Draft Guidance for Salt Water Beaches

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Note: for Appendices and References, go to
http://www.cdph.ca.gov/HealthInfo/environhealth/water/Pages/Beaches.aspx

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Glossary

AB 411: Assembly Bill 411 (Statutes of 1997, Chapter 765), amended Health and Safety Code Sections 115880, 115885, and 115915. These amendments include requirements for the Department of Health Services (DHS) to adopt regulations for public beaches (Health and Safety Code Section 155880—see Appendix A). Particular provisions apply to public beaches that are visited by more than 50,000 people annually and are adjacent to storm drains that flow in the summer. Health and Safety Code Sections 115885 and 115915 include requirements for local health officers.

Closure: The placement of signs at an area of a public beach that informs the public that the area is closed to swimming and water contact. These signs should indicate the nature of the public health concern (e.g., sewage spill), and should, by nature of their language, color, and design, enable the recreating public to differentiate from advisories provided by posting. Closure is envisioned to occur when health risks are considered greater than those associated with posting, as with sewage spills or at areas at which monitoring results show that multiple indicator organism standards are exceeded, for both single sample and 30-day average values. Closure is required by Health and Safety Code Section 115885(f) when an untreated sewage release is known to have reached recreational waters.

Posting: The placement of a sign or signs at an area of a public beach that informs the public of contamination of recreational water and the risk of possible illness, and advises against swimming and/or water contact (see Section 8.2). The placement of signs may be temporary, as a result of monitoring that indicates a single microbiological indicator standard is exceeded (e.g., for a public beach subject to AB 411), or more permanent, where monitoring indicates regular or sporadic contamination (e.g., a storm drain), or where sources of contamination are identifiable and can be explained (e.g., storm drain water, or residential marine mammals or seabirds). Posting is required by Health and Safety Code Section 115915(a) for certain public beaches whenever standards for microbiological indicator organisms are exceeded.

Storm drain: A conveyance through which water flows onto or adjacent to a public beach, and includes rivers, creeks, and streams, whether in natural or in man-made channels. The presence of a storm drain that flows in the summer is one criterion that identifies a public beach as being subject to AB 411.

1.0 Introduction

The purpose of this document is to provide guidance for local health agencies with regard to the sanitation and healthfulness of recreational waters and beaches. It includes guidance for developing a protocol for recreational waters, proposed standards for microbiological indicator organisms, discussions of beach posting, closure, and reopening, comments about public notification, and suggested language for signs used for posting and closure. It also includes other recommendations related to beach cleanliness.

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The appendices to this guidance include a review of current standards and guidance for ocean and fresh water recreation, as well as other related material. Appendices A, B, and C present state statutes and regulations, federal guidance, and local guidance and ordinances, respectively. Appendix D discusses the microbiological indicator organisms in standards and guidance. Appendix E provides a brief review of epidemiological studies associated with ocean and fresh water recreation. Appendix F provides information and current World Health Organization (WHO) guidelines on cyanobacteria (blue-green algae) in fresh water.

1.1 Sources of Microbiological Contamination of Recreational Waters

Microbiological contamination of recreational waters is generally associated human sewage or non-human wastes. So long as recreational areas are isolated from those wastes, contamination by disease-causing microorganisms is unlikely. However, there are a number of pathways by which such contamination may occur.

Sewage—Potential sources of microbiological contamination of recreational waters may be associated with system failures in human sewage treatment facilities, leaking sewer lines, or with rainfall and resulting surface water runoff.

When excessive rainfall occurs and sewage systems are not able to process the volume of water that enters them it, flooding may occur and releases of untreated sewage may occur.

Treatment processes that include secondary treatment followed by filtration and disinfection will be more protective of public health than those that do not include the latter steps.

Other Sources of Sewage—Other sewage retaining systems that are specific for recreational areas may be a potential source of microbiological contamination of recreational waters if they are poorly maintained or if their contents are otherwise released through accident, error, or deliberate action. Sources of possible contamination include releases from boat and recreational vehicle holding tanks, pumping stations, sewer line leaks, and portable toilets.

Septic Systems—Leachate from septic systems may be a potential source of microbiological contamination of recreational waters, particularly from septic systems that are poorly maintained, or during flooding. Although a single home septic system alone may pose a small risk of environmental contamination, in areas where septic systems predominate, shabby maintenance and flooding may be more significant.

Animal Wastes—Animal wastes may also contribute to microbiological contamination of recreational waters, though it is generally assumed that such contamination represents a less substantial human risk than contamination by human sewage. To the extent that animals may be allowed on beaches or other recreational properties, such as equestrian trails, their wastes may add to the microbiological burden of recreational waters.

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Even the practice of "curbing" one's dog may result in an added microbiological burden during times of surface runoff that ultimately reaches a recreational water body.

Feedlots, dairy farms, pasture land, forests and other "natural" areas, and urban surfaces may be sources of microbiological contamination. Animals, both wild and domestic, may also serve as vectors for microbiological parasites of public health concern, such as *Giardia* and *Cryptosporidium*.

Sewage Sludge—The distribution of treated sewage sludge, provided that treatment adequately destroys any microbiological components that may be present, should not pose a potential for microbiological contamination of recreational waters. Organisms in inadequately treated sewage sludge, which should not be disposed of on land, may be present in runoff associated with rainfall or with landscape or agricultural irrigation practices.

Surface Water Runoff—As mentioned previously, surface water runoff can contribute significantly to the census of microbes in a recreational body of water, particularly in times of heavy rains, in which street gutters and storm drain systems that often contain decaying organic matter are flushed out by large volumes of water.
In addition, sanitary sewers systems and septic systems may be overwhelmed by stormwater that may enter them. In situations with common storm drains and sewer drains, or leaking sewer drains, heavy rains are obvious problems.

Dry weather urban runoff may also contain high levels of indicator organisms.
In addition to urban runoff, surface runoff from other land surfaces may also contain microbes, and land on which wildlife or domestic animals are in dense populations may contribute to high microbial densities in runoff.

Swimmer-to-Swimmer Contamination—Another source of microbiological contamination of marine recreational waters are the individuals who are using those waters for recreation. Constituents of residual fecal matter may be washed off the body on contact with water, with most of it washed off within a relatively short time after submersion.

Hence, swimmers, bathers, waders, surfers, the fishing population, and others who may come into full- or most-body contact may all contribute to contamination to which they are exposed.

Infants and young children, and other individuals may also contribute significantly to microbiological contamination by accidental fecal releases. Others may cause contamination by intentional fecal releases, because of a lack of proper sanitary facilities at or near the recreational area, or because such facilities, though present, are not used.

Recreational users at beaches with limited tidal influence or wave action will likely be subject to a greater swimmer-to-swimmer contamination than those at beaches with more tidal exchange and more wave action, where water circulation would be greater.

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2.0 Protocol Development

Protocols should be developed for the following:

- Sanitary survey
- Sewage spills
- Stormwater runoff
- Sampling and laboratory analyses
- Beach posting, closure and reopening procedures

2.1 Sanitary Survey

A sanitary survey should be performed that identifies actual or potential sources of microbiological contamination of the recreational waters and beach areas. Information that is collected for purposes of the Drinking Water Source Assessment and Protection (DWSAP) Program or other watershed-related activities could contribute to a sanitary survey. The DWSAP Program document contains a checklist of possible contaminating activities for surface water sources that may be helpful in this regard.

Sources of contamination near recreational areas may indicate a need for increased monitoring of microbiological indicator organisms.

For recreational area with poor water circulation (e.g., the Salton Sea or certain bay or estuarine situations), the sanitary survey should include a discussion of the impact of bather load on recreational areas. Because of the poor water circulation, heavy bather loads can cause significant elevation in bacterial counts for total and fecal coliform and enterococcus bacteria.

High use areas with poor water circulation may also indicate a need for increased monitoring of microbiological indicator organisms.

2.2 Sewage Spills

A protocol should be developed that sets forth procedures for closing recreational waters and beach areas in the event of a sewage spill, including language that is used in public notification and signage, and monitoring requirements for reopening the affected recreational waters and beach areas (e.g., sampling indicates that standards are being met). The protocol should also indicate the extent of beach closure in terms of distance, based on the amount of sewage estimated to be discharged or spilled.

2.3 Stormwater Runoff

A protocol should be developed that sets forth procedures for public notification about beach contamination whenever significant amounts of rainfall result in urban runoff that enters recreational waters and beach areas.

The public notification should include press releases and updates of a telephone hotline that is accessible to the public. Other means of public access may also be utilized. The notification should inform the public that body contact with stormwater runoff should be

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avoided for a minimum of 72 hours following significant rainfall because of microbiological contamination. The 72-hour period should be adequate to dissipate microbiological contamination.

The protocol should include the language that is used in public notification and the means by which the information is distributed.

2.4 Sampling and Analysis Plan

A sampling and analysis plan should be developed that includes location of sampling sites, frequency of sampling, duration of sampling period, and depth of sampling. The plan should also include other pertinent information, such as containers for sampling, packaging samples for transport, references for analytic methods, reporting of data, requirements for repeat sampling. The plan should be developed in conjunction with the local Public Health Laboratory.

Location of Sampling Sites—Sampling sites should include areas used for water contact sports. In addition, areas known to be regularly or chronically contaminated, e.g., stormwater drains, should be included in the sampling plan.

Frequency of Sampling—Sampling no less frequently than weekly is recommended, and is required by AB 411 (see Appendix A). However, a minimum frequency of sampling should be established locally, based upon historical records, usage, current situations, and the potential of health hazards.

When samples are above standards or guidance levels, more frequent or daily sampling is appropriate, to determine whether the area should be closed to recreational use.

Subsequent sampling is also needed to determine when to reopen the recreational area.

Time of Sampling—Sampling should occur at each location at generally the same time of day.

For crowded beaches at which bather-to-bather contamination may be a significant route of microbiological exposure, for example, where the wave and tidal actions that tend to refresh open ocean beaches are lacking, sampling when recreational use is highest may be appropriate (e.g., mid-afternoon).

Duration of Sampling Period—The sampling period should cover the period of recreational use. AB 411 requires sampling from April 1 through October 31.

Depth of Sampling—Samples should be taken from just below the water surface, in ankle- to knee-depth water, approximately 12 to 24 inches deep.

Sampling from boats is inadequate for beach monitoring, since water depths would exceed those common to beach-related recreational water sports activities, especially for young children. However, local health agencies may desire to assess water quality away from the shore in additional areas where surfing, windsurfing, or other activities may occur.

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Indicator Organisms—Indicator organisms should include total coliform bacteria, fecal coliform bacteria, and enterococcus bacteria. These three are required by AB 411.

2.5 Laboratories and Laboratory Analyses

All samples are to be submitted for analyses to a laboratory certified by the Department of Health Services' Environmental Laboratory Accreditation Program (ELAP), in microbiology for methods appropriate for the analysis of the sample type. [See recommended analytical methods for recreational marine water for AB 411.] Transportation conditions, holding time limits, and analysis of samples shall be in accordance with those methods that appear on the certificate listing for microbiology of ELAP.

Analyses should be completed expeditiously after they are received in the laboratory. Preliminary results should available from the laboratory as soon as possible, and, if they exceed the standards for microbiological indicator organism, the laboratory should telephone the appropriate local agency. Written results should be provided within one week after sampling.

Use of *Escherichia coli* as a surrogate for fecal coliforms—When a test method measures *E. coli* to be used as a surrogate for fecal coliforms, laboratories should split samples between such a method and either the multiple tube fermentation or membrane filtration method with standard confirmation steps, and run the two tests in parallel, to identify an appropriate correction factor to apply to the *E. coli*-derived values (*e.g., E. coli* per 100 ml x 1.2 = fecal coliforms per 100 ml). Such parallel testing should include enough samples to develop a scientifically credible correlation between the two methods. It should occur at least once per year (for example, early summer) or twice each year (for example, early spring and late summer), and ideally should be done for each type of water source that is subject to the sampling program (for example, ocean beach and estuarine beach). The most recently derived correction factor should be applied to the *E. coli* values to determine compliance with the fecal coliform standard. Laboratories should retain the results of the parallel testing in their files, consistent with their record retention procedures.

Data Reporting—The sampling and analysis plan should indicate how data are to be reported, particularly if they are outside the reporting range. For example, samples below the testing range for the most probable number (MPN), e.g., <20 MPN, should be reported as "<20 MPN" and not as "zero."

The sampling and analysis plan should also indicate how data outside the testing range are used in the calculation of 30-day averages. For example, a sample that is <20 MPN may appropriately be designated "10 MPN" (half the upper range for the sample) for purposes of assigning a numeric value that can be used for determining the monthly values.

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2.6 Posting, Closure and Reopening Procedure

The protocol should include procedures for posting and closing beaches and recreational areas, public notification, and procedures for determining whether posting and/or closure should continue.

2.7 Reporting to Water Board Requirements

Pursuant to Health and Safety Code Section 115910, coastal health officers with beaches subject to AB 411 will be required to report postings and closures to the State Water Resources Control Board on a monthly basis, beginning in 2001.

3.0 Corrective Action

When recreational waters fail to meet standards or guidance, the local health officer may need to take corrective action. In some cases, the actions of the local health officer are discretionary, in that after taking into consideration the causes for the elevation of microbiological indicators, he or she may close, post with warning signs, or otherwise restrict use of the recreational area until corrective action has been taken and standards or guidance levels are met.

In other situations, such as ocean beaches that are subject to the provisions of AB 411, the local health officer does not have such discretion.

4.0 Sewage Spills and Closing Recreational Beaches

Immediate beach closure is the appropriate corrective action whenever sewage releases or spills occur. The closure should continue until after the spill or release has been stopped, and until monitoring indicates that the contamination levels meet appropriate standards (see Section 5.0)

5.0 Indicator Organism Levels and Posting/Closure

Appendices A and B present existing state and federal numeric standards and guidance for indicator organisms. Appendix C presents a brief summary of local guidance and ordinances.

Decisions about posting and closing beaches should be based upon the most recent single samples. Thirty-day averages allow determinations to be made of the natural fluctuations of the numbers of those organisms. Longer term evaluations also provide an understanding of the presence of indicator organisms, in terms of their association with rainfall, stormwater runoff, dry urban runoff, recreational use, or other conditions specific to a particular beach or recreational area. The proposed AB 411 regulations instruct the

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local health officer to utilize both single sample and 30-day averages in determining whether to close or otherwise restrict the use of a beach or a portion thereof.

Areas that are consistently contaminated may be appropriate for long-term or permanent posting. Those that are highly contaminated with exceedances of single sample and 30-day standards for multiple indicator organisms may be appropriate for closure.

5.1 Single Sample Values

Beach posting is recommended (and required for certain beaches under Health and Safety Code Section 115915 and the AB 411-implementing regulations) when indicator organisms exceed any of the following levels:

- Total coliforms: 10,000 per 100 ml
- Total coliforms: 1,000 per 100 ml, if the ratio of fecal/total coliforms is greater and 0.1. The fecal/total ratio is an indicator of health risk, and a ratio that increases from 0.1 towards 1.0 may indicate a greater risk of illness.
- Fecal coliforms: 400 per 100 ml
- Enterococcus: 104 per 100 ml

5.2 Thirty-Day Average Values

Additional sanitary surveys and other related evaluations, including more frequent sampling if levels appear to be on an increasing trend, are recommended when indicator organisms exceed any of the levels given below, based on the log mean of at least 5 equally spaced samples in any 30-day period:

- Total coliforms: 1,000 per 100 ml
- Fecal coliforms: 200 per 100 ml
- Enterococcus: 35 per 100 ml

6.0 Reopening Closed Beaches

The standards of Section 5.0 should be used to determine the appropriateness of continuing to post or close beaches or recreational areas, or portions thereof.

7.0 Prohibition of Diapers from Beaches and Recreational Waters

Because of the likelihood of contamination of recreational waters by fecal matter, diaper-wearing infants should be prohibited from water contact.

Public notification may be used to inform parents and others about the prohibition of individuals wearing diapers from water contact. Methods of public notification may include, but are not limited to, signs, notices, or flyers.

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8.0 Public Notification

Notification may be provided to the public by signs, press releases, and electronic access. Health and Safety Code Section 115885(c)(2) requires the local health officer to establish a telephone hotline to provide public information.

Appropriate language for signs and their placement along a beach is best determined by local experience, although Health and Safety Code Section 115915 does have some specific posting requirements.

8.1 Signs

Signs should be present near the portion of the recreational area at which water contact will occur, and elsewhere (e.g., along walkways to the beach, park entrances) where they are likely to be read. Signs should be large enough to be clearly seen and legible. They should be posted in English and other language(s) as appropriate.

Other signage than those examples given below may be appropriate, as determined by local agencies. A variation of the international sign, with a graphic depiction of a swimmer in a red circle with a diagonal hash mark, may be useful in some locations. Signs in a second language may be appropriate if a large percentage of recreational water users only speak that language.

POSTING

Signs for Beach Posting Associated with Storm Drains—If a storm drain at a recreational area is chronically contaminated, the area affected by the storm drain should be posted with language similar to the following:

WARNING!
STORM DRAIN WATER MAY CAUSE ILLNESS.
NO SWIMMING IN STORM DRAIN WATER

or

WARNING!
CONTAMINATED STORM DRAIN WATER.
NO SWIMMING IN STORM DRAIN WATER

Signs for Beach Posting Not Associated with Storm Drains—If a beach or recreational area is contaminated, the area should be posted with language similar to the following:

WARNING!
CONTAMINATED WATER
SWIMMING NOT ADVISED

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Signs for Beach Posting Associated with Contamination by Populations of Marine Mammals or Seabirds—If a beach or recreational area is contaminated by marine animals or birds, the area should be posted with language similar to the following:

WARNING!
WATER CONTAMINATED BY MARINE MAMMALS
SWIMMING NOT ADVISED

or

WARNING!
CONTAMINATED WATER BY BIRDS
SWIMMING NOT ADVISED

CLOSURE

Signs Indicating Beach Closure—If a beach or recreational area is closed because of a sewage spill or other similar contamination, signs should be used to indicate the closure. Signs for closure should be easily recognized (by virtue of their color, shape, wording, symbols) as of different from those used for posting. Language should be similar to the following:

WARNING!
UNTREATED SEWAGE SPILL
BEACH CLOSED

or

WARNING!
CLOSED TO SWIMMING.
BEACH/SWIMMING AREA IS CONTAMINATED
AND MAY CAUSE ILLNESS

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8.2 Press Releases

Notification of beach postings or closures because of rainfall and urban runoff, sewage spills, or other public health concerns by print and electronic media is appropriate. Such notification should be considered supplemental to posting and closure, if those activities are required.

All press releases should come from the health authority.

8.3 Electronic Access

Notification of beach postings or closures because of rainfall and urban runoff, sewage spills, or other public health concerns by means of recorded messages accessible by a telephone hotline is recommended (and required by AB 411). Additional public information may be provided by electronic bulletin boards, the Internet, and local radio and television.

8.4 Other Information

To minimize person-to-person microbiological contamination, local health agencies may provide visitor education programs and present information on sanitary practices, consisting of notices posted at the beach/park entrances and flyers given to individuals.

An example of such information is alerting the public that children should not be allowed to wear diapers in recreational waters.

Because of the likelihood of microbiological contamination of recreational waters by the recreating public themselves, a public education campaign (postings, brochures, public service announcements) might be implemented. Such a program could encourage good hygiene practices, avoidance of swimming while ill, control (where feasible) of accidental fecal releases among infants and young children (including recommendations for no diaper wearing in recreational waters, as discussed in Section 7.0). It could also discuss the increased probability of sharing pathogenic organisms when large numbers of people share recreational waters.

8.5 Notification Associated with a Rainfall Event

In the event of rainfall that occurs between April 1 and October 31 and leads to runoff that reaches public beaches subject to AB 411, local health officers may choose to utilize a combination of posted warnings and telephone hotline information required for AB 411-regulated beaches adjacent to storm drains, and press releases that advise against water contact for 72 hours after rainfall ceases (see Section 2.3). In this way the local health officers can meet their obligation to post warnings around storm drains and provide information via their hotlines, but are able to make use of their discretion in taking corrective action at beaches not adjacent to storm drains. Such an approach is reasonable, and assures that local health agencies need not expend valuable and limited resources by posting and taking down warnings with changing weather.

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