

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION**

**RESOLUTION R2-2008-0061**

**Amending the Water Quality Control Plan for the San Francisco Bay Region to Establish a Total Maximum Daily Load and Implementation Plan for Pathogens in Richardson Bay**

**WHEREAS, the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board), finds that:**

1. The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives. The Basin Plan was duly adopted by the Water Board and approved by the State Water Resources Control Board (State Water Board), State Office of Administrative Law (OAL) and the United States Environmental Protection Agency (U.S. EPA), where required.
2. The Basin Plan may be amended in accordance with California Water Code § 13240, et seq.
3. The Richardson Bay has been identified under federal Clean Water Act §303(d) as an impaired waterbody due to pathogens.
4. Under Clean Water Act § 303(d), the Water Board is required and authorized to establish the total maximum daily load (TMDL) for those pollutants identified as causing impairment of waters on the § 303(d) list. Additionally, the Water Board is authorized to develop an implementation program for achieving water quality standards, such as the numeric water quality objectives.
5. A Basin Plan Amendment has been prepared in accordance with California Water Code § 13240 that will establish the TMDL and Implementation Plan to reduce pathogens-related risks to humans, and restore and protect water quality beneficial uses in the Richardson Bay.
6. The Basin Plan Amendment, including specifications on its physical placement in the Basin Plan, is set forth in Exhibit A hereto.
7. The scientific basis for the regulatory elements of the proposed Basin Plan Amendment was subjected to an independent, external peer review by Professors Kara Nelson and William Yanko, pursuant to the requirements of Health and Safety Code section 57004.
8. On February 8, 2008, the Water Board publicly noticed the proposed Basin Plan Amendment and distributed the proposed Basin Plan Amendment for public review and

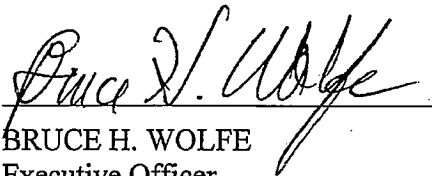
comment, a draft Staff Report, and Environmental Checklist in accordance with applicable state and federal environmental laws and regulations (CWC § 13244, title 23, California Code of Regulations, § 3775 et seq., and 40 CFR Part 25).

9. On April 9, and July 9, 2008, the Water Board held public hearings to consider the Basin Plan Amendment and associated supporting documents, after a 45-day public comment period.
10. The process of basin planning has been certified by the Secretary for Resources as exempt from the requirement of the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) to prepare an Environmental Impact Report or Negative Declaration.
11. The Basin Plan Amendment package includes a Staff Report, an Environmental Checklist, an assessment of the potential environmental impacts of the Basin Plan Amendment, and a discussion of alternatives and cumulative impacts. The Basin Plan Amendment, Environmental Checklist, Staff Report, and supporting documentation serve as a substitute environmental document under the Water Board's certified regulatory program.
12. The Water Board has duly considered the Environmental Checklist, Staff Report and supporting documentation with respect to environmental impacts and finds that the proposed Basin Plan Amendment will not have a significant impact on the environment. The Water Board further finds, based on consideration of the record as a whole, that there is no potential for adverse effect, either individually or cumulatively, on wildlife as a result of the proposed Basin Plan Amendment.
13. The Water Board has also considered the environmental analysis in the Staff Report and the Environmental Checklist of the reasonably foreseeable methods of the compliance with the Basin Plan Amendment, including economics.
14. The Water Board has carefully considered all comments and testimony received, including responses thereto, on the Basin Plan Amendment, as well as all of the evidence in the administrative record.
15. The Basin Plan Amendment must be submitted for review and approval by the State Water Board, OAL, and U.S. EPA. Once approved by the State Water Board, the amendment is submitted to OAL and U.S. EPA. The Basin Plan Amendment will become effective upon approval by OAL and U.S. EPA.

**NOW, THEREFORE BE IT RESOLVED THAT:**

1. The Water Board adopts the Basin Plan Amendment as set forth in Exhibit A hereto.
2. The Executive Officer is directed to forward copies of the Basin Plan Amendment to the State Water Board in accordance with the requirement of CWC Section 13245.
3. The Water Board requests that the State Water Board approve the Basin Plan Amendment in accordance with the requirements of CWC Sections 13245 and 13246 and forward it to the OAL and U.S.EPA for approval.
4. If, during the approval process, Water Board staff, the State Water Board or OAL determines that minor, non-substantive corrections to the language of the Amendment are needed for clarity or consistency, the Executive Officer may make such changes, and shall inform the Water Board of any such changes.
5. Since the Basin Plan Amendment will involve no potential for adverse effect, either individually or cumulatively, on wildlife, the Executive Officer is directed to sign a CEQA Filing Fee No Effect Determination Form and to submit the exemption in lieu of payment of the Department of Fish and Game CEQA filing fee.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on July 9, 2008.

  
BRUCE H. WOLFE  
Executive Officer

**Attachment**

Exhibit A – Basin Plan Amendment to Amend the Water Quality Control Plan for the San Francisco Bay Region to Establish a Total Maximum Daily Load and Implementation Plan for Pathogens in Richardson Bay.

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# Exhibit A

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## Proposed Basin Plan Amendment

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The following text is to be inserted into Chapter 7.

### **Richardson Bay Pathogens Total Maximum Daily Load (TMDL)**

The following sections establish the TMDL for pathogens in Richardson Bay. The numeric targets, load allocations, and implementation plan are designed to support and protect the Bay's designated beneficial uses, water contact recreation and shellfish harvesting. The TMDL includes actions for adaptive implementation to evaluate the effectiveness of implementation actions, monitor progress toward targets, and review the scientific understanding pertaining to pathogens, which may result in modifying the TMDL in the future.

### **Problem Statement**

Richardson Bay is impaired by pathogens. Monitoring results indicate that the Bay exceeds bacteria water quality objectives for shellfish harvesting (e.g., clam, mussel, and oyster harvesting), and water contact recreation (swimming, fishing); Table 3-1). The presence of pathogens is inferred from high concentrations of fecal coliform bacteria, a commonly used indicator of human pathogenic organisms. Therefore, the beneficial uses of shellfish harvesting and recreational water contact are not fully supported.

### **Sources**

Pathogen sources are identified based on elevated coliform bacteria (pathogen indicator) levels downstream or in the vicinity of identified land uses or facilities and from documentation of inadequately treated human waste discharges. If not properly managed, the following source categories have the potential to discharge pathogens to Richardson Bay: sanitary sewer systems, stormwater runoff, houseboats, and vessels.

- High coliform levels detected downstream of storm drains, and the increase in the number of wet season exceedances as compared to the number of dry season exceedances, point to stormwater runoff as a potential pathogen source.
- Documentation of sanitary sewer overflows in Richardson Bay area municipalities suggests that sanitary sewer systems are a potential source of pathogens to the Bay.
- Consistently high coliform levels in houseboat and vessel marinas indicate that houseboat and vessel marinas' failing sewage collection systems are potential sources of pathogens.

Bacteria levels are low at monitoring sites that contain wildlife but are minimally impacted by human activities. This suggests that wildlife may not be a significant, widespread potential source of pathogens in Richardson Bay. Wildlife may be a significant source on an intermittent, localized basis.

### **Numeric Targets**

The numeric targets (desired future long-term conditions) proposed for pathogen indicators in Richardson Bay are presented in Table 7-1.

<b>Table 7-1. Numeric Targets for Richardson Bay<sup>a</sup></b>	
<b><u>Beneficial Use</u></b>	<b><u>Numeric Target</u></b>
<b><u>Shellfish Harvesting</u></b>	<u>Median fecal coliform density<sup>b</sup> &lt; 14 (MPN<sup>c</sup>/100 mL)</u> <u>90<sup>th</sup> percentile fecal coliform density &lt; 43 (MPN/100 mL)</u>
<b><u>Water Contact Recreation</u></b>	<u>Geometric mean fecal coliform density &lt; 200</u> <u>90<sup>th</sup> percentile fecal coliform density &lt; 400</u> <u>Geometric mean Enterococci density &lt; 35 CFU<sup>d</sup>/100 mL</u> <u>90th percentile Enterococci density &lt; 104 CFU/100 mL</u>
<p>a. <u>Based on a minimum of five consecutive samples equally spaced over a 30-day period</u>                      b. <u>"Density" refers to the number of bacteria in a given volume of water (U.S. EPA, 1986, 2002, 2003). The term is analogous to "concentration," which refers to the mass of chemical pollutant in a given volume of water. "Bacterial density" and "bacterial concentration" are sometimes used interchangeably.</u>                      c. <u>Most Probable Number (MPN) is a statistical representation of the standard coliform test results.</u>                      d. <u>CFU stands for colony forming unit (e.g., as in number of bacterial colonies)</u></p>	

The bacterial density targets are based on the Basin Plan's shellfish harvesting and water contact recreation water quality objectives for fecal coliform and on U.S. EPA's recommended Enterococci criteria for water contact recreation in salt water.

**Total Maximum Daily Load**

Table 7-2 shows Richardson Bay's density-based pathogens TMDL, expressed as fecal coliform bacteria concentrations.

<b>Table 7-2. Total maximum daily load for pathogen indicators (fecal coliforms) for Richardson Bay</b>	
<b><u>Indicator Parameter</u></b>	<b><u>TMDL</u></b>
<b><u>Fecal coliform</u></b>	<u>Median<sup>a</sup> &lt; 14 MPN/100 mL</u> <u>90<sup>th</sup> Percentile<sup>b</sup> &lt; 43 MPN/100 mL</u>
<p>a. <u>Based on a minimum five consecutive samples equally spaced over a 30-day period.</u>                      b. <u>No more than 10% of total samples during any 30-day period may exceed this number.</u></p>	

**Load Allocations**

Density-based fecal coliform allocations for each potential pathogen source category in Richardson Bay are presented in Table 7-3. Each discharger in the Richardson Bay watershed is responsible for meeting its source category allocation. All potential dischargers are also responsible for complying with applicable waste discharge requirements, or waste discharge prohibitions (Table 4-1, Prohibitions 5, 15, and 18).



All discharges of raw or inadequately treated human waste, including sewage from vessels, are prohibited. All sources of untreated or inadequately treated human waste have an allocation of zero.

<b>Table 7-3. Density-Based Pollutant Wasteload and Load Allocations<sup>a</sup> for Richardson Bay</b>		
<b><u>Categorical Pollutant Source</u></b>	<b><u>Wasteload and Load Allocations</u></b> <b><u>Fecal Coliform (MPN/100 mL)</u></b>	
	<b><u>For Direct Discharges to the Bay</u></b>	
	<b><u>Median<sup>b</sup></u></b>	<b><u>90<sup>th</sup> Percentile<sup>c</sup></u></b>
<u>Stormwater Runoff<sup>d</sup></u>	<u>&lt;14</u>	<u>&lt; 43</u>
<u>Wildlife<sup>e</sup></u>	<u>&lt;14</u>	<u>&lt; 43</u>
<u>Sanitary Sewer Systems</u>	<u>0</u>	<u>0</u>
<u>Houseboats</u>	<u>0</u>	<u>0</u>
<u>Vessels (Recreational, Live-aboard, Anchor-out Boats)</u>	<u>0</u>	<u>0</u>

**a. These allocations are applicable year-round. b. Based on a minimum of five consecutive samples equally spaced over a 30-day period.**

**c. No more than 10% of total samples during any 30-day period may exceed this number.**

**d. Wasteload allocation for discharges from municipal separate storm sewer systems (NPDES Permit Nos. CAS000004 and CAS000003).**

**e. Wildlife is not believed to be a readily controllable source of pathogens; therefore, no management measures are required.**

### **Implementation Plan**

The Richardson Bay Pathogens TMDL Implementation Plan builds upon previous and ongoing successful efforts to reduce potential pathogen loads in Richardson Bay and its tributaries. The plan requires actions consistent with the California Water Code (CWC 13000 et seq.), the state's Nonpoint Source Pollution Control Program Plan (CWC Section 13369), the Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program, and human waste discharge prohibitions (Table 4-1, Prohibitions 5, 15, and 18).

Table 7-4 lists the required implementation measures for the source categories listed in Table 7-3. These measures include evaluation of operating practices, identification of comprehensive, site-specific pathogens control measures and an associated implementation schedule, and submittal of progress reports to the Water Board documenting actions taken.

**Table 7-4. Trackable implementation measures for the Richardson Bay pathogens TMDL**

<u>Source Category</u>	<u>Implementing Party</u>	<u>Action</u>	<u>Completion Dates</u>
Sanitary Sewer Systems	<p>Marin County Sanitary District No. 5, Sewerage Agency of Southern Marin, Tamalpais Community Services District, City of Mill Valley, Homestead Valley Sanitary District, Alto Sanitary District, Almonte Sanitary District, City of Sausalito, Sausalito Marin City Sanitary District, Richardson Bay Sanitary District</p>	<p>1. <u>Comply with the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems.</u></p>	<p>As specified in applicable <u>WDR permit</u></p>
Stormwater Runoff	<p>Marin County, City of Sausalito, City of Mill Valley, City of Tiburon, City of Belvedere, Caltrans</p>	<p>1. <u>Implement applicable stormwater management plan.</u>                      2. <u>Update/amend applicable stormwater management plans, as appropriate, to include specific measures to reduce pathogen loading, including additional education and outreach efforts, and installation of additional pet waste receptacles.</u>                      3. <u>Report progress on implementation of pathogen reduction measures to Water Board.</u></p>	<p>As specified in <u>approved stormwater management plan and in applicable NPDES permit</u></p>

**Table 7-4. Trackable implementation measures for the Richardson Bay pathogens TMDL**

<u>Source Category</u>	<u>Implementing Party</u>	<u>Action</u>	<u>Completion Dates</u>
<u>Houseboats</u>	<u>RBRA; Marin County; local cities</u>	<ol style="list-style-type: none"> <li>1. <u>Submit to the Executive Officer for approval a plan and schedule for 1) evaluating adequacy and performance of sewage collection systems (onboard sewage systems, pumps, sewer lines, etc.) for all houseboats in Richardson Bay, 2) biennial evaluation of sewage collection system operation and maintenance for all houseboats once they have been repaired/upgraded such that they do not discharge any sewage into the Bay.</u></li> </ol>	<u>July 2009</u>
		<ol style="list-style-type: none"> <li>2. <u>Conduct evaluation per submitted plan.</u></li> </ol>	<u>July 2010</u>
		<ol style="list-style-type: none"> <li>3. <u>Report progress on implementation of the plan to Water Board.</u></li> </ol>	<u>Annually</u>
<u>Houseboat marina owners</u>	<u>Houseboat marina owners</u>	<ol style="list-style-type: none"> <li>1. <u>Submit to the Executive Officer for approval a plan and schedule for 1) repairing/upgrading identified substandard/malfunctioning sewage collection systems (onboard sewage systems, pumps, sewer lines, etc.) such that they do not discharge any sewage into the Bay, 2) long-term operation and maintenance of the systems.</u></li> </ol>	<u>July 2011</u>
		<ol style="list-style-type: none"> <li>2. <u>Report progress on implementation of the plan to Water Board.</u></li> </ol>	<u>Annually</u>
<u>Houseboat owners, houseboat marina owners</u>	<u>Houseboat owners, houseboat marina owners</u>	<ol style="list-style-type: none"> <li>1. <u>Repair/Upgrade identified substandard/malfunctioning sewage collection systems (onboard sewage systems, pumps, sewer lines, etc.) such that they do not discharge any sewage into the Bay.</u></li> </ol>	<u>July 2013</u>
		<ol style="list-style-type: none"> <li>2. <u>Operate and maintain sewage collection systems such that they do not discharge any sewage into the Bay.</u></li> </ol>	<u>Ongoing</u>

<u>Source Category</u>	<u>Implementing Party</u>	<u>Action</u>	<u>Completion Dates</u>
	RBRA, Marin County, local cities	<ol style="list-style-type: none"> <li>Submit to the Executive Officer for approval a plan and implementation schedule for 1) evaluating adequacy and performance of sewage collection systems (sewage dump stations, sewage pumpout stations, onboard sewage systems, sewer lines, etc.) for all vessel marinas and vessels with toilet facilities in Richardson Bay, 2) biennial evaluation of sewage collection system operation and maintenance for all vessel marinas and vessels once they have been repaired/upgraded such that they do not discharge any sewage into the Bay.</li> <li>Conduct evaluation per submitted plan.</li> <li>Report progress on implementation of the plan to Water Board.</li> </ol>	<p>July 2009</p> <p>July 2010</p> <p>Annually</p>
Vessels	Vessel marina owners	<ol style="list-style-type: none"> <li>Submit to the Executive Officer for approval a plan and schedule for 1) installing, as needed, an adequate number of sewage pumpout and dump stations. If no new sewage pumpout and dump stations are needed, provide an explanation as why they are not needed. 2) repairing/upgrading identified leaky/malfunctioning sewage collection systems (sewage dump stations, sewage pumpout stations, onboard sewage systems, sewer lines, etc.) such that they do not discharge any sewage into the Bay. 3) long-term operation and maintenance of the systems such that they do not discharge any sewage into the Bay.</li> <li>Report progress on implementation of the plan to Water Board.</li> </ol>	<p>Annually</p> <p>July 2011</p>
	Vessel owners, vessel marina owners	<ol style="list-style-type: none"> <li>Repair/upgrade identified leaky/malfunctioning sewage collection systems (sewage dump stations, sewage pumpout stations, onboard sewage systems, sewer lines, etc.) such that they do not discharge any sewage into the Bay.</li> <li>Operate and maintain sewage collection systems such that they do not discharge any sewage into the Bay.</li> <li>Enroll in RBRA's mobile sewage collection and disposal service for all live-aboards (both anchor-outs and marina-berthed vessels).</li> </ol>	<p>Annually</p> <p>July 2013</p> <p>Ongoing</p> <p>July 2010</p>

**Regulatory Framework**

The state's Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program requires that current and proposed nonpoint source discharges be regulated under waste discharge requirements, waivers of waste discharge requirements, Basin Plan discharge prohibitions, or some combination of these tools. Municipal and highway stormwater runoffs are regulated under NPDES permits. Table 7-5 describes the regulatory mechanism by which dischargers in each source category will be regulated.

<b><u>Source Category</u></b>	<b><u>Regulatory Tool</u></b>
<u>Sanitary Sewer Systems</u>	<u>General WDR permit</u>
<u>Stormwater Runoff</u>	<u>NPDES permit</u>
<u>Houseboats</u>	<u>Existing prohibition of human waste discharge (Table 4-1, Prohibitions 5 and 15)</u>
<u>Vessels</u>	<u>Existing prohibition of human waste discharge (Table 4-1, Prohibitions 5, 15, and 18)</u>

**Ongoing Water Quality Monitoring in Richardson Bay**

Water quality monitoring will be conducted to assess water quality improvements and obtain additional information for further refinement of the TMDL. The main objectives of the ongoing monitoring program are to:

- Assess attainment of TMDL targets
- Evaluate spatial and temporal water quality trends in the Bay
- Obtain additional information about significant potential pathogen source areas
- Collect sufficient data to prioritize implementation efforts and assess the effectiveness of source control actions

All water quality monitoring (including Quality Assurance and Quality Control procedures) will be performed pursuant to the State Water Board's Quality Assurance Management Plan for the Surface Water Ambient Monitoring Program.

**Adaptive Implementation**

In 2013, the Water Board will evaluate monitoring results and assess progress toward attaining TMDL targets (Table 7-1) and load allocations (Table 7-3). The Water Board will also evaluate compliance with the trackable implementation measures specified in Table 7-4, as documented by submitted progress reports.

If evaluation and monitoring show that source control actions have been fully implemented throughout the watershed, but the TMDL targets (water quality objectives) are not attained, the Water Board may re-evaluate the attainability/applicability of designated water quality objectives.

The Water Board will review the Richardson Bay Pathogens TMDL and evaluate new and relevant information from monitoring, special studies, and scientific literature. At a minimum, these reviews will aim to find answers to the following questions. Additional questions may be developed in collaboration with stakeholders.

1. Is Richardson Bay progressing toward TMDL targets? If progress is unclear, how can monitoring efforts be modified to detect trends? If there has not been adequate progress, how might the implementation actions be modified?
2. What are the pollutant contributions for the various source categories? How have these contributions changed over time? How do they vary seasonally? How might source control measures be modified to improve load reduction? If the answers to these questions are not clear, how can monitoring efforts be modified to answer these questions?
3. Is there new, reliable, and widely accepted scientific information that suggests modifications to targets, or implementation actions? If so, how should the TMDL be modified?

Modifications to the targets or implementation plan will be incorporated into the Basin Plan via an amendment process.

# Adopted Basin Plan Amendment

## **Richardson Bay Pathogens Total Maximum Daily Load (TMDL)**

The following sections establish the TMDL for pathogens in Richardson Bay. The numeric targets, load allocations, and implementation plan are designed to support and protect the Bay's designated beneficial uses, water contact recreation and shellfish harvesting. The TMDL includes actions for adaptive implementation to evaluate the effectiveness of implementation actions, monitor progress toward targets, and review the scientific understanding pertaining to pathogens, which may result in modifying the TMDL in the future.

## **Problem Statement**

Richardson Bay is impaired by pathogens. Monitoring results indicate that the Bay exceeds bacteria water quality objectives for shellfish harvesting (e.g., clam, mussel, and oyster harvesting), and water contact recreation (swimming, fishing); Table 3-1). The presence of pathogens is inferred from high concentrations of fecal coliform bacteria, a commonly used indicator of human pathogenic organisms. Therefore, the beneficial uses of shellfish harvesting and recreational water contact are not fully supported.

## **Sources**

Pathogen sources are identified based on elevated coliform bacteria (pathogen indicator) levels downstream or in the vicinity of identified land uses or facilities and from documentation of inadequately treated human waste discharges. If not properly managed, the following source categories have the potential to discharge pathogens to Richardson Bay: sanitary sewer systems, stormwater runoff, houseboats, and vessels.

- High coliform levels detected downstream of storm drains, and the increase in the number of wet season exceedances as compared to the number of dry season exceedances, point to stormwater runoff as a potential pathogen source.
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**Numeric Targets**

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<b>Table 7-1. Numeric Targets for Richardson Bay<sup>a</sup></b>	
<b>Beneficial Use</b>	<b>Numeric Target</b>
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Water Contact Recreation	Geometric mean fecal coliform density < 200 90 <sup>th</sup> percentile fecal coliform density < 400 Geometric mean Enterococci density < 35 CFU <sup>d</sup> /100 mL 90th percentile Enterococci density < 104 CFU/100 mL
<p><b>a. Based on a minimum of five consecutive samples equally spaced over a 30-day period</b>  <b>b. "Density" refers to the number of bacteria in a given volume of water (U.S. EPA, 1986, 2002, 2003). The term is analogous to "concentration," which refers to the mass of chemical pollutant in a given volume of water. "Bacterial density" and "bacterial concentration" are sometimes used interchangeably.</b>  <b>c. Most Probable Number (MPN) is a statistical representation of the standard coliform test results.</b>  <b>d. CFU stands for colony forming unit (e.g., as in number of bacterial colonies)</b></p>	

The bacterial density targets are based on the Basin Plan’s shellfish harvesting and water contact recreation water quality objectives for fecal coliform and on U.S. EPA’s recommended Enterococci criteria for water contact recreation in salt water.

**Total Maximum Daily Load**

Table 7-2 shows Richardson Bay’s density-based pathogens TMDL, expressed as fecal coliform bacteria concentrations.

<b>Table 7-2. Total maximum daily load for pathogen indicators (fecal coliforms) for Richardson Bay</b>	
<b>Indicator Parameter</b>	<b>TMDL</b>
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<p><b>a. Based on a minimum five consecutive samples equally spaced over a 30-day period.</b>  <b>b. No more than 10% of total samples during any 30-day period may exceed this number.</b></p>	

**Load Allocations**

Density-based fecal coliform allocations for each potential pathogen source category in Richardson Bay are presented in Table 7-3. Each discharger in the Richardson Bay watershed is responsible for meeting its source category allocation. All potential



dischargers are also responsible for complying with applicable waste discharge requirements, or waste discharge prohibitions (Table 4-1, Prohibitions 5, 15, and 18).

All discharges of raw or inadequately treated human waste, including sewage from vessels, are prohibited. All sources of untreated or inadequately treated human waste have an allocation of zero.

<b>Table 7-3. Density-Based Pollutant Wasteload and Load Allocations<sup>a</sup> for Richardson Bay</b>		
<b>Categorical Pollutant Source</b>	<b>Wasteload and Load Allocations Fecal Coliform (MPN/100 mL)</b>	
	<b>For Direct Discharges to the Bay</b>	
	<b>Median<sup>b</sup></b>	<b>90<sup>th</sup> Percentile<sup>c</sup></b>
<i>Stormwater Runoff<sup>d</sup></i>	<14	< 43
<i>Wildlife<sup>e</sup></i>	<14	< 43
<i>Sanitary Sewer Systems</i>	0	0
<i>Houseboats</i>	0	0
<i>Vessels (Recreational, Live-aboard, Anchor-out Boats)</i>	0	0
<p><b>a. These allocations are applicable year-round. b. Based on a minimum of five consecutive samples equally spaced over a 30-day period.</b></p> <p><b>c. No more than 10% of total samples during any 30-day period may exceed this number.</b></p> <p><b>d. Wasteload allocation for discharges from municipal separate storm sewer systems (NPDES Permit Nos. CAS000004 and CAS000003).</b></p> <p><b>e. Wildlife is not believed to be a readily controllable source of pathogens; therefore, no management measures are required.</b></p>		

**Implementation Plan**

The Richardson Bay Pathogens TMDL Implementation Plan builds upon previous and ongoing successful efforts to reduce potential pathogen loads in Richardson Bay and its tributaries. The plan requires actions consistent with the California Water Code (CWC 13000 et seq.), the state’s Nonpoint Source Pollution Control Program Plan (CWC Section 13369), the Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program, and human waste discharge prohibitions (Table 4-1, Prohibitions 5, 15, and 18).

Table 7-4 lists the required implementation measures for the source categories listed in Table 7-3. These measures include evaluation of operating practices, identification of comprehensive, site-specific pathogens control measures and an associated implementation schedule, and submittal of progress reports to the Water Board documenting actions taken.

**Table 7-4. Trackable implementation measures for the Richardson Bay pathogens TMDL**

Source Category	Implementing Party	Action	Completion Dates
Sanitary Sewer Systems	Marin County Sanitary District No. 5, Sewerage Agency of Southern Marin, Tamalpais Community Services District, City of Mill Valley, Homestead Valley Sanitary District, Alto Sanitary District, Almonte Sanitary District, City of Sausalito, Sausalito Marin City Sanitary District, Richardson Bay Sanitary District	1. Comply with the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems.	As specified in applicable WDR permit
Stormwater Runoff	Marin County, City of Sausalito, City of Mill Valley, City of Tiburon, City of Belvedere, Caltrans	1. Implement applicable stormwater management plan.	As specified in approved stormwater management plan and in applicable NPDES permit
		2. Update/amend applicable stormwater management plans, as appropriate, to include specific measures to reduce pathogen loading, including additional education and outreach efforts, and installation of additional pet waste receptacles.	
		3. Report progress on implementation of pathogen reduction measures to Water Board.	

**Table 7-4. Trackable implementation measures for the Richardson Bay pathogens TMDL**

Source Category	Implementing Party	Action	Completion Dates
Houseboats	RBRA; Marin County; local cities	1. Submit to the Executive Officer for approval a plan and schedule for 1) evaluating adequacy and performance of sewage collection systems (onboard sewage systems, pumps, sewer lines, etc.) for all houseboats in Richardson Bay, 2) biennial evaluation of sewage collection system operation and maintenance for all houseboats once they have been repaired/upgraded such that they do not discharge any sewage into the Bay.	July 2009
		2. Conduct evaluation per submitted plan.	July 2010
		3. Report progress on implementation of the plan to Water Board.	Annually
	Houseboat marina owners	1. Submit to the Executive Officer for approval a plan and schedule for 1) repairing/upgrading identified substandard/malfunctioning sewage collection systems (onboard sewage systems, pumps, sewer lines, etc.) such that they do not discharge any sewage into the Bay, 2) long-term operation and maintenance of the systems.	July 2011
		2. Report progress on implementation of the plan to Water Board.	Annually
	Houseboat owners, houseboat marina owners	1. Repair/Upgrade identified substandard/malfunctioning sewage collection systems (onboard sewage systems, pumps, sewer lines, etc.) such that they do not discharge any sewage into the Bay.	July 2013
		2. Operate and maintain sewage collection systems such that they do not discharge any sewage into the Bay.	Ongoing

Source Category	Implementing Party	Action	Completion Dates
Vessels	RBRA; Marin County; local cities	1. Submit to the Executive Officer for approval a plan and implementation schedule for 1) evaluating adequacy and performance of sewage collection systems (sewage dump stations, sewage pumpout stations, onboard sewage systems, sewer lines, etc.) for all vessel marinas and vessels with toilet facilities in Richardson Bay, 2) biennial evaluation of sewage collection system operation and maintenance for all vessel marinas and vessels once they have been repaired/upgraded such that they do not discharge any sewage into the Bay.	July 2009
		2. Conduct evaluation per submitted plan.	July 2010
		3. Report progress on implementation of the plan to Water Board.	Annually
	Vessel marina owners	1. Submit to the Executive Officer for approval a plan and schedule for 1) installing, as needed, an adequate number of sewage pumpout and dump stations. If no new sewage pumpout and dump stations are needed, provide an explanation as why they are not needed, 2) repairing/upgrading identified leaky/malfunctioning sewage collection systems (sewage dump stations, sewage pumpout stations, onboard sewage systems, sewer lines, etc.) such that they do not discharge any sewage into the Bay, 3) long-term operation and maintenance of the systems such that they do not discharge any sewage into the Bay.	July 2011
		2. Report progress on implementation of the plan to Water Board.	Annually
	Vessel owners, vessel marina owners	1. Repair/upgrade identified leaky/malfunctioning sewage collection systems (sewage dump stations, sewage pumpout stations, onboard sewage systems, sewer lines, etc.) such that they do not discharge any sewage into the Bay.	July 2013
		2. Operate and maintain sewage collection systems such that they do not discharge any sewage into the Bay.	Ongoing
		3. Enroll in RBRA's mobile sewage collection and disposal service for all live-aboards (both anchor-outs and marina-berthed vessels).	July 2010

**Regulatory Framework**

The state’s Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program requires that current and proposed nonpoint source discharges be regulated under waste discharge requirements, waivers of waste discharge requirements, Basin Plan discharge prohibitions, or some combination of these tools. Municipal and highway stormwater runoffs are regulated under NPDES permits. Table 7-5 describes the regulatory mechanism by which dischargers in each source category will be regulated.

<b>Table 7-5. Regulatory Framework</b>	
<b>Source Category</b>	<b>Regulatory Tool</b>
Sanitary Sewer Systems	General WDR permit
Stormwater Runoff	NPDES permit
Houseboats	Existing prohibition of human waste discharge (Table 4-1, Prohibitions 5 and 15)
Vessels	Existing prohibition of human waste discharge (Table 4-1, Prohibitions 5, 15, and 18)

**Ongoing Water Quality Monitoring in Richardson Bay**

Water quality monitoring will be conducted to assess water quality improvements and obtain additional information for further refinement of the TMDL. The main objectives of the ongoing monitoring program are to:

- Assess attainment of TMDL targets
- Evaluate spatial and temporal water quality trends in the Bay
- Obtain additional information about significant potential pathogen source areas
- Collect sufficient data to prioritize implementation efforts and assess the effectiveness of source control actions

All water quality monitoring (including Quality Assurance and Quality Control procedures) will be performed pursuant to the State Water Board’s Quality Assurance Management Plan for the Surface Water Ambient Monitoring Program.

**Adaptive Implementation**

In 2013, the Water Board will evaluate monitoring results and assess progress toward attaining TMDL targets (Table 7-1) and load allocations (Table 7-3). The Water Board will also evaluate compliance with the trackable implementation measures specified in Table 7-4, as documented by submitted progress reports.

If evaluation and monitoring show that source control actions have been fully implemented throughout the watershed, but the TMDL targets (water quality objectives)

are not attained, the Water Board may re-evaluate the attainability/applicability of designated water quality objectives.

The Water Board will review the Richardson Bay Pathogens TMDL and evaluate new and relevant information from monitoring, special studies, and scientific literature. At a minimum, these reviews will aim to find answers to the following questions. Additional questions may be developed in collaboration with stakeholders.

1. Is Richardson Bay progressing toward TMDL targets? If progress is unclear, how can monitoring efforts be modified to detect trends? If there has not been adequate progress, how might the implementation actions be modified?
2. What are the pollutant contributions for the various source categories? How have these contributions changed over time? How do they vary seasonally? How might source control measures be modified to improve load reduction? If the answers to these questions are not clear, how can monitoring efforts be modified to answer these questions?
3. Is there new, reliable, and widely accepted scientific information that suggests modifications to targets, or implementation actions? If so, how should the TMDL be modified?

Modifications to the targets or implementation plan will be incorporated into the Basin Plan via an amendment process.

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