MONITORING AND REPORTING PROGRAM
ORDER NO. R5-2004-0839
FOR
CALIFORNIA RICE COMMISSION

UNDER

RESOLUTION NO. R5-2003-0105

CONDITIONAL WAIVER OFWASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM IRRIGATED LANDS

The Regional Water Quality Control Board, Central Valley Region, (Regional Board) issued *Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Resolution No. R5-2003-0105)(Conditional Waiver)* on 11 July 2003. The Conditional Waiver delegates to the Regional Board Executive Officer the authority to issue a specific monitoring and reporting program (MRP) to an individual discharger or to a group in lieu of the Conditional Waiver MRP. The California Rice Commission (CRC) has proposed a rice specific MRP to assess the sources and impacts of waste in discharges from irrigation return flows and storm water from irrigated rice lands in the Sacramento Valley, and where necessary, to track progress in reducing the amount of waste discharged that affects the quality of the waters of the state and its beneficial uses. The CRC represents individual rice dischargers in the Sacramento Valley that discharge waste to waters of the state.

To meet the requirements of the Conditional Waiver, the CRC submitted an MRP Plan dated 1 October 2004 and Quality Assurance Project Plan (QAPP) dated 3 November 2004 to the Regional Board for review and approval by the Executive Officer. This MRP also takes into account that proposed Plan and QAPP, other technical reports and information submitted by the CRC, and requirements of the Conditional Waiver. The MRP Plan includes sites to be monitored, frequency of monitoring, parameters to be monitored, and documentation of monitoring protocols. The CRC and its contractors shall comply with all requirements and procedures for this MRP as described in the QAPP.

This MRP incorporates requirements as outlined in the Coalition Group MRP Order No. R5-2003-0826 and is issued by the Executive Officer pursuant to Water Code Section 13267. The Executive Officer finds that this MRP meets or exceeds the minimum requirements of the Conditional Waiver. The Executive Officer may revise this MRP when necessary. The CRC shall not implement any changes to this MRP unless a revised MRP is issued by the Executive Officer.

The purpose of this MRP is to monitor the discharge of wastes in irrigation return flows and stormwater from irrigated rice lands. The reports required by this MRP are needed to evaluate impacts of discharges of waste from rice drainages to waters of the state and to determine compliance with the Conditional Waiver.

I. MONITORING AND REPORTING PROGRAM REQUIREMENTS

The MRP must achieve the following objectives to comply with the Conditional Waiver:

a. Assess the impacts of waste discharges from irrigated lands to surface water;
b. Determine the degree of implementation of management practices to reduce discharge of specific wastes that impact water quality;
c. Determine the effectiveness of management practices and strategies to reduce discharges of wastes that impact water quality;
d. Determine concentration and load of waste in these discharges to surface waters; and
e. Evaluate compliance with existing narrative and numeric water quality objectives to determine if additional implementation of management practices are necessary to improve and/or protect water quality.

A. Monitoring Sites

Irrigation Season and non-irrigation season monitoring shall be conducted at the following monitoring sites:

Site Code	Site Name
A	Colusa Basin Drain #5 (CBD5)
B	Butte Slough at Lower Pass Rd (BS1)
D	Colusa Basin Drain above Knights Landing (CBD1)
E	Sacramento Slough near Karnak (SS1)[1]
LCC	Lower Coon Creek at Striplin Rd[2]
JS	Jack Slough at Jack Slough Rd[2]

B. Monitoring Phases

Monitoring shall commence in September 2004 and shall continue through October 2007. At the end of this prescribed monitoring period, the MRP will be reviewed and be revised as appropriate. The following monitoring phases shall take place:

Phase	Duration	Sites
Startup	September 2004 – October 2004	A, B, C, D, JS
Year 1	February 2005 – October 2005	A, B, C, D, JS

[1] If SS1 is inaccessible, alternative site at the Sacramento Slough bridge near Karnak Pump Station may be used. Sampling crew must note if this reclamation district pumps are running on field sheet
[2] LCC and JS will be rotated annually as part of a rotational effort to look at smaller watersheds over time. Monitoring for Year 1 will be at the Jack Slough site.

Year 2	February 2006 – October 2006	A, B, C, D, LCC
Year 3	February 2007 - October 2007	A, B, C, D, JS

IRRIGATION SEASON MONITORING

For the purposes of this MRP, the irrigation season is defined as April through August (four samples during irrigation) and late August through September (two samples as fields are drained for harvest).

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Flow	cfs	Field[1]	Monthly	Annually
pH	pH Units	Field	Monthly	Annually
Electrical conductivity (EC)	umhos/cm	Field	Monthly	Annually
Dissolved oxygen (DO)	mg/l	Field	Monthly	Annually
Temperature	degrees C	Field	Monthly	Annually
Color	ADMI	Field	Monthly	Annually
Turbidity	NTUs	Field	Monthly	Annually
Total dissolved solids (TDS)	mg/l	Field	Monthly	Annually
Aquatic Toxicity[2] (Start Up, Years 1, 2)	% survival	Grab	Monthly	Annually
Sediment Toxicity[3] (Years 1, 2)	% survival	Grab	July, Sept	Annually
Lamda cyhalothrin[4] (Start Up, Year 1)	ug/l	Grab	Monthly	Annually
S-cypermethrin[4] (Start Up, Year 1)	ug/l	Grab	Monthly	Annually

[1] Flow may also be obtained from Department of Water Resources monitoring stations, where available

[2] [2] Acute toxicity testing shall be conducted using the invertebrate, *Ceriodaphnia dubia*, and the larval fathead minnow, *Pimephales promelas*, according to standard USEPA acute toxicity test methods (USEPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. Office of Water, Washington, D.C. EPA-821-R-02-012) In addition, to identify toxicity caused by herbicides, 96-hr toxicity tests with the green algae, *Selenastrum capricornutum*, shall be conducted (USEPA. 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition. Office of Water, Washington, D.C. EPA-821-R-02-013.)

[3] [3] Sediment toxicity testing using the invertebrate species *Hyalella azteca* or *Chironomus tentans* according to USEPA methods shall be conducted for hydrophobic (sediment bound) wastes that are present in the waterbody. (USEPA. 1994. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates. Office of Research and Development, Washington, D.C. EPA-600-R-94-024)

[4] Quantification limits must be lower than LC50 of the most sensitive freshwater aquatic species or other applicable federal or state toxic or risk limits.

Carfentrozone-ethyl[4] (Year 2)	ug/l	Grab	Monthly	Annually
Bispyribac-sodium[4] (Year 2)	ug/l	Grab	Monthly	Annually
Cyhalofop-butyl[4] (Year 3)	ug/l	Grab	Monthly	Annually
Pesticide TBD (Year 3)[5]	ug/l	Grab	Monthly	Annually
Hardness (Year 2)	$CaCO_3$	Field	Monthly	Annually
Cadmium (Year 2)	ug/l	Grab	Monthly	Annually
Lead (Year 2)	ug/l	Grab	Monthly	Annually
Nickel (Year 2)	ug/l	Grab	Monthly	Annually
Zinc (Year 2)	ug/l	Grab	Monthly	Annually
Selenium (Year 2)	ug/l	Grab	Monthly	Annually
Arsenic (Year 2)	ug/l	Grab	Monthly	Annually
Boron (Year 2)	ug/l	Grab	Monthly	Annually

NON-IRRIGATION SEASON MONITORING

Non-irrigation season monitoring focuses on the two most significant discharge periods outside of the rice irrigation season. Each October, rice growers flood their fields in preparation for the winter. In February, rice growers drain their fields in anticipation of the next rice season. Unlike a typical farming operation, rice fields typically capture rainfall on field and drainage is most significant during the winter drainage in February. In an effort to evaluate the impacts of non-irrigation season rice field discharges, at a minimum, the CRC shall monitor as follows:

Constituent	Units	Sample Type	Sampling Frequency (Monthly)	Reporting Frequency

[5] Pesticide to be determined prior to Year 3 monitoring. In their Year 2 annual report, the CRC should nominate a pesticide for monitoring based on use at that time, results of the Pesticide Use Report evaluation and other factors. If it continues to see high level of use, propanil should be among the chemicals considered for future monitoring.

Flow	cfs	Field[1]	Oct, Feb	Annually
pH	pH Units	Field	Oct, Feb	Annually
Electrical conductivity	umhos/cm	Field	Oct, Feb	Annually
Dissolved oxygen	mg/l	Field	Oct, Feb	Annually
Temperature	degrees C	Field	Oct, Feb	Annually
Color	ADMI	Field	Oct, Feb	Annually
Turbidity	NTUs	Field	Oct, Feb	Annually
Total dissolved solids	mg/l	Field	Oct, Feb	Annually
Aquatic Toxicity[2] (Start Up, Years 1, 2)	% survival	Grab	Oct, Feb	Annually
Sediment Toxicity[3] (Years 1, 2)	% survival	Grab	February[4]	Annually
Hardness (Year 2)	$CaCO_3$	Field	Monthly	Annually
Cadmium (Year 2)	ug/l	Grab	Oct, Feb	Annually
Lead (Year 2)	ug/l	Grab	Oct, Feb	Annually
Nickel (Year 2)	ug/l	Grab	Oct, Feb	Annually

[1] Flow may also be obtained from Department of Water Resources monitoring stations, where available.

[2] Acute toxicity testing shall be conducted using the invertebrate, *Ceriodaphnia dubia*, and the larval fathead minnow, *Pimephales promelas*, according to standard USEPA acute toxicity test methods (USEPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. Office of Water, Washington, D.C. EPA-821-R-02-012.)In addition, to identify toxicity caused by herbicides, 96-hr toxicity tests with the green algae, *Selenastrum capricornutum*, shall be conducted. (USEPA. 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition. Office of Water, Washington, D.C. EPA-821-R-02-013.)

[3] Sediment toxicity testing using the invertebrate species *Hyalella azteca* or *Chironomus tentans* according to USEPA methods shall be conducted for hydrophobic (sediment bound) wastes that are present in the waterbody. (USEPA. 1994. Methods for Measuring the Toxicity and Bioaccumulation of Sedimentassociated Contaminants with Freshwater Invertebrates. Office of Research and Development, Washington, D.C. EPA-600-R-94-024.)

[4] Sediment toxicity required in February only if toxicity is found in both the previous irrigation season sampling events (July, September).

Zinc (Year 2)	ug/l	Grab	Oct, Feb	Annually
Selenium (Year 2)	ug/l	Grab	Oct, Feb	Annually
Arsenic (Year 2)	ug/l	Grab	Oct, Feb	Annually
Boron (Year 2)	ug/l	Grab	Oct, Feb	Annually

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EDGE OF FIELD MONITORING

The University of California Calfed grant #384, approved for funding by the State Water Resources Control Board on June 17, 2004 (Resolution No. 2004-0035), contains four study components producing data that the CRC shall submit to the Regional Board to comply with the Conditional Waiver monitoring requirements. More detailed discussion is provided in the CRC MRP Plan. In the event that the University is unable to conduct the monitoring approved in Grant #384, the CRC shall conduct the monitoring specified below.

A. Study Component No. 1:

The CRC shall determine the amount and movement of Total Organic Carbon/Total Dissolved Carbon (TOC/DOC), TDS/EC and turbidity in outflows from rice fields with differing straw and winter flood practices. A minimum of 4 fields shall be selected with 2 plots per field. Likely treatments shall be burned compared to winter flooded and burned compared to incorporated flooded. Selection of fields shall attempt to represent the major hydrologic areas where rice is grown in the Sacramento Valley.

Recognizing that study design will be finalized after grant execution, the CRC shall obtain data on the following constituents:

Monitoring Event Constituents to be Monitored[2]	Sampling Frequency	Reporting Frequency
Winter Drainage – TOC/DOC	Weekly	Annually[1]

Drainage is very dependant TDS
on growers preferences and EC

varies annually. It usually occurs over a several week period in February and/or March.	Turbidity *E. Coli* Copper Nitrogen (NO_3, NH_4) Phosphorus (ortho-PO_4) Potassium Sediment		
Drainage for Harvest Drainage is very dependant on growers preferences and EC varies annually. It usually occurs over a several week period in August and/or September and/or October.	TOC/DOC TDS EC Turbidity *E. Coli* Copper Nitrogen (NO_3, NH_4) Phosphorus (ortho-PO_4)' Potassium Sediment	Weekly	Annually[1]
All other months (not captured by Winter Drainage or Drainage for Harvest as defined above)	TOC/DOC TDS EC Turbidity *E. Coli* Copper Nitrogen (NO_3, NH_4) Phosphorus (ortho-PO_4) Potassium Sediment	Monthly	Annually[1]

[1] The CRC must submit the UC grant data as part of their annual report, along with their own analysis of data, including summarizing, interpreting and discussing the specific data to be used for compliance with this MRP order.

[2] *E. Coli*, Copper, Nitrogen, Phosphorus, Potassium, and sediment monitoring added to meet requirements of Waiver. Costs may exceed those allocated by the grant, in which case the CRC will be responsible for providing funding to ensure monitoring of these constituents.

B. Study Component No. 2:

The CRC shall determine the amount and transport of TOC/DOC, TDS/EC and turbidity in rice field peripheral drains. A minimum of 4 drains (1 per field) shall be selected downstream of the fields used in Study Component No. 1.

Monitored	Constituents to be Monitored	Sampling Frequency	Reporting Frequency
Winter Drainage –	TOC/DOC	Weekly	Annually[1]

Drainage is very dependant on growers preferences and varies annually. It usually occurs over a several week period in February and/or March.	TDS EC Turbidity		
Drainage for Harvest	TOC/DOC	Weekly	Annually[1]
Drainage is very dependant on growers preferences and varies annually. It usually occurs over a several week period in August and/or September and/or October.	TDS EC Turbidity		
All other months (not captured by Winter Drainage or Drainage for Harvest as defined above)	TOC/DOC TDS EC Turbidity	Monthly	Annually[1]

[1] The CRC must submit the UC grant data as part of their annual report, along with their own analysis of data, including summarizing, interpreting and discussing the specific data to be used for compliance with this MRP order.

C. Study Component No. 3:

The CRC shall submit data from plots representing typical rice production in the grant component that will determine the impact of alternative seeding methods on pest management and pesticide outflows from rice fields. At a minimum, two plots at the Rice Research Station (Biggs, CA) shall produce data usable for the Conditional Waiver monitoring including the following: (1) water seeded conventionally farmed rice (2) dry seeded conventionally farmed rice.

Constituents to be Monitored	Pesticides	Sampling Frequency	Reporting Frequency
Event After Top Dressing of Fertilizer	(To be determined)[2]	Twice monthly	Annually[1]
For approximately one month following topdressing, which varies each season but usually occurs in June and/or May.	Nitrogen (NO_3, NH_4)		
Irrigation Season (excluding top dressing	Pesticides (To be determined)[2]	Monthly	Annually[1]

monitoring defined above). Irrigation season is defined as April through September.	Nitrogen (NO_3, NH_4)		

[1] The CRC must submit the UC grant data as part of their annual report, along with their own analysis of data, including summarizing, interpreting and discussing the specific data to be used for compliance with this MRP order.
[2] Pesticides applied to plots will be determined at a later date (as required by the grant deliverable timeline) but will most likely consist of the most effective combinations to be as realistic as possible to actual growing practices.

D. Study Component No. 4:

The CRC shall submit data from plots representing typical rice production in the grant component that will determine the impact of alternative rice seeding methods and irrigation management on N and P and sediment outflows from rice fields. At a minimum, two plots at the Rice Research Station (Biggs, CA) shall produce data usable for the waiver monitoring include the following: (1) water seeded conventionally farmed rice (2) dry seeded conventionally farmed rice.

Constituents to be Monitoring Event Post Planting	Monitored Nitrogen (NO_3, NO_2, NH_4, Organic N) Phosphorus (ortho PO_4, Organic P)	Sampling Frequency Twice monthly	Reporting Frequency Annually[1]
First 60 days after planting (planting usually occurs in May or late April)			

Constituents to be Monitoring Event Remaining Months of Irrigation Season excluding Post Planting defined above (likely Aug, Sept, perhaps July depending on planting date)	Monitored Nitrogen (NO_3, NO_2, NH_4, Organic N) Phosphorus (ortho PO_4, Organic P)	Sampling Frequency Monthly	Reporting Frequency Annually[1]

[1] The CRC must submit the UC grant data as part of their annual report, along with their own analysis of data, including summarizing, interpreting and discussing the specific data to be used for compliance with this MRP order.

MANAGEMENT PRACTICE DEVELOPMENT

The CRC shall collect information from Dischargers (individual rice growers) on the type of management practices that are being used, the degree to which they are being implemented within the watershed, and how effective they are in protecting waters of the state throughout the phases of this MRP. Data shall be collected in four broad areas; (1) pesticide mixing, loading, and application practices; (2) pest management practices; (3) management practices to address others wastes (salt, sediment, nitrogen, etc.), and (4) cultural practices. This information may be used to compare the effectiveness of management practices in reducing loading of constituents of concern. As data is collected, this information shall be submitted in the Annual Monitoring Report.

A. Communication Report

When monitoring results indicate that water quality objectives are exceeded in the surface waters of the CRC area, the CRC shall submit a Communication Report describing how it will evaluate the effectiveness of one or more management practice(s) at preventing discharges of constituents of concern (COCs) to surface waters. The selection of management practice evaluation projects shall include consideration of the contribution of target COCs to known water quality impairments, potential application of the management practices over a broad geographic area that address rice discharges and ease and immediacy of possible implementation. Projects need not involve new practices, but can involve quantification of benefits of existing practices.

Several Communication Reports may be submitted for each proposed, implemented, or completed project and shall include, at a minimum: description of management practice(s) being evaluated, target chemical(s), reasons for selecting the specific project, methodology for evaluating the effectiveness of the practice (including sampling and QA/QC plans), and involvement by stakeholders and agencies in developing, implementing and evaluating the project. If projects are completed, the Communication Report shall present the conclusion(s) of the evaluation project. Submission of Communication Reports is an ongoing process.

The CRC shall immediately notify Regional Board staff, via email or fax, that an exceedance of any water quality objective has occurred. The CRC shall submit a written Communication Report within one week of the notification setting forth the process the CRC will follow to investigate the source of toxicity, such as conducting a TIE and communicating with local agricultural commissioners. The CRC shall submit follow-up Communication Reports, as needed, that outline further steps the CRC is taking to address the exceedance(s) of water quality objectives (i.e. grower outreach and management practice implementation).

ADDITIONAL REQUIREMENTS

A. PESTICIDE MONITORING - EVALUATION OF MOST RECENT PESTICIDE USE REPORT (PUR) DATA

PUR Evaluation Report Due: 31 December 2005

The CRC shall submit a PUR Evaluation Report that shall consist of an evaluation of chemicals used on rice fields listed in the most recent version of the Department of Pesticide Regulation PUR. Chemicals will be evaluated based on existing use levels, toxicity data, and other factors. Evaluation should include a prioritized list of chemicals for future monitoring.

B. MONITORING OF METALS

Metal Exemption Request(s) Due: 1 August 2005

Prior to Year 2 monitoring, the CRC shall submit a Metals Report and may request that they be exempted from metal monitoring (other than copper). The Metals Report must present monitoring data for the constituent(s) of concern and evaluate in relation to beneficial uses. The Metals Report shall indicate whether the detection limit used in evaluating any data used for this purpose was lower than levels of concern to aquatic life. A statement that a constituent is either not used on a rice field or not mobilized on a rice field is insufficient evidence for an exemption from monitoring.

C. EDGE OF FIELD MONITORING – QAPP AND MONITORING PLAN

The CRC shall submit a Draft QAPP and Monitoring Plan to Regional Board staff for review based on the deliverable schedule established when the grant is executed.

Monitoring results for monitoring specifically conducted through the UC grant to meet the Conditional Waiver monitoring requirements shall be submitted as part of the Annual Monitoring Report. The Annual Monitoring Report shall include a detailed discussion of how the data meets the Conditional Waiver requirements (including an evaluation of beneficial uses, as applicable).

REPORTING REQUIREMENTS

A. Annual Monitoring Report Due: Annual, 31 December

The CRC shall prepare the Annual Monitoring Report (AMR) after field monitoring events have been completed and shall include a review of the monitoring program including the results of the data collected and data evaluation. The AMR shall include the following components:

1 Title page;
2 Table of contents;
3 Description of the watershed;
4 Monitoring objectives;
5 Sampling site descriptions;
6 Location map of sampling sites and land use;
7 Tabulated results of analyses;
8 Sampling and analytical methods used;
9 Copy of chain of custodies;
10 Associated laboratory and field quality control samples results;
11 Summary of precision and accuracy;
12 Pesticide Use Information;
13 Data interpretation including assessment of data quality objectives;
14 Summary of management practices used;
15 Actions taken to address water quality impacts identified, including but not limited to, revised or additional management practices to be implemented;
16 Communication Report; and
17 Conclusions and recommendations.

The AMR shall include copies of all field documentation and laboratory original data must be included in the annual monitoring report as attachments. The AMR shall also provide a perspective of the field conditions including a description of the weather, rainfall, temperature, stream flow, color of the water, odor, and other relevant information that can help in data interpretation.

In reporting monitoring data, the CRC shall arrange the data in tabular form so that the required information is readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with the Conditional Waiver.

A transmittal letter shall accompany each AMR. This letter shall include a discussion of any violations of the Conditional Waiver found during the reporting period, and actions taken or planned for correcting noted violations, such as operational, field or facility modifications. If the CRC has previously submitted a Communication Report describing actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall be signed and contain a penalty of perjury statement by the CRC, or the CRC's authorized agent. This statement shall state:

> *"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the*

possibility of civil liability under California Water Code Section 13267 and fines pursuant to the California Water Code Division 7 for violations."

The Regional Board may request CRC and/or individual Dischargers to take additional actions if monitoring data indicates the water quality objectives are exceeded in surface waters.

Based on results of the monitoring program after a minimum of one year, the CRC may submit a revised MRP Plan requesting a reduction in the constituents monitored and/or sample frequency. If such reductions are warranted, the MRP may be revised by the Executive Officer.

The CRC, on behalf of the individual member dischargers, shall implement the above monitoring program as of the date of this Order.

Ordered by: ___ Signed by_____THOMAS R. PINKOS, Executive Officer

18 November 2004
(Date)