



# SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

CLEAN WATER ACT  
SECTIONS 305(B) AND 303(D)  
INTEGRATED REPORT  
FOR THE SAN DIEGO REGION

DRAFT  
STAFF REPORT

*October 12, 2016*



CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY



State of California  
*Edmund G. Brown Jr., Governor*

California Environmental Protection Agency  
*Matthew Rodriguez, Secretary for Environmental Protection*

## **REGIONAL WATER QUALITY CONTROL BOARD SAN DIEGO REGION**

*Henry Abarbanel, Ph.D., Chair*  
*Gary Strawn, Vice Chair*  
*Eric Anderson, Member*  
*Tomás Morales, Member*  
*Stefanie Warren, Member*  
*Betty Olson, Ph.D., Member*

---

*David W. Gibson, Executive Officer*

---

2375 Northside Drive, Suite 100, San Diego, California 92108

---

Phone: (619) 519-1990

Fax: (619) 516-1994

Web site: <http://www.waterboards.ca.gov/sandiego>

### **DISCLAIMER**

*This publication is a technical report by staff of the California Regional Water Quality Control Board, San Diego Region. No policy or regulation is expressed nor intended.*

# **CLEAN WATER ACT SECTIONS 305(b) AND 303(d) INTEGRATED REPORT FOR THE SAN DIEGO REGION**

**Draft Staff Report**

**September 28, 2016**

**Report Prepared by:**

Xueyuan Yu  
Chad Loflen  
Carey Nagoda  
Deborah Woodward  
Jeremy Haas

**REGIONAL WATER QUALITY CONTROL BOARD  
SAN DIEGO REGION**

**CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY**



## Acknowledgements

Numerous individuals provided valuable input and support in the development of this report. Staff at the San Diego Regional Water Quality Control Board, Sophie di Campalto, Mike Porter, Alex Cali, and Lauren Bray (former scientific aid) greatly helped with reviewing of lines of evidence, as well as making decisions in the CalWQA database. The Surface Water Quality Assessment Unit at the State Water Resources Control Board tremendously assisted in the development of fact sheets and decisions, and coordinated statewide efforts. David Paradies provided programming assistance which saved staff hundreds of hours of data entry. Jon Marshack's Water Quality Goals compilation was used as a resource for finding available guidelines for the protection of water quality. Credit is also given to all the individuals whose long hours of sample collection, laboratory work and report preparation provided the data and information used as the basis for this report.

## Administrative Summary

This Integrated Report includes the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board) recommendations for changes to both the Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Waterbodies, and CWA Section 305(b) report on the water quality condition of waterbodies within the San Diego Region. The data period for this Integrated Report cycle encompasses data collected until August 2010.

Chapter one, the Introduction, provides the context and purpose of this report, discussing the legal requirements for the San Diego Water Board to update the CWA Section 303(d) list and Section 305(b) report. Chapter two provides a review of the process of data review and decision making during the preparation of the Integrated Report. San Diego Water Board staff evaluated benthic macroinvertebrate data using the California Stream Condition Index, with the details of the methods and results discussed in Chapter three. Chapter four provides a brief summary and discussion of the data assessed and the resultant updates of the 303(d) listings, with details of the results reported in appendices. Chapter five discusses the path forward for the Integrated Report in terms of public review and board approval. Appendices A through K complete the Integrated 305(b)/303(d) Report with lists of waterbodies in different beneficial use support categories, miscellaneous changes, and other supporting information.

The volume of data submitted for assessment in the 2014 cycle significantly increased (approximately 190 percent) compared to previous cycles. As a result, a total of 4,996 Lines of Evidence were generated and 2,612 new or revised decisions made, including 237 new listing decisions and 9 delisting decisions. Finally, the Integrated Report categorizes water bodies according to their ability to support core beneficial uses (including municipal and domestic drinking water supply, aquatic life, fish consumption, shell fish harvesting, contact recreation, and non-contact recreation). A total of 404 waterbody segments were placed into one or more of five beneficial use support categories based on the evaluation of the available water quality data. In accordance with the USEPA guidance (2005 and 2015), some waterbody segments were placed into more than one categories as appropriate. The categories and numbers of waterbodies in each category are listed below:

1. All assessed beneficial uses supported and no beneficial uses known to be impaired (116 waterbody segments);
2. At least one, but not necessarily all, core beneficial use is supported (111 waterbody segments);
3. There is insufficient data and/or information to make a beneficial use support determination but information and/or data indicates beneficial uses may be potentially threatened (72 waterbody segments);
4. At least one beneficial use is not supported but a TMDL is not needed (82 waterbody segments); and
5. At least one beneficial use is not supported and a TMDL is needed (166 waterbody segments).

Changes to the 303(d) list for the San Diego Region must be considered for approval by the San Diego Water Board during a public meeting and after consideration of public comments. A copy of the draft Integrated Report and all the supporting appendices were available for public review from July 12 through August 12, 2016.

## Executive Summary

The Integrated Report includes the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board) proposed recommendations for changes to both the Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Waterbodies, and the CWA Section 305(b) report on the water quality condition of waterbodies within the San Diego Region. The Integrated Report should allow the San Diego Water Board the opportunity to assess beneficial use attainment for our Region's waters for regulatory and prioritization purposes and, more importantly, to inform the public.

The San Diego Water Board's Practical Vision highlights the values of leadership, stewardship, communication, and transparency. Given the challenges of the Integrated Reporting process concerning age and amount of data, the San Diego Water Board has focused drafting an Integrated Report to reflect these core values.

Further, a priority of the San Diego Water Board's Practical Vision and values is to focus on the following Core Beneficial Uses:

- Is it safe to swim?
- Is it safe to eat fish and shellfish?
- Is the water safe to drink?
- Are ecosystems healthy?

Prior Integrated Reports focused primarily on the impaired waters portion (303(d) list) with less attention and emphases on identifying waterbodies where some or all beneficial uses assessed were supported. Given the objective of the Clean Water Act to **protect and restore** waters, good stewardship demands that those waters meeting beneficial uses be identified and protected. Furthermore, communication with the public is needed to identify those waterbodies where beneficial uses are met, including those where conditions are present showing extraordinary high quality. This Integrated Report has begun this process, using multiple lines of evidence of biological data in wadeable streams to identify such waters.

However, a weakness in the relativity of the Integrated Report has been effective communication of impairment and/or lack of impairment for these Core Beneficial Uses. The current reporting process does not allow for identification and communication of how a waterbody is meeting one or more, but not all, Core Beneficial Uses. Instead, the waterbody is traditionally simply identified as "impaired." For example, it may be safe to swim in a waterbody but not safe to consume fish and shellfish. Unfortunately the current system only allows the conveyance of information regarding the impairment. This impedes transparency and effective communication. The San Diego Water Board has begun to address this issue in this Integrated Report. However, much remains to be done to improve statewide data management infrastructure.

A final area of concern addressed by this Integrated Report is regarding the physical and biological aspects of the CWA. This report utilizes benthic macroinvertebrate data for wadeable streams to identify where streams have a degraded biological condition due to pollutants (chemical) and/or or pollution (physical). The identification of physical impairment of waterbodies, such as from habitat degradation and/or hydromodification, has largely been lacking in previous waterbody assessments. This Integrated Report has included a physical assessment for a subset of waterbodies where benthic macroinvertebrate and chemistry data was also evaluated. This allows for better transparency and understanding of where waterbodies may face challenges from impaired chemistry or physical conditions, alone or in combination. This allows for better identification of priorities for regulatory and non-regulatory restoration approaches.



## Table of Contents

Administrative Summary .....	ii
Executive Officer Highlights.....	iv
Table of Contents .....	vi
List of Tables .....	vi
List of Figures .....	vii
List of Appendices.....	vii
List of Acronyms and Abbreviations .....	viii
Chapter 1: Introduction.....	1
Chapter 2. Water Quality Assessment.....	2
Overall Process Review .....	2
The Listing Policy .....	2
Changes to California’s 303(d)/305(b) Integrated Report Reporting Cycle.....	3
Data Solicitation .....	4
Water Quality Standards Used in the Data Assessment.....	4
Data Processing and Analysis .....	5
Determination of Beneficial Use Support and Integrated Report Categories.....	7
TMDL Scheduling.....	9
Chapter 3. Explanation of Specific Analyses:.....	11
Chapter 4. Discussion of Changes to 303(d) listings of the San Diego Region .....	27
Statistics of Data Reviewed.....	27
Results of 2014 Integrated Report.....	27
Adopted TMDLs and TMDLs in Progress.....	29
Chapter 5. Public Review and Board Approval .....	31
References.....	32

## List of Tables

Table 1. Proposed Reporting Cycles by Region .....	3
Table 2. California Integrated Report Category Summary .....	8
Table 3. List of Stream Segments under Categories 4 and/or 5 for Impaired Benthic Community Effects .....	17
Table 4. List of Stream Segments under Categories 1 or 2 for COLD/WARM .....	23
Table 5. Comparison of Data Reviewed in Integrated Report Cycles 2006 through 2014 .....	27
Table 6. San Diego Region TMDLs and TMDL Alternatives: Adopted or In Progress.....	29

## List of Figures

Figure 1. Category 1 Waterbody: Upper Agua Caliente Creek (photo: C. Loflen) .....	22
Figure 2. Pollutant Listings by Category.....	28

## List of Appendices

Appendix A: Proposed Updates to the 303(d) List
Appendix B: Category 5 Waterbody Segments
Appendix C: Category 4a Waterbody Segments
Appendix D: Category 4b Waterbody Segments
Appendix E: Category 4c Waterbody Segments
Appendix F: Category 3 Waterbody Segments
Appendix G: Category 2 Waterbody Segments
Appendix H: Category 1 Waterbody Segments
Appendix I: Fact Sheets
Appendix J: Miscellaneous Changes
Appendix K: Administrative Record

## List of Acronyms and Abbreviations

Basin Plan	Water Quality Control Plan for the San Diego Region
BPTCP	Bay Protection and Toxic Cleanup Program
BMI	Benthic Macroinvertebrates
CalWQA	California Water Quality Assessment (database)
CCAMP	Central Coast Ambient Monitoring Program
CCC	Criteria Continuous Concentration
CCR	California Code of Regulations
CDPH	California Department of Public Health
CFR	Code of Federal Regulations
CMC	Criteria Maximum Concentration
CRAM	California Rapid Assessment Method
CSCI	California Stream Condition Index
CTR	California Toxics Rule
CWA	Clean Water Act
°C	degrees Celsius
°F	degrees Fahrenheit
FED	Functional Equivalent Document
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DFW	Department of Fish and Wildlife, formerly Department of Fish and Game (DFG)
DO	Dissolved oxygen
dw	dry weight
ERM	Effects Range Median
HCH	Hexachlorocyclohexane
HSA	Hydrologic Sub Area
HU	Hydrologic Unit
IBI	Index of Biotic Integrity
ILRP	Irrigated Lands Regulatory Program
IR	Integrated Report
kg	kilogram(s)
Listing Policy	Water Quality Control Policy for Developing California's Section 303(d) List
LOE	Line of Evidence
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
mg/kg	milligrams per kilogram (parts per million)
mg/L	milligrams per liter (parts per million)
µg/g	micrograms per gram (parts per million)
µg/L	micrograms per liter (parts per billion)
MTBE	Methyl tertiary-butyl ether
MTRL	Maximum Tissue Residue Level

NAS	National Academy of Sciences
ng/g	nanograms per gram (parts per billion)
ng/L	nanograms per liter (parts per trillion)
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Unit
oc	organic carbon
OEHHA	Office of Environmental Health Hazard Assessment
PAH	Polynuclear aromatic hydrocarbon
PBDE	Polybrominated diphenyl ethers
PCB	Polychlorinated biphenyl
PEL	Probable Effects Level
pg/L	picograms per liter
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RBI	Relative Benthic Index
RL	Reporting Level
SAFIT	Southwest Association of Freshwater Invertebrate Taxonomists
SCCWRP	Southern California Coastal Waters Research Project
SFEI	San Francisco Estuary Institute
SMWP	State Mussel Watch Program
SQG	Sediment quality guideline
SWAMP	Surface Water Ambient Monitoring Program
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
TSMP	Toxic Substance Monitoring Program
TSS	Total Suspended Solids
USEPA	US Environmental Protection Agency
USGS	US Geological Survey
WDR	Waste Discharge Requirement
WQO	Water quality objective
WQS	Water quality standard
ww	wet weight

## Chapter 1: Introduction

The federal Clean Water Act (CWA) gives states the primary responsibility for protecting and restoring surface water quality. In California, the State Water Resources Control Board (State Water Board) and nine Regional Water Quality Control Boards (Regional Water Boards), collectively referred to as the California Water Boards, serve as the agencies with the primary responsibility for implementing CWA requirements. One such responsibility includes developing and implementing programs to ensure attainment of water quality standards. Water quality standards, pursuant to the CWA, consist of designated beneficial uses of waterbodies, criteria or objectives (numeric and narrative) which are protective of those beneficial uses, and anti-degradation provisions.

Section 305(b) of the CWA requires each state to report biennially to the United States Environmental Protection Agency (USEPA) on the water quality conditions of its surface waters. USEPA compiles these assessments into a biennial “National Water Quality Inventory Report” to Congress. CWA Section 303(d) requires each state to develop, update, and submit to the USEPA for approval, a list of waterbody segments not meeting water quality standards. 40 CFR Section 130.7(d)(1) requires each state to submit the list biennially. This list is commonly referred to as the “303(d) List” or the “List of Impaired Waters.” Waterbody segments placed on the 303(d) list must be addressed through the development of Total Maximum Daily Loads (TMDLs), or an existing regulatory program that is reasonably expected to result in the attainment of the water quality standard within a specified timeframe.

In conformance with USEPA guidance (USEPA, 2005), the State and Regional Water Boards prepare a single Integrated Report that meets the reporting requirements of CWA sections 303(d) and 305(b).

The California Regional Water Quality Control Board, San Diego Region (San Diego Water Board) is responsible for developing and adopting the 2014 Integrated Report for waters within the San Diego Region. Following adoption by the San Diego Water Board, the 2014 Integrated Report will be transmitted to the State Water Board, where it will be considered by the State Water Board for approval.

The purpose of this staff report is to provide background on the assessment process and summarize San Diego Water Board staff’s recommended updates to the California 303(d) list and 305(b) report (Appendices A-H). Results of the staff analysis are presented in the form of fact sheets (Appendix I) that contain a decision and supporting lines of evidence for each waterbody/pollutant pair assessed.

## Chapter 2. Water Quality Assessment

This chapter introduces background information, including and not limited to, the Listing Policy, applicable water quality standards, and the procedures of data evaluation and decision making used in the preparation of the 2014 Integrated Report for the San Diego Region.

### Overall Process Review

The water quality assessment process begins with the State Water Board's solicitation for and subsequent database entry of data collected from the monitoring activities in the region for a specified time period. The State Water Board then assigns beneficial use(s), identifies water quality objectives, and conducts an initial assessment of data. The initial screening and entry of data and assignment of beneficial uses and objectives is then analyzed by the Regional Water Board. Regional Water Board staff then assess the data quality assurance and control, spatial and temporal quantity and quality, and subsequent results to determine if a waterbody is meeting or exceeding water quality standards. The determination of whether water quality standards are being met is made by comparing data to objectives, criteria, and guidelines (protective limits). This analysis forms the basis of CWA section 303(d) and 305(b) assessments. Whether or not these protective limits are exceeded determines a water segment's ability to support its assigned beneficial uses and whether to recommend listing, or not listing, the waterbody-pollutant combination on the 303(d) list. Following the updates of the 303(d) list, waterbodies or segments on the 303(d) list must be addressed through the development of TMDLs or by other means as described in the State's Water Quality Control Policy of Addressing Impaired Waters (State Water Board, 2005).

### The Listing Policy

The [Water Quality Control Policy for Developing California's Clean Water Act Section 303\(d\) List](#), commonly referred to as the Listing Policy (SWRCB, 2004), provides guidelines for the water quality assessment process and establishes a standardized approach for developing California's 303(d) list. It outlines an approach that provides the procedures for making listing decisions based upon different types of data and establishes a systematic framework for statistical analysis of water quality data. The Listing Policy also establishes requirements for data quality, data quantity, and administration of the listing process. Listing and delisting factors are provided for chemical-specific water quality standards; bacterial water quality standards; health advisories; bioaccumulation of chemicals in aquatic life tissues; nuisance such as trash, odor, and foam; nutrients; water and sediment toxicity; adverse biological response; degradation of aquatic life populations and communities; trends in water quality; and weight of evidence.

The Listing Policy requires the water quality assessments and listing decisions for specific waterbody-pollutant combinations to be documented in waterbody “fact sheets.” Fact sheets consist of “lines of evidence” (LOEs) summarizing the applicable standards and the data for a waterbody segment in relation to a specific beneficial use. Staff then recommends “decisions” regarding listing based on beneficial use support. The fact sheets supporting the 2014 Integrated Report for waters in the San Diego Region are provided in Appendix H.

**Changes to California’s 303(d)/305(b) Integrated Report Reporting Cycle**

On June 14, 2013, State Water Board management met with USEPA Division of Water Quality management to discuss strategies to create a more efficient and successful Integrated Report process. The strategy agreed upon includes dividing California into thirds by Regional Water Board and submitting an Integrated Report for three Regional Water Boards per listing cycle. As a result, cycles of Integrated Report have been/will be prepared by the Regional Boards of corresponding cycles (Table 1) to complete the assessment of data obtained during the “Data Solicitation” period (discussed in the following session) for the 2012 cycle:

**Table 1. Proposed Reporting Cycles by Region**

2012 Integrated Report	the North Coast Regional Water Quality Control Board (Region 1) ; the Lahontan Regional Water Quality Control Board (Region 6); and the Colorado River Basin Regional Water Quality Control Board (Region 7)
<b>2014 Integrated Report</b>	the Central Coast Regional Water Quality Control Board (Region 3); the Central Valley Regional Water Quality Control Board (Region 5); and <b>the San Diego Regional Water Quality Control Board (Region 9)</b>
2016 Integrated Report	the San Francisco Bay Regional Water Quality Control Board (Region 2) ; the Los Angeles Regional Water Quality Control Board (Region 4); the Santa Ana Regional Water Quality Control Board (Region 8)

After completing the 2014 Integrated Report, the San Diego Water Board is scheduled to develop the next Integrated Report update in 2020. It is anticipated that the process will allow for those Regional Water Boards that are “off cycle” to still examine high priority data and make decisions related directly to listings and de-listings and submit them for inclusion into the current listing cycle as appropriate.

## Data Solicitation

The State Water Board solicited data from the public with a formal “[Notice of Public Solicitation of Water Quality Data and Information for the California Integrated Report](#)” sent to interested parties subscribed to the [Integrated Report e-mailing list](#). Data used as part of the 2014 Integrated Report were received January 14, 2010 through August 30, 2010. Data sources include government agencies, municipalities, environmental groups, citizen groups, and receiving water data from the National Pollutant Discharge Elimination System (NPDES) dischargers<sup>1</sup>. Data collected by the Regional and State Water Boards under the Surface Water Ambient Monitoring Program (SWAMP) consisted of the majority of the data used to develop and revise fact sheets for the 2014 Integrated Report.

As the 2014 Integrated Report cycle’s data cutoff date was August 30, 2010, a significant amount of data collected between August 2010 and July 2016 is available but cannot be considered by the current Integrated Report. Additional data not included in this cycle of assessment will be assessed in the next update of the 303(d) and 305(b) lists of the San Diego Region scheduled for 2020. Should the San Diego Water Board identify a priority waterbody(ies) for assessment or re-assessment during the interim time period, an off-cycle waterbody or pollutant specific report may be drafted for submittal during another Region’s reporting period.

All data and information submitted are available as part of the electronic administrative record (Appendix J). Data and information pertaining to specific waterbody-pollutant assessments are provided in the fact sheets and link directly to the administrative record.

## Water Quality Standards Used in the Data Assessment

Beneficial uses for waters in the San Diego Region are identified in Tables 2-2 through 2-4 of the Water Quality Control Plan for the San Diego Basin (Basin Plan). California Water Board staff assessed data using regulatory limits when available. The most common regulatory limits used include water quality objectives in the Basin Plan or any statewide Water Quality Control Plans applicable to the waterbody, and criteria for toxic chemicals promulgated by the USEPA under the California Toxics Rule (40 CFR 131.27). When numeric regulatory limits were not available, evaluation guidelines were used to interpret narrative water quality objectives. Evaluation guidelines are selected in conformance with section 6.1.3 of the Listing Policy. A list of regulatory limits including evaluation guidelines used in the 2014 cycle is presented in Appendix K.

---

<sup>1</sup> Receiving water data that were previously submitted to the California Integrated Water Quality System (CIWQS) database under NPDES permit but not in readily-assessable formats (e.g., in EXCEL or ACCESS worksheets) were requested to be submitted again directly to the State Board in appropriate formats to be assessed for the Integrated Report.



In the preparation of the 2014 Integrated Report, San Diego Water Board staff utilized the California Stream Condition Index (CSCI) to evaluate the biological condition of wadeable streams in the San Diego Region. Details of the CSCI method are introduced in Chapter three, Explanation of Specific Analyses.

In its criteria guidance published in 2012, USEPA recommends changes of recreational water quality standards, i.e., using the fecal indicator bacteria (FIB) enterococci and *Escherichia coli* (*E. coli*) as indicators of fecal contamination for fresh water and enterococci for marine water (USEPA, 2012). While the State Water Board is in the process of updating its California Ocean Plan and Water Quality Control Plan for Enclosed Bays and Estuaries to reflect these changes of standards, the State Water Board staff determined that the 2012 USEPA Criteria would not be applied to data submitted for the 2014 Integrated Report cycle, as the data had already been assessed and lines of evidence developed by the time the criteria were finalized. In the interest of expedience, State Water Board staff directed the Regional Water Boards to move forward with the existing lines of evidence and to utilize the 2012 USEPA criteria for the next Integrated Report cycle. Consequently, water quality standards for FIB in forms of geometric mean (GM) and single sample maximum (SSM) used in the evaluation of FIB data in the 2014 cycle of Integrated Report were, for the most part, consistent with those used in previous cycles (e.g., 2008 through 2012).<sup>2</sup> Additionally, with USEPA recommendation, State Water Board staff directed the Regional Water Boards to adopt listings for the various forms of indicator bacteria under the heading “indicator Bacteria”, instead of each individual form of bacteria. Should indicator bacteria standards be updated, the San Diego Water Board may identify priority waterbody(ies) for assessment or re-assessment off-cycle for submittal during another Region’s reporting period.

### **Data Processing and Analysis**

All readily available data and information in the administrative record was considered in the development of the 2014 Integrated Report. However, only data supported by a Quality Assurance Project Plan or equivalent document was considered high-quality and used to make determinations of water quality standards attainment. In the absence of quality assurance documentation, data is used only as supporting evidence and is not the basis of a listing decision.

---

<sup>2</sup>One difference with respect to the use of water quality standards (WQSs) for REC-1 activities in 2014 compared to in previous cycles exists for the assessment of inland waters: in 2008/2010, the WQSs corresponding to “moderately used” intensity were used for inland waters; in 2014, values corresponding to the “heavily used” intensity were selected in order to attain state-wide consistency of evaluation, and also due to the fact that the USEPA has dropped the concept of different levels of “use intensities” in its 2012 guidance criteria (USEPA, 2012).

Data were aggregated by waterbody segment following the requirements of section 6.1.5.4 of the Listing Policy, and assessments were performed on the individual segments. Waterbodies were segmented to account for hydrologic features. Some waterbodies may have been re-segmented, split into additional segments, or had a modification to the waterbody name since the last 303(d) list was approved. These and other non-substantive modifications (i.e., modifications that did not change a listing status) are summarized in the Miscellaneous Changes Report (Appendix J). Due to time constraints some waterbodies will be re-segmented during the next listing cycle. Those waterbodies requiring segmentation are called out specifically in this Integrated Report.

Spatial and temporal representation of data were assessed using the requirements and guidance of the Listing Policy. The available data were used to represent concentrations during the averaging period associated with the particular pollutant and water quality objective, as required by Section 6.1.5.6 of the Listing Policy. For example, if only one data point was available during a 4-day period, it was used to represent the four-day average concentration for that period.

During the assessment, data were compared against water quality objectives and/or protective guideline values to determine if waterbodies attain relevant water quality standards. Results of this assessment, including the number of samples collected and how many samples exceed the objective or guideline, as well as other relevant information, are summarized in Lines of Evidence (LOEs). Other relevant information includes the location and time of sampling activity and the pollutant sampled, the beneficial use affected, and the water quality objective or protective guideline value for the relevant beneficial use selected.

Decision recommendations, as documented in fact sheets, were completed by summarizing all relevant LOEs for a waterbody-pollutant combination, and determining if the number of samples exceeding water quality criteria are greater than the allowable exceedance count, which was developed based on statistical evaluations described in the Listing Policy. Most fact sheets and overall beneficial use support determinations were developed in the California Water Quality Assessment (CalWQA) database. Potential sources are only identified in fact sheets for assessments done which directly address a core beneficial use<sup>3</sup>. Core beneficial uses include: municipal and domestic supply, aquatic life support, fish consumption, shellfish harvesting, contact recreation, and non-contact recreation. Otherwise, the potential source was marked "Source Unknown."

---

<sup>3</sup> The State Water Board developed the concept of "core" beneficial use by combining the Clean Water Act's "fishable/swimmable" goal and the State Water Board's mission. The CWA's "fishable/swimmable" goal is water quality "provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water, wherever attainable" and the State Water Board's mission statement is "To preserve, enhance, and restore the quality of California's water resources and drinking water for the protection of the environment, public health, and all beneficial uses, and to ensure proper water resource allocation and efficient use, for the benefit of present and future generations."

## **Determination of Beneficial Use Support and Integrated Report Categories**

To meet CWA section 305(b) requirements for reporting on water quality conditions, the Integrated Report places each assessed waterbody segment into one or more of five non-overlapping categories based on the overall beneficial use support of the water segment. Water segments were evaluated for at least one of the six core beneficial uses. For each core beneficial use associated with each waterbody segment, a rating of fully supporting, not supporting, or insufficient information was assigned based on the assessment of high-quality data as well as the consideration of other readily available information.

In the 2014 cycle, a total of 404 waterbody segments were evaluated for the San Diego Region. Table 2 below describes each category and summarizes the number of waterbody segments placed in each category. In accordance with the USEPA guidance (2005 and 2015), some waterbody segments were placed into more than one category as appropriate.

**Table 2. California Integrated Report Category Summary**

<b>Category</b>	<b>Description</b>	<b>Waterbody Segments</b>
1	All assessed beneficial uses supported and no beneficial uses known to be impaired.	116
2	At least one, but not necessarily all, core beneficial use is supported.	111*
3	There is insufficient data and/or information to make a beneficial use support determination but information and/or data indicates beneficial uses may be potentially threatened.	72*
4	At least one beneficial use is not supported but a TMDL is not needed.	
4a	A TMDL has been developed and approved by USEPA for a waterbody-pollutant combination and the approved implementation plan is expected to result in full attainment of the water quality standard within a specified time frame.	34
4b	Another regulatory program is reasonably expected to result in attainment of the water quality standard within a reasonable, specified time frame.	16
4c	The non-attainment of any applicable water quality standard for the waterbody segment is the result of pollution and not caused by a pollutant <sup>4</sup> .	29
5	At least one beneficial use is not supported and a TMDL is needed.	166

\* specific number of waterbody segments not available at this time due to database limitations for reporting waterbodies in multiple categories

Detailed Category Reports can be found in Appendices B-H. Pursuant to Section 2 of the Listing Policy, waterbodies remain in Category 5 until all 303(d)-listed pollutants are addressed by USEPA-approved TMDLs or by another regulatory program that is expected to result in the reasonable attainment of the water quality standards, at which point the waterbody will be placed into Category 4a or 4b. Impaired waters are placed in Category 4c if the impairment is not caused by a pollutant but rather caused by pollution, such as flow alteration, habitat alteration, or legacy pollution. Waterbodies placed in Category 4c do not require the development of a TMDL, but nonetheless may be a priority for restoration by a Regional Water Board.

<sup>4</sup> Defined under the CWA as "the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water" (Section 502(19)). Examples of pollution not caused by a pollutant include hydrologic or habitat alteration.

Waterbody-pollutant combinations listed in Category 5 (Appendix B) show the TMDL requirement status. If a “TMDL is still needed” for the waterbody-pollutant combination, the TMDL requirement status is labeled 5A. If the waterbody-pollutant combination is “being addressed by a USEPA approved TMDL,” the TMDL requirement status is labeled 5B. If the waterbody-pollutant combination is “being addressed by an action other than a TMDL”, the TMDL requirement status is labeled 5C. These labels were created for internal tracking within the CalWQA Database and are not Integrated Report sub-categories.

If a waterbody segment had no existing or proposed 303(d) listings, it was placed into Category 1, 2, or 3. Additionally, in order to better present water body conditions in terms of their support of aquatic life, water body segments that meet the criteria for “aquatic life support” were placed into Category 1 or 2, as appropriate. Section “Data Assessment for Category 1 and 2 Inclusion” of Chapter Three provides details of this approach. Water bodies were additionally categorized only in terms of “aquatic life support” in the 2014 cycle. The San Diego Water Board will continue to apply this approach to the other core beneficial uses in future cycles.

## TMDL Scheduling

A TMDL is a determination of the total maximum daily load(s) of a specific pollutant(s) that can be discharged into a given waterbody without impairing water quality standards. Section 5 of the State Water Board Listing Policy requires the San Diego Water Board to include a TMDL completion schedule date for all waterbody-pollutant combinations placed on the 303(d) List. USEPA guidance (1997) states that “schedules should be expeditious and normally extend from eight to thirteen years in length, but could be shorter or slightly longer depending on State-specific factors.” Therefore, the timeline for completing TMDLs for waterbodies listed for the first time as part of the 2014 Integrated Report is estimated to be no longer than thirteen years, which equates to an estimated completion date of 2027. Expected TMDL completion dates are proposed by San Diego Water Board staff in the fact sheets of this report (Appendix I).

While Appendix H includes a TMDL completion schedule for all waterbody-pollutant combinations placed under Category 5, the number of pollutant-waterbody combinations far outweighs the staff resources available for TMDL development and implementation. Instead of working through the Category 5 List on a pollutant-by-pollutant or waterbody-by-waterbody basis, the San Diego Water Board is utilizing USEPA’s Long Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program ([USEPA Vision](#)). Under the USEPA Vision, the San Diego Waterbody has prioritized:

- 1) Protection of those waterbodies already meeting beneficial uses, and
- 2) Meaningful restoration of waterbodies using environmental outcomes and TMDL alternative approaches.

This approach, which is encouraged by the USEPA Vision, is expected to result in meaningful net gains in water quality in a shorter time period at less cost. Where alternative approaches do not result in beneficial use attainment, the traditional TMDL approach may still be warranted and utilized.

Examples of alternative approaches in progress include additional prohibitions on non-stormwater discharges in NPDES permits, issuing Cleanup and Abatement Orders, and facilitating community-generated restoration plans such as Water Quality Improvement Plan for Loma Alta Slough (Resolution R9-2014-0020).

While the USEPA Vision provides a new framework for implementing the CWA 303(d) program, it does not alter state and EPA responsibilities or authorities under the CWA 303(d) regulations. With the recognition that there is not a "one size fits all" approach to restoring and protecting water resources, USEPA is allowing states to be able to develop tailored strategies to implement their CWA 303(d) program responsibilities in the context of their water quality goals.

The USEPA Vision asked states to identify regional priorities for the 2016-2022 period considering both restoration of impaired waters and protection of high quality waters. These would become the focus of reporting to USEPA regarding the 303(d) and TMDL Programs.

In response, the San Diego Water Board identified the following:

1. San Diego Bay, specifically bioaccumulation affecting commercial and sport fishing and shellfish harvesting.
2. Santa Margarita Estuary eutrophication affecting the estuarine and non-contact recreation beneficial uses.
3. Protection of high quality and minimally-impacted freshwater streams supporting the cold- and warm water beneficial uses.

## Chapter 3. Explanation of Specific Analyses:

### Bioassessment Data for Wadeable Streams

#### Introduction

While the San Diego Water Board is tasked with protecting the physical, chemical, and biological integrity of surface waters, existing water quality objectives in the San Diego Water Board's Basin Plan emphasize the chemical integrity of waters on a pollutant by pollutant basis, which assumes that water quality objectives for pollutants will, if attained, result in beneficial use attainment and protection. However, the use of chemistry alone may not adequately protect the biological integrity of waters due to the temporal and spatial extent of chemical monitoring, the number of chemicals monitored, cumulative effects, and the inability of chemistry to detect impairment caused by other factors (e.g. habitat modification). The evaluation of the biological integrity of waters is often referred to as bioassessment. The use of bioassessment can give a better indication of the status of a waterbody and if beneficial uses are being protected or impaired.

The State of California has been conducting bioassessment monitoring using stream benthic macroinvertebrates for over fifteen years in the San Diego Region. The State of California's Surface Water Ambient Monitoring Program (SWAMP) has developed standard operating procedures for bioassessment field collection, lab identification, quality assurance/control, and data management. The development of biological scoring tools, often referred to as indices or metrics, has been on-going during that time period, with various regional indices developed throughout the State (e.g. Ode et al. 2005).

In 2014 the State of California released a peer-reviewed statewide California Stream Condition Index (CSCI, Mazor et al. 2016) for use in wadeable streams throughout the State. The CSCI utilizes a combined reference site approach to determine the site specific benthic community expected to be present at any sampled site.

In prior Integrated Report cycles, the San Diego Water Board utilized benthic macroinvertebrate data and conducted assessments using an Index of Biotic Integrity (IBI) developed for southern California. While the data was entered as LOEs during prior listing cycles, it was not used for listing decision purposes under section 303(d) of the CWA, nor was it used for identifying sites with beneficial uses supported pursuant to section 305(b).

For this Integrated Report the San Diego Water Board is utilizing benthic macroinvertebrate data and the CSCI to assess stream beneficial use attainment pursuant to CWA 303(d) and 305(b).

## **Bioassessment and Impairment under Categories 4 and 5**

### **Biological Populations and Communities**

The assessment for beneficial use impairment under CWA section 303(d) is being conducted in accordance with the State Water Board's Listing Policy. The Listing Policy states the following regarding how bioassessment data should be used for making Listing/Delisting recommendations:

#### **3.9 Degradation of Biological Populations and Communities (Listing)**

A water segment shall be placed on the section 303(d) list if the water segment exhibits significant degradation in biological populations and/or communities as compared to reference site(s) and is associated with water or sediment concentrations of pollutants including but not limited to chemical concentrations, temperature, dissolved oxygen, and trash. This condition requires diminished numbers of species or individuals of a single species or other metrics when compared to reference site(s). The analysis should rely on measurements from at least two stations. Comparisons to reference site conditions shall be made during similar season and/or hydrologic conditions. Association of chemical concentrations, temperature, dissolved oxygen, trash, and other pollutants shall be determined using sections 3.1, 3.2, 3.6, 3.7, 6.1.5.9, or other applicable sections.

For population or community degradation related to sedimentation, the water segment shall be placed on the section 303(d) list if degraded populations or communities are identified and effects are associated with clean sediment loads in water or with loads stored in the channel when compared to evaluation guidelines (satisfying the conditions of section 6.1.3) using the binomial distribution as described in section 3.1 or as compared to reference sites. Bioassessment data used for listing decisions shall be consistent with section 6.1.5.8. For bioassessment, measurements at one stream reach may be sufficient to warrant listing provided that the impairment is associated with a pollutant(s) as described in this section.

#### **4.9 Degradation of Biological Populations and Communities (Delisting)**

Biological populations and communities degradation in the water segment is no longer evident as compared to reference site(s) or associated water or sediment numeric pollutant-specific evaluation guidelines are not exceeded using the binomial distribution as described in section 4.1.



*From Section 6 of the Listing Policy (Policy Implementation)*

*6.1.5.8 Evaluation of Bioassessment Data*

When evaluating biological data and information, RWQCBs shall evaluate all readily available data and information and shall:

- Identify appropriate reference sites within water segments, watersheds, or ecoregions.
- Document methods for selection of reference sites.
- Evaluate bioassessment data at reference sites using water segment-appropriate method(s) and index period(s). Document sampling methods, index periods, and Quality Assurance/Quality Control procedures for the habitat being sampled and question(s) being asked.
- Evaluate bioassessment data from other sites, and compare to reference conditions. Evaluate physical habitat data and other water quality data, when available, to support conclusions about the status of the water segment.
- Calculate biological metrics for reference sites and develop Index of Biological Integrity if possible.

### **California Stream Condition Index and Chemistry/Toxicity**

The San Diego Water Board utilized CSCI scores to determine if a waterbody segment exhibits significant degradation in the biological community, with the 10<sup>th</sup> percentile of reference sites used as a threshold for detection of degradation (Mazor *et al.* 2016). The CSCI meets the requirements set forth in Sections 3.9 and 6.1.5.8 of the Listing Policy by utilizing a reference site approach that is consistent region- and state-wide. Where CSCI scores show degradation at multiple sites in a receiving water, or at a site over multiple years, the San Diego Water Board evaluated additional chemistry and toxicity data to determine if one or more associated pollutants were exceeding water quality standards.

This approach is consistent with the 2010 Integrated Reporting cycle for the Los Angeles Regional Water Quality Control Board, which utilized bioassessment data in accordance with the Listing Policy to place waters on its CWA section 303(d) list for “Benthic Community Effects.” These listings for impairment were approved by the Los Angeles Regional Water Quality Control Board, the State Water Resources Control Board, and USEPA.<sup>5</sup>

---

<sup>5</sup> These Benthic Community Effects listings utilized the Ode et al. 2005 IBI. IBI scores were calculated for this Integrated Report but were not utilized in Listing Decisions.

The water quality chemistry/toxicity and bioassessment data provide a substantial basis that impacts to the benthic macroinvertebrate populations may be caused or contributed to by one or more associated pollutants in the waterbody. The Listing Policy does not specify that a pollutant specific causal relationship be established for listing for Benthic Community Effects. This is consistent with the Integrated Report Guidance from USEPA, which states that when existing and readily available data and information (biological, chemical or physical) are sufficient to determine that a pollutant has caused, is suspected of causing, or is projected to cause the impairment, that receiving water should be listed in Category 5 (USEPA 2002).

Where CSCI scores show degradation at multiple sites in a receiving water, or at a site over multiple years, the San Diego Water Board considered the waterbody to exhibit significant degradation and evaluated additional chemistry and toxicity data to determine if one or more associated pollutants were exceeding water quality standards. Where this was the case, waterbody segments were listed as impaired under Category 5 for Benthic Community Effects (Table 3). If a stream exhibited degradation at multiple sites or over multiple years but chemistry/toxicity data was not associated or was not collected, the stream was evaluated for inclusion under Category 4c. If data and information was insufficient for inclusion in Category 4c, the stream was placed under Category 3 (insufficient information).

### **California Stream Condition Index and Pollution**

Section 3.9 of the Listing Policy states that a water segment shall be placed on the section 303(d) list if the water segment exhibits significant degradation in biological populations and/or communities as compared to reference site(s) and is associated with water or sediment concentrations of pollutants. The focus of prior listing cycles has been on the assessment of pollutants under Category 5. However, water segments often may exhibit significant degradation in biological populations and/or communities that are not associated with concentrations of pollutants, or may exhibit degradation due to concentrations of pollutants combined with other factors not associated with a specific pollutant.

On August 13, 2015, USEPA released additional guidance on Integrated Reporting and Listing Decisions, which included a clarification regarding the assessment and assignment of waters to Category 4c for impairment by “pollution” (USEPA 2015). For stream systems common forms of “pollution” include hydrologic and/or habitat alteration, and USEPA recommends “data and/or *information* documenting significant hydrologic or habitat alteration could be used to make a use attainment decision for an impairment due to pollution not caused by a pollutant and should be collected, evaluated, and reported as appropriate.”

In the San Diego Region hydrologic and habitat alteration impacts on streams are widespread. Thus, where a water segment exhibited significant degradation in biological populations and/or communities as compared to reference site(s) the San Diego Water Board assessed the segment for inclusion in Category 4c using data and information as prescribed in USEPA’s 2015 Guidance:

“Category 4C If States have data and/or information that a water is impaired due to pollution not caused by a pollutant (e.g., aquatic life use is not supported due to hydrologic alteration or habitat alteration), those causes should be identified and that water should be assigned to Category 4C. Examples of hydrologic alteration include: a perennial water is dry; no longer has flow; has low flow; has stand-alone pools; has extreme high flows; or has other significant alteration of the frequency, magnitude, duration or rate-of-change of natural flows in a water; or a water is characterized by entrenchment, bank destabilization, or channelization. Where circumstances such as unnatural low flow, no flow or stand-alone pools prevent sampling, it may be appropriate to place that water in Category 4C for impairment due to pollution not caused by a pollutant. In order to simplify and clarify the identification of waters impaired by pollution not caused by a pollutant, States may create further sub-categories to distinguish such waters. While TMDLs are not required for waterbody impairments assigned to Category 4C, States can employ a variety of watershed restoration tools and approaches to address the source(s) of the impairment.”

Where in-stream data was lacking, stream segments were evaluated using desktop aerial reconnaissance for potential in-stream habitat and hydrologic alteration associated with channel modifications, stream diversion or augmentation, and to evaluate the level of associated development and use of best management practices to mitigate hydromodification.

It is important to note that USEPA recommended in its 2015 guidance that “States assign all of their surface water segments to **one or more of five reporting categories**” (emphasis added). Specific guidance includes the following:

Category 5 If States have data and/or information that a water is impaired due to a pollutant, it would need to be reported in Category 5. This is true even if this segment is also in Category 4C for an impairment due to pollution not caused by a pollutant. In that case, the State should list that water in Category 5 and identify the pollutant causing the impairment (e.g., nutrients) and should also indicate the nature of the pollution (e.g., hydrologic alteration) as a cause of impairment under Category 4C. If the water is later delisted for the pollutant (e.g., nutrients), but pollution (e.g., hydrologic alteration) is still impairing the water's use, then the water should remain in Category 4C. Consistent with previous IR Guidance, if a waterbody is impaired or If assessment of new data and/or information subsequently demonstrates that the impairment is not associated with a pollutant and is due to pollution not caused by a pollutant, the waterbody-pollutant combination would no longer need to be assigned to Category 5 and may be placed into Category 4C."

In the San Diego Water Board's evaluation of bioassessment data and stream segment information, over 96 percent of streams that exhibited biological degradation had both an associated pollutant(s) and supporting information showing pollution from in-stream habitat/hydrologic alteration and/or watershed hydrologic alteration (hydromodification, Table 3).

**Table 3. List of Stream Segments under Categories 4 and/or 5 for Impaired Benthic Community Effects**

<b>Hydrologic Unit</b>	<b>Waterbody Segment</b>	<b>Category 3</b>	<b>Category 4</b>	<b>Category 5</b>	<b>Category 4 Associated Pollution</b>	<b>Category 5 Associated Pollutant(s)</b>
901	Aliso Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Selenium
901	Arroyo Trabuco Creek*	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Metals
901	English Canyon	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Selenium
901	Laguna Canyon Channel	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Mercury
901	Salt Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Mercury
901	San Juan Creek*	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Selenium, Mercury
901	Segunda Descheca Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Metals
901	Wood Canyon	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Selenium
902	Santa Margarita River Lower	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients
903	San Luis Rey Lower	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Selenium
904	Agua Hedionda Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients
904	Buena Vista Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Selenium
904	Cottonwood Creek Encinitas	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Selenium
904	Encinitas Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Nutrients, Selenium
904	Escondido Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients
904	Loma Alta Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Selenium
904	San Marcos Creek above San Marco Reservoir*	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Selenium
905	Green Valley Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients

Hydrologic Unit	Waterbody Segment	Category 3	Category 4	Category 5	Category 4 Associated Pollution	Category 5 Associated Pollutant(s)
905	San Dieguito River below Hodges Reservoir	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Nutrients, TDS
906	Carroll Canyon Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity
906	Los Penasquitos Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Selenium
906	Rose Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Selenium
906	Tecolote Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Selenium, Turbidity
907	Forester Creek	No	4c	Yes	Habitat Alteration, Hydromodification	Nutrients, Selenium, TDS
907	San Diego River Lower	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Cadmium
909	Sweetwater River Above Sweetwater Reservoir	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Selenium, TDS
909	Sweetwater River Below Sweetwater Reservoir	No	4c	Yes	Habitat Alteration, Hydromodification	Nutrients, Aluminum, Selenium
911	Campo Creek Upper*	No	4c	No	Prior Listing: Unknown	None
911	Tijuana River	No	4c	Yes	Habitat Alteration, Hydromodification	Toxicity, Pesticides, Nutrients, Selenium

**\*Stream Segment Footnotes**

The following stream segments have the following clarifications regarding segment scores and spatial listings:

- San Juan Creek: The entire segment is currently mapped. Recent CSCI scores suggest a lack of impairment in the upper watershed within the Cleveland National Forest.
- Trabuco Creek: The entire segment is currently mapped. Scores within upper Trabuco Creek within the Cleveland National Forest indicate no degradation when compared to reference.
- San Marcos Creek: The entire stream is currently mapped as one segment. Scores below San Marcos Reservoir do not indicate degradation while those above do.
- Campo Creek: Two sites for this creek were sampled. Downstream scores were not degraded while a subset of upstream scores were. No pollutants are associated with the upstream site, though it was historically listed under Category 4c (unknown pollution). Additional information is needed regarding the segment.

## CSCI Score Quality

The San Diego Water Board utilized CSCI scores calculated by the State of California and the Southern California Coastal Waters Research Project (SCCWRP) in accordance with the latest *Guidance for calculating scores using GIS and R* (Mazor *et al.* 2015). The San Diego Water Board followed recommendations for exclusion of samples with low benthic macroinvertebrate counts. The San Diego Water Board did include sites that were identified to SAFIT<sup>6</sup> Level 1. The percent of ambiguous taxa and individual values were examined, followed by a calculation of the best possible CSCI score for the site by assuming the maximum diversity of expected Chironomidae subfamilies at a site was present. This represents an over-estimation bias of the score (e.g. a likely better scored than actually observed). Sites with CSCI scores less than the 10<sup>th</sup> percentile of reference sites threshold were thus likely over-estimated and still remained in a degraded condition when compared to reference.

## Data Assessment for Category 1 and 2 Inclusion

Section 305(b) of the CWA requires the State of California to prepare a report on the quality of waters. While the focus of the Integrated Report is typically on which waters are identified as “impaired,” or not meeting water quality standards (Categories 4 and/or 5), less attention is often on which waters have data and information available that indicates water quality standards are being attained for all or some beneficial uses assessed, referred to as Category 1 and 2, respectively. USEPA has drafted and utilizes its own Category definitions for Category 1 and 2. However, because Categories 1-3 are part of the 305(b) report and for informational use only, States and Regions can and do alter those definitions to be consistent with their own integrated reporting purposes.

### Category 1

Historically some States and Regions have defined Category 1 as fully supporting all beneficial uses. While the intent of the Integrated Report is to identify those waterbodies supporting beneficial uses, the ability to fully assess a waterbody segment for all beneficial uses to list as Category 1 is largely infeasible and not cost effective, resulting in a lack of waterbody segments identified as meeting beneficial uses. Listing under Category 1 should not be construed as identifying a waterbody as high quality, reference, or pristine. Rather, Category 1 indicates that beneficial uses are met, which is the expected condition for that waterbody segment. Thus, consistent with recommendations from the State Water Board, the San Diego Water Board is utilizing the following to refine the definition for Category 1 from the existing “all core beneficial uses are supported” to “all assessed beneficial uses supported and no beneficial uses are known to be impaired.” This approach is consistent with USEPA recommendations on assessment for Category 1 (USEPA 2006). It is possible that waterbodies identified in Category 1 may be more appropriately placed in Category 2 (below), but lack the data to assess other beneficial use impairment during a reporting cycle. Should future assessments identify other beneficial uses as impaired, waterbodies may be reassigned categories.

---

<sup>6</sup> Southwest Association of Freshwater Invertebrate Taxonomists

## Category 2

During the last Listing Cycle (2010) for the Integrated Report in the San Diego Region, the following definition was utilized for placing a waterbody segment in Category 2:

“At least one core beneficial use is supported.”

For the 2012 Listing Cycle the State Water Board utilized the following definition for Category 2:

“At least one core beneficial use is supported and none are impaired.”

Current State Water Board guidance recommends using:

“There is insufficient information to determine beneficial use support.”

For this listing cycle, the San Diego Water Board utilizes the definition of “At least one, but not necessarily all, core beneficial use is supported.” This definition, similar to the one used in 2010, was employed due to existing USPEA guidance (USEPA 2005 and 2015), which recommend placing waterbody segments into multiple categories as applicable. Given the core beneficial uses are related to swimming, drinking, fish and shellfish consumption, and ecosystem health, it is important to identify those locations where specific beneficial uses are supported despite potential impairments of other beneficial uses. For example, a waterbody segment in San Diego Bay might be safe to swim though fish tissue pollutant levels impair the commercial and sport fishing (COMM) beneficial use. In this situation staff could place an assessed waterbody segment into **both** Category 2 and 5. The San Diego Water Board contends this distinction is important as the public should be aware of areas where things are meeting beneficial uses as well as where they are not. Unfortunately the current database from the State Water Board makes this distinction largely infeasible when assessing all data received. During this Integrated Report the San Diego Water Board opted to move some Category 1 waterbodies into Category 2 due to evidence received regarding additional impairments.



## Category 1 for Wadaeable Streams

To determine if a wadaeable stream qualified for Category 1, the San Diego Water Board utilized a multiple line of evidence approach with a focus on biological endpoints. The best available data and information was used to assess if beneficial uses were being attained for waterbodies during this listing cycle, with a focus on wadaeable streams. For wadaeable streams the CSCI, indices of biotic integrity for Algae (Fetscher *et al.* 2013), and the California Rapid Assessment Method (CRAM) were utilized to assess if aquatic life beneficial uses of WILD and COLD were being met. Water segment data were compared to reference percentiles for the CSCI (30<sup>th</sup>), indices of biotic integrity for algae (10<sup>th</sup>), and CRAM (10<sup>th</sup>). Water chemistry was utilized as a secondary line of evidence. Where multiple lines of evidence were limited (e.g. benthic macroinvertebrate data only), additional information on land use was utilized in order to more fully assess a site's condition (e.g. Ode *et al.* 2015).

It is important to note that the San Diego Water Board is listing a waterbody under Category 1 for beneficial uses assessed, which include WARM and COLD. The beneficial use definitions for WARM and COLD are as follows:

Warm Freshwater Habitat (WARM) - Includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.

Cold Freshwater Habitat (COLD) - Includes uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.

Many waterbodies, including those listed as Category 1 herein, have beneficial uses for which assessments were not specifically done. For example, assessment of the attainment of contact recreation (REC-1) may not be conducted at some water segments, such as wadaeable streams, due to a lack of monitoring data, inadequate spatial and temporal data. This does not necessarily mean the beneficial use is met, nor should a lack of assessment be perceived as a lack of attainment. A similar lack of assessment may be present for other beneficial uses, including, but not limited to, multiple species under RARE, fish consumption in remote locations (COMM), and for non-water contact activities (REC-2).

**Figure 1. Category 1 Waterbody: Upper Agua Caliente Creek (photo: C. Loflen)**



### **Category 2 for Wadaeble Streams**

The San Diego Water Board received data from the California Department of Fish and Wildlife regarding the attainment of the SPAWN and RARE beneficial use for the endangered Southern California Steelhead (*Oncorhynchus mykiss*) in San Mateo Creek. San Mateo Creek is listed as Critical Habitat for the Southern California Steelhead and was originally included as a Category 1 water segment related to the assessment of stream health and biological condition respective to benthic macroinvertebrates, algae, and riparian habitat for the WARM and COLD beneficial uses. Steelhead were historically present in San Mateo Creek and tributaries, with fish documented as present up until 2002 by the California Department of Fish and Wildlife (Hovey 2004, Clemento et al. 2009). However, more recent repeat surveys of San Mateo Creek by the California Department of Fish and Wildlife, Marine Corps Base at Camp Pendleton, and United States Forest Service provide evidence that invasive species are limiting attainment of RARE and SPAWN for this water segment for steelhead (Hunt 2008, Wilcox 2012). Surveys conducted during the critical period found over 12,700 non-native species dominating over-summering refuge pools, and no steelhead were documented as present (Wilcox 2012, CDFW 2015). The stress from non-native competition in refuge pools can prevent steelhead from surviving thermal stress associated with low or no flow summer conditions (Mathews and Berg 1997,

Spina 2007). In addition, the direct and indirect effects of high densities of non-natives on young-of-year steelhead can prevent their survival and can limit adequate growth for smolt survival (Hovey 2004). Thus, San Mateo Creek will be placed into Category 2 as some core beneficial uses are currently achieved. However, the waterbody segment has simultaneously been placed in Category 5 due to the presence of invasive species causing impairment

The CWA (Section 502) defines pollutant as: dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, **biological materials**, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water (emphasis added)

This approach is consistent with prior decisions by Regional Boards for assessment of degradation associated with invasive species as pollutants (e.g. non-native crabs in Bodega Harbor).

The following sites/streams were identified for Listing as Category 1 or 2 for the Integrated Report for Warm Freshwater Habitat and Cold Freshwater Habitat:

**Table 4. List of Stream Segments under Categories 1 or 2 for COLD/WARM**

Category	Hydrologic Unit	Waterbody
1	901	Upper Arroyo Trabuco
1	901	Hot Spring Canyon Creek
2	901	San Mateo Creek
1	902	Roblar Creek
1	903	Upper Agua Caliente Creek
1	903	Upper Pauma Creek
1	903	Doane Creek
1	903	Fry Creek
1	903	Iron Springs Creek
1	905	Santa Ysabel Creek below Witch Creek
1	905	Carney Canyon Creek
1	905	Boden Canyon Creek
1	905	Temescal Creek above Pamo Road
1	907	Cedar Creek
1	907	Upper San Diego River
1	907	Upper King Creek
1	907	Boulder Creek above Boulder Creek Road
1	909	Japacha Creek above 79
1	909	Sweetwater River above Tanglewood Lane

Category	Hydrologic Unit	Waterbody
1	909	Cold Spring Creek
1	911	Noble Canyon
1	911	Indian Creek
1	911	Pine Valley Creek above Barrett Reservoir
1	911	Kitchen Creek above Kitchen Creek Road
1	911	Long Canyon Creek at Cibbets Flat
1	911	Wilson Creek above Barrett Reservoir

## Fish Consumption Advisories in the San Diego Region

The core beneficial use question “Is it safe to eat fish and shellfish” is typically addressed in terms of waterbody impairment in Regional Board Integrated Reports by comparing fish and shellfish tissue data to risk-based chemical thresholds. However, the State of California Office of Environmental Health Hazard Assessment (OEHHA) is the agency responsible for issuance of consumption advisories for specific waterbodies and species. Evaluation by OEHHA weighs factors beyond individual thresholds on a pollutant by pollutant basis, such as synergistic effects. In order to develop consumption advisories OEHHA collects available fish tissue data (e.g. SWAMP data), evaluates data quantity and quality sufficiency, identifies pollutants of concern, and calculates relative risk related to consumption of tissues (primarily fillets) for segments of the general public. This process is similar to the San Diego Water Board evaluation of lines of evidence and subsequent decision making for individual pollutants in the Integrated Report.

The Listing Policy under Section 3.4 states as follows:

### *3.4 Health Advisories*

*A water segment shall be placed on the section 303(d) list if a health advisory against the consumption of edible resident organisms, or a shellfish harvesting ban has been issued by the Office of Environmental Health Hazard Assessment (OEHHA), or Department of Health Services and there is a designated or existing fish consumption beneficial use for the segment. In addition, water segment-specific data must be available indicating the evaluation guideline for tissue is exceeded.*

On October 22, 2013, OEHHA an individual *Health Advisory and Safe Eating Guidelines for Eating Fish* for both San Diego and Mission Bay. The pollutants used as the basis for both consumption advisories were PCBs and mercury. The data for both advisories was collected by the State of California through the Coastal Fish Contamination Program and SWAMP from 1999 to 2009, consistent with the Integrated Report data time frame period. The water segment-specific data is publically available through the California Environmental Data Exchange Network (CEDEN) and the OEHHA advisories, including evaluation guidelines used for data comparison, are publically available documents<sup>7</sup>. Thus, section 3.4 of the Listing Policy is satisfied for utilizing the OEHHA health advisories for listing purposes for PCBs and Mercury in fish tissue due to impairment of the COMM beneficial use in the San Diego Water Board Basin Plan.

---

<sup>7</sup> <http://oehha.ca.gov/fish>

For San Diego Bay, the health advisory against edible resident organisms includes recommendations of no consumption and limited consumption. San Diego Bay is currently listed as impaired for fish consumption due to PCBs. Based on Section 3.4 of the Listing Policy, the OEHHA consumption advisory warrants not delisting San Diego Bay for impairment (Category 5) due to PCBs in fish tissue and listing for impairment due to mercury in fish tissue.

For Mission Bay, the health advisory against resident organisms includes recommendations of limited consumption for the sensitive population. Mission Bay is not currently listed as impaired for fish consumption. Based on section 3.4 of the Listing Policy, the OEHHA consumption advisory warrants listing Mission Bay for impairment (Category 5) due to PCBs and mercury in fish tissue. It is important to note that PCBs were much lower in Mission Bay than San Diego Bay, with elevated levels present in fewer species and at lower concentrations. The San Diego Water Board intends to ask OEHHA to consider a re-assessment of Mission Bay PCBs in fish tissue.

## Chapter 4. Discussion of Changes to 303(d) listings of the San Diego Region

### Statistics of Data Reviewed

Compared to the previous cycle, the volume of data submitted for review in the 2014 cycle increased roughly 190 percent, resulting in a total number of 4,996 lines of evidence (LOEs) generated, requiring 3,548 decisions. Table 5 shows the comparison of data reviewed, in terms of waterbody segments assessed, LOE generated, and decisions made, in cycles of the Integrated Report from 2006 to 2014.

**Table 5. Comparison of Data Reviewed in Integrated Report Cycles 2006 through 2014**

Statistics		2014	2010	2006
Total Number of Waterbody Segments		404	274	Not Available
Total Number of (new) LOEs		4996	2635	1424
Total Number of Decisions	Total	3548	1623	935
	New + Revised	2612	724	28
	Original	936	899	907

Source of information: CalWQA database 2010, (search results of 06/26/2016)

### Results of 2014 Integrated Report

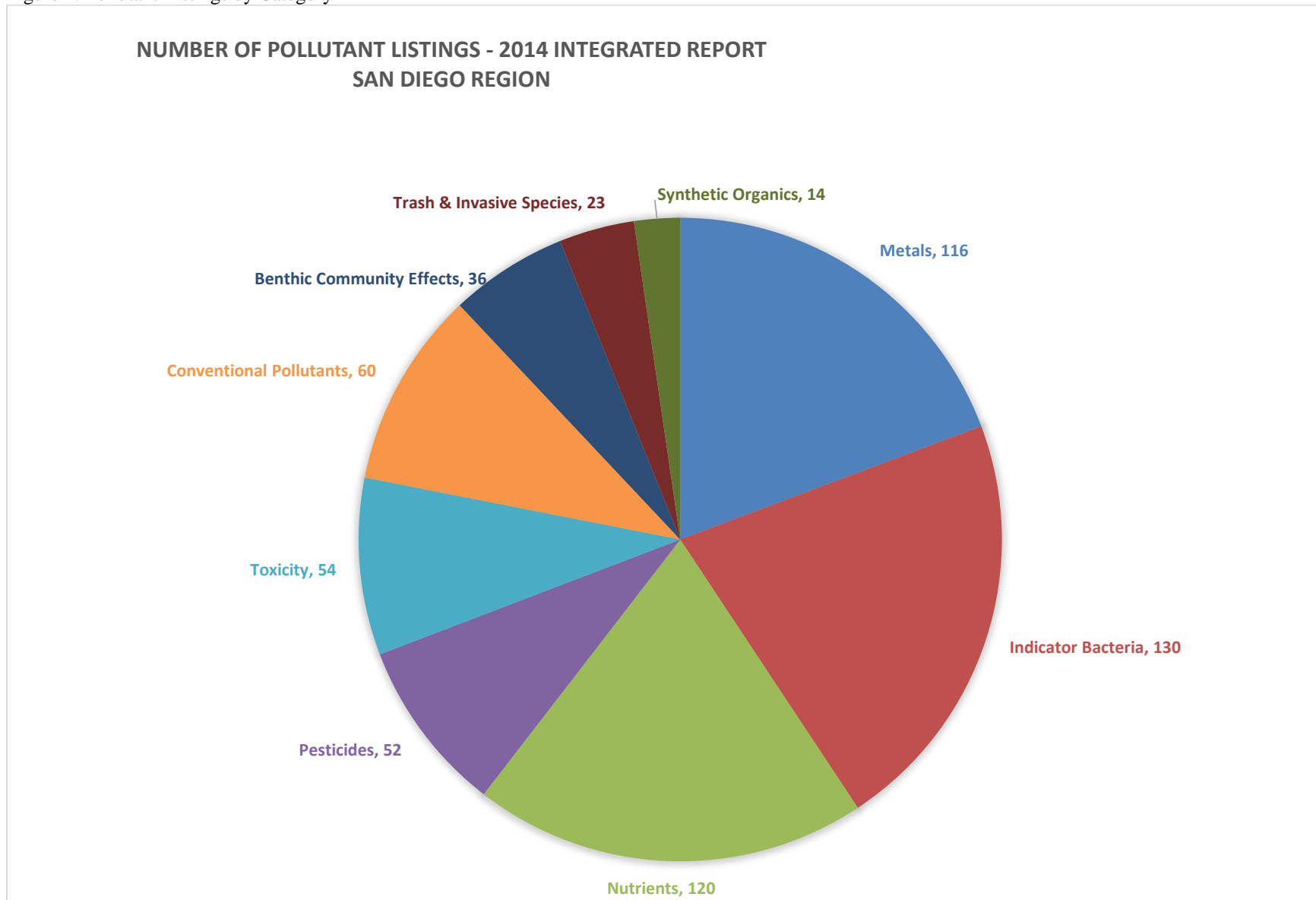
Results of data assessment show a proposed new listing of 237 and delisting of 9 waterbody/pollutant combinations in the 2014 Integrated Report (Appendix A), with both numbers lower than in the previous cycle of 2010 (345 new listings and 134 delistings). The relatively large number of revised listings in the 2014 cycle is likely due to the significantly increased volume of new water quality data that was submitted for the 2014 cycle, the protective water quality standards applicable to these waterbodies, the correction of errors from the last cycle,<sup>8</sup> and the requirements of the Listing Policy to evaluate all readily available data. Therefore, the number of proposed revised listings does not necessarily reflect an overall decrease in water quality since the previous (2010) listing cycle.

Of all current listings of pollutants (i.e., waterbody/pollutant pairs corresponding to water body segments in Categories 4 and 5) in the San Diego Region, indicator bacteria (21%), nutrients (20%) and metals<sup>9</sup> (20%), are the top three categories of pollutants that collectively account for more than half of all listings. Pesticides and toxicity each account for about eight percent of total listings. The detailed breakdown of listings as a result of the 2014-cycle assessment is presented in Appendix A and Figure 2.

<sup>8</sup> Section 6.7 of the Listing Policy requires nutrients being evaluated as toxicants, for which the allowable exceedance rates are lower than for conventional pollutants. In 2010, nutrients were mistakenly evaluated as conventional pollutants and these errors were corrected in the 2014 cycle.

<sup>9</sup> Including Section 64431 California Code of Regulations Title 22 metals and aluminum, iron, and manganese.

Figure 2. Pollutant Listings by Category





## Adopted TMDLs and TMDLs in Progress

Pursuant to Section 2 of the Listing Policy, waterbodies remain in Category 5 until **all 303(d)-listed pollutants** are addressed by USEPA-approved TMDLs or by another regulatory program that is expected to result in the reasonable attainment of the water quality standards (“TMDL Alternative”). Only when all 303(d)-listed pollutants are addressed by TMDLs will the waterbody will be placed into Category 4a (TMDL) or 4b (TMDL Alternative). Thus, those waterbodies with existing TMDLs but with new listings remain in Category 5 and are not easily distinguished as having improved due to a TMDL process. In addition, numerous waterbodies have TMDLs or TMDL Alternatives in progress. These efforts were not wholly captured by the Integrated Report database and should be acknowledged, specifically for TMDL Alternatives in progress as they involve a wide variety of stakeholders and can be implemented in a shorter timeframe than traditional TMDLs, potentially at less cost. For reporting purposes, TMDL Alternatives in progress are identified as Category 5-Alt. This identifies the waterbody as impaired but now provides clarity on the current expected course of action for that waterbody-pollutant combination. Should the TMDL Alternative approach be insufficient these may revert into traditional TMDLs. Existing [USEPA approved TMDLs and TMDL Alternatives](#) as well as [TMDLs and TMDL Alternatives in progress \(5-Alt\)](#) are included in Table 6:

**Table 6. San Diego Region TMDLs and TMDL Alternatives: Adopted or In Progress**

Waterbody	Pollutant	Adopted	In Progress
Chollas Creek	Diazinon	TMDL 2002	-
Chollas Creek	Copper, Lead, Zinc	TMDL 2007	
Rainbow Creek	Nitrogen, Phosphorus	TMDL 2005	-
Shelter Island Yacht Basin	Copper	TMDL 2005	-
20 Beaches and Creeks	Indicator Bacteria	TMDL 2010	-
Baby Beach and Shelter Island Park	Indicator Bacteria	TMDL 2008	-
Los Penasquitos	Sediment	TMDL 2012	-
Loma Alta Slough	Phosphorus	TMDL Alternative 2014 <sup>a</sup>	<sup>a</sup>
Famosa Slough	Eutrophication	-	TMDL Alternative (5-Alt)
Santa Margarita Estuary	Eutrophication	-	TMDL Alternative (5-Alt)
Tijuana River and Estuary	Sediment, Trash	-	TMDL Alternative (5-Alt) <sup>b</sup>
Lake San Marcos	Eutrophication	-	TMDL Alternative (5-Alt)
San Diego Bay Marine Sediments: Multiple Locations	Toxicity, Bioaccumulation	-	TMDL, TMDL Alternative (5-Alt)

<sup>a</sup> Adopted by San Diego Water Board, Water Quality Improvement Plan and USEPA Approval Pending

<sup>b</sup> State Water Board's Trash Policy including Implementation Plan

Approaches for the identified TMDL alternatives include:

1. Loma Alta Slough. The eutrophication impairment will be addressed the Water Quality Improvement Plan for the Carlsbad Watershed Management Area. This strategy was endorsed by the San Diego Water Board via Resolution No. R9-2014-0020 in June 2014.
2. Famosa Slough. The eutrophication impairment will be addressed via the Water Quality Improvement Plan for the San Diego River Management Area. A resolution in support of this strategy is anticipated to be considered by the Water Board in Spring 2017.
3. Tijuana River and Estuary. The sediment and trash impairments will be addressed by the efforts of the Tijuana River Valley Recovery Team. This strategy was endorsed by the San Diego Water Board via Resolution No. R9-2012-0030 in February 2012.
4. Lake San Marcos. The eutrophication impairment may be addressed via a non-TMDL alternative involving responsible parties. The Executive Officer of the San Diego Water Board issued Investigative Order R9-2011-0033 to the Citizens Development Corporation to complement voluntary diagnostic efforts by various other parties. As described in the Investigative Order, subsequent cleanup activities are expected to occur either voluntarily or through enforcement actions, such as a Cleanup and Abatement Order issued by the Water Board under Water Code section 13304.
5. San Diego Bay. Several marine sediment impairments are being addressed by various Investigative Orders issued pursuant to Water Code section 13267 and Cleanup and Abatement Orders issued pursuant to Water Code section 13304.

## Chapter 5. Public Review and Board Approval

Pursuant to section 6.2 of the Listing Policy, waterbodies listed in Category 4a, 4b, or 5, require public review and approval by the Regional Water Board during a public Board hearing and are then submitted to the State Water Board for compiling into the California section 303(d) list of impaired waters. Waterbodies listed in Categories 1, 2, 3, or 4c are provided as additional waterbody information and will be submitted to the State Water Board for inclusion into the California Integrated Report. Once compiled, the California Integrated Report is noticed for additional public review and approval by the Executive Director or State Water Board, as outlined in section 6.3 of the Listing Policy. The California Category 5 list (i.e., 303(d)-listed waterbodies) will require final approval by the USEPA. If USEPA determines that changes are needed to the submitted report it will initiate further public review before finalizing and publishing the report.

## References

*For a complete list of references used in all the assessment fact sheets, see Appendix K.*

California Department of Fish and Wildlife. San Mateo Creek Invasive Species Removal. Presentation to the South Coast Steelhead Coalition Meeting on November 16, 2015.

California Regional Water Quality Control Board San Diego Region. 2012. Water Quality Control Plan for the San Diego Basin (Basin Plan). Updated August 28, 2012.

Clemento, A.J., Anderson, E.C., Boughton, D., Girman, D. and J.C. Garza. 2009. Population genetic structure and ancestry of *Oncorhynchus mykiss* populations above and below dams in south-central California. *Conservation Genetics*: 1321-1336

Fetscher, A.E., Stancheva, R., Kociolek, J.P., Sheath, R.G., Stein, E.D., Mazor, R.D., Ode, P.R. and L.B. Busse. 2013. Development and comparison of stream indices of biotic integrity using diatoms vs. non-diatom algae vs. a combination. *Journal of Applied Phycology* 25(4)

Hovey, T.E. 2004. Current Status of Southern Steelhead/Rainbow Trout in San Mateo Creek, California. *California Fish and Game* 90 (3): 140-154

Hunt, L.W. 2008. Southern California Coast Steelhead Recovery Planning Area Conservation Action Planning Workbooks Threats Assessment Summary. Prepared for NOAA-NMFS. 22 June 2008.

Mathews, K.R. and N.H. Berg. 1997. Rainbow trout responses to water temperature and dissolved oxygen stress in two southern California stream pools. *Journal of Fish Biology* 50: 50-67.

Mazor, R.M., Ode, P.R., Rehn, A.C., Engeln, M., Boyle, T., Fintel, E., Verbrugge, S. and C. Yang. 2015. The California Stream Condition Index (CSCI): Interim instructions for calculating scores using GIS and R. SCCWRP Technical Report #883, Revision Update November 12, 2015.

Mazor, R.D., Rehn, A.C., Ode, P.R., Engeln, M., Schiff, K.C., Stein, E.D., Gillett, D.J., Herbst, D.B. and C.P. Hawkins. 2016. Bioassessment in complex environments: designing an index for consistent meaning in different settings. *Freshwater Science* 35(1): 249-271.

Ode, P.R., Rehn, A.C. and J.T. May. 2005. A Quantitative Tool for Assessing the Integrity of Southern Coastal California Streams. *Environmental Management* 35(4): 493-504.

Ode, P.R., Rehn, A.C., Mazor, R.D., Schiff, K.C., Stein, E.D., May, J.T., Brown, L.R., Herbst, D.B., Gillett, D., Lunde, K. and C.P. Hawkins. 2016. Evaluating the adequacy of a reference-site pool for ecological assessments in environmentally complex regions. *Freshwater Science* 35(1): 237-248.

Spina, A.P. 2007. Thermal ecology of juvenile steelhead in a warm-water environment. *Environmental Biology of Fishes* 80(1): 23-34

State Water Resources Control Board (SWRCB). 2004. Water Quality Control Policy For Developing California's Clean Water Act Section 303(d) List. SWRCB. Sacramento, CA.

SWRCB. 2005. Water Quality Control Policy of Addressing Impaired Waters. State Water Resources Control Board Resolution No. 2005-0050. SWRCB. Sacramento, CA.

United States Environmental Protection Agency (USEPA). 1997. Memorandum from Robert Perciasepe, Assistant Administrator, to Regional Administrators and Regional Water Division Directors Regarding New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs).

USEPA. 2002. Memorandum from Robert Perciasepe, Assistant Administrator, to Regional Administrators and Regional Water Division Directors Regarding Clarification of the use of Biological Data and Information in the 2002 Integrated Water Quality Monitoring and Assessment Report Guidance. USEPA Washington, D.C.

USEPA. 2003. Elements of a State Water Monitoring and Assessment Program. USEPA. Washington, D.C.

USEPA. 2005. Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b), and 314 of the Clean Water Act. USEPA. Washington, D.C.

USEPA. 2015. Memorandum from Robert Perciasepe, Assistant Administrator, to Regional Administrators and Regional Water Division Directors Regarding Information Concerning 2016 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions. USEPA Washington, D.C.

Wilcox, J.M. 2012. Assessment of Southern California Steelhead Trout On the Cleveland National Forest. United States Department of Agriculture, U.S. Forest Service.