

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION**

**ATTACHMENT C to ORDER R7-2019-0030
MONITORING AND REPORTING PROGRAM**

**GENERAL WASTE DISCHARGE REQUIREMENTS
FOR
DISCHARGES OF WASTE FROM IRRIGATED AGRICULTURAL LANDS
FOR DISCHARGERS THAT ARE MEMBERS OF A COALITION GROUP
IN THE PALO VERDE VALLEY AND PALO VERDE MESA
IMPERIAL AND RIVERSIDE COUNTIES**

I. Introduction

This Monitoring and Reporting Program (MRP) is required pursuant to Water Code section 13267, which authorizes the California Regional Water Quality Control Board, Colorado River Basin Region (Colorado River Basin Water Board) to require preparation and submittal of technical and monitoring reports. This MRP includes requirements for the Palo Verde Outfall Coalition (Outfall Coalition or Coalition), a third-party representative entity assisting individual Irrigated Agricultural Lands operators and owners that are members of the Coalition (Members) and enrolled under the *General Waste Discharge Requirements for Discharges of Waste from Irrigated Agricultural Lands for Dischargers that Are Members of a Coalition Group in the Palo Verde Valley and Palo Verde Mesa*, Order R7-2019-0030 (Order). It also contains monitoring and reporting requirements for Members with respect to on-farm drinking water well testing. The requirements of this MRP are necessary to monitor Member compliance with the provisions of the Order and determine whether state waters receiving discharges from Members are meeting water quality objectives.

This MRP establishes specific surface water and groundwater monitoring, reporting, and electronic data deliverable requirements for the Outfall Coalition. Due to the variable nature of Irrigated Agricultural Lands operations, monitoring requirements for surface waters and groundwaters will be periodically reassessed to determine if changes should be made to better represent Irrigated Agricultural Lands discharges to state waters. The monitoring schedule will also be periodically reassessed so that constituents are monitored during application and/or release timeframes, when constituents of concern are most likely to affect water quality. The Coalition must not implement any changes to this MRP unless the Colorado River Basin Water Board or its Executive Officer issues a revised MRP.

This MRP conforms to the goals of the Nonpoint Source (NPS) Program as outlined in the *Plan for California's nonpoint source pollution control program* by:

1. tracking, monitoring, assessing, and reporting program activities;
2. ensuring consistent and accurate reporting of monitoring activities;
3. targeting NPS Program activities at the watershed level;
4. coordinating with public and private partners; and
5. tracking implementation of management practices to improve water quality and

protect existing beneficial uses.

Surface water and groundwater monitoring must provide sufficient data to describe Irrigated Agricultural Lands' impacts on surface water and groundwater quality and to determine whether existing or newly implemented management practices comply with the receiving water limitations of the Order. Surface water and groundwater monitoring shall include a comprehensive suite of constituents (also referred to as "parameters") monitored periodically in a manner that allows for an evaluation of the condition of a water body and determination whether Irrigated Agricultural Lands operations in the Palo Verde Valley and Palo Verde Mesa watersheds are causing or contributing to any surface water or groundwater quality problems.

II. General Monitoring and Reporting Provisions

1. Samples and measurements taken for the purpose of monitoring shall be representative of the volume and nature of the discharge sampled and shall be collected at monitoring points approved by the Colorado River Basin Water Board's Executive Officer.
2. All monitoring instruments and devices shall be properly maintained and calibrated as necessary to ensure their continued accuracy. Any flow measurement devices shall be calibrated at least once per year to ensure continued accuracy of the devices.
3. Monitoring shall be conducted according to the U.S. Environmental Protection Agency (USEPA) test procedures approved under title 40 of the Code of Federal Regulations (40 CFR) part 136, *Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act*, as amended, for the analyses of pollutants, unless another method is specified in this MRP. The Colorado River Basin Water Board's Executive Officer may approve equivalent test procedures at her or his discretion.
4. Groundwater monitoring, sample preservation, and analyses shall be performed in accordance with the latest edition of USEPA's *Test Methods for Evaluating Solid Waste*, SW-846, unless another method is specified in this MRP. The Colorado River Basin Water Board's Executive Officer may approve equivalent test procedures at her or his discretion.
5. Laboratory data must quantify each constituent down to the approved reporting levels for specific constituents. All analytical data shall be reported with method detection limits (MDLs) and with either the reporting level or limits of quantitation (LOQs) according to 40 Code of Federal Regulations part 136, Appendix B.
6. All analyses shall be conducted by a laboratory certified to perform such analyses by the [State Water Resources Control Board \(State Water Board\), Division of Drinking Water's Environmental Laboratory Accreditation Program \(ELAP\)](#).
7. Monitoring data collected to meet the requirements of the Order must be collected

and analyzed in a manner that ensures the quality of the data. The Coalition must follow sampling and analytical procedures as specified in the approved Monitoring Program Quality Assurance Project Plan (QAPP).

8. The Coalition shall retain records of all monitoring information, copies of all reports required by the Order, and records of all data used to complete the application for the Order, for a period of at least **10 years** from the date of the sample, measurement, report or application. Records may be maintained electronically, and back up files must be stored in a secure, offsite location managed by an independent entity.
9. Records of monitoring information shall include:
 - a. The date, time, and location that the sample was taken.
 - b. The individual(s) who performed the sampling or measurements.
 - c. The date(s) analyses were performed.
 - d. The individual(s) who performed the analyses.
 - e. The analytical techniques or methods used; and
 - f. The results of such analyses.
10. To the extent feasible, all technical reports, information, and data required by this MRP must be submitted electronically in a format specified by the Colorado River Basin Water Board's Executive Officer.
11. This MRP requires the Outfall Coalition to collect information from its Members and allows the Coalition to report the information to the Board in a summary format. The Coalition must submit specific Member information collected as part of the Order and this MRP when requested by the Executive Officer or as specified in the Order.
12. This MRP becomes effective May 15, 2019. The Executive Officer may revise this MRP as necessary. Upon the effective date of this MRP, the Outfall Coalition, on behalf of the individual Members, shall implement the monitoring and reporting below.

III. surface Water Quality Monitoring Requirements

A. Surface Water Monitoring Sites

Surface water monitoring shall be performed at sites which are representative of the greater watershed for Palo Verde Valley and Palo Verde Mesa. This MRP designates the following four (4) sites as representative of the Palo Verde Valley and Palo Verde Mesa:

- Monitoring Site # 1 is in the Colorado River at the Palo Verde Diversion Dam. Samples from this location serve as an upstream control for comparison with the other monitoring sites.
- Monitoring Site # 2 is upstream of the siphon where the Eastside Drain crosses Lovekin Boulevard.
- Monitoring Site # 3 is in the Outfall Drain between 35th Avenue and the line

between Imperial and Riverside Counties.

- Monitoring Site # 4 is at the Outfall Drain metering station 148+00 about 0.8 miles above the Township line, which is the southern boundary line for Palo Verde Irrigation District (PVID).

The Coalition shall propose these locations in its Surface and Groundwater Monitoring Program Plan, subject to approval of the Executive Officer. These 4 sites will provide surface water quality information on the Irrigated Agricultural Lands discharge to the drain system. By comparing the upstream water quality at Site #1 with the downstream water quality at Sites #2, 3, or 4, maintenance impacts for various time periods can be evaluated for the different stretches of drainage areas. Also, for the Outfall Drain, by comparing the upstream water quality at Site #2 to the downstream Site #3 and additionally by comparing the upstream water quality at Site #3 to the downstream Site #4, maintenance impacts for various time periods can be evaluated for the different stretches of the drain system. The comparison of the upstream Site #1 water quality to the downstream Site #4 will help to determine the magnitude of constituents discharging to the Colorado River.

Samples are to be taken within the actual flow area of the water. Sampling should be avoided from ponded, sluggish, or stagnant water. Note that samples taken downstream of a bridge could be contaminated from the bridge structure or runoff from the road surface, so samples should be taken upstream when possible.

Table 1. Outfall Coalition Surface Water Quality Monitoring Sites Geographic Coordinates¹

Monitoring Site	Station Code	Latitude	Longitude
1	PVC Sta. 5+80	33.730679	-114.512032
2	Eastside Drain Sta. 110+62	33.537615	-114.599387
3	Outfall Drain Sta. 567+99	33.455931	-114.705504
4	Outfall Drain Sta. 148+00	33.455931	-114.718484

B. Monitoring Schedule, Frequency, and Parameters

Monitoring must be conducted when the pollutant is most likely to be present. If there is a temporal or seasonal component to a beneficial use of the water body, monitoring must also be conducted when beneficial use impacts could occur. The frequency of data collection must be sufficient to allow determination of compliance with the relevant numeric water quality objective(s) or water quality guideline triggers.

The major pollutants of concern within the Palo Verde region from Irrigated Agricultural Lands discharges include nutrients, pesticides, salts, and sediments. Water quality monitoring shall be used to assess the wastes in discharges from Irrigated Agricultural Lands to state waters and to evaluate the effectiveness of management practices implementation. Water quality shall be evaluated with both field-measured parameters and

¹ Monitoring sites listed in the table are not an exclusive list; the Executive Officer may require that the Coalition add monitoring sites as necessary to meet the requirements of the Order.

laboratory analytical testing as listed on Table 2. Water quality shall also be evaluated with fish tissue laboratory analytical testing as listed in Table 3.

Table 2: Surface Water Quality Monitoring Parameters, Frequency, and Aquatic Life and Consumption Numeric Water Quality Objectives or Criteria at all 4 sites ^{2 3}

Parameter	Field or Laboratory Analysis	Frequency	Numeric Water Quality Objectives or Criteria
pH	Field	Monthly	6.0 to 9.0
Temperature	Field	Monthly	
Total Dissolved Solids (TDS)	Field	Monthly	
Total Dissolved Solids (TDS)	Laboratory	Quarterly	
Dissolved Oxygen (DO)	Field	Monthly	5.0 mg/L ⁴
Chloride	Laboratory	Quarterly	230 mg/L
Nitrate (as N)	Laboratory	Quarterly	
Total Nitrogen	Laboratory	Quarterly	
Total Suspended Solids (TSS)	Laboratory	Quarterly	200 mg/L
Total Phosphorus	Laboratory	Semi-annual (March and October)	
<i>Escherichia coli</i> ⁵	Laboratory	Quarterly	6-week GM ⁶ (100 cfu/100 ml ⁷); or STV ⁸ (320 cfu/100 ml)
Chlorpyrifos	Laboratory	Semi-annual (March and October)	0.020 µg/l ⁹ (1-hour average), 0.014 µg/l (4-day average).
Malathion	Laboratory	Semi-annual (March and October)	0.170 µg/l (Max 1-hour average), 0.028 µg/l (4-day average)
Dimethoate	Laboratory	Semi-annual (March and October)	43 µg/l

Annual (once yearly) fish tissue sampling will be conducted in late October/early November. The following table lists the constituents that are to be analyzed on trophic

² SM = Standard Method; EPA = Environmental Protection Agency Method

³ Laboratory analyses should have the detection limit and reportable detection limit lower than corresponding numeric water quality objectives or water quality guidelines. Change of laboratory method with approval of Regional Water Board may be required to meet the reporting limits requirement.

⁴ mg/L = milligrams per liter

⁵ The new E. coli numeric water quality objective was recently adopted by the State Water Board and approved by OAL and USEPA.

⁶ GM = geometric mean

⁷ 100 cfu/100 ml = 100 colony-forming units per 100 milliliters

⁸ STV = statistical threshold value

⁹ µg/l = micrograms per liter

level 4 fish tissue samples from the selected sample site on an annual basis:

Table 3: Fish Tissue Monitoring Parameters, Frequency, and Water Quality Objectives at Monitoring Site # 3^{10 11}

Fish Tissue Measured Parameters	Field or Laboratory Analysis	Frequency	Numeric Water Quality Objectives or Criteria
DDT	Laboratory	Annual	15 ug/kg
Toxaphene	Laboratory	Annual	4.3 ug/kg

C. Surface Water Data Management Requirements

Data should be provided in a form compatible with the Surface Water Ambient Monitoring Program (SWAMP). The results of monitoring are to be included in the monthly and annual monitoring reports described below, and shall include a map of the sampled locations, tabulation of the analytical data, and time concentration charts.

IV. Groundwater Quality Monitoring Requirements

The Coalition must collect sufficient data to describe Irrigated Agricultural Lands impacts on groundwater quality and to determine whether existing or newly-implemented management practices comply with the groundwater receiving water limitations of the Order. The evaluation of groundwater quality required by this MRP focuses on two primary areas: (1) groundwater trend monitoring and (2) drinking water supply well monitoring.

The purpose of the groundwater quality trend monitoring program is to determine current water quality conditions of groundwater relevant to Irrigated Agricultural Lands and develop long-term groundwater quality information that can be used to evaluate the regional effects of Irrigated Agricultural Lands practices. The purpose of the drinking water supply well program is to identify drinking water wells that have nitrate concentrations that threaten to exceed the maximum contaminant level (MCL) of 10 mg/L of nitrate + nitrite as N and notify any well users of the potential for human health impacts.

A. Groundwater Quality Trend Monitoring

The Coalition shall develop a groundwater monitoring network of wells that will (1) be representative of the Coalition’s geographic area and (2) employ shallow wells (though not necessarily wells completed in the uppermost zone of first encountered groundwater). The Coalition shall propose the locations of the sampling wells in its Surface and Groundwater Monitoring Program Plan, subject to approval of the Executive Officer. The rationale for the distribution of trend monitoring wells shall be included in the workplan.

¹⁰ SM = Standard Method; EPA = Environmental Protection Agency Method

¹¹ Laboratory analyses should have the detection limit and reportable detection limit lower than corresponding numeric water quality objectives or water quality guidelines. Change of laboratory method with approval of Regional Water Board may be required to meet the reporting limits requirement.

Details for wells proposed for groundwater monitoring shall include:

1. GPS coordinates;
2. Physical address of the property on which the well is situated (if available);
3. California state well number (if known);
4. Well depth;
5. Top and bottom perforation depths;
6. A copy of the water well drillers log, if available;
7. Depth of standing water (static water level), if available (this may be obtained after implementing the program); and
8. Well seal information (type of material, length of seal).

Monitoring wells shall be sampled, at a minimum, annually at the same time of the year and analyzed at least for the indicator parameters identified in Table 4 below:

Table 4: Groundwater Monitoring Constituents, Methods, Frequency, and Drinking WQOs^{12 13}

Surface Water Measured Parameters	Field or Laboratory Analysis	Frequency	Numeric Water Quality Objectives or Criteria
Dissolved Oxygen (DO)	Field	Annually	
pH	Field	Annually	
Nitrate (as N)	Laboratory	Annually	10 mg/L
Total Dissolved Solids (TDS)	Laboratory	Annually	
Temperature	Field	Annually	
Anions (carbonate, bicarbonate, chloride, and sulfate)	Laboratory	Initially and once every five years	
Cations (boron, calcium, sodium, magnesium, and potassium)	Laboratory	Initially and once every five years	
Malathion	Laboratory	Annually	
Dimethoate	Laboratory	Annually	

The results of trend monitoring shall be included in the Coalition’s annual monitoring reports and shall include a map of the sampled wells, tabulation of the analytical data, and time concentration charts.

B. Drinking Water Supply Well Monitoring

¹² SM = Standard Method; EPA = Environmental Protection Agency Method

¹³ Laboratory analyses should have the detection limit and reportable detection limit lower than corresponding numeric water quality objectives or water quality guidelines. Change of laboratory method with approval of Regional Water Board may be required to meet the reporting limits requirement

By **March 1, 2020**, Members must initiate sampling of drinking water supply wells located on their property, as described below:

1. **Initial Testing.** Initially, Members must conduct annual drinking water supply well sampling for nitrates for three years. In lieu of one or more of these three annual tests, Members may submit one or more annual drinking water supply well sampling results from one or more of the five prior years, provided sampling and testing for nitrates was completed using EPA-approved methods and by an ELAP-certified laboratory.
2. **Continued Testing.** Members must continue conducting annual drinking water supply well sampling for nitrates, unless the nitrate concentration is below 8 mg/L nitrate+nitrite as N in three consecutive annual samples, in which case Members may conduct sampling every five years going forward. An alternative sampling schedule based on trending data for the well may be required by the Executive Officer at any time.
3. **Ceasing Sampling.** Sampling may cease if a drinking water well is taken out of service or no longer provides drinking water, including where the well is taken out of service because sufficient replacement water is being supplied. Members must keep any records (e.g. photos, bottled water receipts) establishing that the well is not used for drinking water.
4. **Exceedances.** If groundwater monitoring determines that water in any well that is used for drinking water exceeds 10 mg/L of nitrate+nitrite as N, the Member must provide notice to the users within 10 days of learning of the exceedance and send a copy of the notice to the Colorado River Basin Region Water Board. If the Member is not the owner of the Irrigated Agricultural Lands, the Member may provide notice instead to the owner within 24 hours of learning of the exceedance, and the owner must provide notice to the users within nine days and send a copy of the notice to the Colorado River Basin Region Water Board.
5. **Form of Notice.** At a minimum, notice shall be given to users by providing them a copy of a Drinking Water Notification Template approved by the Executive Officer. The template shall be signed by the Member (or landowner if the Member is not the owner) certifying notice has been provided to the users. A copy of the signed template shall be sent to the Colorado River Basin Region Water Board and retained by the Member or non-Member owner.

Groundwater samples must be collected using proper sampling methods, chain-of-custody, and quality assurance/quality control protocols. Groundwater samples must be collected at or near the well head before the pressure tank and prior to any well head treatment. In cases where this is not possible, the water sample must be collected from a sampling point as close to the pressure tank as possible, or from a cold-water spigot located before any filters or water treatment systems.

All drinking water supply well monitoring data, including any existing data, is to be submitted electronically to the State Water Board's GeoTracker database by the testing laboratory.

The data submitted shall include the APN where the drinking water supply well is located.

V. Surface and Groundwater Monitoring Program Plan

The Coalition shall prepare and submit a detailed Surface and Groundwater Monitoring Program Plan (Monitoring Program Plan) to implement the surface water and groundwater monitoring requirements specified in this MRP. The Monitoring Program Plan is required under Section E.5.b of the General WDRs and shall be submitted **within 90 days** of adoption of the Order.

At a minimum the Monitoring Program Plan shall contain the following:

1. Monitoring Event Preparation and Protocols

The Monitoring Program Plan shall include a description of monitoring event preparation and field protocols for sample collection and sample handling (including chain of custody requirements). The Monitoring Program Plan shall also describe protocols for ensuring that all monitoring instruments and devices used by the Coalition for the prescribed monitoring and sample collection are properly maintained and calibrated to ensure proper working condition and continued accuracy.

2. Quality Assurance Project Plan (QAPP)

The Monitoring Program Plan shall include a QAPP describing the objectives and organization of the proposed surface water and groundwater monitoring, and quality assurance/quality control to be conducted. The purpose of the QAPP is to ensure that the data collection and analysis is consistent with the type and quality of data needed to meet the Colorado River Basin Water Board's monitoring goals and objectives. The QAPP shall meet the State Water Board's SWAMP requirements and shall include at least the following four sections: (1) Project Management, (2) Data Generation and Acquisition, (3) Assessment and Oversight, and (4) Data Validation and Usability. Laboratory analytical methods shall be included as an appendix of the QAPP. The Executive Officer must approve the QAPP prior to implementation. The Water Board website contains a [QAPP template](#).

3. Monitoring Locations

The Monitoring Program Plan shall include a list of the monitoring locations. The monitoring locations shall meet the monitoring location requirements listed in Sections III.A and IV.A of this MRP. The Monitoring Program Plan shall describe the characteristics of each sampling site, including nearby crop type and cultivation practices, and shall provide an appropriately scaled map of the monitoring locations and GPS coordinates for each monitoring location. The Monitoring Program Plan shall also provide the supporting scientific rationale for the selection of each surface water monitoring location including a demonstration that the proposed locations are appropriate for evaluating the effects of irrigation runoff, stormwater, and non-stormwater discharges from Irrigated Agricultural Lands, and for evaluating the success of management practices.

4. Monitoring Constituents

The Monitoring Program Plan shall include a list of the constituents to be monitored

at each monitoring location shall be provided. The list shall include, but need not be limited to, the parameters listed in Tables 2, 3, and 4 and Sections III.B, IV.A, and IV.B of this MRP.

5. Monitoring Frequency

The Monitoring Program Plan shall include the frequency and approximate dates of monitoring. Surface water monitoring shall be conducted during the dry season and wet season and at the frequency specified in in Tables 2, 3, and 4 and Section III.B, IV.A, and IV.B of this MRP.

6. Monitoring Team

A description of the monitoring team and analytical laboratories, including names, titles, qualifications, and contact information of key personnel. Changes to the monitoring team should be included in the Annual Monitoring Report (Section VI.E of this MRP).

VI. Reporting Requirements

Reports and notices shall be submitted in accordance with Section F of the Order, General Provisions.

A. Monthly Submittals of Surface Water Monitoring Results

Each month, the Coalition shall submit surface water field measurements and laboratory analysis results as they are available in an electronic format. The monthly surface water monitoring data results shall include the following for the required reporting period:

1. An Excel workbook containing all data records (surface water data). The workbook shall contain, at a minimum, those items detailed in the most recent version of the Coalition's approved Monitoring Program Plan and QAPP.
2. Electronic copies of all field sheets.
3. Electronic copies of photos obtained from all surface water monitoring sites, clearly labeled with station code and date.
4. Electronic copies of all applicable laboratory analytical reports on a CD.
5. For chemistry data, analytical reports must include, at a minimum, the following:
 - a. A lab narrative describing quality control failures;
 - b. Analytical problems and anomalous occurrence;
 - c. Chain of custody and sample receipt documentation;
 - d. All sample results for contract and subcontract laboratories with units, Reporting Limits and Method Detection Limits;
 - e. Sample preparation, extraction, and analysis dates; and
 - f. Results for all quality control samples including all field and laboratory blanks, lab control spikes, matrix spikes, field and laboratory duplicates, and surrogate recoveries.

If any data is missing from the monthly report, the submittal must include a description of what data is missing and when it will be submitted to the Colorado River Basin Water Board.

B. Annual Submittal of Groundwater Monitoring Results

Each year, the Coalition shall submit groundwater field measurements and laboratory analysis results as they are available in an electronic format. The annual groundwater monitoring data results shall include the following for the required reporting period:

1. An Excel workbook containing all data records (groundwater data). The workbook shall contain, at a minimum, those items detailed in the most recent version of the Coalition's approved Monitoring Program Plan and QAPP.
2. Electronic copies of all field sheets.
3. Electronic copies of photos obtained from all surface water monitoring sites, clearly ~~labeled~~ with station code and date.
4. Electronic copies of all applicable laboratory analytical reports on a CD.
5. For chemistry data, analytical reports must include, at a minimum, the following:
 - a. A lab narrative describing quality control failures;
 - b. Analytical problems and anomalous occurrence;
 - c. Chain of custody and sample receipt documentation;
 - d. All sample results for contract and subcontract laboratories with units, Reporting Limits and Method Detection Limits;
 - e. Sample preparation, extraction and analysis dates; and
 - f. Results for all quality control samples including all field and laboratory blanks, lab control spikes, matrix spikes, field and laboratory duplicates, and surrogate recoveries.
 - g. If any data is missing from the annual data report, the submittal must include a description of the missing data and the date it will be submitted to the Colorado River Basin Water Board.

C. Annual Management Practice Data

By **March 1, 2020**, and **annually** thereafter, the Coalition shall submit to the Colorado River Basin Water Board management practice implementation data from the most recently submitted Farm Plans.

The following data shall be reported to the Colorado River Basin Water Board for each field:

1. Anonymous Member ID
2. Crop: If the Member has more than one field of a given crop, these may be identified by crop plus a number (e.g., tomato₁, tomato₂)
3. Irrigation method
4. Irrigation practices
5. Pest management practices
6. Sediment and erosion management practices
7. Whether there are irrigation wells
8. Whether there are abandoned wells

D. Annual Irrigation and Nitrogen Management Summary Data

The Coalition shall submit certain data from the prior year's Irrigation and Nitrogen

Management Plan (INMP) Summary Reports and certain additional calculations in three tables in Excel workbook format.

The Coalition shall submit the Individual Field AR Data by Anonymous Member ID Table beginning **March 1, 2022** and **annually** thereafter. The Coalition shall submit Individual Field AR Data by Anonymous APN ID Table beginning **March 1, 2022** and **annually** thereafter. The Coalition shall submit Township AR Data Table information beginning **March 1, 2022** and **annually** thereafter.

The Coalition shall calculate the following values and convert them to per acre values as indicated:

Total Nitrogen Removed

The Total Nitrogen Removed shall be calculated from the total amount of material removed (harvested/sequestered) and multiplied by a crop-specific coefficient, C_N . The Coalition shall determine, through literature review, nitrogen removed testing, and research, the most appropriate C_N coefficients for converting crop yield to Nitrogen Removed. The Coalition shall publish C_N coefficients for crops that cover 95% of acreage within the Coalition's boundaries in time to calculate Total Nitrogen Removed values based on yield values reported in the INMP Summary Reports due **March 1, 2023**. By **March 1, 2024**, the Coalition shall publish C_N coefficients for crops that cover 99% of acreage within the Coalition's boundaries. For the crops that cover the remaining 1% of acreage within the Coalition's boundaries, it is acceptable to use estimated C_N coefficients based on similar crop types. The methods used to establish C_N coefficients must be approved by the Executive Officer. Until C_N coefficients have been established for a particular crop, the Member will only report the crop yield in the INMP. Nitrogen Removed includes nitrogen removal via harvest and nitrogen sequestered in permanent wood of perennial crops.

Nitrogen Applied/Nitrogen Removed Ratio (A/R Ratio)

The A/R ratio shall be reported as the ratio of Total Nitrogen Applied to Total Nitrogen Removed.

Multi-Year Applied/Nitrogen Removed Ratio (A/R Ratio)

For each field for which three consecutive years of A/R ratio is available, the multi-year A/R ratio shall be reported as the ratio of Total Nitrogen Applied to Total Nitrogen Removed for the three prior consecutive years.

Nitrogen Applied – Nitrogen Removed Difference (A-R Difference)

The A-R difference shall be reported as the numerical difference between Total Nitrogen Applied and Total Nitrogen Removed. The Coalition shall review each Member's INMP Summary Reports and independently calculate and report both the A/R ratio and the A-R difference for the current reporting cycle ($A/R_{1 \text{ year}}$ and $A-R_{1 \text{ year}}$). Beginning the third year of reporting, for those locations with data available for three years, the Coalition shall calculate and report a three-year running total for both the A/R ratio and the A-R difference ($A/R_{3 \text{ year}}$ and $A-R_{3 \text{ year}}$). The formulas for the A/R ratios and A-R differences are shown in the equations below.

$$\text{A/R Ratio} = \frac{\text{Nitrogen Applied (from any source, including fertilizers, irrigation)}}{\text{Nitrogen Removed (via harvest, etc.)}}$$

$$\text{A-R Difference} = \text{Nitrogen Applied} - \text{Nitrogen Removed}$$

The following data shall be reported to the Colorado River Basin Water Board in three tables:

1. Individual Field-Level AR Data by Anonymous Member ID Table:

One entry is made for each field or management unit reported.

- a. Anonymous Member ID: Each Anonymous Member ID may be associated with more than one field
- b. Crop: If the Member has more than one field of a given crop, these may be identified by crop plus a number (e.g. tomato₁, tomato₂)¹⁴
- c. Nitrogen applied via fertilizers (lbs/acre)
- d. Nitrogen applied via organics and compost (lbs/acre)
- e. Nitrogen applied via irrigation water (lbs/acre)
- f. Total Nitrogen applied (lbs/acre) [sum of nitrogen from fertilizer, organics/compost, and irrigation water]
- g. Nitrogen removed per acre (lbs/acre)
- h. A/R ratio
- i. A-R difference (lbs/acre)
- j. 3-year A/R ratio, if available

2. Individual Field-Level AR Data by Anonymous APN ID Table:

An entry for a field or management unit may be repeated if there is more than one Anonymous APN ID associated with the field or management unit.

- a. Anonymous APN ID: List on a separate line each Anonymous APN ID assigned to parcels the field overlays completely or partially
- b. Associated groundwater basin or sub basin
- c. Crop: If there is more than one field of a given crop in the APN, these may be identified by crop plus a number (e.g. tomato₁, tomato₂)
- d. Nitrogen applied via fertilizers (lbs/acre)
- e. Nitrogen applied via organics and compost (lbs/acre)
- f. Nitrogen applied via irrigation water (lbs/acre)
- g. Total Nitrogen applied (lbs/acre) [sum of nitrogen from fertilizer, organics/compost, and irrigation water]
- h. Nitrogen removed per acre (lbs/acre)

¹⁴ The Colorado River Basin Water Board recognizes that, if multiple crop types are grown in the same field over the course of a year or over several years, variations on field nomenclature and crop reporting will be necessary. For example, the field could be identified as the same field in an extra column and an extra row could be added for each crop. In addition, the three-year A/R target range would likely need to be expressed as a weighted average of the crops grown during the three years.

- i. A/R ratio
- j. A-R difference (lbs/acre)
- k. 3-year A/R ratio, if available

3. Township-Level Aggregated AR Data Table:

- a. Township and range
- b. Crop
- c. Total acreage: sum for all the acreage for each unique crop within the township (acres)
- d. Total nitrogen applied via fertilizer: sum for all acreage for each unique crop (total lbs)
- e. Total nitrogen applied via organics and compost: sum for compost for each unique crop (total lbs)
- f. Total nitrogen applied via irrigation water: sum for all acreage for each unique crop (total lbs)
- g. Total nitrogen applied for each unique crop (total lbs) [sum of nitrogen from fertilizer, organics/compost, and irrigation water]
- h. Total nitrogen removed for each unique crop (total lbs)
- i. A/R ratio for each unique crop
- j. A-R difference for each unique crop (total lbs)

E. Annual Monitoring Report (AMR)

The Annual Monitoring Report (AMR) shall be submitted by **March 1** every year. The AMR shall cover the monitoring periods from the previous calendar year. The AMR shall include the following components:

1. Signed transmittal letter;
2. Title page;
3. Table of contents;
4. Executive summary;
5. Description of the Coalition's covered geographical area;
6. Monitoring objectives and design;
7. Sampling site/monitoring well descriptions and rainfall records for the time period covered under the AMR;
8. Location map(s) of sampling sites/monitoring wells, crops, and land uses;
9. Results of all surface water and groundwater analyses arranged in tabular form so that the required information is readily discernible;
10. Discussion of data relative to water quality objectives, and where applicable, Water Quality Restoration Plan milestones;
11. Sampling and analytical methods used;
12. Summary of Quality Assurance Evaluation results (as identified in the most recent version of the Coalition's approved QAPP);
13. Specification of the method(s) used to obtain estimated flow at each surface water monitoring site during each monitoring event;
14. Summary of exceedances of water quality objectives/trigger limits occurring during the reporting period and for surface water-related pesticide use information;

15. Actions taken to address water quality exceedances that have occurred, including but not limited to, revised or additional management practices implemented;
16. Evaluation of monitoring data to identify spatial trends and patterns;
17. Summary of management practice information collected as part of the Farm Plans;
18. Summary of INMP Summary Report data;
19. Summary of education and outreach activities; and
20. Conclusions and recommendations.

Additional clarifications necessary for some of the above report components are described below:

Report Component (1) —Signed Transmittal Letter

A transmittal letter shall accompany each report. The transmittal letter shall be submitted and signed in accordance with the requirements of Section F of the Order, General Provisions.

Report Component (8) — Location Maps

Location map(s) showing the sampling sites/monitoring wells, crops, and land uses within the Coalition's geographic area must be included in the AMR. An accompanying GIS shapefile or geodatabase of monitoring site and monitoring well information must include site code and name (surface water only) and Global Positioning System (GPS) coordinates (surface water sites and wells used for monitoring). The map(s) must contain a level of detail that ensures they are informative and useful. GPS coordinates must be provided as latitude and longitude in the decimal degree coordinate system (at a minimum of five decimal places). The datum must be either WGS 1984 or NAD83, and clearly identified on the map. The source and date of all data layers must be identified on the map(s). All data layers/shapefiles/geodatabases included in the map shall be submitted with the AMR.

Report Component (9) – Tabulated Results

In reporting monitoring data, the Coalition 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 data collection requirements of the MRP.

Report Component (10) — Data Discussion to Illustrate Compliance

The report shall include a discussion of the Coalition's compliance with the data collection requirements of the MRP. If a required component was not met, an explanation for the missing data must be included. Results must also be compared to water quality objectives and trigger limits.

Report Component (12) — Quality Assurance Evaluation (Precision, Accuracy and Completeness)

A summary of precision and accuracy results (both laboratory and field) is required in the report. Acceptance criteria for all measurements of precision and accuracy must be identified. The Coalition must review all quality assurance/quality control (QA/QC) results to verify that protocols were followed and identify any results that

did not meet acceptance criteria. A summary table or narrative description of all QA/QC results that did not meet water quality objectives must be included. Additionally, the report must include a discussion of how the failed QA/QC results affect the validity of the reported data and the corrective actions to be implemented.

In addition to precision and accuracy, the Coalition must also calculate and report completeness. Completeness includes the percentage of all quality control results that meet acceptance criteria, as well as a determination of project completeness. The Coalition may ask the laboratory to provide assistance with evaluation of their QA/QC data, provided that the Coalition prepares the summary table or narrative description of the results for the AMR.

Report Component (14) — Summary of Exceedances

A summary of the exceedances of water quality objectives or triggers that have occurred during the monitoring period is required in the AMR. In the event of exceedances for pesticides or in surface water, local pesticide use data must be included in the AMR. Pesticide use information may be acquired from the agricultural commissioner. This requirement is described further in Section F below on Surface and Groundwater Exceedance Reports.

Report Component (16) — Evaluation of Monitoring Data

The Coalition must evaluate its monitoring data in the AMR in order to identify potential trends and patterns in surface water and groundwater quality that may be associated with waste discharge from Irrigated Agricultural Lands. As part of this evaluation, the Coalition must analyze all readily available monitoring data that meet program quality assurance requirements to determine deficiencies in monitoring for discharges from Irrigated Agricultural Lands and whether additional sampling locations are needed. If deficiencies are identified, the Coalition must propose a schedule for additional monitoring or source studies. Upon notification from the Executive Officer, the Coalition must monitor any parameter in a watershed that lacks sufficient monitoring data (i.e., a data gap should be filled to assess the effects of discharges from Irrigated Agricultural Lands on water quality).

The Coalition should incorporate pesticide use information, as needed, to assist in its data evaluation. Wherever possible, the Coalition should utilize tables or graphs that illustrate and summarize the data evaluation.

Report Component (17) – Summary of Management Practice Information

The Coalition will aggregate and summarize information collected from management practices implementation. The summary of management practice data must include a quality assessment of the collected information by township (e.g. missing data, potentially incorrect/inaccurate reporting), and a description of corrective actions to be taken regarding any deficiencies in the quality of data submitted, if such deficiencies were identified.

Report Component (18) – INMP Summary Report Evaluation

In addition to submitting the INMP Summary Report data, the Coalition shall submit an evaluation comparing individual field data collected from the Members' INMP

Summary Reports. These comparisons shall include the ratio of Nitrogen Applied¹⁵ to Nitrogen Removed and the difference between Nitrogen Applied and Nitrogen Removed for crops in the watershed. Nitrogen Applied includes nitrogen from any sources, including, but not limited to, organic amendments, synthetic fertilizers, and irrigation water.

The Coalition's evaluation of both the $A/R_{1\text{ year}}$ and $A/R_{3\text{ year}}$ ratios must include, at a minimum, a comparison of A/R ratios by crop type. As directed by the Executive Officer, initial further evaluations within each crop type comparing the irrigation method, the soil conditions, and the farming operation size may be developed. The Coalition shall evaluate the corresponding $A-R_{1\text{ year}}$ and $A-R_{3\text{ year}}$ differences by crop type. The Coalition shall also evaluate any other A/R ratio or A-R difference comparisons as directed by the Executive Officer. For each comparison, the Coalition must identify the mean and the standard deviation as well as develop a histogram plot of the data. A box and whisker plot comparing the A/R ratio and A-R difference for each comparison, or equivalent tabular or graphical presentation of the data approved by the Executive Officer, may also be used. The summary of nitrogen management data must include a quality assessment of the collected information (e.g. missing data, potentially incorrect/inaccurate reporting). Spreadsheets showing the calculations used for data evaluation must also be submitted to the Executive Officer. The Coalition may include any recommendations regarding future A/R ratio target values.

F. Surface and Groundwater Exceedance Reports

The Outfall Coalition shall provide surface and groundwater exceedance reports if monitoring results show exceedances of applicable numeric water quality objectives and/or water quality benchmarks. For each surface or groundwater quality objective exceeded at a monitoring location, the Coalition shall submit an Exceedance Report to the Colorado River Basin Water Board. The Coalition shall evaluate all of its monitoring data and determine exceedances no later than 14 business days after receiving the laboratory analytical reports for an event. Upon determining an exceedance, the Coalition shall send the Exceedance Report by email to the Coalition's designated Colorado River Basin Water Board staff contact by the next business day.

¹⁵ For some crops, the information needed to determine nitrogen removed may not be readily available. This will be determined through N removed research and crop yield will serve as a placeholder until nitrogen removed data is made available.