

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION**

MEETING OF JANUARY 13-14, 2021

ITEM 6
BACTERIA WATER QUALITY OBJECTIVES BOARD WORKSHOP

CHRONOLOGY	
November 9, 1995	Lahontan Regional Water Quality Control Plan (Basin Plan) adopted by Lahontan Water Board. Expands surface water bacteria objective of 20 colony forming units (cfu) fecal coliform/ 100 mL to all surface waters. Previously the objective applied to ten specifically identified watersheds which were identified as valuable recreation and drinking water resources.
May 29, 2000	USEPA approves 1995 Basin Plan. Approval letter indicates that the fecal coliform objective was expanded to most Region 6 surface waters because most surface waters are now considered sources of drinking water. The letter also indicates that using fecal coliform as indicator bacteria is no longer recommended by USEPA and the Water Board should consider updating to an <i>E. coli</i> -based water quality objective.
November 12, 2014	Lahontan Water Board agenda item presenting a status report on bacteria sampling and analysis to characterize bacterial water quality across the region. The informational item includes discussion for the potential for future actions pertaining to bacteria water quality objectives by the State Water Board.
November 4, 2015	Lahontan Water Board adopts 2015 Triennial Review. Updating the bacteria water quality objective identified as the top basin planning priority
August 7, 2018	State Water Board adopts statewide <i>E. coli</i> bacteria water quality objective for the specific protection of the Water Contact Recreation (REC-1) beneficial use in all California surface waters where the use is designated. In Resolution 2018-0038, Recital 18, the State Board stipulates that the new objective " <i>would not supersede the fecal coliform objective established generally for all surface waters in the region. Therefore, the existing fecal coliform objective and the applicable Bacteria Water Quality Objective would apply to all REC-1 surface waters within the Lahontan region</i> ". Resolve 4 of Resolution 2018-0038 continues "[<i>The State Board</i>] [<i>e</i>]ncourages the Lahontan Regional Water Board to

CHRONOLOGY	
	<i>evaluate with input from relevant stakeholders the region's fecal coliform water quality objective (described in recital 18), and to prioritize that effort during the region's upcoming triennial review process, which the region anticipates will occur during the fall of 2018."</i>
November 15, 2018	Lahontan Water Board adopts 2018 Triennial Review. Top basin planning priority identified as "Evaluate Bacteria Water Quality Objectives."

BACKGROUND
<p>The numeric bacteria water quality objective (WQO) in the Water Quality Control Plan for the Lahontan Region (Basin Plan) is 20 cfu fecal coliforms per 100 milliliters (mL) of water (fecal coliform WQO). The 1975 Basin Plan for the North Lahontan Basin applied this objective to ten water bodies. The current bacteria water quality objective was included in the 1995 Basin Plan, which received USEPA approval in 2000. The 1995 Basin Plan extended the fecal coliform WQO regionwide.</p> <p>The fecal coliform WQO level was developed as part of the 1968 National Technical Advisory Committee (NTAC) criteria for desirable fecal coliform conditions in surface waters used as public water supply. That guidance was included in the State Board 1973 Guidance Memos for Development of the 1975 Basin Plans. The 1975 Basin Plan included the NTAC criteria in the description of the municipal and domestic supply beneficial use. While NTAC describes the 20 cfu fecal coliform level as appropriate for untreated public supply waters, the 1975 plan assigned these criteria to the REC-1 beneficial use for ten specific waterbodies. All other waterbodies were assigned a water quality objective of 200 cfu/100mL for the REC-1 beneficial use. In the 1995 Basin Plan the fecal coliform WQO applies to all surface waters and is not explicitly associated with a specific beneficial use, although the May 2000 letter from USEPA approving the 1995 Basin Plan revisions indicate that the objective was extended regionwide to reflect that most Lahontan surface waters were now considered sources of drinking water.</p> <p>The 2000 USEPA approval of the 1995 Plan notes that fecal coliform is outdated for use as a fecal indicator bacteria and the Lahontan Water Board should update the bacteria water quality objective to use E. coli as an indicator, as recommended in the 1986 Ambient Water Quality Criteria published by the USEPA. In 2012, the USEPA released a recommendation for recreational water quality criteria which expanded upon the 1986 criteria. For fresh waters, the recommended criteria included options for E. coli levels, each based on slightly different risk levels or illness rates derived from epidemiological surveys of water contact recreation and incidence of illness.</p> <p>In the 2012 Triennial Review the Lahontan Water Board set as the number two basin planning priority a project to Review Water Quality Objectives for Bacteria. In the same time frame, the State Water Board began a project to adopt statewide bacteria objectives, based on the USEPA recommendation, to protect REC-1 beneficial use. The 2015 Triennial Review included as priority number four Bacteria Water Quality</p>

BACKGROUND

Objective Revisions. Work on this project was delayed in anticipation of the outcome from the State Water Board bacteria objectives project. With the 2018 State Water Board adoption of a statewide REC-1 bacteria water quality objective, based on the 2012 USEPA recommended criteria, it became clear that staff should evaluate the impact, applicability, appropriateness, and relationship between the regionwide and statewide bacteria objectives and use that context to inform any recommended updates or revisions to the fecal coliform WQO. Thus the 2018 Triennial Review identified its top priority as a project to evaluate the existing statewide and regional Bacteria Water Quality Objectives. The evaluation project, its conclusions, and subsequent project development are to be informed by current science, policy considerations, public engagement, and analysis of a large regional bacteria dataset.

ISSUES

Water Board staff will be presenting on the statewide and regionwide bacteria water quality objectives. The discussion will include a description of scientific and policy considerations analyzed by staff, as well as factors supporting a need to amend the Basin Plan and a description of different possible project options. Staff will also seek input from Water Board members.

DISCUSSION

The 2018 Triennial Review prioritized the evaluation of the bacteria WQO. The fecal coliform WQO was evaluated using a holistic approach to finding the most appropriate regulatory structure without presupposing a basin planning outcome. This Board workshop and accompanying staff report detail the analysis performed by staff, illustrated by a number of considerations, that serves as the evaluation. Staff will present that evaluation, and the conclusion that a Basin Plan amendment is needed.

While project development is still in the early phases, staff, in consultation with the public, have developed several preliminary project options. Staff will present some of the options, which are included in the staff report and appendices. The options are not intended as a complete list of all possible options or scenarios available to the Lahontan Water Board, and each option presented is in preliminary form.

The goal of this workshop is to revisit the issue of bacteria water quality objectives, inform the Board of staff progress on the project, and provide a report of the public engagement that has informed the effort to date. Staff seek to solicit Board feedback on the potential preliminary project options and policy values that have been identified as influential to the direction of the project. The workshop also serves to update interested parties on project progress and provide a forum for the interested parties to inform the Board and staff of their interests and perspectives on the project and public process.

Both the regionwide fecal coliform WQO and the statewide REC-1 water quality objective apply to most surface waters in the Lahontan Region. Having clarity on the applicability – and appropriateness – of the bacteria water quality objectives is key to the effectiveness of several Lahontan Water Board programs, including Non-Point

DISCUSSION

Source permitting and Clean Water Act section 303(d) water quality assessments. With a goal of clear and effective use of bacteria WQOs in these programs, there are several factors that this project must consider and address when reviewing the regionwide bacteria WQO:

- Fecal coliform is outdated as a fecal indicator bacteria (FIB) and has not been recommended for use as such since 1986, nearly 35 years.
- The regionwide fecal coliform WQO is not directly linked in the Basin Plan to the protection of a specific beneficial use.
- The statewide bacteria WQO uses *E. coli* as a FIB and is designed to protect the REC-1 beneficial use.
- The statewide REC-1 beneficial use alone does not provide a numeric water quality objective that preserves and maintains the bacterial water quality in the Region's high-quality waters.
- Staff contend that reducing the quality of water could reduce the protection of the beneficial uses – even if the numeric objective is not exceeded and the beneficial use is not technically impaired per the 303(d) assessment process.
- Many surface waters in the Lahontan Region are naturally of very high water quality for fecal bacteria, meaning that low bacteria counts often exist under ambient conditions. Such conditions regularly meet the regionwide fecal coliform WQO.
- Stakeholders have indicated that fecal bacteria levels in many surface waters proximal to urban and long-existing agricultural land uses (primarily livestock grazing) cannot reasonably be expected to meet the highly protective regionwide fecal coliform WQO or that the regionwide fecal coliform objective may not be possibly achieved by historically impactful land uses.

SUSTAINABLE GROUNDWATER MANAGEMENT ACT BASINS

The focus of this project is water quality objectives in surface waters regionwide. It is a planning effort and does not focus on any one discharge or any specific groundwater basin.

CLIMATE CHANGE RESPONSE

The goal of this project is to maintain, amend, or establish bacteria water quality objectives for the region's surface waters. This project will be consistent with [Resolution R6T-2019-0277 \(Resolution\)](#), the Water Board's Climate Change Mitigation and Adaptation Strategy in the following key resources areas: (1) Protection of Wetlands, Floodplains, and Headwaters; (2) Infrastructure Protection; (3) Protection of Groundwater Quality and Supply; and (4) Protection of Headwater Forests and Promoting Fire Resilient Landscapes.

The outcome of this project may help to protect headwaters and protect infrastructure by reducing the treatment burden on water supply systems for waters designated with, and employed for, the MUN beneficial use, two of the key resource areas identified in the Resolution. As populations in California continue to expand to more

rural areas of the Lahontan Region because of climate drivers such as rising sea levels, increasing temperatures, and shortages of groundwater supply, this project may help to address potential resource issues associated with fecal bacteria contamination of surface waters. Protection of Lahontan Region headwaters resources will become more important as climate stressors increase the demand for municipal and domestic supply (MUN) uses in previously untapped water resources and recreational (REC-1) uses of surface waters become more widespread.

PUBLIC OUTREACH/INPUT

In anticipation of a high level of public interest in this project, staff worked with the Office of Public Participation (OPP) to engage interested parties regionwide. This effort began with a listserv-distributed survey in January 2020. The survey received almost 80 responses, which informed planning for four in-person public meetings in Victorville, Bishop, South Lake Tahoe, and Susanville. Unfortunately, those meetings were scheduled the week of the March shelter-in-place order as response to the Covid-19 Pandemic began and were consequently cancelled.

Staff re-grouped and in May sent out a second survey to gauge the pandemic-influenced interest and ability of interested parties to participate remotely in this project. Staff created a pre-recorded presentation that was distributed to the Basin Planning listserv and posted online in July. Several weeks later, staff hosted an online public workshop and question and answer session attended by nearly 40 participants. Project staff were joined in this effort by the generous participation of staff from OPP, the Office of Information Management and Analysis (OIMA), and numerous Lahontan Water Board employees. Participants in the online workshop included private citizens, Water Board employees, and representatives from public agencies, interest groups, and two native American tribes. Details of all the public outreach efforts are in section 5 of the staff report (Enclosure 1) and the staff report appendices contain documents pertaining to the outreach efforts.

Notice of this Board meeting item was distributed via the Board Meeting listserv and the Basin Planning – Regionwide listserv.

PRESENTERS

Ed Hancock, Water Board, Environmental Scientist (presentation is Enclosure 2).

RECOMMENDATION

This item is an informational workshop and no formal action is requested, though the Water Board members may give direction to staff. Staff will ask the Water Board members to provide feedback on the status and direction of the Bacteria project.

ENCLOSURE	ITEM	BATES NUMBER
1	Bacteria Water Quality Objectives Evaluation – workshop Staff Report	6 - 7
2	Water Board staff presentation (Ed Hancock)	6 - 69

ENCLOSURE 1



**DRAFT STAFF REPORT ON THE
BACTERIA WATER QUALITY OBJECTIVES EVALUATION PROJECT
FOR THE LAHONTAN REGION**

January 2021



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TABLE OF CONTENTS

1. PURPOSE AND INTENT OF THIS STAFF REPORT	5
1.1 How this Report is organized	5
2. INTRODUCTION.....	6
2.1 WQO Background.....	6
2.2 Project Goals.....	8
3. CONSIDERATIONS WHEN EVALUATING EXISTING WQOS	9
3.1 Lahontan Water Board Planning Priorities.....	9
3.2 2018 State Water Board adoption of the Bacteria Provisions.....	10
3.3 The Lahontan Region’s fecal coliform WQO	11
3.4 Advancing science of Fecal Indicator Bacteria (FIB)	14
3.6 High-Quality waters in the Lahontan Region	15
3.7 Antidegradation considerations.....	16
3.8 Programmatic and regulatory requirements of the Water Board	18
3.9 Analysis of existing WQOs	19
3.10 Basin Plan amendment recommended.....	20
4. PROJECT OPTIONS	20
4.1 Narrative WQOs	21
4.1.1 Options for narrative WQOs	22
4.1.2 Removal of narrative WQO	22
4.1.3 Amending or replacing the language of the narrative WQO.....	22
4.2 Numeric WQOs	23
4.2.1 Numeric WQO Option 1	26
4.2.2 Numeric WQO Option 2	26
4.2.3 Numeric WQO Option 3	27
4.2.4 Numeric WQO Option 4.....	28
5. PUBLIC PARTICIPATION.....	29
5.1 January 2020 Public Engagement Survey.....	30
5.2 March 2020 Public Workshops.....	30
5.3 May 2020 Public Engagement Survey	31
5.4 July 2020 Information Video Presentation	32

5.5 August 2020 Public Workshop	32
5.6 Future opportunities for public engagement	33
6. PROJECT TIMELINE	34
7. LIST OF REFERENCES	36

List of Tables and Figures

Table 3.1: Bacteria Water Quality Objectives in Inland Surface Waters, Enclosed Bays, and Estuaries	11
Table 3.2 Lahontan Basin Plan fecal coliform WQO	12
Table 4.1 Matrix of Project Options for numeric WQO amendments.....	24
Table 4.2 Project Option 1 advantages and disadvantages analysis	26
Table 4.3 Project Option 2 advantages and disadvantages analysis	27
Table 4.4 Project Option 3 advantages and disadvantages analysis	28
Table 4.5 Project Option 4 advantages and disadvantages analysis	29
Figure 6.1: Tentative Project Timeline.....	35

Table of Appendices

Appendix A: Description of alternative Project Options
Appendix B: January 2020 Notice of Project & Public Survey questions
Appendix C: March 2020 Notice of Public Workshops & Notice of Cancellation
Appendix D: May 2020 COVID Announcement & Public Survey
Appendix E: July 2020 Notice of Public Information Session & Information Video Slides
Appendix F: August 2020 Public Workshop Supporting Documents

1. Purpose and Intent of this Staff Report

This staff report supports the January 2021 Bacteria Water Quality Objectives Evaluation Project (project) workshop for the Lahontan Water Board. The workshop will occur at the January 13th and 14th, 2021 Board meeting. This report, together with the staff presentation, are intended to educate the Water Board regarding progress with this project. Staff present this information to promote discussion and help the Water Board provide direction to staff regarding next steps for project work. Staff has sought engagement from interested parties regarding this project already, and anticipates further public engagement during the next phases of the project.

This report provides an overview of the development of bacteria water quality objectives in the Lahontan Region dating back to the 1970s, and should serve as a centralized location and resource for the Lahontan Water Board, Water Board staff, and interested stakeholders. The report details the considerations used to evaluate existing bacteria regulations and then presents a series of preliminary potential options to amend the Lahontan Region Basin Plan with updated bacteria water quality regulations. The report also contains information about the early public outreach and engagement that has already taken place, and provides a likely project timeline, the culmination of which may result in a Basin Plan amendment.

1.1 How this Report is organized

The information presented in Sections 2, 3, and 4 is not intended to be an exhaustive account of all aspects of the project. [Section 2](#) provides some background information and a brief history related to this subject and includes goals for the evaluation of the existing bacteria regulations in the Lahontan Region. [Section 3](#) presents the key considerations when engaged in this evaluation project. The relative importance of such considerations may potentially increase with progression of project work. Section 3 also summarizes the findings of these considerations. [Section 4](#) presents some potential scenarios in light of the considerations and findings detailed in Section 3. Other potential scenarios are also included in Appendix A. Each option presented should be considered preliminary. [Section 5](#) details public engagement since staff began project work in 2019. [Section 6](#) provides a tentative timeline for project work, and this timeline is subject to change given the multiple moving parts related to Board direction, public engagement, and investigative work performed by staff.

2. Introduction

The Bacteria Water Quality Objectives Evaluation Project (project) evaluates fecal bacteria water quality regulations in the Lahontan Region. The project is necessary for two reasons: 1) fecal coliform fecal indicator bacteria (FIB), which presently are included in the Water Quality Control Plan for the Lahontan Region (Basin Plan), are no longer recommended by the United States Environmental Protection Agency (U.S. EPA) as an accurate indicator of recent, harmful fecal pollution in surface waters; and 2) because of State Water Resources Control Board (State Board) [Resolution No. 2018-0038](#), which adopted a new water quality objective (WQO) based on *Escherichia Coli* (*E. coli*) FIB for the protection of the Water Contact Recreation (REC-1) beneficial use (BU). Resolve 4 of this resolution “encourages the Lahontan Water Board to evaluate with input from relevant stakeholders the region’s fecal coliform water quality objective”.

The chief conclusion of the evaluation of existing bacteria WQOs is that regulations pertaining to fecal bacteria in the Lahontan Region should be updated and that the Lahontan Region Basin Plan should be amended to reflect these updates. Potential options to amend the Basin Plan are presented in [Section 4](#) and in Appendix A. They are not intended as a complete list of all possible options or scenarios available to the Lahontan Water Board, and each option presented should be considered in preliminary form. Presently, staff do not recommend any specific project option described in Section 4 but present these options to inform the Board. Several alternative options are also presented in Appendix A.

2.1 WQO Background

The State Board *E. coli* WQO adopted by [Resolution No. 2018-0038](#) applies to all surface waters in the State of California, including in the Lahontan Region, where the REC-1 BU is designated. The *E. coli* WQO supersedes all other bacteria WQO’s applied to protect the REC-1 BU in California fresh waters. Lahontan Region surface waters are also regulated by a region-specific fecal bacteria WQO contained in the Basin Plan. This WQO is based on fecal coliform FIB and is ‘generally applicable’ to all BUs in the region. Because the fecal coliform WQO applies to all Lahontan Region BUs, this WQO continues to apply to the region’s surface waters even with the adoption of the *E. coli* WQO for the protection of the REC-1 BU.

The *E. coli* and fecal coliform WQOs offer different types of water quality protection, and each WQO provides a different numeric threshold to indicate a water quality violation. The *E. coli* WQO is derived via a risk-based approach, where attainment of the WQO and protection of the REC-1 BU are based upon a statistical determination of acceptable risk of illness in water-contact recreators should they contact surface waters

contaminated by fecal bacteria. The risk threshold is 32 illnesses per one thousand exposures to contaminated water.

The fecal coliform WQO is based on 1968 National Technical Advisory Committee (NTAC) guidance for desirable fecal coliform conditions in surface waters harnessed for municipal and domestic purposes with no water treatment. The NTAC guidance was included in the 1973 *Guidance Memos for Development of the 1975 Basin Plan* issued by the State Water Board as a threshold for untreated surface waters used as a source of MUN. The Lahontan Region 1975 Basin Plan is based on this memo.

In its description of the MUN BU, the 1975 Lahontan Basin Plan described the principal issues for domestic and municipal water supply as “(1) protection of the public health, (2) aesthetic acceptability of the product, and (3) the economic impacts associated with treatment or quality-related damages” (1975 Basin Plan, I-4-3). This description also included by reference the NTAC surface water criteria “for public water supply prior to treatment”. These criteria can be found in the *Water Quality Standards Criteria Digest: A Compilation of Federal/State Criteria on Bacteria* (1972) compiled by U.S. EPA. The NTAC surface water criteria for *desired* conditions for fecal coliforms is “20/100 [ml]”.

The 1975 iteration of the Basin Plan also included the narrative bacteria objective “waters shall not contain concentrations of coliform organisms attributable to human wastes” and stipulated a WQO for the REC-1 BU of 200 fecal coliforms/100 mL. Additionally, the document explicitly designated ten surface waters in the North Lahontan Basin¹ with an objective of 20 fecal coliforms per 100 mL, also to protect the REC-1 use in these waters. This objective is the same as the NTAC criteria “for public water supply prior to treatment”.

It is not clear why the 1975 Basin Plan associated the NTAC criteria “for public water supply prior to treatment” with the REC-1 use for ten specific surface waters. Any reasons offered here would be speculative as the rationale has been lost to time. What is clear, however, is that the 20 fecal coliform criteria was developed by NTAC to reflect a *desired* condition for pre-treatment surface waters used for public water supply, and that the State Board recommended Regional Boards adopt this criteria in their 1975 Basin Plans. The intent of this criteria was to offer protection for municipal and domestic water uses harnessed from untreated surface waters ; The 1975 Basin Plan application of this threshold in the Lahontan Region appears to be both for the MUN use, by inference in the uses’ description, and for the REC-1 use in the ten North Basin surface waters described previously.

¹ These surface waters were: Eagle Lake, Susan River, Lake Tahoe, Truckee River, East Fork Carson River, West Fork Carson River, East Walker River, West Walker River, Lake Topaz, and Bryant Creek.

In 1988, the State Board adopted the [Sources of Drinking Water Policy](#). This policy resolved that all surface and ground waters of the State that are presently or potentially suitable for municipal and domestic water supply be designated the MUN BU by the relevant Regional Board. The policy allows for some very limited exceptions to the MUN designation based on existing water quality characteristics measured in specific waters, such as specific Total Dissolved Solids (TDS) or electrical conductivity thresholds, contamination that cannot reasonably be treated, or because water volume does not support the use. For the Lahontan Region, where surface waters are generally abundant and of high quality, the Lahontan Water Board thus designated MUN to approximately 95% of surface waters in addition to the existing MUN designations in the region.

During the 1994/1995 revision of the Basin Plan, the fecal coliform WQO specific to the ten surface waters described earlier was expanded to apply to all regional surface waters to provide a greater level of protection for potential sources of drinking water. The fecal coliform WQO is described in the Basin Plan revision as being applicable “to all surface waters”, and the Basin Plan does not expressly indicate a beneficial use. On May 29, 2000, U.S. EPA issued approval of the 1995 revisions to the Basin Plan. In this approval U.S. EPA notes that “the stringent fecal coliform requirements which were previously applicable only to North Basin water bodies are now applicable regionwide. The rationale for this change is based upon the fact that most surface waters of the region are now considered to be sources of drinking water, which therefore justifies requiring a greater level of protection region-wide against fecal coliform contamination”. After the 1994/1995 revisions, Board actions have removed the MUN BU from several surface and ground waters, including Piute Ponds and most of the Searles Valley groundwater basin, where existing conditions or uses preclude the designation of this use.

[2.2 Project Goals](#)

The application of the State Board *E. coli* WQO and the fecal bacteria WQO is creating issues for several Water Board processes and for the region’s regulated community, and is further explained in [Section 3.8](#). Such issues affect Clean Water Act section 303(d) water quality assessments undertaken by the Water Board, permit conditions for certain activities occurring in the Lahontan Region, and cause confusion for interested parties looking to the Water Board for water quality guidance. This project aims to remove these uncertainties.

The goals of the project are to:

1. Consider the many, diverse high-quality waters found in the Lahontan Region which are subject to little or no pollution by fecal bacteria.

2. Consider the pertinence of the FIB WQO's that currently apply in the Lahontan Region. Such evaluation includes consideration of current microbial indicator science and recent changes to fecal bacteria regulations.
3. Provide, if necessary, potential options to amend the existing bacteria regulations. The project could conclude with a Basin Plan amendment which provides an appropriate mechanism to identify unacceptable levels of contamination by fecal bacteria:
 - a. In a manner consistent with modern microbial science and,
 - b. In a manner which reflects the many, varied uses of surface waters in the region.
4. Provide regulatory clarity to regional stakeholders and users of the Lahontan Region Basin Plan.
5. Explain the origin and rationale behind the Lahontan Region fecal coliform WQOs and BU designation.

3. Considerations when evaluating existing WQOs

The Lahontan Region encompasses many, diverse watersheds, from the mountainous Sierra Nevada to the low-lying Death Valley. Some watersheds are beneficially used by people for agricultural, industrial, and municipal purposes. FIB concentrations in these watersheds are often elevated above the Lahontan Regions fecal coliform WQO. Other watersheds in the region have not been subject to extensive anthropogenic development or changes to natural land use. In such watersheds, available fecal bacteria water quality data show that FIB concentrations remain exceptionally low.

This section provides information on the numerous considerations for the project. This information is provided so that the reader might better understand the myriad of Project Options provided in [Section 4](#) of this document. The intent is also to provide information regarding some of the limitations that the project operates within.

3.1 Lahontan Water Board Planning Priorities

Bacteria regulations in the Lahontan Region have been scrutinized for more than two decades. In the year 2000 approval letter of the Lahontan Region's 1994/1995 Basin Plan revisions, US. EPA recommended that the existing Basin Plan fecal coliform WQO be updated to use *E. coli* FIB. The Water Board could not immediately act on this recommendation because of competing regional priorities.

From 2008, staff began collecting *E. coli* FIB data together with fecal coliform FIB to compare concentrations of each FIB in regional surface waters. Between 2010 and 2014, Lahontan staff addressed the Board on several occasions with updates regarding

FIB data collections and presented the Board with possible approaches to amend the existing fecal coliform regulations. Such approaches included elevation-based regulations or exemptions for certain watersheds where existing activities render the fecal coliform WQO impossible to attain.

In 2012 U.S. EPA published updated recreational water quality criteria. The publication of these criteria prompted the State Board to pursue updated bacteria regulations for California waters (see [Section 3.2](#) below). Because the State Board was engaged in a planning process for bacteria WQOs, the Lahontan Board decided to wait for the conclusion of this process before embarking on its own evaluation of bacteria regulations.

After U.S. EPA published the updated recreational water quality criteria, but before the State Water Board finished their planning process, in November 2014 staff presented a status report on bacteria sampling and analysis to the Lahontan Board, including recognition of the ongoing State Board planning effort. A majority of the Lahontan Board members indicated that the public should not expect to drink water in the backcountry without treatment. The Lahontan Board also had general agreement that it may be appropriate in some areas of the Region to have less protective standard than the nationwide fecal coliform standard.

The State Board planning process concluded in August 2018 with Resolution No. 2018-0038, a finding of which encouraged the Lahontan Region prioritize evaluation of the fecal coliform objective. In November 2018 the Lahontan Water Board identified evaluation of the fecal coliform WQO as the top planning priority during the 2018 Triennial Review of the Basin Plan. This project is a result of that planning priority determination.

3.2 2018 State Water Board adoption of the Bacteria Provisions

In 2018, the State Board adopted Resolution No. 2018-0038 [Part 3 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California – Bacteria Provisions](#) (Provisions) which established new WQOs to protect the REC-1 use in California. The new WQOs apply to both fresh and marine surface waters in the State of California, and these objectives supersede any other WQOs for fecal bacteria specifically for the protection of the REC-1 use, including for surface waters in the Lahontan Region. The Provisions adopted an *E. coli*-based WQO for fresh waters and an *Enterococcus*-based WQO for brackish and marine waters. The new WQOs are shown in Table 3.1.

Table 3.1: Bacteria Water Quality Objectives in Inland Surface Waters, Enclosed Bays, and Estuaries

Applicable Waters	FIB	Geometric Mean ^A (cfu/100 mL) ^C	STV ^B (cfu/100 mL)
Fresh surface waters ¹	<i>E. coli</i>	100	320
Marine waters ²	<i>Enterococci</i>	30	110

^A The water body Geometric Mean (GM) shall not be greater than the applicable GM magnitude in any six-week interval, calculated weekly

^B Statistical Threshold Value (STV) shall not be exceeded by more than 10 percent of samples collected in a CALENDAR MONTH, calculated in a static manner

^C Colony-forming units (cfu) per 100 milliliters of sample water

¹ All waters where the salinity is equal to or less than 1 ppt 95 percent or more of the time

² All waters where the salinity is greater than 1 ppt more than 5 percent of the time

The WQOs are based upon U.S. EPA’s 2012 Recreational Water Quality Criteria, which were initially developed in 1986 as the Ambient Water Quality Criteria for Bacteria. The U.S. EPA criteria provide a statistical approach to risk-based water quality objectives, developed from a series of epidemiological studies. These studies identified a link between the presence of either *E. coli* or *Enterococcus* in surface waters and incidence of sickness in water contact recreators. The criteria provide numeric thresholds dependent on different estimated illness rates. The illness rate adopted by the State Board is 32 illnesses per 1000 water contact recreators.

One of the goals of the Provisions was to “provide efficient and consistent implementation” for bacteria regulations for recreational water users throughout the State. However, because the State Board Provisions apply only to the REC-1 use, and because existing bacteria regulations in the Lahontan Region apply to all surface waters, the Provisions explicitly only supersede the Lahontan Region bacteria objectives for the REC-1 BU. Thus, while the State Board Provisions are successful in providing consistent regulation for recreational uses of water, the Lahontan Region finds itself with multiple bacteria WQOs.

3.3 The Lahontan Region’s fecal coliform WQO

As described in [Section 2](#), the fecal coliform WQO that applies to all Lahontan Region surface waters is based on NTAC guidance for desired coliform conditions in surface waters that are intended for public water supply. The WQO includes both a narrative

and numeric objective. The existing fecal coliform regulations are shown in Table 3.2 and can be found in [Chapter 3](#), page 4 of the Basin Plan.

Table 3.2 Lahontan Basin Plan fecal coliform WQO

Narrative Objective	Numeric Objective: Log Mean ^A	Numeric Objective: 10% threshold ^B
“Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.”	“The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100mL”	“[No] more that 10 percent of all samples collected during any 30-day period exceed 40/100mL”

^A *The log mean shall ideally be based on a minimum of not less than five samples collected as evenly spaced as practicable during any 30-day period. However, a log mean concentration exceeding 20/100 mL for any 30-day period shall indicate a violation of this objective even if fewer than five samples were collected.*

^B *The Susanville Hydrologic Unit has a site specific WQO for the 10% threshold: 75//100mL in any 30-day period.*

The fecal coliform WQO first appeared in the 1975 iteration of the Lahontan Basin Plan where it was included by reference in the MUN use description and was also specified for the REC-1 use in a limited number of North Lahontan Basin surface waters. The threshold of 20 fecal coliforms was originally developed by NTAC in 1968 for surface waters used for public water supply *prior to treatment*. Attainment of this threshold would help minimize water treatment and ensure cost-effective treatment processes could be deployed (NTAC 1968)..

In 1988, the State Board adopted the [Sources of Drinking Water Policy](#). This policy resolved that all surface and ground waters of the State that are presently or potentially suitable for municipal and domestic water supply be designated the MUN use by the relevant Regional Board. The policy allows for some very limited exceptions to the MUN designation based on existing water quality characteristics and water volume. In the Lahontan Region where surface water is often abundant and of high quality, the Lahontan Water Board thus designated approximately 95% of regional surface waters with the MUN use. In the 1994/1995 Basin Plan revisions, the existing fecal coliform WQO was expanded to all regional surface waters because most surface waters of the region were now considered to be sources of drinking water.

In a separate process known as the [Integrated Report](#) , the Lahontan Region fecal coliform WQO has at times been assessed to determine attainment of the REC-1 use. The Integrated Report is an evolving process, and not all reports have always

associated specific WQOs with specific BUs. Beginning in approximately 2006 there was a statewide effort to associate WQOs with BUs for the Integrated Report.

Integrated Report assessors look to the Basin Plan to determine the appropriate water quality objectives to apply for assessment purposes. The fecal coliform WQO, which is included in Chapter Three of the Lahontan Basin Plan as “applicable to all surface waters”, is not explicitly associated with a BU. In 2006, the general applicability of the fecal coliform objective put the burden on the assessor to determine which BU that the fecal coliform objective should apply to. There is precedent in the Integrated Report to apply the REC-1 use as the most sensitive BU for the human health endpoint. REC-1 uses are sensitive endpoints for human health because such uses involve contact with, and incidental ingestion of, untreated surface waters. Fecal bacteria are often monitored in surface waters to determine if there are risks to human health.

Basin Plans in other Water Board Regions would have also been a resource to Region 6 assessors when determining which BU the fecal coliform WQO should apply to. Some Basin Plans explicitly tie REC-1 uses to fecal bacteria objectives. Furthermore, for those performing Lahontan Region assessments in the mid-2000s, the history of the 20 fecal coliform WQO and its original association with the MUN use (as explained in [Section 2.1](#) of this document) was probably not readily available. These factors likely led the Lahontan Region fecal coliform WQO to be applied to determine attainment of the REC-1 use in 2006. The association between the fecal coliform WQO with the REC-1 BU remained in effect for several iterations of the Lahontan Region Integrated Report.

The Lahontan Region recently completed the 2018 Integrated Report. This report was the first to assess the regions’ surface waters for attainment of the REC-1 BU with the E. coli WQO. Because the E. coli WQO applies to the REC-1 use in all California surface waters, this objective replaced the previously used fecal coliform WQO for REC-1 assessments in the Lahontan Region. However, the fecal coliform WQO applies “to all surface waters” in the region, and thus is still an applicable objective for assessment purposes. Because fecal coliform is still an applicable objective and given the history of the WQO related to MUN uses², during the 2018 report this WQO was applied to determine the attainment of the MUN use for surface waters where fecal coliform data were available for assessment. Differences between E. coli and fecal coliform WQOs

There are differences between each fecal bacteria WQO that should be accounted for when evaluating the objectives within the Lahontan Region. The differences are:

² The passage of the 2018 Bacteria Provisions led Region 6 staff to investigate the origins of the regions’ fecal coliform WQO.

- a. **FIB type:** The presence of *E. coli* in a freshwater surface water is more indicative of the presence of recent, harmful fecal pollution including viruses and pathogens when compared with fecal coliforms. *E. coli* bacteria is a subset of the fecal coliform family.³
- b. **WQO approach:** The *E. coli* WQO is statistically derived and offers a risk-based approach. The fecal coliform WQO was derived to reflect conditions for surface waters to support MUN.
- c. **Numeric thresholds:** The fecal coliform WQO numeric threshold is approximately five and a half times more restrictive of bacteria water quality (when accounting for differences between FIB type).
- d. **Compliance period:** The period over which compliance with the WQO is determined. Fecal coliform logarithmic (log) means are calculated over 30 days, while *E. coli* geometric means (geomeans) are calculated over 42 days. Log means and geomeans are alternative mathematical methods which arrive at the same calculation.
- e. **Beneficial Uses:** The *E. coli* WQO is designed to apply only to the REC-1 use. The fecal coliform WQO was derived as a threshold for the MUN BU, but is described in the Lahontan Region Basin Plan as applying to all surface waters in the region.

3.4 Advancing science of Fecal Indicator Bacteria (FIB)

Bacteria WQOs designed to protect human health during contact with surface waters have been recommended by national scientific organizations since the 1940's and by U.S. EPA as part of the National Recommended Water Quality Criterion since the 1970's. The earliest objectives used measurements of total coliforms to determine the potential risks from contact with contaminated surface waters. Total coliforms are still employed by regulators today to determine compliance of groundwaters and wastewater treatment plant effluent.

In the 1960's, fecal coliforms, which are a subset of the total coliform group, were shown as more accurate indicators of the presence of fecal pollution in surface waters when compared with total coliforms. Subsequent water quality criteria were thus based on fecal coliforms. During the late 1970's and early 1980's, U.S EPA engaged in a series of epidemiological studies to determine the risks of illness in humans from contact with both fresh and marine waters polluted with sewage. Such studies

³ For surface waters where the salinity is greater than one part per thousand greater than five percent of the time, *Enterococci* are recommended as an indicator of recent, harmful pollution. *Enterococci* FIB would be applicable to a small yet important subset of Lahontan Region surface waters, such as Mono Lake. There are approximately 35 surface waters (not including minor surface waters or wetlands) where the Inland Saline Water Habitat (SAL) BU applies. Surface waters where the *Enterococci* FIB will apply will be determined during the course of the project.

determined *E. coli* in freshwaters and Enterococcus in marine waters as more accurate predictors of occurrences of human illness in recreators. In 1986 U.S. EPA published their [ambient water quality criteria for bacteria](#) based on these findings. These criteria recommended that States and Tribes move away from fecal coliform as an indicator of harmful fecal pollution in favor of *E. coli* or Enterococcus.

FIB research has continued since 1986, and other potential FIB and alternative methods of water quality monitoring have been investigated as potential replacements for *E. coli*. Microbial Source Tracking (MST), for example, which identifies the genetic source of fecal contamination, has been successfully deployed for investigative purposes both in the Lahontan Region and throughout the nation, and the technology has been utilized for source attribution in TMDL and TMDL-type projects. PhyloChip is another genetic technology which has shown promise in source-attribution applications and was recently used in a TMDL project by the North Coast Regional Water Board. [Quantitative Microbial Risk Assessment](#) (QMRA) has gained traction in recent years as an approach to determine illness risk from different types of fecal pollution and recognizes that illness risks to humans vary depending on the origination of the source of fecal material.

While each of these technologies shows promise, each technology also requires significant investment, significant planning, and significant expertise to facilitate deployment, all of which are often not readily available to regulators and the regulated community. No alternative technology has yet been able to provide a numeric threshold that might be applied to protect BUs in a regulatory setting.

Additionally, no new technology has thus far been able to match *E. coli* FIB in terms of ease and affordability of testing, repeatability of assays, and speed with which test results are returned. *E. coli* monitoring provides a cheap, easy, and rapid approach to screen surface waters for potentially harmful fecal pollution. The technology is not perfect, and some research has identified that autochthonous (naturally sustaining) *E. coli* populations may persist in stream and streambank sediments in the absence of recent fecal contamination, potentially confounding water quality monitoring results. However, because *E. coli* testing can be cheaply deployed to rapidly screen surface waters for fecal pollution, and because several different epidemiological efforts performed by U.S. EPA have found *E. coli* to be an adequate indicator of potential adverse health effects from contact with contaminated waters, *E. coli* FIB presently remain the most practical approach for numeric water quality regulations and for screening surface water quality.

3.6 High-Quality waters in the Lahontan Region

The Lahontan Region is fortunate to encompass a myriad of diverse waterbodies, including high-elevation creeks and lakes in the Sierra Nevada and Cascade mountain

ranges, and other unique surface waters and wetland areas found in the low-lying areas of the region. Many watersheds in the Lahontan Region have not been heavily impacted by anthropogenic development or land uses, and bacteria water quality in such waterbodies remains amongst the cleanest in California.

The quality of Lahontan Region surface waters not only supports a variety of BUs but also enhances the quality of those uses. Uses such as REC-1, noncontact recreation (REC-2), commercial and sport fishing (COMM), or agricultural supply (AGR), and the aquatic life or wildlife-focused cold freshwater habitat (COLD) or wildlife habitat (WILD) are all enhanced because of the quality of waters that support them. Lakes, creeks, and rivers throughout the Lahontan Region are world renowned recreation destinations, drawing millions of visitors each year to surface waters such as Eagle Lake in Lassen County, Lake Tahoe in El Dorado and Placer Counties, Twin Lakes in Mono County, or South Lake in Inyo County. Hundreds of miles of creeks and rivers attract recreationists, whether for fishing, camping, backpacking, or swimming. Cattle grazing occurs in meadows of lush forage supported by abundant, clean water flowing from the mountains. Abundant populations of wildlife inhabit wet meadows and undisturbed areas throughout the region, in part because of the clean and clear water that flows from the region's headwaters.

The Water Board has developed a robust bacteria dataset using both fecal coliform and *E. coli* collected from a wide variety of surface waters throughout the region. These FIB data illustrate that ambient water quality in many regional surface waters generally attains the existing fecal coliform WQO threshold. It is not uncommon for such FIB monitoring to return results of "non detect" (ND) or find FIB concentrations measuring in single digits, regardless of the season of monitoring. Such data demonstrate that many surface waters around the region are valuable both because their existing quality enhances the BUs they support (such as REC-1 or WILD) and because such waters are of sufficient quality to support MUN uses with limited water treatment.

3.7 Antidegradation considerations

The mission of the Water Boards is to "preserve, enhance and restore" California's water resources. The fecal coliform WQO provides a numeric threshold that was derived to reflect desired bacteria conditions in surface waters designated MUN. This threshold is also highly protective of water quality. As previously stated, fecal coliform datasets developed by the Water Board show that many regional surface waters remain exceptionally high-quality for fecal bacteria. Such data demonstrates that the fecal coliform WQO threshold may be appropriate, both for its original purpose as a mechanism to protect potential public water supply, and also because this threshold is analogous to ambient conditions in many regional surface waters. As described in

[Section 3.6](#), surface waters which carry little or no fecal wastes are of valuable high quality and serve to enhance a multitude of BUs that apply to them.

The *E. coli* WQO, in contrast, provides a numeric threshold for water quality beyond which there is an unacceptable risk of illness in humans should they contact water contaminated by fecal bacteria while recreating. The illness rate for the REC-1 WQO applicable to California surface waters is thirty-two illnesses per one thousand exposures. This illness rate was developed by U.S. EPA. The *E. coli* WQO is designed as a risk-based water quality endpoint and is not designed to protect existing or ambient water quality.

In October 1968, the State Board adopted [Resolution No. 68-16 Statement of Policy with Respect to Maintaining High Quality of Waters in California](#) (Antidegradation Policy). This policy guides the regulatory programs for the State and Regional Boards, including permitting actions, focusing on specific actions regulated by the Water Board that may potentially lower water quality. In addition, the federal antidegradation policy is set forth in the 40 Code of Federal Regulations, part 131.12. The State-Board has interpreted State Board Resolution No. 68-16 to incorporate the federal antidegradation policy in situations where the federal antidegradation policy is applicable.

The Antidegradation Policy indicates that high quality waters shall be maintained to the maximum extent possible. Existing high quality waters must be maintained unless the Regional Board determines that a change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies. In addition, those activities which may produce a waste or an increase in waste which discharges to an existing high quality water will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

If the water quality protections presently provided by the fecal coliform WQO are removed entirely from Lahontan Region surface waters in favor of only the *E. coli* WQO, many of the Lahontan Regions' high-quality surface waters could experience increasing fecal bacteria pollution before beneficial uses are determined as impaired for REC-1. Water quality assessments undertaken for the Integrated Report would not identify FIB impairments because such assessments would determine REC-1 as supported even as water quality is degraded beyond ambient conditions. In some cases, FIB pollution could increase more than ten-fold over the existing conditions before such pollution is

officially determined to affect BUs during 303(d) assessments. This situation could drastically alter the quality of surface waters in the Lahontan Region.

High-quality surface waters enhance the uses they support, and such high-quality waters are integral to the continuing aesthetic, cultural, recreational, agricultural, and natural value of Eastern California. So that the Water Board might continue to successfully fulfill its mission to “preserve, enhance, and restore” California’s water resources for the fecal bacteria pollutant, including preventing degradation of the regions’ high-quality waters from this pollutant, the Lahontan Region has several options. One is to rely on the Antidegradation Policy during consideration of permit issuance. Another option is to maintain the existing fecal coliform WQO threshold, update the FIB to align with modern scientific recommendations, and clearly link this WQO to a BU. There is also opportunity to develop an alternative benchmark for fecal bacteria in ambient surface waters. Such a benchmark would not be tied to a specific beneficial use, nor would it be a WQO, but such a benchmark would provide a mechanism to retain institutional memory regarding ambient bacteria water quality in the regions’ surface waters. Other benefits of this approach include offering a mechanism to track changes in ambient water quality over time.

3.8 Programmatic and regulatory requirements of the Water Board

The Federal Clean Water Act and California Porter-Cologne Act require the Water Board to perform certain functions so that water quality is effectively and consistently regulated. Such functions include (but are not limited to) the completion of water quality assessments, the Total Maximum Daily Load (TMDL) program which develops water quality improvement plans (WQIP) for waters where BUs are determined as unsupported, and the regulatory work of the Water Board such as issuance of permits to regulated parties to ensure water quality is maintained.

That there are two FIB WQOs which presently apply in the Lahontan Region has created challenges for several processes and projects that the Water Board is engaged in. One such challenges affects water quality assessments which, must be completed based on each FIB WQO. Completing assessments for two FIB WQO caused confusion amongst interested parties in the Lahontan Region during the 2018 Integrated Report and resulted in decisions to list certain surface waters as impaired by Indicator Bacteria for one FIB yet not for another.

Challenges also affect the regulatory process as Water Board staff must contend with two different WQOs for FIB. When establishing the *E. coli* objective in 2018, the State Board determined that “where a permit, WDR, or waiver of WDR includes an effluent limitation or discharge requirement derived from a water quality objective, guideline, or other requirement to control bacteria that is a more stringent value than the applicable

[state board] BACTERIA WATER QUALITY OBJECTIVE, the BACTERIA WATER QUALITY OBJECTIVE shall not be implemented in the permit, WDR, or waiver of WDR.” Stakeholders have expressed concerns that the fecal coliform objective is overly stringent and not protective of the REC-1 or MUN beneficial use.

To remedy the challenges faced by the Water Board, the FIB of the Basin Plan could be updated to reflect modern science. Additionally, the WQO could be clearly linked to the MUN BU in recognition of the intent of the original criteria or the WQO could be amended to state that it is reflective of existing regional water quality. Such changes would provide clarity for Water Board staff and the regulated community alike.

3.9 Analysis of existing WQOs

Sections 3.1 through 3.8 provide information regarding the major considerations when evaluating the existing FIB WQOs in the Lahontan Region. Based on these considerations, staff have distilled three overarching recommendations regarding the existing bacteria regulations:

1. Fecal coliform FIB is no longer a recommended indicator for recent, harmful pollution of freshwater surface waters. Because of this, fecal coliform should no longer be included as the FIB in the Basin Plan.
2. The *E. coli* WQO adopted by the State Board is designed as a risk-based threshold for a human health endpoint. While this is valuable for the REC-1 BU, the WQO has less utility for the protection of high quality surface waters and the high-quality uses these waters support such as are found in the Lahontan Region.
3. There are challenges related to fecal bacteria regulation in the Lahontan Region. Some of the challenges arise because the fecal coliform objective applies to all surface waters without directly being associated with a beneficial use in the Basin Plan. Other challenges come from having two FIB WQOs which apply to most surface waters in the region. Because of the challenges, the Water Board should consider amending existing regulations for regulatory clarity.

The fecal coliform WQO is outdated because it relies on an outmoded FIB. Fecal coliforms are not the sensitive indicator of the presence of recent fecal pollution (and thus of pathogens and viruses) as was once thought. However, for Lahontan Region surface waters, the numeric threshold associated with the fecal coliform WQO likely still has utility to protect surface waters which might be used for public water supply purposes in the future, and this threshold reflects ambient bacteria conditions in many regional surface waters. This conclusion is supported by data collected by the Water Board. As such, the Water Board includes maintenance of the existing Basin Plan threshold as an option for consideration.

The *E. coli* WQO uses an indicator which is better aligned with the presence of pathogens or viruses dangerous to human health. As such, this indicator should be deployed to monitor the presence of such pollution. However, unlike the fecal coliform objective, the *E. coli* WQO threshold is not appropriate for the ambient conditions found in many Lahontan Region surface waters. The *E. coli* WQO threshold permits bacteria concentrations which by far exceed ambient bacteria conditions found in many mountainous, coastal freshwater, and undisturbed surface waters in California, including in the Lahontan Region. Relying only on a fecal bacteria WQO threshold which is so far elevated above ambient surface water quality conditions may contribute to reductions in ambient water quality over time. This type of reduction in water quality could impact the high quality surface waters in the Lahontan Region, which may reduce the aesthetic, cultural, and recreational value of such waters.

As described in Section 3.8, the existence of two FIB WQOs for regional surface waters is creating challenges for some Water Board projects and programs. To remove these challenges, the Water Board should consider updating and streamlining the existing regulations by making amendments to the Basin Plan. Carefully crafted amendments would result in benefits to multiple processes, such as water quality assessments, the development of WQIPs and TMDLs, and several permitting processes that Board staff are engaged in.

3.10 Basin Plan amendment recommended

Based on the considerations detailed in Sections 3.1 through 3.8, and because of the findings of the analyses detailed in Section 3.9, bacteria regulations in the Lahontan Region should be amended to reflect modern FIB science. Amendments might include modernization of FIB (from fecal coliform to *E. coli*) and maintenance of the existing WQO threshold, inclusion of the language and thresholds pertaining to the *E. coli* WQO, a hybridized version of these two approaches, or a novel approach to bacteria regulation.

[Section 4](#) presents a variety of potential options given the considerations detailed in Section 3. All options should be considered as preliminary, and alterations, additions, or deletions can be made to any approach should that change better reflect the needs of the Water Board, inhabitants, and the environment of the Lahontan Region.

4. Project Options

This section presents an overview of some preliminary options for this project. Section 4.1 presents a brief analysis of the current narrative WQO and presents potential options for updating it. Section 4.2 provides details of some preliminary options for

amending numeric objectives. More possible options are described in Appendix A. Each numeric WQO option includes a table of pros and cons. The options presented in this document do not represent an exhaustive list of possibilities, but these options do represent some potential scenarios to achieve the project goals and considerations.

In line with developments related to microbial science and improved understanding of FIB referenced in [Section 3.5](#) of this document, each project option assumes that the fecal coliform *indicator* will be replaced with either *E. coli* FIB or an alternative FIB. This change only pertains to the indicator bacteria and does not always affect the numeric threshold of the WQO in the presented options.

4.1 Narrative WQOs

The existing narrative WQO for fecal bacteria for surface waters in the Lahontan Basin Plan is:

“Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.”

[Chapter 3 – 4](#)

The language of the narrative WQO is prescriptive, especially given the land uses and beneficial uses of water which occur throughout the Lahontan Region. For example, surface waters in numerous watersheds throughout the region are beneficially used for cattle grazing, which brings significant economic benefits to the region, but which also delivers coliform organisms to surface waters adjacent to such uses.

Given the adoption of the *E. coli* REC-1 WQO in 2018 by the State Water Board, some significant advancements in microbial science since the last revision of bacteria regulations in the Basin Plan, and several more decades of bacteria water quality monitoring by the Lahontan Water Board, there is potential to improve the existing narrative objective . The State Water Board adopted a bacteria WQO for REC-1 which allows some fecal bacteria pollution, either attributable to humans, livestock, or wildlife, without impairment to the REC-1 beneficial use. The fecal coliform numeric WQO presently in the Basin Plan also provides that some level of fecal pollution, albeit much less than the *E. coli* WQO, is permissible before WQOs are exceeded.

FIB data collected in the region indicates that some surface waters contain coliform organisms which could reasonably be attributable to humans or livestock, but such concentrations do not always impair beneficial uses. Microbial research has also found that not all coliform bacteria are valuable to indicate recent, harmful bacteria pollution. Thus, the existing narrative WQO in the Lahontan Basin Plan could be amended to match current scientific understanding.

4.1.1 Options for narrative WQOs

Given the premise that the present narrative WQO could be updated, there are likely two general approaches:

1. Remove the fecal bacteria narrative WQO from the Basin Plan;
2. Amend or replace the language of the existing narrative WQO to reflect desired conditions for fecal bacteria in surface waters

Pursuit of one of these options may be dependent on the approach pertaining to numeric WQOs. Because this approach is presently not known, a limited analysis of changes to the narrative WQO is offered here.

4.1.2 Removal of narrative WQO

Basin Plan users would rely solely on numeric objectives for fecal bacteria, which would be applicable for water quality assessments, permitting actions, and for the protection of Beneficial Uses. An advantage of removing the narrative WQO is that relying on an numeric objective would provide simplicity for the Basin Plan user and streamline permit requirements.

A disadvantage of removing the narrative WQO is that numeric objectives would not be backstopped by a “catch-all” protection in the Basin Plan. This may become an issue in specific cases where certain types of fecal bacteria water quality problems arise, or if different types of fecal bacteria water quality data other than those stipulated in the numeric WQOs are presented to the Water Board for evaluation and assessment. Issues may also arise in the future as water quality monitoring for fecal organisms, including pathogens and viruses, improves and existing numeric WQOs potentially become outmoded.

4.1.3 Amending or replacing the language of the narrative WQO

Editing or replacing the narrative WQO might benefit the Basin Plan by improving the language to match current scientific understanding. This might also provide some regulatory clarity to Basin Plan users. Narrative WQOs can also provide flexibility to ensure water quality protection. In the case of bacteria regulations, providing flexibility has utility in the landscape of ever-improving microbial science and advancements in water quality monitoring.

The North Coast Regional Water Quality Control Board (Region 1) Basin Plan contains a narrative WQO for bacteria:

“The bacteriological quality of waters of the North Coast Region shall not be degraded beyond natural background levels.”

[Region 1 Basin Plan, Chapter 3-3](#)

This statement provides Region 1 the flexibility to determine what “natural background” might be before determining if the objective is violated. The statement also recognizes that there will be differences in bacteria concentrations in different surface waters depending on (but not limited to) the type and population of wildlife, and other natural conditions which might occur in a watershed such as autochthonous bacteria populations residing in soils and stream sediments.

Other Water Board Regions, such as the San Francisco Bay Region and Los Angeles Region, use narratives to delineate a reference system approach to bacteria regulation. A reference system approach recognizes that natural sources of bacteria sometimes impact surface water quality to a level that might exceed numeric WQOs. Under this approach all anthropogenic sources of bacteria in certain surface waters are controlled, and the remaining bacteria concentrations in that surface water are compared to those in a reference waterbody, which is a surface water that has been minimally impacted by anthropogenic activities.

Should the Lahontan Water Board elect to amend or replace the language of the narrative bacteria WQO the Board would have wide discretion regarding the type and content of the amendment. The Board may look to other Regional Board Basin Plans and other related literature if such an amendment is determined as an appropriate course of action.

4.2 Numeric WQOs

This part of Section 4 presents several options for making changes to the numeric WQOs for FIB. The potential scenarios for narrative WQOs described in [Section 4.1](#) could be combined with any of the options for numeric WQOs presented in the following subsections. Table 4.1 presents a brief description of possible project options together with a matrix describing what application of such option would achieve. The four options (nos. 1 through 4) are described in detail below Table 4.1. The other project options are described in Appendix A.

Table 4.1 Matrix of Project Options for numeric WQO amendments

Project Option Number & Description	Includes REC-1 <i>E.coli</i> WQO in Basin Plan	Changes fecal coliform WQO to <i>E. coli</i> FIB	Applies Region-wide	Provides antidegradation benchmark for high-quality waters	Develops new BU or new subcategory of BU for high quality waters	Develops new WQO
Option 1: Amend the Basin Plan to include the Statewide <i>E. coli</i> WQO for the protection of REC-1	X		X			
Option 2: Amend the Lahontan Region Basin Plan to include the Statewide <i>E. coli</i> WQO for the protection of REC-1. Amend the existing fecal coliform WQO to use <i>E. coli</i> FIB and apply the updated WQO specifically for the protection of the MUN BU	X	X	X			
Option 3: Amend the Lahontan Region Basin Plan to include the Statewide <i>E. coli</i> WQO for the protection of REC-1. Amend the existing Basin Plan fecal coliform WQO to use <i>E. coli</i> FIB and apply only to specific regional surface waters	X	X	X ⁴			
Option 4: Amend the Lahontan Region Basin Plan to include the Statewide <i>E. coli</i> WQO for the protection of REC-1 & provide an antidegradation benchmark for fecal bacteria for high-quality waters	X		X ⁴	X		

⁴ Certain elements of this option apply regionwide

Project Option Number & Description	Includes REC-1 <i>E.coli</i> WQO in Basin Plan	Changes fecal coliform WQO to <i>E. coli</i> FIB	Applies Region-wide	Provides antidegradation benchmark for high-quality waters	Develops new BU or new subcategory of BU for high quality waters	Develops new WQO
Option 5: Amend the Lahontan Region Basin Plan to include the new Statewide <i>E. coli</i> WQO for the protection of REC-1. Develop elevation-based FIB regulations to reflect elevation-dependent changes to uses of surface waters	X	X			X	
Option 6a: Amend the Lahontan Region Basin Plan to include the new Statewide <i>E. coli</i> WQO for the protection of REC-1. Develop a new Beneficial Use and WQO based on <i>E. coli</i> for high-quality surface waters in the Lahontan Region	X		X ⁴		X	X
Option 6b: Amend the Lahontan Region Basin Plan to include the new Statewide <i>E. coli</i> WQO for the protection of REC-1. Create a subset of an existing Beneficial use to reflect uses in high-quality waters and assign a new <i>E. coli</i> WQO reflective of bacteria conditions in such waters	X		X ⁴		X	X
Option 7a: Develop a new FIB WQO based on alternative fecal indicators			X			X
Option 7b: Develop new WQOs based on novel approaches to fecal bacteria water quality monitoring			X			X
Option 8: Take no action. Basin Plan fecal coliform WQO remains in place			X			

4.2.1 Numeric WQO Option 1

Amend the Basin Plan to include the Statewide E. coli WQO for the protection of REC-1

This project option would amend the Basin Plan to include the new Statewide *E. coli* WQO for the protection of the REC-1 BU and delete the existing regionwide WQO. The language regarding *E. coli* WQO is found in *Section III.E.2* of [Part 3 of the Water Quality Control Plan Inland Surface Waters, Enclosed Bays, and Estuaries \(ISWEBE\)](#).

This would be the only amendment made to the Lahontan Basin Plan in this option. High-quality waters in the Lahontan Region would be subject to [State Water Board Resolution 68-16 Statement of Policy with Respect to Maintaining High Quality Waters of California](#) for regulatory analyses. Any future antidegradation analyses would begin with an evaluation of existing high quality conditions for a certain surface water.

Table 4.2 Project Option 1 advantages and disadvantages analysis

Advantages of Project Option 1	Disadvantages of Project Option 1
<ul style="list-style-type: none"> • Consistent with State Board 2018 Bacteria Objectives for the protection of the REC-1 BU • <i>E. coli</i> FIB is consistent with modern microbial scientific recommendations concerning indicators • This Basin Plan amendment would remove some of the regulatory challenges described in Section 3. • Clarity for CWA Section 303(d) assessments • Achieves 2018 Triennial Review Item #1 	<ul style="list-style-type: none"> • High-quality waters in the Region will be subject to degradation up to the <i>E. coli</i> WQO threshold • Future permit conditions may be based on the <i>E. coli</i> REC-1 WQO, potentially leading to poorer water quality resulting from permitted activities. • Institutional knowledge regarding bacteria water quality in the Lahontan Region will not be retained in the Basin Plan. This knowledge could be lost to future generations • This option may not be protective of the MUN BU.

4.2.2 Numeric WQO Option 2

Amend the Lahontan Region Basin Plan to include the Statewide E. coli WQO for the protection of REC-1. Amend the existing fecal coliform WQO to use E. coli FIB and designate the updated WQO specifically for the protection of the MUN BU

This project option would amend the Basin Plan to include the new Statewide *E. coli* WQO for the protection of the REC-1 BU. The language regarding this WQO is found in

Section III.E.2 of [Part 3 of the Water Quality Control Plan Inland Surface Waters, Enclosed Bays, and Estuaries \(ISWEBE\)](#).

This option would also amend the existing Basin Plan fecal coliform WQO to use *E. coli* FIB. Fecal coliform and *E. coli* bacteria are from the same coliform bacteria family, and *E. coli* populations are approximately 90% of fecal coliform populations.

The updated, *E. coli* based WQO will be specifically designated to protect the MUN BU in surface waters where this use is designated. The WQO would be applicable for 303(d) assessments and would be an enforceable WQO.

Table 4.3 Project Option 2 advantages and disadvantages analysis

Advantages of Project Option 2	Disadvantages of Project Option 2
<ul style="list-style-type: none"> • Amendment includes the State Board 2018 Bacteria Objectives for the protection of the REC-1 BU • The option retains the threshold of the existing Basin Plan bacteria water quality regulations • High-quality waters remain protected by existing Basin Plan threshold • Achieves 2018 Triennial Review Item #1 	<ul style="list-style-type: none"> • CWA 303(d) assessments for FIB would require clear messaging regarding BUs assessed Protects MUN beneficial use with a more stringent WQO than the REC-1 use • Certain surface waters may be routinely determined as impaired for the MUN use.

4.2.3 [Numeric WQO Option 3](#)

*Amend the Lahontan Region Basin Plan to include the Statewide *E. coli* WQO for the protection of REC-1. Additionally, amend the existing Basin Plan fecal coliform WQO to use *E. coli* FIB and apply this objective to specific waters*

This project option would amend the Basin Plan to include the new Statewide *E. coli* WQO for the protection of the REC-1 BU. The language regarding this WQO is found in Section III.E.2 of [Part 3 of the Water Quality Control Plan Inland Surface Waters, Enclosed Bays, and Estuaries \(ISWEBE\)](#).

Similarly to [Project Option 2](#), this option would amend the existing Basin Plan fecal coliform WQO to use the *E. coli* indicator. The amendment would maintain the existing WQO threshold. Stakeholders have expressed concerns that anthropogenic uses⁵

⁵ Anthropogenic alterations include, but are not limited to, urban development, agriculture, recreation activities, industrial processes such a mining, etc. Some such anthropogenic alterations have been in place for more than 150 years, for example: grazing in the Bridgeport Valley.

preclude the attainment of this WQO threshold in certain waterbodies. Unlike Option 2, this option would not directly associate the WQO with the MUN BU. The WQO would remain applicable to all surface waters in the Lahontan Region. This option would remove or amend the threshold in specific surface waters where that change can be justified.

Table 4.4 Project Option 3 advantages and disadvantages analysis

Advantages of Project Option 3	Disadvantages of Project Option 3
<ul style="list-style-type: none"> • Amendment includes the State Board 2018 Bacteria Objectives for the protection of the REC-1 BU • Amends FIB in the Lahontan Basin Plan to reflect modern microbial scientific recommendations concerning indicators • Provides some regulatory clarity for anthropogenic activities in specific watersheds in the Region • High-quality waters remain protected by existing Lahontan Basin Plan FIB threshold • Achieves 2018 Triennial Review Item #1 	<ul style="list-style-type: none"> • Some communication challenges may remain • High quality water may not be maintained • MUN beneficial use may not be protected in waters where only the <i>E. coli</i> REC-1 WQO applies

4.2.4 Numeric WQO Option 4

*Amend the Lahontan Region Basin Plan to include the Statewide *E. coli* WQO for the protection of REC-1. Remove fecal coliform FIB and WQO threshold. Replace this threshold with an antidegradation benchmark for *E. coli* FIB specifically for high-quality waters*

This project option would amend the Basin Plan to include the new Statewide *E. coli* WQO for the protection of the REC-1 BU. The language regarding this WQO is found in Section III.E.2 of [Part 3 of the Water Quality Control Plan Inland Surface Waters, Enclosed Bays, and Estuaries \(ISWEBE\)](#). The fecal coliform FIB and WQO threshold would be removed in this amendment.

This option would also provide an antidegradation-focused numeric benchmark for high-quality Lahontan Region surface waters. The numeric benchmark will be included in Chapter 4 of the Basin Plan together with information detailing to which surface waters it will apply. The benchmark would reflect ambient *E. coli* bacteria water quality for surface waters in watersheds with little or no anthropogenic changes to natural land

uses. The benchmark would be developed from a more than twelve-year *E. coli* dataset collected by the Water Board from many, diverse surface waters throughout the region. The benchmark would not be a water quality objective and would not apply for 303(d) assessment purposes.

The numeric benchmark would be a tool for future antidegradation analyses, and a mechanism to retain institutional knowledge regarding the ambient bacterial quality of Lahontan Region surface waters. The benchmark would also be useful to external interested parties seeking information about ambient FIB conditions in the Lahontan Region.

The goal of a numeric benchmark is to recognize and maintain high-quality waters. Such waters are valuable for recreational, cultural, and ecological uses, and bacteria water quality in these waters not only supports designated beneficial uses but also enhances the quality of those uses.

Table 4.5 Project Option 4 advantages and disadvantages analysis

Advantages of Project Option 4	Disadvantages of Project Option 4
<ul style="list-style-type: none"> • Amendment includes the State Board 2018 Bacteria Objectives for the protection of the REC-1 BU • Removes the regulatory challenges described in Section 3 • Recognizes high-quality water resources in the Lahontan Region with a specific benchmark designed to assist in maintenance of such waters • Retains institutional knowledge regarding ambient water quality conditions • Improves clarity of CWA 303(d) assessments • Achieves 2018 Triennial Review Item #1 	<ul style="list-style-type: none"> • Benchmark(s) may become outdated if water quality conditions improve. Future updates may be needed • Guidance for antidegradation analyses and the use of the benchmarks may be required • Option may be challenging to communicate to interested parties

5. Public Participation

Public participation is integral to the success of the project. To this end, project staff have begun the public engagement process, through a series of public engagement

surveys, by planning a series of in-person workshops around the Region (which were postponed due to COVID-19 concerns), and most recently through an interactive meeting held remotely online. This section will detail the Public Participation efforts taken by project staff to-date.

5.1 January 2020 Public Engagement Survey

On January 22, 2020 project staff circulated a public survey to several Lahontan Region email list-serve lists. The public survey was also circulated to a list of contacts who had previously expressed an interest in this planning project. A copy of the survey is available in Appendix B.

The goal of the survey was to determine which organizations and individuals in the region might have interest in the project. The survey also asked if there were specific surface waters that interested parties would like to focus on. Information was collected regarding the level of understanding of FIB water quality and Indicator Bacteria WQOs, and respondents were asked to indicate their interest in a series of public workshops during the Spring of 2020. The survey included questions related to how actively interested parties intended to participate in the project, and whether survey respondents possessed data and information pertinent to the planning process.

A total of 78 geographically representative responses were collected through the January survey. Responses were collected from a variety of interest groups, representing Tribes, government organizations, agriculture and grazing interests, landowners, nongovernmental organizations, the academic community, recreation enthusiasts, and private individuals. Generally, respondents indicated that they would like to be involved in the project, and most indicated at least some level of familiarity with fecal bacteria water quality and WQOs. Most respondents indicated that they would attend an in-person workshop, either in Susanville, South Lake Tahoe, Bishop, or Victorville. No respondents provided new data or information pertinent to the project via their survey responses.

Survey responses supported project staff assumptions that there was interest in this project from throughout the Lahontan Region and that there would be a group of actively interested parties. Based on these responses, staff determined that a series of in-person meetings in Spring 2020 were warranted.

5.2 March 2020 Public Workshops

Project staff organized a series of four public workshops scheduled for late-March 2020. The intent of the workshops was to formally introduce the project to interested parties, and to provide a forum for the public to ask questions of staff related to fecal bacteria water quality. The workshops were to take place at the Mojave Water Agency in Apple

Valley on March 24th, at the Eastern Sierra County Fair in Bishop on March 25th, at the Lahontan Water Board offices in South Lake Tahoe on March 26th, and at the Lassen County Fair on March 30th, 2020.

Staff planned to provide a presentation to introduce the project, followed by a public question and answer session during which a panel of subject matter experts would answer questions from the public. The panel consisted of Water Board staff, staff from the State Water Boards Office of Public Participation (OPP) and the Office of Information Management and Analysis (OIMA), by County Public Health officials from counties where the meetings would be held, and by experts in fecal bacteria water quality from the Southern California Coastal Water Research Project (SCCWRP).

[Notices](#) regarding the public workshops were circulated via email through the Water Board's listserv service, sent via email to a list of project contacts, circulated to Tribes in the Lahontan Region via paper mail, and posted on the [Lahontan Water Boards website](#). Project staff planned the workshops as a forum to facilitate information exchange, both about the project from staff to interested parties, and from interested parties to staff.

On March 19th, 2020 Governor Newsom issued a [Stay at Home Order](#) to protect Public Health and slow the spread of the novel COVID-19 coronavirus. The Stay at Home Order resulted in Water Board staff indefinitely postponing the public workshops for the project. [Notices of postponement](#) were circulated via the same channels as the original meeting notices.

Materials related to the planned March 2020 public workshops can be found in Appendix C.

5.3 May 2020 Public Engagement Survey

After the indefinite postponement of the public workshops scheduled for March, in May 2020 staff circulated a second public engagement survey. The intent of this survey was to determine if it was appropriate for the evaluation project to immediately continue given the Stay at Home Orders and the considerable anxiety created by the COVID-19 global pandemic. If interested parties felt comfortable continuing to engage in this project despite the public health emergency, the survey asked respondents to indicate their preferred methods of information transfer given no in-person meetings could take place. Respondents could choose between a live, interactive webinar including a question and answer session, a series of newsletters and factsheets about the project circulated by email and US postal mail, a recorded video presentation with an opportunity to ask questions of staff via telephone or email at a later date, or a webpage

containing project information. The survey also provided an option for respondents to suggest their own approach to engage project staff.

The May 2020 survey received 50 responses. Respondents overwhelmingly indicated that they were prepared to continue to engage with staff on this project despite the pandemic, and that a hybrid approach of a webpage, prerecorded information video presentations, and live, interactive, online meetings would be sufficient to do so. The survey questions can be found in Appendix D.

5.4 July 2020 Information Video Presentation

Based on the responses to the May public engagement survey, staff prepared an [information video presentation](#) which was circulated via email and posted on the [project webpage](#). The intent of the video presentation was to introduce the project to interested parties and to provide background information regarding the Basin Plan, fecal bacteria WQOs, BU's, and to introduce some potential options for the project. The video also provided background information to inform a live, interactive, online meeting between staff and interested parties in August 2020.

To complement the video presentation, staff also developed a [Frequently Asked Questions \(FAQ\) document](#) for the project and posted this document along with the video and [slides from the video presentation](#) on the project webpage. In anticipation of questions from interested parties, staff also set up a dedicated project email address, LahontanBacteriaObjectives@waterboards.ca.gov.

The video presentation is approximately forty minutes long and was [circulated on July 16th, 2020](#) together with a notice for the August 2020 public workshop. Prior to the public workshop, the video was viewed approximately 114 times. Slides from the video presentation, the FAQ document, and the circulation notice can be found in Appendix E.

5.5 August 2020 Public Workshop

On Wednesday, On August 5th, 2020 at 6:00p.m., staff hosted a public workshop regarding the project. All meeting attendees and staff participated remotely via the Zoom online platform or watched the meeting through the CalEPA's meeting webcast service to observe social distancing protocols resulting from the COVID-19 public health emergency. The purpose of the workshop was to discuss elements of the Project prefaced in the video presentation, and to provide a public forum for interested parties to ask questions of staff and provide staff with their observations regarding bacteria water quality objectives and bacteria water quality in the Lahontan Region. The meeting was recorded and [the recording](#) and the [meeting notes](#) are available on the Project webpage. A copy of the meeting notes is included in Appendix F.

The 90-minute meeting was attended by thirty-nine individuals, nineteen of whom actively participated through the Zoom online platform and twenty who watched the meeting via webcast. Attendee affiliations included two Native American Tribes – the Bishop Paiute Tribe and the Big Pine Paiute Tribe, private citizens with interests in bacteria water quality, staff from external organizations such as the California Cattlemen’s Association, Los Angeles Department of Water and Power, county governments, legal representatives from ranching interests, private consultancy firms, and Water Board staff with interests in the Project.

Questions and comments submitted during the meeting came from private citizens, consultancy firms, a lawyer for Centennial Livestock of Bridgeport Valley in Mono County, and the Inyo/Mono Agricultural Commissioner. Question topics included technical aspects of potential project options, antidegradation concerns, clarifications on bacteria water quality and fecal indicator bacteria, and a likely timeline for the Project. Comments made by meeting attendees highlighted the outstanding water quality of many regional surface waters, underlined the value of water contact recreation in the Lahontan Region, and voiced a desire to ensure continued bacteria protections for such waters. One commenter also offered a potential project scenario based on elevation for staff to consider.

A total of twelve Water Board staff were actively involved in planning and executing the event, including Region 6 Planning and Assessment Unit, Cannabis Unit, and Enforcement Unit staff, staff from the State Water Board’s OIMA, OPP, and Office of Chief Counsel, and staff from CalRecycle’s Audio/Visual Services office who facilitated the meeting webcast. Staff filled a variety of roles, including public facing project technical experts and meeting facilitators, and behind-the-scenes roles to ensure the workshop progressed as planned.

The workshop notice, presentation slides, and meeting notes can be found in Appendix F. The recording of the meeting is available on the [project webpage](#).

5.6 Future opportunities for public engagement

The next official opportunity for interested parties to engage with this project will be at the January 13th & 14th, 2021 Lahontan Water Board meeting. At the meeting the Board will hear an information item regarding the project. Project staff actively encouraged participation in the Water Board process at the August 2020 public workshop. At the workshop staff also encouraged those with interests, concerns, or ideas about the project to contact project staff directly to discuss such issues at their convenience. To date, staff have not received any additional feedback from interested parties related to the project.

Following the January 2021 Board meeting, public engagement will next occur as the project begins the scoping phase under the California Environmental Quality Act (CEQA). Scoping is tentatively scheduled for late Spring 2021 and will include a series of Tribal consultations and public meetings designed to provide information related to the evaluation project.

6. Project Timeline

The intent of the workshop item presented to the Water Board at the January 2021 Board meeting is to provide Board members with information about the project, and to present the preliminary project options outlined in [Section 4](#). The Board may give direction to staff during the workshop regarding which option(s) should be further developed for possible consideration by the Board at a future date.

Once an option(s) for the project has been identified for further development, staff will begin the Basin Plan Amendment (BPA) process, starting with CEQA scoping. If Project Options 1 through 4 are selected as the preferred option to amend the Basin Plan, staff tentatively expect a BPA resulting from this project in November 2022. Should the variations of Options 5 through 8 be selected, staff expect a longer timeline to amend the Basin Plan. Figure 6.1 provides details of the project timeline based on selection of Options 1 through 4, including tasks that have been completed to date. Tasks still to be completed are subject to change.

7. List of References

**Copies of references which do not include a webpage link are available by request*

Water Quality Control Plan for the Lahontan Region ([Basin Plan](#))

Water Quality Control Plan Report, North Lahontan Basin (6A), Lahontan Water Quality Control Board

Water Quality Control Plan for the Los Angeles Region ([Basin Plan](#))

Water Quality Control Plan for the North Coast Region ([Basin Plan](#))

Water Quality Control Plan for the San Francisco Bay Basin ([Basin Plan](#))

Recreational Water Quality Criteria, **2012** [U.S. EPA Office of Water 820-F-12-058](#)

Part III of the Water Quality Control Plan for the Inland Surface Waters, Enclosed Bays, and Estuaries of California – [Bacteria Provisions and a Water Quality Standards Variance Policy](#)

Statement of Policy with respect to Maintaining High Quality of Waters in California (Antidegradation Policy), State Water Resources Control Board, [Resolution No. 68-16](#)

Report of the Committee on Water Quality Criteria, National Technical Advisory Committee, **1968**. [U.S EPA Archives](#)

Water Quality Standards Criteria Digest: A Compilation of Federal/State Criteria on Bacteria, **1972** U.S EPA

State Board Guidance Memos for Development of 1975 Basin Plan, **1973**.

Policy entitled 'Sources Of Drinking Water', State Water Resources Control Board, [Resolution No. 88-63](#)

Incorporation of "Sources of Drinking Water" Policy into the Water Quality Control Plan for the Lahontan Region, Regional Board Resolution 6-89-94

Clean Water Act Sections 305(b) and 303(d) 2018 Integrated Report for the Lahontan Region, **2018** [Staff Report](#) and [website](#)

C. Nilson, T. Suk et al. **2012**. Bacteria Monitoring in the Eastern Sierra Nevada: Summary of Results for 2011. [Lahontan Water Quality Control Board](#)

R. Knapp, C. Nelson. **2015.** Assessment of Bacterial Water Quality in the Lahontan Region. [Water Board Contract Number 12-067-160](#)

R. Knapp, C. Nelson. **2016.** Microbial Source Tracking (MST) at Bacteria-Impaired Waters of the Lahontan Region. [Water Board Contract Number 13-054-160](#)

Appendix A: Project Options descriptions

Numeric WQO Option 5: Develop elevation-based FIB regulations to reflect elevation-dependent changes to uses of surface waters

This project option would develop an elevation-based approach to FIB regulation, with more stringent protections given to surface waters at higher elevations where fecal bacteria concentrations are typically lower. This project option would also amend the Basin Plan to include the new Statewide *E. coli* WQO for the protection of the REC-1 BU. The language regarding this WQO is found in *Section III.E.2* of [Part 3 of the Water Quality Control Plan Inland Surface Waters, Enclosed Bays, and Estuaries \(ISWEBE\)](#).

Lahontan Region surface waters found at elevation (typically above ~6000ft above sea level) can often be classed as high-quality for fecal bacteria because these portions of the Region typically have negligible bacteria inputs from wildlife or human uses. Lower elevation surface waters typically carry higher volumes of fecal wastes because lands surrounding these waters have often been developed for anthropogenic uses including residential, agricultural, municipal, and industrial use. In some instances, there are also larger populations of wildlife at lower elevations, and such populations could contribute fecal bacteria to surface waters in these areas.

Table 4.5 Project Option 5 advantages and disadvantages analysis

Advantages of Project Option 5	Disadvantages of Project Option 5
<ul style="list-style-type: none">• Improvement of CWA Section 303(d) assessments• Achieves 2018 Triennial Review Item #1• Resulting WQOs would provide regulatory clarity• Recognition of valuable, high-quality water resources	<ul style="list-style-type: none">• Elevation-driven analysis of surface waters likely to be a resource intensive process• A “one-size-fits-all” approach may not be appropriate given watershed-scale differences in land uses, wildlife activity, and available data

Numeric WQO Option 6a: Amend the Lahontan Region Basin Plan to include the new Statewide *E. coli* WQO for the protection of REC-1. Develop a new Beneficial Use and WQO based on *E. coli* for high-quality surface waters in the Lahontan Region

This project option would amend the Basin Plan to include the new Statewide *E. coli* WQO for the protection of the REC-1 BU. The language regarding this WQO is found in

Section III.E.2 of [Part 3 of the Water Quality Control Plan Inland Surface Waters, Enclosed Bays, and Estuaries \(ISWEBE\)](#).

This option would also develop a new BU that captures uses which are enhanced by their occurrence in undisturbed areas and/or other high-quality surface waters of the Region. Examples of a new BU include “Enhanced Recreation”, “Enhanced Cultural Uses” or “Natural Waters”. The new BU will be protected with a numeric, *E. coli*-based WQO developed from a bacteria dataset collected by the Water Board. Based on initial evaluation of these data, a new WQO threshold may be similar to the existing fecal coliform WQO presently found in the Lahontan Basin Plan.

The new BU and WQO would be designated to surface waters in the Region where ambient water quality enhances beneficial uses in those surface waters. Such surface waters generally have FIB concentrations far below the Statewide *E. coli* REC-1 WQO threshold.

Table 4.6 Project Option 6a advantages and disadvantages analysis

Advantages of Project Option 6a	Disadvantages of Project Option 6a
<ul style="list-style-type: none"> • Consistent with State Board 2018 Bacteria Objectives for the protection of the REC-1 BU • Provision of regulatory clarity • Improvement of CWA Section 303(d) assessments • Achieves 2018 Triennial Review Item #1 • Designation of new BU and WQO will reflect use of water in the Region and protect high-quality waters 	<ul style="list-style-type: none"> • Development and designation of a new BU and WQO will be a resource intensive process • Stepwise deployment of Basin Plan amendments might result in gaps of water quality protection for an unknown period

Numeric WQO Option 6b: Amend the Lahontan Region Basin Plan to include the new Statewide *E. coli* WQO for the protection of REC-1. Create a subset of an existing Beneficial use to reflect uses in high-quality waters and assign a new *E. coli* WQO reflective of bacteria conditions in such waters.

This project option has similarities with [Project Option 6a](#). However, unlike *Project Option 6a*, rather than developing a new BU, this option would instead subset an existing BU and protect the amended BU with an *E. coli* FIB WQO developed from the Lahontan Region’s *E. coli* dataset. Potential BUs that could be subset may include Freshwater Replenishment (FRSH), Water Contact Recreation (REC-1), Noncontact

Water Recreation (REC-2), or Wildlife Habitat (WILD). The new WQO would be similar to the existing fecal coliform WQO of the Lahontan Basin Plan.

Table 4.7 Project Option 6b advantages and disadvantages analysis

Advantages of Project Option 6b	Disadvantages of Project Option 6b
<ul style="list-style-type: none"> • Consistent with State Board 2018 Bacteria Objectives for the protection of the REC-1 BU • Updated FIB in the Lahontan Basin Plan to reflect modern microbial scientific recommendations concerning indicators • Basin Plan amendment would provide some regulatory clarity • Improvement of CWA Section 303(d) assessments • Achieves 2018 Triennial Review Item #1 	<ul style="list-style-type: none"> • Development and designation of a subset BU and WQO will be a resource intensive process • Subset BU may not accurately capture uses occurring in Regional surface waters • Stepwise approach for the Project Option could result in gaps of water quality protection for an unknown period

Numeric WQO Option 7a: Develop a new FIB WQO based on alternative fecal indicators

This project option would replace the existing fecal coliform WQO of the Lahontan Basin Plan with a brand new WQO based on FIB different from *E. coli*, such as *Bacteroidales*, *Clostridium perfringens*, or coliphages. Development of a new objective would be in accordance with Section 6.2.3 of U.S. EPA’s [2012 Recreational Water Quality Criteria document](#) and the 2014 [Guide to the Site-Specific Alternative Recreational Criteria Technical Support Materials](#). The new WQO would apply to determine attainment of the REC-1 BU or to a new, as-yet-undeveloped BU.

Table 4.8 Project Option 7a advantages and disadvantages analysis

Advantages of Project Option 7a	Disadvantages of Project Option 7a
<ul style="list-style-type: none"> • Resulting WQOs would provide regulatory clarity • Improvement of CWA Section 303(d) assessments • Achieves 2018 Triennial Review Item #1 • Inclusion of state-of-the-art science in Lahontan Basin Plan 	<ul style="list-style-type: none"> • Inconsistent with Statewide <i>E. coli</i> WQOs • Alternative Criteria development is a resource intensive process with no guarantees • Process would require independent expert review • WQO development would likely be a slow process requiring gathering

	<p>of new FIB datasets from Regional surface waters</p> <ul style="list-style-type: none"> • Significant financial investment would likely be required
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Numeric WQO Option 7b: Develop new WQOs based on novel approaches to fecal bacteria water quality monitoring

This project option would develop an alternative WQO based on emerging methods of water quality monitoring for fecal bacteria. Such methods include quantitative Polymerase Chain Reaction (qPCR) and [Quantitative Microbial Risk Assessment \(QMRA\)](#). These methods offer alternative approaches to determine public health risks from fecal contamination of Lahontan Region surface waters. A new WQO would be applied for the protection of the REC-1 BU, or to an as-yet-undetermined BU.

Table 4.9 Project Option 7b advantages and disadvantages analysis

Advantages of Project Option 7b	Disadvantages of Project Option 7b
<ul style="list-style-type: none"> • Resulting WQOs would provide regulatory clarity • Improvement of CWA Section 303(d) assessments • Achieves 2018 Triennial Review Item #1 • Inclusion of state-of-the-art science in Lahontan Basin Plan 	<ul style="list-style-type: none"> • Inconsistent with Statewide <i>E. coli</i> WQOs • Alternative Criteria development is a resource intensive process with no guarantees • Process would require independent expert review • WQO development would likely be a slow process requiring gathering of new FIB datasets from Regional surface waters • Significant financial investment would likely be required

Numeric WQO Option 8: Take no action. Basin Plan fecal coliform WQO remains in place

Under this project option, no action would be taken to update the Basin Plan fecal bacteria WQO. [The issues described earlier](#) in this document would remain.

Table 4.10 Project Option 8 advantages and disadvantages analysis

Advantages of Project Option 8	Disadvantages of Project Option 8
<ul style="list-style-type: none"> • Maintains existing water quality protections in the Lahontan Region 	<ul style="list-style-type: none"> • Ongoing issues for CWA 303(d) assessments

	<ul style="list-style-type: none">• Continued issues with regulatory clarity• Continued use of outdated science regarding FIB
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Appendix B
January 2020 Notice of Project & Public Survey

Lahontan Regional Water Quality Control Board

TO: All interested parties or persons

**FROM: PLANNING AND ASSESSMENT UNIT
LAHONTAN WATER QUALITY CONTROL BOARD**

DATE: 1/22/2020

**SUBJECT: NOTICE OF LAHONTAN REGION BASIN PLANNING PROJECT:
BACTERIA WATER QUALITY OBJECTIVE EVALUATION**

The Lahontan Regional Water Quality Control Board (Water Board) is evaluating the fecal indicator bacteria water quality objective (WQO) contained in the Water Quality Control Plan for the Lahontan Region (Basin Plan). The Water Board is evaluating this WQO in light of the August 2018 adoption of another indicator bacteria WQO by the State Water Resources Control Board specifically to protect the Water Contact Recreation (REC-1) beneficial use. The new REC-1 WQO uses *Escherichia Coli* (*E. coli*) to indicate the likely presence of fecal matter in surface waters. The Water Board is seeking to engage with Lahontan regional stakeholders and interested parties or persons so that a comprehensive evaluation of the current fecal coliform objective can be completed.

The existing Lahontan Region Basin Plan fecal indicator bacteria WQO uses fecal coliform to indicate the likely presence of fecal matter in regional surface waters. The WQO is a two-part numeric objective, the first part of which uses a log-mean calculation of fecal coliform data collected from the same monitoring location in the same 30-day period. This part of the objective is set at 20 colony-forming-units (CFU) per 100 milliliters (mL) of sample water. The second part of the objective is a statistical calculation where no more than 10% of samples collected during the same 30-day period may exceed 40CFU/100mL of sample water. This part of the objective is applied when there is insufficient data to calculate a log-mean. The WQO applies to all surface waters and wetlands in the Lahontan region. The newly adopted *E. coli* WQO to protect the REC-1 beneficial use is also written in two parts: the first is a geometric mean calculation of “generally not less than five samples distributed over a six week period” and is set as 100CFU/100mL of sample water. The second part is a statistical threshold

value, applied when insufficient data is available to calculate a geometric mean, and is set as no more than 10% of samples exceeding 320CFU/100mL in a calendar month. The *E. coli* WQO applies to all Lahontan Region surface waters where the REC-1 beneficial use is designated.

Surface waters contaminated by fecal matter present a human health concern because pathogens and viruses which can be harmful to human health are shed with fecal matter and can be transmitted to people via contact with contaminated water. The presence of fecal matter in surface waters also contributes to environmental degradation. In light of the recently adopted *E. coli* objective to protect the REC-1 beneficial use and because of the significant human health risks associated with fecal contamination of surface waters, the Water Board has made evaluation of the current Basin Plan fecal bacteria WQO a top planning priority.

The Water Board is requesting your participation in a [short survey regarding fecal indicator bacteria WQOs](#). Participation in the survey should take approximately 5 minutes. Your responses will help the Water Board focus the agency's comprehensive evaluation of the fecal bacteria WQO for the Lahontan Region. Survey responses will also be used to focus future stakeholder meetings and ensure that, to the extent feasible, the Water Board is able to address all issues and concerns raised throughout the evaluation process. The Water Board intends to hold a series of public meetings throughout the Lahontan Region regarding the bacteria objective evaluation project in March of 2020. Notices of these meetings will be circulated at a later date.

If you are aware of another individual or organization that may be interested in participating in the WQO evaluation, please forward this notice and link to the survey to them.

[The bacteria evaluation project survey can be found at this link](#), or at <https://www.surveymonkey.com/r/NZYTTYJ>. **The survey will be available until Friday February 28th, 2020 at 5.00pm.**

Future notices regarding the Bacteria Water Quality Objective Evaluation Project will be circulated via the [Basin Planning – Regionwide](#) email list. If you are not already a member of this list, please go to https://www.waterboards.ca.gov/resources/email_subscriptions/reg6_subscribe.html, enter your contact information and check “Basin Planning – Regionwide” to subscribe.

The Water Board thanks you in advance for your participation in this survey and looks forward to collaborating with interested parties in the region.

January 2020 Public Survey Questions

1) What is your first and last name?

(Your name and contact information will NOT be distributed. We are asking for this information so that we may follow-up with interested parties and gain additional information to your responses. If you do not want to be contacted in the future, skip question #2).

2) Are you an individual or organization that would like to be actively involved in the bacteria water quality objectives evaluation project?

- Yes, I am an individual
- Yes, I represent an organization
- No, I would not like to be actively involved

3) Which of the following groups do you most closely associate with or represent? Use the comment box below to specify your particular area of interest or applicable sub-category.

1. Government Organization or Resource Conservation District
2. Tribal government
3. Industry (Grazing)
4. Industry (Pack animals or equestrian)
5. Industry (Timber or other)
6. Water purveyor
7. Landowner
8. Environmental Protection
9. Recreation
10. Other or individual

4) Please indicate your level of interest regarding the bacteria water quality objective evaluation project.

1. Not interested
2. Somewhat interested
3. Interested, but I have limited time to engage with the Water Board
4. Interested, and I have some concerns I would like to share
5. Very interested. I would like to be an active stakeholder

5) What is your understanding of fecal indicator bacteria and fecal bacteria water quality objectives?

1. I know nothing about this subject
2. I am aware of indicator bacteria but would like to know more
3. I have some cursory knowledge about fecal indicator bacteria and related objectives
4. I have working knowledge of fecal indicator bacteria and bacteria water quality objectives
5. I am a researcher or water quality professional with good understanding of fecal indicator bacteria and related water quality objectives

6) Given the choice, would you favor the current Lahontan Region fecal coliform objective of 20CFU/100mL or the statewide *E. coli* objectives of 100CFU/100mL?

- I favor the existing Lahontan Basin Plan fecal coliform objective
- I favor the statewide *E. coli* objective
- I do not have a preference between the two objectives

7) Are you interested in attending an initial project outreach meeting in one of the following locations in Spring 2020?

1. Bishop
2. Susanville
3. South Lake Tahoe
4. Victorville
5. I am not interested in attending a project meeting in Spring 2020.

8) Do you have data and/or information pertaining to the bacterial quality of the Lahontan Regions' surface waters that you are willing to share with the Water Board?

(Please indicate yes or no. Staff will contact you directly to arrange data or information transfer should you indicate yes. Data submitted to the Water Board for this project will not be used beyond the bacteria evaluation project without the express consent of the data provider.)

1. Yes
2. No

9) Do you have an interest in a specific geographic portion of the Lahontan Region, or an interest in specific waterbodies? Are there certain waterbodies where you think the fecal coliform 20CFU/100mL objective or the *E. coli* 100CFU/100mL should specifically apply?

10) Do you know of another person or organization who may be interested in this project? Use the comment box to share contact information of the person or organization that may be interested (Contact information will ONLY be used to contact potential interested party. Contact information will NOT be distributed).

1. Yes (please enter contact information in text box below)
2. No

Appendix C
March 2020 Public Workshop Notice



Lahontan Regional Water Quality Control Board

NOTICE OF PUBLIC WORKSHOPS

LAHONTAN REGION BASIN PLANNING PROJECT

BACTERIA WATER QUALITY OBJECTIVE EVALUATION

The Lahontan Regional Water Quality Control Board (Regional Board) will host a series of staff-led public workshops about the Bacteria Water Quality Objective (WQO) Evaluation project. The intent of the workshops is to inform the public about the definition of the bacteria WQO, why the Regional Board is engaging in the evaluation of the WQO, and the proposed timeline for the project. Meeting participants will have the opportunity to engage with Regional Board staff, local public health officials, and other subject matter experts, to ask questions, and to share comments and concerns regarding the project.

PUBLIC WORKSHOPS

Regional Board staff invites you to participate in any of the upcoming public workshops:

Tuesday, March 24, 2020 – 5:30PM

Mojave Water Agency
13846 Conference Center Drive, Apple Valley, CA 92307

Wednesday, March 25, 2020 – 5:30PM

Tallman Pavilion, Eastern Sierra Tri-County Fair
1234 Sierra Street, Bishop, CA 93514

Thursday, March 26, 2020 – 5:30PM

Lahontan Water Board Annex Hearing Room
971 Silver Dollar Avenue, South Lake Tahoe, CA 96150

Monday, March 30, 2020 – 5:30PM

Jensen Hall, Lassen County Fair
195 Russell Avenue, Susanville, CA 96130

**Oral language and Sign Language services are available upon request for public meetings. Please place your request for services at least 10 business days prior to the meeting by calling: Marina Pérez at (916) 322-4265*

For more information or to submit questions

Contact Ed Hancock at (530) 542-5574 or ed.hancock@waterboards.ca.gov

To review project information visit: [Lahontan Water Board Basin Planning webpage](https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/)
https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/

March 2020 Public Workshop Cancellation Notice



Lahontan Regional Water Quality Control Board

NOTICE OF POSTPONEMENT OF PUBLIC WORKSHOPS

LAHONTAN REGION BASIN PLANNING PROJECT BACTERIA WATER QUALITY OBJECTIVES EVALUATION

Due to the unprecedented public health emergency created by the COVID-19 Coronavirus, the Lahontan Water Board has taken the difficult decision to postpone the upcoming public workshops for the Bacteria Water Quality Objectives Evaluation Project. The Water Board is committed to protecting the health of the public and members of staff, and the uncertainty surrounding transmission of the novel COVID-19 virus and the known effects on vulnerable populations in our community warrants exercising extreme caution. **Staff are investigating alternative methods of meeting for these workshops. Information about future workshops will be shared via email and distributed via the 'Basin Planning – Regionwide' email list. Sign up for email notifications at**

https://www.waterboards.ca.gov/resources/email_subscriptions/reg6_subscribe.html

PUBLIC WORKSHOPS POSTPONED

Regional Board staff invites you to participate in any of the upcoming public workshops:

Tuesday, March 24, 2020 – 5:30PM

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13846 Conference Center Drive, Apple Valley, CA 92307

Wednesday, March 25, 2020 – 5:30PM

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For more information or to submit questions

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To review project information visit: [Lahontan Water Board Basin Planning webpage](https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/)
https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/

Appendix D
May 2020 COVID Announcement and Public Survey



Lahontan Regional Water Quality Control Board

FROM: Ed Hancock, Planning and Assessment Unit
LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD

DATE: 29 April 2020

SUBJECT: BACTERIA WATER QUALITY OBJECTIVES EVALUATION PROJECT,
COVID-19 PUBLIC ENGAGEMENT STRATEGIES

Greetings.

As a result of COVID-19 crisis, the Lahontan Water Board (Water Board) postponed the Bacteria Water Quality Objectives Evaluation Project (Bacteria Project) public workshops scheduled throughout the region in March 2020.

The Water Board takes the health of all people who live, work, and visit the Lahontan Region extremely seriously. We recognize that the COVID-19 situation is fluid and are sensitive to the fact that priorities for most people are focused on the health and safety of their loved ones. We also understand that the Bacteria Project is an important issue for many in the Lahontan Region, and that further delays for this project will continue to prolong existing issues. Staff would like to continue moving the Bacteria Project forward as best as possible given the current situation.

In January 2020, many of you responded to a survey about the Bacteria Project. Survey results showed a high level of interest in participating in the planning process, a desire to protect human health and the health of our water ways from fecal pollution, and a strong interest from respondents to continue to provide input and share their views during the course of the Bacteria Project. Based on the high level of participation and interest received during the first survey, Water Board staff have created a second survey to assess how best to continue to inform and engage interested parties and to help determine how to best to proceed with the Bacteria Project during these challenging times. The survey can be found [here](#) or at <https://www.surveymonkey.com/r/GNM3R9C>. We encourage you to fill out this survey and forward it to other interested parties. The survey will close Friday, May 15th at 5pm.

We value your opinion and are keen to understand the ways in which you use surface waters in Eastern California. Our intent is to host public meetings for this project once

the COVID-19 situation is resolved. However, given the current restrictions on public gatherings, we are interested to engage with you in ways that do not involve face-to-face contact at this time. Your input is vital to help staff complete a comprehensive evaluation of the bacteria water quality objectives currently in place in the Lahontan Region. Should you have any questions, please contact Ed Hancock at (530) 542-5574 or at ed.hancock@waterboards.ca.gov.

Wishing you and your family all the best during these challenging times.

Kind regards,

Ed Hancock, M.S.
Environmental Scientist, Planning and Assessment Unit

May 2020 Public Survey

- 1) Given the challenges and restrictions posed by COVID-19, is this still a good time for you to engage with the Water Board about the Bacteria Water Quality Objectives Evaluation Project (Bacteria Project)?
 - Yes
 - No
- 2) If you responded “no” to question 1, what time might be better to engage in the Bacteria Project?
 - a. When COVID-19 is no longer an issue
 - b. In 2-3 months,
 - c. 6 months from now.
- 3) Information sharing between the Water Board and people interested in the Bacteria Project is an important step to ensuring an accurate and comprehensive evaluation of water quality objectives. How would you prefer to receive information about the project in the absence of face-to-face meetings? (***Please rank the following choices in order of preference***)
 - A live-broadcast webinar hosted by Water Board staff with an opportunity for questions and answers from the audience afterwards. This option requires access to a computer which can join a live-broadcast meeting.
 - A series of newsletters and/or factsheets distributed by email or US postal mail. The public will have an opportunity to pose questions/concerns by contacting staff via phone, email and US postal mail.
 - A recorded video of a project presentation with the option to ask further questions via email or over the phone at a time that is suitable for you.
 - A webpage which includes information about the project such as video presentations, factsheets and links to external resources which is updated periodically and is accessible to you at a time that works for you.
- 4) Are there other ways of sharing and receiving information that are not listed in question 3 that would work best for you? (*insert text box to solicit written responses*)

- 5) If you indicated that your preference is to receive information about the project by US postal mail, please enter the address where you would like to receive mail:
(insert text box)
- 6) What did you think about this survey? Was it appropriate during this current health crisis? What can the Water Board do to improve communication with you? Please enter your thoughts in the text box below. *(insert text box)*

Appendix E: July Notice of Public Information Session & Information Video Slides

Lahontan Regional Water Quality Control Board

NOTICE OF PUBLIC INFORMATION SESSION **Bacteria Water Quality Objectives Evaluation Project**

NOTICE IS HEREBY GIVEN that the Lahontan Regional Water Quality Control Board (Water Board) is circulating a pre-recorded informational video presentation (presentation) about the Bacteria Water Quality Objectives Evaluation Project (Project). Several weeks after circulation of the presentation, Water Board staff will host a live Question and Answer (Q&A) webinar session about the Project to answer questions and receive informal comments from interested parties.

[Informational Video Presentation](#) (40mins) [slides only](#)

Live Q&A Session:
Wednesday, August 5th at 6 p.m. – 8.00 p.m.
[Registration Link for Live Q&A Session](#)

Remote Participation Only for Q&A Session

BACKGROUND

The Water Board is evaluating the Basin Plan fecal coliform bacteria water quality objective (WQO) as a result of the August 2018 State Water Resources Control Board action to adopt another fecal indicator bacteria WQO specifically to protect the Water Contact Recreation (REC-1) beneficial use. The recently adopted REC-1 WQO uses *Escherichia Coli* (*E. coli*) to indicate the likely presence of fecal matter in surface waters. The Water Board is seeking to engage with Lahontan Region interested parties or persons so that a comprehensive evaluation of the current fecal coliform objective can be completed.

Surface waters contaminated by fecal matter present a human health concern because pathogens and viruses which can be harmful to human health are shed with fecal matter and can be transmitted to people via contact with contaminated water. The presence of fecal matter in surface waters also contributes to environmental degradation. In light of the recently adopted *E. coli* objective to protect the REC-1 beneficial use and because of the significant human health risks associated with fecal contamination of surface waters, the Water Board has made evaluation of the current Basin Plan fecal coliform WQO a top planning priority.

The pre-recorded video presentation will provide an opportunity for interested parties to learn details about the project and highlight some of the issues this project will address. The live Q&A webinar session will provide a forum for interested parties to ask

PETER C. PUMPHREY, CHAIR | PATTY Z. KOUYOUMDJIAN, EXECUTIVE OFFICER

questions of Water Board staff and give informal comments to staff regarding the project.

DOCUMENT AVAILABILITY

The presentation video, presentation slides, Project contact information, and other documents for the Project can be found at the [Project website](#).

PROCEDURAL MATTERS

Due to ongoing circumstances related to the COVID-19 emergency, all public participation for this project will be remote via an online or telephone hosted platform. The presentation video and presentation slides are now available for review at the links provided above. Staff strongly encourage questions, comments, and discussion items be submitted to LahontanBacteriaObjectives@waterboards.ca.gov in advance of the live Q&A webinar session to guarantee their inclusion in the live event.

The purpose of the live Q&A webinar session is for interested parties to ask Water Board staff questions about the Project and to provide informal comments should they have any. Staff will not be giving a formal presentation at the live webinar, although there will be some brief, introductory comments to get the discussion started. Staff strongly encourage all webinar attendees to review the informational video presentation prior to the webinar. The presentation is available at the links provided above. The live Q&A webinar session will be recorded and made available on the Project website for those who are unable attend the live event.

ACCESSIBILITY

Please register for the live Q&A webinar session using the Registration Link provided above. Registrations are made through Eventbrite. The session will be held online over Zoom. Additional information about how to access the webinar will be provided through your Eventbrite registration.

FUTURE NOTICES

The Water Board will hold the public Q&A webinar session at the time and place noted above. Any change in the date, time, or place of the webinar will be noticed through the Project e-mail distribution list. Any person interested in receiving future notices, including any changes to this notice of public webinars, must sign up for the e-mail distribution list using the [subscription form](#), select the box for 'Basin Planning – Regionwide' list, and provide the required information.

CONTACT INFORMATION

Questions regarding this notice may be directed to LahontanBacteriaObjectives@waterboards.ca.gov or to the Project Lead, Ed Hancock Ed.Hancock@waterboards.ca.gov. Ed can also be reached via telephone on 530-542-5574.

Bacteria Water Quality Objectives Evaluation Project

July 2020 Outreach Meeting
Ed Hancock, Environmental Scientist



Lahontan Water Board Planning Unit

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About me....

- Native to England, living in Tahoe
~10 years (Water Board for ~ 5yrs)
- Avid skier and mountain biker
- Master of Science in Environmental
Management
- Masters Thesis: Recreational Water
Quality and bacteria pollution



California Water Boards

2

3

Outline for today's presentation

- California Water Boards
- Purpose of Bacteria Evaluation Project
- Why do we need a bacteria water quality objective?
- Bacteria water quality objectives in the Lahontan Region
- **Project expectations**

California Water Boards

3

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Water Board Mission....

- ***“... [to] preserve, enhance and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.”***

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4

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Nine CA Regional Water Boards



Lahontan Region – R6

- 570 miles long
- 33,131 square miles
- 700+ lakes
- 3,000+ miles of streams
- 1,500+ sq miles of groundwater basins

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5

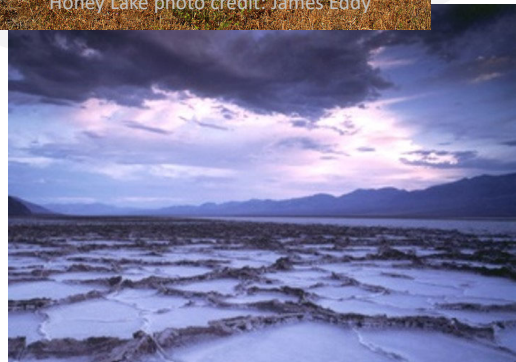
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The Lahontan Region

- Clockwise from right:
 - Honey Lake – 3,990 ft
 - Death Valley – -282 ft
 - Mt. Whitney – 14,494 ft



Honey Lake photo credit: James Eddy



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6

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Why is there a Bacteria Objectives Evaluation Project?

- Two legally enforceable objectives currently apply in the Lahontan Region
- Water Board identified bacteria objectives evaluation as a top priority



Top of Monitor Pass, Alpine Co.

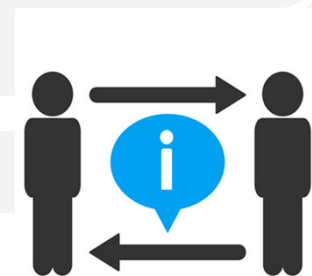
California Water Boards

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Presentation goals

- Information sharing about project
- Engage those interested in this project
- Begin a discussion & enable collaboration



VectorStock.com/2231265

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Survey results

- ~120 combined respondents from throughout the Region
- Many groups represented: agriculture, recreation, Tribes, drinking water suppliers, cities, counties, NGOs, government agencies, private individuals
- Some respondents favor stricter regulations, other respondents favor relaxed regulations



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9

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What is a water quality objective?

“The limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.”

Porter-Cologne Act



Pic: West Fork Carson River near Picketts Junction – SWAMP photo

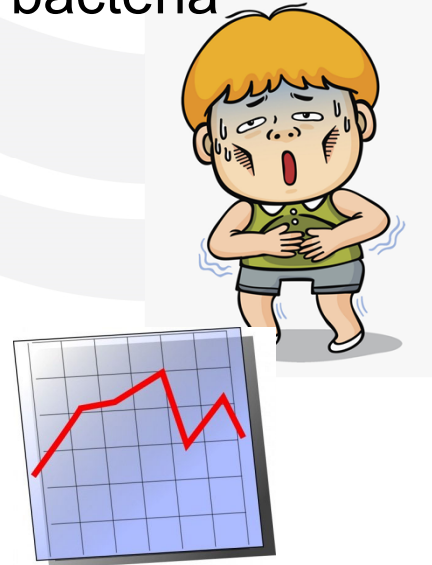
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What is the purpose of a bacteria objective?

- Protect water users from exposure to pathogens or viruses associated with fecal material that might have contaminated a waterbody
- Identify surface waters where beneficial uses are not being supported
- Track changes to water quality over time



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11

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How does sampling surface waters for bacteria work?

- Pathogens and viruses are difficult to test for
- Scientists use indicators of the likely presence of pathogens or viruses
- Surface water moves all the time, some amount of math is needed to determine if there is a bacteria contamination issue

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12

13

Bacteria objectives: fecal coliform

“The fecal coliform concentration during any 30-day period shall not exceed **a log mean of 20/100 ml**, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml”

Lahontan Basin Plan, Chapter 3

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13

14

Bacteria objectives: *E. coli*

“...a six-week rolling GEOMETRIC MEAN of *E. coli* **not to exceed 100 colony forming units (cfu) per 100 milliliters (mL)**, calculated weekly, and a STATISTICAL THRESHOLD VALUE (STV) of 320 cfu/100 mL not to be exceeded by more than 10 percent of the samples collected in a CALENDAR MONTH”

Recreation Bacteria Objectives, State Water Board 2018

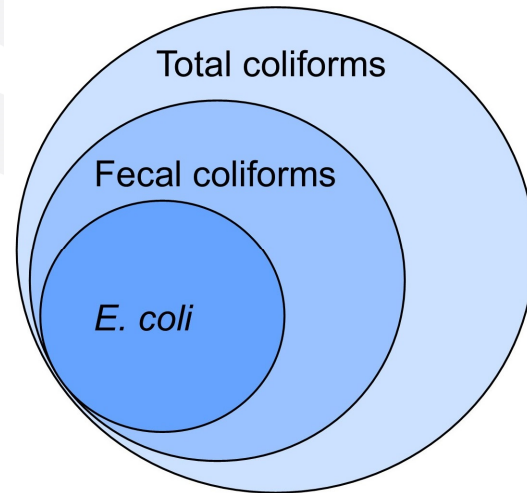
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14

15

What are the differences between the fecal coliform and *E. coli* objectives?

- Fecal coliform and *E. coli* are part of the same coliform bacteria family
- Fecal coliform objective: <0.1 illnesses in 1000 exposures
- *E. coli* objective: 32 illnesses in 1000 exposures



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15

16

Bacteria Objectives: Current Issues

- Two different thresholds of water quality protection
 - Problematic for 303(d) List assessments and permit issuance
- Fecal coliform indicator bacteria represents outmoded science
 - *E. coli* better correlated with the presence of pathogens
- Protective fecal coliform objective is analogous to “expected” water quality conditions

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16

17

Possible Project Options

- Adopt *E. coli* objective to protect human health, Take not further action
 - This option would leave a variety of high-quality waters susceptible to bacteria pollution and could negatively impact Beneficial Uses in the future

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17

18

Possible Project Options (2)

- Adopt REC-1 *E. coli* objective to protect human health; Apply a numeric guideline to certain high-quality waters in the Region, such as high alpine lakes and streams.
 - This non-binding numeric guideline would recognize Lahontan surface waters that are valuable for recreational, ecological, or cultural uses but would not be used to determine if Beneficial Uses were supported.

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18

19

Possible Project Options (3)

- Adopt REC-1 *E. coli* objective to protect human health; Update the existing fecal coliform objective to use *E. coli*, and remove this objective from specific waterbodies in the Region where existing uses make the REC-1 objective difficult to meet

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19

20

Potential Project Options (4)

- Adopt REC-1 *E. coli* objective to protect human health; Develop a new Beneficial Use with *E. coli*-based water quality objective analogous to the current fecal coliform objective.
 - The new Beneficial Use and objective would be designated to high-quality surface waters in the Region, such as high-elevation alpine lakes and streams

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20

21

High-quality waters

- Surface waters where water quality is better than objectives set to protect **than X to support** Beneficial Uses
- Waters where water quality results in high-quality uses
 - Examples: swimming in Lake Tahoe; fishing in the West Walker River; agriculture in the Bridgeport Valley
- Surface waters which require a higher level of water quality protection to ensure high-quality water and high-quality uses continue for future generations

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21

22

Project timeline 2020

- Winter/Spring 2020: Evaluation of bacteria data and pertinent information; development of Project Options
- July 2020: Engage with interested parties in the Lahontan Region
- Fall/Winter 2020: Present a selection of strategies for updating bacteria objectives to Lahontan Water Board

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22

23

Project timeline 2021

- Winter 2020/21: Begin official CEQA process
- 2022: Amend Basin Plan with updated water quality objective..?

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23

24

Next steps after watching this video:

- Live Q&A session(s) – date & time: XXXX
- Ask questions about project any time via email or telephone
- Look out for more information about this project by subscribing to the '**Basin Planning – Regionwide**' email subscription list www.waterboards.ca.gov/resources/email_subscriptions/reg6_subscribe.html

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24

Thanks for listening!

- Ed.Hancock@waterboards.ca.gov
- 530.542.5574
- www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/#basin

Pic: West Fork Carson River – Cindy Wise



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25

26



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26



Appendix F: August 2020 Public Workshops supporting documents

- i. Slides from Staff presentation

Bacteria Water Quality Objectives Evaluation Project

Question and Answer Session

Wednesday, August 5th 6 p.m. – 8 p.m.




CALIFORNIA
Water Boards

Lahontan Regional Water Quality Control Board

1

Welcome!

- Thank you for participating this evening
- Please make sure to mute your microphone



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2

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Meeting logistics

- Take breaks as you need them:
2-hour workshop with a 10-minute break about halfway through but we encourage everyone to take care of themselves.
- Purpose of workshop: to answer your questions about this Project. Please ask for clarification on any concerns you might have

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3

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How to submit questions and comments:

- Email LahontanBacteriaObjectives@waterboards.ca.gov
 - Subject line: Q&A Session: 'Question' or 'Comment'
- Please provide the following information:
 - Your First and Last Name
 - Who you represent (i.e., self, another person, an organization)
 - Indicate if you will read your question or comment yourself, or if you would like staff to read it for you
 - Your concise question or comment

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4

MP7
CD1
EH2

Overview of today's meeting

- [Information video](#) / [Presentation slides](#) / [Project website](#)
- Recap of Project information
 - Timeline
 - Purpose
 - Potential Project strategies
- Questions and informal comments to staff

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5

6

Project Timeline

- November 2018: Lahontan Water Board makes Bacteria Objectives Evaluation a top planning priority
- July 2019: Project work begins
- March 2020: Public workshops postponed due to COVID-19 restrictions
- **July/August 2020: Online engagement with interested parties**
 - *November 2020: Water Board informational item at Barstow meeting*
 - *February 2021: CEQA begins*

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6

7

Why is there a Project?

- Two bacteria objectives in the Lahontan Region
 - Fecal coliform obj. in Lahontan Basin Plan
 - *E. coli* objective adopted by State Water Board in 2018
- Progression of research and scientific understanding regarding Fecal Indicator Bacteria (FIB)

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7

8

Some Project goals...

- Update fecal coliform indicator of Basin Plan to reflect modern indicator science
- Provide regulatory clarity
- Protections for high-quality waters

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8

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Some potential options:

1. Relying only on Statewide *E. coli*/REC-1 use objective
2. Apply *E. coli*/REC-1 use objective together with a numeric antidegradation guideline assigned to high-quality waters in the Region
3. Develop a Regionwide objective and/or beneficial use with *E. coli* as the indicator bacteria
 - New objective would be approximate to the current fecal coliform objective

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9

10

Next Steps

- Project Strategies: further development and Staff Report
- **November 2020** - Lahontan Water Board Meeting
 - Staff will present Project information
 - Board may provide direction on Project strategies
- Interested persons can communicate directly with Project staff – what are your thoughts and concerns?

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10

11

Questions and Comments

- This is your opportunity to participate early in this project
- Your questions and comments are important to us
- Please feel free to ask any questions, or provide your observations, about bacteria water quality

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11

12

How to submit questions and comments:

- Email LahontanBacteriaObjectives@waterboards.ca.gov
 - Subject line: *Q&A Session: 'Question' or 'Comment'*
- Please provide the following information:
 - Your First and Last Name
 - Who you represent (i.e., self, another person, an organization)
 - Indicate if you will read your question or comment yourself, or if you would like staff to read it for you
 - Your concise question or comment

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12

13

Contact information

- Webpage:
https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/#basin
- Project email address:
LahontanBacteriaObjectives@waterboards.ca.gov
- Project Lead: Ed Hancock
Ed.Hancock@waterboards.ca.gov
530.542.5574



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13

ii. Meeting Notes

Bacteria Water Quality Objectives Evaluation Project, Public Information Meeting August 5, 2020 6:00 p.m. – Meeting Notes

6pm	Ed Hancock	<p>Meeting Start- Welcome</p> <p>Presents Meeting Materials</p> <p>Project Website</p> <p>Introduces Marina Perez</p>
	Marina Perez	<p>Introductions of panel (Ed Hancock, Marissa Van Dyke, Dan Sussman)</p> <p>Presentation Start</p> <p>Logistics/ Meeting Details</p> <p>November 2020 Board Meeting Noted</p>
6:08pm	Ed Hancock	<p>Project Overview Slide</p> <p>Timeline</p> <p>Top Priority project identified in November 2018</p> <p>Project informational item at November 2020 Lahontan Board Meeting Noted</p> <p>February 2021 CEQA begins</p> <p>Summary of three potential project options</p> <p>Collaboration between interested parties and project staff encouraged</p>
6:19pm	Marina Perez	<p>Opening Q &A Session</p>
6:22pm	Cindy Wise	<p>Presents Questions to the panel that have been previously submitted by attendees</p> <p>Lauri Kemper: concerned resident of South Lake Tahoe; submitted via email on Tuesday</p> <p>1. In option 2, what does a guideline really do? I get that the region won't have to list waters as impaired, but will you be able to take any regulatory actions based on a guideline? Would you be able to reduce existing grazing in an area, for example? Would the board be able to prevent new activities which might contribute to bacterial contamination such as new development on septic systems, increased grazing, horse stables, etc.?</p>

	<p>Ed Hancock - <i>Numeric guideline detailed in Option 2 is not designed to reduce current land use activities in the Lahontan Region. The E. coli objective adopted by the State Water Board is designed to set an acceptable risk of sickness in humans, but this objective is not the best tool to apply to high-quality Lahontan surface waters. A numeric benchmark as presented in Option 2 is designed to retain institutional memory for future Basin Plan users, and to provide future permit writers with a numeric threshold to begin antidegradation analyses. Option 2 provides an approach to protect high-quality surface waters from bacteria pollution which many not impair the Water Contact Recreation beneficial uses but which is above expected water quality conditions in the waterbody where the numeric guideline is designated.</i></p> <p>2. I'm a little confused between option 3 and 4...</p> <p>In one option, will the 18 <i>E. coli</i> objective be applied everywhere in the region that currently identifies rec-1 as a beneficial use? And the other option, it will only be applied to set number of water bodies?</p> <p>Ed Hancock- <i>Option #3 Statewide E. coli/Rec 1 beneficial use as human health backstop.</i></p> <p><i>Fecal coliform (FC) objective in the Basin Plan would be updated to use E. coli (EC) as the indicator. Updated objective would also be de-designated from specific surface waters where bacteria conditions preclude the achievement of current Basin Plan objective.</i></p> <p><i>Examples given- Tallac Creek (natural wildlife) and Bridgeport Valley (long-standing grazing) where FC objective is rarely obtained.</i></p> <p><i>Option #4-Statewide E. coli/REC-1 use (human health backstop) and new beneficial use for high quality waters. New use protected with a new objective developed from Lahontan collected E. coli data. Based on data review, it is likely that new objective would be similar to present Basin Plan objective.</i></p> <p><i>Example of use: Recreational/Cultural where “superior microbial water quality” supports an enhanced use.</i></p>
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	<p><i>Use R6 historical bacteria data set to come up with a new numeric standard (pertaining to areas with low level bacteria only)</i></p> <p><i>EC REC-1 objective would be used for heavily impacted areas, such as high-traffic recreation areas and grazing lands.</i></p> <p>3. What about an option that sets 18 <i>E.coli</i> for all Sierra Nevada waters above 5000 ft elevation or above the base of the eastern escarpment? And maybe additional high-quality waters in the San Bernardino, San Gabriel, Warner mountains?</p> <p>Ed Hancock – <i>Thanks for this suggestion. Something staff have been considering; an option such as this would need to determine a beneficial use also. Similar to Option #4 in terms of a high-quality use. Also, issues related to solely pursuing elevation-based protections because of impacts to certain surface waters at elevation. We will add this option to the potential options list for analysis.</i></p> <p>Comment from Lauri Kemper – I’m concerned about relaxing bacteria water quality standards in the Lahontan Region. I support an <i>E. coli</i> standard that correlated to the existing fecal coliform standard</p> <p>Ed Hancock – <i>Thanks for that comment. It gets at a major issue for this project. The current E. coli objective has limited utility for ecological and cultural uses associated with high quality waters in the Region. Lahontan surface waters are an important resource for other parts of State and state neighbors. This comment has been noted.</i></p> <p>Nathan Reade: Agricultural Commissioner/Director of Weights & Measures Inyo and Mono Counties</p> <p>1.Option 4 was briefly mentioned that allows for certain waters to be identified as high quality which would have different standards for them. Who would make the determination and how?</p> <p>Dan Sussman - <i>Approach would be internally developed based on land use and beneficial uses then presented to public</i></p>
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	<p>Ed Hancock - <i>Would be data driven/land use assessment followed by public process. The goal would be to protect high quality waters</i></p> <p>Eric Miller: interested party in the event R6 actions are taken up by R 4, 8, & 9:</p> <p>1. Does "superior microbial quality" of natural waters account for naturally occurring microbial contamination from natural wildlife?</p> <p>Marisa Van Dyke – <i>wildlife does contribute fecal material and natural contamination is considered. Refers to Ed to address “superior microbial quality”</i></p> <p>Ed Hancock - <i>“superior microbial quality” has not been specifically defined by R6, although perhaps it should be as part of this project. I used this term to refer to waters with low to ND (non-detect) bacteria counts, usually occurring in the mountainous and undisturbed watersheds in the region.</i></p> <p>Marisa Van Dyke – <i>In summary, yes naturally occurring wildlife is considered for high-quality waters determination.</i></p> <p>2. How does adopting the State's metric endanger R6's waters? Fecal and E. coli are not interchangeable, so lower fecal does not = E. coli?</p> <p>Ed Hancock – <i>E. coli is a subset of fecal coliform, so they are related. An issue we have is the E. coli objective was developed for human health protection, but the regional dataset for Lahontan shows significantly lower E. coli counts than the statewide objective threshold for impairment. Relying only on the statewide objective could lead to unregulated degradation of surface waters before REC-1 use is impaired. EC & FC are two separate organisms but are related</i></p> <p>Marisa Van Dyke - <i>Addressing EC vs. FC</i></p> <p><i>FC is a large group of bacteria with EC being one member of the FC group (a subset)</i></p> <p>Dan Sussman – <i>I want to note that the State Board metric already does apply to R6 waterbodies, as it is a statewide REC-1 objective. Therefore adopting it would not be the</i></p>
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case, it would be a process of amending the Basin Plan to include the objective in the Basin Plan.

Cindy Wise – Acknowledges hands up in the room. We will get to your questions.

3. How has the water board attempted to separate American beaver fecal coliform contributions from sources that pose human health concerns?

Marisa Van Dyke - Use of Microbial Source tracking (MST) allows for genetic tracing of fecal sources. This applies to Beaver. These studies have been applied in CA. There are ways to determine where fecal sources come from by MST but is also requires some data interpretation and MST is not always definitive.

Ed Hancock – Useful to understand if you, Mr. Miller, have a specific waterbody in mind. MST is one way to separate source contributions in a waterbody. We are interested to continue this conversation with you.

4. At what level does the fecal coliform contamination result in human health impacts similar to the *E. coli* metric?

Marisa Van Dyke – earlier slides described how EC vs FC objectives were derived. FC objective derived to prevent one of less illnesses per thousand exposures; EC objective allows more illnesses – 32 illnesses/thousand. Each objective developed a little differently. We would have to go back to dataset to determine exactly how.

Ed Hancock – Building on what Marisa said, fecal coliform has a long history dating back to early 20th century. There have not been as many epidemiological studies for fecal coliform when compared with *E. coli*. *E. coli* has a large body of evidence related to cause/effect in recent scientific history. This is part of the reason for this project – modern science support *E. coli* as an indicator, and a goal of this project is to look at fecal coliform in light of this evidence.

5. I read an Executive Officers report from R6 citing a prior report by the Sierra Nevada Aquatic Research Lab (SNARL) that concluded the cattle was the main source. I would note that they did not use a bovine-specific genetic test, but rather one for ruminants in general. Furthermore, their method of parsing out the vertebrate contributions was

		<p>inconsistent with modern science and reports from SCCWRP as MST results are not comparable between test types. Results from one MST for ruminants cannot be directly compared to MST results for birds. The MST results are each on a separate scale.</p> <p>Ed Hancock – <i>Elaborates on SNARL work. Ruminant marker was used, not specific bovine. Clarifies that a relationship analysis was used looking at concentrations of fecal indicator bacteria next to MST concentrations. Agrees with Miller, results from MST markers are not comparable between test types. SNARL did not compare MST markers between each other but used a relationship analysis with indicator bacteria.</i></p>
7:00pm	Marina Perez	<p>Begins to field live questions from participants with raised hands</p> <p>Tess Dunham: Representing Livestock interest in the Bridgeport Valley and Centennial Livestock</p> <p>1.Question addressing options presented and application of antidegradation policy. Does not believe that the antidegradation policy as a backstop has been properly considered by staff. None of the options have not included a further explanation of how antidegradation policy would be applied.</p> <p>Ed Hancock – <i>Thanks Ms. Dunham. We are early in process. Notes that no options are final. Presented as potential ways. How does 68-16 Policy fit into our process? Very valuable question. Has been part of the conversation, but we are still working on it. Option 2 guideline is just that – an explicit flag to help guide antidegradation analyses.</i></p> <p>Dan Sussman - <i>regarding the 68-16 Policy and how we would apply it if only the Statewide objective was relied upon. For permit development, what should allowable water quality be in watersheds where water quality is better than the Statewide objective? Option 2 is one was of addressing this question and sets an explicit level. It is only one option. Another option could be to require a period of monitoring in a waterbody prior to permit issuance. We are early in process, but we do need to account for high-quality waters in the region. There are several ways to do that: within the Basin Plan, or outside the Basin Plan.</i></p>

		<p>Lauri Kemper: resident of Sierra Nevada</p> <p>1. Regarding Outreach -How has the water board reached out to Native Americans and Tribes within the region (unsure if any representatives are on the call)</p> <p>Ed Hancock - <i>R6 has noticed the regions tribes via email and paper mailers. Noting that BryAnna Vaughan from the Bishop Paiute Tribe is on the call.</i></p> <p>Lauri Kemper comment- <i>notes that the new State Board standard is a risk based standard and not protective of human health and would cause 32x more risk of getting ill. Not fair to describe the Statewide standard as protective of human health because it allows 32x more illnesses that the current Basin Plan objective. Not acceptable for R6 as it has heavy recreational (rec1 contact) users including backcountry users that travel from all over the world to visit our region. Backcountry users (using hand-held filters) are depending on clean water source with minimal contamination.</i></p> <p>Ed Hancock – <i>Thanks for your comment, and for recognizing some of the issues we have with this project and the complexity of the assignment.</i></p> <p>Tess Dunham: Representing Livestock interest in the Bridgeport Valley</p> <p>1.Question addressing the process and follow up timeline (for further questions/comments)</p> <p>Ed Hancock - <i>Sooner the better but always open to talk. November Board Meeting items will need to be submitted by end of September, referring to Dan to confirm a date</i></p> <p>Dan Sussman - <i>End of September for inclusion in November Board meeting.</i></p>
7:20pm	Marina Perez	Confirms No Further Questions -Closes Q & A Session
7:21pm	Ed Hancock	Contact Info/Webpage/Emailer List
7:23pm	Ed Hancock	Closes Meeting

iii. FAQ Document (drafted to support August meeting)

Why is a bacteria water quality objective important?

A bacteria water quality objective sets the allowable level of pollution from fecal waste in rivers, lakes, streams, and other surface waters. These objectives are a way to track changes in an aquatic environment over time. Some objectives are designed to protect humans from getting sick from exposure to water polluted by sewage or manure. Water samples can be compared to the allowable indicator bacteria levels set by a bacteria objective and provide environmental managers information about where there are water quality problems that need to be addressed.

I am concerned that a surface water I recreate in might be polluted by sewage or manure. Should I tell someone?

Yes. If you are concerned about a change you see in a stream, creek, river, or lake you are familiar with you should reach out to your local county environmental health department, to the Lahontan Water Board at Lahontan@waterboards.ca.gov or (530)-542-5400, or report your concerns to the [CalEPA Environmental Complaint System](#). Changes in a surface water may include changes to water color, water clarity or water odor. There may also be changes in the amount of water you see, although please be aware that flows are often reduced in California streams beginning during the summer until rain and snow begins in the fall.

What kind of illnesses might I get if I wade or swim in a surface water polluted by sewage? What are the symptoms and who should I report it to?

In most cases, people who have contact with water which has been contaminated by raw sewage or manure suffer from some form of gastrointestinal illness, such as stomach flu or gastroenteritis. Symptoms include diarrhea, vomiting, nausea, stomachache, and fever, or any combination of these symptoms. Some people may experience skin irritations or skin rashes. In more severe cases symptoms might also include abdominal cramps or bloody stool. Other diseases may also be transmitted through surface waters contaminated by sewage or manure such as shigellosis, typhoid fever, salmonella or cholera, as well as *E. coli* O7:H157 which can cause death in rare cases. There is evidence that the novel COVID-19 virus is also carried in fecal material and raw sewage and could be transmitted to humans via contact with a feces-contaminated surface water.

Parasites can also be found in sewage or manure, including *Cryptosporidium* or *Giardia lamblia*. Exposure to these agents can cause diarrhea and stomach cramps. Viruses such as Hepatitis A are also present in sewage and can cause liver damage. Symptoms of Hepatitis A are feeling tired, jaundice, lack of appetite, nausea and diarrhea. If you experience any of these symptoms within twelve days of contacting a surface water you suspect has caused you to become sick, you should contact your local Public Health Department as soon as you are able.

Can fecal coliform or *E. coli* bacteria make me sick? Do I have to drink the water to get sick?

Generally, both fecal coliform and *E. coli* exist within human intestines and do good things for our body. These types of bacteria do not make us sick. However, there are some strains of *E. coli* which can be harmful to humans, such as the O157:H7 strain. This strain usually causes illnesses through consumption of contaminated or undercooked food or unwashed leafy green vegetables. *E. coli* O157:H7 generally is generally not transmitted through contaminated surface waters but can be found in raw sewage and therefore could be present in a river, lake or stream in rare cases.

Drinking untreated water can make you sick. However, you may become sick simply from contact with contaminated water which you do not drink. Water droplets can be inhaled when you breath while you are partially submerged or close to a surface water contaminated with fecal material, allowing any pathogens or viruses in that water to enter your body. Touching contaminated water might also transmit infections, either through your skin or by touching your eyes, nose, or mouth with your hands after touching contaminated water.

What is my risk of becoming ill?

Your risk of getting an illness from a contaminated surface water depends on two factors. First, the amount of fecal material that might be present in a surface water can determine the number of pathogens, viruses or other diseases that could be present. Second, the amount of water you are exposed to can determine the type and severity of illness suffered. For example, exposing skin to contaminated water might result in only a mild skin irritation; ingesting a mouthful or more of the same water could cause more severe gastrointestinal illnesses or other complications

The Lahontan Water Board fecal coliform bacteria objective equates to a risk of illness of about 1 in 1000 exposures. The Statewide *E. coli* objective equates to 32 illnesses in 1000 exposures. EPA defines gastrointestinal illness as “any of the following [within ten to 12 days of swimming]: (a) diarrhea (three or more loose stools in a 24-hour period), (b) vomiting, (c) nausea and stomachache, or (d) nausea or stomachache and impact on daily activity.

Do animals have the same risk? What about my pet?

Pathogens, viruses, and other bacteria that affect humans can also affect other animals. Household pets such as dogs can be infected by *Giardia*, *Campylobacter* and *Salmonella* which can cause them to become sick. Generally, the risks of infection from contact with a contaminated surface water is lower for animals.

What is the timeline for the Bacteria Water Quality Objectives Evaluation Project?

Staff will present a collection of potential options for the project for the Lahontan Water Board to consider in November 2020. The Board will give direction to staff about which strategy will result in the most appropriate outcome for the Lahontan Region, after which staff will begin to work under the California Environmental Quality Act (CEQA) guidelines for developing projects that affect our environment. This part of the project is expected to last through 2021. Staff expect to present the Lahontan Board with a recommendation to amend the Basin Plan in 2022, although the timeline may change as the project advances.

How can I receive project updates?

To receive updates and notices about this project, enter your email information on the [Project webpage](#). To subscribe, you will need to provide your email address and your name.

Who can I contact for more information about Bacteria Water Quality Objectives Evaluation Project?

You can contact Ed Hancock, the project lead at (530)-542-5574 or Ed.Hancock@waterboards.ca.gov, if you would like to discuss anything related to this project in more detail.

iv. One week before, 1 day before, 1-week-post meeting electronic (lyris) notices

From: [Avila, Michelle@waterboards](mailto:Avila_Michelle@waterboards)
To: reg6_basinplanning_regionwide@swrcb18.waterboards.ca.gov;
reg6_basinplanning_triennial@swrcb18.waterboards.ca.gov
Cc: [Hancock, Ed@Waterboards](mailto:Hancock_Ed@Waterboards)
Subject: Bacteria Water Quality Objectives Evaluation Project: Public Information Session
Date: Tuesday, July 28, 2020 4:14:03 PM

Good Afternoon,

On Wednesday August 5th, 2020 from 6p.m. to 8p.m., staff from the Lahontan Water Board will host an online information session regarding the [Bacteria Water Quality Objectives Evaluation Project](#). Please review this entire email for important information about the online session. Participants who want to actively participate in the online session must [register here](#).

- **The purpose of the online session** is to provide a forum for interested parties to ask questions of staff and provide any informal comments they may have regarding the project. Staff will not be giving a formal presentation during the live session, although a brief Project overview will be provided. Staff encourage questions, comments, and discussion items be submitted to LahontanBacteriaObjectives@waterboards.ca.gov in advance of the online session to guarantee inclusion in the live event.
- **Meeting materials:** [Information video presentation](#), [presentation slides](#), [bacteria water quality objectives factsheet](#), [project webpage](#). Staff encourage those interested in participating in the meeting to review the information video presentation and other available project information prior to joining the information session.
- **How to participate:** The interactive meeting will be hosted via the Zoom online platform. We encourage public participation in the workshop.
 - **To actively participate in the meeting** by asking questions or giving informal comments, interested parties must [register for the meeting](#). Once registered, details regarding how to join the online session will be provided via email.
 - **To observe the meeting but not actively participate** please access the live webcast at video.calepa.ca.gov.
 - **To submit questions or comments via email**, please complete the following instructions:
 - Send an email to LahontanBacteriaObjectives@waterboards.ca.gov.
 - In the subject line, indicate "Q&A Session 'Question' or 'Comment'".
 - In the body of the email, include the following:
 - Your name
 - Who you represent (i.e., self, another person, an organization)

- If you want to read your question or comment aloud or if you would like a Water Board staff person to read your question or comment
- Your concise question or comment
- If participating in the meeting by phone, the last three digits of the phone number you will be calling from

After receiving your email, the Meeting Coordinator will respond to your email with instructions

- **To call-in to the workshop** please call Ed Hancock at 530-542-5574 or email LahontanBacteriaObjectives@waterboards.ca.gov for the dial-in number and passcode.
- **Zoom Guidance:** Zoom provides resources to help you [log into Zoom](#), [join a test meeting](#) to see how Zoom works, [joining a meeting by phone](#), and [more!](#)
- **Questions:** If you have questions about the workshop including how to use the Zoom online participation platform, please contact please call Ed Hancock at 530-542-5574 or email LahontanBacteriaObjectives@waterboards.ca.gov
- **Improve your online meeting experience:**
 1. Use the [Zoom desktop application](#) instead of mobile or web applications.
 2. Use a headset for better audio quality.
 3. Close other programs and avoid using other data-intensive applications during the Zoom workshop.
 4. [Test your internet connection and audio/video](#) before the workshop.
 5. [Log into](#) the Zoom workshop early.

Subject: 1-day Notice: Bacteria Water Quality Objectives Evaluation Project: Public Information Session
Date: Tuesday, August 4, 2020 2:48:40 PM

Good afternoon,

Tomorrow, Wednesday August 5th, 2020 from 6p.m. to 8p.m., staff from the Lahontan Water Board will host an online public information session regarding the [Bacteria Water Quality Objectives Evaluation Project](#). Please review this entire email for important information about the online session. Participants who want to actively participate in the online session must [register here](#). Staff will end the session once all questions have been answered and meeting participants have concluded their comments.

- **To observe the meeting:** Access the live webcast at video.calepa.ca.gov.
- **To participate in the meeting via the Zoom online platform** please review instructions in the [public notice](#).
- **To participate in the meeting via telephone** please call Ed Hancock at 530.542.5574 or email LahontanBacteriaObjectives@waterboards.ca.gov for the dial-in number and passcode.
- **To submit questions or comments before the meeting**, please complete the following instructions:
 - Send an email to LahontanBacteriaObjectives@waterboards.ca.gov.
 - In the subject line, indicate “Q&A Session ‘Question’ or ‘Comment’”.
 - In the body of the email, include the following:
 - Your name
 - Who you represent (i.e., self, another person, an organization)
 - If you want to read your question or comment aloud or if you would like a Water Board staff person to read your question or comment
 - Your concise question or comment
 - If participating in the meeting by phone, the last three digits of the phone number you will be calling from
- **Log in early** to ensure your computer video and audio are working correctly.
- **Meeting materials** are available online at [the project website](#). Meeting participants are strongly encouraged to review the [information video presentation](#) prior to joining the online workshop.
- **If you have technical issues during the meeting**, please email LahontanBacteriaObjectives@waterboards.ca.gov.
- **If you have questions about meeting logistics** including how to use the Zoom online participation platform or participate by telephone, please contact Ed Hancock by telephone at 530.542.5574 or email LahontanBacteriaObjectives@waterboards.ca.gov.

- ***Improve your online meeting experience:***
 1. Use the [Zoom desktop application](#) instead of mobile or web applications.
 2. Use a headset for better audio quality.
 3. Close other programs and avoid using other data-intensive applications during the Zoom meeting.
 4. [Test your internet connection and audio/video](#) before the meeting.
 5. [Log into](#) the Zoom meeting early.

From: lyris@swrcb18.waterboards.ca.gov
To: Hancock, Ed@Waterboards
Subject: Bacteria Water Quality Objectives Evaluation Project: August 5th Public Meeting Recording and Meeting Notes
Date: Wednesday, August 12, 2020 5:15:58 PM

EXTERNAL:

Good afternoon,

[A recording](#) of the August 5th, 2020 public information meeting for the Bacteria Water Quality Objectives Evaluation Project (Project) is now available. The [meeting notes](#) are also available. Both the video and the notes are posted on the [Project webpage](#).

Project staff would like to thank all those who attended the online meeting. If you have further questions, comments, or would like more information about any aspect of this project, please email LahontanBacteriaObjectives@waterboards.ca.gov, or call Ed Hancock at 530.542.5574.

The next opportunity for interested parties to engage Project staff in a public forum will be at the November 18th & 19th, 2020 Lahontan Water Board meeting. Details about how to join that meeting will be circulated approximately 10 days before the event. Any interested party who would like more information about the Project before the November 2020 Board meeting is encouraged to contact Project staff directly. Staff look forward to working with interested parties regarding this Project in the future.



Angelica Soto, Office Technician
Lahontan Regional Water Quality Control Board
15095 Amargosa Road, Bldg. 2, Suite 210,
Victorville, CA 92394
(760) 241-6583 | angelica.soto@waterboards.ca.gov

PLEASE NOTE: The majority of Lahontan Water Board staff are teleworking due to an Executive Order from Governor Newsom. However, we are available via email and voicemail. We are responding to emails throughout the workday. Responses to voicemail may take more than one business day.

You are currently subscribed to reg6_basinplanning_regionwide as:
ed.hancock@waterboards.ca.gov.

To unsubscribe click here: leave-7519835-5891398.0cc0b2130d946c92c57e9c21e05d52a3@swrcb18.waterboards.ca.gov

ENCLOSURE 2

Bacteria Water Quality Objectives Evaluation Project

Project Workshop
Lahontan Water Board Meeting
January 13th, 2021



Ed Hancock, Environmental Scientist

Need for this project

- 1986 & 2012 U.S. EPA: Fecal coliform indicator is no longer recommended for freshwater surface water monitoring
 - *Escherichia coli* or *Enterococci* are recommended
- 2018 SWRCB: Adopts U.S. EPA objectives to apply to REC-1 uses in all CA surface waters
 - *E. coli* for freshwaters; *Enterococci* where salinity >1 ppt
- 2018 Region 6 Triennial Review Priority #1 is to evaluate bacteria regulations applicable to the region

Project Purpose:

- To evaluate fecal bacteria water quality regulations applicable to the Lahontan Region
- To explore options to potentially update the Basin Plan fecal bacteria objectives

Purpose of today's workshop

- *Provide* an update to the Board
- *Present* findings of the water quality objectives evaluation
- *Preview* some preliminary options to address issues identified during the evaluation process
- *Promote* a discussion amongst the Board, Board staff, and stakeholders about project direction

History of fecal coliform objective & Region 6

- Objective designed for *desired* water quality in *untreated* surface waters used for public water supply (~MUN: Municipal and Domestic Supply)
- Region 6 1975 Basin Plan references objective with MUN BU description *and* applies it for REC-1 in ten specific watersheds
- 1995: Objective applied to all Region 6 surface waters
- ~2006+ Objective becomes synonymous with REC-1 because of 303(d) assessment process (Integrated Report)

Project work in 2020

- Planning and execution of public engagement events
- Literature and data review
- Technical work to evaluate existing fecal bacteria regulations
- Document preparation: Staff Report, various presentations, information sheets
- Project administration

2020 Public Outreach

- January public survey and project introduction
- March 2020 public workshops (Planned Pre-COVID)
 - Apple Valley, Bishop, South Lake Tahoe, Susanville
 - **Cancelled** due to Shelter-in-Place orders given in March
- Post-lockdown survey
- July/August 2020 public information session
- Lyris communications: updates and meeting invites

Evaluation: *Considerations*

- SWRCB 2018 Bacteria Provisions
- Modern indicator science
- High-quality waters in the Lahontan Region
- Antidegradation considerations
- Programmatic and regulatory requirements of the Water Board

Evaluation: *Findings* (1)

- Fecal coliforms are not the best indicators of recent fecal pollution in freshwater surface waters
- The existing fecal coliform objective *threshold* is analogous to ambient conditions in many of the regions' waterbodies
- The *E. coli* REC-1 objective threshold is much greater than ambient surface water conditions characteristic of the Lahontan Region

Evaluation: *Findings* (2)

- The Lahontan Region contains many surface waters where fecal pollution is minimal. Such waters are valuable for recreational, ecological, aesthetic, and cultural purposes
- Present application of the two different bacteria regulations creates challenges for Water Board projects and programs

Evaluation: *Recommendation*

➤ **Pursue a Basin Plan Amendment**

- Ideally, such an amendment *would at a minimum*:
 - Insert the Statewide REC-1 objective language into the Lahontan Basin Plan
 - Serve to remedy the challenges presented by the existing bacteria regulations

Tentative schedule 2021

February-April: Develop a preferred project option

~**April:** Begin AB52 Tribal Consultation

May-June: CEQA Scoping Process to gather public input

July-December: Draft Basin Plan Amendment, Staff Report & SED

Opportunity to determine goals for regional bacteria regulations:

- Protections for human and/or environmental health?
- Preservation of waters/conditions which *enhance* Beneficial Uses?
- Single out high-quality waters for special protection?
- Retain institutional memory directly in the Basin Plan?
- Pursue a novel approach for bacteria monitoring?



Preliminary Approaches: Option 1

- Remove fecal coliform objective and amend the Basin Plan to include the Statewide *E. coli* objective for REC-1
- ✓ Consistent with SWRCB objective for REC-1
- ✓ Removes some existing challenges
- ✗ Ambient water quality may be subject to degradation up to the *E. coli* objective threshold
- ✗ Future permit conditions may be based on the *E. coli* REC-1 WQO, potentially leading to poorer water quality

Preliminary Approaches: Option 2

- Add REC-1 objective language to Basin Plan. Amend the existing fecal coliform indicator to *E. coli* but maintain existing fecal coliform objective threshold. Specifically indicate the objective is for the protection of MUN
- ✓ MUN uses receive explicit protection
- ✓ Retains the impairment threshold of existing objective and provides protections for ambient water quality
- ✓ High-quality waters remain protected by existing Basin Plan threshold
- ✗ MUN use is protected with a more stringent objective than REC-1
- ✗ Some surface waters may be routinely impaired for MUN use
- ✗ 303(d) assessments for FIB would require clear messaging regarding BUs assessed

Preliminary Approaches: Option 3

- Add REC-1 objective language to Basin Plan. Replace existing fecal coliform indicator with *E. coli* and maintain existing objective threshold. Apply this objective to specific waterbodies.
- ✓ Reduces some existing challenges in watersheds where amended objective would not apply
- ✓ Retains impairment threshold of existing objective and provides protections for ambient water quality
- ✓ Modernizes Basin Plan with current recommendations for fecal indicators
- ✗ Some high-quality waters may not be maintained
- ✗ Some communication challenges may remain
- ✗ MUN uses may not be protected in waterbodies where only *E. coli* REC-1 objective applies

Preliminary Approaches: Option 4

- Add REC-1 objective language to Basin Plan. Remove fecal coliform objective. Add an *E. coli* benchmark for high quality surface waters which reflects ambient *E. coli* bacteria conditions
- ✓ Benchmark recognizes regional high quality surface waters & is designed to assist in maintenance of such waters
- ✓ Institutional memory for ambient water quality conditions retained
- ✓ Minimizes existing challenges
- ✗ Guidance for practical application of benchmark may be required
- ✗ Option may present communication challenges

Other approaches in Appendix A of Staff Report

- Development of new BUs; Amendments to existing BUs; Development objectives based on novel approaches to fecal pollution monitoring
- **Disclaimer**: all approaches described today are preliminary. All are draft and subject to change
 - ***The project is still in an exploratory phase. Let's collaborate!***

Possible Project Goals: Recap

- Protections for human and/or environmental health?
- Preservation of waters/conditions which *enhance* Beneficial Uses?
- Single out high-quality waters for special protection?
- Retain institutional memory directly in the Basin Plan?
- Pursue a novel approach for bacteria monitoring?

Time for thoughts, comments, and questions

- Opportunity to share ideas:
- Are there priority questions and/or themes that the project should be pursuing?
- Which (if any) of the preliminary options do you prefer?
- Should other considerations be included in the analyses of existing objectives?



Freel Peak from Meyers, CA. Photo : E.Hancock

Thank you!

- Ed.Hancock@waterboards.ca.gov 530.542.5574
- LahontanBacteriaObjectives@waterboards.ca.gov