# Newport Bay Enterococci Analysis

Newport Bay Fecal Coliform
Stakeholder Meeting

August 24, 2017

# Background

- **At our first meeting, we decided we want to focus first on existing fecal indicators**
  - Fecal coliform and *Enterococcus*
  - *We have that data in house already*

- **At the next meeting, Steve showed how we were faring for both those indicators**
  - Enterococcus was more sensitive
  - We selected this as our focal point for assessment

# Two Challenges

- **We need a threshold for what constitutes an unacceptable level of Enterococcus standards exceedances**
  - **At the last meeting we explored using a reference beach approach**
  - **Decided there aren't great reference beaches**
  - **Decided to default to numbers in listing policy**
- **The State has recently proposed new Enterococcus standards**
  - **We don't what effect that will have on the earlier analyses we examined**

# Goals for today

- **Compare the number of exceedances between old and new standards**

- **Apply the listing policy thresholds to determine whether/where/how often the beaches are above listing thresholds**

# Impairment Assessment under Potential State Bacteria Provisions Using 2010-16 *Enterococcus* Data

Evaluated potential impairments using 2004 State Listing/Delisting Policy in the following ways:

- **Evaluated by Weather**
  - Dry weather (no precipitation or 4+ days after precipitation) vs wet weather (rain day plus 3 days)
- **Evaluated by Bay Region**
  - Upper Bay, Lower Bay, and Entire Bay vs individual monitoring stations
- **Evaluated by Potential State Objectives**
  - 42-day rolling geomean objective of **30 CFU/100 mL**
  - Static 4-week/30 day/calendar month - 90$^{th}$ percentile objective of **110 CFU/100 mL** (**Statistical Threshold Value, or STV**)

    [Note: an additional analysis was conducted using a 4% threshold for summer season data based on input from Steve Weisberg]

# Water Quality Objectives

- 2004 EPA Criteria (Water Quality Standards for Coastal and Great Lakes Recreational Waters)
  - Geomean (30-day period): **35 CFU/100 mL**
  - Single Sample Maximum: **104 CFU/100 mL**

- 2018 Propose New State Criteria
  - Geomean (Six week period): **30 CFU/100 mL**
  - Single Sample Maximum replaced with Statistical Threshold Value (STV)
    - **No more than 10% of samples above 110 CFU/100 mL**

# Comparison between old and new WQS for Geomean

| Waterbody | Analysis period | Number of geomeans | Geomean window | Water Quality Standard | Number of geomeans> WQS | Percentage |
|---|---|---|---|---|---|---|
| Upper Bay | Year, Dry weather | 321 | 30 days | 35 | 5 | 2% |
| Upper Bay | Year, Dry weather | 313 | 42 days | 30 | 5 | 2% |
| | | | | | | |
| Lower Bay | Year, Dry weather | 407 | 30 days | 35 | 0 | 0% |
| Lower Bay | Year, Dry weather | 313 | 42 days | 30 | 0 | 0% |

# 2004 Listing Policy

- Listing policy identifies failing the enterococcus standards up to 4% of the time in the AB411 season as acceptable
  - This number rises to 10% in the non-AB411 season
- The policy also identifies a zone of indetermination to account for circumstances when you have low sample size
  - Uses a binomial distribution to determine what is large enough to be truly larger than the 4 (or 10)% threshold

# A ton of Tables

- **We sent you out a ton of tables**
  - **Many permutations**
- **I will walk you through what is included in those tables**
- **I will finish by giving you my interpretation of the most relevant tables**

# Resulting Tables

- **Tables 1-9**
  - Upper Bay, Lower Bay, and Entire Bay
  - Dry and wet combined / dry weather alone /wet weather alone
  - Rolling 42-day geomean
  - Static STV: 28 day / calendar month / 30 day
  - Sample size: any sample size (min. of 1 sample)
  - Impairment threshold: 10%
- **Not a big difference in static approach for four week, calendar month, or 30-day – State is proposing monthly**

# Resulting Tables

- **Tables 10-15**
  - Individual station analysis
  - Dry and wet combined / dry weather alone /wet weather alone
  - Rolling 42-day geomean
  - Static STV: Calendar month only
  - Sample size: 5 or more samples period / any sample size (min. of 1 sample)
  - Impairment Threshold: 10%
- **Fewer STV exceedances using any sample size – unable to calculate STV for wet weather for 5 or more samples**

# Results: Tables Description

- **Tables 16-17**
  - Upper Bay, Lower Bay, and Entire Bay
  - Dry season/wet season
  - Rolling 42-day geomean
  - Static STV: Calendar month only
  - Impairment Threshold: 4 % (dry season) 10% (wet season)
- **No impairment during dry season and potential impairments during wet season**

# Results: Tables Description

- **Tables 18-19**
  - Individual Station
  - Dry season/wet season
  - Rolling 42-day geomean
  - Static STV: Calendar month only
  - Impairment Threshold: 4 % (dry season) 10% (wet season)
- **More stations have STV and geomean exceedances during dry season when using the 4% threshold than during year round dry weather using the 10% threshold**

# Data Analysis for Newport Bay Fecal Coliform Stakeholder Meeting
# August 24, 2017

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# Tables 1-3

**Analysis Conditions**

| | |
|---|---|
| Period: | 2010-16 |
| Season: | Table 1 - Dry and wet weather year round |
| | Table 2 - Dry weather |
| | Table 3 - Wet weather |
| Region: | Upper Bay, Lower Bay, and Entire Bay |
| Geomean objective: | 30 CFU/100 mL |
| Rolling period geomean, by week (Sundays): | Six weeks (42-days) |
| STV: | 110 CFU/100 mL |
| Static period STV: | Four weeks (28 days) |
| Impairment threshold: | 10% |

**Table 1. Impairment assessment (REC-1 enterococci numeric criteria) for Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and static four week (STV), dry and wet weather data**

| Dataset Description | | | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Static Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time period[1] | Site | Number of samples[2] | Overall geometric mean[3] | Number of six week geomeans | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of four week periods | Listing threshold[5] | Number of four week periods with 10% of samples > 110 CFU/100 mL | Number of four week periods with 90th Percentile >110 CFU/100 mL |
| 2010-16 | Upper Bay | 2,082 | 11 | 313 | 52 | 39 | 79 | 14 | 25 | 23 |
| | Lower Bay | 7,263 | 6 | 313 | 52 | 2 | 79 | 14 | 8 | 9 |
| | Entire Bay | 9,345 | 7 | 313 | 52 | 5 | 79 | 14 | 18 | 16 |

[1] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

[2] The column shows the total number of samples collected for weekly monitoring.

[3] Samples with a lower detection of <9 CFU/100 mL or <10 CFU/100 mL were standardized to 3.7 CFU/100 mL based on evaluation by the City of Los Angeles Environmental Monitoring Division (Jurisdictional Groups, 2009. Reconsideration Elements for Bacteria TMDLs, July 2009).

[4] Analysis is by rolling six week periods with data grouped on Sundays comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

[5] The State Listing/Delisting Policy states that at least three years must be used in assessing trends to determine impairment (10% threshold used for year round analysis).

Exceedances less than the listing threshold (should not be listed)

Exceedances greater than the listing threshold

[6] Analysis is by static four week periods comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

**Table 2. Impairment assessment (REC-1 enterococci numeric criteria) for Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and static four week (STV), dry weather data**

| Dataset Description | | | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Static Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time period[1] | Site | Number of samples[2] | Overall geometric mean[3] | Number of six week geomeans | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of calendar months | Listing threshold[5] | Number of four week periods with 10% of samples > 110 CFU/100 mL | Number of four week periods with 90th Percentile >110 CFU/100 mL |
| 2010-16 | Upper Bay | 1,694 | 7 | 313 | 52 | 5 | 79 | 14 | 13 | 9 |
| | Lower Bay | 5,932 | 5 | 313 | 52 | 0 | 79 | 14 | 6 | 4 |
| | Entire Bay | 7,626 | 5 | 313 | 52 | 0 | 79 | 14 | 6 | 4 |

[1] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

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**Table 3. Impairment assessment (REC-1 enterococci numeric criteria) for Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and static four week (STV), wet weather data (samples collected through 72 hours after rainfall)**

| Dataset Description | | | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Static Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time period[1] | Site | Number of samples[2] | Overall geometric mean[3] | Number of six week geomeans | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of four week periods | Listing threshold[5] | Number of four week periods with 10% of samples > 110 CFU/100 mL | Number of four week periods with 90th Percentile >110 CFU/100 mL |
| 2010-16 | Upper Bay | 388 | 68 | 186 | 31 | 112 | 37 | 7 | 24 | 23 |
| | Lower Bay | 1,331 | 13 | 186 | 31 | 38 | 37 | 7 | 13 | 11 |
| | Entire Bay | 1,719 | 19 | 193 | 32 | 55 | 37 | 7 | 23 | 22 |

[1] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

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Exceedances greater than the listing threshold

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# Tables 4-6

**Analysis Conditions**

| | |
|---|---|
| Period: | 2010-16 |
| Season: | Table 4 - Dry and wet weather year round |
| | Table 5 - Dry weather |
| | Table 6 - Wet weather |
| Region: | Upper Bay, Lower Bay, and Entire Bay |
| Geomean Objective: | 30 CFU/100 mL |
| Rolling Period Geomean, by week (Sundays): | Six weeks (42-days) |
| STV: | 110 CFU/100 mL |
| Static Period STV: | Calendar month |
| Impairment Threshold: | 10% |

**Table 4. Impairment assessment (REC-1 enterococci numeric criteria) for Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and calendar month (STV), dry and wet weather data**

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| Time period[1] | Site | Number of samples[2] | Overall geometric mean[3] | Number of six week geomeans | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of calendar months | Listing threshold[5] | Number of calendar months with 10% of samples > 110 CFU/100 mL | Number of calendar months with 90th Percentile >110 CFU/100 mL |
| 2010-16 | Upper Bay | 2,082 | 11 | 313 | 52 | 39 | 72 | 12 | 19 | 19 |
| | Lower Bay | 7,263 | 6 | 313 | 52 | 2 | 72 | 12 | 10 | 10 |
| | Entire Bay | 9,345 | 7 | 313 | 52 | 5 | 72 | 12 | 11 | 11 |

[1] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

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[4] Analysis is by rolling six week periods with data grouped on Sundays comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

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**Table 5. Impairment assessment (REC-1 enterococci numeric criteria) for Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and calendar month (STV), dry weather data**

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| Time period[1] | Site | Number of samples[2] | Overall geometric mean[3] | Number of six week geomeans | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of calendar months | Listing threshold[5] | Number of calendar months with 10% of samples > 110 CFU/100 mL | Number of calendar months with 90th Percentile >110 CFU/100 mL |
| 2010-16 | Upper Bay | 1,694 | 7 | 313 | 52 | 5 | 72 | 12 | 9 | 9 |
| | Lower Bay | 5,932 | 5 | 313 | 52 | 0 | 72 | 12 | 3 | 3 |
| | Entire Bay | 7,626 | 5 | 313 | 52 | 0 | 72 | 12 | 4 | 4 |

[1] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

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**Table 6. Impairment assessment (REC-1 enterococci numeric criteria) for Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and calendar month (STV), wet weather data**

| Dataset Description | | | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Static Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time period[1] | Site | Number of samples[2] | Overall geometric mean[3] | Number of six week geomeans | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of calendar months | Listing threshold[5] | Number of calendar months with 10% of samples > 110 CFU/100 mL | Number of calendar months with 90th Percentile >110 CFU/100 mL |
| 2010-16 | Upper Bay | 388 | 68 | 186 | 31 | 112 | 28 | 5 | 13 | 13 |
| | Lower Bay | 1,331 | 13 | 186 | 31 | 38 | 41 | 7 | 6 | 7 |
| | Entire Bay | 1,719 | 19 | 193 | 32 | 55 | 36 | 6 | 20 | 21 |

[1] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

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[6] Analysis is by calendar month periods comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

# Tables 7-9

**Analysis Conditions**

| | |
|---|---|
| Period: | 2010-16 |
| Season: | Table 7 - Dry and wet weather year round |
| | Table 8 - Dry weather |
| | Table 9 - Wet weather |
| Region: | Upper Bay, Lower Bay, and Entire Bay |
| Geomean Objective: | 30 CFU/100 mL |
| Rolling Period Geomean, by week (Sundays): | Six weeks (42-days) |
| STV: | 110 CFU/100 mL |
| Static Period STV: | 30 days |
| Impairment Threshold: | 10% |

**Table 7. Impairment assessment (REC-1 enterococci numeric criteria) for Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and static 30-day periods (STV), dry and wet weather data**

| Dataset Description | | | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Static Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time period[1] | Site | Number of samples[2] | Overall geometric mean[3] | Number of six week geomeans | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of 30-day periods | Listing threshold[5] | Number of 30-day periods with 10% of samples > 110 CFU/100 mL | Number of 30-day periods with 90th Percentile >110 CFU/100 mL |
| 2010-16 | Upper Bay | 2,082 | 11 | 313 | 52 | 39 | 74 | 13 | 26 | 23 |
| | Lower Bay | 7,263 | 6 | 313 | 52 | 2 | 74 | 13 | 12 | 11 |
| | Entire Bay | 9,345 | 7 | 313 | 52 | 5 | 74 | 13 | 16 | 15 |

[1] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

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**Table 8. Impairment assessment (REC-1 enterococci numeric criteria) for Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and static 30-day periods (STV), dry weather data**

| Dataset Description | | | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Static Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time period[1] | Site | Number of samples[2] | Overall geometric mean[3] | Number of six week geomeans | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of 30-day periods | Listing threshold[5] | Number of 30-day periods with 10% of samples > 110 CFU/100 mL | Number of 30-day periods with 90th Percentile >110 CFU/100 mL |
| 2010-16 | Upper Bay | 1,694 | 7 | 313 | 52 | 5 | 74 | 13 | 12 | 8 |
| | Lower Bay | 5,932 | 5 | 313 | 52 | 0 | 74 | 13 | 5 | 5 |
| | Entire Bay | 7,626 | 5 | 313 | 52 | 0 | 74 | 13 | 5 | 4 |

[1] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

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**Table 9. Impairment assessment (REC-1 enterococci numeric criteria) for Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and static 30-day periods (STV), wet weather data**

| Dataset Description | | | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Static Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time period[1] | Site | Number of samples[2] | Overall geometric mean[3] | Number of six week geomeans | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of 30-day periods | Listing threshold[5] | Number of 30-day periods with 10% of samples > 110 CFU/100 mL | Number of 30-day periods with 90th Percentile >110 CFU/100 mL |
| 2010-16 | Upper Bay | 388 | 68 | 186 | 31 | 112 | 36 | 6 | 24 | 23 |
| | Lower Bay | 1,331 | 13 | 186 | 31 | 38 | 36 | 6 | 13 | 12 |
| | Entire Bay | 1,719 | 19 | 193 | 32 | 55 | 44 | 6 | 21 | 19 |

[1] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

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Exceedances less than the listing threshold (should not be listed)

Exceedances greater than the listing threshold

[6] Analysis is by static 30-day periods comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2

# Tables 10-12

**Analysis Conditions**

| | |
|---|---|
| Period: | 2010-16 |
| Season: | Table 10 - Dry and wet weather year round |
| | Table 11 - Dry weather |
| | Table 12 - Wet weather |
| Region: | Individual stations |
| Geomean Objective: | 30 CFU/100 mL |
| Rolling Period Geomean, by week (Sundays): | Six weeks (42-days) |
| STV: | 110 CFU/100 mL |
| Static Period STV: | Calendar month |
| Minimum sample size: | 5 |
| Impairment Threshold: | 10% |

**Table 10. Impairment assessment (REC-1 enterococci numeric criteria) for each station in the Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and calendar month (STV), dry and wet weather data**

| | Site name | Dataset description | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Number of samples[1] | Overall geometric mean[2, 3] | Number of six week periods | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of months | Listing threshold[5] | Number of months with 10% of samples > 110 CFU/100 mL | Number of months with 90th Percentile >110 CFU/100 mL |
| Lower Bay | Rocky Point Beach | 310 | 4 | 53 | 9 | 0 | 28 | 5 | 4 | 4 |
| | N Street Beach | 307 | 3 | 53 | 9 | 0 | 25 | 5 | 3 | 1 |
| | Bayside Drive Beach | 332 | 13 | 53 | 9 | 5 | 39 | 7 | 15 | 6 |
| | Ruby Avenue Beach | 319 | 6 | 53 | 9 | 1 | 31 | 6 | 10 | 8 |
| | Promontory Point Channel | 311 | 3 | 53 | 9 | 0 | 27 | 5 | 4 | 2 |
| | Onyx Avenue Beach | 315 | 7 | 53 | 9 | 1 | 30 | 5 | 9 | 8 |
| | Park Avenue Beach | 309 | 4 | 52 | 9 | 0 | 27 | 5 | 4 | 3 |
| | Garnet Avenue Beach | 338 | 10 | 53 | 9 | 5 | 40 | 7 | 17 | 15 |
| | Sapphire Avenue Beach | 330 | 7 | 53 | 9 | 3 | 35 | 6 | 9 | 8 |
| | Abalone Avenue Beach | 317 | 7 | 53 | 9 | 0 | 29 | 5 | 8 | 6 |
| | Grand Canal | 312 | 7 | 53 | 9 | 1 | 28 | 5 | 7 | 5 |
| | Lido Yacht Club Beach | 314 | 5 | 53 | 9 | 0 | 29 | 5 | 8 | 6 |
| | 10th Street Beach | 313 | 5 | 52 | 9 | 2 | 29 | 5 | 9 | 9 |
| | Alvarado/Bay Isle Beach | 321 | 6 | 53 | 9 | 1 | 33 | 6 | 11 | 8 |
| | Rhine Channel | 310 | 4 | 52 | 9 | 0 | 27 | 5 | 5 | 4 |
| | 19th Street Beach | 299 | 4 | 49 | 9 | 0 | 26 | 5 | 6 | 5 |
| | 15th Street Beach | 308 | 4 | 52 | 9 | 0 | 26 | 5 | 4 | 3 |
| | 43rd Street Beach | 317 | 7 | 53 | 9 | 3 | 31 | 6 | 11 | 10 |
| | 38th Street Beach | 318 | 8 | 53 | 9 | 2 | 32 | 6 | 9 | 7 |
| | 33rd Street Beach | 329 | 10 | 51 | 9 | 5 | 35 | 6 | 16 | 13 |
| | Newport Blvd Bridge | 307 | 24 | 52 | 9 | 24 | 25 | 5 | 18 | 17 |
| | Via Genoa Beach | 316 | 5 | 53 | 9 | 1 | 30 | 5 | 8 | 7 |
| | Bayshore Beach | 311 | 5 | 53 | 9 | 0 | 28 | 5 | 7 | 5 |
| Upper Bay | De Anza Launch | 311 | 6 | 53 | 9 | 2 | 29 | 5 | 9 | 7 |
| | Newport Dunes West | 322 | 10 | 52 | 9 | 11 | 38 | 7 | 20 | 19 |
| | Newport Dunes Middle | 316 | 10 | 52 | 9 | 6 | 29 | 5 | 10 | 9 |
| | Newport Dunes East | 335 | 13 | 52 | 9 | 13 | 37 | 7 | 21 | 17 |
| | Newport Dunes North | 323 | 12 | 52 | 9 | 7 | 35 | 6 | 15 | 14 |
| | North Star Beach | 320 | 9 | 52 | 9 | 8 | 33 | 6 | 16 | 15 |
| | Vaughns Launch[7] | 120 | 21 | 2 | 1 | 1 | 0 | -- | | |
| | Ski Zone[7, 8] | 34 | 82 | 0 | -- | | 0 | -- | | |

[1] The column shows the total number of samples collected for weekly monitoring.

[2] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

[3] Samples with a lower detection of <9 CFU/100 mL or <10 CFU/100 mL were standardized to 3.7 CFU/100 mL based on evaluation by the City of Los Angeles Environmental Monitoring Division (Jurisdictional Groups, 2009. Reconsideration Elements for Bacteria TMDLs, July 2009).

[4] Analysis is by rolling six week periods having at least five samples, with data grouped on Sundays comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

[5] The Listing/delisting Policy states that at least three years must be used in assessing trends to determine impairment (10% threshold used for year round analysis).

Exceedances less than the listing threshold (should not be listed)

Exceedances greater than the listing threshold

Insufficient sample size to assess

[6] Analysis is by calendar month periods having at least five samples, comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

[7] No month had five or more samples.

[8] No rolling 42-day periods had five or more samples.

**Table 11. Impairment assessment (REC-1 enterococci numeric criteria) for each station in the Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and calendar month (STV), dry weather data**

| | Site name | Dataset description | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Number of samples[1] | Overall geometric mean[2, 3] | Number of six week periods | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of months | Listing threshold[5] | Number of months with 10% of samples > 110 CFU/100 mL | Number of months with 90th Percentile >110 CFU/100 mL |
| Lower Bay | Rocky Point Beach | 251 | 4 | 38 | 7 | 0 | 10 | 2 | 1 | 1 |
| | N Street Beach | 250 | 3 | 36 | 6 | 0 | 10 | 2 | 0 | 0 |
| | Bayside Drive Beach | 274 | 12 | 36 | 6 | 1 | 25 | 5 | 13 | 4 |
| | Ruby Avenue Beach | 261 | 5 | 37 | 7 | 0 | 13 | 3 | 2 | 2 |
| | Promontory Point Channel | 253 | 3 | 37 | 7 | 0 | 10 | 2 | 2 | 1 |
| | Onyx Avenue Beach | 257 | 6 | 38 | 7 | 0 | 13 | 3 | 4 | 3 |
| | Park Avenue Beach | 252 | 3 | 36 | 6 | 0 | 12 | 2 | 2 | 1 |
| | Garnet Avenue Beach | 279 | 9 | 38 | 7 | 3 | 24 | 4 | 13 | 11 |
| | Sapphire Avenue Beach | 271 | 7 | 37 | 7 | 2 | 21 | 4 | 8 | 6 |
| | Abalone Avenue Beach | 259 | 6 | 39 | 7 | 1 | 13 | 3 | 3 | 1 |
| | Grand Canal | 255 | 6 | 36 | 6 | 1 | 13 | 3 | 2 | 2 |
| | Lido Yacht Club Beach | 256 | 4 | 37 | 7 | 0 | 12 | 2 | 3 | 1 |
| | 10th Street Beach | 255 | 4 | 37 | 7 | 0 | 11 | 2 | 1 | 1 |
| | Alvarado/Bay Isle Beach | 263 | 5 | 38 | 7 | 0 | 13 | 3 | 4 | 3 |
| | Rhine Channel | 252 | 3 | 36 | 6 | 0 | 12 | 2 | 2 | 1 |
| | 19th Street Beach | 241 | 3 | 34 | 6 | 0 | 11 | 2 | 2 | 1 |
| | 15th Street Beach | 250 | 4 | 37 | 7 | 0 | 10 | 2 | 0 | 0 |
| | 43rd Street Beach | 260 | 6 | 38 | 7 | 1 | 13 | 3 | 2 | 2 |
| | 38th Street Beach | 260 | 7 | 37 | 7 | 1 | 14 | 3 | 4 | 4 |
| | 33rd Street Beach | 272 | 8 | 35 | 6 | 1 | 19 | 4 | 10 | 7 |
| | Newport Blvd Bridge | 250 | 19 | 36 | 6 | 12 | 10 | 2 | 5 | 5 |
| | Via Genoa Beach | 258 | 4 | 38 | 7 | 0 | 13 | 3 | 3 | 3 |
| | Bayshore Beach | 253 | 4 | 37 | 7 | 0 | 13 | 3 | 1 | 1 |
| Upper Bay | De Anza Launch | 253 | 4 | 37 | 7 | 0 | 13 | 3 | 2 | 1 |
| | Newport Dunes West | 263 | 7 | 41 | 7 | 1 | 14 | 3 | 2 | 2 |
| | Newport Dunes Middle | 256 | 6 | 37 | 7 | 0 | 12 | 2 | 1 | 1 |
| | Newport Dunes East | 277 | 9 | 39 | 7 | 2 | 21 | 4 | 11 | 7 |
| | Newport Dunes North | 264 | 8 | 37 | 7 | 0 | 16 | 3 | 5 | 4 |
| | North Star Beach | 261 | 6 | 39 | 7 | 1 | 14 | 3 | 1 | 1 |
| | Vaughns Launch[7, 8] | 94 | 14 | 0 | -- | | 0 | -- | | |
| | Ski Zone[7, 8] | 26 | 41 | 0 | -- | | 0 | -- | | |

[1] The column shows the total number of samples collected for weekly monitoring.

[2] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

[3] Samples with a lower detection of <9 CFU/100 mL or <10 CFU/100 mL were standardized to 3.7 CFU/100 mL based on evaluation by the City of Los Angeles Environmental Monitoring Division (Jurisdictional Groups, 2009. Reconsideration Elements for Bacteria TMDLs, July 2009).

[4] Analysis is by rolling six week periods having at least five samples, with data grouped on Sundays comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

[5] The Listing/delisting Policy states that at least three years must be used in assessing trends to determine impairment (10% threshold used for year round analysis).

Exceedances less than the listing threshold (should not be listed)

Exceedances greater than the listing threshold

Insufficient sample size to assess

[6] Analysis is by calendar month periods having at least five samples, comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

[7] No month had five or more samples.

[8] No rolling 42-day periods had five or more samples.

**Table 12. Impairment assessment (REC-1 enterococci numeric criteria) for each station in the Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and calendar month (STV), wet weather data**

| | Site name | Dataset description | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Number of samples[1] | Period geometric mean[2, 3] | Number of six week periods | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of months | Listing threshold[5] | Number of months with 10% of samples > 110 CFU/100 mL | Number of months with 90th Percentile >110 CFU/100 mL |
| Lower Bay | Rocky Point Beach | 59 | 8 | 1 | -- | 0 | 0 | -- | | |
| | N Street Beach | 57 | 5 | 1 | -- | 0 | 0 | -- | | |
| | Bayside Drive Beach | 58 | 15 | 1 | -- | 0 | 0 | -- | | |
| | Ruby Avenue Beach | 58 | 13 | 1 | -- | 0 | 0 | -- | | |
| | Promontory Point Channel | 58 | 5 | 1 | -- | 0 | 0 | -- | | |
| | Onyx Avenue Beach | 58 | 16 | 1 | -- | 1 | 0 | -- | | |
| | Park Avenue Beach | 57 | 8 | 1 | -- | 0 | 0 | -- | | |
| | Garnet Avenue Beach | 59 | 15 | 1 | -- | 0 | 0 | -- | | |
| | Sapphire Avenue Beach | 59 | 11 | 1 | -- | 0 | 0 | -- | | |
| | Abalone Avenue Beach | 58 | 13 | 1 | -- | 0 | 0 | -- | | |
| | Grand Canal | 57 | 13 | 1 | -- | 0 | 0 | -- | | |
| | Lido Yacht Club Beach | 58 | 8 | 1 | -- | 0 | 0 | -- | | |
| | 10th Street Beach | 58 | 12 | 1 | -- | 0 | 0 | -- | | |
| | Alvarado/Bay Isle Beach | 58 | 18 | 1 | -- | 0 | 0 | -- | | |
| | Rhine Channel | 58 | 7 | 1 | -- | 0 | 0 | -- | | |
| | 19th Street Beach | 58 | 11 | 1 | -- | 0 | 0 | -- | | |
| | 15th Street Beach | 58 | 13 | 1 | -- | 0 | 0 | -- | | |
| | 43rd Street Beach | 57 | 15 | 1 | -- | 0 | 0 | -- | | |
| | 38th Street Beach | 58 | 15 | 1 | -- | 0 | 0 | -- | | |
| | 33rd Street Beach | 57 | 28 | 1 | -- | 1 | 0 | -- | | |
| | Newport Blvd Bridge | 57 | 58 | 1 | -- | 0 | 0 | -- | | |
| | Via Genoa Beach | 58 | 14 | 1 | -- | 0 | 0 | -- | | |
| | Bayshore Beach | 58 | 25 | 1 | -- | 0 | 0 | -- | | |
| Upper Bay | De Anza Launch | 58 | 28 | 1 | -- | 0 | 0 | -- | | |
| | Newport Dunes West | 59 | 78 | 1 | -- | 1 | 0 | -- | | |
| | Newport Dunes Middle | 60 | 70 | 1 | -- | 1 | 0 | -- | | |
| | Newport Dunes East | 58 | 86 | 1 | -- | 1 | 0 | -- | | |
| | Newport Dunes North | 59 | 84 | 1 | -- | 1 | 0 | -- | | |
| | North Star Beach | 60 | 59 | 1 | -- | 1 | 0 | -- | | |
| | Vaughns Launch | 26 | 92 | 0 | -- | | 0 | -- | | |
| | Ski Zone | 8 | 748 | 0 | -- | | 0 | -- | | |

[1] The column shows the total number of samples collected for weekly monitoring.

[2] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

[3] Samples with a lower detection of <9 CFU/100 mL or <10 CFU/100 mL were standardized to 3.7 CFU/100 mL based on evaluation by the City of Los Angeles Environmental Monitoring Division (Jurisdictional Groups, 2009. Reconsideration Elements for Bacteria TMDLs, July 2009).

[4] Analysis is by rolling six week periods having at least five samples, with data grouped on Sundays comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

[5] The Listing/delisting Policy states that at least three years must be used in assessing trends to determine impairment (10% threshold used for year round analysis).

Exceedances less than the listing threshold (should not be listed)

Exceedances greater than the listing threshold

Insufficient sample size to assess

[6] Analysis is by calendar month periods having at least five samples, comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

[7] No month had five or more samples.

[8] No rolling 42-day periods had five or more samples.

# Tables 13-15

**Analysis Conditions**

| | |
|---|---|
| Period: | 2010-16 |
| Season: | Table 13 - Dry and wet weather year round |
| | Table 14 - Dry weather |
| | Table 15 - Wet weather |
| Region: | Individual stations |
| Geomean Objective: | 30 CFU/100 mL |
| Rolling Period Geomean, by week (Sundays): | Six weeks (42-days) |
| STV: | 110 CFU/100 mL |
| Static Period STV: | Calendar month |
| Minimum sample size: | None |
| Impairment Threshold: | 10% |

**Table 13. Impairment assessment (REC-1 enterococci numeric criteria) for each station in the Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and calendar month (STV), dry and wet weather data**

| | Site name | Dataset description | | Enterococcus Rolling Geometric Mean[3, 4] | | | *Enterococcus* Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Number of samples[1] | Overall geometric mean[2, 3] | Number of six week periods | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of months | Listing threshold[5] | Number of months with 10% of samples > 110 CFU/100 mL | Number of months with 90th Percentile >110 CFU/100 mL |
| Lower Bay | Rocky Point Beach | 310 | 4 | 53 | 9 | 0 | 72 | 12 | 6 | 6 |
| | N Street Beach | 307 | 3 | 53 | 9 | 0 | 72 | 12 | 5 | 2 |
| | Bayside Drive Beach | 332 | 13 | 53 | 9 | 5 | 72 | 12 | 19 | 10 |
| | Ruby Avenue Beach | 319 | 6 | 53 | 9 | 1 | 72 | 12 | 12 | 10 |
| | Promontory Point Channel | 311 | 3 | 53 | 9 | 0 | 72 | 12 | 6 | 4 |
| | Onyx Avenue Beach | 315 | 7 | 53 | 9 | 1 | 72 | 12 | 11 | 10 |
| | Park Avenue Beach | 309 | 4 | 53 | 9 | 0 | 72 | 12 | 5 | 4 |
| | Garnet Avenue Beach | 338 | 10 | 53 | 9 | 5 | 72 | 12 | 19 | 17 |
| | Sapphire Avenue Beach | 330 | 7 | 53 | 9 | 3 | 72 | 12 | 15 | 14 |
| | Abalone Avenue Beach | 317 | 7 | 53 | 9 | 0 | 72 | 12 | 10 | 7 |
| | Grand Canal | 312 | 7 | 53 | 9 | 1 | 72 | 12 | 10 | 7 |
| | Lido Yacht Club Beach | 314 | 5 | 53 | 9 | 0 | 72 | 12 | 9 | 7 |
| | 10th Street Beach | 313 | 5 | 53 | 9 | 2 | 72 | 12 | 15 | 15 |
| | Alvarado/Bay Isle Beach | 321 | 6 | 53 | 9 | 1 | 72 | 12 | 16 | 13 |
| | Rhine Channel | 310 | 4 | 53 | 9 | 0 | 72 | 12 | 9 | 7 |
| | 19th Street Beach | 299 | 4 | 53 | 9 | 1 | 71 | 12 | 8 | 7 |
| | 15th Street Beach | 308 | 4 | 53 | 9 | 1 | 72 | 12 | 10 | 7 |
| | 43rd Street Beach | 317 | 7 | 53 | 9 | 3 | 72 | 12 | 16 | 15 |
| | 38th Street Beach | 318 | 8 | 53 | 9 | 2 | 72 | 12 | 19 | 15 |
| | 33rd Street Beach | 329 | 10 | 53 | 9 | 5 | 71 | 12 | 26 | 22 |
| | Newport Blvd Bridge | 307 | 24 | 53 | 9 | 24 | 72 | 12 | 45 | 42 |
| | Via Genoa Beach | 316 | 5 | 53 | 9 | 1 | 72 | 12 | 10 | 9 |
| | Bayshore Beach | 311 | 5 | 53 | 9 | 0 | 72 | 12 | 15 | 13 |
| Upper Bay | De Anza Launch | 311 | 6 | 53 | 9 | 2 | 72 | 12 | 17 | 15 |
| | Newport Dunes West | 322 | 10 | 53 | 9 | 11 | 72 | 12 | 26 | 25 |
| | Newport Dunes Middle | 316 | 10 | 53 | 9 | 6 | 72 | 12 | 19 | 18 |
| | Newport Dunes East | 335 | 13 | 53 | 9 | 13 | 72 | 12 | 28 | 24 |
| | Newport Dunes North | 323 | 12 | 53 | 9 | 7 | 72 | 12 | 23 | 22 |
| | North Star Beach | 320 | 9 | 53 | 9 | 8 | 72 | 12 | 22 | 20 |
| | Vaughns Launch | 120 | 21 | 46 | 8 | 17 | 60 | 10 | 16 | 16 |
| | Ski Zone | 34 | 82 | 21 | 5 | 15 | 24 | 5 | 13 | 13 |

[1] The column shows the total number of samples collected for weekly monitoring.

[2] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

[3] Samples with a lower detection of <9 CFU/100 mL or <10 CFU/100 mL were standardized to 3.7 CFU/100 mL based on evaluation by the City of Los Angeles Environmental Monitoring Division (Jurisdictional Groups, 2009. Reconsideration Elements for Bacteria TMDLs, July 2009).

[4] Analysis is by rolling six week periods having at least five samples, with data grouped on Sundays comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

[5] The Listing/delisting Policy states that at least three years must be used in assessing trends to determine impairment (10% threshold used for year round analysis).

Exceedances less than the listing threshold (should not be listed)

Exceedances greater than the listing threshold

Insufficient sample size to assess

[6] Analysis is by calendar month periods comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

**Table 14. Impairment assessment (REC-1 enterococci numeric criteria) for each station in the Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and calendar month (STV), dry weather data**

| | Site name | Dataset description | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Number of samples[1] | Overall geometric mean[2, 3] | Number of six week periods | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of months | Listing threshold[5] | Number of months with 10% of samples > 110 CFU/100 mL | Number of months with 90th Percentile >110 CFU/100 mL |
| Lower Bay | Rocky Point Beach | 251 | 4 | 53 | 9 | 0 | 72 | 12 | 3 | 3 |
| | N Street Beach | 250 | 3 | 53 | 9 | 0 | 72 | 12 | 1 | 1 |
| | Bayside Drive Beach | 274 | 12 | 53 | 9 | 2 | 72 | 12 | 4 | 13 |
| | Ruby Avenue Beach | 261 | 5 | 53 | 9 | 0 | 72 | 12 | 4 | 5 |
| | Promontory Point Channel | 253 | 3 | 53 | 9 | 0 | 72 | 12 | 2 | 3 |
| | Onyx Avenue Beach | 257 | 6 | 53 | 9 | 0 | 72 | 12 | 5 | 7 |
| | Park Avenue Beach | 252 | 3 | 53 | 9 | 0 | 72 | 12 | 1 | 2 |
| | Garnet Avenue Beach | 279 | 9 | 53 | 9 | 3 | 72 | 12 | 12 | 14 |
| | Sapphire Avenue Beach | 271 | 7 | 53 | 9 | 3 | 72 | 12 | 9 | 11 |
| | Abalone Avenue Beach | 259 | 6 | 53 | 9 | 2 | 72 | 12 | 4 | 6 |
| | Grand Canal | 255 | 6 | 53 | 9 | 1 | 71 | 12 | 5 | 5 |
| | Lido Yacht Club Beach | 256 | 4 | 53 | 9 | 0 | 72 | 12 | 4 | 6 |
| | 10th Street Beach | 255 | 4 | 53 | 9 | 0 | 72 | 12 | 5 | 5 |
| | Alvarado/Bay Isle Beach | 263 | 5 | 53 | 9 | 0 | 72 | 12 | 8 | 9 |
| | Rhine Channel | 252 | 3 | 53 | 9 | 0 | 72 | 12 | 2 | 3 |
| | 19th Street Beach | 241 | 3 | 52 | 9 | 0 | 71 | 12 | 2 | 3 |
| | 15th Street Beach | 250 | 4 | 53 | 9 | 0 | 72 | 12 | 1 | 2 |
| | 43rd Street Beach | 260 | 6 | 53 | 9 | 1 | 72 | 12 | 10 | 11 |
| | 38th Street Beach | 260 | 7 | 53 | 9 | 1 | 72 | 12 | 9 | 9 |
| | 33rd Street Beach | 272 | 8 | 52 | 9 | 3 | 71 | 12 | 15 | 19 |
| | Newport Blvd Bridge | 250 | 19 | 53 | 9 | 22 | 72 | 12 | 36 | 38 |
| | Via Genoa Beach | 258 | 4 | 53 | 9 | 0 | 72 | 12 | 3 | 6 |
| | Bayshore Beach | 253 | 4 | 53 | 9 | 0 | 72 | 12 | 2 | 2 |
| Upper Bay | De Anza Launch | 253 | 4 | 53 | 9 | 0 | 72 | 12 | 1 | 3 |
| | Newport Dunes West | 263 | 7 | 53 | 9 | 2 | 72 | 12 | 9 | 9 |
| | Newport Dunes Middle | 256 | 6 | 53 | 9 | 1 | 72 | 12 | 5 | 6 |
| | Newport Dunes East | 277 | 9 | 53 | 9 | 6 | 72 | 12 | 11 | 15 |
| | Newport Dunes North | 264 | 8 | 53 | 9 | 2 | 72 | 12 | 9 | 11 |
| | North Star Beach | 261 | 6 | 53 | 9 | 2 | 72 | 12 | 8 | 8 |
| | Vaughns Launch | 94 | 14 | 42 | 7 | 10 | 54 | 9 | 9 | 8 |
| | Ski Zone | 26 | 41 | 19 | 5 | 11 | 20 | 5 | 7 | 7 |

[1] The column shows the total number of samples collected for weekly monitoring.

[2] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

[3] Samples with a lower detection of <9 CFU/100 mL or <10 CFU/100 mL were standardized to 3.7 CFU/100 mL based on evaluation by the City of Los Angeles Environmental Monitoring Division (Jurisdictional Groups, 2009. Reconsideration Elements for Bacteria TMDLs, July 2009).

[4] Analysis is by rolling six week periods with data grouped on Sundays comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

[5] The Listing/delisting Policy states that at least three years must be used in assessing trends to determine impairment (10% threshold used for year round analysis).

Exceedances less than the listing threshold (should not be listed)

Exceedances greater than the listing threshold

Insufficient sample size to assess

[6] Analysis is by calendar month periods comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

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**Table 15. Impairment assessment (REC-1 enterococci numeric criteria) for each station in the Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and calendar month (STV), wet weather data**

| | Site name | Dataset description | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Number of samples[1] | Period geometric mean[2, 3] | Number of six week periods | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of months | Listing threshold[5] | Number of months with 10% of samples > 110 CFU/100 mL | Number of months with 90th Percentile >110 CFU/100 mL |
| Lower Bay | Rocky Point Beach | 59 | 8 | 33 | 6 | 6 | 36 | 6 | 3 | 3 |
| | N Street Beach | 57 | 5 | 32 | 6 | 4 | 35 | 6 | 4 | 3 |
| | Bayside Drive Beach | 58 | 15 | 33 | 6 | 8 | 36 | 6 | 8 | 8 |
| | Ruby Avenue Beach | 58 | 13 | 33 | 6 | 10 | 36 | 6 | 7 | 6 |
| | Promontory Point Channel | 58 | 5 | 33 | 6 | 4 | 36 | 6 | 3 | 4 |
| | Onyx Avenue Beach | 58 | 16 | 33 | 6 | 9 | 36 | 6 | 6 | 6 |
| | Park Avenue Beach | 57 | 8 | 33 | 6 | 9 | 35 | 6 | 3 | 3 |
| | Garnet Avenue Beach | 59 | 15 | 33 | 6 | 12 | 36 | 6 | 6 | 6 |
| | Sapphire Avenue Beach | 59 | 11 | 34 | 7 | 9 | 37 | 7 | 6 | 6 |
| | Abalone Avenue Beach | 58 | 13 | 33 | 6 | 10 | 36 | 6 | 4 | 3 |
| | Grand Canal | 57 | 13 | 33 | 6 | 9 | 36 | 6 | 5 | 5 |
| | Lido Yacht Club Beach | 58 | 8 | 33 | 6 | 7 | 36 | 6 | 4 | 6 |
| | 10th Street Beach | 58 | 12 | 33 | 6 | 8 | 36 | 6 | 11 | 11 |
| | Alvarado/Bay Isle Beach | 58 | 18 | 33 | 6 | 11 | 36 | 6 | 9 | 10 |
| | Rhine Channel | 58 | 7 | 33 | 6 | 7 | 36 | 6 | 6 | 5 |
| | 19th Street Beach | 58 | 11 | 33 | 6 | 7 | 36 | 6 | 5 | 6 |
| | 15th Street Beach | 58 | 13 | 33 | 6 | 10 | 36 | 6 | 8 | 9 |
| | 43rd Street Beach | 57 | 15 | 33 | 6 | 9 | 36 | 6 | 8 | 8 |
| | 38th Street Beach | 58 | 15 | 33 | 6 | 11 | 36 | 6 | 11 | 11 |
| | 33rd Street Beach | 57 | 28 | 33 | 6 | 14 | 35 | 6 | 13 | 13 |
| | Newport Blvd Bridge | 57 | 58 | 33 | 6 | 20 | 36 | 6 | 18 | 17 |
| | Via Genoa Beach | 58 | 14 | 33 | 6 | 10 | 36 | 6 | 7 | 7 |
| | Bayshore Beach | 58 | 25 | 33 | 6 | 11 | 36 | 6 | 13 | 12 |
| Upper Bay | De Anza Launch | 58 | 28 | 33 | 6 | 12 | 36 | 6 | 15 | 15 |
| | Newport Dunes West | 59 | 78 | 33 | 6 | 23 | 36 | 6 | 20 | 20 |
| | Newport Dunes Middle | 60 | 70 | 33 | 6 | 23 | 36 | 6 | 17 | 18 |
| | Newport Dunes East | 58 | 86 | 33 | 6 | 22 | 36 | 6 | 18 | 18 |
| | Newport Dunes North | 59 | 84 | 33 | 6 | 20 | 36 | 6 | 15 | 15 |
| | North Star Beach | 60 | 59 | 33 | 6 | 19 | 36 | 6 | 16 | 16 |
| | Vaughns Launch | 26 | 92 | 20 | 5 | 16 | 21 | 4 | 9 | 9 |
| | Ski Zone | 8 | 748 | 7 | 5 | 7 | 8 | 2 | 7 | 7 |

[1] The column shows the total number of samples collected for weekly monitoring.

[2] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

[3] Samples with a lower detection of <9 CFU/100 mL or <10 CFU/100 mL were standardized to 3.7 CFU/100 mL based on evaluation by the City of Los Angeles Environmental Monitoring Division (Jurisdictional Groups, 2009. Reconsideration Elements for Bacteria TMDLs, July 2009).

[4] Analysis is by rolling six week periods with data grouped on Sundays comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

[5] The Listing/delisting Policy states that at least three years must be used in assessing trends to determine impairment (10% threshold used for year round analysis).

Exceedances less than the listing threshold (should not be listed)

Exceedances greater than the listing threshold

Insufficient sample size to assess

[6] Analysis is by calendar month periods comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

# Tables 16-17

**Analysis Conditions**

| | |
|---|---|
| Period: | 2010-16 |
| Season: | Table 16 - Dry season (April 1 – October 31)<br>Table 17 - Wet season (Nov 1- March 31) |
| Region: | Upper Bay, Lower Bay, and entire Bay |
| Geomean Objective: | 30 CFU/100 mL |
| Rolling Period Geomean, by week (Sundays): | Six weeks (42-days) |
| STV: | 110 CFU/100 mL |
| Static Period STV: | Calendar month |
| Impairment Threshold: | 4% (Dry Season) 10% (Wet Season) |

**Table 16. Impairment assessment (REC-1 enterococci numeric criteria) for Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and calendar month (STV), dry season (April 1 – October 31) data**

| Dataset Description | | | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Static Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time period[1] | Site | Number of samples[2] | Overall geometric mean[3] | Number of six week geomeans | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of calendar months | Listing threshold[5] | Number of calendar months with 10% of samples > 110 CFU/100 mL | Number of calendar months with 90th Percentile >110 CFU/100 mL |
| 2010-16 | Upper Bay | 1,201 | 6 | 183 | 22 | 6 | 42 | 5 | 4 | 4 |
| | Lower Bay | 4,280 | 5 | 183 | 22 | 0 | 42 | 5 | 2 | 2 |
| | Entire Bay | 5,481 | 5 | 183 | 22 | 0 | 42 | 5 | 2 | 3 |

[1] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

[2] The column shows the total number of samples collected for weekly monitoring.

[3] Samples with a lower detection of <9 CFU/100 mL or <10 CFU/100 mL were standardized to 3.7 CFU/100 mL based on evaluation by the City of Los Angeles Environmental Monitoring Division (Jurisdictional Groups, 2009. Reconsideration Elements for Bacteria TMDLs, July 2009).

[4] Analysis is by rolling six week periods with data grouped on Sundays comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

[5] The State Listing/Delisting Policy states that at least three years must be used in assessing trends to determine impairment (4% threshold used for summer season analysis).

Exceedances less than the listing threshold (should not be listed)

Exceedances greater than the listing threshold

[6] Analysis is by static four week periods comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

**Table 17. Impairment assessment (REC-1 enterococci numeric criteria) for Newport Bay (April 1, 2010 – March 31, 2016) – assessment by six week rolling by week (Geomean) and calendar month (STV), wet season (November 1 – March 31) data**

| Dataset Description | | | | *Enterococcus* Rolling Geometric Mean[3, 4] | | | *Enterococcus* Static Statistical Threshold Value[6] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time period[1] | Site | Number of samples[2] | Overall geometric mean[3] | Number of six week geomeans | Listing threshold[5] | Number of six week periods with geomean > 30 CFU/100 mL | Number of calendar months | Listing threshold[5] | Number of calendar months with 10% of samples > 110 CFU/100 mL | Number of calendar months with 90th Percentile >110 CFU/100 mL |
| 2010-16 | Upper Bay | 881 | 23 | 130 | 22 | 28 | 30 | 5 | 15 | 16 |
| | Lower Bay | 2,983 | 8 | 130 | 22 | 0 | 30 | 5 | 8 | 9 |
| | Entire Bay | 3,864 | 10 | 130 | 22 | 4 | 30 | 5 | 9 | 10 |

[1] Time period (April 1, 2010 through March 31, 2016) was determined because data were collected after implementation of key projects (2005 - complete diversion of dry weather flow from San Diego to San Joaquin Marsh, 2010 - increased tidal flushing of Newport Bay due to completion of dredging project).

[2] The column shows the total number of samples collected for weekly monitoring.

[3] Samples with a lower detection of <9 CFU/100 mL or <10 CFU/100 mL were standardized to 3.7 CFU/100 mL based on evaluation by the City of Los Angeles Environmental Monitoring Division (Jurisdictional Groups, 2009. Reconsideration Elements for Bacteria TMDLs, July 2009).

[4] Analysis is by rolling six week periods with data grouped on Sundays comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

[5] The State Listing/Delisting Policy states that at least three years must be used in assessing trends to determine impairment (10% threshold used for winter season analysis).

Exceedances less than the listing threshold (should not be listed)

Exceedances greater than the listing threshold

[6] Analysis is by static four week periods comparing to EPA 2012 Recreational Water Quality Criteria Recommendation 2.

# Tables 18-19

## Will be provided later

**Analysis Conditions**

| | |
|---|---|
| Period: | 2010-16 |
| Season: | Table 18 - Dry season (April 1 – October 31) |
| | Table 19 - Wet season (Nov 1- March 31) |
| Region: | Individual Stations |
| Geomean Objective: | 30 CFU/100 mL |
| Rolling Period Geomean, by week (Sundays): | Six weeks (42-days) |
| STV: | 110 CFU/100 mL |
| Static Period STV: | Calendar month |
| Impairment Threshold: | 4% (Dry Season) 10% (Wet Season) |

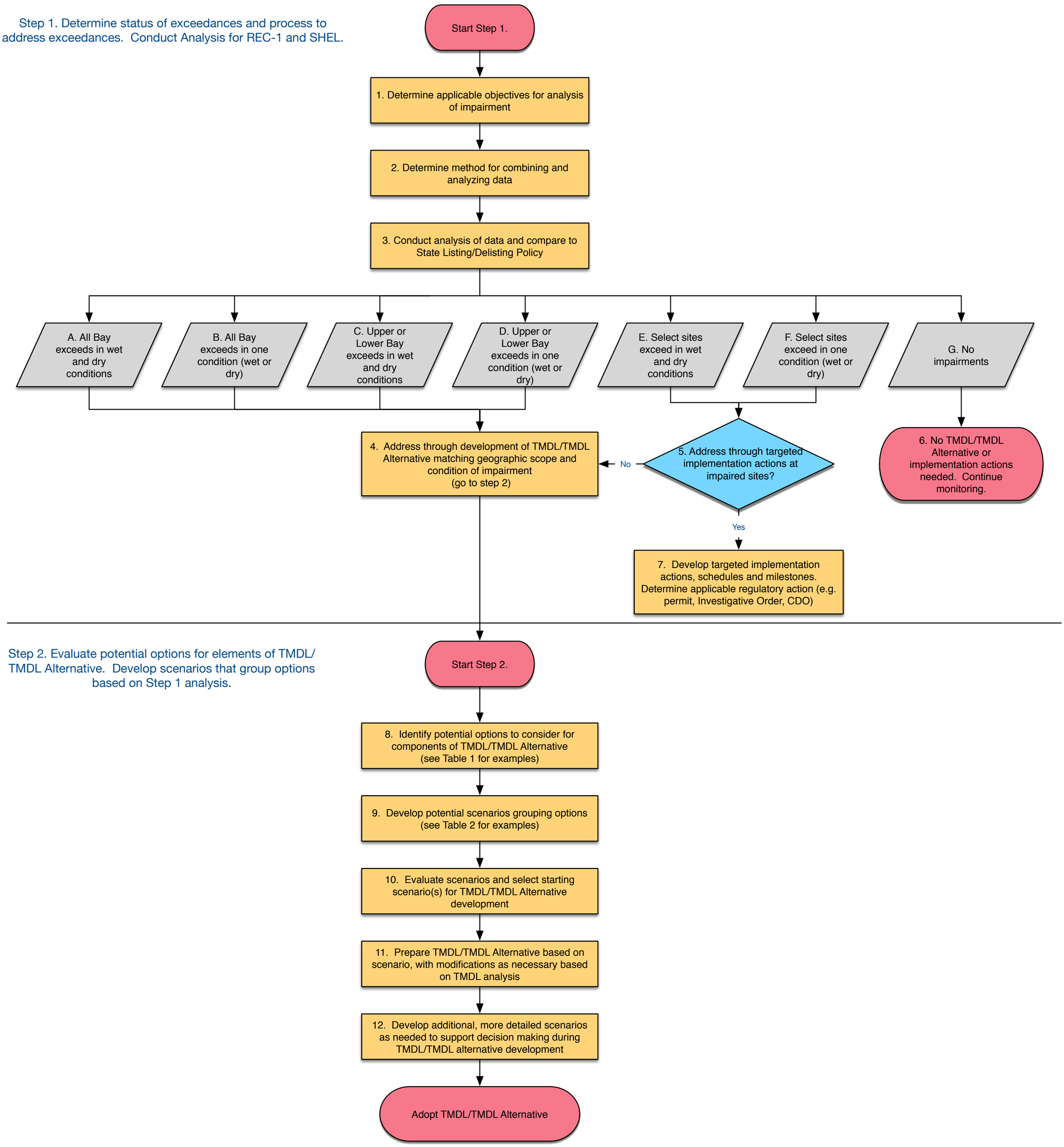

Step 1. Determine status of exceedances and process to address exceedances. Conduct Analysis for REC-1 and SHEL.
Start Step 1.
1. Determine applicable objectives for analysis of impairment
2. Determine method for combining and analyzing data
3. Conduct analysis of data and compare to State Listing/Delisting Policy
A. All Bay exceeds in wet and dry conditions
B. All Bay exceeds in one condition (wet or dry)
C. Upper or Lower Bay exceeds in wet and dry conditions
D. Upper or Lower Bay exceeds in one condition (wet or dry)
E. Select sites exceed in wet and dry conditions
F. Select sites exceed in one condition (wet or dry)
G. No impairments
4. Address through development of TMDL/TMDL Alternative matching geographic scope and condition of impairment (go to step 2)
No
5. Address through targeted implementation actions at impaired sites?
Yes
6. No TMDL/TMDL Alternative or implementation actions needed. Continue monitoring.
7. Develop targeted implementation actions, schedules and milestones. Determine applicable regulatory action (e.g. permit, Investigative Order, CDO)
Step 2. Evaluate potential options for elements of TMDL/ TMDL Alternative. Develop scenarios that group options based on Step 1 analysis.
Start Step 2.
8. Identify potential options to consider for components of TMDL/TMDL Alternative (see Table 1 for examples)
9. Develop potential scenarios grouping options (see Table 2 for examples)
10. Evaluate scenarios and select starting scenario(s) for TMDL/TMDL Alternative development
11. Prepare TMDL/TMDL Alternative based on scenario, with modifications as necessary based on TMDL analysis
12. Develop additional, more detailed scenarios as needed to support decision making during TMDL/TMDL alternative development
Adopt TMDL/TMDL Alternative

**Table 1. Potential options for elements of TMDL/TMDL Alternative. Develop scenarios that group various options from categories below. Scenarios and options shown are examples to start discussion and are not mutually exclusive.**

| | Scenario 1-Traditional Approach | Scenario 2-Basin Plan Objectives with alternative compliance | Scenario 3-Phased TMDL with Site-specific | Scenario 4-Other? |
|---|---|---|---|---|
| **REC Targets-Possible Options** | | | | |
| Enterococcus-SWRCB proposed values | X | X | | |
| Enterococcus USEPA 2012 values based on | X? | X? | X | |
| Site-specific objective (would need to be developed) | | | X | |
| | | | | |
| | | | | |
| | | | | |
| **Target Implementation - Possible Options** | | | | |
| Reference Reach/Antidegradation to generate allowable exceedance frequency (AEF)-would require study | X | | X | |
| Natural source exclusion-would require study | X | | X | |
| Alternative assessment methods-(e.g. HF183) | | X | X | |
| Seasonal suspensions (likely not applicable) | | | | |
| | | | | |
| | | | | |
| | | | | |
| **Allocations-Possible Options** | | | | |
| Concentrations equal to targets | X | X | X | |
| Loads | X | X | X | |
| Percent load reductions | X | X | X | |
| | | | | |
| | | | | |
| | | | | |
| **Implementation Strategy-Possible Options** | | | | |
| Target FIB | X | X | X | |
| Target human sources | | X | X | |
| Set of core strategies to implement "everywhere" with targeted implementation actions in high recreational use areas (or sites with impairments) | X | X | X | |
| | | | | |
| | | | | |
| | | | | |
| **Implementation Schedule-Possible Options** | | | | |
| Maintain schedule | X | X | | |
| Phased schedule | | X | X | |
| Extend schedule | X | X | | |
| | | | | |
| | | | | |

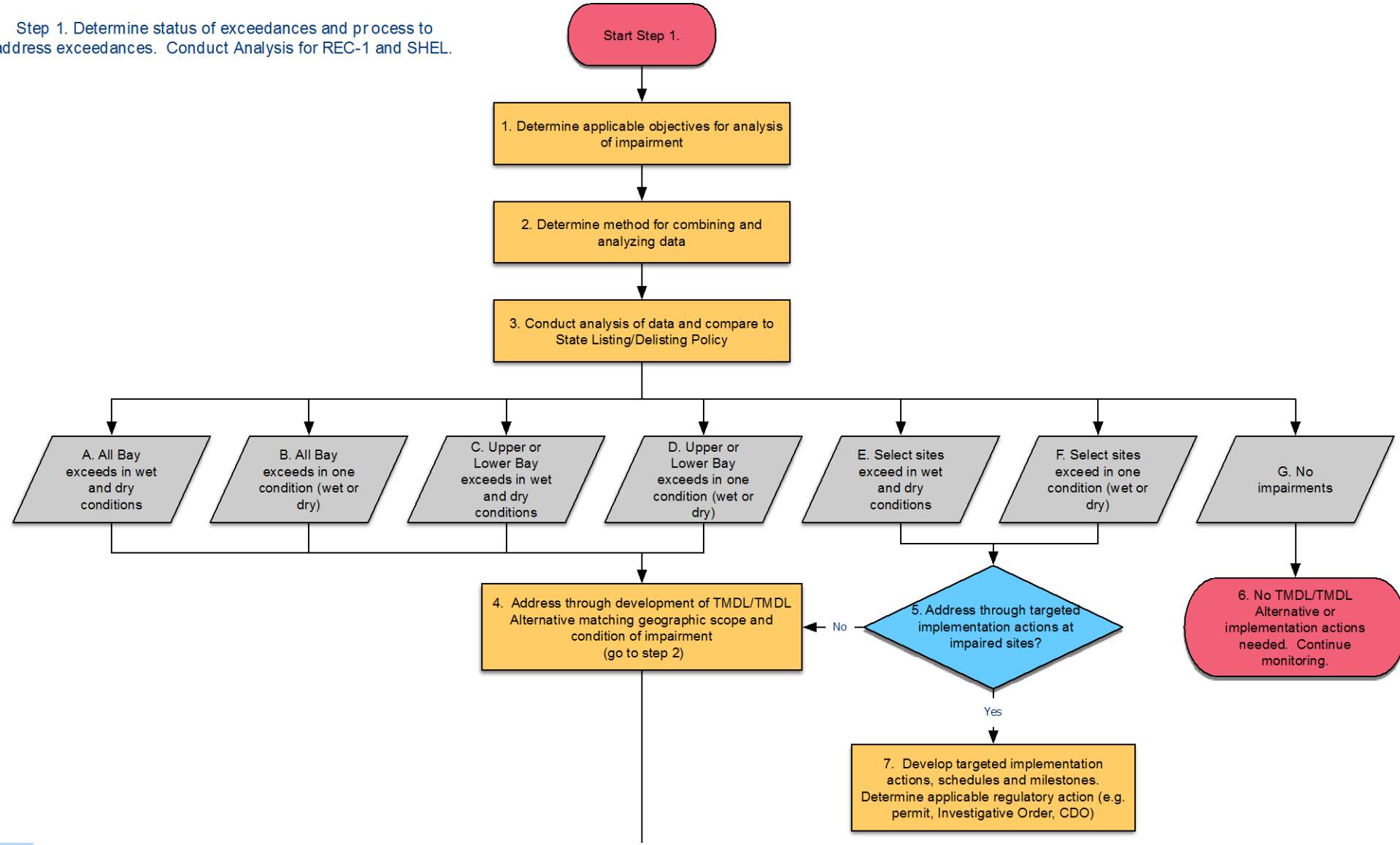
# Newport Bay Fecal Coliform TMDL Stakeholder Meeting

August 24, 2017

LARRY WALKER ASSOCIATES

Science. Policy. Solutions.

Step 1. Determine status of exceedances and process to address exceedances. Conduct Analysis for REC-1 and SHEL.



# Data Result Summary

| | Dry | | | | | | Wet | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Upper | | Lower | | Whole | | Upper | | Lower | | Whole | |
| | GM | STV | GM | STV | GM | STV | GM | STV | GM | STV | GM | STV |
| STV 4 weeks (28 days) | | | | | | | | | | | | |
| STV Calendar month | | | | | | | | | | | | |
| STV 30 days | | | | | | | | | | | | |
| Individual Stations (Min 5 samples) | .:.“ | Ã¨ “ | À¨ ÃÕ | Àœ ÃÕ | ≈≈ | ≈≈ | ≈≈ | ≈≈ | ≈≈ | ≈≈ | ≈≈ | ≈≈ |
| Individual Stations (No min samples) | Ã¨ “ | À¨ “ | À¨ ÃÕ | Õ ÃÕ | ≈≈ | ≈≈ | “¨ “ | “¨ “ | ÃÀ¨ ÃÕ | ÀŒ ÃÕ | ≈≈ | ≈≈ |

Potential possible outcomes based on Step 1:

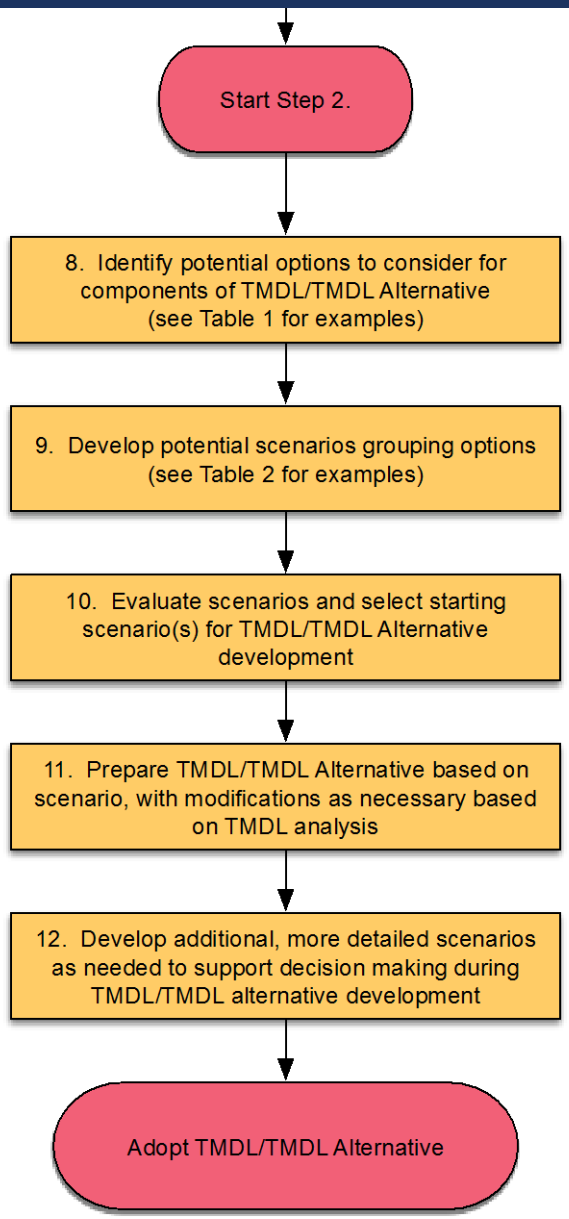
Wet condition:

- B. Whole Bay
- D., E. Upper Bay, Lower Bay select sites

Dry Condition:

- G. No impairments
- E. Select sites

# Step 2. Evaluate Potential options for Elements of TMDL/TMDL Alternative. *Develop scenarios that group options for evaluation*



# REC Targets-Possible Options

| | Scenario 1-Traditional Approach | Scenario 2-Basin Plan Objectives with alternative compliance options | Scenario 3-Phased TMDL with Site-specific objectives | Scenario 4-Other? |
|---|---|---|---|---|
| Enterococcus-SWRCB proposed values | X | X | | |
| Enterococcus USEPA 2012 values based on 36/1000 illness rate | X? | X? | X | |
| Site-specific objective (would need to be developed) | | | X | |

# Target Implementation-Possible Options

| | Scenario 1-Traditional Approach | Scenario 2-Basin Plan Objectives with alternative compliance options | Scenario 3-Phased TMDL with Site-specific objectives | Scenario 4-Other? |
|---|---|---|---|---|
| Reference Reach / Antidegradation-would require study | X | | X | |
| Natural source exclusion-would require study | X | | X | |
| Seasonal suspensions-likely not applicable, but could assess | | | | |
| Alternative assessment methods-(e.g., HF183) | | X | X | |

# Allocations-Possible Options

| | Scenario 1-Traditional Approach | Scenario 2-Basin Plan Objectives with alternative compliance options | Scenario 3-Phased TMDL with Site-specific objectives | Scenario 4-Other? |
|---|---|---|---|---|
| Concentrations equal to targets | X | X | X | |
| Loads | X | X | X | |
| Percent load reductions | X | X | X | |

# Implementation Strategy-Possible Options

| | Scenario 1-Traditional Approach | Scenario 2-Basin Plan Objectives with alternative compliance options | Scenario 3-Phased TMDL with Site-specific objectives | Scenario 4-Other? |
|---|---|---|---|---|
| Target FIB | X | X | X | |
| Target human sources | | X | X | |
| Set of core strategies to implement "everywhere" with targeted implementation actions in high priority areas (e.g. high recreation and identified impairments) | X | X | X | |

# Implementation Schedule-Possible Options

| | Scenario 1-Traditional Approach | Scenario 2-Basin Plan Objectives with alternative compliance options | Scenario 3-Phased TMDL with Site-specific objectives | Scenario 4-Other? |
|---|---|---|---|---|
| Maintain schedule | X | X | | |
| Phased schedule | | X | X | |
| Extend schedule | X | X | | |

# Step 9. Example Scenarios for Developing TMDL/TMDL Alternatives for Newport Bay for Discussion Only. *Enterococcus concentrations (CFU/100 mL).*

- The following are examples of how scenarios could be developed and do not represent the full range of scenarios that could be considered.
- Scenarios are not mutually exclusive. Can select elements of different scenarios to create a new scenario.

# Example Scenarios Pg. 1 of 2

| | Scenario 1- Traditional SWRCB objectives and concentration allocations | | Scenario 2 - Traditional SWRCB objectives and load allocations | | Scenario 3 - (SWRCB objective with HF183 Compliance) *** | | Scenario 4 - Site-specific objective with phased schedule** | |
|---|---|---|---|---|---|---|---|---|
| **Description of Scenario** | Develop TMDL using traditional methods, SWRCB proposed objectives, and set allocations equal to targets | | Develop TMDL using traditional methods, SWRCB proposed objectives, and set allocations equal to loads | | Use EPA 2012 criteria as ENT objectives, but allow HF183 combined with an allowable exceedance frequency to be used to demonstrate compliance with objectives in the Basin Plan. | | Develop site-specific objectives | |
| | STV* | Geomean | STV* | Geomean | STV* | Geomean | STV* | Geomean |
| **Basin Plan Objective** | 110 | 30 | 110 | 30 | 110 | 30 | TBD based on study | TBD based on study |
| **Basin Plan Objective Implementation** | AEF applicable if suitable reference reach data can be identified. Could use the listing/delisting policy to establish allowable exceedances in absence of reference reach data. Could also conduct natural source exclusion study. | | AEF applicable if suitable reference reach data can be identified. Could use the listing/delisting policy to establish allowable exceedances in absence of reference reach data. Could also conduct natural source exclusion study. | | AEF not applicable. Use HF183 for assessment instead | | AEF applicable if suitable reference reach data can be identified. Could use the listing/delisting policy to establish allowable exceedances in absence of reference reach data. Could also conduct natural source exclusion study. | |

* Method of assessing data as compared to STV and geomean should be specified in TMDL for dry and wet weather.
** Requires site-specific amendment for objectives and Basin Plan Amendment for Basin Plan Implementation Provisions.
*** May require Basin Plan Amendment for Basin Plan Implementation Provisions to use HF183. Would only require site-specific objective if SWRCB does not adopt EPA 2012 criteria.

# Example Scenarios Pg.2 of 2

| | Scenario 1- Traditional SWRCB objectives and concentration allocations | | Scenario 2 - Traditional SWRCB objectives and load allocations | | Scenario 3 - (SWRCB objective with HF183 Compliance) *** | | Scenario 4 - Site-specific objective with phased schedule** | |
|---|---|---|---|---|---|---|---|---|
| **TMDL Targets** | 110 | 30 | 110 | 30 | 110 | 30 | TBD based on study | TBD based on study |
| **Allocations** | Equal to targets | | Loads | | Equal to targets or loads | | Equal to targets | |
| **Implementation Strategy** | Compliance if meet TMDL targets or allocations. | | Compliance if meet TMDL targets or allocations. | | Compliance if meet TMDL target in Bay or HF183 marker threshold in discharge or meet allocations. Another option would be to say if ENT values are not met, but HF183 values are, then the ENT exceedance is an "allowable exceedance." | | Compliance if meet TMDL targets or allocations. | |
| | Monitoring FIB | | Monitoring FIB | | HF 183 threshold TBD based on study unless SHS thresholds can be applied. | | Monitoring FIB or alternative indicator used for SSO | |
| | Implementation actions to capture FIB | | Implementation actions to capture FIB | | HF183 monitoring optional. HF183 results above threshold trigger source investigations and human source reduction, but are not required if ENT targets are being met. | | Implementation targeting FIB or sources of alternative indicator | |
| | Addressed throughout watershed to meet concentrations everywhere. | | Target at areas with highest FIB load to reduce loadings to Bay | | Implementation actions target human sources | | Phased schedule while conducting study. Require SSO based on study to be considered prior to second phase of implementation. | |

**Table 2. Example Scenarios for Developing TMDL/TMDL Alternatives for Newport Bay for Discussion Only. Enterococcus (ENT) concentrations (CFU/100 mL).**

These are examples of how scenarios could be developed and do not represent the full range of scenarios that could be considered. For all scenarios, specifics could be modified to incorporate elements of other scenarios if desired. (August 24, 2017)

| | **Scenario 1A-Traditional Approach (SWRCB objectives and concentration allocations)** | | **Scenario 1B-Traditional Approach (SWRCB objectives and load allocations)** | | **Scenario 2-Basin Plan Objectives with alternative compliance options*** ** | | **Scenario 3 Site-specific objective with phased schedule**** | |
|---|---|---|---|---|---|---|---|---|
| **Description of Scenario** | Develop TMDL using traditional methods, SWRCB proposed objectives, and set allocations equal to targets | | Develop TMDL using traditional methods, SWRCB proposed objectives, and set allocations equal to loads | | Use EPA 2012 criteria as ENT objectives, but allow HF183 combined with an allowable exceedance frequency to be used to demonstrate compliance with objectives in the Basin Plan. | | Develop site-specific objectives | |
| **Basin Plan Objective** | **STV*** | **Geomean** | **STV*** | **Geomean** | **STV*** | **Geomean** | **STV*** | **Geomean** |
| | 110 | 30 | 110 | 30 | 110 | 30 | TBD based on study | TBD based on study |
| **Basin Plan Objective Implementation** | Allowable exceedance frequency (AEF) applicable if suitable reference reach data can be identified. Could use the listing/delisting policy to establish AEF in absence of reference reach data. Could also conduct natural source exclusion study. | | | | AEF not applicable. Use HF183 for assessment instead | | AEF applicable if suitable reference reach data can be identified. Could use the listing/delisting policy to establish allowable exceedances in absence of reference reach data. Could also conduct natural source exclusion study. | |
| **TMDL Targets** | 110 | 30 | 110 | 30 | 110 | 30 | TBD based on study | TBD based on study |
| **Allocations** | Equal to targets | | Equal to loads | | Equal to targets or loads | | Equal to targets | |
| **Implementation Strategy** | Compliance if meet TMDL targets or allocations. | | | | Compliance if meet TMDL target in Bay or HF183 marker threshold in discharge or meet allocations. Another option would be to say if ENT values are not met, but HF183 values are, then the ENT exceedance is an "allowable exceedance." | | Compliance if meet TMDL targets or allocations. | |
| | Monitoring FIB | | | | HF 183 threshold TBD based on study unless San Diego Surfer Health Study thresholds can be applied. | | Monitoring FIB or alternative indicator used for SSO | |
| | Implementation actions to capture FIB | | | | HF183 monitoring optional. HF183 results above threshold trigger source investigations and human source reduction, but are not required if ENT targets are being met. | | Implementation targeting FIB or sources of alternative indicator | |
| | Addressed throughout watershed to meet concentrations everywhere. | | Target at areas with highest FIB load to reduce loadings to Bay | | Implementation actions target human sources | | Phased schedule while conducting study. Require SSO based on study to be considered prior to second phase of implementation. | |

* Method of assessing data as compared to STV and geomean should be specified in TMDL for dry and wet weather.

** Requires site-specific amendment for objectives and Basin Plan Amendment for Basin Plan Implementation Provisions.

*** May require Basin Plan Amendment for Basin Plan Implementation Provisions to use HF183. Would only require site-specific objective if SWRCB does not adopt EPA 2012 criteria.

**Example Scenarios for Developing TMDL/TMDL Alternatives**

**For Discussion Only**

| | Scenario |
|---|---|
| **Description of Scenario** | |
| **Basin Plan Objective** | **STV** |
| | |
| **Basin Plan Objective Implementation** | |
| **TMDL Targets** | |
| **Allocations** | |
| **Implementation Strategy** | |
| | |
| | |
| | |

for Newport Bay

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| Geomean |
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