APPENDIX A
Development History of SMBBB TMDLs

In December 1997, the Natural Resources Defense Council (NRDC), acting as legal representative for Heal the Bay, Inc., and Santa Monica BayKeeper, Inc., filed a Notice of Intent to sue the United States Environmental Protection Agency (EPA) over failure of the Regional Water Quality Control Board, Los Angeles (RWQCB), to adequately implement the 303(d)/TMDL Program. In December 1998, NRDC and BayKeeper entered into a Federal Consent Decree with EPA. The Consent Decree established 92 TMDL analytical units, which are water quality limited segments and associated pollutants for which TMDLs must be developed. Specific dates were established for development of some of these TMDL analytical units. The Santa Monica Bay Beaches Bacterial TMDL (SMBBB TMDL) unit had a required completion date of March 2002. During development of the SMBBB TMDL, the Regional Board bifurcated the TMDL into two – one for dry weather periods and one for wet weather periods. The SMBBB TMDLs were not completed by the March 2002 deadline. The Consent Decree then allowed USEPA one year to promulgate the TMDLs. That one-year date, March 2003, was missed also, but the TMDLs were so close to EPA approval that no objections were raised. EPA approved the two SMBBB TMDLs and both became effective July 15, 2003. Both TMDLs require the responsible jurisdictions and responsible agencies to submit a coordinated, shoreline monitoring plan within 120 days after the effective date of the TMDLs (see Resolution 2002-004, attachment A, Table 7-4.3 and Resolution 2002-022, attachment A, Table 7-4.7).

The Santa Monica Bay beaches were designated as impaired and included on California's 1998 CWA §303(d) list of impaired waters due to excessive amounts of coliform bacteria. In July 1999, a committee was formed to oversee the wet-weather dynamic modeling program for the Los Angeles River and Santa Monica Bay watersheds. The purpose of this committee was to design and initiate a wet-weather land use study for both watersheds in order to develop fate and transport models for several pollutants in the watersheds. Its members included representatives from the RWQCB, Southern California Coastal Water Research Project (SCCWRP), Heal the Bay, the City of Los Angeles, the County of Los Angeles, County Sanitation Districts of Los Angeles County, and the Santa Monica Bay Restoration Project (TMDL Draft – Version 4, footnote 3). Many of the responsible jurisdictions, notably the smaller beach cities, were not represented on this committee. This wet-weather, land use study committee last met in 2001.

In October 2001, Resolution 2001-018, revising bacteriological water quality standards for Water Contact Recreation (REC-1) beneficial use in the Los Angeles Basin Plan, was adopted by the LARWQCB. The full significance of this REC-1 revision was not fully understood by most beach cities until the first draft of the SMBBB TMDL was released for public review and comment a month later in November 2001, too late for comment on the REC-1 standard. The TMDL divided the year into three separate periods for compliance purposes, each with specific requirements. The periods were summer dry-weather (April 1 – October 31), winter dry-weather (November 1 – March 31), and wet-

weather (days with ≥ 0.1 inches of precipitation and the three days following the end of the rain event).

By January 2002, it became apparent that more work needed to be done for the wet-weather period. The RWQCB then bifurcated the wet- and dry-weather portions of the TMDL, and only the dry-weather portion was adopted in January 2002. In April 2002, the RWQCB staff briefed responsible jurisdictions on the proposed wet-weather TMDL. The RWQCB staff agreed to utilize the City of Los Angeles' cost estimates for end-of-pipe treatment facilities. Additionally, the Regional Board staff was receptive to the City of Los Angeles's Integrated Resources Approach as an implementation option and to allowing an implementation schedule of more than 10 years, provided the proposal had well defined milestones to achieve compliance.

A preliminary draft of the Santa Monica Bay beaches wet-weather bacterial TMDL was released in June 2002 by the RWQCB and a "final" draft in August 2002. These drafts included an Integrated Resources Approach as a viable implementation option, and proposed an 18-year compliance schedule with interim compliance milestones and 2020 as the final implementation deadline. At a Public Hearing in September 2002 before the Los Angeles RWQCB, there was much criticism by environmental stakeholders of the 18-year compliance schedule. The Board wanted to reduce it to 10 years, but they and the environmental groups liked the concept of an Integrated Resources Approach to capture and beneficially use stormwater runoff. To encourage this approach, the Board directed RWQCB staff to revise the TMDL compliance schedule so that a longer, up to 18 years, compliance schedule could be granted to those dischargers proposing to use the Integrated Resources Approach, but the compliance schedule would remain up to 10 years for those dischargers not proposing to beneficially use the water. The SMBBB TMDL for wet weather finally was adopted in December 2002.

Both the SMBBB dry- and wet-weather TMDLs were approved by EPA in June 2003 and became effective on July 15, 2003. The final staff report for the dry-weather TMDL is dated January 14, 2002, and November 7, 2002, for the wet-weather TMDL.

APPENDIX B
Compliance Monitoring Sites and Observational Sites

Table B-1. Jurisdictional Group 1 compliance monitoring sites

STATION NAME	TYPE	BAYKEEPER ID	DESCRIPTION (including historical site ID, if any)	LOW FLOW DIVERSION	COORDINATES		SUBWATERSHED	SAMPLING AGENCY
SMB-1-1	Point Zero	sad50	Arroyo Sequit Creek at Leo Carrillo State Beach (DHS010)	No	34.04558	-118.93336	Arroyo Sequit	LACDHS
SMB-1-2	Open Beach	N/A	El Pescador State Beach	--	TBD	TBD	Los Aliso	EMD
SMB-1-3	Open Beach	N/A	El Matador State Beach	--	TBD	TBD	Encinal	EMD
SMB-1-4	Point Zero	sad920	Trancas Creek at Broad Beach (DHS008)	No	TBD	TBD	Trancas	LACDHS
SMB-1-5	Point Zero	sad1070	Zuma Creek at Zuma Beach (DHS007)	No	TBD	TBD	Zuma	LACDHS
SMB-1-6	Point Zero	s1d30	"Walnut Creek" in Paradise Cove	No	34.01375	-118.79100	Ramirez	EMD
SMB-1-7	Point Zero	s1d50	Ramirez Canyon at Parasise Cove Pier (DHS006)	No	34.02032	-118.78600	Ramirez	LACDHS
SMB-1-8	Point Zero	s1d150	Escondido Creek, just east of Escondido State Beach	No	34.02551	-118.76500	Escondido	EMD
SMB-1-9	Point Zero	s1d240	Latigo Canyon, adjacent the Tivoli Bay Villa Treatment Plant (DHS005)	No	34.02895	-118.75300	Latigo	LACDHS
SMB-1-10	Point Zero	s1d290	Solstice Creek at Dan Blocker County Beach	No	34.03297	-118.74100	Solstice	EMD
SMB-1-11	Point Zero	s1d320	Un-named creek at Puerco Beach (DHS004)	No	34.03328	-118.73300	Corral	LACDHS
SMB-1-12	Point Zero	s2d170	Marie Canyon storm drain at Puerco Beach	No	34.03072	-118.71000	Corral	EMD
SMB-1-13	Point Zero	s3d10	Sweetwater Canyon on Carbon Beach	No	34.03811	-118.67300	Carbon	EMD
SMB-1-14	Point Zero	s3d150	Las Flores Creek at Las Flores State Beach	No	34.03684	-118.63600	Las Flores	EMD
SMB-1-15	Open Beach	N/A	Big Rock Beach (DHS001)	--	34.03670	-118.61012	Piedra Gorda	LACDHS
SMB-1-16	Point Zero	s4d60	Pena Creek at Las Tunas County Beach	No	34.03933	-118.59600	Pena	EMD
SMB-1-17	Point Zero	s5d175	Tuna Canyon	No	34.03936	-118.58900	Tuna	EMD
SMB-1-18	Point Zero	s5d315	Topanga Canyon at Topanga State Beach (S2)	No	34.03814	-118.58200	Topanga	EMD

Table B-2. Jurisdictional Group 2 compliance monitoring sites

STATION NAME	TYPE	BAYKEEPER ID	DESCRIPTION (including historical site ID, if any)	LOW FLOW DIVERSION	COORDINATES		SUBWATERSHED	SAMPLING AGENCY
SMB-2-1	Point Zero	s5d480	Castlerock (Parker Mesa) storm drain	Summer 2006	34.04135	-118.56600	Castlerock	EMD
SMB-2-2	Point Zero	s6d30	Santa Ynez storm drain	Summer	34.03801	-118.55500	Santa Ynez	EMD
SMB-2-3	Open Beach	N/A	Will Rogers State Beach, 1/4 mile east of Gladstone's restaurant (DHS101)	--	34.03934	-118.55052	Santa Ynez	LACDHS
SMB-2-4	Point Zero	s6d109, 110	Pulga storm drain (S3)	Summer	34.03757	-118.54200	Santa Ynez	EMD
SMB-2-5	Point Zero	s6d100	Bay Club Storm drain in front of the Bel Air Bay Club (DHS102)	No	34.03837	-118.54400	Santa Ynez	LACDHS
SMB-2-6	Point Zero	s6d140	Temescal Canyon storm drain (DHS103)	Yes	34.03473	-118.53600	Pulga	LACDHS
SMB-2-7	Point Zero	s6d230	Santa Monica Canyon	Yes	34.02784	-118.51800	S.M. Canyon	EMD
SMB-2-8	Open Beach	N/A	Venice Beach, 50 yards south of the pier (DHS108)	--	33.97826	-118.46714	Marina Del Rey	LACDHS
SMB-2-9	Open Beach	N/A	Venice Beach at Topsail Street (DHS109)	--	33.96768	-118.45994	Marina Del Rey	LACDHS
SMB-2-10	Point Zero	s9d10	Culver storm drain (S11)	No	33.95641	-118.45100	Dockweiler	EMD
SMB-2-11	Point Zero	s9d50	North Westchester storm drain	Summer	33.94447	-118.44400	Dockweiler	EMD
SMB-2-12	Open Beach	N/A	Dockweiler Beach at World Way (DHS110)	--	33.94064	-118.44226	Dockweiler	LACDHS
SMB-2-13	Point Zero	s9d70	Imperial storm drain (S12)	Yes	33.93005	-118.43600	Dockweiler	EMD
SMB-2-14	Open Beach	N/A	Dockweiler Beach opposite the Hyperion Treatment Plant (DHS111)	--	33.92331	-118.43326	Dockweiler	LACDHS
SMB-2-15	Point Zero	N/A	Dockweiler Beach, at the wave wash of Grand Avenue storm drain outlet (DHS112)	--	33.91592	-118.42926	Dockweiler	LACDHS

Table B-3. Jurisdictional Group 3 compliance monitoring sites

STATION NAME	TYPE	BAYKEEPER ID	DESCRIPTION (including historical site ID, if any)	LOW FLOW DIVERSION	COORDINATES		SUBWATERSHED	SAMPLING AGENCY
SMB-3-1	Point Zero	s6d232	Montana storm drain (DHS104)	Fall 2005	34.02061	-118.50900	Santa Monica	LACDHS
SMB-3-2	Point Zero	s6d235	Wilshire storm drain (DHS105)	Fall 2005	34.01535	-118.50200	Santa Monica	LACDHS
SMB-3-3	Point Zero	s7d5	Santa Monica Pier storm drain (S5)	Yes	34.00870	-118.49600	Santa Monica	EMD
SMB-3-4	Point Zero	s7d10	Pico-Kenter storm drain (S6)	Yes	34.00615	-118.49100	Santa Monica	EMD
SMB-3-5	Point Zero	s7d20	Ashland storm drain (S7)	Summer	33.99702	-118.48400	Santa Monica	EMD
SMB-3-6	Point Zero	s7d50	Rose storm drain	Summer	33.99398	-118.48100	Santa Monica	EMD
SMB-3-7	Point Zero	s7d70	Brooks storm drain (DHS107)	Yes	33.98946	-118.47700	Santa Monica	LACDHS
SMB-3-8	Point Zero	s7d80	Windward storm drain (S8)	Yes	33.98520	-118.47600	Santa Monica	EMD
SMB-3-9	Open Beach	N/A	Santa Monica Beach at Strand Street (DHS106)	--	34.00199	-118.48979	Santa Monica	LACDHS

Table B-4. Jurisdictional Group 4 compliance monitoring site

STATION NAME	TYPE	BAYKEEPER ID	DESCRIPTION (including historical site ID, if any)	LOW FLOW DIVERSION	COORDINATES		SUBWATERSHED	SAMPLING AGENCY
SMB-4-1	Point Zero	N/A	Nicholas Canyon Creek at Nicholas Beach (DHS009)	No	34.04241	-118.91559	Nicholas	LACDHS

Table B-5. Jurisdictional Group 5 compliance monitoring sites

STATION NAME	TYPE	BAYKEEPER ID	DESCRIPTION (including historical site ID, if any)	LOW FLOW DIVERSION	COORDINATES		SUBWATERSHED	SAMPLING AGENCY
SMB-5-1	Open Beach	N/A	Manhattan Beach at 40th Street (S13)	--	33.90390	-118.42250	Hermosa	EMD
SMB-5-2	Point Zero	s10d30	28th Street storm drain at Manhattan Beach (DHS113)	Summer 2004	33.89444	-118.41800	Hermosa	LACDHS
SMB-5-3	Point Zero	s11d002	36" storm drain under the Manhattan Beach Pier (S14)	No	33.88422	-118.41100	Hermosa	EMD
SMB-5-4	Open Beach	N/A	Hermosa Beach at 26th Street (DHS114)	--	33.87146	-118.40663	Hermosa	LACDHS
SMB-5-5	Open Beach	N/A	Hermosa Beach Pier (S15)	--	33.86112	-118.40270	Hermosa	EMD

Table B-6. Jurisdictional Group 6 compliance monitoring sites

STATION NAME	TYPE	BAYKEEPER ID	DESCRIPTION (including historical site ID, if any)	LOW FLOW DIVERSION	COORDINATES		SUBWATERSHED	SAMPLING AGENCY
SMB-6-1	Point Zero	s12d30	Herondo storm drain (DHS115)	Yes	33.85199	-118.39800	Redondo	LACDHS
SMB-6-2	Open Beach	N/A	Redondo Beach, 100 yards south of the pier (S16)	--	33.83908	-118.39000	Redondo	EMD
SMB-6-3	Point Zero	s14d30	4' x 4' box structure at Redondo Beach	No	33.83378	-118.39000	Redondo	EMD
SMB-6-4	Open Beach	N/A	Redondo Beach, approximately 120 feet north of Topaz groin (DHS116)	--	33.83207	-118.39071	Redondo	LACDHS
SMB-6-5	Point Zero	s14d50	Avenue I storm drain at Redondo Beach (S17)	Summer 2005	33.81944	-118.39000	Redondo	EMD
SMB-6-6	Open Beach	N/A	Malaga Cove (S18)	No	33.80440	-118.39424	Redondo	EMD

Table B-7. Jurisdictional Group 7 compliance monitoring sites

STATION NAME	TYPE	BAYKEEPER ID	DESCRIPTION (including historical site ID, if any)	LOW FLOW DIVERSION	COORDINATES		SUBWATERSHED	SAMPLING AGENCY
SMB-7-1	Open Beach	N/A	Malaga Cove (LACSDM)	--	33.80500	-118.39470	P. V. Peninsula	LACSD
SMB-7-2	Open Beach	N/A	Bluff Cove (LACSDB)	--	33.80330	-118.39589	P. V. Peninsula	LACSD
SMB-7-3	Open Beach	N/A	Long Point (LACSD1)	--	33.79362	-118.40684	P. V. Peninsula	LACSD
SMB-7-4	Open Beach	N/A	Abalone Cove (LACSD2)	--	33.73872	-118.39394	P. V. Peninsula	LACSD
SMB-7-5	Open Beach	N/A	Portuguese Bend Club (LACSD3)	--	33.74183	-118.37912	P. V. Peninsula	LACSD
SMB-7-6	Open Beach	N/A	White's Point/Royal Palms County Beach (LACSD5)	--	33.73630	-118.36000	P. V. Peninsula	LACSD
SMB-7-7	Point Zero	N/A	Storm drain outlet halfway between White Point County Beach and te Wilder Annex	No	33.71773	-118.32182	P. V. Peninsula	LACSD
SMB-7-8	Open Beach	N/A	Point Fermin/Wilder Annex (LACSD6)	--	33.71415	-118.31642	P. V. Peninsula	LACSD
SMB-7-9	Open Beach	N/A	Outer Cabrillo Beach (LACSD7)	--	33.71010	-118.29901	P. V. Peninsula	LACSD

Table B-8. Ballona Creek watershed shoreline compliance monitoring site

STATION NAME	TYPE	BAYKEEPER ID	DESCRIPTION (including historical site ID, if any)	LOW FLOW DIVERSION	COORDINATES		SUBWATERSHED	SAMPLING AGENCY
SMB-BC-1	Point Zero	N/A	Ballona Creek (S10)	No	33.96077	-118.45550	Ballona	EMD

Table B-9. Malibu Creek watershed shoreline compliance monitoring sites

STATION NAME	TYPE	BAYKEEPER ID	DESCRIPTION (including historical site ID, if any)	LOW FLOW DIVERSION	COORDINATES		SUBWATERSHED	SAMPLING AGENCY
SMB-MC-1	Open Beach	N/A	Malibu Point on Malibu State Beach (DHS003)	--	34.03143	-118.68204	Malibu	LACDHS
SMB-MC-2	Point Zero	s2d290	Breach point of Malibu Lagoon (S1)	No	34.03244	-118.67900	Malibu	EMD
SMB-MC-3	Open Beach	N/A	Malibu Pier on Carbon Beach (DH002)	--	34.03757	-118.67631	Malibu	LACDHS

Table B-10. Observational sites

STATION NAME	JURIS. GROUP	BAYKEEPER ID	DESCRIPTION (including historical site ID, if any)	LOW FLOW DIVERSION	COORDINATES		FREQUENCY	OBSERVING AGENCY
SMB-O-1	1	s1d40	Paradise Cove	No	34.01690	-118.78900	TBD	TBD
SMB-O-2	1	s2d140	Puerco Canyon storm drain	No	34.03160	-118.71300	TBD	TBD
SMB-O-3	1	s3d280	36" storm drain	No	34.03776	-118.62000	TBD	TBD
SMB-O-4	2	s6d50	24" corrugated metal pipe near Gladstones restaurant and site SMB-2-3 (DHS101)	No	34.03897	-118.55000	TBD	TBD
SMB-O-5	2	s6d90	46" concrete storm drain a few hundred feet east of SMB-O-4	No	34.03931	-118.549	TBD	TBD
SMB-O-6	5	s10d20	24" storm drain on Manhattan Beach, a couple of hundred feet north of SMB-5-2	No	33.89718	-118.41800	TBD	TBD
SMB-O-7	6	s13d40	36" storm drain under the Redondo Beach pier	No	33.83908	-118.39000	TBD	TBD
SMB-O-8	6	s14d70	32" storm drain on Torrance Beach	No	33.81123	-118.39100	TBD	TBD
SMB-O-9	7	s15d40	70" storm drain outlet located 50 yards southwest of the Palos Verdes Swim/Beach	No	33.80220	-118.39700	TBD	TBD

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APPENDIX C
Field Sampling Equipment and Supply List

The following equipment is needed for shoreline sample collection.

- Sterile wide-mouth polypropylene sample bottles - 125 mL, 500 mL and 1000 mL sampling poles - 125 mL, 500 mL and 1000 mL size
- Special samplers, such as those for Ballona Creek/Centinela Bridge and Pacific Ave Bridge sampler
- Flopper bottle sampler
- Thermometer
- Wind Meter
- Rubber boots
- Compaq Pocket PC , data sheets, and beach observation sheet
- Watch
- Ice Chest with ice
- Cell Phone
- Shovel and tow strap
- Thomas Guide map book
- First Aid kit
- Tire gauge
- Accident forms

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APPENDIX D
Field Sampling Standard Operating Procedures

Preparation

- Shoreline samples are collected every morning. Sample collection must be conducted during daylight hours after sunrise and before sunset.

- Check the posted monthly sample calendar for the day's duplicate stations, zero point samples, and any other special samples to be collected.

- Check the sterility results of the sample bottles that will be used. Use only sample bottles that have passed the sterility control QA check. (Also, make sure that the stripes on the autoclave tape are black).

    - The sterility results are recorded in an Equipment/Media Prep Log book under the date that the bottles are autoclaved.

    - The autoclave date will be written on the autoclave tape on top of the sample bottles. Record this date in the Equipment/Media Prep Log book for the date the sample bottles are used.

- Using a black lab marker, label the autoclave tape on the sterile sample bottles with the station number or sample name.

    - The North Beach Run includes stations XX-XX

    - The Central Beach Run includes stations XX-XX

    - The South Beach Run includes stations XX-XX, as well as the Palos Verdes Peninsula and Cabrillo Beach stations.

    - Use 250 mL bottles for shoreline samples.

- Extra sample bottles should be stored in each vehicle in case the sample collector needs them.

- Place sample bottles in the ice chest and fill the chest with ice until the bottom half of the sample bottles are covered.

Sample Collection

- When collecting a sample, make sure the sample is taken from the point in direct line with the sample location landmark. If a sample location is inaccessible or deemed to be unsafe and you cannot sample, please note this on the beach observation sheet. **REMEMBER, Safety Is Important!**

- For collecting samples at locations where there is a freshwater outlet, collect samples as close as safely possible to point zero (wave wash), but no further away than 10 meters down current of the storm drain or outlet.

- At open beaches without freshwater outlets (storm drains or coastal creeks), collect samples at ankle depth and on an incoming wave.

- Place the appropriate size sample bottle in the sampling pole. Just before collecting the sample, unscrew the bottle cap, being careful not to touch the lip of the bottle or the inside of the cap. Use aseptic techniques to avoid any contamination (i.e., do not touch the inner surfaces or lip edges of the bottle or cap).

- Hold the mouth of the bottle towards the surf and collect the sample from an **incoming** wave. Try to get as little sand in the sample bottle as possible. Leave enough headspace (about 1 inch) for later mixing of the sample. Avoid collecting sample in multiple sweeps and **avoid refilling** of the sample bottle.

- Tightly screw the cap back on the bottle, avoiding contamination. Record the time of sample collection on the *Compaq* Pocket PC or beach observation sheet.

- Place the sample bottle back into the ice chest. Make sure at least one-third of the bottom of the bottle is immersed in the ice. The maximum allowable transport time (time of sample collection to sample analysis) is 6 hours.

- Storm Drains and Zero-point Stations (see Appendix B: Sampling Stations/Locations)

Collect Reference Site Sample (Leo Carrillo/SMB-1-1)

- LACDHS will collect Leo Carrillo zero-point samples each Monday throughout the year.

Post Sample Collection

- Place samples in the refrigerator in the lab. Empty and clean out the ice chest and put it away.

- Log in the samples in the sample log-in book. Write the sample collection time and your initials for each sample collected.

- Make sure the beach observation sheet is completely filled out for that day. Do not forget the date and your initials.

- Vehicle maintenance:
    - Sweep out sand.
    - Remove trash.
    - Wash exterior and clean windows inside and out.
    - Gas vehicle if below half full.

QA/QC

- Please refer to Appendix I Quality Assurance/Quality Control for QA/QC procedures.

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APPENDIX E
Field and Data Entry Worksheets

Examples of worksheets for Chain of Custody sheets (2 pages) and recording analytical results used by the City of Los Angeles' Environmental Monitoring Division are provided herein. They include shoreline beach observations, Chromogenic Substrate data entry, and Membrane Filtration data entry. Once completed, data are then entered into the LIMS database.

Date:

Department of Public Works
Bureau of Sanitation
Environmental Monitoring Division

Sample Chain of Custody

EMD
LIMS #: _____

EMD Sample ID: _____
Project Name: _____

Sampling Information:
Sampling Agency: _____
Agency Sample ID#: _____
Phone Number: _____
Fax Number: _____
Contact Person: _____
email address: _____

Sampler's Name: _____
Sampler's Title _____

Sampler's Signature: _____

Witness: Name _____
Title _____

Name _____
Title _____

Sample Location: _____

Sampling Program: _____

Purpose of program: _____

Report Time Frame: _____

Sample Date: _____

Sampling Time: _____

Sampling Address: _____

Requested Analysis:
- Metals: ☐
- Organics: ☐
- Conventional Chemistry: ☐
- Micro Biological: ☐
- Toxicity: ☐
- Air Testing: ☐

See back of page for specifics analyses

Sample Notification:

PC: _____ Date: _____

Wet: _____ Date: _____

Micro: _____ Date: _____

Toxicity: _____ Date: _____

Metals: _____ Date: _____

Semi-Vol: _____ Date: _____

Volatile: _____ Date: _____

Current Holder Name	Signature	Title	Received Date	Received Time	Released Date

Analysis to be performed on the Sample(s):

EMD
LIMS #: _____

	Locator:	Collection Time:		Locator:	Collection Time:
-1			-6		
-2			-7		
-3			-8		
-4			-9		
-5			-10		

Sample Information: Liquid: ☐ Solid: ☐ Other: ☐ Temperature _____
Grab ☐ Composite: ☐
Start time: _____ Finish time: _____ pH _____
Container: Glass Size: _____ Color: _____ Number: ___
Plastic Size: _____ Color: _____ Number: ___ Residual Cl2 _____
Preservative ☐ Number of samples: ☐

Metals:
- ☐ Ag
- ☐ Al
- ☐ As
- ☐ Ba
- ☐ Be
- 85 ☐ Ca
- ☐ Cd
- ☐ Co
- ☐ Cr
- ☐ Cu
- ☐ Fe
- ☐ Hg
- ☐ K
- ☐ Mg
- ☐ Mn
- ☐ Mo
- ☐ Na
- ☐ Ni
- ☐ Pb
- ☐ Sb
- ☐ Se
- ☐ Sn
- ☐ Sr
- ☐ Tl
- ☐ V
- ☐ Zn
- ☐ Other: _____
- ☐ Total
- ☐ Dissolved

Organics:
- ☐ VOC
- ☐ BNA
- ☐ TOX
- ☐ Herbicides
- ☐ Pesticides/PCB
- ☐ Dioxin - screen
- ☐ Other: _____
- ☐ Clopyralid
- ☐ Dioxin - low resolution
- ☐ Dioxin - high resolution
- ☐ Tributyltin
- ☐ Air VOC
- ☐ Fixed Gases
- ☐ GC Sulfur
- ☐ Siloxanes

Conventional Chemical:
- ☐ Alkalinity
- ☐ BOD
- ☐ Boron
- ☐ Chloride
- ☐ COD
- ☐ Conductivity
- ☐ Cyanide (Free)
- ☐ Cyanide (Total)
- ☐ Flashpoint
- ☐ Fluoride
- ☐ Grain Size
- ☐ Hardness
- ☐ Hexavalent Chromium
- ☐ H_2S
- ☐ MBAS
- ☐ Nitrogen:
  - ☐ Ammonia Nitrogen
  - ☐ Nitrate-N
  - ☐ Nitrite-N
  - ☐ Organic-N
  - ☐ Kjeldahl Nitrogen
- ☐ Oil & Grease
- ☐ pH
- ☐ Phenols
- ☐ Phosphate, Total
- ☐ Phosphate, Dissolved
- ☐ Radioactivity
- ☐ Salinity
- ☐ Solids:
  - ☐ Total Solids
  - ☐ Total Dissolved Solids
  - ☐ Total Suspended Solids
  - ☐ Settleable Solids
  - ☐ Volatile Suspended Solids
  - ☐ Volatile Total Solids
- ☐ Sulfates
- ☐ Sulfides, Total
- ☐ Sulfides, Dissolved
- ☐ Thiosulfate
- ☐ TOC
- ☐ Turbidity
- ☐ Other:

Biological:
- ☐ Total Coliform
- ☐ Fecal Coliform
- ☐ E. coli
- ☐ Enterococcus
- ☐ Salmonella
- ☐ Acute Toxicity (Fresh water)
- ☐ Chronic Toxicity (Sea water)
- ☐ Chronic Toxicity (Fresh water)
- ☐ Other: _____

Remarks: _____

Date:_____

Read by:_____ Time:_____

Environmental Monitoring Division

Microbiology Group

Validated:_____

TOTAL

SHORELINE QUANTITRAY COUNTS

Station	S01	S02	S03	S04	S05	S06	S07	S08	S09	Blank	Dup
10 ml											
Large cells											
Small cells											
Blank 100 mL										Blank	
Large Cells											
Small Cells											

E. coli

Station	S01	S02	S03	S04	S05	S06	S07	S08	S09	Blank	Dup
10 ml											
Large cells											
Small cells											
Blank 100 mL										Blank	
Large Cells											
Small Cells											

Date: _____SHE

ENVIRONMENTAL MONITORING DIVISION
MICROBIOLOGY UNIT

Entered by: 1: _____ 2:
Validated by:

SHORELINE BACTERIAL DENSITIES

ENTEROCOCCUS

Read by: _____ Time:

VOL. (mL)	01	02	03	04	05	06	07	08	09	DUP
10										
50										
100										

ENTERO/100 mL

VOL. (mL)	10	11	12	13	14	15	16	17	18	DUP
10										
50										
100										

ENTERO/100 mL

SMBBB TMDL SOUTH BEACH OBSERVATION SHEET

DATE (Day/Month/Year): SAMPLER NAME AND INITIAL: HTP LOGIN #:

STATION ID	POINT ZERO SITES																				STATION ID	OPEN BEACHES				
SAMPLE TIME																					SAMPLE TIME					
Beach Refuse																					Beach Refuse					
Ocean Debris																					Ocean Debris					
Seaweed																					Seaweed					
Tar																					Tar					
Rubber / Plastic Goods																					Rubber / Plastic Goods					
Plankton Color																					Plankton Color					
Dead Marine																					Dead Marine					
Sewage Grease																					Sewage Grease					
Sewage Susp. Solids																					Sewage Susp. Solids					
Odor																					Odor					
Oil																					Oil					
Foam																					Foam					
Bathers																					Bathers					
Animals / Birds																					Animals / Birds					
Storm Drain Flow																					Storm Drain Flow					
Storm Drain Position																					Storm Drain Position					
Tide Height*																					Tide Height*					
Reached Surf																					Reached Surf					
Reverse Flow																					Reverse Flow					
Conductivity (Reverse Flow only)																					Conductivity (Reverse Flow only)					

CODE	0	1	2	3	4	5	6	7
Reverse Flow	NO	YES						
Reached Surf	NO	YES						
Storm Drain Position	Buried in Sand	Submerged(Not Sampled)						
Storm Drain Flow	Dry	Ponded	Low Flow (garden Hose)	Medium flow (between 2 and 4)	Heavy flow (Fire Hose)			
Plankton Color		Brown	Green	Red	Yellow	Blue-Green		
Dead Marine		Fish	Jellyfish	Seal	Dolphin	Bird	Whale	Crab
Odor		Sewage	Oil	Chemical	Marine			
Foam		Some	Heavy					
Animals / Birds or Bathers (50 yards each direction)		1 to 5	5 to 10	10 to 20	20 to 50	50 to 100	> 100	

NOTE: DO NOT PUT YOURSELF AT RISK IN ORDER TO COMPLETE THIS FORM

COMMENTS:

WEDNESDAY (accelerated)

DATE:
SAMPLER NAME AND INITIAL:
HTP LOGIN #:

STATION ID								
SAMPLE TIME								
Beach Refuse								
Ocean Debris								
Seaweed								
Tar								
Rubber / Plastic								
Plankton Color								
Dead Marine								
Sewage Grease								
Sewage Susp. Solids								
Odor								
Oil								
Foam								
Bathers								
Animals / Birds								
Storm Drain Flow								
Storm Drain Position								
Tide Height*								
Reached Surf								
Reverse Flow								
Conductivity (Reverse Flow only)								

FRIDAY (accelerated)

DATE:
SAMPLER NAME AND INITIAL:
HTP LOGIN #:

STATION ID								
SAMPLE TIME								
Beach Refuse								
Ocean Debris								
Seaweed								
Tar								
Rubber / Plastic								
Plankton Color								
Dead Marine								
Sewage Grease								
Sewage Susp. Solids								
Odor								
Oil								
Foam								
Bathers								
Animals / Birds								
Storm Drain Flow								
Storm Drain Position								
Tide Height*								
Reached Surf								
Reverse Flow								
Conductivity (Reverse Flow only)								

	WEATHER - NORTH BEACH		
	MON	WED	FRI
DATE			
SAMPLER			
Weather			
Wind Direction			
Sea Conditions			
Air Temp			
Surf Temp			
Wave Height			

CODE	1	2	3	4	5	6	7	8
WEATHER	Fair	Cloudy	Fog	Rain	P-Cldy	Hazy	Overcast	
SEA	Calm	Chop	Waves					
WIND DIRECTION	N	NE	E	SE	S	SW	W	NW

APPENDIX F
Laboratory Equipment and Supply List

Chromogenic Substrate Method

- **Materials and Equipment**

  - Sterile, transparent, non-fluorescent container - 125 mL volume (use containers provided by Colilert kit if available)
  - Colilert-18 reagent packets
  - Enterolert reagent packets
  - Quantitray/2000 trays
  - Graduated cylinder, sterile - 100 mL (optional)
  - Quantitray/2000 rubber tray insert
  - UV cabinet or lamp - long wave, 366nm
  - Deionized water – sterile
  - Colilert Quantitray/2000 color/fluorescence comparators

Membrane Filtration Method

- **Materials and Equipment**

  - Plate Labeling
    - Indelible marking pen
    - Kimwipes
    - Prepared mEndo, mFC, and mE agar plates
    - Agar plate carrier with dark cover
  - Filtration
    - 1 mL and 10 mL sterile, bacteriological or Mohr disposable pipets
    - Pipet biohazard container
    - Vacuum pump
    - Filtration manifold
    - Microfil vacuum support base
    - Microfil filter screen disc (in 95% alcohol jar)
    - Sterile, disposable Microfil funnels
    - Membrane filters - sterile, white, grid-marked, 7 mm diameter filters with 0.45µM pore size
    - Labeled mEndo, mFC, and mE agar plates in covered plate carrier
    - Alcohol lamp
    - 95% and 70% ethanol
    - Glass safety jar with lid
    - Paper towels
    - Sterile, plastic squirt bottle

- Forceps - smooth-tipped stainless steel
- Pipet bulb
- Alcohol pads
- Incubator, 35.0 ± 0.5°C
- Water bath, 44.5 ± 0.2°C
- Incubator, 41.0 ± 0.5°C
- Solid heat-sink fecal coliform incubator, 44.5 ± 0.2°C
- Matches
- Long-handled forceps
- Sterile, phosphate-buffered rinse water
- Sterile, phosphate-buffered water dilution tubes

- Colony Counting
  - Binocular, stereoscopic microscope with fluorescent lamp
  - Disposable gloves
  - Data worksheets
  - Large biohazard container
  - Incubated mEndo, mFC, and mE agar plates
  - EIA agar plates

APPENDIX G
Laboratory Standard Operating Procedures (City of Los Angeles)

Chromogenic Substrate Method: Shoreline/Marine Samples

- **Procedure**
  - Disinfect the workbench area with 70% ethanol. Let air-dry.
  - Preparation of sample container
    - You will need one sterile container per sample. Label each sample container with station name and test to be performed (e.g., Container 1: S01, TC/EC, Container 2: S01, Entero).
    - Remove the outer plastic ring/label seal around the container cap. Remove the container cap, being careful not to touch the inside of the cap. Pour sterile deionized water from a flask into each container. Be careful not to touch the rim of the deionized flask or the container. Pour the D.I. water to the 100 mL mark on each container and replace the cap. Replace the cap back onto the D.I. water flask if there is any D.I. water left in the flask.
    - If a 10 mL sample aliquot is to be used, remove 10 ml of D.I. water from all sample containers using a sterile 10 ml pipet. If only 1 ml of sample is to be analyzed, skip this step of removing 10 ml of D.I. water.
    - You will need one Coli-18 reagent pak for each sample container labeled TC/EC and one Enterolert reagent pak for each container labeled Entero. Carefully separate one reagent snap pak from the strip, taking care not to accidentally open the adjacent pak. Tap the snap pak to ensure that all of the reagent powder is in the bottom part of the pack.
    - Open the pak by snapping back the top at the score line. Do not touch the opening of the pak.
    - Add the reagents to the appropriate sample containers filled with D.I. water. Replace the cap on the container, tighten, and gently mix until the reagent is dissolved. Note that when the Coli-18 reagent is added to the D.I. water in the container, the solution is a clear color and when Enterolert reagent is added to the D.I. water, the solution is a yellow color.
    - Pipet 10 mL of each sample into the appropriate sample containers. Place the used pipets into the pipet biohazard container. Replace the sample container caps and mix gently.

  - Quanti-tray/2000
    - Turn on Quanti-tray® sealer at the start of sample preparation.
    - You will need **one** Quanti-tray for **each** labeled sample container.
    - Check to see that the green Ready Light (above the amber power light) is illuminated on the sealer. The sealer will not operate until both the amber power light and the green Ready Light are

illuminated.

- Using one hand, hold a Quanti-tray upright with the well side (plastic) facing your palm. Squeeze the upper part of the Quanti-tray so that it bends towards the palm of your hand. Using your other hand, gently pull the foil tab at the top of the tray to separate the foil from the top of the tray, creating an open pouch. Avoid touching the inside of the foil or tray and be careful not to tear the foil.
- Pour the reagent/sample mixture directly into the Quanti-tray, avoiding contact with the foil tab at the top of the tray. Tap the small wells at the bottom of the tray to release any air bubbles. Allow any foam present to settle.
- Place the sample-filled tray onto the rubber insert of the sealer with the well side (plastic) of the tray facing down. Align the small and large wells with their corresponding holes in the rubber insert. Make sure the tray is properly seated in the rubber insert. With your hand, gently press on the back of the tray to distribute some of the liquid into the larger wells.
- Slide the rubber insert into the sealer until the motor grabs the rubber insert and begins to draw it into the sealer.
- In approximately 15 seconds, the tray will be sealed and partially ejected from the rear of the sealer. Remove the rubber insert and tray from the rear of the sealer.
- If a misaligned tray is accidentally fed into the sealer, press and hold the "**reverse"** button (located on the top, front center of the sealer). This will reverse the motor and you can then remove the tray. Do not reverse the motor once the rubber insert has been drawn fully into the input slot of the sealer.
- Repeat for each labeled tray. Turn off the sealer and unplug the unit when you are finished sealing all the trays.
- Using a felt-tipped marker, label the front of each tray with the incubation time.
- Place all Quanti-trays labeled "TC/EC" into the 35°C (Total coliform) incubator for 18 hours.
- Place all Quanti-trays labeled "Entero" into the 41°C (Enterococcus) incubator for 24 hours.

- QA Controls
  - Refer to QA/QC SOP
- Clean-up
  - Dispose of the empty, used sample container in the large, red biohazard containers.
  - Dispose of all pipet wrappers and empty reagent packs in the regular trash receptacle. Return all lab supplies to their proper storage areas.
  - Disinfect the workbench area with 70% ethanol. Let air-dry.
  - Discard original sample remaining in sample bottle (can discard down sink drain). Rinse with tap water and place empty bottles on

trash cart for later cleaning.

- Reading Quanti-Tray Sample Results
  - Disinfect the workbench area with 70% ethanol. Let air-dry.
  - TOTAL COLIFORMS - read 18 hours after incubation.
    - Remove the Quanti-trays from the 35°C (Total coliform) incubator.
    - Record the date, time, and analyst name or initials on the sample data sheet for the reading of Total Coliforms.
    - Compare the intensity of the yellow color of the sample wells to the intensity of the yellow color of the Comparator Quanti-tray. Any well with a yellow color of equal or greater intensity than the Comparator is considered a "positive" well. Wells with a clear color or a yellow intensity less than the Comparator are considered as "negative." **If reaction is unclear or borderline yellow, replace the tray in incubator for further incubation up to a total of 22 hours.**
    - Count the number of positive large wells. Remember that the single, large well at the very top of the Quanti-tray should also be included in the count if it is positive. Record the number of positive large wells on the sample data sheet. Count and record the number of large positive wells for each sample dilution that was set.
    - Count the number of positive small wells. Record the number of positive small wells on the sample data sheet. Count and record the number of small positive wells for each sample dilution that was set.

  - *E. COLI* - read 18-22 hours after incubation.
    - These results are read from the Total coliform Quanti-trays.
    - Record the date, time, and analyst name or initials on the sample data sheet for the reading of *E. coli*.
    - Place Quanti-tray under a UV cabinet or lamp.
    - Press the red button on the top of the UV lamp to turn the lamp on. Make sure the lamp is pointed away from you.
    - Count the number of large and small fluorescent wells for each sample dilution. Remember that the single, large well at the very top of the Quanti-tray should also be included in the count for the large wells if it is positive. Record the results on the sample data sheet.
    - If in doubt as to the fluorescence of a well, compare it to the negative fluorescence of the Quanti-tray Comparator. This Comparator is "negative" for fluorescence. **If fluorescence on the well(s) is/are still questionable, mark the well(s) with an indelible pen or marker and re-incubate Quanti-tray for an additional 2 - 4 hours**. Read Quanti-tray again following the incubation period.

ENTEROCOCCUS - read 24-28 hours after incubation

- Remove the Quanti-trays from the 41°C (Enterococcus) incubator.
- Record the date, time, and analyst name or initials on the sample data sheet for the reading of Enterococcus.
- Place Quanti-tray under a UV cabinet or lamp
- Press the red button on the top of the UV lamp to turn the lamp on. Make sure the lamp is pointed away from you.
- Shine the UV lamp directly on the sample Quanti-tray within five inches of the tray. Count the number of large and small fluorescent wells for each sample dilution. Remember that the single, large well at the very top of the Quanti-tray should also be included in the count for the large wells if it is positive. Record the results on the sample data sheet. Record the results on the sample data sheet.
- If in doubt as to the fluorescence of a well, compare it to the negative fluorescence of the Quanti-tray Comparator. This Comparator is "negative" for fluorescence. **If fluorescence on the well(s) is/are still questionable, mark the well(s) with an indelible pen or marker and re-incubate Quanti-tray for an additional 2 – 4 hours**. Read Quanti-tray again following the incubation period.

- When finished reading all the Quanti-trays, turn off UV lamp and dispose of all trays into the large red biohazard containers.
- Disinfect the workbench area with 70% ethanol. Let air dry.
- Leave the sample data sheets on the clipboard by the Quanti-tray sealer.

- Quanti-Tray Calculations
  - Enter the number of positive large and small wells into the Idexx generator or read from the Idexx MPN table. Multiply the number given in the table by the dilution factor used. If more than one dilution generates a result, take the average.

Example # Positive large wells: 23

Positive small wells: 16

Idexx MPN table: 52.7

Calculation (10 ml aliquot of sample):

52.7 (**number from table**) x 10 (**Result based on a 100 ml sample size**) = 530 MPN/100 ml

Membrane Filtration Method (for Enterococci analysis)

- **Media Preparation**
  - mEndo Agar LES
    - To rehydrate the medium, suspend 51 grams in 1 liter deionized

water containing 20 mL 95% ethanol and heat to boiling to dissolve completely. Cool to 45-50°C. (If using the agarmatic, follow the agarmatic directions for making mEndo.) Aseptically dispense 4-5 mL amounts into the lower halves of 60x15 mm sterile, disposable Petri dishes and allow to solidify. Final pH 7.2 ± 0.2. Record pH results in the media prep logbook.

- Set QA media controls.
  - Refer to QA/QC SOP
- Place agar plates in a labeled media container and refrigerate until needed. The holding time for agar plates is two weeks.

- mFC Agar
  - To rehydrate the medium, suspend 52 grams in 1 liter deionized water and heat to boiling to dissolve completely. Add 10 mL of a 1% solution of rosolic acid in 0.2 *N* NaOH. Continue heating for 1 minute. Cool to 45 -50°C. (If using the agarmatic, follow the agarmatic directions for making mFC.) Aseptically dispense 4-5 mL amounts into the lower halves of 50-60x15 mm tight-fitting sterile, disposable Petri dishes and allow to solidify. Final pH 7.4 ± 0.2. Record pH results in the media prep logbook.

  - 1% Rosolic Acid Solution - Add 0.1 grams rosolic acid to 10 mL of stock 0.2 *N* NaOH. Mix well.

  - Stock 0.2 *N* NaOH - Add 0.8 grams NaOH to 100 mL deionized water. Mix to dissolve. Store in a labeled polyethylene reagent bottle.

  - Set QA media controls.
    - Refer to QA/QC SOP
  - Place agar plates in a labeled Tupperware container and refrigerate until needed. The holding time for agar plates is two weeks.

- mE Agar
  - To rehydrate the medium, suspend 7.12 grams in 100 mL of deionized water. Heat to boiling to dissolve completely. Autoclave for 15 minutes at 121°C. Promptly remove from the autoclave and cool to 45-50°C. Add 0.024 grams Nalidixic Acid and 1.5 mL of a 1% solution of triphenyl tetrazolium chloride (TTC). (If using the agarmatic, follow the agarmatic directions for making mE.) Aseptically dispense 4-5 mL amounts into the lower halves of 60x15 mm sterile, disposable Petri dishes and allow to solidify. Final pH 7.1 ± 0.2. Record pH results in the media prep logbook.

    1% TTC Solution - Add 1 gram TTC to 100 mL of deionized water. Mix well. Using a sterile 0.22µm Millex-GS filter, filter-

sterilize the solution into a sterile, labeled 500 mL reagent bottle. Store in the refrigerator.

- Set QA media controls.
  - Refer to QA/QC SOP
- Place agar plates in a labeled Tupperware container and refrigerate until needed. The holding time for agar plates is two weeks.

- Esculin Iron Agar (EIA)
  - To rehydrate the medium, suspend 1.65 grams in 100 mL of deionized water. Heat to boiling to dissolve completely. Autoclave for 15 minutes at 121°C. Promptly remove from the autoclave and cool to 45-50°C. (If using the agarmatic, follow the agarmatic directions for making EIA.) Aseptically dispense 4-5 mL amounts into the lower halves of 60x15 mm sterile, disposable Petri dishes and allow to solidify. Final pH 7.1 ± 0.2. Record pH results in the media prep logbook.
  - Set QA media controls.
    - Refer to QA/QC SOP
  - Place agar plates in a labeled Tupperware container and refrigerate until needed. The holding time for agar plates is two weeks.
- Phosphate-Buffered Water
  - 1 *N* NaOH - Carefully add 4 grams NaOH to 100 mL deionized water. Mix to dissolve. Store in a labeled polyethylene reagent bottle.
  - Stock Phosphate Buffer Solution - add 34.0 grams potassium dihydrogen phosphate (KH_2PO_4) to 500 mL deionized water and mix to dissolve. Adjust pH to 7.2 ± 0.5 with 1 *N* NaOH and bring volume to 1 liter, using a 1-liter volumetric flask. Transfer to a reagent bottle and autoclave for 15 minutes at 121°C. Let cool and refrigerate. Discard if turbidity is present.
  - Stock Magnesium Chloride Solution - add 81.1 grams $MgCl_2 \cdot 6H_2O$ to 1 liter deionized water and mix to dissolve. Transfer to a reagent bottle and autoclave for 15 minutes at 121°C. Let cool and refrigerate. Discard if turbidity is present.
  - Working Solution of Phosphate-Buffered Dilution/Rinse Water
    - Add 1.25 mL stock phosphate buffer solution and 5 mL stock magnesium chloride solution to 1 liter deionized water. Adjust pH to approximately 7.6-7.7 with 1 *N* NaOH. Mix and dispense approximately 9.5 mL into specially marked dilution test tubes. Autoclave at 121°C for 15 minutes. If phosphate-buffered rinse water is needed, autoclave 1-2 L volumes in large flasks for 45 minutes at 121°C.
    - Cool and check that buffered water level is at the marked line (9 mL) on the test tube. Aseptically adjust water level if necessary. Tightened test tube or flask caps and store at

room temperature. Holding time for screw-capped media is 3 months. Final pH 7.2 ± 0.1.

- Sterility control - test the sterility of the buffered dilution water by aseptically pouring 2 test tubes of dilution water into a sterile bottle containing 100 mL of Tryptic Soy Broth. Test the sterility of the liter flasks of rinse water by aseptically adding 20 mL buffer to a sterile bottle containing 100 mL TSB. Incubate the bottle for 48 hours at 35.0 ± 0.5°C. Record pH and sterility check results in the media prep logbook.

- Tryptic Soy Broth (TSB)
  - To rehydrate the medium, suspend 30 grams in 1 liter of deionized water and mix to dissolve completely. Dispense 100 mL of broth into 125 mL Nalgene bottles. Autoclave for 15 minutes at 121°C. Promptly remove from the autoclave when done. Let cool and then tighten caps. Final pH 7.3 ± 0.2. Record pH results in the media prep logbook.
  - Set QA media controls.
    - Refer to QA/QC SOP
  - Place TSB bottles in the refrigerator until needed. The holding time for screw-capped media is three months.

- **Plate Labeling Procedure**
  - Clean and wipe the bench-top work area with 70% ethanol and let air dry.
  - Check the monthly sample calendar for the samples and duplicates scheduled for the day.
  - Check the QA results of the prepared agar plates to be used. These results are recorded in the media prep logbook. Use only media that have passed the sterility, positive control, and negative control checks.
  - Record the media preparation dates for all the agar plates being labeled. The dates are recorded in the media prep logbook under "Prep Date of Media in Use."
  - Inspect all agar plates.
    - Discard any plates that have bubbles that will interfere with bacterial growth when the membrane filter is placed on the agar surface.
    - Check plates for contamination of any kind (bacterial growth, mold, or strange color). Discard any contaminated plates into a biohazard bag.
  - Using an indelible marking pen or pre-printed labels, label each plate with the station name or location at the top of the Petri dish, sample volume or dilution in the middle, and sample date at the bottom of the dish.
    - Consult the Sample Dilution Table for the necessary dilutions for each sample type.
    - mEndo and mFC agar plates are labeled on the bottom (agar side) of the Petri dish.

        - mE agar plates are labeled on the top (lid side) and the bottom (agar side) of the Petri dish.
    - Stack all the agar plates for the same station together after the plates are labeled. Stack plates by ascending volume order (smallest volume on top).
    - When stacking, be sure to place all plates, agar side up.
    - Place the stack of plates for each sample into a slot in one of the agar plate carriers.
    - Add a small stack of unlabelled mEndo agar plates to the carrier. These plates will be used for QA blanks as needed during filtering.
    - Label the cover of each plate carrier with the sample stations or locations for all plates in the carrier. Include duplicate stations on the label for all boat plate carriers.
    - If plates are labeled one day in advance of use, refrigerate the plate carriers. Labeled plates that are refrigerated need to be taken out of the refrigerator on the day of use.
    - If plates are labeled on the day of use, the plate carriers can be left out at room temperature until needed.

- **Filtration Procedure**
    - Clean and wipe the bench top work area with 70% ethanol and let air dry.
    - Gather the necessary filtration equipment.
    - Aseptically transfer sterile, phosphate-buffered rinse water into a sterile squirt bottle.
    - Select samples to be filtered. Select the proper agar plates for the samples and check the plate stacking order to make sure sample volumes are in ascending order.
    - Make 1:10 serial dilutions (if needed).
        - Shake the sample vigorously for several seconds (about 25 - 30 times) to break up any bacterial cell aggregates, to separate cells from particulate matter, and to make the sample homogenous.
        - Aseptically pipet 1 mL of the sample into a sterile 9 mL dilution test tube and shake or vortex vigorously. This is a 1:10 (10^{-1}) dilution of the sample.
        - Aseptically pipet 1 mL of the 10^{-1} dilution into a second 9 mL dilution tube and shake or vortex vigorously. This is a 1:100 (10^{-2}) dilution.
        - Aseptically pipet 1 mL from the second (10^{-2}) dilution tube into a third 9 mL dilution tube and shake or vortex vigorously. This is a 1:1000 (10^{-3}) dilution.
        - Continue making 1:10 serial dilutions as needed.
    - Fill the alcohol lamp with 95% ethanol and light it.
    - Prepare filtration equipment, one filtration unit per sample.
        - Wipe the Microfil support base with an alcohol pad. Let dry.
        - Remove filter screen disc from the 95% alcohol jar using the long-handled forceps. Gently shake the disc over the alcohol jar to

remove any excess alcohol. Flame-sterilize the disc. Allow flame to self-extinguish. Place disc onto the Microfil support base.
    - Squirt the disc with a small amount of sterile buffer to wash any residual alcohol off the disc. Apply vacuum to drain the buffer off the disc.
    - Aseptically remove a membrane filter from the filter dispenser, using an alcohol flame-sterilized forceps. Place the filter, grid-side-up on filter support base.
    - Aseptically remove a sterile, disposable Microfil funnel from the funnel dispenser.
    - Put the funnel over the filter on the support base. Place thumbs and index fingers of both hands on the upper, outside ridge of the funnel. Evenly push down on the funnel to securely lock it into place.
- Shake sample vigorously for several seconds (about 25 - 30 times) to break up any bacterial cell aggregates, to separate cells from particulate matter, and to make the sample homogenous. Place bottle at a slant to let any sand or debris in the sample settle to the bottom sides of the bottle.
- Record filtering start time and initials in the LIMS "Micro Log-in" Excel worksheet on the PC computer. Move the cursor to the appropriate cell for the sample being filtered.
    - If the starting time is the current time, press "CTRL+T."
    - Alternately, enter the time using a colon, ex. "10:25 or 14:00."
- Before filtering the sample, determine if a QA sterility blank needs to be done.
    - Refer to QA/QC SOP
- Wet the membrane filter with an adequate amount of sterile rinse water before adding sample aliquots delivered with a pipet. Add the sample aliquot to the filter according to the plate stacking order. Use a new filter for each sample aliquot.
- Use sterile pipets for sample volumes < 20 mL. If the pipet is to be used again, rest the pipet tip against the inner lip of the sample bottle. Do not let the pipet tip rest on the bottom of the sample bottle. Discard used pipets into the pipet biohazard container.
- For sample volumes of 50 mL or 100 mL, aseptically pour the sample to the measured lines on the Microfil funnel. If an excess amount of sample is poured into the funnel, use a sterile pipet to remove the excess. Discard the excess sample along with the pipet into the pipet biohazard container.
- Before applying the vacuum, swirl the sample in Microfil funnel by moving the funnel in a gentle circular motion to evenly distribute bacterial cells on the membrane filter surface.
- Apply vacuum, letting the sample drain through the filter.
- Thoroughly rinse down the walls of the funnel two times with a generous amount of sterile buffer water. This will wash down any bacteria that may adhere to the sides of the funnel.
- With one hand on the outside walls of the funnel, use a backwards and

upwards motion to pop the funnel off the support base. Continue to hold the funnel with your hand. Use your other hand to remove aseptically the filter with a flame-sterilized forceps (one sterile forceps per membrane filter). Aseptically replace the funnel back on the support base.

- Aseptically place the filter on the surface of the appropriate agar plate, using a rolling motion to avoid trapping air between the agar and the filter that will result in the formation of bubbles. If any air is trapped under the filter, reset the membrane filter onto the agar surface. Place the used forceps into the jar of ethanol.
- Stack finished plates by sample and media type. Remember to always position finished plates agar (bottom) side up. This is to avoid any condensation dripping onto the surface of the filter during incubation, which may interfere with or distort bacterial growth.
- Continue filtering the sample, following the steps detailed above for each sample volume or dilution labeled on the stack of plates.
- If a duplicate sample is being filtered, the same pipets and dilution tubes (if needed) may be used for both the regular sample and the duplicate sample.
- When the sample is finished being filtered, place mEndo and mE agar plates in a covered incubation container (with moist sponges) according to media type. Total coliform mEndo agar plates are incubated for 24 ± 2 hours at 35.0 ± 0.5 °C. Fecal coliform mFC agar plates are incubated for 24 ± 2 hours at 44.5.0 ± 0.2 °C. It is important that these plates be incubated within 20 minutes of filtration to ensure heat-shock of the non-fecal bacteria. Plates are incubated in either the dry heat-sink incubators or sealed in waterproof bags and placed in the 44.5 ± 0.2°C water bath. Enterococcus mE agar plates are incubated for 48 ± 2 hours at 41.0 ± 0.5°C.
- Record filtration finish time, initials, and incubation time in the LIMS "Micro Log-in" Excel worksheet on the PC computer.
- The incubation containers should be labeled with the indicator bacteria, test date, and incubation time.
- Place used Microfil funnels in the biohazard bag for the funnels. Place sample bottles, empty buffer flasks, and used squirt bottles (if not being used for filtering more samples) in a tub for later washing.
- Wipe down the bench-top work area with 70% ethanol and let air dry.
- To filter another set of samples, wipe the Microfil support base and filter screen disc with a new alcohol pad. Rinse the disc with sterile rinse water. Repeat procedure as detailed in the above sections.
- When taking a long break between filtering samples, wipe the Microfil support base and filter screen disc with a new alcohol pad. Leave the alcohol pad on the screen disc. Place an alcohol-wiped cap over the Microfil unit. Before filtering again, remove the cap and re-wipe the Microfil unit and filter screen disc with the alcohol pad. Rinse the disc with sterile rinse water. Repeat procedure as detailed in the above sections.

- When all samples have been filtered, remove the filter screen disc from the Microfil support base and put in the 95% alcohol jar. Wipe the Microfil support base with a new alcohol pad. Leave the alcohol pad in the empty disc space. Place an alcohol-wiped cap over the Microfil unit.

- **Colony Counting Procedure**
  - Check the LIMS "Micro Log-in" Excel worksheet for the incubation times of the plates that need to be read that day. Determine when the plates can be read according to their required incubation times.
  - Gather the necessary data worksheets for all samples to be read. Each test and sample type has separate data worksheets.
  - Record the time the plates are read and analyst initials in the LIMS "Micro Log-in" Excel worksheet and on the data worksheets.
    - If the read time is the current time, press "CTRL+T."
    - Alternately, enter the time using a colon, ex. "10:25 or 14:00."
  - If desired, wear disposable gloves when handling and reading the plates.
  - Remove plates from the incubator when it is time to read them and arrange them in ascending volume order for each station.
  - Use the stereoscopic microscope with a fluorescent lamp to aid in identifying and counting colonies.
  - Starting with the control blank plate if one was done, examine the filter for bacterial contamination or any notable changes on the filter or agar media.
  - Examine and count all the plates set for a single sample, starting with the smallest sample volume filtered or the most dilute sample.
  - Colonies that have grown into each other should be counted individually. Separate nuclei or a fine line of contact may usually be seen.
  - Colonies in every filter grid square within the filtering area are to be counted.
  - To make counting easy and simple, start counting at the top of the filter. Count from left to right, following the grid lines, and continue to the bottom of the filter.
  - Countable ranges - Due to the possible adverse effect of colony crowding on sheen or color development on the filter membrane, and to be assured of a statistically valid colony count, minimum and maximum bacterial levels have been set for each of the indicator bacteria.
    - Total bacteria: <200 total colonies (background and indicator bacteria).
    - Total Coliform: 20 - 80 coliform colonies
    - Fecal Coliform: 20 - 60 fecal coliform colonies
    - Enterococcus: 20 - 60 Enterococcus colonies
  - Colony Morphology
    - Total Coliforms
      - The typical colony has a pink to dark-red color with a shiny, greenish-gold, metallic surface sheen. The sheen may cover the entire colony, or it may appear only in the central area or on the periphery.

        - This sheen is produced as a by-product of lactose fermentation (acid aldehyde complex) in combination with the Schiff's reagent (fuschin sulfite) in the mEndo media.
    - Fecal Coliforms
        - Any colony exhibiting any light or dark blue color, whether covering the entire colony or only in or on part of the colony.
        - This blue color is a result of the acid produced by the fermentation of lactose combining with the aniline blue dye in the mFC media.
        - Colonies exhibiting a cream or grey color are not fecal coliforms.
    - Enterococcus
        - After 48 ± 2 hours incubation, mE filters with growth on them are transferred to room temperature EIA plates.
        - Using forceps, remove the filter (handling the filter by its edge, outside of the filtration area) from the mE plate and roll it onto the agar surface of the EIA plate.
        - Replace the top of the EIA plate with the labeled top lid of the original mE plate.
        - Incubate the EIA plates for 20 minutes at 41.0 ± 0.5°C.
        - Enterococci are pink to carmine-red colonies with black or reddish-brown precipitate or halos on the underside of the filter when placed on EIA agar.
        - The colony color is due to the reduction of the vital indicator TTC (2,3,5-Triphenyl tetrazolium chloride) to non-reversible formazin. The dark precipitate or halo is the result of the hydrolysis of esculin.
- Record all colony counts and any other notable information on the data worksheet. Comments should include information about unusual conditions on the filter, such as the presence of solids, artifacts, or high background counts. The condition of the growth on the filter should also be noted, such as confluent areas or confluent growth over the filter.
    - CG = confluent bacterial growth with indistinct or non-discrete colonies.
    - TNTC = Too Numerous To Count
    - >200 = greater than 200 background and indicator colonies on a filter.
- If there are any questions regarding counting colonies or any unusual or suspicious plates, save all plates for that sample and show them to a microbiologist.
- Dispose of all plates and gloves in a biohazard container. Autoclave at the end of the day.

- **Calculations**
  - Due to the possible adverse effect of colony crowding or color development on the filter membrane, and to be assured of a statistically valid colony count, minimum and maximum bacterial levels have been set for each of the indicator bacteria.
    - Total bacteria: <200 total colonies (background and indicator bacteria).
    - Total Coliform: 20 - 80 coliform colonies
    - Fecal Coliform: 20 - 60 fecal coliform colonies
    - Enterococcus: 20 - 60 Enterococcus colonies
  - Indicator bacteria are expressed as bacterial density (CFU) per 100 mL of sample.
  - The raw bacterial counts from the data worksheets are entered into LIMS "Sample Data Entry" Excel worksheets on the PC computer by a technician. The computer calculates the final bacterial densities for each sample and prints a copy of the data worksheet. See the LIMS Data Entry SOP for more details.
  - The supervisor verifies the daily-calculated bacterial densities. Daily bacterial density reports are printed out by the computer and E-mailed to the primary leads of the jurisdictional groups, who in turn will communicate this data to its jurisdictional members. The data reports are kept in a labeled notebook and the original data worksheets are kept in the data file cabinet. See the LIMS Data Validation SOP for more details.
  - If the final bacterial densities need to be calculated by hand, the following guidelines should be used. All calculated values should have only 1 or 2 significant figures, depending on the colony counts.

    - Countable Range (Standard Methods., EPA):

      Countable range number of colonies x 100 = (value) CFU/100 **mL filter volume**

    Disregard non-countable range counts and volumes.

Volume	Count	
blank	0	
0.5	0	
5.0	6	$\frac{35}{20}$ x 100 = **180 CFU/100 mL**
20	35	
50	95	

    - Two volumes in the countable range (EPA):

      Calculate each count independently as in 6.4.1. above and then average the results.

Volume	Count		
blank	0	$\frac{20}{20}$ x 100 = 100	$\frac{60}{50}$ x 100 = 120
0.5	0		
5.0	6		
20	20	$\frac{100 + 120}{2}$ = **110 CFU/100 mL**	
50	60		

- Counts less than the countable range (Standard Methods):

  $\frac{\text{Add all colonies}}{\text{Total all volumes}}$ x 100 = (value) CFU/100 mL

Volume	Count	
blank	0	
0.5	0	
5.0	1	$\frac{19 + 4 + 1 + 0}{50 + 20 + 5 + 0.5}$ x 100 = **32 CFU/100 mL**
20	4	
50	19	

- No counts on any filter volume (EPA):

  $\frac{1 \text{ x } 100}{\text{Largest volume filtered}}$ = < (value) CFU/100 mL

Volume	Count	
blank	0	
0.5	0	$\frac{1}{50}$ x 100 = **<2 CFU/100 mL**
5.0	0	
20	0	
50	0	

- Counts greater than the countable range - too numerous to count (TNTC) or confluent growth (CG) (EPA):

$\frac{\text{Highest upper limit count x 100}}{\text{Smallest volume filtered}}$ = >(value) CFU/ 100 mL

Volume	Count	For Total Coliforms:
blank	0	$\frac{80}{0.5}$ x 100 = **>16,000 CFU/100 mL**
0.5*	TNTC or CG	
5.0	TNTC or CG	For Fecal Coliforms or Enterococci:
20	TNTC or CG	$\frac{60}{0.5}$ x 100 = **>12,000 CFU/100 mL**
50	TNTC or CG	

*NOTE: If the count at the lowest dilution is TNTC, try to estimate the

count on the plate. Estimate the count in a quadrant if necessary. Use this number to calculate the count per 100 mL.

- Confluent Growth Counts (Standard Methods, EPA):

  Disregard all dilution volumes that are confluent growth. Analyze remaining counts and volumes.

Volume	Count
blank	0
0.5	0
5.0	CG
20	CG
50	CG

Volume	Count
blank	0
0.5	3
5.0	20
20	CG
50	CG

$\frac{1}{0.5}$ x 100 = **<200 CFU/100 mL**

$\frac{20}{5.0}$ x 100 = **400 CFU/100 mL**

- Total bacterial count (background bacteria plus indicator bacteria) greater than 200 colonies (Std. Methods.):

  Analyze counts and volumes. Report as a greater than value.

Volume	Count
blank	0
0.5	0 (>200)
5.0	0 (>200)
20	CG
50	CG

Volume	Count
blank	0
0.5	0
5.0	3
20	18 (>200)
50	60 (>200)

$\frac{1}{5}$ x 100 = **>20 CFU/100 mL**

$\frac{60}{50}$ x 100 = **>120 CFU/100 mL**

- Total colonies less than 200, but indicator bacteria greater than upper limit (Std. Methods.):

  If plate has well isolated, discrete colonies that can be easily counted, use the higher count.

Volume	Count
blank	0
0.5	85
5.0	TNTC
20	TNTC
50	TNTC

Volume	Count
blank	0
0.5	2
5.0	95
20	TNTC
50	CG

$$\frac{85}{0.5} \times 100 = \mathbf{17{,}000\ CFU/100\ mL} \qquad \frac{95}{5} \times 100 = \mathbf{1{,}900\ CFU/100\ mL}$$

APPENDIX H
Data Acquisition, Reduction, Validation, and Reporting SOPs

When performing analyses, results are generally tabulated onto laboratory worksheets (see Appendix E, Field and Laboratory Worksheets) but sometimes are generated electronically via instrumentation. Data on laboratory worksheets are entered into the Laboratory Information Management System using an Excel interface. These data are then validated through a quality assurance process that checks for correctness of data entry and validity of results. The analyst who generates the data has the initial and primary responsibility for the completeness and correctness of the data. The data are then checked by the unit supervisor (or designee). The following procedures describe the data acquisition and entry process then the quality assurance and quality control procedures.

Data Acquisition

Both raw and calculated data are acquired in the laboratory by manual, electronic, or direct computer acquisition. Acquired data are properly and securely stored for the duration specified by regulatory agencies or the customer. Guidelines for documentation and recording of information are as follows:

- Manual (Hand-written) Data Entry
    - Data are entered directly into the notebook or worksheet with non-erasable ink.
    - Data entries are signed and dated by the analyst making the entry. If the entry is more than one page, each page is signed and dated.
    - Mistakes are canceled by drawing a line through the entry, entering the correct value, and signing and dating the correction. The use of correction fluid is not acceptable.
    - Blank pages or substantial portions of pages with no entries are marked with a large "X" to indicate that they were intentionally left blank.

- Direct Computer Acquisition
    - In EMD's Microbiology Unit, the program/software used to generate results is prepared internally. A designated staff member of the Information & Control System Division (ICSD) at Hyperion has the responsibility of preparing the program and maintaining the supporting documents.
    - The laboratory relies on vendor-supplied information for the validity and integrity of instruments equipped with significant computer functions as an integral part of the system.

Data Reduction

Data reduction, where applicable, is described in specific SOP's. It involves reporting values with the appropriate significant figures in the concentration units established by the regulatory agency or the data user.

Procedure for Entering Microbiology Data into LIMS

- Log-On to LIMS Computer System
  - To log onto the LIMS system, double-click on the "Data Entry" icon on the PC computer screen.
  - A Microsoft Excel dialog box will appear. Select the "Enable Macros" button.
  - Wait until the "Microbiology Laboratory Worksheet StartDialog" dialog box appears.

- Data Entry for CS
  - Enter the sample date in the dialog box. Please note that current date is filled in by default.
  - Select the sample type. There is a list of sample locations from which to choose. (E.g. 5-Mile, Ballona Creek, Cabrillo Beach, LAH Plume, SMB Plume Day1, Shoreline, Inshore, and so on.)
  - Dilutions for the CS method are not modified for rain events. For this method always make sure the "No" button is selected.
  - Select the "OK" button.
  - A computer form similar to the raw data worksheet will appear. Select the Excel worksheet tab for the type of test data to be entered. (ex. Total, *E. coli*, or Total & *E. coli*)
  - Enter analyst initials, date, and time into the computer in the designated cells.
  - Check to make sure the sample volumes or dilutions in the computer match the volumes or dilutions on the raw data worksheet. In the case of Ballona Creek, make changes to the volumes on the computer form, if necessary.
  - Enter the number of large and small positive wells.
  - Check to make sure all data has been entered correctly. If a calculated value does not appear for a sample, notify a microbiologist or the supervisor.
  - At the top of the computer worksheet, select the "Send Data to LIMS/Wisard" button.
  - Select the "Print" button at the top of the computer worksheet. A printed hardcopy of the raw data worksheet will print out on the printer in the micro lab.
  - Select the "New Worksheet" button at the top of the computer screen if entering data for another sample location. Select the "Save/Exit" button if all the data entry has been done.
  - If there are any problems or error messages regarding sending the data to LIMS, please contact LIMS staff at 55749 or 55120.

- Data Entry for MF
  - Enter the sample date in the dialog box. Please note that current date is filled in by default.
  - Select the sample type. There is a list of sample locations from which to choose. (E.g. 5-Mile, Ballona Creek, Cabrillo Beach, LAH Plume, SMB Plume Day1, Shoreline, Inshore, and so on.)
  - If rain dilutions were used on the data worksheet, select "Yes" in the small "Rain" box. If normal dilutions were used, make sure the "No" button is selected.
  - Select the "OK" button.
  - A computer form similar to the raw data worksheet will appear. Select the Excel worksheet tab for the type of test data to be entered. (ex. Total, Fecal, Entero, or Total & Fecal)
  - Enter analyst initials, date, and time into the computer in the designated cells.
  - Check to make sure the sample volumes or dilutions in the computer match the volumes or dilutions on the raw data worksheet. In the case of Ballona Creek, make changes to the volumes on the computer form, if necessary.
  - Enter the bacterial colony counts.
  - Check to make sure all data has been entered correctly. If a calculated value does not appear for a sample, notify a microbiologist or the supervisor.
  - At the top of the computer worksheet, select the "Send Data to LIMS/Wisard" button.
  - Select the "Print" button at the top of the computer worksheet. A printed hardcopy of the raw data worksheet will print out on the printer in the micro lab.
  - Select the "New Worksheet" button at the top of the computer screen if entering data for another sample location. Select the "Save/Exit" button if all the data entry has been done.
  - If there are any problems or error messages regarding sending the data to LIMS, please contact LIMS staff at 55749 or 55120.

Review and Validation

Review

Data review is the process of comparing results to all available information, such as sample preparation and QC sample data, to evaluate the validity of the results. It supports the contention that the data are:

- Reasonable (experience with similar situations, common sense), and
- Capable of supporting a defensible decision.

The analyst and the unit supervisor (or designee) are responsible for reviewing the data relative to the following:

- Method blanks and QC sample
- Raw data
- Calculations
- Transcription

Validation

Data validation is the systematic procedure of reviewing data against a set of criteria to provide assurance of its validity before reporting the data. It is accomplished through routine examination of data collection, flow procedures, and QC sample results. It uses QC criteria to reject or accept specific data

- Validation includes the following:

  - Dated and signed entries by analysts on the worksheets and logbooks used for all samples.
  - Use of QC criteria to reject or accept specific data.
  - Checking of LIMS data entry and reporting

- Validation Guidelines include the following:

  - Documentation of methods used and QC applied.
  - Maintenance performed on instruments.
  - Documentation of sample preservation, transport, and storage.
  - Review of QC sample data.

Data validation is performed, signed, and dated by the analyst, the unit supervisor (or designee), and where applicable, the laboratory manager.

Reporting

Monthly data summary reports will be submitted to the Regional Board by the last day of each month for data collected during the previous month. Two agencies will submit the monthly reports on behalf of all responsible agencies: EMD on behalf of Jurisdictional Groups 1 through 6, 8, and 9; and LACSD on behalf of Jurisdictional Group 7. LACDHS will submit its data to EMD for compilation and submittal to the Regional Board. Copies of the monthly reports will be distributed to the lead agency of the appropriate jurisdictional group. If requested, the lead agency of each jurisdictional group will distribute the monthly reports to the responsible agencies within their respective jurisdictional group. Electronic data storage (archiving) will be performed by each agency for its own monitoring data.

EMD's Microbiology Unit will generate EMD's monthly routine and accelerated sampling report for the bacterial TMDL compliance. Regulatory limitation calculations will be applied to the data set and exceedances clearly listed. If stations are out-of-compliance, accelerated monitoring will be indicated. The data report prepared for release to the Legal

Reporting Unit are checked and approved by the Micro unit supervisor (or designee) by the 10th of the following month for the previous month's data. The report is again scanned by DSM for missing data and outliers. Any regulatory required summary reports of source identification findings or sanitary surveys will be included. The report is signed by the Division Manager before distribution and may include the following:

- Sample ID used by the laboratory and the client (if available).
- Sample matrix type, description, and method number.
- The chemical/physical/biological parameters analyzed with the reported values and units of measurement.
- Data for all parameters reported with consistent number of significant figures.
- Results of QC samples, if appropriate.
- Footnotes referenced to specific data, if required, to explain reported values.
- If there are regulatory limits applicable to specific analyses, then limits are clearly notated and exceedances listed.
- Discussion on non-compliance data
- Report transmittal letter or memorandum identifying the person sending the report and the person(s) receiving the data.

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APPENDIX I
Quality Assurance/Quality Control

The quality assurance objectives for measurement of data are unique to the particular program for which the data are collected and utilized. They describe the overall uncertainty that the data user is willing to accept in order to make decisions for environmental or other concerns. This uncertainty describes the data quality that is needed, which are usually expressed in terms of precision, bias, representativeness, comparability, and completeness.

The participating laboratories will use approved and recognized test methods, and comply with uncertainty requirements of the method. Quality control samples are measured, uncertainties are assessed, and results must be within the range prescribed by the methods. Internal acceptance criteria are established by analyzing laboratory control samples on a daily basis. The participating laboratories will strive to meet the QA/QC goals described in this section and, therefore, be able to attest to the integrity of the sampling and analytical process.

The following QA/QC procedures will be conducted for shoreline sample collection, laboratory analyses, and data management to ensure the production of reliable and defensible data.

Sample Collection

Only trained laboratory staff will be assigned to collect samples using proper sampling procedures, appropriate sampling equipment, required containers, and proper preservation techniques.

General guidelines for sample collection by laboratory staff are as follows:

- Assure sterility check on sample bottles and avoid contamination.
- Label sample containers with sample date, sample time, sampling point, sample type (grab/composite), preservatives added (if needed), the name of the sampler, and analyses needed.
- Use aseptic technique when collecting samples to prevent contamination (e.g. the inner surfaces or lip edges of the bottle or cap are not to be touched).
- Avoid collecting sample in multiple sweeps and no refilling of the sample bottle.
- Once the sample is collected, immerse at least one-third of the sample bottle in ice.
- Do not exceed maximum allowable transport time (time of sample collection to sample analysis) of 6 hours.
- Once received, log the samples into the laboratory system as soon as possible, assigned a unique login number, and properly stored.
- Sample preparation steps done prior to analysis, such as sample preservation are described in individual test SOP's.

Sample Handling

Chain-of-Custody

The purpose of the chain-of-custody is to establish detailed written and legal documentation of all transactions in which samples are transferred from the custody of one individual to another. The custody procedure is also used whenever samples are submitted to a laboratory within the division or to a contract laboratory. The chain-of-custody begins at the sample collection site and includes couriers or messengers who handle the sample in transit. It follows the sample in the laboratory until its ultimate disposal. It is a form of proof used to establish the authenticity and integrity of the sample, since the results will be used to show compliance with the TMDL requirements, i.e., numeric targets and wasteload allocations.

A Chain-of-Custody (COC) must accompany each sample submitted to a participating laboratory. If a COC has not been filled out prior to delivery of the sample, a form will be provided to the delivery person prior to acceptance of said sample. The COC will be reviewed to make sure that all of the needed information has been supplied. As an example, the Chain-of-Custody Form being used at EMD is attached (Appendix E).

Samples that are collected by EMD's Microbiology Unit staff for bacteriological testing are delivered directly to the microbiology laboratory. A COC sheet is not required since technically there is no sample exchange, i.e., the sample collection staff and the analytical staff are the same.

Sample Holding & Preservation

Samples must meet EPA holding time requirements for each testing parameter. The sample refrigeration and holding time of six hours until analyses are performed are crucial for microbiological testing. Microbiological samples must be handled and stored under contamination free environments.

After the sample is received, the participating laboratory will enter the sample information into the Laboratory Information Management System (LIMS) or comparable database and a unique laboratory registration number will be generated for that sample.

Sample Disposal

After the analyses are completed the sample will be retained as legal evidence or legally disposed of as determined by the microbiological analysis of the sample. Analyzed samples and standards used in analyses are disposed of in accordance with the laboratories written procedures, e.g., EMD's Chemical Hygiene Plan.

Analytical Procedures

Analyses

Analyses performed at EMD laboratories are generally driven by regulatory concerns and plant operations' requirements. There are many different analytical methods applicable to

environmental analyses. EMD's methods are generally based on those specified by EPA, Federal and State regulatory agencies, or professional organizations. As a guide, references for the microbiological procedures are listed below.

"Standard Methods for the Examination of Water and Wastewater," 18th edition, 1992, APHA, AWWA, WPCF, Washington, DC.

"Microbiological Methods for Monitoring the Environment, Water, and Wastes," EPA-600/8-78-017.

Standard Operating Procedures (SOPs)

Routine analyses are defined in Standard Operating Procedures (SOPs), which are detailed descriptions of how to use and what to expect from a method. They contain method-specific QC criteria (i.e., instrument calibration, reagent blank, method blank, calibration standards, etc.), and QC requirements such as duplicate analysis, spike recoveries, holding time, etc. EMD follows a standardized SOP format, its content and application is presented in Appendix H of this document.

Microbiological Analyses

The following methods and target organisms are used in analysis of shoreline samples:

- Membrane Filtration
  - Total coliform
  - Fecal coliform
  - *Enterococcus*

- Chromogenic Substrate
  - Total coliform
  - *E. coli*
  - *Enterococcus*

For the SMB Beaches Bacterial TMDL Monitoring Program, the chromogenic substrate method will be used in the determination of total coliforms/*E. coli*, while either the chromogenic substrate method or membrane filtration will be used for total coliforms, fecal coliforms, and Enterococcus.

The following QA/QC checklist is applicable for the chromogenic substrate and membrane filtration methods.

Chromogenic Substrate

- QC Checks on Idexx Reagent
  - Colilert-18 and Enterolert –sterility check performed with each use; autofluorescence, positive and negative controls; performed on each new lot of reagent

    - Monthly QC verification of at least 10 positive wells/target organism

- Quanti-trays:
    - Leak test performed on each new lot of trays

- DI Water
    - Sterility check performed with each autoclaved batch
    - Heterotrophic plate count performed monthly
    - Amm-N, Org-N, and TOC performed monthly
    - Heavy metals, total and single, performed annually
    - Total chlorine performed with each use

- Equipment and Laboratory Environment:
    - Incubator temperatures checked twice daily (morning and late afternoon)
    - Refrigerator temperatures checked twice daily (morning and late afternoon)
    - Thermometers calibrated semiannually
    - Autoclaves calibrated semiannually; preventative maintenance performed quarterly
    - Air and Rodac testing for laboratory air and surface environments performed monthly.
    - Balances calibrated semiannually; weight check with each use
    - PH meters- calibrated semiannually; standardized with each use
    - Quanti-tray sealers checked and cleaned weekly

- Personnel QA checks
    - Reagents blanks
    - Sample duplicates (done on 10% of the samples per month)
    - Standard sample analysis and comparison count performed monthly

Membrane Filtration

- QC Checks on Media (mEndo, mFC, mE, EIA; phosphate buffered water):
    - mEndo, mFC, mE, EIA: pH, sterility check and positive, and negative controls with each new batch
    - Phosphate buffered water: pH and sterility check with each new batch
    - Monthly QC verification of at least 10 positive colonies/target organism

- Equipment and Laboratory Environment:
    - Incubator temperatures checked twice daily (morning and late afternoon)
    - Refrigerator temperatures checked twice daily (morning and late afternoon)
    - Thermometers calibrated semi-annually
    - Autoclaves calibrated semi-annually; preventative maintenance performed quarterly

- Air and Rodac testing for laboratory air and surface environments performed monthly.
- Balances calibrated semi-annually; weight check with each use
- PH meters- calibrated semi-annually; standardized with each use)
- Residue on glass- performed annually for glassware and Petri dishes

- Personnel QA checks (performed by all technical lab staff)
  - Reagents blanks
  - Sample duplicates (done on 10% of the samples per month)
  - Standard sample analysis and comparison count performed monthly for MF analysis:

System and Performance Audits

An audit is a periodic check to ensure that the laboratory operates according to the policies and procedures described in the Quality Assurance Manual, complies with good laboratory practices, and meets the requirements of regulatory agencies. It may be either a system or a performance audit.

System Audit

A system audit is a review of laboratory operations conducted to verify that the laboratory has the necessary facilities, equipment, staff, and procedures in place to generate acceptable data. It is an on-site inspection of the laboratory's system of operations. It may be an internal or external audit. Internal inspections may be performed by quality assurance personnel. External audits are generally laboratory certification-related activities.

1. Internal

   Periodically, the QA Officer (or designee) audits the laboratories and reports the results to the Division Manager (or laboratory director), laboratory managers, and unit supervisors.

2. External

   State-certified laboratories are site visited every two years by auditors from the Environmental Laboratory Accreditation Program (ELAP) of the California Department of Health Services (CA DOHS). Accreditation is by scientific discipline or field of testing. Non-compliances with good laboratory practices are identified and reported as deficiencies and are subject to corrective action before accreditation is renewed.

Performance Audit

A performance audit is a review to evaluate the laboratory's analytical activities as well as the data produced by analysts. It verifies the ability of the laboratory to correctly identify and quantify compounds in unknown samples submitted by the auditing entity. The purpose of these audits is to determine the laboratory's capability to generate scientifically sound data.

1. Internal

   Periodically, the QA staff submits unknown samples to most of the laboratories. These samples are usually from the inventory of previous Performance Evaluation (PE) samples from EPA. Analysis of these samples is also a corrective action requirement for Discharge Monitoring Report (DMR) and/or Water Pollution (WP) samples evaluated with "unacceptable results." The QA staff may also conduct intra- and inter-comparison studies.

2. External

   All laboratory units, including the Microbiology laboratory, at EMD participate in mandatory QA Performance Evaluation (PE) Study Programs.

   a. Mandatory PE Programs

      * Water Pollution QA Study Program (WP) serves a dual purpose. It satisfies EPA's wastewater testing laboratory requirements and meets one of ELAP's laboratory certification criteria. Test samples are analyzed for parameters listed under each field of testing on our certifications and are specified in the WP Program following certified procedures. A laboratory can participate in a WP Study twice a year.

      * For the Microbiology Performance Evaluation (PE) Study, Drinking Water/Wastewater Enumeration is required for ELAP certification. Like all the other PE programs, the samples are acquired from NIST-approved vendors and analyses are done for certified analytes.

   b. Voluntary PE Program

      The Microbiology Unit also takes part in the interlaboratory calibration studies with EPA. These programs are performance based.

Assessment of Precision and Accuracy

Data quality may be assessed in terms of precision, accuracy, representativeness, completeness, and comparability. The latter three are usually determined outside of the laboratory operations and with limited involvement of laboratory staff. These measures are not included in this section. The internal quality control measures (i.e., precision and accuracy) that are performed in the laboratory to evaluate data quality are described in this section.

Precision

Precision is the agreement among a set of replicate measurements without knowledge of the true value. It is the degree to which a measurement is reproducible. Precision, expressed as Relative Percent Difference (RPD), is determined for each laboratory unit by analyzing replicates of the same sample, a number of duplicate pairs, or matrix-spiked duplicate samples.

Accuracy

Accuracy is a measurement of how close the result is to the true value. Each laboratory unit establishes its accuracy of measurement by analyzing QC check samples (spiked samples, standard reference materials from a reliable source, etc). The results of the QC samples are correlated to documented, certified values. Results of spiked samples are calculated as Percent Recovery. Actual Percent Recovery is compared to established reference data. The degree of closeness of the QC check sample contributes to the general assurance that the accuracy of the data is within acceptable limits.

Corrective Action

Laboratory events and data that fall outside established quality acceptance criteria may require investigation or corrective action. The corrective action implemented depends on the type of analysis, the extent of the error, and whether the error can be determined and corrected. The purpose of the corrective action is to resolve the problem and to restore the system to proper operation. Investigative steps and corrective actions implemented are documented.

Corrective Action Procedures

1. The initial corrective action procedures may be handled at the bench level. The unit supervisor is immediately notified of the deviation. The analyst reviews the sample preparation for possible errors and checks the instrument calibration, calibration and spike solutions, instrument sensitivity, etc.

2. If the error cannot be resolved by the analyst, the unit supervisor has the responsibility of resolving the problem with assistance, if needed, from the laboratory manager and/or the QA Officer.

3. The corrective action adopted may be determined by the analyst, the unit supervisor, the laboratory manager, the QA Officer, or through a consensus. If needed, the final decision for corrective action rests with the laboratory manager after consultation with the QA Officer.

4. The unit supervisor shall maintain an accurate and up-to-date record of corrective actions taken in the unit. A corrective action report form (included herein as an attachment) is available for use.

5. The laboratory manager shall periodically review corrective action records and plan for system improvement by involving analysts, unit supervisors, and QA personnel.

General Guidelines for Initiating a Corrective Action

1. Identify/define the problem.

2. Assign responsibility for investigating the problem.

3. Investigate and determine the causes.

4. Develop corrective action to eliminate the problem.

5. Measure the effectiveness of the corrective action.

6. Analyst, unit supervisor, laboratory manager, and the QA Officer meet to review and evaluate the process, if necessary.

7. Document the process by filling out the Corrective Action Report Form.

APPENDIX J
City of Los Angeles Environmental Monitoring Division's Data Archival Format

Data format. List of fields, type of data, whether it is required, and description of data format to be used for submission for archival by EMD.

Field Name	Type	Required	Description
Agency	Text	Y	A unique code used by the submitting agency (luAgency)
Account	Text	Y	Place-holder code to contain "TMDL."
Program	Text	Y	Place-holder code to contain "SMBBB TMDL."
StationID	Text	Y	The station name from the list of stations provided in lookup list (luStations).
AgencySampleID	Text	N	The laboratory internal sample identifier
SampleDate	Date/Time	Y	The date the sample was analyzed (must be the same date as when the sample was taken) expressed as dd-mmm-yyyy
SampleTime	Number	Y	The time the sample was collected expressed as hh:mm
SamplerID	Text	Y	Name of person collecting sample
AnalysisDate	Date/Time	Y	The date the sample was analyzed (must be the same date as when the sample was taken) expressed as dd-mmm-yyyy
AnalysisTime	Number	Y	The time the testing was started expressed as hh:mm
AnalystID	Text	Y	Name of person analyzing sample
ParameterCode	Text	Y	What type of bacteria are being tested
Qualifier	Text	N	Qualifier for the result
Result	Number	Y	The numerical results of the test
ResultUnits	Text	Y	The units for the results
TextValue	Text	Y	Explanation for sample not analyzed, default None, luAnalyticalFailure
Dilution	Number	Y	The dilution factor associated with the result.
LabRep	Text	Y	The count of the lab replicate.
AnalysisMethod	Text	Y	The Method used to do the analysis
Comments	Text	N	Additional comments

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APPENDIX K
Santa Monica Bay Beaches Bacteria TMDLs

State of California
California Regional Water Quality Control Board, Los Angeles Region

RESOLUTION NO. 02-004
January 24, 2002

Amendment to the Water Quality Control Plan (Basin Plan) for the Los Angeles Region to Incorporate a Dry Weather Total Maximum Daily Load for Bacteria at Santa Monica Bay Beaches

WHEREAS, the California Regional Water Quality Control Board, Los Angeles Region, finds that:

1. The federal Clean Water Act (CWA) requires the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) to develop water quality objectives which are sufficient to protect beneficial uses for each water body found within its region.

2. A consent decree between the U.S. Environmental Protection Agency (USEPA), Heal the Bay, Inc. and BayKeeper, Inc. was approved on March 22, 1999. This court order directs the USEPA to complete Total Maximum Daily Loads (TMDLs) for all the Los Angeles Region's impaired waters within 13 years. A schedule was established in the consent decree for the completion of 29 TMDLs within 7 years, including completion of a TMDL to reduce bacteria at Santa Monica Bay beaches by March 2002. The remaining TMDLs will be scheduled by Regional Board staff within the 13-year period.

3. The elements of a TMDL are described in 40 CFR 130.2 and 130.7 and section 303(d) of the CWA, as well as in USEPA guidance documents (e.g., USEPA, 1991). A TMDL is defined as "the sum of the individual waste load allocations for point sources and load allocations for nonpoint sources and natural background" (40 CFR 130.2). Regulations further stipulate that TMDLs must be set at "levels necessary to attain and maintain the applicable narrative and numeric water quality standards with seasonal variations and a margin of safety that takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality" (40 CFR 130.7(c)(1)). The provisions in 40 CFR 130.7 also state that TMDLs shall take into account critical conditions for stream flow, loading and water quality parameters.

4. Upon establishment of TMDLs by the State or USEPA, the State is required to incorporate the TMDLs along with appropriate implementation measures into the State Water Quality Management Plan (40 CFR 130.6(c)(1), 130.7). The Water Quality Control Plan for the Los Angeles Region (Basin Plan), and applicable statewide plans, serve as the State Water Quality Management Plans governing the watersheds under the jurisdiction of the Regional Board.

5. Santa Monica Bay is located in Los Angeles County, California. The proposed TMDL addresses documented bacteriological water quality impairments at 44 beaches from the Los Angeles/Ventura County line, to the northwest, to Outer Cabrillo Beach, just south of the Palos Verdes Peninsula.

6. The Regional Board's goal in establishing the above-mentioned TMDL is to reduce the risk of illness associated with swimming in marine waters contaminated with human sewage and

other sources of bacteria. Local and national epidemiological studies compel the conclusion that there is a causal relationship between adverse health effects, such as gastroenteritis, and recreational water quality, as measured by bacteria indicator densities.

7. Interested persons and the public have had reasonable opportunity to participate in review of the amendment to the Basin Plan. Efforts to solicit public review and comment include staff presentations to the Santa Monica Bay Restoration Project's Bay Watershed Council and Technical Advisory Committee between May 1999 and October 2001 and creation of a Steering Committee in July 1999 to provide input on scientific and technical components of the TMDL with participation by the Southern California Coastal Water Research Project, City of Los Angeles, County of Los Angeles Department of Public Works, County Sanitation Districts of Los Angeles County, Heal the Bay, and Santa Monica Bay Restoration Project. In addition, a draft of the TMDL for bacteria at Santa Monica Bay beaches was released for public comment on November 9, 2001; a Notice of Hearing and Notice of Filing were published and circulated 45 days preceding Board action; Regional Board staff responded to oral and written comments received from the public; and the Regional Board held a public hearing on January 24, 2002 to consider adoption of the TMDL.

8. On October 25, 2001, the Regional Board adopted Resolution 2001-018 establishing revised bacteriological water quality objectives for the Water Contact Recreation (REC-1) beneficial use, and the TMDL is intended to accompany and to implement the revised water quality objectives. While the Regional Board has approved the water quality objective change, the change is not yet effective because the State Water Resources Control Board, the Office of Administrative Law, and the USEPA have not yet approved the revised water quality objective.

9. The amendment is consistent with the State Antidegradation Policy (State Board Resolution No. 68-16), in that the changes to water quality objectives (i) consider maximum benefits to the people of the state, (ii) will not unreasonably affect present and anticipated beneficial use of waters, and (iii) will not result in water quality less than that prescribed in policies. Likewise, the amendment is consistent with the federal Antidegradation Policy (40 CFR 131.12).

10. The basin planning process has been certified as functionally equivalent to the California Environmental Quality Act requirements for preparing environmental documents (Public Resources Code, Section 21000 et seq.) and as such, the required environmental documentation and CEQA environmental checklist have been prepared.

11. The proposed amendment results in no potential for adverse effect (de minimis finding), either individually or cumulatively, on wildlife.

12. The regulatory action meets the "Necessity" standard of the Administrative Procedures Act, Government Code, section 11353, subdivision (b).

13. The Basin Plan amendment incorporating a TMDL for bacteria at Santa Monica Bay beaches must be submitted for review and approval by the State Water Resources Control Board (State Board), the State Office of Administrative Law (OAL), and the USEPA. The Basin Plan amendment will become effective upon approval by OAL and USEPA. A Notice of Decision will be filed.

THEREFORE, be it resolved that pursuant to Section 13240 and 13242 of the Water Code, the Regional Board hereby amends the Basin Plan as follows:

1. Pursuant to sections 13240 and 13242 of the California Water Code, the Regional Board, after considering the entire record, including oral testimony at the hearing, hereby adopts the amendment to Chapter 7 the Water Quality Control Plan for the Los Angeles Region to incorporate the elements of the Santa Monica Bay Beaches Bacteria TMDL for dry weather as set forth in Attachment A hereto.

2. The Executive Officer is directed to forward copies of the Basin Plan amendment to the State Board in accordance with the requirements of section 13245 of the California Water Code.

3. The Regional Board requests that the State Board approve the Basin Plan amendment in accordance with the requirements of sections 13245 and 13246 of the California Water Code and forward it to OAL and the USEPA.

4. The Basin Plan amendment set forth in Attachment A shall only become effective if the water quality objectives revised by Regional Board Resolution 2001-018, or equivalent water quality objectives, have been approved by the State Board, OAL, and USEPA, and are consistent with the TMDL.

5. If during its approval process the State 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 Board of any such changes.

6. The Executive Officer is authorized to sign a Certificate of Fee Exemption.

I, Dennis A. Dickerson, 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, Los Angeles Region, on January 24, 2002.

Original Signed By (01/24/2002)

_____
Dennis A. Dickerson
Executive Officer

Attachment A to Resolution No. 02-004

Proposed Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate the Santa Monica Bay Beaches Bacteria TMDL

Proposed for adoption by the California Regional Water Quality Control Board, Los Angeles Region on January 24, 2002.

Amendments:

Table of Contents
Add:

Chapter 7. Total Maximum Daily Loads (TMDLs) Summaries
7-4 Santa Monica Bay Beaches Bacteria TMDL*

List of Figures, Tables and Inserts
Add:

Chapter 7. Total Maximum Daily Loads (TMDLs)
Tables
7-4 Santa Monica Bay Beaches Bacteria TMDL
7-4.1. Santa Monica Bay Beaches Bacteria TMDL (Dry Weather Only): Elements
7-4.2a. Santa Monica Bay Beaches Bacteria TMDL (Dry Weather Only): Implementation Schedule
7-4.2b. Santa Monica Bay Beaches Bacteria TMDL (Dry Weather Only): Implementation Schedule
7-4.3. Santa Monica Bay Beaches Bacteria TMDL (Dry Weather Only): Significant Dates

Chapter 7. Total Maximum Daily Loads (TMDLs) Summaries
Santa Monica Bay Beaches Bacteria TMDL (Dry Weather Only)*

This TMDL was adopted by:

The Regional Water Quality Control Board on January 24, 2002.
The State Water Resources Control Board on [Insert Date].
The Office of Administrative Law on [Insert Date].
The U.S. Environmental Protection Agency on [Insert Date].

The following table summarizes the key elements of this TMDL.

Table 7-4.1. Santa Monica Bay Beaches Bacteria TMDL (Dry Weather Only): Elements

Element	Key Findings and Regulatory Provisions
Problem Statement	Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use at many Santa Monica Bay (SMB) beaches. Swimming in waters with elevated bacterial indicator densities has long been associated with adverse health effects. Specifically, local and national epidemiological studies compel the conclusion that there is a causal relationship between adverse health effects and recreational water quality, as measured by bacterial indicator densities.
Numeric Target *(Interpretation of the numeric water quality objective, used to calculate the waste load allocations)*	The TMDL has a multi-part numeric target based on the bacteriological water quality objectives for marine water to protect the water contact recreation use. These targets are the most appropriate indicators of public health risk in recreational waters. These bacteriological objectives are set forth in Chapter 3 of the Basin Plan, as amended by the Regional Board on October 25, 2001. The objectives are based on four bacterial indicators and include both geometric mean limits and single sample limits. The Basin Plan objectives are as follows: 1. <u>Rolling 30-day Geometric Mean Limits</u> a. Total coliform density shall not exceed 1,000/100 ml. b. Fecal coliform density shall not exceed 200/100 ml. c. Enterococcus density shall not exceed 35/100 ml. 2. <u>Single Sample Limits</u> a. Total coliform density shall not exceed 10,000/100 ml. b. Fecal coliform density shall not exceed 400/100 ml. c. Enterococcus density shall not exceed 104/100 ml. d. Total coliform density shall not exceed 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1. The targets apply throughout the year. The compliance point for the targets is the wave wash[1], where there is a freshwater outlet (i.e., storm drain or creek) to the beach, or at ankle depth at beaches without a freshwater outlet. The geometric mean targets may not be exceeded at any time. For the single sample targets, each existing shoreline monitoring site is assigned an allowable number of exceedance days for two time periods (summer dry weather and winter dry weather as defined in Table 7-4.2a). (A separate amendment will address the allowable number of wet weather exceedance days.) The allowable number of exceedance days is set such that (1) bacteriological water quality at any site is at least as good as at a designated reference site within the watershed and (2) there is no degradation of existing shoreline bacteriological water quality.
Source Analysis	With the exception of isolated sewage spills, dry weather urban runoff conveyed by storm drains and creeks is the primary source of elevated bacterial indicator densities to SMB beaches during dry weather. Limited natural runoff and groundwater may also potentially contribute to elevated bacterial indicator densities during winter dry weather. This

[1] The wave wash is defined as the point at which the storm drain or creek empties and the effluent from the storm drain initially mixes with the receiving ocean water.

	is supported by the finding that historical monitoring data from the reference beach indicate no exceedances of the single sample targets during summer dry weather and on average only three percent exceedance during winter dry weather.

Loading Capacity	Studies show that bacterial degradation and dilution during transport from the watershed to the beach do not significantly affect bacterial indicator densities at SMB beaches. Therefore, the loading capacity is defined in terms of bacterial indicator densities, which is the most appropriate for addressing public health risk, and is equivalent to the numeric targets, listed above.
Waste Load Allocations	Waste load allocations are expressed as the number of sample days at a shoreline monitoring site that may exceed the single sample targets identified under "Numeric Target." Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection. For each shoreline monitoring site and corresponding subwatershed, the allowable number of exceedance days is set for two time periods. These two periods are: 1. summer dry weather (April 1 to October 31), and 2. winter dry weather (November 1 to March 31). The allowable number of exceedance days for a shoreline monitoring site for each time period is based on the lesser of two criteria (1) exceedance days in the designated reference system and (2) exceedance days based on historical bacteriological data at the monitoring site. This ensures that shoreline bacteriological water quality is at least as good as that of a largely undeveloped system and that there is no degradation of existing shoreline bacteriological water quality.[2] All responsible jurisdictions and responsible agencies[3] within a subwatershed are jointly responsible for complying with the allowable number of exceedance days for each associated shoreline monitoring site identified in Table 7-4.2a below. The three Publicly Owned Treatment Works (POTWs)[4] discharging to Santa Monica Bay are each given individual WLAs of zero (0) days of exceedance during both summer dry weather and winter dry weather.
Implementation	This TMDL will be implemented in two phases over a 6-year period. The regulatory mechanisms used to implement the TMDL will include primarily the Los Angeles County Municipal Storm Water NPDES Permit, the Caltrans Storm Water Permit, the three NPDES permits for the POTWs, and the authority vested in the Executive Officer via 13267 of the Porter-Cologne Water Quality Control Act. Within 3 years of the effective date of the TMDL, summer dry-weather allowable exceedance days and the rolling 30-day geometric mean

[2] In order to fully protect public health, no exceedances are permitted at any shoreline monitoring location during summer dry weather (April 1 to October 31). In addition to being consistent with the two criteria, waste load allocations of zero (0) exceedance days are further supported by the fact that the California Department of Health Services has established minimum protective bacteriological standards – the same as the numeric targets in this TMDL – which, when exceeded during the period April 1 to October 31, result in posting a beach with a health hazard warning (California Code of Regulations, title 17, section 7958).

[3] For the purposes of this TMDL, "responsible jurisdictions and responsible agencies" includes: (1) local agencies that are responsible for discharges from a publicly owned treatment works to the Santa Monica Bay watershed or directly to the Bay, (2) local agencies that are permittees or co-permittees on a municipal storm water permit, (3) local or state agencies that have jurisdiction over a beach adjacent to Santa Monica Bay, and (4) the California Department of Transportation pursuant to its storm water permit.

[4] Hyperion Wastewater Treatment Plant, Joint Water Pollution Control Plant, and Tapia Wastewater Reclamation Facility.

	targets must be achieved. Within 6 years of the effective date, winter dry-weather allowable exceedance days and the rolling 30-day geometric mean targets must be achieved.
Margin of Safety	WLAs of zero days of exceedance during the summer include an implicit margin of safety. The WLAs of a maximum of three days of exceedance during winter dry weather include an implicit margin of safety because the maximum allowable days of exceedance are based on samples collected 50 yards downcurrent of the freshwater outlet at the reference beach. Findings from a bacterial dispersion study of selected freshwater outlets show that there is typically significant dilution between the freshwater outlet, the wave wash (the compliance point), and a point 50 yards downcurrent.
Seasonal Variations and Critical Conditions	Seasonal variations are addressed by developing separate waste load allocations for two time periods (summer dry weather and winter dry weather) based on public health concerns and observed natural background levels of exceedance of bacterial indicators. The critical period for this dry weather bacteria TMDL is during winter months, when historic shoreline monitoring data for the reference beach indicate that the single sample bacteria objectives are exceeded on average 3% of the dry weather days sampled.

Note: The complete staff report for the TMDL is available for review upon request.

Table 7-4.3. Santa Monica Bay Beaches Bacteria TMDL (Dry Weather Only): Significant Dates

Date	Action
120 days after the effective date of the TMDL	Responsible jurisdictions and responsible agencies must submit coordinated shoreline monitoring plan(s), including a list of new sites or sites relocated to the wave wash at which time responsible jurisdictions and responsible agencies will select between daily and weekly shoreline sampling.
120 days after the effective date of the TMDL	Responsible jurisdictions and responsible agencies must identify and provide documentation on 342 potential discharges to Santa Monica Bay beaches listed in Appendix C of the TMDL Staff Report dated January 11, 2002. Documentation must include a Report of Waste Discharge (ROWD) where necessary. Responsible jurisdictions and responsible agencies must identify and provide documentation on potential discharges to the Area of Special Biological Significance (ASBS) in northern Santa Monica Bay from Latigo Point to the County line. Cessation of the discharges into the ASBS shall be required in conformance with the California Ocean Plan.
2 years after effective date of TMDL	Re-open TMDL to re-evaluate allowable winter dry weather exceedance days based on additional data on bacterial indicator densities in the wave wash, a re-evaluation of the reference system selected to set allowable exceedance levels, and a re-evaluation of the reference year used in the calculation of allowable exceedance days.
3 years after effective date of the TMDL	Achieve compliance with allowable exceedance days as set forth in Table 7-4.2a and rolling 30-day geometric mean targets during summer dry weather (April 1 to October 31).
6 years after effective date of the TMDL	Achieve compliance with allowable exceedance days as set forth in Table 7-4.2a and rolling 30-day geometric mean targets during winter dry weather (November 1 to March 31).

Table 7-4.2a: Santa Monica Bay Beaches Bacteria TMDL Implementation Schedule (Dry Weather Only): Allowable Number of Days that May Exceed Any Single Sample Bacterial Indicator Target for Existing Shoreline Monitoring Stations

Compliance Deadline			3 years after effective date		6 years after effective date	
			Summer Dry Weather^ Apr. 1-Oct. 31		Winter Dry Weather^* Nov. 1-Mar. 31	
Station ID	Location Name	Subwatershed	Daily sampling (No. days)	Weekly sampling (No. days)	Daily sampling (No. days)	Weekly sampling (No. days)
City of Los Angeles, Environmental Monitoring Division Sites						
S1	Surfrider Beach (breach point) - daily	Malibu Canyon	0	0	3	1
S2	Topanga State Beach	Topanga Canyon	0	0	3	1
S3	Pulga Canyon storm drain - 50 yards east (Will Rogers)	Pulga Canyon	0	0	3	1
S4	Santa Monica Canyon, Will Rogers State Beach	Santa Monica Canyon	0	0	3	1
S5	Santa Monica Municipal Pier - 50 yards southeast	Santa Monica	0	0	3	1
S6	Santa Monica Beach at Pico/Kenter storm drain	Santa Monica	0	0	3	1
S7	Ashland Av. storm drain - 50 yards south (Venice)	Santa Monica	0	0	3	1
S8	Venice City Beach at Windward Av. - 50 yards north	Ballona	0	0	2	1
S10	Ballona Creek entrance - 50 yards south (Dockweiler)	Dockweiler	0	0	3	1
S11	Dockweiler State Beach at Culver Bl.	Dockweiler	0	0	3	1
S12	Imperial Highway storm drain - 50 yards north (Dockweiler)	Dockweiler	0	0	2	1
S13	Manhattan State Beach at 40th Street	Hermosa	0	0	1	1
S14	Manhattan Beach Pier - 50 yards south	Hermosa	0	0	1	1
S15	Hermosa Beach Pier - 50 yards south	Hermosa	0	0	2	1
S16	Redondo Municipal Pier - 50 yards south	Redondo	0	0	3	1
S17	Redondo State Beach at Avenue I	Redondo	0	0	3	1
S18	Malaga Cove, Palos Verdes Estates - daily	Palos Verdes	0	0	1	1
Los Angeles County Department of Health Services Sites						
DHS (010)	**Leo Carillo Beach (REFERENCE BEACH)**	**Arroyo Sequit Canyon**	**0**	**0**	**3**	**1**
DHS (009)	Nicholas Beach	Nicholas Canyon	0	0	0	0
DHS (010a)	Broad Beach	Trancas Canyon	0	0	3	1
DHS (008)	Trancas Beach entrance	Trancas Canyon	0	0	0	0
DHS (007)	Westward Beach, SE end	Zuma Canyon	0	0	0	0
DHS (006)	Paradise Cove	Ramirez Canyon	0	0	3	1
DHS (005)	26610 Latigo Shore Drive	Latigo Canyon	0	0	3	1
DHS (005a)	Corral Beach	Latigo Canyon	0	0	3	1
DHS (004)	Puerco Beach	Corral Canyon	0	0	3	1
DHS (003)	Malibu Point, Malibu Colony Dr.	Malibu Canyon	0	0	3	1
DHS (003a)	Surfrider Beach, Malibu, 50 yds.	Malibu Canyon	0	0	3	1
DHS (002)	Malibu Pier	Malibu Canyon	0	0	3	1
DHS (001a)	Las Flores Beach	Las Flores Canyon	0	0	3	1
DHS (001)	Big Rock Beach	Piedra Gorda Canyon	0	0	3	1
DHS (101)	17200 Pacific Coast Hwy.	Santa Ynez Canyon	0	0	3	1
DHS (102)	Bel Air Bay Club, 16801 Pacific	Santa Ynez Canyon	0	0	3	1
DHS (103)	Temescal Storm Drain	Pulga Canyon	0	0	3	1
DHS (104a)	San Vicente Blvd. extended	Santa Monica	0	0	3	1
DHS (104)	Montana Ave. Storm Drain	Santa Monica	0	0	3	1
DHS (105)	Wilshire Blvd., Santa Monica	Santa Monica	0	0	3	1
DHS (106)	Strand Street extended	Santa Monica	0	0	3	1
DHS (106a)	Ashland Storm Drain	Santa Monica	0	0	3	1
DHS (107)	Venice City Beach at Brooks Av.	Ballona	0	0	3	1
DHS (108)	Venice Pier, Venice	Ballona	0	0	3	1
DHS (109)	Topsail Street extended	Ballona	0	0	3	1
DHS (110)	World Way extended	Dockweiler	0	0	3	1
DHS (111)	Opposite Hyperion Plant, 1 mile	Dockweiler	0	0	3	1
DHS (112)	Grand Avenue extended	Dockweiler	0	0	3	1
DHS (113)	26th Street extended	Hermosa	0	0	0	0
DHS (114)	Herondo Street extended	Hermosa	0	0	3	1
DHS (115)	Topaz Street extended	Redondo	0	0	3	1
County Sanitation Districts of Los Angeles County Sites						
LACSD1	Long Point	Palos Verdes	0	0	1	1
LACSD2	Abalone Cove	Palos Verdes	0	0	0	0
LACSD3	Portuguese Bend Cove	Palos Verdes	0	0	1	1
LACSD5	Royal Palms	Palos Verdes	0	0	1	1
LACSD6	Wilder Annex	Palos Verdes	0	0	1	1
LACSD7	Cabrillo Beach, oceanside	Palos Verdes	0	0	1	1
LACSDMC	Malaga Cove	Palos Verdes	0	0	1	1
LACSDBC	Bluff Cove	Palos Verdes	0	0	1	1

Notes: The allowable number of exceedance days during winter dry weather is calculated based on the 10th percentile year in terms of non-rain days at the LAX meteorological station.
The number of allowable exceedances during winter dry weather is based on the lesser of (1) the reference system or (2) existing levels of exceedance based on historical shoreline data.
^Dry weather days are defined as those with <0.1 inch of rain and those days not less than 3 days after a rain day. Rain days are defined as those with >=0.1 inch of rain.
* A re-opener is scheduled for two years after the effective date of the TMDL in order to re-evaluate the allowable exceedance days during winter dry weather based on additional monitoring data.

Table 7-4.2b. Santa Monica Bay Beaches Bacteria TMDL Implementation Schedule (Dry Weather):
Required Reduction in Number of Days Exceeding Single Sample Bacterial Indicator Targets for Existing Shoreline Monitoring Stations

Compliance Deadline		3 years after effective date	6 years after effective date
Location Name	Subwatershed	Summer Dry Weather (Apr. 1-Oct. 31)	Winter Dry Weather (Nov. 1-Mar. 31)*
City of Los Angeles, Environmental Monitoring Division Sites			
Surfrider Beach (breach point) - daily	Malibu Canyon	48	31
Topanga State Beach	Topanga Canyon	10	8
Pulga Canyon storm drain - 50 yards east (Will Rogers)	Pulga Canyon	4	6
Santa Monica Canyon, Will Rogers State Beach	Santa Monica Canyon	36	7
Santa Monica Municipal Pier - 50 yards southeast (Santa Monica)	Santa Monica	54	22
Santa Monica Beach at Pico/Kenter storm drain (Santa Monica)	Santa Monica	15	20
Ashland Av. storm drain - 50 yards south (Venice)	Santa Monica	16	6
Venice City Beach at Windward Av. - 50 yards north	Ballona	3	0
Ballona Creek entrance - 50 yards south (Dockweiler)	Dockweiler	7	3
Dockweiler State Beach at Culver Bl.	Dockweiler	6	1
Imperial Highway storm drain - 50 yards north (Dockweiler)	Dockweiler	7	0
Manhattan State Beach at 40th Street	Hermosa	1	0
Manhattan Beach Pier - 50 yards south	Hermosa	1	0
Hermosa Beach Pier - 50 yards south	Hermosa	2	0
Redondo Municipal Pier - 50 yards south	Redondo	16	9
Redondo State Beach at Avenue I	Redondo	2	0
Malaga Cove, Palos Verdes Estates - daily	Palos Verdes	1	0
Los Angeles County Department of Health Services Sites			
Leo Carillo Beach (REFERENCE BEACH)	**Arroyo Sequit Canyon**	**0**	**0**
Nicholas Beach	Nicholas Canyon	7	0
Broad Beach	Trancas Canyon	3	3
Trancas Beach entrance	Trancas Canyon	5	0
Westward Beach, SE end	Zuma Canyon	8	0
Paradise Cove	Ramirez Canyon	16	9
26610 Latigo Shore Drive	Latigo Canyon	11	13
Corral Beach	Latigo Canyon	3	5
Puerco Beach	Corral Canyon	0	7
Malibu Point, Malibu Colony Dr.	Malibu Canyon	23	6
Surfrider Beach, Malibu, 50 yds.	Malibu Canyon	58	25
Malibu Pier	Malibu Canyon	42	14
Las Flores Beach	Las Flores Canyon	18	7
Big Rock Beach	Piedra Gorda Canyon	32	20
17200 Pacific Coast Hwy.	Santa Ynez Canyon	3	9
Bel Air Bay Club, 16801 Pacific	Santa Ynez Canyon	14	5
Temescal Storm Drain	Pulga Canyon	17	0
San Vicente Blvd. extended	Santa Monica	7	0
Montana Ave. Storm Drain	Santa Monica	7	0
Wilshire Blvd., Santa Monica	Santa Monica	15	4
Strand Street extended	Santa Monica	8	6
Ashland Storm Drain	Santa Monica	24	2
Venice City Beach at Brooks Av.	Ballona	3	10
Venice Pier, Venice	Ballona	4	0
Topsail Street extended	Ballona	11	0
World Way extended	Dockweiler	5	1
Opposite Hyperion Plant, 1 mile	Dockweiler	3	4
Grand Avenue extended	Dockweiler	8	5
26th Street extended	Hermosa	5	0
Herondo Street extended	Hermosa	5	1
Topaz Street extended	Redondo	8	12
County Sanitation Districts of Los Angeles County Sites			
Long Point	Palos Verdes	1	0
Abalone Cove	Palos Verdes	1	0
Portuguese Bend Cove	Palos Verdes	1	0
Royal Palms	Palos Verdes	1	0
Wilder Annex	Palos Verdes	1	0
Cabrillo Beach, oceanside	Palos Verdes	1	0
Malaga Cove	Palos Verdes	2	0
Bluff Cove	Palos Verdes	0	0

* A re-opener is scheduled for two years after the effective date of the TMDL in order to re-evaluate the allowable exceedance days and necessary reductions during winter dry weather based on additional monitoring data.

** Required reductions are based on the assumption of daily sampling.

State of California
California Regional Water Quality Control Board, Los Angeles Region

RESOLUTION NO. 2002-022
December 12, 2002

Amendment to the Water Quality Control Plan (Basin Plan) for the Los Angeles Region to Incorporate Implementation Provisions for the Region's Bacteria Objectives and to Incorporate a Wet-Weather Total Maximum Daily Load for Bacteria at Santa Monica Bay Beaches

WHEREAS, the California Regional Water Quality Control Board, Los Angeles Region, finds that:

1. The federal Clean Water Act (CWA) requires the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) to develop water quality standards which include beneficial use designations and criteria to protect beneficial uses for each water body found within its region.

2. The Regional Board carries out its CWA responsibilities through California's Porter-Cologne Water Quality Control Act and establishes water quality objectives designed to protect beneficial uses contained in the Water Quality Control Plan for the Los Angeles Region (Basin Plan).

3. Section 303(d) of the CWA requires states to identify and to prepare a list of water bodies that do not meet water quality standards and then to establish load and waste load allocations, or a total maximum daily load (TMDL), for each water body that will ensure attainment of water quality standards and then to incorporate those allocations into their water quality control plans.

4. Many of the beaches along Santa Monica Bay were listed on California's 1998 section 303(d) list, due to impairments for coliform or for beach closures associated with bacteria generally. The beaches appeared on the 303(d) list because the elevated bacteria and beach closures prevented full support of the beaches' designated use for water contact recreation (REC-1).

5. A consent decree between the U.S. Environmental Protection Agency (USEPA), Heal the Bay, Inc. and BayKeeper, Inc. was approved on March 22, 1999. This court order directs the USEPA to complete TMDLs for all the Los Angeles Region's impaired waters within 13 years. A schedule was established in the consent decree for the completion of 29 TMDLs within 7 years, including completion of a TMDL to reduce bacteria at Santa Monica Bay beaches by March 2002. The remaining TMDLs will be scheduled by Regional Board staff within the 13-year period.

6. The elements of a TMDL are described in 40 CFR 130.2 and 130.7 and section 303(d) of the CWA, as well as in USEPA guidance documents (e.g., USEPA, 1991). A TMDL is defined as "the sum of the individual waste load allocations for point sources and load allocations for nonpoint sources and natural background" (40 CFR 130.2). Regulations further stipulate that TMDLs must be set at "levels necessary to attain and maintain the applicable narrative and numeric water quality standards with seasonal variations and a margin of safety that takes into account any lack of knowledge concerning the relationship between effluent limitations

and water quality" (40 CFR 130.7(c)(1)). The provisions in 40 CFR 130.7 also state that TMDLs shall take into account critical conditions for stream flow, loading and water quality parameters.

7. Upon establishment of TMDLs by the State or USEPA, the State is required to incorporate the TMDLs along with appropriate implementation measures into the State Water Quality Management Plan (40 CFR 130.6(c)(1), 130.7). The Basin Plan and applicable statewide plans serve as the State Water Quality Management Plans governing the watersheds under the jurisdiction of the Regional Board.

8. Santa Monica Bay is located in Los Angeles County, California. The proposed TMDL addresses documented bacteriological water quality impairments at 44 beaches from the Los Angeles/Ventura County line, to the northwest, to Outer Cabrillo Beach, just south of the Palos Verdes Peninsula.

9. The Regional Board is establishing the above-mentioned TMDL to preserve and enhance the water quality at Santa Monica Bay beaches and for the benefit of the 55 million beachgoers, on average, that visit these beaches each year. At stake is the health of swimmers and surfers and associated health costs as well as sizeable revenues to the local and state economy. Estimates are that visitors to Santa Monica Bay beaches spend approximately $1.7 billion annually.

10. The Regional Board's goal in establishing the above-mentioned TMDL is to reduce the risk of illness associated with swimming in marine waters contaminated with bacteria. Local and national epidemiological studies compel the conclusion that there is a causal relationship between adverse health effects, such as gastroenteritis and upper respiratory illness, and recreational water quality, as measured by bacteria indicator densities. The water quality objectives on which the TMDL numeric targets are based will ensure that the risk of illness to the public from swimming at Santa Monica Bay beaches generally will be no greater than 19 illnesses per 1,000 swimmers, which is defined by the US EPA as an "acceptable health risk"in marine recreational waters.

11. Interested persons and the public have had reasonable opportunity to participate in review of the amendment to the Basin Plan. Efforts to solicit public review and comment include staff presentations to the Santa Monica Bay Restoration Project's Bay Watershed Council and Technical Advisory Committee between May 1999 and October 2001 and creation of a Steering Committee in July 1999 to provide input on scientific and technical components of the TMDL with participation by the Southern California Coastal Water Research Project, City of Los Angeles, County of Los Angeles Department of Public Works, County Sanitation Districts of Los Angeles County, Heal the Bay, and Santa Monica Bay Restoration Project.

12. A first draft of the TMDL for bacteria at Santa Monica Bay beaches was released for public comment on November 9, 2001; an interim draft TMDL covering wet weather only was released on June 21, 2002, for discussion at a public workshop; and a public workshop on the draft Wet-Weather TMDL was held on June 27, 2002 at a regularly scheduled Regional Board meeting.

13. A final draft of the Wet-Weather TMDL along with a Notice of Hearing and Notice of Filing were published and circulated 45 days preceding Board action; Regional Board staff responded to oral and written comments received from the public; and the Regional Board

held a public hearing on September 26, 2002 to consider adoption of the Wet-Weather TMDL.

14. The Regional Board continued the item from the September 26, 2002 Board meeting to the December 12, 2002 Board meeting to give staff time to make revisions based on public comments and Board discussion at the September 26, 2002 Board meeting. Specifically, the Board wanted an implementation program that was reasonable and as short as practicable given the testimony on impairments to the REC-1 beneficial use.

15. The Regional Board recognizes that there are two broad approaches to implementing the TMDL. One approach is an integrated water resources approach that takes a holistic view of regional water resources management by integrating planning for future wastewater, storm water, recycled water, and potable water needs and systems; focuses on beneficial re-use of storm water, including groundwater infiltration, at multiple points throughout a watershed; and addresses multiple pollutants for which Santa Monica Bay or its watershed are listed on the CWA section 303(d) List as impaired. The other approach is a non-integrated water resources approach.

    Some responsible jurisdictions and agencies have indicated a preference to take an integrated water resources approach to realize the benefits of re-using storm water to preserve local groundwater resources and to reduce reliance on imported water. The Regional Board recognizes that an integrated water resources approach not only provides water quality benefits to the people of the Los Angeles Region, but also recognizes that the responsible jurisdictions implementing this TMDL can serve a variety of public purposes by adopting an integrated water resources approach. An integrated water resources approach will address multiple pollutants, and as a result, responsible jurisdictions can recognize cost-savings because capital expenses for the integrated approach will implement several TMDLs that address pollutants in storm water. In addition, jurisdictions serve multiple roles for their citizenry, and an integrated approach allows for the incorporation and enhancement of other public goals such as water supply, recycling and storage; environmental justice; parks, greenways and open space; and active and passive recreational and environmental education opportunities.

    The Regional Board acknowledges that a longer timeframe is reasonable for an integrated water resources approach because it requires more complicated planning and implementation such as identifying markets for the water and efficiently siting storage and transmission infrastructure within the watershed(s) to realize the multiple benefits of such an approach.

16. Therefore, after considering testimony, the Regional Board directed staff to adjust the implementation provisions of the TMDL to allow for a longer implementation schedule (up to 18 years) only when the responsible jurisdictions and agencies clearly demonstrate their intention to undertake an integrated water resources approach and justify the need for a longer implementation schedule. In contrast, testimony indicated that a shorter implementation schedule (up to 10 years) is reasonable and practicable for non-integrated approaches because the level of planning is not as complicated.

17. A revised draft of the Basin Plan amendment and Tentative Resolution were circulated 45 days preceding Board action. Regional Board staff responded to oral and written comments received from the public on the revised draft. The Regional Board held a second public hearing on December 12, 2002 to consider adoption of the Wet-Weather TMDL.

18. On October 25, 2001, the Regional Board adopted Resolution 2001-018 establishing revised bacteriological water quality objectives for the Water Contact Recreation (REC-1) beneficial use, and the TMDL is intended to accompany and to implement the revised water quality objectives. The State Water Resources Control Board approved the Regional Board's Basin Plan amendment on July 18, 2002 in State Board Resolution 2002-0142, the Office of Administrative Law approved it on September 19, 2002 in OAL File No. 02-0807-01-S, and the US EPA approved it on September 25, 2002.

19. Under certain circumstances and through the TMDL development process, the Regional Board proposes to implement the aforementioned revised bacteria objectives using either a 'reference system/anti-degradation approach' or a 'natural sources exclusion approach.' As required by the CWA and Porter-Cologne Water Quality Control Act, the Basin Plan includes beneficial uses of waters, water quality objectives to protect those uses, an anti-degradation policy, collectively referred to as water quality standards, and other plans and policies necessary to implement water quality standards. This TMDL and its associated waste load allocations, which will be incorporated into relevant permits, are the vehicles for implementation of the bacteria standards as required under Water Code section 13242.

20. Both the 'reference system/anti-degradation approach' and the 'natural sources exclusion approach' recognize that there are natural sources of bacteria that may cause or contribute to exceedances of the single sample objectives.

21. The Regional Board's intent in implementing the bacteria objectives using a 'reference system/anti-degradation approach' is to ensure that bacteriological water quality is at least as good as that of a reference site and that no degradation of existing bacteriological water quality is permitted where existing bacteriological water quality is better than that of a reference site. The Regional Board's intent in implementing the bacteria objectives using a 'natural sources exclusion approach' is to ensure that all anthropogenic sources of bacteria are controlled such that they do not cause an exceedance of the single sample objectives. These approaches are consistent with state and federal anti-degradation policies (State Board Resolution No. 68-16 and 40 C.F.R. 131.12), while acknowledging that it is not the intent of the Regional Board to require treatment or diversion of natural coastal creeks or to require treatment of natural sources of bacteria from undeveloped areas. While treatment and diversion of natural sources may fully address the impairment of the water contact recreation beneficial use, such an approach may adversely affect valuable aquatic life and wildlife beneficial uses in the Region.

22. For the Wet-Weather and Dry-Weather Bacteria TMDLs at Santa Monica Bay beaches, Leo Carrillo Beach and its associated drainage area, Arroyo Sequit Canyon, were selected as the local reference system until other reference sites or approaches are evaluated and the necessary data collected to support the use of alternative reference sites or approaches when the TMDL is revised four years after the effective date. Leo Carrillo Beach was selected as the interim reference site because it best met the three criteria for selection of a reference system. Specifically, its drainage is the most undeveloped subwatershed in the larger Santa Monica Bay watershed, the subwatershed has a freshwater outlet (i.e., creek) to the beach, and adequate historical shoreline monitoring data were available. It is the intent of the Regional Board to re-evaluate the use of Leo Carrillo Beach due to potential problems arising from the heavy recreational use of the beach and the close proximity of two campgrounds.

23. Northern Bay beach monitoring sites are fewer in number and provide less comprehensive data than the extensive shoreline monitoring network elsewhere in Santa Monica Bay.

24. The numeric targets in this TMDL are not water quality objectives and do not create new bases for enforcement against dischargers apart from the water quality objectives they translate. The targets merely establish the bases through which load allocations and wasteload allocations (WLAs) are calculated. WLAs are only enforced for a dicharger's own discharges, and then only in the context of it National Pollutant Discharge Elimination System (NPDES) permit, which must be consistent with the assumptions and requirements of the WLA. The Regional Board will develop permit requirements through a subsequent permit action that will allow all interested persons, including but not limited to municipal storm water dischargers, to provide comments on how the waste load allocations will be translated into permit requirements.

25. The Regional Board has the authority to authorize compliance schedules through the basin planning process. In this Basin Plan amendment, the Regional Board establishes a schedule for implementation that affords the responsible jurisdictions and agencies up to ten or eighteen years, depending on the implementation approaches pursued, to implement this Wet-Weather Bacteria TMDL.

26. Previously, the Regional Board adopted a Dry-Weather Bacteria TMDL for the Santa Monica Bay Beaches. The Dry-Weather TMDL includes implementation provisions contained in Table 7-4.3 of the Basin Plan, including a provision to reconsider two years after the effective date the Dry-Weather TMDL and specifically the reference beach(es) used. Because that effort overlaps with reconsideration of the reference beach(es) anticipated by this Wet-Weather TMDL, the Regional Board proposes to coordinate the reconsiderations of the reference beach approach to assure efficiency and consistency in implementing the two Santa Monica Beaches TMDLs.

27. The basin planning process has been certified as functionally equivalent to the California Environmental Quality Act requirements for preparing environmental documents (Public Resources Code, Section 21000 et seq.) and as such, the required environmental documentation and CEQA environmental checklist have been prepared.

28. The proposed amendment results in no potential for adverse effect (de minimis finding), either individually or cumulatively, on wildlife.

29. The regulatory action meets the "Necessity" standard of the Administrative Procedures Act, Government Code, section 11353, subdivision (b).

30. The Basin Plan amendment incorporating a TMDL for bacteria at Santa Monica Bay beaches must be submitted for review and approval by the State Water Resources Control Board (State Board), the State Office of Administrative Law (OAL), and the USEPA. The Basin Plan amendment will become effective upon approval by OAL and USEPA. A Notice of Decision will be filed.

THEREFORE, be it resolved that pursuant to Section 13240 and 13242 of the Water Code, the Regional Board hereby amends the Basin Plan as follows:

1. Pursuant to sections 13240 and 13242 of the California Water Code, the Regional Board, after considering the entire record, including oral testimony at the hearing, hereby adopts the amendments to Chapters 3 and 7 of the Water Quality Control Plan for the Los Angeles Region, as set forth in Attachment A hereto, to incorporate the elements of the Santa Monica

Bay Beaches Bacteria TMDL for wet weather and to implement the water quality objectives for bacteria set to protect the water contact recreation beneficial use.

2. Pursuant to sections 13240 and 13242 of the California Water Code, the Regional Board, after considering the entire record, including oral testimony at the hearing, hereby adopts the amendments to Chapter 7 of the Water Quality Control Plan for the Los Angeles Region, as set forth in Attachment B hereto, to amend Table 7-4.3 of the Santa Monica Bay Beaches Bacteria TMDL for dry weather to change the date for revision of the TMDL from two years after the effective date to four years after the effective date [of the Wet-Weather TMDL] to achieve consistency in scheduling between the Dry-Weather and Wet-Weather TMDLs.

3. The Executive Officer is directed to exercise authority under Water Code section 13267, or other applicable law, to require additional monitoring data in the northern Bay beach regions to ensure that wet weather bacteria exposure is adequately quantified before the TMDL is reconsidered in four years.

4. The Executive Officer is directed to forward copies of the Basin Plan amendment to the State Board in accordance with the requirements of section 13245 of the California Water Code.

5. The Regional Board requests that the State Board approve the Basin Plan amendment in accordance with the requirements of sections 13245 and 13246 of the California Water Code and forward it to OAL and the USEPA.

6. If during its approval process the State 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 Board of any such changes.

7. The Executive Officer is authorized to sign a Certificate of Fee Exemption.

I, Dennis A. Dickerson, 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, Los Angeles Region, on December 12, 2002.

ORIGINAL SIGNED BY
Dennis A. Dickerson
Executive Officer

Final – 12/12/02

Attachment A to Resolution No. 2002-022

Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate Implementation Provisions for the Region's Bacteria Objectives and to incorporate the Santa Monica Bay Beaches Wet-Weather Bacteria TMDL

Adopted by the California Regional Water Quality Control Board, Los Angeles Region on December 12, 2002.

Amendments:

List of Figures, Tables and Inserts
Add under Chapter 7, Section 7-4 (Santa Monica Bay Beaches Bacteria TMDL):
Tables

7-4.4. Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only): Elements
7-4.5. Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only): Final Allowable Exceedance Days by Beach Location
7-4.6. Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only): Interim Compliance Targets by Jurisdictional Groups
7-4.7. Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only): Significant Dates

Chapter 3. Water Quality Objectives, "Bacteria, Coliform"

Add under "Implementation Provisions for Water Contact Recreation Bacteria Objectives"

The single sample bacteriological objectives shall be strictly applied except when provided for in a Total Maximum Daily Load (TMDL). In all circumstances, including in the context of a TMDL, the geometric mean objectives shall be strictly applied. In the context of a TMDL, the Regional Board may implement the single sample objectives in fresh and marine waters by using a 'reference system/antidegradation ap□roach' or 'natural sources exclusion approach' as discussed below. A reference system is defined as an area and associated monitoring point that is not impacted by human activities that potentially affect bacteria densities in the receiving water body.

These approaches recognize that there are natural sources of bacteria, which may cause or contribute to exceedances of the single sample objectives for bacterial indicators. They also acknowledge that it is not the intent of the Regional Board to require treatment or diversion of natural water bodies or to require treatment of natural sources of bacteria from undeveloped areas. Such requirements, if imposed by the Regional Board, could adversely affect valuable aquatic life and wildlife beneficial uses supported by natural water bodies in the Region.

Under the reference system/antidegradation implementation procedure, a certain frequency of exceedance of the single sample objectives above shall be permitted on the basis of the observed exceedance frequency in the selected reference system or the targeted water body, whichever is less. The reference system/anti-degradation approach ensures that bacteriological water quality is at least as good as that of a reference system and that no degradation of existing bacteriological water quality is permitted where existing bacteriological water quality is better than that of the selected reference system.

Under the natural sources exclusion implementation procedure, after all anthropogenic sources of bacteria have been controlled such that they do not cause or contribute to an exceedance of the single sample objectives and natural sources have been identified and quantified, a certain frequency of exceedance of the single sample objectives shall be permitted based on the residual exceedance frequency in the specific water body. The residual exceedance frequency shall define the background level of exceedance due to natural sources. The 'natural sources exclusion' approach may be used if an appropriate reference system cannot be identified due to unique characteristics of the target water body. These approaches are

consistent with the State Antidegradation Policy (State Board Resolution No. 68-16) and with federal antidegradation requirements (40 CFR 131.12).

The appropriateness of these approaches and the specific exceedance frequencies to be permitted under each will be evaluated within the context of TMDL development for a specific water body, at which time the Regional Board may select one of these approaches, if appropriate.

These implementation procedures may only be implemented within the context of a TMDL addressing municipal storm water, including the municipal storm water requirements of the Statewide Permit for Storm Water Discharges from the State of California Department of Transportation (Caltrans), and non-point sources discharges. These implementation provisions do not apply to NPDES discharges other than MS4 discharges.[1]

Chapter 7. Total Maximum Daily Loads (TMDLs) Summaries, Section 7-4 (Santa Monica Bay Beaches Bacteria TMDL)

Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only)*

This TMDL was adopted by the Regional Water Quality Control Board on December 12, 2002.

This TMDL was approved by:

The State Water Resources Control Board on [Insert Date].
The Office of Administrative Law on [Insert Date].
The U.S. Environmental Protection Agency on [Insert Date].

The following table summarizes the key elements of this TMDL.

[1] Municipal storm water discharges in the Los Angeles Region are those with permits under the Municipal Separate Storm Sewer System (MS4) NPDES Program. For example, the MS4 permits at the time of this amendment are the Los Angeles County Municipal Storm Water NPDES Permit, Ventura County Municipal Storm Water NPDES Permit, City of Long Beach Municipal Storm Water NPDES Permit, and elements of the statewide storm water permit for the California Department of Transportation (Caltrans).

Table 7-4.4. Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only): Elements

Element	Key Findings and Regulatory Provisions
Problem Statement	Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use at many Santa Monica Bay (SMB) beaches. Swimming in waters with elevated bacterial indicator densities has long been associated with adverse health effects. Specifically, local and national epidemiological studies compel the conclusion that there is a causal relationship between adverse health effects and recreational water quality, as measured by bacterial indicator densities.
Numeric Target *(Interpretation of the numeric water quality objective, used to calculate the waste load allocations)*	The TMDL has a multi-part numeric target based on the bacteriological water quality objectives for marine water to protect the water contact recreation (REC-1) use. These targets are the most appropriate indicators of public health risk in recreational waters. These bacteriological objectives are set forth in Chapter 3 of the Basin Plan, as amended by the Regional Board on October 25, 2001. The objectives are based on four bacterial indicators and include both geometric mean limits and single sample limits. The Basin Plan objectives that serve as numeric targets for this TMDL are: 1. Rolling 30-day Geometric Mean Limits a. Total coliform density shall not exceed 1,000/100 ml. b. Fecal coliform density shall not exceed 200/100 ml. c. Enterococcus density shall not exceed 35/100 ml. 2. Single Sample Limits a. Total coliform density shall not exceed 10,000/100 ml. b. Fecal coliform density shall not exceed 400/100 ml. c. Enterococcus density shall not exceed 104/100 ml. d. Total coliform density shall not exceed 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1. These objectives are generally based on an acceptable health risk for marine recreational waters of 19 illnesses per 1,000 exposed individuals as set by the US EPA (US EPA, 1986). The targets apply throughout the year. The final compliance point for the targets is the wave wash[2] where there is a freshwater outlet (i.e., publicly-owned storm drain or natural creek) to the beach, or at ankle depth at beaches without a freshwater outlet. Implementation of the above bacteria objectives and the associated TMDL numeric targets is achieved using a 'reference system/anti-degradation approach' rather than the alternative 'natural sources exclusion approach' or strict application of the single sample objectives. As required by the CWA and Porter-Cologne Water Quality Control Act, Basin Plans include beneficial uses of waters, water quality objectives to protect those uses, an anti-degradation policy, collectively referred to as water quality standards, and other plans and policies necessary to implement water quality standards. This TMDL and its associated waste load allocations, which shall be incorporated into relevant permits, are the vehicles for implementation of the Region's

[2] The wave wash is defined as the point at which the storm drain or creek empties and the effluent from the storm drain initially mixes with the receiving ocean water.

Element	Key Findings and Regulatory Provisions
	standards. The 'reference system/anti-degradation approach' means that on the basis of historical exceedance levels at existing shoreline monitoring locations, including a local reference beach within Santa Monica Bay, a certain number of daily exceedances of the single sample bacteria objectives are permitted. The allowable number of exceedance days is set such that (1) bacteriological water quality at any site is at least as good as at a designated reference site within the watershed and (2) there is no degradation of existing shoreline bacteriological water quality. This approach recognizes that there are natural sources of bacteria that may cause or contribute to exceedances of the single sample objectives and that it is not the intent of the Regional Board to require treatment or diversion of natural coastal creeks or to require treatment of natural sources of bacteria from undeveloped areas. The geometric mean targets may not be exceeded at any time. The rolling 30-day geometric means will be calculated on each day. If weekly sampling is conducted, the weekly sample result will be assigned to the remaining days of the week in order to calculate the daily rolling 30-day geometric mean. For the single sample targets, each existing shoreline monitoring site is assigned an allowable number of exceedance days during wet weather, defined as days with 0.1 inch of rain or greater and the three days following the rain event. (A separate amendment incorporating the Santa Monica Bay Beaches Dry-Weather Bacteria TMDL addressed the allowable number of summer and winter dry-weather exceedance days.)
Source Analysis	With the exception of isolated sewage spills, storm water runoff conveyed by storm drains and creeks is the primary source of elevated bacterial indicator densities to SMB beaches during wet weather. Because the bacterial indicators used as targets in the TMDL are not specific to human sewage, storm water runoff from undeveloped areas may also be a source of elevated bacterial indicator densities. For example, storm water runoff from natural areas may convey fecal matter from wildlife and birds or bacteria from soil. This is supported by the finding that, at the reference beach, the probability of exceedance of the single sample targets during wet weather is 0.22.
Loading Capacity	Studies show that bacterial degradation and dilution during transport from the watershed to the beach do not significantly affect bacterial indicator densities at SMB beaches. Therefore, the loading capacity is defined in terms of bacterial indicator densities, which is the most appropriate for addressing public health risk, and is equivalent to the numeric targets, listed above. As the numeric targets must be met in the wave wash and throughout the day, no degradation allowance is provided.
Waste Load Allocations *(for point sources)*	Waste load allocations are expressed as the number of sample days at a shoreline monitoring site that may exceed the single sample targets identified under "Numeric Target." Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection.

Attachment A to Resolution No. 2002-022

Element	Key Findings and Regulatory Provisions
	For each shoreline monitoring site and corresponding subwatershed, an allowable number of exceedance days is set for wet weather. The allowable number of exceedance days for a shoreline monitoring site for each time period is based on the lesser of two criteria (1) exceedance days in the designated reference system and (2) exceedance days based on historical bacteriological data at the monitoring site. This ensures that shoreline bacteriological water quality is at least as good as that of a largely undeveloped system and that there is no degradation of existing shoreline bacteriological water quality. All responsible jurisdictions and responsible agencies[3] within a subwatershed are jointly responsible for complying with the allowable number of exceedance days for each associated shoreline monitoring site identified in Table 7-4.5 below. The three Publicly Owned Treatment Works (POTWs), the City of Los Angeles' Hyperion Wastewater Treatment Plant, Los Angeles County Sanitation Districts' Joint Water Pollution Control Plant, and the Las Virgenes Municipal Water Districts' Tapia Wastewater Reclamation Facility, discharging to Santa Monica Bay are each given individual WLAs of zero (0) days of exceedance during wet weather.

[3] For the purposes of this TMDL, "responsible jurisdictions and responsible agencies" are defined as: (1) local agencies that are responsible for discharges from a publicly owned treatment works to the Santa Monica Bay watershed or directly to the Bay, (2) local agencies that are permittees or co-permittees on a municipal storm water permit, (3) local or state agencies that have jurisdiction over a beach adjacent to Santa Monica Bay, and (4) the California Department of Transportation pursuant to its storm water permit.

Attachment A to Resolution No. 2002-022

Element	Key Findings and Regulatory Provisions
Load Allocations *(for nonpoint sources)*	Because all storm water runoff to SMB beaches is regulated as a point source, load allocations of zero days of exceedance are set in this TMDL. If a nonpoint source is directly impacting shoreline bacteriological quality and causing an exceedance of the numeric target(s), the permittee(s) under the Municipal Storm Water NPDES Permits are not responsible through these permits. However, the jurisdiction or agency adjacent to the shoreline monitoring location may have further obligations as described under "Compliance Monitoring" below.
Implementation	The regulatory mechanisms used to implement the TMDL will include primarily the Los Angeles County Municipal Storm Water NPDES Permit (MS4 Permit), the Caltrans Storm Water Permit, the three NPDES permits for the POTWs, the authority contained in sections 13267 and 13263 of the Water Code, and regulations to be adopted pursuant to section 13291 of the Water Code. Each NPDES permit assigned a waste load allocation shall be reopened or amended at reissuance, in accordance with applicable laws, to incorporate the applicable waste load allocation(s) as a permit requirement. The implementation schedule will be determined on the basis of the implementation plan(s), which must be submitted to the Regional Board by responsible jurisdictions and agencies within two years of the effective date of the TMDL (see Table 7-4.7). After considering the implementation plan(s), the Regional Board shall amend the TMDL at a public hearing and, in doing so, will adopt an individual implementation schedule for each jurisdictional group (described in paragraph 3 below) that is as short as possible taking into account the implementation approach being undertaken. Responsible jurisdictions and agencies must clearly demonstrate in the above-mentioned plan whether they intend to pursue an integrated water resources approach.[4] If an integrated water resources approach is pursued, responsible jurisdictions and agencies may be allotted up to an 18-year implementation timeframe, based on a clear demonstration of the need for a longer schedule in the implementation plan, in recognition of the additional planning and time needed to achieve the multiple benefits of this approach. Otherwise, at most a 10-year implementation timeframe will be allotted, depending upon a clear demonstration of the time needed in the implementation plan. The subwatersheds associated with each beach monitoring location may

[4] An integrated water resources approach is one that takes a holistic view of regional water resources management by integrating planning for future wastewater, storm water, recycled water, and potable water needs and systems; focuses on beneficial re-use of storm water, including groundwater infiltration, at multiple points throughout a watershed; and addresses multiple pollutants for which Santa Monica Bay or its watershed are listed on the CWA section 303(d) List as impaired. Because an integrated water resources approach will address multiple pollutants, responsible jurisdictions can recognize cost-savings because capital expenses for the integrated approach will implement several TMDLs that address pollutants in storm water. An integrated water resources approach shall not only provide water quality benefits to the people of the Los Angeles Region, but it is also anticipated that an integrated approach will incorporate and enhance other public goals. These may include, but are not limited to, water supply, recycling and storage; environmental justice; parks, greenways and open space; and active and passive recreational and environmental education opportunities.

Element	Key Findings and Regulatory Provisions
	include multiple responsible jurisdictions and responsible agencies. Therefore, a "primary jurisdiction," defined as the jurisdiction comprising greater than fifty percent of the subwatershed land area, is identified for each subwatershed (see Table 7-4.6).[5] Seven primary jurisdictions are identified within the Santa Monica Bay watershed, each with a group of associated subwatersheds and beach monitoring locations. These are identified as "jurisdictional groups" (see Table 7-4.6). The primary jurisdiction of each "jurisdictional group" shall be responsible for submitting the implementation plan described above, which will determine the implementation timeframe for the subwatershed. A jurisdictional group may change its primary jurisdiction by submitting a joint, written request, submitted by the current primary jurisdiction and the proposed primary jurisdiction, to the Executive Officer requesting a reassignment of primary responsibility. Two jurisdictional groups may also choose to change the assignment of monitoring locations between the two groups by submitting a joint, written request, submitted by the current primary jurisdiction and the proposed primary jurisdiction, to the Executive Officer requesting a reassignment of the monitoring location. If an integrated water resources approach is pursued, the jurisdictional group(s) must achieve a 10% cumulative percentage reduction from the total exceedance-day reduction required for the group of beach monitoring locations within 6 years, a 25% reduction within 10 years, and a 50% reduction within 15 years of the effective date of the TMDL. These interim milestones for the jurisdictional group(s) will be re-evaluated, considering planning, engineering and construction tasks, based on the written implementation plan submitted to the Regional Board two years after the effective date of the TMDL (see Table 7-4.7). If an integrated water resources approach is not pursued, the jurisdictional group(s) must achieve a 25% cumulative percentage reduction from the total exceedance-day reduction required for the group of beach monitoring locations within 6 years, and a 50% reduction within 8 years of the effective date of the TMDL (see Table 7-4.7). For those beach monitoring locations subject to the antidegradation provision, there shall be no increase in exceedance days during the implementation period above that estimated for the beach monitoring location in the critical year as identified in Table 7-4.5. The final implementation targets in terms of allowable wet-weather exceedance days must be achieved at each individual beach location no later than 18 years after the TMDL's effective date if an integrated water resources approach is pursued, or no later than 10 years after the TMDL's effective date if an integrated water resources approach is not pursued. In addition, the geometric mean targets must be achieved for each individual beach location no later than 18 years or 10 years after the effective date, respectively, depending on whether a integrated

[5] Primary jurisdictions are not defined for the Ballona Creek subwatershed or the Malibu Creek subwatershed, since separate bacteria TMDLs are being developed for these subwatersheds.

Element	Key Findings and Regulatory Provisions
	water resources approach is pursued or not.

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Element	Key Findings and Regulatory Provisions
Margin of Safety	The TMDL is set at levels that are exactly equivalent to the applicable water quality standards along with the proposed reference system/antidegradation implementation procedure. An implicit margin of safety is included in the supporting water quality model by assuming no dilution between the storm drain and the wave wash, the point of compliance. This is a conservative assumption since studies have shown that there is a high degree of variability in the amount of dilution between the storm drain and wave wash temporally, spatially and among indicators, ranging from 100% to 0%.
Seasonal Variations and Critical Conditions	Seasonal variations are addressed by developing separate waste load allocations for three time periods (wet weather, summer dry weather and winter dry weather) based on public health concerns and observed natural background levels of exceedance of bacterial indicators. (The two dry-weather periods are addressed in the Santa Monica Bay Beaches Dry-Weather Bacteria TMDL.) The critical condition for this bacteria TMDL is wet weather generally, when historic shoreline monitoring data for the reference beach indicate that the single sample bacteria objectives are exceeded on 22% of the wet-weather days sampled. To more specifically identify a critical condition within wet weather in order to set the allowable exceedance days shown in Tables 7-4.5 and 7-4.6, the 90th percentile 'storm year'[6] in terms of wet days is used as the reference year. Selecting the 90th percentile year avoids a situation where the reference beach is frequently out of compliance. It is expected that because responsible jurisdictions and agencies will be planning for this 'worst-case' scenario, there will be fewer exceedance days than the maximum allowed in drier years. Conversely, in the 10% of wetter years, it is expected that there may be more than the allowable number of exceedance days.
Compliance Monitoring	Responsible jurisdictions and agencies as defined in Footnote 2 shall conduct daily or systematic weekly sampling in the wave wash at all major drains[7] and creeks or at existing monitoring stations at beaches without storm drains or freshwater outlets to determine compliance.[8] At all locations, samples shall be taken at ankle depth and on an incoming wave. At locations where there is a freshwater outlet, during wet weather, samples should be taken as close as possible to the wave wash, and no further away than 10 meters down current of the storm drain or outlet.[9] At locations where there is a freshwater outlet, samples shall be taken when the freshwater outlet is flowing into the surf zone. If the number of exceedance days is greater than the allowable number of exceedance days for any jurisdictional group at the interim implementation milestones the responsible jurisdictions and agencies

[6] For purposes of this TMDL, a 'storm year' means November 1 to October 31. The 90th percentile storm year was 1993 with 75 wet days at the LAX meteorological station.
[7] Major drains are those that are publicly owned and have measurable flow to the beach during dry weather.
[8] The frequency of sampling (i.e., daily versus weekly) will be at the discretion of the implementing agencies. However, the number of sample days that may exceed the objectives will be scaled accordingly.
[9] Safety considerations during wet weather may preclude taking a sample in the wave wash.

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Element	Key Findings and Regulatory Provisions
	shall be considered out-of-compliance with the TMDL. If the number of exceedance days exceeds the allowable number of exceedance days for a target beach at the final implementation deadline, the responsible jurisdictions and agencies within the contributing subwatershed shall be considered out-of-compliance with the TMDL. Responsible jurisdictions or agencies shall not be deemed out of compliance with the TMDL if the investigation described in the paragraph below demonstrates that bacterial sources originating within the jurisdiction of the responsible agency have not caused or contributed to the exceedance. If a single sample shows the discharge or contributing area to be out of compliance, the Regional Board may require, through permit requirements or the authority contained in Water Code section 13267, daily sampling in the wave wash or at the existing open shoreline monitoring location (if it is not already) until all single sample events meet bacteria water quality objectives. Furthermore, if a beach location is out-of-compliance as determined in the previous paragraph, the Regional Board shall require responsible agencies to initiate an investigation, which at a minimum shall include daily sampling in the wave wash or at the existing open shoreline monitoring location until all single sample events meet bacteria water quality objectives. If bacteriological water quality objectives are exceeded in any three weeks of a four-week period when weekly sampling is performed, or, for areas where testing is done more than once a week, 75% of testing days produce an exceedence of bacteria water quality objectives, the responsible agencies shall conduct a source investigation of the subwatershed(s) pursuant to protocols established under Water Code 13178. If a beach location without a freshwater outlet is out-of-compliance or if the outlet is diverted or being treated, the adjacent municipality, County agency(s), or State or federal agency(s) shall be responsible for conducting the investigation and shall submit its findings to the Regional Board to facilitate the Regional Board exercising further authority to regulate the source of the exceedance in conformance with the Porter-Cologne Water Quality Control Act.

Note: The complete staff report for the TMDL is available for review upon request.

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Table 7-4.5. Final Allowable Wet-Weather Exceedance Days by Beach Location

Beach Monitoring Location	Estimated no. of wet weather exceedance days in critical year (90th percentile)*	Final allowable no. of wet weather exceedance days (daily sampling)*
DHS 010 - Leo Carrillo Beach, at 35000 PCH	17	17
DHS 009 - Nicholas Beach- 100 feet west of lifeguard tower	14	14
DHS 010a - Broad Beach	15	15
DHS 008 - Trancas Beach entrance, 50 yards east of Trancas Bridge	19	17
DHS 007 - Westward Beach, east of Zuma Creek	17	17
DHS 006 - Paradise Cove, adjacent to west side of Pier	23	17
DHS 005 - Latigo Canyon Creek entrance	33	17
DHS 005a - Corral State Beach	17	17
DHS 001a - Las Flores Beach	29	17
DHS 001 - Big Rock Beach, at 19900 PCH	30	17
DHS 003 - Malibu Point	18	17
DHS 003a - Surfrider Beach (second point)- weekly	45	17
S1 - Surfrider Beach (breach point)- daily	47	17
DHS 002 - Malibu Pier- 50 yards east	45	17
S2 - Topanga State Beach	26	17
DHS 101 - PCH and Sunset Bl.- 400 yards east	25	17
DHS 102 - 16801 Pacific Coast Highway, Bel Air Bay Club (chain fence)	28	17
S3 - Pulga Canyon storm drain- 50 yards east	23	17
DHS 103 - Will Rogers State Beach- Temescal Canyon (25 yrds. so. of drain)	31	17
S4 - Santa Monica Canyon, Will Rogers State Beach	25	17
DHS 104a - Santa Monica Beach at San Vicente Bl.	34	17
DHS 104 - Santa Monica at Montana Av. (25 yrds. so. of drain)	31	17
DHS 105 - Santa Monica at Arizona (in front of the drain)	31	17
S5 - Santa Monica Municipal Pier- 50 yards southeast	35	17
S6 - Santa Monica Beach at Pico/Kenter storm drain	42	17
DHS 106 - Santa Monica Beach at Strand St. (in front of the restrooms)	36	17
DHS 106a - Ashland Av. storm drain- 50 yards north	39	17
S7 - Ashland Av. storm drain- 50 yards south	22	17
DHS 107 - Venice City Beach at Brooks Av. (in front of the drain)	40	17

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Beach Monitoring Location	Estimated no. of wet weather exceedance days in critical year (90th percentile)*	Final allowable no. of wet weather exceedance days (daily sampling)*
S8 - Venice City Beach at Windward Av.- 50 yards north	13	13
DHS 108 - Venice Fishing Pier- 50 yards south	17	17
DHS 109 - Venice City Beach at Topsail St.	38	17
S11 - Dockweiler State Beach at Culver Bl.	23	17
DHS 110 - Dockweiler State Beach- south of D&W jetty	30	17
S12 - Imperial HWY storm drain- 50 yards north	17	17
DHS 111 - Hyperion Treatment Plant One Mile Outfall	18	17
DHS 112 - Dockweiler State Beach at Grand Av. (in front of the drain)	25	17
S10 - Ballona Creek entrance- 50 yards south	34	17
S13 - Manhattan State Beach at 40th Street	4	4
S14 - Manhattan Beach Pier- 50 yards south	5	5
DHS 114 - Hermosa City Beach at 26th St.	12	12
S15 - Hermosa Beach Pier- 50 yards south	8	8
DHS 115 - Herondo Street storm drain- (in front of the drain)	19	17
S16 - Redondo Municipal Pier- 50 yards south	14	14
DHS 116 - Redondo State Beach at Topaz St. - north of jetty	19	17
S17 - Redondo State Beach at Avenue I	6	6
S18 - Malaga Cove, Palos Verdes Estates-daily	3	3
LACSDM - Malaga Cove, Palos Verdes Estates-weekly	14	14
LACSDB - Palos Verdes (Bluff) Cove, Palos Verdes Estates	0	0
LACSD1 - Long Point, Rancho Palos Verdes	5	5
LACSD2 - Abalone Cove Shoreline Park	1	1
LACSD3 - Portuguese Bend Cove, Rancho Palos Verdes	2	2
LACSD5 - Royal Palms State Beach	6	6
LACSD6 - Wilder Annex, San Pedro	2	2
LACSD7 - Cabrillo Beach, oceanside	3	3

Notes: * The compliance targets are based on existing shoreline monitoring data and assume daily sampling. If systematic weekly sampling is conducted, the compliance targets will be scaled accordingly. These are the compliance targets until additional shoreline monitoring data are collected prior to revision of the TMDL. Once additional shoreline monitoring data are available, the following will be re-evaluated when the TMDL is revised 1) estimated number of wet-weather exceedance days in the critical year at all beach locations, including the reference system(s) and 2) final allowable wet-weather exceedance days for each beach location.

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Table 7-4.6. Interim Compliance Targets by Jurisdictional Group

Jurisdiction Group	Primary Jurisdiction	Additional Responsible Jurisdictions & Agencies	Subwatershed(s)	Monitoring Site(s)***	Interim Compliance Targets as Maximum Allowable Exceedance Days during Wet Weather*,**		
					10% Reduction Milestone	25% Reduction Milestone	50% Reduction Milestone
1	County of Los Angeles	Caltrans Malibu City of Los Angeles (Topanga only) Calabasas (Topanga only)	Arroyo Sequit	DHS 010	221	212	197
			Carbon Canyon	none			
			Corral Canyon	DHS 005a			
			Encinal Canyon	DHS 010a#			
			Escondido Canyon	none			
			Las Flores Canyon	DHS 001a			
			Latigo Canyon	DHS 005			
			Los Alisos Canyon	none			
			Pena Canyon	none			
			Piedra Gorda Canyon	DHS 001			
			Ramirez Canyon	DHS 006			
			Solstice Canyon	none			
			Topanga Canyon	S2			
			Trancas Canyon	DHS 008			
			Tuna Canyon	none			
			Zuma Canyon	DHS 007			
2	City of Los Angeles	Caltrans County of Los Angeles El Segundo (DW only) Manhattan Beach (DW only) Culver City (MDR only) Santa Monica	Castlerock	none	342	324	294
			Dockweiler	S11, DHS 110, S12, DHS 111, DHS 112			
			Marina del Rey	DHS 107, S8#, DHS 108, DHS 109			
			Pulga Canyon	S3, DHS 103			
			Santa Monica Canyon	S4			
			Santa Ynez Canyon	DHS 101, DHS 102			

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Jurisdiction Group	Primary Jurisdiction	Additional Responsible Jurisdictions & Agencies	Subwatershed(s)	Monitoring Site(s)***	Interim Compliance Targets as Maximum Allowable Exceedance Days during Wet Weather*,**		
					10% Reduction Milestone	25% Reduction Milestone	50% Reduction Milestone
3	Santa Monica	Caltrans City of Los Angeles County of Los Angeles	Santa Monica	DHS 104a, DHS 104, DHS 105, S5, S6, DHS 106, DHS 106a, S7	257	237	203
4	Malibu	Caltrans County of Los Angeles	Nicholas Canyon	DHS 009#	14	14	14
5	Manhattan Beach	Caltrans El Segundo Hermosa Beach Redondo Beach	Hermosa	S13#, S14#, DHS 114#, S15#	29	29	29
6	Redondo Beach	Caltrans Hermosa Beach Manhattan Beach Torrance County of Los Angeles	Redondo	DHS 115, S16#, DHS 116, S17#	58	57	56

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Jurisdiction Group	Primary Jurisdiction	Additional Responsible Jurisdictions & Agencies	Subwatershed(s)	Monitoring Site(s)***	Interim Compliance Targets as Maximum Allowable Exceedance Days during Wet Weather*,**		
					10% Reduction Milestone	25% Reduction Milestone	50% Reduction Milestone
7	Rancho Palos Verdes	Caltrans City of Los Angeles Palos Verdes Estates Redondo Beach Rolling Hills Rolling Hills Estates Torrance County of Los Angeles	Palos Verdes Peninsula	S18#, LACSDM#, LACSDB#, LACSD1#, LACSD2#, LACSD3#, LACSD5#, LACSD6#, LACSD7#	36	36	36

Notes: *Interim milestones will be re-calculated during the revision of the TMDL based on shoreline monitoring data collected from the wave wash and a re-evaluation of the most appropriate reference system and reference year. Furthermore, if an integrated water resources approach is pursued, as demonstrated by the implementation plans to be submitted to the Regional Board by the primary jurisdictions within two years of the effective date of the TMDL, the interim milestones will be re-evaluated on the basis of the implementation plan, considering planning, engineering and construction tasks. **Interim milestones for the Malibu and Ballona shoreline monitoring locations will be identified in subsequent bacteria TMDLs to be developed for these two watersheds. ***Monitoring sites are those shoreline locations currently monitored by the City of Los Angeles, County Sanitation Districts of Los Angeles County, and the Los Angeles County Department of Health Services at the time of adoption of this TMDL by the Regional Board. This list does not preclude the establishment of additional monitoring stations. For those subwatersheds without an existing shoreline monitoring site, responsible jurisdictions and agencies must establish a shoreline monitoring site if there is measurable flow from a creek or publicly owned storm drain to the beach during dry weather. # For those beach monitoring locations subject to the antidegradation provision, there shall be no increase in exceedance days during the implementation period above that estimated for the beach monitoring location in the critical year as identified in Table 7-4.5.

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Table 7-4.7. Santa Monica Bay Beaches Bacteria TMDL (Wet Weather Only): Significant Dates

Date	Action
120 days after the effective date of the TMDL	Pursuant to a request from the Regional Board, responsible jurisdictions and responsible agencies must submit coordinated shoreline monitoring plan(s) to be approved by the Executive Officer, including a list of new sites* and/or sites relocated to the wave wash at which time responsible jurisdictions and responsible agencies shall select between daily or systematic weekly shoreline sampling.
20 months after the effective date of the TMDL	Responsible jurisdictions and agencies shall provide a draft written report to the Regional Board outlining how each intends to cooperatively (through Jurisdictional Groups) achieve compliance with the TMDL. The report shall include implementation methods, an implementation schedule, and proposed milestones.
Two years after effective date of TMDL	Responsible jurisdictions and agencies shall provide a written report to the Regional Board outlining how each intends to cooperatively (through Jurisdictional Groups) achieve compliance with the TMDL. The report shall include implementation methods, an implementation schedule, and proposed milestones. Under no circumstances shall final compliance dates exceed 10 years for non-integrated approaches or 18 years for integrated water resources approaches. Regional Board staff shall bring to the Regional Board the aforementioned plans as soon as possible for consideration.
4 years after effective date of TMDL	The Regional Board shall reconsider the TMDL to: (1) refine allowable wet weather exceedance days based on additional data on bacterial indicator densities in the wave wash and an evaluation of site-specific variability in exceedance levels, (2) re-evaluate the reference system selected to set allowable exceedance levels, including a reconsideration of whether the allowable number of exceedance days should be adjusted annually dependent on the rainfall conditions and an evaluation of natural variability in exceedance levels in the reference system(s), (3) re-evaluate the reference year used in the calculation of allowable exceedance days, and (4) re-evaluate whether there is a need for further clarification or revision of the geometric mean implementation provision.

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Date	Action
Significant Dates for Responsible Jurisdictions and Agencies *Not* Pursuing an Integrated Water Resources Approach	
6 years after effective date of the TMDL	Each defined jurisdictional group must achieve a 25% cumulative percentage reduction from the total exceedance-day reductions required for that jurisdictional group as identified in Table 7-4.6.
8 years after effective date of the TMDL	Each defined jurisdictional group must achieve a 50% cumulative percentage reduction from the total exceedance-day reductions required for that jurisdictional group as identified in Table 7-4.6.
10 years after effective date of the TMDL	Final implementation targets in terms of allowable wet-weather exceedance days must be achieved at each individual beach as identified in Table 7-4.5. In addition, the geometric mean targets must be achieved for each individual beach location.
Significant Dates for Responsible Jurisdictions and Agencies Pursuing an Integrated Water Resources Approach to Implementation	
6 years after effective date of the TMDL	Each defined jurisdictional group must achieve a 10% cumulative percentage reduction from the total exceedance-day reductions required for that jurisdictional group as identified in Table 7-4.6.
10 years after effective date of the TMDL	Each defined jurisdictional group must achieve a 25% cumulative percentage reduction from the total exceedance-day reductions required for that jurisdictional group as identified in Table 7-4.6.
15 years after effective date of the TMDL	Each defined jurisdictional group must achieve a 50% cumulative percentage reduction from the total exceedance-day reductions required for that jurisdictional group as identified in Table 7-4.6.
18 years after effective date of the TMDL	Final implementation targets in terms of allowable wet-weather exceedance days must be achieved at each individual beach as identified in Table 7-4.5. In addition, the geometric mean targets must be achieved for each individual beach location.

Notes: *For those subwatersheds without an existing shoreline monitoring site, responsible jurisdictions and agencies must establish a shoreline monitoring site if there is measurable flow from a creek or publicly owned storm drain to the beach during dry weather.

Attachment B to Resolution No. 2002-022

Amendment to the Water Quality Control Plan – Los Angeles Region to Revise the Santa Monica Bay Beaches Dry-Weather Bacteria TMDL

Adopted by the California Regional Water Quality Control Board, Los Angeles Region on December 12, 2002.

Amendments:

Chapter 7. Total Maximum Daily Loads (TMDLs) Summaries
Santa Monica Bay Beaches Bacteria TMDL (Dry Weather Only)*

Table 7-4.3. Santa Monica Bay Beaches Bacteria TMDL (Dry Weather Only): Significant Dates

Date	Action
120 days after the effective date of the TMDL	Responsible jurisdictions and responsible agencies must submit coordinated shoreline monitoring plan(s), including a list of new sites or sites relocated to the wave wash at which time responsible jurisdictions and responsible agencies will select between daily and weekly shoreline sampling.
120 days after the effective date of the TMDL	Responsible jurisdictions and responsible agencies must identify and provide documentation on 342 potential discharges to Santa Monica Bay beaches listed in Appendix C of the TMDL Staff Report dated January 11, 2002. Documentation must include a Report of Waste Discharge (ROWD) where necessary. Responsible jurisdictions and responsible agencies must identify and provide documentation on potential discharges to the Area of Special Biological Significance (ASBS) in northern Santa Monica Bay from Latigo Point to the County line. Cessation of the discharges into the ASBS shall be required in conformance with the California Ocean Plan.
~~2~~ 4 years after effective date of TMDL	Re-open TMDL to re-evaluate allowable winter dry weather exceedance days based on additional data on bacterial indicator densities in the wave wash, a re-evaluation of the reference system selected to set allowable exceedance levels, and a re-evaluation of the reference year used in the calculation of allowable exceedance days.
3 years after effective date of the TMDL	Achieve compliance with allowable exceedance days as set forth in Table 7-4.2a and rolling 30-day geometric mean targets during summer dry weather (April 1 to October 31).
6 years after effective date of the TMDL	Achieve compliance with allowable exceedance days as set forth in Table 7-4.2a and rolling 30-day geometric mean targets during winter dry weather (November 1 to March 31).

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APPENDIX L
Safety

Driving Safety & Reporting Vehicle Accidents

During beach sample collection, 4-wheel drive mode should be used on the sand. It is best to use 4-lo when driving on the sand in 4-wheel drive (4WD). Tire pressure should equal 20-25 psi for the small beach truck, and 35 psi for the large truck. If there is some problem driving on the sand (i.e., stuck or barely moving) the tire pressure is decreased to 15 psi then when off the sand re-inflated to 20 psi. When the sampler arrives back at the lab, the tire pressure is increased back up to 25 psi. The sampler needs to exit 4WD when leaving the sand for street driving. When driving with tires at minimum activation pressure range (as recommended by the National Highway Traffic Safety Administration), one should not exceed 65 MPH on the freeway and drive for no longer than 60 minutes at high speed. Safety issues related to tires and tire pressure may be found at this website: http://www.nhtsa.dot.gov/cars/rules/rulings/TirePresFinal.

The Life Guard speed limit on the sand is 15 MPH, dependent upon conditions. At no time is driving faster than 15 MPH allowable. Observe the beach speed limit and anticipate the possibility of people covered in sand or otherwise obscured from view. Be extremely cautious when children are present.

The following are additional precautions for City of L.A.'s EMD and participating laboratories' personnel to use as guidelines while driving a 4WD vehicle to collect beach samples:

1. Drivers of city vehicles must have a valid operating license.
2. If persons in vehicle observe a potential unsafe condition with the vehicle, discontinue operation, return the vehicle, and report the problem to management and Fleet Services.
3. Vehicle occupants must wear safety belts and ensure the vehicle contains an accident-reporting envelope.
4. Cargo items should not be stacked above seat level; if they are, a safety screen should be installed.
5. Employee responsibility:
6. It is the responsibility of every City employee who drives, is in control of, or is responsible for any City-owned, rented or mileage vehicle which is involved in an accident (no matter how slight) to notify the proper authorities and to fill out the proper forms in case of a vehicle accident.
7. Detailed instructions on what to do are contained in the packet (form Gen. 84) which is kept in the glove compartment of every City-owned or mileage vehicle. If the vehicle you are using does not contain a packet, you may obtain one by calling any Fleet Services facility where City vehicles are maintained. Included

in the packet is form Gen. 88, which is the automobile accident report. This form has five copies, which are to be distributed to the locations printed on the top of the form. This written report must be filed with the City Attorney within 24 hours of the accident.

8. If a vehicle accident occurs, the driver must report the accident to the police by notifying the Police Complaint Board at 213-485-2683 or 213-623-3311. For emergencies, dial 911. Additionally, if any injury or death has occurred, you must report the accident by phone to the City Attorney, Automobile Liability Division, at 213-485-3634. If no one answers, have the City Hall Chief Operator, at 213-485-5500, relay your call. If an EMD employee is injured, contact the Workers' Compensation Division at 213-847-9405 to report the injury. All City/EMD vehicles involved in accidents must be brought to Fleet Services (213-485-4985) for inspection within five working days.

   a. All accidents must be reported including:
      - When an accident occurs in a County or incorporated area,
      - When a driver is accused of being in an accident but has no knowledge of same,
      - When an animal is seriously injured or killed. Search for the owner and report the incident.
      - When two City vehicles are involved in an accident,
      - When the accident occurs on a freeway.

      The Occupational Safety Office must be notified if there is death or serious injury caused by the vehicular accident. The City of Los Angeles' Occupational Safety Office telephone number is 213-485-4691. Call The City Hall Chief Operator at 213-485-5500 and ask for a safety engineer if the accident occurs after working hours.

      The driver must remain on the scene of the accident and obtain information from other persons involved. The driver should also have witnesses fill out the witness cards located in the packet of information and forms in the glove compartment.

   b. Supervisor's Responsibility:
      - Ensure that the driver has made all the required notifications and has properly filled out all the forms.
      - Investigate the accident and attempt to determine what may have lead to the incident.
      - Discuss your finding of the investigation with the driver and co-workers so that these types of incidents can be avoided in the futures.

   c. Vehicle Accident Reporting Procedure
      The EMD employee involved in the accident must:
      - First:

    - Stop immediately and provide needed first aid.
    - Call for an ambulance if necessary
    - Avoid obstructing traffic.
    - Place emergency flags or flares if available.
    - Notify the Police Complaint Board.
    - If a death or serious injury has occurred, call the Occupational Safety Office.
- Second:
    - Follow "Accident Reporting Instructions" in the form Gen. 88 packet.
    - Be courteous; avoid arguments.
    - Ask witnesses to sign witness cards.
    - Sign no statements.
    - Admit no negligence or fault.
    - Assume no liability for yourself or the City.
- Third:
    - Notify your supervisor that you have been involved in an accident.
    - Completely fill out form Gen. 88. The carbon copies of the form must not contain information on the back portion of the original or City Attorney's copy. The form must be signed, dated, and turned in to the employee's supervisor.
    - If a death or serious injury has occurred, call the City Attorney.
    - Contact Worker's Compensation if a City employee has been injured

Field Sampling

For employees who have been assigned the duty of sample collection, there must be an awareness of the potential hazards involved at both the site and in the sampling subject. The following are general precautions to be observed during beach and storm drain sample collection.

a. Use proper equipment for the job. This includes personal protective gear such as eye protection, gloves, boots, or hardhat, when necessary; and equipment required to aid in sampling such as poles and holders for the bottles. While moving around Hyperion Treatment Plant, hardhats must be worn at all times.
b. No Laboratory Technician should sample alone along the beach prior to proper training; if possible bring someone along to assist.
c. Be sure samples are secure in the vehicle or mode of transport to avoid the risk of contamination and the possibility of spillage resulting in exposure.
d. Never deliberately touch the water or waste being sampled. Remember that these substances could pose a risk to your health.
e. Disinfect hands and exposed body parts after sampling, and be sure to clean off utensils, gloves, and boots to protect others.

During shoreline sampling, safety of the sampler is of prime importance. If a sample location is inaccessible or deemed to be unsafe, no sample is required to be collected and comments noted on the beach observation sheet. During wet weather, safety consideration may preclude collection of a wave-wash sample. Samples at historical sites may be collected, if deemed safe.

Laboratory Safety

The collection and analysis of environmental samples involves contact with samples that may contain agents that pose a microbiological hazard. The primary means of exposure to these microbiological hazards involve body contact during sample collection and hand-mouth or nose contact while handling the samples. Personal protective measures are mandatory while working in the field and laboratory. Following are some key steps to be followed by all laboratory analysts:

1. Assure that appropriate eye protection is worn by all persons, when toxic materials (chemicals or biochemicals) are handled. Contact lenses should not be worn when working with chemicals.
2. Wear appropriate gloves when the potential for contact with toxic materials exists; inspect gloves before each use, wash them before removal, and replace them periodically.
3. Persons doing sampling must wear boots. The boots must be cleaned before entering the building. Boots cannot be worn in the lunchroom, under any circumstances. Steel-toed chemical resistant boots should be worn for the harshest environments, where there is also risk of injury to the foot and toes.
4. Use any other protective and emergency apparel and equipment as appropriate.
5. Remove laboratory coats immediately on significant contamination.

In addition, persons who work in biological laboratories are often at risk of exposing themselves to a number of infectious agents, especially those known to be indigenous to wastewater. Most persons trained in biological and especially microbiological fields usually are aware of the risks involved, and even if precautions are taken, most of the work-related infections are due to certain practices conducted in the laboratory resulting in the generation of aerosols or through cutaneous pathways. The following guidelines are designed to prevent any exposure of personnel to infectious agents.

1. General chemical hygiene practices apply as well to the biological laboratories.
2. All work areas must be disinfected before and after all laboratory operations.
3. Hazardous areas and receptacles of contaminated items are to be marked with a biohazard sign.
4. No eating or drinking in the laboratory. No food or drink may be stored in laboratory refrigerators, incubators or on bench tops.

5. Store personal effects outside the microbiology laboratory area to prevent contamination. Manager and supervisors are responsible for enforcing this rule.

1. It is policy to wear a lab coat while working in the microbiology lab. Lab coats and street clothes should be stored separately. Lab coats are prohibited in the lunchroom.
2. Latex or plastic gloves are to be provided and used by employees.
3. Always wash your hands thoroughly after handling sewage, sludge, or receiving water samples of any source before handling food or leaving the lab. "All" samples should be treated as potentially hazardous. Germicidal soap is to be available to all employees, and should be kept in stock.
4. Laboratory workers should not touch their hands to their face, especially the eyes, nose, and mouth when working with wastewater and sludge samples.
5. For workers who handle wastewater and its byproducts, it is recommended that they have been vaccinated for polio and tetanus. Persons in poor health and at risk of infection should inform their supervisor, and arrange for an improvement in their personal protection.
6. Handle all microorganisms as if they are pathogenic. The principle of sterile technique should be understood and applied during the handling of cultures and their related equipments.
7. Never pipette by mouth. Use bulbs or other mechanical means to draw up the liquid. Discard all used pipettes into a jar containing disinfectant solution for decontamination before washing them.
8. Avoid generation of aerosols during operations such as inoculation, pipetting, mixing, or centrifuging.
9. Equipment:
10. Microscopes, colony counters, etc. are to be kept in the work area and be dust free; they are to be cleaned after use.
11. Water baths should be kept free of growth deposits.
12. Autoclaves, hot air sterilizing ovens, and water distilling equipment and centrifuges should be cleaned regularly to ensure safe operating.
13. Employees are to be trained in autoclave operation and operating instructions posted near each instrument.
14. Performance checks of autoclaves and hot air sterilizers should be conducted with the use of spore strips, spore ampoules, indicators, etc.
15. Safety cabinets of the appropriate type and class are to be supplied, maintained, and used.
16. Personnel are to be trained in the proper procedures for handling lyophilized (freeze-dried) cultures when used.

17. Employees should use the provided bottle carriers when moving reagents, acids, and solvents through the building.
18. Laboratory personnel must follow labeling protocols in the laboratory to prevent mix-ups of reagents, and when possible use the pre-labeled or permanently labeled bottles. Secondary containers are to be labeled as well.
19. In the event of a spill, all possible contaminated surfaces and tools are to be disinfected and the absorbent material placed in a biohazard bag for disposal.
20. All contaminated plates and Quanti-trays are to be autoclaved in biohazard bags at the end of the analysis and then disposed of in the labeled bags as regular trash.
21. Sterilize biological waste materials and contaminated equipment (cultures, glassware, etc.) before washing, storage, or disposal by autoclaving or decontaminating.
22. Eliminate flies and other insects to prevent contamination vectors of sterile equipment, media, samples, cultures, and infection of personnel (i.e., provide screens on windows and doors to outside if there is no air conditioning).

APPENDIX M
LACDHS Follow-up Monitoring Protocol

(This protocol is attached as reference only. See Section 4.2 for accelerated testing procedures following an exceedance.)

A. All information and actions taken shall be recorded in a log maintained by the Recreational Health Program. In addition, the information shall be entered into a State Water Control Resource Board, Microsoft Access database.
B. Elevated bacterial levels exist when any of the single sample standards are exceeded.
C. When a sampling station exhibits elevated bacterial levels, when practicable, a resample shall be taken between 24-48 hours after the initial sample.
D. When there is an elevated bacterial level the following guidelines shall be followed:

- All storm drains continually discharging or intermittently discharging into the ocean during dry weather shall be posted with a white "Warning" (storm drain) sign at the point where the discharge meets the surf zone.
- When a sampling station, in front of, or in proximity to a storm drain, exceeds single State standards, white "Warning" (storm drain) signs shall be posted at 50 and 100 yards on either side of the storm drain or where the point of discharge meets the surf zone. If not already posted, a white "Warning" (storm drain) sign shall be posted directly in front of the storm drain or where the point of discharge meets the surf zone. Posting patterns and distances may vary depending on bacteria levels and local geographic conditions.
- When a sampling station, <u>not</u> in proximity to a storm drain, exceeds single State standards, a beige "Warning" sign shall be posted at the sampling station and 50 yards either side of the sampling station. Posting patterns and distances may vary depending on bacteria levels and local geographic conditions.
- Areas with a chronic history of elevated bacteria levels exceeding State standards, may be posted continuously with either a beige or white "Warning" sign.

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APPENDIX N
Participating Organizations and Contacts (Monitoring)

Table N-1

JURISDICTIONAL GROUP 1							
Responsible Agency	Primary Contact	Phone	Fax	Email	Secondary Contact	Phone	Email
County of Los Angeles (lead)	Frank Wu	(626) 458-4358	(626) 457-1526	fwu@ladpw.org	Bill DePoto	(626) 458-4313	bdepoto@ladpw.org
County of Ventura	Darla Wise	(805) 654-3942		darla.wise@mail.co.ventura.ca.us			
Caltrans	Bob Wu	(213) 897-8636	(213) 897-0205	robert_wu@dot.ca.gov	Paul Thakur	(213) 897-7546	jai_paul_thakur@dot.ca.gov
Calif. Dept. of Parks & Rec.	Nat Cox			nscox@aol.com			
Calabasas	Robin Hull	(818) 878-4242 x306	(818) 878-4205	rhull@ci.calabasas.ca.us	Roxanne Hughes	(800) 491-1720	RHughes@WILLDAN.com
City of Los Angeles	Mas Dojiri	(310) 648-5610	(310) 648-5731	mdojiri@san.lacity.org	Farhana Mohamed	(310) 648-5923	fym@san.lacity.org
Malibu	Melanie Irwin	(310) 456-2489 x275	(310) 456-3356	mirwin@ci.malibu.ca.us			

Table N-2

JURISDICTIONAL GROUP 2							
Responsible Agency	Primary Contact	Phone	Fax	Email	Secondary Contact	Phone	Email
City of Los Angeles (lead)	Mas Dojiri	(310) 648-5610	(310) 648-5731	mdojiri@san.lacity.org	Farhana Mohamed	(310) 648-5923	fym@san.lacity.org
County of Los Angeles	Frank Wu	(626) 458-4358	(626) 457-1526	fwu@ladpw.org	Bill DePoto	(626) 458-4313	bdepoto@ladpw.org
Caltrans	Bob Wu	(213) 897-8636	(213) 897-0205	robert_wu@dot.ca.gov	Paul Thakur	(213) 897-7546	jai_paul_thakur@dot.ca.gov
Calif. Dept. of Parks & Rec.	Nat Cox			nscox@aol.com			
El Segundo	Paul Giera	(310) 524-2742		pgiera@elsegundo.org			
Santa Monica	Neal Shapiro	(310) 458-8223		neal-shapiro@santa-monica.org			

Table N-3

JURISDICTIONAL GROUP 3							
Responsible Agency	Primary Contact	Phone	Fax	Email	Secondary Contact	Phone	Email
Santa Monica (lead)	Neal Shapiro	(310) 458-8223		neal-shapiro@santa-monica.org			
City of Los Angeles	Mas Dojiri	(310) 648-5610	(310) 648-5731	mdojiri@san.lacity.org	Farhana Mohamed	(310) 648-5923	fym@san.lacity.org
County of Los Angeles	Frank Wu	(626) 458-4358	(626) 457-1526	fwu@ladpw.org	Bill DePoto	(626) 458-4313	bdepoto@ladpw.org
Caltrans	Bob Wu	(213) 897-8636	(213) 897-0205	robert_wu@dot.ca.gov	Paul Thakur	(213) 897-7546	jai_paul_thakur@dot.ca.gov
Calif. Dept. of Parks & Rec.	Nat Cox			nscox@aol.com			

Table N-4

JURISDICTIONAL GROUP 4							
Responsible Agency	Primary Contact	Phone	Fax	Email	Secondary Contact	Phone	Email
Malibu (lead)	Melanie Irwin	(310) 456-2489 x275	(310) 456-3356	mirwin@ci.malibu.ca.us			
County of Los Angeles	Frank Wu	(626) 458-4358	(626) 457-1526	fwu@ladpw.org	Bill DePoto	(626) 458-4313	bdepoto@ladpw.org
Caltrans	Bob Wu	(213) 897-8636	(213) 897-0205	robert_wu@dot.ca.gov	Paul Thakur	(213) 897-7546	jai_paul_thakur@dot.ca.gov

Table N-5

JURISDICTIONAL GROUP 5							
Responsible Agency	Primary Contact	Phone	Fax	Email	Secondary Contact	Phone	Email
Manhattan Beach (lead)	Steve Didier	(310) 802-5363	(310) 802-5351	sdidier@citymb.info			
El Segundo	Paul Giera	(310) 524-2742		pgiera@elsegundo.org			
Hermosa Beach	Sheila Kennedy	(562) 802-7880 x29	(562) 802-2297	skennedy@jlha.net	Homayoun Behboodi	(310) 318-0212	hbehboodi@hermosabch.org
Redondo Beach	Mike Shay	(310) 318-0661 x2455	(310) 374-4828	mike.shay@redondo.org			
County of Los Angeles	Frank Wu	(626) 458-4358	(626) 457-1526	fwu@ladpw.org	Bill DePoto	(626) 458-4313	bdepoto@ladpw.org
Caltrans	Bob Wu	(213) 897-8636	(213) 897-0205	robert_wu@dot.ca.gov	Paul Thakur	(213) 897-7546	jai_paul_thakur@dot.ca.gov

Table N-6

JURISDICTIONAL GROUP 6							
Responsible Agency	Primary Contact	Phone	Fax	Email	Secondary Contact	Phone	Email
Redondo Beach (lead)	Mike Shay	(310) 318-0661 x2455	(310) 374-4828	mike.shay@redondo.org			
El Segundo	Paul Giera	(310) 524-2742		pgiera@elsegundo.org			
Hermosa Beach	Sheila Kennedy	(562) 802-7880 x29	(562) 802-2297	skennedy@jlha.net	Homayoun Behboodi	(310) 318-0212	hbehboodi@hermosabch.org
Manhattan Beach	Steve Didier	(310) 802-5363	(310) 802-5351	sdidier@citymb.info			
Torrance	Wendell Johnson	(310) 618-5951	(310) 618-2822	wjohnson@torrnet.com			
County of Los Angeles	Frank Wu	(626) 458-4358	(626) 457-1526	fwu@ladpw.org	Bill DePoto	(626) 458-4313	bdepoto@ladpw.org
Caltrans	Bob Wu	(213) 897-8636	(213) 897-0205	robert_wu@dot.ca.gov	Paul Thakur	(213) 897-7546	jai_paul_thakur@dot.ca.gov

Table N-7

JURISDICTIONAL GROUP 7							
Responsible Agency	Primary Contact	Phone	Fax	Email	Secondary Contact	Phone	Email
Rancho Palos Verdes (lead)	John Hunter	(562) 802-7880 x25	(562) 802-2297	jhunter@jlha.net	Dean Allison		deana@rpv.com
City of Los Angeles	Mas Dojiri	(310) 648-5610	(310) 648-5731	mdojiri@san.lacity.org	Farhana Mohamed	(310) 648-5923	fym@san.lacity.org
Palos Verdes Estates	Kimberly Colbert	(310) 212-5778	(310) 212-0993	kimberlycolbert@caaprofessiionals.com	Allan Rigg		Arigg@pvestates.org
Rolling Hills	Yolanta Schwartz	(310) 377-1521	(310) 377-7288	YSchwartz@cityofRH.net	Kathleen McGowan	(310) 373-0330	kathleen.enve@verizon.net
Rolling Hills Estates	Gregg Grammer	(310) 377-1577	(310) 377-4468	gregg@rhe.org	Kathleen McGowan	(310) 373-0330	kathleen.enve@verizon.net
County of Los Angeles	Frank Wu	(626) 458-4358	(626) 457-1526	fwu@ladpw.org	Bill DePoto	(626) 458-4313	bdepoto@ladpw.org

Table N-8

"JURISDICTIONAL GROUP 8" (BALLONA CREEK WATERSHED)							
Responsible Agency	Primary Contact	Phone	Fax	Email	Secondary Contact	Phone	Email
City of Los Angeles	Mas Dojiri	(310) 648-5610	(310) 648-5731	mdojiri@san.lacity.org	Farhana Mohamed	(310) 648-5923	fym@san.lacity.org
Beverly Hills	Vincent Chee	(310) 285-2507		vchee@beverlyhills.org			
Culver City	Lee Torres	(310) 253-5623	(310) 253-5626	lee.torres@culvercity.org	Sheila Kennedy	(562) 802-7880 x29	skennedy@jlha.net
Inglewood	Eric Escobar	(310) 412-5383		eescobar@cityofinglewood.org			
Santa Monica	Neal Shapiro	(310) 458-8223		neal-shapiro@santa-monica.org			
West Hollywood	Jan Harmon	(323) 848-6499		jharmon@weho.org			-
County of Los Angeles	Frank Wu	(626) 458-4358	(626) 457-1526	fwu@ladpw.org	Bill DePoto	(626) 458-4313	bdepoto@ladpw.org
Caltrans	Bob Wu	(213) 897-8636	(213) 897-0205	robert_wu@dot.ca.gov	Paul Thakur	(213) 897-7546	jai_paul_thakur@dot.ca.gov

Table N-9

"JURISDICTIONAL GROUP 9" (MALIBU CREEK WATERSHED)							
Responsible Agency	Primary Contact	Phone	Fax	Email	Secondary Contact	Phone	Email
County of Los Angeles	Frank Wu	(626) 458-4358	(626) 457-1526	fwu@ladpw.org	Bill DePoto	(626) 458-4313	bdepoto@ladpw.org
County of Ventura	Darla Wise	(805) 654-3942		darla.wise@mail.co.ventura.ca.us			
Caltrans	Bob Wu	(213) 897-8636	(213) 897-0205	robert_wu@dot.ca.gov	Paul Thakur	(213) 897-7546	jai_paul_thakur@dot.ca.gov
Calif. Dept. of Parks & Rec.							
(LVMWD)							
Agoura Hills	Jed Ireland			JIreland@ci.agoura-hills.ca.us			
Calabasas	Robin Hull	(818) 878-4242 x306	(818) 878-4205	rhull@ci.calabasas.ca.us	Roxanne Hughes	(800) 491-1720	RHughes@WILLDAN.com
Hidden Hills	Mark Smith	(310) 548-8454		envirosmith@earthlink.net			-
Malibu	Melanie Irwin	(310) 456-2489 x275	(310) 456-3356	mirwin@ci.malibu.ca.us			
Simi Valley	Ann Shubert Reyes			-			-
Thousand Oaks	Arne Anselm	(805) 449-2386		aanselm@toaks.org			-
Westlake Village	Roxanne Hughes	(800) 491-1720	(805) 643-0791	RHughes@WILLDAN.com			-

Table N-10

OTHER PARTICIPATING AGENCIES/ORGANIZATIONS							
Responsible Agency	Primary Contact	Phone	Fax	Email	Secondary Contact	Phone	Email
County of Los Angeles DHS	Richard Kebabjian	(626) 430-5370		rkebabjian@dhs.co.la.ca.us	Eric Edwards	(626) 430-5360	eedwards@dhs.co.la.ca.us
LACSD	Kathy Walker	(310) 830-2400 x5514		kwalker@lacsd.org	Alex Steele		
RWQCB	Renee DeShazo	(213) 576-6783		rdeshazo@rb4.swrcb.ca.gov	Jon Bishop		jbishop@rb4.swrcb.ca.gov
Santa Monica BayKeeper	Angie Bera	(310) 305-9645 x3	(310) 305-7985	octopus@smbaykeeper.org	Tracy Egoscue	(310) 305-9645 x1	baykeeper@smbaykeeper.org
Heal the Bay	Mitzy Taggert			mtaggart@healthebay.org			

APPENDIX O
Basin Plan

The Los Angeles Regional Water Quality Control Board's (Regional Board) Basin Plan is designed to preserve and enhance water quality and protect the beneficial uses of all regional waters. Specifically, the Basin Plan (i) designates beneficial uses for surface and ground waters, (ii) sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy, and (iii) describes implementation programs to protect all waters in the Region. In addition, the Basin Plan incorporates (by reference) all applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations. Those of other agencies are referenced in appropriate sections throughout the Basin Plan.

The Basin Plan is a resource for the Regional Board and others who use water and/or discharge wastewater in the Los Angeles Region. Other agencies and organizations involved in environmental permitting and resource management activities also use the Basin Plan. Finally the Basin Plan provides valuable information to the public about local water quality issues.

The Basin Plan is reviewed and updated as necessary. Following adoption by the Regional Board, the Basin Plan and subsequent amendments are subject to approval by the State Board, the State Office of Administrative Law (OAL), and the United States Environmental Protection Agency (USEPA).

The Basin Plan can be downloaded from the Regional Board's website:

http://www.swrcb.ca.gov/rwqcb4/html/meetings/tmdl/Basin_plan/basin_plan.html

Figure 1. Santa Monica Bay Beaches Bacterial TMDLs, Jurisdictional Overview.

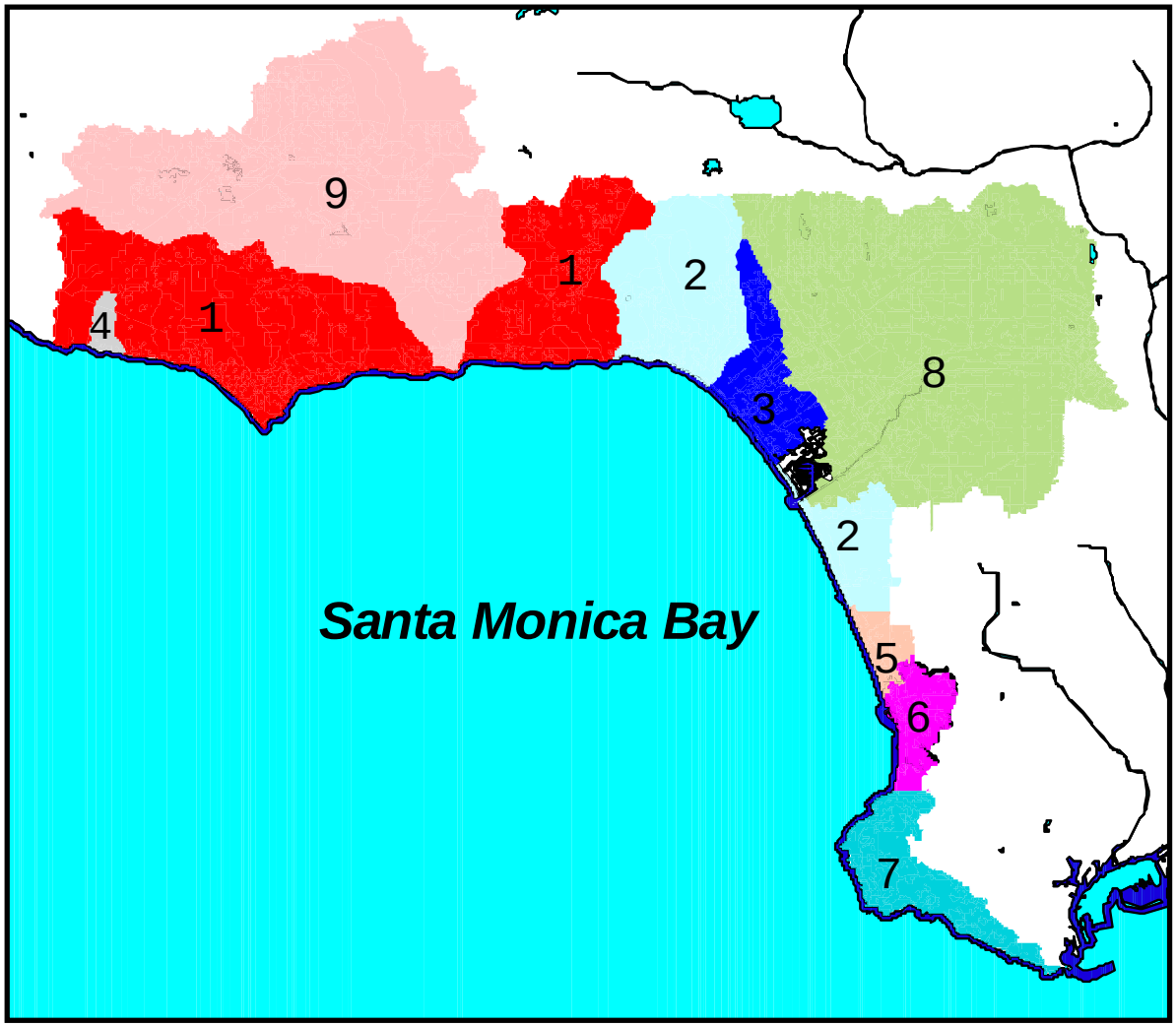


Figure 2. Jurisdiction 1.

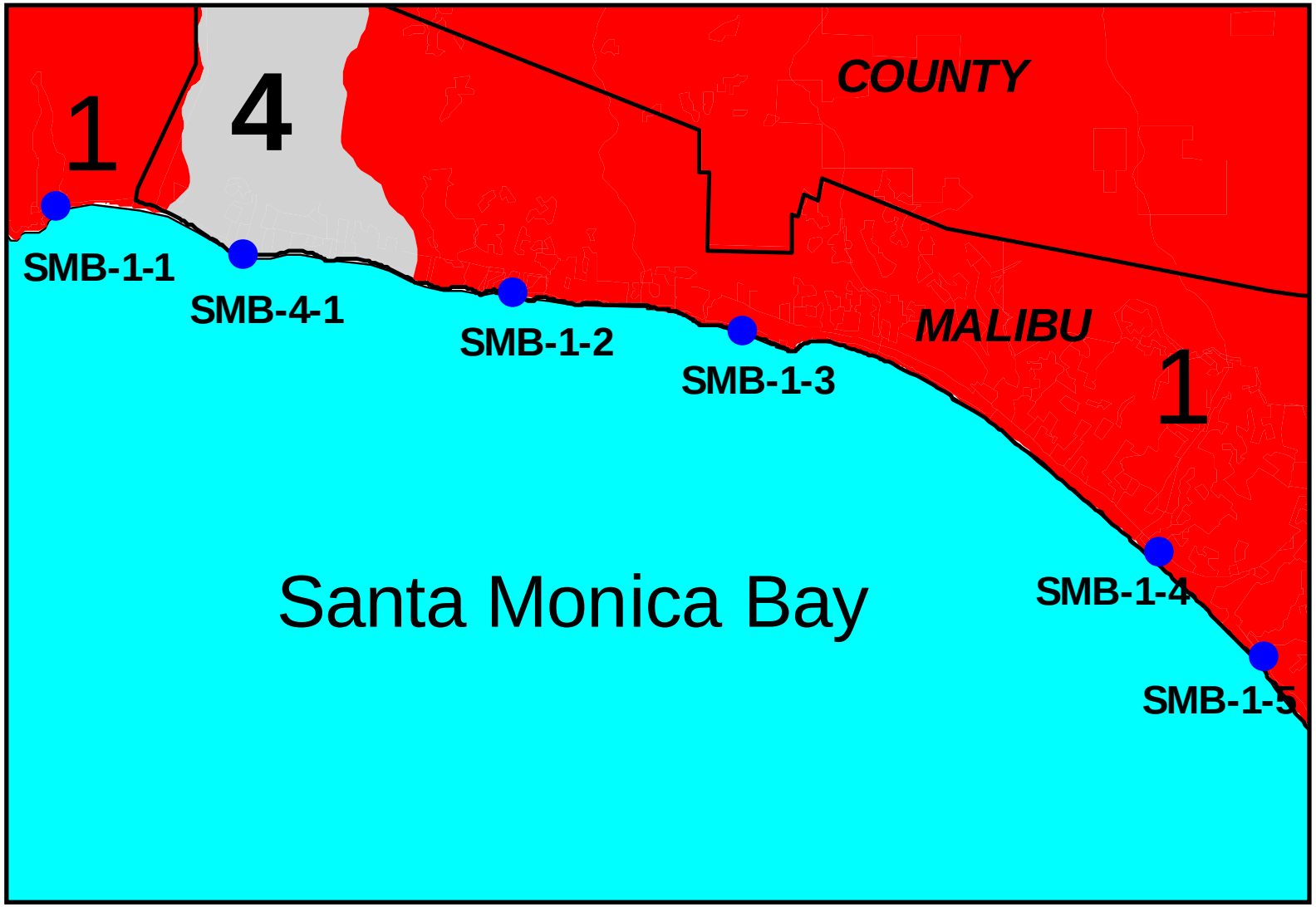
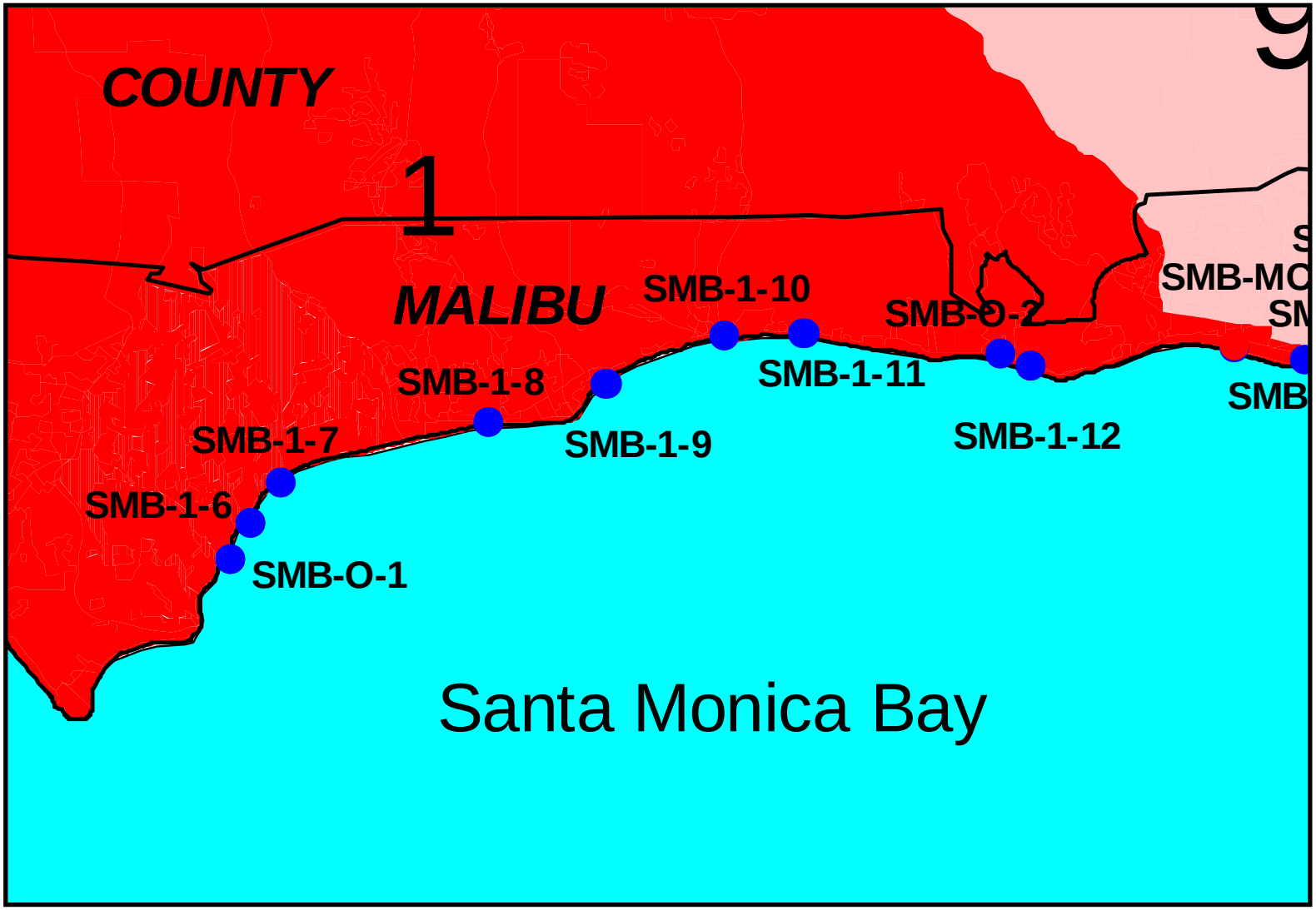


Figure 3. Jurisdiction 1 (Continued).



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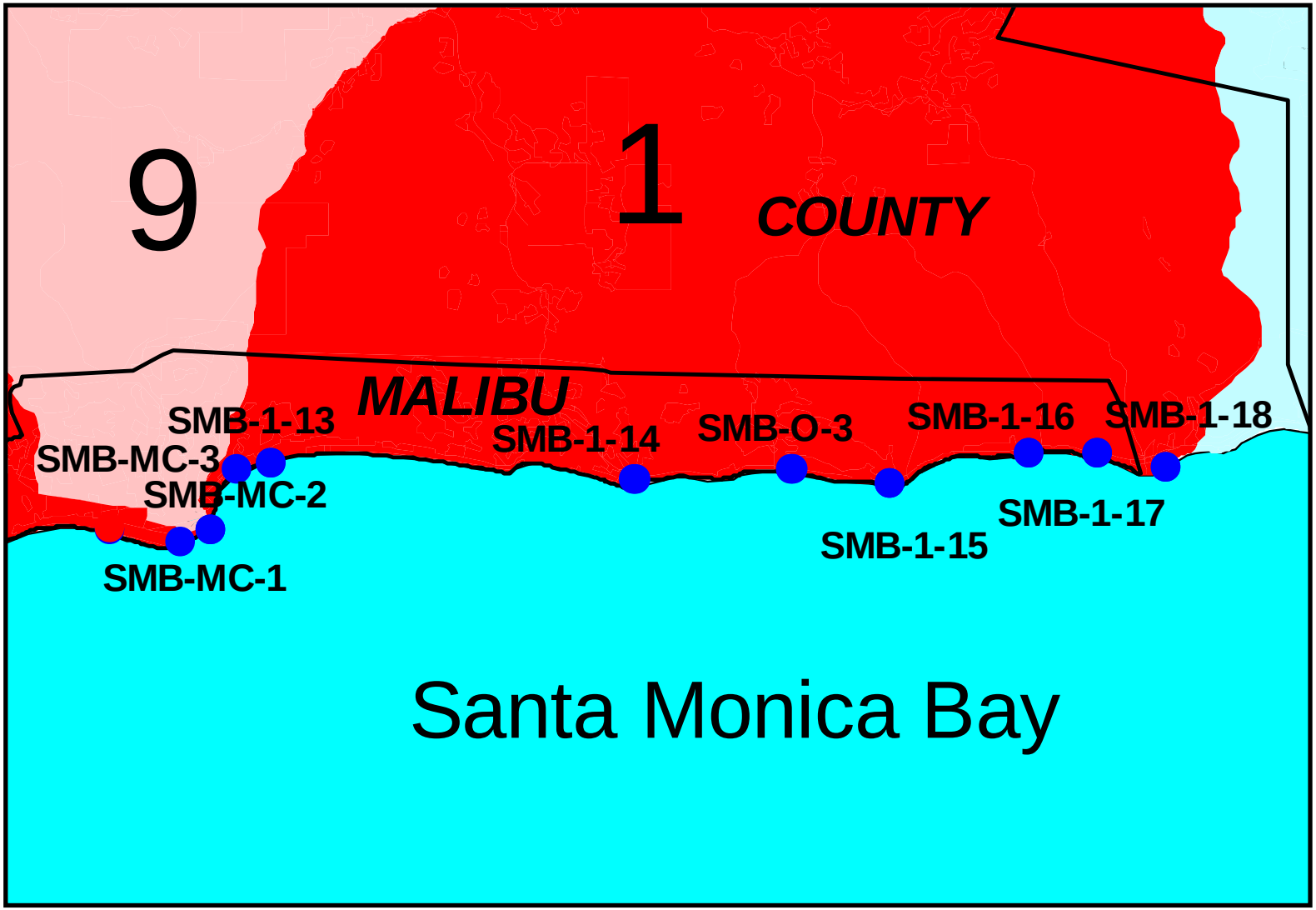


Figure 5. Jurisdiction 2.

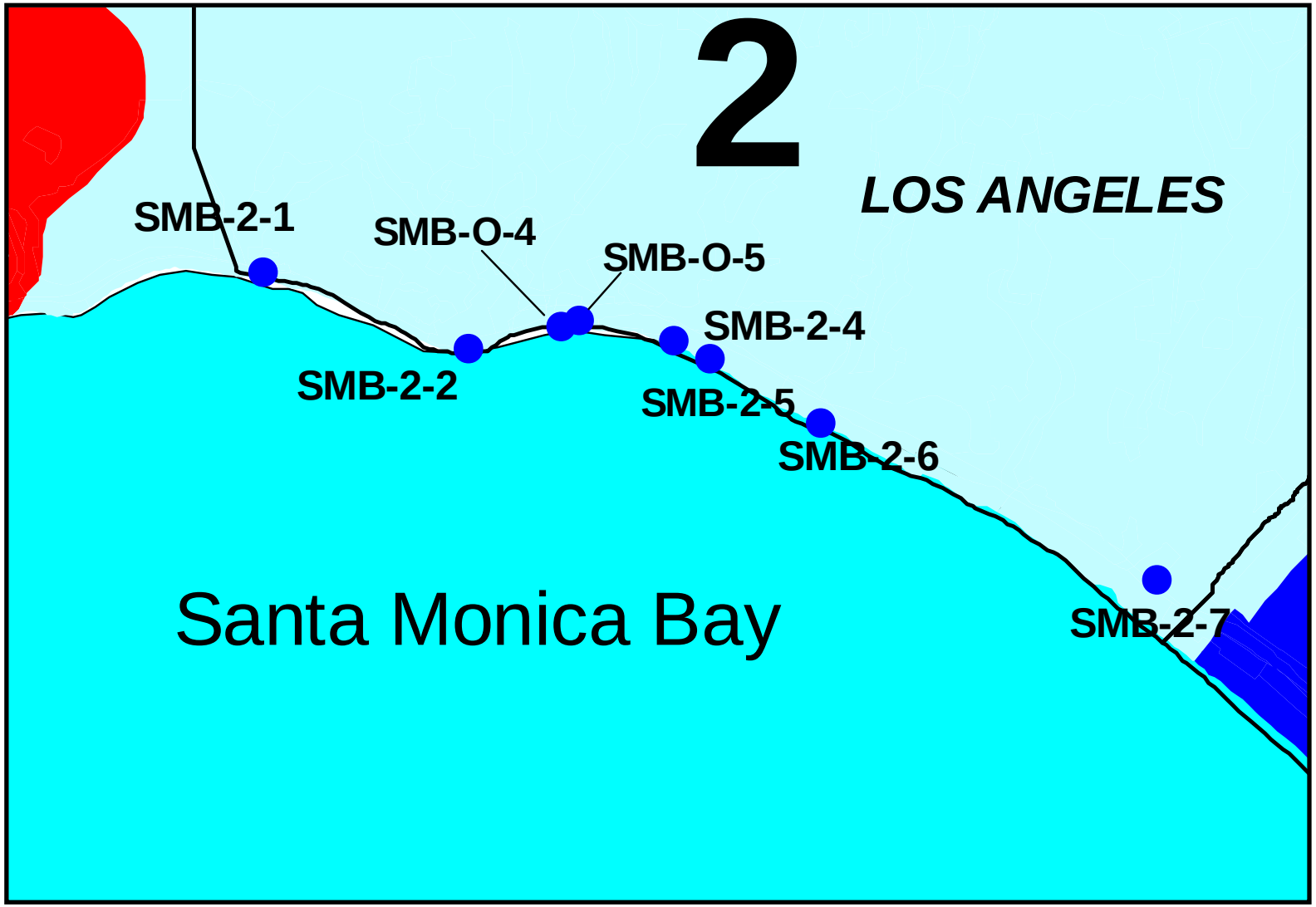
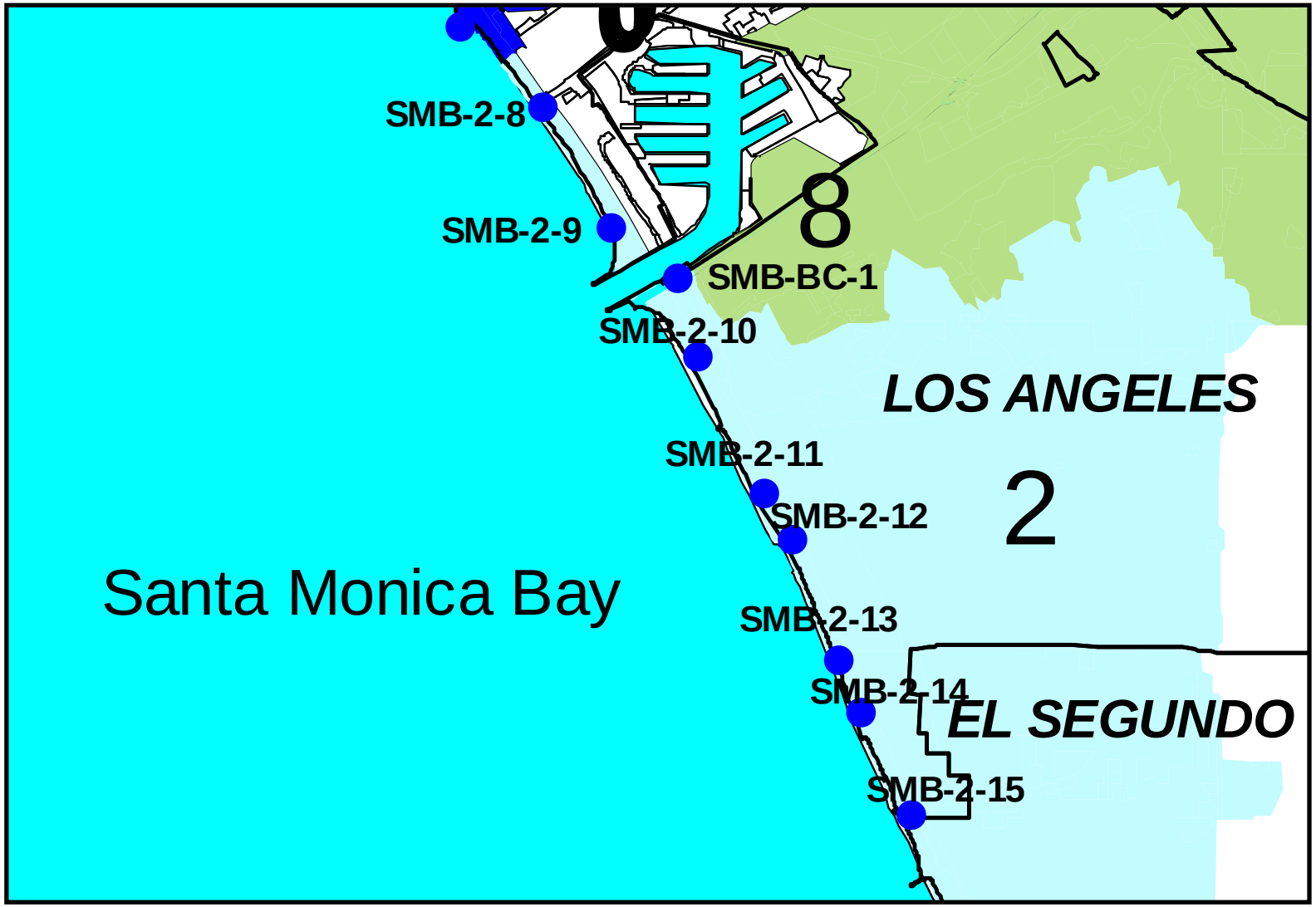


Figure 6. Jurisdiction 2 (Continued).



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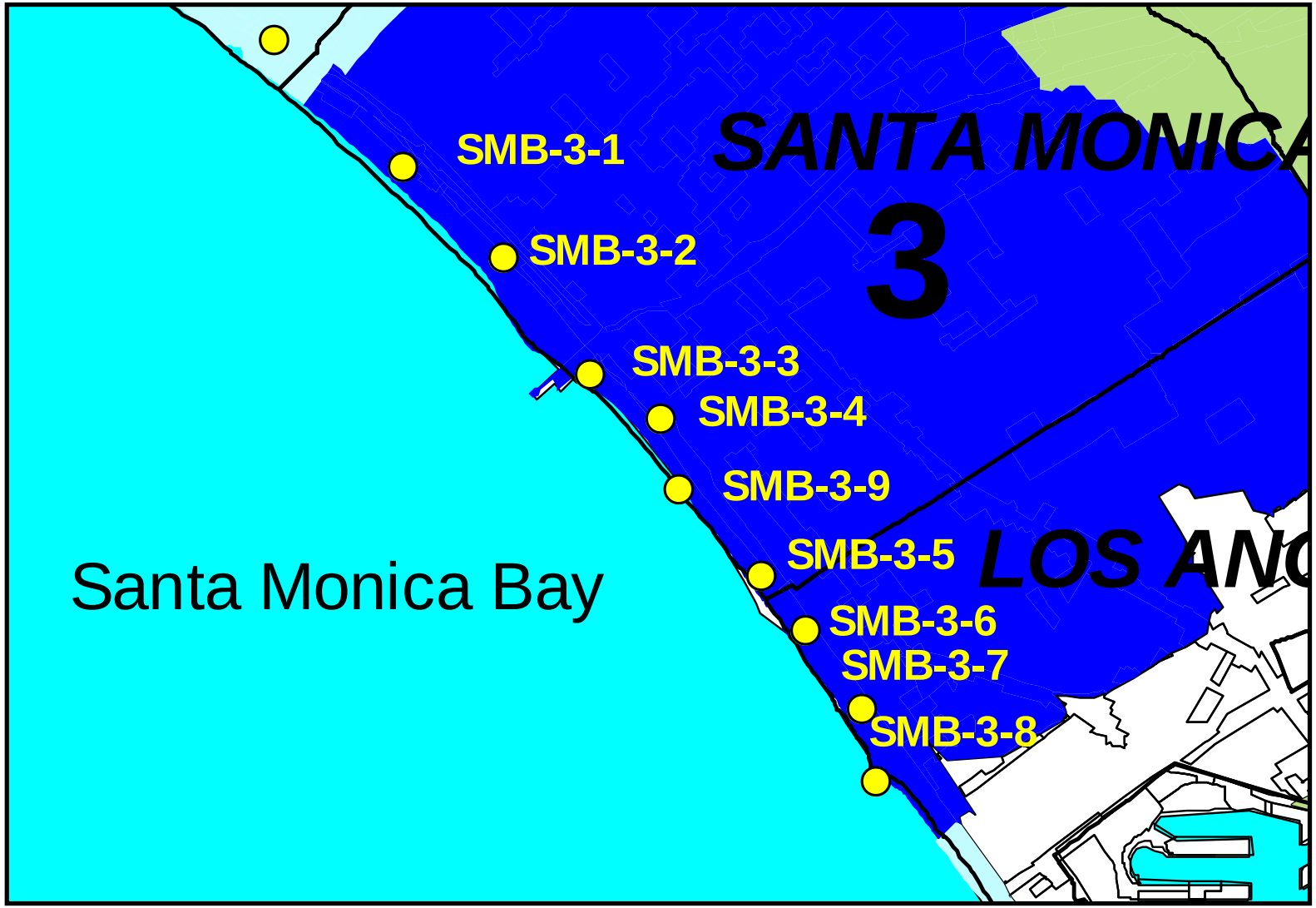

Figure 8. Jurisdiction 4.

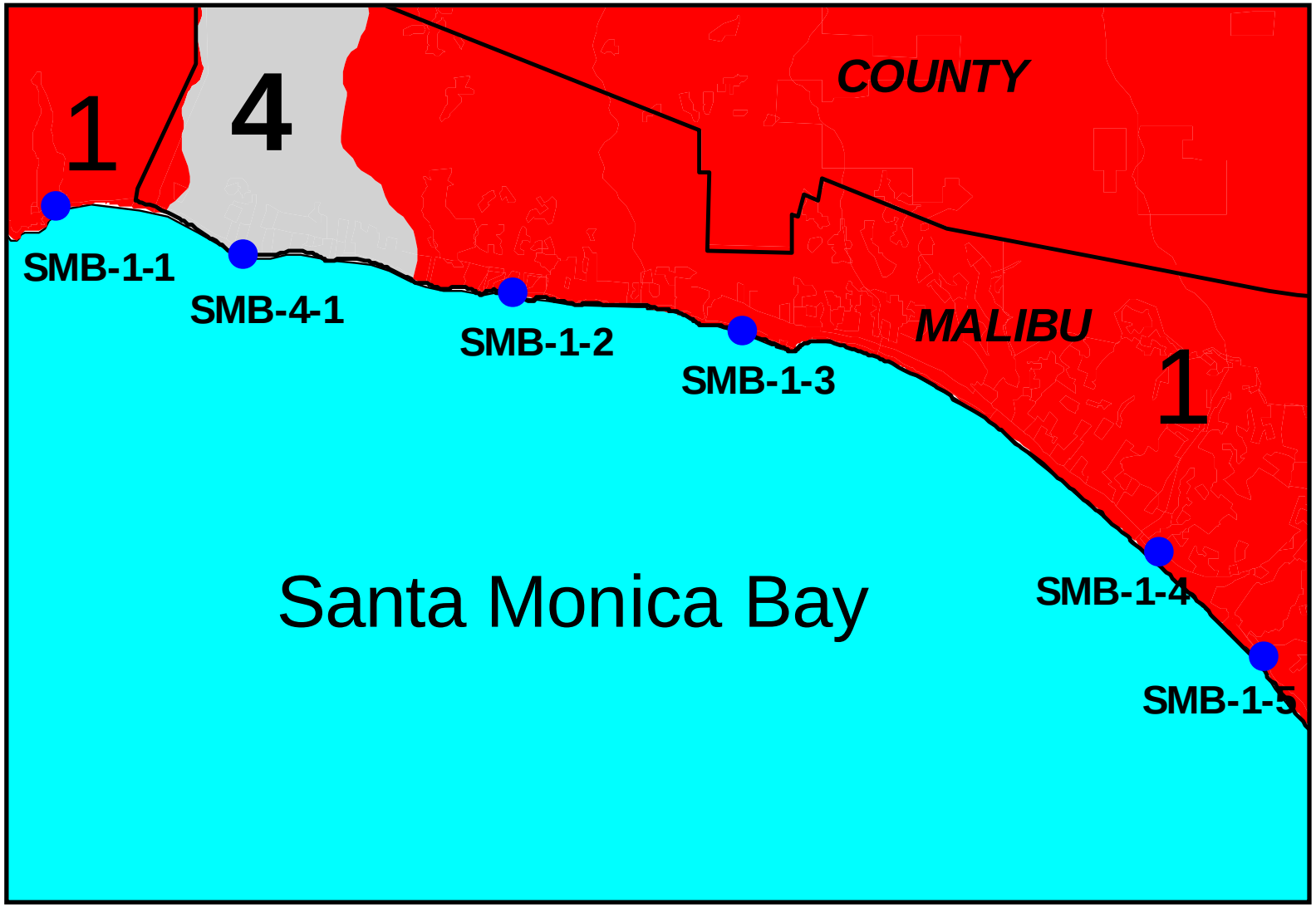

Figure 9. Jurisdiction 5.

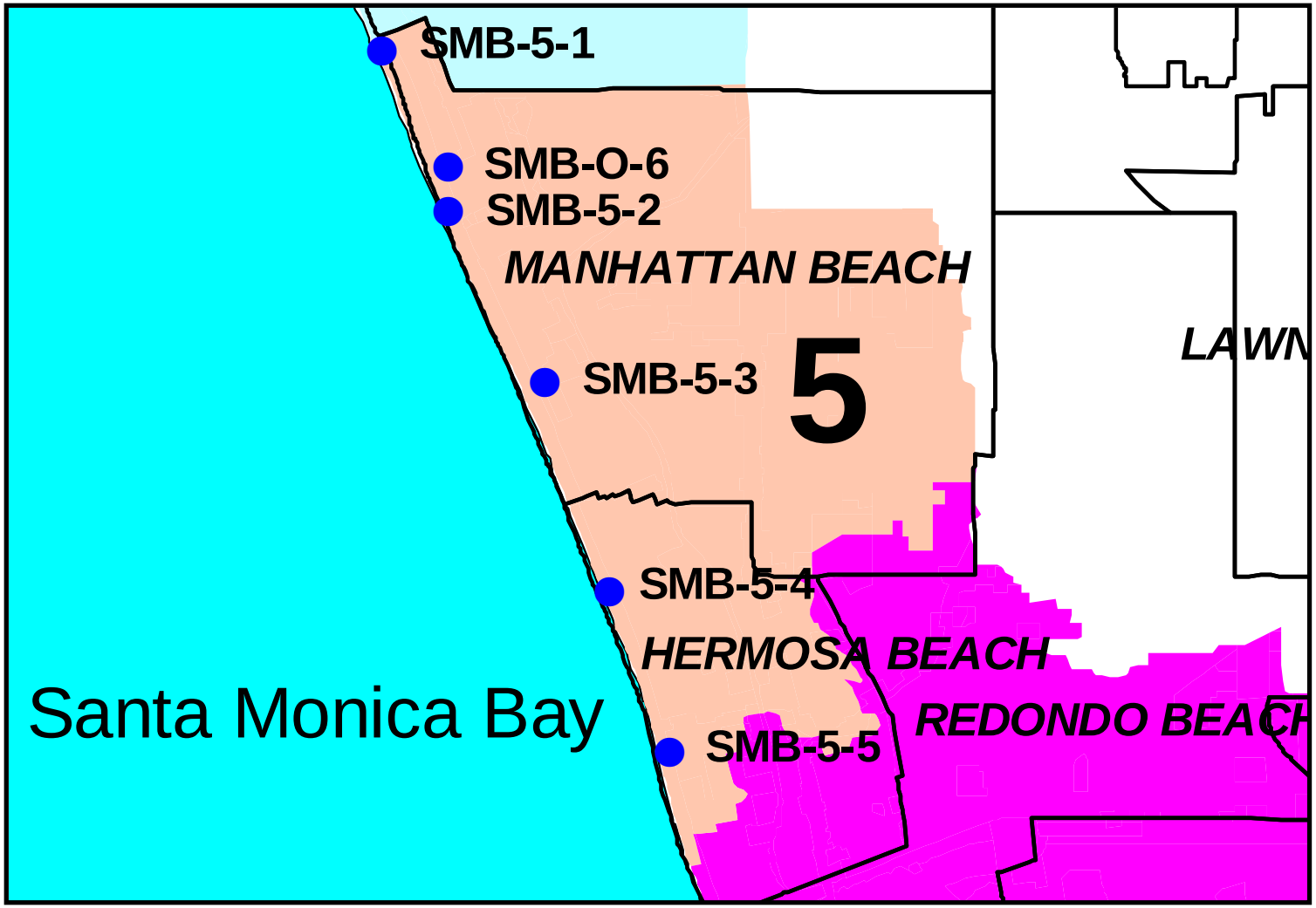

Figure 10. Jurisdiction 6.

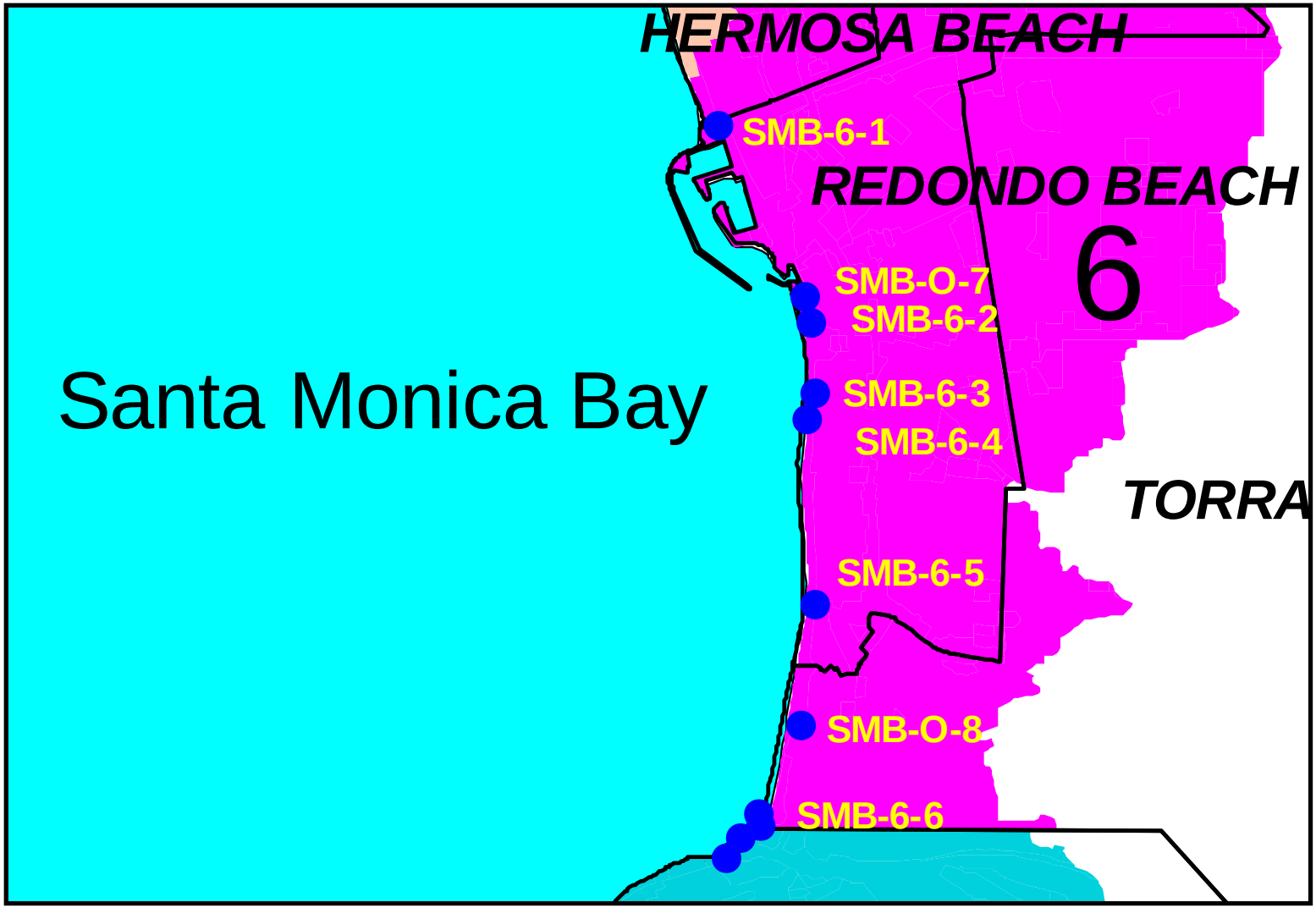

Figure 11. Jurisdiction 7.

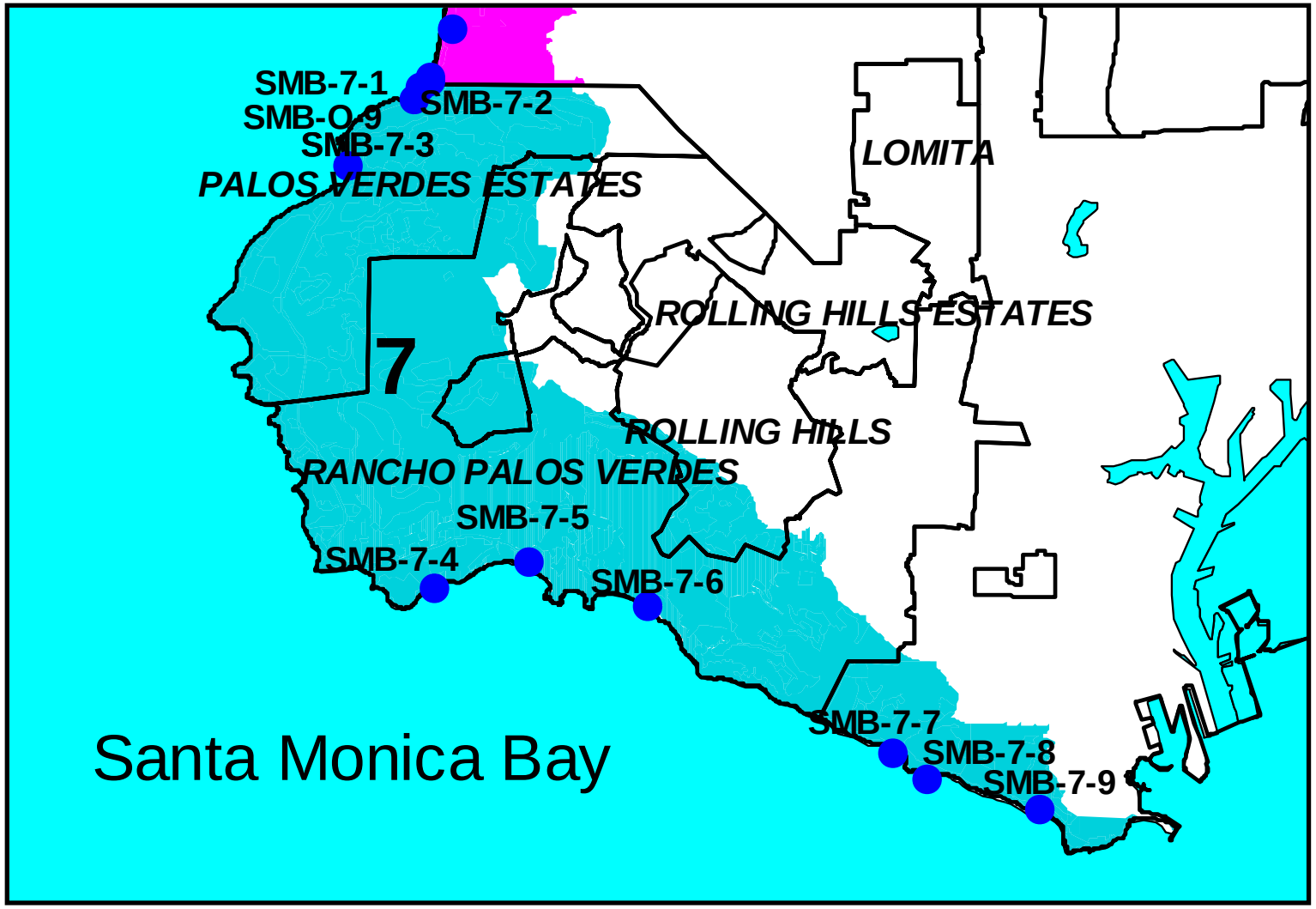

Figure 12. Jurisdiction 8.

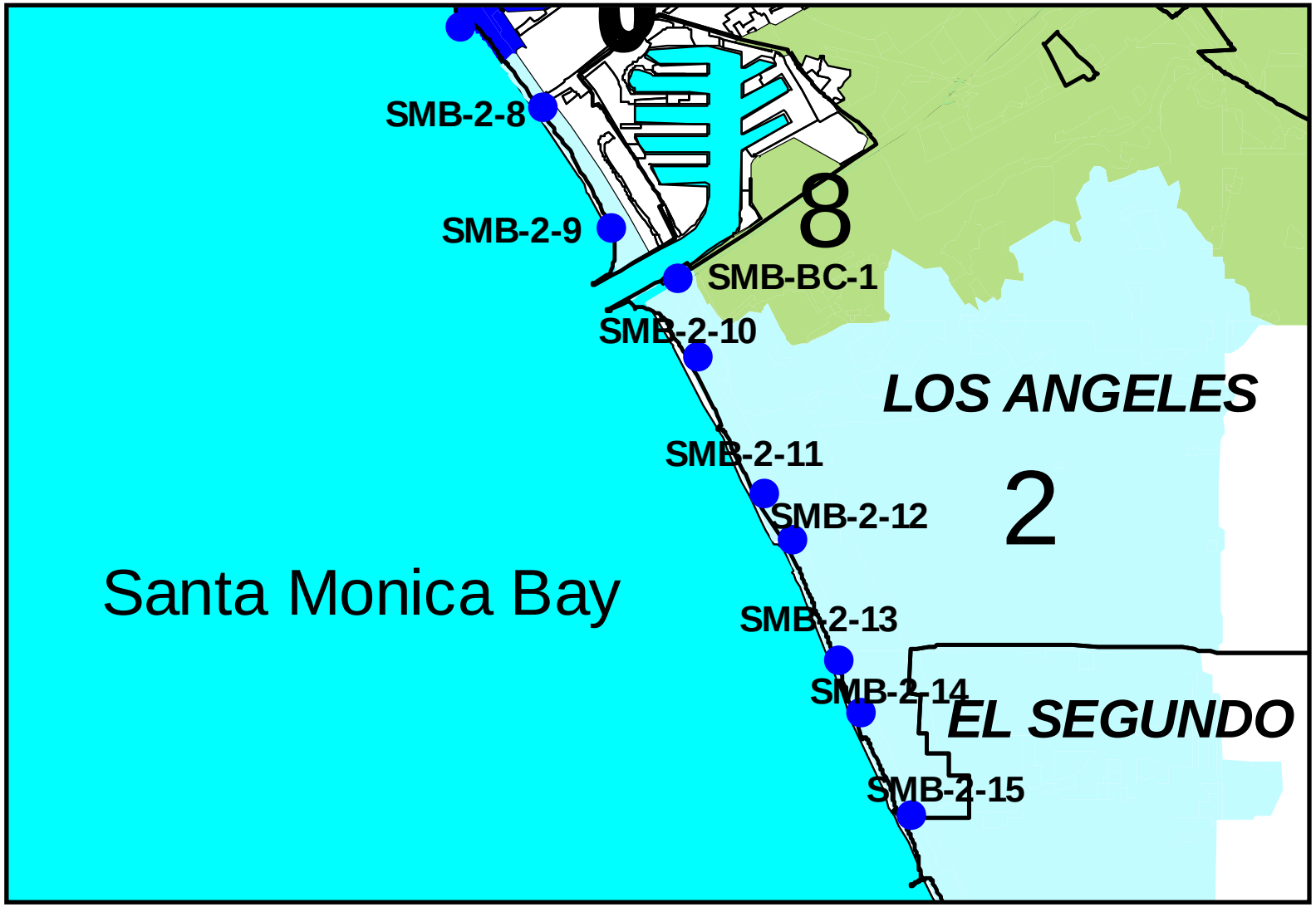

Figure 13. Jurisdiction 9.

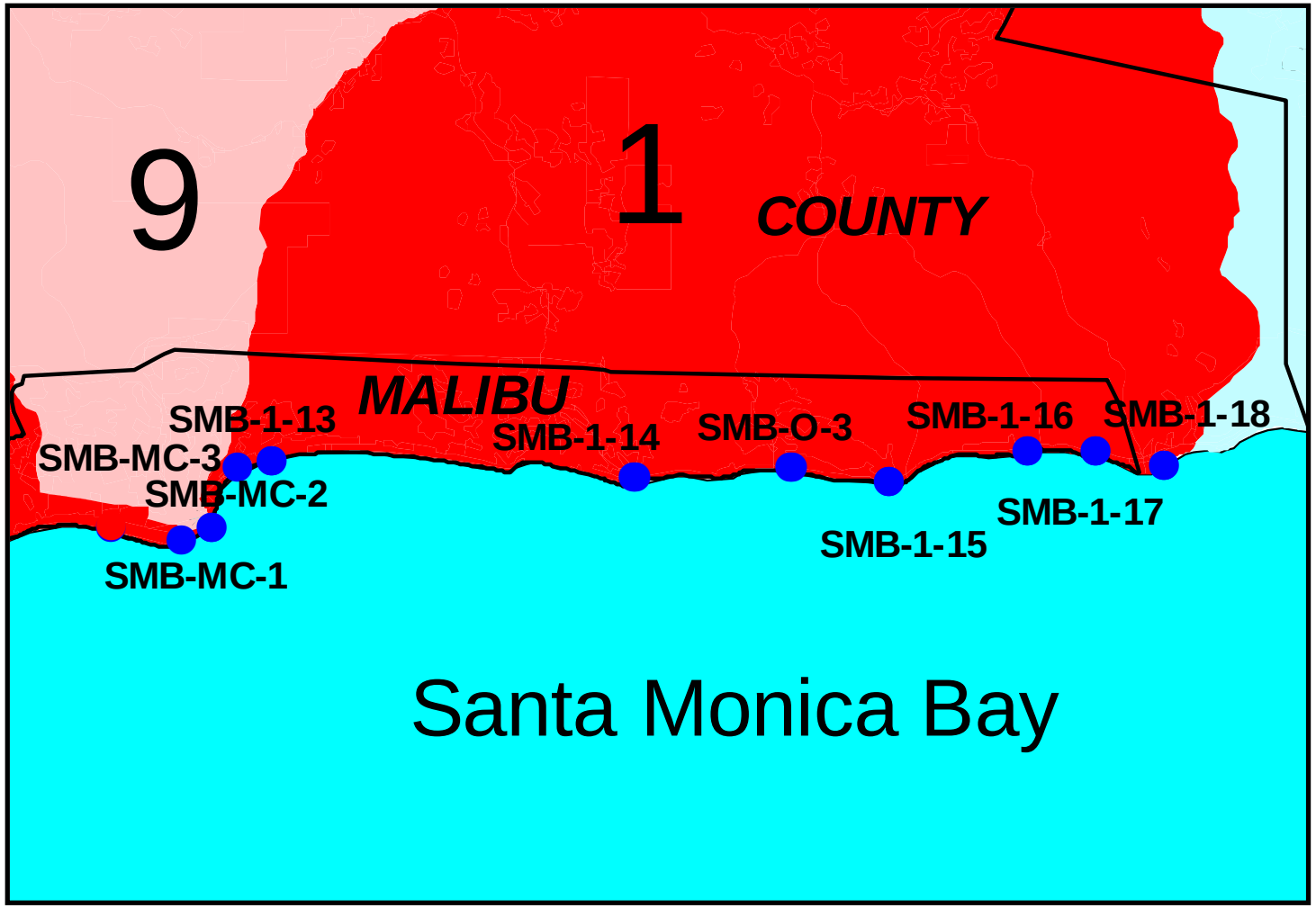
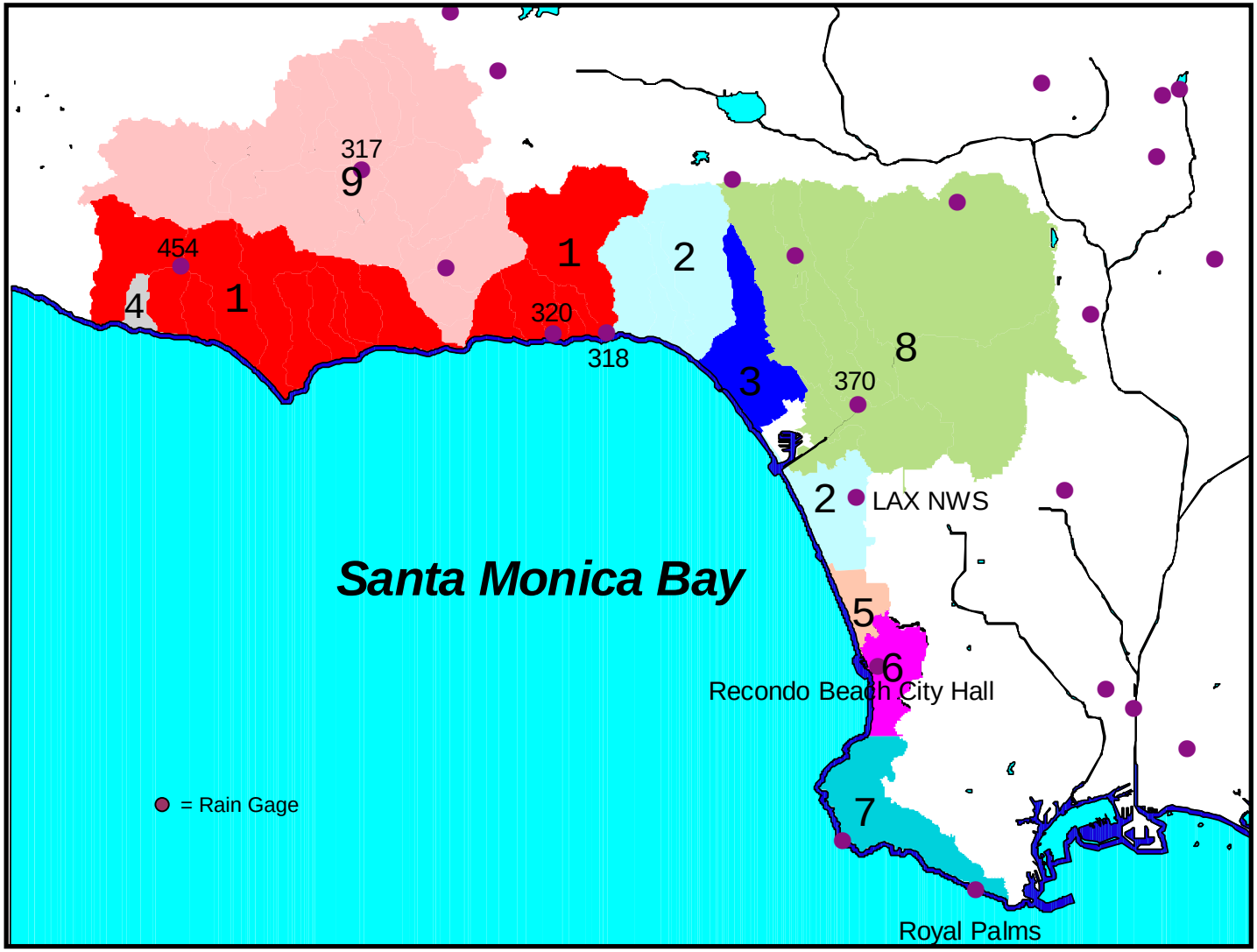
Figure 14. Rain Gage Locations.