

Guide to Russian River Watershed Pathogen TMDL Staff Report Revisions

CHAPTER AND SECTION SUMMARIES

NORTH COAST REGIONAL WATER QUALITY CONTROL BOARD

INTRODUCTION

On August 21, 2015, the North Coast Regional Water Quality Control Board (Regional Board) released for a 48-day public review period the *Draft Staff Report for the Action Plan for the Russian River Watershed Pathogen Indicator Bacteria Total Maximum Daily Load (August 21, 2015)* and *Draft Basin Plan Amendment* including revisions to the Onsite Waste Treatment System Policy (OWTS Policy). These documents are referred to here as the 2015 Draft Staff Report and Action Plan. The number and extent of public comments precipitated staff's re-evaluation of the project, including outreach to 1) the State Water Resources Control Board (State Board) to identify funding for community-based planning and low interest loans for individual OWTS upgrades and 2) the counties to identify local and state roles and responsibilities associated with community-based planning and oversight of individual OWTS assessment and upgrade. Also, in response to public comments, the 2015 Draft Staff Report and Action Plan was significantly revised and re-released for public review.

On August 7, 2017, the Regional Board released for a 53-day public review period the revised project as described in the *Staff Report for the Action Plan for the Russian River Watershed Pathogen Indicator Bacteria Total Maximum Daily Load (August 2017)* and *Draft Action Plan for the Russian River Pathogen Total Maximum Daily Load*, including revisions to the OWTS Policy. These documents are referred to here as the 2017 Draft Staff Report and Action Plan. The number and extent of public comments again precipitated staff's re-evaluation of the project.

This document summarizes the revisions made to the 2015 and 2017 Draft Staff Reports to result in the proposed 2019 Staff Report and Basin Plan Amendment out for a 45-day public review beginning May 9, 2019 and concluding on June 24, 2019 at 5:00pm. This document provides a broad overview of the most substantive changes to be found in the 2019 proposed Staff Report and Basin Plan Amendment. Appendix A to this document provides a chapter by chapter guide to the revisions made over time. This document and Attachment A are intended as a guide to highlight the key revisions made to the documents and may not capture the nuances and details of all revisions. A Response to Comments document will be released prior to an adoption hearing, which responds to all substantive comments received since 2015.

A. REVISION TO PROGRAM OF IMPLEMENTATION FOR OWTS

The major revisions made to the 2015 draft Staff Report and Action Plan were to address comments made on the Program of Implementation, particularly the approach to addressing Onsite Wastewater Treatment Systems (OWTS). The Regional Water Board received many written comments and oral testimony voicing concern about the expense and obligations assigned to OWTS owners, based on the assumption that OWTS within close proximity to a watercourse could be affecting water quality conditions. The Program of Implementation was revised in 2017 to:

1. Describe a Memorandum of Understanding (MOU) between the County of Sonoma and the Regional Water Board to share in the responsibility of defining the Advanced Protection Management Program (APMP) boundary, obtaining information regarding the condition of OWTS within the APMP boundary to determine the specific properties requiring upgrade, and ensuring that existing OWTS within the APMP that are failing or substandard are upgraded.¹
2. Establish a clear APMP boundary using the County's parcel map.
3. Modify the requirements applicable to properties within the APMP boundary to better target those specific properties with failing or substandard systems.
4. Highlight the availability of grant funds to support planning for community-based solutions where necessary and to establish public funding support to low income property owners.

B. REVISION TO DATA ASSESSMENT

The major revisions made to the 2017 draft Staff Report and Action Plan primarily were to address the availability of the new statewide bacteria objective adopted by the State Water Board in August 2018. The adopted statewide bacteria objectives established limitations for *E. coli* in freshwater and enterococci in saline water to protect water contact recreational users from the effects of pathogens in California water bodies. Saline waters are defined as those waters where salinity exceeds 1 part per thousand more than 5% of the time. The new bacteria objectives include limitations based on a geometric mean (GM), to be calculated on a rolling size week basis. They also include limitations based on a statistical threshold value (STV), to be calculated in a static manner using all samples within a given calendar month. No more than 10% of samples in a calendar month can exceed the STV limitation to remain in compliance. To address the terms of the adopted statewide bacteria objective, the water quality data collected to support the TMDL findings had to be reanalyzed. Specifically, the following reanalysis was conducted:

1. Historic ambient fecal coliform data collected in the Russian River Watershed were excluded from consideration. The adopted statewide bacteria objectives for *E. coli* in freshwater and enterococci in saline waters now replaces the fecal coliform objective associated with REC-1 protection included in the Basin Plan. The exclusion of fecal coliform data alters the impairment findings as presented in the 2012 303(d) list of impaired waters.
2. The GM for *E. coli* data collected in all waters defined as freshwater were recalculated using a rolling six-week average as required by the new bacteria objective. This differs from the method of calculation used in the 2015 and 2017 draft staff reports, which was conducted on a static basis.
3. The reanalysis did not alter staff's approach to using multiple lines of evidence as the basis for establishing the TMDL. But, to better assess the relationships among the multiple lines of evidence, ambient water quality data was binned into

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https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/pdf/170420/Russian_River_TMDL_MOU_Redacted.pdf

subwatersheds defined by HUC-12 boundaries, a finer geographic scale than the Hydrologic Subareas that had previously been used. The finer scale of assessment allowed for more refined conclusions to be drawn relative to areas of pollution/impairment.

4. Staff used enterococci data to assess pollution/impairment in the HUC-12 subwatershed containing the Russian River estuary, in conformance with the adopted statewide objectives.
5. Staff continued to use enterococci data to assess pollution/impairment in freshwater HUC-12 subwatersheds, in conformance with the guidance resulting from the scientific peer review process. But, in order for a freshwater HUC-12 subwatershed to be found polluted/impaired based on enterococci data staff also required an additional line of evidence of pollution/impairment, notably evidence of beach closures.
6. *Bacteroides* data and other DNA marker data (PhyloChip™) were binned by HUC-12 and assessed, as well. But, the results of the data were not used to draw conclusions regarding pollution/impairment. Instead, the data were used to a) augment pollution/impairment findings using *E. coli*, enterococci and beach closures and b) identify areas that are a high priority for additional monitoring.
7. The data collected for the OWTS Study and Land Cover Study were also binned by HUC-12 and assessed. The results of these data were also not used to draw conclusions regarding pollution/impairment. Instead, these data were used to refine our understanding of the fecal waste sources requiring control (e.g., human versus bovine or grazer).

The results of the data reanalyses are 1) a reduced area defined as polluted/impaired, 2) alteration of the APMP boundary to conform to the newly defined area of pollution/impairment, 3) the identification of high priority monitoring locations for future data collection, and 4) support for a proposed Fecal Waste Discharge Prohibition to address fecal waste discharges throughout the Russian River Watershed. While the available ambient water quality data was insufficient to assess the entire watershed with respect to pollution/impairment status, the OWTS Study and Land Cover Study clearly demonstrate an association of certain land cover types (e.g., developed land, shrubland, agricultural lands, and rural residential lands) and density of OWTS with evidence of pollution/impairment. The adoption of statewide bacteria objectives and refinement in fecal indicator bacteria analysis has led to revision of the proposed fecal waste discharge prohibition and the wasteload and load allocations to better conform with data results. Notably, these refinements have highlighted the need for the Regional Water Board to develop a program to address fecal waste discharges from non-dairy livestock and farm animal facilities.

What follows is a chapter by chapter guide to the revisions made to the 2015, 2017 and 2019 versions of the Staff Report. This document is intended as a guide to highlight the key revisions made to the documents and may not capture the nuances and details of all revisions. Revisions to the 2017 version are shown in ~~strikeout~~ and underline text in the 2019 version of the draft Staff Report.

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INTRODUCTION			
	<p>1.1. PURPOSE. The purpose of the staff report, as described in 2015, was to present the information and analyses necessary to support the Russian River Pathogen TMDL Action Plan. The Russian River Pathogen TMDL Action Plan was described as designed to 1) improve bacteriological conditions in the Russian River, 2) set limits on bacterial discharge, 3) identify implementation actions, and 4) identify monitoring actions.</p>	<p>Revisions were made in 2017 to 1) de-emphasize the Action Plan as a TMDL Action Plan, 2) emphasize the Regional Board’s authority under both the Clean Water Act and Porter Cologne to implement water quality protections, 3) emphasize the Action Plan’s adherence to the Nine Key Elements of a Watershed Plan to support 319(h) grant funding, 4) explicitly recognize the basin planning process as certified as an exempt regulatory program with respect to CEQA, and 5) describe the approval process for basin plan amendments.</p>	<p>Section revised to clarify that the Program of Implementation included a prohibition against the discharge of fecal waste to the surface waters of the Russian River Watershed. All other revisions made in 2019 were editorial, only.</p>

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1.2 PROJECT HISTORY	Not Included	This section was newly added in 2017 to 1) provide a summary of the scientific peer review process, 2) describe the public review process for the 2015 Draft Staff Report and Action Plan, 3) acknowledge the need to re-evaluate the project and postpone a hearing, and 4) highlight some of the significant revisions overall. These include: the development of a Memorandum of Understanding (MOU) with Sonoma County on roles and responsibilities and the delineation of a geographic boundary for the Advanced Protection Management Program (APMP). This section describes other revisions as made to improve clarity and transparency; though, no significant revisions were made to the technical analysis.	This section was revised to highlight the adoption by the State Water Board of new statewide bacteria objectives and the reanalysis of TMDL data in conformance with the new methods of calculation.
1.3 REGULATORY FRAMEWORK	1.2 REGULATORY FRAMEWORK. This section introduced the Clean Water Act and Porter Cologne as two laws relevant to the project.	Language was revised in 2017 to de-emphasize the Action Plan as a TMDL Action Plan, given the Regional Board’s authority under Porter Cologne to address pollution, too.	No changes

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1.3.1 SECTION 303(d) LISTING	1.2.1 IMPAIRED WATERBOARDIES. In 2015, this section presented the waterbody-pollutant pairs identified under Section 303(d) of the Clean Water Act as impaired. It also presented new waterbody-pollutant pairs in the Russian River watershed that were identified through the TMDL analysis as impaired. The section confirmed for the reader that the TMDL applies to the whole Russian River watershed, as supported by the impairment findings of the TMDL analyses. It indicated that the new waterbody-pollutant pairs would be considered in the next 303(d) listing cycle.	2017 revisions to this section included 1) greater explanation of fecal indicator bacteria as providing evidence of fecal waste discharge and 2) the potential for human exposure to pathogens when fecal waste is present in the water. Language was revised to refer to “the pollution status” of non-303(d) listed reaches and to emphasize the authority of the Regional Board to address all incidences of pollution, regardless of listing status.	This section was revised to highlight the reanalysis of ambient water quality data, organizing data based on HUC-12 subwatershed areas and applying the new statewide bacteria objectives. It also notes the reduction in the APMP boundary due to the results of the ambient water quality data reanalysis.
1.3.2 TOTAL MAXIMUM DAILY LOAD (TMDL)	1.2.2, TMDL DEVELOPMENT. This section presented perfunctory information regarding the relationship of 303(d) listing to TMDL development and the authority of the U.S. Environmental Protection Agency to review and approve TMDLs.	In 2017, this section was revised to more directly focus on the elements of a TMDL.	All revisions made in 2019 were editorial, only.

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1.3.3 ACTION PLAN	1.2.3, BASIN PLAN AMENDMENT DEVELOPMENT. This section described the development of a TMDL as required under the Clean Water Act and a basin plan amendment as appropriate to incorporate the TMDL and program of implementation as new regulation, because multiple actions are necessary to reduce fecal waste discharge, restore beneficial uses, and attain water quality objectives.	In 2017, this section was renamed ACTION PLAN and focused on the development of an Action Plan as the mechanism to establish a program of implementation by which to attain water quality objectives, restore beneficial uses, and protect public health. The development of a Program of Implementation is authorized under Porter Cologne as the mechanism for implementing water quality objectives.	All revisions made in 2019 were editorial, only.
WATERSHED SETTING			
2 WATERSHED SETTING	1.3, WATERSHED DESCRIPTION AND ENVIRONMENTAL SETTING.	In 2017, this section was redefined as Chapter 2.	All revisions made in 2019 were editorial, only.
2.1 LOCATION	Not included.	In 2017, an introductory paragraph was added to generally describe the area and its value to local, regional, and state stakeholders.	All revisions made in 2019 were editorial, only.
2.2 HYDROLOGY	1.3.1, HYDROLOGY. This section described the mainstem, tributaries and reservoirs that make up the Russian River watershed.	All revisions made in 2017 were editorial, only.	In 2019, in response to public comment, revisions were made to the discussion of the reservoirs in the Russian River Watershed and the associated water rights and water diversions.

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2.3 LAND USES	1.3.2, LAND USES. This section described the land cover, population densities, and ownership in the Russian River watershed.	The 2017 revisions to this section were primarily editorial. A sentence was added to acknowledge that each land cover type represents its own unique risk of fecal waste discharge and refers the reader to another chapter for further details.	In 2019, in response to public comment, revisions were made by replacing the municipality and its associated municipal population with the city names and populations in the Russian River Watershed.
2.4 RECREATIONAL USES	1.3.2.1 RECREATIONAL USES. This section described the recreational use of waters in the Russian River watershed. It specifically highlighted popular swimming beaches.	In 2017, the order of this section was upgraded to be comparable to that of HYDROLOGY and LAND USES. No other notable revisions were made.	No changes made.
2.5 CLIMATE	1.3.3, CLIMATE. This section described precipitation patterns in the Russian River watershed.	All revisions made in 2017 were editorial, only.	No changes made.
2.6 GEOLOGY AND SOILS	1.3.4, GEOLOGY AND SOILS. This section described the geology and soils of the Russian River watershed, including soil runoff characteristics.	The 2017 revisions to this section were primarily editorial. A sentence was added to refer the reader to the Independent Science Review Panel's 2017 report, which provides a conceptual model of how the watershed setting influences the functioning of the watershed.	All revisions made in 2019 were editorial, only

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2.7 SUMMARY	The 2015 draft Staff Report included an unnumbered summary at the end of Chapter 1, which broadly reiterated the environmental setting and highlighted the content of other key chapters of the staff report.	In 2017, the summary was numbered and revised to focus on the importance of the environmental setting to understanding the potential sources of pathogens in the Russian River Watershed, the conditions that result in fecal waste discharge, and the concomitant effects of fecal waste discharge on water quality, contact recreation, and public health.	No changes made
BACTERIA STANDARDS AND OTHER INDICATORS OF PATHOGEN POLLUTION			
3 BACTERIA STANDARDS AND OTHER INDICATORS OF PATHOGEN POLLUTION	2, PROBLEM IDENTIFICATION: STANDARDS AND INDICATORS. In 2015, this chapter was described water quality standards applicable to the TMDL, the types of human pathogens most commonly associated with waterborne diseases, the types of bacteria used to indicate the presence of pathogens, and the nature of the impairment identified in the Russian River Watershed	In 2017 revisions were designed to emphasize 1) a focus on water quality measures of the potential for public exposure to illness-causing pathogens, 2) use of innovative methodologies and metrics, and 3) applicability of standards and indicators to the TMDL.	All revisions made in 2019 were editorial, only

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3.1 WATER QUALITY STANDARDS FOR BACTERIA	2.1, WATER QUALITY STANDARDS. In 2015, this section described the relationship between a TMDL and water quality standards. The components of a water quality standard were described separately in sections 2.1.1 BENEFICIAL USES and 2.1.2 WATER QUALITY OBJECTIVES. A summary of the development of new national bacteria criteria to protect recreational use was also included. Section 2.2.3 ADDRESSING IMPAIRMENT OF REC-1 AND REC-2 ONLY described the focus of the TMDL on the protection of the recreation beneficial uses.	2017 revisions combined the 2015 subsections and elaborated on staff's reference stream study, its cursory shellfish harvesting assessment, need for updated bacteria objectives to protect the shellfish harvesting use, and need for updated bacteria objectives to protect recreational uses. It described the status of the State Board's efforts to revise statewide bacteria objectives. It also established the draft statewide bacteria objectives for recreation as the basis for the Russian River Pathogen TMDL.	2019 revisions replaced the draft statewide bacteria objectives with the objectives that were adopted by the State Board in August 2018. Language was added to better describe Hydrologic Areas and Hydrologic Sub Areas. Revisions describing the federal and state Antidegradation Policy were included as well as a general description of the Regional Water Boards responsibilities regarding Antidegradation. All other revisions were editorial, only.
3.2 OTHER INDICATORS OF PATHOGEN POLLUTION	2.2 WATER QUALITY IMPAIRMENTS. In 2015, this section described the numerous pathogens associated with waterborne diseases, including bacteria, protozoans, and viruses.	The 2017 revisions made clear that the draft TMDL was based on the draft statewide <i>E. coli</i> objective for the protection of recreation. But it highlighted the importance of other measures of pathogens to assess fecal waste discharge, potential human exposure to pathogens, and the presence of pollution, as defined under state law.	Revisions note the different bacteria objectives for freshwater and saline waters. No other changes were made.

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3.2.1 FECAL INDICATOR BACTERIA	2.2.1 BACTERIA INDICATORS. In 2015, this section described the fecal indicator bacteria that are used to assess the presence of fecal waste in a waterbody, and therefore indicators of pathogenic contamination and risk of illness. Subsections included discussion of fecal coliform, <i>E. coli</i> and enterococci bacteria, <i>Bacteroides</i> bacteria, DNA marker sensitivity and specificity, and bacteria communities.	The 2017 revisions simply highlighted the fact that the bacteria indicators are indicators of fecal waste discharge, which brings with it risk of pollution and risk to public health via exposure to pathogens. The subsection discussions were largely unaltered; however, subsections on direct measurement of pathogens and cryptosporidium and giardia protozoa were added.	The elimination of fecal coliform as a fecal indicator bacteria (FIB) of concern is highlighted. An explanation is given for how enterococci data are evaluated, including consideration of the new statewide bacteria objective for saline waters and the national criteria for freshwaters. An explanation is given for how <i>Bacteroides</i> bacteria data and PhyloChip™ data are used.
3.3 SUMMARY	Not included.	This section was added in the 2017 version to highlight the key elements of the chapter. It makes note of the direction from Scientific Peer Reviewers to consider enterococci as an important indicator of human health risk.	The summary is revised to acknowledge the reanalysis of <i>E. coli</i> and enterococci data. Other revisions are editorial in nature.
EVIDENCE OF POLLUTION			

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4 EVIDENCE OF POLLUTION	The 2015 Draft Staff Report included this information as Chapter 3.	The 2017 Draft Staff Report re-envisioned this chapter to include evidence of fecal waste pollution, to augment the assessment of exceedances of water quality objectives and 303(d) listing. This is because of the advances in the science associated with pathogen and fecal indicator bacteria monitoring and the specific concern of controllable fecal waste discharges to the Russian River Watershed.	Chapter 4 was significantly revised to describe the results of a re-analysis of the fecal indicator bacteria data. The State Water Board's adoption of a statewide bacteria objective for the protection of REC-1 codified a method for calculating a geometric mean of the data that was different from the approach used to support the 2015 and 2017 drafts of the Russian River Watershed Pathogen TMDL. The re-analysis specifically applied to <i>E. coli</i> data in freshwater and enterococci data in saline water. To improve data presentation and refine decision-making, the fecal indicator data were evaluated by Hydrologic Unit Code 12 (HUC-12) Subwatersheds, rather than across the watershed as a whole.

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4.1 OVERVIEW	The 2015 Draft Staff Report included an unnumbered overview to this chapter. It summarized the findings of the chapter to describe all of the surface streams and river reaches of the Russian River Watershed as impaired by pathogen indicator bacteria. It provided a list of 7 findings upon which the conclusion was based.	The 2017 Draft Staff Report numbered this section as an OVERVIEW. The overview was expanded to recognize the Action Plan as a program of implementation designed to both address exceedances of water quality objectives for bacteria and address evidence of pollution as provided by multiple lines of evidence. It highlighted the additional studies completed since the 2012 303(d) impairment listing. And it expanded on the findings described in the 2015 Draft Staff Report, adding the microbiological source identification using PhyloChip™ phylogenetic DNA microarray as an eighth line of evidence.	This section was modified to highlight the State Water Board's adoption of statewide bacteria objectives for the protection of REC-1. It was also modified to describe the re-analysis of fecal indicator bacteria. This section now includes a description of the evaluation criteria used to determine the impairment/pollution status of each HUC-12 subwatershed. A table was added to provide to relate the monitoring locations to HUC-12 subwatersheds and Hydrologic Subareas.
4.2 ASSESSMENT OF FECAL COLIFORM BACTERIA CONCENTRATIONS	3.1 ASSESSMENT OF FECAL COLIFORM BACTERIA DATA. The 2015 Draft Staff Report described the collected fecal coliform data and compared them to Basin Plan objectives. It summarized the lines of evidence related to fecal coliform measurements that indicated water quality issues.	The 2017 Staff Report slightly augmented the section to include a table of fecal coliform data.	This section was removed in the 2019 staff report. Fecal coliform bacteria data is no longer used as a fecal indicator bacteria of concern, since the Basin Plan's fecal coliform bacteria objective for the protection of REC-1 has been replaced by the statewide bacteria objective.

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4.3 ASSESSMENT OF E. COLI BACTERIA CONCENTRATIONS	3.2 ASSESSMENT OF E. COLI BACTERIA DATA. The 2015 Draft Staff Report described the collected <i>E. coli</i> data and compared them to U.S. EPA National criteria.	2017 revisions expanded the conclusions to refer not only to evidence of impairment, but of pollution, as well.	This section is now section 4.2. This section has been revised to report the results of the re-analysis of the <i>E. coli</i> data based on the new statewide bacteria objective. It includes a table and figure, which presents the results of the re-analysis. It also identifies those HUC-12 subwatersheds that are defined as impaired/polluted based on <i>E. coli</i> exceedances.
4.4 ASSESSMENT OF ENTEROCOCCI BACTERIA CONCENTRATIONS	3.3 ASSESSMENT OF ENTEROCOCCI BACTERIA DATA. The 2015 Draft Staff Report described the collected enterococci data and compared them to U.S. EPA National criteria.	2017 revisions expanded the conclusions to refer to the guidance of scientific peer reviewers and the Regional Board's authority to control sources of pollution under Porter Cologne.	This section is now section 4.3. This section has been revised to describe the results of a re-analysis of enterococci data based on HUC-12 subwatersheds. The data summary table and figure have been revised to depict the results. A summary discussion of the results is provided. Enterococci exceedances of the U.S. EPA criteria are used in combination with public health advisories as the basis for identifying impaired/polluted HUC-12 subwatersheds.

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4.5 ASSESSMENT OF BACTEROIDES BACTERIA CONCENTRATIONS	3.4 ASSESMENT OF BACTEROIDES BACTERIA DATA. The 2015 Draft Staff Report described the collected Bacteroides data and only recognized waters with concentrations below the laboratory reporting limit as minimally disturbed.	2017 revisions recognized human and domestic animal Bacteroides concentrations above laboratory reporting limits as indicating a high likelihood of the presence of fecal waste and providing evidence that the bacteriological quality of the water had been degraded. This is recognized as evidence that the natural background narrative bacteria water quality objective is exceeded.	This section is now section 4.4. This section has been revised to describe the results of the re-analysis of <i>Bacteroides</i> data based on HUC-12 subwatersheds. The data summary tables and figures have been revised to depict the results. A summary discussion of the results is provided. <i>Bacteroides</i> data are not used as the basis for determining impairment/pollution. They are used to refine understanding of the likely fecal waste sources at issue in individual HUC-12s and to inform monitoring decisions.

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4.6 MICROBIOLOGICAL SOURCE IDENTIFICATION	5.1 HUMAN, GRAZER, & BIRD FECAL WASTE SOURCES & DISTRIBUTION. The 2015 Draft Staff Report initially reported the findings of a microbial source identification study with Lawrence Berkeley National Laboratory in the Source Analysis chapter. This section described the purpose of the study and the methods used. The study highlighted evidence of human fecal waste discharge in the Laguna de Santa Rosa and the lower Russian River, grazer fecal waste discharge in the Laguna de Santa Rosa, and bird fecal waste discharge throughout the watershed.	The 2017 revisions placed the discussion of the microbiological source identification study in Chapter 4, Evidence of Pollution because staff concluded that the results of the study were better used to augment other lines of evidence that human and domestic fecal waste is entering the Russian River Watershed with the potential to degrade water quality. The text of the section was significantly altered; but the content or conclusions were not.	This section is now section 4.5. This section has been revised to describe the results of the re-analysis of PhyloChip™ data based on HUC-12 subwatersheds. The data summary tables and figures have been revised to depict the results. A summary discussion of the results is provided. PhyloChip™ data are not used as the basis for determining impairment/pollution. They are used to refine understanding of the likely fecal waste sources at issue in individual HUC-12s and to inform monitoring decisions.
4.6.1 METHODS	Not included.	The 2017 Draft Staff Report was revised to include a section specifically describing the methods associated with the microbiological source identification study with Lawrence Berkeley National Laboratory.	This section is now section 4.5.1. There are no revisions made.

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4.6.2 RESULTS	5.1.1 RESULTS. The 2015 Draft Staff Report represents the results of the study in text, a table, and 3 maps.	The 2017 revisions were editorial, only.	This section is now section 4.5.2. As described in section 4.5 above, this section has been revised to describe the results of the data re-analysis based on HUC-12 subwatersheds. The data is presented in tables, only. There are no figures.
4.7 ASSESSMENT OF PATHOGENIC SPECIES	3.5 ASSESSMENT OF PATHOGENIC SPECIES. The 2015 Draft Staff Report described the results of direct pathogen sampling as evidence of impairment.	The 2017 revisions described the results of direct pathogen sampling as evidence of pollution.	This section is not section 4.6. There are no revisions.
4.7.1 PATHOGENIC BACTERIA DETECTIONS	3.5.1 PATHOGENIC BACTERIA DETECTIONS. The 2015 Draft Staff Report included results of the PhyloChip™ study, which indicated the presence of 7 know human pathogens in the mainstem and tributaries with potential illnesses including urinary tract infections, gastroenteritis, pneumonia, meningitis, nondescript infections, and the plague.	2107 revisions were editorial, only.	This section is now section 4.6.1. There are editorial revisions, only.

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4.7.2 CRYPTOSPORIDIUM AND GIARDIA DETECTIONS	3.5.2 CRYPTOSPORIDIUM AND GIARDIA DETECTIONS. The 2015 Draft Staff Report included results of the Sonoma County Water Agency, which analyzed water samples in 2004 and 2006 for <i>Cyptosporidium</i> and <i>Giardia</i> oocysts and cysts, respectively. The findings indicated a low concentration of each and an indication that no additional water treatment was necessary.	2017 revisions were editorial, only.	This section is now section 4.6.2. There are editorial revisions, only.
4.8 SECTION 303(D) IMPAIRED WATER LISTINGS	3.6 SECTION 303(D) IMPAIRED WATER LISTINGS. The 2015 Draft Staff Report describes that 6 waterbody-pollutant pairs in the Russian River Watershed were identified in the 2012 303(d) listing cycle as not attaining water quality standards. <i>E. coli</i> data were compared against draft California Department of Health Services guidance for posting advisories at fresh water beaches. The draft staff report uses updated criteria for evaluating data.	2017 revisions were editorial, only.	This section has been deleted because the 2012 303(d) Impaired Water Listing will soon be updated with the 2019 303(d) Impaired Water Listing, which is currently underway. Further, the 2012 303(d) listing determinations are superseded by the findings of the Russian River Watershed Pathogen TMDL, itself.

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4.9 PUBLIC HEALTH ADVISORIES	3.7 PUBLIC HEALTH ADVISORIES. The 2015 Draft Staff Report includes a record of public health advisories made by the Sonoma County Department of Health as evidence of impairment. Advisories were issued on 157 days in the period from 2001 and 2014.	2017 revisions were editorial, only.	This section is now section 4.8. The table depicting beach advisories has been updated to include posting up through 2018. Further, the table has been reorganized to separate out those listings prior to 2012 from those after 2012, when posting criteria changed to rely solely on E. coli data.
4.10 SUMMARY	The 2015 Draft Staff Report includes a summary of the findings from multiple lines of evidence of impairment.	The 2017 revisions consider the additional lines of evidence included in this chapter. The summary is more targeted and direct, but the conclusions are the same.	This section is now section 4.9. It has been revised to update the findings based on FIB analysis per HUC-12. A new summary table has been added, which identifies those HUC-12s that are determined to be impaired/polluted based on FIB analyses. It also includes narrative description of the findings.
NUMERIC TARGETS			

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5 NUMERIC TARGETS	4 NUMERIC TARGETS. The 2015 Draft Staff Report identified two numeric targets as appropriate to measure progress towards attainment of water quality standards: <i>E. coli</i> and enterococci thresholds derived from U.S. EPA's 2012 recreational criteria based on no more than 32 gastrointestinal illnesses per 1000 recreators. The geometric mean and statistical threshold values established by U.S. EPA were both identified as TMDL targets.	The 2017 Draft Staff Report identified the same two metrics and 4 thresholds as numeric targets. The chapter was significantly revised, however.	This chapter has been revised to rely exclusively on the new statewide bacteria objectives for the protection of REC-1 beneficial use as the basis for establishing numeric targets.
5.1 OVERVIEW	In the 2015 Draft Staff Report the introductory paragraphs were unnumbered. This overview described the purpose of numeric targets, the limitations of the fecal coliform bacteria objective for the protection of public health and identified <i>E. coli</i> and enterococci as the fecal indicator bacteria recommended in 2012 by U.S. EPA to assess unacceptable human health risks.	The 2017 Draft Staff Report simplified the introductory paragraph to establish the numeric targets as important to assessing unacceptable human health risks.	This section has been updated to refer to the new statewide bacteria objective as the basis for the numeric targets.
5.2 E. COLI BACTERIA	4.1.1 E. COLI BACTERIA. The 2015 Draft Staff Report relied on the U.S. EPA 2012 recreational criteria for <i>E. coli</i> as the basis for the identified thresholds.	The 2017 Draft Staff Report relied on the draft State Board recreational objectives for <i>E. coli</i> as the basis for the identified thresholds.	This section has been deleted as unnecessary given reliance on the statewide bacteria objective, only.

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5.3 ENTEROCOCCI BACTERIA	4.1.2 ENTEROCOCCI BACTERIA. The 2015 Draft Staff Report relied on the U.S. EPA 2012 recreational criteria for enterococci as the basis for the identified thresholds.	The 2017 Draft Staff Report also relied on the U.S. EPA 2012 recreational criteria as the basis for the identified thresholds. The 2017 Draft Staff Report further elaborated on the guidance offered through the scientific review process to include enterococci criteria as a robust metric with clear epidemiological connection to human health risk.	This section has been deleted as unnecessary given reliance on the statewide bacteria objective, only.
5.4 PROPOSED NUMERIC TARGETS	The 2015 Draft Staff Report proposed the numeric targets within the discussion of each metric and in the summary.	Following a discussion of the value of <i>E. coli</i> and enterococci as metrics to indicate human health risk, the 2017 Draft Staff Report highlights the recommended numeric targets in a separate numbered section	This section has been revised to refer to and outline the requirements of the statewide bacteria objective.
5.5 SUMMARY	The 2015 Draft Staff Report summarizes the recommendations in an unnumbered section at the end of the chapter.	The 2017 Draft Staff Report summarizes the recommendations for <i>E. coli</i> and enterococci numeric targets, citing the principle of caution as the reason for including both parameters. The summary also recognizes the enterococci numeric targets as providing a margin of safety to ensure that any false negatives using <i>E. coli</i> are properly identified and addressed.	This section has been revised to refer to the statewide bacteria objective, only.
SOURCE ANALYSIS			

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6 SOURCE ANALYSIS	5 SOURCE ANALYSIS. This chapter relied on 3 studies/assessments to identify sources of fecal waste discharge to the Russian River Watershed.	In the 2017 Draft Staff Report, this chapter relied on 2 studies/assessment to identify sources of fecal waste discharge to the Russian River Watershed. The DNA study discussion was moved to the Evidence of Pollution chapter (Chapter 4). The review of known point source facilities and activities was substantially reorganized to better account for discharges that go directly to surface water versus those that go to land with the potential for runoff.	Revisions to this chapter were primarily editorial. An explanation vis a vis the statewide bacteria objective and calculation of a geometric mean is included in the discussion of the Land Cover Study.

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6.1 OVERVIEW	<p>The opening paragraphs of the 2015 Draft Staff Report identified three methods for assessing sources of fecal waste in an unnumbered overview. Those methods were ambient water quality DNA matches associated with fecal indicator bacteria (FIB) concentration data; FIB concentrations associated with individual land cover classes; and, a review of known point and nonpoint source facilities and activities that discharge or have the potential to discharge fecal waste.</p>	<p>The opening paragraphs of the 2017 Draft staff Report are a numbered section described as an overview. This section augmented the 2015 discussion by describing how a source analysis is conducted in a pathogen TMDL. The overview acknowledges that there is no load of untreated fecal waste that can be said to protect public health. As such, the TMDL is set as a concentration equal to the water quality objective, rather than a fecal waste load. The sources of fecal waste are identified either because they are known potential sources or are associated with a land cover type that has a high likelihood of fecal waste discharge. The DNA study discussion was moved from the Source Analysis chapter to the Evidence of Pollution chapter.</p>	<p>Revisions are editorial.</p>

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6.2 SOURCES BY LAND COVER TYPE	5.2 SOURCES BY LAND COVER TYPE. The 2015 Draft Staff Report described a Land Cover analysis conducted by staff in which <i>E. coli</i> , enterococcus, human-specific Bacteroides, and bovine-specific Bacteroides ambient water concentration data was associated with land cover types as defined by the National Land Cover Dataset. The land cover types evaluated for their association with elevated fecal indicator bacteria concentrations were: forest land, shrubland, agriculture, developed sewerred areas, and developed non-sewerred areas.	Language in the 2015 Draft Staff Report was augmented to introduce the study parameters.	Revisions are largely editorial; though, a summary of Chapter 4 findings is updated to reflect revisions in that chapter.
6.2.1 METHODS	The methods were described in section 5.2 as summarized above.	Section 5.2 of the 2015 Draft Staff Report was renumbered as Section 6.2.1 and described the methods used in the Land Cover assessment.	Revisions are largely editorial, though an explanation is made regarding retention of the static geomean calculation methods used in the Land Cover Study. The results of the Land Cover Study were first published in 2013. Staff assert that the differences between the static and rolling methods of calculation through real are insignificant with respect to the purpose of the Land Cover Study.

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6.2.2 RESULTS	<i>E. coli</i> and enterococcus concentrations were compared to the Ca. Department of Public Health Criterion to assess potential harm to public health. The reporting limit for Bacteroides analyses was used to assess the presence of fresh fecal waste. The results were provided in the form of graphs and text that summarized the findings.	<i>E. coli</i> and enterococcus concentrations were compared to both the geometric and statistical threshold values (STV) of the draft statewide bacteria objective to assess potential harm to public health. There was no change in the approach to assessing the Bacteroides data. The results were provided in the form of graphs and text that summarized the findings. A summary of the findings was added to aid the reader in interpreting the conclusions.	Revisions are editorial, only.
6.2.3 CONCLUSIONS	Not included.	A new section was added in the 2017 Staff Report, which summarizes the findings of the study and offers conclusions regarding the next steps.	No changes made.
6.3 POINT SOURCE FACILITIES AND ACTIVITIES	5.3 POINT SOURCE FACILITIES AND ACTIVITIES. This section described potential point source of pathogens in the Russian River Watershed.	2017 revisions were editorial, only.	No changes made.

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6.3.1 WASTEWATER DISCHARGES TO SURFACE WATER	5.3.1 WASTEWATER DISCHARGES TO SURFACE WATER. This section described municipal wastewater discharges to surface waters, recycled water holding ponds, sanitary sewer systems, sanitary sewer exfiltration, and other NPDES facilities.	Much of the language of this section remained the same. The following revisions made to address public comment are worth noting. 1) The number of publicly-owned sanitary sewer systems within the Russian River Watershed was reduced from 21 to 19. 2) The 2015 Table 5.3 was revised in 2017 as Table 6.2 with an increase in total miles of publicly-owned laterals from 863 to 899. 3) The 2015 Table 5.4 was revised in 2017 as Table 6.3 to address sanitary sewer overflows from 2007 to July 2017. 4) A sentence was added to the discussion of sanitary sewer systems that reads “However, SSO reporting from small communities is inconsistent, which may result in under reporting of SSOs.”	Table 6.3 (Sanitary Sewer Overflows in the Russian River Watershed from 2007 to July 2017) was corrected to indicate that 94% of the SSOs reached surface waters. All other revisions are editorial.

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6.3.2 STORM WATER	5.3.3 STORM WATER. This section described the storm water permits implemented in the Russian River watershed, as potential sources of pathogens. These permits address: municipal stormwater, industrial stormwater, construction storm water, and CalTrans stormwater programs.	The 2015 language is largely left as drafted in the 2017 edition. However, a section on Pet Waste is added as a subsection to the Municipal Storm Water discussion. The discussion on pet waste was moved from the 2015 Draft Staff Report section 5.4.5 to its location in 2017 as section 6.3.2.1.1.	Multiple paragraphs were added that focused on what a Phase I and II MS4 Permit are and actions needed by the permittee. Sonoma State University was identified as a Non-traditional Phase II Small MS4 permittee. An additional sentence on pet waste was included. Editorial changes were made in 2019 in this section. All other revisions are editorial.

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6.3.3 POINT SOURCE CONCLUSIONS	Not included.	The 2017 Draft Staff Report added a new section in which to describe conclusions relevant to point source discharges. In summary, the section concluded that NPDES permits for treated municipal wastewater, fish hatcheries, industrial sites, construction sites, and other NPDES dischargers are unlikely sources of fecal waste discharge and pathogens. It described the MS4s as significant potential sources. It also described recycled water storage pond, exfiltration from sanitary sewers, and SSOs from private laterals as potential sources, though recognized that more information is needed.	Revisions are editorial, only.
6.4 WASTE DISCHARGES TO LAND	5.5.1 WATERWATER DISCHARGES TO LAND. This section describes discharges of municipal wastewater discharges to land, land application of municipal biosolids, private domestic wastewater discharges to land greater than 1,500 GPD, wine beverage and food processors, and mobile home parks and campgrounds.	The 2017 Draft Staff Report moves the discussion of recycled water discharges from landscape irrigation to this section from the Nonpoint Sources section where it was in the 2015 Draft Staff Report (section 5. 4.4).	No changes made.

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6.4.1 MUNICIPAL WASTEWATER DISCHARGES TO LAND	5.5.1.1 MUNICIPAL WASTEWATER DISCHARGES TO LAND. This section describes the 5 municipal wastewater treatment facilities that are authorized under WDRs to discharge treated waste to land. The treatment facilities rely primarily on aerobic ponds for treatment, chlorine disinfection, and percolation ponds or irrigation to pasture for disposal.	2017 revisions were editorial, only.	Text was added to section 6.4.1 to indicate that municipal wastewater discharged to land via irrigation at agronomic rates was not expected to cause pathogenic contamination of groundwater and surface water. Table 6.6 was also corrected to remove that Santa Rosa Oakmont Wastewater Treatment Plant because that facility is no longer in operation. All other revisions made in 2019 were editorial.
6.4.2 LAND APPLICATION OF MUNICIPAL BIOSOLIDS	5.5.1.2 LAND APPLICATION OF MUNICIPAL BIOSOLIDS. This section describes the City of Santa Rosa as the only entity that is permitted to apply municipal biosolids to land in Watershed. The application is controlled under a statewide general WDR.	The 2017 Draft Staff Report adds the acknowledgment that there is no evidence that applied biosolids have migrated outside of the authorized application areas.	No significant changes made.

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6.4.3 RECYCLED WATER DISCHARGES FROM LANDSCAPE IRRIGATION	5.4.4 RECYCLED WATER DISCHARGES FROM LANDSCAPE IRRIGATION. This section describes the prevalence of recycled water use in the Russian River Watershed, the risk of bacterial regrowth in recycled water holding ponds, the risk of bacteria entering surface waters as a result of large volume spills of recycled water, and the de minimis risk of small volume spills or overspray.	The 2017 Draft Staff Report updates the language describing the City of Santa Rosa’s implementation of BMPs as required under NPDES Permit No. R1-2009-0050 to refer to the requirements of NPDES Permit No. R1-2015-0030.	All Revisions made in 2019 were editorial, only

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6.4.4 PRIVATE DOMESTIC WASTEWATER DISCHARGES TO LAND (WITH FLOW GREATER THAN 10,000 GALLONS PER DAY)	Not included.	The 2017 Draft Staff Report incorporates information to include nineteen large and medium-sized private domestic wastewater treatment facilities that are currently regulated under WDRs that discharge to land through conventional septic tank/leach field systems, subsurface drip irrigation systems, percolation ponds, or spray irrigation. Land disposal through percolation ponds that are proximate to surface waters have the potential to contribute to bacterial loading in surface waters, depending on site specific conditions, and require site-specific evaluation. Groundwater monitoring data to assess the water quality impact of wastewater discharges to land is currently lacking and should be addressed in future permit updates.	The City of Ten Thousand Buddhas as added to Table 6.7 (Private Domestic WDR Wastewater Treatment Facilities in the Russian River Watershed (with flows greater than 1,500 gallons per day)).

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6.4.5 WINE BEVERAGE AND FOOD PROCESSORS	<p>5.5.1.4 WINE BEVERAGE AND FOOD PROCESSORS.</p> <p>This section focuses on wine, beverage, and food (WBF) processing facilities that include but are not limited to alcoholic and non-alcoholic beverage producers, fruit and vegetable processors, meat wrapping, and dairy product manufacturers. These facilities range in size from small in-home operated, non-commercial establishments to large, industrial or commercial establishments. The Regional Water Board currently regulates discharges to land from WBF processing facilities that could affect the quality of waters of the state through the issuance of facility-specific WDRs, enrollment under a general WDR for wineries, or issuances of conditional waivers of WDRs.</p>	<p>The 2017 revisions were editorial only.</p>	<p>Text was added to acknowledge the 2016 adoption of general waste discharge requirements and a conditional waiver of waste discharge requirements. All other revisions are editorial.</p>

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6.4.6 MOBILE HOME PARKS AND CAMPGROUNDS	<p>5.5.1.5 MOBILE HOME PARKS AND CAMPGROUNDS.</p> <p>This section focuses on the 133 mobile home and special occupancy (RV) parks in the Russian River Watershed. Forty-one of these parks are located outside of sewer areas and consequently dispose of domestic waste onsite via individual septic systems which are often poorly maintained or overloaded. Thus, Regional Water Board staff has determined that these facilities, when they are poorly sited and inadequately operated and maintained, are a probable source of pathogenic bacteria in surface waters.</p>	The 2017 Draft Staff Report are editorial only.	No changes made.
6.4.7 DISCHARGES TO LAND SOURCE CONCLUSIONS	Not Included.	The 2017 Draft Staff Report section was added to summarize the potential for land discharges to deliver pathogens to surface waters.	A new section 6.4.7 has been added by moving the section 6.5.1 (Onsite Wastewater Treatment Systems) from the 2017 Staff Report to the 6.4 Waste Discharges to Land discussion. Revisions of the 2017 6.5.1 section are largely editorial. The 2017 Staff Report section 6.4.7 has been renumbered as section 6.4.8. Revisions to this section are editorial, only.

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6.5 NONPOINT SOURCES	5.4 NONPOINT SOURCES. Nonpoint source is defined as any source of water pollution that is not from a discernible, confined, and discrete conveyance. Nonpoint source pollution comes from many diffuse sources and is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, depositing them into streams and other waters This section primarily focuses on controllable nonpoint sources in developed areas and agricultural areas, since the runoff from these areas show the highest concentrations of fecal bacteria.	2017 revisions were editorial, only.	Editorial revisions, only.

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6.5.1 ONSITE WASTEWATER TREATMENT SYSTEMS	5.4.1 ONSITE WASTERWATER TREATMENT SYSTEMS Estimates made during the 2010 U.S. Census indicate that about 31% of houses in the watershed are not connected to a sanitary sewer and are assumed to use onsite wastewater treatment systems (OWTS) for treatment of domestic waste. Regional Water Board staff conducted a focused study on the potential influence of OWTS on the discharges of pathogens, as measured by fecal indicator bacteria concentrations in receiving surface waters. Results show that a higher parcel density in areas with only OWTS is directly associated with higher concentrations of both Bacteroides and E. coli bacteria, confirming that OWTS contribute to the potential for fecal indicator bacteria in surface waters.	The 2017 Draft Staff Report added a sentence that identified OWTS as non- point sources in the action plan. An addition to the study, presented in 2015, includes a larger focus on parcel density and how it was determined, as well as, risks of FIB transport determination. The study section included specific locations and the analyses performed throughout the study to determine that the parcel density showed a positive correlation with water quality data.	This section has been moved to section 6.4 Waste Discharges to Land and renumbered as section 6.4.7. Revisions to this section are largely editorial.

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6.5.2 RECREATION AT PUBLIC BEACHES	5.4.2 RECREATION AT PUBLIC BEACHES. There are many public swimming beaches along the mainstem Russian River. Swimming and other water contact recreation in the river can be a source of bacteria and other pathogens through direct human urination or defecation in the water or along the shore. Pathogens may also be washed off the body during immersion.	2017 revisions were editorial, only.	No changes made

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6.5.3 HOMELESS ENCAMPMENTS	<p>5.4.3 HOMELESS ENCAMPMENTS. Homeless encampments are potential sources of bacteria. Many riparian areas attract homeless people and these areas most often do not have sanitary disposal facilities. The discharge of untreated human waste directly to surface waters within these riparian corridors from homeless encampments could be one of the causes of the presence of human-source indicator bacteria found in undeveloped areas. In addition, some farmworkers may seek temporary lodging in encampments where adequate restroom facilities are not available. Where itinerant farmworker encampments are located near water courses, there is an increased opportunity for human waste contamination.</p>	<p>The 2017 Draft Staff Report incorporates data specific to homeless populations in Mendocino and Sonoma counties.</p>	<p>Revisions are largely editorial.</p>

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6.5.4 LIVESTOCK WASTE	5.4.6 LIVESTOCK WASTE. Many bacterial pathogens found in manure from livestock have the potential to cause illness in humans. Pathogens can be discharged directly to watercourses when livestock have access to streams. They can also be carried to surface waters in storm water runoff or in runoff resulting from over-application of liquefied manure to pasture land.	2017 revisions were editorial, only.	Editorial revisions, only.

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6.5.5 DAIRIES, MANURE HOLDING PONDS, & LANDSCAPE APPLICATIONS OF MANURE	5.4.7 DAIRIES, MANUE HOLDING PONDS, & LANDSCAPE APPLICATIONS OF MANURE. This section focuses on any release of manure to surface waters from holding ponds and landscape application from confined animal facilities that has a significant potential to impact bacterial water quality due to large amounts of stored and land-applied manure and the high concentration of bacteria in raw manure (up to 100 million fecal coliforms per gram). Most commercial dairies store manure in large lagoons that can hold millions of gallons of liquid manure. Waste lagoons can break, spill, leak, or fail. In addition, many dairies spread or spray liquefied manure on pasture land. When liquid waste is over-applied or inappropriately applied to farm fields through irrigation, runoff of manure to surface waters can result.	2017 revisions were editorial, only.	Editorial revisions, only.

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6.5.6 NONPOINT SOURCE CONCLUSIONS	Not Included.	<p>The 2017 Draft Staff Report included this section summarizing nonpoint sources. Identified potential nonpoint sources of fecal waste to surface waters provide an elevated risk of pathogen discharge and impairment of REC-1 beneficial uses. The primary nonpoint sources of fecal waste include OWTS, homeless encampments, recreational water uses and users, and manure from dairies and non-dairy livestock. Assessment of potential fecal waste sources and fecal bacteria do not inform relative load contributions between the sources. As such, all identified potential nonpoint sources of fecal waste to surface waters require a program of implementation and monitoring to prevent and assure that fecal waste and potential pathogens are not discharged to surface waters.</p>	Editorial revisions, only.

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6.6 SOURCE ANALYSIS CONCLUSIONS	Not Included.	6.6 SOURCE ANALYSIS CONCLUSIONS. The 2017 staff report describes staff's fecal waste analysis of indicator bacteria concentrations, land uses, point and nonpoint sources. There is evidence of human and bovine fecal waste entering the waters during all times of the year, though higher during wet weather. Using multiple lines of inquiry, this section lists the variety of source categories that have potential to discharge pathogens to surface waters.	Minor changes were made for clarification.
TMDL CALCULATIONS AND ALLOCATIONS			

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<p>7 TMDL CALCULATIONS AND ALLOCATIONS</p>	<p>Chapter 8. TMDL CALCULATIONS AND ALLOCATIONS. The introductory paragraph to this chapter describes the Total Maximum Daily Load accounting for the capacity of the waterbody for the pollutant plus a margin of safety to account for uncertainties. The loads are allocated among the various sources of the pollutant. Anthropogenic pollutant sources are characterized as either point sources that receive a WLA or nonpoint sources that receive a load allocation.</p>	<p>The 2017 Draft Staff Report labeled this as 7.1 OVERVIEW.</p>	<p>Several significant revisions were made to this chapter based on the State Water Board’s adoption of statewide bacteria objectives for the protection of REC-1. The TMDL, wasteload allocations (WLA), and load allocations (LA) all rely on the statewide objectives, only. Also, the wasteload and load allocations have been updated to align individual fecal waste source categories with numeric WLAs and LAs that are consistent with the proposed fecal waste discharge prohibition and NPDES and WDR permits. Significantly, non-dairy livestock and farm animal waste is assigned a LA consistent with the statewide bacteria objective—not zero. To ensure that fecal waste discharges from this source category achieve the proposed LA, a WDR or waiver of WDRs will have to be developed that describes appropriate controls. See Chapter 9 for further explanation.</p>

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7.1 OVERVIEW	See above.	See above.	No changes made
7.2 LOADING CAPACITY, TMDL AND MARGIN OF SAFETY	8.1 TMDLS, LOADING CAPACITIES & MARGIN OF SAFETY The TMDLs are shown in Table 8.1 and are expressed as concentrations of E. coli and enterococci bacteria in surface waters and discharges. In accordance with 40 CFR §130.2(i), the TMDLs are to be expressed as concentrations instead of loads. This is appropriate since public health risks associated with recreation are based on concentrations of pathogen indicator bacteria in water and not the total load of bacteria passing through the Russian River in a day.	The 2017 Draft Staff Report replaced the information presented in 2015 with a focus on the new statewide bacteria objectives, including a discussion on the U.S. EPA national E. coli criteria. As an added margin of safety, thresholds for two fecal indicator bacteria are proposed as numeric targets, referring the reader to chapter 5, which describes the fecal indicator bacteria; e. coli and enterococci.	Revisions are the result of the new statewide bacteria objective for protection of REC-1.

<p>7.3 WASTELOAD AND LOAD ALLOCATIONS</p>	<p>In 2015, wasteload allocations and load allocations were described separately in sections 8.2 and 8.3, respectively.</p> <p>8.2 WASTELOAD ALLOCATIONS Regulations require that a TMDL include wasteload allocations (WLAs), which identify the portion of the loading capacity allocated to individual existing and future point sources. <i>E. coli</i> and enterococci bacteria WLAs shall be incorporated into point source permits for discharges of pathogen or pathogen indicator bacteria at the time of permit adoption or renewal based upon facility type.</p> <p>8.3 LOAD ALLOCATIONS Regulations require that a TMDL include load allocations (LAs), which identify the portion of the loading capacity allocated to existing and future nonpoint sources.</p> <p>The concentration-based LAs for <i>E. coli</i> and enterococci bacteria apply to all existing and new non-natural background, nonpoint sources in the Russian River Watershed. The <i>E. coli</i> and enterococci bacteria LAs shall be incorporated into nonpoint source permits at the discretion of the Regional Water Board at the time of adoption of a new or renewed nonpoint source permit.</p>	<p>The 2017 Draft Staff Report combined the WLA and LA sections from 2015 into section 7.3. This includes a focus on the water quality objective and its equivalency to wasteload and LAs. The sampling frequency and period of sampling is important to proper interpretation of monitoring results. The draft statewide <i>E. coli</i> objective requires that the geometric mean be calculated weekly based on a rolling 6-week period using a statistically relevant number of samples, generally a minimum of 5 within 6 weeks. The Statistical Threshold Value (STV) is to be exceeded no more than 10% of the time, calculated monthly. To remain consistent with the draft statewide <i>E. coli</i> objectives, the same sampling frequency and calculation approach are required here.</p>	<p>Revisions are the results of the new statewide bacteria objective for protection of REC-1. The wasteload and load allocations have been updated to align individual fecal waste source categories with numeric WLAs and LAs that are consistent with the proposed fecal waste discharge prohibition and NPDES and WDR permits. Significantly, non-dairy livestock and farm animal waste is assigned a LA consistent with the statewide bacteria objective—not zero. To ensure that fecal waste discharges from this source category achieve the proposed LA, a WDR or waiver of WDRs will have to be developed that describes appropriate controls. See Chapter 9 for further explanation.</p>
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7.4 SEASONAL VARIATION	<p>The 2015 Draft Staff Report included this information as Chapter 6, stating that all three indicator bacteria show significantly higher concentrations measured during wet weather compared to dry weather samples.</p>	<p>The 2017 Draft Staff Report included this section as its own section without sub-topics. It demonstrates the difference in wet v dry seasons. It references the beneficial use of concern, REC-1, a year-round use which includes multiple forms of water contact recreation based on the potential to ingest water incidental to the recreational activity.</p>	<p>Revisions are largely editorial.</p>

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7.5 REQUIRED REDUCTIONS	<p>8.4 ESTIMATED REDUCTIONS NEEDED</p> <p>This section describes how the Regional Water Board staff conducted an analysis of the reductions likely needed to achieve the TMDLs for E. coli and enterococci bacteria concentrations at numerous locations in the watershed. Using multiple lines of evidence to assess the extent of fecal waste contamination, the TMDL demonstrates that both the mainstem and tributaries are impacted by fecal waste with the potential to deliver pathogens. E. coli and enterococci bacteria measurements collected since 2001 were used to estimate the percent reduction needed to meet TMDLs. A large percentage of the locations in the mainstem Russian River met the TMDLs for E. coli bacteria concentrations and require no reductions. However, most of the tributaries do not meet the TMDLs for E. coli bacteria and will require controls to reduce fecal waste loads.</p>	<p>The 2017 Draft Staff Report summarized information from 2015 into a single section titled 7.5 REQUIRED REDUCTIONS. This focused on the necessary reductions of E. coli to achieve the TMDL, and the studies that provided evidence for this logic. A statistical rollback method was applied to use the statistical characteristics of a bacteria concentration distribution to estimate future concentrations after abatement processes are applied to sources. The percent reductions necessary to achieve both the geometric mean and statistical threshold value established by the draft statewide <i>E. coli</i> objective were estimated at each location where sufficient historic <i>E. coli</i> data was available. The required reductions range from 49-99% and are particularly important in the tributaries.</p>	No changes made

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7.6 TMDL SCHEDULE	Not included.	<p>The 2017 Draft Staff Reports notes that attainment of a TMDL and its WLA and LAs are generally required on the quickest schedule that can reasonably be applied. Chapter 9 describes the implementation actions that are necessary to identify and control individual fecal waste sources. The Action Plan establishes the time frame for achieving each of the elements of the program of implementation. Completion of all action and attainment of the TMDL are anticipated to occur within 20 years of Action Plan adoption and approval.</p>	No changes made.

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LINKAGE ANALYSIS			
8 LINKAGE ANALYSIS	The 2015 Draft Staff Report included this information as Chapter 7.	The 2017 Draft Staff Report included this as an introduction to the chapter. It identifies the purpose as establishing the link between the sources of fecal waste on the landscape, evidence of fecal waste discharge to the Russian River and its tributaries, the risk of contact with human and domestic animal fecal waste when recreating in and around the Russian River and its tributaries, the increased risk of illness that could potentially result from contact with pathogen-contaminated waters, and the reduction in risk of pathogen contact and illness that will result from the control of fecal waste discharge in a manner described in the proposed Program of Implementation.	Revisions to this chapter are primarily to update discussion of 1) the statewide bacteria objective for protection of REC-1 and 2) the results of FIB re-analysis based on HUC-12 subwatersheds.

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8.1 SOURCES OF FECAL WASTE ON THE LANDSCAPE	Chapter 5 Sources are found by assessing the type of human and animal fecal waste found in the Russian River and its tributaries and identifying areas of higher and lower DNA matches in the watershed, assessing indicator bacteria concentrations from different types of land uses, and identifying the types of point source and nonpoint source facilities and activities that discharge or have the potential to discharge fecal waste to surface waters.	The 2017 Draft Staff Report provided a specific section for the topic which refers the reader to Chapter 6 which presents an inventory of all the known sources of fecal waste on the landscape within the Russian River Watershed. The inventory does not quantify the sources or establish their actual potential to discharge. Instead, it identifies each of the sources of fecal waste discharge.	Editorial revisions, only.

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8.2 EVIDENCE OF FECAL WASTE DISCHARGE	<p>The 2015 Draft Staff Report included evidence of fecal waste discharge information in Chapter 4 and 5. Several key epidemiological studies have evaluated the U.S. EPA criteria for protection of public health from water contact recreation. These studies concluded that the 1976 EPA recommended fecal coliform bacteria criteria were not protective of public health from swimming recreation, but recommended E. coli and enterococci bacteria concentration criteria as an indicator of health risk from water contact recreation. In addition, chapter 5 describes how PhyloChip™ phylogenetic DNA tests of water samples were used to locate gene sequences of animal feces. Fecal waste from humans and animals were found throughout the middle and lower areas of the Russian River.</p>	<p>The 2017 Draft Staff Report combined information from Chapter 4-6 to create its own section. The information provided were editorial, only.</p>	<p>Revisions made to update the summary of FIB re-analysis and conclusions regarding impairment/pollution.</p>

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8.3 RISK OF CONTACT WITH FECAL WASTE	<p>In the 2015 Draft Staff Report, chapters 5 and 6 confirm that E. coli, enterococci, and Bacteroides bacteria showed statistically-significant higher concentrations in wet periods versus dry periods. Runoff from forest lands showed statistically-significant lower concentrations of fecal indicator bacteria than runoff in all other assessed land cover categories.</p>	<p>The 2017 Draft Staff Report combined information from Chapter 5-6 to create its own section. This section affirms that the Regional Water Board has designated the water contact recreational beneficial use as a year-round use, thereby obligating it to ensure protection during all months of the year. The revisions provided were editorial, only.</p>	<p>Revisions are largely editorial. Though, the results of the Land Cover Study described in Chapter 6 are highlighted to acknowledge that in addition to the impairment/pollution status of individual HUC-12s, the Russian River Watershed Pathogen TMDL also points to urban areas; areas with high density of OWTS; and areas such as shrubland, agricultural lands, and rural residential lands that include cows as areas with an elevated risk of fecal waste discharge.</p>

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8.4 RISK OF PATHOGEN-RELATED ILLNESS	Not included.	The 2017 Draft Staff Report delivers information of ambient water quality testing compared to the statewide bacteria objectives. This section takes information provided in chapter 4 to recognize exceedances of the statewide bacteria objectives in 16 of 31 locations sampled for E. coli and 27 of 31 locations for enterococci. Phylochip phylogenetic DNA microarray was used for more detail on specific bacteria that was found, as well as, symptoms and protocols that may occur when in contact with these bacteria.	This section has been revised to highlight the HUC-12 subwatersheds that are identified as impaired/polluted and therefore present a risk of pathogen exposure.
8.5 ATTAINMENT OF WATER QUALITY OBJECTIVE	The 2015 Draft Staff Report contained information pertaining to attainment of water quality objectives throughout various chapters.	This section of the 2017 Draft Staff Report recorded the numerical fecal coliform objective as the outdated water quality objective contained in the Basin Plan soon to be superseded by the statewide E. coli bacteria objective. The E. coli bacteria objective will be no more than 32 gastrointestinal illnesses per 1,000 recreators, which will ensure protection of the REC-1 beneficial use and public health.	Revisions have been made based on the State Water Board's adoption of statewide bacteria objectives for the protection of REC-1.

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8.6 CONCLUSION	Not Included.	The 2017 Draft Staff Report summarizes the chapter by noting wildlife that can contain pathogens, what indicator bacteria are, how water quality samples were collected, how monitoring data was used, fecal waste discharge impact, the definitions of loading capacity and numeric targets, and the potential effects of E. coli and enterococci bacteria reductions.	Revisions are largely editorial but include new language that refers to the statewide bacteria objective.
PROGRAM OF IMPLEMENTATION			
9 PROGRAM OF IMPLEMENTATION	The purpose is to describe the steps necessary to reduce pathogen concentrations and achieve the TMDL's. It identifies actions how the staff expects will reduce pathogens: parties responsible for taking these actions, regulatory mechanisms by which the Regional Water Board will ensure that these actions are taken, and a timeline for completion of actions.	The 2017 Draft Staff Report were editorial, only.	All Revisions made in 2019 were editorial, only
9.1 WASTE DISCHARGE PROHIBITIONS	This section focuses on controllable water quality factors, such as discharges of fecal material from humans or from domestic animals to waters of the state, that shall conform to the bacteria water quality objective.	The 2017 Draft Staff Report were editorial, only.	The prohibition was expanded to clarify the means of compliance with the prohibition for the fecal waste sources identified in the Action Plan.

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9.2 IMPLEMENTATION ACTIONS	The implementation actions included in the TMDL address pathogens from specific controllable pathogen sources, including humans and domesticated animals.	The 2017 Draft Staff Report was revised to list the controllable pathogen sources for which implementation actions would be specified in the Action Plan. Also, Table 1 (Summary of Implementation Actions), was deleted.	Minor changes were made for clarification.
9.2.1 MUNICIPAL WASTEWATER DISCHARGES OF SURFACE WATERS	This section identifies municipal wastewater treatment facilities that collect, treat, and discharge fully-treated effluent directly to the Russian River or its tributaries.	The 2017 Draft Staff Report was revised to remove the Russian River County Sanitation District and the City of Cloverdale from the list of municipal wastewater treatment facilities that discharge wastewater directly to the Russian River. Also, a statement was added that properly disinfected wastewater was not expected to contribute to an exceedance of REC-1 bacteria standards. Effluent limitations for NPDES permits that would be expected to attain the WLAs were updated to reflect current discharge specifications for total coliform bacteria.	All Revisions made in 2019 were editorial, only.

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9.2.2 WASTEWATER HOLDING POND DISCHARGES TO SURFACE WATERS	<p>This section identifies municipal wastewater treatment facilities that collect, treat, dispose, or recycle municipal wastewater and discharge treated effluent from a wastewater holding pond to the Russian River or its tributaries. This section describes special studies required for these entities to demonstrate that human-source bacteria and pathogens are effectively killed or removed from the waste stream and are not present in the holding pond discharge, in order to establish compliance with the WLAs</p>	<p>The 2017 Draft Staff Report was revised to remove the Occidental County Sanitation District from the list of municipal wastewater treatment facilities discharging wastewater from holding ponds to surface water. This section no longer describes a required special study to verify compliance with <i>E. coli</i> and enterococcus WLAs, but rather, states that within five years from the effective date of the Action Plan, the Regional Water Board will establish the effluent limitations for <i>E. coli</i> that are equivalent to the WLAs in each entity's NPDES permit. The enterococcus WLA was removed in the 2017 draft.</p>	<p>The 2019 Draft Staff Report was revised to require Water Quality-based Effluent Limitations (WQBELs) for bacteria based on the results of a Reasonable Potential Analysis (RPA) to be conducted during the NPDES permittee's next permit revision following the effective date of the Action Plan. All RPAs are expected to occur within seven years after the effective date of the Action Plan. A time schedule to comply with WQBELs may be authorized for up to ten years after the date of adoption of the NPDES permit.</p>

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9.2.3 PERCOLATION POINDS AND DISPOSAL BY IRRIGATION	<p>This section identifies municipal and private wastewater treatment facilities in that collect, treat, and dispose of or recycle treated effluent to land via percolation ponds or by irrigation. To demonstrate compliance with bacteria limitations, facilities shall conduct representative effluent monitoring, in accordance with WDRs.</p>	<p>The 2017 Draft Staff Report removed the Mayacamas Golf Club and Vintner’s Inn from the list of wastewater treatment facilities using percolation ponds and surface irrigation for disposal and moved to the Recycled Water Irrigation Runoff fecal waste source category. The 2017 draft was also revised to clearly state that discharges from this source category to surface water was prohibited and that compliance with WDRs would ensure protection of the REC-1 beneficial use.</p>	<p>No changes made.</p>

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9.2.4 SANITARY SEWER SYSTEMS	<p>There are eighteen sanitary sewer systems that collect and convey domestic wastewater to wastewater treatment facilities for treatment, and disposal or recycling. In order to comply with the TMDL, each municipality and district shall maintain compliance with GWDRs for Sanitary Sewer Systems. In addition, within one year of the effective date of the TMDL, entities shall revise their Sanitary Sewer Management Plan (SSMP) to describe actions that it takes or plans to take to further minimize sanitary sewer overflows, spills, and exfiltration from its sanitary sewer system.</p>	<p>The 2017 Draft Staff Report found that compliance with the Sanitary Sewer System General Permit would ensure compliance with bacteria LAs. The requirement for sewer system operators to revise SSMPs to comply with the TMDL was removed as were the recommendations for possible additions to the SSMPs.</p>	<p>All Revisions made in 2019 were editorial, only.</p>

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9.2.5 LAND APPLICATION OF TREATED MUNICIPAL SEWAGE SLUDGE	<p>Currently, the City of Santa Rosa is the only public entity permitted for the land application of biosolids as a soil amendment. In order to comply with the TMDL, the City of Santa Rosa shall maintain coverage for its biosolids land application projects under GWDRs. In addition, within one year of the effective date of the TMDL, the City of Santa Rosa shall prepare and submit an Erosion Control Plan that describes actions and time schedules for enhanced protections to prevent the movement of biosolids from the application area.</p>	<p>The 2017 Draft Staff Report found that compliance with the Biosolids General Permit would ensure compliance with bacteria LAs. The requirement for entities that land apply biosolids to prepare an Erosion Control Plan to comply with the TMDL was removed as were the recommendations for enhanced protections for an Erosion Control Plan.</p>	<p>No changes made.</p>

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9.2.6 RECYCLED WATER IRRIGATION RUNOFF	<p>Each entity that is permitted to beneficially reuse treated wastewater for landscape irrigation, agricultural irrigation, or other use allowable under California Code of Regulations, title 22, chapter 3, article 3, sections 60303-60307 shall maintain compliance with water recycling requirements in State Water Resources Control Board Order WQ 2014-0090-DWQ, General WDRs for Recycled Water Use, subsequent general orders, individual waste discharge requirements, or Master Water Reclamation Permits. Each municipality and district that is permitted to beneficially reuse treated wastewater shall develop (or update) and implement a Non-Storm Water BMP Plan. The Regional Water Board will require submission of the Non-Storm Water BMP Plan under authority of section 13267 subdivision (b) of the Water Code.</p>	<p>The 2017 Draft Staff Report identified additional entities in the Russian River Watershed that use recycled water. This section included specifics regarding recycled water such as that from title 22 prohibits the escape of recycled water from recycled water use areas as surface water flow that would enter surface waters. Accordingly, recycled water permits prohibit discharges of recycled water to surface water, except for when the runoff is deemed incidental. In order to ensure ambient fecal indicator bacteria concentrations are protective of REC-1, each municipality and district or other entity that is permitted to beneficially reuse treated wastewater for landscape irrigation, agricultural irrigation, or other use shall maintain compliance with its applicable water recycling requirements and shall develop and implement a Recycled Water BMP Plan or equivalent BMP plan.</p>	<p>All Revisions made in 2019 were editorial, only.</p>

<p>9.2.7 INDIVIDUAL ONSITE WASTEWATER TREATMENT SYSTEMS</p>	<p>In association with high density OWTS, the TMDL prescribes a risk-based management approach for the regulation of individual OWTS. The management approach mandates special requirements for those OWTS whose operation is likely to pose the greatest threat to public health and water quality. To most efficiently implement this risk-based approach, areas that rely primarily on OWTS for wastewater treatment and disposal are identified and prioritized for application of special provisions based on threats to water quality from OWTS. The Regional Water Board, in consultation with the local agency, will further define and rank communities and other areas based on the threat to water quality from OWTS within these areas as new data become available.</p>	<p>The 2017 Draft Staff Report eliminated the designation of “High Priority Areas” and “Low Priority Areas” in the 2015 draft and the requirements associated with each priority area. Specifically, the 2017 draft deleted the three options to comply with the TMDL: 1) meet performance standards, 2) connect to an existing centralized sanitary sewer system, or 3) comply with regulations established by a local agency consistent with an approved LAMP. The geographic area of the APMP was revised to include parcels within 600 feet of the Russian River mainstem and each water body listed in the 2012 303(d) list for pathogens. The APMP also included parcels within 600 feet of mapped streams within subwatersheds where parcel densities were greater than 50 parcels per square mile. The 2017 draft also added a description of the corrective action process, and introduced the requirement for a Regional Water Board OWTS Assessment Program to identify OWTS in need of corrective action. The 2017 draft also included a new section for community-based planning for communities where there are significant numbers of OWTS requiring corrective action</p>	<p>The 2019 Draft Staff Report includes a new description of the geographic area of the APMP, which was revised based on a reassessment of monitoring data and new statewide bacteria water quality objectives adopted by the State Water Board in 2018. The APMP boundary is now established in HUC-12 subwatersheds where there is substantial evidence of pollution attributable to fecal waste discharges. OWTS zones of influence to identify parcels subject to APMP requirements were established for parcels within 600-feet of perennial streams and 200 feet from intermittent and ephemeral streams in each HUC-12 subwatershed. The 2019 Draft Staff Report describes new minimum treatment and disposal requirements for new and replacement OWTS and requirements to existing seepage pits. The revised APMP requires OWTS to have supplemental treatment components to remove pathogens or enhanced effluent dispersal systems for OWTS in</p>
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		<p>and where corrective measures were infeasible or cost prohibitive to individual OWTS owners.</p>	<p>the APMP and within 600 feet of a water body, unless the OWTS has adequate separation to groundwater and soil that is adequate to remove bacterial and other wastewater pathogens. Section 9.2.7.7 (Planning for Community-based Systems) was expanded to acknowledge an ongoing community-based planning project in the communities of Monte Rio and Villa Grande.</p>

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9.2.8 LARGE ONSITE WASTEWATER TREATMENT SYSTEMS	<p>Owners of OWTS with projected flow $\geq 10,000$ gpd shall submit an RWD to the Regional Water Board, whom shall issue (Waiver)WDRs. For Owners of OWTS located in the APMP geographic area, the Regional Water Board shall include requirements in the (Waiver) WDR that the owners comply with added treatment components for pathogens, which shall ensure OWTS effluent doesn't exceed a 30-day average of 30 mg TSS/L, can achieve an effluent <i>E. coli</i> bacteria concentration of ≤ 100 MPN/100 mL, and can achieve an effluent enterococci bacteria concentration of ≤ 30 MPN/100 mL. Owners in High Priority Areas can commit to connecting to a centralized wastewater collection and treatment system.</p>	<p>The 2017 Draft Staff Report eliminated specific requirements for large OWTS in "High Priority Areas" and "Low Priority Areas," which were designations included in the 2015 draft and removed in the 2017 draft. Owners of large OWTS not regulated under WDRs were required to submit a report of waste discharge to the Regional Water Board within three months after the effective date of the Action Plan.</p>	<p>The 2019 Draft Staff Report was revised to clarify that the 10,000 gallons per day threshold for regulation by a local agency under an approved LAMP in the is based by the combined projected flows of all OWTS in a multi-OWTS facility, such as a campground.</p>

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9.2.9 RECREATIONAL WATER USES AND USERS	<p>Within two years of the effective date of the TMDL, Sonoma County, Mendocino County, and other landowners of recreational beaches shall prepare and submit a BLRP that describes actions to reduce bacteria loading associated with activities at recreational beaches and other known swimming areas within their jurisdiction to attain LAs. Regional Water Board staff will review the BLRP and determine appropriate program actions to regulate the implementation actions proposed in the BLRP.</p>	<p>The 2017 Draft Staff Report specifies that the strategy to reduce contamination from recreation water uses is through public outreach and education to increase awareness. A Memorandum of Understanding outlines a Joint Policy for addressing water quality impacts relative to recreational water use.</p>	<p>No changes made.</p>

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9.2.10 HOMELESS ENCAMPMENTS AND ILLEGAL CAMPING	<p>Within two years of the effective date of the TMDL, Sonoma County, Mendocino County, municipalities, and other owners of land with homeless and farmworker encampments shall prepare and submit a BLRP that describes actions to reduce noncompliance with existing ordinances pertaining to illegal camping and farmworker housing; and provide secure waste disposal facilities for homeless persons currently residing along watercourses and other areas within the public space. The entity shall submit BLRP to control sources of bacteria. The Regional Water Board will require submission of the BLRP under authority of section 13267 subdivision (b) of the Water Code.</p>	<p>The 2017 Draft Staff Report defines the homelessness issue, impact, and need for change as a Memorandum of Understanding that plans for suitable housing projects and septic system compliance.</p>	<p>No changes made.</p>

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9.2.11 URBAN RUNOFF	<p>Within the Russian River Watershed’s urban boundaries, storm and non- storm water runoff is regulated under a Phase I Municipal Separate Storm Sewer Systems (MS4) Permit. In order to comply with the TMDL, discharges of urban storm water from MS4s shall attain the E. coli and enterococci bacteria WLAs. In addition, MS4 permittees will be required to develop and implement additional best management practices to reduce the discharge of pathogens from MS4s to surface waters from illicit discharges, sanitary sewer overflows, and improper disposal of pet waste.</p>	<p>The 2017 Draft Staff Report requires that Phase I and II MS4 Permittees either implement existing pathogen work plans or develop and implement a Pathogen Reduction Plan, or equivalent plan, to reduce levels of pathogens discharged from MS4s to surface waters.</p>	<p>Section 9.2.11 of the 2019 Draft Staff Report was renamed as “Municipal Storm Water Runoff” to better reflect the fecal source category and the implementing parties. Other revisions were made to more clearly describe the Phase I and II MS4 permittees and the status of and requirements for pathogen work plan submission.</p>

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9.2.12 CALTRANS STORM WATER RUNOFF	<p>Caltrans is regulated under General Storm Water Permit (NPDES Permit No. CAS000003), which includes a TMDL- specific permit implementation requirements. The statewide permit regulates storm water and non-storm water discharges from Caltrans' properties, and discharges associated with operation and maintenance of the state highway system. On renewal of the statewide storm water permit, Regional Water Board staff will work with the State Water Board to include the Russian River Pathogen Indicator Bacteria TMDL in the TMDL requirements of the permit to ensure compliance with E. coli and enterococci bacteria WLAs.</p>	<p>Potential implementation actions for Caltrans were removed from the 2017 Draft Staff Report.</p>	<p>A minor change was made to accommodate interagency flexibility in determining compliance with TMDL requirements.</p>

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9.2.13 NON-DAIRY LIVESTOCK AND FARM ANIMALS	<p>Owners and operators of animal facilities, livestock production and other similar agriculture operations, and commercial animal boarding facilities, shall implement BMPs to properly contain and dispose of waste, and mitigate for potential water quality impacts resulting from surface runoff of animal waste. WDRs for owners and operators of animal is waived for animal facilities who implement BMPs that achieve to protect water quality and public health. Owners and operators of animal facilities found to be in violation of the prohibition may be subject to enforcement action for the unpermitted discharge and may be required to submit a report of waste discharge for the possible establishment of WDRs for the discharge.</p>	<p>No significant revisions were made to the 2017 Draft Staff Report.</p>	<p>The 2019 Draft Staff Report was revised to require owners and operators of animal facilities to implement BMPs consistent with those contained in U.C. Davis Ranch Water Quality Planning Short Course materials to contain and control animal waste on their properties or develop and implement a ranch management plan, if required of the Executive Officer. This section was also revised to indicate that the Regional Water Board intends to adopt a general WDR or a waiver of WDRs for these facilities.</p>

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9.2.14 DAIRIES AND CAFOS	The focus of this section is how cow dairy and Confined Animal Feeding Operation (CAFO) is required to maintain compliance with requirements set forth in the WDR Conditional Waiver, the general WDR, an individual WDR, or NPDES permit, as applicable. Within 2 years of the effective date of the TMDL, in order to prevent discharges of animal waste to surface water, each person under the WDR Conditional Waiver of shall update its Water Quality Plan (WQP) to address sources of bacteria.	The 2017 Draft Staff Report states that under an NPDES permit, discharge of process wastewater is prohibited from a CAFO except that portion of wastewater which overflows from a facility designed, constructed, operated and maintained to contain all process generated wastewater plus the runoff from a 25-year, 24-hour rainfall event. During a 25-year, 24-hour or greater rainfall event, discharges of fecal waste from CAFOs shall comply with the WLAs described in Chapter 7. At all other times, the WLAs for CAFOs shall be zero.	The 2019 Draft Staff Report was revised to explain that the General WDR for dairies is being revised in 2019; that the point source discharge of dairy waste to waters of the United States that is subject to an NPDES permit is prohibited in the revised General WDR; and that monitoring of surface water will be required to provide information regarding the effectiveness of the required management plans.
WATERSHED MONITORING			
10 WATERSHED MONITORING	This section describes how monitoring leads to assessment, adaptive management and evaluating the progress toward attainment of the TMDLs/loading capacities.	See section 10.1.	No changes made.
10.1 OVERVIEW	See section 10.0	The 2017 Draft Staff Report describes the local watershed. The watershed includes various agencies and organizations that study and attempt to restore the Russian River Watershed system comprises of 1,484 square miles.	No changes made.

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10.2 MONITORING PURPOSE	MONITORING & REPORTING OF IMPLEMENTATION ACTIONS BLRPs include requirements to report the status of individual implementation actions to the Reginal Water Board to understand if actions are improving pathogen and indicator bacteria concentrations.	The 2017 Draft Staff Report is editorial, only.	Added details to the purpose of the monitoring plan to include assessment of ambient water quality.
10.3 RUSSIAN RIVER REGIONAL MONITORING PROGRAM	MONITORING & REPORTING OF TMDL ATTAINMENT In order to assess changes in in-stream conditions and attainment of the TMDLs/loading capacities, indicator bacteria data should be collected in mainstem Russian River and tributary sites. Since both E. coli and enterococci bacteria can originate from natural sources, human and domestic animal sources causing exceedance of the concentration-based TMDLs should be investigated in the BLRPs and Russian River Watershed Regional Monitoring Program. The RBW will assess progress toward attainment of the TMDLs/loading capacities on a (sub)watershed scale, and provide a report, likely every five years.	The 2017 Draft Staff Report adds details to include the Russian River Regional Monitoring Program’s (R3MP) goals that include coordinating the monitoring efforts with various agencies and developing a governing structure. The R3MP is being developed to accommodate growth to include multiple members with multiple purposes related to the restoration of the water quality and ecological health of the Russian River Watershed.	Edits made to update the accomplishments in the development of the R3MP since 2017.

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10.4 INDIVIDUAL MONITORING & REPORTING REQUIREMENTS	<p>10.2 POST TMDL-ATTAINMENT OR NON-ATTAINMENT PROCEDURES When reaches of the Russian River and/or its tributaries attain the TMDLs/loading capacities, it is assumed that WLAs and LAs are attained in the watersheds. Effluent limitations shall remain in place, implementation and monitoring shall be maintained, and status reports will not be required.</p>	<p>The 2017 Draft Staff Report notes that dischargers under existing, new or revised NPDES permits or WDRs will be required to monitor, assess, and report on the implementation of their assigned actions. A point source discharge must be sampled at its point of entry to any surface water and nonpoint source discharge is assessed by inspection of BMPs, photographic evidence of BMP performance and ambient conditions, and ambient water quality monitoring at multiple locations.</p>	<p>Revisions made to note the requirements for facilities that discharge to land and to facilities with a potential to spill or leak to surface or groundwater.</p>
10.5 MONITORING RECREATIONAL USE	<p>This section is not included.</p>	<p>The 2017 Draft Staff Report records monitoring efforts by various Sonoma County agencies and its authority to issue public warning or closing of beaches in relation to public health.</p>	<p>Editorial changes only.</p>

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10.6 AMBIENT WATER QUALITY MONITORING	This section is not included.	<p>The 2017 Draft Staff Report provides information on a few key parameters that should be part of any ambient water quality monitoring, such as effectiveness, water quality trend, compliance, or public health protection purposes. A weight of evidence approach is necessary to ensure full and complete protection of water quality, beneficial uses, and public health. In the case of the Russian River Watershed, the fecal indicator bacteria that are most relevant and valuable are <i>E. coli</i> and enterococci. Their results indicate if there is evidence of a risk to REC-1 of unacceptable human exposure to illness causing pathogens.</p>	<p>Revisions were made to integrate statewide bacteria objectives for the protection of REC-1 adopted in 2018.</p>

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Chapter and Section Title and No. Based on the 2019 Staff Report	Summary of 2015 Draft Staff Report	Highlighted Revisions 2017 Draft Staff Report	Highlighted Revisions 2019 Proposed Staff Report
10.6.1 BACTEROIDES BACTERIA	The 2015 Staff Draft Report labeled this subsection as 10.3.1 IDENTIFICATION OF BACTERIA SOURCES. Bacteroides bacteria concentrations are often used to indicate fecal contamination of surface waters due to their short live span. They are suitable indicators of a waterbody's bacteriological quality since they come from the gastrointestinal systems of animals, degrade rapidly outside of the body, and can be traced back to specific types of animals. Host-specific Bacteroides bacteria can be used to help assess the natural background of pathogenic indicator bacteria in minimally disturbed waterbodies.	The 2017 Draft Staff Report are editorial, only	Revisions were made to clarify the use of <i>Bacteroides</i> as a means to determine presence of fecal waste.
10.6.2 BACTERIOPHAGES	The 2015 Staff Draft Report labeled this subsection as 10.3.1 IDENTIFICATION OF BACTERIA SOURCES. Bacteroides bacteria are rapidly inactivated by environmental oxygen levels, but Bacteroides bacteriophages are resistant to degradation. One group of phages that specifically use B. fragilis strain HSP40 as a host is found only in human feces.	The 2017 Draft Staff Report is editorial, only	No changes made.

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10.6.3 VIRUSES	<p>The 2015 Staff Draft Report labeled this subsection as 10.3.1 IDENTIFICATION OF BACTERIA SOURCES. Several methods detect viruses excreted in feces and/or urine with high specificity to human waste and almost no cross-reactivity with other sources, such as markers for DNA viruses. The DNA genomes of these viruses are less labile than those of common human enteric viruses with RNA genomes, which may make them more resistant to environmental degradation and therefore easier to detect.</p>	<p>The 2017 Draft Staff Report is editorial, only.</p>	<p>No changes made.</p>
10.6.4 CHEMICAL SOURCE TRACKING	<p>The 2015 Staff Draft Report labeled this subsection as 10.3.1 IDENTIFICATION OF BACTERIA SOURCES. Chemicals found in wastewater might be useful for independently confirming human waste in ambient surface waters. Measurement of chemicals could include optical brighteners used in laundry detergents, caffeine, fecal sterols, and metabolite of nicotine excreted by tobacco users.</p>	<p>The 2017 Draft Staff Report added that <i>E. coli</i> and enterococci data should be collected weekly to ensure an adequate number of samples to assess compliance with the targets. Storm water monitoring will assess the effectiveness of the Action Plan. It should consider monitoring areas that allow for assessing known, and unknown, fecal waste discharge impacts and water quality trends associated with specific areas and waters contained within the APMP area based on an approved QA/QC Plan.</p>	<p>No changes made.</p>

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10.7 SPECIAL STUDIES	Not included in document.	Not included in document.	Added language to note the possible need for a future assessment of the water quality impacts related to Sonoma County Water Agency mechanically breaching the sand bar that forms at the mouth of the Russian River.
10.8 REPORTING AND ASSESSMENT	10.3.2 REPORTING AND ASSESSMENT The assessment of E. coli and enterococci concentrations and TMDL target attainment in tributary streams and creeks shall be assessed by Regional Water Board staff through available instream data. This may include effectiveness monitoring data submitted by the monitoring coalition or by individual implementing parties under their BLRPs, data collected by other watershed stakeholders, or data collected by the Surface Water Ambient Monitoring Program and other Regional Water Board efforts. Regional Water Board staff will assess progress toward TMDL/loading capacity attainments on a watershed or sub-watershed scale and provide reports every 5 years.	The 2017 Draft Staff Report is editorial, only.	Editorial changes only.

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Chapter and Section Title and No. Based on the 2019 Staff Report	Summary of 2015 Draft Staff Report	Highlighted Revisions 2017 Draft Staff Report	Highlighted Revisions 2019 Proposed Staff Report
CEQA SUBSTITUTE ENVIRONMENTAL ANALYSIS			
<p>11 CEQA SUBSTITUTE ENVIRONMENTAL ANALYSIS</p>	<p>The proposed Action Plan, Substitute Environmental Documentation (SED), incorporates the Russian River Watershed Pathogen Indicator Bacteria TMDL into the Basin Plan, consists of a description of the TMDL pathogen indicator bacteria-related LAs, numeric targets, and implementation actions necessary to comply with the TMDL. The proposed Action Plan is necessary to comply with existing federal and State laws, regulations, plans and policies. The Regional Water Board basin planning process is certified as “functionally equivalent” to CEQA. Thus, it is exempt from the requirement for preparation of an environmental impact report or negative declaration and initial study.</p>	<p>The 2017 Draft Staff Report details SED. It lists the minimum components of the document, includes an environmental analysis of reasonably foreseeable methods of compliance for the project, and considers a reasonable range of topics. This section documents a plan for public hearing.</p>	<p>Revised to expand the discussion of project-level impacts and the necessity of implementing the federally required TMDL via the Action Plan. Language was added to clearly address the overriding benefits of restoration and enhancement of beneficial uses provided by this Action Plan</p>

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Chapter and Section Title and No. Based on the 2019 Staff Report	Summary of 2015 Draft Staff Report	Highlighted Revisions 2017 Draft Staff Report	Highlighted Revisions 2019 Proposed Staff Report
11.1 SUMMARY OF PROPOSED ACTION PLAN	<p>The Action Plan is proposed to include an analysis of the pathogen contamination sources, the TMDL of pathogenic waste that can be discharged and still attain water quality objectives, WLAs and LAs for pathogenic waste applicable to all controllable factors identified, a new Waste Discharge Prohibition specific to unauthorized discharges, and requirements of responsible parties to develop: a. BLRP for wastewater holding ponds discharging to surface water, recreational uses, homeless and farmworker encampments, and Caltrans; b. SSMP; c. Erosion Control Plan for land disposal of biosolids; d. Non-Storm Water BMP Plan for recycled water projects; e. Water Quality Management Plan, Waste Management Plan, or Nutrient Management Plan for dairies; f. Report of Waste Discharge or Bacteria Load Reduction Plan for large private OWTS, OWTS not meeting conditions of the WDR Conditional Waiver, and perhaps municipal storm water.</p>	<p>The 2017 Draft Staff Report is editorial, only.</p>	<p>Revised to make clear the method of compliance with the fecal waste prohibition. A requirement to create a Pathogen Reduction Plan for MS4 general permit enrollees was added. Other edits were editorial.</p>

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11.2 ALTERNATIVES ANALYSIS	Regional Water Board staff has identified two alternatives to address the pathogen indicator bacteria impairment: Adoption of the Action Plan and No Action.	The 2017 Draft Staff Report is editorial, only.	Editorial changes only.
11.2.1 ALTERNATIVE 1— ADOPTION OF THE ACTION PLAN (PREFERRED ALTERNATIVE)	The plan includes the establishment of the human and domestic animal waste discharge prohibition, the source assessment, WLAs and LAs for each of the identified sources, and an implementation program describing the actions likely necessary to achieve the TMDL allocations and numeric targets. Regional Water Board staff will conduct reviews to evaluate the success of implementation actions aimed at reducing loading to achieve the TMDL. The Action Plan requirements will be implemented with updates to existing permits and through existing Regional Water Board authorities. The staff determined that this alternative is the likeliest to result in attainment of water quality standards in a reasonable time frame and that most of the impacts resulting from this action are less than significant or can be mitigated.	The 2017 Draft Staff Report is editorial, only.	No changes made.

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11.2.2 ALTERNATIVE 2 – NO ACTION	<p>Under the No Action Alternative, no amendment to the Basin Plan would occur and staff would continue to implement existing Regional and State Water Board programs and permits. The Regional Water Board would not require specific load reductions from each source, the proposed prohibition would not be enacted, and they would not adopt a TMDL. All existing OWTS would continue to comply with the Basin Plan requirements. If the Regional Water Board does not adopt a TMDL within two years of the TMDL completion date specified in Attachment 2 of the statewide OWTS Policy, coverage under the OWTS Policy’s conditional waiver of WDRs will expire for any OWTS that has any part of its dispersal system within 600 feet of the water bodies listed in Attachment 2 for pathogens.</p>	<p>The 2017 Draft Staff Report is editorial, only.</p>	<p>Language was added to identify the requirements under the Policy for the Implementation and Enforcement of the Nonpoint Source Pollution Control Program (NPS Policy). Other changes were editorial only.</p>

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11.3 REASONABLY FORESEEABLE MEANS OF COMPLIANCE	This section presents an analysis of the potential environmental impacts associated with the reasonably foreseeable methods of compliance with the Action Plan. The current impairment created by elevated pathogen indicator bacteria densities are detrimental to the environment and exceed of water quality objectives. The Action Plan provides a program for addressing the adverse impacts of non-compliance with water quality objectives through a progressive reduction in the loading of pathogen indicator bacteria, and a schedule that is reasonable and as short as possible. The compliance measures and pollution controls necessary to comply with the Action Plan will depend on several site-specific conditions and factors.	The 2017 Draft Staff Report is editorial, only.	Editorial changes only.
11.3.1 NON-STRUCTURAL CONTROLS	Non-structural controls are aimed at controlling sources of a pollutant, do not involve earth moving/landscape manipulations, are primarily planning or outreach in nature, and unlikely to have an environmental impact because they are not physical in nature.	The 2017 Draft Staff Report is editorial, only.	No changes made.

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Chapter and Section Title and No. Based on the 2019 Staff Report	Summary of 2015 Draft Staff Report	Highlighted Revisions 2017 Draft Staff Report	Highlighted Revisions 2019 Proposed Staff Report
11.3.2 STRUCTURAL CONTROLS	Structural controls for non-point sources divert, store, treat, and/or infiltrate storm water to prevent the discharge of waste material to the river as a result of runoff. Structural controls for point sources can be implemented to treat waste before discharge and/or prevent the direct discharge of waste into a waterbody and can involve activities that create potentially significant environmental impacts.	The 2017 Draft Staff Report is editorial, only.	Language was added in a number of sections to note the overriding benefits of the project in regard to potentially significant impacts that cannot be reduced to less than a significant level. All other 2019 revisions were editorial, only.

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11.4 ENVIRONMENTAL CHECKLIST	<p>This section discusses the reasonably foreseeable compliance measures, alternatives, and mitigation measures of the compliance methods. The exact compliance measures that may be implemented to comply with the Action Plan are unknown, and therefore the analysis considers a range of non-structural and structural measures that might be used. When specific measures are selected for implementation, a project-level/site-specific CEQA analysis will be performed by the responsible party. The evaluation considers whether the implementation of the reasonably foreseeable compliance measures considers environmental effects in proportion to their severity and probability of occurrence.</p>	<p>The 2017 Draft Staff Report is editorial, only.</p>	<p>All 2019 revisions were editorial, only.</p>
ECONOMIC CONSIDERATIONS			

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12 ECONOMIC CONSIDERATIONS	<p>The Pathogen Indicator Bacteria TMDL considers the potential costs of implementing the reasonably foreseeable compliance measures without considering whether compliance measures are currently part of the existing regulatory baseline. Although the Regional Water Board is required to consider economics during the Basin Plan amendment process, it is not obligated to consider the balance of costs and benefits associated with implementation of the amendment but consider the costs of compliance and potential sources of funding and may adopt a Basin Plan amendment even if the costs are significant. For CEQA purposes, the economic and social impacts of the draft proposed project are considered to determine if they will cause or contribute to an adverse environmental impact, not if the measure costs are significant or will cause economic hardship.</p>	<p>The 2017 Draft Staff Report is listed as Overview.</p>	<p>No changes made.</p>
12.1 OVERVIEW	<p>Not included.</p>	<p>The 2017 Draft Staff Report is editorial only and listed above.</p>	<p>No changes made.</p>

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12.2 ESTIMATED COST OF COMPLIANCE	<p>Many of the cost breakdowns are based on a variety of example sites throughout the county over the last two decades. Therefore, it can be generally assumed that these costs have increased with inflation, although some compliance measures have become more affordable as improvements in technologies are made. Cost estimates are provided at the county level and the data used for the analysis are specific to Northern California as described in their Fiscal Year 2014 Payment Schedule.</p>	<p>The 2017 Draft Staff Report adds a paragraph focusing on construction and Operation and Maintenance unit costs. Labor rates will increase at a long-term average 3% and capital cost inflation. Factors affecting the cost of construction in different areas of the county include cost of transporting material and equipment to the project site, state and local taxes, construction wage requirements, labor supply, compliance with local codes, and managing local conditions.</p>	<p>All revisions made in 2019 were editorial, only.</p>

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<p>12.2.1 POTENTIAL COSTS FOR TREATMENT PLANT UPGRADES AT EXISTING WWTFs</p>	<p>All municipal wastewater treatment facilities are required to comply with effluent disinfection requirements contained in WDRs. Permitted wastewater treatment facilities will incur increased costs associated with additional effluent and receiving water bacteria monitoring to demonstrate compliance with the TMDL. The costs through improvements in wastewater disinfection systems include capital costs and cost for routine operations and maintenance. Wastewater collection costs are typically the largest cost for expansion of the complete system, but land purchases can be significant when land suitable for waste management. Cost estimates for expanding the wastewater collection system are highly variable depending on various site constraints. When the municipality or special district chose to comply with the TMDL by expanding effluent storage so discharge to surface water is eliminated, the capital cost could include costs for land acquisition, permitting, pond excavation and liner, pumping, and electrical systems.</p>	<p>The 2017 Draft Staff Report was revised to move information about expansion of collection, treatment, and disposal or recycled water systems to a new section (section 12.2.1.2).</p>	<p>The 2019 Draft Staff Report includes variable, but unspecified costs for completing studies to provide information for a reasonable potential analysis that could determine whether structural improvements were needed to comply with WLAs. Table 12.1 was updated with new cost estimate information for ultraviolet light disinfection systems. New cost estimate information was added for expansion of collection, treatment, and disposal or recycled water systems, based on new information from a local project for Larkfield Estates subdivision.</p>
<p>12.2.2</p>	<p>Sanitary sewer systems greater than one mile in length are required under the existing General Permit</p>	<p>The 2017 Draft Staff Report is editorial, only.</p>	<p>No changes made.</p>

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POTENTIAL COST FOR SANITARY SEWER SYSTEMS	<p>for Sanitary Sewer Systems to be designed, operated, and maintained in such a way as to prevent or minimize sanitary sewer overflows. No new costs to prevent sanitary sewer overflows are anticipated as a result of the TMDL. If public entities that own sanitary sewer systems enact new ordinances or programs to require or promote private property owners to inspect their private sewer laterals, costs to develop the ordinances or programs will be incurred.</p>		

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<p>12.2.3 POTENTIAL COSTS FOR INDIVIDUAL AND DECENTRALIZED ONSITE WASTEWATER TREATMENT SYSTEMS</p>	<p>The supplemental treatment components necessary to comply with performance requirements will vary depending on type and age of the existing OWTS, site conditions and constraints, the availability of and proximity to the individual OWTS to community sewer systems, and the availability of financial assistance to private property owners to fund OWTS upgrades. Costs vary depending if the report is prepared by the property owner or qualified professionals, how much information is available to characterize the discharge and site conditions, and the proposed supplemental treatment system to be used for performance requirements. The cost for a general site evaluation to obtain local agency approvals for a new or replacement OWTS is approximately \$1,000. Cost for preparation waste discharge reports by a qualified professional could range from \$2,000- \$6,000. Application fees and first annual fees sent to the Regional Water Board for WDRs is currently \$2,088. Additional cost for developing and administering a LAMP may occur.</p>	<p>The 2017 Draft Staff Report was revised to move information about costs for decentralized OWTS and costs for local agency oversight to new sections, section 12.2.3.2 and 12.2.3.3, respectively.</p>	<p>An additional sentence was added to the 2019 Draft Staff Report that focused on the value of permit and design fees to construct an individual new or replacement OWTS. All other revisions were editorial, only.</p>
<p>12.2.4 POTENTIAL COSTS OF ADDRESSING</p>	<p>The TMDL encourages counties, municipalities, and special districts</p>	<p>The 2017 Draft Staff Report moved section 12.1.4 to section 12.2.4 and separated Homeless</p>	<p>An additional paragraph was included in the 2019 Draft Staff Report that included specific</p>

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HOMELESS ENCAMPMENTS, ILLEGAL CAMPING AND RECREATION WATER USE	to construct public restroom facilities that are accessible to homeless individuals. The control of pathogenic waste due to recreational water use primarily relies on the availability of adequate restroom facilities at places of significant recreational water use. The costs apply to the construction of public restroom facilities at recreational beaches and trailheads and for maintenance.	Encampments/Illegal Camping and Recreation Water Use sources into two sections, section 12.2.4.1 and 12.2.4.2, respectively.	costs to public restroom maintenance.

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12.2.5 POTENTIAL COSTS TO CONTROL URBAN STORM WATER RUNOFF	12.1.5 POTENTIAL COSTS TO CONTROL URBAN STORM WATER RUNOFF The Storm Water Management Plan and Monitoring Program includes ongoing costs for operations and maintenance, inspections, enforcement, staff training, public education and outreach, illicit connections and discharges response and abatement, and effectiveness monitoring. The costs for implementing the Storm Water Management Plan and Monitoring Program are baseline program costs and will be incurred by MS4 Permittees with or without additional, incremental costs associated with a specific program to control pathogen indicator bacteria.	The 2017 Draft Staff Report moved the Cost for Storm Water Controls for Caltrans and the General Storm Water Compliance Measures Costs to new sections, section 12.2.5.2 and 12.2.5.3, respectively.	An additional paragraph in the 2019 Draft Staff Report detailed other structural controls that may result in extra costs, such as fencing.

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12.2.7 POTENTIAL COSTS FOR PET WASTE MANAGEMENT PROGRAMS	12.1.7 POTENTIAL COSTS FOR PET WASTE MANEGEMENT PROGRAMS The program is dependent on the participation and cooperation of individual pet owners. The cost of a public education program depends on the type of materials produced and the method of distribution. This is an existing program under the MS4 permit for the City of Santa Rosa, the County of Sonoma, and Sonoma County Water Agency. No new costs are anticipated beyond the installation of new trash receptacles and pet waste bag dispensers, which is approximately \$60.	The 2017 Draft Staff Report is editorial, only.	No changes made.

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12.2.8 POTENTIAL COSTS FOR DAIRIES	12.1.8 POTENTIAL COSTS FOR DAIRIES Costs on dairies depend on the required design storm and the resulting required pond volume. Average national installation costs for livestock ponds is 2.2 cents per gallon for ponds with a capacity less than 1 million gallons, 1.8 cents per gallon for capacities from 1 million to 3 million gallons, and 1.5 cents per gallon for capacities greater than 3 million gallons. Increasing capacity in existing ponds by raising the levels of pond berms would cost significantly less.	The 2017 Draft Staff Report is editorial, only.	No changes made.

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12.2.9 POTENTIAL COSTS FOR BIOSOLIDS APPLICATION	12.1.9 POTENTIAL COSTS FOR BIOSOLIDS APPLICATION Options for managing wastewater biosolids both beneficial reuse technologies and non-reuse options, including landfilling. Cost for controlling biosolid application as related to the pathogen TMDL are associated with the development and implementation of erosion control plans. If a facility already has a water pollution control plan, modification to address storm water contamination concerns will require minimal cost. The need to control erosion is an existing regulatory requirement and the cost of site assessment and plan development range from \$500 to \$7,000.	The 2017 Draft Staff Report removes the specifics of costs for producing an Erosion Control Plan, which was a requirement removed in the 2017 draft.	No changes made.
12.2.10 POTENTIAL COSTS FOR PUBLIC OUTREACH AND EDUCATION PROGRAMS	Not included in document.	Not included in document.	Section added to provide information related to potential costs for public outreach and education programs.

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12.3 SOURCES OF FUNDING	12.2 SOURCES OF FUNDING Potential sources of funding include money from private and public sources. Public financing includes grant funds; single-purpose appropriations from federal, state, and/or local legislative bodies; and bond indebtedness and loans from government institutions.	No significant changes were made to the 2017 Draft Staff Report.	No changes made.
12.3.1 SUMMARY OF PERTINENT STATE FUNDING PROGRAMS	12.2.1 SUMMARY OF PERTINENT STATE FUNDING PROGRAMS There are several potential sources of public financing through grant and loan funding programs administered such as Clean Water State Revolving Fund, OWTS-Mini Loan Program, Linked Deposit Program, Safe Drinking Water State Revolving Fund, Propositions 50 and 84 Grant Program, Integrated Regional Water Management Grants, Clean Beaches Initiative Grant Program, and Agricultural Drainage Program.	The 2017 Draft Staff Report included a paragraph regarding an emergency solution grant program that provides grants to assist homeless individuals and families. It included more details in the section of Clean Water State Revolving Fund that funds water projects with up to 15% of the funds available to be allocated from Prop 1, Water Quality, Supply, and Infrastructure Improvement Act of 2014. The 2017 draft also removed a description of the State Water Board’s mini-loan program, because this funding program is a component of the State’s CWSFR Program.	Revisions were made throughout this section to better align listed funding sources with this project’s requirements.

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12.3.2 SUMMARY OF PERTINENT FEDERAL FUNDING PROGRAMS	12.2.2 SUMMART OF PERTINENT FEDERAL FUNDING PROGRAMS Several federal agencies, including the EPA, NOAA Fisheries, FWC, and USDA NRCS provide grants and other funding opportunities.	The 2017 Draft Staff Report provided details on USDA interest loans in relation to low income homeowners. It provides grants to the elderly to remove health and safety hazards and provides loans to multi-family housing.	Revisions were made throughout this section to better align listed funding sources with this project's requirements and to provide more information on available funding sources
ANTIDEGRADATION ANALYSIS			
13 ANTIDEGRADATION	CHAPTER 13 ATIDEGRADATION ANALYSIS This Chapter briefly describes the state and federal antidegradation policies and how they apply to the Russian River Watershed Pathogen Indicator Bacteria TMDL Action Plan. This chapter analyzes whether approval of the draft amendment would be consistent with the federal and state antidegradation policies.	Not Included	No changes made.
13.1 OVERVIEW	Not included.	The 2017 Draft Staff Report is editorial, only.	No changes made.

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<p>13.2 STATE AND FEDERAL ANTIDEGRADATION POLICIES</p>	<p>The federal antidegradation policy requires that existing instream designated uses and the level of water quality necessary to protect the existing uses be maintained and protected. Where the water quality exceeds levels necessary to support propagation of wildlife and recreation in and out of the water, that quality must be maintained and protected unless the state finds that such activity is necessary to accommodate important economic or social development in the area in which the waters are located, water quality is adequate to protect existing beneficial uses fully; and the highest statutory and regulatory requirements for all new and existing point source discharges and all cost-effective and reasonable best management practices for nonpoint source control are achieved. The state must determine that lowering the quality of high-quality waters will be consistent with the maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial uses of such water, and will not result in water quality less than that prescribed. Before any degradation of water quality is permitted, it must be shown that the discharge will be</p>	<p>The 2017 Draft Staff Report is editorial, only.</p>	<p>Editorial changes only.</p>
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	required to meet WDRs that result in best practicable treatment necessary to assure that pollution or nuisance will not occur.		
13.3 APPLICABILITY TO THE RUSSIAN RIVER WATERSHED PATHOGEN TMDL ACTION PLAN AND WASTE DISCHARGE PROHIBITION	Management measures are generally defined in individual water quality control plans and must tailor measures to a particular site, and include an iterative planning approach based on monitoring feedback. This section describes how the Action Plan directs the Regional Water Board staff to incorporate pathogen protection measures into its point and nonpoint source permitting actions. It includes a prohibition of the discharge of fecal waste materials that contribute to an exceedance of bacteria water quality objectives.	The 2017 Draft Staff Report states that high concentrations of fecal indicator bacteria in ambient waters infer the presence of human and animal fecal waste and associated disease-causing microorganisms that pose a risk to human health. Changes made in 2017 were largely editorial.	Revisions were made to clarify the expectations that the Action Plan will improve water quality and promote attainment of water quality standards. Language was added to clarify the process for permit development in regards to Antidegradation.
PUBLIC PARTICIPATION			
14 PUBLIC PARTICIPATION SUMMARY	This chapter describes some of the opportunities that have been made available to the public for comment on and participation in the development of the Russian River Watershed Pathogen Indicator Bacteria TMDL Staff Report and Implementation Plan.	The 2017 Draft Staff Report updated the tables to include public participation efforts occurring after the release of the 2015 Draft Staff Report.	No changes made.

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Chapter and Section Title and No. Based on the 2019 Staff Report	Summary of 2015 Draft Staff Report	Highlighted Revisions 2017 Draft Staff Report	Highlighted Revisions 2019 Proposed Staff Report
14.1 STAKEHOLDER AND PUBLIC OUTREACH	<p>Regional Water Board staff has held numerous meetings to update and inform key stakeholders and the public TMDL development process. The outreach meetings included both public meetings and meetings targeted to small groups of individuals and local agency representatives who were identified by Regional Water Board staff as key stakeholders in the TMDL process.</p>	<p>The 2017 Draft Staff Report updated the tables to include public participation efforts occurring after the release of the 2015 Draft Staff Report.</p>	<p>An updated table on stakeholder and public meetings was included. Section 14.1.1 COMMUNITY AND INTERAGENCY GROUPS was added to discuss community involvement in the projects. All other revisions made in 2019 were editorial, only.</p>
14.2 PRESENTATIONS TO THE REGIONAL WATER BOARD	<p>Periodically, Regional Water Board staff have presented updates and status reports to the Regional Water Board and interested members of the public on the Russian River Watershed Pathogen Indicator Bacteria TMDL. The presentations were opportunities for the public and board members to hear status updates and background information and provide comments regarding progress and emerging issues related to the TMDL development process.</p>	<p>The 2017 Draft Staff Report is editorial, only.</p>	<p>No changes made</p>

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Chapter and Section Title and No. Based on the 2019 Staff Report	Summary of 2015 Draft Staff Report	Highlighted Revisions 2017 Draft Staff Report	Highlighted Revisions 2019 Proposed Staff Report
14.3 PRESENTATION TO COUNTY SUPERVISORS	In order to keep local agencies informed of the details of the Russian River Watershed TMDL, Regional Water Board staff met with County Supervisors from Sonoma County and Mendocino County.	The 2017 Draft Staff Report is editorial, only.	Revisions were made to update and expand upon efforts engaging with the County of Sonoma.
14.4 SCIENTIFIC PEER REVIEW	14.4 PEER REVIEW Prior to development of the Public Review Draft of the Russian River Watershed TMDL Staff Report, a peer- review draft report was reviewed by the following two professors as part of a formal state-mandated peer-review process: Dr. Nicholas J. Ashbolt and Dr. Patricia A. Holden.	The 2017 Draft Staff Report is editorial, only.	No changes made.

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Chapter and Section Title and No. Based on the 2019 Staff Report	Summary of 2015 Draft Staff Report	Highlighted Revisions 2017 Draft Staff Report	Highlighted Revisions 2019 Proposed Staff Report
14.5 2015 PUBLIC REVIEW DRAFT	<p>The proposed Staff Report and the Implementation Plan will be posted and available for public review and comment on prior to the adoption hearing on 11/19/2015. The public review period for the Staff Report and Action Plan was set to close on 10/8/2015. Throughout the Basin Plan amendment process, there are opportunities for public participation and comment including the CEQA scoping meeting and 3 Regional Water Board workshops planned prior to the Regional Water Board hearing for the proposed TMDL Basin Plan amendment, the Regional Water Board hearing to consider adoption of the TMDL Basin Plan amendment, before the State Water Board, and during public forum at any Regional Water Board meeting.</p>	<p>The 2017 Draft Staff Report is editorial, only.</p>	<p>Revisions were made to update the 2019 Draft Staff Report with current information on public review.</p>
14.6 2017 PUBLIC REVIEW DRAFT	<p>Not included.</p>	<p>The 2017 Draft Staff Report is editorial as it provides current updates regarding public review dates.</p>	<p>2019 public review draft</p>

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15 NINE KEY ELEMENTS	This specific section is not included in the 2015 Final Staff Draft Report.	The 2017 Draft Staff Report is listed as Overview below. However, element 1 identifies individual nonpoint sources and element 5 includes a public participation focus. Overall the report simplified much of the chapter in 2015.	No changes made.
15.1 OVERVIEW	In the 2015 Draft Staff Report, the overview describes the California Nonpoint Source Grant Program on how it allocates Clean Water Act section 319(h) funding from the U.S. EPA to support projects that implement full scale, on-the-ground management measures or practices in alignment with the watershed-based plans to address water quality problems in surface water and groundwater resulting from NPS pollution. Before giving 319 NPS grants to projects, the project proponent must demonstrate that the US EPA's Nine Key Elements are prepared for a watershed.	The 2017 Draft Staff Report is editorial, only.	All revisions made in 2019 were editorial only.

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Chapter and Section Title and No. Based on the 2019 Staff Report	Summary of 2015 Draft Staff Report	Highlighted Revisions 2017 Draft Staff Report	Highlighted Revisions 2019 Proposed Staff Report
15.2 SUMMARY	<p>The level of detail needed to address the nine key elements of watershed management listed above will vary in proportion to the homogeneity of land use types, and variety and complexity of pollution sources. Urban and suburban watersheds will typically be implemented at a smaller scale than watersheds with large areas of a similar rural character. The availability of 319(h) grant funds to support the development and implementation of both the watershed plan and the individual management plans may be critical to the success of the TMDL.</p>	<p>The 2017 Draft Staff Report greatly simplified the summary section of Chapter 15 of the 2015 report.</p>	<p>No changes made.</p>