California Bacteria Summit
September 14-16, 2022

Summary

Co-Hosted by the California Water Boards and CASQA

PURPOSE AND GOALS OF THE SUMMIT

Understand what it means to have waters that are safe to swim and shellfish that are safe to eat, based on the latest science and learnings, and identify actions needed to achieve those outcomes

DAY 1 GOAL:

- Develop a common understanding of the evolution of the standards and science relevant to defining and achieving waters that are safe to swim and shellfish that are safe to eat

DAY 2 GOALS:

- Review current source reduction and regulatory tools
- Identify what's working well, what may be falling short, and potential improvements or opportunities to effectively reach our goals

DAY 3 GOALS:

- Identify needed regulatory actions and research for achieving waters that are safe to swim and shellfish that are safe to eat
- Discuss a process for implementing those actions, including immediate next steps

DAY 1 AND DAY 2 SUMMARIES

DAY 1 TAKEAWAYS:

- Affirmed that do all have the same shared goals
- Learned more about the United States Environmental Protection Agency's (EPA's) 2012 criteria and the linkage to risk
    - Allows consideration of other methods and indicators protective of the use
- Science continues to advance our understanding of risk in recreational waters affected by fecal contamination
- Source matters for risk
    - In waters impacted by human sources, viruses most likely to make people sick
    - In waters not impacted by human fecal sources, viruses likely not present
    - Nature and magnitude of source(s) are important in determining the risk of illness
- Riskiest sources are human and cattle, but other sources if present in high concentrations can cause illness
- Fecal indicator bacteria can do a good job indicating risk, but not all of the time
- Rapid methods would increase timely risk communication to the public and better communicate if it is safe to swim today
- Quantitative Microbial Risk Assessment (QMRA) is a tool to better characterize risk and answer risk management questions
    - QMRA provides the ability to model different risk scenarios at a local scale and can identify a fecal indicator bacteria level protective of a set illness rate based on type of waste in the water, while epidemiological studies are limited to answering the questions in the study design
    - Scientific community has developed risk-based thresholds and frameworks for doing QMRAs and QMRAs are sensitive to the input parameters
    - A framework for guiding when and how to use QMRA would be helpful.
- Tools are under development to identify sources and determine where human sources are coming from (e.g., septic, sewer, and possibly unhoused communities)

- Distinguishing the sources is important for identifying what actions to take
- Coliphage is another tool for identifying raw sewage and heard about other case studies

DAY 2: SOURCE REDUCTION TAKEAWAYS:

- Source not only matters for risk, but it also matters for implementation to determine if our actions are removing the risk.
- Source reduction actions were discussed. There has been significant progress in dry weather, but there are more questions about what works in wet weather. Stormwater capture and use is something to consider for its multiple benefits.
- For inland waters, the scope is much bigger and we have less studies and bigger data gaps for inland waters

DAY 2: SOURCE REDUCTION (CASE STUDIES PRESENTED) TAKEAWAYS:

- Indicator bacteria did not correlate with human waste markers. Human waste was not detected at some project sites and human waste was detected in some storm drains
- Removal of human markers (HF183) does not always remove fecal indicator bacteria
- Finding the source of human waste is hard; resolving the issue may be easier than finding the source
- Communicating safety of swimming is just as important as communicating when it's not safe to swim so we are not removing the use if it is safe to swim

DAY 2: REGULATORY TAKEAWAYS:

- In the 1970s there was significant investment in wastewater treatment that significantly improved water quality
- In the 1990s began focusing more on stormwater. However, there continue to be questions on how to best address bacteria.
    - How do we focus on human sources in stormwater?
    - How do we connect the work of stormwater and wastewater to learn from the successes wastewater has?
- Focus on addressing controllable sources through moving to a more proactive statewide approach
    - What's the baseline level of activities that everyone should be doing to address bacteria?
- A tension may exist between the ideal world of implementing actions to address risk and the reality of enforcing the water quality objectives that may need to be addressed
- Identifying the water quality that can be achieved is needed due to the challenges with treating stormwater for bacteria
- If a risk-based approach is considered, a linkage to illness rate in state standards is needed
- The existing regulatory tools built into state standards were discussed, such as the natural source exclusion and seasonal suspensions of use
- Need to figure out what to do when source identification analysis shows no human sources
- Working to fill data gap to communicate what it means to be safe to swim in inland waters
- Desire to work with health agencies

California Bacteria Summit
September 14-16, 2022

Summary

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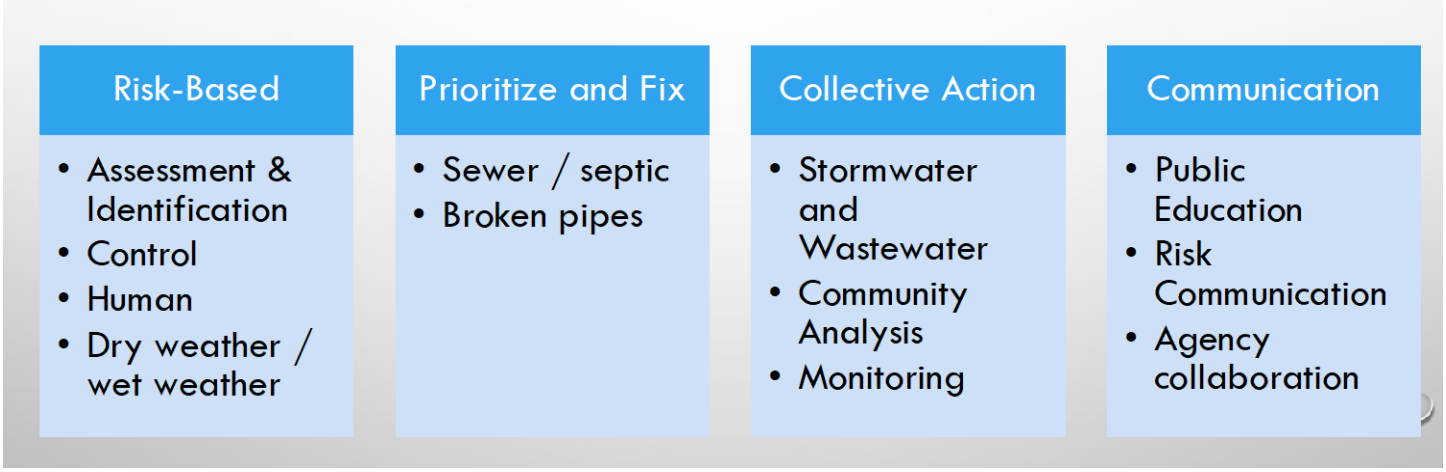
DAY 2 DISCUSSION ON WHAT RESONATED: SOURCE REDUCTION TAKEAWAYS (SEE ATTACHMENT B FOR FULL RESULTS)

The following is a summary of what resonated from the small group discussions



DAY 2 DISCUSSION ON WHAT RESONATED: REGULATORY TAKEAWAYS (SEE ATTACHMENT B FOR FULL RESULTS)

There were no clear themes from the results of the regulatory discussion. A lot of different ideas that covered the full expanse of the regulatory landscape were provided for consideration. There are a lot of pieces to the regulatory framework and all of the interplay, but every stakeholder is interacting with the regulatory structure in different ways.

DAY 1 AND DAY 2 TAKEAWAYS RELATED TO THE SHELLFISH BENEFICIAL USE:

- Acknowledgement that more research is needed to evaluate uses and objectives
- Desire for California Department of Public Health (CDPH), Food and Drug Administration (FDA), local public health agencies, and Water Board to work together
- Interest in a shellfish index to communicate safety to the public

DAY 1 AND DAY 2 WHAT ELSE NEEDS TO BE CONSIDERED AS WE MOVE FORWARD:

- Tribal and cultural beneficial uses
- Equity

California Bacteria Summit
September 14-16, 2022

Summary

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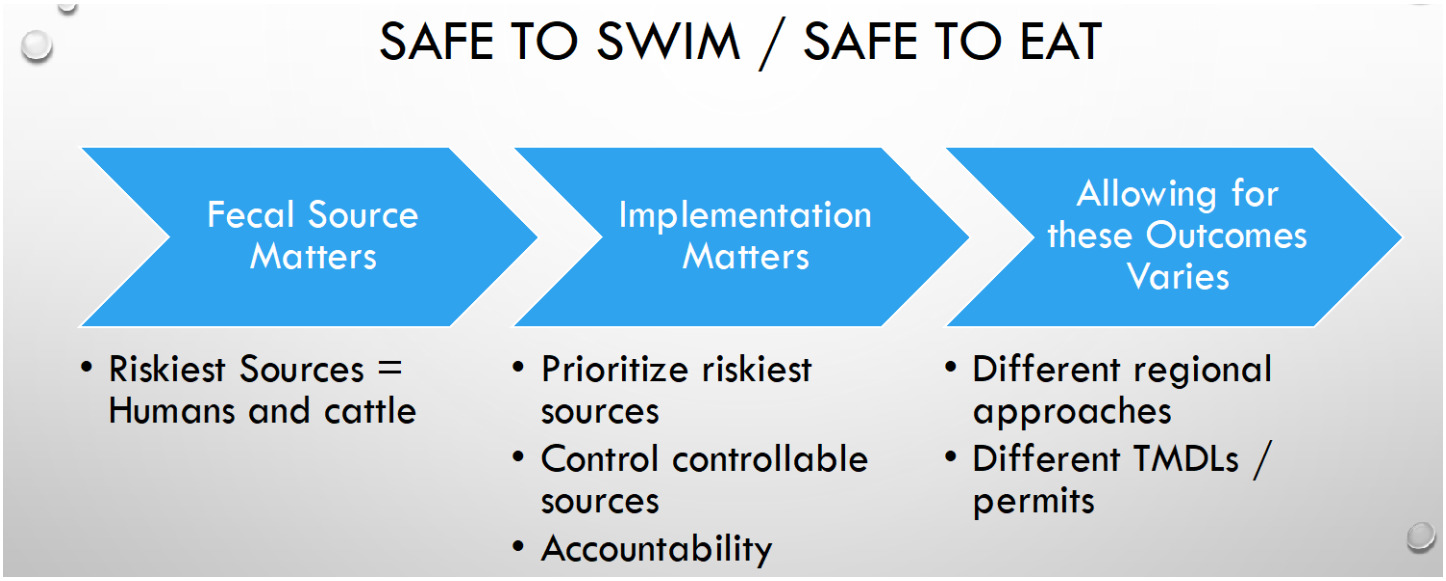
DAY 1 AND DAY 2 HIGH LEVEL WRAP UP:



- Goal is to get to a place where it is safe to swim and safe to eat shellfish
- Fecal source matters and looking at the riskiest sources is important to achieve the goal
- Implementation matters and think about ways where it is valuable and right to prioritize the riskiest sources and control what is controllable while maintaining accountability to implement actions as quickly as possible to get to goals
- Variety of regulatory approaches to getting to the goals that need to be considered both regionally and across the Water Boards
- A lot of value in collection action and collaboration and communicating to the public to get to shared outcomes

California Bacteria Summit
September 14-16, 2022

Summary

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DAY 3 SUMMARY

Key takeaways and principles to be considered moving forward:

- Goal remains the same to get to the point where it is safe to swim and shellfish are safe to eat
- Risk-based perspective takes a lot of forms, but is something that came out clearly in the summit
- Fecal contamination source type matters as not every source of indicator bacteria has the same level of risk
- Are some opportunities to use and improve standards
    - Current objectives are most indictive of risk when there are high levels of human and cattle sources and may not be as appropriate when the primary fecal contamination source types are less risky.
    - Risk modeling, such as QMRA, could be useful tools and could support site-specific objectives. A framework for how to do the studies and interpret the results would be helpful.
    - Consideration of tribal and subsistence beneficial uses
- For implementation:
    - Control the controllable sources and prioritize source control for fecal contamination source types with the greater illness risk.
    - Accountability is important
    - A framework for defining the actions needed would be helpful.
- Collective action, partnering and messaging are critical and important to everything that has been discussed. Examples include:
    - Joint fact finding
    - Partnering with public health experts
    - Working with expert panels and scientists
    - Highlighting successes and learning from existing studies and monitoring
    - Communicating to the public so they can understand the risks more in real time
- For monitoring, data, and tools, need to ensure that data are consistent and comparable and to support upcoming needs like source tracking and rapid, real-time data.

See Attachment C for full results of the breakout group discussions on Day 3.
See Attachment D for results of the post-summit survey.

NEXT STEPS

CASQA will work with CASA to develop a white paper on ways in which the wastewater and stormwater community can coordinate to help reduce human sources. CASQA will also support agencies with sharing success stories and best practices and in identifying tools to conduct effective human source identification studies.

The Water Boards and CASQA continue to have conversations within our organizations to identify ways we can support the goals of waters that are safe to swim and shellfish that are safe to eat. Other agencies are encouraged to have similar conversations.

As the summit concluded, a near-term action was identified for the Water Board to meet with additional nongovernmental organizations and to hear from those with perspectives that were not shared during the summit. To achieve those goals, continue the conversation, and build upon the 2022 Bacteria Summit, State Water Board staff and many organizations are working collaboratively to plan the next summit, tentatively scheduled for September 2023. The goals remain the same – to work collaboratively with all parties to identify

actionable solutions to improving water quality related to fecal indicator bacteria, consider how fecal source type matters, and realize our shared long-term goals for California Waters that are safe swim and shellfish that are safe to eat.

To get involved in planning for the 2023 Bacteria Summit or to learn more, please visit the Water Board's bacterial objectives website at https://www.waterboards.ca.gov/bacterialobjectives/#bsummit.

California Bacteria Summit
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Attachment A - Agenda with Links

PURPOSE OF THE SUMMIT

Understand what it means to have waters that are safe to swim and shellfish that are safe to eat, based on the latest science and learnings, and identify actions needed to achieve those outcomes

DAY 1 GOAL:

- Develop a common understanding of the evolution of the standards and science relevant to defining and achieving waters that are safe to swim and shellfish that are safe to eat

Item	Topic	Speaker(s)	Format	Time
1.	**Welcome / Opening**	Jonathan Bishop, State Water Board Karen Cowan, CASQA Day 1 Video Recording Link Time 0:12	Presentation	9:00am -9:25am
2.	**Icebreaker Activity / Review of the Summit Agenda and Format**	Ryan Golten, Facilitator Day 1 Video Recording Link Time 33:23	Presentation	9:25am - 9:40am
3.	**What Does It Mean to Say "*Waters That Are Safe to Swim and Shellfish That Are Safe to Eat*?"**	Ryan Golten, Facilitator Day 1 Video Recording Link Time 46:50	Focused group discussion	9:40am -10:15am
	BREAK			10:15am -10:30am
4.	**Understanding The Now: Current Water Quality Standards and How They Were Developed**			
	California Water Quality Standards	Rebecca Fitzgerald, State Water Board Day 1 Video Recording Link Time 1:32:00	Presentation + Q&A	10:30am -10:55am
	Framework for Ocean Beach & Inland Beach REC Monitoring	Amanda Blackwell and Nick Martorano, State Water Board Day 1 Video Recording Link Time 1:53:30	Presentation + Q&A	10:55am -11:15am
	National Water Quality Recreational Criteria	John Ravenscroft, EPA Day 1 Video Recording Link Time 2:06:00	Presentation + Q&A	11:15am -11:55am
	California Dept. of Public Health Regulatory Framework	Vanessa Zubkousky, CA Dept. of Public Health Day 1 Video Recording Link Time 2:42:00	Presentation + Q&A	11:45am - 12:15pm
	LUNCH			12:15pm -1:45pm
5.	**How Do We Evaluate and Measure if Waters are Safe to Swim and Shellfish are Safe to Eat?**	Josh Steele, Southern CA Coastal Water Research Project (SCCWRP) Day 1 Video Recording Link Time 3:17:00 Jeff Soller, Soller Environmental Day 1 Video Recording Link Time 3:30:00 Ali Boehm, Stanford University Day 1 Video Recording Link Time 3:51:00	Presentations	1:45pm - 2:50pm
6.	**What Are We Learning That is Helping Us Better Determine if Waters are Safe to Swim and Shellfish are Safe to Eat in California?**	Charles Brooke, CA Dept. Food and Agriculture Lucy Lefkowitz, Heal the Ocean Jian Peng, County of Orange Ken Schiff, SCCWRP John Griffith, SCCWRP Day 1 Video Recording Link Time 4:33:00	Panel and interactive Q&A	2:50pm - 4:00pm
7.	**Close with Short Wrap-Up Activity**	Ryan Golten, Facilitator Day 1 Video Recording Link Time 5:48:00		4:00pm - 4:30pm

California Bacteria Summit
September 14-16, 2022

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DAY 2 GOALS:

- Review current source reduction and regulatory tools
- Identify what's working well, what may be falling short, and potential improvements or opportunities to effectively reach our goals

Item	Topic	Speaker	Format	Time
8.	**Welcome and Intro to Day 2**	Ryan Golten, Facilitator Day 2 Video Recording Link Time 1:05		9:00am -9:20am
9.	**Understanding The Now:** **How Have Sources Been Reduced and What Lessons Have Been Learned from Those Efforts?**			
	Overview of potential sources of bacteria and how they get to waterbodies Efforts that have been used to reduce indicator bacteria concentrations	Ashli Desai, Larry Walker Assoc. Day 2 Video Recording Link Time 17:30 Brandon Steets, Geosyntec Day 2 Video Recording Link Time 26:30	Presentation + Q&A	9:20am -10:00am
10.	**Opportunities and Emerging Implementation Approaches**			
	Efforts that have been used to reduce human sources of bacteria	Jill Murray, City of Santa Barbara Day 2 Video Recording Link Time 1:19:20 Vicki Kalkirtz, City of San Diego Day 2 Video Recording Link Time 59:30	Presentation + Q&A	10:00am -10:45am
	BREAK			10:45am -11:00am
	Discussion of Opportunities for Source Reduction Moving Forward	Ryan Golten, Facilitator	Facilitated discussion in small groups	11:00am-12:00pm
	LUNCH			12:00pm -1:30pm
11.	**Understanding The Now: Current Regulations and Tools to Implement the Standards**			
	Water Boards Permitting & TMDL Framework	Rebecca Fitzgerald Day 2 Video Recording Link Time 4:38:00 Tom Mumley, San Francisco Bay Water Board Day 2 Video Recording Link Time 4:54:00	Presentation + Q&A	1:30pm -2:15pm
12.	**Opportunities and Emerging Regulatory Approaches**	Rebecca Fitzgerald (moderator) Alisha Wenzel, Central Valley Water Board LB Nye, LA Water Board Tom Mumley, SF Water Board Stacy Gillespie, State Water Board Jeremy Haas, San Diego Water Board Day 2 Video Recording Link Time 5:15:00	Discussion and interactive Q&A	2:15pm -3:15pm
	BREAK			3:15pm-3:30pm
	Discussion of Regulatory Opportunities	Ryan Golten, Facilitator	Facilitated discussion in small groups	3:30pm -4:30pm
13.	**Close with Short Wrap-Up Activity**	Ryan Golten, Facilitator Day 2 Video Recording Link Time 7:35:00	Discussion	4:30pm -5:00pm

California Bacteria Summit
September 14-16, 2022

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DAY 3 GOALS:

- Identify needed regulatory actions and research for achieving waters that are safe to swim and shellfish that are safe to eat
- Discuss a process for implementing those actions, including immediate next steps

Item	Topic	Speaker	Format	Time
14.	**Welcome and Intro to Day 3:** ***Where do we go from here?***	Ryan Golten, Facilitator Day 3 Video Recording Link Time 2:30		9:00am - 9:15am
15.	**Key Take-Aways from Day 1 and Day 2**	Jonathan Bishop, State Water Board Karen Cowan, CASQA Day 3 Video Recording Link Time 30:35	Slides to frame discussion, based on previous days; with opportunity for group to discuss and add key points	9:15am – 10:00am
16.	**What Does Long-Term and Short-Term Success Look Like – given the last 2 days of discussions?**	Small-Group Facilitated Discussions	Brainstorming to seed full-group discussions (agenda items 17 and 18)	10:00am -11:00am
	BREAK			11:00am – 11:15am
17.	**Big Picture/ Long Term:** What is our vision for success? What are the prioritized regulatory and scientific/research actions needed to achieve this vision?	Full-Group Facilitated Discussion Day 3 Video Recording Link Time 2:24:00	Facilitator (with planning team) to frame discussion, drawing from the small-group brainstorming	11:15am -12:15pm
	LUNCH			12:15pm – 1:15pm
18.	**Near Term:** Given our long-term vision, what does success look like in the interim? What are the prioritized regulatory and scientific/research actions needed to achieve this vision?	Full-Group Facilitated Discussion	Facilitator (with planning team) to frame discussion, drawing from the small-group brainstorming	1:15pm - 2:15pm
19.	**How Can We Accomplish This Together:** What should be our process for working together to achieve these outcomes?	Full-Group Facilitated Discussion Day 3 Video Recording Link Time 4:22:00	Framing Slides / questions to help the discussion	2:15pm – 3:00pm
20.	**Wrap up and Next Steps** What are the specific next steps and assignments?	Ryan Golten, Facilitator Rebecca Fitzgerald	Summary and Action Items	3:00pm - 3:30pm

California Bacteria Summit
September 14-16, 2022

Attachment B - Bacteria Summary Day 2
Small Group Discussion Feedback

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QUESTION 1: GROUPED KEY OPPORTUNITIES FOR REDUCING SOURCES OF BACTERIA

Actionable Activities
Address laterals
All source database share
Baseline data
Best Management Practices
Better and more monitoring
BMP Implementation
Calculate risk for HF183
Find leaky sewers
Finding broken pipes
Finding risky sources
Fix human and cow sources
Fix old septic systems
Fix old sewer laterals
More disinfect of water
More research
More source monitoring
Rebate incentives
Repair old WW pipes
Sanitary survey
Toilets for homeless
Update infrastructure
Updated guidance
Wet weather pilot testing

Data Gaps
Data needs
What should we control

Engagement
Add sewer agencies
Agency collaboration
Collaborate stakeholders
Collaborate with wastewater agency
Collaboration
Collective action
Communicating data
Communication
Community analysis
Conversation septic sewer
Cooperation
Coordination
Departmental collaboration
Effective partnerships
Enhancing public education
Group coordination
Improve public communication
Interagency cooperation
Interagency Partnerships
Multisector Collaboration
Outreach programs
Public Education
Robust public outreach
Stakeholder coordination
Trust communication
Utilities coordination

Funding
Commercial Partnerships
Resources

Integrate New Science
New indicators

Joint Fact Finding
CCTV
Ideas from wastewater
Robust science basis
Source characterization
Source control matters
Source ID tools
Source Identification
Source information
Source tracking
Source tracking toolbox
Toolbox address human
Toolbox guidance
Tools for private sources
Toolset
Track source

Risk-based Communication
Communicate Risk
Education
Multiple benefits options

Risk-based Implementation
Accept risk
Better risk evaluation
Capture
Dry weather
Evaluate source
Focus implementation
Focus on HF183
Focus on human
Focus on sewer sources
Focus on sources
Go upstream
HF183 criteria
HF183 survey
Human markers
Human source
Human source investigation tools
Human source tracking
Human waste sources
ID tools for abatement
Identification
Identify the sources from
Identity source
Illicit discharge detection
Improved markers
Individualized
Industry surveillance
Investigate
Known risk from sources
Known sources
Monitoring Methods
New indicator tools
New Technology Source Tracking
Pre and post data

California Bacteria Summit
September 14-16, 2022

Attachment B - Bacteria Summary Day 2
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Prioritization
Prioritize sources
Rapid-Assessment
Tailored
Test all outfalls

Risk-Based Regulations

Achievability
Adaptive
Creative Regulations
Exclusion
Holistic approach
Homeless management
Market Viability Testing
Prioritize by use base
Prioritize risk
Provide compliance path
Reasonableness
Regulating discharge
Regulations to support science
Regulatory incentives
Risk analysis
Risk assessment
Risk communication
Risk evaluation
Risk-based
Risk-based Focus
Risk-based regulations
Risk-based source ID
Riskiest conditions
Science risk prioritization
TMDL
True source control
Understanding True Risk

Other

Don't blame unhoused
Legislate
Milestones
One Water planning
PL Maintenance
Private infrastructure
Private laterals
Quality over quantity
Recycled water use
Wastewater treatment
Water recycling
Right size
Sanitary homeless camps
Scoop the poop program
Sewage collection systems
SW capture
SW capture recharge
SW collab with WW
SW treatment
Tiger team

QUESTION 2: SHARE UP TO 3 REGULATORY OPPORTUNITIES THAT MOST EFFECTIVELY ALIGN WITH ACHIEVING OUR GOALS OF WATERS THAT ARE SAFE TO SWIM

Actionable Activities

Sample monthly

Data Gaps

QMRA technical data gaps

Engagement

Agency and NGO consensus
Clear demonstration
Collaboration
Coordinate between agencies
Departmental coordination
Educate
Encourage collaboration
Expert panel
Improve public communication
Info sharing
NGO engagement
Public engagement
Public health officials
Public support
SB RB collaboration
Statewide collaboration
Tribal, culturally based WQO
Trust

Funding

Funding opportunities
More funding
Provide funds for agencies
Resource leveraging
SW tax

Integrate New Science

Reopener for new tech
Science support
Science driven regulations
Studies
Timelines align with science

Joint Fact Finding

Determining the source
Identify BMP effectiveness
Identifying barriers
Monitor different human sources
Natural source exclusion
Pilot project opportunity
Rapid test
Sampling in same areas
Upstream indirect sources

Leadership

Credit for action
Credit for progress
Credit for targeted actions
More accountability
Regional Board Freedom

California Bacteria Summit
September 14-16, 2022

Attachment B - Bacteria Summary Day 2
Small Group Discussion Feedback

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Regional Monitoring
Support for regulatory project

Risk-Based Communication

Notification of spills
Specific RB guidance
SSO control
SSO notifications
Streamlined reporting

Risk-Based Implementation

Adaptive management
Creative solutions
Extend TMDL without TSO
Holistic thinking
Implement based on risk
Implementation focus
Incentive for risk based
Incentives for actions
Monitoring
More sampling
Prescribed implementation
Prioritization of sources
Prioritize risk
Prioritize waterbodies
QMRA implementation
QMRA reference manual
Schedule extensions
Seasonal use suspensions
Seasonality to uses
SSOs
Storm event waiver
Wet weather pause
Wet weather variance

Risk-Based Regulation

Alternative compliance pathways
Alternative TMDL guidance
Attainment documentation
Beneficial use
BMP based compliance
Change the objectives
Changes to beneficial uses
Compliance
Compliance pathways
Continued creativity
Control plan vs TMDL
Correct Beneficial Uses
Correct use designations
Flexibility
Focus on most used waters
Focus on real goal
Framework for alternative to TMDL
HF183 objectives
Holistic approach
Narrative objective
Non TMDL pathway
Performance-based
Permit
Permit and TMDL flexible
Permit flexibility
Reevaluate beneficial use
Reference approach guide
Regional regulatory aid
Regulatory flexibility
Remove legal constraints
Risk-based indicator
Risk reduction standards
Risk-based
Risk-based approaches
Risk-based standard
Risk-based target
Site specific objectives
Site specific QMRA
Site-specific
Soften terms of compliance
Statewide approach
Statewide compliance path
Statewide HF183 objective
Summarize multiple permits into one TMDL
TMDL amendment
Trash amendment model
Trash policy model
Try new things in TMDL
use designation
Use state standards
WQ over compliance
Yearly average HF183

Other

Accessibility of data
Agriculture
City effort credit TMDL
Clean
Confined animals
Duration
Enforcement
Legislative updates
Low high flow suspension
Source reduction credit
Suspend Rec high events
Suspension

California Bacteria Summit
September 14-16, 2022

Attachment B - Bacteria Summary Day 2
Small Group Discussion Feedback

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QUESTION 3: SHARE UP TO 3 REGULATORY OPPORTUNITIES THAT MOST EFFECTIVELY ALIGN WITH ACHIEVING OUR GOALS OF SHELLFISH THAT ARE SAFE TO EAT

Engagement
Agency collaboration
Better public health information
CDHP collaboration
Clarity
Clear streamline communication
Collaboration
Coordination
NGO engagement
QMRA food literature review
QMRA reference manual
Specific RB guidance

Funding
Consider subsistence
Consumption rates

Integrate New Science
Emerging science guidance
Improved indicators
More studies

Leadership
Expert panel
Holistic thinking

Risk-Based Communication
Notification of spills
Enforceable waiver

Risk-Based Implementation
Best practices
Performance
Risk evaluation
Risk uses consumption
Risk-based target
SSO control
Subsistence vs commercial

Risk-Based Regulation
Actual risk-based standards
Alternative indicator
Beneficial use
Change the objective
Correct use designation
Define different use
Define standards
Designated areas
Locations for subsistence
Monitoring Policies Safety
No 303(d) listing
Public health based
Recreation vs commercial use
Remove legal constraints
Review beneficial uses
Review standards
Revise beneficial Uses
Risk-based objectives
Risk-based standards
Sensible objectives
Source control standards
State standards
Statewide compliance path
Subsistence Index
Tissue based QMRA
TMDL alternatives
Trash policy model
Upstream source management
Use attainability UAA

Other
Use designation
Be careful or salmonella
BMP effectiveness
Grazing
Redefine
Same program with CDPH
Short term relief
Support indigenous uses
Technology
Uniformity
Updates

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September 14-16, 2022

Attachment C - Bacteria Summary Day 3
Small Group Discussion Feedback

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Top 3 Big Picture and Near-Term Ideas for Achieving Our Goals

Theme	Idea
Actionable Activities	List of baseline activities that should be doing is really needed. What is needed to do to get to the goal?
Data Gaps	Address gaps in science to help consider alternative thresholds if needed.
	Urgent vs importance in technical guidance and decision making
	More research! And laboratory capabilities and real-time data.
Engagement	Near term action. Need to engage with the NGOs and figure out how to have a collective dialogue to get to collaborative action.
	Communication and collaborative messaging.
	Engage with NGOs and stakeholders at a regional level. Have regional engagement.
	Improving communication with public about bacteria.
	Collaboration and engagement with EVERYONE - community members, permittees, regulators, NGOs, other govt agencies is crucial to begin to affect change. Messaging and communication are as well.
	broader public engagement and provide resources to execute
	Statewide consistency and annual communication.
	Consensus for basic action
	Work with NGOs to develop consistent messaging for the public
Funding	Establish and target funding mechanism to identify high risk infrastructure to prioritize source reduction.
	Framework that provides need-based funding support and assistance in applying for and managing grants.
Integrate New Science	Explore ways to allow state and regional boards to use new science as it becomes available.
Joint Fact Finding	Joint fact finding ahead of TMDLs and tools that promote development of better models, source identification methods, and high-resolution 3D mapping of infrastructure.
	Developing processes for communicating with all interested parties so we can come together in a manner that creates constructive dialogues.
	Cohesion amongst regional + state + all
Leadership	State board leadership in coordinating/communicating for consistency
Other	Develop a structure and process for an integrated approach to permitting
	Apply the technology to clean stormwater
	Marine spatial planning

Attachment C - Bacteria Summary Day 3
Small Group Discussion Feedback

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Theme	Idea
Risk-Based Communication	Index to weigh risk
	Communication to the public and among agencies
Risk-Based Implementation	Accurately assess conditions, then target actions at most dangerous sources of contamination,
	Moving towards risk-based assessments.
	Identify a toolkit of actions that should be taken to address risk.
	Develop a simplified computer program to determine risk. Ideally this would allow for an individual ton input WQ information that is specific to a waterbody.
	Better source tracking tools. They need to be simpler, more affordable, and real-time.
Risk-Based Regulations	Update provisions based on more current science and allow for local use of compliance pathway tools and risk-based factors.
	Flexibility for regulators and for permittees in compliance.
	Flexibility in TMDL implementation.
	Discussion about how could look at alternative ways of demonstrating whether or not the standards are met with confidence that waters are safe to swim and shellfish are safe to eat.
	Flexibility in reviewing and adjusting TMDLs.
	Risk-based regulations
	Brainstorm ways to provide regulatory flexibility (i.e., allow multiple pathways to compliance).
	Pathways to compliance
	Short Term: have all agencies focus on controllable sources. Allow Reg Boards flexibility for region specific Long Term: Develop state-wide criteria for: High flow suspension Use Attainability Analysis Credits for addressing controllable sources
	Revise use of FIB as a standard. Could use FIB and a preliminary screening to inform need to target monitoring efforts
	Regulations resulting to best protection of human health minus cohesion amongst regional + state + all

California Bacteria Summit
September 14-16, 2022

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Big Picture and Near-Term Ideas for Achieving Our Goals-Brainstorming Ideas

Theme	Idea
Actionable Items	Developing "little g" statewide guidance, non-regulatory, for all implementing parties to use (building on existing guidance, e.g., SCCWRP, ASCE)
Data Gaps	Increase precision of source identification
	Near term, what are the data gaps upstream?
	Data gaps to help identify alternative indicators/approaches if needed
	Address data needs and standards for inland beach monitoring (e.g., higher quality and long-term data sets to inform future studies, QMRA, etc.).
Engagement	Near term & long term: state providing reference document to guide regional, municipal, permittees; like what LB Nye mentioned of something providing confidence to present to their boards
	Near Term: Identifying a third party with expertise to have a voice in conversation
	Reduce/eliminate separate meetings to reduce "he said, she said"; getting NGOs and all stakeholders in the conversation real time
	Provide resources to disadvantaged groups to be able to attend these conversations; not just environmental NGOs = representation matters but many may need assistance to get here; even a 2-hour period to answer questions from online; not that they lack interest but may just lack resources
	Need to figure out a way to have a dialogue with the NGOs and figure out a path forward to collective action.
	List of actions that everyone should be doing with agreements to help build trust and understanding of expectations and create accountability.
	Near Term: Similar style summit should happen on regional level to discuss regulatory protections
	List of actions needs to be A level of effort, not just baseline.
	Near Term/Big Picture: Overcoming political barriers; engaging with NGOs meaningfully; expert panel with NGOs as well
	Gaps in Communication-People interpret words in different ways and need to work on how to talk effectively with each other to understand the successes and what else needs to be done
	Near Term: State Board have blanket statement about how to handle wet weather events
	open and proactive conversation
	communication with NGOS
	Transparency is commonly requested but how transparent is confusing and how that information is used is unclear
	Current reporting requirements are complicated and difficult to relay to the public.
	Near Term/Big Picture: Increasing understanding of how collection systems work

Attachment C - Bacteria Summary Day 3
Small Group Discussion Feedback

Co-Hosted by the California Water Boards and CASQA

Theme	Idea
	Statewide action campaign for public messaging
	Any next step needs to prioritize equity, tribal and cultural resources, and subsistence.
	outreach/communications beyond those here
	All parties should meet annually.
	Big Picture: Engage NGOs and make environmental justice a priority
	aligning vision from the people who work in all sections of the spectrum; and making sure everyone gets a spotlight; field visits to experience the problem and hard work
Funding	Remove pressure off of MS4 permittees to solve problems outside of their purview (unhoused population).
	Cost effectiveness of TMDLs/permits
	Resources for stormwater
	program-wide funding rather than project specific to provide flexibility
	Tri-plex-type test to determine source and funding for its development
	Support from Waterboards on actions so entities can get funding/support
	Increased coordination with public health departments (both state and local) and funding to support local health department actions/activities.
	Establish and target funding mechanism to identify high risk infrastructure to prioritize source reduction.
	Stop dis-incentivizing innovation (i.e., bioswales and green infrastructure)
	funding availability and coordination and suppling it
Integrate New Science	Need affordable, readily available, real-time tools to take immediate action for source identification and response.
	supporting equitable scientific innovation
	Develop SWB guidance on how to implement the two tools for permittees (Reference tool and Natural Source Exclusion tool).
	More data and research is needed on shellfish harvesting inland waters (e.g., locations and risks).
	Develop guidance on how to use the existing tools in the toolbox
	Explore ways to allow state and regional boards to use new science as it becomes available.
	Research and apply the technology to clean SW.
	Creating an inventory of science to make information available. Fundamental agreement that study results are legitimate.
Joint Fact Finding	Identify controllable sources
	Evaluation and designation of beneficial uses (e.g., ensuring designation of appropriate spatial areas).

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Theme	Idea
	Determine if TMDL should apply to all tributaries, some creeks/ drainages are intermittent and may not contribute to mainstem exceedances.
	Figure out how to address the near term TMDL deadlines.
Leadership	Maintain pathway for continued interagency collaboration (i.e., research, diversion
	consensus for basic action
	Increase local and state interagency collaboration - move away from jurisdictional boundary mentality
	collaborations between regional boards too and more frequent conversations
	cross sector collaboration
	Relationship building
	Figuring out the best way to fold in the health professionals.
	Create a framework for engaging with other partners in solving the problem
	Getting credit for actions towards compliance
	Credit and spotlight the good efforts too not just calling out the "bad"
Risk-Based Communication	Emphasize the goal of achieving safe to swim/eat, if meeting the FIB objective is not realistic.
	Near Term: Recognizing indicator bacteria may not be best mechanism for proving Safe to Swim/Safe to Eat
	Recognition that FIB may not be realistic in some situations.
	Defining the criteria for use attainability
	Identifying how we are identifying progress, what metrics we use and be clear in what the challenges are.
	Recognizing when beneficial use is not occurring and allowing for flexibility with compliance.
	Expanding predictive modeling tools to identify and communicate real time risk (both inland and coastal).
	Consistent guidance or templates for communicating risk effectively to the public (e.g., consistent signage statewide and using infographics).
	Changes in messaging (annual grading scale like restaurants)
	Improving Water Board's internal permitting coordination (e.g., stormwater programs, NPDES). AKA Statewide consistency.
	Update and align terminology so that it's more consistent (i.e., indicator bacteria).
	Guidance on wet weather work
	Develop a consistent messaging to the public - work with NGOs in messaging
	USEPA scientific guidance on pathways
	Big Picture: Improve communication about bacteria levels and where bacteria is coming from
	technical workshops in EO meetings; State boards providing technical and communicate collaborative efforts to regional

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Theme	Idea
	Incentivize SSOs
	Communicate what safe really means. Could use an index to indicate severity of risk (AQI or fire risk rating as model).
	Consistency of messaging to NGOs, with clear options for compliance.
	Communicate beach hygiene to younger generations (short term).
	Guidance from the state level to regions on suspensions
	Language for allow flexibility
	Rapid monitoring for risk communication. Need real-time communication for the public.
Risk-Based Implementation	Contamination from unhoused may be over inflated, should focus on source ID.
	Near Term: Prioritization of how to assess wet weather vs dry weather events
	Mechanisms to manage capacity inland
	Near Term: Prioritization of waterbodies based on recreational use and anticipated use; resilience in the face of heat waves
	Attempt bacteria control plan prior to TMDL development (Short Term).
	Transition to rapid test methods to be more protective of public health (e.g., ATP).
	State Board could provide support to Regional Boards as they try risk-based approaches.
	Better source tracking tools- easier, more affordable and real-time
	urgent vs importance -- guidance from State to clarify and understanding what's "high" concentration = shouldn't be relative or subjective
	Provide guidance and framework for Regional Board implementation alternatives.
	Identifying what can be done during dry weather that might help during wet weather and how we can use the tools for source tracking to help with identifying solutions during wet weather.
Risk-Based Regulations	Reconsidering how we broadly apply the REC-1 BU to all WBs where there is no recreation. Apply common sense to where we designate REC-1.
	Compliance pathway with agreement on the things that need to get done and reasonable timeline for doing that.
	Characterizing controllable and non-controllable sources from a stormwater program perspective.
	Add compliance schedules to bacteria provisions
	Treat bacteria the same as all other water quality objectives. Maybe need to think of a different approach.
	Beneficial use assessment
	Near Term/Big Picture: Adapting REC standards to more arid regions
	Revise use of FIB as a standard. Could use FIB as a preliminary screening to inform need to target monitoring efforts or types of analyses.

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Theme	Idea
	use alternative pathway
	Performance based compliance standards
	Flexible compliance schedules
	inclusion of inland water ways
	Marine spatial planning- monitoring in real time for SHELL and push it out-shore
	Alternative compliance pathways
	Big Picture: Determine alternative means of how we work on TMDLs (Plan B track)
	Near Term: TMDL re-opener to revise objectives and reevaluate stream studies, etc.
	Near Term: Find an appropriate threshold for shellfish
	Risk-based regulations
	Simplified computer program (e.g., plug and play) to determine risk. Ability to input a variety of WQ information to determine site specific risk.
	Index to weight risks
	Create regulatory flexibility with the goal to minimize threat or fear to participate in efforts and studies that would help realize the overall goal.
	Develop an integrated approach to permitting
	A proposed indicator tool should link to a risk-based level that informs prioritization of actions.
	Use the flexibility in the provisions to apply SSOs.
	Permittees need options for compliance pathways.
	pathway evaluation process
	Flexibility in regulations to allow Regional Boards to take adaptive approaches.
	Risk-based water quality standards could be used in TMDLs where FIB is not appropriate.
	Coordination with public health experts on future regulatory approaches.
	Brainstorm ways to provide regulatory flexibility (i.e., allow multiple pathways to compliance).
	Review and revision of the TMDL process allowing for flexibility and integration into new standards.
	A proof of concept at a watershed scale- invest into a single watershed, identify the limitations/what we can achieve, and extrapolate to individual WBs.
	risk based framework
	Big Picture: How to move towards risk-based assessment
	Different sources have different correlation with risk, if can enumerate that the risk has been addressed, will the science be far enough along to enumerate the risk from natural sources to be able to create new standards?

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Theme	Idea
Other	Help Desk resources for TMDLs
	Need to identify if unhoused populations are a contribution to water quality problems and risk in receiving waters-Data Gap. Determine what the sources are and whether they are contributing to risk.
	strong voice on equity (inclusion of tribal folks in the conversation)
	Knowing what does work so have in the toolbox and know what won't move the needle or is questionable
	Progress moves at the pace of trust - build trust.
	Incentivize people doing the right thing.

California Bacteria Summit
September 14-16, 2022

Attachment D - Bacteria Summary Post Summit Survey

Co-Hosted by the California Water Boards and CASQA

Question	Responses
What were your greatest learnings from the Summit?	Agency collaboration at all levels is important to achieve the common goal of swimmable water and safe to eat shellfish. There are enough scientific tools to guide meaningful management actions, but a regulatory framework is lacking to incentivize innovative solutions.
	There is interesting science being done, but not linked to (walking down) a future compliance pathway.
	It appears that there is likely room for improvement when it comes to how we assess waterways for human and animal pathogens, especially when it comes to re-evaluating waterway use (especially with climate change as some waterways are now dry) and how we understand risk, and taking a more targeted approach instead of a one size fits all model
	We are still severely limited by outdated standards and difficult, seldom utilized processes (because time consuming and extremely costly) such as natural source exclusion & SSO's even though there is so much more science available that demonstrates the issues with current standards. Although a great effort and extremely well put together, at the end I left with little hope of any positive changes in the near term (5 years).
	Great information on the state of the science (especially risk assessment) and regulatory limitations.
	I learned that local waterboards throughout the state are in different stages of implementing Bacteria regulations. Local waterboards vary in their openness or opposition to alternative risk-based approaches to addressing bacteria. I learned that public messaging can be very important for communications regarding perceived and actual risks to human health.
	I have a much better understanding of the risk analysis behind the standards and the risk associated with different pathogen sources. But I'm concerned that the standards in the pathogen TMDL my jurisdiction has a WLA for aren't particularly relevant to what we're trying to achieve.
	Understanding the impact across the state.
	Potential regulatory willingness to set science-based, risk-based standards... at least from state WB (LA/SD regions less certain).
	That everyone appears to be aware of the challenges with the bacteria standards and want to work toward a solution.
	The science has come a long way. Regulations that utilize the newer science are lagging.
	Historically used Fecal Indicators can be an effective tool in understanding water quality but have significant limitation as predictors of health risk. In order to make our recreational waters safe to swim, we will need to use the latest scientific approaches to develop effective source control strategies and stormwater projects. If we are not wise in how we approach this problem, a lot of public funds will be spent towards water quality compliance, but little progress will be made towards having safer recreational waters. We need water quality regulations to incorporate the latest science so that responsible agencies have incentives to invest in the science and targeted mitigation efforts.
	What areas of current bacteria regulations that the State and Regional Water Boards are most open to making changes in.

California Bacteria Summit
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Question	Responses
What suggestions do you have for potential follow up?	SWB/RBs to develop a state-wide bacteria reduction implementation plan that includes action-based compliance pathways for the permittees.
	Compliance cost discussion or loss of environmental flows.
	It would be great to have the NGO perspective as well as perspectives from lower income communities and tribal communities which were not represented at this meeting
	Continue conversation, make short term goals
	1) More information/examples for freshwater; 2) consideration of tribal uses; 3) coordination with HAB efforts; and 4) discussion on standard procedures, data quality, and public availability of data.
	I suggest that the State Board initiate a Tech Advisory committee to draft a path forward for alternative risk-based compliance.
	Reopening and updating pathogen TMDLs: What is the Water Board's commitment to using the best available science and addressing TMDLs that are past their target dates? How do we move past requirements to monitor water quality with the same methods we've always used if the methods aren't providing the best or most meaningful data? Aquaculture: Building bridges between stormwater and water quality programs and commercial aquaculture operations. What is working and what isn't? The summit discussed recreational shellfish harvesting but I didn't hear much discussion about commercial aquaculture operations beyond what Public Health presented. Has anyone established a successful strategy for collaborating with commercial shellfish growers to better understand water quality trends?
	Would be interesting to have the people in the same regional board areas connected
	Case study beaches in LA and SD regions where risk-based site-specific objectives are being pursued
	A written statement by the State Board encouraging stakeholders to conduct studies to support the evolution and application of new science. Continued discussion on the topic. State Board supporting regions with incorporating new concepts in TMDLs.
	It would be helpful if the State Board would collaborate with Regional Boards (and other key stakeholders) on specific Bacteria TMDLs to demonstrate the utility of new scientific approaches in a novel regulatory framework. For example, the LA Regional Board will be developing a new Bacteria TMDL in the Dominguez Channel. This TMDL could serve as an interesting test case where compliance strategies rely on identifying and mitigating high-risk source(s) of fecal bacteria.
	Maybe a fact sheet defining key scientific points about bacteria, water quality objectives, and health risk. Perhaps they could be ranked by confidence level related to the fact point. These fact points would then be the foundation for future discussions as without agreement on the key points misinformation will cloud future discussions.

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Question	Responses
Any remaining questions you were left with?	What was the value in the small group summary slides. What was their outcome or implementation path.
	How do we maintain the quality of waterways for recreation while also directing resources appropriately and creating equitable regulations with suitable guidance
	Why aren't the wastewater agencies brought into the discussion and why aren't their WDRs addressing this topic?, are people getting sick? I don't hear of reports of people getting sick, permittees are stuck with controlling both controllable and uncontrollable as there is little flexibility in regulations and permittee are guilty until proven innocent (everything characterized as controllable unless you can prove natural/uncontrollable)... and that is seldom possible
	Costs for different monitoring or study options (qPCR, QMRA, etc.)
	What is the best way to keep Wastewater agencies engaged in the dialogue? How do we get wastewater to understand their bacteria contribution and their share of addressing the issue?
	How can we use the EPA Sanitary Survey format to add value to the FIB data we are collecting as part of our WAAP? Can we extract more value from our limited monitoring data if we have more comprehensive environmental data, or do we need to ramp up the frequency of testing and re-examine the test methods we're using?
	How do we fix the issue of bacteria?
	Whether passing risk-based site-specific objectives will actually be possible with either the LA or SD Regional Board given anticipated eNGO opposition.
	What is the path to compliance?
	Most people expressed the feeling like it will take 10+ years to address the issues with bacteria objectives. If this is such a big issue from a human health and regulatory perspective, why does it need to take 10 years to address?
	Are NGOs willing to accept to embrace these newer scientific tools if they result in more effective reduction in pathogens/risk?
	A better understanding on beneficial uses and proper designation to begin with especially potential beneficial uses. Regulations should be required to include what would be needed beyond just water quality to achieve the potential beneficial use (e.g., removal of concrete channel walls, public access points, etc.). According, a separate pathway of regulatory compliance should be setup for these potential beneficial use waterbodies.

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Question	Responses
Any other feedback you would like to share with the organizers/facilitators?	Hope the NGOs can join the conversation and work together toward the common goal.
	Interesting, but I didn't see a light at the end of the tunnel, just distracting fireflies.
	I think without the perspectives of folks outside of the water boards and CASQA, it's really challenging to adequately understand the complexity of this issue and the perspectives of the diverse residents of the state of California. I think in the future events like these need to push to have more representation present to have a well-rounded discussion of the issues.
	This conversation is long overdue and it was a great effort, its seems like it will be a very long road to make any progress...permittees are guilty until proven innocent which is extremely challenging and costly to do, if possible at all....
	Coffee and snacks were an unexpected luxury. Lunch places were very busy or a bit far to walk to. Sale of lunch boxes would be convenient to many folks.
	I'd love to learn more about what is (and isn't) working for Phase II communities who are grappling with bacteria loading in natural waterways. Several of the tools/remedies highlighted by Phase I jurisdictions (Dry weather diversion, UV treatment) aren't applicable for Phase II's that are working in semi-natural channels with mandated minimum flow requirements. I'd appreciate a deeper discussion on what tools we should be reaching for when proven Phase I strategies aren't on the table.
	Thank you, you all did an amazing job on what could have been a snooze fest.
	The organizers/facilitators did an incredible job. It was clear that a lot of hard work went into putting the summit together. I really appreciated the information and discussion. I hope we can continue the discussion in a similar format.
	I really appreciate the State Board embracing the summit and playing a strong leadership role in water quality standards. By having regulators acknowledge what is working and what is not has already helped me convince stormwater managers that these new tools are worth the investment and that our implementation efforts should follow the science (even though it may take a while for the regulations to be updated accordingly).
	Overall, great speakers and a great summit. Biggest disappoint was that due to the lack of NGO presence the State Water Board seemed unwilling to discuss next steps and so there is concern that momentum will now be lost.