Appendix B

Proposed Basin Plan Amendment
Showing All Changes Since February 10, 2006

Pathogens in the Napa River Total Maximum Daily Load (TMDL)

Proposed Basin Plan Amendment

~~February 10~~June 7, 2006

California Regional Water Quality Control Board
San Francisco Bay Region

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Proposed Basin Plan Amendment

The following text is to be inserted into Chapter 7:

Napa River Pathogen Total Maximum Daily Load (TMDL)
The Napa River and its tributaries are impaired by pathogens. The overall goal of this TMDL is to minimize human exposure to waterborne disease-causing pathogens and to protect uses of water for recreational activities such as wading, swimming, fishing, and rafting.

The most common sources of pathogens are wastes from warm-blooded animals, including humans, livestock, domestic pets, and wildlife. The following sections establish a density-based pathogen TMDL for the Napa River and its tributaries, and identify actions and monitoring necessary to implement the TMDL. The TMDL defines allowable density-based bacteria concentrations and prohibits discharge of raw or inadequately treated human waste. The implementation plan specifies actions necessary to protect and restore water contact recreation beneficial uses.

This TMDL strives to achieve a balance that allows ongoing human activities including agriculture and recreation to continue, while restoring and protecting water quality. As outlined in the adaptive implementation section, the effectiveness of implementation actions, results of monitoring to track progress toward targets, and the scientific understanding of pathogens will be reviewed periodically, and the TMDL may be adapted to future conditions as warranted.

In addition to pathogens, both animal and human wastes contain nutrients that in excess pose a threat to aquatic ecosystem beneficial uses; the Napa River is also listed as impaired by nutrients. By eliminating the discharge of human waste and controlling the discharge of animal waste, this TMDL will also protect the beneficial uses of the Napa River watershed's aquatic ecosystem, such as cold and warm freshwater habitat, and wildlife habitat. Controlling human and animal waste discharges will also reduce risks from other harmful constituents such as pharmaceuticals and steroids.

Problem Statement
Due to the presence of pathogens in the Napa River and its tributaries, the beneficial uses of water contact and noncontact recreation are impaired. Waterborne pathogens pose a risk to human health. In ambient waters, the presence of human and animal fecal waste and associated pathogens is inferred from high concentrations of fecal coliform and *E. coli* bacteria. Bacteria levels in the Napa River and its tributaries are higher than the bacteria water quality objectives established to protect people who swim, wade and fish in these waters (Tables 3-1 and 3-2). Consequently, humans who recreate in the Napa River and its tributaries are at risk of contracting waterborne disease.

Sources
The following source categories have the potential to discharge pathogens to surface waters in the Napa River watershed:

- On-site sewage disposal systems (septic systems)
- Sanitary sewer lines
- Municipal runoff
- Grazing lands
- Confined animal facilities
- Municipal wastewater treatment facilities
- Wildlife

Water quality monitoring data indicate that on-site sewage disposal systems are potentially a significant pathogen source, primarily in the Murphy Creek, Browns Valley Creek, and Salvador Channel subwatersheds. Sanitary sewer lines are a likely source, primarily in the Browns Valley Creek and Salvador Channel sub watersheds. Municipal runoff is a significant source in all urban areas, and livestock grazing and confined animal facilities are considered to be potential sources throughout the watershed.

Both discharger monitoring reports and in-stream water quality monitoring indicate that municipal wastewater treatment facility discharges are not significant pathogen sources in the Napa River watershed. These facilities are considered potential sources due to the possibility of spills or treatment system malfunction.

Wildlife are not a significant, widespread pathogen source, as evidenced by low indicator bacteria levels at sites that contain wildlife but are minimally impacted by human activities. Wildlife may be a significant source on a limited, localized basis.

Numeric Targets
The numeric water quality targets listed in Table 7-a are derived from water quality objectives for coliform bacteria in contact recreational waters, and from U.S. EPA's ~~recommended~~ bacteriological criteria (Tables 3-1 and 3-2). The ~~third~~ last target, "zero discharge of untreated or inadequately treated human waste," is consistent with Discharge Prohibition 15 (Table 4-1). The zero human waste discharge target is necessary because human waste is a significant source of pathogenic organisms including viruses; and attainment of fecal coliform targets alone may not be sufficient to protect human health. ~~The *E. coli*~~ These bacteria targets, in combination with the human waste discharge prohibitions, are the basis for the TMDL and load allocations, and fully protect beneficial uses.

~~Table 7-a~~ ~~Water Quality Targets[a] for the Napa River and Its Tributaries~~
~~*E. coli* density: Geometric mean < 126 CFU/100 mL[b]~~
~~*E. coli* density: 90th percentile < 320 CFU/100 mL[c]~~
~~Zero discharge of untreated or inadequately treated human waste~~
~~[a]These targets are applicable year-round.~~ ~~[b]Based on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period~~ ~~[c]No more than 10% of total samples during any 30-day period may exceed this number.~~

Table 7-a **TMDL Water Quality Targets[a] for the Napa River**
E. coli density: Geometric mean < 126 CFU/100 mL[b]; 90th percentile < 409 CFU/100 mL[c]
Fecal coliform density[d]: Geometric mean < 200 CFU/100 mL[b]; 90th percentile < 400 CFU/100 mL[c]
Total coliform density[d]: Median < 240 CFU/100 mL[b]; no sample to exceed 10,000 CFU/100 mL
Zero discharge of untreated or inadequately treated human waste
[a]These targets are applicable year-round. [b]Based on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period. [c]No more than 10 percent of total samples during any 30-day period may exceed this number. [d]The numeric targets for total coliform and fecal coliform shall sunset and shall no longer be effective upon the replacement of the total and fecal coliform water quality objectives in the Basin Plan with *E.coli*-based water quality objectives for contact recreation.

Total Maximum Daily Load

The TMDL, as indicated in Table 7-b, is expressed as density-based total coliform, fecal coliform, and *E. coli* bacteria limits.

~~Table 7-b~~ ~~Total Maximum Daily Loads of Pathogen Indicators for the Napa River and Its Tributaries~~	
~~Indicator~~	~~TMDL (CFU/100 mL)~~
~~*E. coli*~~	~~Geometric mean < 126 [a]~~ ~~90th percentile < 320 [b]~~
~~[a]Based on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period.~~ ~~[b]No more than 10% of total samples during any 30-day period may exceed this number.~~	

Table 7-b
Total Maximum Daily Loads of Pathogen Indicators for the Napa River

Indicator	TMDL (CFU/100 mL)
E. coli	Geometric mean < 126 [a] 90th percentile < 409 [b]
Fecal coliform[c]	Geometric mean < 200 [a] 90th percentile < 400 [b]
Total coliform[c]	Median < 240 [a] No sample to exceed 10,000

[a] Based on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period.
[b] No more than 10 percent of total samples during any 30-day period may exceed this number.
[c] The Total Maximum Daily Loads for total coliform and fecal coliform shall sunset and shall no longer be effective upon the replacement of the total and fecal coliform water quality objectives in the Basin Plan with *E.coli*-based water quality objectives for contact recreation.

Load Allocations

Density-based pollutant allocations for pathogen source categories are shown in Table 7-c. Table 7-d presents wasteload allocations for individual municipal wastewater dischargers. Due to the inherent uncertainty in estimating pathogen loading from nonpoint sources and municipal runoff (Table 7-c), allocations for these source categories incorporate a 10 percent margin of safety. Each entity in the watershed is responsible for meeting its source category allocation.

All discharges of raw or inadequately treated human waste are prohibited. All sources of untreated or inadequately treated human waste have an allocation of zero.

Discharging entities will not be held responsible for uncontrollable discharges originating from wildlife. If wildlife contributions are found to be the cause of exceedances, the TMDL targets and allocation scheme will be revisited as part of the adaptive implementation program.

~~**Table 7-c**~~
~~**Density-Based Pollutant Load Allocations[a] for Dischargers of Pathogens in the Napa River Watershed**~~

~~Categorical Pollutant Source~~	~~*E. coli* Density (CFU/100 mL)[b]~~	
	~~Geometric Mean~~	~~90th Percentile~~
~~On-site sewage disposal systems~~	~~0~~	~~0~~
~~Sanitary sewer systems~~	~~0~~	~~0~~
~~Municipal runoff~~	~~<126~~	~~<320~~
~~Grazing lands~~	~~<126~~	~~<320~~
~~Confined animal facilities~~	~~<126~~	~~<320~~
~~Wildlife[c]~~	~~<126~~	~~<320~~

~~[a]These allocations are applicable year-round. Wasteload allocations apply to any sources (existing or future) subject to regulation by a NPDES permit.~~
~~[b]Based on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period.~~
~~[c]Wildlife are not believed to be a significant source of pathogens and their contribution is considered natural background; therefore, no management measures are required.~~

Table 7-c
Density-Based Pollutant Load Allocations[a] and Wasteload Allocations[a] for Pathogen Dischargers in the Napa River Watershed

Categorical Pollutant Source	*E. coli*		Fecal coliform[b]		Total coliform[b]	
	Geometric mean[c]	90th percent-ile[c]	Geometric mean[c]	90th percent-ile	Median[c]	Single sample maximum
On-site sewage disposal systems	0	0	0	0	0	0
Sanitary sewer systems	0	0	0	0	0	0
Municipal runoff	< 113	< 368	< 180	< 360	< 216	9,000
Grazing lands	< 113	< 368	< 180	< 360	< 216	9,000
Confined animal facilities	< 113	< 368	< 180	< 360	< 216	9,000
Wildlife[d]	< 113	< 368	< 180	< 360	< 216	9,000

[a] These allocations are applicable year-round. Wasteload allocations apply to any sources (existing or future) subject to regulation by a NPDES permit. Allocations reflect a 10% margin of safety.
[b] The allocations for total coliform and fecal coliform shall sunset and shall no longer be effective upon the replacement of the total and fecal coliform water quality objectives in the Basin Plan with *E.coli*-based water quality objectives for contact recreation.
[c] Based on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period.
[d] Wildlife are not believed to be a significant source of pathogens and their contribution is considered natural background; therefore, no management measures are required.

~~**Table 7-d**~~

~~**Density-Based Wasteload Allocations[a] for Municipal Wastewater Treatment Facilities**~~

~~Facility~~	~~*E. coli* Density (CFU/100 mL)[b]~~		~~NPDES Permit #~~
	~~Geometric Mean~~	~~90th Percentile~~	
~~Napa Sanitation District~~	~~<126~~	~~<320~~	~~CA0037575~~
~~Town of Yountville~~	~~<126~~	~~<320~~	~~CA0038121~~
~~City of St. Helena~~	~~<126~~	~~<320~~	~~CA0038016~~
~~City of Calistoga~~	~~<126~~	~~<320~~	~~CA0037966~~
~~City of American Canyon~~	~~<126~~	~~<320~~	~~CA0038768~~
~~Napa River Reclamation District #2109~~	~~<126~~	~~<320~~	~~CA0038644~~

~~[a] These allocations are applicable year-round. Wasteload allocations apply to any sources (existing or future) subject to regulation by a NPDES permit.~~

~~[b]Based on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period.~~

Table 7-d

Density-Based Wasteload Allocations[a] for Municipal Wastewater Treatment Facilities

Facility	*E. coli* Density (CFU/100 mL)						NPDES Permit #
	E. coli		Fecal coliform[b]		Total coliform[b]		
	Geometric mean[c]	90th %ile[c]	Geometric mean[c]	90th %ile	Median[c]	Single sample max	
Napa Sanitation District	< 126	< 400	< 200	< 400	< 240	10,000	CA0037575
Town of Yountville	< 126	< 400	< 200	< 400	< 240	10,000	CA0038121
City of St. Helena	< 126	< 400	< 200	< 400	< 240	10,000	CA0038016
City of Calistoga	< 1263	< 400	< 200	< 400	< 240	10,000	CA0037966
City of American Canyon	< 126	< 400	< 200	< 400	< 240	10,000	CA0038768
Napa River Reclamation District #2109	< 126	< 400	< 200	< 400	< 240	10,000	CA0038644

[a]These allocations are applicable year-round. Wasteload allocations apply to any sources (existing or future) subject to regulation by a NPDES permit.

[b]The allocations for total coliform and fecal coliform shall sunset and shall no longer be effective upon the replacement of the total and fecal coliform water quality objectives in the Basin Plan with *E.coli*-based water quality objectives for contact recreation.

[c]Based on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period.

Implementation Plan

This plan builds upon previous and ongoing successful efforts to reduce pathogen loads in the Napa River and its tributaries, and requires actions consistent with the California Water Code (CWC Section 13000 et seq.); the state's Nonpoint Source Pollution Control Program Plan (CWC Section 13369) and its Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program; and the human waste discharge prohibition.

Table 7-e contains the required implementation measures for each of the source categories listed in Table 7-c and 7-d. These measures include evaluation of operating practices; development of comprehensive, site-specific pathogen control measures and a corresponding implementation schedule; and submittal of progress reports documenting actions undertaken. Progress reports may be submitted directly to the Water Board or to third parties if designated. These reports will serve as documentation that source reduction measures are being implemented.

It is important to note that the numeric targets and load allocations in the TMDL are not directly enforceable. To demonstrate attainment of applicable allocations, responsible parties must demonstrate that they are in compliance with specified implementation measures and any applicable waste discharge requirements (WDRs) or waiver conditions.

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 WDRs, waivers of WDRs, Basin Plan prohibitions, or some combination of these tools. Table 7-f specifies the regulatory framework for each discharger source category. The Water Board intends to work with stakeholders to develop conditions for waiving WDRs for grazing lands by 2009.

Table 7-e Trackable Implementation Measures for the Napa River Pathogen Total Maximum Daily Load			
Source Category	**Action**	**Implementing Party**	**Completion Dates**
On-Site Sewage Disposal Systems (OSDS)	Submit to the Water Board Executive Officer for approval a plan and implementation schedule for evaluating OSDS performance and correcting deficiencies in OSDSs identified as potentially discharging to surface waters. Priority should be given to the Browns Valley Creek, Murphy Creek, and Salvador Channel subwatersheds	Napa County	January 2008
	Report progress on implementation of OSDS evaluation and repair program		January 2011 and biennially thereafter
	Comply with applicable County, Water Board, or State Water Board requirements	Septic system owners	As specified in applicable requirements
Sanitary Sewer Systems	~~Comply with applicable Waste Discharge Requirements (WDRs)~~	Napa Sanitation District, City of Calistoga, City of St. Helena, Yountville Joint Treatment Plant, City of American Canyon, Napa River Reclamation District #2109	~~As specified in the applicable WDRs~~
	~~Submit to the Executive Officer for approval a plan and implementation schedule for evaluating sanitary sewer line performance and correcting identified deficiencies[a] Priority should be given to the Browns Valley Creek and Salvador Channel subwatersheds~~ Apply for coverage under the State Water Board's general WDRs for sanitary sewer systems Board (Order No. 2006-0003). Comply with provisions of WDRs.		~~January 2008~~ As specified in general WDRs
	Report progress on inspection and evaluation of sewer systems~~[b]~~[a]		Annually
Grazing Lands	Submit a Report of Waste Discharge[c] to the Water Board that provides the following: a description of the facility; identification of necessary site-specific grazing management measures to reduce animal waste runoff; and an implementation schedule for identified management measures	Ranchers (landowners and lessees). These reports may be submitted individually or jointly or through a third party~~[d]~~[c].	January 2010
	Comply with applicable WDRs, waiver conditions, or prohibitions	Ranchers (landowners and lessees)	As specified in WDRs or waiver conditions

Source Category	Action	Implementing Party	Completion Dates
	Report progress on implementation of grazing-management measures that reduce animal waste runoff	Ranchers (landowners and lessees). These reports may be submitted individually or jointly or through a third party[dc].	As specified in applicable WDRs or waiver of WDRs
Confined Animal Facilities	Submit a Report of Waste Discharge[eb] to the Water Board that provides the following: a description of the facility; identification of necessary site-specific management measures to reduce animal waste runoff; and a schedule for implementation of identified management measures	Confined animal facilities. These reports may be submitted individually or jointly or through a third party.	January 2010
	Comply with applicable WDRs or waiver conditions	Confined animal facilities -	As specified in applicable WDRs or waiver of WDRs.
	Report progress on implementation of management measures that reduce animal waste runoff	Confined animal facilities. These reports may be submitted individually or jointly or through a third party.	As specified in applicable WDRs or waiver of WDRs
Municipal Runoff	Comply with approved stormwater management plans. Update/amend storm water management plans as needed to include specific measures to reduce discharge of human and animal wastes	Napa County, City of Napa, Town of Yountville, City of St. Helena, City of Calistoga, City of American Canyon	As specified in approved stormwater management plan and in applicable NPDES permit
	Report progress on implementation of human and animal waste runoff reduction measures		
Municipal Wastewater Discharges	Comply with applicable NPDES permits	Napa Sanitation District, City of Calistoga, City of St. Helena, Yountville Joint Treatment Plant, City of American Canyon, Napa River Reclamation District #2109	As specified in applicable NPDES permits

Source Category	Action	Implementing Party	Completion Dates
	~~[a] Plans may be incorporated into approved Sanitary Sewer Management Plans (SSMPs).~~ ~~[b]~~[a] Reports may be incorporated into annual SSMP audit reports. ~~[c]~~[b] WDRs waiver conditions may allow for other submittals in lieu of a Report of Waste Discharge. ~~[d]~~[c] While third parties may provide valuable assistance in TMDL implementation, the discharger is the entity responsible for compliance with the specified regulations and regulatory controls.		

Table 7-f Regulatory Framework for Discharges by Source Category	
Source Category	**Regulatory Tool**
On-site Sewage Disposal Systems	General Waste Discharge Requirements (WDRs), Individual WDRs, or Waiver of WDRs, as appropriate[a] Prohibition of Human Waste Discharge
Sanitary Sewer Systems	General WDRs or Individual WDRs, as appropriate Prohibition of Human Waste Discharge
Grazing Lands	Waiver of WDRs [b]
Confined Animal Facilities	Waiver of WDRs [b]
Municipal Runoff	NPDES Permit
Municipal Wastewater Treatment Facilities	NPDES Permit
[a]Regulatory tool(s) employed will be consistent with State Water Board regulatory actions. [b]Water Board retains the option of requiring general or individual waste discharge requirements or compliance with a discharge prohibition, as appropriate.	

Cost estimate: Agricultural Water Quality Control Program
Because the implementation measures for grazing lands constitute an agricultural water quality control program, the cost of that program is estimated below, consistent with California Water Code requirements (Section 13141).

The average annual program implementation cost to agricultural dischargers is estimated to range between $60,000 and $250,000 for the next 10 years. These costs will be shared by Napa River watershed grazing lands operators (approximately 20). This estimate includes the cost of implementing animal waste controls and grazing management measures, and is based on costs associated with technical assistance and evaluation, installation of water troughs, and livestock control fencing along up to 25 percent of streams in grazing lands. Besides fencing, other acceptable methods of managing livestock access to streams are not included in this cost estimate due to variability in costs and site-specific applicability. In addition to private funding, potential sources of financing include federal and state water quality grants and federal agricultural grants.

Evaluation and Monitoring
Beginning in 2011 and approximately every five years thereafter, the Water Board will evaluate site-specific, subwatershed-specific, and watershed-wide compliance with the trackable implementation measures specified in Table 7-e. In evaluating compliance with the trackable implementation measures, the Water Board will consider levels of participation for each source category as well as for individual dischargers (as documented by Water Board staff or third parties).

In addition to the programmatic monitoring described above, Water Board staff, in collaboration with stakeholders, will conduct water quality monitoring to evaluate *E. coli* concentration trends in the Napa River and its tributaries. Five years after TMDL adoption, the Water Board will evaluate monitoring results and assess progress made toward attaining TMDL targets (Table 7-a) and load allocations (Table 7-c). The main objectives of the Monitoring Program are to:

- Assess attainment of TMDL targets
- Evaluate spatial and temporal water quality trends
- Further identify significant pathogens source areas
- Collect sufficient data to prioritize implementation efforts and assess the effectiveness of source control actions

Table 7-g presents locations for baseline water quality monitoring. Each site will be sampled for *E. coli* ten times each year. Five samples will be collected weekly during one 30-day period in each wet season (November through March) and one 30-day period in each dry season (May through September). 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. Additional monitoring will be conducted as needed if funds are available. In lieu of the monitoring plan described in Table 7-g, one or more implementing parties may submit an alternative monitoring plan for Executive Officer approval.

Table 7-g
Baseline Monitoring Sites

Napa River at Third Street, Napa
Napa River at Zinfandel Lane
Napa River at Calistoga Community Center
Browns Valley Creek at Browns Valley Road
Browns Valley Creek at Borrette Lane
Murphy Creek at Coombsville Road
Murphy Creek at upstream location to be determined[a]
Salvador Channel at Solano Avenue
Salvador Channel at Dry Creek Road
Four additional tributaries to be determined[a], rotated each year

[a]Sites will be determined by Water Board staff in coordination with stakeholders.

If source control actions are fully implemented throughout the watershed and the TMDL targets are not met, the Water Board may consider whether the TMDL targets are

attainable, and re-evaluate or revise the TMDL and allocations as appropriate. Alternatively, if the required actions are not implemented or are only partially implemented, the Water Board may consider regulatory or enforcement action against dischargers not in compliance.

Adaptive Implementation

Approximately every five years, the Water Board will review the Napa River Pathogen TMDL and evaluate new and relevant information from monitoring, special studies, and the scientific literature. At a minimum, the following questions will be included in the reviews. Additional questions will be developed in collaboration with stakeholders during each review cycle.

1. Are the river and the tributaries progressing toward TMDL targets as expected? If progress is unclear, how should monitoring efforts be modified to detect trends? If there has not been adequate progress, how might the implementation actions or allocations be modified?
2. What are the pollutant loads for the various source categories (including naturally occurring background pathogen contributions and the contribution from open space lands)? How have these loads changed over time, how do they vary seasonally, and how might source control measures be modified to improve load reduction?
3. Is there new, reliable, and generally accepted scientific information that suggests modifications to targets, allocations, or implementation actions? If so, how should the TMDL be modified?

Reviews will be coordinated by the Water Board's continuing planning program, with stakeholder participation. Any necessary modifications to the targets, allocations, or implementation plan will be incorporated into the Basin Plan via an amendment process. In evaluating necessary modifications, the Water Board will favor actions that reduce sediment and nutrient loads, pollutants for which the Napa River watershed is also impaired.