California Regional Water Quality Control Board
Colorado River Basin Region

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Edmund G. Brown Jr.
Governor

TO: Victoria A. Whitney, Deputy Director
DIVISON OF WATER QUALITY
STATE WATER RESOURCES CONTROL BOARD

FROM: Robert Perdue
Executive Officer
COLORADO RIVER BASIN
REGIONAL WATER QUALITY CONTROL BOARD

DATE: July 18, 2011

SUBJECT: MINOR, NON-SUBSTANTIVE CHANGES TO THE BASIN PLAN AMENDMENT ADOPTED UNDER COLORADO RIVER BASIN REGIONAL WATER BOARD RESOLUTION NOS. R7-2007-0039 and R7-2010-0028

Thank you for your letters dated May 31, 2011, and July 15, 2011, requesting changes in the language of the Basin Plan amendment associated with the Colorado River Basin Water Board Resolution No. R7-2007-0039, adopted May 16, 2007, and Resolution No. R7-2010-0028 adopted on June 17, 2010, which revised the amendment adopted by Resolution No. R7-2007-0039. These adopted resolutions establish a Total Maximum Daily Load and Implementation Plan for Bacterial Indicators in the Coachella Valley Storm Water Channel.

In your letters, State Water Board staff determined that minor, non-substantive changes in the language of the Basin Plan amendment are necessary. Attached, please find both the strikethrough/underline language and the final corrected language.

Please contact Nadim Zeywar at (760) 776-8942, or Logan Raub at (760) 776-8966 if you have further questions or comments.

Attachments

Cc: Rik Rassmusen, DWQ
Michael Buckman, DWQ
Tom Vandenberg, OCC

Attachment 1: Strikethrough/Underline Language for the CVSC Bacteria TMDL BPA

June 17, 2010

An Amendment to the Water Quality Control Plan for the Colorado River Basin Region to Establish the Coachella Valley Stormwater Channel Bacterial Indicators Total Maximum Daily Load

AMENDMENT

(Proposed changes are in reference to the Basin Plan as amended through June 2006. Proposed additions are denoted by underlined text, proposed deletions are denoted by ~~strikethrough~~ text)

To CHAPTER 4- IMPLEMENTATION, Section V. TOTAL MAXIMUM DAILY LOADS (TMDLS) AND IMPLEMENTATION PLANS, add the following new subsequent Sections and renumber accordingly:

~~G~~H. Coachella Valley Stormwater Channel Bacterial Indicators Total Maximum Daily Load

1. TMDL ELEMENTS

Table H-1: Coachella Valley Stormwater Channel Bacterial Indicators TMDL Elements

ELEMENT	DESCRIPTION
Project Definition	Coachella Valley Stormwater Channel (CVSC) is on the California 303(d) List for impairment by pathogens of unknown sources. This listing applies to the 17-mile length of the CVSC from Indio to the Salton Sea. This violation of water quality standards (WQSs) is a threat to public health, and impairs the following CVSC beneficial uses (BUs): Water Contact Recreation (REC I) and Water Non-Contact Recreation (REC II). WQSs consist of designated beneficial uses, specified numeric or narrative water quality objectives (WQOs) that protect these BUs, and antidegradation requirements to ensure that existing uses and the level of water quality necessary to protect the existing uses are maintained and protected. The following Table summarizes REC I bacteria indicator WQOs for all surface waters in the Colorado River Basin Region, excepting the Colorado River:

Bacterial Indicator Water Quality Objectives

Indicator Parameter	30-Day Geometric[a] Mean	Maximum Instantaneous
E. coli	126 MPN[b]/100 Milliliter (ml)	400 MPN/100 ml
Fecal coliform	200 MPN/100 ml	c
Enterococci	33 MPN/100 ml	100 MPN/100 ml

a- Based on a minimum of no less than 5 samples equally spaced over a 30-day period.
b- Most probable number.
c- No more than 10 % of total samples during any 30-day period exceed 400 MPN per 100 ml

	Federal Clean Water Act (CWA), Section 303(d)(1)(A) requires all states to identify surface waters impaired by pollution (i.e., that do not meet WQSs), and to establish Total Maximum Daily Loads (TMDLs) for pollutants causing the impairments. As a result, a TMDL to address bacterial indicator organisms is proposed for CVSC, which has been completed pursuant to the State of California TMDL Guidance issued in June 2005, and USEPA guidance published in April 2001.
Watershed Description	CVSC is located in Coachella Valley in Riverside County, California. The Coachella Valley is bounded to the north by the San Bernardino and Little San Bernardino Mountains, and to the south by the San Jacinto and Santa Rosa Mountains, and the Salton Sea. The Coachella Valley has been heavily agricultural since the early 1900's. Agricultural lands are irrigated by groundwater and water from the Colorado River delivered to the Valley through the Coachella Canal via the All-American Canal. CVSC is an unlined, engineered extension of the Whitewater River, and serves as a conveyance channel for irrigation return water, treated wastewater from three National Pollutant Discharge Elimination System (NPDES) permitted municipal wastewater treatment plants, wastewater discharge from one NPDES permitted aquaculture facility (Kent SeaTech Corporation Fish Farm (KSCFF), owned/operated by Kent SeaTech Corporation), and urban and stormwater runoff. The Coachella Valley Water District (CVWD) operates and maintains the CVSC. The three permitted wastewater treatment plants are: • Valley Sanitary District Wastewater Treatment Plant (VSDWTP), Indio, owned/operated by Valley Sanitary District; • Mid-Valley Water Reclamation Plant (MVWRP), Thermal, owned/operated by CVWD; and • Coachella Sanitary District Wastewater Treatment Plant (CSDWTP), Coachella, owned/operated by the City of Coachella and the Coachella Sanitary District. Average annual flows in CVSC are decreasing due to changes in agricultural practices and suburban development. The CVSC and its tributary drains provide flood control and protection in addition to habitat for many types of wildlife including migratory songbirds, waterfowl, coyotes, raccoons, and rodents. Although recreation in the stormwater channel is prohibited by CVWD, people are known to recreate in and around the stormwater channel.
Data Analysis	During the development of this TMDL, water quality samples were collected monthly at eight locations in the CVSC, from February to September 2003, to evaluate bacteria concentrations and loading. Eleven of the 59 samples collected exceeded the 400 MPN/100 ml E. coli WQO in the Colorado River Basin Water Quality Control Plan (Basin Plan) and one of the proposed numeric targets for this TMDL. Based on the 2004 State of California's 303(d) Listing Policy, this exceedance rate would be sufficient to confirm the impairment identified in the 303(d) List.
Source Analysis	To identify potential sources of bacteria, Regional Water Board staff reviewed bacteria data provided by the three NPDES wastewater treatment facilities (WWTFs) and the City of Coachella, which is the only Municipal Separate Storm

	Sewer System (MS4) permittee discharging into the impaired section of the CVSC. Data reviewed indicate that all three WWTFs met their applicable bacteria WQOs. Data also indicate that urban and stormwater flows contain fecal coliform levels in violation of its applicable WQOs for REC I and REC II. These water quality violations range up to 900,000 MPN/100 ml at Avenue 52 Storm Drain in Coachella, September 1999. Due to the limited data available, actual contribution from urban and stormwater runoff and contributions from other point and nonpoint sources require further characterization. To assist with characterizing the bacterial contribution from agricultural sources (Agricultural Dischargers), the Coachella Valley Agricultural Stakeholder Water Quality Task Force (CVAS) was formed for the purpose of collecting water samples and monitoring the amount of E. coli discharged from agricultural sources. Samples were collected from subsurface drain collectors that service agricultural land and ultimately discharge into the CVSC. Monitoring was conducted from July 2008 through June 2009. Four hundred fifty water samples were collected from five (5) representative subsurface drain collectors at receiving water locations upstream from the collectors, and at receiving water locations downstream from the collectors. The samples were analyzed for E. coli concentrations. The analysis of results from this monitoring program indicated that E. coli levels in the subsurface drain collectors were typically two orders of magnitude lower than the E. coli levels in the CVSC. Out of one hundred fifty samples collected from the drain collectors, four exceeded the 400 MPN/100 ml Instantaneous Maximum E. coli WQO. None of the ninety 30-day geometric means calculated for E. coli exceeded the Basin Plan WQO of 126 MPN/100 ml. No significant correlation could be made between the E. coli levels measured in the drain collector discharges and the E. coli levels measured in the CVSC. The overall results of this monitoring program indicate that bacteria entering the CVSC in flows from subsurface drain collectors serving agricultural lands have only a de minimis effect on the bacterial indicator impairment in the CVSC. To further identify possible sources of bacteria to CVSC, a Ribotype or DNA microbial source tracking (MST) method was used. MST methods match fingerprints from bacterial strains isolated from a water system to those isolated from hosts such as humans, cows, geese, chicken, or municipal wastewater. The DNA monitoring and analysis study was conducted from October 2003 through March 2004. Two hundred water samples were collected from three sites along CVSC. E. coli strains were isolated from water samples, ribotypes fingerprinted, and then compared to a source library. The DNA monitoring and analysis study determined the percentage distribution of fecal sources in the CVSC. The following potential bacterial sources were identified in CVSC from the two hundred samples collected during the study: avian (40%), human (25%), rodents plus other wild mammals (25%), and livestock (<3%). Approximately 6% of the E. coli species originated from unknown sources. This distribution provides an idea of the possible sources of bacteria in CVSC, although it does not reflect the relative loading from those sources. Although scientific studies support the use of ribotype-based MST methods, there are concerns regarding their accuracy due to spatial and temporal vectors, stability of the markers, and sampling design.

Critical Conditions and Seasonal Variation	The climate in the Coachella Valley is arid with hot summers and warm winters and very low average annual rainfall (<3 inches/year). The water in the CVSC mainly originates from irrigation return flows, rising groundwater, fish farm effluent, treated municipal wastewater, urban runoff, and stormwater runoff. Analysis of available water quality data suggest slightly higher concentrations of bacteria in warm months, but the bacteria concentrations do not appear to be correlated with flow.
Numeric Targets	TMDL numeric targets derived from the Basin Plan's WQOs have been established for E. coli as a log mean (Geomean) of 126 MPN/100 ml (based on a minimum of not less than five samples during a 30-day period), ~~or~~and 400 MPN/100 ml for a single sample. The rationale supporting Regional Water Board staff's decision to choose only one bacterial indicator for the CVSC, E. coli, is as follows: The Colorado River Basin Region's Basin Plan has bacterial indicator WQOs for E. coli, fecal coliform, and enterococci. In most cases, these indicators do not cause human illness directly; rather, they have shown a correlation as indicators of the presence of other harmful pathogens in water bodies. The general inclusion of all three bacterial indicators in the Basin Plan has presented region-wide application problems and confusion for the regulated community. The CVSC is considered a fresh water recreational surface water. The decision to express the numeric targets, loading capacity, and allocations in the CVSC TMDL in terms of E.coli only was based on recommendations from USEPA guidance to eliminate fecal coliform as an indicator of pathogens causing human illness, and to rely instead on either E. coli and/or Enterococci. The USEPA water quality criteria document, titled "Ambient Water Quality Criteria for Bacteria, 1986" recommends replacing fecal coliform with either E. coli or enterococci as bacterial indicators for the protection of fresh water recreational users. The USEPA provided draft implementation guidance in May 2002, titled "Implementation Guidance for Ambient Water Quality Criteria for Bacteria," that reaffirmed the 1986 guidance. Further, E. coli, which is a species of fecal coliform, is being used in the TMDL as a surrogate for fecal coliform. Consequently, a load reduction in E. coli into the CVSC that will attain the E. coli WQOs will also result in a load reduction in fecal coliform and attain the fecal coliform WQOs. The TMDL targets must not be exceeded more frequently than the allowable ~~exceedence~~exceedance rate described in the State of California's 303(d) Listing Policy, as a result of controllable sources with the exception of the three NPDES WWTFs, which have met their applicable bacteria WQOs and thus, shall be required to continue to meet their WQOs. All other responsible parties, however, shall be required to attain their respective WLA and LA numeric targets within ten (10) years after USEPA approves the TMDL.
Linkage Analysis	For this TMDL, the connection between pollutant loading and protection of BUs is established by the fact that TMDL numeric targets and allocations are equal to WQOs for the most stringent BU of CVSC in the Basin Plan. Therefore, this TMDL's numeric targets protect all BUs of CVSC. There is a one-to-one relationship between loading allocations and numeric targets in this TMDL. For example, a 30-day geometric mean wasteload/load allocation of 126 MPN/100 ml for E. coli at the point of discharge makes it more likely that 126 MPN/100 ml or

	less will be present in the CVSC, especially if contributions from natural background sources are not exceeding these allocations. The potential for increased or decreased concentration downstream due to growth and decay dynamics may be offset by dilution from subsurface drainage from irrigated agricultural lands and effluent from permitted wastewater treatment plants and thus provides an implicit margin of safety.
TMDL Calculations and Allocations	A TMDL is a numeric calculation of the loading capacity of a water body to assimilate a certain pollutant and still attain all WQSs. The TMDL is the sum of the individual wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources and natural background sources, and a margin of safety (MOS) to address uncertainties. Discharges from all current and future point sources and controllable nonpoint sources of pollution to the impaired section of CVSC shall not exceed the following WLAs and LAs for E. coli~~:~~. Both WLAs and LAs for E. coli are: 1) the log mean (Geomean) of samples collected shall not exceed 126 MPN/100 ml (based on a minimum of not less than five samples during a 30-day period), and~~or~~[1] 2) 400 MPN/100 ml for a single sample. The allocations are applicable throughout the entire stretch of the impaired section of the CVSC year-round. The numeric target concentrations are based on extensive epidemiological studies conducted by the USEPA and others. To address the uncertainty concerning bacterial die-off and re-growth dynamics in CVSC, and to better address critical conditions and seasonal variations, this TMDL provides a MOS by including a monitoring and review plan that uses data collected during implementation to evaluate TMDL effectiveness and the need for revision. Load allocations (LAs) and wasteload allocations (WLAs) for bacteria indicator dischargers into CVSC are described below:

Allocation Type	Discharger	E. Coli Allocations
Point Source (WLAs)	VSDWTP CSDWTP MVWRP	A log mean (Geomean) of ≤126 MPN/100 ml (based on a minimum of not less than five samples during a 30-day period), and 400 MPN/100 ml for a single sample
Point Source (WLAs)	KSCFF Cal-Trans	A log mean (Geomean) of ~~the MPN of~~ ≤126 MPN /100 ml (based on

[1] For Nonpoint sources, when it is impractical to collect five samples for the log mean (Geomean), the single sample maximum allocation of 400 MPN/100 ml may be used to determine compliance with the load allocation.

		City of Coachella (MS4 co-permittee)_	a minimum of not less than five samples during a 30-day period), ~~or~~ and 400 MPN/100 ml for a single sample
	Nonpoint Source (LAs)	Agricultural Runoff Federal Lands Tribal Lands	A log mean (Geomean) of ≤126 MPN/100 ml (based on a minimum of not less than five samples during a 30-day period), ~~or~~ and 400 MPN/100 ml for a single sample
	Nonpoint Source (LAs)	Septic Systems	Zero (0) MPN/100 ml
Monitoring Plan	Dischargers listed in Table H-2 will be required to develop and submit as a whole, or in groups, a comprehensive water quality monitoring program for the 303(d) listed segment of CVSC to the Regional Water Board Executive Officer for review and approval 90 days after USEPA approves the TMDL. The monitoring plan will include a sufficient number of monitoring stations and monitoring events to adequately address all potential sources of bacteria.		

2. IMPLEMENTATION ACTIONS FOR ATTAINMENT OF TMDL

The implementation plan is divided into two phases ~~and begins 90 days following USEPA approval of the TMDL~~. Phase I actions will take three years to complete and will focus on monitoring and addressing bacterial indicators associated with wastewater discharges from NPDES facilities, and urban and stormwater runoff. Regional Water Board staff will coordinate closely with USEPA to address waste discharges from tribal lands. If E. coli WQOs are not achieved by the end of Phase I, Regional Water Board staff will implement additional actions to control E. coli sources in Phase II. Enforcement actions against violators of the TMDL will occur in both phases if necessary. This approach provides for immediate assessment of known sources of bacterial indicators while allowing time for additional monitoring to assess TMDL implementation, effectiveness, and need for modification.

Agricultural Dischargers ~~Farmers~~ and the CVWD are specifically exempted from having to complete Phase I monitoring actions regarding agricultural discharges. The Regional Water Board acknowledges the monitoring completed by CVAS in 2008-2009, and finds that its monitoring accurately characterizes the contribution of irrigated agriculture to the bacterial indicator impairment in the CVSC. The Regional Water Board considers CVAS's effort as an early implementation of this TMDL. Accordingly, this effort does not exempt Agricultural Dischargers and the CVWD from completing Phase II actions, should Phase II become necessary and available data indicate discharges into the CVSC from irrigated agriculture

exceed E. coli WQOs ~~based on the criteria listed in Table 3.2 of the Water Quality Control Policy For Developing California's Clean Water Act Section 303 (d) List – September 2004~~.

2.1 Phase I Implementation Actions

Phase I actions will occur within three years after USEPA approves the TMDL, and begin ~~immediately after USEPA approves the TMDL~~as directed in Table H-2 below. Phase I requires:

- Monitor CVSC for bacteria loading from city of Coachella, KSCFF, Cal-Trans, federal lands, and tribal lands;
- Identify significant federal and tribal dischargers to CVSC and notify them of their role in TMDL implementation;
- Receive a written report from each tribal entity, or from USEPA, describing measures to ensure waste discharges from tribal property do not violate or contribute to a violation of this TMDL~~;~~
- Prepare an amendment to the Basin Plan that rectifies current limitations of having three bacterial indicator organisms, clarifies which indicators apply to specified surface waters of the Region, and as necessary, determines the need for site-specific objectives; and
- Monitor, track, and survey CVSC to determine if Phase I activities achieve bacteria WQOs.

2.2 Phase I Implementation Responsible Parties and Schedule

The time schedule and parties responsible for implementing Phase I actions are provided in Table H-2 below.

Table H-2: Phase I Actions and Time Schedules

Due	Action
Immediately following Regional Water Board approval of TMDL	Regional Water Board staff shall begin preparing an amendment to the Basin Plan that rectifies current limitations of having three bacteria indicator organisms, clarifies which indicators apply to which surface waters of the Region, and as necessary, develops site-specific objectives. This Basin Plan amendment shall be drafted and presented to the Regional Water Board for consideration of adoption at the earliest practicable date, but no later than eighteen (18) months following USEPA approval of the CVSC Bacterial Indicators TMDL.
90 days after USEPA approves the TMDL	Pursuant to requests from Regional Water Board staff, the responsible parties, which includes Kent Seatech Corporation Fish Farm (NPDES permittee), Cal-Trans (MS4 permittee); and the city of Coachella (MS4 permittee), shall submit to Regional Water Board staff with the cooperation and assistance of the Coachella Valley Water District, which operates and maintains the impaired section of CVSC, data that

	characterize their contribution of bacteria to the CVSC or shall develop bacterial indicator water quality monitoring programs. As part of the water quality monitoring programs, Quality Assurance Project Plans (QAPPs) shall be developed and submitted to the Regional Water Board Executive Officer for review and approval. Monitoring data will be provided to Regional Water Board staff on a quarterly basis and will be used to assess contributions of bacteria to CVSC from anthropogenic sources (stormwater and urban runoff, and other sources). Responsible parties that join groups to complete Phase I actions shall be allowed an additional 90 days to submit their QAPP.
90 days after USEPA approves the TMDL	Regional Water Board staff shall begin to identify significant federal and tribal dischargers to CVSC and notify them of their role in TMDL implementation.
90 days after USEPA approves the TMDL	Regional Water Board staff shall develop~~s~~ a plan to conduct TMDL surveillance and track TMDL activities. The objectives of the plan are to assess monitoring data, measure ~~milestone~~ attainment of the water quality objectives, and determine compliance with the TMDL.
90 days after USEPA approves the TMDL	Pursuant to a request from the Regional Water Board, each tribal entity, in coordination with USEPA, shall submit a technical report describing measures to ensure that waste discharges to CVSC from tribal land do not violate or contribute to a violation of this TMDL.
3 years after USEPA approves the TMDL	Regional Water Board staff shall submit a written report to the Regional Water Board describing monitoring results, ~~milestone~~ attainment of the water quality objectives, and the need to revise the TMDL, if necessary.

Phase I actions are intended to aid in developing an effective assessment of critical conditions and sources, which will be used to develop and implement appropriate control measures in Phase II. Responsible parties, who are fulfilling their responsibilities, have no obligation to undertake the actions assigned to others, who may fail to perform.

2.3 Phase II Implementation Actions

Actions taken in Phase I (within three years after USEPA approves the TMDL) will determine whether WQOs have been achieved, sources of bacterial pollution have been identified, and whether additional actions are required in Phase II (within seven years after end of Phase 1) to meet WQOs. If monitoring and assessment in Phase I indicate that waste discharges to CVSC from anthropogenic activities violate this TMDL, and that violations persist despite recommended operation and maintenance procedures and control measures in ~~their~~ responsible parties' existing permits, the Regional Water Board shall require the implementation of additional actions to control anthropogenic sources of bacteria in Phase II. The Regional Water Board will require responsible parties to select and implement new/additional management practices (MPs) for Phase II, following characterization of sources and a determination of whether these sources can be controlled. This determination shall take into

consideration background conditions and cost factors. The Regional Water Board may revise Municipal Separate Storm Sewer System (MS4) permit water quality based effluent limitations, which may be expressed in terms of narrative management practice (MP) requirements. The Regional Water Board may also consider revising WQOs for CVSC to address natural background sources of bacteria. This revision would be accomplished through the establishment of a Site Specific Objective (SSO) after completing a Use Attainability Analysis (UAA). If an SSO is required, it would be developed by the end of Phase 2 based on available resources.

Violations of WQOs will be addressed by implementing MPs identified in the discharger's existing Regional Water Board permit, or by implementing measures provided in the SWRCB's Nonpoint Source Program Plan and/or Nonpoint Source Program Strategy and Implementation Plan (PROSIP). Appropriate and required regulatory procedures will be followed prior to implementing any additional control practice(s).

2.4 TMDL Review Schedule

Annual reports will be provided to the Regional Water Board by Regional Board staff describing progress in attaining the water quality objectives~~milestones~~. The reports will assess:

- Water quality improvement in terms of E. coli concentration;
- Water quality objectives ~~Milestones~~ achieved, delayed, or not achieved, and why; and
- Compliance with Regional Water Board orders and requests.

2.5 Triennial Review

Federal law requires states to hold public hearings to review WQSs, and modify/adopt standards as appropriate (CWA Section 303(c); 40 CFR Section 131.20). State law requires that each regional board shall formulate and adopt water quality control plans (Basin Plan) for all areas within the region. Such plans shall be periodically reviewed and may be revised~~formulating and periodically reviewing and updating regional water quality control plans (Basin Plan)~~ (CWC Section 13240). All Basin Plan amendments and supporting documents adopted by the Regional Water Board must be submitted to the SWRCB, and then OAL, for review and approval. Lastly, the USEPA has final approval authority for Basin Plan amendments concerning surface waters.

The first review of this TMDL is scheduled for completion three years after USEPA approves the TMDL to provide adequate time for implementation and data collection. Subsequent reviews will be conducted concurrently with the Triennial Review of the Basin Plan. The TMDL review schedule is shown below in Table H-3.

Table H-3: TMDL Review Schedule

Activity	Date*
Begin TMDL Review	Two years after USEPA approves the TMDL
Terminate First TMDL Review, and conduct Regional Water Board Public Hearing	Three years after USEPA approves the TMDL
Begin Second TMDL Review	Five years after USEPA approves the TMDL
Terminate Second Review and Conduct Regional Water Board Public Hearing	Six years after USEPA approves the TMDL
Etc.	
* Dates are contingent upon availability of Regional Water Board resources.	

Monitoring results and progress toward ~~milestone~~ attainment of the water quality objectives will be provided during Triennial Review public hearings. If TMDL progress is insufficient, staff will recommend to the Regional Water Board additional MPs to control pollutant sources, enforcement action, TMDL revision, or other means to achieve WQOs.

This proposed review schedule reflects the Regional Water Board's commitment to periodic review and refinement of this TMDL, via the basin plan amendment process.

Attachment 2: Final Corrected Language for the CVSC Bacteria TMDL BPA

June 17, 2010

An Amendment to the Water Quality Control Plan for the Colorado River Basin Region to Establish the Coachella Valley Stormwater Channel Bacterial Indicators Total Maximum Daily Load

AMENDMENT

To CHAPTER 4- IMPLEMENTATION, Section V. TOTAL MAXIMUM DAILY LOADS (TMDLS) AND IMPLEMENTATION PLANS, add the following new subsequent Sections and renumber accordingly:

H. Coachella Valley Stormwater Channel Bacterial Indicators Total Maximum Daily Load

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Source Analysis	To identify potential sources of bacteria, Regional Water Board staff reviewed bacteria data provided by the three NPDES wastewater treatment facilities (WWTFs) and the City of Coachella, which is the only Municipal Separate Storm Sewer System (MS4) permittee discharging into the impaired section of the CVSC. Data reviewed indicate that all three WWTFs met their applicable bacteria WQOs. Data also indicate that urban and stormwater flows contain fecal coliform

	levels in violation of its applicable WQOs for REC I and REC II. These water quality violations range up to 900,000 MPN/100 ml at Avenue 52 Storm Drain in Coachella, September 1999. Due to the limited data available, actual contribution from urban and stormwater runoff and contributions from other point and nonpoint sources require further characterization. To assist with characterizing the bacterial contribution from agricultural sources (Agricultural Dischargers), the Coachella Valley Agricultural Stakeholder Water Quality Task Force (CVAS) was formed for the purpose of collecting water samples and monitoring the amount of E. coli discharged from agricultural sources. Samples were collected from subsurface drain collectors that service agricultural land and ultimately discharge into the CVSC. Monitoring was conducted from July 2008 through June 2009. Four hundred fifty water samples were collected from five (5) representative subsurface drain collectors at receiving water locations upstream from the collectors, and at receiving water locations downstream from the collectors. The samples were analyzed for E. coli concentrations. The analysis of results from this monitoring program indicated that E. coli levels in the subsurface drain collectors were typically two orders of magnitude lower than the E. coli levels in the CVSC. Out of one hundred fifty samples collected from the drain collectors, four exceeded the 400 MPN/100 ml Instantaneous Maximum E. coli WQO. None of the ninety 30-day geometric means calculated for E. coli exceeded the Basin Plan WQO of 126 MPN/100 ml. No significant correlation could be made between the E. coli levels measured in the drain collector discharges and the E. coli levels measured in the CVSC. The overall results of this monitoring program indicate that bacteria entering the CVSC in flows from subsurface drain collectors serving agricultural lands have only a de minimis effect on the bacterial indicator impairment in the CVSC. To further identify possible sources of bacteria to CVSC, a Ribotype or DNA microbial source tracking (MST) method was used. MST methods match fingerprints from bacterial strains isolated from a water system to those isolated from hosts such as humans, cows, geese, chicken, or municipal wastewater. The DNA monitoring and analysis study was conducted from October 2003 through March 2004. Two hundred water samples were collected from three sites along CVSC. E. coli strains were isolated from water samples, ribotypes fingerprinted, and then compared to a source library. The DNA monitoring and analysis study determined the percentage distribution of fecal sources in the CVSC. The following potential bacterial sources were identified in CVSC from the two hundred samples collected during the study: avian (40%), human (25%), rodents plus other wild mammals (25%), and livestock (<3%). Approximately 6% of the E. coli species originated from unknown sources. This distribution provides an idea of the possible sources of bacteria in CVSC, although it does not reflect the relative loading from those sources. Although scientific studies support the use of ribotype-based MST methods, there are concerns regarding their accuracy due to spatial and temporal vectors, stability of the markers, and sampling design.
Critical Conditions and	The climate in the Coachella Valley is arid with hot summers and warm winters and very low average annual rainfall (<3 inches/year). The water in the CVSC mainly originates from irrigation return flows, rising groundwater, fish farm

Seasonal Variation	effluent, treated municipal wastewater, urban runoff, and stormwater runoff. Analysis of available water quality data suggest slightly higher concentrations of bacteria in warm months, but the bacteria concentrations do not appear to be correlated with flow.
Numeric Targets	TMDL numeric targets derived from the Basin Plan's WQOs have been established for E. coli as a log mean (Geomean) of 126 MPN/100 ml (based on a minimum of not less than five samples during a 30-day period), and 400 MPN/100 ml for a single sample. The rationale supporting Regional Water Board staff's decision to choose only one bacterial indicator for the CVSC, E. coli, is as follows: The Colorado River Basin Region's Basin Plan has bacterial indicator WQOs for E. coli, fecal coliform, and enterococci. In most cases, these indicators do not cause human illness directly; rather, they have shown a correlation as indicators of the presence of other harmful pathogens in water bodies. The general inclusion of all three bacterial indicators in the Basin Plan has presented region-wide application problems and confusion for the regulated community. The CVSC is considered a fresh water recreational surface water. The decision to express the numeric targets, loading capacity, and allocations in the CVSC TMDL in terms of E.coli only was based on recommendations from USEPA guidance to eliminate fecal coliform as an indicator of pathogens causing human illness, and to rely instead on either E. coli and/or Enterococci. The USEPA water quality criteria document, titled "Ambient Water Quality Criteria for Bacteria, 1986" recommends replacing fecal coliform with either E. coli or enterococci as bacterial indicators for the protection of fresh water recreational users. The USEPA provided draft implementation guidance in May 2002, titled "Implementation Guidance for Ambient Water Quality Criteria for Bacteria," that reaffirmed the 1986 guidance. Further, E. coli, which is a species of fecal coliform, is being used in the TMDL as a surrogate for fecal coliform. Consequently, a load reduction in E. coli into the CVSC that will attain the E. coli WQOs will also result in a load reduction in fecal coliform and attain the fecal coliform WQOs. The TMDL targets must not be exceeded more frequently than the allowable exceedance rate described in the State of California's 303(d) Listing Policy, as a result of controllable sources with the exception of the three NPDES WWTFs, which have met their applicable bacteria WQOs and thus, shall be required to continue to meet their WQOs. All other responsible parties, however, shall be required to attain their respective WLA and LA numeric targets within ten (10) years after USEPA approves the TMDL.
Linkage Analysis	For this TMDL, the connection between pollutant loading and protection of BUs is established by the fact that TMDL numeric targets and allocations are equal to WQOs for the most stringent BU of CVSC in the Basin Plan. Therefore, this TMDL's numeric targets protect all BUs of CVSC. There is a one-to-one relationship between loading allocations and numeric targets in this TMDL. For example, a 30-day geometric mean wasteload/load allocation of 126 MPN/100 ml for E. coli at the point of discharge makes it more likely that 126 MPN/100 ml or less will be present in the CVSC, especially if contributions from natural background sources are not exceeding these allocations. The potential for increased or decreased concentration downstream due to growth and decay dynamics may be offset by dilution from subsurface drainage from irrigated

	agricultural lands and effluent from permitted wastewater treatment plants and thus provides an implicit margin of safety.
TMDL Calculations and Allocations	A TMDL is a numeric calculation of the loading capacity of a water body to assimilate a certain pollutant and still attain all WQSs. The TMDL is the sum of the individual wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources and natural background sources, and a margin of safety (MOS) to address uncertainties. Discharges from all current and future point sources and controllable nonpoint sources of pollution to the impaired section of CVSC shall not exceed the following WLAs and LAs for E. coli. Both WLAs and LAs for E. coli are: 1) the log mean (Geomean) of samples collected shall not exceed 126 MPN/100 ml (based on a minimum of not less than five samples during a 30-day period), and[1] 2) 400 MPN/100 ml for a single sample. The allocations are applicable throughout the entire stretch of the impaired section of the CVSC year-round. The numeric target concentrations are based on extensive epidemiological studies conducted by the USEPA and others. To address the uncertainty concerning bacterial die-off and re-growth dynamics in CVSC, and to better address critical conditions and seasonal variations, this TMDL provides a MOS by including a monitoring and review plan that uses data collected during implementation to evaluate TMDL effectiveness and the need for revision. Load allocations (LAs) and wasteload allocations (WLAs) for bacteria indicator dischargers into CVSC are described below:

Allocation Type	Discharger	E. Coli Allocations
Point Source (WLAs)	VSDWTP CSDWTP MVWRP	A log mean (Geomean) of ≤126 MPN/100 ml (based on a minimum of not less than five samples during a 30-day period), and 400 MPN/100 ml for a single sample
Point Source (WLAs)	KSCFF Cal-Trans City of Coachella (MS4 co-permittee)_	A log mean (Geomean) of ≤126 MPN /100 ml (based on a minimum of not less than five samples during a 30-day period), and 400 MPN/100 ml for a single

[1] For Nonpoint sources, when it is impractical to collect five samples for the log mean (Geomean), the single sample maximum allocation of 400 MPN/100 ml may be used to determine compliance with the load allocation.

			sample
	Nonpoint Source (LAs)	Agricultural Runoff Federal Lands Tribal Lands	A log mean (Geomean) of ≤126 MPN/100 ml (based on a minimum of not less than five samples during a 30-day period), and 400 MPN/100 ml for a single sample
	Nonpoint Source (LAs)	Septic Systems	Zero (0) MPN/100 ml
Monitoring Plan	Dischargers listed in Table H-2 will be required to develop and submit as a whole, or in groups, a comprehensive water quality monitoring program for the 303(d) listed segment of CVSC to the Regional Water Board Executive Officer for review and approval 90 days after USEPA approves the TMDL. The monitoring plan will include a sufficient number of monitoring stations and monitoring events to adequately address all potential sources of bacteria.		

2. IMPLEMENTATION ACTIONS FOR ATTAINMENT OF TMDL

The implementation plan is divided into two phases. Phase I actions will take three years to complete and will focus on monitoring and addressing bacterial indicators associated with wastewater discharges from NPDES facilities, and urban and stormwater runoff. Regional Water Board staff will coordinate closely with USEPA to address waste discharges from tribal lands. If E. coli WQOs are not achieved by the end of Phase I, Regional Water Board staff will implement additional actions to control E. coli sources in Phase II. Enforcement actions against violators of the TMDL will occur in both phases if necessary. This approach provides for immediate assessment of known sources of bacterial indicators while allowing time for additional monitoring to assess TMDL implementation, effectiveness, and need for modification.

Agricultural Dischargers and the CVWD are specifically exempted from having to complete Phase I monitoring actions regarding agricultural discharges. The Regional Water Board acknowledges the monitoring completed by CVAS in 2008-2009, and finds that its monitoring accurately characterizes the contribution of irrigated agriculture to the bacterial indicator impairment in the CVSC. The Regional Water Board considers CVAS's effort as an early implementation of this TMDL. Accordingly, this effort does not exempt Agricultural Dischargers and the CVWD from completing Phase II actions, should Phase II become necessary and available data indicate discharges into the CVSC from irrigated agriculture exceed E. coli WQOs.

2.1 Phase I Implementation Actions

Phase I actions will occur within three years after USEPA approves the TMDL, and begin as directed in Table H-2 below. Phase I requires:

- Monitor CVSC for bacteria loading from city of Coachella, KSCFF, Cal-Trans, federal lands, and tribal lands;
- Identify significant federal and tribal dischargers to CVSC and notify them of their role in TMDL implementation;
- Receive a written report from each tribal entity, or from USEPA, describing measures to ensure waste discharges from tribal property do not violate or contribute to a violation of this TMDL;
- Prepare an amendment to the Basin Plan that rectifies current limitations of having three bacterial indicator organisms, clarifies which indicators apply to specified surface waters of the Region, and as necessary, determines the need for site-specific objectives; and
- Monitor, track, and survey CVSC to determine if Phase I activities achieve bacteria WQOs.

2.2 Phase I Implementation Responsible Parties and Schedule

The time schedule and parties responsible for implementing Phase I actions are provided in Table H-2 below.

Table H-2: Phase I Actions and Time Schedules

Due	Action
Immediately following Regional Water Board approval of TMDL	Regional Water Board staff shall begin preparing an amendment to the Basin Plan that rectifies current limitations of having three bacteria indicator organisms, clarifies which indicators apply to which surface waters of the Region, and as necessary, develops site-specific objectives. This Basin Plan amendment shall be drafted and presented to the Regional Water Board for consideration of adoption at the earliest practicable date, but no later than eighteen (18) months following USEPA approval of the CVSC Bacterial Indicators TMDL.
90 days after USEPA approves the TMDL	Pursuant to requests from Regional Water Board staff, the responsible parties, which includes Kent Seatech Corporation Fish Farm (NPDES permittee), Cal-Trans (MS4 permittee); and the city of Coachella (MS4 permittee), shall submit to Regional Water Board staff with the cooperation and assistance of the Coachella Valley Water District, which operates and maintains the impaired section of CVSC, data that characterize their contribution of bacteria to the CVSC or shall develop bacterial indicator water quality monitoring programs. As part of the water quality monitoring programs, Quality Assurance Project Plans (QAPPs) shall be developed and submitted to the Regional Water Board Executive Officer for review and approval. Monitoring data will be provided to Regional Water Board staff on a quarterly basis and will be

	used to assess contributions of bacteria to CVSC from anthropogenic sources (stormwater and urban runoff, and other sources). Responsible parties that join groups to complete Phase I actions shall be allowed an additional 90 days to submit their QAPP.
90 days after USEPA approves the TMDL	Regional Water Board staff shall begin to identify significant federal and tribal dischargers to CVSC and notify them of their role in TMDL implementation.
90 days after USEPA approves the TMDL	Regional Water Board staff shall develop a plan to conduct TMDL surveillance and track TMDL activities. The objectives of the plan are to assess monitoring data, measure attainment of the water quality objectives, and determine compliance with the TMDL.
90 days after USEPA approves the TMDL	Pursuant to a request from the Regional Water Board, each tribal entity, in coordination with USEPA, shall submit a technical report describing measures to ensure that waste discharges to CVSC from tribal land do not violate or contribute to a violation of this TMDL.
3 years after USEPA approves the TMDL	Regional Water Board staff shall submit a written report to the Regional Water Board describing monitoring results, attainment of the water quality objectives, and the need to revise the TMDL, if necessary.

Phase I actions are intended to aid in developing an effective assessment of critical conditions and sources, which will be used to develop and implement appropriate control measures in Phase II. Responsible parties, who are fulfilling their responsibilities, have no obligation to undertake the actions assigned to others, who may fail to perform.

2.3 Phase II Implementation Actions

Actions taken in Phase I (within three years after USEPA approves the TMDL) will determine whether WQOs have been achieved, sources of bacterial pollution have been identified, and whether additional actions are required in Phase II (within seven years after end of Phase 1) to meet WQOs. If monitoring and assessment in Phase I indicate that waste discharges to CVSC from anthropogenic activities violate this TMDL, and that violations persist despite recommended operation and maintenance procedures and control measures in responsible parties' existing permits, the Regional Water Board shall require the implementation of additional actions to control anthropogenic sources of bacteria in Phase II. The Regional Water Board will require responsible parties to select and implement new/additional management practices (MPs) for Phase II, following characterization of sources and a determination of whether these sources can be controlled. This determination shall take into consideration background conditions and cost factors. The Regional Water Board may revise Municipal Separate Storm Sewer System (MS4) permit water quality based effluent limitations, which may be expressed in terms of narrative management practice (MP) requirements. The Regional Water Board may also consider revising WQOs for CVSC to address natural background sources of bacteria. This revision would be accomplished through the establishment of a Site

Specific Objective (SSO) after completing a Use Attainability Analysis (UAA). If an SSO is required, it would be developed by the end of Phase 2 based on available resources.

Violations of WQOs will be addressed by implementing MPs identified in the discharger's existing Regional Water Board permit, or by implementing measures provided in the SWRCB's Nonpoint Source Program Plan and/or Nonpoint Source Program Strategy and Implementation Plan (PROSIP). Appropriate and required regulatory procedures will be followed prior to implementing any additional control practice(s).

2.4 TMDL Review Schedule

Annual reports will be provided to the Regional Water Board by Regional Board staff describing progress in attaining the water quality objectives. The reports will assess:

- Water quality improvement in terms of E. coli concentration;
- Water quality objectives achieved, delayed, or not achieved, and why; and
- Compliance with Regional Water Board orders and requests.

2.5 Triennial Review

Federal law requires states to hold public hearings to review WQSs, and modify/adopt standards as appropriate (CWA Section 303(c); 40 CFR Section 131.20). State law requires that each regional board shall formulate and adopt water quality control plans (Basin Plan) for all areas within the region. Such plans shall be periodically reviewed and may be revised (CWC Section 13240). All Basin Plan amendments and supporting documents adopted by the Regional Water Board must be submitted to the SWRCB, and then OAL, for review and approval. Lastly, the USEPA has final approval authority for Basin Plan amendments concerning surface waters.

The first review of this TMDL is scheduled for completion three years after USEPA approves the TMDL to provide adequate time for implementation and data collection. Subsequent reviews will be conducted concurrently with the Triennial Review of the Basin Plan. The TMDL review schedule is shown below in Table H-3.

Table H-3: TMDL Review Schedule

Activity	Date*
Begin TMDL Review	Two years after USEPA approves the TMDL
Terminate First TMDL Review, and conduct Regional Water Board Public Hearing	Three years after USEPA approves the TMDL
Begin Second TMDL Review	Five years after USEPA approves the TMDL
Terminate Second Review and Conduct Regional Water Board Public Hearing	Six years after USEPA approves the TMDL
Etc.	
* Dates are contingent upon availability of Regional Water Board resources.	

Monitoring results and progress toward attainment of the water quality objectives will be provided during Triennial Review public hearings. If TMDL progress is insufficient, staff will recommend to the Regional Water Board additional MPs to control pollutant sources, enforcement action, TMDL revision, or other means to achieve WQOs.

This proposed review schedule reflects the Regional Water Board's commitment to periodic review and refinement of this TMDL, via the basin plan amendment process.