or 0.6	0.8		
3		27.7	5.5	0.2 / 0.8 or 0.6	0.2	1.0	
4		35.8	8	0.2 / 0.8 or 0.6	0.7	1.2	
5		49.9	8	0.2 / 0.8 or 0.6	0.6	0.9	Next to Pillar
6		61.0	8	0.2 / 0.8 or 0.6	0.2	0.9	
7		72.1	7	0.2 / 0.8 or 0.6	0.2	0.0	
8		83.2	7	0.2 / 0.8 or 0.6	0.0	0.0	
9		94.3	9	0.2 / 0.8 or 0.6	0.1	0.1	
10		105.4	3	0.2 / 0.8 or 0.6	0.0	0.0	
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			Channel length: 110'
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			11' foot sections
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			midpoint 5.5'
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC			Date: 6/19/2018
StationID & Name : **BS1**			FIRST SAMPLE TIME: 11:00
Project ID: **20154800.004A 02-0000 Rice WDR 2017**	Arrival Time: 1045	Departure Time: 11:38	Target Lat. & Long.:
Sampling Crew (and Agency): L Short, J. Cowley - KLF			Actual Lat & Long:
			Datum: / Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk., Other		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:

Water Column Thickness: 11' **Sample Depth:** 5.5'

PHYSICAL PARAMETERS	SAC	GTR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	24.8	24.7	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	80's		OCCUPATION METHOD:	Walk-in, Bridge, Other
*pH>8.5 or <6.5 pH:	7.64	7.64	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other e
*DO<7.0 DO (mg/L):	5.90	6.13	SAMPLE LOCATION:	Bank, Near Bank, Thalweg, Midchannel, Open Water
*SC>700 SC (µS/cm):	284.0	288.0	HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other
Turbidity (NTU):	Not Applicable**		HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years

2 people fishing

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	6/19/2018
StationID & Name : **BS1**			FIRST SAMPLE TIME:
Project ID: 20154800.004A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ J Cowley	Start Time (24 hr): 1105		Discharge (cfs):
Right Edge Water (REW):	End Time (24 hr): 1135		Discharge calculated by:

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes 116' 11.6
1		5.8	3	0.2 / 0.8 or 0.6	0.0	0.0	
2		17.4	7	0.2 / 0.8 or 0.6	0.0	0.0	
3		29	7	0.2 / 0.8 or 0.6	0.0	0.0	
4		40.6	8	0.2 / 0.8 or 0.6	0.0	0.0	
5		52.2	10	0.2 / 0.8 or 0.6	0.0	0.0	
6		63.8	9	0.2 / 0.8 or 0.6	0.0	0.0	
7		75.4	10	0.2 / 0.8 or 0.6	0.0	0.0	
8		87	10	0.2 / 0.8 or 0.6	0.0	0.2	
9		98.6	8.5	0.2 / 0.8 or 0.6	0.0	0.0	
10		110.2	4	0.2 / 0.8 or 0.6	0.0	0.0	
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

Channel length: 116'
Section: 11.6'
midpoint: 5.8'

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC	Date: **6/19/2018**
StationID & Name : **CBD5**	FIRST SAMPLE TIME: 1223
Project ID: **20154800.004A 02-0000 Rice WDR 2017** — Arrival Time: 12:12 — Departure Time: 13:24	Target Lat. & Long.:
Sampling Crew (and Agency): L Short, J. Cowley - KLF	Actual Lat & Long:
	Datum: — Accuracy (ft / m):

OBSERVATIONS	WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE: Concrete, Cobble, Gravel, Sand, Mud, Unk., Other: _____		
SITE ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other: _____	SKY CODE: clear, partly cloudy, overcast, fog, hazy	
OTHER PRESENCE: Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other: _____	PRECIPITATION: None, Foggy, Drizzle, Rain, Snow	
WATER ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other: _____	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	
WATER CLARITY: Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR: colorless, green, yellow, brown, other: ____	
OBSERVED FLOW: NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:

Water Column Thickness: 6' **Sample Depth:** 3'

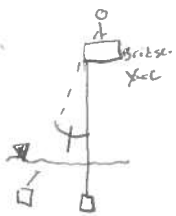
PHYSICAL PARAMETERS	SPP	GTR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	25.6	25.5	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	90s		OCCUPATION METHOD:	Walk-in, Bridge, Other: _____
*pH>8.5 or <6.5 pH:	7.86	7.83	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other: Kemerer
*DO<7.0 DO (mg/L):	7.12	6.95	SAMPLE LOCATION:	Bank, Thalweg, Midchannel, Open Water
*SC>700 SC (µS/cm):	631	642	HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other: _____
Turbidity (NTU):	Not Applicable**		HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	6/19/2018
StationID & Name : **CBD5**			FIRST SAMPLE TIME:
Project ID: 20154800.004A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ J Cowley	Start Time (24 hr): 1230		Discharge (cfs):
Right Edge Water (REW):	End Time (24 hr): 1320		Discharge calculated by:



#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes 70 7
1		3.5	3.5	0.2 / 0.8 or 0.6	0.0	0.0	
2		10.5	5.5	0.2 / 0.8 or 0.6	0.0	0.0	
3		17.5	7.5	0.2 / 0.8 or 0.6	0.0	0.2	
4	10	24.5	9	0.2 / 0.8 or 0.6	1.0	1.0	
5	15	31.5	10	0.2 / 0.8 or 0.6	1.3	1.7	
6	15	38.5	10	0.2 / 0.8 or 0.6	1.1	1.4	
7		46.5	6	0.2 / 0.8 or 0.6	0.0	0.0	Shifter river right due to pilcr
8		52.5	4.5	0.2 / 0.8 or 0.6	0.0	0.0	
9		59.5	4	0.2 / 0.8 or 0.6	0.0	0.0	
10		66.5	2	0.2 / 0.8 or 0.6	0.1		back eddy
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			Channel length: 70'
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			Section: 7'
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			Midpoint: 35'
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC			Date: 6/19/2018
StationID & Name : **CBD1**			FIRST SAMPLE TIME: 14:29
Project ID: **20154800.004A 02-0000 Rice WDR 2017**	Arrival Time: 14:14	Departure Time: 1535	Target Lat. & Long.:
Sampling Crew (and Agency): L Short, J. Cowley - KLF			Actual Lat & Long:
			Datum: / Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk., Other		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:

Water Column Thickness: 11 **Sample Depth:** 5.5

PHYSICAL PARAMETERS	SAC	GTR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	24.7	24.6	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	90's		OCCUPATION METHOD:	Walk-in, Bridge, Other
*pH>8.5 or <6.5 pH:	7.45	7.52	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other Kemerrer
*DO<7.0 DO (mg/L):	0.11	0.61	SAMPLE LOCATION:	Bank, Near Bank, Thalweg, Midchannel, Open Water
*SC>700 SC (µS/cm):	704	707	HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other
Turbidity (NTU):	Not Applicable**		HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years

- Sunken boat
- Trash along bank

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	6/19/2018
StationID & Name : **CBD1**			FIRST SAMPLE TIME:
Project ID: 20154800.004A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ J Cowley	Start Time (24 hr): 1440		Discharge (cfs):
Right Edge Water (REW):	End Time (24 hr): 1520		Discharge calculated by:

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes 166 16.6
1		8.3	1	0.2 / 0.8 or 0.6	0.0		
2		24.9	7	0.2 / 0.8 or 0.6	0.0	0.0	
3		41.5	7	0.2 / 0.8 or 0.6	0.0	0.0	
4		58.1	7.5	0.2 / 0.8 or 0.6	0.0	0.0	
5		74.7	7	0.2 / 0.8 or 0.6	0.0	0.0	
6		91.3	9	0.2 / 0.8 or 0.6	0.0	0.0	
7		107.9	10	0.2 / 0.8 or 0.6	0.0	0.0	
8		124.5	8	0.2 / 0.8 or 0.6	0.0	0.0	
9		141.1	5	0.2 / 0.8 or 0.6	0.0	0.0	
10		157.7	2	0.2 / 0.8 or 0.6	0.0		
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			Channel length: 166'
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			16.6' Section
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			Midpoint: 8.3
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC			Date: 7/2/2018
StationID & Name : **SSB**			FIRST SAMPLE TIME: 0837
Project ID: **20154800.004A 02-0000 Rice WDR 2017**	Arrival Time: 0817	Departure Time: 939	Target Lat. & Long.:
Sampling Crew (and Agency): L Short, J. Cowley - KLF			Actual Lat & Long:
			Datum: / Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk, Other		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:

Water Column Thickness: 7.5' **Sample Depth:** 3.5'

PHYSICAL PARAMETERS	1151	GTR	SAMPLE COLLECTION	
Water Temp (Celsius):	26.73	26.6	Sample Depth (circle one):	0.1 m (subsurface grab) -88 (integrated)
Air Temp (°F):	80's		STARTING BANK:	LB / RB/ NA
*pH>8.5 or <6.5 pH:	7.68	7.77	OCCUPATION METHOD:	Walk-in, Bridge, Other
*DO<7.0 DO (mg/L):	4.56	5.02	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other Remove.
*SC>700 SC (µS/cm):	416	414.5	SAMPLE LOCATION:	Bank, Near Bank, Thalweg, Midchannel, Open Water
Turbidity (NTU):	Not Applicable**		HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other
			HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	7/2/2018
StationID & Name : **SSB**			FIRST SAMPLE TIME:
Project ID: 20154800.004A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ J Cowley	Start Time (24 hr): 0840		Discharge (cfs):
Right Edge Water (REW):	End Time (24 hr): 0910		Discharge calculated by:

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes
1		5.6	1.5	0.2 / 0.8 or 0.6	0.0		
2		16.7	2	0.2 / 0.8 or 0.6	0.0		
3		29.9	4	0.2 / 0.8 or 0.6	0.0	0.0	
4		39.0	8	0.2 / 0.8 or 0.6	0.0	0.0	
5		50.2	7.5	0.2 / 0.8 or 0.6	0.0	0.0	
6		61.3	8	0.2 / 0.8 or 0.6	0.0	0.0	
7		72.5	9	0.2 / 0.8 or 0.6	0.0	0.0	
8		83.6	8	0.2 / 0.8 or 0.6	0.0	0.0	river left from piller
9		94.7	8	0.2 / 0.8 or 0.6	0.0	0.0	
10		105.9	5.5	0.2 / 0.8 or 0.6	0.0	0.0	
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			length:
23				0.2 / 0.8 or 0.6			111.5
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			Section
26				0.2 / 0.8 or 0.6			11.1
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			midpoint: 5.6
29				0.2 / 0.8 or 0.6			

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC			Date: 7/2/2018
StationID & Name : **BS1**			FIRST SAMPLE TIME: 1012
Project ID: **20154800.004A 02-0000 Rice WDR 2017**	Arrival Time: 0925	Departure Time: 1400	Target Lat. & Long.:
Sampling Crew (and Agency): L Short, J. Cowley - KLF			Actual Lat & Long:
			Datum: / Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk, Other		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments: Trash along banks

Water Column Thickness: 10.5' **Sample Depth:** 5'

PHYSICAL PARAMETERS	1151	GTR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	26.33	26.5	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	90's		OCCUPATION METHOD:	Walk-in, Bridge, Other
*pH>8.5 or <6.5 pH:	7.64	7.78	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other Kemmerer
*DO<7.0 DO (mg/L):	5.70	6.55	SAMPLE LOCATION:	Bank, Near Bank, Thalweg, Midchannel, Open Water
*SC>700 SC (µS/cm):	289.1	270.1	HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other
Turbidity (NTU):	Not Applicable**		HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	7/2/2018
StationID & Name : **BS1**			FIRST SAMPLE TIME: 1012
Project ID: 20154800.004A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ J Cowley	Start Time (24 hr): 1020		Discharge (cfs):
Right Edge Water (REW):	End Time (24 hr): 1155		Discharge calculated by:

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes
1		5.8	2	0.2 / 0.8 or 0.6	0.0	0.0	
2		17.3	6.5	0.2 / 0.8 or 0.6	0.0	0.0	
3		28.3	5.5	0.2 / 0.8 or 0.6	0.0	0.0	
4		40.4	6.5	0.2 / 0.8 or 0.6	0.0	0.0	
5		51.9	8	0.2 / 0.8 or 0.6	0.0	0.0	
6		63.5	10	0.2 / 0.8 or 0.6	0.0	0.0	
7		75.0	7.5	0.2 / 0.8 or 0.6	0.0	0.0	
8		86.5	10	0.2 / 0.8 or 0.6	0.0	0.0	
9		98.1	10	0.2 / 0.8 or 0.6	0.0	0.0	
10		109.6	4	0.2 / 0.8 or 0.6	0.0	0.0	
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			
19				0.2 / 0.8 or 0.6			length: 115.4
20				0.2 / 0.8 or 0.6			Section: 11.5
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			midpoint: 5.8
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC			Date: **7/2/2018**
StationID & Name : **CBD5**			FIRST SAMPLE TIME: 1140
Project ID: **20154800.004A 02-0000 Rice WDR 2017**	Arrival Time: 1120	Departure Time: 1235	Target Lat. & Long.:
Sampling Crew (and Agency): L Short, J. Cowley - KLF			Actual Lat & Long:
			Datum: / Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk., Other: _____		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other: _____	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other: _____	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other: _____	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other: ____
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments:

Water Column Thickness: 7' **Sample Depth:** 3.5

PHYSICAL PARAMETERS	1151	GTR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	26.42	26.3	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	90's		OCCUPATION METHOD:	Walk-in, Bridge, Other: _____
*pH>8.5 or <6.5 pH:	7.80	7.81	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other: Kemmerer
*DO<7.0 DO (mg/L):	6.02	6.45	SAMPLE LOCATION:	Bank, Thalweg, Midchannel, Open Water
*SC>700 SC (µS/cm):	994	989	HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other: _____
Turbidity (NTU):	Not Applicable**		HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years
					D - 1141
					M - 1142
					F - 1200

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	7/2/2018
StationID & Name : **CBD5**			FIRST SAMPLE TIME:
Project ID: 20154800.004A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ J Cowley	Start Time (24 hr):		Discharge (cfs):
Right Edge Water (REW):	End Time (24 hr):		Discharge calculated by:

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes
1		3.6	2	0.2 / 0.8 or 0.6	0.0		
2		10.7	4.5	0.2 / 0.8 or 0.6	0.0		
3		17.8	5	0.2 / 0.8 or 0.6	0.0	0.0	
4		24.9	8	0.2 / 0.8 or 0.6	0.0	0.0	
5		32.0	0	0.2 / 0.8 or 0.6	0.0	0.2	
6		39.1	7	0.2 / 0.8 or 0.6	0.0	0.3	
7		46.2	6	0.2 / 0.8 or 0.6	0.0	0.5	
8		53.3	5	0.2 / 0.8 or 0.6	0.0	0.0	
9		60.4	3	0.2 / 0.8 or 0.6	0.0	0.0	
10		67.5	2	0.2 / 0.8 or 0.6	0.0		
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			
21				0.2 / 0.8 or 0.6			
22				0.2 / 0.8 or 0.6			
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

length: 71.1
section. 7.1
mp: 3.6

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

CEDEN Field Data Sheet - Water Sample Collection

Coalition Name: CRC			Date: 7/2/2018
StationID & Name : **CBD1**			FIRST SAMPLE TIME: 1333
Project ID: **20154800.004A 02-0000 Rice WDR 2017**	Arrival Time: 1321	Departure Time: 1425	Target Lat. & Long.:
Sampling Crew (and Agency): L Short, J. Cowley - KLF			Actual Lat & Long:
			Datum: / Accuracy (ft / m):

OBSERVATIONS		WADEABLE: YES / NO	PICTURE NAME/S:
DOMINANT SUBSTRATE:	Concrete, Cobble, Gravel, Sand, Mud, Unk., Other		
SITE ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	SKY CODE:	clear, partly cloudy, overcast, fog, hazy
OTHER PRESENCE:	Vascular, Nonvascular, OilySheen, Foam, Trash, None, Other	PRECIPITATION:	None, Foggy, Drizzle, Rain, Snow
WATER ODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None
WATER CLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	WATERCOLOR:	colorless, green, yellow, brown, other
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Observed Flow, Isolated Pool, 0.1 - 1cfs, 1 - 5 cfs, 5 - 20 cfs, 20 - 50 cfs, 50 - 200 cfs, >200cfs		

Comments: sunken Boat
trash along banks

Water Column Thickness: 5' **Sample Depth:** 2.5'

PHYSICAL PARAMETERS	1151	GTR	SAMPLE COLLECTION	Sample Depth (circle one): 0.1 m (subsurface grab) -88 (integrated)
Water Temp (Celsius):	25.98	26.1	STARTING BANK:	LB / RB/ NA
Air Temp (°F):	90's		OCCUPATION METHOD:	Walk-in, Bridge, Other
*pH>8.5 or <6.5 pH:	6.88	7.14	SAMPLING EQUIPMENT:	Indiv bottle by hand, By pole, Other kemmerer
*DO<7.0 DO (mg/L):	2.13	2.78	SAMPLE LOCATION:	Bank, Near Bank, Thalweg, Midchannel, Open Water
*SC>700 SC (µS/cm):	837	832	HYDRO-MODIFICATION:	None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Other
Turbidity (NTU):	Not Applicable**		HYDROMODLOC:	US / DS / NA

CALCULATED SITE DISCHARGE (cfs):		Wet Channel Width (m):	Wet Channel Width (m):
Transfer Calculated Value from Discharge Worksheet		Midchannel depth (m):	Stage:

√	Sample ID	Analyte	Container	Number	Notes
	See Attached Chain of Custodies				** Only collected during assessment and modified assessment years

CEDEN Discharge Worksheet

Coalition Name: CRC		Date:	7/2/2018
StationID & Name : **CBD1**		FIRST SAMPLE TIME:	1333
Project ID: 20154800.004A 02-0000 Rice WDR 2017	Method: USGS (bridge), USGS (wading), culvert, other:		
Sampling Crew (and Agency): L Short/ J Cowley	Start Time (24 hr): 1345	Discharge (cfs):	
Right Edge Water (REW):	End Time (24 hr): 1420	Discharge calculated by:	

#	Angle (if from bridge)	Interval Midpoint (meters or feet)	Interval Depth (meters or feet)	% Depth (from surface)*	Revolutions/Velocity (m/s or f/s)		Notes
1		7.7	3	0.2 / 0.8 or 0.6	0.0	0.0	
2		23.1	5	0.2 / 0.8 or 0.6	0.0	0.0	
3		38.4	7	0.2 / 0.8 or 0.6	0.0	0.0	
4		53.8	7	0.2 / 0.8 or 0.6	0.0	0.0	
5		69.2	5	0.2 / 0.8 or 0.6	0.0	0.0	
6		84.5	4	0.2 / 0.8 or 0.6	0.0	0.0	
7		99.9	4	0.2 / 0.8 or 0.6	0.0	0.0	
8		115.3	8	0.2 / 0.8 or 0.6	0.0	0.6	
9		130.6	6.5	0.2 / 0.8 or 0.6	0.0	0.0	
10		146.0	6	0.2 / 0.8 or 0.6	0.0	0.0	Sunken Boat
11				0.2 / 0.8 or 0.6			
12				0.2 / 0.8 or 0.6			
13				0.2 / 0.8 or 0.6			
14				0.2 / 0.8 or 0.6			
15				0.2 / 0.8 or 0.6			
16				0.2 / 0.8 or 0.6			
17				0.2 / 0.8 or 0.6			
18				0.2 / 0.8 or 0.6			Length: 153.7'
19				0.2 / 0.8 or 0.6			
20				0.2 / 0.8 or 0.6			Section: 15.4'
21				0.2 / 0.8 or 0.6			Midpoint: 7.7
22				0.2 / 0.8 or 0.6			
23				0.2 / 0.8 or 0.6			
24				0.2 / 0.8 or 0.6			
25				0.2 / 0.8 or 0.6			
26				0.2 / 0.8 or 0.6			
27				0.2 / 0.8 or 0.6			
28				0.2 / 0.8 or 0.6			
29				0.2 / 0.8 or 0.6			

*two measurement should be taken (0.2 and 0.8 from the surface of the water) if the depth is greater than 0.76m (2.5ft).

KLEINFELDER
Bright People. Right Solutions.

COC# 456754

Project No.	Project Name
20154800.004A Task 02	WDR SE-4

L.P. No. (PO No.):

Samplers: (Signature/Number) Short

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers*	Penoxsulam	Bensulfuron-methyl										Instructions/Remarks
1	07/02/18	8:37	SSB-NCL-SE-4	W	3	40 mL VOA	X	X										
2	07/02/18	10:12	BS1-NCL-SE-4	W	3	40 mL VOA	X	X										
3	07/02/18	11:40	CBD5-NCL-SE-4	W	3	40 mL VOA	X	X										
4	07/02/18	11:42	CBD5-NCL-SE-4-M	W	9	40 mL VOA	X	X										MS/MSD, LCS/LCSD,lab blank, lab dup
5	07/02/18	12:00	CBD5-NCL-SE-4-F	W	3	40 mL VOA	X	X										
6	07/02/18	11:41	CBD5-NCL-SE-4-D	W	3	40 mL VOA	X	X										
7	07/02/18	13:33	CBD1-NCL-SE-4	W	3	40 mL VOA	X	X										
8																		
9																		
10																		*All VOAs are unpreserved
11																		
12																		
13																		
14																		
15																		

Analysis

Receiving Lab:
North Coast Laboratories
5680 West End Rd., Arcata CA 95521
Attn: Roxanne Moore (707) 822-4649

Instructions/Remarks

CEDEN EDD
EXCEL EDD
MDL Report
standard turn around time

Relinquished By:	Date/Time	Received By:
[signature]	7/2/18 1900	FEDEX
Relinquished By:	Date/Time	Received By:
Relinquished By:	Date/Time	Received By:

Instructions/Remarks
Please send invoice to KLEINFELDER

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

CHAIN-OF-CUSTODY

KLEINFELDER
INSTRUMENT CALIBRATION LOG

Sampler Name/No.: 0 Short

Date: 7/2/2018

Project No.: 20154800.004A-01

Job Name: RPP 2018

Calibration Start Time: 0530

pH Meter: GTR								EC Meter: GTR	
	Time	Temp. via Thermometer	Temp. via YSI Meter	pH7	mVpH (pH 7)	pH10	mVpH (pH10)		1413 umho
Reading (initial)	0602		30.6	6.91	-18.9	10.01	-196.2	Reading (initial)	1500
Calibration (initial)	0620		30.1	7.00	-18.9	10.00	-196.4	Calibration (initial)	1503
Reading (intermediate)								Reading (intermediate)	
Calibration (intermediate)								Calibration (intermediate)	
Reading (end of day)								Reading (end of day)	

Comments: DO - yellow probe
Kerted YSI DSS

Turbidity Meter (make/number): _____

	____NTU	____NTU	____NTU	Battery Check	
Reading (Initial)					
Calibration					

D.O. Meter: GTR			
Barometric Pressure: 757.7 mmHg			
		mg/L	%
	Reading (initial):	—	98.1
	Reading (adj.):	8.14	99.8
	Intermediate Reading (initial):		
	Intermediate Reading (adj.):		

KLEINFELDER
INSTRUMENT CALIBRATION LOG

Sampler Name/No.: Short

Date: 7/2/2018

Project No.: 20154800.004A-01

Job Name: RPP 2018

Calibration Start Time: 0530

pH Meter: 1151								EC Meter: 1151	
	Time	Temp. via Thermometer	Temp. via YSI Meter	pH7	mVpH (pH 7)	pH10	mVpH (pH10)		1413 umho
Reading (initial)	0547		29.73	6.94	-4.9	10.09	-184.6	Reading (initial)	1413
Calibration (initial)	0610		29.73	7.00	-4.7	10.00	-184.5	Calibration (initial)	1413
Reading (intermediate)								Reading (intermediate)	
Calibration (intermediate)								Calibration (intermediate)	
Reading (end of day)								Reading (end of day)	

Comments: DO - Blue probe
Rentec 451 556

Turbidity Meter (make/number):	___NTU	___NTU	___NTU	Battery Check	
Reading (Initial)					
Calibration					

D.O. Meter: 1151			
Barometric Pressure: 757.7 mmHg			
		mg/L	%
	Reading (initial):	8.89	106.3
	Reading (adj.):	8.34	99.7
	Intermediate Reading (initial):		
	Intermediate Reading (adj.):		

Appendix B-2
North Coast Laboratory Results

NORTH COAST LABORATORIES LTD.

June 07, 2018

Gowan Company
370 S Main Street
Yuma, AZ 85364

Attn: Cindy Smith

Order No.: 1805421
Invoice No.: 140378
PO No.:
ELAP No.1247-Expires July 2018

RE: 20154800.003A Task 02

SAMPLE IDENTIFICATION

Fraction	Client Sample Description
01A	SSB-NCL-SE-1
02A	BS1-NCL-SE-1
03A	BS1-NCL-SE-1-D
04A	BS1-NCL-SE-1-F
05A	BS1-NCL-SE-1-M
06A	CBD5-NCL-SE-1
07A	CBD1-NCL-SE-1

ND = Not Detected at the Reporting Limit

Limit = Reporting Limit

Flag = Explanation in Case Narrative

All solid results are expressed on a wet-weight basis unless otherwise noted.

Approved for release by:

Roxanne Moore, Project Manager

Date: 07-Jun-2018
WorkOrder: 1805421

CASE NARRATIVE

J Flags:
Test results that fall below the reporting limit and above the method detection limit are considered approximate values.

LC-MS/MS Scan:
The Metabolite B recovery of the closing calibration verification standard was above the upper acceptance limit (127% vs. 120%). This indicates the potential a slight positive bias may exist for Metabolite B in samples "CBD5-NCL-SE-1" and "CBD1-NCL-SE-1".

Date: 07-Jun-2018
WorkOrder: 1805421

ANALYTICAL REPORT

Client Sample ID: SSB-NCL-SE-1
Lab ID: 1805421-01A **Matrix:** Water
Test Name: Benzobicyclon/Metabolite B
Reference: NCL ME 337
Received: 5/25/2018
Collected 5/22/2018 9:37
Analyst: WHB

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	5/27/2018	05/28/18 22:17
Metabolite B	ND			1.0	0.26	µg/L	1.0	5/27/2018	05/28/18 22:17
Surrogate: Atrazine-d5	105			65-135	N/A	% Rec	1.0	5/27/2018	05/28/18 22:17

Client Sample ID: BS1-NCL-SE-1
Lab ID: 1805421-02A **Matrix:** Water
Test Name: Benzobicyclon/Metabolite B
Reference: NCL ME 337
Received: 5/25/2018
Collected 5/22/2018 11:40
Analyst: WHB

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	5/27/2018	05/28/18 22:36
Metabolite B	ND			1.0	0.26	µg/L	1.0	5/27/2018	05/28/18 22:36
Surrogate: Atrazine-d5	105			65-135	N/A	% Rec	1.0	5/27/2018	05/28/18 22:36

Client Sample ID: BS1-NCL-SE-1-D
Lab ID: 1805421-03A **Matrix:** Water
Test Name: Benzobicyclon/Metabolite B
Reference: NCL ME 337
Received: 5/25/2018
Collected 5/22/2018 11:41
Analyst: WHB

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	5/27/2018	05/28/18 22:55
Metabolite B	ND			1.0	0.26	µg/L	1.0	5/27/2018	05/28/18 22:55
Surrogate: Atrazine-d5	103			65-135	N/A	% Rec	1.0	5/27/2018	05/28/18 22:55

Client Sample ID: BS1-NCL-SE-1-F
Lab ID: 1805421-04A **Matrix:** Water
Test Name: Benzobicyclon/Metabolite B
Reference: NCL ME 337
Received: 5/25/2018
Collected 5/22/2018 12:10
Analyst: WHB

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	5/27/2018	05/28/18 23:13
Metabolite B	ND			1.0	0.26	µg/L	1.0	5/27/2018	05/28/18 23:13
Surrogate: Atrazine-d5	106			65-135	N/A	% Rec	1.0	5/27/2018	05/28/18 23:13

Date: 07-Jun-2018
WorkOrder: 1805421

ANALYTICAL REPORT

Client Sample ID: BS1-NCL-SE-1-M
Lab ID: 1805421-05A **Matrix:** Water
Test Name: Benzobicyclon/Metabolite B
Reference: NCL ME 337

Received: 5/25/2018
Collected 5/22/2018 11:42
Analyst: WHB

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	5/27/2018	05/28/18 23:32
Metabolite B	ND			1.0	0.26	µg/L	1.0	5/27/2018	05/28/18 23:32
Surrogate: Atrazine-d5	105			65-135	N/A	% Rec	1.0	5/27/2018	05/28/18 23:32

Client Sample ID: CBD5-NCL-SE-1
Lab ID: 1805421-06A **Matrix:** Water
Test Name: Benzobicyclon/Metabolite B
Reference: NCL ME 337

Received: 5/25/2018
Collected 5/22/2018 13:45
Analyst: WHB

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	5/27/2018	05/28/18 23:50
Metabolite B	***0.88***	J		1.0	0.26	µg/L	1.0	5/27/2018	05/28/18 23:50
Surrogate: Atrazine-d5	106			65-135	N/A	% Rec	1.0	5/27/2018	05/28/18 23:50

Client Sample ID: CBD1-NCL-SE-1
Lab ID: 1805421-07A **Matrix:** Water
Test Name: Benzobicyclon/Metabolite B
Reference: NCL ME 337

Received: 5/25/2018
Collected 5/22/2018 16:05
Analyst: WHB

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	5/27/2018	05/29/18 0:09
Metabolite B	***0.81***	J		1.0	0.26	µg/L	1.0	5/27/2018	05/29/18 0:09
Surrogate: Atrazine-d5	104			65-135	N/A	% Rec	1.0	5/27/2018	05/29/18 0:09

North Coast Laboratories, Ltd.

Date: 6/7/2018

CLIENT: Gowan Company
Work Order: 1805421
Project: 20154800.003A Task 02

QC SUMMARY REPORT

Method Blank

Sample ID **MB-36118** Batch ID: **36118** Test Code: **BENZOW** Units: **µg/L** Analysis Date **5/28/2018 8:26:22 PM** Prep Date **5/27/2018**

Client ID: Run ID: **ORLCMSMS2_180528B** SeqNo: **1361939**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzobicyclon	ND	1.0									
Metabolite B	0.5771	1.0									J
Surrogate: Atrazine-d5	11.1	1.0	10.0	0	111%	65	135	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 6/7/2018

CLIENT: Gowan Company
Work Order: 1805421
Project: 20154800.003A Task 02

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID **1805421-05AMS** Batch ID: **36118** Test Code: **BENZOW** Units: **µg/L** Analysis Date **5/28/2018 9:22:05 PM** Prep Date **5/27/2018**
Client ID: **BS1-NCL-SE-1-M** Run ID: **ORLCMSMS2_180528B** SeqNo: **1361942**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzobicyclon	10.41	1.0	10.0	0	104%	50	150	0			
Metabolite B	12.04	1.0	10.0	0	120%	50	150	0			
Surrogate: Atrazine-d5	10.7	1.0	10.0	0	107%	65	135	0			

Sample ID **1805421-05AMSD** Batch ID: **36118** Test Code: **BENZOW** Units: **µg/L** Analysis Date **5/28/2018 9:40:41 PM** Prep Date **5/27/2018**
Client ID: **BS1-NCL-SE-1-M** Run ID: **ORLCMSMS2_180528B** SeqNo: **1361943**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzobicyclon	10.86	1.0	10.0	0	109%	50	150	10.4	4.24%	20	
Metabolite B	13.04	1.0	10.0	0	130%	50	150	12.0	7.99%	20	
Surrogate: Atrazine-d5	10.8	1.0	10.0	0	108%	65	135	10.7	1.05%	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 6/7/2018

CLIENT: Gowan Company
Work Order: 1805421
Project: 20154800.003A Task 02

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID **LCS-36118** Batch ID: **36118** Test Code: **BENZOW** Units: **µg/L** Analysis Date **5/28/2018 8:44:55 PM** Prep Date **5/27/2018**
Client ID: Run ID: **ORLCMSMS2_180528B** SeqNo: **1361940**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzobicyclon	9.284	1.0	10.0	0	92.8%	50	150	0			
Metabolite B	10.31	1.0	10.0	0	103%	50	150	0			
Surrogate: Atrazine-d5	10.3	1.0	10.0	0	103%	65	135	0			

Sample ID **LCSD-36118** Batch ID: **36118** Test Code: **BENZOW** Units: **µg/L** Analysis Date **5/28/2018 9:03:29 PM** Prep Date **5/27/2018**
Client ID: Run ID: **ORLCMSMS2_180528B** SeqNo: **1361941**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzobicyclon	8.189	1.0	10.0	0	81.9%	50	150	9.28	12.5%	20	
Metabolite B	9.587	1.0	10.0	0	95.9%	50	150	10.3	7.30%	20	
Surrogate: Atrazine-d5	11.1	1.0	10.0	0	111%	65	135	10.3	8.04%	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

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COC# 209970

1805421

Page 1 of 1

Project No.	Project Name
20154800.004A Task 02	WDR SE-1

L.P. No. (PO No.)

Samplers: (Signature/Number) Short

Receiving Lab:
North Coast Laboratories
5680 West End Rd., Arcata CA 95521
Attn: Roxanne Moore (707) 822-4649

Instructions/Remarks
CEDEN EDD
EXCEL EDD
MDL Report
Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers	Analysis: Benzobicyclon	Metabolite B										Remarks
1	05/22/18	0937	SSB-NCL-SE-1	W	1	500 mL	X	X										
2	05/22/18	1140	BS1-NCL-SE-1	W	1	500 mL	X	X										
3	05/22/18	1141	BS1-NCL-SE-1-D	W	1	500 mL	X	X										
4	05/22/18	1210	BS1-NCL-SE-1-F	W	1	500 mL	X	X										
5	05/22/18	1142	BS1-NCL-SE-1-M	W	2	500 mL/ 1L	X	X										MS/MSD, LCS/LCSD,lab blank, lab dup
6	05/22/18	1345	CBD5-NCL-SE-1	W	1	500 mL	X	X										
7	05/22/18	1605	CBD1-NCL-SE-1	W	1	500 mL	X	X										
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		

Relinquished By:	Date/Time	Received By:
[signature]	5/24/18 1900	KLF Sample Control
KLF Sample Control	5/24/18 1900	[signature]
[signature]	5/24/18 1900	FEDEX

Instructions/Remarks
Please send invoice to GOWAN

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

[signature] 5/25/18 1210
1.8°C

CHAIN-OF-CUSTODY

NORTH COAST LABORATORIES LTD.

June 20, 2018

Gowan Company
370 S Main Street
Yuma, AZ 85364

Attn: Cindy Smith

Order No.: 1806151
Invoice No.: 140567
PO No.:
ELAP No.1247-Expires July 2018

RE: 20154800.003A Task 02 WDR SE-2

SAMPLE IDENTIFICATION

Fraction	Client Sample Description
01A	SSB-NCL-SE-2
02A	BS1-NCL-SE-2
03A	CBD5-NCL-SE-2
04A	CBD1-NCL-SE-2
05A	CBD1-NCL-SE-2-D
06A	CBD1-NCL-SE-2-F
07A	CBD1-NCL-SE-2-M

ND = Not Detected at the Reporting Limit

Limit = Reporting Limit

Flag = Explanation in Case Narrative

All solid results are expressed on a wet-weight basis unless otherwise noted.

Approved for release by:

Roxanne Moore, Project Manager

Date: 20-Jun-2018
WorkOrder: 1806151

CASE NARRATIVE

THIS IS AN AMENDED REPORT:
Results for the lab duplicate have been added to the report.

J Flags:
Test results that fall below the reporting limit and above the method detection limit are considered approximate values.

Date: 20-Jun-2018
WorkOrder: 1806151

ANALYTICAL REPORT

Client Sample ID: SSB-NCL-SE-2 **Received:** 6/8/2018
Lab ID: 1806151-01A **Matrix:** Aqueous **Collected** 6/5/2018 9:45
Test Name: Benzobicyclon/Metabolite B **Analyst:** WHB
Reference: NCL ME 337

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	6/11/2018	06/15/18 15:13
Metabolite B	ND			1.0	0.26	µg/L	1.0	6/11/2018	06/15/18 15:13
Surrogate: Atrazine-d5	95.0			65-135	N/A	% Rec	1.0	6/11/2018	06/15/18 15:13

Client Sample ID: BS1-NCL-SE-2 **Received:** 6/8/2018
Lab ID: 1806151-02A **Matrix:** Aqueous **Collected** 6/5/2018 11:10
Test Name: Benzobicyclon/Metabolite B **Analyst:** WHB
Reference: NCL ME 337

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	6/11/2018	06/15/18 15:31
Metabolite B	ND			1.0	0.26	µg/L	1.0	6/11/2018	06/15/18 15:31
Surrogate: Atrazine-d5	114			65-135	N/A	% Rec	1.0	6/11/2018	06/15/18 15:31

Client Sample ID: CBD5-NCL-SE-2 **Received:** 6/8/2018
Lab ID: 1806151-03A **Matrix:** Aqueous **Collected** 6/5/2018 12:44
Test Name: Benzobicyclon/Metabolite B **Analyst:** WHB
Reference: NCL ME 337

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	6/11/2018	06/15/18 15:50
Metabolite B	***0.91***	J		1.0	0.26	µg/L	1.0	6/11/2018	06/15/18 15:50
Surrogate: Atrazine-d5	111			65-135	N/A	% Rec	1.0	6/11/2018	06/15/18 15:50

Client Sample ID: CBD1-NCL-SE-2 **Received:** 6/8/2018
Lab ID: 1806151-04A **Matrix:** Aqueous **Collected** 6/5/2018 14:47
Test Name: Benzobicyclon/Metabolite B **Analyst:** WHB
Reference: NCL ME 337

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	6/11/2018	06/15/18 16:09
Metabolite B	***0.85***	J		1.0	0.26	µg/L	1.0	6/11/2018	06/15/18 16:09
Surrogate: Atrazine-d5	125			65-135	N/A	% Rec	1.0	6/11/2018	06/15/18 16:09

Date: 20-Jun-2018
WorkOrder: 1806151

ANALYTICAL REPORT

Client Sample ID: CBD1-NCL-SE-2-D
Received: 6/8/2018
Lab ID: 1806151-05A **Matrix:** Aqueous
Collected 6/5/2018 14:47
Test Name: Benzobicyclon/Metabolite B
Analyst: WHB
Reference: NCL ME 337

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	6/11/2018	06/15/18 16:27
Metabolite B	***0.81***	J		1.0	0.26	µg/L	1.0	6/11/2018	06/15/18 16:27
Surrogate: Atrazine-d5	125			65-135	N/A	% Rec	1.0	6/11/2018	06/15/18 16:27

Client Sample ID: CBD1-NCL-SE-2-F
Received: 6/8/2018
Lab ID: 1806151-06A **Matrix:** Aqueous
Collected 6/5/2018 15:05
Test Name: Benzobicyclon/Metabolite B
Analyst: WHB
Reference: NCL ME 337

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	6/11/2018	06/15/18 16:46
Metabolite B	ND			1.0	0.26	µg/L	1.0	6/11/2018	06/15/18 16:46
Surrogate: Atrazine-d5	129			65-135	N/A	% Rec	1.0	6/11/2018	06/15/18 16:46

Client Sample ID: CBD1-NCL-SE-2-M
Received: 6/8/2018
Lab ID: 1806151-07A **Matrix:** Aqueous
Collected 6/5/2018 14:40
Test Name: Benzobicyclon/Metabolite B
Analyst: WHB
Reference: NCL ME 337

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Benzobicyclon	ND			1.0	0.08	µg/L	1.0	6/11/2018	06/15/18 17:04
Metabolite B	***0.85***	J		1.0	0.26	µg/L	1.0	6/11/2018	06/15/18 17:04
Surrogate: Atrazine-d5	121			65-135	N/A	% Rec	1.0	6/11/2018	06/15/18 17:04

North Coast Laboratories, Ltd.

Date: 6/20/2018

CLIENT: Gowan Company
Work Order: 1806151
Project: 20154800.003A Task 02 WDR SE-2

QC SUMMARY REPORT

Method Blank

Sample ID **MB-36174** Batch ID: **36174** Test Code: **BENZOW** Units: **µg/L** Analysis Date **6/15/2018 1:40:30 PM** Prep Date **6/11/2018**

Client ID: Run ID: **ORLCMSMS2_180615A** SeqNo: **1363936**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzobicyclon	ND	1.0									
Metabolite B	ND	1.0									
Surrogate: Atrazine-d5	11.4	1.0	10.0	0	114%	65	135	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 6/20/2018

CLIENT: Gowan Company
Work Order: 1806151
Project: 20154800.003A Task 02 WDR SE-2

QC SUMMARY REPORT

Sample Duplicate

Sample ID **1806151-07A** Batch ID: **36174** Test Code: **BENZOW** Units: **µg/L** Analysis Date **6/15/2018 5:23:27 PM** Prep Date **6/11/2018**

Client ID: **CBD1-NCL-SE-2-M** Run ID: **ORLCMSMS2_180615A** SeqNo: **1363948**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzobicyclon	ND	1.0	0	0	0%	0	0	0	0%	0	
Metabolite B	0.8302	1.0	0	0	0%	0	0	0.852	2.54%	0	J
Surrogate: Atrazine-d5	11.6	1.0	10.0	0	116%	65	135	12.1	4.32%	0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 6/20/2018

CLIENT: Gowan Company
Work Order: 1806151
Project: 20154800.003A Task 02 WDR SE-2

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID **1806151-07AMS** Batch ID: **36174** Test Code: **BENZOW** Units: **µg/L** Analysis Date **6/15/2018 2:36:14 PM** Prep Date **6/11/2018**
Client ID: **CBD1-NCL-SE-2-M** Run ID: **ORLCMSMS2_180615A** SeqNo: **1363939**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzobicyclon	7.171	1.0	10.0	0	71.7%	50	150	0			
Metabolite B	10.22	1.0	10.0	0.852	93.7%	50	150	0			
Surrogate: Atrazine-d5	11.4	1.0	10.0	0	114%	65	135	0			

Sample ID **1806151-07AMSD** Batch ID: **36174** Test Code: **BENZOW** Units: **µg/L** Analysis Date **6/15/2018 2:54:48 PM** Prep Date **6/11/2018**
Client ID: **CBD1-NCL-SE-2-M** Run ID: **ORLCMSMS2_180615A** SeqNo: **1363940**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzobicyclon	7.880	1.0	10.0	0	78.8%	50	150	7.17	9.42%	20	
Metabolite B	10.31	1.0	10.0	0.852	94.6%	50	150	10.2	0.873%	20	
Surrogate: Atrazine-d5	11.6	1.0	10.0	0	117%	65	135	11.4	2.01%	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 6/20/2018

CLIENT: Gowan Company
Work Order: 1806151
Project: 20154800.003A Task 02 WDR SE-2

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID **LCS-36174** Batch ID: **36174** Test Code: **BENZOW** Units: **µg/L** Analysis Date **6/15/2018 1:59:06 PM** Prep Date **6/11/2018**
Client ID: Run ID: **ORLCMSMS2_180615A** SeqNo: **1363937**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzobicyclon	7.109	1.0	10.0	0	71.1%	50	150	0			
Metabolite B	9.327	1.0	10.0	0	93.3%	50	150	0			
Surrogate: Atrazine-d5	10.9	1.0	10.0	0	109%	65	135	0			

Sample ID **LCSD-36174** Batch ID: **36174** Test Code: **BENZOW** Units: **µg/L** Analysis Date **6/15/2018 2:17:41 PM** Prep Date **6/11/2018**
Client ID: Run ID: **ORLCMSMS2_180615A** SeqNo: **1363938**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzobicyclon	8.019	1.0	10.0	0	80.2%	50	150	7.11	12.0%	20	
Metabolite B	8.845	1.0	10.0	0	88.5%	50	150	9.33	5.30%	20	
Surrogate: Atrazine-d5	11.8	1.0	10.0	0	118%	65	135	10.9	7.84%	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

KLEINFELDER
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COC# 543993

1806151

Page 1 of 1

Project No.	Project Name
20154800.004A Task 02	WDR SE-2

L.P. No. (PO No.)

Samplers: (Signature/Number) Short

Receiving Lab:
North Coast Laboratories
5680 West End Rd., Arcata CA 95521
Attn: Roxanne Moore (707) 822-4649

Instructions/Remarks
CEDEN EDD
EXCEL EDD
MDL Report
Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers	Analysis: Benzobicyclon	Metabolite B										Instructions/Remarks
1	06/05/18	945	SSB-NCL-SE-2	W	1	500 mL	X	X										
2	06/05/18	1110	BS1-NCL-SE-2	W	1	500 mL	X	X										
3	06/05/18	1241	CBD5-NCL-SE-2	W	1	500 mL	X	X										
4	06/05/18	14:46	CBD1-NCL-SE-2	W	1	500 mL	X	X										
5	06/05/18	14:47	CBD1-NCL-SE-2-D	W	1	500 mL	X	X										
6	06/05/18	15:05	CBD1-NCL-SE-2-F	W	1	500 mL	X	X										
7	06/05/18	1440	CBD1-NCL-SE-2-M	W	3	500 mL	X	X										MS/MSD, LCS/LCSD,lab blank, lab dup
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		

Relinquished By:	Date/Time	Received By:
[signature]	6/5/19 1800	CLFSC
CLFSC	6/7/19 1500	[signature]
[signature]	6/7/19 1700	Fedex

Instructions/Remarks
Please send invoice to GOWAN

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

Jessica Eller 6/8/18 NCL
11:35 2.7°

CHAIN-OF-CUSTODY

NORTH COAST LABORATORIES LTD.

July 19, 2018

Kleinfelder
2882 Prospect Park Dr.
Suite 200
Rancho Cordova, CA 95670
Attn: Craig Riddle

Order No.: 1806367
Invoice No.: 141081
PO No.:
ELAP No.1247-Expires July 2018

RE: WDR SE-3 20154800.003A Task 02

SAMPLE IDENTIFICATION

Fraction	Client Sample Description
01A	SSBN-NCL-SE-3
02A	SSB-NCL-SE-3-M
03A	SSB-NCL-SE-3-F
04A	SSB-NCL-SE-3-D
05A	BS1-NCL-SE-3
06A	CBD5-NCL-SE-3
07A	CBD1-NCL-SE-3

ND = Not Detected at the Reporting Limit

Limit = Reporting Limit

Flag = Explanation in Case Narrative

All solid results are expressed on a wet-weight basis unless otherwise noted.

Approved for release by:

Roxanne Moore, Project Manager

Date: 19-Jul-2018
WorkOrder: 1806367

CASE NARRATIVE

J Flags:
Test results that fall below the reporting limit and above the method detection limit are considered approximate values.

S2: The surrogate recovery was above the upper acceptance limit. The surrogate recoveries for the quality control samples were within acceptance limits. This indicates the high recovery may be due to matrix interference from the samples.

Date: 19-Jul-2018
WorkOrder: 1806367

ANALYTICAL REPORT

Client Sample ID: SSBN-NCL-SE-3 **Received:** 6/21/2018
Lab ID: 1806367-01A **Matrix:** Aqueous **Collected** 6/19/2018 9:01
Test Name: HPLC MS Scan **Analyst:** WHB
Reference: NCL ME 326

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/2/2018	07/09/18 21:41
Penoxsulum	***0.35***			0.10	0.015	µg/L	1.0	7/2/2018	07/09/18 21:41
Surrogate: Atrazine-d5	121			65-135	0.13	% Rec	1.0	7/2/2018	07/09/18 21:41

Client Sample ID: SSB-NCL-SE-3-M **Received:** 6/21/2018
Lab ID: 1806367-02A **Matrix:** Aqueous **Collected** 6/19/2018 9:02
Test Name: HPLC MS Scan **Analyst:** WHB
Reference: NCL ME 326

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/2/2018	07/09/18 22:03
Penoxsulum	***0.34***			0.10	0.015	µg/L	1.0	7/2/2018	07/09/18 22:03
Surrogate: Atrazine-d5	138	S	S2	65-135	0.13	% Rec	1.0	7/2/2018	07/09/18 22:03

Client Sample ID: SSB-NCL-SE-3-F **Received:** 6/21/2018
Lab ID: 1806367-03A **Matrix:** Aqueous **Collected** 6/19/2018 9:15
Test Name: HPLC MS Scan **Analyst:** WHB
Reference: NCL ME 326

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/2/2018	07/09/18 22:46
Penoxsulum	ND			0.10	0.015	µg/L	1.0	7/2/2018	07/09/18 22:46
Surrogate: Atrazine-d5	142	S	S2	65-135	0.13	% Rec	1.0	7/2/2018	07/09/18 22:46

Client Sample ID: SSB-NCL-SE-3-D **Received:** 6/21/2018
Lab ID: 1806367-04A **Matrix:** Aqueous **Collected** 6/19/2018 9:03
Test Name: HPLC MS Scan **Analyst:** WHB
Reference: NCL ME 326

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/2/2018	07/09/18 23:08
Penoxsulum	***0.35***			0.10	0.015	µg/L	1.0	7/2/2018	07/09/18 23:08
Surrogate: Atrazine-d5	160	S	S2	65-135	0.13	% Rec	1.0	7/2/2018	07/09/18 23:08

Date: 19-Jul-2018
WorkOrder: 1806367

ANALYTICAL REPORT

Client Sample ID: BS1-NCL-SE-3 **Received:** 6/21/2018
Lab ID: 1806367-05A **Matrix:** Aqueous **Collected** 6/19/2018 11:00
Test Name: HPLC MS Scan **Analyst:** WHB
Reference: NCL ME 326

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/2/2018	07/09/18 23:30
Penoxsulum	***0.056***	J		0.10	0.015	µg/L	1.0	7/2/2018	07/09/18 23:30
Surrogate: Atrazine-d5	139	S	S2	65-135	0.13	% Rec	1.0	7/2/2018	07/09/18 23:30

Client Sample ID: CBD5-NCL-SE-3 **Received:** 6/21/2018
Lab ID: 1806367-06A **Matrix:** Aqueous **Collected** 6/19/2018 12:23
Test Name: HPLC MS Scan **Analyst:** WHB
Reference: NCL ME 326

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/2/2018	07/09/18 23:51
Penoxsulum	***0.17***			0.10	0.015	µg/L	1.0	7/2/2018	07/09/18 23:51
Surrogate: Atrazine-d5	150	S	S2	65-135	0.13	% Rec	1.0	7/2/2018	07/09/18 23:51

Client Sample ID: CBD1-NCL-SE-3 **Received:** 6/21/2018
Lab ID: 1806367-07A **Matrix:** Aqueous **Collected** 6/19/2018 14:29
Test Name: HPLC MS Scan **Analyst:** WHB
Reference: NCL ME 326

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/2/2018	07/10/18 0:13
Penoxsulum	***0.073***	J		0.10	0.015	µg/L	1.0	7/2/2018	07/10/18 0:13
Surrogate: Atrazine-d5	143	S	S2	65-135	0.13	% Rec	1.0	7/2/2018	07/10/18 0:13

North Coast Laboratories, Ltd.

Date: 7/19/2018

CLIENT: Kleinfelder
Work Order: 1806367
Project: WDR SE-3 20154800.003A Task 02

QC SUMMARY REPORT

Method Blank

Sample ID **MB-36235** Batch ID: **36235** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/9/2018 7:53:50 PM** Prep Date **7/2/2018**

Client ID: Run ID: **ORLCMSMS2_180709A** SeqNo: **1367131**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bensulfuron-methyl	ND	1.0									
Penoxsulum	ND	0.10									
Surrogate: Atrazine-d5	10.7	1.0	10.0	0	107%	65	135	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 7/19/2018

CLIENT: Kleinfelder
Work Order: 1806367
Project: WDR SE-3 20154800.003A Task 02

QC SUMMARY REPORT

Sample Duplicate

Sample ID **1806367-02A** Batch ID: **36235** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/9/2018 10:25:09 PM** Prep Date **7/2/2018**

Client ID: **SSB-NCL-SE-3-M** Run ID: **ORLCMSMS2_180709A** SeqNo: **1368697**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bensulfuron-methyl	ND	1.0	0	0	0%	0	0	0	0%	30	
Penoxsulum	0.3550	0.10	0	0	0%	0	0	0.341	4.02%	30	
Surrogate: Atrazine-d5	16.1	1.0	10.0	0	161%	0	0	13.8	15.4%	30	S

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 7/19/2018

CLIENT: Kleinfelder
Work Order: 1806367
Project: WDR SE-3 20154800.003A Task 02

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID **1806367-02AMS** Batch ID: **36235** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/9/2018 8:58:38 PM** Prep Date **7/2/2018**
Client ID: **SSB-NCL-SE-3-M** Run ID: **ORLCMSMS2_180709A** SeqNo: **1367134**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bensulfuron-methyl	11.77	1.0	10.0	0	118%	50	150	0			
Penoxsulum	0.9931	0.10	1.00	0.341	65.2%	50	150	0			
Surrogate: Atrazine-d5	12.0	1.0	10.0	0	120%	65	135	0			

Sample ID **1806367-02AMSD** Batch ID: **36235** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/9/2018 9:20:15 PM** Prep Date **7/2/2018**
Client ID: **SSB-NCL-SE-3-M** Run ID: **ORLCMSMS2_180709A** SeqNo: **1367135**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bensulfuron-methyl	13.38	1.0	10.0	0	134%	50	150	11.8	12.8%	25	
Penoxsulum	1.058	0.10	1.00	0.341	71.7%	50	150	0.993	6.35%	25	
Surrogate: Atrazine-d5	12.7	1.0	10.0	0	127%	65	135	12.0	5.42%	25	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 7/19/2018

CLIENT: Kleinfelder
Work Order: 1806367
Project: WDR SE-3 20154800.003A Task 02

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID **LCS-36235** Batch ID: **36235** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/9/2018 8:15:27 PM** Prep Date **7/2/2018**
Client ID: Run ID: **ORLCMSMS2_180709A** SeqNo: **1367132**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bensulfuron-methyl	10.73	1.0	10.0	0	107%	50	150	0			
Penoxsulum	0.5654	0.10	1.00	0	56.5%	50	150	0			
Surrogate: Atrazine-d5	12.1	1.0	10.0	0	121%	65	135	0			

Sample ID **LCSD-36235** Batch ID: **36235** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/9/2018 8:37:02 PM** Prep Date **7/2/2018**
Client ID: Run ID: **ORLCMSMS2_180709A** SeqNo: **1367133**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bensulfuron-methyl	11.83	1.0	10.0	0	118%	50	150	10.7	9.75%	30	
Penoxsulum	0.5923	0.10	1.00	0	59.2%	50	150	0.565	4.65%	30	
Surrogate: Atrazine-d5	12.6	1.0	10.0	0	126%	65	135	12.1	4.68%	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

1806367

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COC# 666080

Page 1 of 1

Project No.	Project Name
20154800.004A Task 02	WDR SE-3

L.P. No. (PO No.):

Samplers: (Signature/Number):

Receiving Lab:
North Coast Laboratories
5680 West End Rd., Arcata CA 95521
Attn: Roxanne Moore (707) 822-4649

Instructions/Remarks:
CEDEN EDD
EXCEL EDD
MDL Report
standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers*	Penoxsulam	Bensulfuron-methyl										
1	06/19/18	0901	SSB-NCL-SE-3	W	3	40 mL VOA	X	X										
2	06/19/18	0902	SSB-NCL-SE-3-M	W	9	40 mL VOA	X	X										MS/MSD, LCS/LCSD,lab blank, lab dup
3	06/19/18	0915	SSB-NCL-SE-3-F	W	3	40 mL VOA	X	X										
4	06/19/18	0903	SSB-NCL-SE-3-D	W	3	40 mL VOA	X	X										
5	06/19/18	1100	BS1-NCL-SE-3	W	3	40 mL VOA	X	X										
6	06/19/18	1223	CBD5-NCL-SE-3	W	3	40 mL VOA	X	X										
7	06/19/18	1429	CBD1-NCL-SE-3	W	3	40 mL VOA	X	X										
8																		
9																		*All VOAs are unpreserved
10																		
11																		
12																		
13																		
14																		
15																		

Relinquished By:	Date/Time	Received By:
[signature]	6/19/18 1400	Fedex
Relinquished By:	Date/Time	Received By: [signature] 6/20/18 1148
Relinquished By:	Date/Time	Received By:

Instructions/Remarks
Please send invoice to KLEINFELDER

1-8°C

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

NORTH COAST LABORATORIES LTD.

July 12, 2018

Kleinfelder
2882 Prospect Park Dr.
Suite 200
Rancho Cordova, CA 95670
Attn: Craig Riddle

Order No.: 1807026
Invoice No.: 140965
PO No.:
ELAP No.1247-Expires July 2018

RE: 20154800.003A Task 02 WDR SE-4

SAMPLE IDENTIFICATION

Fraction	Client Sample Description
01A	SSB-NCL-SE-4
02A	BS1-NCL-SE-4
03A	CBD5-NCL-SE-4
04A	CBD5-NCL-SE-4-M
05A	CBD5-NCL-SE-4-F
06A	CBD5-NCL-SE-4-D
07A	CBD1-NCL-SE-4

ND = Not Detected at the Reporting Limit

Limit = Reporting Limit

Flag = Explanation in Case Narrative

All solid results are expressed on a wet-weight basis unless otherwise noted.

Approved for release by:

Roxanne Moore, Project Manager

Date: 16-Jul-2018
WorkOrder: 1807026

CASE NARRATIVE

J Flags:
Test results that fall below the reporting limit and above the method detection limit are considered approximate values.

S2: The surrogate recovery was above the upper acceptance limit. The surrogate recoveries for the quality control samples were within acceptance limits. This indicates the high recovery may be due to matrix interference from the samples.

Bensulfuron-methyl:
The relative percent difference (RPD) between the laboratory control samples associated with the bensulfuron-methyl analysis was above the acceptance limit for atrazine-d5 (surrogate). This indicates that the sample results could be variable. Since there were no detectable levels of analyte in the sample, the data were accepted.

Date: 16-Jul-2018
WorkOrder: 1807026

ANALYTICAL REPORT

Client Sample ID: SSB-NCL-SE-4
Lab ID: 1807026-01A **Matrix:** Aqueous
Test Name: HPLC MS Scan
Reference: NCL ME 326
Received: 7/3/2018
Collected 7/2/2018 8:37
Analyst: WHB

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/5/2018	07/10/18 3:06
Penoxsulum	***0.097***	J		0.10	0.015	µg/L	1.0	7/5/2018	07/10/18 3:06
Surrogate: Atrazine-d5	103			65-135	0.13	% Rec	1.0	7/5/2018	07/10/18 3:06

Client Sample ID: BS1-NCL-SE-4
Lab ID: 1807026-02A **Matrix:** Aqueous
Test Name: HPLC MS Scan
Reference: NCL ME 326
Received: 7/3/2018
Collected 7/2/2018 10:12
Analyst: WHB

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/5/2018	07/10/18 3:28
Penoxsulum	***0.13***			0.10	0.015	µg/L	1.0	7/5/2018	07/10/18 3:28
Surrogate: Atrazine-d5	83.5			65-135	0.13	% Rec	1.0	7/5/2018	07/10/18 3:28

Client Sample ID: CBD5-NCL-SE-4
Lab ID: 1807026-03A **Matrix:** Aqueous
Test Name: HPLC MS Scan
Reference: NCL ME 326
Received: 7/3/2018
Collected 7/2/2018 11:40
Analyst: WHB

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/5/2018	07/10/18 8:11
Penoxsulum	***0.11***			0.10	0.015	µg/L	1.0	7/5/2018	07/10/18 8:11
Surrogate: Atrazine-d5	139	S	S2	65-135	0.13	% Rec	1.0	7/5/2018	07/10/18 8:11

Client Sample ID: CBD5-NCL-SE-4-M
Lab ID: 1807026-04A **Matrix:** Aqueous
Test Name: HPLC MS Scan
Reference: NCL ME 326
Received: 7/3/2018
Collected 7/2/2018 11:42
Analyst: WHB

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/5/2018	07/10/18 8:33
Penoxsulum	***0.088***	J		0.10	0.015	µg/L	1.0	7/5/2018	07/10/18 8:33
Surrogate: Atrazine-d5	128			65-135	0.13	% Rec	1.0	7/5/2018	07/10/18 8:33

Date: 16-Jul-2018
WorkOrder: 1807026

ANALYTICAL REPORT

Client Sample ID: CBD5-NCL-SE-4-F
Received: 7/3/2018
Lab ID: 1807026-05A **Matrix:** Aqueous
Collected 7/2/2018 12:00
Test Name: HPLC MS Scan
Analyst: WHB
Reference: NCL ME 326

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/5/2018	07/10/18 9:16
Penoxsulum	ND			0.10	0.015	µg/L	1.0	7/5/2018	07/10/18 9:16
Surrogate: Atrazine-d5	121			65-135	0.13	% Rec	1.0	7/5/2018	07/10/18 9:16

Client Sample ID: CBD5-NCL-SE-4-D
Received: 7/3/2018
Lab ID: 1807026-06A **Matrix:** Aqueous
Collected 7/2/2018 11:41
Test Name: HPLC MS Scan
Analyst: WHB
Reference: NCL ME 326

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/5/2018	07/10/18 9:37
Penoxsulum	***0.069***	J		0.10	0.015	µg/L	1.0	7/5/2018	07/10/18 9:37
Surrogate: Atrazine-d5	121			65-135	0.13	% Rec	1.0	7/5/2018	07/10/18 9:37

Client Sample ID: CBD1-NCL-SE-4
Received: 7/3/2018
Lab ID: 1807026-07A **Matrix:** Aqueous
Collected 7/2/2018 13:33
Test Name: HPLC MS Scan
Analyst: WHB
Reference: NCL ME 326

Parameter	Result	Qual	Flag	Limit	MDL	Units	DF	Extracted	Analyzed
Bensulfuron-methyl	ND			1.0	0.26	µg/L	1.0	7/5/2018	07/10/18 9:59
Penoxsulum	***0.15***			0.10	0.015	µg/L	1.0	7/5/2018	07/10/18 9:59
Surrogate: Atrazine-d5	120			65-135	0.13	% Rec	1.0	7/5/2018	07/10/18 9:59

North Coast Laboratories, Ltd.

Date: 7/12/2018

CLIENT: Kleinfelder
Work Order: 1807026
Project: 20154800.003A Task 02 WDR SE-4

QC SUMMARY REPORT

Method Blank

Sample ID **MB-36253** Batch ID: **36253** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/10/2018 1:18:09 AM** Prep Date **7/5/2018**

Client ID: Run ID: **ORLCMSMS2_180709B** SeqNo: **1367190**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bensulfuron-methyl	ND	1.0									
Penoxsulum	ND	0.10									
Surrogate: Atrazine-d5	7.33	1.0	10.0	0	73.3%	65	135	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 7/12/2018

CLIENT: Kleinfelder
Work Order: 1807026
Project: 20154800.003A Task 02 WDR SE-4

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID **1807026-04AMS** Batch ID: **36253** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/10/2018 2:23:04 AM** Prep Date **7/5/2018**
Client ID: **CBD5-NCL-SE-4-M** Run ID: **ORLCMSMS2_180709B** SeqNo: **1367193**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bensulfuron-methyl	6.520	1.0	10.0	0	65.2%	50	150	0			
Surrogate: Atrazine-d5	7.39	1.0	10.0	0	73.9%	65	135	0			

Sample ID **1807026-04AMSD** Batch ID: **36253** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/10/2018 2:44:43 AM** Prep Date **7/5/2018**
Client ID: **CBD5-NCL-SE-4-M** Run ID: **ORLCMSMS2_180709B** SeqNo: **1367194**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bensulfuron-methyl	7.849	1.0	10.0	0	78.5%	50	150	8.13	3.52%	30	
Surrogate: Atrazine-d5	9.66	1.0	10.0	0	96.6%	65	135	9.32	3.62%	30	

Sample ID **1807026-04AMS** Batch ID: **36253** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/10/2018 11:47:17 AM** Prep Date **7/5/2018**
Client ID: **CBD5-NCL-SE-4-M** Run ID: **ORLCMSMS2_180709B** SeqNo: **1367206**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Penoxsulum	6.750	1.0	10.0	0.0878	66.6%	50	150	0			
Surrogate: Atrazine-d5	9.32	10	10.0	0	93.2%	65	135	0			J

Sample ID **1807026-04AMSD** Batch ID: **36253** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/10/2018 12:08:50 PM** Prep Date **7/5/2018**
Client ID: **CBD5-NCL-SE-4-M** Run ID: **ORLCMSMS2_180709B** SeqNo: **1367207**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Penoxsulum	8.431	1.0	10.0	0.0878	83.4%	50	150	6.75	22.1%	30	
Surrogate: Atrazine-d5	11.0	10	10.0	0	110%	65	135	9.32	16.7%	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 7/12/2018

CLIENT: Kleinfelder
Work Order: 1807026
Project: 20154800.003A Task 02 WDR SE-4

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID **LCS-36253** Batch ID: **36253** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/10/2018 1:39:46 AM** Prep Date **7/5/2018**
Client ID: Run ID: **ORLCMSMS2_180709B** SeqNo: **1367191**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bensulfuron-methyl	7.933	1.0	10.0	0	79.3%	50	150	0			
Surrogate: Atrazine-d5	9.52	1.0	10.0	0	95.2%	65	135	0			

Sample ID **LCSD-36253** Batch ID: **36253** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/10/2018 2:01:24 AM** Prep Date **7/5/2018**
Client ID: Run ID: **ORLCMSMS2_180709B** SeqNo: **1367192**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bensulfuron-methyl	7.701	1.0	10.0	0	77.0%	50	150	9.74	23.4%	30	
Surrogate: Atrazine-d5	8.14	1.0	10.0	0	81.3%	65	135	11.3	32.7%	30	R

Sample ID **LCS-36253** Batch ID: **36253** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/10/2018 11:04:11 AM** Prep Date **7/5/2018**
Client ID: Run ID: **ORLCMSMS2_180709B** SeqNo: **1367204**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Penoxsulum	9.815	1.0	10.0	0	98.1%	50	150	0			
Surrogate: Atrazine-d5	11.3	10	10.0	0	113%	65	135	0			

Sample ID **LCSD-36253** Batch ID: **36253** Test Code: **HPLCMS2** Units: **µg/L** Analysis Date **7/10/2018 11:25:44 AM** Prep Date **7/5/2018**
Client ID: Run ID: **ORLCMSMS2_180709B** SeqNo: **1367205**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Penoxsulum	8.901	1.0	10.0	0	89.0%	50	150	9.82	9.76%	30	
Surrogate: Atrazine-d5	10.2	10	10.0	0	102%	65	135	11.3	10.9%	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

1807026

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COC# 456754

Page 1 of 1

Project No.	Project Name
20154800.004A Task 02	WDR SE-4

L.P. No. (PO No.)

Samplers: (Signature/Number) Short

Receiving Lab:
North Coast Laboratories
5680 West End Rd., Arcata CA 95521
Attn: Roxanne Moore (707) 822-4649

Instructions/Remarks
CEDEN EDD
EXCEL EDD
MDL Report
standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers*	Analysis: Penoxsulam	Bensulfuron-methyl										Remarks
1	07/02/18	8:37	SSB-NCL-SE-4	W	3	40 mL VOA	X	X										
2	07/02/18	10:12	BS1-NCL-SE-4	W	3	40 mL VOA	X	X										
3	07/02/18	11:40	CBD5-NCL-SE-4	W	3	40 mL VOA	X	X										
4	07/02/18	11:42	CBD5-NCL-SE-4-M	W	9	40 mL VOA	X	X										MS/MSD, LCS/LCSD,lab blank, lab dup
5	07/02/18	12:00	CBD5-NCL-SE-4-F	W	3	40 mL VOA	X	X										
6	07/02/18	11:41	CBD5-NCL-SE-4-D	W	3	40 mL VOA	X	X										
7	07/02/18	13:35	CBD1-NCL-SE-4	W	3	40 mL VOA	X	X										
8																		
9																		*All VOAs are unpreserved
10																		
11																		
12																		
13																		
14																		
15																		

Relinquished By:	Date/Time	Received By:
[signature]	7/2/18 1900	FEDEX
Relinquished By:	Date/Time	Received By:
	7/3/18 11:30	Jessica Billerman
Relinquished By:	Date/Time	Received By:

Instructions/Remarks
Please send invoice to KLEINFELDER

4.0°C

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

CHAIN-OF-CUSTODY

Appendix C
2018 Submitted Exceedance Reports

California Rice Commission

Rice Waste Discharge Requirements Order
General Parameter Surface Water Quality Exceedance Report
2018 Sampling Season

SAMPLING EVENT:	MAY EVENT 1 (Irrigation Season)
SAMPLING DATES:	5/22/2018 - WDR sampling event; 5/29/2018 - D.O. resample
PARAMETERS:	DISSOLVED OXYGEN, pH, SC
EXCEEDANCE DESCRIPTIONS:	D.O. - The COLD beneficial use water quality standard (7.0 mg/L D.O.) was exceeded at sites SSB, BS1, and CBD1. Primary site measurements at sites SSB and BS1 achieved the WARM water quality standard (5 mg/L D.O.). The measured D.O. at site CBD1 exceeded both the WARM and COLD standards. *See note regarding D.O. measurements below table. pH - The water quality standard for pH (minimum 6.5, maximum 8.5) was exceeded in the secondary measurements at sites CBD1 and CBD5. SC - The CVRWQCB EC threshold for reporting (700 µmhos/cm) was exceeded at site CBD1.
SITES WITH EXCEEDANCES:	SSB, BS1, CBD1, CBD5

Field Results

Date	Site	Sample Time	Water Temp (°C)	Dissolved Oxygen (mg/L)	pH	SC (µS/cm)	Flow (cfs)
5/22/18	SSB	9:37	22.0 / 21.80	**6.68 / 4.88***	8.04 / 8.03	402 / 399	0.0
	BS1	11:40	22.1 / 21.97	**6.51 / 3.48***	7.78 / 8.06	255 / 254	0.2
	CBD1	16:06	23.5 / 23.11	**3.43 / 1.91***	7.80 / **8.91**	**708 / 723**	72
	CBD5	13:45	23.0 / 22.83	9.48 / 7.04	7.98 / **8.65**	444 / 441	318
5/29/18 D.O. Resample	*SSB*	*NA*	*NA*	***6.89 / 6.46***	*NA*	*NA*	*NA*
	BS1	*NA*	*NA*	***6.22 / 5.55***	*NA*	*NA*	*NA*
	CBD1	*NA*	*NA*	***4.81 / 4.01***	*NA*	*NA*	*NA*
	CBD5	*NA*	*NA*	*7.17 / 7.16*	*NA*	*NA*	*NA*

Notes:
Two instruments are used for sampling. The results are reported as instrument 1/instrument 2.
Blue text indicates that the COLD water quality standard was exceeded.
Red indicates that the WARM water quality standard was exceeded.
NA = not available

*The D.O. readings from instrument 2 during the 5/22/2018 sampling event were much lower than the readings from instrument 1. It is assumed that the D.O. sensor on instrument 2 was malfunctioning during this sampling event, and the results from instrument 2 are not representative of actual D.O. conditions. The instrument was checked by the manufacturer and a resampling event was undertaken on 5/29/2018, which yielded D.O. results very similar to the results from instrument 1 on the 5/22/2018 sampling date.

California Rice Commission

Rice Waste Discharge Requirements Order
General Parameter Surface Water Quality Exceedance Report
2018 Sampling Season

SAMPLING EVENT:	June Event 1 (Irrigation Season)
SAMPLING DATES:	6/5/2018
PARAMETERS:	DISSOLVED OXYGEN
EXCEEDANCE DESCRIPTIONS:	D.O. - The COLD beneficial use water quality standard (7.0 mg/L D.O.) was exceeded at all sites during the first June sampling event. The measurements at SSB and CBD5 achieved the WARM water quality standard (5 mg/L D.O.), however, the measured D.O. at sites BS1 and CBD1 exceeded both the WARM and COLD standards.
SITES WITH EXCEEDANCES:	SSB, BS1, CBD1, CBD5

Field Results

Date	Site	Sample Time	Water Temp (°C)	Dissolved Oxygen (mg/L)	pH	SC (µS/cm)	Flow (cfs)
6/5/18	SSB	9:45	24.1 / 24.0	**6.38 / 6.96**	7.88 / 7.79	344 / 350	221
	BS1	11:10	25.1 / 25.0	**4.24 / 4.94**	7.47 / 7.37	258 / 263	148
	CBD1	14:45	25.5 / 25.3	**4.09 / 4.95**	7.80 / 7.77	660 / 675	0.0
	CBD5	12:44	24.5 / 24.4	**6.57** / 7.11	7.90 / 7.80	532 / 539	375

Notes:
Two instruments are used for sampling. The results are reported as instrument 1/instrument 2.
Blue text indicates that the COLD water quality standard was exceeded.
Red indicates that the WARM water quality standard was exceeded.
NA = not available

California Rice Commission

Rice Waste Discharge Requirements Order
General Parameter Surface Water Quality Exceedance Report
2018 Sampling Season

SAMPLING EVENT:	June Event 2 (Irrigation Season)
SAMPLING DATES:	6/19/2018
PARAMETERS:	DISSOLVED OXYGEN and SPECIFIC CONDUCTANCE
EXCEEDANCE DESCRIPTIONS:	D.O. - The COLD beneficial use water quality standard (7.0 mg/L D.O.) was exceeded at all sites during the second June sampling event. The measurements at SSB, BS1, and CBD5 achieved the WARM water quality standard (5 mg/L D.O.), however, the measured D.O. at site CBD1 exceeded both the WARM and COLD standards. SC – The CVRWQCB EC threshold for reporting (700 µmhos/cm) was exceeded at site CBD1.
SITES WITH EXCEEDANCES:	SSB, BS1, CBD1, CBD5

Field Results

Date	Site	Sample Time	Water Temp (°C)	Dissolved Oxygen (mg/L)	pH	SC (µS/cm)	Flow (cfs)
6/19/18	SSB	9:00	24.1 / 23.9	**6.04 / 5.76**	7.61 / 7.59	314 / 319	313
	BS1	11:00	24.8 / 24.7	**5.90 / 6.13**	7.64 / 7.64	284 / 288	18.6
	CBD1	14:29	24.7 / 24.6	**0.11 / 0.61**	7.45 / 7.52	**704 / 707**	0.0
	CBD5	12:23	25.6 / 25.5	7.12 / **6.99**	7.86 / 7.83	631 / 642	279

Notes:
Two instruments are used for sampling. The results are reported as instrument 1/instrument 2.
Blue text indicates that the COLD water quality standard was exceeded.
Red indicates that the WARM water quality standard was exceeded.
NA = not available

California Rice Commission

Rice Waste Discharge Requirements Order
General Parameter Surface Water Quality Exceedance Report
2018 Sampling Season

SAMPLING EVENT:	July Event (Irrigation Season)
SAMPLING DATES:	7/2/2018
PARAMETERS:	DISSOLVED OXYGEN and SPECIFIC CONDUCTANCE
EXCEEDANCE DESCRIPTIONS:	D.O. - The COLD beneficial use water quality standard (7.0 mg/L D.O.) was exceeded at all sites during the July sampling event. The measurements at BS1 and CBD5 and one of the measurements at SSB achieved the WARM water quality standard (5 mg/L D.O.), however, the measured D.O. at site CBD1 and one of the measurements at SSB exceeded both the WARM and COLD standards. SC – The CVRWQCB EC threshold for reporting (700 µmhos/cm) was exceeded at sites CBD1 and CBD5.
SITES WITH EXCEEDANCES:	SSB, BS1, CBD1, CBD5

Field Results

Date	Site	Sample Time	Water Temp (°C)	Dissolved Oxygen (mg/L)	pH	SC (µS/cm)	Flow (cfs)
7/2/18	SSB	8:37	26.73 / 26.6	**4.56 / 5.02**	7.68 / 7.77	416 / 415	0.0
	BS1	10:12	26.33 / 26.5	**5.70 / 6.55**	7.64 / 7.78	289 / 270	0.0
	CBD1	13:33	25.98 / 26.1	**2.13 / 2.78**	6.88 / 7.14	**837 / 832**	0.0
	CBD5	11:40	26.42 / 26.3	**6.02 / 6.45**	7.80 / 7.81	**994 / 989**	38

Notes:
Two instruments are used for sampling. The results are reported as instrument 1/instrument 2.
Blue text indicates that the COLD water quality standard was exceeded.
Red indicates that the WARM water quality standard was exceeded.
NA = not available

Appendix D
Groundwater Field Data Sheets, Chain-of-Custody Forms, and Laboratory Results

Appendix D-1
Groundwater Field Data Sheets and Chain-of-Custody Forms

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CALIFORNIA RICE COMMISSION WATER QUALITY PROJECT
GROUNDWATER SAMPLING FIELD DATA SHEET

Project Name:	Rice GW 2018	Project #:	20154800.004A Task 3	Date:	8/13/19	Sampler Name:	Lauren + Jordan.
						Arrival Time:	0830
						Departure Time:	1048
Well #:	08A1M			Pictures Taken:			

Casing Dia. (in):	2"	Static W.L. (ft):	5.75	Total Depth (ft.)	33.45	Water Column Thick. (ft):	27.70	Casing Volume: 2" dia = 0.16 gal/ft.	Calculated Casing Volume (gal): 4.32 gallons	W.L. after sampling is completed (ft):	5.90

Well Construction Details			
Total Depth (ft.)	35	Screen Depth (ft)	25 to 30

27.70 × 0.16 = 4.432 × 3 = 13.297 13.3

Pump Type (Make and Model):	Bailer	Water Quality Meter (Make and Model):	YSI pro plus	Pump Depth (ft):	~27

Time	Casing Volumes Removed	Gallons Removed	Temp. (°C)	pH	Conductivity (µS/cm)	Dissolved O (mg/L)	Color	Odor	Pump Rate (gal/min)	W.L. (ft)	Remarks:
0959	0	0	Start pump in well							5.75	
	Pump	fail	ed								
		Switch	to	bailer		Bail	TD =	27'			
1007	1	25	20.4	7.12	250.9	0.90	Clr	none.			
1012		7.5	19.5	6.80	246.1	0.75	Clr	none		7.57	+ rising quickly
1017		10	19.3	6.84	245.2	0.52	Clr	none.			
1019	3	13	19.0	6.97	245.7	0.50	Clr	nn		7.57	
1021		15	18.9	6.89	245.9	0.51	Clr	nn			
1023		17	18.8	6.91	246.1	0.49	Clr	nn			
1025		19								6.50	rising quickly
1041			18.9	6.93	246.1	0.50	Clr	none		5.90	+ rising.

Sample Time:	1033, 1034	Well Condition:	Good

Quality Control Samples Collected:

non.

Data Quality Objectives:	Temperature	pH	Conductivity	Dissolved Oxygen
	± 0.2 °C	± 0.1 std unit	± 5% < 100 µS/cm ±3% > 100 µS/cm	± 0.3 mg/L

pump failed. Bailed instead
Bailer set to 27'

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CALIFORNIA RICE COMMISSION WATER QUALITY PROJECT
GROUNDWATER SAMPLING FIELD DATA SHEET

Project Name:	Rice GW 2018	Project #:	20154800.004A Task 3	Date:	8/13/19	Sampler Name:	Short & Jordan
						Arrival Time:	1145
						Departure Time:	1315
Well #:	35J2M			Pictures Taken:			

Casing Dia. (in):	2"	Static W.L. (ft):	4.32	Total Depth (ft.)	24.00	Water Column Thick. (ft):	19.68	Casing Volume: 2" dia ≈ 0.16 gal/ft.	Calculated Casing Volume (gal):	3.15	W.L. after sampling is completed (ft):	5.23

Well Construction Details				19.68×0.15=3.15×3=9.4=10
Total Depth (ft.)	24.2	Screen Depth (ft)	19.2 – 24.2	

Pump Type (Make and Model):	Grund flow Rediflo2	Water Quality Meter (Make and Model):	YSI pro plus	Pump Depth (ft):	21

Time	Casing Volumes Removed	Gallons Removed	Temp. (°C)	pH	Conductivity (µS/cm)	Dissolved O (mg/L)	Color	Odor	Pump Rate (gal/min)	W.L. (ft)	Remarks:
1205	0	0	Start pump in well								
		5									1gal @1610 flow calibrate
1210		5	19.0	6.93	899	1.0	Brown	none			
1215	3	10	19.8	6.98	876	0.12	Clear	none	~1	9.25	Flow rate adjusted
1220		12.5	19.8	7.00	868	0.09	Clear	none	20.5	10.20	
1225		15	19.9	7.02	860	0.18	Clear	none	20.5	10.22	
1230		18	19.8	7.02	858	0.14	Clear	none	~0.5	10.22	
1235	6	21	19.8	7.04	863	0.03	Clear	none	~0.5	9.90	
1240		23.5	19.8	7.06	857	0.03	Clear	none	~0.5	10.10	
1245		25	19.8	7.02	856	0.02	Clr	none.	~0.5	6.92	pump paused for DTW
1250		27.5	19.9	7.03	856	0.02	Clr	none	~0.5	10.20	
1255	9	30	19.8	7.04	855	0.03	Clr	none	~0.5	10.20	
1257			Sample								
1300			20.0	7.10	853	0.31	Clr	none.		5.23	

Sample Time:	1257, 1258	Well Condition:	Good, locking valve

Quality Control Samples Collected: none. 125

Data Quality Objectives:	Temperature	pH	Conductivity	Dissolved Oxygen
	± 0.2 °C	± 0.1 std unit	5% < 100 µS/cm ±3% > 100 µS/cm	± 0.3 mg/L

pump paused when empty, purge bucket

Hz: 104.28

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CALIFORNIA RICE COMMISSION WATER QUALITY PROJECT
GROUNDWATER SAMPLING FIELD DATA SHEET

Project Name:	Rice GW 2018	Project #:	20154800.004A Task 3	Date:	8/15/17	Sampler Name:	Lauren Short
						Arrival Time:	1415
						Departure Time:	1600
Well #:	09C2M			Pictures Taken:			

Casing Dia. (in):	2"	Static W.L. (ft):	4.34	Total Depth (ft.)	39.8	Water Column Thick. (ft):	35.46	Casing Volume: 2" dia = 0.16 gal/ft.	Calculated Casing Volume (gal): 5.67	W.L. after sampling is completed (ft):	4.34

Well Construction Details				
Total Depth (ft.)	45	Screen Depth (ft)	35 to 40	39.8 − 4.34 = 35.46(0.16) = 5.67x3 = 17.01

Pump Type (Make and Model):	Bailer	Water Quality Meter (Make and Model):	YSI pro plus	Pump Depth (ft):	~10-15

Time	Casing Volumes Removed	Gallons Removed	Temp. (°C)	pH	Conductivity (µS/cm)	Dissolved O (mg/L)	Color	Odor	Pump Rate (gal/min)	W.L. (ft)	Remarks:
	0	0	Start pump in well								
230pm		1.5	21.7	7.29	678	5.85	Clear	none		4.47	
235		4	19.7	7.42	679	0.58	Clear	none		4.39	
245	1	6.5	19.3	7.54	880		slight Brown	none		4.34	Failed collection
250		7.5	18.7	7.37	885	0.49	slight Brown	none		4.49	
255		10	18.6	7.5	874	1.79	slight Brown	none		4.52	
300	2	12.5	18.7	7.66	887	3.22	slight Brown	none		4.68	
307		15	18.5	7.62	885	0.49	slight Brown	none		4.52	
315	3	17.5	18.0	7.56	882	0.26	Clr	non.			
			18.1	7.51	885	.022		"			1 Bailer volume
			18.1	7.49	875	0.25					
320pm			18.1	7.48	878	0.12					
			Sample.								
		~19	18.3	7.50	878	0.17	Clr			4.34	Completed.

Sample Time:	1531, 1533	Well Condition:	Bad. PVC first 2 feet is a 45° angle. Obstacle at about 16'
Quality Control Samples Collected:	None.		

Data Quality Objectives:	Temperature	pH	Conductivity	Dissolved Oxygen
	± 0.2 °C	± 0.1 std unit	5% < 100 µS/cm ±3% > 100 µS/cm	± 0.3 mg/L

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CALIFORNIA RICE COMMISSION WATER QUALITY PROJECT
GROUNDWATER SAMPLING FIELD DATA SHEET

Project Name:	Rice GW 2018	Project #:	20154800.004A Task 3	Date:	3/14/18	Sampler Name:	Short J Jordan
						Arrival Time:	0930
						Departure Time:	1100
Well #:	22 BLM			Pictures Taken:			

Casing Dia. (in):	2"	Static W.L. (ft):	1.20'	Total Depth (ft.)	32.60'	Water Column Thick. (ft):	31.4	Casing Volume: 2" dia = 0.16 gal/ft.	Calculated Casing Volume (gal): 5.024	W.L. after sampling is completed (ft):	1.20'

Well Construction Details				
Total Depth (ft.)	35	Screen Depth (ft)	25 to 30	31.4(0.16) = 5.024(3) = 15.072

Pump Type (Make and Model):	Grundfos Rediflo2	Water Quality Meter (Make and Model):	YSI pro plus	Pump Depth (ft):	27

Time	Casing Volumes Removed	Gallons Removed	Temp. (°C)	pH	Conductivity (µS/cm)	Dissolved O (mg/L)	Color	Odor	Pump Rate (gal/min)	W.L. (ft)	Remarks:
0959	0	0	Start pump in well								
1011	1	5					Clear	none	1	1.20	Flow Calibration
1014		7.5	17.3	7.43	775	0.20	Clr	none	1	1.58	
1019	2	11.5	17.3	7.38	772	0.06	Clr	none	1	1.59	
1024	3	15	17.3	7.41	774	0.00	Clr	none	1	1.59	
1028		19	17.3	7.43	770	0.01	Clr	none	1	1.58	
1035			Sample.								
			17.4	7.43	767	0.03	Clr	non	1	1.50	Final Reading

Sample Time:	1035, 1036	Well Condition:	Good

Quality Control Samples Collected: None.

Data Quality Objectives:	Temperature	pH	Conductivity	Dissolved Oxygen
	± 0.2 °C	± 0.1 std unit	5% < 100 µS/cm ±3% > 100 µS/cm	± 0.3 mg/L

Hz: 76

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CALIFORNIA RICE COMMISSION WATER QUALITY PROJECT
GROUNDWATER SAMPLING FIELD DATA SHEET

Project Name:	Rice GW 2018	Project #:	20154800.004A Task 3	Date:	8/18/18	Sampler Name:	Short & Jordan
						Arrival Time:	1140
						Departure Time:	1255
Well #:	08D1M			Pictures Taken:			

Casing Dia. (in):	2"	Static W.L. (ft):	2.00	Total Depth (ft.)	38.1	Water Column Thick. (ft):	36.1	Casing Volume: 2" dia = 0.16 gal/ft.	Calculated Casing Volume (gal): 5.776	W.L. after sampling is completed (ft):	2.10

Well Construction Details				
Total Depth (ft.)	38.5	Screen Depth (ft)	28.5 to 33.5	36.1(0.16) = 5.776(3) = 17.328

Pump Type (Make and Model):	Grundfos Rediflo 2	Water Quality Meter (Make and Model):	YSI pro plus	Pump Depth (ft):	30.5

Time	Casing Volumes Removed	Gallons Removed	Temp. (°C)	pH	Conductivity (µS/cm)	Dissolved O (mg/L)	Color	Odor	Pump Rate (gal/min)	W.L. (ft)	Remarks:
1205	0	0	Start pump in well								
		1					Brown	none.	1		Flow calibration
1210	1	6	17.7	7.29	388.1	0.10	clr	none	1	2.30	
1215		8.5	17.7	7.36	389.8	0.00	clr	none	0.5	2.32	flow adj.
1220	2	13.5	17.6	7.45	391.1	0.00	clr	none	1	2.33	flow adj.
1223		15									Discharge Mark
1225	3	17	17.7	7.49	387.1	0.00	clr	none	1	2.31	
1228		20									Discharge Mark
1230		22.5	17.7	7.49	387.2	0.00	clr	none	1	2.29	
1232		25									Discharge
1235			Sample.								
1236			17.7	7.45	389.4	0.01	clr	none.		2.32	

Sample Time: 1235, 1236

Well Condition: No vault or well vault seal

Quality Control Samples Collected: None.

Data Quality Objectives:	Temperature	pH	Conductivity		Dissolved Oxygen
	± 0.2 °C	± 0.1 std unit	5% < 100 µS/cm	±3% > 100 µS/cm	± 0.3 mg/L

Hr: 8 | 07

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CALIFORNIA RICE COMMISSION WATER QUALITY PROJECT
GROUNDWATER SAMPLING FIELD DATA SHEET

Project Name:	Rice GW 2018	Project #:	20154800.004A Task 3	Date:	8/14/19	Sampler Name:	Short & Jordan
						Arrival Time:	1315
						Departure Time:	1440
Well #:	09L1M			Pictures Taken:			

Casing Dia. (in):	2"	Static W.L. (ft):	3.33	Total Depth (ft.)	32.51	Water Column Thick. (ft):	29.13	Casing Volume: 2" dia = 0.16 gal/ft.	Calculated Casing Volume (gal): 4.66	W.L. after sampling is completed (ft):	3.39

Well Construction Details				
Total Depth (ft.)	35	Screen Depth (ft)	25 to 30	29.13 X0.16=4.66 → 13.9 → 14

Pump Type (Make and Model):	Grundfos Rediflo 2	Water Quality Meter (Make and Model):	YSI pro plus	Pump Depth (ft):	27'

Time	Casing Volumes Removed	Gallons Removed	Temp. (°C)	pH	Conductivity (µS/cm)	Dissolved O (mg/L)	Color	Odor	Pump Rate (gal/min)	W.L. (ft)	Remarks:
1345	0	0	Start pump in well								
1350		3									flow calibration
1355		8	18.1	7.06	723	0.06	Clr	none	~1	3.40	
1400	3	13	18.0	7.09	734	0.42	Clr	none	~1	3.39	
1405		18	18.0	7.15	740	0.31	Clr	none	~1	3.40	
1410		23	18.0	7.16	732	0.32	Clr	none	~1	3.39	
1412		Sa	mple								
1415			18.0	7.19	736	0.41	Clr	none		3.40	

Sample Time:	1412, 1413	Well Condition:	vault seal damaged

Quality Control Samples Collected:
None

Data Quality Objectives:	Temperature	pH	Conductivity	Dissolved Oxygen
	± 0.2 °C	± 0.1 std unit	±5% < 100 µS/cm ±3% > 100 µS/cm	± 0.3 mg/L

Hr: 73.32

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CALIFORNIA RICE COMMISSION WATER QUALITY PROJECT
GROUNDWATER SAMPLING FIELD DATA SHEET

Project Name:	Rice GW 2018	Project #:	20154800.004A Task 3	Date:	8/15/18	Sampler Name:	Short & Jordan
						Arrival Time:	0915
						Departure Time:	1015
Well #:	18HIM			Pictures Taken:			

Casing Dia. (in):	2"	Static W.L. (ft):	1.74	Total Depth (ft.)	48.22'	Water Column Thick. (ft):	46.48	Casing Volume: 2" dia = 0.16 gal/ft.	Calculated Casing Volume (gal): 7.44	W.L. after sampling is completed (ft):	1.70

Well Construction Details				
Total Depth (ft.)	50 ft	Screen Depth (ft)	40 - 45	46.48 * 0.16 = 7.44 * 3 ~ 23.31 → 24

Pump Type (Make and Model):	Grundfos Rediflo 2	Water Quality Meter (Make and Model):	YSI Proplus	Pump Depth (ft):	42

Time	Casing Volumes Removed	Gallons Removed	Temp. (°C)	pH	Conductivity (µS/cm)	Dissolved O (mg/L)	Color	Odor	Pump Rate (gal/min)	W.L. (ft)	Remarks:
0855	0	0	Start pump in well								
0902		1					Brown		~1	2.58	Flow Calibration
0903		6	18.8	7.25	12760	0.0	Clr	none	~1	2.91	
0913		10	18.7	7.28	12810	0.0	Clr	non.	~1	3.00	
0918		13	18.7	7.29	12718	0.0	Clr	none	~1	2.95	
0922		15									Discharge Mark
0923			18.7	7.31	12773	0.50	Clr	none	~1	3.20	
0928		20	18.7	7.31	12714	0.55	Clr	none	~1	3.20	
0933	3	25	18.7	7.32	127785	0.0	Clr	none	~1	3.12	
0938		30	18.7	7.32	12740	0.58	Clr	none.	~1	3.12	
0943		34	18.7	7.32	12753	0.63	Clr	non	~1	3.20	
0943		37	18.7	7.32	12752	0.63	Clr	none.	~1	3.20	
0951			Sample								
0954			18.6	7.33	12798	0.59	Clr	none.		3.20	

Sample Time:	0951, 0952.	Well Condition:	Good

Quality Control Samples Collected: None

Data Quality Objectives:	Temperature	pH	Conductivity	Dissolved Oxygen
	± 0.2 °C	± 0.1 std unit	5% < 100 µS/cm ±3% > 100 µS/cm	± 0.3 mg/L

Buckets: ||||

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CALIFORNIA RICE COMMISSION WATER QUALITY PROJECT
GROUNDWATER SAMPLING FIELD DATA SHEET

Project Name:	Rice GW 2018	Project #:	20154800.004A Task 3	Date:	8/15/17	Sampler Name:	Short & Jordan
						Arrival Time:	1100
						Departure Time:	1201
Well #:	09B2M			Pictures Taken:			

Casing Dia. (in):	2"	Static W.L. (ft):	2.41	Total Depth (ft.)	22.05	Water Column Thick. (ft):	19.64	Casing Volume: 2" dia = 0.16 gal/ft.	Calculated Casing Volume (gal): 3.14 π	W.L. after sampling is completed (ft):	2.42

Well Construction Details			
Total Depth (ft.)	29	Screen Depth (ft)	19 - 25

19.64 x 0.16 = 3.14 x 3 = 9.42

Pump Type (Make and Model):	Grundfos Rediflo2	Water Quality Meter (Make and Model):	YSI Proplus	Pump Depth (ft):	20'

Time	Casing Volumes Removed	Gallons Removed	Temp. (°C)	pH	Conductivity (µS/cm)	Dissolved O (mg/L)	Color	Odor	Pump Rate (gal/min)	W.L. (ft)	Remarks:
1121	0	0	Start pump in well								
1125		1							~1	2.72	flow calibration
1130		6	18.6	7.44	1198	0.26	Clr	none.	~1	2.75	Flow adjusted
1135	3	11	18.7	7.43	1197	0.06	Clr	none	4.5	3.03	Flow Adjusted
1138		16									Discharge Mark
1140			18.6	7.44	1193	0.01	Clr	none.	~1.25	2.90	
1142		21									Discharge Mark
1145			18.7	7.47	1205	0.0	Clr	none.	~1	2.95	
1147		26									Discharge Mark
1150			18.7	7.46	1192	0.0	Clr	none	~1	3.07	
1151		25									
1152			Sample								Flow adj.
1154			18.7	7.49	1204	0.0	Clr	none		2.95	

Sample Time:	1152, 1157	Well Condition:	Good

Quality Control Samples Collected: none

Data Quality Objectives:	Temperature	pH	Conductivity	Dissolved Oxygen
	± 0.2 °C	± 0.1 std unit	5% < 100 µS/cm ±3% > 100 µS/cm	± 0.3 mg/L

22'

Buckets: NA

Ht: 125.30

Dawson pumping b/w buckets to [illegible]

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CALIFORNIA RICE COMMISSION WATER QUALITY PROJECT
GROUNDWATER SAMPLING FIELD DATA SHEET

Project Name:	Rice GW 2018	Project #:	20154800.004A Task 3	Date:	8/16/18	Sampler Name:	Short & Jordan
						Arrival Time:	0840
						Departure Time:	1000
Well #:	27B1M			Pictures Taken:			

Casing Dia. (in):	2"	Static W.L. (ft):	1.01	Total Depth (ft.)	32.38	Water Column Thick. (ft):	31.37	Casing Volume: 2" dia = 0.16 gal/ft.	Calculated Casing Volume (gal): 5.019	W.L. after sampling is completed (ft):	1.11

Well Construction Details				
Total Depth (ft.)	33.5	Screen Depth (ft)	23.5 to 28.5	31.37 x 0.16 = 5.019 x 3 = 15.05

Pump Type (Make and Model):	Grundfos Redi-flo 2	Water Quality Meter (Make and Model):	Ysi proplus	Pump Depth (ft):	26

Time	Casing Volumes Removed	Gallons Removed	Temp. (°C)	pH	Conductivity (µS/cm)	Dissolved O (mg/L)	Color	Odor	Pump Rate (gal/min)	W.L. (ft)	Remarks:
0900	0	0	Start pump in well								
0903							Brown	none	~1		Flow Calibration
0906		4	17.9	7.19	238.5	0.00	Clr	none	~1	1.49	
0910	1	5									Discharge Mark
0913		7.5	17.8	7.28	237.5	0.00	Clr	none	~1	1.51	
0917	2	10									Discharge Mark
0918		11	17.8	7.35	235.8	0.00	Clr	none	~1	1.51	
0923		14	17.8	7.40	236.6	0.00	Clr	none	~1	1.53	
0925	3	15									Discharge mark
0929		17.5	17.8	7.44	235.7	0.00	Clr	none	~1	1.54	
0933	4	20									Discharge mark
0934		21	17.8	7.47	234.8	0.00	Clr	none	~1	1.54	
0935				SAMPLE							
0940			17.8	7.52	236.7	0.00	Clr	none		1.48	

Sample Time:	9:35, 9:36	Well Condition:	Good

Quality Control Samples Collected:

Data Quality Objectives:	Temperature	pH	Conductivity	Dissolved Oxygen
	± 0.2 °C	± 0.1 std unit	5% < 100 µS/cm ±3% > 100 µS/cm	± 0.3 mg/L

Hz = 59.30

1111

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CALIFORNIA RICE COMMISSION WATER QUALITY PROJECT
GROUNDWATER SAMPLING FIELD DATA SHEET

Project Name:	Rice GW 2018	Project #:	20154800.004A Task 3	Date:	8/16/18	Sampler Name:	Short + Jordan.
						Arrival Time:	1100
						Departure Time:	1230
Well #:	10R1M			Pictures Taken:			

Casing Dia. (in):	2"	Static W.L. (ft):	1.01	Total Depth (ft.)	43.67	Water Column Thick. (ft):	33.57	Casing Volume: 2" dia = 0.16 gal/ft.	Calculated Casing Volume (gal): 5.37	W.L. after sampling is completed (ft):	1.03

Well Construction Details				
Total Depth (ft.)	44	Screen Depth (ft)	34 to 39	33.57 + 0.16 = 53.37 ×3 = 16.11

Pump Type (Make and Model):	Grundfos Rediflo2	Water Quality Meter (Make and Model):	YSI proplus	Pump Depth (ft):	26.5

Time	Casing Volumes Removed	Gallons Removed	Temp. (°C)	pH	Conductivity (µS/cm)	Dissolved O (mg/L)	Color	Odor	Pump Rate (gal/min)	W.L. (ft)	Remarks:
1130	0	0	Start pump in well								
1132							Brown	Sulfur	~1		Flow Calibration
1126	1	5									Discharge Mark
1137		6.5	18.4	7.39	598	0.00	Clr	sulfur	~1	3.14	
1140	2	10									Discharge Mark
1142		12	18.4	7.47	597	0.00	Clr	Sulfur	~1	3.15	
1145	3	15									Discharge Mark
1147		17.5	18.4	7.52	594	0.00	Clr	sulfur	~1	3.15	
1149	4	20									Discharge Mark
1152		23	18.4	7.55	593	0.00	Clr	sulfur	~1	3.14	
1154	5	25									Discharge Mark
1157		29	18.3	7.57	592	0.00	Clr	sulfur	~1	3.16	
1200			SAMPLE								
1205			18.3	7.58	592	0.00	Clr	Sulfur		3.18	

Sample Time: 1200, 1201 Well Condition: Good

Quality Control Samples Collected:
Field Blank: 1217 Dup: 1202 MS/MSD: 1203

Data Quality Objectives:	Temperature	pH	Conductivity	Dissolved Oxygen
	± 0.2 °C	± 0.1 std unit	5% < 100 µS/cm ±3% > 100 µS/cm	± 0.3 mg/L

$H_2 = 89.61$

MLL

KLEINFE[illegible]R
INSTRUMENT CALIBRATION LOG

Sampler Name/No.: Short

Date: 8/13/18

Project No.: 20154800.004A-03

Job Name: Rice GW 2018

Calibration Start Time: 0533

pH Meter: SPP-R								EC Meter: SPP-R	
	Time	Temp. via Thermometer	Temp. via YSI Meter	pH7	mVpH (pH 7)	pH10	mVpH (pH10)		1413 µmho
Reading (initial)	0555	30 °C	32.7	6.97	-13.4	10.00	-175.1	Reading (initial)	1358
Calibration (initial)	0611	30 °C	32.7	7.00	-13.4	10.00	-175.0	Calibration (initial)	1413
Reading (intermediate)								Reading (intermediate)	
Calibration (intermediate)								Calibration (intermediate)	
Reading (end of day)	1828		34.3	7.02	-14.5	9.94	-193.9	Reading (end of day)	14.09

Comments:

Turbidity Meter (make/number): _____

	____NTU	____NTU	____NTU	Battery Check	
Reading (Initial)					
Calibration					

D.O. Meter: SPP-R

Barometric Pressure: 756.7 mmHg

		mg/L	%
	Reading (initial):	—	103.0
	Reading (adj.):	7.89	99.6
	Intermediate Reading (initial):		
	Intermediate Reading (adj.):		

KLEINFE[illegible]R
INSTRUMENT CALIBRATION LOG

Sampler Name/No.: Jordan A.

Date: 8/14/18

Project No.: 20154800.004A-03

Job Name: Rice GW 2018

Calibration Start Time: 0600

pH Meter: SPP-R								EC Meter: SPP-R	
	Time	Temp. via Thermometer	Temp. via YSI Meter	pH7	mVpH (pH 7)	pH10	mVpH (pH10)		1413 umho
Reading (initial)	0638	29°C	31.3°C	6.99	-14.7	9.95	-193.9	Reading (initial)	1407
Calibration (initial)	0703	28°C	29.4°C	6.97	-14.5	10.00	-194.1	Calibration (initial)	1412
Reading (intermediate)								Reading (intermediate)	
Calibration (intermediate)								Calibration (intermediate)	
Reading (end of day)	1635		31.8°C	6.9	-8.3	9.92	-190.7	Reading (end of day)	1407

Comments:

Turbidity Meter (make/number): _____

	____NTU	____NTU	____NTU	Battery Check	
Reading (Initial)					
Calibration					

D.O. Meter: SPP-R

Barometric Pressure: 756.3 mmHg

	mg/L	%
Reading (initial):	—	106.4
Reading (adj.):	8.29	99.9
Intermediate Reading (initial):		
Intermediate Reading (adj.):		

KLEINFE[illegible]R
INSTRUMENT CALIBRATION LOG

Sampler Name/No.: Jordan A

Date: 8/15/18

Project No.: 20154800.004A-03

Job Name: Rice GW 2018

Calibration Start Time: 0605

pH Meter: SPP-R								EC Meter: SPP-R	
	Time	Temp. via Thermometer	Temp. via YSI Meter	pH7	mVpH (pH 7)	pH10	mVpH (pH10)		1413 umho
Reading (initial)	0624	31°C	29.8°C	6.99	-14.8	9.95	-195.4	Reading (initial)	1408
Calibration (initial)	0627	29.8°C	29.6°C	7.00	-14.1	10.02	-195.7	Calibration (initial)	1411
Reading (intermediate)								Reading (intermediate)	
Calibration (intermediate)								Calibration (intermediate)	
Reading (end of day)	1420		28.0°C	6.95	-11.4	9.99	-193.9	Reading (end of day)	1404

Comments:

Turbidity Meter (make/number): _____

	____NTU	____NTU	____NTU	Battery Check
Reading (Initial)				
Calibration				

D.O. Meter: SPP-R

Barometric Pressure: 756.9 mmHg

	mg/L	%
Reading (initial):	—	109.1
Reading (adj.):	8.32	97.8
Intermediate Reading (initial):		
Intermediate Reading (adj.):		

KLEINFE[illegible]R
INSTRUMENT CALIBRATION LOG

Sampler Name/No.: Jordan A.

Date: 8/16/18

Project No.: 20154800.004A-03

Job Name: Rice GW 2018

Calibration Start Time: 0605

pH Meter: SPP-R								EC Meter: SPP-R	
	Time	Temp. via Thermometer	Temp. via YSI Meter	pH7	mVpH (pH 7)	pH10	mVpH (pH10)		1413 umho
Reading (initial)	0623	31°C	29.6°C	6.99	-12.8	9.95	-194.6	Reading (initial)	1407
Calibration (initial)	0625	31°C	29.6°C	6.96	-12.3	9.99	-194.7	Calibration (initial)	1413
Reading (intermediate)								Reading (intermediate)	
Calibration (intermediate)								Calibration (intermediate)	
Reading (end of day)	1220		28.3°C	7.04	-15.0	10.08	-197.1	Reading (end of day)	1421

Comments:

Turbidity Meter (make/number): _____

	____NTU	____NTU	____NTU	Battery Check	
Reading (Initial)					
Calibration					

D.O. Meter: SPP-R

Barometric Pressure: 758.7 mmHg

	mg/L	%
Reading (initial):	—	109.2
Reading (adj.):	8.22	99.8
Intermediate Reading (initial):		
Intermediate Reading (adj.):		

geotech
Calibrated at Geotech's California North service center
4620 Northgate Blvd; Suite 170
Sacramento, CA 95834
Fax: (916) 648-7766

YSI Pro Series Calibration Certificate

Unit Number: 5400
Serial Number: 15J103780

Calibration Date 8/3/2018
Technician: Nick Robello

Installed Probes
- ☑ Conductivity
- ☑ PH
- ☑ ORP
- ☑ DO

- ☑ Display is clear, and free of damage
- ☑ Cable and accessories are free of damage
- ☑ Firmware version is up to date.

Display Battery	5.6 V	Pass
Spare Battery	6 V	Pass
Cable Flex Test:	Pass	

Cable Length	4M	pH Probe Lot #	17L
Cable Lot #	16b100185	ORP Probe Lot	16A
Cond Probe Lot #	16A100443	DO Probe Lot #	15k100038
Bath Temp	23.2 °C		
Meter Temp	23.3 °C		
Variance	-0.10	Pass	

Cond

Calibration	Reading		Buffer Lot #	Exp. Date	
1.413 mS	1.413 mS	Pass	8GA635	1/19	Pass

pH

Point Test	Calibration	Reading	mV	Slope		Buffer Lot #	Exp. Date	
2 Point	pH 7	pH 7	-15.7 mV			8GA635	1/19	Pass
	pH 10	pH 10	-191.6 mV	175.9	Pass	7GD255	4/19	Pass

ORP

Calibraition	Reading		Buffer Lot #	Exp. Date	
220 mV	220 mV	Pass	7GJ546	7/18	Fail

DO

Barometer	Calibration	Reading	Variance		Test Fluid
758.2 mmHg	99.8 %	101.1 %	1.3%	Pass	Water Saturated Air

Time:	Min.	Sec.	Reading		Nitrogen Lot #
	0	15	2 %	Pass	15182N2

Geotech Environmental Equipment, Inc. takes pride in ensuring this instrument is tested to function as specified by the manufacturer and was calibrated in accordance to manufacturer specifications. All calibration standards used are NIST traceable. With the provided lot numbers we can provide NIST documents on request. Call us at (800) 833-7958 and we will be glad to help.

Appendix D-2
CLS Laboratory Results

CALIFORNIA LABORATORY SERVICES

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August 22, 2018

CLS Work Order #: 18H0933
COC #: 601913, 955980

Craig Riddle
Kleinfelder (Sacramento)
2882 Prospect Park Dr. suite 200
Rancho Cordova, CA 95742

Project Name: Rice GW 2018

Enclosed are the results of analyses for samples received by the laboratory on 08/15/18 13:52. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES
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08/22/18 15:33

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0933**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 601913, 955980

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
09B2M (18H0933-01) Water Sampled: 08/15/18 11:52 Received: 08/15/18 13:52										
Ammonia as N	**0.027**	0.025	0.10	mg/L	1	1806911	08/20/18	08/20/18	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**4.8**	0.055	0.40	"	"	1806746	08/15/18	08/15/18	EPA 300.0	
Total Dissolved Solids	**440**	5.0	10	"	"	1806915	08/20/18	08/21/18	SM2540C	
18H1M (18H0933-03) Water Sampled: 08/15/18 09:51 Received: 08/15/18 13:52										
Ammonia as N	**0.33**	0.025	0.10	mg/L	1	1806911	08/20/18	08/20/18	SM4500-NH3F-1997	
Nitrate/Nitrite as N	**2.2**	0.055	0.40	"	"	1806746	08/15/18	08/16/18	EPA 300.0	
Total Dissolved Solids	**11000**	5.0	10	"	"	1806964	08/21/18	08/22/18	SM2540C	

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08/22/18 15:33

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0933**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 601913, 955980

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806746 - General Prep											
Blank (1806746-BLK1)					Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (1806746-BS1)					Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	4.13	0.055	0.40	mg/L	4.00		103	80-120			
LCS Dup (1806746-BSD1)					Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	3.97	0.055	0.40	mg/L	4.00		99	80-120	4	20	
Matrix Spike (1806746-MS1)			**Source: 18H0865-01**		Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	3.81	0.055	0.40	mg/L	4.00	ND	95	80-120			
Matrix Spike Dup (1806746-MSD1)			**Source: 18H0865-01**		Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	3.65	0.055	0.40	mg/L	4.00	ND	91	80-120	5	20	
Batch 1806911 - General Preparation											
Blank (1806911-BLK1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (1806911-BS1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	0.523	0.025	0.10	mg/L	0.500		105	80-120			
LCS Dup (1806911-BSD1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	0.522	0.025	0.10	mg/L	0.500		104	80-120	0.2	25	
Matrix Spike (1806911-MS1)			**Source: 18H0856-02**		Prepared & Analyzed: 08/20/18						
Ammonia as N	0.968	0.025	0.10	mg/L	0.500	0.470	100	75-125			

CALIFORNIA LABORATORY SERVICES
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08/22/18 15:33

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0933**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 601913, 955980

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806911 - General Preparation											
Matrix Spike Dup (1806911-MSD1)			**Source: 18H0856-02**		Prepared & Analyzed: 08/20/18						
Ammonia as N	0.936	0.025	0.10	mg/L	0.500	0.470	93	75-125	3	25	
Batch 1806915 - General Preparation											
Blank (1806915-BLK1)					Prepared: 08/20/18 Analyzed: 08/21/18						
Total Dissolved Solids	ND	5.0	10	mg/L							
Duplicate (1806915-DUP1)			**Source: 18H0940-01**		Prepared: 08/20/18 Analyzed: 08/21/18						
Total Dissolved Solids	388	5.0	10	mg/L		388			0	20	
Batch 1806964 - General Preparation											
Blank (1806964-BLK1)					Prepared: 08/21/18 Analyzed: 08/22/18						
Total Dissolved Solids	ND	5.0	10	mg/L							
Duplicate (1806964-DUP1)			**Source: 18H1133-01**		Prepared: 08/21/18 Analyzed: 08/22/18						
Total Dissolved Solids	137	5.0	10	mg/L		131			4	20	

08/22/18 15:33

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0933**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 601913, 955980

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a "MDL Report", thus if the report denotes an "ND" for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

KLEINFELDER
Bright People. Right Solutions.

COC# 601913

1VH0933

Project No.	Project Name
20154800.004A Task 03	Rice GW 2018

L.P. No. (PO No.)

Samplers: (Signature/Number)

Receiving Lab:
California Laboratory Services
3249 Fitzgerald Rd.
Rancho Cordova, CA 95742

Instructions/Remarks
Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers	Total Dissolved Solids (SM2540C)	Nitrate +Nitrite as N (EPA300/SM4500	Total Ammonia as N (SM4500 NH3)									Instructions/Remarks
1	8/15/13	1152	09B2M	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									
2	8/15/13	1153	09B2M-B	W	2	250 mL POLY (1 w/ H2SO4)												BACKUP- Please hold 30 days pending instructions
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Relinquished By:	Date/Time	Received By:
	8/15/13 1352	
Relinquished By:	Date/Time	Received By:
Relinquished By:	Date/Time	Received By:
	8/15/13 1352	

Instructions/Remarks
Please send invoice to KLEINFELDER

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

1-0

KLEINFELDER
Bright People. Right Solutions.

COC# 955980

Project No.	Project Name
20154800.004A Task 03	Rice GW 2018

L.P. No. (PO No.):

Samplers: (Signature/Number)

Receiving Lab:
California Laboratory Services
3249 Fitzgerald Rd.
Rancho Cordova, CA 95742

Instructions/Remarks: Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers	Total Dissolved Solids (SM2540C)	Nitrate +Nitrite as N (EPA300/SM4500	Total Ammonia as N (SM4500 NH3)									Remarks
1	8/15/18	0951	18H1M	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									
2	8/15/18	0952	18H1M-B	W	2	250 mL POLY (1 w/ H2SO4)												BACKUP- Please hold 30 days pending instructions
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Relinquished By:	Date/Time	Received By:
	8/15/18 1352	
Relinquished By:	Date/Time	Received By:
Relinquished By:	Date/Time	Received By:
	8/15/18 1352	

Instructions/Remarks
Please send invoice to KLEINFELDER

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

CALIFORNIA LABORATORY SERVICES

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August 23, 2018

CLS Work Order #: 18H1032
COC #: 587334, 150051

Craig Riddle
Kleinfelder (Sacramento)
2882 Prospect Park Dr. suite 200
Rancho Cordova, CA 95742

Project Name: Rice GW 2018

Enclosed are the results of analyses for samples received by the laboratory on 08/16/18 14:22. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES
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08/23/18 14:42

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H1032**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 587334, 150051

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10R1M (18H1032-01) Water Sampled: 08/16/18 12:00 Received: 08/16/18 14:22										
Ammonia as N	**0.086**	0.025	0.10	mg/L	1	1806928	08/20/18	08/20/18	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.43**	0.055	0.40	"	"	1806854	08/17/18	08/17/18	EPA 300.0	
Total Dissolved Solids	**340**	5.0	10	"	"	1806929	08/20/18	08/21/18	SM2540C	
10R1M-F (18H1032-03) Water Sampled: 08/16/18 12:15 Received: 08/16/18 14:22										
Ammonia as N	**0.041**	0.025	0.10	mg/L	1	1806928	08/20/18	08/20/18	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	1806854	08/17/18	08/17/18	EPA 300.0	
Total Dissolved Solids	ND	5.0	10	"	"	1806929	08/20/18	08/21/18	SM2540C	
10R1M-D (18H1032-04) Water Sampled: 08/16/18 12:02 Received: 08/16/18 14:22										
Ammonia as N	**0.087**	0.025	0.10	mg/L	1	1806928	08/20/18	08/20/18	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.25**	0.055	0.40	"	"	1806854	08/17/18	08/17/18	EPA 300.0	J
Total Dissolved Solids	**330**	5.0	10	"	"	1806929	08/20/18	08/21/18	SM2540C	
10R1M-M (18H1032-05) Water Sampled: 08/16/18 12:03 Received: 08/16/18 14:22										
Ammonia as N	**0.074**	0.025	0.10	mg/L	1	1806928	08/20/18	08/20/18	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.25**	0.055	0.40	"	"	1806854	08/17/18	08/17/18	EPA 300.0	J
Total Dissolved Solids	**350**	5.0	10	"	"	1806929	08/20/18	08/21/18	SM2540C	
27B1M (18H1032-06) Water Sampled: 08/16/18 09:35 Received: 08/16/18 14:22										
Ammonia as N	**0.035**	0.025	0.10	mg/L	1	1806928	08/20/18	08/20/18	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.25**	0.055	0.40	"	"	1806854	08/17/18	08/17/18	EPA 300.0	J
Total Dissolved Solids	**150**	5.0	10	"	"	1806929	08/20/18	08/21/18	SM2540C	

CALIFORNIA LABORATORY SERVICES
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08/23/18 14:42

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H1032**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 587334, 150051

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806854 - General Prep											
Blank (1806854-BLK1)					Prepared & Analyzed: 08/17/18						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (1806854-BS1)					Prepared & Analyzed: 08/17/18						
Nitrate/Nitrite as N	3.96	0.055	0.40	mg/L	4.00		99	80-120			
LCS Dup (1806854-BSD1)					Prepared & Analyzed: 08/17/18						
Nitrate/Nitrite as N	3.91	0.055	0.40	mg/L	4.00		98	80-120	1	20	
Matrix Spike (1806854-MS1)			**Source: 18H1032-05**		Prepared & Analyzed: 08/17/18						
Nitrate/Nitrite as N	3.98	0.055	0.40	mg/L	4.00	0.250	93	80-120			
Matrix Spike Dup (1806854-MSD1)			**Source: 18H1032-05**		Prepared & Analyzed: 08/17/18						
Nitrate/Nitrite as N	4.21	0.055	0.40	mg/L	4.00	0.250	99	80-120	6	20	
Batch 1806928 - General Preparation											
Blank (1806928-BLK1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (1806928-BS1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	0.451	0.025	0.10	mg/L	0.500		90	80-120			
LCS Dup (1806928-BSD1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	0.453	0.025	0.10	mg/L	0.500		91	80-120	0.4	25	
Matrix Spike (1806928-MS1)			**Source: 18H1032-05**		Prepared & Analyzed: 08/20/18						
Ammonia as N	0.464	0.025	0.10	mg/L	0.500	0.0740	78	75-125			

CALIFORNIA LABORATORY SERVICES
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08/23/18 14:42

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H1032**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 587334, 150051

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806928 - General Preparation											
Matrix Spike Dup (1806928-MSD1)			**Source: 18H1032-05**		Prepared & Analyzed: 08/20/18						
Ammonia as N	0.475	0.025	0.10	mg/L	0.500	0.0740	80	75-125	2	25	
Batch 1806929 - General Preparation											
Blank (1806929-BLK1)					Prepared: 08/20/18 Analyzed: 08/21/18						
Total Dissolved Solids	ND	5.0	10	mg/L							
Duplicate (1806929-DUP1)			**Source: 18H0991-02**		Prepared: 08/20/18 Analyzed: 08/21/18						
Total Dissolved Solids	51.0	5.0	10	mg/L		48.0			6	20	
Duplicate (1806929-DUP2)			**Source: 18H1032-05**		Prepared: 08/20/18 Analyzed: 08/22/18						
Total Dissolved Solids	326	5.0	10	mg/L		346			6	20	

08/23/18 14:42

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H1032**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 587334, 150051

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a "MDL Report", thus if the report denotes an "ND" for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

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COC# 587334

Project No.	Project Name
20154800.004A Task 03	Rice GW 2018

L.P. No. (PO No.)

Samplers: (Signature/Number)

Receiving Lab:
California Laboratory Services
3249 Fitzgerald Rd.
Rancho Cordova, CA 95742

Instructions/Remarks
Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers	Total Dissolved Solids (SM2540C)	Nitrate +Nitrite as N (EPA300/SM4500	Total Ammonia as N (SM4500 NH3)									Remarks
1	03/6/18	1200	10R1M	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									
2	03/6/18	1201	10R1M-B	W	2	250 mL POLY (1 w/ H2SO4)												BACKUP- Please hold 30 days pending instructions
3	03/6/18	1215	10R1M-F	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									
4	03/6/18	1202	10R1M-D	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									
5	03/6/18	1203	10R1M-M	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									MS/MSD, LCS/LCSD,lab blank, lab dup
6																		
7																		
8																		
9																		
10																		

Relinquished By:	Date/Time	Received By:
	03/6/18 1421	
Relinquished By:	Date/Time	Received By:
Relinquished By:	Date/Time	Received By:
	03/6/18 1422	

Instructions/Remarks
Please send invoice to KLEINFELDER

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

11.3

KLEINFELDER
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COC# 150051

Page 1 of 1

Project No.	Project Name
20154800.004A Task 03	Rice GW 2018

L.P. No. (PO No.)

Samplers: (Signature/Number)

Receiving Lab:
California Laboratory Services
3249 Fitzgerald Rd.
Rancho Cordova, CA 95742

Instructions/Remarks
Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers	Analysis: Total Dissolved Solids (SM2540C)	Nitrate +Nitrite as N (EPA300/SM4500	Total Ammonia as N (SM4500 NH3)									Instructions/Remarks
1	8/16/13	0935	27B1M	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									
2	8/16/13	0936	27B1M-B	W	2	250 mL POLY (1 w/ H2SO4)												BACKUP- Please hold 30 days pending instructions
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Relinquished By:	Date/Time	Received By:
	8/16/13 1422	
Relinquished By:	Date/Time	Received By:
Relinquished By:	Date/Time	Received By:
	8/16/13 1422	

Instructions/Remarks
Please send invoice to KLEINFELDER

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

H3

CALIFORNIA LABORATORY SERVICES

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August 22, 2018

CLS Work Order #: 18H0901
COC #: 948120

Craig Riddle
Kleinfelder (Sacramento)
2882 Prospect Park Dr. suite 200
Rancho Cordova, CA 95742

Project Name: Rice GW 2018

Enclosed are the results of analyses for samples received by the laboratory on 08/15/18 08:31. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES
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08/22/18 15:32

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0901**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 948120

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
09L1M (18H0901-01) Water Sampled: 08/14/18 14:12 Received: 08/15/18 08:31										
Ammonia as N	**0.050**	0.025	0.10	mg/L	1	1806911	08/20/18	08/20/18	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.88**	0.055	0.40	"	"	1806746	08/15/18	08/15/18	EPA 300.0	
Total Dissolved Solids	**450**	5.0	10	"	"	1806915	08/20/18	08/21/18	SM2540C	

CALIFORNIA LABORATORY SERVICES
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08/22/18 15:32

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0901**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 948120

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806746 - General Prep											
Blank (1806746-BLK1)					Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (1806746-BS1)					Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	4.13	0.055	0.40	mg/L	4.00		103	80-120			
LCS Dup (1806746-BSD1)					Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	3.97	0.055	0.40	mg/L	4.00		99	80-120	4	20	
Matrix Spike (1806746-MS1)			**Source: 18H0865-01**		Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	3.81	0.055	0.40	mg/L	4.00	ND	95	80-120			
Matrix Spike Dup (1806746-MSD1)			**Source: 18H0865-01**		Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	3.65	0.055	0.40	mg/L	4.00	ND	91	80-120	5	20	
Batch 1806911 - General Preparation											
Blank (1806911-BLK1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (1806911-BS1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	0.523	0.025	0.10	mg/L	0.500		105	80-120			
LCS Dup (1806911-BSD1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	0.522	0.025	0.10	mg/L	0.500		104	80-120	0.2	25	
Matrix Spike (1806911-MS1)			**Source: 18H0856-02**		Prepared & Analyzed: 08/20/18						
Ammonia as N	0.968	0.025	0.10	mg/L	0.500	0.470	100	75-125			

CALIFORNIA LABORATORY SERVICES
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08/22/18 15:32

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0901**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 948120

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806911 - General Preparation											
Matrix Spike Dup (1806911-MSD1)			**Source: 18H0856-02**		Prepared & Analyzed: 08/20/18						
Ammonia as N	0.936	0.025	0.10	mg/L	0.500	0.470	93	75-125	3	25	
Batch 1806915 - General Preparation											
Blank (1806915-BLK1)					Prepared: 08/20/18 Analyzed: 08/21/18						
Total Dissolved Solids	ND	5.0	10	mg/L							
Duplicate (1806915-DUP1)			**Source: 18H0940-01**		Prepared: 08/20/18 Analyzed: 08/21/18						
Total Dissolved Solids	388	5.0	10	mg/L		388			0	20	

08/22/18 15:32

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0901**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 948120

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a "MDL Report", thus if the report denotes an "ND" for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

18H0901

KLEINFELDER
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COC# 948120

Project No	Project Name
20154800.004A Task 03	Rice GW 2018

L.P. No (PO No.):

Samplers: (Signature/Number)

Receiving Lab:
California Laboratory Services
3249 Fitzgerald Rd.
Rancho Cordova, CA 95742

Instructions/Remarks
Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D	Matrix	No. of Containers	Type of Containers	Total Dissolved Solids (SM2540C)	Nitrate +Nitrite as N (EPA300/SM4500	Total Ammonia as N (SM4500 NH3)									Remarks
1	8/14/18	1412	09L1M	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									
2	8/14/18	1413	09L1M-B	W	2	250 mL POLY (1 w/ H2SO4)												BACKUP- Please hold 30 days pending instructions
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Relinquished By	Date/Time	Received By
	8/14/18 1700	KLF SC
KLF SC	8/15/18 800	
	8/15/18 831	

8/15/18 0831 (9.9)

Instructions/Remarks
Please send invoice to KLEINFELDER

Send Results To
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

CALIFORNIA LABORATORY SERVICES

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August 22, 2018

CLS Work Order #: 18H0900
COC #: 509451

Craig Riddle
Kleinfelder (Sacramento)
2882 Prospect Park Dr. suite 200
Rancho Cordova, CA 95742

Project Name: Rice GW 2018

Enclosed are the results of analyses for samples received by the laboratory on 08/15/18 08:31. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES
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08/22/18 15:31

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0900**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 509451

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
08D1M (18H0900-01) Water Sampled: 08/14/18 12:35 Received: 08/15/18 08:31										
Ammonia as N	**0.048**	0.025	0.10	mg/L	1	1806911	08/20/18	08/20/18	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	1806746	08/15/18	08/15/18	EPA 300.0	
Total Dissolved Solids	**240**	5.0	10	"	"	1806915	08/20/18	08/21/18	SM2540C	

CALIFORNIA LABORATORY SERVICES
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08/22/18 15:31

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0900**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 509451

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806746 - General Prep											
Blank (1806746-BLK1)					Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (1806746-BS1)					Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	4.13	0.055	0.40	mg/L	4.00		103	80-120			
LCS Dup (1806746-BSD1)					Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	3.97	0.055	0.40	mg/L	4.00		99	80-120	4	20	
Matrix Spike (1806746-MS1)			**Source: 18H0865-01**		Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	3.81	0.055	0.40	mg/L	4.00	ND	95	80-120			
Matrix Spike Dup (1806746-MSD1)			**Source: 18H0865-01**		Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	3.65	0.055	0.40	mg/L	4.00	ND	91	80-120	5	20	
Batch 1806911 - General Preparation											
Blank (1806911-BLK1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (1806911-BS1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	0.523	0.025	0.10	mg/L	0.500		105	80-120			
LCS Dup (1806911-BSD1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	0.522	0.025	0.10	mg/L	0.500		104	80-120	0.2	25	
Matrix Spike (1806911-MS1)			**Source: 18H0856-02**		Prepared & Analyzed: 08/20/18						
Ammonia as N	0.968	0.025	0.10	mg/L	0.500	0.470	100	75-125			

CALIFORNIA LABORATORY SERVICES
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08/22/18 15:31

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0900**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 509451

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806911 - General Preparation											
Matrix Spike Dup (1806911-MSD1)			**Source: 18H0856-02**		Prepared & Analyzed: 08/20/18						
Ammonia as N	0.936	0.025	0.10	mg/L	0.500	0.470	93	75-125	3	25	
Batch 1806915 - General Preparation											
Blank (1806915-BLK1)					Prepared: 08/20/18 Analyzed: 08/21/18						
Total Dissolved Solids	ND	5.0	10	mg/L							
Duplicate (1806915-DUP1)			**Source: 18H0940-01**		Prepared: 08/20/18 Analyzed: 08/21/18						
Total Dissolved Solids	388	5.0	10	mg/L		388			0	20	

08/22/18 15:31

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0900**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 509451

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a "MDL Report", thus if the report denotes an "ND" for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

18H0900

KLEINFELDER
Bright People. Right Solutions.

COC# 509451

Project No	Project Name
20154800.004A Task 03	Rice GW 2018

L.P. No. (PO No.):

Samplers: (Signature/Number): [signature]

Receiving Lab: **California Laboratory Services, 3249 Fitzgerald Rd., Rancho Cordova, CA 95742**

Instructions/Remarks: Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers	Total Dissolved Solids (SM2540C)	Nitrate + Nitrite as N (EPA300/SM4500	Total Ammonia as N (SM4500 NH3)									Remarks
1	8/14/18	1235	08D1M	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									
2	8/14/18	1236	08D1M-B	W	2	250 mL POLY (1 w/ H2SO4)												BACKUP- Please hold 30 days pending instructions
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Relinquished By	Date/Time	Received By
[signature]	8/14/18 1700	KLFSC
KLFSC	8/15/18 800	[signature]
[signature]	8/15/18 831	[signature]

Instructions/Remarks: **Please send invoice to KLEINFELDER**

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

8/15/18 0831 (59)

CALIFORNIA LABORATORY SERVICES

Committed. Responsive. Flexible.

August 22, 2018

CLS Work Order #: 18H0899
COC #: 389406

Craig Riddle
Kleinfelder (Sacramento)
2882 Prospect Park Dr. suite 200
Rancho Cordova, CA 95742

Project Name: Rice GW 2018

Enclosed are the results of analyses for samples received by the laboratory on 08/15/18 08:31. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

08/22/18 15:30

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0899**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 389406

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
22B1M (18H0899-01) Water Sampled: 08/14/18 10:36 Received: 08/15/18 08:31										
Ammonia as N	**0.052**	0.025	0.10	mg/L	1	1806911	08/20/18	08/20/18	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**1.3**	0.055	0.40	"	"	1806746	08/15/18	08/15/18	EPA 300.0	
Total Dissolved Solids	**440**	5.0	10	"	"	1806915	08/20/18	08/21/18	SM2540C	

CALIFORNIA LABORATORY SERVICES
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08/22/18 15:30

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0899**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 389406

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806746 - General Prep											
Blank (1806746-BLK1)					Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (1806746-BS1)					Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	4.13	0.055	0.40	mg/L	4.00		103	80-120			
LCS Dup (1806746-BSD1)					Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	3.97	0.055	0.40	mg/L	4.00		99	80-120	4	20	
Matrix Spike (1806746-MS1)			**Source: 18H0865-01**		Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	3.81	0.055	0.40	mg/L	4.00	ND	95	80-120			
Matrix Spike Dup (1806746-MSD1)			**Source: 18H0865-01**		Prepared & Analyzed: 08/15/18						
Nitrate/Nitrite as N	3.65	0.055	0.40	mg/L	4.00	ND	91	80-120	5	20	
Batch 1806911 - General Preparation											
Blank (1806911-BLK1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (1806911-BS1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	0.523	0.025	0.10	mg/L	0.500		105	80-120			
LCS Dup (1806911-BSD1)					Prepared & Analyzed: 08/20/18						
Ammonia as N	0.522	0.025	0.10	mg/L	0.500		104	80-120	0.2	25	
Matrix Spike (1806911-MS1)			**Source: 18H0856-02**		Prepared & Analyzed: 08/20/18						
Ammonia as N	0.968	0.025	0.10	mg/L	0.500	0.470	100	75-125			

CALIFORNIA LABORATORY SERVICES
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08/22/18 15:30

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0899**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 389406

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806911 - General Preparation											
Matrix Spike Dup (1806911-MSD1)			**Source: 18H0856-02**		Prepared & Analyzed: 08/20/18						
Ammonia as N	0.936	0.025	0.10	mg/L	0.500	0.470	93	75-125	3	25	
Batch 1806915 - General Preparation											
Blank (1806915-BLK1)					Prepared: 08/20/18 Analyzed: 08/21/18						
Total Dissolved Solids	ND	5.0	10	mg/L							
Duplicate (1806915-DUP1)			**Source: 18H0940-01**		Prepared: 08/20/18 Analyzed: 08/21/18						
Total Dissolved Solids	388	5.0	10	mg/L		388			0	20	

08/22/18 15:30

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0899**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 389406

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a "MDL Report", thus if the report denotes an "ND" for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

KLEINFELDER
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COC# 389406

Project No	Project Name
20154800.004A Task 03	Rice GW 2018

L.P. No (PO No.):

Samplers: (Signature/Number)

Receiving Lab: **California Laboratory Services, 3249 Fitzgerald Rd., Rancho Cordova, CA 95742**

Instructions/Remarks: Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D	Matrix	No. of Containers	Type of Containers	Total Dissolved Solids (SM2540C)	Nitrate + Nitrite as N (EPA300/SM4500	Total Ammonia as N (SM4500 NH3)									Remarks
1	8/14/18	1036	22B1M	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									
2	8/14/18	1035	22B1M-B	W	2	250 mL POLY (1 w/ H2SO4)												BACKUP- Please hold 30 days pending instructions
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Relinquished By	Date/Time	Received By
[signature]	8/14/18 | 1100	KLFSC
KLFSC	8/15/18 | 802	[signature]
[signature]	8/15/18 | 831	[signature]

Instructions/Remarks: **Please send invoice to KLEINFELDER**

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

8/15/18 0831 (59)

CALIFORNIA LABORATORY SERVICES

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August 21, 2018

CLS Work Order #: 18H0777
COC #: 185282

Craig Riddle
Kleinfelder (Sacramento)
2882 Prospect Park Dr. suite 200
Rancho Cordova, CA 95742

Project Name: Rice GW 2018

Enclosed are the results of analyses for samples received by the laboratory on 08/14/18 08:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES
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08/21/18 13:13

Kleinfelder (Sacramento)	Project:	Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number:	20154800.004A Task 03	**CLS Work Order #: 18H0777**
Rancho Cordova, CA 95742	Project Manager:	Craig Riddle	COC #: 185282

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
09C2M (18H0777-01) Water Sampled: 08/13/18 15:27 Received: 08/14/18 08:30										
Ammonia as N	**0.086**	0.025	0.10	mg/L	1	1806822	08/16/18	08/16/18	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.34**	0.055	0.40	"	"	1806716	08/14/18	08/14/18	EPA 300.0	J
Total Dissolved Solids	**470**	5.0	10	"	"	1806818	08/16/18	08/17/18	SM2540C	

CALIFORNIA LABORATORY SERVICES
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08/21/18 13:13

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0777**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 185282

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806716 - General Prep											
Blank (1806716-BLK1)					Prepared: 08/14/18 Analyzed: 08/15/18						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (1806716-BS1)					Prepared & Analyzed: 08/14/18						
Nitrate/Nitrite as N	3.96	0.055	0.40	mg/L	4.00		99	80-120			
LCS Dup (1806716-BSD1)					Prepared & Analyzed: 08/14/18						
Nitrate/Nitrite as N	3.96	0.055	0.40	mg/L	4.00		99	80-120	0.1	20	
Matrix Spike (1806716-MS1)			**Source: 18H0765-01**		Prepared & Analyzed: 08/14/18						
Nitrate/Nitrite as N	6.37	0.055	0.40	mg/L	4.00	2.47	98	80-120			
Matrix Spike Dup (1806716-MSD1)			**Source: 18H0765-01**		Prepared & Analyzed: 08/14/18						
Nitrate/Nitrite as N	6.44	0.055	0.40	mg/L	4.00	2.47	99	80-120	1	20	
Batch 1806818 - General Preparation											
Blank (1806818-BLK1)					Prepared: 08/16/18 Analyzed: 08/17/18						
Total Dissolved Solids	ND	5.0	10	mg/L							
Duplicate (1806818-DUP1)			**Source: 18H0844-01**		Prepared: 08/16/18 Analyzed: 08/17/18						
Total Dissolved Solids	153	5.0	10	mg/L		144			6	20	
Batch 1806822 - General Preparation											
Blank (1806822-BLK1)					Prepared & Analyzed: 08/16/18						
Ammonia as N	ND	0.025	0.10	mg/L							

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08/21/18 13:13

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0777**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 185282

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806822 - General Preparation											
LCS (1806822-BS1)					Prepared & Analyzed: 08/16/18						
Ammonia as N	0.496	0.025	0.10	mg/L	0.500		99	80-120			
LCS Dup (1806822-BSD1)					Prepared & Analyzed: 08/16/18						
Ammonia as N	0.509	0.025	0.10	mg/L	0.500		102	80-120	3	25	
Matrix Spike (1806822-MS1)			**Source: 18H0717-02**		Prepared & Analyzed: 08/16/18						
Ammonia as N	0.505	0.025	0.10	mg/L	0.500	0.163	68	75-125			QM-7
Matrix Spike Dup (1806822-MSD1)			**Source: 18H0717-02**		Prepared & Analyzed: 08/16/18						
Ammonia as N	0.483	0.025	0.10	mg/L	0.500	0.163	64	75-125	4	25	QM-7

08/21/18 13:13

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0777**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 185282

Notes and Definitions

QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS and/or LCSD recovery.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a "MDL Report", thus if the report denotes an "ND" for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

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COC# 185282

18H0777

Page 1 of 1

Project No	Project Name
20154800.004A Task 03	Rice GW 2018

L.P. No (PO No.):

Samplers: (Signature/Number)

Receiving Lab:
California Laboratory Services
3249 Fitzgerald Rd.
Rancho Cordova, CA 95742

Instructions/Remarks
Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers	Total Dissolved Solids (SM2540C)	Nitrate + Nitrite as N (EPA300/SM4500	Total Ammonia as N (SM4500 NH3)									Remarks
1	8/14/18	3:27 pm	09C2M	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									
2	8/14/18	3:28 pm	09C2M-B	W	2	250 mL POLY (1 w/ H2SO4)												BACKUP- Please hold 30 days pending instructions
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Relinquished By	Date/Time	Received By
[signature]	8/13/18 1830	KLFSC
[signature]	8/14/18 0830	[signature] 8/14/18 0830

Instructions/Remarks
Please send invoice to KLEINFELDER
U.6

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

CALIFORNIA LABORATORY SERVICES

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August 21, 2018

CLS Work Order #: 18H0776
COC #: 370966

Craig Riddle
Kleinfelder (Sacramento)
2882 Prospect Park Dr. suite 200
Rancho Cordova, CA 95742

Project Name: Rice GW 2018

Enclosed are the results of analyses for samples received by the laboratory on 08/14/18 08:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES
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08/21/18 13:12

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0776**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 370966

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
35J2M (18H0776-01) Water Sampled: 08/13/18 12:57 Received: 08/14/18 08:30										
Ammonia as N	**0.11**	0.025	0.10	mg/L	1	1806822	08/16/18	08/16/18	SM4500-NH3F-1997	
Nitrate/Nitrite as N	**10**	0.055	0.40	"	"	1806716	08/14/18	08/14/18	EPA 300.0	
Total Dissolved Solids	**530**	5.0	10	"	"	1806777	08/15/18	08/16/18	SM2540C	

CALIFORNIA LABORATORY SERVICES
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08/21/18 13:12

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0776**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 370966

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806716 - General Prep											
Blank (1806716-BLK1)					Prepared: 08/14/18 Analyzed: 08/15/18						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (1806716-BS1)					Prepared & Analyzed: 08/14/18						
Nitrate/Nitrite as N	3.96	0.055	0.40	mg/L	4.00		99	80-120			
LCS Dup (1806716-BSD1)					Prepared & Analyzed: 08/14/18						
Nitrate/Nitrite as N	3.96	0.055	0.40	mg/L	4.00		99	80-120	0.1	20	
Matrix Spike (1806716-MS1)			**Source: 18H0765-01**		Prepared & Analyzed: 08/14/18						
Nitrate/Nitrite as N	6.37	0.055	0.40	mg/L	4.00	2.47	98	80-120			
Matrix Spike Dup (1806716-MSD1)			**Source: 18H0765-01**		Prepared & Analyzed: 08/14/18						
Nitrate/Nitrite as N	6.44	0.055	0.40	mg/L	4.00	2.47	99	80-120	1	20	
Batch 1806777 - General Preparation											
Blank (1806777-BLK1)					Prepared: 08/15/18 Analyzed: 08/16/18						
Total Dissolved Solids	ND	5.0	10	mg/L							
Duplicate (1806777-DUP1)			**Source: 18H0776-01**		Prepared: 08/15/18 Analyzed: 08/16/18						
Total Dissolved Solids	528	5.0	10	mg/L		528			0	20	
Batch 1806822 - General Preparation											
Blank (1806822-BLK1)					Prepared & Analyzed: 08/16/18						
Ammonia as N	ND	0.025	0.10	mg/L							

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08/21/18 13:12

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0776**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 370966

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806822 - General Preparation											
LCS (1806822-BS1)					Prepared & Analyzed: 08/16/18						
Ammonia as N	0.496	0.025	0.10	mg/L	0.500		99	80-120			
LCS Dup (1806822-BSD1)					Prepared & Analyzed: 08/16/18						
Ammonia as N	0.509	0.025	0.10	mg/L	0.500		102	80-120	3	25	
Matrix Spike (1806822-MS1)			**Source: 18H0717-02**		Prepared & Analyzed: 08/16/18						
Ammonia as N	0.505	0.025	0.10	mg/L	0.500	0.163	68	75-125			QM-7
Matrix Spike Dup (1806822-MSD1)			**Source: 18H0717-02**		Prepared & Analyzed: 08/16/18						
Ammonia as N	0.483	0.025	0.10	mg/L	0.500	0.163	64	75-125	4	25	QM-7

08/21/18 13:12

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0776**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 370966

Notes and Definitions

QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS and/or LCSD recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a "MDL Report", thus if the report denotes an "ND" for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

13H0716

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COC# 370966

Project No	Project Name
20154800.004A Task 03	Rice GW 2018

L.P. No (PO No.):

Samplers: (Signature/Number)

Receiving Lab:
California Laboratory Services
3249 Fitzgerald Rd.
Rancho Cordova, CA 95742

Instructions/Remarks
Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D	Matrix	No. of Containers	Type of Containers	Total Dissolved Solids (SM2540C)	Nitrate + Nitrite as N (EPA300/SM4500	Total Ammonia as N (SM4500 NH3)									Remarks
1	8/13/18	1257	35J2M	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									
2	8/13/18	1259	35J2M-B	W	2	250 mL POLY (1 w/ H2SO4)												BACKUP- Please hold 30 days pending instructions
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Relinquished By	Date/Time	Received By
	8/13/18 1933	KLFSC
	8/14/18 0830	8/14/18 0930

Instructions/Remarks
Please send invoice to KLEINFELDER
0-6

Send Results To
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

CHAIN-OF CUSTODY

CALIFORNIA LABORATORY SERVICES

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August 21, 2018

CLS Work Order #: 18H0778
COC #: 525688

Craig Riddle
Kleinfelder (Sacramento)
2882 Prospect Park Dr. suite 200
Rancho Cordova, CA 95742

Project Name: Rice GW 2018

Enclosed are the results of analyses for samples received by the laboratory on 08/14/18 08:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES
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08/21/18 13:13

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0778**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 525688

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
08A1M (18H0778-01) Water Sampled: 08/13/18 10:33 Received: 08/14/18 08:30										
Ammonia as N	**0.041**	0.025	0.10	mg/L	1	1806822	08/16/18	08/16/18	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.087**	0.055	0.40	"	"	1806716	08/14/18	08/14/18	EPA 300.0	J
Total Dissolved Solids	**220**	5.0	10	"	"	1806818	08/16/18	08/17/18	SM2540C	

CALIFORNIA LABORATORY SERVICES
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08/21/18 13:13

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0778**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 525688

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806716 - General Prep											
Blank (1806716-BLK1)					Prepared: 08/14/18 Analyzed: 08/15/18						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (1806716-BS1)					Prepared & Analyzed: 08/14/18						
Nitrate/Nitrite as N	3.96	0.055	0.40	mg/L	4.00		99	80-120			
LCS Dup (1806716-BSD1)					Prepared & Analyzed: 08/14/18						
Nitrate/Nitrite as N	3.96	0.055	0.40	mg/L	4.00		99	80-120	0.1	20	
Matrix Spike (1806716-MS1)			**Source: 18H0765-01**		Prepared & Analyzed: 08/14/18						
Nitrate/Nitrite as N	6.37	0.055	0.40	mg/L	4.00	2.47	98	80-120			
Matrix Spike Dup (1806716-MSD1)			**Source: 18H0765-01**		Prepared & Analyzed: 08/14/18						
Nitrate/Nitrite as N	6.44	0.055	0.40	mg/L	4.00	2.47	99	80-120	1	20	
Batch 1806818 - General Preparation											
Blank (1806818-BLK1)					Prepared: 08/16/18 Analyzed: 08/17/18						
Total Dissolved Solids	ND	5.0	10	mg/L							
Duplicate (1806818-DUP1)			**Source: 18H0844-01**		Prepared: 08/16/18 Analyzed: 08/17/18						
Total Dissolved Solids	153	5.0	10	mg/L		144			6	20	
Batch 1806822 - General Preparation											
Blank (1806822-BLK1)					Prepared & Analyzed: 08/16/18						
Ammonia as N	ND	0.025	0.10	mg/L							

CALIFORNIA LABORATORY SERVICES
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08/21/18 13:13

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0778**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 525688

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1806822 - General Preparation											
LCS (1806822-BS1)					Prepared & Analyzed: 08/16/18						
Ammonia as N	0.496	0.025	0.10	mg/L	0.500		99	80-120			
LCS Dup (1806822-BSD1)					Prepared & Analyzed: 08/16/18						
Ammonia as N	0.509	0.025	0.10	mg/L	0.500		102	80-120	3	25	
Matrix Spike (1806822-MS1)			**Source: 18H0717-02**		Prepared & Analyzed: 08/16/18						
Ammonia as N	0.505	0.025	0.10	mg/L	0.500	0.163	68	75-125			QM-7
Matrix Spike Dup (1806822-MSD1)			**Source: 18H0717-02**		Prepared & Analyzed: 08/16/18						
Ammonia as N	0.483	0.025	0.10	mg/L	0.500	0.163	64	75-125	4	25	QM-7

08/21/18 13:13

Kleinfelder (Sacramento)	Project: Rice GW 2018	
2882 Prospect Park Dr. suite 200	Project Number: 20154800.004A Task 03	**CLS Work Order #: 18H0778**
Rancho Cordova, CA 95742	Project Manager: Craig Riddle	COC #: 525688

Notes and Definitions

QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS and/or LCSD recovery.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a "MDL Report", thus if the report denotes an "ND" for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

KLEINFELDER
Bright People. Right Solutions.

COC# 525688

18H0778

Project No	Project Name
20154800.004A Task 03	Rice GW 2018

L.P. No (PO No.):

Samplers (Signature/Number):

Receiving Lab: **California Laboratory Services, 3249 Fitzgerald Rd., Rancho Cordova, CA 95742**

Instructions/Remarks: Standard turn around time

	Date MM/DD/YY	Sample I.D. Time HH-MM-SS	Sample I.D.	Matrix	No. of Containers	Type of Containers	Total Dissolved Solids (SM2540C)	Nitrate + Nitrite as N (EPA300/SM4500)	Total Ammonia as N (SM4500 NH3)									Remarks
1	8/13/18	1033	08A1M	W	2	250 mL POLY (1 w/ H2SO4)	X	X	X									
2	8/13/18	1037	08A1M-B	W	2	250 mL POLY (1 w/ H2SO4)												BACKUP- Please hold 30 days pending instructions
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Relinquished By	Date/Time	Received By
	8/13/18 1030	KLF SC
	8/14/18 0830	8/14/18 0830

Instructions/Remarks: **Please send invoice to KLEINFELDER**

Send Results To:
rfiroved@calrice.org
jenny.krenz@CH2M.com
criddle@kleinfelder.com
lshort@kleinfelder.com

Appendix E
CEDEN Workbooks and
2018 CRC eQAPP
(Files in folder on CD submittal)

Appendix F
Farm Evaluation Summary – Growing Years 2015, 2016, and 2017

Appendix F-1
Farm Evaluation Data Summary by Township

Table F-1. Farm Management Practices Regulatory Sum Total Acres - 2015 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Follow Label Restrictions Acreage Sum	% of Response Acres	Follow County Permit Cds Acreage Sum	% of Response Acres	Waterholding Requirements Acreage Sum	% of Response Acres	Monitor Wind Conditions Acreage Sum	% of Response Acres	Appropriate Buffer Zones Acreage Sum	% of Response Acres	Attend Trainings Acreage Sum	% of Response Acres	Use Low Drift Nozzles Acreage Sum	% of Response Acres	Use PCA Recommendations Acreage Sum
M08N03E	3279	3037	93%	3037	93%	3037	93%	3037	93%	3037	93%	3037	93%	1330	41%	3279
M09N01E	77	77	100%	77	100%	77	100%	77	100%	77	100%	77	100%	77	100%	77
M09N01W	108	108	100%	108	100%	108	100%	108	100%	108	100%	108	100%	108	100%	108
M09N03E	2877	2483	86%	2483	86%	2483	86%	2483	86%	2483	86%	2322	81%	1078	37%	2476
M09N04E	643	643	100%	643	100%	643	100%	643	100%	643	100%	643	100%	643	100%	643
M10N01W	104	104	100%	104	100%	104	100%	104	100%	104	100%	104	100%	104	100%	104
M10N03E	934	934	100%	934	100%	934	100%	934	100%	934	100%	934	100%	475	51%	934
M10N04E	9877	9877	100%	9877	100%	9877	100%	9877	100%	9806	99%	9877	100%	9291	94%	9877
M11N01E	90	90	100%	90	100%	90	100%	90	100%	90	100%	90	100%	90	100%	90
M11N02E	1047	1047	100%	1047	100%	1047	100%	1047	100%	1047	100%	1047	100%	1047	100%	1047
M11N03E	3406	3406	100%	3406	100%	3406	100%	3406	100%	3406	100%	3406	100%	3307	97%	3406
M11N04E	10860	10860	100%	10860	100%	10664	98%	10664	98%	8731	80%	10664	98%	10422	96%	10664
M11N05E	357	357	100%	357	100%	357	100%	301	84%	357	100%	357	100%	301	84%	301
M12N01E	8014	8014	100%	7542	94%	7542	94%	7542	94%	7542	94%	7542	94%	6623	83%	7365
M12N01W	279	279	100%	279	100%	279	100%	279	100%	279	100%	279	100%	279	100%	279
M12N02E	6745	6668	99%	6356	94%	6356	94%	5795	86%	6356	94%	6356	94%	5795	86%	6356
M12N03E	7018	7018	100%	7018	100%	6907	98%	6907	98%	6907	98%	6317	90%	6317	90%	6610
M12N04E	8531	8496	100%	8531	100%	8044	94%	8079	95%	8044	94%	7899	93%	7618	89%	8079
M12N05E	5099	4911	96%	5099	100%	4459	87%	4459	87%	4911	96%	4867	95%	3991	78%	5099
M12N06E	291	291	100%	291	100%	113	39%	113	39%	291	100%	291	100%	113	39%	291
M13N01E	6699	6699	100%	6699	100%	6699	100%	6699	100%	6699	100%	6699	100%	6547	98%	6699
M13N01W	3871	3752	97%	3871	100%	3871	100%	3871	100%	3871	100%	3871	100%	3615	93%	3871
M13N02E	9565	9565	100%	9565	100%	9565	100%	9565	100%	9565	100%	9335	98%	9565	100%	9565
M13N03E	3446	3446	100%	3446	100%	3446	100%	3333	97%	3446	100%	3446	100%	3333	97%	3446
M13N04E	4961	4961	100%	4961	100%	4961	100%	4961	100%	4961	100%	4748	96%	3066	62%	4961
M13N05E	4915	4915	100%	4915	100%	4915	100%	4915	100%	4915	100%	4915	100%	4361	89%	4915
M14N01E	1699	1699	100%	1699	100%	1699	100%	1699	100%	1506	89%	1506	89%	1506	89%	1699
M14N01W	3791	3791	100%	3791	100%	3791	100%	3791	100%	3791	100%	3791	100%	3646	96%	3791
M14N02E	3563	3563	100%	3563	100%	3444	97%	3563	100%	3563	100%	3563	100%	3444	97%	3563
M14N02W	1598	1598	100%	1598	100%	1598	100%	1598	100%	1598	100%	1598	100%	1598	100%	1598
M14N03E	34	34	100%	34	100%	34	100%	34	100%	34	100%	34	100%	34	100%	34
M14N04E	3583	3583	100%	3583	100%	3583	100%	3583	100%	3583	100%	3079	86%	2403	67%	3583
M14N05E	2621	2621	100%	2621	100%	2621	100%	2621	100%	2621	100%	2434	93%	2369	90%	2621
M14N06E	274	274	100%	274	100%	274	100%	274	100%	274	100%	274	100%	274	100%	274
M15N01E	2913	2913	100%	2913	100%	2633	90%	2913	100%	2612	90%	2623	90%	1978	68%	2838
M15N01W	5559	5559	100%	5559	100%	5559	100%	5559	100%	5559	100%	4364	79%	5559	100%	5559
M15N02E	2632	2632	100%	2632	100%	2632	100%	2632	100%	2632	100%	2632	100%	2632	100%	2632
M15N02W	5519	5519	100%	5519	100%	5347	97%	5519	100%	5519	100%	5347	97%	5146	93%	5519

Table F-1. Farm Management Practices Regulatory Sum Total Acres - 2015 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Follow Label Restrictions Acreage Sum	% of Response Acres	Follow County Permit Cds Acreage Sum	% of Response Acres	Waterholding Requirements Acreage Sum	% of Response Acres	Monitor Wind Conditions Acreage Sum	% of Response Acres	Appropriate Buffer Zones Acreage Sum	% of Response Acres	Attend Trainings Acreage Sum	% of Response Acres	Use Low Drift Nozzles Acreage Sum	% of Response Acres	Use PCA Recommendations Acreage Sum
M15N03E	453	453	100%	453	100%	453	100%	453	100%	453	100%	453	100%	453	100%	453
M15N03W	3624	2784	77%	2784	77%	2708	75%	2605	72%	2605	72%	2708	75%	2226	61%	2784
M15N04E	5518	5518	100%	5518	100%	5518	100%	5518	100%	4697	85%	5518	100%	5518	100%	5518
M15N04W	517	517	100%	517	100%	517	100%	295	57%	295	57%	517	100%	295	57%	517
M15N05E	350	350	100%	350	100%	350	100%	350	100%	350	100%	350	100%	350	100%	350
M16N01E	105	105	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0
M16N01W	2074	2074	100%	2074	100%	2074	100%	2074	100%	2074	100%	2074	100%	2074	100%	2074
M16N02E	2313	2313	100%	2039	88%	2039	88%	2039	88%	1919	83%	1919	83%	1919	83%	1919
M16N02W	7059	7059	100%	7059	100%	7059	100%	7059	100%	7059	100%	6630	94%	6339	90%	7059
M16N03E	536	536	100%	536	100%	536	100%	536	100%	536	100%	536	100%	536	100%	536
M16N03W	10724	10724	100%	10724	100%	10388	97%	8529	80%	8857	83%	10092	94%	8746	82%	10211
M16N04E	8971	8971	100%	8971	100%	8971	100%	8971	100%	8971	100%	8909	99%	8704	97%	8971
M16N04W	2083	2083	100%	2083	100%	1963	94%	2083	100%	2083	100%	1963	94%	1795	86%	2083
M16N05E	50	50	100%	50	100%	50	100%	50	100%	50	100%	50	100%	50	100%	50
M17N01E	2140	2140	100%	1344	63%	1344	63%	1063	50%	1344	63%	1344	63%	1344	63%	1344
M17N01W	6802	6802	100%	6802	100%	6802	100%	6802	100%	6802	100%	6690	98%	6723	99%	6723
M17N02E	2943	2792	95%	1436	49%	1436	49%	1436	49%	1436	49%	1436	49%	1436	49%	1436
M17N02W	5961	5961	100%	5961	100%	5961	100%	5961	100%	5961	100%	5659	95%	5235	88%	5961
M17N03E	580	580	100%	580	100%	580	100%	580	100%	580	100%	580	100%	580	100%	580
M17N03W	12301	12119	99%	12119	99%	12000	98%	11751	96%	11900	97%	11515	94%	7968	65%	11914
M17N04E	3378	3378	100%	3328	99%	3328	99%	3328	99%	3328	99%	3328	99%	3328	99%	3328
M18N01E	8295	8295	100%	8287	100%	8287	100%	8287	100%	8287	100%	8214	99%	8190	99%	8018
M18N01W	3809	3809	100%	3809	100%	3809	100%	3669	96%	3669	96%	3669	96%	3591	94%	3669
M18N02E	7814	7714	99%	7714	99%	7714	99%	7012	90%	7456	95%	6471	83%	6634	85%	6729
M18N02W	9331	9331	100%	9331	100%	9331	100%	9074	97%	9193	99%	9251	99%	9028	97%	9251
M18N03E	1507	1507	100%	1425	95%	1425	95%	1425	95%	1425	95%	1425	95%	1425	95%	1425
M18N03W	4488	4488	100%	4488	100%	4488	100%	4488	100%	4488	100%	3808	85%	3660	82%	4488
M18N04W	567	567	100%	567	100%	567	100%	567	100%	567	100%	567	100%	567	100%	567
M19N01E	19348	19348	100%	19134	99%	19197	99%	18638	96%	18753	97%	18894	98%	18416	95%	18809
M19N01W	3862	3862	100%	3862	100%	3862	100%	3862	100%	3862	100%	3862	100%	3862	100%	3862
M19N02E	14354	14135	98%	14135	98%	13643	95%	13327	93%	13398	93%	13169	92%	12970	90%	13391
M19N02W	15006	14975	100%	15006	100%	14970	100%	14040	94%	14004	93%	13961	93%	13759	92%	13124
M19N03E	1083	1083	100%	1083	100%	1083	100%	1083	100%	740	68%	1083	100%	685	63%	1083
M19N03W	6725	6618	98%	6618	98%	6618	98%	6542	97%	6366	95%	6618	98%	4974	74%	6056
M20N01E	7723	7289	94%	7289	94%	7289	94%	7220	93%	7220	93%	6943	90%	6713	87%	7000
M20N01W	1014	1014	100%	906	89%	906	89%	906	89%	688	68%	906	89%	688	68%	790
M20N02E	10939	10637	97%	10637	97%	10111	92%	10111	92%	10086	92%	9806	90%	9558	87%	9806
M20N02W	10119	10119	100%	10119	100%	10119	100%	10046	99%	9982	99%	10119	100%	9476	94%	10119

Table F-1. Farm Management Practices Regulatory Sum Total Acres - 2015 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Follow Label Restrictions Acreage Sum	% of Response Acres	Follow County Permit Cds Acreage Sum	% of Response Acres	Waterholding Requirements Acreage Sum	% of Response Acres	Monitor Wind Conditions Acreage Sum	% of Response Acres	Appropriate Buffer Zones Acreage Sum	% of Response Acres	Attend Trainings Acreage Sum	% of Response Acres	Use Low Drift Nozzles Acreage Sum	% of Response Acres	Use PCA Recommendations Acreage Sum
M20N03E	1967	1967	100%	1967	100%	1967	100%	1967	100%	1967	100%	1967	100%	1967	100%	1967
M20N03W	839	839	100%	839	100%	839	100%	839	100%	839	100%	839	100%	635	76%	839
M20N04W	62	62	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0
M21N01E	856	856	100%	856	100%	856	100%	856	100%	856	100%	856	100%	856	100%	856
M21N01W	494	494	100%	494	100%	494	100%	494	100%	494	100%	494	100%	494	100%	494
M21N02E	354	354	100%	354	100%	354	100%	354	100%	354	100%	354	100%	354	100%	354
M21N02W	130	130	100%	130	100%	130	100%	130	100%	130	100%	130	100%	130	100%	130
Sum	**346,039**	**342,619**	**99%**	**339,153**	**98%**	**335,329**	**97%**	**329,489**	**95%**	**328,020**	**95%**	**326,149**	**94%**	**304,332**	**88%**	**330,884**

Table F-1. Farm Management Practices Regulatory Sum Total Acres - 2015 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	% of Response Acres	End Of Row Shutoff Acreage Sum	% of Response Acres	Avoid Surface Water Acreage Sum	% of Response Acres	Compliance With PPE Acreage Sum	% of Response Acres	Use Drift Control Agents Acreage Sum	% of Response Acres	Provide Employee Safety Training Acreage Sum	% of Response Acres
M08N03E	3279	100%	3037	93%	3037	93%	3037	93%	3037	93%	2625	80%
M09N01E	77	100%	77	100%	77	100%	77	100%	77	100%	0	0%
M09N01W	108	100%	108	100%	108	100%	108	100%	108	100%	108	100%
M09N03E	2877	86%	2322	81%	2322	81%	2322	81%	2322	81%	1910	66%
M09N04E	643	100%	643	100%	643	100%	643	100%	643	100%	643	100%
M10N01W	104	100%	104	100%	104	100%	104	100%	104	100%	104	100%
M10N03E	934	100%	934	100%	934	100%	934	100%	934	100%	934	100%
M10N04E	9877	100%	9806	99%	9853	100%	9877	100%	9877	100%	9793	99%
M11N01E	90	100%	90	100%	90	100%	90	100%	90	100%	90	100%
M11N02E	1047	100%	1047	100%	907	87%	907	87%	1047	100%	1047	100%
M11N03E	3406	100%	3406	100%	3307	97%	3406	100%	3307	97%	3406	100%
M11N04E	10860	98%	8480	78%	8731	80%	10664	98%	10266	95%	10618	98%
M11N05E	357	84%	255	72%	301	84%	357	100%	255	72%	357	100%
M12N01E	8014	92%	6872	86%	7232	90%	7232	90%	7232	90%	3440	43%
M12N01W	279	100%	279	100%	279	100%	279	100%	279	100%	279	100%
M12N02E	6745	94%	5795	86%	5795	86%	6356	94%	5795	86%	6356	94%
M12N03E	7018	94%	6317	90%	6317	90%	6317	90%	6317	90%	6573	94%
M12N04E	8531	95%	7269	85%	6711	79%	8079	95%	6973	82%	7658	90%
M12N05E	5099	100%	3725	73%	3725	73%	4411	87%	3991	78%	3973	78%
M12N06E	291	100%	113	39%	113	39%	113	39%	113	39%	113	39%
M13N01E	6699	100%	6699	100%	6699	100%	6597	98%	6699	100%	6392	95%
M13N01W	3871	100%	3806	98%	3871	100%	3871	100%	3871	100%	3312	86%
M13N02E	9565	100%	9075	95%	9195	96%	9425	99%	9565	100%	8725	91%
M13N03E	3446	100%	3333	97%	3333	97%	3446	100%	3333	97%	3446	100%
M13N04E	4961	100%	4040	81%	3006	61%	4961	100%	2690	54%	4684	94%
M13N05E	4915	100%	3052	62%	3417	70%	4144	84%	1821	37%	3736	76%
M14N01E	1699	100%	1699	100%	1506	89%	1506	89%	1699	100%	1506	89%
M14N01W	3791	100%	3129	83%	3366	89%	3230	85%	3718	98%	3564	94%
M14N02E	3563	100%	2983	84%	3164	89%	3283	92%	3444	97%	3269	92%
M14N02W	1598	100%	997	62%	1325	83%	1325	83%	1325	83%	1325	83%
M14N03E	34	100%	34	100%	34	100%	34	100%	34	100%	34	100%
M14N04E	3583	100%	2939	82%	2403	67%	3583	100%	1694	47%	3583	100%
M14N05E	2621	100%	2621	100%	2369	90%	2621	100%	2230	85%	2519	96%
M14N06E	274	100%	274	100%	274	100%	274	100%	43	16%	274	100%
M15N01E	2913	97%	2106	72%	1978	68%	2586	89%	2106	72%	2785	96%
M15N01W	5559	100%	5559	100%	5559	100%	5559	100%	5559	100%	5431	98%
M15N02E	2632	100%	2632	100%	2632	100%	2632	100%	2632	100%	2632	100%
M15N02W	5519	100%	4577	83%	5109	93%	5238	95%	5209	94%	5238	95%

Table F-1. Farm Management Practices Regulatory Sum Total Acres - 2015 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	% of Response Acres	End Of Row Shutoff Acreage Sum	% of Response Acres	Avoid Surface Water Acreage Sum	% of Response Acres	Compliance With PPE Acreage Sum	% of Response Acres	Use Drift Control Agents Acreage Sum	% of Response Acres	Provide Employee Safety Training Acreage Sum	% of Response Acres
M15N03E	453	100%	453	100%	453	100%	453	100%	453	100%	453	100%
M15N03W	3624	77%	2117	58%	2420	67%	2599	72%	2193	61%	3439	95%
M15N04E	5518	100%	5518	100%	4697	85%	5518	100%	5518	100%	5518	100%
M15N04W	517	100%	295	57%	50	10%	517	100%	295	57%	517	100%
M15N05E	350	100%	350	100%	350	100%	350	100%	350	100%	350	100%
M16N01E	105	0%	0	0%	0	0%	0	0%	0	0%	0	0%
M16N01W	2074	100%	2074	100%	2074	100%	2074	100%	2007	97%	2074	100%
M16N02E	2313	83%	1919	83%	1919	83%	1919	83%	1825	79%	1825	79%
M16N02W	7059	100%	5357	76%	5933	84%	6630	94%	5424	77%	7059	100%
M16N03E	536	100%	536	100%	536	100%	536	100%	536	100%	536	100%
M16N03W	10724	95%	8239	77%	8312	78%	10174	95%	7804	73%	9710	91%
M16N04E	8971	100%	8874	99%	7990	89%	8971	100%	7909	88%	7837	87%
M16N04W	2083	100%	1795	86%	1456	70%	1795	86%	2083	100%	1795	86%
M16N05E	50	100%	50	100%	50	100%	50	100%	50	100%	50	100%
M17N01E	2140	63%	1063	50%	1344	63%	1344	63%	1344	63%	1344	63%
M17N01W	6802	99%	5709	84%	5799	85%	6723	99%	6181	91%	6195	91%
M17N02E	2943	49%	1247	42%	1247	42%	1436	49%	1416	48%	1436	49%
M17N02W	5961	100%	5380	90%	4889	82%	5472	92%	5062	85%	5961	100%
M17N03E	580	100%	580	100%	524	90%	524	90%	580	100%	580	100%
M17N03W	12301	97%	7772	63%	7623	62%	10917	89%	10307	84%	10913	89%
M17N04E	3378	99%	3290	97%	3290	97%	3290	97%	3328	99%	3290	97%
M18N01E	8295	97%	6846	83%	6846	83%	8190	99%	7633	92%	6338	76%
M18N01W	3809	96%	3434	90%	3434	90%	3669	96%	3669	96%	3669	96%
M18N02E	7814	86%	5527	71%	5755	74%	7129	91%	7079	91%	5624	72%
M18N02W	9331	99%	7248	78%	7514	81%	9151	98%	8974	96%	7934	85%
M18N03E	1507	95%	1425	95%	1425	95%	1425	95%	1425	95%	1268	84%
M18N03W	4488	100%	3660	82%	4036	90%	3660	82%	4154	93%	4047	90%
M18N04W	567	100%	567	100%	567	100%	567	100%	509	90%	567	100%
M19N01E	19348	97%	14561	75%	15624	81%	18282	94%	18245	94%	17836	92%
M19N01W	3862	100%	2208	57%	3278	85%	3862	100%	3717	96%	3732	97%
M19N02E	14354	93%	11332	79%	11223	78%	13011	91%	12675	88%	13719	96%
M19N02W	15006	87%	12252	82%	13008	87%	13759	92%	13848	92%	13622	91%
M19N03E	1083	100%	1015	94%	1015	94%	1079	100%	1015	94%	1083	100%
M19N03W	6725	90%	4531	67%	5208	77%	5642	84%	5652	84%	4661	69%
M20N01E	7723	91%	5743	74%	6368	82%	6817	88%	6673	86%	6749	87%
M20N01W	1014	78%	289	29%	507	50%	688	68%	836	82%	906	89%
M20N02E	10939	90%	8434	77%	7540	69%	10057	92%	8857	81%	10612	97%
M20N02W	10119	100%	8314	82%	9143	90%	8371	83%	9931	98%	9467	94%

Table F-1. Farm Management Practices Regulatory Sum Total Acres - 2015 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	% of Response Acres	End Of Row Shutoff Acreage Sum	% of Response Acres	Avoid Surface Water Acreage Sum	% of Response Acres	Compliance With PPE Acreage Sum	% of Response Acres	Use Drift Control Agents Acreage Sum	% of Response Acres	Provide Employee Safety Training Acreage Sum	% of Response Acres
M20N03E	1967	100%	0	0%	0	0%	1967	100%	1967	100%	1967	100%
M20N03W	839	100%	635	76%	839	100%	635	76%	839	100%	553	66%
M20N04W	62	0%	0	0%	0	0%	0	0%	0	0%	0	0%
M21N01E	856	100%	357	42%	856	100%	856	100%	0	0%	856	100%
M21N01W	494	100%	494	100%	494	100%	494	100%	352	71%	494	100%
M21N02E	354	100%	354	100%	354	100%	354	100%	354	100%	354	100%
M21N02W	130	100%	130	100%	130	100%	130	100%	130	100%	130	100%
Sum	**346,039**	**96%**	**282,206**	**82%**	**285,943**	**83%**	**320,709**	**93%**	**303,633**	**88%**	**309,547**	**89%**

Table F-2. Farm Management Practices Voluntary Sum Total Acres - 2015 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Land Lev Prec Tech Acreage Sum	% of Response Acres	Utilize Tailwater Return Acreage Sum	% of Response Acres	Acres Utilize Peripheral Drains	% of Response Acres	Monitor Rain Forecasts Acreage Sum	% of Response Acres	Crop Rotation Org Acreage Sum	% of Response Acres	Cover Cropping Org Acreage Sum	% of Response Acres	Strip Cropping Org Acreage Sum	% of Response Acres	Compacting Levees Acreage Sum
M08N03E	3279	2592	79%	3279	100%	3141	96%	2592	79%	242	7%	0	0%	0	0%	2867
M09N01E	77	77	100%	0	0%	0	0%	77	100%	0	0%	77	100%	0	0%	77
M09N01W	108	108	100%	0	0%	108	100%	108	100%	0	0%	0	0%	0	0%	108
M09N03E	2877	2006	70%	1925	67%	1638	57%	1904	66%	0	0%	0	0%	0	0%	2120
M09N04E	643	0	0%	643	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0
M10N01W	104	104	100%	0	0%	0	0%	104	100%	0	0%	104	100%	0	0%	0
M10N03E	934	934	100%	459	49%	459	49%	934	100%	0	0%	0	0%	0	0%	934
M10N04E	9877	9877	100%	7880	80%	3911	40%	9581	97%	0	0%	0	0%	0	0%	8196
M11N01E	90	90	100%	0	0%	0	0%	90	100%	0	0%	0	0%	0	0%	90
M11N02E	1047	1047	100%	196	19%	95	9%	349	33%	558	53%	558	53%	0	0%	489
M11N03E	3406	3406	100%	540	16%	899	26%	2338	69%	753	22%	753	22%	0	0%	2410
M11N04E	10860	10860	100%	7794	72%	3783	35%	9986	92%	1452	13%	1452	13%	0	0%	10336
M11N05E	357	357	100%	102	28%	46	13%	357	100%	102	28%	102	28%	0	0%	102
M12N01E	8014	8014	100%	182	2%	1449	18%	6122	76%	1730	22%	2086	26%	0	0%	1559
M12N01W	279	279	100%	279	100%	0	0%	279	100%	0	0%	0	0%	0	0%	279
M12N02E	6745	6745	100%	3759	56%	4109	61%	5964	88%	1132	17%	1132	17%	0	0%	4907
M12N03E	7018	7018	100%	1803	26%	1881	27%	5967	85%	384	5%	193	3%	0	0%	5496
M12N04E	8531	8531	100%	3075	36%	5132	60%	7869	92%	1116	13%	1056	12%	0	0%	6349
M12N05E	5099	4863	95%	803	16%	1528	30%	4003	78%	2527	50%	420	8%	0	0%	1808
M12N06E	291	291	100%	0	0%	178	61%	113	39%	178	61%	0	0%	0	0%	0
M13N01E	6699	6699	100%	1695	25%	2868	43%	6406	96%	0	0%	0	0%	0	0%	4978
M13N01W	3871	3871	100%	1577	41%	2599	67%	3871	100%	0	0%	588	15%	0	0%	3593
M13N02E	9565	9335	98%	4865	51%	4797	50%	9123	95%	279	3%	279	3%	141	1%	6429
M13N03E	3446	3446	100%	1542	45%	2596	75%	3446	100%	0	0%	0	0%	0	0%	2890
M13N04E	4961	4956	100%	806	16%	1427	29%	4961	100%	253	5%	253	5%	0	0%	3001
M13N05E	4915	4011	82%	2700	55%	563	11%	4162	85%	291	6%	0	0%	97	2%	3383
M14N01E	1699	1699	100%	1026	60%	540	32%	1699	100%	0	0%	0	0%	0	0%	1262
M14N01W	3791	3791	100%	1272	34%	1273	34%	3462	91%	0	0%	307	8%	0	0%	1748
M14N02E	3563	3563	100%	939	26%	915	26%	3133	88%	0	0%	0	0%	0	0%	2904
M14N02W	1598	1598	100%	991	62%	1280	80%	1598	100%	273	17%	0	0%	0	0%	1518
M14N03E	34	34	100%	0	0%	0	0%	34	100%	0	0%	0	0%	0	0%	0
M14N04E	3583	3583	100%	1243	35%	533	15%	3583	100%	184	5%	184	5%	184	5%	616
M14N05E	2621	2621	100%	1200	46%	1163	44%	2058	79%	0	0%	0	0%	0	0%	1302
M14N06E	274	274	100%	274	100%	0	0%	0	0%	0	0%	0	0%	0	0%	274
M15N01E	2913	2769	95%	1366	47%	1071	37%	2639	91%	0	0%	0	0%	0	0%	1834
M15N01W	5559	5559	100%	3916	70%	3196	57%	4919	88%	0	0%	1572	28%	0	0%	3423
M15N02E	2632	2632	100%	1604	61%	1812	69%	2425	92%	0	0%	0	0%	0	0%	1082
M15N02W	5519	5519	100%	951	17%	1880	34%	5207	94%	389	7%	280	5%	280	5%	4446
M15N03E	453	453	100%	338	75%	338	75%	453	100%	0	0%	0	0%	0	0%	453

Table F-2. Farm Management Practices Voluntary Sum Total Acres - 2015 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Land Lev Prec Tech Acreage Sum	% of Response Acres	Utilize Tailwater Return Acreage Sum	% of Response Acres	Acres Utilize Peripheral Drains	% of Response Acres	Monitor Rain Forecasts Acreage Sum	% of Response Acres	Crop Rotation Org Acreage Sum	% of Response Acres	Cover Cropping Org Acreage Sum	% of Response Acres	Strip Cropping Org Acreage Sum	% of Response Acres	Compacting Levees Acreage Sum
M15N03W	3624	3624	100%	123	3%	1457	40%	2444	67%	425	12%	316	9%	0	0%	1939
M15N04E	5518	5518	100%	4450	81%	4517	82%	5518	100%	3077	56%	3077	56%	1472	27%	2923
M15N04W	517	517	100%	226	44%	50	10%	295	57%	0	0%	0	0%	0	0%	517
M15N05E	350	350	100%	350	100%	350	100%	350	100%	0	0%	0	0%	0	0%	350
M16N01E	105	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0
M16N01W	2074	2074	100%	2007	97%	403	19%	2007	97%	0	0%	0	0%	0	0%	476
M16N02E	2313	2169	94%	794	34%	794	34%	1898	82%	0	0%	0	0%	0	0%	1076
M16N02W	7059	7059	100%	2258	32%	2069	29%	3743	53%	0	0%	0	0%	0	0%	2438
M16N03E	536	536	100%	250	47%	356	66%	536	100%	124	23%	124	23%	124	23%	356
M16N03W	10724	10470	98%	1477	14%	2227	21%	6549	61%	160	1%	56	1%	0	0%	5416
M16N04E	8971	8971	100%	5529	62%	6889	77%	7830	87%	2517	28%	2534	28%	2517	28%	7810
M16N04W	2083	1915	92%	1312	63%	1456	70%	1795	86%	0	0%	0	0%	0	0%	1760
M16N05E	50	50	100%	0	0%	50	100%	50	100%	0	0%	0	0%	0	0%	50
M17N01E	2140	1830	86%	1170	55%	163	8%	1344	63%	0	0%	0	0%	0	0%	901
M17N01W	6802	6581	97%	3929	58%	4204	62%	6550	96%	542	8%	1385	20%	104	2%	4743
M17N02E	2943	2642	90%	494	17%	1110	38%	1333	45%	0	0%	0	0%	0	0%	1158
M17N02W	5961	5961	100%	3158	53%	4297	72%	4979	84%	1222	21%	1122	19%	1122	19%	4448
M17N03E	580	580	100%	0	0%	213	37%	580	100%	0	0%	0	0%	0	0%	580
M17N03W	12301	11849	96%	2482	20%	5229	43%	10771	88%	409	3%	420	3%	0	0%	6244
M17N04E	3378	3328	99%	2633	78%	2973	88%	3191	94%	920	27%	920	27%	920	27%	3328
M18N01E	8295	8295	100%	5192	63%	2295	28%	7857	95%	0	0%	0	0%	0	0%	6210
M18N01W	3809	3669	96%	3303	87%	2312	61%	3669	96%	542	14%	825	22%	400	11%	2890
M18N02E	7814	7814	100%	2279	29%	2389	31%	6715	86%	0	0%	45	1%	0	0%	3464
M18N02W	9331	8763	94%	3171	34%	5195	56%	7363	79%	513	6%	12	0%	0	0%	6776
M18N03E	1507	1425	95%	512	34%	498	33%	780	52%	0	0%	0	0%	0	0%	425
M18N03W	4488	4488	100%	1503	33%	1497	33%	3135	70%	829	18%	829	18%	829	18%	3730
M18N04W	567	567	100%	47	8%	47	8%	509	90%	0	0%	0	0%	0	0%	567
M19N01E	19348	19197	99%	4520	23%	6820	35%	10743	56%	229	1%	78	0%	78	0%	7868
M19N01W	3862	3862	100%	1921	50%	2306	60%	3727	97%	0	0%	0	0%	0	0%	1345
M19N02E	14354	13714	96%	2836	20%	7591	53%	12794	89%	749	5%	930	6%	0	0%	10005
M19N02W	15006	13540	90%	5235	35%	7090	47%	12838	86%	836	6%	535	4%	535	4%	9084
M19N03E	1083	1079	100%	734	68%	702	65%	1083	100%	0	0%	0	0%	0	0%	667
M19N03W	6725	4709	70%	852	13%	1532	23%	4292	64%	695	10%	695	10%	0	0%	2799
M20N01E	7723	7489	97%	3145	41%	4671	60%	6000	78%	209	3%	209	3%	0	0%	5164
M20N01W	1014	1014	100%	0	0%	305	30%	906	89%	0	0%	0	0%	0	0%	492
M20N02E	10939	10318	94%	7432	68%	7537	69%	9829	90%	831	8%	791	7%	0	0%	8228
M20N02W	10119	10119	100%	1466	14%	2671	26%	9499	94%	77	1%	750	7%	0	0%	7200
M20N03E	1967	1967	100%	1678	85%	1678	85%	1967	100%	0	0%	0	0%	0	0%	289
M20N03W	839	839	100%	700	83%	211	25%	613	73%	0	0%	0	0%	0	0%	552

Table F-2. Farm Management Practices Voluntary Sum Total Acres - 2015 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Land Lev Prec Tech Acreage Sum	% of Response Acres	Utilize Tailwater Return Acreage Sum	% of Response Acres	Acres Utilize Peripheral Drains	% of Response Acres	Monitor Rain Forecasts Acreage Sum	% of Response Acres	Crop Rotation Org Acreage Sum	% of Response Acres	Cover Cropping Org Acreage Sum	% of Response Acres	Strip Cropping Org Acreage Sum	% of Response Acres	Compacting Levees Acreage Sum
M20N04W	62	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0
M21N01E	856	88	10%	499	58%	0	0%	856	100%	0	0%	0	0%	0	0%	0
M21N01W	494	352	71%	352	71%	352	71%	411	83%	0	0%	0	0%	0	0%	290
M21N02E	354	354	100%	354	100%	354	100%	354	100%	0	0%	0	0%	0	0%	354
M21N02W	130	130	100%	130	100%	130	100%	130	100%	0	0%	0	0%	0	0%	130
Sum	**346,039**	**333,422**	**96%**	**141,520**	**41%**	**154,198**	**45%**	**289,747**	**84%**	**26,746**	**8%**	**27,046**	**8%**	**8,803**	**3%**	**218,300**

Table F-2. Farm Management Practices Voluntary Sum Total Acres - 2015 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	% of Response Acres	Water Release Pre Field Prep Acreage Sum	% of Response Acres	Water Release Pre Harvest Acreage Sum	% of Response Acres	Slow Release Acreage Sum	% of Response Acres	Crop Rotation Nonorg Acreage Sum	% of Response Acres	Voluntary Trainings Acreage Sum	% of Response Acres
M08N03E	3279	87%	2592	79%	2592	79%	3004	92%	1707	52%	3141	96%
M09N01E	77	100%	0	0%	0	0%	0	0%	0	0%	0	0%
M09N01W	108	100%	108	100%	108	100%	108	100%	0	0%	108	100%
M09N03E	2877	74%	1579	55%	1579	55%	1893	66%	1442	50%	1967	68%
M09N04E	643	0%	0	0%	0	0%	643	100%	0	0%	0	0%
M10N01W	104	0%	104	100%	104	100%	104	100%	104	100%	104	100%
M10N03E	934	100%	459	49%	459	49%	459	49%	459	49%	934	100%
M10N04E	9877	83%	7706	78%	9636	98%	9636	98%	970	10%	9140	93%
M11N01E	90	100%	90	100%	90	100%	90	100%	0	0%	90	100%
M11N02E	1047	47%	907	87%	349	33%	907	87%	711	68%	1047	100%
M11N03E	3406	71%	1838	54%	2173	64%	2584	76%	586	17%	3034	89%
M11N04E	10860	95%	5389	50%	7494	69%	10170	94%	3015	28%	10249	94%
M11N05E	357	28%	0	0%	102	28%	102	28%	255	72%	357	100%
M12N01E	8014	19%	6933	87%	5873	73%	7542	94%	6884	86%	3065	38%
M12N01W	279	100%	279	100%	279	100%	279	100%	0	0%	279	100%
M12N02E	6745	73%	5358	79%	5279	78%	5872	87%	3680	55%	5722	85%
M12N03E	7018	78%	4575	65%	5377	77%	5377	77%	765	11%	6160	88%
M12N04E	8531	74%	7360	86%	7203	84%	7788	91%	609	7%	7248	85%
M12N05E	5099	35%	1726	34%	1726	34%	1904	37%	1655	32%	3526	69%
M12N06E	291	0%	0	0%	0	0%	113	39%	0	0%	113	39%
M13N01E	6699	74%	4462	67%	4954	74%	6621	99%	2785	42%	4901	73%
M13N01W	3871	93%	2878	74%	3218	83%	3218	83%	1403	36%	3383	87%
M13N02E	9565	67%	8483	89%	9123	95%	9123	95%	1609	17%	7863	82%
M13N03E	3446	84%	3025	88%	3333	97%	3226	94%	263	8%	3333	97%
M13N04E	4961	60%	3197	64%	3066	62%	4961	100%	359	7%	4741	96%
M13N05E	4915	69%	3570	73%	3651	74%	3447	70%	231	5%	4099	83%
M14N01E	1699	74%	414	24%	843	50%	1699	100%	843	50%	1270	75%
M14N01W	3791	46%	1222	32%	2259	60%	3791	100%	452	12%	1822	48%
M14N02E	3563	82%	2699	76%	3014	85%	3133	88%	515	14%	3238	91%
M14N02W	1598	95%	1007	63%	1280	80%	1598	100%	0	0%	1087	68%
M14N03E	34	0%	34	100%	0	0%	0	0%	0	0%	34	100%
M14N04E	3583	17%	1572	44%	1572	44%	3461	97%	184	5%	3478	97%
M14N05E	2621	50%	1796	69%	1163	44%	1555	59%	0	0%	2519	96%
M14N06E	274	100%	0	0%	0	0%	274	100%	0	0%	274	100%
M15N01E	2913	63%	1583	54%	2016	69%	2913	100%	778	27%	2154	74%
M15N01W	5559	62%	3860	69%	4992	90%	5240	94%	1572	28%	4575	82%
M15N02E	2632	41%	1089	41%	1868	71%	2632	100%	770	29%	2414	92%
M15N02W	5519	81%	2708	49%	4650	84%	4811	87%	280	5%	3297	60%
M15N03E	453	100%	338	75%	453	100%	453	100%	115	25%	393	87%

Table F-2. Farm Management Practices Voluntary Sum Total Acres - 2015 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	% of Response Acres	Water Release Pre Field Prep Acreage Sum	% of Response Acres	Water Release Pre Harvest Acreage Sum	% of Response Acres	Slow Release Acreage Sum	% of Response Acres	Crop Rotation Nonorg Acreage Sum	% of Response Acres	Voluntary Trainings Acreage Sum	% of Response Acres
M15N03W	3624	53%	1277	35%	2939	81%	3548	98%	0	0%	2437	67%
M15N04E	5518	53%	5349	97%	5349	97%	5349	97%	1472	27%	5306	96%
M15N04W	517	100%	295	57%	517	100%	517	100%	0	0%	517	100%
M15N05E	350	100%	350	100%	350	100%	350	100%	0	0%	350	100%
M16N01E	105	0%	0	0%	0	0%	0	0%	0	0%	105	100%
M16N01W	2074	23%	1827	88%	2074	100%	2001	96%	247	12%	2007	97%
M16N02E	2313	47%	1616	70%	1759	76%	1759	76%	348	15%	2063	89%
M16N02W	7059	35%	5790	82%	6073	86%	5428	77%	0	0%	4172	59%
M16N03E	536	66%	536	100%	536	100%	536	100%	124	23%	536	100%
M16N03W	10724	50%	5921	55%	9031	84%	9547	89%	174	2%	6695	62%
M16N04E	8971	87%	7165	80%	6792	76%	8162	91%	3313	37%	8544	95%
M16N04W	2083	85%	1788	86%	1963	94%	1963	94%	0	0%	1795	86%
M16N05E	50	100%	0	0%	0	0%	0	0%	0	0%	50	100%
M17N01E	2140	42%	727	34%	1182	55%	1344	63%	0	0%	1654	77%
M17N01W	6802	70%	5432	80%	6043	89%	6246	92%	1482	22%	5518	81%
M17N02E	2943	39%	1436	49%	1436	49%	1436	49%	219	7%	1308	44%
M17N02W	5961	75%	5111	86%	5325	89%	5574	94%	1415	24%	4913	82%
M17N03E	580	100%	580	100%	580	100%	580	100%	0	0%	213	37%
M17N03W	12301	51%	7292	59%	7998	65%	8166	66%	0	0%	6402	52%
M17N04E	3378	99%	2973	88%	2874	85%	3328	99%	2836	84%	3328	99%
M18N01E	8295	75%	4277	52%	7328	88%	8214	99%	0	0%	5923	71%
M18N01W	3809	76%	3125	82%	3125	82%	3203	84%	1355	36%	3512	92%
M18N02E	7814	44%	4391	56%	6405	82%	6321	81%	58	1%	3426	44%
M18N02W	9331	73%	6081	65%	7387	79%	8710	93%	0	0%	4781	51%
M18N03E	1507	28%	480	32%	1282	85%	1425	95%	0	0%	428	28%
M18N03W	4488	83%	2599	58%	3861	86%	4488	100%	829	18%	3513	78%
M18N04W	567	100%	567	100%	567	100%	567	100%	0	0%	509	90%
M19N01E	19348	41%	6419	33%	15191	79%	17935	93%	527	3%	7454	39%
M19N01W	3862	35%	1520	39%	1650	43%	2522	65%	0	0%	3408	88%
M19N02E	14354	70%	7794	54%	8036	56%	10661	74%	0	0%	8447	59%
M19N02W	15006	61%	9672	64%	11825	79%	11682	78%	535	4%	10662	71%
M19N03E	1083	62%	749	69%	749	69%	69	6%	0	0%	689	64%
M19N03W	6725	42%	2768	41%	4098	61%	5226	78%	0	0%	2704	40%
M20N01E	7723	67%	5009	65%	4915	64%	7131	92%	227	3%	5213	68%
M20N01W	1014	49%	520	51%	807	80%	906	89%	0	0%	642	63%
M20N02E	10939	75%	6653	61%	6454	59%	8982	82%	0	0%	8218	75%
M20N02W	10119	71%	5918	58%	7739	76%	8326	82%	0	0%	7799	77%
M20N03E	1967	15%	1967	100%	1967	100%	1967	100%	0	0%	792	40%
M20N03W	839	66%	261	31%	531	63%	839	100%	0	0%	320	38%

Table F-2. Farm Management Practices Voluntary Sum Total Acres - 2015 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	% of Response Acres	Water Release Pre Field Prep Acreage Sum	% of Response Acres	Water Release Pre Harvest Acreage Sum	% of Response Acres	Slow Release Acreage Sum	% of Response Acres	Crop Rotation Nonorg Acreage Sum	% of Response Acres	Voluntary Trainings Acreage Sum	% of Response Acres
M20N04W	62	0%	0	0%	0	0%	0	0%	0	0%	62	100%
M21N01E	856	0%	0	0%	0	0%	0	0%	0	0%	856	100%
M21N01W	494	59%	352	71%	352	71%	267	54%	0	0%	432	87%
M21N02E	354	100%	0	0%	0	0%	354	100%	0	0%	354	100%
M21N02W	130	100%	130	100%	130	100%	130	100%	0	0%	106	81%
Sum	**346,039**	**63%**	**217,653**	**63%**	**259,092**	**75%**	**296,486**	**86%**	**50,159**	**14%**	**249,319**	**72%**

Table F-3. Farm Management Practices Regulatory Sum Total Acres - 2016 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Follow Label Restrictions Acreage Sum	% of Response Acres	Follow County Permit Cds Acreage Sum	% of Response Acres	Waterholding Requirements Acreage Sum	% of Response Acres	Monitor Wind Conditions Acreage Sum	% of Response Acres	Appropriate Buffer Zones Acreage Sum	% of Response Acres	Attend Trainings Acreage Sum	% of Response Acres	Use Low Drift Nozzles Acreage Sum	% of Response Acres
M08N01E	85	85	100%	85	100%	85	100%	85	100%	85	100%	85	100%	85	100%
M08N03E	4438	4438	100%	4438	100%	4438	100%	4438	100%	4438	100%	4438	100%	4438	100%
M09N01E	2511	2511	100%	2511	100%	2511	100%	2511	100%	2511	100%	2511	100%	2511	100%
M09N01W	2474	2474	100%	2474	100%	2474	100%	2474	100%	2474	100%	2474	100%	2474	100%
M09N02E	247	247	100%	247	100%	247	100%	247	100%	247	100%	247	100%	247	100%
M09N03E	3307	3307	100%	3307	100%	3307	100%	3307	100%	3307	100%	3307	100%	3307	100%
M10N03E	1273	1273	100%	1273	100%	1273	100%	1273	100%	1273	100%	1273	100%	1273	100%
M10N04E	9388	9388	100%	9388	100%	9388	100%	9388	100%	8999	96%	9388	100%	8999	96%
M11N01E	1108	1108	100%	1108	100%	1108	100%	1108	100%	1108	100%	1108	100%	680	61%
M11N02E	1645	1645	100%	1645	100%	1645	100%	1645	100%	1645	100%	1645	100%	1645	100%
M11N03E	3205	3205	100%	3205	100%	3205	100%	3205	100%	3205	100%	3205	100%	3149	98%
M11N04E	11289	10869	96%	10869	96%	10585	94%	10585	94%	10585	94%	10817	96%	10333	92%
M11N05E	2348	2348	100%	2348	100%	2348	100%	2348	100%	305	13%	2348	100%	305	13%
M12N01E	8176	8176	100%	8176	100%	8176	100%	8176	100%	8012	98%	8176	100%	6469	79%
M12N01W	464	464	100%	464	100%	464	100%	464	100%	464	100%	464	100%	464	100%
M12N02E	7055	7055	100%	7055	100%	7055	100%	7055	100%	6769	96%	7055	100%	6769	96%
M12N03E	7614	7614	100%	7614	100%	7614	100%	7614	100%	5982	79%	7614	100%	5982	79%
M12N04E	9661	9511	98%	9564	99%	8460	88%	8956	93%	8460	88%	8956	93%	8315	86%
M12N05E	6053	5681	94%	6053	100%	5280	87%	5681	94%	5280	87%	5681	94%	5280	87%
M12N06E	224	224	100%	224	100%	224	100%	224	100%	224	100%	224	100%	224	100%
M13N01E	8980	8980	100%	8980	100%	8980	100%	8980	100%	8980	100%	8980	100%	8980	100%
M13N01W	4285	4285	100%	4285	100%	4285	100%	4285	100%	4285	100%	4285	100%	3402	79%
M13N02E	9163	9163	100%	9163	100%	9163	100%	9163	100%	9163	100%	8931	97%	9163	100%
M13N03E	5310	5310	100%	5310	100%	5310	100%	5310	100%	3158	59%	5310	100%	3001	57%
M13N04E	5418	5221	96%	5221	96%	4920	91%	5335	98%	4920	91%	5304	98%	4920	91%
M13N05E	5960	5960	100%	5960	100%	5960	100%	5625	94%	5960	100%	5960	100%	5780	97%
M14N01E	2665	2485	93%	2485	93%	2404	90%	2485	93%	2404	90%	2404	90%	2342	88%
M14N01W	5287	5287	100%	5136	97%	5136	97%	5136	97%	5136	97%	5287	100%	4894	93%
M14N02E	9925	9925	100%	9925	100%	9777	99%	9777	99%	9777	99%	9777	99%	9471	95%
M14N02W	2483	2483	100%	2483	100%	2483	100%	2483	100%	2483	100%	2483	100%	2483	100%
M14N03E	164	164	100%	164	100%	164	100%	164	100%	164	100%	164	100%	164	100%
M14N04E	5296	5221	99%	5221	99%	5221	99%	5221	99%	5102	96%	5296	100%	5221	99%
M14N05E	2708	2708	100%	2708	100%	2708	100%	2708	100%	2708	100%	2708	100%	2708	100%
M14N06E	211	211	100%	211	100%	211	100%	211	100%	211	100%	211	100%	211	100%
M15N01E	2077	2077	100%	2077	100%	2077	100%	2077	100%	1434	69%	2077	100%	1122	54%
M15N01W	7226	7226	100%	7226	100%	7226	100%	7226	100%	7226	100%	7226	100%	7045	97%
M15N02E	4250	4250	100%	4250	100%	4250	100%	4195	99%	4250	100%	4250	100%	3978	94%
M15N02W	8832	8832	100%	8832	100%	8832	100%	8832	100%	8832	100%	8832	100%	8072	91%

Table F-3. Farm Management Practices Regulatory Sum Total Acres - 2016 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Follow Label Restrictions Acreage Sum	% of Response Acres	Follow County Permit Cds Acreage Sum	% of Response Acres	Waterholding Requirements Acreage Sum	% of Response Acres	Monitor Wind Conditions Acreage Sum	% of Response Acres	Appropriate Buffer Zones Acreage Sum	% of Response Acres	Attend Trainings Acreage Sum	% of Response Acres	Use Low Drift Nozzles Acreage Sum	% of Response Acres
M15N03E	557	557	100%	557	100%	557	100%	557	100%	557	100%	557	100%	557	100%
M15N03W	5871	5871	100%	5871	100%	5871	100%	5688	97%	5688	97%	5871	100%	5384	92%
M15N04E	4817	4817	100%	4817	100%	4817	100%	4817	100%	4343	90%	4817	100%	4817	100%
M15N04W	605	605	100%	605	100%	605	100%	383	63%	383	63%	605	100%	357	59%
M15N05E	241	241	100%	241	100%	241	100%	241	100%	241	100%	241	100%	241	100%
M16N01E	105	105	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
M16N01W	3571	3571	100%	3571	100%	3571	100%	3571	100%	3571	100%	3571	100%	3571	100%
M16N02E	4034	4034	100%	3623	90%	3623	90%	3623	90%	3623	90%	3623	90%	3550	88%
M16N02W	11504	11504	100%	11504	100%	11504	100%	11504	100%	11504	100%	11504	100%	11504	100%
M16N03E	691	691	100%	691	100%	691	100%	691	100%	691	100%	691	100%	691	100%
M16N03W	12657	12657	100%	12657	100%	12591	99%	11410	90%	11333	90%	12591	99%	10925	86%
M16N04E	12923	12923	100%	12923	100%	12923	100%	12923	100%	12923	100%	12923	100%	12923	100%
M16N04W	2496	2496	100%	2496	100%	2496	100%	2496	100%	2496	100%	2496	100%	2302	92%
M16N05E	735	735	100%	735	100%	735	100%	735	100%	735	100%	735	100%	735	100%
M17N01E	3254	3254	100%	2944	90%	2944	90%	2944	90%	2944	90%	2944	90%	2360	73%
M17N01W	7913	7913	100%	7913	100%	7913	100%	7913	100%	7913	100%	7913	100%	7913	100%
M17N02E	6016	6016	100%	5764	96%	5764	96%	5764	96%	5764	96%	5764	96%	4078	68%
M17N02W	7639	7639	100%	7639	100%	7639	100%	6873	90%	6873	90%	7639	100%	6873	90%
M17N03E	612	612	100%	612	100%	612	100%	612	100%	612	100%	612	100%	592	97%
M17N03W	11727	11526	98%	11727	100%	11526	98%	11396	97%	11396	97%	11526	98%	10667	91%
M17N04E	3986	3986	100%	3986	100%	3986	100%	3986	100%	3986	100%	3986	100%	3986	100%
M17N04W	356	356	100%	356	100%	356	100%	356	100%	356	100%	356	100%	356	100%
M18N01E	10881	10881	100%	10881	100%	10881	100%	10881	100%	10806	99%	10806	99%	10697	98%
M18N01W	3439	3439	100%	3439	100%	3439	100%	3439	100%	3439	100%	3439	100%	3439	100%
M18N02E	13607	13575	100%	13607	100%	13575	100%	13445	99%	13515	99%	13575	100%	13364	98%
M18N02W	12105	12091	100%	12105	100%	12031	99%	11928	99%	11991	99%	12105	100%	11502	95%
M18N03E	2249	2249	100%	2167	96%	2167	96%	2167	96%	2167	96%	1915	85%	2167	96%
M18N03W	7125	7125	100%	7125	100%	7125	100%	7125	100%	7125	100%	7125	100%	6977	98%
M18N04E	46	46	100%	46	100%	46	100%	46	100%	46	100%	46	100%	46	100%
M18N04W	273	273	100%	273	100%	273	100%	273	100%	273	100%	273	100%	273	100%
M19N01E	14172	14172	100%	14172	100%	14022	99%	13563	96%	13727	97%	13727	97%	13270	94%
M19N01W	4355	4355	100%	4355	100%	4131	95%	4131	95%	4131	95%	4131	95%	4131	95%
M19N02E	17979	17979	100%	17979	100%	16296	91%	16296	91%	16007	89%	16007	89%	15988	89%
M19N02W	15670	15670	100%	15670	100%	15439	99%	15427	98%	15439	99%	15670	100%	14380	92%
M19N03E	667	667	100%	667	100%	667	100%	667	100%	667	100%	667	100%	667	100%
M19N03W	11351	11351	100%	11351	100%	11351	100%	11351	100%	11251	99%	11351	100%	10157	89%
M19N04W	218	218	100%	218	100%	218	100%	218	100%	218	100%	218	100%	218	100%
M20N01E	6463	6463	100%	6463	100%	6463	100%	6397	99%	6397	99%	6397	99%	6033	93%

Table F-3. Farm Management Practices Regulatory Sum Total Acres - 2016 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Follow Label Restrictions Acreage Sum	% of Response Acres	Follow County Permit Cds Acreage Sum	% of Response Acres	Waterholding Requirements Acreage Sum	% of Response Acres	Monitor Wind Conditions Acreage Sum	% of Response Acres	Appropriate Buffer Zones Acreage Sum	% of Response Acres	Attend Trainings Acreage Sum	% of Response Acres	Use Low Drift Nozzles Acreage Sum	% of Response Acres
M20N01W	940	940	100%	940	100%	940	100%	940	100%	722	77%	940	100%	722	77%
M20N02E	11148	11148	100%	11148	100%	10192	91%	10192	91%	10192	91%	10192	91%	9276	83%
M20N02W	13721	13721	100%	13647	99%	13721	100%	13721	100%	13389	98%	13626	99%	13126	96%
M20N03E	2109	2109	100%	2109	100%	2109	100%	2109	100%	2109	100%	2109	100%	2109	100%
M20N03W	1676	1676	100%	1676	100%	1676	100%	1676	100%	1676	100%	1676	100%	1472	88%
M20N04W	174	174	100%	174	100%	174	100%	174	100%	174	100%	174	100%	174	100%
M21N01E	600	600	100%	600	100%	600	100%	600	100%	600	100%	600	100%	600	100%
M21N01W	704	704	100%	704	100%	704	100%	704	100%	704	100%	704	100%	704	100%
M21N02E	890	890	100%	890	100%	890	100%	890	100%	890	100%	890	100%	635	71%
M21N02W	672	672	100%	672	100%	672	100%	672	100%	672	100%	672	100%	672	100%
Sum	**428,349**	**426,708**	**100%**	**425,995**	**99%**	**419,761**	**98%**	**417,512**	**97%**	**407,825**	**95%**	**420,501**	**98%**	**393,087**	**92%**

Table F-3. Farm Management Practices Regulatory Sum Total Acres - 2016 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Use PCA Recommendations Acreage Sum	% of Response Acres	End of Row Shutoff Acreage Sum	% of Response Acres	Avoid Surface Water Acreage Sum	% of Response Acres	Compliance With PPE Acreage Sum	% of Response Acres	Use Drift Control Agents Acreage Sum	% of Response Acres	Provide Employee Safety Training Acreage Sum	% of Response Acres
M08N01E	85	85	100%	85	100%	85	100%	85	100%	85	100%	85	100%
M08N03E	4438	4438	100%	4438	100%	4438	100%	4438	100%	4245	96%	4336	98%
M09N01E	2511	2511	100%	2511	100%	2061	82%	2511	100%	2511	100%	2061	82%
M09N01W	2474	2474	100%	2474	100%	2474	100%	2474	100%	2474	100%	2474	100%
M09N02E	247	247	100%	247	100%	247	100%	247	100%	247	100%	119	48%
M09N03E	3307	3307	100%	3307	100%	3005	91%	3005	91%	3307	100%	2745	83%
M10N03E	1273	1273	100%	1273	100%	1273	100%	1273	100%	1273	100%	1107	87%
M10N04E	9388	9388	100%	6841	73%	8750	93%	9388	100%	8999	96%	9355	100%
M11N01E	1108	1108	100%	680	61%	680	61%	680	61%	1108	100%	1108	100%
M11N02E	1645	1645	100%	1645	100%	1645	100%	1645	100%	1645	100%	1489	91%
M11N03E	3205	3205	100%	3071	96%	3009	94%	3205	100%	3106	97%	3205	100%
M11N04E	11289	10654	94%	10244	91%	10366	92%	10585	94%	10574	94%	10977	97%
M11N05E	2348	2348	100%	305	13%	305	13%	2348	100%	305	13%	2348	100%
M12N01E	8176	8176	100%	7190	88%	7000	86%	7160	88%	7826	96%	7681	94%
M12N01W	464	464	100%	464	100%	464	100%	464	100%	464	100%	464	100%
M12N02E	7055	6916	98%	6769	96%	6344	90%	7055	100%	6629	94%	7055	100%
M12N03E	7614	7614	100%	7108	93%	7458	98%	7024	92%	5982	79%	7614	100%
M12N04E	9661	9053	94%	8079	84%	7319	76%	8546	88%	7590	79%	9006	93%
M12N05E	6053	5681	94%	4878	81%	4878	81%	5411	89%	5280	87%	5411	89%
M12N06E	224	224	100%	224	100%	224	100%	224	100%	224	100%	224	100%
M13N01E	8980	8853	99%	8833	98%	7540	84%	7510	84%	8697	97%	8824	98%
M13N01W	4285	4285	100%	2637	62%	3481	81%	4152	97%	3681	86%	4285	100%
M13N02E	9163	8059	88%	9163	100%	7951	87%	8823	96%	7545	82%	8591	94%
M13N03E	5310	5310	100%	5310	100%	4971	94%	5214	98%	3001	57%	4952	93%
M13N04E	5418	5221	96%	4760	88%	4108	76%	4920	91%	2782	51%	5117	94%
M13N05E	5960	5960	100%	4265	72%	1904	32%	5680	95%	2933	49%	4636	78%
M14N01E	2665	2404	90%	2342	88%	2263	85%	2263	85%	2217	83%	2549	96%
M14N01W	5287	5287	100%	3835	73%	3149	60%	3290	62%	5136	97%	4828	91%
M14N02E	9925	9777	99%	9471	95%	9471	95%	9319	94%	9194	93%	8778	88%
M14N02W	2483	2483	100%	1920	77%	1879	76%	2243	90%	2483	100%	2255	91%
M14N03E	164	164	100%	164	100%	164	100%	164	100%	164	100%	164	100%
M14N04E	5296	5221	99%	5221	99%	5055	95%	5221	99%	3152	60%	5178	98%
M14N05E	2708	2708	100%	2708	100%	2708	100%	2708	100%	2178	80%	2708	100%
M14N06E	211	211	100%	211	100%	211	100%	211	100%	0	0%	211	100%
M15N01E	2077	1765	85%	1122	54%	1122	54%	1765	85%	1122	54%	1765	85%
M15N01W	7226	7226	100%	6722	93%	5999	83%	6932	96%	7226	100%	6844	95%
M15N02E	4250	4250	100%	3978	94%	3978	94%	3978	94%	4065	96%	3764	89%
M15N02W	8832	8832	100%	7330	83%	8209	93%	8363	95%	8339	94%	8755	99%

Table F-3. Farm Management Practices Regulatory Sum Total Acres - 2016 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Use PCA Recommendations Acreage Sum	% of Response Acres	End of Row Shutoff Acreage Sum	% of Response Acres	Avoid Surface Water Acreage Sum	% of Response Acres	Compliance With PPE Acreage Sum	% of Response Acres	Use Drift Control Agents Acreage Sum	% of Response Acres	Provide Employee Safety Training Acreage Sum	% of Response Acres
M15N03E	557	557	100%	557	100%	557	100%	557	100%	557	100%	557	100%
M15N03W	5871	5871	100%	5264	90%	4801	82%	5416	92%	5384	92%	5746	98%
M15N04E	4817	4817	100%	4802	100%	4328	90%	4817	100%	4817	100%	4649	97%
M15N04W	605	605	100%	357	59%	48	8%	579	96%	357	59%	532	88%
M15N05E	241	241	100%	241	100%	241	100%	241	100%	241	100%	241	100%
M16N01E	105	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
M16N01W	3571	3571	100%	3571	100%	3571	100%	3571	100%	3571	100%	3571	100%
M16N02E	4034	3623	90%	2632	65%	2632	65%	2632	65%	3623	90%	3526	87%
M16N02W	11504	11504	100%	11136	97%	9599	83%	11504	100%	11504	100%	11344	99%
M16N03E	691	691	100%	691	100%	691	100%	691	100%	691	100%	691	100%
M16N03W	12657	12580	99%	10925	86%	10250	81%	12464	98%	11009	87%	11671	92%
M16N04E	12923	12923	100%	11324	88%	11324	88%	12923	100%	12656	98%	12819	99%
M16N04W	2496	2496	100%	2364	95%	1992	80%	2081	83%	2364	95%	2302	92%
M16N05E	735	735	100%	735	100%	735	100%	735	100%	735	100%	735	100%
M17N01E	3254	2944	90%	2168	67%	2243	69%	2944	90%	2944	90%	2683	82%
M17N01W	7913	7913	100%	7190	91%	7190	91%	7913	100%	7771	98%	7786	98%
M17N02E	6016	5764	96%	4760	79%	4760	79%	5123	85%	5123	85%	5764	96%
M17N02W	7639	7639	100%	6873	90%	4680	61%	6873	90%	6725	88%	7263	95%
M17N03E	612	592	97%	592	97%	592	97%	612	100%	592	97%	331	54%
M17N03W	11727	11526	98%	10445	89%	8760	75%	10212	87%	11139	95%	11224	96%
M17N04E	3986	3986	100%	3986	100%	3986	100%	3986	100%	3986	100%	3986	100%
M17N04W	356	356	100%	356	100%	356	100%	356	100%	356	100%	356	100%
M18N01E	10881	10881	100%	7764	71%	7617	70%	10806	99%	10153	93%	9075	83%
M18N01W	3439	3439	100%	2549	74%	2549	74%	3439	100%	3276	95%	3395	99%
M18N02E	13607	13575	100%	11780	87%	10851	80%	13425	99%	12856	94%	12420	91%
M18N02W	12105	12105	100%	9426	78%	9605	79%	11765	97%	11968	99%	10948	90%
M18N03E	2249	2167	96%	2029	90%	2029	90%	2131	95%	2089	93%	1915	85%
M18N03W	7125	7125	100%	5944	83%	5944	83%	6977	98%	7125	100%	6361	89%
M18N04E	46	46	100%	46	100%	46	100%	0	0%	0	0%	46	100%
M18N04W	273	273	100%	273	100%	273	100%	273	100%	273	100%	273	100%
M19N01E	14172	14022	99%	9229	65%	9993	71%	13727	97%	13727	97%	13054	92%
M19N01W	4355	4131	95%	3703	85%	3703	85%	4131	95%	3703	85%	4131	95%
M19N02E	17979	17366	97%	13008	72%	11599	65%	17144	95%	14392	80%	17201	96%
M19N02W	15670	14029	90%	12694	81%	12337	79%	14161	90%	15318	98%	14100	90%
M19N03E	667	667	100%	667	100%	667	100%	667	100%	667	100%	667	100%
M19N03W	11351	10952	96%	10014	88%	9497	84%	10687	94%	10700	94%	8741	77%
M19N04W	218	218	100%	218	100%	218	100%	218	100%	218	100%	144	66%
M20N01E	6463	6397	99%	4933	76%	5092	79%	6397	99%	6192	96%	6252	97%

Table F-3. Farm Management Practices Regulatory Sum Total Acres - 2016 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Use PCA Recommendations Acreage Sum	% of Response Acres	End of Row Shutoff Acreage Sum	% of Response Acres	Avoid Surface Water Acreage Sum	% of Response Acres	Compliance With PPE Acreage Sum	% of Response Acres	Use Drift Control Agents Acreage Sum	% of Response Acres	Provide Employee Safety Training Acreage Sum	% of Response Acres
M20N01W	940	940	100%	707	75%	925	98%	722	77%	940	100%	797	85%
M20N02E	11148	10648	96%	6131	55%	5487	49%	8876	80%	10067	90%	10838	97%
M20N02W	13721	13338	97%	12866	94%	12227	89%	13146	96%	13439	98%	11474	84%
M20N03E	2109	2109	100%	0	0%	0	0%	2109	100%	2109	100%	2109	100%
M20N03W	1676	1592	95%	1676	100%	1676	100%	1472	88%	1676	100%	1591	95%
M20N04W	174	174	100%	174	100%	174	100%	174	100%	174	100%	174	100%
M21N01E	600	600	100%	600	100%	600	100%	600	100%	178	30%	600	100%
M21N01W	704	704	100%	704	100%	704	100%	704	100%	704	100%	704	100%
M21N02E	890	890	100%	890	100%	635	71%	255	29%	635	71%	890	100%
M21N02W	672	672	100%	672	100%	672	100%	672	100%	672	100%	672	100%
Sum	**428,349**	**418,821**	**98%**	**361,491**	**84%**	**344,644**	**80%**	**401,432**	**94%**	**387,185**	**90%**	**399,417**	**93%**

Table F-4. Farm Management Practices Voluntary Sum Total Acres - 2016 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Land Lev Prec Tech Acreage Sum	% of Response Acres	Utilize Tailwater Return Acreage Sum	% of Response Acres	Utilize Peripheral Drains Acreage Sum	% of Response Acres	Monitor Rain Forecasts Acreage Sum	% of Response Acres	Crop Rotation Org Acreage Sum	% of Response Acres	Cover Cropping Org Acreage Sum	% of Response Acres	Strip Cropping Org Acreage Sum	% of Response Acres
M08N01E	85	85	100%	0	0%	85	100%	85	100%	85	100%	85	100%	0	0%
M08N03E	4438	4438	100%	4346	98%	3512	79%	4438	100%	2269	51%	2269	51%	2269	51%
M09N01E	2511	2511	100%	1737	69%	1266	50%	2511	100%	0	0%	0	0%	0	0%
M09N01W	2474	2474	100%	69	3%	910	37%	2153	87%	0	0%	0	0%	0	0%
M09N02E	247	128	52%	128	52%	128	52%	247	100%	119	48%	119	48%	119	48%
M09N03E	3307	1923	58%	1923	58%	1923	58%	3005	91%	1923	58%	1923	58%	1923	58%
M10N03E	1273	1273	100%	1065	84%	243	19%	1273	100%	243	19%	243	19%	243	19%
M10N04E	9388	9388	100%	7164	76%	4851	52%	8922	95%	607	6%	607	6%	1987	21%
M11N01E	1108	1108	100%	527	48%	955	86%	680	61%	0	0%	0	0%	0	0%
M11N02E	1645	1564	95%	1408	86%	942	57%	1645	100%	158	10%	0	0%	0	0%
M11N03E	3205	3205	100%	1744	54%	2578	80%	3149	98%	353	11%	353	11%	195	6%
M11N04E	11289	11200	99%	7734	69%	6953	62%	9288	82%	2031	18%	2031	18%	181	2%
M11N05E	2348	2348	100%	50	2%	2043	87%	0	0%	305	13%	305	13%	0	0%
M12N01E	8176	7791	95%	5291	65%	6922	85%	7224	88%	160	2%	366	4%	0	0%
M12N01W	464	464	100%	464	100%	0	0%	464	100%	0	0%	0	0%	0	0%
M12N02E	7055	7055	100%	4747	67%	4527	64%	6620	94%	0	0%	0	0%	0	0%
M12N03E	7614	7614	100%	2708	36%	2778	36%	5897	77%	97	1%	27	0%	0	0%
M12N04E	9661	9564	99%	5113	53%	5628	58%	8811	91%	1548	16%	1645	17%	148	2%
M12N05E	6053	5681	94%	1670	28%	1602	26%	3498	58%	3187	53%	2815	47%	231	4%
M12N06E	224	224	100%	111	50%	111	50%	224	100%	0	0%	0	0%	0	0%
M13N01E	8980	8739	97%	3188	36%	4787	53%	7478	83%	0	0%	445	5%	0	0%
M13N01W	4285	4098	96%	2101	49%	3734	87%	3587	84%	0	0%	604	14%	0	0%
M13N02E	9163	8823	96%	4721	52%	6215	68%	8875	97%	0	0%	0	0%	0	0%
M13N03E	5310	5214	98%	1632	31%	1258	24%	4741	89%	0	0%	0	0%	0	0%
M13N04E	5418	5417	100%	2276	42%	2395	44%	4929	91%	1379	25%	1379	25%	61	1%
M13N05E	5960	5960	100%	2462	41%	1069	18%	3271	55%	324	5%	0	0%	0	0%
M14N01E	2665	2584	97%	1155	43%	1302	49%	2263	85%	657	25%	657	25%	0	0%
M14N01W	5287	5287	100%	2771	52%	3347	63%	3817	72%	50	1%	50	1%	88	2%
M14N02E	9925	9777	99%	2021	20%	3863	39%	8347	84%	140	1%	140	1%	0	0%
M14N02W	2483	2483	100%	1093	44%	1885	76%	1985	80%	258	10%	258	10%	729	29%
M14N03E	164	164	100%	0	0%	0	0%	164	100%	0	0%	0	0%	0	0%
M14N04E	5296	5030	95%	2761	52%	1147	22%	4191	79%	378	7%	378	7%	378	7%
M14N05E	2708	2708	100%	1409	52%	1690	62%	2569	95%	215	8%	215	8%	215	8%
M14N06E	211	211	100%	211	100%	0	0%	0	0%	0	0%	0	0%	0	0%
M15N01E	2077	1702	82%	530	26%	738	36%	1557	75%	248	12%	248	12%	0	0%
M15N01W	7226	6928	96%	4886	68%	3083	43%	6504	90%	238	3%	238	3%	238	3%
M15N02E	4250	4048	95%	2425	57%	3213	76%	4033	95%	493	12%	493	12%	0	0%
M15N02W	8832	8544	97%	2034	23%	5219	59%	8044	91%	132	1%	132	1%	1205	14%
M15N03E	557	557	100%	310	56%	310	56%	490	88%	0	0%	0	0%	0	0%

Table F-4. Farm Management Practices Voluntary Sum Total Acres - 2016 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Land Lev Prec Tech Acreage Sum	% of Response Acres	Utilize Tailwater Return Acreage Sum	% of Response Acres	Utilize Peripheral Drains Acreage Sum	% of Response Acres	Monitor Rain Forecasts Acreage Sum	% of Response Acres	Crop Rotation Org Acreage Sum	% of Response Acres	Cover Cropping Org Acreage Sum	% of Response Acres	Strip Cropping Org Acreage Sum	% of Response Acres
M15N03W	5871	5871	100%	604	10%	1719	29%	4147	71%	0	0%	0	0%	0	0%
M15N04E	4817	4817	100%	3439	71%	3508	73%	4772	99%	0	0%	0	0%	0	0%
M15N04W	605	579	96%	209	35%	0	0%	357	59%	0	0%	0	0%	0	0%
M15N05E	241	241	100%	241	100%	241	100%	241	100%	0	0%	0	0%	0	0%
M16N01E	105	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
M16N01W	3571	3571	100%	3194	89%	3425	96%	3571	100%	0	0%	0	0%	144	4%
M16N02E	4034	3623	90%	1917	48%	2048	51%	2632	65%	440	11%	0	0%	0	0%
M16N02W	11504	11187	97%	6347	55%	9400	82%	10036	87%	0	0%	0	0%	206	2%
M16N03E	691	691	100%	588	85%	691	100%	691	100%	0	0%	0	0%	0	0%
M16N03W	12657	12464	98%	4793	38%	7569	60%	11061	87%	452	4%	419	3%	419	3%
M16N04E	12923	12923	100%	7409	57%	9580	74%	11825	92%	0	0%	0	0%	0	0%
M16N04W	2496	2302	92%	1621	65%	1760	71%	2133	85%	0	0%	0	0%	0	0%
M16N05E	735	735	100%	0	0%	45	6%	45	6%	0	0%	0	0%	0	0%
M17N01E	3254	2944	90%	2066	63%	1907	59%	2944	90%	0	0%	0	0%	0	0%
M17N01W	7913	7738	98%	3795	48%	5620	71%	7913	100%	626	8%	626	8%	0	0%
M17N02E	6016	5718	95%	2457	41%	2853	47%	5110	85%	365	6%	0	0%	0	0%
M17N02W	7639	7639	100%	3850	50%	6576	86%	6453	84%	454	6%	420	5%	0	0%
M17N03E	612	612	100%	0	0%	0	0%	612	100%	20	3%	20	3%	0	0%
M17N03W	11727	11727	100%	3755	32%	9109	78%	9990	85%	1120	10%	0	0%	0	0%
M17N04E	3986	3986	100%	2887	72%	2673	67%	3351	84%	0	0%	0	0%	0	0%
M17N04W	356	356	100%	326	92%	356	100%	356	100%	0	0%	0	0%	0	0%
M18N01E	10881	10881	100%	6885	63%	5010	46%	9539	88%	0	0%	0	0%	0	0%
M18N01W	3439	3439	100%	2299	67%	2999	87%	3439	100%	0	0%	0	0%	0	0%
M18N02E	13607	13607	100%	2959	22%	5667	42%	10855	80%	182	1%	150	1%	0	0%
M18N02W	12105	11274	93%	6957	57%	7551	62%	10920	90%	33	0%	0	0%	0	0%
M18N03E	2249	2167	96%	1398	62%	528	23%	1383	61%	0	0%	0	0%	0	0%
M18N03W	7125	7039	99%	1894	27%	2569	36%	4218	59%	863	12%	863	12%	863	12%
M18N04E	46	46	100%	46	100%	0	0%	46	100%	0	0%	0	0%	0	0%
M18N04W	273	273	100%	47	17%	102	37%	273	100%	0	0%	0	0%	0	0%
M19N01E	14172	14078	99%	6708	47%	10560	75%	12968	92%	0	0%	150	1%	0	0%
M19N01W	4355	4131	95%	2518	58%	3985	92%	3996	92%	0	0%	11	0%	0	0%
M19N02E	17979	17810	99%	5265	29%	11545	64%	15397	86%	229	1%	1912	11%	0	0%
M19N02W	15670	14229	91%	3691	24%	6710	43%	12348	79%	0	0%	0	0%	0	0%
M19N03E	667	667	100%	667	100%	667	100%	667	100%	0	0%	0	0%	0	0%
M19N03W	11351	10705	94%	2788	25%	5882	52%	9785	86%	149	1%	49	0%	49	0%
M19N04W	218	218	100%	144	66%	218	100%	218	100%	144	66%	0	0%	0	0%
M20N01E	6463	6463	100%	2411	37%	4877	75%	5960	92%	0	0%	0	0%	0	0%
M20N01W	940	940	100%	99	11%	241	26%	940	100%	0	0%	0	0%	0	0%
M20N02E	11148	10507	94%	8306	75%	9321	84%	8905	80%	0	0%	956	9%	0	0%

Table F-4. Farm Management Practices Voluntary Sum Total Acres - 2016 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Land Lev Prec Tech Acreage Sum	% of Response Acres	Utilize Tailwater Return Acreage Sum	% of Response Acres	Utilize Peripheral Drains Acreage Sum	% of Response Acres	Monitor Rain Forecasts Acreage Sum	% of Response Acres	Crop Rotation Org Acreage Sum	% of Response Acres	Cover Cropping Org Acreage Sum	% of Response Acres	Strip Cropping Org Acreage Sum	% of Response Acres
M20N02W	13721	12974	95%	4272	31%	5140	37%	13233	96%	0	0%	505	4%	0	0%
M20N03E	2109	2109	100%	2109	100%	2109	100%	2109	100%	0	0%	0	0%	0	0%
M20N03W	1676	1629	97%	1371	82%	1034	62%	694	41%	0	0%	0	0%	0	0%
M20N04W	174	174	100%	0	0%	116	67%	174	100%	0	0%	0	0%	0	0%
M21N01E	600	600	100%	422	70%	0	0%	600	100%	0	0%	0	0%	0	0%
M21N01W	704	581	83%	393	56%	351	50%	657	93%	88	13%	88	13%	0	0%
M21N02E	890	890	100%	890	100%	635	71%	890	100%	0	0%	0	0%	0	0%
M21N02W	672	656	98%	467	69%	96	14%	672	100%	0	0%	0	0%	0	0%
Sum	**428,349**	**416,123**	**97%**	**200,489**	**47%**	**250,205**	**58%**	**366,105**	**85%**	**22,762**	**5%**	**24,194**	**6%**	**11,891**	**3%**

Table F-4. Farm Management Practices Voluntary Sum Total Acres - 2016 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Compacting Levees Acreage Sum	% of Response Acres	Water Release Pre Field Prep Acreage Sum	% of Response Acres	Water Release Pre Harvest Acreage Sum	% of Response Acres	Slow Release Acreage Sum	% of Response Acres	Crop Rotation Nonorg Acreage Sum	% of Response Acres	Voluntary Trainings Acreage Sum	% of Response Acres
M08N01E	85	85	100%	0	0%	85	100%	85	100%	0	0%	85	100%
M08N03E	4438	4438	100%	4346	98%	4346	98%	4346	98%	2269	51%	4346	98%
M09N01E	2511	2462	98%	1413	56%	1413	56%	2266	90%	0	0%	2061	82%
M09N01W	2474	2474	100%	2201	89%	2201	89%	2201	89%	0	0%	2474	100%
M09N02E	247	128	52%	128	52%	128	52%	128	52%	0	0%	128	52%
M09N03E	3307	2836	86%	2534	77%	2761	83%	2836	86%	1923	58%	2534	77%
M10N03E	1273	1025	81%	1273	100%	1273	100%	1273	100%	243	19%	1273	100%
M10N04E	9388	6853	73%	6142	65%	6320	67%	8544	91%	1987	21%	8653	92%
M11N01E	1108	1108	100%	1108	100%	1108	100%	1108	100%	0	0%	1108	100%
M11N02E	1645	1564	95%	1489	91%	1489	91%	1645	100%	861	52%	1564	95%
M11N03E	3205	3063	96%	2931	91%	1997	62%	2969	93%	1519	47%	3145	98%
M11N04E	11289	8932	79%	9744	86%	8616	76%	9976	88%	3318	29%	10454	93%
M11N05E	2348	2043	87%	0	0%	2348	100%	305	13%	0	0%	305	13%
M12N01E	8176	6374	78%	7150	87%	7271	89%	8176	100%	3236	40%	7215	88%
M12N01W	464	464	100%	464	100%	464	100%	464	100%	0	0%	464	100%
M12N02E	7055	6405	91%	5380	76%	5859	83%	6769	96%	4719	67%	6916	98%
M12N03E	7614	4153	55%	4958	65%	5114	67%	5521	73%	2155	28%	5548	73%
M12N04E	9661	7672	79%	8811	91%	8300	86%	8584	89%	445	5%	8326	86%
M12N05E	6053	3208	53%	3096	51%	5681	94%	5217	86%	231	4%	5009	83%
M12N06E	224	111	50%	111	50%	111	50%	224	100%	0	0%	224	100%
M13N01E	8980	7426	83%	5840	65%	7452	83%	8741	97%	2713	30%	7624	85%
M13N01W	4285	3839	90%	3269	76%	3402	79%	4031	94%	480	11%	3735	87%
M13N02E	9163	8500	93%	5592	61%	5592	61%	8751	96%	1435	16%	7667	84%
M13N03E	5310	2467	46%	4328	82%	4328	82%	4731	89%	542	10%	2527	48%
M13N04E	5418	3351	62%	3648	67%	3693	68%	5130	95%	515	10%	4958	92%
M13N05E	5960	4701	79%	3936	66%	3227	54%	5120	86%	0	0%	4265	72%
M14N01E	2665	1964	74%	880	33%	1356	51%	2342	88%	863	32%	2083	78%
M14N01W	5287	3168	60%	2356	45%	4126	78%	4987	94%	392	7%	3632	69%
M14N02E	9925	6615	67%	6901	70%	7611	77%	7893	80%	1940	20%	7298	74%
M14N02W	2483	2048	82%	2243	90%	2483	100%	2483	100%	0	0%	1684	68%
M14N03E	164	164	100%	0	0%	0	0%	164	100%	0	0%	0	0%
M14N04E	5296	2043	39%	2999	57%	2303	43%	4320	82%	378	7%	4832	91%
M14N05E	2708	1409	52%	1456	54%	1456	54%	2081	77%	360	13%	2708	100%
M14N06E	211	211	100%	0	0%	0	0%	211	100%	0	0%	211	100%
M15N01E	2077	590	28%	814	39%	1062	51%	1705	82%	1221	59%	1399	67%
M15N01W	7226	4817	67%	6191	86%	5820	81%	6987	97%	0	0%	4720	65%
M15N02E	4250	2308	54%	3127	74%	3607	85%	3818	90%	315	7%	3904	92%
M15N02W	8832	6734	76%	7419	84%	8613	98%	8613	98%	426	5%	7012	79%
M15N03E	557	247	44%	0	0%	119	21%	247	44%	0	0%	0	0%

Table F-4. Farm Management Practices Voluntary Sum Total Acres - 2016 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Compacting Levees Acreage Sum	% of Response Acres	Water Release Pre Field Prep Acreage Sum	% of Response Acres	Water Release Pre Harvest Acreage Sum	% of Response Acres	Slow Release Acreage Sum	% of Response Acres	Crop Rotation Nonorg Acreage Sum	% of Response Acres	Voluntary Trainings Acreage Sum	% of Response Acres
M15N03W	5871	2669	45%	3843	65%	4466	76%	4956	84%	388	7%	4258	73%
M15N04E	4817	2332	48%	3900	81%	3916	81%	3916	81%	0	0%	4389	91%
M15N04W	605	558	92%	383	63%	605	100%	605	100%	0	0%	579	96%
M15N05E	241	241	100%	0	0%	241	100%	241	100%	0	0%	241	100%
M16N01E	105	0	0%	0	0%	0	0%	0	0%	0	0%	105	100%
M16N01W	3571	1198	34%	3048	85%	3048	85%	3425	96%	1275	36%	2625	74%
M16N02E	4034	2565	64%	2123	53%	2123	53%	2524	63%	1064	26%	2723	68%
M16N02W	11504	4392	38%	10054	87%	10306	90%	10590	92%	562	5%	5602	49%
M16N03E	691	637	92%	447	65%	637	92%	637	92%	0	0%	637	92%
M16N03W	12657	7946	63%	9441	75%	12275	97%	12544	99%	1869	15%	9026	71%
M16N04E	12923	9193	71%	11526	89%	11588	90%	12074	93%	0	0%	12593	97%
M16N04W	2496	2160	87%	2161	87%	2180	87%	2496	100%	221	9%	2176	87%
M16N05E	735	45	6%	635	86%	690	94%	735	100%	0	0%	690	94%
M17N01E	3254	2372	73%	2136	66%	2463	76%	2463	76%	584	18%	2435	75%
M17N01W	7913	6506	82%	6958	88%	7238	91%	7824	99%	0	0%	5782	73%
M17N02E	6016	3651	61%	4381	73%	4589	76%	5764	96%	1876	31%	3858	64%
M17N02W	7639	4701	62%	6141	80%	6840	90%	6873	90%	0	0%	3627	47%
M17N03E	612	612	100%	311	51%	311	51%	612	100%	0	0%	311	51%
M17N03W	11727	8603	73%	8543	73%	9663	82%	11396	97%	0	0%	8079	69%
M17N04E	3986	3017	76%	3308	83%	3308	83%	3589	90%	0	0%	3986	100%
M17N04W	356	326	92%	326	92%	254	71%	356	100%	0	0%	102	29%
M18N01E	10881	9696	89%	5982	55%	9906	91%	10698	98%	72	1%	6659	61%
M18N01W	3439	2892	84%	3128	91%	3439	100%	3439	100%	0	0%	2549	74%
M18N02E	13607	9723	71%	7395	54%	9633	71%	12628	93%	0	0%	6562	48%
M18N02W	12105	8061	67%	8465	70%	10185	84%	10894	90%	252	2%	5192	43%
M18N03E	2249	1341	60%	954	42%	1205	54%	1879	84%	0	0%	1720	76%
M18N03W	7125	4873	68%	3642	51%	5895	83%	7125	100%	1182	17%	4797	67%
M18N04E	46	46	100%	0	0%	0	0%	0	0%	0	0%	0	0%
M18N04W	273	217	79%	217	79%	273	100%	273	100%	0	0%	47	17%
M19N01E	14172	11092	78%	8595	61%	11032	78%	13928	98%	0	0%	8108	57%
M19N01W	4355	3129	72%	2969	68%	3996	92%	4131	95%	0	0%	2847	65%
M19N02E	17979	14423	80%	11192	62%	10926	61%	16286	91%	143	1%	9368	52%
M19N02W	15670	9945	63%	10713	68%	11450	73%	13646	87%	138	1%	9458	60%
M19N03E	667	667	100%	667	100%	667	100%	667	100%	0	0%	667	100%
M19N03W	11351	5771	51%	5299	47%	7220	64%	9655	85%	646	6%	6093	54%
M19N04W	218	218	100%	218	100%	218	100%	218	100%	144	66%	144	66%
M20N01E	6463	3800	59%	3999	62%	3388	52%	6121	95%	0	0%	4721	73%
M20N01W	940	626	67%	534	57%	940	100%	940	100%	0	0%	865	92%
M20N02E	11148	7323	66%	5989	54%	8071	72%	8120	73%	0	0%	3746	34%

Table F-4. Farm Management Practices Voluntary Sum Total Acres - 2016 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Compacting Levees Acreage Sum	% of Response Acres	Water Release Pre Field Prep Acreage Sum	% of Response Acres	Water Release Pre Harvest Acreage Sum	% of Response Acres	Slow Release Acreage Sum	% of Response Acres	Crop Rotation Nonorg Acreage Sum	% of Response Acres	Voluntary Trainings Acreage Sum	% of Response Acres
M20N02W	13721	10451	76%	9331	68%	10922	80%	13649	99%	252	2%	9821	72%
M20N03E	2109	2109	100%	2109	100%	2109	100%	2109	100%	0	0%	0	0%
M20N03W	1676	1400	84%	557	33%	809	48%	898	54%	0	0%	799	48%
M20N04W	174	58	33%	58	33%	174	100%	174	100%	0	0%	116	67%
M21N01E	600	422	70%	0	0%	0	0%	422	70%	0	0%	422	70%
M21N01W	704	474	67%	351	50%	351	50%	562	80%	0	0%	351	50%
M21N02E	890	0	0%	0	0%	635	71%	255	29%	0	0%	255	29%
M21N02W	672	266	40%	131	19%	285	42%	672	100%	0	0%	467	69%
Sum	**428,349**	**300,747**	**70%**	**296,438**	**69%**	**333,605**	**78%**	**388,001**	**91%**	**45,154**	**11%**	**301,689**	**70%**

Table F-5. Farm Management Practices Regulatory Sum Total Acres - 2017 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Follow Label Restrictions Acreage Sum	% of Response Acres	Follow County Permit Cds Acreage Sum	% of Response Acres	Waterholding Requirements Acreage Sum	% of Response Acres	Monitor Wind Conditions Acreage Sum	% of Response Acres	Appropriate Buffer Zones Acreage Sum	% of Response Acres	Attend Trainings Acreage Sum	% of Response Acres	Use Low Drift Nozzles Acreage Sum	% of Response Acres
M08N01E	76	76	100%	76	100%	76	100%	76	100%	76	100%	76	100%	76	100%
M08N03E	3702	3702	100%	3702	100%	3702	100%	3702	100%	3702	100%	3702	100%	3602	97%
M09N01E	1998	1998	100%	1998	100%	1998	100%	1998	100%	1525	76%	1998	100%	1525	76%
M09N01W	1271	1271	100%	1271	100%	1271	100%	1271	100%	1271	100%	1271	100%	1271	100%
M09N02E	427	427	100%	427	100%	427	100%	427	100%	427	100%	427	100%	301	70%
M09N03E	2814	2814	100%	2814	100%	2814	100%	2814	100%	2814	100%	2814	100%	1925	68%
M10N01W	62	62	100%	62	100%	62	100%	62	100%	62	100%	62	100%	62	100%
M10N03E	167	167	100%	167	100%	167	100%	167	100%	167	100%	167	100%	167	100%
M10N04E	7367	7367	100%	7367	100%	7367	100%	7367	100%	7367	100%	7367	100%	6547	89%
M11N01E	1014	1014	100%	1014	100%	1014	100%	1014	100%	1014	100%	1014	100%	503	50%
M11N02E	1943	1943	100%	1943	100%	1943	100%	1943	100%	1943	100%	1943	100%	1943	100%
M11N03E	2104	2104	100%	2104	100%	2104	100%	2104	100%	2104	100%	2104	100%	2104	100%
M11N04E	7393	7393	100%	7333	99%	7135	97%	5626	76%	6835	92%	7105	96%	6698	91%
M11N05E	255	255	100%	255	100%	255	100%	255	100%	255	100%	255	100%	255	100%
M12N01E	10160	10160	100%	10160	100%	10160	100%	10160	100%	9761	96%	10160	100%	9309	92%
M12N01W	471	471	100%	471	100%	471	100%	471	100%	471	100%	471	100%	471	100%
M12N02E	6034	6034	100%	6034	100%	6034	100%	5747	95%	6034	100%	6034	100%	5747	95%
M12N03E	5527	5527	100%	5527	100%	5527	100%	5371	97%	5527	100%	5527	100%	5371	97%
M12N04E	7203	7203	100%	7143	99%	6223	86%	6277	87%	5994	83%	6390	89%	5994	83%
M12N05E	4227	4227	100%	4227	100%	4227	100%	4227	100%	4227	100%	4227	100%	3561	84%
M12N06E	113	113	100%	113	100%	113	100%	113	100%	113	100%	113	100%	113	100%
M13N01E	8177	8177	100%	7875	96%	8177	100%	8177	100%	7578	93%	8177	100%	6558	80%
M13N01W	3415	3415	100%	3415	100%	3415	100%	3415	100%	3078	90%	3415	100%	2522	74%
M13N02E	7325	7325	100%	7325	100%	7325	100%	7325	100%	7325	100%	7325	100%	7325	100%
M13N03E	3496	3496	100%	3496	100%	3496	100%	3496	100%	3496	100%	3496	100%	3496	100%
M13N04E	4693	4693	100%	4693	100%	4398	94%	4543	97%	4248	91%	4618	98%	4248	91%
M13N05E	4925	4925	100%	4925	100%	4925	100%	4843	98%	4843	98%	4925	100%	3896	79%
M14N01E	2642	2518	95%	2602	98%	2602	98%	2602	98%	2116	80%	2602	98%	2116	80%
M14N01W	5044	5044	100%	4739	94%	5044	100%	5044	100%	5044	100%	5044	100%	3823	76%
M14N02E	8364	8364	100%	8364	100%	8364	100%	8364	100%	8058	96%	8364	100%	8364	100%
M14N02W	2024	2024	100%	2024	100%	2024	100%	2024	100%	2024	100%	2024	100%	1789	88%
M14N03E	34	34	100%	34	100%	34	100%	34	100%	34	100%	34	100%	34	100%
M14N04E	3958	3958	100%	3958	100%	3958	100%	3958	100%	3958	100%	3958	100%	3958	100%
M14N05E	2834	2834	100%	2834	100%	2834	100%	2834	100%	2834	100%	2834	100%	2834	100%
M14N06E	211	211	100%	211	100%	211	100%	211	100%	211	100%	211	100%	211	100%
M15N01E	1531	1531	100%	1531	100%	1531	100%	1531	100%	1478	97%	1361	89%	1065	70%
M15N01W	4058	4058	100%	4058	100%	4058	100%	4058	100%	4058	100%	4058	100%	4058	100%
M15N02E	3820	3424	90%	3424	90%	3820	100%	3820	100%	3602	94%	3820	100%	3820	100%

Table F-5. Farm Management Practices Regulatory Sum Total Acres - 2017 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Follow Label Restrictions Acreage Sum	% of Response Acres	Follow County Permit Cds Acreage Sum	% of Response Acres	Waterholding Requirements Acreage Sum	% of Response Acres	Monitor Wind Conditions Acreage Sum	% of Response Acres	Appropriate Buffer Zones Acreage Sum	% of Response Acres	Attend Trainings Acreage Sum	% of Response Acres	Use Low Drift Nozzles Acreage Sum	% of Response Acres
M15N02W	8456	8456	100%	8456	100%	8456	100%	8456	100%	8456	100%	8456	100%	7605	90%
M15N03E	298	298	100%	298	100%	298	100%	298	100%	298	100%	298	100%	298	100%
M15N03W	3846	3846	100%	3846	100%	3846	100%	3846	100%	3242	84%	3846	100%	3060	80%
M15N04E	4143	4143	100%	4143	100%	4143	100%	4143	100%	4117	99%	4143	100%	4143	100%
M15N04W	417	417	100%	417	100%	417	100%	417	100%	195	47%	417	100%	195	47%
M15N05E	223	223	100%	223	100%	223	100%	223	100%	223	100%	223	100%	223	100%
M16N01E	105	105	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
M16N01W	1955	1955	100%	1955	100%	1955	100%	1955	100%	1955	100%	1955	100%	1650	84%
M16N02E	1736	1736	100%	1736	100%	1736	100%	1557	90%	1557	90%	1557	90%	1284	74%
M16N02W	10590	10411	98%	10590	100%	10590	100%	10590	100%	10590	100%	10590	100%	10373	98%
M16N03E	509	509	100%	509	100%	509	100%	509	100%	509	100%	509	100%	509	100%
M16N03W	12377	12377	100%	12377	100%	12377	100%	12377	100%	11162	90%	12262	99%	10865	88%
M16N04E	13238	13238	100%	13238	100%	13238	100%	13238	100%	13238	100%	13238	100%	13238	100%
M16N04W	2485	2485	100%	2485	100%	2485	100%	2485	100%	2424	98%	2485	100%	2424	98%
M16N05E	711	711	100%	711	100%	711	100%	711	100%	711	100%	711	100%	711	100%
M17N01E	1995	1995	100%	1995	100%	1995	100%	1995	100%	1995	100%	1995	100%	1562	78%
M17N01W	5382	5127	95%	5127	95%	5127	95%	5127	95%	5382	100%	5382	100%	5175	96%
M17N02E	5911	5911	100%	5761	97%	5761	97%	5761	97%	5725	97%	5761	97%	5082	86%
M17N02W	7191	7191	100%	7191	100%	7159	100%	7191	100%	6882	96%	6882	96%	6734	94%
M17N03E	311	311	100%	311	100%	311	100%	311	100%	311	100%	311	100%	311	100%
M17N03W	11778	11778	100%	11778	100%	11778	100%	11778	100%	10694	91%	11177	95%	10215	87%
M17N04E	3224	3224	100%	3224	100%	3224	100%	3224	100%	3224	100%	3224	100%	2944	91%
M17N04W	253	253	100%	253	100%	253	100%	253	100%	253	100%	253	100%	253	100%
M18N01E	8608	8608	100%	8608	100%	8608	100%	8608	100%	8608	100%	8608	100%	8304	96%
M18N01W	3589	3589	100%	3589	100%	3589	100%	3176	88%	3176	88%	3589	100%	3176	88%
M18N02E	10266	10266	100%	10266	100%	9967	97%	10033	98%	9724	95%	9689	94%	9425	92%
M18N02W	12983	12852	99%	12923	100%	12846	99%	12399	96%	12668	98%	12650	97%	12406	96%
M18N03E	1237	1194	97%	1237	100%	1237	100%	1175	95%	1237	100%	1163	94%	1163	94%
M18N03W	6728	6728	100%	6485	96%	6485	96%	6485	96%	6172	92%	6172	92%	5731	85%
M18N04W	508	508	100%	508	100%	508	100%	508	100%	508	100%	508	100%	508	100%
M19N01E	12706	12706	100%	12706	100%	12586	99%	12276	97%	12321	97%	12586	99%	12269	97%
M19N01W	3084	3084	100%	3084	100%	3084	100%	3084	100%	3084	100%	3084	100%	3084	100%
M19N02E	15178	14896	98%	15178	100%	13747	91%	13800	91%	13335	88%	13696	90%	12743	84%
M19N02W	15404	15404	100%	15404	100%	15404	100%	15404	100%	14928	97%	15030	98%	14218	92%
M19N03E	1076	1076	100%	1076	100%	1076	100%	1076	100%	1076	100%	1076	100%	1076	100%
M19N03W	8660	8660	100%	8228	95%	7865	91%	7865	91%	7376	85%	7376	85%	7124	82%
M20N01E	10928	10928	100%	10928	100%	10928	100%	10928	100%	10928	100%	10723	98%	10723	98%
M20N01W	1082	1082	100%	1082	100%	1082	100%	864	80%	864	80%	1082	100%	864	80%

Table F-5. Farm Management Practices Regulatory Sum Total Acres - 2017 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Follow Label Restrictions Acreage Sum	% of Response Acres	Follow County Permit Cds Acreage Sum	% of Response Acres	Waterholding Requirements Acreage Sum	% of Response Acres	Monitor Wind Conditions Acreage Sum	% of Response Acres	Appropriate Buffer Zones Acreage Sum	% of Response Acres	Attend Trainings Acreage Sum	% of Response Acres	Use Low Drift Nozzles Acreage Sum	% of Response Acres
M20N02E	10797	10797	100%	10712	99%	10040	93%	9796	91%	9537	88%	9609	89%	9324	86%
M20N02W	13588	13588	100%	13588	100%	13588	100%	13451	99%	13451	99%	13588	100%	12939	95%
M20N03E	1393	1393	100%	1393	100%	1393	100%	1393	100%	1393	100%	1393	100%	1393	100%
M20N03W	913	913	100%	913	100%	913	100%	913	100%	913	100%	913	100%	709	78%
M20N04W	490	490	100%	490	100%	490	100%	490	100%	490	100%	490	100%	490	100%
M21N01E	300	300	100%	300	100%	300	100%	300	100%	300	100%	300	100%	300	100%
M21N01W	978	924	94%	978	100%	978	100%	978	100%	518	53%	886	91%	534	55%
M21N02E	764	764	100%	764	100%	764	100%	764	100%	365	48%	764	100%	764	100%
M21N02W	683	683	100%	683	100%	683	100%	683	100%	576	84%	683	100%	588	86%
M26N03W	135	135	100%	135	100%	135	100%	135	100%	135	100%	135	100%	135	100%
Sum	**370,091**	**368,627**	**100%**	**367,598**	**99%**	**364,194**	**98%**	**360,500**	**97%**	**352,500**	**95%**	**360,961**	**98%**	**336,506**	**91%**

Table F-5. Farm Management Practices Regulatory Sum Total Acres - 2017 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Use PCA Recommendations Acreage Sum	% of Response Acres	End of Row Shutoff Acreage Sum	% of Response Acres	Avoid Surface Water Acreage Sum	% of Response Acres	Compliance With PPE Acreage Sum	% of Response Acres	Use Drift Control Agents Acreage Sum	% of Response Acres	Provide Employee Safety Training Acreage Sum	% of Response Acres
M08N01E	76	76	100%	76	100%	76	100%	76	100%	0	0%	76	100%
M08N03E	3702	3702	100%	3702	100%	3702	100%	3702	100%	3702	100%	3472	94%
M09N01E	1998	1998	100%	1525	76%	1525	76%	1998	100%	1998	100%	1663	83%
M09N01W	1271	1271	100%	1271	100%	1271	100%	1271	100%	1271	100%	1271	100%
M09N02E	427	427	100%	301	70%	301	70%	301	70%	301	70%	301	70%
M09N03E	2814	2814	100%	1925	68%	1925	68%	1925	68%	1925	68%	1925	68%
M10N01W	62	62	100%	62	100%	62	100%	62	100%	62	100%	62	100%
M10N03E	167	167	100%	167	100%	167	100%	167	100%	167	100%	167	100%
M10N04E	7367	7367	100%	7367	100%	6444	87%	7367	100%	7367	100%	7200	98%
M11N01E	1014	1014	100%	1014	100%	503	50%	1014	100%	1014	100%	1014	100%
M11N02E	1943	1943	100%	1943	100%	1943	100%	1943	100%	1794	92%	1788	92%
M11N03E	2104	1937	92%	2104	100%	2044	97%	2104	100%	2005	95%	1924	91%
M11N04E	7393	7105	96%	4766	64%	4602	62%	7105	96%	6698	91%	6934	94%
M11N05E	255	255	100%	255	100%	255	100%	255	100%	255	100%	255	100%
M12N01E	10160	7225	71%	10091	99%	9119	90%	10160	100%	9970	98%	9970	98%
M12N01W	471	471	100%	471	100%	471	100%	471	100%	471	100%	471	100%
M12N02E	6034	4824	80%	5341	89%	5191	86%	5628	93%	5341	89%	5478	91%
M12N03E	5527	4951	90%	5371	97%	5005	91%	5527	100%	5371	97%	4486	81%
M12N04E	7203	6704	93%	5285	73%	4975	69%	6077	84%	5107	71%	5519	77%
M12N05E	4227	4227	100%	3561	84%	3561	84%	3962	94%	3561	84%	3962	94%
M12N06E	113	113	100%	113	100%	113	100%	113	100%	113	100%	113	100%
M13N01E	8177	8057	99%	8177	100%	6438	79%	8177	100%	8177	100%	7888	96%
M13N01W	3415	3078	90%	3078	90%	2650	78%	3078	90%	3078	90%	3415	100%
M13N02E	7325	6144	84%	7325	100%	6440	88%	7325	100%	7325	100%	7173	98%
M13N03E	3496	3496	100%	3496	100%	3203	92%	3496	100%	3496	100%	3496	100%
M13N04E	4693	4693	100%	3295	70%	3295	70%	4398	94%	2270	48%	4398	94%
M13N05E	4925	4925	100%	3798	77%	2439	50%	4474	91%	1996	41%	3769	77%
M14N01E	2642	2602	98%	2602	98%	2116	80%	2518	95%	2518	95%	2558	97%
M14N01W	5044	5044	100%	4615	91%	3623	72%	4633	92%	5044	100%	5044	100%
M14N02E	8364	8364	100%	8364	100%	8058	96%	8364	100%	8214	98%	8180	98%
M14N02W	2024	2024	100%	1869	92%	1634	81%	2024	100%	1869	92%	1567	77%
M14N03E	34	34	100%	34	100%	34	100%	34	100%	34	100%	0	0%
M14N04E	3958	3958	100%	3958	100%	3836	97%	3958	100%	2437	62%	3323	84%
M14N05E	2834	2834	100%	2834	100%	2834	100%	2695	95%	2442	86%	2020	71%
M14N06E	211	211	100%	211	100%	211	100%	0	0%	0	0%	0	0%
M15N01E	1531	1531	100%	1145	75%	1065	70%	1531	100%	502	33%	1531	100%
M15N01W	4058	4058	100%	4058	100%	3737	92%	4058	100%	3596	89%	3596	89%
M15N02E	3820	3820	100%	3699	97%	3481	91%	3699	97%	3394	89%	2959	77%

Table F-5. Farm Management Practices Regulatory Sum Total Acres - 2017 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Use PCA Recommendations Acreage Sum	% of Response Acres	End of Row Shutoff Acreage Sum	% of Response Acres	Avoid Surface Water Acreage Sum	% of Response Acres	Compliance With PPE Acreage Sum	% of Response Acres	Use Drift Control Agents Acreage Sum	% of Response Acres	Provide Employee Safety Training Acreage Sum	% of Response Acres
M15N02W	8456	8456	100%	7558	89%	7718	91%	8456	100%	7806	92%	7612	90%
M15N03E	298	298	100%	298	100%	298	100%	298	100%	298	100%	0	0%
M15N03W	3846	3846	100%	3060	80%	3270	85%	3846	100%	3060	80%	3507	91%
M15N04E	4143	4143	100%	4143	100%	3596	87%	4067	98%	3933	95%	3405	82%
M15N04W	417	417	100%	195	47%	0	0%	417	100%	195	47%	417	100%
M15N05E	223	223	100%	223	100%	223	100%	223	100%	223	100%	0	0%
M16N01E	105	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
M16N01W	1955	1955	100%	1658	85%	1353	69%	1658	85%	1658	85%	1955	100%
M16N02E	1736	1557	90%	1284	74%	1284	74%	1284	74%	1246	72%	1519	88%
M16N02W	10590	10590	100%	10169	96%	9812	93%	10115	96%	10169	96%	10590	100%
M16N03E	509	509	100%	509	100%	509	100%	509	100%	509	100%	392	77%
M16N03W	12377	12262	99%	10937	88%	10508	85%	12225	99%	10725	87%	11979	97%
M16N04E	13238	13000	98%	13238	100%	10574	80%	12269	93%	12002	91%	11907	90%
M16N04W	2485	2485	100%	2424	98%	2078	84%	2424	98%	2485	100%	2424	98%
M16N05E	711	711	100%	711	100%	50	7%	711	100%	711	100%	661	93%
M17N01E	1995	1995	100%	1448	73%	1408	71%	1618	81%	1825	91%	1995	100%
M17N01W	5382	5382	100%	4605	86%	4605	86%	4831	90%	4831	90%	4831	90%
M17N02E	5911	5761	97%	5114	87%	5114	87%	5577	94%	5561	94%	5620	95%
M17N02W	7191	6882	96%	6734	94%	6702	93%	6580	92%	5813	81%	6453	90%
M17N03E	311	311	100%	311	100%	311	100%	311	100%	311	100%	311	100%
M17N03W	11778	11401	97%	10837	92%	9682	82%	10979	93%	11067	94%	11146	95%
M17N04E	3224	3224	100%	2944	91%	2603	81%	2825	88%	2825	88%	3105	96%
M17N04W	253	253	100%	253	100%	253	100%	253	100%	253	100%	253	100%
M18N01E	8608	8608	100%	5936	69%	6259	73%	7667	89%	7501	87%	8515	99%
M18N01W	3589	3589	100%	2145	60%	1981	55%	3005	84%	2728	76%	3176	88%
M18N02E	10266	9967	97%	7158	70%	8077	79%	9663	94%	7781	76%	9594	93%
M18N02W	12983	12843	99%	9919	76%	9996	77%	12700	98%	11628	90%	11763	91%
M18N03E	1237	1237	100%	1126	91%	1126	91%	1126	91%	1120	91%	1163	94%
M18N03W	6728	5880	87%	5752	85%	5459	81%	5647	84%	6054	90%	5816	86%
M18N04W	508	508	100%	214	42%	508	100%	214	42%	508	100%	508	100%
M19N01E	12706	12266	97%	8890	70%	7952	63%	12170	96%	11615	91%	12321	97%
M19N01W	3084	3084	100%	2156	70%	1877	61%	3084	100%	2949	96%	2946	96%
M19N02E	15178	13660	90%	9091	60%	9069	60%	12330	81%	12096	80%	12634	83%
M19N02W	15404	14836	96%	11084	72%	11293	73%	13768	89%	14914	97%	13359	87%
M19N03E	1076	1076	100%	1076	100%	1024	95%	1024	95%	1024	95%	1024	95%
M19N03W	8660	7376	85%	6298	73%	6106	71%	7136	82%	6892	80%	6374	74%
M20N01E	10928	10777	99%	9672	89%	8875	81%	10723	98%	10220	94%	10364	95%
M20N01W	1082	1082	100%	622	57%	622	57%	634	59%	414	38%	361	33%

Table F-5. Farm Management Practices Regulatory Sum Total Acres - 2017 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Use PCA Recommendations Acreage Sum	% of Response Acres	End of Row Shutoff Acreage Sum	% of Response Acres	Avoid Surface Water Acreage Sum	% of Response Acres	Compliance With PPE Acreage Sum	% of Response Acres	Use Drift Control Agents Acreage Sum	% of Response Acres	Provide Employee Safety Training Acreage Sum	% of Response Acres
M20N02E	10797	9609	89%	5847	54%	5822	54%	9402	87%	8964	83%	9139	85%
M20N02W	13588	13180	97%	12745	94%	12535	92%	12617	93%	13294	98%	12211	90%
M20N03E	1393	1393	100%	0	0%	0	0%	1393	100%	1393	100%	1393	100%
M20N03W	913	869	95%	709	78%	869	95%	674	74%	913	100%	672	74%
M20N04W	490	490	100%	490	100%	490	100%	490	100%	490	100%	490	100%
M21N01E	300	300	100%	300	100%	300	100%	300	100%	0	0%	0	0%
M21N01W	978	886	91%	534	55%	426	44%	778	80%	426	44%	778	80%
M21N02E	764	764	100%	764	100%	762	100%	764	100%	764	100%	764	100%
M21N02W	683	683	100%	588	86%	576	84%	671	98%	576	84%	671	98%
M26N03W	135	135	100%	135	100%	135	100%	135	100%	135	100%	135	100%
Sum	**370,091**	**354,285**	**96%**	**311,173**	**84%**	**292,439**	**79%**	**345,281**	**93%**	**326,790**	**88%**	**335,221**	**91%**

Table F-6. Farm Management Practices Voluntary Sum Total Acres - 2017 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Land Lev Prec Tech Acreage Sum	% of Response Acres	Utilize Tailwater Return Acreage Sum	% of Response Acres	Utilize Peripheral Drains Acreage Sum	% of Response Acres	Monitor Rain Forecasts Acreage Sum	% of Response Acres	Crop Rotation Org Acreage Sum	% of Response Acres	Cover Cropping Org Acreage Sum	% of Response Acres	Strip Cropping Org Acreage Sum	% of Response Acres
M08N01E	76	76	100%	0	0%	76	100%	76	100%	76	100%	76	100%	0	0%
M08N03E	3702	3702	100%	3602	97%	3602	97%	3113	84%	1873	51%	1873	51%	1873	51%
M09N01E	1998	1998	100%	1539	77%	1539	77%	1998	100%	0	0%	0	0%	0	0%
M09N01W	1271	1271	100%	650	51%	520	41%	1271	100%	0	0%	0	0%	0	0%
M09N02E	427	427	100%	427	100%	301	70%	301	70%	427	100%	427	100%	301	70%
M09N03E	2814	2814	100%	2814	100%	1925	68%	1115	40%	1673	59%	1673	59%	1115	40%
M10N01W	62	62	100%	62	100%	62	100%	62	100%	0	0%	0	0%	0	0%
M10N03E	167	167	100%	167	100%	167	100%	167	100%	167	100%	167	100%	167	100%
M10N04E	7367	7367	100%	5811	79%	5441	74%	7148	97%	586	8%	586	8%	586	8%
M11N01E	1014	1014	100%	1014	100%	503	50%	1014	100%	0	0%	0	0%	0	0%
M11N02E	1943	1630	84%	600	31%	287	15%	1943	100%	1039	53%	1039	53%	1039	53%
M11N03E	2104	2104	100%	410	19%	1395	66%	1719	82%	194	9%	399	19%	0	0%
M11N04E	7393	7343	99%	6226	84%	5310	72%	6491	88%	2182	30%	2277	31%	1163	16%
M11N05E	255	0	0%	0	0%	0	0%	0	0%	255	100%	255	100%	0	0%
M12N01E	10160	9970	98%	7226	71%	8921	88%	9970	98%	647	6%	647	6%	647	6%
M12N01W	471	471	100%	471	100%	471	100%	471	100%	0	0%	0	0%	0	0%
M12N02E	6034	6034	100%	1971	33%	4130	68%	5747	95%	457	8%	457	8%	457	8%
M12N03E	5527	5527	100%	3493	63%	3917	71%	4459	81%	0	0%	27	0%	0	0%
M12N04E	7203	7203	100%	3063	43%	2565	36%	6151	85%	1160	16%	840	12%	0	0%
M12N05E	4227	2699	64%	943	22%	773	18%	1883	45%	1793	42%	1793	42%	0	0%
M12N06E	113	113	100%	0	0%	0	0%	113	100%	0	0%	0	0%	0	0%
M13N01E	8177	8018	98%	4395	54%	4766	58%	8177	100%	0	0%	297	4%	0	0%
M13N01W	3415	3379	99%	2379	70%	2251	66%	3415	100%	0	0%	0	0%	0	0%
M13N02E	7325	7325	100%	2791	38%	5755	79%	7325	100%	0	0%	0	0%	0	0%
M13N03E	3496	3496	100%	1070	31%	3459	99%	3496	100%	0	0%	0	0%	0	0%
M13N04E	4693	4692	100%	1883	40%	1135	24%	3970	85%	295	6%	295	6%	0	0%
M13N05E	4925	4744	96%	2120	43%	0	0%	3670	75%	294	6%	0	0%	0	0%
M14N01E	2642	2558	97%	1117	42%	1466	55%	2438	92%	124	5%	438	17%	0	0%
M14N01W	5044	5044	100%	3504	69%	3561	71%	4953	98%	618	12%	0	0%	0	0%
M14N02E	8364	8364	100%	5139	61%	5528	66%	8056	96%	53	1%	0	0%	0	0%
M14N02W	2024	2024	100%	1328	66%	1740	86%	1770	87%	412	20%	158	8%	0	0%
M14N03E	34	34	100%	0	0%	0	0%	34	100%	0	0%	0	0%	0	0%
M14N04E	3958	3958	100%	1656	42%	1143	29%	3215	81%	0	0%	0	0%	0	0%
M14N05E	2834	2834	100%	784	28%	2581	91%	2695	95%	0	0%	0	0%	0	0%
M14N06E	211	211	100%	211	100%	211	100%	0	0%	0	0%	0	0%	0	0%
M15N01E	1531	1531	100%	135	9%	0	0%	1025	67%	0	0%	174	11%	0	0%
M15N01W	4058	3818	94%	3586	88%	3165	78%	3692	91%	0	0%	0	0%	0	0%
M15N02E	3820	3424	90%	1277	33%	2086	55%	3341	87%	0	0%	0	0%	0	0%
M15N02W	8456	8131	96%	3248	38%	5519	65%	7601	90%	169	2%	0	0%	0	0%

Table F-6. Farm Management Practices Voluntary Sum Total Acres - 2017 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Land Lev Prec Tech Acreage Sum	% of Response Acres	Utilize Tailwater Return Acreage Sum	% of Response Acres	Utilize Peripheral Drains Acreage Sum	% of Response Acres	Monitor Rain Forecasts Acreage Sum	% of Response Acres	Crop Rotation Org Acreage Sum	% of Response Acres	Cover Cropping Org Acreage Sum	% of Response Acres	Strip Cropping Org Acreage Sum	% of Response Acres
M15N03E	298	298	100%	238	80%	238	80%	298	100%	0	0%	0	0%	0	0%
M15N03W	3846	3846	100%	1195	31%	2313	60%	2525	66%	242	6%	121	3%	0	0%
M15N04E	4143	4143	100%	3066	74%	2829	68%	4143	100%	0	0%	0	0%	0	0%
M15N04W	417	417	100%	176	42%	0	0%	417	100%	0	0%	0	0%	0	0%
M15N05E	223	223	100%	0	0%	223	100%	223	100%	0	0%	0	0%	0	0%
M16N01E	105	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
M16N01W	1955	1658	85%	1732	89%	1427	73%	1441	74%	0	0%	0	0%	0	0%
M16N02E	1736	1431	82%	273	16%	352	20%	1079	62%	0	0%	0	0%	0	0%
M16N02W	10590	9756	92%	4471	42%	6828	64%	9270	88%	302	3%	146	1%	285	3%
M16N03E	509	509	100%	289	57%	289	57%	509	100%	0	0%	0	0%	0	0%
M16N03W	12377	12047	97%	4886	39%	6186	50%	11370	92%	0	0%	0	0%	0	0%
M16N04E	13238	13168	99%	8019	61%	9340	71%	13168	99%	0	0%	0	0%	0	0%
M16N04W	2485	2424	98%	847	34%	1713	69%	2201	89%	221	9%	0	0%	0	0%
M16N05E	711	711	100%	50	7%	711	100%	711	100%	0	0%	0	0%	0	0%
M17N01E	1995	1995	100%	1307	66%	1600	80%	1995	100%	0	0%	0	0%	0	0%
M17N01W	5382	4483	83%	2685	50%	4598	85%	4922	91%	415	8%	415	8%	0	0%
M17N02E	5911	5761	97%	2716	46%	3152	53%	5363	91%	36	1%	0	0%	0	0%
M17N02W	7191	7043	98%	2612	36%	5360	75%	5685	79%	346	5%	209	3%	0	0%
M17N03E	311	311	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
M17N03W	11778	11778	100%	2393	20%	10621	90%	11778	100%	0	0%	0	0%	0	0%
M17N04E	3224	3224	100%	2484	77%	2382	74%	2944	91%	0	0%	0	0%	0	0%
M17N04W	253	253	100%	253	100%	253	100%	253	100%	0	0%	0	0%	0	0%
M18N01E	8608	8608	100%	5451	63%	4622	54%	7832	91%	0	0%	0	0%	0	0%
M18N01W	3589	3176	88%	2326	65%	2291	64%	2817	78%	0	0%	0	0%	0	0%
M18N02E	10266	10266	100%	3083	30%	5767	56%	7558	74%	256	2%	519	5%	220	2%
M18N02W	12983	12622	97%	3795	29%	9356	72%	10344	80%	1112	9%	1077	8%	400	3%
M18N03E	1237	1237	100%	567	46%	500	40%	1041	84%	0	0%	0	0%	0	0%
M18N03W	6728	6607	98%	1410	21%	3056	45%	5118	76%	0	0%	0	0%	0	0%
M18N04W	508	508	100%	47	9%	214	42%	508	100%	0	0%	0	0%	0	0%
M19N01E	12706	12474	98%	6712	53%	7239	57%	12089	95%	347	3%	120	1%	0	0%
M19N01W	3084	3084	100%	2277	74%	1590	52%	2949	96%	662	21%	0	0%	0	0%
M19N02E	15178	14820	98%	6219	41%	10224	67%	12496	82%	1593	10%	1343	9%	212	1%
M19N02W	15404	13888	90%	5930	38%	9003	58%	11266	73%	53	0%	53	0%	53	0%
M19N03E	1076	1076	100%	1042	97%	681	63%	714	66%	0	0%	0	0%	52	5%
M19N03W	8660	7910	91%	1827	21%	4358	50%	6447	74%	96	1%	96	1%	0	0%
M20N01E	10928	10928	100%	7316	67%	8861	81%	9751	89%	215	2%	215	2%	215	2%
M20N01W	1082	1012	94%	242	22%	384	35%	788	73%	230	21%	0	0%	0	0%
M20N02E	10797	8814	82%	6773	63%	7115	66%	7437	69%	1241	11%	1018	9%	261	2%
M20N02W	13588	13516	99%	2723	20%	7606	56%	12990	96%	0	0%	506	4%	0	0%

Table F-6. Farm Management Practices Voluntary Sum Total Acres - 2017 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Land Lev Prec Tech Acreage Sum	% of Response Acres	Utilize Tailwater Return Acreage Sum	% of Response Acres	Utilize Peripheral Drains Acreage Sum	% of Response Acres	Monitor Rain Forecasts Acreage Sum	% of Response Acres	Crop Rotation Org Acreage Sum	% of Response Acres	Cover Cropping Org Acreage Sum	% of Response Acres	Strip Cropping Org Acreage Sum	% of Response Acres
M20N03E	1393	1393	100%	1393	100%	1393	100%	1393	100%	0	0%	0	0%	0	0%
M20N03W	913	896	98%	587	64%	35	4%	738	81%	0	0%	0	0%	0	0%
M20N04W	490	490	100%	428	87%	490	100%	490	100%	0	0%	0	0%	0	0%
M21N01E	300	300	100%	300	100%	0	0%	300	100%	0	0%	0	0%	0	0%
M21N01W	978	978	100%	728	74%	256	26%	886	91%	92	9%	92	9%	92	9%
M21N02E	764	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
M21N02W	683	683	100%	229	34%	0	0%	620	91%	0	0%	0	0%	0	0%
M26N03W	135	135	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Sum	**370,091**	**356,477**	**96%**	**178,209**	**48%**	**231,727**	**63%**	**320,952**	**87%**	**21,953**	**6%**	**19,828**	**5%**	**9,138**	**2%**

Table F-6. Farm Management Practices Voluntary Sum Total Acres - 2017 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Compacting Levees Acreage Sum	% of Response Acres	Water Release Pre Field Prep Acreage Sum	% of Response Acres	Water Release Pre Harvest Acreage Sum	% of Response Acres	Slow Release Acreage Sum	% of Response Acres	Crop Rotation Nonorg Acreage Sum	% of Response Acres	Voluntary Trainings Acreage Sum	% of Response Acres
M08N01E	76	76	100%	0	0%	76	100%	0	0%	0	0%	76	100%
M08N03E	3702	3702	100%	3113	84%	3602	97%	3113	84%	2362	64%	586	16%
M09N01E	1998	1998	100%	1998	100%	1998	100%	1998	100%	0	0%	1204	60%
M09N01W	1271	1271	100%	1271	100%	1271	100%	1271	100%	0	0%	1271	100%
M09N02E	427	301	70%	301	70%	301	70%	301	70%	301	70%	301	70%
M09N03E	2814	1925	68%	1115	40%	1925	68%	1115	40%	2118	75%	364	13%
M10N01W	62	62	100%	62	100%	62	100%	62	100%	0	0%	62	100%
M10N03E	167	167	100%	167	100%	167	100%	167	100%	167	100%	167	100%
M10N04E	7367	6210	84%	5706	77%	5706	77%	6547	89%	878	12%	6185	84%
M11N01E	1014	1014	100%	503	50%	1014	100%	1014	100%	0	0%	0	0%
M11N02E	1943	591	30%	600	31%	600	31%	749	39%	1501	77%	1794	92%
M11N03E	2104	1800	86%	1421	68%	1688	80%	2104	100%	410	19%	1719	82%
M11N04E	7393	5886	80%	3938	53%	5544	75%	6641	90%	2624	35%	6491	88%
M11N05E	255	0	0%	0	0%	255	100%	255	100%	0	0%	255	100%
M12N01E	10160	8935	88%	7619	75%	9699	95%	9889	97%	2250	22%	6079	60%
M12N01W	471	471	100%	471	100%	471	100%	471	100%	0	0%	471	100%
M12N02E	6034	3947	65%	4280	71%	4429	73%	4931	82%	2904	48%	5329	88%
M12N03E	5527	4394	80%	3632	66%	3981	72%	4642	84%	1209	22%	4665	84%
M12N04E	7203	4464	62%	4897	68%	4827	67%	6131	85%	646	9%	5216	72%
M12N05E	4227	1461	35%	1482	35%	3340	79%	4227	100%	83	2%	2744	65%
M12N06E	113	0	0%	0	0%	0	0%	113	100%	0	0%	113	100%
M13N01E	8177	6651	81%	3572	44%	6837	84%	8177	100%	1820	22%	5935	73%
M13N01W	3415	3075	90%	2400	70%	3287	96%	3287	96%	474	14%	2310	68%
M13N02E	7325	6664	91%	5959	81%	6440	88%	6915	94%	2177	30%	4511	62%
M13N03E	3496	3397	97%	3496	100%	3496	100%	3496	100%	0	0%	3496	100%
M13N04E	4693	2576	55%	2556	54%	4281	91%	4543	97%	42	1%	3987	85%
M13N05E	4925	3082	63%	1189	24%	1620	33%	3753	76%	0	0%	2152	44%
M14N01E	2642	2344	89%	458	17%	1224	46%	2558	97%	280	11%	2032	77%
M14N01W	5044	2472	49%	2445	48%	4153	82%	4262	84%	365	7%	3264	65%
M14N02E	8364	6236	75%	6000	72%	7201	86%	6988	84%	3211	38%	7007	84%
M14N02W	2024	1669	82%	1152	57%	1652	82%	1845	91%	133	7%	1234	61%
M14N03E	34	34	100%	0	0%	0	0%	34	100%	0	0%	0	0%
M14N04E	3958	1296	33%	1235	31%	2197	56%	3078	78%	237	6%	3958	100%
M14N05E	2834	2515	89%	1875	66%	2629	93%	2834	100%	0	0%	2159	76%
M14N06E	211	211	100%	0	0%	0	0%	211	100%	0	0%	211	100%
M15N01E	1531	382	25%	683	45%	891	58%	1205	79%	481	31%	1491	97%
M15N01W	4058	2956	73%	3875	95%	3875	95%	3978	98%	200	5%	3225	79%
M15N02E	3820	2562	67%	2276	60%	3213	84%	2977	78%	55	1%	2605	68%
M15N02W	8456	6791	80%	6085	72%	7153	85%	8035	95%	545	6%	5640	67%

Table F-6. Farm Management Practices Voluntary Sum Total Acres - 2017 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Compacting Levees Acreage Sum	% of Response Acres	Water Release Pre Field Prep Acreage Sum	% of Response Acres	Water Release Pre Harvest Acreage Sum	% of Response Acres	Slow Release Acreage Sum	% of Response Acres	Crop Rotation Nonorg Acreage Sum	% of Response Acres	Voluntary Trainings Acreage Sum	% of Response Acres
M15N03E	298	298	100%	298	100%	298	100%	298	100%	0	0%	0	0%
M15N03W	3846	2896	75%	2661	69%	3244	84%	3846	100%	121	3%	3201	83%
M15N04E	4143	2390	58%	3841	93%	3841	93%	3841	93%	829	20%	3650	88%
M15N04W	417	417	100%	195	47%	417	100%	417	100%	0	0%	417	100%
M15N05E	223	223	100%	223	100%	223	100%	223	100%	0	0%	0	0%
M16N01E	105	0	0%	0	0%	0	0%	0	0%	0	0%	105	100%
M16N01W	1955	992	51%	915	47%	1135	58%	1870	96%	144	7%	1285	66%
M16N02E	1736	1216	70%	899	52%	1104	64%	1448	83%	466	27%	1040	60%
M16N02W	10590	5023	47%	9114	86%	8866	84%	10085	95%	1456	14%	5426	51%
M16N03E	509	509	100%	509	100%	509	100%	509	100%	0	0%	453	89%
M16N03W	12377	7745	63%	9618	78%	11820	95%	12262	99%	110	1%	9420	76%
M16N04E	13238	12585	95%	10989	83%	13067	99%	13238	100%	1589	12%	12876	97%
M16N04W	2485	2319	93%	2305	93%	2305	93%	2485	100%	0	0%	1904	77%
M16N05E	711	661	93%	711	100%	711	100%	711	100%	0	0%	661	93%
M17N01E	1995	1825	91%	1129	57%	1785	89%	1785	89%	433	22%	1691	85%
M17N01W	5382	4013	75%	3651	68%	4428	82%	4831	90%	658	12%	4576	85%
M17N02E	5911	5192	88%	4730	80%	5613	95%	4864	82%	1670	28%	4386	74%
M17N02W	7191	5092	71%	4564	63%	5228	73%	6882	96%	215	3%	3347	47%
M17N03E	311	311	100%	311	100%	311	100%	311	100%	0	0%	311	100%
M17N03W	11778	9606	82%	9510	81%	11346	96%	10943	93%	428	4%	7772	66%
M17N04E	3224	2944	91%	2507	78%	2626	81%	3176	99%	562	17%	2992	93%
M17N04W	253	253	100%	253	100%	253	100%	253	100%	0	0%	0	0%
M18N01E	8608	6909	80%	2966	34%	7089	82%	7923	92%	72	1%	6208	72%
M18N01W	3589	2704	75%	1138	32%	2787	78%	3105	87%	0	0%	2026	56%
M18N02E	10266	5533	54%	3858	38%	8763	85%	8052	78%	430	4%	7120	69%
M18N02W	12983	8681	67%	8454	65%	11589	89%	11958	92%	301	2%	6658	51%
M18N03E	1237	1194	97%	698	56%	1051	85%	1194	97%	0	0%	1132	92%
M18N03W	6728	5938	88%	2925	43%	5493	82%	6057	90%	0	0%	4308	64%
M18N04W	508	508	100%	508	100%	214	42%	508	100%	167	33%	214	42%
M19N01E	12706	10341	81%	4995	39%	9642	76%	11505	91%	445	4%	10279	81%
M19N01W	3084	1596	52%	1145	37%	2795	91%	2278	74%	0	0%	1744	57%
M19N02E	15178	11699	77%	7642	50%	7399	49%	13699	90%	672	4%	11890	78%
M19N02W	15404	11755	76%	8722	57%	10833	70%	12603	82%	1284	8%	11516	75%
M19N03E	1076	714	66%	1076	100%	1076	100%	1076	100%	52	5%	1076	100%
M19N03W	8660	4266	49%	3653	42%	4949	57%	6023	70%	234	3%	5393	62%
M20N01E	10928	9627	88%	7801	71%	9654	88%	9972	91%	1529	14%	10348	95%
M20N01W	1082	723	67%	385	36%	495	46%	738	68%	0	0%	345	32%
M20N02E	10797	6981	65%	3469	32%	6171	57%	8239	76%	611	6%	4820	45%
M20N02W	13588	12229	90%	7275	54%	10720	79%	12540	92%	980	7%	10154	75%

Table F-6. Farm Management Practices Voluntary Sum Total Acres - 2017 Growing Season

TOWNSHIP	Rice Acreage Grown Total Sum	Compacting Levees Acreage Sum	% of Response Acres	Water Release Pre Field Prep Acreage Sum	% of Response Acres	Water Release Pre Harvest Acreage Sum	% of Response Acres	Slow Release Acreage Sum	% of Response Acres	Crop Rotation Nonorg Acreage Sum	% of Response Acres	Voluntary Trainings Acreage Sum	% of Response Acres
M20N03E	1393	1393	100%	0	0%	1175	84%	1393	100%	0	0%	1393	100%
M20N03W	913	453	50%	244	27%	448	49%	703	77%	0	0%	709	78%
M20N04W	490	490	100%	490	100%	490	100%	490	100%	0	0%	62	13%
M21N01E	300	300	100%	300	100%	300	100%	300	100%	0	0%	300	100%
M21N01W	978	484	49%	636	65%	636	65%	728	74%	0	0%	636	65%
M21N02E	764	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
M21N02W	683	588	86%	514	75%	671	98%	514	75%	0	0%	671	98%
M26N03W	135	135	100%	135	100%	135	100%	135	100%	0	0%	135	100%
Sum	**370,091**	**275,339**	**74%**	**225,794**	**61%**	**294,810**	**80%**	**329,928**	**89%**	**42,931**	**12%**	**264,959**	**72%**

Appendix F-2
Farm Evaluation Raw Export Files
(Files in folder on CD submittal)

Appendix G
2018 Groundwater Results Spreadsheet

Appendix G. Groundwater Data

Well Type	DWR State Well Number	Mapping ID	USGS Well ID	Latitude	Longitude	Sample Date	2018 Depth to Water Level (feet bgs)	Field Parameters				Laboratory Parameters		
								Conductivity (µS/cm)	pH	DO (mg/L)	Water Temp (°F)	TDS (mg/L)	Nitrate + Nitrite as N (mg/L)	Ammonia as N (mg/L)
USGS	012N003E18H001M	18H1M	385314121401701	38°53'12.90"N	121°40'21.88"W	8/15/2018	1.74	12798	7.33	0.59	65.48	11000	2.2	0.33
USGS	012N002E09B002M	09B2M	385431121451401	38°54'30.56"N	121°45'18.24"W	8/15/2018	2.41	1204	7.49	0	65.66	440	4.8	0.027j
USGS	014N002E10R001M	10R1M	390416121433601	39°04'15.43"N	121°43'39.14"W	8/16/2018	1.01	592	7.58	0	64.94	340	0.43	0.086j
USGS	018N001W27B001M	27B1M	392328121571501	39°23'27.50"N	121°57'19.11"W	8/16/2018	1.01	236.7	7.52	0	64.0	150	0.25j	0.035j
USGS	018N002E09L001M	09L1M	392542121452501	39°25'35.40"N	121°45'41.96"W	8/14/2018	3.38	736	7.19	0.41	64.4	450	0.88	0.050j
USGS	018N001E08D001M	08D1M	392604121531801	39°26'05.43"N	121°53'18.16"W	8/14/2018	2.00	389.4	7.45	0.01	63.9	240	ND<0.055	0.048j
USGS	019N001E22B001M	22B1M	392924121504801	39°29'24.94"N	121°50'51.37"W	8/14/2018	1.20	767	7.43	0.03	63.3	440	1.3	0.052j
USGS	019N001E09C002M	09C2M	393118121521401	39°31'18.1"N	121°52'14.1"W	8/13/2018	4.34	878	7.5	0.17	64.9	470	0.34j	0.086j
USGS	020N002E35J002M	35J2M	393230121422202	39°32'29.6"N	121°42'27.1"W	8/13/2018	4.32	858	7.1	0.31	68.0	530	10	0.11
USGS	020N002E08A001M	08A1M	393630121455401	39°36'29.27"N	121°45'56.86"W	8/13/2018	5.75	246.10	6.93	0.50	66.02	220	0.087j	0.041j

Notes:

Method reporting limits: TDS = 10 mg/L; nitrate+nitrite as N = 0.40 mg/L; ammonia as N = 0.10 mg/L

°F = degree(s) Fahrenheit
µS/cm = microsiemen(s) per centimeter
bgs = below ground surface
ID = identification
j = EPA Flag; analyte detected but below the method reporting limit, therefore the result is an estimated concentration
mg/L = milligram(s) per liter

Appendix H
2018 Workshop Handout Examples

Thiobencarb Mandatory Stewardship and Rice WDR Overview 2018

Roberta Firoved
California Rice Commission

California Rice

Presentation Outline

- History and background
- Rice Pesticide Program
- Thiobencarb monitoring results and usage
- Examples of Central Valley Water Board violations
- Overview of 2018 program
- Rice WDR Overview
- Summary

California Rice

Background on the rice commission

California Rice

California Rice Commission

- Statutory organization - a marketing order
  - *CDFA Food & Ag Code*
  - *Not a state agency*
- Represent all rice growers (producers) & mills (handlers)
  - *Different from an association*
  - *Membership is mandatory*
  - *Based off an assessment*
- Strategic planning defines programs
  - *Regulatory, conservation, public education*
- Industry Affairs Manager, regulatory programs for:
  - *Water Quality*
  - *Crop Protection*

California Rice

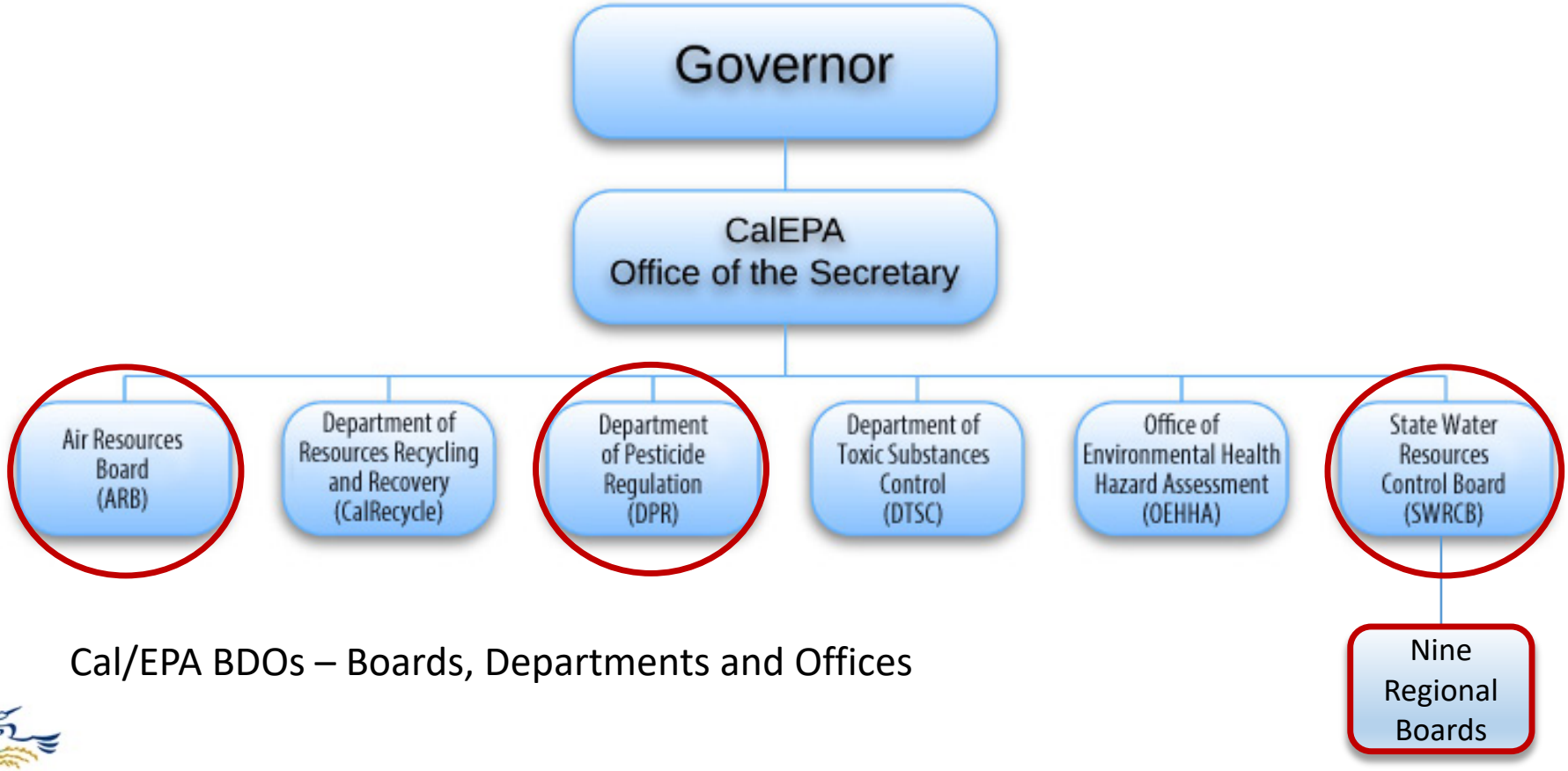
The Rice Pesticide Program

California Rice

Rice Pesticide Program Responsibilities

- CRC
  - *Monitoring, reporting, program management, recommendations & stewardship*
- Valent
  - *Product registrant provides support for meetings, inspections & lab analysis*
- Cities of Sacramento and West Sacramento
  - *Significant stakeholders*
- Central Valley Water Board
  - *Approves the management practices & program*
- Department of Pesticide Regulation
  - *Pesticide enforcement, permit conditions, county support*
- County Agricultural Commissioner Offices
  - *Issues the permits and provides local pesticide use enforcement*

Cal/EPA Structure



Cal/EPA BDOs – Boards, Departments and Offices

California Rice

Regional Water Boards

<u>Nine Regional Water Quality Control Boards</u>: Responsible to protect all beneficial uses of waters under federal and state laws

Central Valley Regional Water Quality Control Board (Region 5) = 40% of the State

California Rice

2017 ACRES PLANTED TO RICE
SACRAMENTO VALLEY COUNTIES

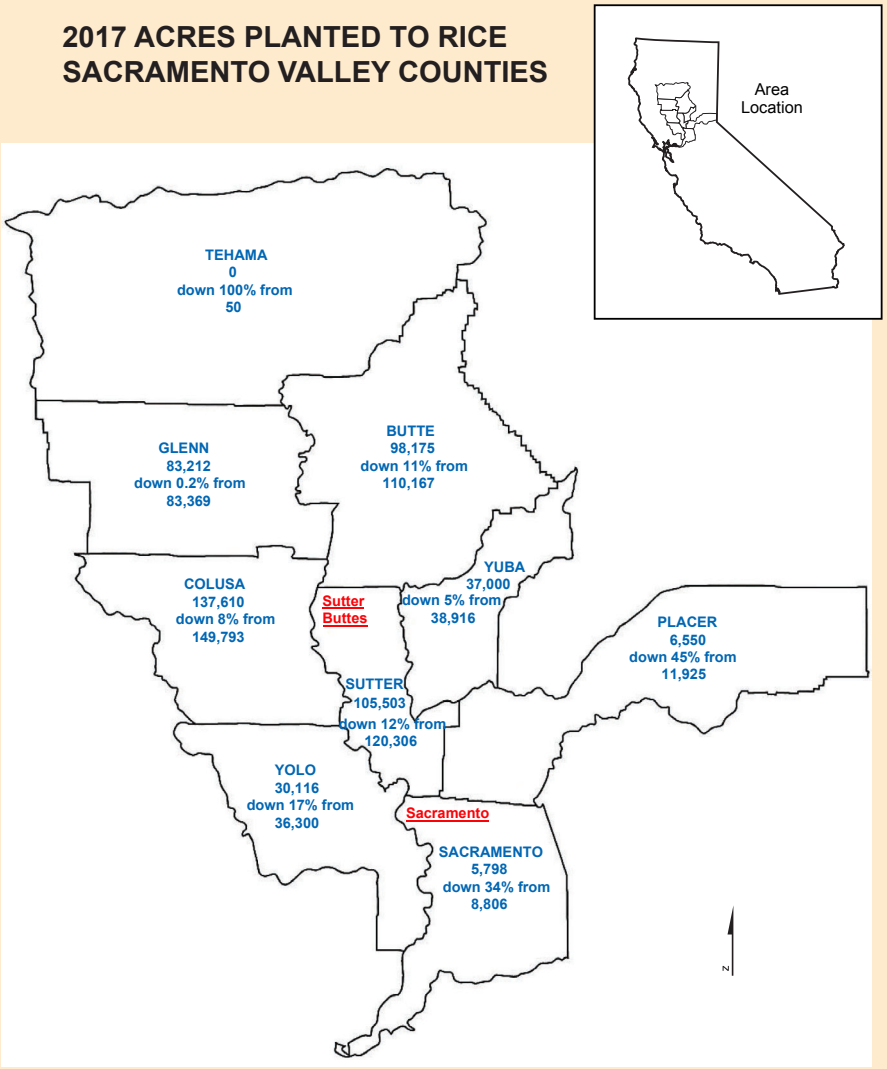


FIGURE 1-1
Sacramento Valley Rice Acres, 2017
CRC 2017 Annual Monitoring Report

Note: Acreage totals based on preliminary data provided by the County Agricultural Commissioners 503,964 acres (down 10% from 559,632)

CH2MHILL

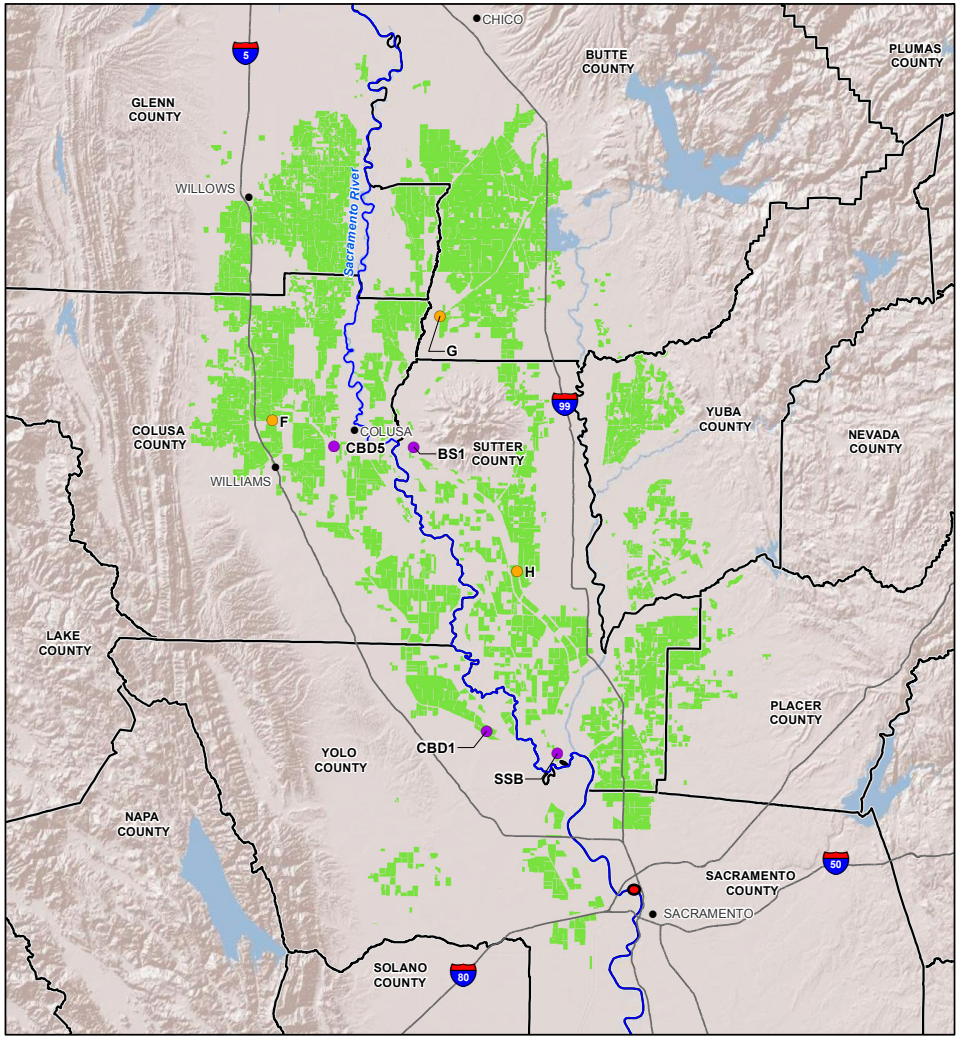
California Rice

Rice Water Quality Programs

- Rice Pesticide Program (prohibition of discharge)
  - *Compliance with Board approved management practices*
  - *Water monitoring measures compliance*
- Regional Water Board's Basin Plan
  - *1990 molinate and thiobencarb*
  - *1991 carbofuran, malathion, methyl parathion*
  - *Current: thiobencarb*
- 1976-1983 environmental & assessment monitoring
  - *Where rice irrigation water was draining*
  - *Whether there was an impact on the Delta*
  - *Basis for the current monitoring sites*

CRC Surface Water Monitoring Sites

- 1976 to 1983 monitoring at 83 sites to determine where rice field water was draining, and that lead to…
- Maintain four core sites from the Rice Pesticide Program (thiobencarb)
- Add three additional sites during assessment & modified assessment every three years (Rice WDR)
- Provided scientifically/technically defensible program to maintain these sites (Rice WDR)
- Countered staff proposal of one monitoring site per 5,000 acres: 500,000 acres ÷ 5,000 acres = <u>100 monitoring sites</u> (Rice WDR)



LEGEND
- CITY
- COUNTY

MONITORING SITES
- PRIMARY SITE
- SECONDARY SITE
- RICE LAND 2017 PERMIT AREA

NOTES:

DATUM: NAD 1983.

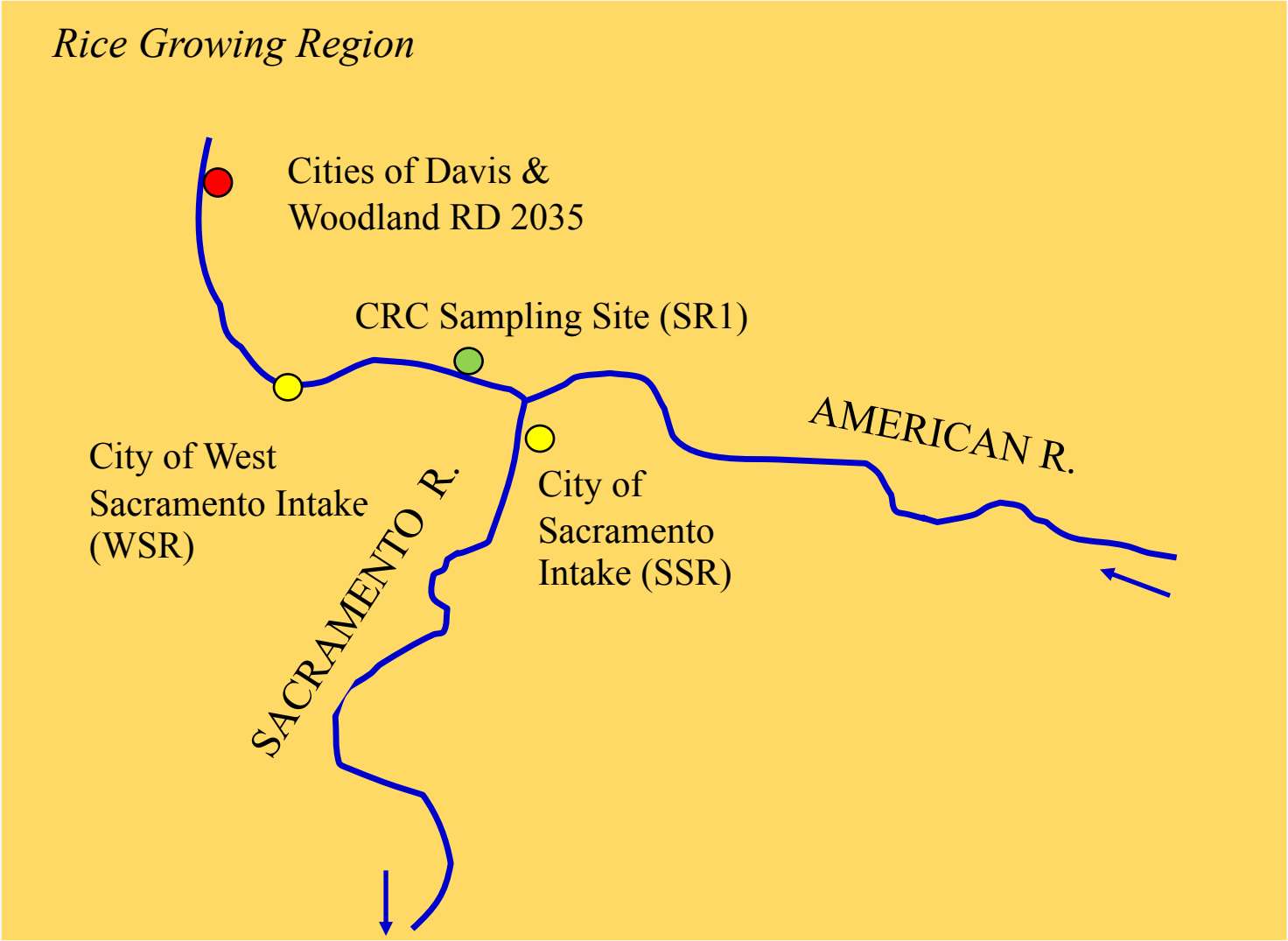
SOURCES: BASEMAP (COPYRIGHT:© 2014 ESRI); RICE LANDS (CAL AG PERMIT, 2015); COUNTY (CAL FIRE 2007) ; HYDROLOGY (NHD ACCESSED JAN 2016).

0 6 12 Miles

FIGURE 4-1
2017 Rice Lands Permit Areas and Surface Water Sampling Sites
2017 Annual Monitoring Report
California Rice Commission

California Rice

Municipal intakes



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Basin Plan Limits: Rice Pesticides

- Thiobencarb performance goal is 1.5 ppb in surface water (1990)
- Water quality objective for drinking water:
  - *1.0 ppb thiobencarb*
  - *As secondary maximum contaminant level (MCL) for nuisance at city intakes*
- Management practices must be approved by the Central Valley Water Board with performance goals achieved, or prohibition of discharge may apply

Pesticide	Performance Goal (ppb)
Thiobencarb	**1.5**
Molinate	10.0
Malathion	0.1
Methyl parathion	0.13
Carbofuran	0.4

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Thiobencarb monitoring results/usage

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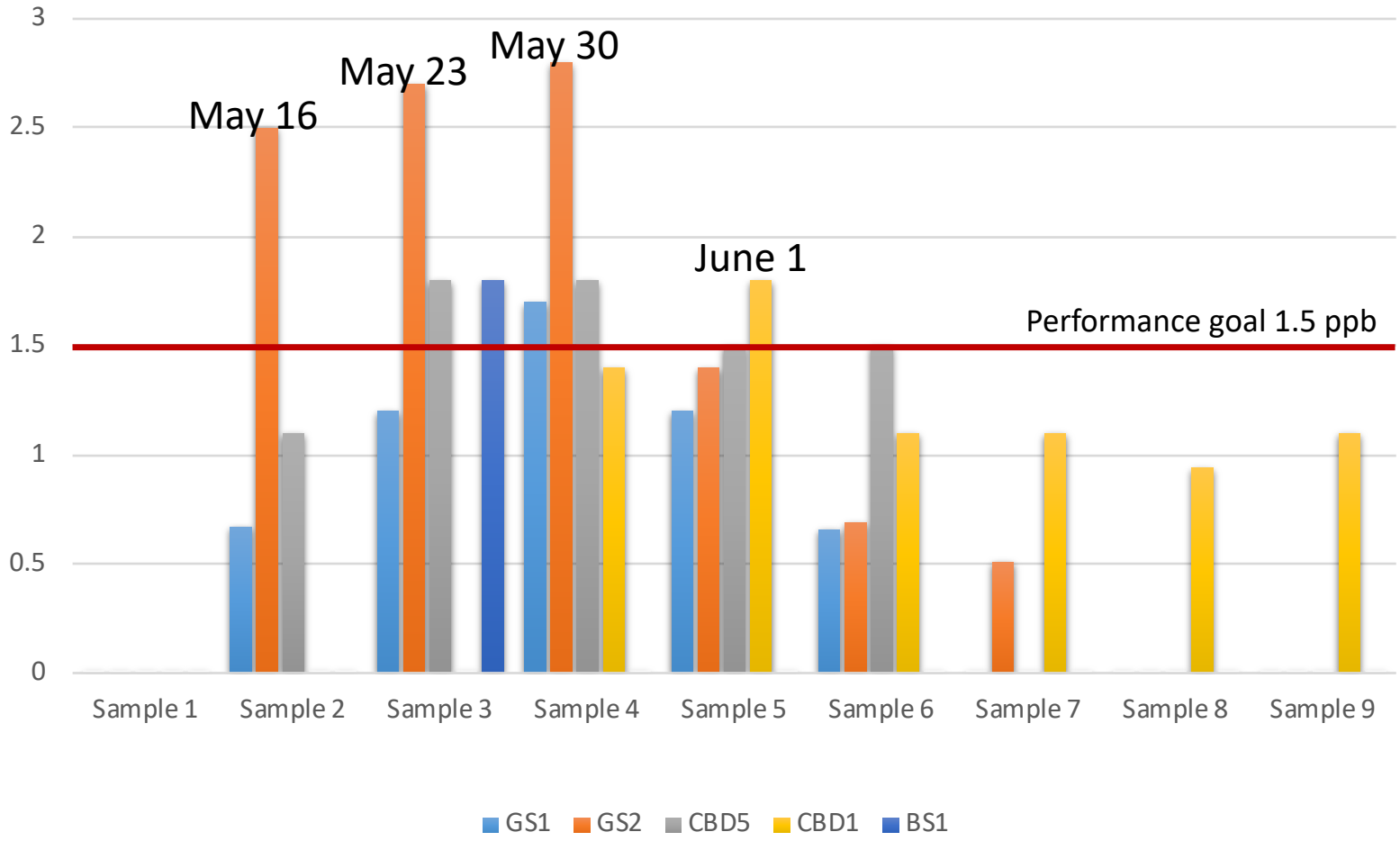
DPR Sites GS1 & GS2 compared to CBD5, CBD1 & BS1



- GS1 = Norman Road at Willow Creek
- GS2 = Norman Road at Colusa Drain
- Monitored in 2017 per request of DPR
- CBD5 = 156,000 acres in Colusa and Glenn Counties
- Will not monitor GS1 and GS2 in 2018

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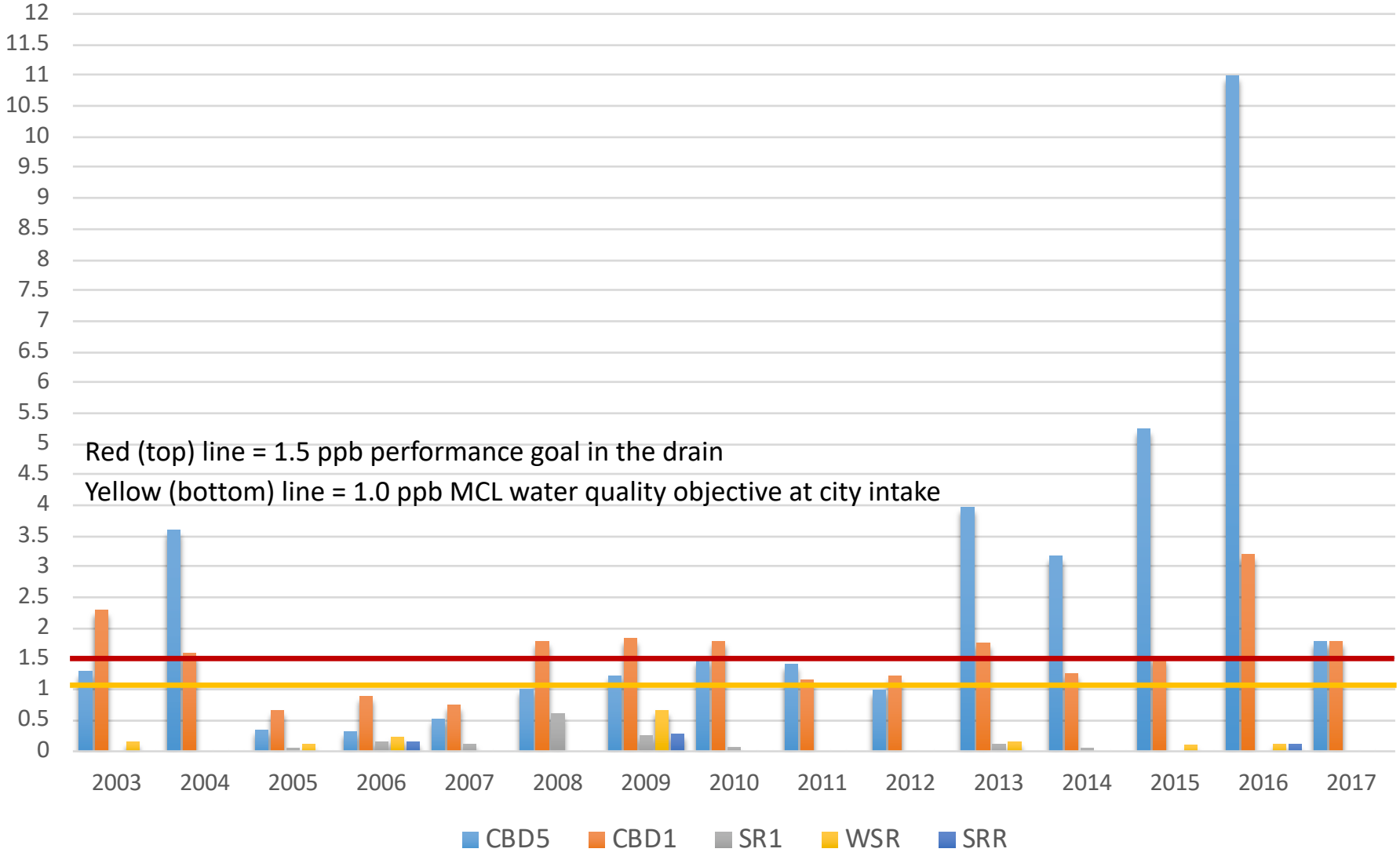
Thiobencarb Results Summary 2003-2017



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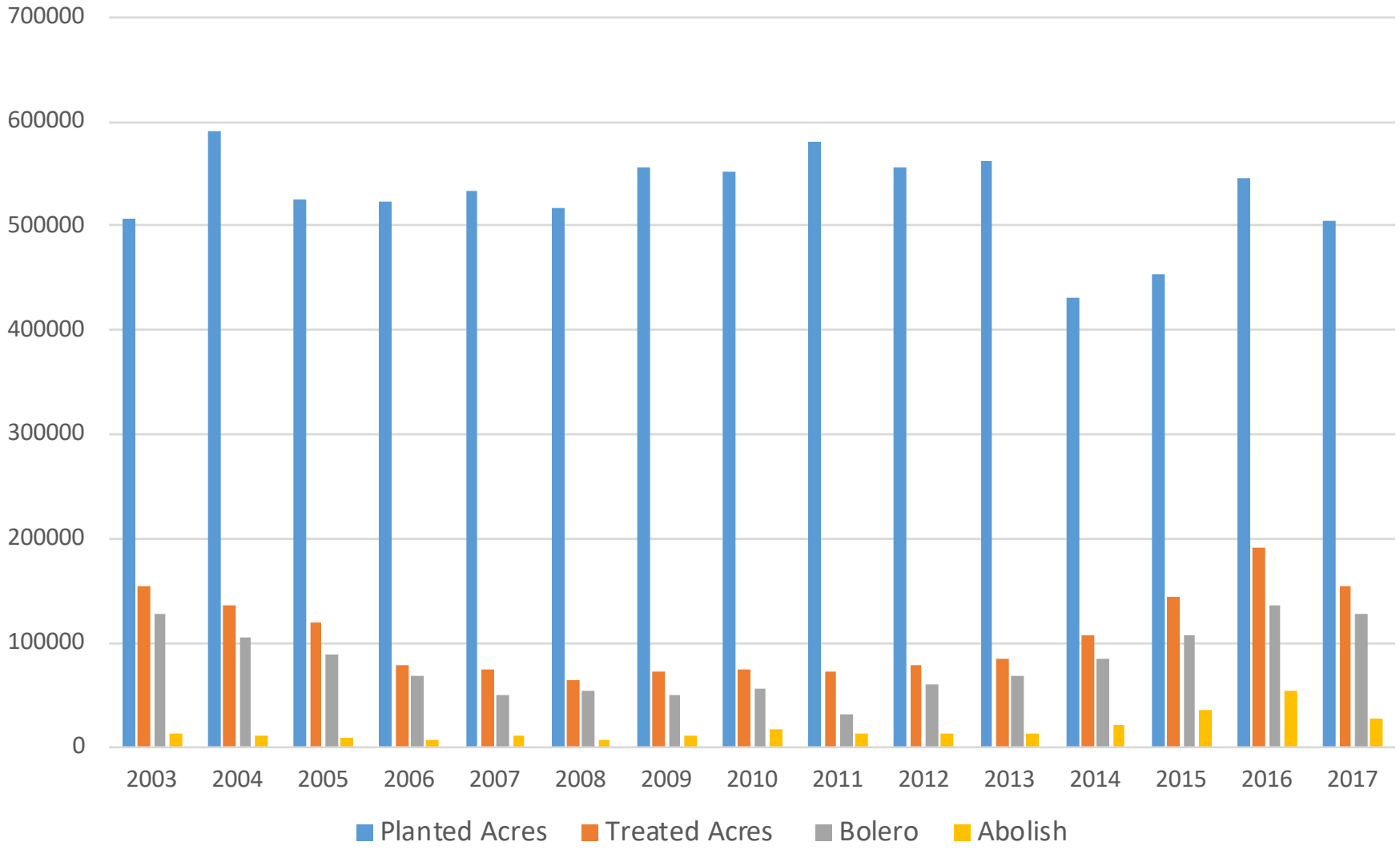
Thiobencarb Usage 2003-2017



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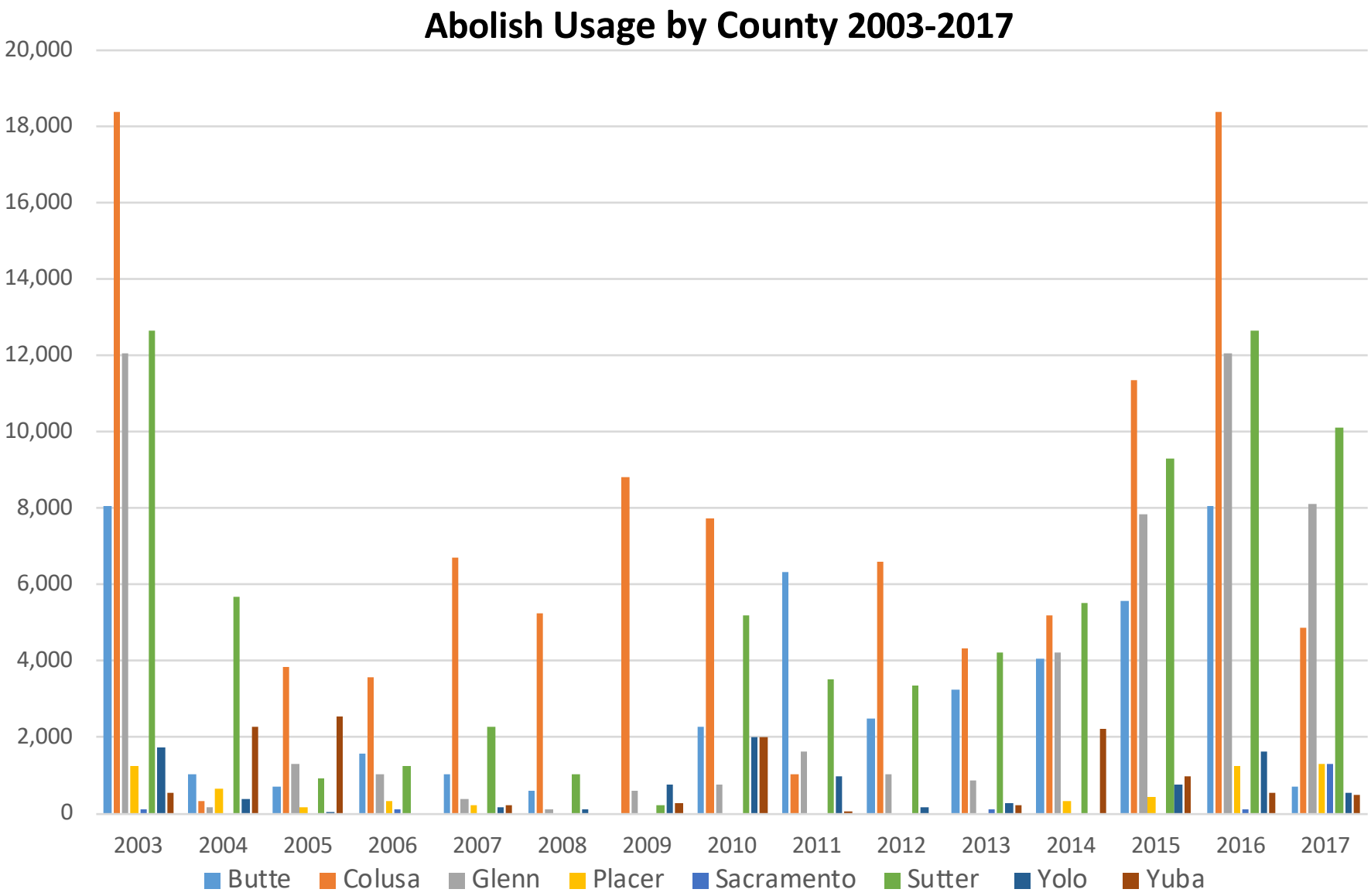

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Enforcement examples

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Differences in Enforcement

Central Valley Water Board

- California Water Code administrative civil liability:
- Up to $5,000 per day
- Or, $10 per gallon for discharge of pollutants
- Or, subject to civil liability up to $15,000 per day
- Or, $20 per gallon
- = tens of thousands of dollars

Department of Pesticide Regulation

- Food & Ag Code & CA Code of Regulations
- Fine range for each class of violation:
  - *Class A; $700 to $5,000*
  - *Class B: $250 to $1,000*
  - *Class C: $50 to $400*

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Examples of Central Valley Water Board Enforcement Actions

- Violations range from $9,152 to $300,000
- Failure to file Farm Evaluation = $26,500
- Failure to file for coverage (join a coalition) = $42,900 to $63,700
- Similar to discharges from construction
  - *Caltrans 800,000 gallon discharge*
  - *$2.7 million dollar settlement*
  - *$443,000 to environmental program*

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Overview of 2018 program

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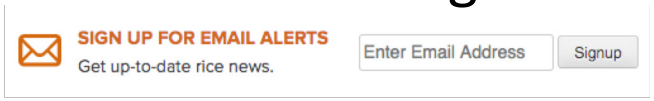
What's in place for 2018

- Rice industry support of county agricultural commissioners enforcing to fullest extent of the law
- Outreach through letters, e-coms and calricenews.org with information where violations occur



- DPR evaluates all thiobencarb formulations
- Continuation of all practices currently in place and with the DPR Permit Conditions/EPA ESA Bulletins
- Continue permit conditions on liquid formulation in parts of Colusa/Glenn Counties as DPR study area

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Summary

California Rice

Other fun facts: Thiobencarb…

- Binds to soil
- High concentrations in field
- Peak values 1-6 days
- Concentrations do not drop below 100 ppb before 12 days
- Maximum 30-day waterhold in the field
- Summary:
  Cost of thiobencarb at time of application est. $45/acre

- Is not active in the soil
- Is active in the water
- 233 to 1260 ppb at 24 hours
- Concentrations do not drop below the MDL before 27 days
- Allows product to degrade to an acceptable level
- Summary:
  Amount of thiobencarb wasted at 6-days post application $40+/acre

Source: DPR 1984: U.S. EPA 1997

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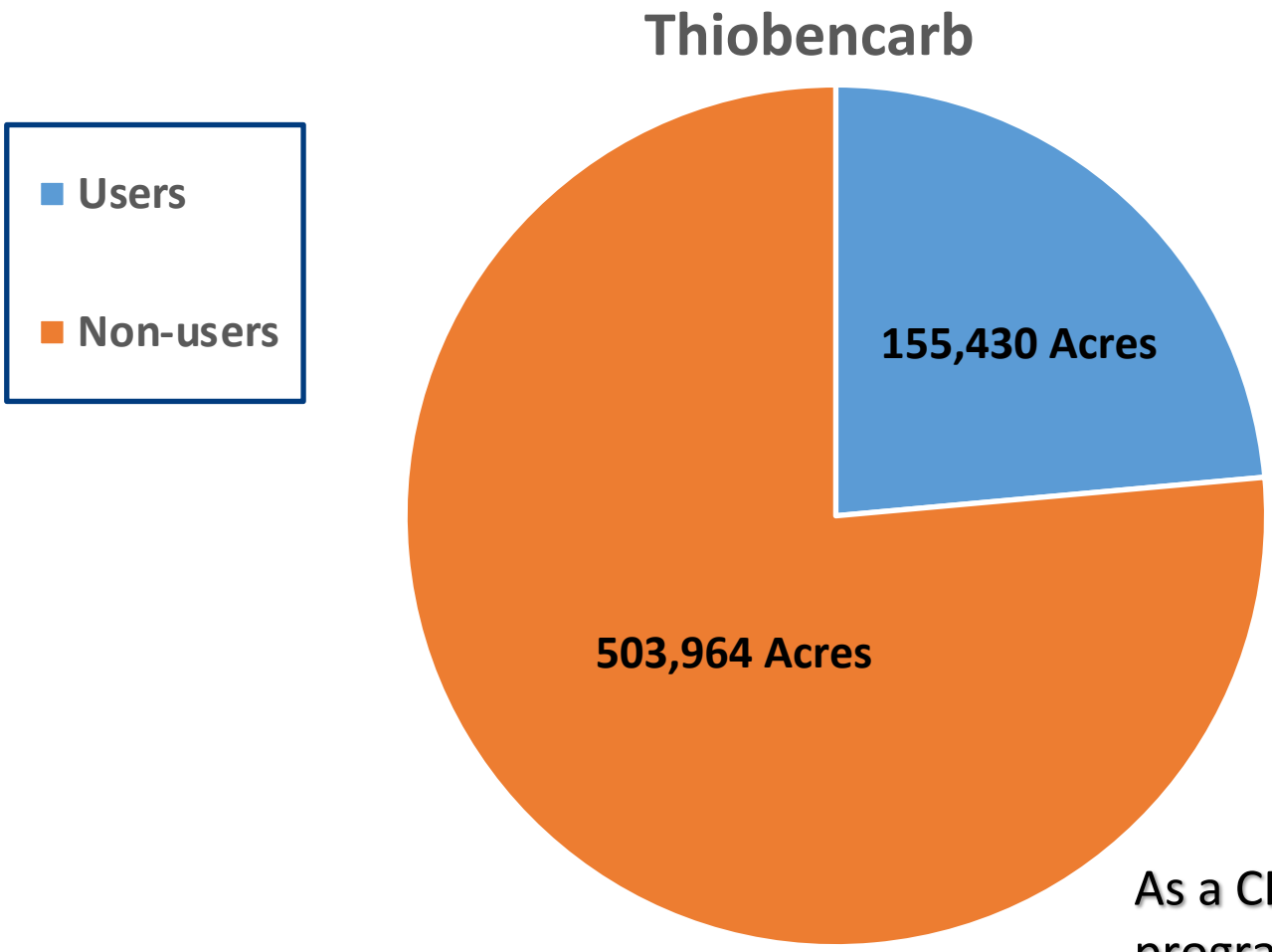
Who pays for the Rice Pesticide Program?



As a CRC managed program, 100% of the rice industry pays

Answer: Everyone pays!

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Opportunity to prove ourselves

- First industry managed water quality program
- Set the example for how it can be done
- Established credibility for the rice industry in other water quality programs (Rice WDR)
- Established monitoring sites representing 90% of all rice field drainage
- 2018 will be a another critical year
- Never think the program can run on auto pilot
- Think of this as an another year of opportunity

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Rice WDR

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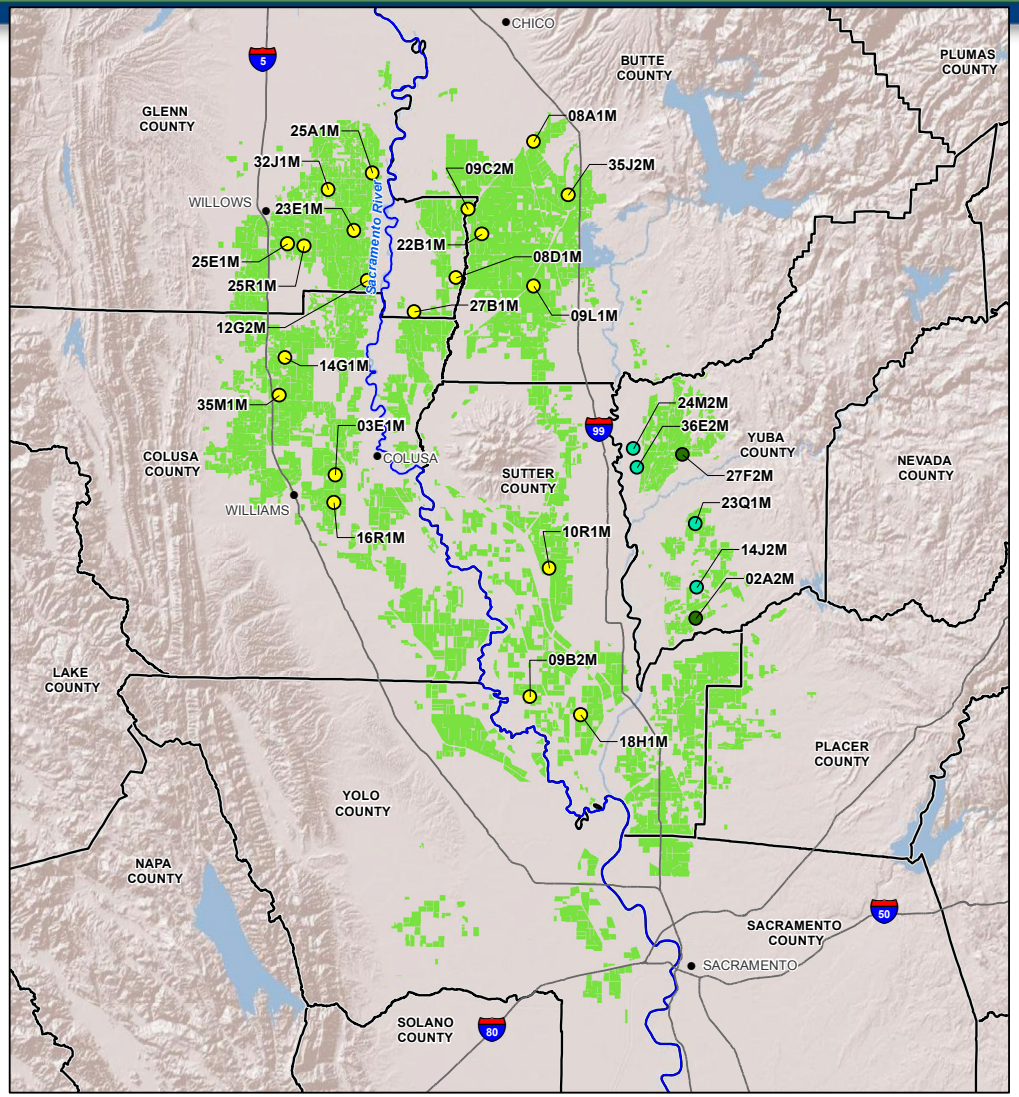
Agricultural Water Quality Programs

- Irrigated Lands Regulatory Program (ILRP)
  - *2002 sunset of agricultural exemption from discharge permits*
  - *2003-2004 start-up of conditional program*
    - Ag Waiver and then ILRP
    - Form coalitions and establish SW monitoring programs
    - Gave rice the basis for commodity specific program
  - *2014 Long-term ILRP became permanent regulation implemented as a Rice Waste Discharge Requirements Order*
    - Surface water, groundwater, pesticides, nitrogen, toxicity, field parameters, Farm Evaluations, and Nitrogen Management Plans
    - Additional requirements for other coalitions
    - This is a real regulation that is not going away

California Rice

CRC Groundwater Monitoring Sites

- Initial proposal to monitor 7 to 9 wells with study area
- 21 wells on three year rotation with study area
  - *Request reduction after three years*
- Groundwater Assessment Report proves rice does not degrade groundwater



LEGEND

- CITY
- COUNTY
- RICE LAND 2017 PERMIT AREA

Well Location

- USGS wells – sampled July 2017
- DWR Wells – sampled August 2016
- DWR Wells – sampled September 2017

NOTES:

DATUM: NAD 1983.

SOURCES: BASEMAP (COPYRIGHT:© 2014 ESRI); RICE LANDS (CAL AG PERMIT, 2015); COUNTY (CAL FIRE 2007) ; HYDROLOGY (NHD ACCESSED JAN 2016).
USGS RICE WELLS (USGS 2017).
DWR MONITORING WELLS (DWR 2017)

California Rice

0 6 12
Miles

FIGURE 4-2
Groundwater Sampling Wells
2017 Annual Monitoring Report
California Rice Commission

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Future Trends for Water Quality

- Water quality regulations gain momentum
  - *Nitrates and salts*
  - *Impacts on disadvantaged communities*
  - *Regulation affects all agriculture*
- Climate change as a regulatory driver
- Increasing influence from non-basic registrants
  - *More of a concern due to inability to provide stewardship*
- More influence at U.S. EPA/OPP from Central Valley Water Board

Thank you

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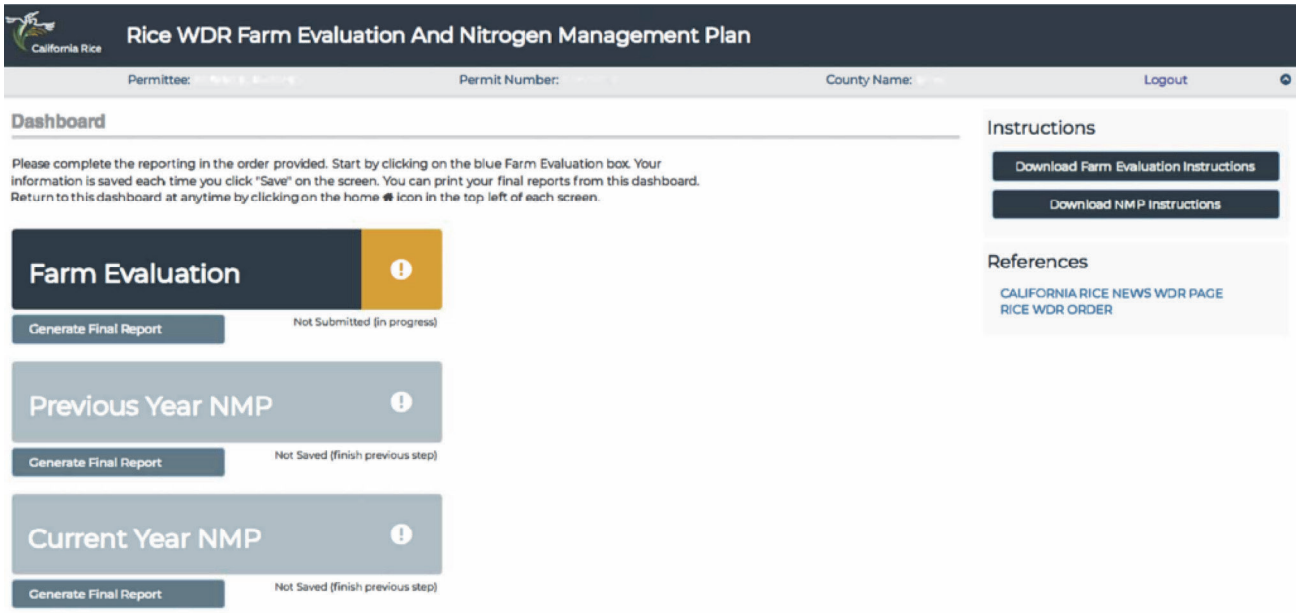
CALIFORNIA RICE NEWS

WDR

WDR • JANUARY 8, 2018

Farm Evaluation & Nitrogen Management Plan reporting website is open



New for this year is a list of Frequently Asked Questions you can access here and on the website.

Please go to calricenews.org and complete the Farm Evaluation (FE) and Nitrogen Management Plan (NMP) reporting by March 1. The reporting for the Rice Waste Discharge Requirements (Rice WDR) remains the same as the last three years.

You will notice some minor formatting improvements in making the process more user friendly, and provide easier access from tablets. Please utilize the onscreen instructions to assist in filling out the information. The Grower Dashboard allows you to begin the reporting by entering the last seven digits of your pesticide use permit number (restricted materials permit or private applicator number in some counties).

You use one login button for all three reporting areas (FE, previous year NMP and current year NMP) with completion in this same sequence. You need to complete the FE before moving onto the previous year NMP. Both require reporting of your farming practices from the previous year. The current year NMP is your planning tool for the upcoming planting season.

The completed and submitted reports can be accessed after the site is closed for maintenance. This allows you to retrieve and print reports throughout the year.

Access through: www.calricenews.org
Click on: Waste Discharge Requirement
Click on: Start an Evaluation under Rice WDR Farm Evaluation
Enter the last seven digits of your pesticide use permit number

For additional information and updates, you can read the posts under www.calricenews.org and click on Waste Discharge Requirements.

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CALIFORNIA
RICE NEWS

WDR

WDR • JUNE 15, 2017

Now is the time to update fields for 2018 reporting

We use the field information from the restricted materials (pesticide permits) at the county agricultural commissioner offices for uploading to the Farm Evaluation and the Nitrogen Management Plan – the reporting requirements for the Rice Waste Discharge Requirements. The CRC cannot manipulate, or change the field information if it is incorrect. Please correct the information at the county agricultural commissioner office in preparation for reporting next year.

Our office requests the data download in September. Please visit the offices soon to allow time for the county agricultural commissioner staff to update the database. The data download for this season is used to populate the database for reporting due by March 1, 2018. We always request reporting from the previous year. Your reporting for this year was from the crop in 2016.