



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# California

## National Park Service Reduces Bacteria Sources at Whiskeytown Lake Beaches

### Waterbody Improved

Whiskeytown Lake is a popular swimming spot in the Whiskeytown National Recreation Area in the Clear Creek watershed of Northern California. Water sampling in the late 1980s showed fecal coliform bacteria levels above water quality standards at some of the more popular beaches, prompting California to add the lake to the Clean Water Act (CWA) section 303(d) list of impaired waters in 1990. Potential sources of fecal contamination included large numbers of swimmers, animals (pets, bears and geese), and unsatisfactory waste management. The National Park Service (Park Service) addressed those sources of contamination by implementing a range of management practices that have improved water quality. As a result, California removed Whiskeytown Lake from its list of impaired waters in 2010.

### Problem

Whiskeytown Lake swimming beaches at Brandy Creek and Oak Bottom are popular recreation areas approximately 15 miles west of Redding, California. In the summer months, Whiskeytown Lake (Figure 1) provides 36 miles of shoreline and 3,200 surface acres for recreation. Beginning in the late 1980s Central Valley Regional Water Quality Control Board (Water Board) staff conducted water quality sampling that showed elevated fecal coliform numbers at those beaches during high visitation weekends.

Three primary sources of fecal matter at the beaches were identified: (1) many visitors and inadequate sanitation facilities composed of portable restrooms that were used reluctantly and prone to spills; (2) inadequate garbage facilities, which led to scattering of waste (including disposable diapers) by animals; and (3) problematic levels of animal waste from pets and wildlife.

Because of the water sampling results and multiple sources of fecal contamination, California placed Whiskeytown Lake on the CWA section 303(d) list of impaired waters for fecal contamination in 1990.

### Project Highlights

To address the problem, the Park Service started a long-term water quality monitoring program and developed and implemented improved management measures to address the many sources of fecal contamination. Beginning in the 1990s, Water Board staff worked collaboratively with Park



Figure 1. Whiskeytown Lake's Brandy Creek swimming beach.

Service staff and provided input on monitoring and techniques to reduce the nonpoint source pollution. The partners implemented the following measures at popular beaches:

- Capped visitation at the affected beaches. Added parking capacity limits and user fees to reduce and disperse park visitors.
- Improved sanitation facilities. Upgraded toilets and wastewater facilities, including new pipelines, new toilets, washing features and a new wastewater treatment system with a 5-million-gallon tank. Installed floating toilets for boaters.
- Improved solid waste management. Installed wildlife-proof garbage cans, which reduced numbers of bears and raccoons at the beach and reduced scattering of human waste by wildlife.

- Banned dogs from main swimming beaches (Figure 2).
- Modified contours of the inner beach at Brandy Creek to enhance water circulation. Barred swimmers from an area with restricted water circulation.
- Created and distributed public information flyers regarding protection of water quality (use of swim diapers for kids and admonition against feeding geese).
- Improved cleanup of waste on the beaches.



Figure 2. The Park Service banned dogs from beach areas to reduce potential sources of bacteria.

coliform as the pathogen load indicator. However, plans are under consideration to change the Basin Plan to the more widely used *Escherichia coli* standard (235 most probable number [MPN] maximum and 126 MPN mean). Because the Park Service had an extensive collection of Whiskeytown Lake *E. coli* monitoring data, project partners worked to ensure that the *E. coli* and fecal coliform data were comparable. They collected 15 fecal coliform samples in 2007 and compared them with *E. coli* results. The analysis indicated that testing for *E. coli* is comparable or more sensitive than fecal coliform analysis at low levels. Analysis of 45 water samples collected from 2006 through 2007 shows no exceedances of the single sample limit of 235 MPN of *E. coli* (Table 1).

On the basis of the management measures implemented and the demonstrated reduction in fecal coliform contamination, California proposed removing Whiskeytown Lake from the CWA section 303d list of impaired waters in 2008. The lake was delisted in 2010.

## Results

Water quality (fecal coliform) monitoring conducted by Park Service staff, and confirmed by additional Water Board staff sampling, show successful reduction in bacterial contamination at the popular Brandy Creek and Oak Bottom swimming beaches after the nonpoint source pollution control measures were implemented.

The current Central Valley Water Quality Control Plan (also known as a Basin Plan) standard uses fecal

## Partners and Funding

This success story is a result of sustained efforts by the Park Service to improve management and monitoring of the popular swimming beaches and effective collaboration between the Park Service and the Central Valley Regional Water Quality Control Board. Partial funding for water quality monitoring and Water Board technical participation was provided through the CWA section 319 program.

**Table 1. Whiskeytown Lake combined Park Service and Water Board data; *E. coli* results summary (2005–2007)**

Location	Brandy Creek Beach			East Beach			Oak Bottom Beach			Whiskey Creek Beach		
	2007	2006	2005	2007	2006	2005	2007	2006	2005	2007	2006	2005
Year (May to Sept. period)	2007	2006	2005	2007	2006	2005	2007	2006	2005	2007	2006	2005
Total Number of samples (sample size)	93	90	51	52	52	34	38	27	17	26	27	17
Number of intervals that exceed geometric mean (126 MPN <i>E. coli</i> )	0	0	0	0	0	0	0	0	0	0	0	0
Number of samples that exceed single sample limit (235 MPN <i>E. coli</i> )	2	3	0	0	0	0	0	0	0	0	0	0
Delisting criteria: Number of exceedances allowed for sample size*	15	14	8	8	8	5	6	4	N/A	4	4	N/A

\* Water Quality Control Policy, Table 4.2, adopted September 2004



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