

APPENDIX H

Identification of Goals

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APPENDIX H. IDENTIFICATION OF GOALS

Numeric goals have been developed to support Water Quality Improvement Plan implementation and are used to measure progress toward addressing the highest priority water quality conditions. Numeric goals may take a variety of forms, but are quantifiable so that progress toward and achievement of the goals are measurable. Applicable Total Maximum Daily Load (TMDL) targets are required to be incorporated as Water Quality Improvement Plan goals. Also in accordance with the MS4 Permit and applicable regulatory drivers, final goals and reasonable interim goals for each five-year period from Water Quality Improvement Plan approval to the anticipated final goal compliance date (including an interim goal for this permit term) have been developed. This appendix presents Bacteria TMDL numeric targets, how the targets were derived, and how the targets were translated into Water Quality Improvement Plan numeric goals.

Within the San Dieguito River WMA, the Bacteria TMDL dictates the bacteria goals for each weather condition to address and attain Recreational Water Contact (REC-1) beneficial uses. A TMDL represents the maximum amount of a pollutant of concern that a water body can receive and still attain water quality standards. TMDLs can take a variety of forms, including concentration-based TMDLs, which focus on reducing pollutant sources to achieve a maximum pollutant concentration consistent with existing water quality objectives (WQOs), and load-based TMDLs, which focus on reducing sources to achieve a watershed-specific maximum load that is protective of beneficial uses. The Bacteria TMDL incorporates load-based reductions that were calculated on the basis of watershed modeling results and applicable bacteria WQOs.

Although the Pacific Ocean shoreline segment was removed from the 303d list for REC-1 impairment in 2010, calculation of the Bacteria TMDL had already begun and the segment remained in the TMDL through adoption in 2011. The San Dieguito shoreline segment was then incorporated into the Bacteria TMDL requirements within the MS4 Permit in 2013. Therefore, the TMDL targets are required to be incorporated into the Water Quality Improvement Plan goals. If monitoring data supports compliance with wet and dry weather Bacteria TMDL targets, the Responsible Agencies will use the adaptive management protocol in Section 6 to identify new highest priority water quality conditions and develop goals and strategies to address new priorities.

The final and interim numeric goals for the San Dieguito River WMA were derived from water quality-based effluent limitations (WQBELs) identified in the Bacteria TMDL and incorporated into the MS4 Permit. Bacteria TMDL WQBELs include receiving water limitations and effluent limitations, presented in multiple formats. The receiving water limitations and effluent limitations are discussed in detail in Section H.1 and Section H.2, respectively. Attachment E.4 of the Municipal Permit provides the following options to meet numeric goals and to demonstrate final compliance with the Bacteria TMDL:

- (1) There is no direct or indirect discharge from the Responsible Agency's municipal separate storm sewer systems (MS4s) to the receiving water; OR

- (2) There are no exceedances of the final receiving water limitations in the receiving water at, or downstream of, the Responsible Agency's MS4 outfalls; OR
- (3) There are no exceedances of the final effluent limitations at the Responsible Agency's MS4 outfalls; OR
- (4) The pollutant load reductions for discharges from the Responsible Agencies' MS4 outfalls are greater than or equal to the final effluent limitations; OR
- (5) The Responsible Agencies can demonstrate that exceedances of the final receiving water limitations in the receiving water are due to loads from natural sources, AND pollutant loads from the Responsible Agencies' MS4 are not causing or contributing to the exceedances; OR
- (6) The Responsible Agencies develop and implement the Water Quality Improvement Plan as follows:
 - (a) The Responsible Agencies incorporate best management practices (BMPs) to achieve the receiving water limitations and/or the effluent limitations,
 - (b) The Responsible Agencies include an analysis in the Water Quality Improvement Plan, utilizing a watershed model or other watershed analytical tools, to demonstrate that the implementation of the BMPs achieves compliance with the final receiving water and/or effluent limitations,
 - (c) The results of the analysis must be accepted by the San Diego Water Board as part of the Water Quality Improvement Plan,
 - (d) The Responsible Agencies continue to implement the BMPs, and
 - (e) The Responsible Agencies continue to perform the specific monitoring and assessment specified to demonstrate compliance with the receiving water and effluent limitations (RWQCB, 2013a).

H.1 Receiving Water Limitations

Bacteria TMDL receiving water limitations are expressed as concentrations and as an allowable exceedance frequency. The limitations vary depending on the weather condition. The Bacteria TMDL identified WQBELs based on precipitation: wet weather (day of 0.2 inch of rain or more plus three days) and dry weather (all other days, including those in the winter season). For each condition, receiving water targets were identified based on water quality objectives (WQOs) (Table H-1). WQOs are concentrations of bacteria indicators identified as acceptable levels for REC-1. Wet weather conditions are episodic and short in duration; therefore, single-sample maximum WQOs apply. Geometric mean WQOs apply during dry weather when monitoring results over a longer duration are averaged and assessed. The WQOs do not account for a natural increase in bacteria at the shoreline during storm events. To account for background bacteria concentrations during wet weather, the Bacteria TMDL incorporated an allowable

exceedance frequency of the WQO based on a reference (mostly undeveloped) watershed.

**Table H-1
 Final Receiving Water Numeric Goals for San Dieguito River WMA**

Indicator Bacteria	Shoreline WQO (MPN/100mL)	Shoreline Allowable Exceedance Frequency ¹	Shoreline WQO (MPN/100mL)	Shoreline Allowable Exceedance Frequency
	Wet Weather (Single Sample Maximum) ²		Dry Weather (30-day Geometric Mean) ³	
	Final Compliance: April 4, 2031		Final Compliance: April 4, 2021	
Fecal coliform	400	22%	200	0%
Enterococcus	104	22%	35	0%
Total Coliform	10,000	22%	1,000	0%

Note:

1. The 22% allowable exceedance frequency only applies to wet weather days. For dry weather days, the dry weather bacteria densities must be consistent with the single sample maximum REC-1 water quality objects in the Ocean Plan.
2. During wet weather days, only the single sample maximum receiving water limitations are required to be achieved.
3. During dry weather days, the single sample maximum and 30-day geometric mean receiving water limitations are required to be achieved.

% = percent; mL = milliliters; MPN = most probable number; WQO = water quality objective

The Bacteria TMDL specifies a final receiving water limitation allowable exceedance frequency of 22 percent during wet weather periods based on reference conditions, but allows no exceedances during dry weather. To assess compliance, the Bacteria TMDL expressed exceedances of WQOs as the number of days that the appropriate WQO would be exceeded. The TMDL calculated this number using a mass-based conversion based on bacteria loading, as required by federal regulations (Bacteria TMDL). The TMDL load was calculated by multiplying the WQOs by the daily modeled stream flow. Modeled daily loads greater than this threshold were flagged as an exceedance. Modeled daily loads were classified as occurring on either wet weather days or dry weather days to determine compliance with the different weather-based requirements. For wet weather, the Bacteria TMDL specifies a final allowable exceedance frequency of 22 percent based on reference conditions, while no exceedances are allowed during dry weather. For wet weather, the daily loads from wet weather days greater than the TMDL and the calculated allowable exceedance loads (load from the 22 percent of the allowable days) were flagged as exceedances. For dry weather days, the daily loads from dry weather days greater than the TMDL were flagged as exceedances.

The number of total wet and dry weather days will change by year, but the percentage of exceedance days is the compliance point. For example, the TMDL calculated the number of allowable exceedance days for the critical, or wettest, year within the model period, water year 1993. The number of wet weather days was 98; therefore, the final number of

allowable wet weather exceedance days for the critical year would have been 22 (rounded expression of 22 percent of 98 days). The final allowable number of dry weather exceedance days for the critical year is zero, because a reference condition was not applied to dry weather days in the TMDL. Final compliance with wet weather WQBELs is required in fiscal year (FY) 31. Final compliance with dry weather WQBELs is required in FY21.

H.2 Effluent Limitations

The Bacteria TMDL provides two expressions of effluent limitations. The first expression is equivalent to the receiving water limitations, but is assessed at MS4 outfalls (Table H-2). The second expression is a mass-based load reduction from the subwatersheds discussed below.

Table H-2
Final Effluent Limitations Expressed as an Exceedance Frequency for San Dieguito River WMA

Indicator Bacteria	WQO (MPN/100mL)	MS4 Outfall Allowable Exceedance Frequency ¹	WQO (MPN/100mL)	MS4 Outfall Allowable Exceedance Frequency
	Wet Weather (Single Sample Maximum) ²		Dry Weather (30-day Geometric Mean) ³	
	Final Compliance: April 4, 2031		Final Compliance: April 4, 2021	
Fecal coliform	400	22%	200	0%
Enterococcus	104	22%	35	0%
Total Coliform	10,000	22%	1,000	0%

Note:

1. The 22% allowable exceedance frequency only applies to wet weather days. For dry weather days, the dry weather bacteria densities must be consistent with the single sample maximum REC-1 water quality objects in the Ocean Plan.
2. During wet weather days, only the single sample maximum receiving water limitations are required to be achieved.
3. During dry weather days, the single sample maximum and 30-day geometric mean receiving water limitations are required to be achieved.

% = percent; mL = milliliters; MPN = most probable number; WQO = water quality objective

Another expression of WQBELs is the percent bacteria load reduction required from the watershed to meet the WQOs expressed as an allowable exceedance frequency. The Bacteria TMDL calculated the watershed load reductions that were required to achieve the Bacteria TMDL receiving water limitations. The MS4 Permit incorporated these load reductions for wet and dry weather as effluent limitations. The loading capacity was calculated by multiplying the WQOs by the average daily modeled stream flow. Modeled daily loads greater than this threshold were flagged as an exceedance. The allowable exceedance load for wet weather was calculated by summing the top 22 days (22 percent of the 98 wet weather days in the critical year) with the highest modeled daily loads. This load was then subtracted from the modeled wet weather total for the year. The difference

between the remaining modeled load and the TMDL load represents the load reduction required for wet weather. The percent load reduction is calculated by dividing the exceedance load by the total annual load for the critical year. The final load reductions estimated to meet receiving water goals are presented in Table H-3.

**Table H-3
 Final Effluent Limitations Expressed as an Exceedance Frequency for San
 Dieguito River WMA**

Indicator Bacteria	Percent Watershed Load Reduction Required	
	Wet Weather	Dry Weather
	Final Compliance: April 4, 2031	Final Compliance: April 4, 2021
Fecal coliform	1.5%	20.7%
Enterococcus	7.7%	83.5%
Total coliform	4.3%	14.4%

Dry weather WQBELs, expressed as percent watershed load reduction, were calculated using the same formula, but daily loads were calculated using a slightly different model (steady-state plug-flow reactor model) in the Bacterial TMDL. Two variations in the calculation are that (1) an allowable load using the reference watershed approach was not applied for dry weather, per the TMDL, and (2) the percent load reductions were calculated based on a 30-day period for comparison with the 30-day geometric mean WQO. Otherwise, the TMDL load was calculated in the same manner as that for the wet weather load and the difference between the remaining modeled load and the TMDL load is the load reduction required for dry weather. The percent load reduction is calculated by dividing the exceedance load by the total monthly load for the critical year (Table H-2).

H.3 Interim Goals and Existing Conditions

The first five TMDL interim compliance pathways are the same as the final compliance pathways. In addition, two compliance pathways (6 and 7 below) provide interim compliance calculated using a midpoint between existing conditions and final targets. Finally, compliance pathway 8 provides interim compliance with the TMDL if the Responsible Agencies are implementing strategies selected and included in a watershed model or other analytical tool to demonstrate that the interim TMDL compliance requirements will be met. Attachment E.4 of the Municipal Permit provides the following options to meet interim numeric goals and to demonstrate interim compliance with the Bacteria TMDL:

- (1) There is no direct or indirect discharge from the Responsible Agency's municipal separate storm sewer systems (MS4s) to the receiving water; OR
- (2) There are no exceedances of the final receiving water limitations in the receiving water at, or downstream of, the Responsible Agency's MS4 outfalls;
OR

- (3) There are no exceedances of the final effluent limitations at the Responsible Agency's MS4 outfalls; OR
- (4) The pollutant load reductions for discharges from the Responsible Agencies' MS4 outfalls are greater than or equal to the final effluent limitations; OR
- (5) The Responsible Agencies can demonstrate that exceedances of the final receiving water limitations in the receiving water are due to loads from natural sources, AND pollutant loads from the Responsible Agencies' MS4 are not causing or contributing to the exceedances; OR
- (6) There are no exceedances of the interim receiving water limitations in the receiving water at, or downstream of, the Responsible Agency's MS4 outfalls; OR
- (7) The pollutant load reductions for discharges from the Responsible Agencies' MS4 outfalls are greater than or equal to the interim effluent limitations; OR
- (8) The Responsible Agencies submit and are fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim TMDL compliance requirements will be achieved by the interim compliance dates.

Interim goals are identified for each expression of WQBELs and each weather condition. Bacteria TMDL wet and dry weather interim compliance is calculated as the halfway point between the existing, 2002 conditions and the final TMDL target. The MS4 Permit allows an alternative interim compliance date from the original Bacteria TMDL compliance date (MS4 Permit, Attachment E). Interim compliance of receiving water or effluent limitations is most reasonably attained in FY24 for wet weather and FY19 for dry weather. Updates to existing programs, changes in municipal ordinances, and collaboration within jurisdictions, WMAs, and the region have been occurring since the Bacteria TMDL and the 2013 MS4 Permit were adopted and are ongoing. Through CLRP and Water Quality Improvement Plan development, planning efforts are underway, including measures to secure funding and increase general momentum to implement and expand storm water and water conservation measures. The alternative compliance dates allow for the success of the monitoring, assessment, and goal and strategy adaptation process detailed within this Water Quality Improvement Plan.

The TMDL model used data through 2002, which is why 2002 is considered the existing condition. The existing condition does not necessarily reflect current conditions, nor is it the Water Quality Improvement Plan baseline for all goals. The existing condition for load reductions is assumed to be 0% in 2002, as that was the beginning of implementation planning. The Bacteria TMDL estimated the 2002 existing exceedance frequency for wet weather since wet weather data was not available. The MS4 permit requires the dry weather exceedance frequency to be calculated and presented in the Water Quality Improvement Plans. For each indicator bacteria, available monitoring data collected between January 1, 1996 and December 31, 2002 was assessed and compared to 30-day geometric mean WQOs.

Table H-4 presents the existing condition for the receiving water and effluent limitations and the interim TMDL compliance target for San Dieguito River. The Bacteria TMDL estimates that the 2002 wet weather exceedance frequencies for fecal coliforms, *Enterococcus*, and total coliforms were 43 percent, 49 percent, and 44 percent, respectively, based on modeling results. To calculate dry weather exceedance frequencies, 118 results were available for *Enterococcus* and 116 results each for fecal coliforms and total coliforms between 1996 and 2002. The exceedance frequency (percent of dry weather days exceeding the WQO) was 17% for *Enterococcus*, 11% for fecal coliforms, and 6% for total coliforms. Interim compliance is 50% of the existing condition.

**Table H-4
 Existing Conditions and Interim TMDL Targets for San Dieguito River WMA**

Bacteria Indicator	Receiving Water Exceedance Frequency		Effluent Load Reduction		Interim Compliance Date
	Existing 2002 Condition	Interim Compliance ¹	Existing 2002 Condition	Interim Compliance ¹	
Wet Weather					
Fecal coliform	43% ²	33%	0%	0.8% ²	April 4, 2024
Enterococcus	49% ²	36%	0%	3.9% ²	
Total coliform	44% ²	33%	0%	2.2% ²	
Dry Weather					
Fecal coliform	11% ³	5.5%	0%	10.4% ²	April 4, 2019
Enterococcus	17% ³	8.5%	0%	41.8% ²	
Total coliform	6% ³	3.0%	0%	7.2% ²	

Note:

1. Interim compliance is calculated as 50% between the existing condition and the final TMDL target.
 2. Source: Bacteria TMDL
 3. Source: Monitoring data
- % = percent; N/A = not applicable

The difference between the existing dry weather exceedance frequency and the dry weather load reduction highlights the shortcomings of dry weather modeling based on limited observed data. Uncertainties in the model may result in a potential disconnect between receiving water quality and watershed loading estimates. An exceedance frequency of less than 20% based on monitoring data would seem to require a lower load reduction from the watershed than 80%; however this highlights the difference between concentration and load-based information which incorporates potential uncertainties in modeling dry weather flows. An 80% watershed load reduction likely overstates the actual load reduction required to meet final compliance. Regardless of the load reduction required, the primary strategy during dry weather is to eliminate dry weather flows, which will, in turn, reduce and eliminate pollutant loading. In the Water Quality Improvement

Plan, dry weather reduction strategies and progress towards meeting them are more frequently discussed in terms of flow reduction, rather than load reduction. This acknowledges the related benefit to load reductions, but highlights the source or transport mechanism for dry weather implementation.

H.4 Compliance Pathways

Interim and final compliance with the Bacteria TMDL, as incorporated into the MS4 Permit, may be demonstrated by the Responsible Agencies using any one of the methods presented in the previous sections. Section 5 of the Water Quality Improvement Plan provides additional information on the monitoring that will be completed for assessment.

References

San Diego Regional Water Quality Control Board (Regional Board). 2010. *Revised TMDL for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)*. Resolution No. R9-2010-0001. Approved February 10, 2010.
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