

## APPENDIX F

### WATER QUALITY OBJECTIVES FOR INDICATOR BACTERIA

Under section 304(a) of the Clean Water Act, the USEPA is required to publish water quality criteria accurately reflecting the latest scientific knowledge for the protection of human health and aquatic life. Prior to 1986, the USEPA recommended bacteria criteria based on fecal coliforms to protect human health.<sup>1</sup> In 1986, the USEPA recommended the use of criteria based on *Escherichia coli* (*E. coli*) for fresh waters and enterococci for fresh and marine waters rather than the use of criteria based on fecal coliform.<sup>2</sup> The USEPA recommended this change in the use of bacteria indicator organisms because the USEPA studies demonstrated that *E. coli* and enterococci are better predictors of the presence of gastrointestinal illness-causing pathogens than fecal and total coliforms and hence provide a better means of protecting human health. Subsequent supporting research led the USEPA to reaffirm these findings in 2002.<sup>3</sup> The USEPA strongly recommends the replacement of water quality objectives based on fecal or total coliforms with objectives based on enterococci and *E. coli*.

In January 2005 the State Water Resources Control Board (SWRCB) adopted an amendment to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) that maintained the total and fecal coliform water quality objectives. Additionally, the SWRCB added provisions that required additional monitoring if the single sample maximum water quality objectives are exceeded. Water quality objectives for enterococci were also added to the Ocean Plan at this time.

As described below, the Basin Plan for the San Diego Region contains objectives based on fecal and total coliform as well as enterococci and *E. coli* for inland surface waters, enclosed bays and estuaries and coastal lagoons.

#### ***I. REC-1 Water Quality Objectives in the San Diego Region***

The REC-1 water quality objectives for bacterial indicators applicable in the San Diego Region are contained in the Ocean Plan and in the San Diego Water Board's Basin Plan. The objectives contained in both are derived from water quality criteria promulgated by the USEPA in 1976 and 1986. The Ocean Plan currently contains REC-1 objectives for total and fecal coliforms and enterococci. The Basin Plan currently contains REC-1 objectives for total coliform, fecal coliform, enterococci and *E. coli* as shown below.

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<sup>1</sup> Quality Criteria for Water. USEPA 1976

<sup>2</sup> Ambient Water Quality Criteria for Bacteria. USEPA 1986

<sup>3</sup> Implementation Guidance for Ambient Water Quality Criteria for Bacteria. May 2002 DRAFT.

**REC-1**  
**Ocean Waters (from Ocean Plan)**

Within a zone bounded by the shoreline and a distance of 1,000 feet from the shoreline or the 30-foot depth contour, whichever is further from the shoreline, and in areas outside this zone used for water contact sports, as determined by the Regional Board (i.e., waters designated as REC-1), but including all kelp beds, the following bacterial objectives shall be maintained throughout the water column:

**30-day Geometric Mean** – The following standards are based on the geometric mean of the five most recent samples from each site:

- i. **Total coliform** density shall not exceed **1,000** per 100 ml;
- ii. **Fecal coliform** density shall not exceed **200** per 100 ml; and
- iii. **Enterococci** density shall not exceed **35** per 100 ml.

**Single Sample Maximum:**

- i. **Total coliform** density shall not exceed **10,000** per 100 ml;
- ii. **Fecal coliform** density shall not exceed **400** per 100 ml;
- iii. **Enterococci** density shall not exceed **104** per 100 ml; and
- iv. **Total coliform** density shall not exceed **1,000** per 100 ml when the fecal coliform/total coliform ratio exceeds 0.1.

**REC-1**  
**Inland Surface Waters, Enclosed Bays and Estuaries and Coastal Lagoons (from Basin Plan)**

**Fecal Coliform Water Quality Objective for Contact Recreation:**

The fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean of 200 organisms per 100 ml.

In addition, the fecal coliform concentration shall not exceed 400 organisms per 100 ml for more than 10 percent of the total samples during any 30-day period.

**Enterococci and E. Coli Water Quality Objectives for Contact Recreation:**

The USEPA published E. coli and enterococci bacteriological criteria applicable to waters designated for contact recreation (REC-1) in the Federal Register, Vol. 51, No. 45, Friday, March 7, 1986, 8012-8016.

USEPA BACTERIOLOGICAL CRITERIA FOR WATER CONTACT RECREATION  
 (in colonies per 100 ml)

	Freshwater		Saltwater
	Enterococci	E. coli	Enterococci
<b>Steady State</b>			
(all areas)	33	126	35
<b>Maximum</b>			
(designated beach)	61	235	104
(moderately or lightly used area)	108	406	276
(infrequently used area)	151	576	500

**Total Coliform Water Quality Objective for Contact Recreation for Bays and Estuaries:**

In bays and estuaries, the most probable number of total coliform organisms in the upper 60 feet of the water column shall be less than 1,000 organisms per 100 ml (10 organisms per ml); provided that not more than 20 percent of the samples at any sampling station, in any 30-day period, may exceed 1,000 organisms per 100 ml (10 per ml); and provided further that no single sample as described below is exceeded.

The most probable number of total coliform organisms in the upper 60 feet of the water column in no single sample when verified by a repeat sample taken within 48 hours shall exceed 10,000 organisms per 100 ml (100 organisms per ml).

***II. REC- 2 Water Quality Objectives in the San Diego Region***

The REC-2 water quality objectives for bacterial indicators applicable in the San Diego Region are contained in the Basin Plan and are derived from water quality criteria promulgated by the USEPA in 1976.

**REC-2**

**Inland Surface Waters, Enclosed Bays and Estuaries and Coastal Lagoons (from Basin Plan)**

**Fecal Coliform Water Quality Objective for Non-contact Recreation:**

In waters designated for non-contact recreation (REC-2) and not designed for contact recreation (REC-1), the average fecal coliform concentrations for any **30-day period**, shall not exceed **2,000** organisms per 100 ml, nor shall more than **10 percent** of total samples collected during any **30-day period** exceed **4,000** organisms per 100 ml.

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