

June 1, 2011

State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-2000



RE: Comment Letter – CVSC BI TMDL

Dear Sir:

Thank you for an opportunity to comment on the “Proposed Approval of Amendments to the Water Quality Control Plan for the Colorado River Basin Region to Establish a Total Maximum Daily Load and Implementation Plan for Bacterial Indicators in the Coachella Valley Storm Water Channel” dated June 17, 2010. To the Twenty-Nine Palms Band of Mission Indians, the Coachella Valley Storm Water Channel is the Whitewater River. The river has served as a valuable water source for the Chemehuevi and Desert Cahuilla Indians that resided in the area for well over a century. To this day, the Whitewater River is a culturally significant water source that has invaluable beneficial uses for the Tribe. The Tribe has identified many natural resources within the Whitewater River basin that have been utilized for traditional purposes long before any other users. There is clear scientific support provided by archaeological and biological studies for traditional uses. These resources were used to support hunting, constructing shelters, serving as food sources and enabling tool production that provided a manageable way of life.

Presently, discharges from the Valley Sanitary District Wastewater Treatment Plant (VSDWTP) in Indio provide the main source of water for the river. The discharged water flows about a quarter mile downstream before reaching the western border of the 29 Palms Reservation (*Figure 1*). After entering the Reservation, the river runs through the heart of the Reservation before leaving under the Dillon Road bridge at the eastern border. Even though the Tribal section of the Whitewater River is less than one mile, the Twenty-nine Palms Band of Mission Indians received EPA approval for treatment in the same manner as a state (TAS) to administer water quality standards and certification programs under §303 and §401 of the Clean Water Act (CWA).

For over a decade, the river has been listed on the 305b list of impaired waters mainly due to impairment by pathogens of unknown sources. Potential sources of bacterial contamination include fecal material from humans via a local sewage treatment plant just upstream from the Reservation, birds from a bird sanctuary near the Reservation, livestock located adjacent to the Reservation, wild birds and animals, other humans including the homeless living on or near the river, and various non-point sources from nearby parking lots, streets, and freeways. Although the State Water Board (Board) has updated the Colorado River Basin Plan (Basin Plan) in 1993, and adopted amendments in 2006, this section of the Whitewater River has remained on the California 303(d) List of impaired waters. As with other updates, the current amendment proposal does not provide a timeline for removing the river from the 303(d) list.

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

1. TMDL ELEMENTS

Project Definition

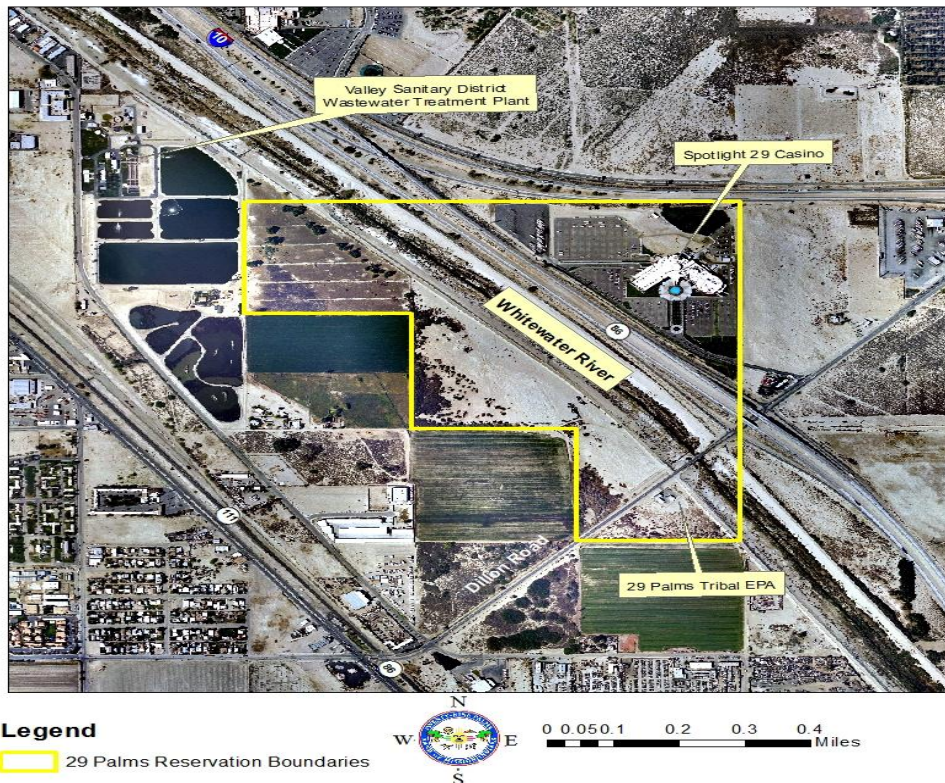
On October 26, 2006, the Twenty-nine Palms Band of Mission Indians received EPA approval for treatment in the same manner as a state (TAS) to administer water quality standards and certification programs under §303 and §401 of the Clean Water Act (CWA). Since that time, the Tribe has been working diligently to set its own water quality standards and establish TMDL along the stretch of the Whitewater River running through the Reservation. Although it is anticipated that the Tribe would adopt beneficial uses similar to those designated by the Board, additional beneficial uses might also be included to preserve and protect Tribal natural and cultural resources that are important for supporting traditional Tribal lifeway and practices.

Watershed Description

The “headwater” for this section of the Whitewater River is the single wastewater discharge pipe located at the Valley Sanitary District Wastewater Treatment Plant (VSDWTP) in Indio. Other potential sources of water may flow from shallow aquifers and infrequent stormwater arising from upstream and surrounding drainage. The western border of the 29 Palms Reservation is near a concrete culvert, which forms a waterfall a quarter mile downstream from the VSDWTP discharge pipe (*Figure 1*).

Figure 1

Twenty-Nine Palms Band of Mission Indian Reservation



The Whitewater River then bisects the Reservation before exiting under the Dillon Road bridge at the eastern Reservation border. The Whitewater River and channel not only provides flood control, but also provides habitat for many types of wildlife including migratory songbirds, waterfowl, coyotes, raccoons, and rodents. Trespassers are also known to recreate in and around the river running through Tribal land. Recent Tribal assessments revealed flora and fauna that warrant preservation and protection by the Tribe.

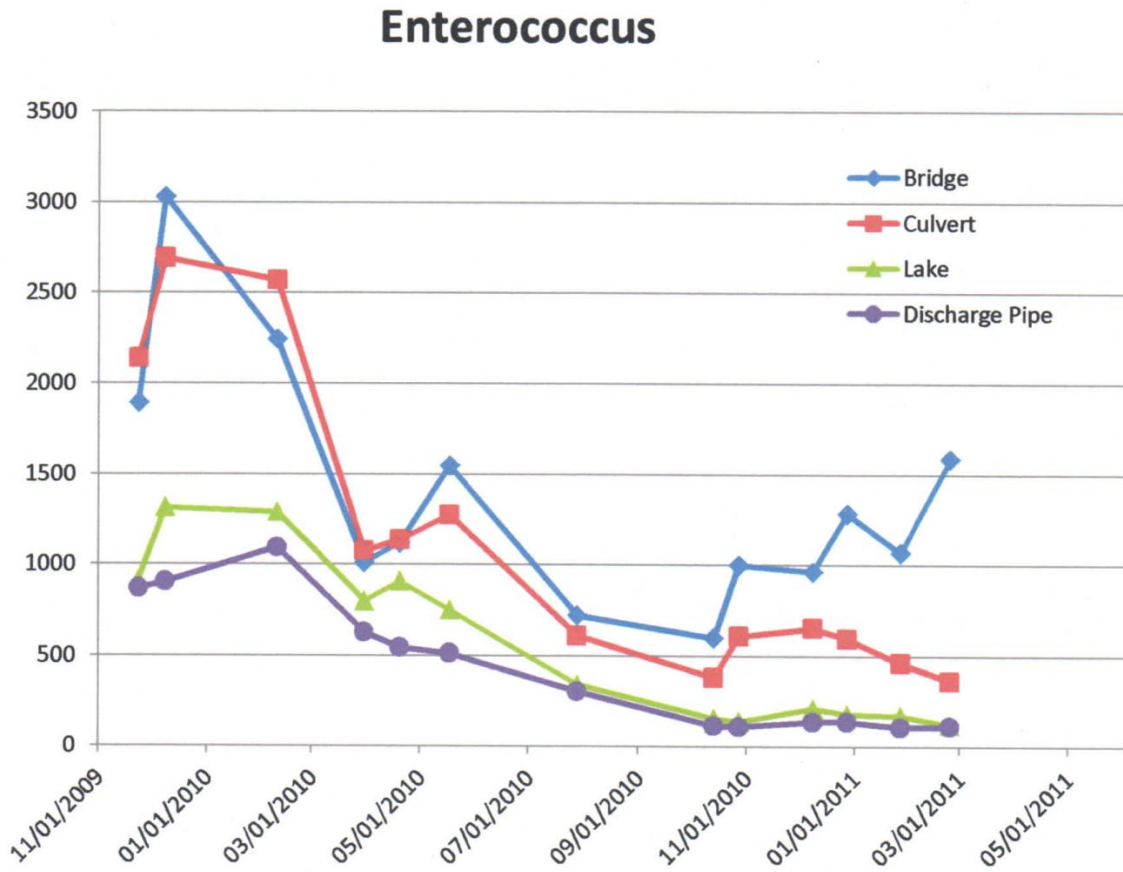
Data Analysis

With support from the U.S. EPA and BIA, the 29 Palms Tribal EPA collected water quality samples monthly at five sites (Figure 2) from November 2009 to March 2011 to evaluate fecal bacteria concentration and loading. *Enterococcus* analysis was performed using IDEXX Enterolert with quantitray. Geometric mean (GEOMEAN) (5-point) were above 33 MPN/100 mL (Figure 3) and instantaneous maximum (IMAX) exceeded 100 MPN/100 mL (data not shown) at all sampling sites and at all sampling dates. Also note that as the water flowed downstream away from the discharge pipe towards the culvert and under the Dillon bridge, *Enterococcus* concentration increased to even higher levels.

Figure 2 – 29 Palms Reservation Surface Water Sampling Sites



Figure 3



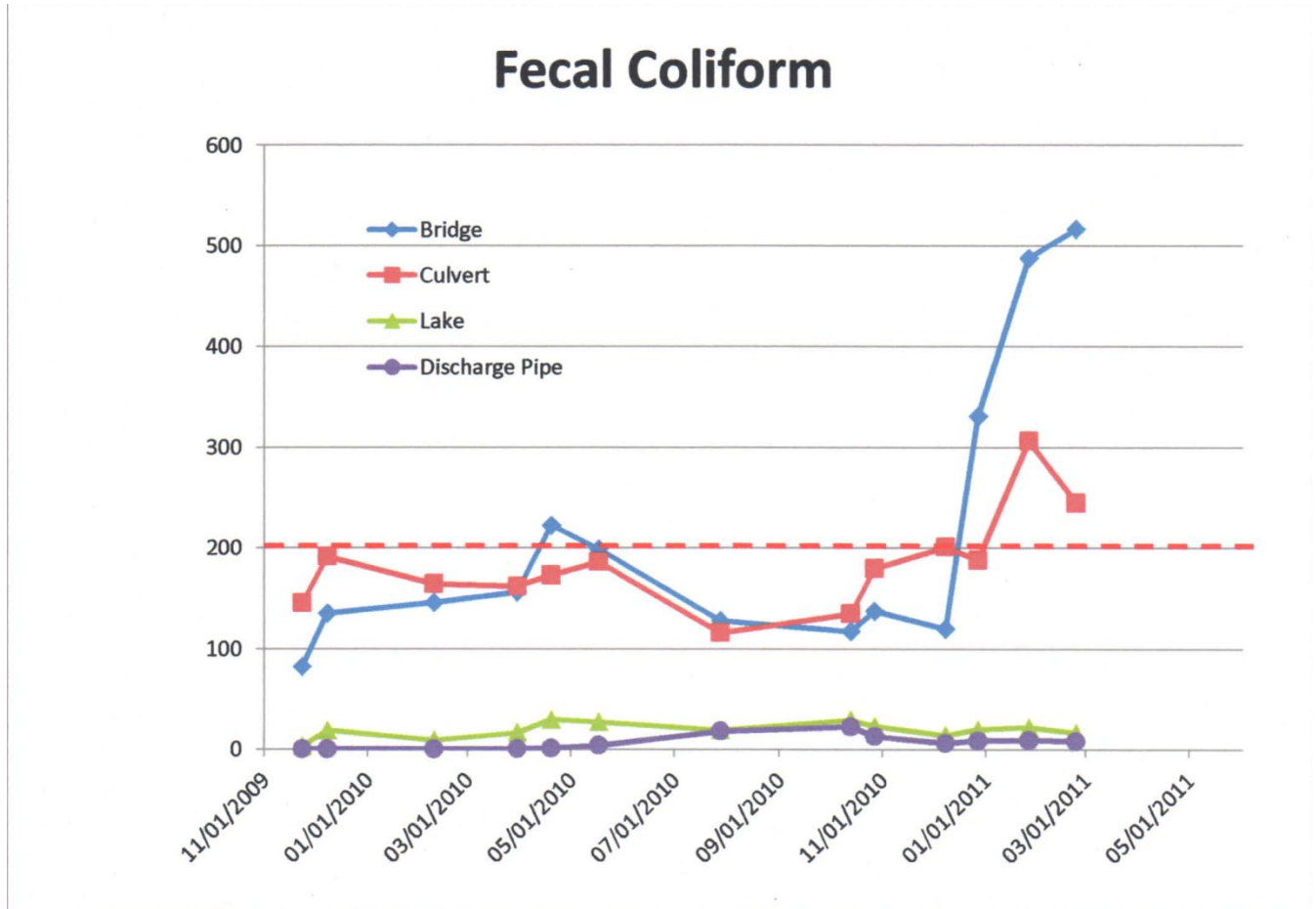
Fecal Coliform was analyzed using IDEXX Colisure with quantitray. State WQO of 200 MPN/100 mL (Figure 4) was not exceeded at any time at the VSDWTP discharge pipe and at the Lake that was formed from the discharge at the bottom of the river bank. As with *Enterococcus*, concentrations of *Fecal Coliform* continue to increase as the water flowed downstream away from the discharge pipe. Recent monitoring showed that the GEOMEAN for *Fecal Coliform* exceeded 200 MPN/100 mL at the culvert and under the Dillon Bridge. During the sampling period over the last two years, IMAX of 400 MPN/mL was exceeded 2 times at the culvert and 3 times under the bridge. *Total Coliform* and *Heterotrophic Bacteria* showed similar trends (Data not shown).

Source Analysis

This section states that because “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 CVAS (Coachella Valley Agricultural Stakeholder Water Quality Task Force) 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”. Based on this erroneous logic, discharge from VSDWTP would also

have minimum effect on the bacterial indicator impairment in the CVSC because as indicated above, there is also no correlation between FIB levels measured from the discharge pipe and the FIB levels measured in the Whitewater River.

Figure 4



Microbial source tracking (MST) via ribotyping of *E. coli* is outdated, labor intensive, time consuming, not quantitative, and expensive. Furthermore, it is now clear scientifically that this method is not useful for MST. The Board should consider implementing more state-of-the-art methodology for tracking sources of fecal pollution. Recently, qPCR (quantitative polymerase chain reaction) analysis of fecal *Bacteroides* has shown promise for MST for the following reasons:

1. Why *Bacteroides*?
 - a. Found exclusively in feces, rumens, and other cavities of human and other animals
 - b. 1/3 of fecal flora
 - c. Obligate anaerobes
 - d. Not expected to grow in the environment
 - e. Limited survival in the environment

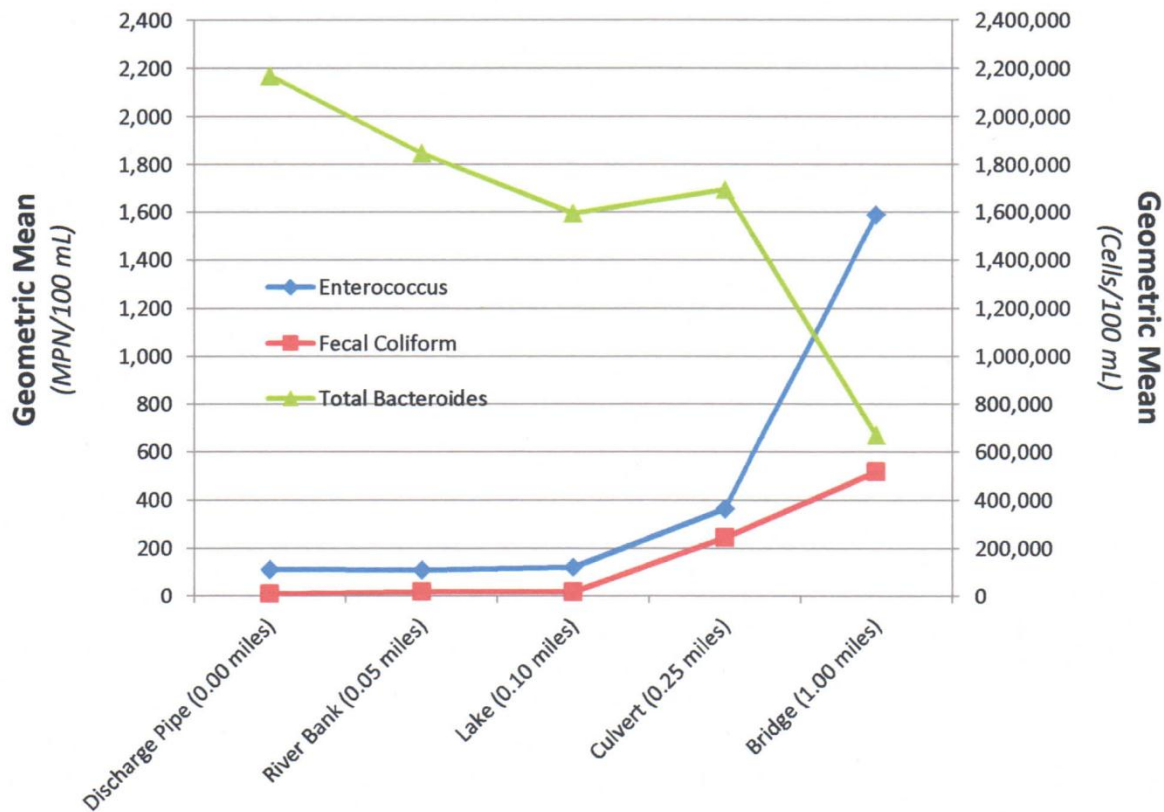
- f. Useful for tracking recent fecal pollution
 - g. Genetic markers associated with *Bacteroides* 16S ribosomal DNA have been shown to be useful in determining host-specific fecal pollution
2. qPCR is simple and does not necessarily require DNA extraction of the sample.
 3. qPCR is rapid. Results could become available within 2 hours after sample collection.
 4. Unlike most MST methods, qPCR is quantitative.
 5. qPCR analysis of fecal *Bacteroides* is sufficiently sensitive due to the large number of the bacteria in feces. Multiple copies of genetic markers for total *Bacteroides* are present in each cell.
 6. qPCR is specific.
 - a. *Bacteroides* is only found in the gut.
 - b. Primers and probes targeting *Bacteroides* do not cross-react with genetic markers from other bacteria.
 - c. Differentiating between human and non-human sources of fecal pollution is possible but is currently not perfect.
 7. qPCR is less labor intensive and is amenable to automation.
 8. qPCR is inexpensive. After initial investment for qPCR instrumentation (less than \$25,000), each analysis costs less than \$2.00.
 9. qPCR can be mobile. Instrumentation is commercially available to perform analyses in the field.

Figure 5 compares concentrations of fecal *Bacteroides* with other traditional fecal indicator bacteria (*Enterococcus* and *Fecal Coliform*) as VSDWTP wastewater discharge travels downstream on February 23, 2011. At the discharge pipe, the concentration of *Enterococcus* exceeded the State WQO of 32 MPM/100 mL but *Fecal Coliform* did not exceed 200 MPN/mL. After traveling downstream past the culvert (0.25 miles downstream), both *Enterococcus* and *Fecal Coliform* levels exceeded the State WQOs. High concentrations of *Bacteroides* were discharged into the Whitewater River; however, WQO has not been established for *Bacteroides*. In contrast to traditional fecal indicator bacteria, the concentration of *Bacteroides* did not increase as water flowed downstream from the discharge pipe. In fact, bacterial levels steadily decreased, which is compatible with the notion the anaerobic bacteria do not survive or propagate in the environment. These data suggest that *Bacteroides* is a useful indicator of recent fecal pollution in the Whitewater River. The data also suggest that there are no new sources of pollution downstream as was suggested when traditional fecal bacteria indicators were used.

Note that the data presented here focused only on total fecal *Bacteroides* using an ALLBAC qPCR assay. Estimation of human and non-human fecal *Bacteroides* could also be performed using similar qPCR methodology targeting human and non-human genetic markers. 29 Palms SOP for *Bacteroides* analysis are available for viewing and download at www.tepa29.org.

Figure 5

February 23, 2011



Critical Conditions and Seasonal Variation

Based on the data presented above, the effect of bacterial colonization and regrowth in the Whitewater River is likely and is underestimated by the Board. Fecal indicator bacteria (FIB) monitoring using traditional methods suggested additional sources of pollution downstream from VSDWTP. However, monitoring anaerobic *Bacteroides*, which does not accumulate and grow in the river, suggested that there are no new pollution sources downstream (at least as far as the eastern borders of the 29 Palms Reservation). If there were other recent sources of fecal pollution downstream, *Bacteroides* levels should also increase together with the traditional FIBs.

The Board should consider including an anaerobic FIB in its monitoring program. At the last annual ASM meeting, Hawaii reported the importance of using anaerobic FIB in their warm and tropical climate. They have studied the feasibility of including anaerobic *Clostridium* in their State water quality monitoring programs. In support of this strategy, we have demonstrated that anaerobic *Bacteroides* is a useful year-round FIB in our warm and hot valley and will continue to monitor fecal pollution of the Whitewater River using both traditional and state-of-the-art methodologies.

Linkage Analysis

As shown from our data presented above, the temporal and spatial trends of bacterial levels in the Whitewater River are not the same for all FIBs.

Along the 29 Palms Tribal section of the Whitewater River, increasing bacterial concentration downstream due to growth and decay dynamics may **not** be offset by dilution from subsurface drainage from irrigated agricultural load and effluent for permitted wastewater treatment plants (VSDWTP).

What is BU? Please define all acronyms.

Final thought: The relationship between FIB levels and pathogens are unknown. Because most pathogens do not survive and propagate in the environment, anaerobic FIB may more closely mimic survival dynamics of pathogens.

TMDL Calculations and Allocations

Calculations:

Because bacterial loading of the Whitewater River is not only from point and non-point pollution sources, the calculation of loading capacity should also take into account of non-polluting sources. This would be especially important for calculating LAs.

The board should consider **not** establishing TMDL based only on *E. coli*. Not all FIB exhibit the same temporal and spatial trends along the Whitewater River. In the stretch of the river that we have monitored monthly for over 2 years, we have found no correlation between levels fecal coliform, enterococcus, and bacteroides in discharged wastewater and water quality at sites located downstream. Furthermore, our monitoring data suggest that most if not all of the water in the Tribal section of the Whitewater River most likely originated from the VSDWTP point source.

Allocations:

Tribal Lands: As stated in the beginning of this letter, the Twenty-nine Palms Band of Mission Indians received EPA approval for treatment in the same manner as a state (TAS) to administer water quality standards and certification programs under §303 and §401 of the Clean Water Act (CWA). We are currently working to set Tribal water quality standards on the section of the Whitewater River running through our Reservation.

Please note that consultation on a government to government basis is required for any proposed allocations involving the 29 Palms Band of Mission Indians.

Monitoring Plan

- Any monitoring plan should include more than *E. coli*.
- Any monitoring plan should include at least one anaerobic indicator of fecal pollution.

- All monitoring plans should be made available to the public for review.
- All monitoring plans should contain a State and/or U.S. EPA approved quality assurance project plan (QAPP).

2. IMPLEMENTATION ACTIONS FOR ATTAINMENT OF TMDL

Farmers and the CVWD **should not** be specifically exempted from having to complete Phase I monitoring actions regarding agricultural discharges. In our opinion, the monitoring completed by CVAS in 2008-2009 did not accurately and fully characterize the contribution of irrigated agriculture to the bacterial indicator impairment in the CVSC based on many of the reasons that we presented above.

2.1 Phase I Implementation Actions

The proposed Phase I actions should have been completed by now. This is especially true since the strategy for monitoring FIB has not changed since the very first Basin Plan. No new incite would be gained by continuing to use this outdated strategy.

Phase II implementation actions should be initiated now, not three years from now.

- Monitor CVSC for bacteria loading from city of Coachella, KSCFF, Cal-Trans, federal lands, and **tribal lands**;

Monitoring data should be shared with Tribes.

- Identify significant federal and **tribal dischargers** to CVSC and notify them of their role in TMDL implementation;

Tribes need to be consulted with on a government to government basis.

- 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;

1. Tribes need to be consulted with on a government to government basis.

2. The board should also require written reports from any discharger.

3. Reports submitted to the board should be accessible to Tribes.

- 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.

One or more anaerobic FIB should be included in the new monitoring strategy.

- Monitor, track, and survey CVSC to determine if Phase I activities achieve bacteria WQOs.

It is not clear who will be doing this, but any monitoring, tracking, and survey data should be made available to Tribes upon request.

2.3 Phase II Implementation Actions

Any BMPs and/or mitigation plans would fail if:

1. the contribution of bacterial regrowth and colonization is not taken into account; and
2. A reliable MST is not developed and implemented.

Thank you again for this opportunity to comment on the amendment of the CVSC Bacterial Indicators TMDL. As you might gathered from our comments, the Whitewater River flowing through the 29 Palms Reservation is more than just a stormwater channel to the Tribe. This river is an important cultural and natural resource for our Tribe. For many years, we have worked hard in partnership with the U.S EPA, BIA, and the Water Board to build the capacity needed for monitoring water quality and protecting habitat along the Tribal section of the Whitewater River. The Tribe hopes that the Board will continue to partner with us on a government to government basis to achieve our mutual water quality goals for the Whitewater River.

Sincerely yours,



Darrell Mike
Tribal Chairman

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