

**For Discussion: Middle Santa Ana River Bacteria TMDL – Next Steps
April 22, 2020 Task Force Meeting**

I. Purpose

The Middle Santa Ana River (MSAR) Bacteria TMDL Task Force (MSAR Task Force) was formed in January 2006 to provide a forum for watershed stakeholders to work collaboratively on the implementation of the MSAR TMDL. This TMDL, adopted by the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) in August 2005, became effective in May 2007 after United States Environmental Protection Agency (USEPA) approval. Since 2007, there have been two significant regulatory actions that change the underlying basis for the establishment of this TMDL. In addition, a substantial body of work has been completed that has greatly increased our knowledge about bacterial indicators in the watershed. With the recent completion of the 2019 MSAR Bacteria Synoptic Study, early 2020 submittal of the fourth TMDL Triennial Report and upcoming wet season compliance target date, this is an appropriate time for the MSAR Task Force to determine its next steps with respect to TMDL implementation and potential revisions to the existing TMDL and/or the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan).

II. Regulatory Background

This section provides an overview of the regulatory changes that have occurred since adoption of the existing TMDL and the known status of compliance by dischargers with assigned wasteload allocations (WLAs) or load allocations (LAs).

A. Regulatory Changes Since MSAR TMDL Adoption

Since adoption of the MSAR TMDL, the Santa Ana Water Board has amended the Basin Plan to modify requirements to protect recreational beneficial uses in the Santa Ana Region. In addition, the State Water Resources Control Board (State Water Board) recently adopted Statewide Bacteria Provisions to protect recreational uses. Following is a discussion of each of these regulatory actions and their relevance to the MSAR TMDL.

1. 2012 Recreational Use Basin Plan Amendment

On June 15, 2012, the Santa Ana Water Board adopted the following resolution that modified the Basin Plan:

Resolution Approving Amendments to the Basin Plan Pertaining to Bacteria Quality Objectives and Implementation Strategies, Recreation Beneficial Uses, the Addition and Deletion of Certain Waters Listed in the Basin Plan and Designation of Appropriate Beneficial Uses, and Other Minor Modifications (R8-2012-0001).

This Basin Plan amendment was subsequently approved by the State Water Board on January 21, 2014 (Resolution No. 2014-0005), and by USEPA on April 8, 2015. Key elements that have an impact on the requirements or content of the existing TMDL include:

- Removal of fecal coliform as the bacterial indicator for inland freshwaters (Note: MSAR TMDL states that the fecal coliform TMDL targets become ineffective upon adoption of *Escherichia coli* (*E. coli*) criteria in the Basin Plan).
- Revised narrative objective that incorporates the term “controllable” and defines controllable vs. uncontrollable bacterial indicators.
- Establishment of (a) high flow suspension to temporarily suspend recreational uses under specified conditions; and (b) identification of inland waters where the high flow suspension applies. **Table 1** summarizes the elements that comprise the high flow suspension in the Basin Plan.

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- Removal of REC1 use on Reach 1 Cucamonga Creek.

Among other things, the Basin Plan now provides the following water quality objective for pathogen indicator concentrations (Pages 4-16 and 4-17):

“Pathogen indicator concentrations shall not exceed the values specified in Table 4-pio below as a result of controllable water quality factors (...) unless it is demonstrated to the Regional Board’s satisfaction that the elevated indicator concentrations do not result in excessive risk of illness among people recreating in or near the water. If this demonstration is made, then site-specific consideration of appropriate pathogen indicator concentrations will be necessary.”

Table 4-pio – Pathogen Indicator Bacteria Objectives for Fresh Waters¹

Recreational Use	Pathogen Indicator Objective (geometric mean of at least 5 samples in a 30-day period (running) ²
REC1-only or REC1 and REC2	<126 <i>E. coli</i> organisms per 100 mL ³
REC2-only ⁴	N/A; see <i>REC2 Only Freshwaters</i> , below, and Chapter 5, Recreation Water Quality Standards, <i>Antidegradation targets for REC2 only freshwaters</i>

¹ The water quality objectives specified in Table 4-pio (...) do not apply to a river or stream if and when the recreational uses are temporarily suspended due to unsafe flow conditions therein. (...).

² The Regional Board may adopt other alternative averaging periods, such as annual or seasonal averages, through the basin planning process.

³ Where it is necessary to make public notification and/or beach closure decisions in the absence of sufficient data to calculate a representative geometric mean for *E. coli*, no single sample shall exceed the default value shown in Table 5-REC1-ssv (...).

⁴ Waterbodies designated REC2 but not designated REC1.

With respect to what constitutes a controllable source or controllable water quality factor, the Basin Plan specifically indicates that the following sources within the Santa Ana Region may be considered uncontrollable (Page 5-107):

- “Wildlife activity and waste
- Bacterial regrowth within sediment or biofilm
- Resuspension from disturbed sediment
- Marine vegetation (wrack) along high tide line
- Concentrations (flocks) of semi-wild waterfowl
- Shedding during swimming

Controllable bacteria sources refer to any bacteria indicator source that can be controlled by treatment or management measures.”

2. 2018 Statewide Bacteria Provisions

The State Water Board amended the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries (ISWEBE) to establish new statewide water quality standards for pathogen indicator bacteria (Resolution No. 2018-0038, August 7, 2018). To ensure consistency between the Basin Plan and the ISWEBE, the following elements in the Basin Plan need to be addressed:

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- Revise the geometric mean for *E. coli* from 126 cfu/100 mL to 100 cfu/100 mL;
- Allow for the calculation of a geometric mean over a 6-week averaging period (instead of the existing 30-day averaging period);
- Replace the Single Sample Maximum values in the Basin Plan (Table 5-REC1-ssv) with the Statistical Threshold Value of 320 cfu/mL;
- Acknowledge that the new statewide bacteria objectives do not supersede the existing narrative or site-specific pathogen objectives in the Basin Plan;
- Consider the addition of other bacteria-related elements of the ISWEBE: (a) Incorporation of a Limited REC1 beneficial use; and (b) alternatives to implement the bacteria water quality objectives: Reference System/Antidegradation Approach and Natural Exclusion Approach.

Most of the above elements impact the basis for the existing MSAR TMDL. The ISWEBE provisions also allow for the implementation of a high flow suspension to temporarily suspend recreational uses when conditions are unsafe; however, as noted above, the Basin Plan already includes this provision. Table 1 summarizes key differences between the State Water Board and Santa Ana Water Board high flow suspension regulations.

As noted above, the ISWEBE includes two alternatives for modifying bacteria water quality objectives. These provisions (and a brief discussion of potential applicability to the MSAR watershed) include:

- *Reference System/Antidegradation Approach* - This approach may be utilized to ensure: (1) bacteria water quality is at least as good as that of an applicable reference system; and (2) no degradation of existing water quality is allowed when the existing water quality is better than the reference system. In such circumstances, the TMDL or Basin Plan may include a certain frequency of exceedance of the applicable water quality objectives based on the observed exceedance frequency in the applicable reference system or the targeted water body, whichever is less.

The State Water Board defines a “Reference System” as: “A watershed or waterbody segment determined by the Water Board to be minimally disturbed by anthropogenic stressors but otherwise is representative of conditions of the assessed site, watershed, or waterbody segment.” Defining an acceptable “reference system” in an urban environment may be challenging given the need to identify a waterbody/waterbody segment that is minimally disturbed. Therefore, this approach may have limited use in the MSAR watershed.

- *Natural Sources Exclusion Approach* - This approach may be utilized after all anthropogenic sources of bacteria are identified, quantified, and controlled. In such circumstances, the TMDL or Basin Plan may include a certain frequency of exceedance of the applicable water quality objectives based on the observed exceedance frequency of the identified and quantified natural sources of bacteria of the targeted water body.

This approach for modifying a water quality objective requires a determination of the frequency of exceedances of the *E. coli* objective based on the observed exceedance frequency of the identified and quantified natural sources of the targeted water body. The Santa Ana Water Board’s Basin Plan uses the terms “controllable” and “uncontrollable” sources as compared to the terms of “anthropogenic” and “natural” sources in the ISWEBE. It is unclear if the Santa Ana Water Board’s terms for controllable and uncontrollable would be considered equivalent to the ISWEBE’s terms. If so, the use of this approach may be a viable option. Otherwise, to obtain approval of a natural sources exclusion would essentially require proving the negative, i.e., it will be necessary to show that none of the bacteria in the waterbody/watershed has an anthropogenic origin. As long as an MS4 has a discharge,

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it will contribute bacteria, which will likely be considered an anthropogenic source. To determine the viability of this approach, we must better understand how the Santa Ana Water Board defines the ISWEBE terms in the context of its existing Basin Plan. Otherwise, the MS4s may be better positioned to comply with the TMDL targets through MS4 flow reduction/elimination strategies through CBRP implementation rather than expending resources on studies to support a natural exclusion approach.

B. Status of MSAR TMDL Compliance

The MSAR TMDL assigns WLAs and LAs as follows:

- WLA – Applicable to (a) urban runoff, including stormwater discharges; and (b) discharges from confined animal feeding operations (CAFO); and
- LA – Applicable to (a) agricultural runoff discharges; (b) and natural sources.

The existing compliance targets in TMDL Table 5-9x are based on summer and winter conditions:¹

- Dry summer conditions (April 1 – October 31) compliance must be achieved by December 31, 2015;
- Wet winter conditions (November 1 – March 31) compliance is required by December 31, 2025.

Following is a summary of the known status of compliance for the entities responsible for implementation of the MSAR TMDL:

1. Riverside and San Bernardino County MS4s; Cities of Claremont and Pomona MS4s

Compliance with the dry summer condition targets is achieved through implementation of a dry season Comprehensive Bacteria Reduction Plan (CBRP),¹ which became the final water quality-based effluent limit once approved by the Santa Ana Water Board. The County CBRPs were approved on February 10, 2012 (Resolution Nos. R8-2012-0015 and R8-2012-0016, respectively). The City CBRPs were approved on March 14, 2014 (Resolution Nos. R8-2014-0030 and R8-2014-0031, respectively).

In 2018, the Santa Ana Water Board completed audits of the Riverside and San Bernardino County MS4 CBRPs and concluded that the MS4 Programs were in compliance with CBRP requirements. In addition, Board staff recommended that the CBRPs be updated; however, this update should not occur until after the MSAR TMDL is revised.

The MS4 Permits required that the dry season CBRPs provide a schedule for development of a wet season CBRP. The CBRPs for all jurisdictions established the following schedule for development of wet season CBRPs: “...the earliest a draft wet weather condition CBRP will be submitted...for review will be 24 months following adoption of the next MS4 permit.” The “next permit” has not yet been adopted; accordingly, no action has occurred on the development of a wet weather condition CBRP by any MS4 discharger.

2. Agricultural Operators

The Chino Basin Water Master and the Milk Producers Council submitted a Bacterial Agricultural Source Management Plan (BASMP) to the Santa Ana Water Board in December 2014 to fulfill TMDL implementation requirements applicable to agricultural dischargers. The BASMP relies on a combination of comprehensive source evaluation and BMP implementation to control bacteria sources from

¹ While TMDL Table 5-9x establishes TMDL targets based on the following two conditions: “dry summer” and “wet winter” conditions, other documents, e.g., MS4 permits and Comprehensive Bacteria Reduction Plans, refer to these conditions as “dry season” and “wet season.”

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agricultural lands with emphasis on demonstrating that no dry weather flows occur off of agricultural lands as a result of excessive irrigation. While the Santa Ana Water Board requested public comment on the BASMP in early 2015, it is unclear if the BASMP has been formally approved.

3. Confined Animal Feeding Operations

The WLAs applicable to CAFOs during the dry summer condition are implemented through provisions contained in the General Waste Discharge Requirements for Concentrated Animal Feeding Operations (Dairies and Related Facilities) within the Santa Ana Region (Order No. R8-2018-001). Wet winter condition WLAs must be complied with by December 31, 2025. The Permit has specific requirements to address compliance with the 2015 dry summer condition WLAs. In addition, the Permit has requirements for demonstrating compliance with the wet winter condition WLAs by 2025.

4. Small MS4s

The State Water Board authorizes the discharge of stormwater from small MS4s through the General Permit for Waste Discharge Requirements for Storm Water Dischargers from Small Municipal Separate Storm Sewer Systems (Order No. 2013-0001-DWQ). This Order was amended in 2017 to incorporate TMDL requirements for the following specific entities in the MSAR Watershed: University of California Riverside (UCR); California Institute for Men; California Institute for Women; California Rehab Center. These entities have the same CBRP (dry and wet season) requirements as other MS4s in the watershed. While, none of these entities has yet demonstrated compliance with the dry season compliance targets, UCR has initiated work to address this issue.

III. MSAR TMDL Revision

Dischargers are currently in compliance with the 2015 dry summer condition WLAs in the TMDL, as required by their permits. The wet winter condition TMDL compliance date is December 31, 2025. The TMDL should be revised prior to that date to incorporate the numerous regulatory changes that have occurred since TMDL adoption, e.g., adoption of a high flow suspension of REC1 use during unsafe conditions. In addition to revising the TMDL to incorporate relevant regulatory changes, revision of the TMDL also provides the opportunity to incorporate findings from nearly 13 years of studies conducted in the watershed during TMDL implementation.

A. *Elements to Revise in the MSAR TMDL*

Following are the key elements that should be addressed during the TMDL revision process:

- Restructure the TMDL. The existing TMDL is based on conditions that occur by season (Dry Summer Condition: April 1 – October 31 versus Wet Winter Condition: November 1 – March 31). The TMDL should be revised to clarify how compliance with the WLAs and LAs is considered. Instead of dry summer/wet winter conditions (or dry/wet season conditions), TMDL compliance should be based on dry *weather* and wet *weather* conditions.
- Define dry and wet weather conditions. The existing TMDL has no definition for the dry or wet weather condition. The CBRPs define the dry weather condition as, “a condition where daily rainfall does not exceed 0.1 inches.” This definition coupled with the incorporation of a high flow suspension (see below) can provide a foundation for evaluating compliance under dry and wet weather conditions.
- Incorporate the Basin Plan’s high flow suspension into the TMDL (see Table 1 for an overview of the high flow suspension Basin Plan language).

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- Delete the obsolete compliance targets, WLAs, and LAs for fecal coliform (these elements are no longer effective following the approval of the 2012 Basin Plan amendment and ISWEBE; regardless they should still be removed).
- Establish new compliance targets, WLAs and LAs consistent with the revised Basin Plan that are consistent with the ISWEBE. When developing these TMDL elements, consider the findings from 13 years of watershed studies/research. Key issues to consider include:
 - *Concentration vs. Load-based Compliance Targets* – The existing TMDL compliance targets are concentration-based. The CBRP and all four Triennial Reports have provided a load-based analysis to determine the relative contribution of bacterial indicators from various sources to impaired waterbodies in the MSAR watershed. The MSAR Task Force needs to determine whether to retain the existing compliance approach or shift to a load-based approach.
 - *Controllability of Bacterial Indicators* – Determine how to best incorporate “controllability,” as defined by the Basin Plan, into a revised TMDL.
- Delete Cucamonga Creek Reach 1 from the TMDL since the 2012 Basin Plan revision removed the REC1 use from this segment of Cucamonga Creek.
- Revise the TMDL compliance deadlines for meeting the more stringent bacterial objectives established by the ISWEBE.
- Add small MS4s identified as responsible parties to the TMDL by the State Water Board.
- Establish a mechanism for assuring that discharges from commercial agricultural operations comply with the applicable LA for bacterial indicators.
- Establish a new schedule of deliverables for all named parties in the TMDL including, but not limited to, update of the CBRPs or other TMDL implementation plans and revision of the Monitoring Plan.

C. Revision of TMDL Implementation Plans

1. CBRP

A key finding in the CBRP audits is that the existing CBRPs should not be updated until the Basin Plan and MSAR TMDL are revised. This document and its recommendations assume this finding will continue to be the position of the Santa Ana Water Board. When the CBRPs are updated, it is recommended that the existing CBRP not only be updated to reflect revisions to the Basin Plan and TMDL, but also to incorporate a bacteria management strategy to address the wet weather condition, as applicable. This recommendation is based on the following discussion.

The existing CBRPs are applicable to urban discharges during dry season conditions (daily rainfall ≤ 0.1 inches) from April 1 through October 31. Above we propose to modify the TMDL to move from a season-based structure to a weather condition-based structure that incorporates a high flow suspension. **Figure 1** illustrates the outcome of this structural change from a CBRP perspective.

The existing CBRP addresses the condition shown on the left side of Figure 1, i.e., condition when daily rainfall is ≤ 0.1 inches. Per the Basin Plan, the high flow suspension would automatically apply to days with a daily rainfall of ≥ 0.5 inches (although this can be modified on a site-specific basis, see Table 1). A revision to the CBRP would only need to address the gap between dry and very wet conditions, i.e., days with rainfall > 0.1 but < 0.5 inches.

When the CBRPs are updated based on the revised Basin Plan and TMDL, dischargers should consider updating the CBRP to not only address the dry weather condition but also incorporate conditions where

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the high flow suspension is not applicable. This approach not only simplifies future bacteria compliance requirements, but also recognizes the likelihood that the bacteria management strategy applicable to the conditions with rainfall ≤ 0.1 inch would not be substantively different to the management strategy implemented under daily rainfall conditions > 0.1 but < 0.5 inches. This approach also means that dischargers would only need to update the existing CBRP and not create a new CBRP specific to the wet weather condition.

2. Other TMDL Implementation Plans

Other TMDL implementation plans developed in the watershed would also need to consider how to update their bacteria management strategies based on a revised TMDL that includes a high flow suspension.

IV. Next Steps

Moving forward, it is recommended that the MSAR Task Force work collaboratively with the Santa Ana Water Board to implement three key activities over the next 5 years.

A. Revise the Basin Plan and MSAR TMDL

As noted above, the MSAR TMDL should be revised before the existing December 31, 2025 wet season compliance target date. The Basin Plan also requires revision to incorporate ISWEBE provisions. To maximize the effective use of resources, these two revision processes should be combined into one Basin Plan amendment process (Note: Simultaneous revisions to the Basin Plan and TMDL could be uncoupled and completed as separate actions, if it becomes necessary to revise the TMDL in a timely manner).

Figure 2 illustrates the key tasks that need to be implemented to complete the Basin Plan amendment process (assuming the Basin Plan/TMDL revisions are coupled) and a general schedule to execute the tasks. This proposed schedule, which begins July 2020, results in an adopted Basin Plan amendment by early 2023 and an EPA-approved amendment by the latter part of 2024, well before the 2025 wet season compliance date.

B. Complete Special Studies

The MSAR Task Force already has a substantial body of work to draw from to support revision of the TMDL. While the TMDL can be revised based solely on this work, the opportunity exists to further supplement this foundation with additional research early in the TMDL revision process. For example, a key study recommended from the Synoptic Study could be considered for implementation now:

- Evaluate the extent to which naturalized *E. coli* reside in bottom sediments or biofilms of the Santa Ana River.

The Figure 2 schedule allows time for additional studies to be completed to support TMDL revision during the first year. However, as needed to keep the process moving forward in a timely manner, it is possible that some studies could be deferred for implementation during preparation of updated CBRPs.

C. Revisions to TMDL Implementation Plans

While the revised TMDL would include an updated schedule of compliance, the proposed schedule provided in Figure 2 anticipates revision to the CBRP could begin as early as USEPA approval of the

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revised TMDL. To facilitate revision to the CBRPs, additional studies/research may be appropriate. Two examples are provided below, but others may be identified during the TMDL revision process:

- CBRP audits included a finding that a process should be developed for determining sources of bacteria in the watershed (Audit Section 5, Finding D):
“...However, there are other factors that may need to be considered before determining that the MSAR permittees have met the waste load allocation. These include determining if the source is anthropogenic versus natural, if the source is controllable, and if the source is from an MS4. There is no consensus process for reaching conclusions on these other factors and for supporting a conclusive, transparent determination regarding compliance with waste load allocations. A process should be developed and subjected to public comments after the update of bacterial TMDL has taken place.”
- To support CBRP implementation, MS4 permittees may wish to develop site-specific hydrologic analyses to clarify or refine the trigger for application of the high flow suspension on selected waterbodies.

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Table 1. High Flow Suspension (HFS) – Comparison Between Basin Plan and Statewide Bacteria Provisions

Factor	Basin Plan	State ISWEBE	Notes/Comments
Definition	For waterbodies designated REC1 and REC2, the narrative and numeric pathogen objectives are temporarily suspended when high flows preclude safe recreation in or near freshwater stream channels that have been engineered, heavily modified or maintained to serve as temporary flood control facilities.	A Water Board may adopt an HFS for REC1 that reflects water conditions considered unsafe for the REC1 beneficial use due to high water flow or velocity. REC1 water quality objectives do not apply during HFS. All other applicable public health-related beneficial uses need to be protected during the period of the HFS.	State’s provisions limit HFS to REC1 beneficial use and states that “all other applicable public health-related uses” need to be protected during a HFS. This implies the REC2 is not suspended. In contrast, the Basin Plan explicitly suspends both REC1 and REC2 uses.
Trigger to Initiate HFS	Flow conditions are presumptively unsafe if either of the following conditions occur: (1) Stream velocity is greater than 8 feet-per-second (fps); or, (2) The product of stream depth (feet) and stream velocity (fps) (depth-velocity product) is greater than 10 ft ² /s. Where representative stream gauge data are not available, unsafe flows are presumed to exist in stream channels that have been engineered or heavily modified for flood control purposes when rainfall in the area tributary to the stream is greater than or equal to 0.5 inches in 24 hours.	A rainfall measure, flow measure, or other requirements shall be established by the Water Board to describe specific conditions during which the HFS would apply.	The Statewide provisions and Basin Plan do not limit application of the HFS to rainfall runoff, but allow for consideration of factors that cause unsafe conditions. The Basin Plan is more explicit regarding what may cause unsafe conditions: “...Stormwater runoff significantly increases the volume and velocity of local stream flows. Dam releases and other irregular sources, such as imported water transfers, can also result in dramatic, though transitory, increases in stream flow and velocity. Such flows create a severe hazard to public safety and temporarily preclude attainment of recreational uses in or near the water.”
Trigger to End HFS	Stream flows presumed to return to safe conditions and the temporary suspension of recreation standards will cease 24-hours after the end of the storm event, unless actual flow data demonstrate that the suspension should terminate sooner or later than the default period. In such cases, the suspension terminates once stream flows (measured as cubic-feet/second or (cfs) have returned to the range of normal pre-storm conditions (cfs < 98 th percentile as calculated from a calibrated hydrograph for the stream).		The Basin Plan also has a provision allowing for site-specific triggers: The hydrology of individual freshwater streams varies greatly. Therefore, the thresholds and presumptions related to rainfall and stream flow identified above may be adjusted based on site-specific data analysis and/or runoff models, subject to approval by the Regional Board through the normal public participation process.

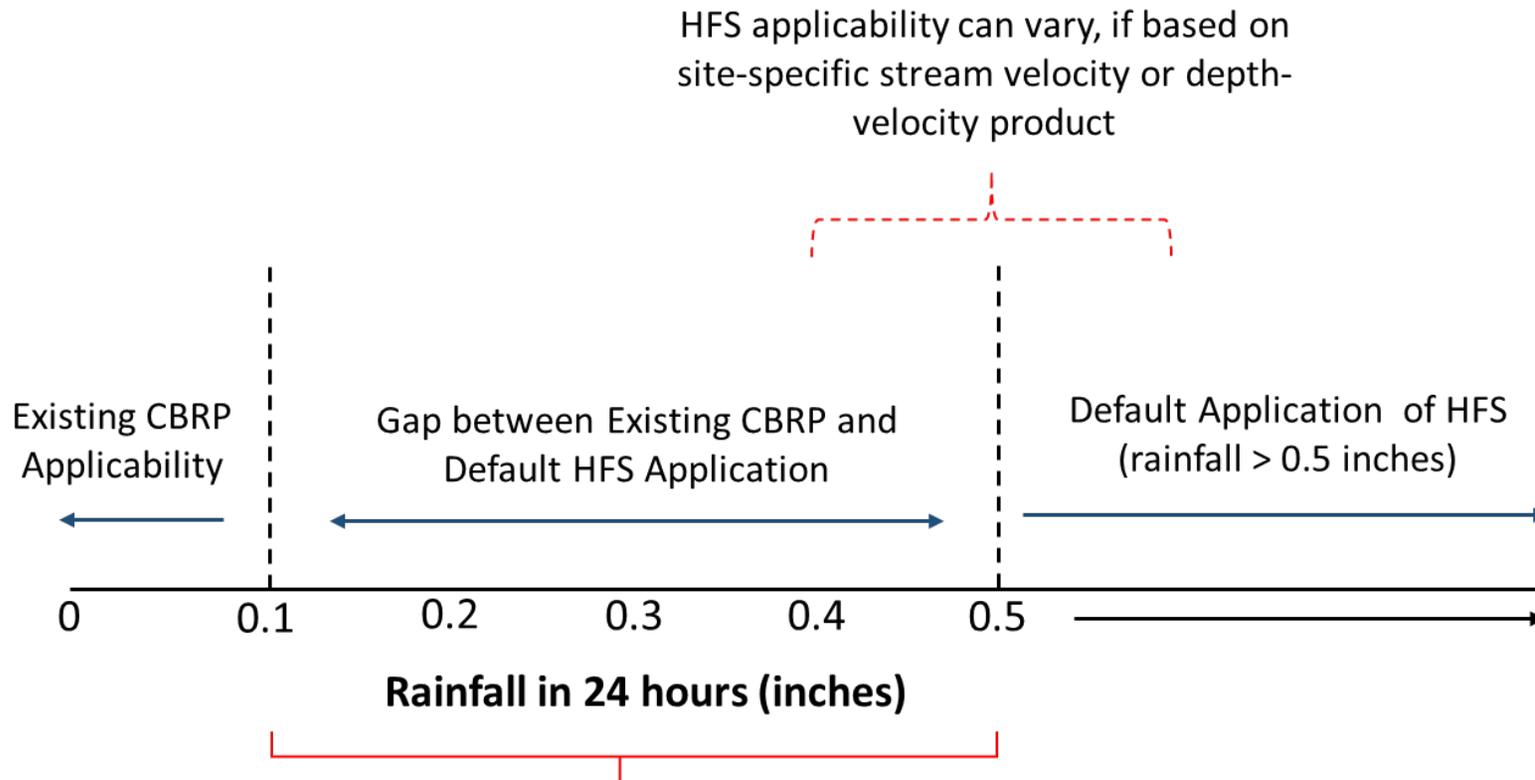
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Table 1. High Flow Suspension (HFS) – Comparison Between Basin Plan and Statewide Bacteria Provisions

Factor	Basin Plan	State ISWEBE	Notes/Comments
Channel Type Applicability	<ul style="list-style-type: none"> • General Applicability - When high flows preclude safe recreation in or near freshwater stream channels that have been engineered, heavily modified¹ or maintained to serve as temporary flood control facilities. • Specific Applicability: <ul style="list-style-type: none"> - SAR Reach 3 – HFS applicable - SAR Reach 2 - Flow-based threshold cannot be used to trigger application of the HFS. Instead, the HFS may only be applied using the rainfall criteria (see above) or when the Army Corps of Engineers is releasing excess flows stored behind Prado Dam in response to previous rain events as described in their SOPs. 	State limits applicability discussion to the following: Water conditions considered unsafe for the REC1 beneficial use due to high water flow or velocity	<p>Basin Plan has general and specific language regarding applicability in the Santa Ana Region.</p> <p>Statewide provisions do not establish any explicit limitations on applicability of a HFS to any particular channel type</p>
Process to Establish an HFS on a Waterbody	<p>Basin Plan already identifies waterbodies where HFS applies:</p> <ul style="list-style-type: none"> • Appendix VIII - Maps of the waterbody segments where HFS applies. • Appendix IX contains ArcGIS files for producing high resolution maps of water bodies where HFS applies. <p>Supplement to the Basin Plan amendment's Substitute Environment Document included tables for each County listing the waterbodies by name where the HFS applies.</p>	To adopt a high flow suspension of the REC1 beneficial use, the Water Board must conduct a Use Attainability Analysis.	The inclusion of waterbodies where the HFS applies in Appendix VIII of the Basin Plan (and associated ArcGIS files in Appendix IX) demonstrates that the need for UAAs for these waterbodies has been satisfied. These appendices were approved by the State Water Board and USEPA during the approval of the 2012 Basin Plan amendments.

¹ Basin Plan defines “engineered or heavily modified channels” as follows: The temporary suspension of recreational uses and related water quality objectives during unsafe flow conditions applies only to streams that have been engineered or heavily modified to enhance flood control protection. Engineered streams include all man-made flood control facilities with a box-shaped, V-shaped or trapezoidal configuration that have been lined on the side(s) and/or bottom with concrete or similar channel-hardening materials. Heavily modified channels include once natural streams that have been substantially re-engineered, using levees, bank stabilization (rip-rap), channel straightening, vegetation removal and other similar practices, to facilitate rapid evacuation of increased urban runoff during storm events.

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- Updated CBRP would address days under these rainfall conditions
- Would BMPs implemented during this period differ from BMPs implemented during dry weather?

Figure 1. Rainfall Conditions in Context of Applicability of Existing CBRP and Application of a High Flow Suspension

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Figure 2. Schedule to Complete Basin Plan Amendments and Implement Revisions to TMDL Implementation Plans

Task	Activity	Year (Quarter)																							
		2020		2021				2022				2023				2024				2025					
		3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
1	Special Studies/Technical Analyses																								
2	1 st Draft of TMDL Technical Report																								
3	2 nd Draft of TMDL Technical Report																								
4	Draft Basin Plan Revisions (State Water Board consistency)																								
5	Substitute Environmental Document; Economic Analysis																								
6	Final TMDL Technical Document																								
7	Final Draft Revisions to Basin Plan																								
8	Preliminary Administrative Record																								
9	Public Workshop																								
10	External Scientific Peer Review																								
11	Response to Peer Review Comments																								
12	Draft Staff Report																								
13	Workshop/Public Comment & Response																								
14	Board Hearing to Consider Basin Plan Amendments																								
15	Final Administrative Record																								
16	State Water Board Approval of Basin Plan Amendment																								
17	Office Administrative Law Review																								
18	EPA Approval																								
19	Updates to CBRP/Other TMDL Implementation Plans																								