

2019 – 2020

**Ocean, Harbor and Bay
Water Quality Report**



Executive Summary

The 2019 – 2020 Ocean, Harbor and Bay Water Quality Report provides updated data on sewage spills and their impacts resulting in ocean water closures and provides an analysis of bacteriological water quality data collected at Orange County's (OC) ocean, harbor and bay waters. The OC Health Care Agency (HCA) Water Quality Team (WQ) has been collecting information on sewage spill incidents in Orange County for a 33-year period (1987 – 2020) and this data is utilized to identify the main causes of sewage spills and to reduce the number of ocean water closures in Orange County.

In addition, the WQ has been collecting bacteriological water quality data for the 20-year period (2000 – 2020) established by the California Assembly Bill 411 (AB 411) Ocean Water-Contact Sports Standards. This data is used to present an overview of the year-to-year variability and long-term trends associated with ocean, harbor and bay water quality in Orange County.

Project Managers:

- ◆ Anthony Martinez, Program Manager
- ◆ Lauren Robinson, Supervising Environmental Health Specialist
- ◆ Hisham Elmishad, Environmental Health Specialist III



Sewage Spills and Ocean, Harbor and Bay Water Closures (1987 – 2020)

- ❖ A total number of 88 sewage spills were reported to the WQ in 2020, which was well below the 33-year average of 191 spills per year.
- ❖ In 2020, 2% of the 88 sewage spills reported, resulted in ocean, harbor and bay water closures representing a total of 2 ocean water closures for the year.
- ❖ Of the 2 ocean water closures that occurred in 2020, sewage spills originating on private property accounted for 1 of the ocean, harbor and bay water closures for the year.
- ❖ Blockages in pipelines have been responsible for an average of 62% of all beach closures since 1999. The major causes of pipeline blockages during this period are the infiltration of roots (10%), buildup of grease (18%), and unknown (55%).

Posted Warnings Due to Bacteriological Standards Violations from April 1 to October 31 (2000 – 2020)

- ❖ In 2020, the total number of Beach Mile Days (BMDs) posted for Orange County beaches due to violations of bacteriological water quality standards was 60.4 BMDs. From 2000 – 2012 the average number of posted warnings was 205.2 BMDs, but over the past 7-year period (2013 - 2020) the average number of posted warnings dropped significantly to 44 BMDs a year.
- ❖ In 2020, Bolsa Chica Beach, Newport Slough, South County Beach, Laguna Beach, and Capistrano County Beach did not exceed any AB 411 bacteriological standards from April 1 to October 31. A summary of this data is available in Annex A: Postings by Open Coastal Water Areas 2000 – 2020.
- ❖ Excellent bacteriological water quality (less than 1.0 BMDs) was recorded at Huntington City Beach, Crystal Cove Beach, Dana Point Beach, and Capistrano

Bay District Beach monitoring locations from April 1 to October 31. A summary of this data is available in Annex A: Postings by Open Coastal Water Areas 2000 – 2020.

- ❖ The beach areas in 2020 exceeded a total number of 4.0 BMDs from April 1 to October 31 were Seal Beach/Surfside/Sunset (5.97 BMDs), Doheny State Beach (12.4 BMDs), and San Clemente City Beach (6.53 BMDs). A summary of this data is available in Annex A: Postings by Open Coastal Water Areas 2000 –2020.

Note about COVID-19 and Beach Sampling

- ❖ Although COVID-19 caused a major disruption to everyday life in 2020, it posed only a minimal disruption for beach sampling. We observed several stations that had reduced accessibility when the “Stay at Home” orders were issued. This information was communicated to the public by gray pins to represent “No Data” on our website, www.ocbeachinfo.com. Links for updated Orange County beach closure or restriction information were provided on our website and sent out in the email Hotline updates.
- ❖ The pandemic also affected the ways and locations water was used and wastewater was produced. An increase in Private Property sewage spills was observed, although both the overall number of sewage spills and closures resulting from sewage spills declined.
- ❖ It was of utmost importance to keep both the public and staff safe and informed. Staff wore additional Personal Protective Equipment (PPE) and the Water Quality Lab employed additional COVID-19 prevention methods when receiving and processing the samples.



Table of Contents

Executive Summary	1
The Ocean Water Protection Program	4
◆ Orange County Ocean Water Monitoring Stations	
Sewage Waste Discharges	7
◆ Number of Sewage Waste Discharges Reported 1987 – 2020	
◆ Private Property Owner Sewage Spills 1999 – 2020	
◆ Sewage Pipeline Blockages and Breaks 1999 – 2020	
◆ Percent of Sewage Waste Discharges Resulting in Closures 1987 – 2020	
Ocean and Bay Closures Due to Sewage Waste Discharges	13
◆ Total Number of Closures Due to Sewage Spills 1987 – 2020	
◆ Total Number of Closures, Closure Days and Beach Mile Days 1999 – 2020	
◆ Sewage Spill Closure Causes 1999 – 2020	
◆ Types of Pipeline Blockages Causing Closures 1999 – 2020	
◆ Closures Due to Private Property Owner Sewage Spills 1999 – 2020	
Ocean Water Posted Warnings Due to Bacteriological Standards Violations	19
◆ Total Number of Posted Warnings, Posting Days and Beach Mile Days 2000 – 2020	

◆ Total Number of Beach Mile Days Posted 2000 – 2020	
Ocean, Harbor and Bay Water Rain Advisories	22
◆ Total Number of Rain Advisory Days 2000 – 2020	
◆ Number of Rain Advisory Days and Sewage Spill Beach Closures 2000 – 2020	
2019 – 2020 Appendix	25
◆ A: Disease-Causing Microorganisms	
◆ B: Indicator Bacteria Testing Methods	
◆ C: Ocean Water-Contact Sports Standards – Assembly Bill 411 (AB 411)	
◆ D: Public Notification and Risk Communication	
◆ E: Closure and Warning Signs	
◆ F: BMDs	
◆ G: Ocean, Harbor and Bay Rain Advisories (2000 – 2020)	
2019 – 2020 Annex	
◆ A: Postings by Open Coastal Water Areas 2000 – 2020	
◆ B: Postings by Harbor and Bay Water Areas 2000 – 2020	
◆ C: Unauthorized Discharges of Waste and Ocean/Harbor/Bay Closures 1987 – 2020	
◆ D: Sewage Spill Closures for Ocean, Harbor and Bay Water Areas - 2020	



The Ocean Water Monitoring Program

As part of the OC Health Care Agency (HCA), the Environmental Health (EH) Water Quality Team (WQ) is responsible for protecting the public from exposure to ocean and bay waters that may be contaminated with sewage or may cause illness along Orange County's 42 miles of open ocean coastline and 70 miles of harbor and bay frontage. Ocean and bay waters used for recreational activities such as swimming, surfing and diving must meet specific bacteriological water quality standards to be considered safe for such purposes.

It is critical to accurately measure and assess the overall health of our coastal waters through a full range of indicators and provide this information to the public in an annual report. The annual report does not set goals, make recommendations or offer advice; rather, it provides factual data for use by government officials, public agencies, environmental groups, concerned citizens and all other interested parties. In addition, this report provides a foundation for future projects aimed at assessing the health of Orange County's ocean, harbor and bay waters. The report and its appendices contains data on sewage spills and their impacts resulting in ocean

water closures. This report also provides an analysis of bacteriological water quality data for samples collected from Orange County's ocean, harbor and bay waters. Additional detailed statistical information regarding year-to-year variability, rain advisories issued, trends for each beach area and for sewage spill incidents can be found in the 2019 - 2020 Annex for the Ocean, Harbor & Bay Water Quality Report.

The HCA along with the Orange County Sanitation District (OCSD), South Orange County Wastewater Authority (SOCWA) and Orange County Public Works (OCPW) collaboratively sample and analyze the coastal waters in Orange County for bacteria that indicates the possible presence of disease-causing

organisms (see Appendix A, page 25). Staff from these agencies cooperate in the weekly collection of water samples at 141 ocean, harbor and bay monitoring stations throughout coastal Orange County (Figure 1, page 6). Last year, over 7,600 ocean, harbor and bay water samples were collected and approximately 23,000 analyses (see Appendix B, page 26) were performed to determine the results for three indicator bacteria used for compliance purposes (i.e., total coliform, fecal coliform and enterococcus).

HCA's WQ Team reviews the bacteriological sample results daily and issues ocean, harbor and bay water closures, posts warnings and health advisories under the requirements stipulated by the California Health



and Safety Code and Title 17 of the California Code of Regulations (see Appendix C, page 27). When the results of testing indicate that one or more of the AB 411 Ocean Water-Contact Sports Standards has been exceeded, the public is notified (see Appendix D), signs are posted at the beach (see Appendix E), and the sampling frequency and monitoring locations may increase until the sample results meet established standards and/or the source of the problem is eliminated. A metric called “Beach Mile Days” (BMDs) is used as a measurement that takes into account the length of the beach and amount of time a posted warning or closure is in place (see Appendix F). The numeric value associated with a Beach Mile Day represents the public’s loss of recreational water use and allows for beach-to-beach comparisons.

WQ staff are on-call 24 hours/7 days a week to respond to and investigate any reports of sewage or other potential contamination incidents that may affect public health at any of Orange County’s ocean, harbor and bay water areas. The WQ Team maintains an Ocean, Harbor and Bay Water Posting and Closure webpage, telephone hotline and social media account (Twitter), all of which provide current information regarding Orange County beach closures, posted warnings and advisories. The telephone hotline and webpage are immediately updated and social media messages are sent when a change of status occurs at any ocean, harbor or bay water area in Orange County.



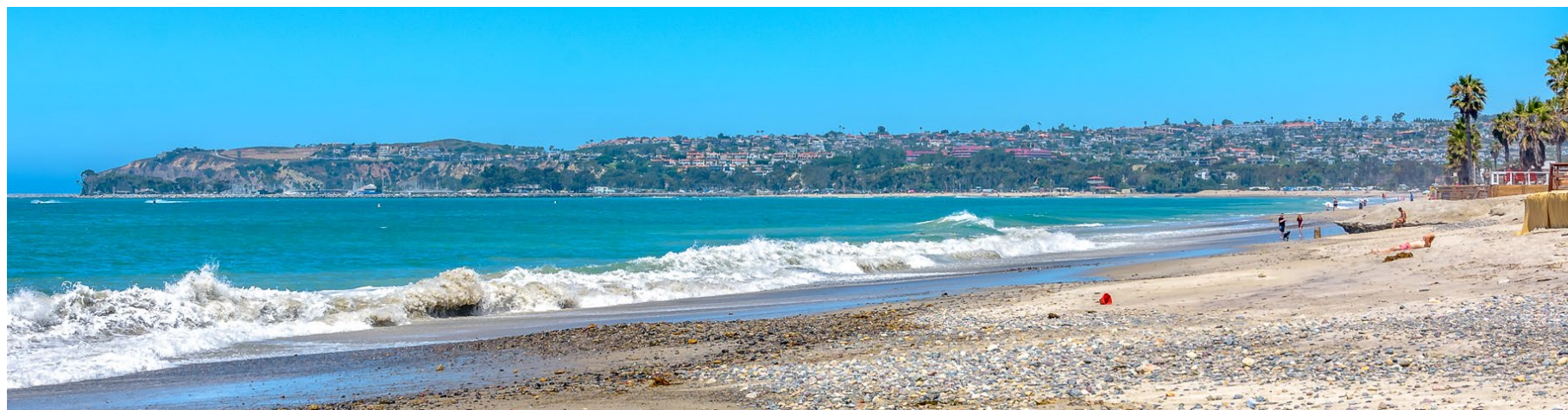
Ocean, Harbor and Bay Water Closure & Posting Telephone Hotline
(714) 433-6400



Ocean, Harbor and Bay Water Closure & Posting Web Page
www.ocbeachinfo.com

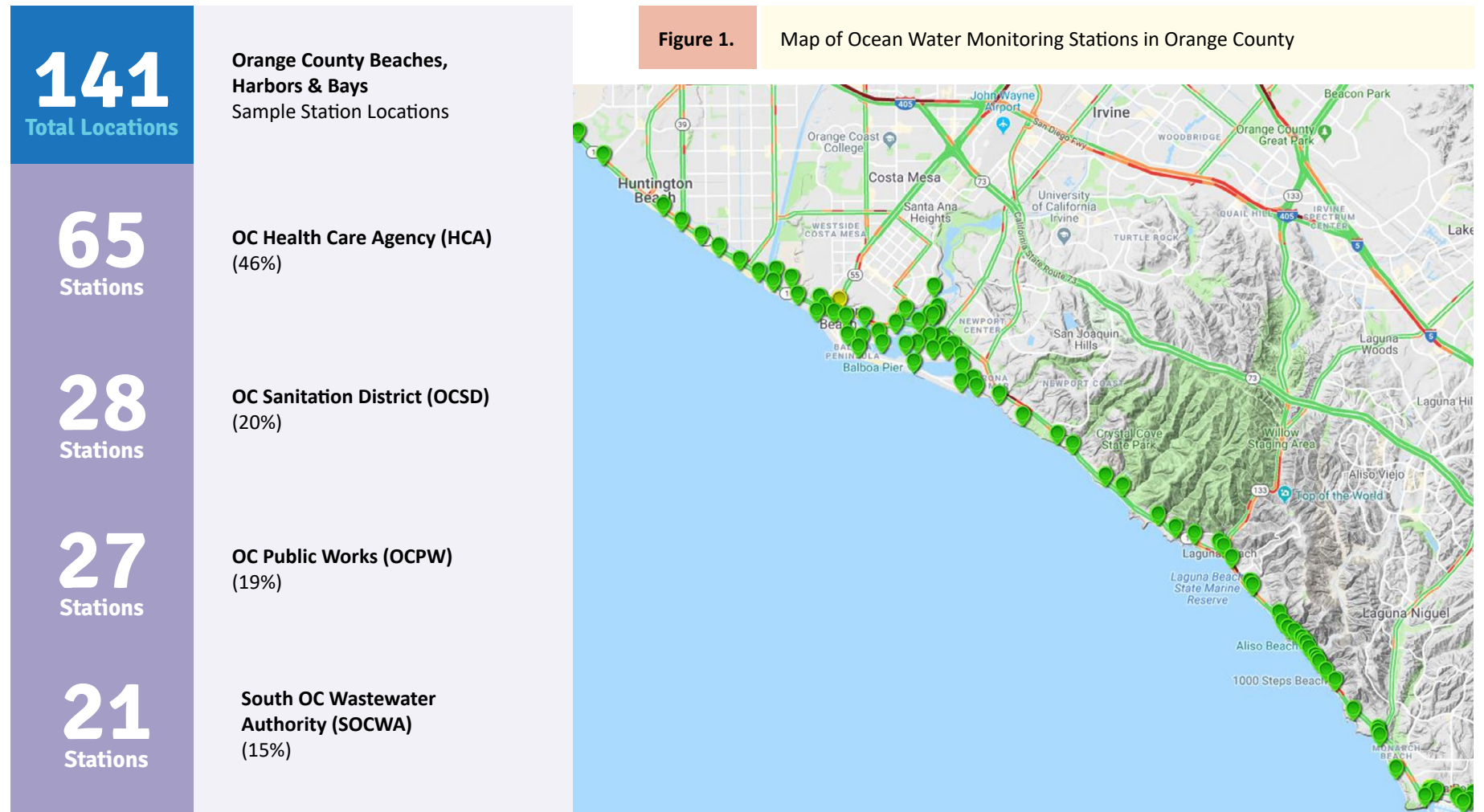


Twitter
<http://twitter.com/ochealth>



Orange County Ocean Water Monitoring Stations

Four separate public agencies conduct microbial ocean water quality monitoring along 42 miles of open coastline and 72 miles of harbor and bay frontage under various discharge permit requirements or statutory mandates. Staff from these agencies cooperate in a collaborative effort to collect weekly water samples at 141 ocean, harbor and bay monitoring stations located throughout coastal Orange County (Figure 1).



Sewage Waste Discharges

Sewage waste discharges commonly known as “sewage spills,” occur when wastewater being transported via underground pipes overflows through a manhole, clean-out drain or broken pipe. Sewage spills can cause health hazards, damage homes and businesses, and threaten the environment, local waterways and beaches. Untreated sewage has high levels of disease-causing bacteria and viruses. Orange County WQ is responsible for protecting public health by closing ocean, harbor and bay water areas affected by sewage spills

Local and state agencies have legal jurisdiction and enforcement authority to ensure sewage spills are remediated. Allowing sewage to discharge or not reporting the sewage spill from a home, business or public property may subject the responsible party to penalties and/or out-of-pocket costs to reimburse local and state agencies for cleanup efforts. As mandated by the California Health and Safety Code, any person who causes or permits a sewage discharge to any state waters must immediately notify the local health agency of the discharge. After a significant increase in the number of ocean water closures due to sewage spills in 1998, the WQ Team started collecting detailed data on all sewage spills occurring in Orange County. Therefore, the type of sewage waste discharges data (e.g., private property owner, pipeline blockages and pipeline breaks) are only available from 1999 onward.

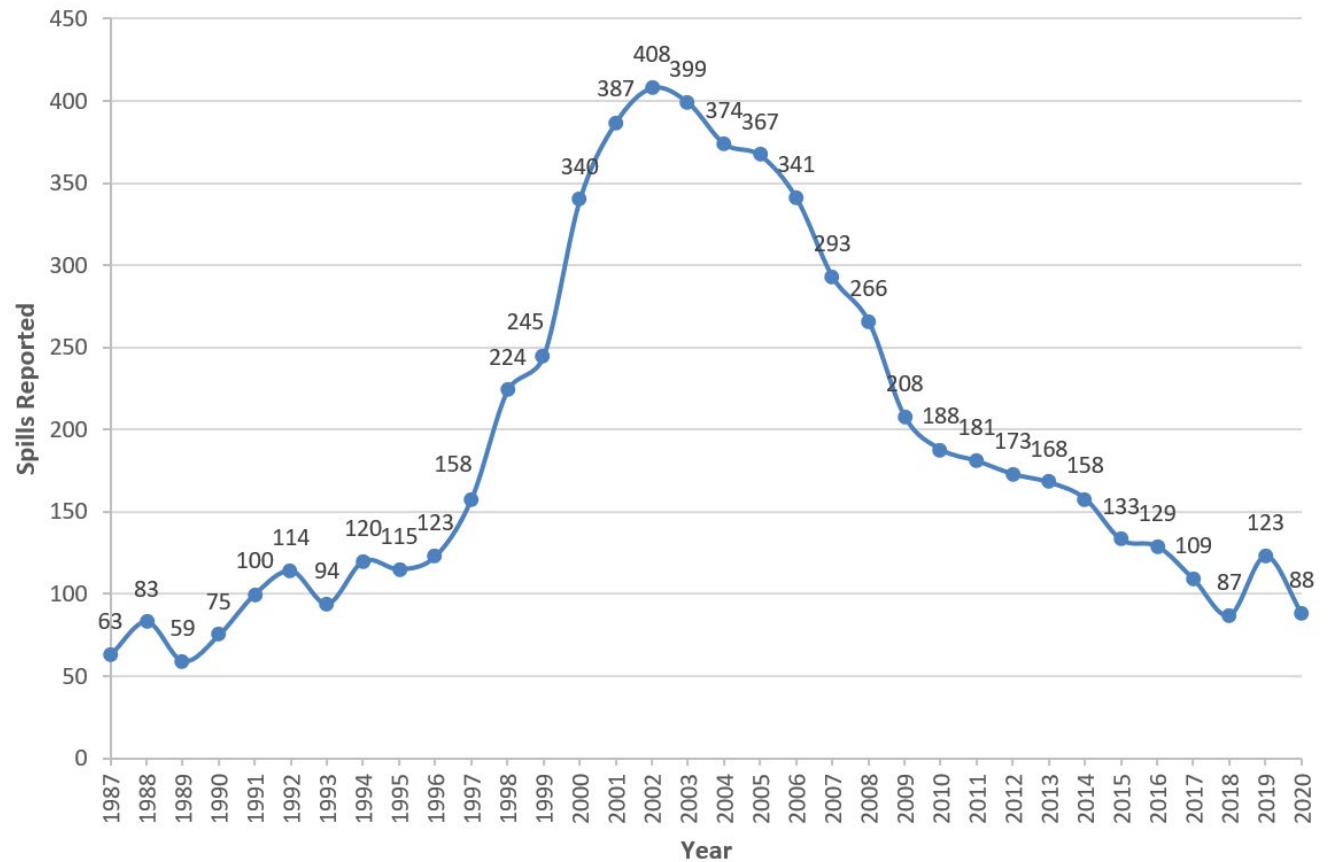


Number of Sewage Waste Discharges Reported 1987 – 2020

The number of sewage discharges reported to the Orange County WQ by sanitation districts, cities that operate sewage collection systems and private property owners from 1987 – 2020 is detailed in Figure 2. The number of spills in both 2019 and 2020 were well below the average of 191 spills per year.



Figure 2. Number of Sewage Spills Reported 1987 – 2020



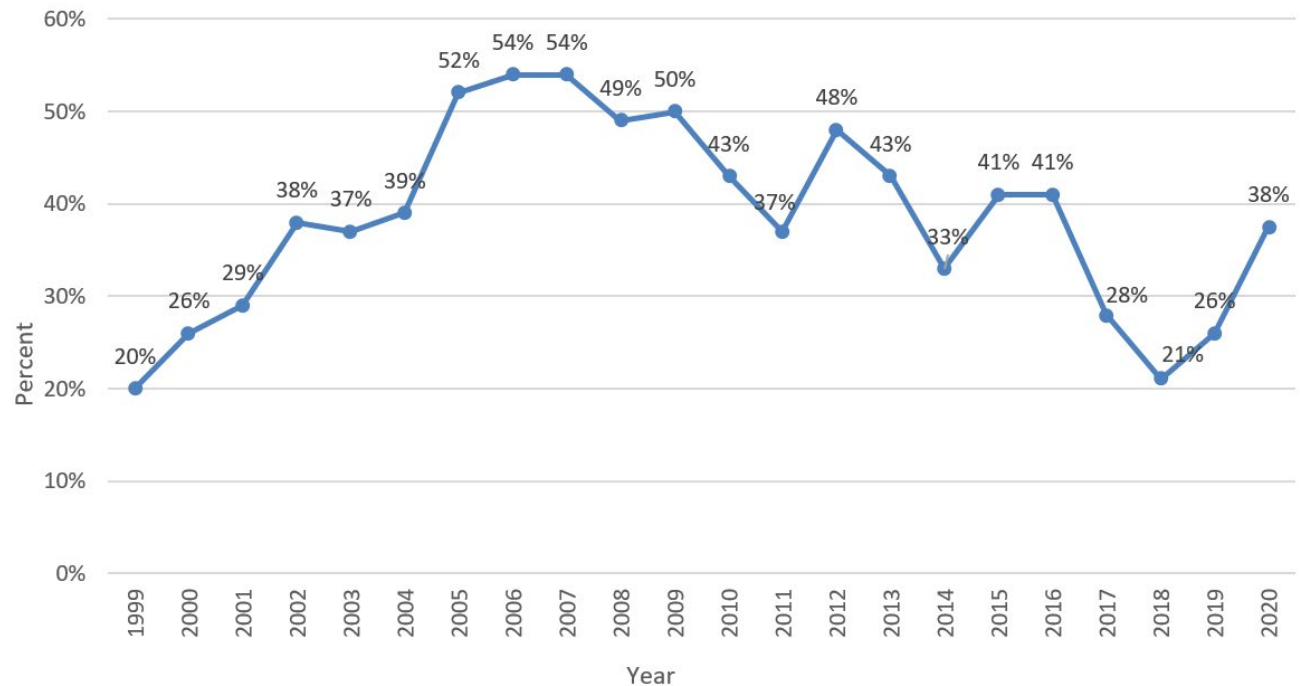
Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data



Private Property Owner Sewage Spills 1999 – 2020

Figure 3 depicts the percentage of sewage spills due to overflows from privately owned sewage systems (e.g. residential homes, apartment/condominium complexes, strip malls, etc.) reported each year from 1999 – 2020. In 2020, privately owned sewage systems were responsible for 38% of all sewage waste discharges reported in Orange County and equal to the 21-year average of 38%. Although, the percentage of spills was higher, the actual number of overflows from privately owned sewage systems stayed consistent in years 2019 and 2020.

Figure 3. Percent of Private Property Owner Sewage Spills 1999 – 2020



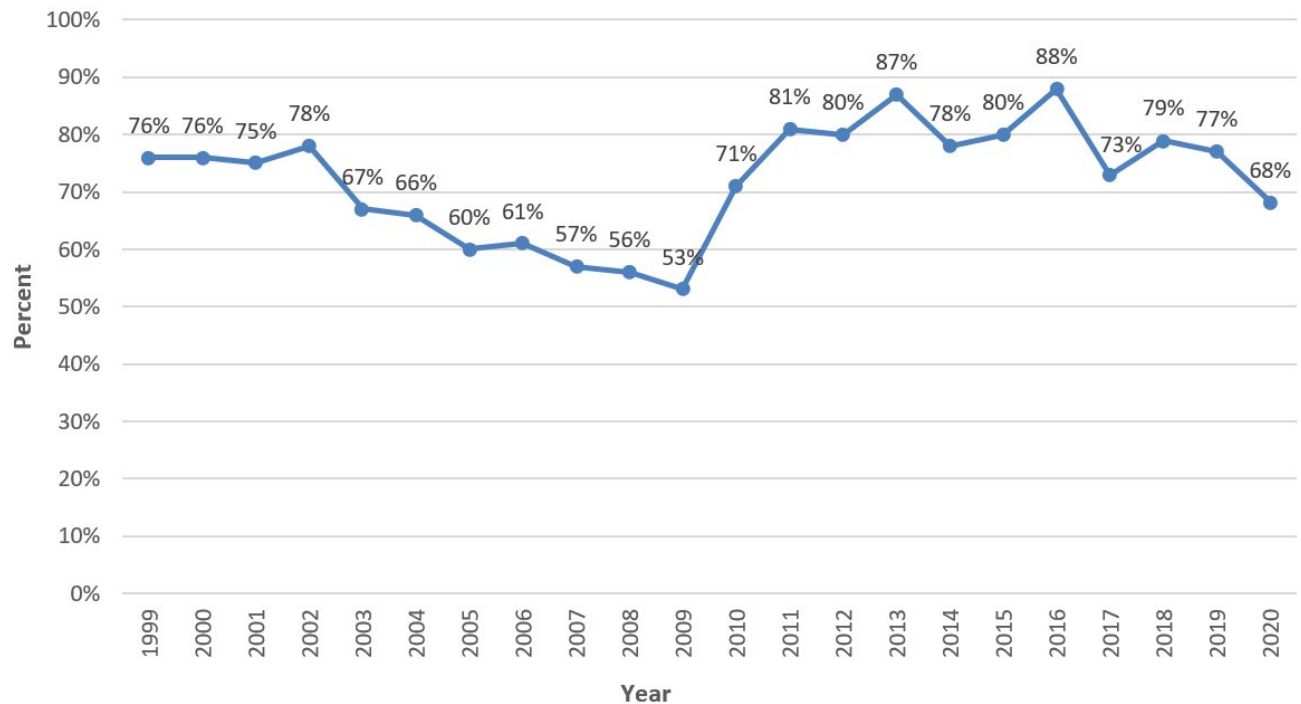
Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data



Sewage Pipeline Blockages 1999 – 2020

The percentage of sewage spills caused by pipeline blockages from 1999 – 2020 is detailed in Figure 4. The percentage of sewage spills caused by pipeline blockages continues to be the leading cause of sewage waste discharges from 1999 – 2020. Since 2009, the increase in the percentage of sewage spills caused by pipeline blockages is primarily due to the significant decrease in the percentage of sewage spills caused by pipeline breaks as shown in Figure 5 (page 11). The significant reduction in pipeline breaks can be attributed to the wastewater collection agencies having to adopt “Sewer System Management Plans” which require the routine inspection, maintenance and rehabilitation of aging sewers. This reduction in pipeline breaks has been maintained at 5% - 8% for the past 10 years.

Figure 4. Percent of Sewage Spills Caused By Pipeline Blockages 1999 – 2020



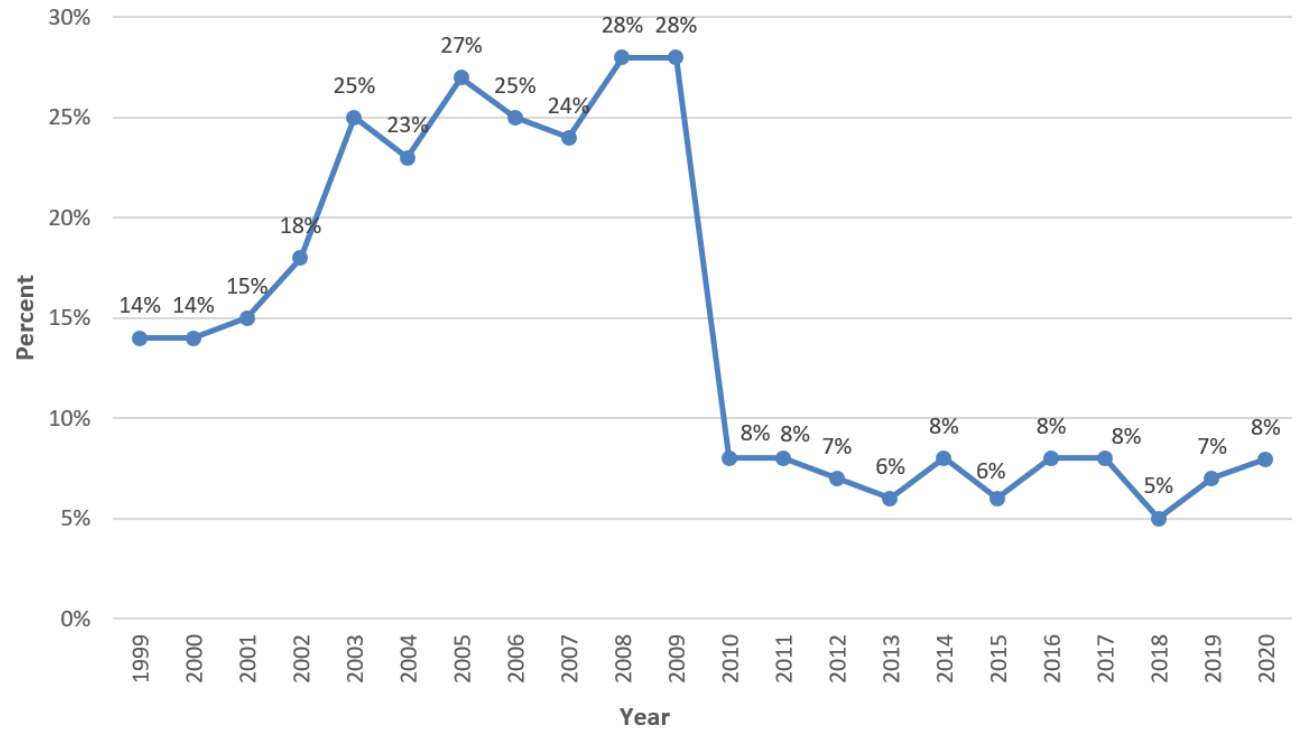
Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data



Sewage Pipeline Breaks 1999 – 2020



Figure 5. Percent of Sewage Spills Caused by Pipeline Breaks 1999 – 2020



Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data

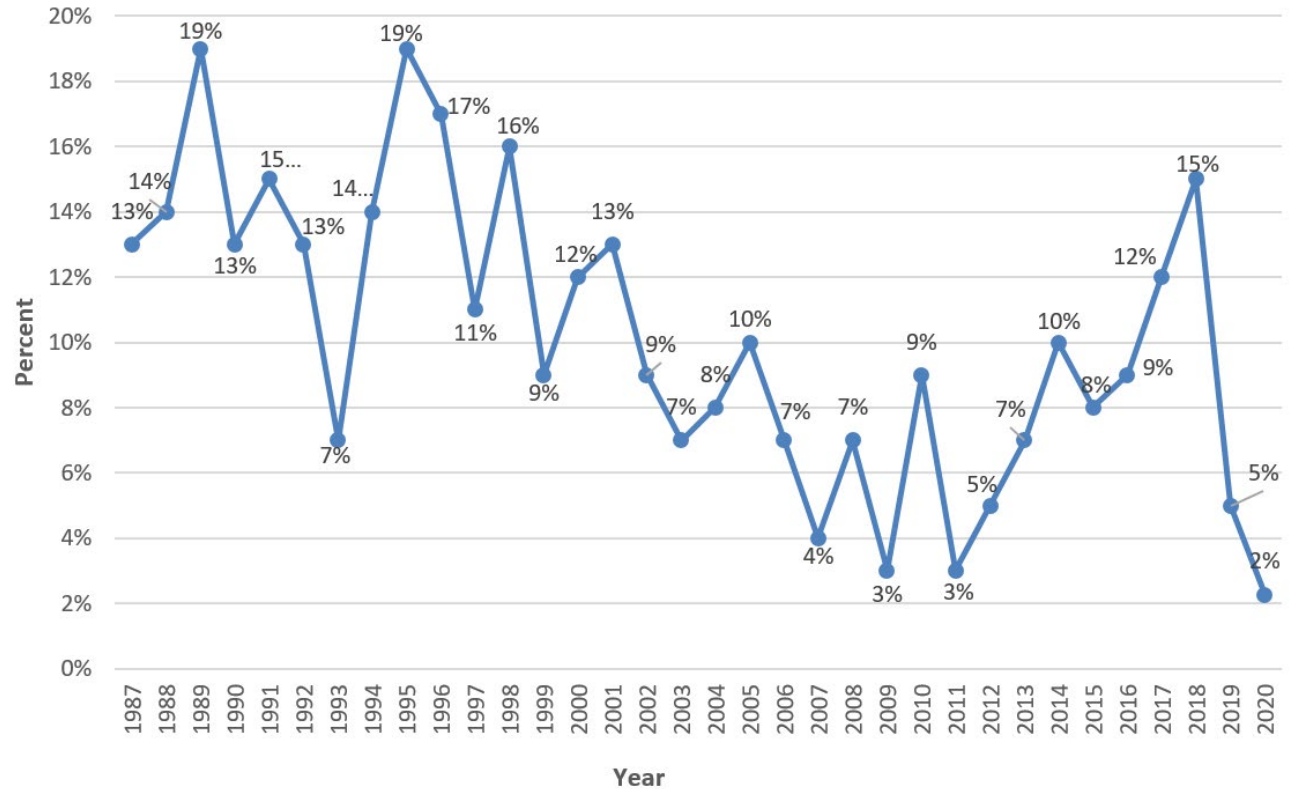


Percent of Sewage Waste Discharges Resulting in Closures 1987 – 2020

The percentage of sewage spills reported that resulted in an ocean, harbor or bay water closure from 1987 – 2020 is shown in Figure 6. The past two years have shown a significant decline in the number of ocean water closure, both well below the 10% annual average from 1987 - 2020.



Figure 6. Percent of Sewage Spills Resulting in Ocean Harbor and Bay Water Closures 1987 – 2020



Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data



Ocean, Harbor and Bay Water Closures Due to Sewage Spills

When a known release of sewage or other harmful waste is reported to the WQ Team, the ocean, harbor or bay water areas that may be affected by the sewage discharge are immediately closed to water-contact recreational activities. The area closure is based on many factors including type of sewage (e.g., untreated, secondary treated, etc.), volume of spill, location of spill, ocean currents and tides, historical sewage spills in the area and other pertinent information. After the initial closure is established, the appropriate agencies are notified, the area is posted with closure signs, a press release is issued, the Ocean, Harbor and Bay Water Closure & Posting Telephone Hotline and Webpage are updated with the beach closure information, and daily bacterial sampling of the affected area is initiated.

The closed ocean or bay water area will be reopened or reduced in size when the contamination source has been eliminated and after two daily consecutive sampling results indicate the affected area meets the AB 411 Ocean Water-Contact Sports Standards.

The WQ Team began recording information on ocean water closures in 1987. After a significant increase in the number of ocean water closures due to sewage spills in 1998, the WQ Team started collecting detailed data on all sewage spills occurring in Orange County the following year (1999).

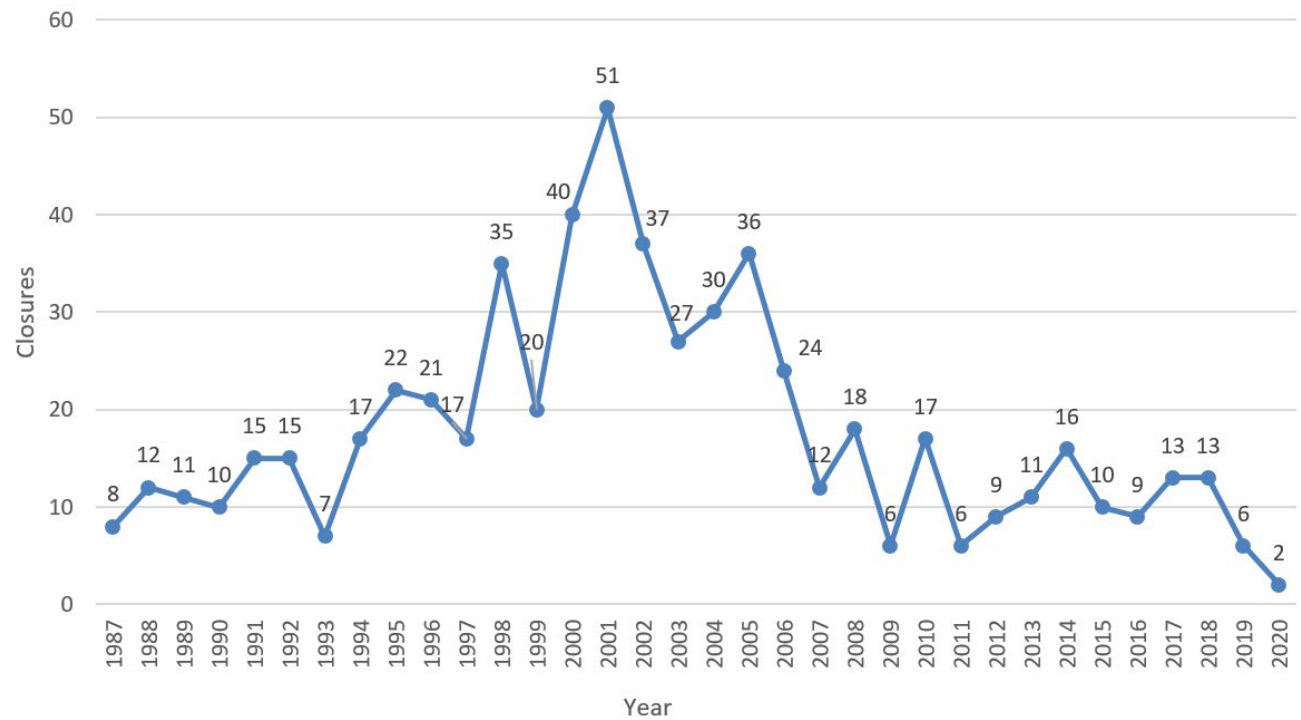


Total Number of Closures Due to Sewage Spills 1987 – 2020

The total number of ocean, harbor and bay water closures in Orange County due to sewage spills from 1987 – 2020 is summarized in Figure 7. In 2020, the total number of closures due to sewage spills (2) is the lowest amount since closures were tracked in Orange County.



Figure 7. Number of Ocean, Harbor and Bay Water Closures Due to Sewage Spills 1987 – 2020



Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data



Total Number of Closures, Closure Days and BMDs 1999 – 2020

The following graphs depict the total number of closures (Figure 8), total number of closure days (Figure 9) and total number of BMDs (Figure 10, page 16) of closure due to sewage spills in Orange County. In 2020, the total number of closures (2), and the total number of closure days (6) continued to remain consistently below the 21-year averages of 19 closures and 65 closure days for the period from 1999 – 2020.

Figure 8. Total Number of Closures 1999 – 2020

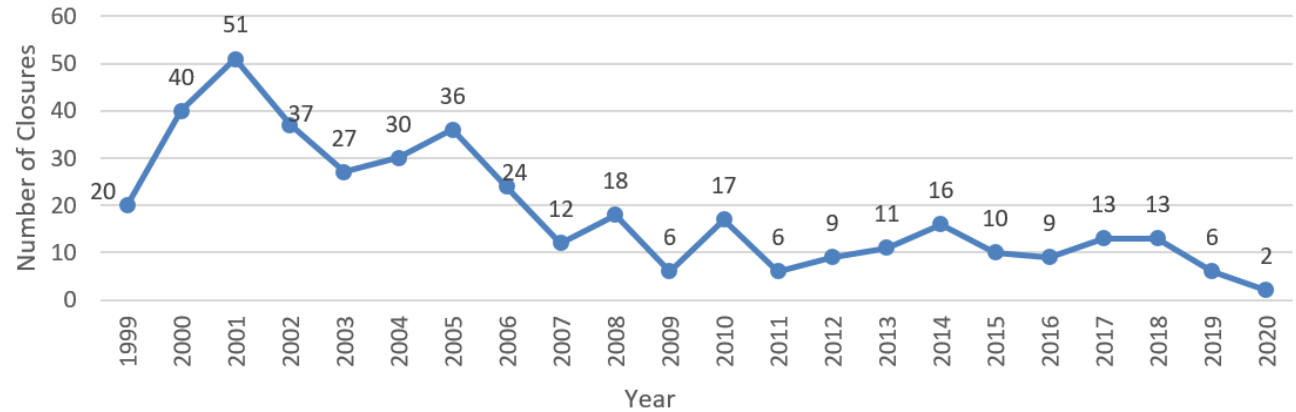
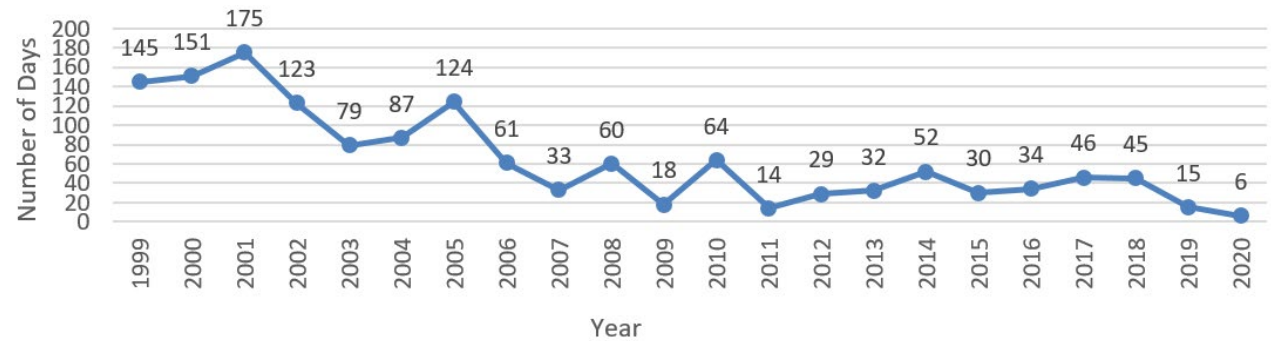


Figure 9. Total Number of Closure Days 1999 – 2020



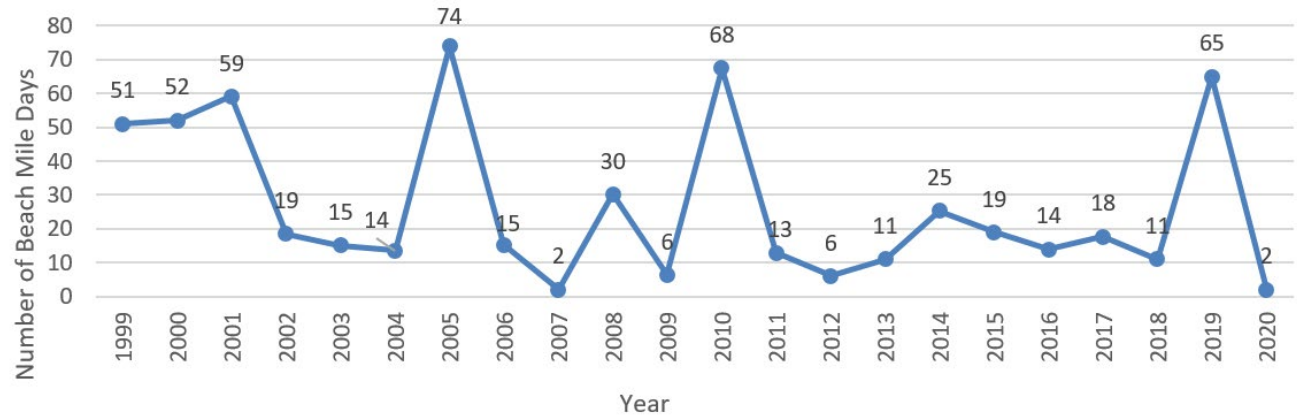
Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data



Total Number of Closures, Closure Days and BMDs 1999 – 2020

The 2020 total number of BMDs (2) ties for the lowest number of BMDs since this data has been tracked in 1999. Additionally, in the prior year of 2019, 57 of the 65 BMDs were from one large sewage spill that occurred over a holiday weekend due to a force main break.

Figure 10. Total Number of BMDs From Closures 1999 – 2020



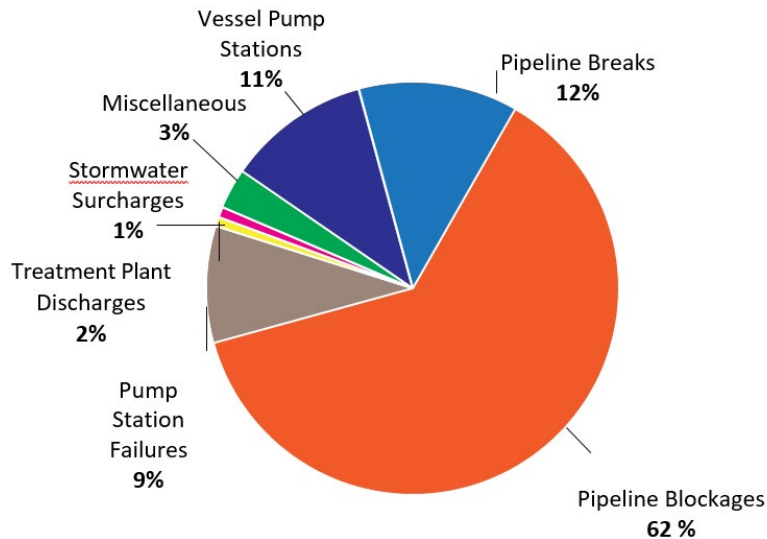
Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data



Sewage Spill Closure Causes 1999 – 2020

Figure 11 illustrates the distribution of different causes of sewage spills that resulted in ocean, harbor and bay water closures from 1999 – 2020. Sewage system pipeline blockages caused the majority (62%) of all ocean, harbor and bay water closures in Orange County for the 21-year period from 1999 - 2020. The remaining 38% of sewage closures were caused by pipeline breaks (12%), vessel pump stations (11%), pump station failures (9%), treatment plant discharges (2%), storm water surcharges (1%) and miscellaneous (3%).

Figure 11. Causes of Ocean, Harbor and Bay Water Closures 1999 – 2020

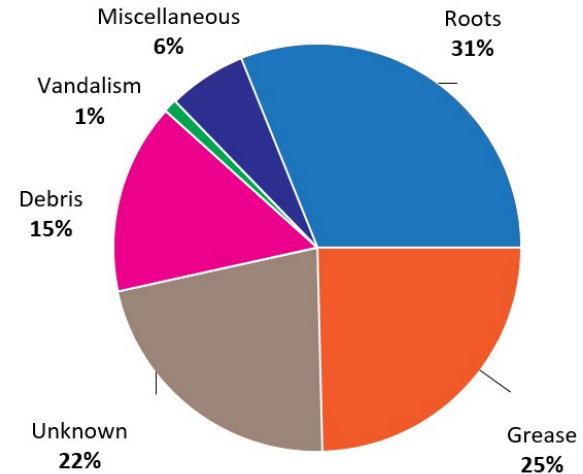


Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data

Types of Pipeline Blockages Causing Closures 1999 – 2020

Figure 12 illustrates the distribution of different causes of pipeline blockages that resulted in ocean, harbor and bay water closures from 1999-2020. The infiltration of roots (31%) and deposition of grease (25%) into sewer pipes accounted for slightly more than half (56%) of the pipeline blockages that resulted in ocean, harbor and bay water closures in Orange County for the 21-year period from 1999 – 2020. Other causes of pipeline blockages that resulted in water closures were debris (15%), miscellaneous (6%) and vandalism (1%). The remaining 22% of pipeline blockages that caused ocean, harbor and bay water closures were not able to be determined (unknown).

Figure 12. Types of Pipeline Blockages Causing Closures 1999 – 2020



Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data

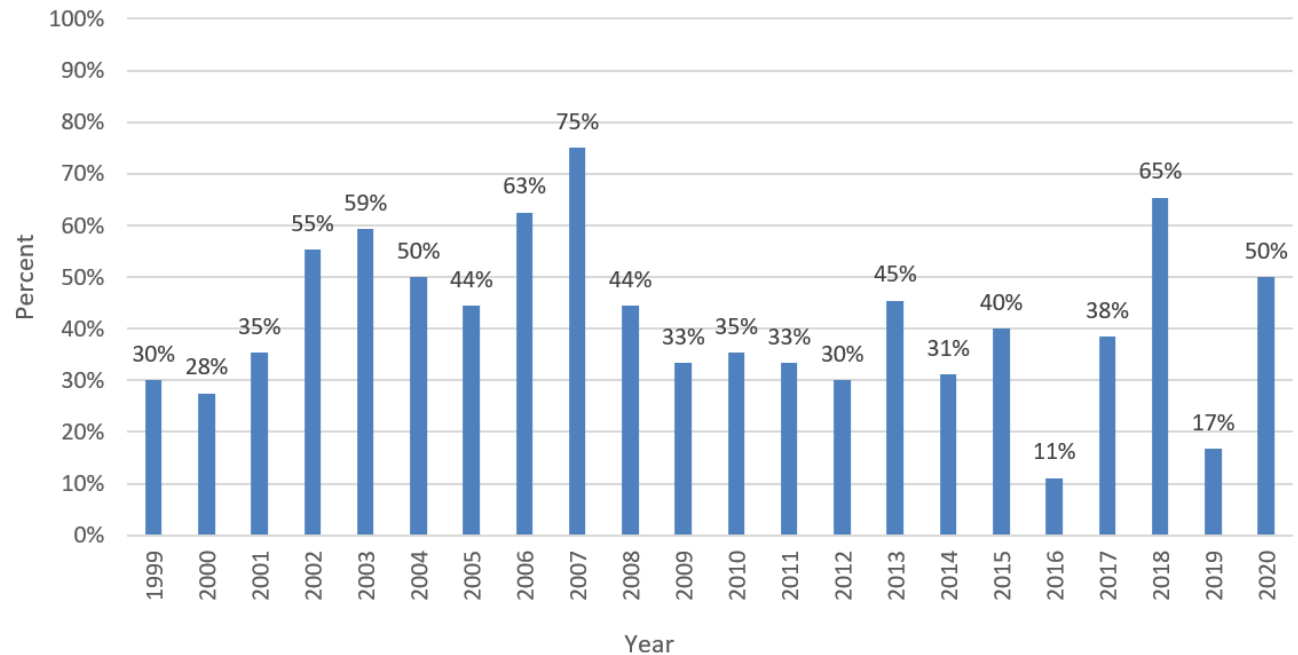


Closures Due to Private Property Owner Sewage Spills 1999 – 2020

The percentage of ocean, harbor and bay water closures that were due to private property owner sewage system spills for the 21-year period from 1999 – 2020 is shown in Figure 13. Of the 6 ocean water closures that occurred in 2019, private property owner sewage spills accounted for 17% of the closures for the year which is significantly below the 41% annual average percentage of private property owner caused sewage spill closures from 1999 – 2020. Only 1 of the 2 closures in 2020 was from a private property source.

Figure 13.

Percent of Ocean, Harbor and Bay Water Closures Due to Private Property Owner Sewage Spills 1999 – 2020



Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data



Ocean Water Postings Due To Bacteriological Standards Violations

Upon implementation of the AB 411 Ocean Water-Contact Sports Standards in July of 1999, the WQ Team began posting the required health warning signs at public beaches where the ocean, harbor or bay waters failed to meet state mandated recreational water quality standards.

To better protect the health of the residents and visitors to Orange County, WQ collects bacteriological water samples at 141 ocean, harbor and bay locations throughout Orange County, year-round, even though regulations only require collection from April 1 through October 31. Sample results are reviewed daily by the WQ Team to determine compliance with the seven AB 411 bacteriological standards established by the State of California. Each year the WQ Team reviews the bacteriological water quality results for over 3,800 water samples collected from April 1 to October 31. Because ocean, harbor or bay water areas that violate the AB 411 Ocean Water-Contact Sports Standards may cause illness to recreational water users, the WQ staff recommends staying out of the water at all beach areas that are posted with the health warning sign.

When a bacteriological water sample fails to meet an AB 411 Ocean Water-Contact Sports Standard, the following actions are taken:

- ❖ Warning signs are posted at the affected ocean, harbor or bay water area indicating that bacteria levels have exceeded health standards and ocean water contact may cause illness.
- ❖ The information regarding the posted area is updated on the Ocean, Harbor

and Bay Water Closure and Posting Hotline at (714) 433-6400, Webpage at www.ocbeachinfo.com and on Twitter <http://twitter.com/ochealth>.

- ❖ Follow-up bacteriological water samples are collected at the posted location and the results are evaluated daily to determine if the posted warning area should be modified, kept the same or removed.



Total Number of Posted Warnings, Posting Days and BMDs 2000 – 2020

As required by the California Health and Safety Code Section 115910, violations of the AB 411 Ocean Water-Contact Sports Standards between April 1 and October 31, must be reported to the California State Water Resources Control Board by all California coastal counties, on a monthly basis. The information provided in this section is the data reported to the California State Water Resources Control Board beginning with the year 2000, the first full calendar year that the AB 411 Ocean Water-Contact Sports Standards were put in place.

The total number of posted warnings, total number of posting days, and total number of BMDs that were posted due to AB 411 standards violations between April 1 and October 31 for all Orange County ocean, harbor and bay water areas, are shown in Table 1. There has been a significant reduction in the total number days and BMDs for the 20-year period from 2000 – 2020. This reduction is due to multiple mitigation measures and strategies being implemented by local, County and state agencies to reduce the amount of urban runoff being discharged into storm drains, creeks and rivers that impact ocean, harbor and bay waters.

Table 1. Total Number of Posting Warnings, Posting Days and BMDs 2000 – 2020

Year	Posted Warnings	Posting Days	BMDs
2000	199	2,123	362.8
2001	208	2,454	282.4
2002	308	2,456	366.0
2003	160	1,732	247.5
2004	141	1,877	196.8
2005	102	1,512	197.6
2006	183	1,381	177.4
2007	116	1,037	139.0
2008	121	857	132.2
2009	109	791	135.6
2010	102	843	87.6
2011	114	855	164.0
2012	119	1,135	178.6
2013	87	458	34.6
2014	115	632	35.4
2015	109	674	36.2
2016	74	662	29.1
2017	99	777	38.9
2018	103	807	51.6
2019	112	1,052	63.9
2020	121	1,095	60.4

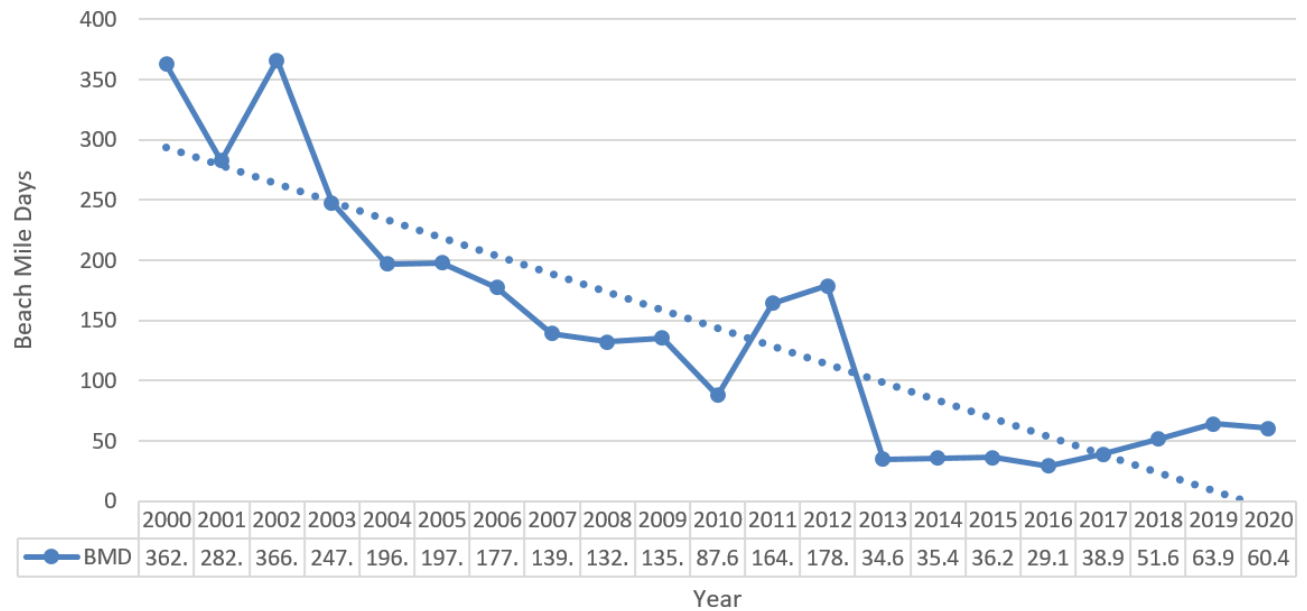


Total Number of BMDs Posted 2000 – 2020

The trend in the total number of BMDs that were posted due to AB 411 standards violations between April 1 and October 31 from 2000 – 2020 is detailed in Figure 14. BMDs have gone down by 3.5 BMDs from the previous year and both years are largely below the 20-year average of 144 BMDs.



Figure 14. Total Number of BMDs Posted 2000 – 2020 (April 1 – October 31)



Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data



Ocean, Harbor And Baywater Rain Advisories

During and after a significant rainstorm event, storm drains, creeks and rivers carry floodwaters with urban runoff into local ocean, harbor and bay waters. Urban runoff may include fertilizers, road oils, litter and large amounts of bacteria from a variety of sources, such as animal waste and decomposing vegetation.

The levels of bacteria can rise significantly in ocean and bay waters close to discharging storm drains and outlets of creeks, rivers, and streams during and after rainstorms. To ensure that public health and safety is protected, WQ staff advise against body-contact recreational use of ocean, harbor or bay waters where there may be contamination due to storm water carrying urban runoff. The elevated bacterial levels in ocean, harbor and bay waters may continue for a period of at least three days, depending on the intensity of the rain and the volume of runoff.

Swimmers, surfers and divers should avoid body-contact recreation with Orange County's ocean, harbor and bay waters during and after a rainstorm event and all beach users

should avoid contact with any storm drain or creek runoff on the beach during dry or wet weather conditions.

WQ issues a Rain Advisory during or immediately after a rainstorm event that results in measured rainfall greater than or equal to two-tenths of an inch (0.20"). If multiple rainstorm events occur during the 72-hour window of the previous rainstorm, the existing Rain Advisory continues for an additional 72 hours. Rain Advisory information is provided by issuing a Rain Advisory Press Release to media outlets and on the Ocean, Harbor and Bay Water Closure and Posting Hotline at (714) 433-6400, Webpage at www.ocbeachinfo.com, and on Twitter <http://twitter.com/ochealth>.

Upon implementation of the AB 411 Ocean Water-Contact Sports Standards in July of 1999, the WQ Team began issuing Rain Advisories for all coastal ocean, harbor or bay waters in Orange County. The annual report uses data beginning in 2000 when the first full year of the Rain Advisories were issued. Appendix G provides the total number of Rain Advisory Days for each year and the dates the advisories were in effect (2000 – 2020).

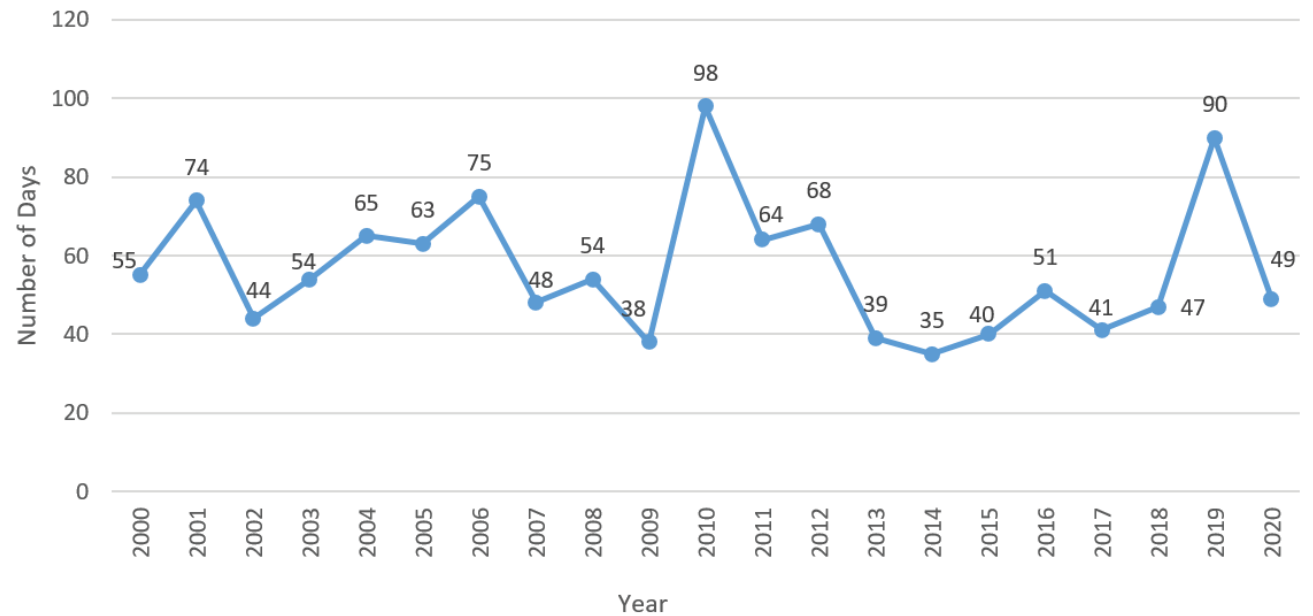


Total Number of Rain Advisory Days 2000 – 2020

The following graph (Figure 15) depicts the total number of Rain Advisory Days issued for ocean, harbor and bay waters from 2000 – 2020. In 2020, Orange County experienced a total of 49 Rain Advisory Days which is below the 20-year average of 57 Rain Advisory Days per year from 2000 – 2020.



Figure 15. Total Number of Rain Advisory Days 2000 – 2020



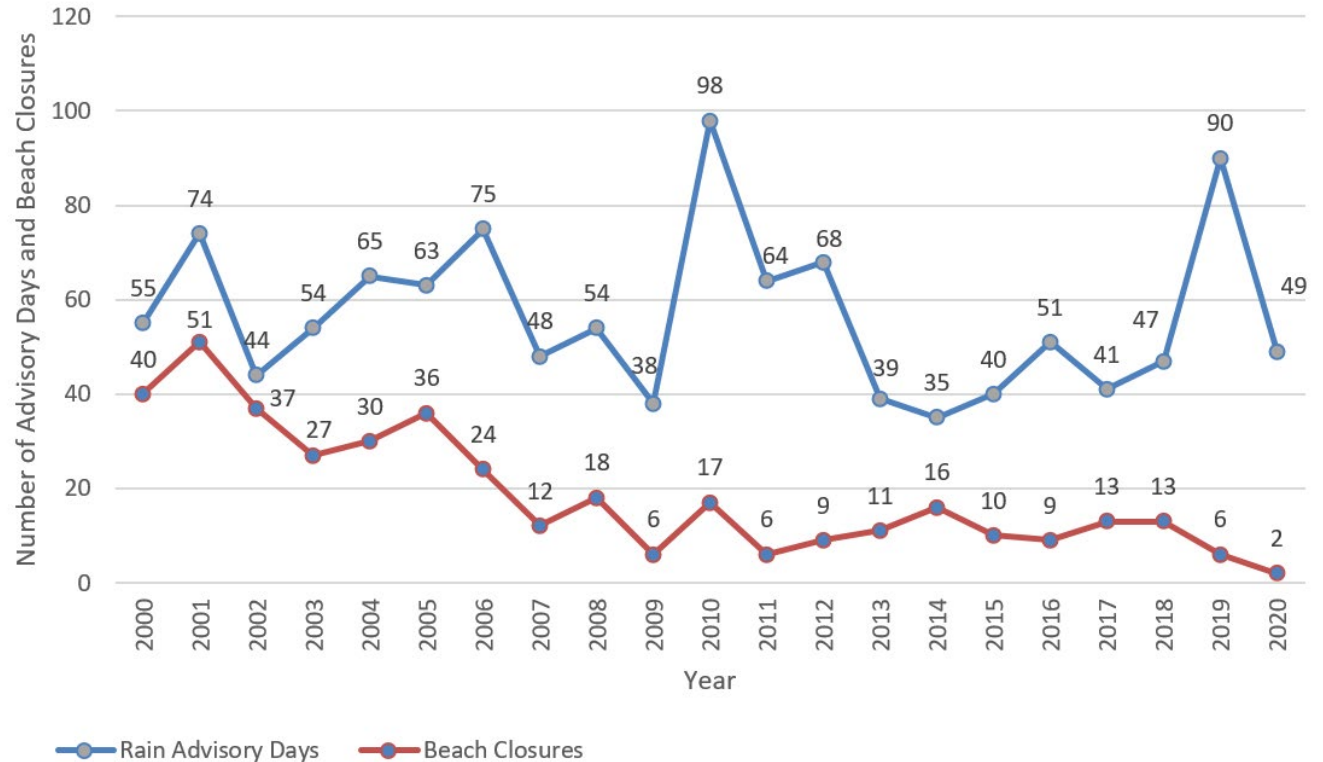
Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data



Number of Rain Advisory Days and Sewage Spill Beach Closures 2000 – 2020

The following graph (Figure 16) compares the total number of Rain Advisory Days to the total number of sewage spill beach closures from 2000 – 2020. For the 12-year period from 2000 – 2012, an increase or decrease in the total number of Rain Advisory Days generally resulted in a similar increase or decrease in the total number of sewage spill beach closures. However, since 2013, it appears this relationship between sewage spill beach closures increasing and decreasing along with the number of Rain Advisory Days no longer exists.

Figure 16. Number of Rain Advisory Days and Sewage Spill Beach Closures 2000 – 2020



Source: Orange County Ocean, Harbor and Bay Water Quality Report Historical Data



2019-2020 Appendix

Appendix A

Disease-Causing Microorganisms

Contaminated runoff and untreated sewage released into ocean and bay waters may result in swimmer exposure to pathogenic bacteria, viruses or protozoa. These disease-causing microorganisms may be present at or near the sites where discharges enter the water.

The following table lists the types of microorganisms and the diseases (or symptoms) they may cause.



Disease-Causing Microorganisms

Pathogenic Agent	Disease
Bacteria	
<i>Escherichia coli (E. coli)</i>	Gastroenteritis
<i>Salmonella (not typhi)</i>	Gastroenteritis, usually with fever; less commonly septi-cemia (generalized infection - organisms multiply in the bloodstream)
Some strains of <i>Shigella</i>	Gastroenteritis, usually with fever
Protozoa (Intestinal Parasites)	
<i>Cryptosporidium</i>	Diarrhea - Cryptosporidiosis
<i>Giardia lamblia</i>	Diarrhea - Giardiasis
Viruses	
<i>Rotavirus</i>	Gastroenteritis
<i>Enteroviruses</i>	Respiratory infection, rash, fever, meningitis
Norwalk and Norwalk-like viruses	Gastroenteritis
Adenovirus	Respiratory infection and gastroenteritis
Hepatitis A (outbreaks associated with eating shellfish from sewage-contaminated water)	Infectious hepatitis (liver malfunction)

The levels of bacteria, viruses and protozoa typically decrease in ocean and bay waters over time due to the following reasons:

- Die-off due to sun (ultraviolet exposure), salt water or age.
- Predation by other organisms.
- Dispersion and dilution.



Appendix B

Indicator Bacteria Testing Methods

The detection and enumeration of disease-causing organisms (pathogens) identified with waterborne illness is difficult, time-consuming and costly. Thus, most water quality laboratories are required to test for fecal indicator bacteria (i.e., total coliforms, fecal coliforms and enterococci) as a means to ascertain the likelihood that human pathogens may be present in recreational waters. Fecal indicator bacteria normally occur in the intestines of all warm-blooded animals, are excreted in high numbers in feces, but can also be found in soil and decaying vegetation. Since there is no ideal indicator group, testing is done for more than one indicator. Total coliforms are a broad group of organisms that include fecal coliform bacteria as well as *E. coli*. The enterococci group has been determined to be a good indicator of water-contact associated gastroenteritis. The methods most commonly used to detect fecal indicator bacteria in water include:

- ❖ Membrane Filtration (MF)
- ❖ Multiple-Tube Fermentation (MTF)
- ❖ Colilert®
- ❖ Enterolert®

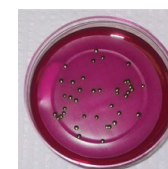
All of the methods are culture based, which means that the indicator bacteria present in water must be allowed to grow in order to be detected. Differences between the methods include how the bacteria are detected and counted, how soon the results become known and cost. Each method has its advantages and disadvantages. Most of the limitations depend on factors such as the other types of constituents in the water and density of bacteria present, and all require at least an 18-hour incubation period. The following is a brief summary of the Membrane Filtration method, the method used by the HCA/Public Health Laboratory, the South Orange County Wastewater Authority Laboratory, and the Orange County Sanitation District Laboratory for the analyses of total coliforms, fecal coliforms, and enterococci in ocean and bay waters. Detailed descriptions for the Membrane Filtration (MF), Multiple-Tube Fermentation (MTF), Colilert® and Enterolert® methods are available in the latest edition of Standard Methods for the Examination of Water and Wastewater.

Membrane Filtration (MF)

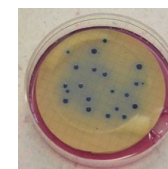
The Membrane Filtration method involves filtering water through a porous membrane to concentrate or trap bacteria from the water sample on the filter surface. The membrane filter is placed onto a

culture medium designed to encourage the growth of the target indicator. The filter is incubated for 22–24 hours to allow the bacterial cells to multiply into visible colonies. Theoretically, each bacterial cell (or clump of cells) produces a single colony on the membrane.

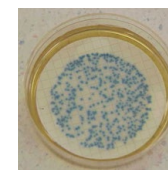
The colonies are viewed under a 10X magnifying lens and distinguished from non-target bacteria based on the type, size and color of the colonies. Target bacteria are indicated by pigment production resulting from bacterial enzymatic reactions to specific substrates. The number of colonies present in 100 milliliters of water, also known as “Colony Forming Units” (CFUs), is counted and the concentration of organisms in the original sample is calculated.



Total Coliform Colonies



Fecal Coliform Colonies



Enterococcus Colonies



Appendix C

Ocean Water-Contact Sports Standards – Assembly Bill 411 (AB 411)

In 1998, AB 411 (Wayne) was chaptered into law and added Sections 115875-115915 to the California Health and Safety Code. The law authorized the creation of bacteriological ocean water quality standards that are considered protective of public health (California Code of Regulations Sections 7956-7962).

The standards are informally called “AB 411 Standards” and include the following:

- ❖ Required testing of the waters adjacent to all ocean and bay public beaches for total coliforms, fecal coliforms and enterococci bacteria that may indicate the presence of possible disease-causing bacteria, viruses or protozoa.
- ❖ Required maintenance and updates of the Ocean, Harbor and Bay Posting and Closure Hotline.
- ❖ Established single sample standards for total coliforms, fecal coliforms and enterococci bacteria which shall not exceed:
 - ◆ Total Coliforms: 10,000 organisms per 100 milliliter sample.
 - ◆ Fecal Coliforms: 400 organisms per 100 milliliter sample.
 - ◆ Enterococci: 104 organisms per 100 milliliter sample.
 - ◆ Fecal Coliform to Total Coliform ratio: >1,000 total coliforms if ratio exceeds 0.1.
- ❖ Established 30-day geometric mean standards (of five weekly samples) for total coliforms, fecal coliforms and enterococci bacteria which shall not exceed:
 - ◆ Total Coliforms: 1,000 organisms per 100 milliliter sample.
 - ◆ Fecal Coliforms: 200 organisms per 100 milliliter sample.
 - ◆ Enterococci: 35 organisms per 100 milliliter sample.
- ❖ When any waters adjacent to a public beach fail to meet any of the standards

described above, the local health officer shall post signs on the beach to restrict access to the affected waters.

- ❖ Weekly testing is required from April 1 – October 31 if the following apply:
 - ◆ The beach is visited by more than 50,000 people annually.
 - ◆ The beach is located in an area adjacent to a storm drain that flows in the summer.
- ❖ In the case of a known release of sewage into ocean or bay waters adjacent to a public beach, the local health officer is required to:
 - ◆ Immediately close the affected ocean or bay waters until the source of the sewage is eliminated.
 - ◆ Collect bacterial samples from the affected waters.
 - ◆ Continue the closure until testing results of water samples meet the established standards.



Appendix D

Public Notification and Risk Communication

Public notification and risk communication are a critical component of the WQ Team. Public awareness and enhancing the capacity for informed personal choice are important factors in ensuring public health protections are provided to recreational water users. The WQ Team has established and maintains an integrated management system to inform the public of the potential health risks associated with water contact activities in coastal recreational waters that do not meet applicable water quality standards. Multiple communication measures are promptly taken to notify the public when ocean, harbor or bay water areas do not meet or are expected not to meet AB 411 Ocean Water-Contact Sports Standards. The WQ Team implements the following types of public notification measures to communicate information regarding beach water quality and to protect the health of beach users:

- ❖ **Beach Signs** – Signs are posted to notify beach users of the current status of the ocean, harbor or bay water area. Posted beach signs are located where they are most likely to be noticed by beach users and provide a visual notice at the point of ocean water access.
- ❖ **Telephone Hotline** – The Ocean, Harbor and Bay Water Closure & Posting Telephone Hotline has been established to inform the public about all beaches that are currently closed, posted with a health warning or when a rain advisory has been issued. The telephone hotline message is immediately updated when a change in the status of beach closures, postings or advisories occurs. The Ocean, Harbor and Bay Water Closure & Posting Telephone Hotline is **(714) 433-6400**.
- ❖ **Email Hotline** – The Email Hotline is the digital written version of the information that is provided on the Telephone Hotline that is sent out when changes occur to a list serve of stakeholders and the public.
- ❖ **Social Media** – Public notification of ocean water quality status changes are being communicated to the public through the social media network of Twitter. For the latest information and instant ocean water quality updates when they occur, follow us on Twitter at <http://twitter.com/ochealth>.
- ❖ **Press Releases** – Public notification of a beach closure or rain advisory is provided in a press release issued by the HCA. The press release will indicate whether a closure or advisory is being issued, the reason for the closure or advisory, the area affected and the anticipated duration of the closure or advisory.
- ❖ **Annual Reports** – To assess the health of the ocean, harbor and bay waters being monitored, the WQ Team compiles a report of the beach closures, postings and advisories after the year has ended. The annual or biennial Ocean, Harbor and Bay Water Quality Report provides an updated analysis of bacteriological water quality, describes year-to-year variability and trends for Orange County’s recreational waters, and includes data on sewage spills and beach closures. Reports from 2002 to present can be viewed and downloaded from the Ocean, Harbor and Bay Water Closure & Posting Web Page at www.ocbeachinfo.com.



Appendix E

Closure and Warning Signs



The yellow closure sign is posted when a sewage spill affects ocean or bay waters adjacent to a public beach. This sign is also available in Spanish language.



The warning sign with the red and black border is posted when a violation of the AB 411 Ocean Water-Contact Sports Standards occurs.



The warning sign with the yellow and black border is permanently posted near storm drains, creeks and rivers to advise the public of the risks associated with possible contamination from urban runoff and violations of the AB 411 Ocean Water-Contact Sports Standards where runoff enters the ocean. The ocean water warning area is from 75 feet upcoast to 75 feet downcoast of the flowing storm drain, creek or river.



Appendix F

Beach Mile Days (BMDs)

The term “Beach Mile Days” is used to represent the measurement of the number of days and the linear area of ocean, harbor or bay front waters that are closed due to a sewage spill or posted for a violation of the AB 411 Ocean Water-Contact Sports Standards.

BMDs are calculated by multiplying the number of days of a closure or posting by the number of miles of beach closed or posted:

$$\text{(Number of Days)} \times \text{(Miles of Beach Closed or Posted)} = \text{BMDs}$$

For example, if a sewage spill resulted in the closure of $\frac{1}{2}$ mile of beach for 7 days, then:

$$\text{(7 days)} \times \text{(0.5 miles of beach closed)} = \text{3.5 BMDs of closure}$$

Another example, if 300 feet of beach is posted for a violation of the AB 411 Ocean Water-Contact Sports Standards for 5 consecutive days, then:

$$\text{(5 days)} \times \text{(0.06 miles of beach posted)} = \text{0.3 BMDs of posting}$$

Using BMD as a measurement of ocean and bay water availability is more meaningful than using the number of incidences or the number of days since BMD takes into account both the length of beach and number of days for a closure or posting. The State of California Water Resources Control Board and all California coastal counties use BMD for reporting closures and postings which provides a standardized measurement that allows comparison of different areas (beach to beach or county to county) and the assessment of closure and posting trends over time.



Appendix G

Ocean, Harbor and Bay Rain Advisories 2000 – 2020

Listed below are the total number of rain advisory days for each year and the dates that the ocean, harbor and bay water rain advisories were in effect for Orange County from 2000 – 2020.

Year 2000 (55 Total Rain Advisory Days)

January 25 – February 2	February 28 – March 13	October 11 – October 15
February 10 – February 16	April 17 – April 23	October 27 – November 2
February 17 – February 27	September 23 – September 25	

Year 2001 (74 Total Rain Advisory Days)

January 8 – January 16	April 7 – April 13	November 29 – December 6
January 24 – January 31	April 21 – April 24	December 14 – December 18
February 10 – February 16	November 12 – November 16	December 21 – December 25
February 20 – March 13	November 24 – November 27	December 30 – December 31

Year 2002 (44 Total Rain Advisory Days)

January 1 – January 3	March 7 – March 11	November 8 – November 13
January 28 – February 1	March 18 – March 21	November 30 – December 3
February 17 – February 21	March 23 – March 27	December 16 – December 31

Year 2003 (54 Total Rain Advisory Days)

January 1 – January 2	April 14 – April 18	December 8 – December 11
January 8 – January 12	May 3 – May 7	December 15 – December 18
February 11 – February 17	July 30 – August 3	December 25 – December 28
February 25 – March 2	November 1 – November 7	
March 15 – March 19	November 13 – November 19	

Year 2004 (65 Total Rain Advisory Days)

January 2 – January 6	April 17 – April 20	November 21 – November 25
February 3 – February 6	October 17 – October 24	November 27 – December 1
February 18 – March 6	October 26 – November 1	December 5 – December 12
April 2 – April 5	November 8 – November 12	December 28 – December 31

Year 2005 (73 Total Rain Advisory Days)

January 1 – January 18	March 19 – March 26	October 17 – October 21
January 28 – January 31	April 22 – May 1	November 10 – November 14
February 11 – February 28	May 6 – May 10	December 31
March 5 – March 8	September 20 – September 24	



Year 2006 (75 Total Rain Advisory Days)		
January 1 – January 6	April 14 – April 18	December 10 – December 14
February 18 – February 23	April 23 – April 26	December 17 – December 21
February 27 – March 24	May 22 – May 25	December 22 – December 25
March 28 – April 9	October 14 – October 17	December 27 – December 31

Year 2007 (48 Total Rain Advisory Days)		
January 31 – February 6	March 21 – March 23	November 30 – December 4
February 11 – February 16	April 20 – April 25	December 7 – December 12
February 19 – February 26	September 22 – September 25	December 19 – December 24
February 27 – March 2	October 13 – October 16	

Year 2008 (54 Total Rain Advisory Days)		
January 4 – January 10	February 14 – February 17	November 4 – November 7
January 22 – February 1	February 21 – February 27	November 26 – December 1
February 3 – February 6	May 22 – May 27	December 15 – December 28

Year 2009 (38 Total Rain Advisory Days)		
January 23 – January 27	March 5 – March 8	December 7 – December 16
February 5 – February 21	October 14 – October 17	December 22 – December 25

Year 2010 (98 Total Rain Advisory Days)		
January 18 – January 30	April 22 – April 25	November 8 – November 11
February 5 – February 13	April 28 – May 1	November 20 – November 27
February 20 – March 10	October 5 – October 10	November 28 – December 1
April 5 – April 8	October 19 – October 24	December 6 – December 9
April 12 – April 15	October 25 – November 2	December 17 – December 31

Year 2011 (64 Total Rain Advisory Days)		
January 1 – January 7	March 20 – March 29	November 4 – November 10
February 16 – February 23	April 9 – April 12	November 12 – November 15
February 26 – March 1	May 17 – May 21	November 20 – November 24
March 7 – March 10	October 4 – October 9	December 12 – December 19

Year 2012 (68 Total Rain Advisory Days)		
January 16 – January 19	March 25 – March 29	November 9 – November 12
January 21 – January 27	April 11 – April 17	November 17 – November 20
February 15 – February 18	April 26 – April 29	November 29 – December 6
February 27 – March 2	July 13 – July 16	December 13 – December 21
March 17 – March 21	October 11 – October 15	December 24 – December 31



Year 2013 (39 Total Rain Advisory Days)		
January 24 – January 30	May 6 – May 11	December 7 – December 10
February 8 – February 11	October 9 – October 13	December 19 – December 22
February 20 – February 23	November 21 – November 25	
March 8 – March 12	November 29 – December 3	

Year 2014 (35 Total Rain Advisory Days)		
February 3 – February 10	April 26 – April 29	December 12 – December 19
February 27 – March 5	November 1 – November 4	
April 1 – April 5	December 2 – December 7	

Year 2015 (40 Total Rain Advisory Days)		
January 11 – January 15	May 14 – May 18	October 5 – October 8
February 23 – February 26	July 18 – July 22	December 14 – December 17
March 1 – March 5	September 9 – September 12	December 19 – December 25
May 8 – May 11	September 15 – September 18	

Year 2016 (51 Total Rain Advisory Days)		
January 5 – January 10	May 6 – May 10	December 16 – December 19
January 31 – February 3	October 17 – October 20	December 21 – December 27
February 18 – February 21	October 24 – October 28	December 30 – December 31
March 6 – March 16	November 21 – November 24	
April 10 – April 12	November 26 – November 30	

Year 2017 (41 Total Rain Advisory Days)		
January 1 – January 15	February 17 – February 21	May 7 – May 10
January 18 – January 26	February 27 – March 1	
February 6 – February 14	March 1 – March 3	

Year 2018 (47 Total Rain Advisory Days)		
January 9 – January 13	March 11 – March 26	November 29 – December 1
February 27 – March 1	May 3 – May 6	December 1 – December 3
March 1 – March 2	October 13 – October 17	December 5 – December 10
March 3 – March 6	November 22 – November 25	December 25 – December 28

Year 2019 (90 Total Rain Advisory Days)		
January 6 – January 9	March 12 – March 15	November 27 – December 3
January 12 – January 20	March 21 – March 24	December 4 – December 12
January 31 – February 25	May 16 – May 30 (AM)	December 23 – December 30
March 2 – March 11	November 20 – November 24	

Year 2020 (49 Total Rain Advisory Days)		
January 17 - January 20	March 10 – March 28	November 7 – November 12
February 9 – February 13	April 6 – April 16	December 28 – December 31
February 23 – February 26	May 19 – May 22	



2019 - 2020 Annex

Ocean, Harbor & Bay Water Quality Report



Introduction

This Annex provides graphic representations of the data summarized for the 2019-2020 Ocean, Harbor and Bay Water Quality Report. The source of the detailed statistical information in this Annex is from the Orange County WQ division. This Annex offers supplemental data and information which can be used by government officials, public agencies, environmental groups and concerned citizens to examine, evaluate and compare year-to-year variability and trends for beach areas and sewage spill incidents.

List of Annexes:

- Annex A:** Postings by Open Coastal Water Areas 2000 – 2020
- Annex B:** Postings by Harbor and Bay Water Areas 2000 – 2020
- Annex C:** Unauthorized Discharges of Waste and Ocean/Harbor/Bay Closures 1987 – 2020
- Annex D:** Sewage Spill Closures for Ocean, Harbor and Bay Water Areas – 2020



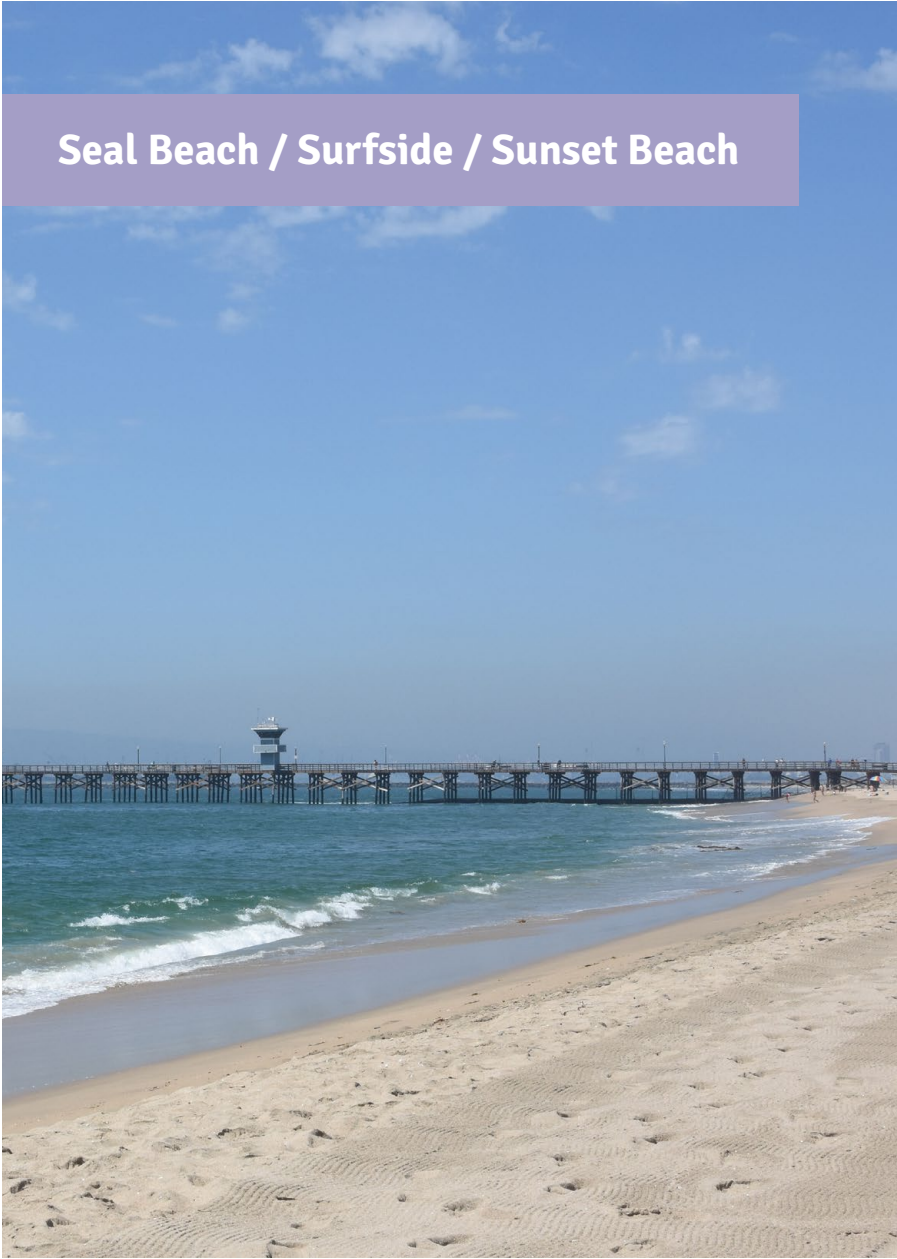
Annex A

Postings by Open Coastal Ocean Water Areas 2000 – 2020

The following tables and graphs provide monitoring information from **April 1 – October 31** for each of Orange County’s open coastal ocean water areas and is arranged geographically from north to south along the Orange County shoreline. The appendix information provided for each open coastal ocean water area includes:

- ❖ Total number of posted warnings, total number of posted warning days and total number of BMDs (BMD) that were posted due to AB 411 standards violations from **April 1 – October 31** in 2000 – 2020;
- ❖ A trend graph depicting the total number of BMDs that the open coastal water area was posted from **April 1 – October 31** in 2000 – 2020; and
- ❖ The open coastal ocean water area monitoring station descriptions and the number of posted warnings, posting days and BMDs that were posted at each monitoring station due to AB 411 standards violations from **April 1 – October 31, 2020**.





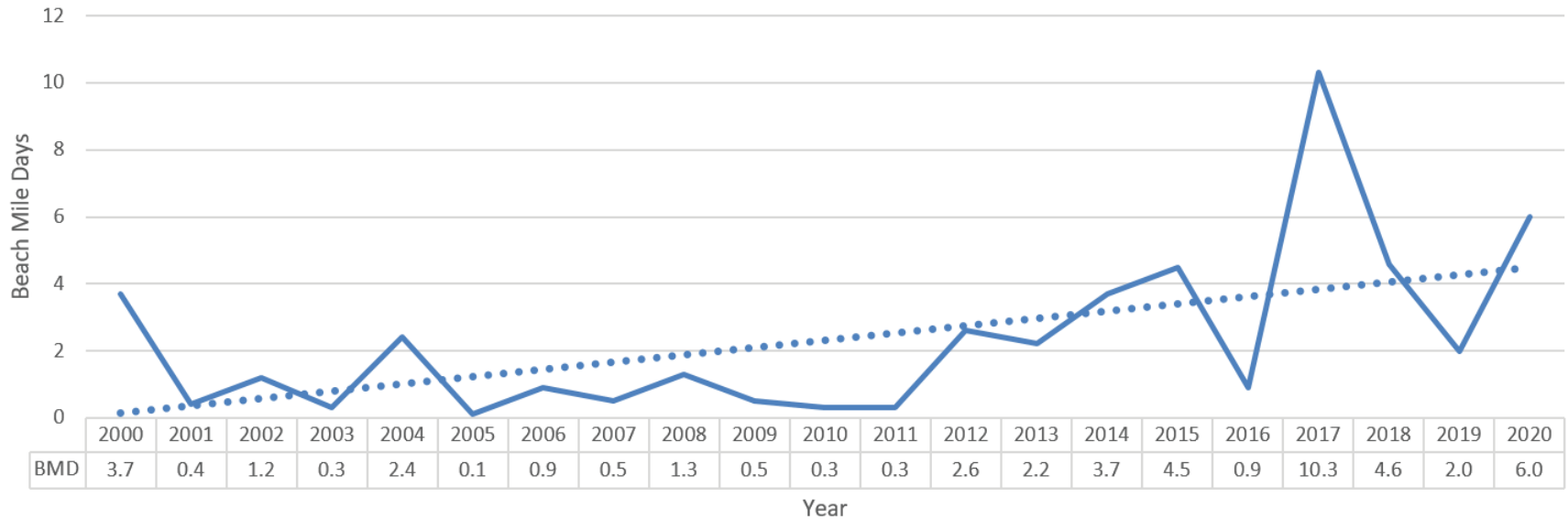
Seal Beach / Surfside / Sunset Beach

2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	6	47	3.7
2001	3	6	0.4
2002	5	22	1.2
2003	3	5	0.3
2004	3	18	2.4
2005	1	2	0.1
2006	8	15	0.9
2007	2	8	0.5
2008	4	8	1.3
2009	4	8	0.5
2010	2	5	0.3
2011	2	4	0.3
2012	6	18	2.6
2013	5	11	2.0
2014	20	65	3.7
2015	13	70	4.5
2016	6	14	0.9
2017	13	70	10.3
2018	8	56	4.6
2019	10	16	2.0
2020	10	69	6.0



Seal Beach / Surfside / Sunset Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)

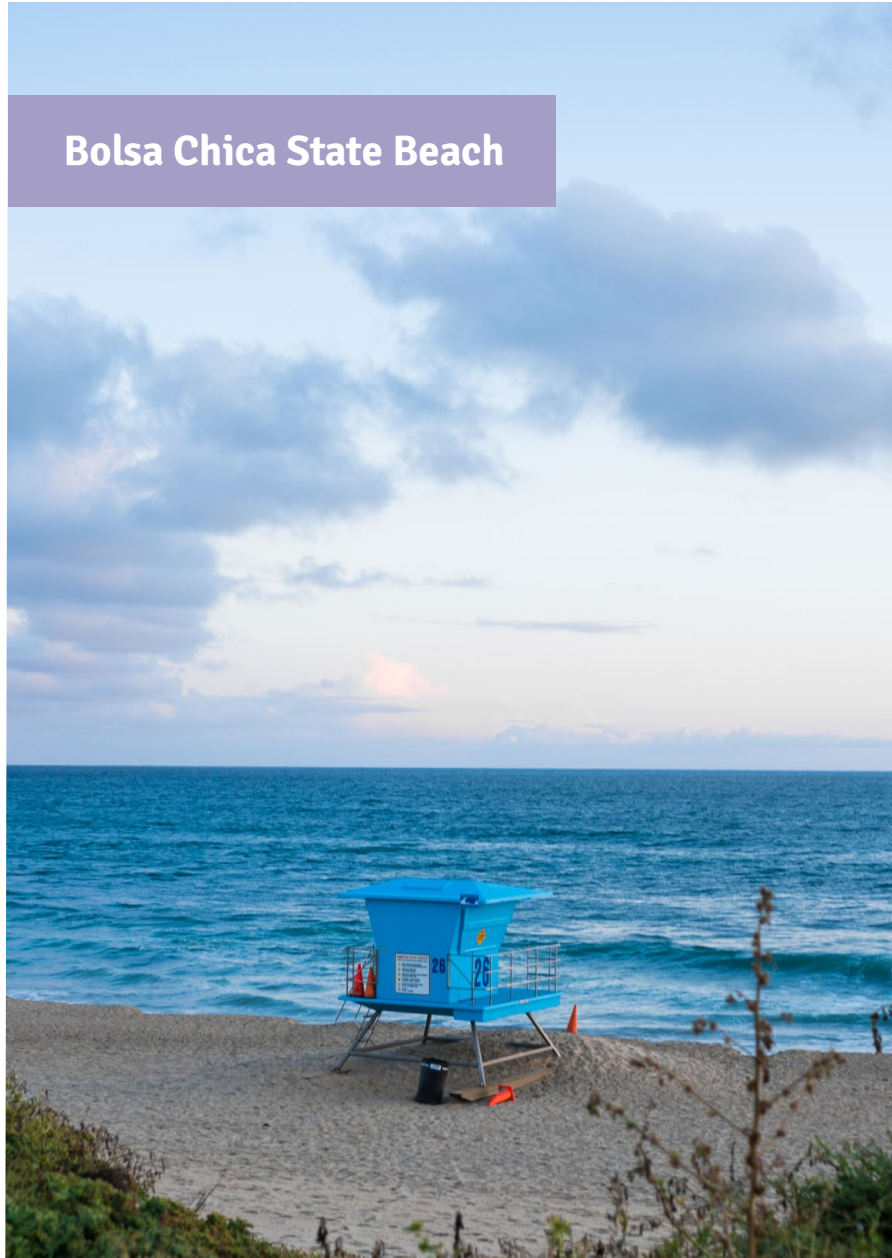


Seal Beach / Surfside / Sunset Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
Projection of 1st Street	7	63	4.38
Projection of 8th Street	1	2	0.74
100 Yards South of Pier	1	2	0.74
Projection of 14th Street	0	0	0.0
Projection of Seaway	1	2	0.11
Projection of Broadway	0	0	0.0



Bolsa Chica State Beach

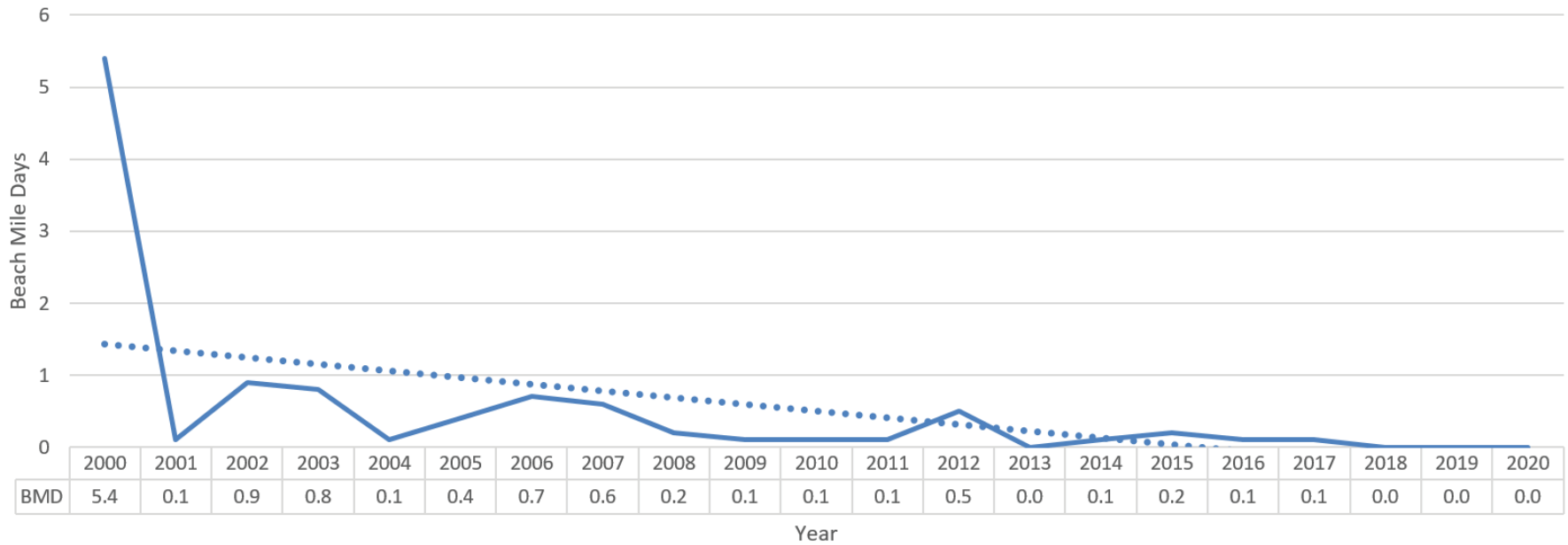


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	6	12	5.4
2001	1	1	0.1
2002	7	11	0.9
2003	8	14	0.8
2004	1	1	0.1
2005	4	7	0.4
2006	7	13	0.7
2007	3	6	0.6
2008	2	2	0.2
2009	1	1	0.1
2010	1	1	0.1
2011	2	2	0.1
2012	5	9	0.5
2013	0	0	0.0
2014	2	2	0.1
2015	4	4	0.2
2016	1	1	0.1
2017	1	1	0.1
2018	0	0	0.0
2019	0	0	0.0
2020	0	0	0.0



Bolsa Chica State Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)

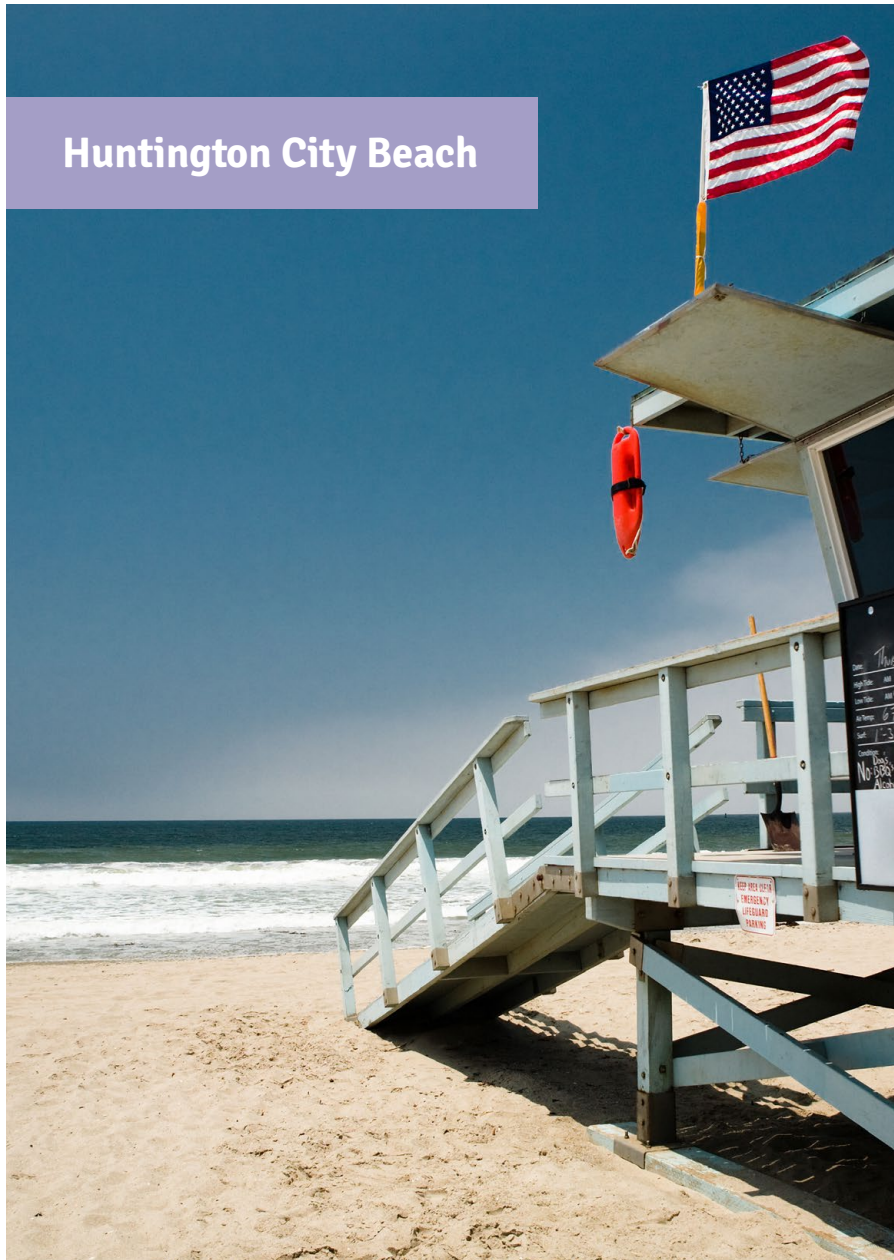


Bolsa Chica State Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
Bolsa Chica Beach – Parking Area #14	0	0	0
Bolsa Chica Beach – Parking Area #20	0	0	0



Huntington City Beach

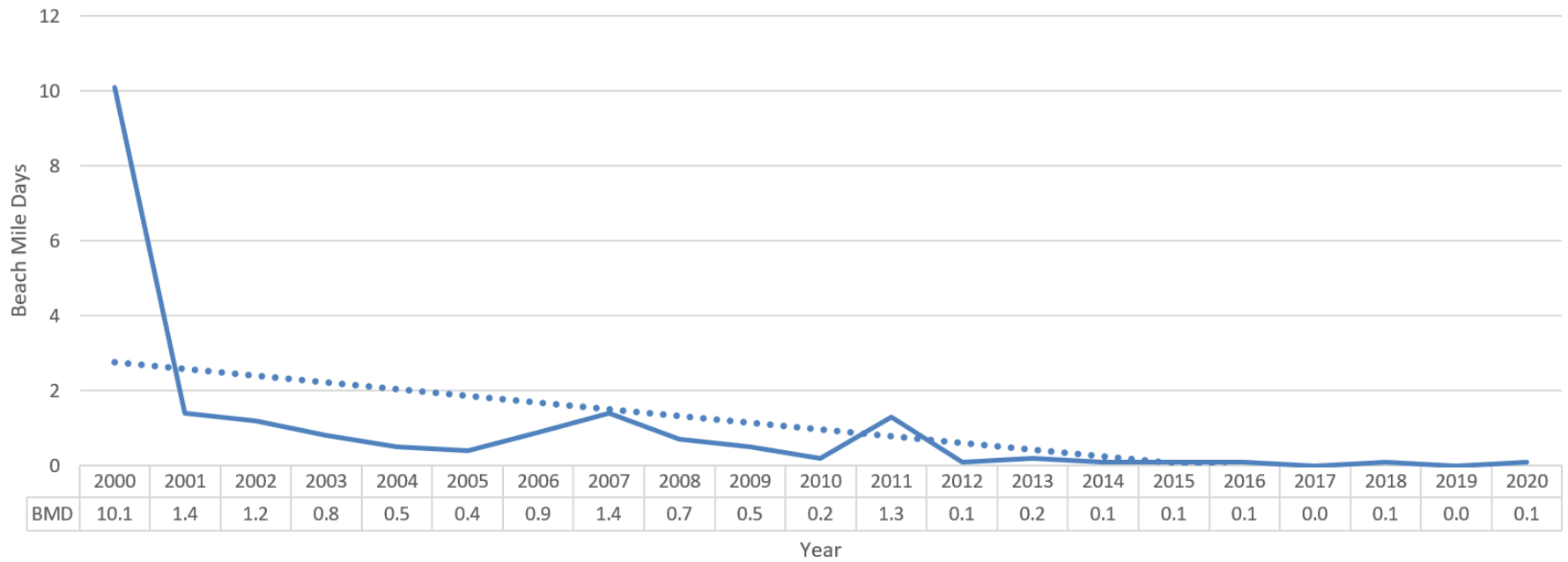


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	6	10	10.1
2001	10	16	1.4
2002	7	14	1.2
2003	7	12	0.8
2004	4	8	0.5
2005	3	7	0.4
2006	4	6	0.9
2007	10	18	1.4
2008	7	9	0.7
2009	5	7	0.5
2010	3	3	0.2
2011	7	9	1.3
2012	1	1	0.1
2013	3	3	0.2
2014	2	2	0.1
2015	1	1	0.1
2016	1	1	0.1
2017	0	0	0.0
2018	2	3	0.1
2019	0	0	0.0
2020	2	2	0.1



Huntington City Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)



Huntington City Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
Bluffs at Sea Pointe (Dog Beach)	1	1	0.06
Projection of 17th Street	1	1	0.06
Projection of Jack's Snack Bar	0	0	0.0
Projection of Beach Blvd.	0	0	0.0



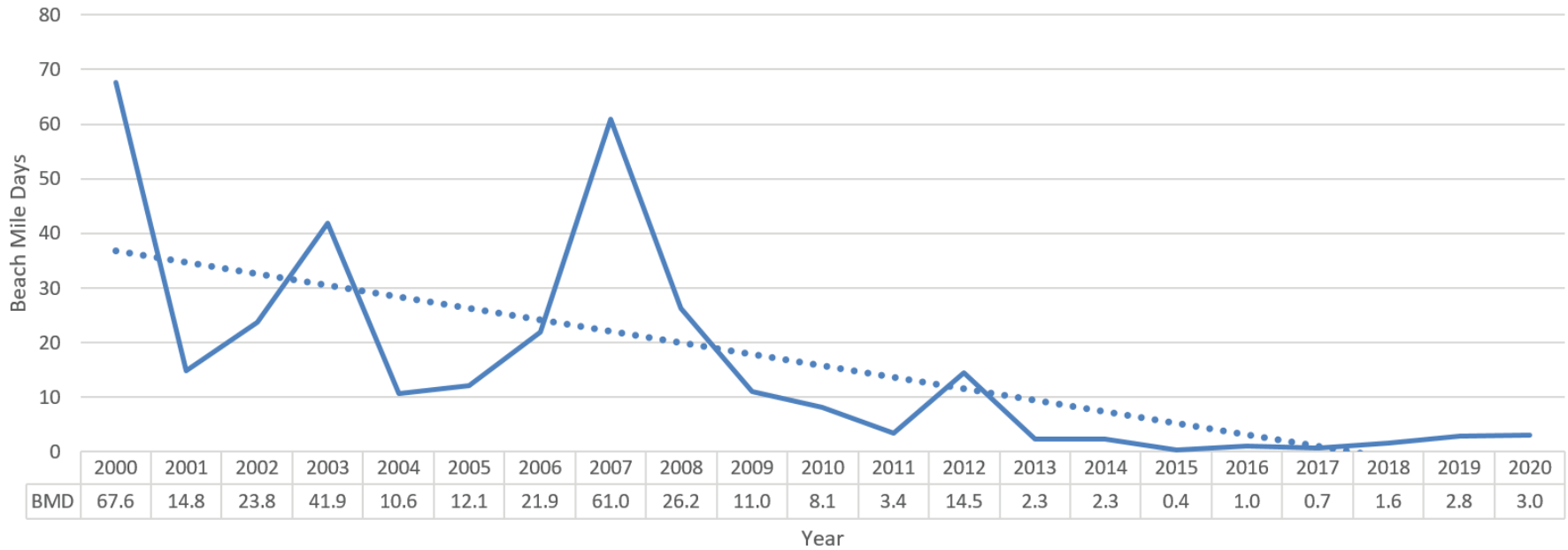


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	28	223	67.6
2001	29	70	14.8
2002	31	89	23.8
2003	21	72	41.9
2004	23	55	10.6
2005	14	55	12.1
2006	34	92	21.9
2007	27	112	61.0
2008	28	78	26.2
2009	23	32	11.0
2010	11	27	8.1
2011	7	8	3.4
2012	18	55	14.5
2013	8	8	2.3
2014	14	41	2.3
2015	4	5	0.4
2016	8	9	1.0
2017	8	8	0.7
2018	11	15	1.6
2019	15	18	2.8
2020	14	38	3.0



Huntington State Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)



Huntington State Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
Projection of Newland Street	2	2	0.12
Projection of Magnolia Street	7	31	2.56
Projection of Brookhurst Street	3	3	0.18
Santa Ana River Mouth	2	2	0.12



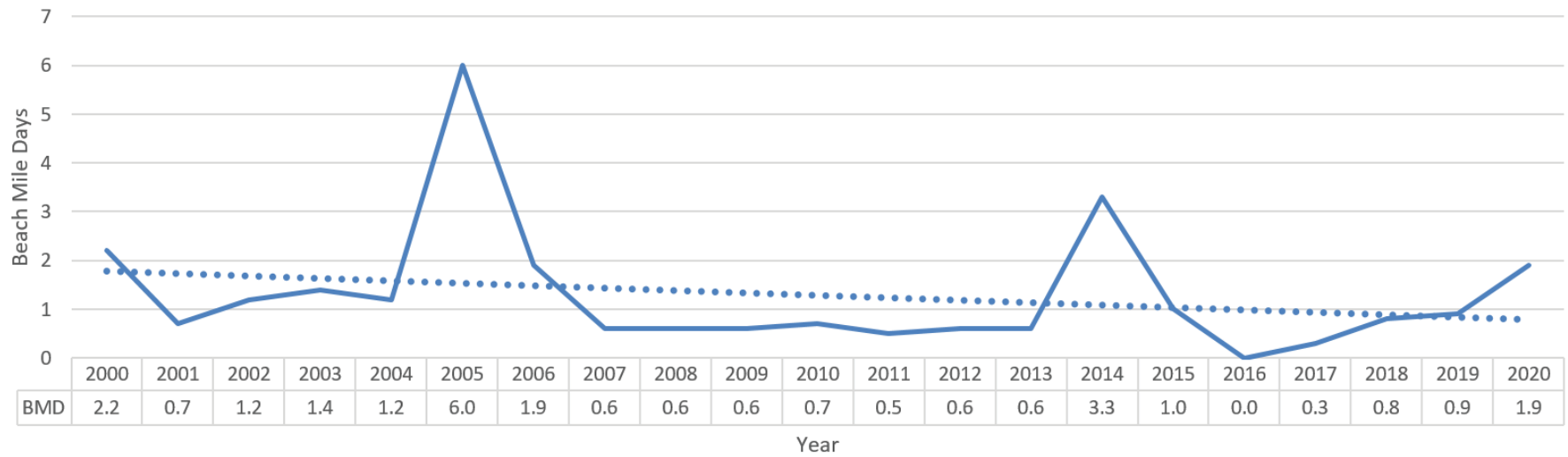


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	8	18	2.2
2001	8	13	0.7
2002	10	17	1.2
2003	14	23	1.4
2004	12	18	1.2
2005	6	21	6.0
2006	6	10	1.9
2007	8	10	0.6
2008	6	11	0.6
2009	3	10	0.6
2010	11	11	0.7
2011	7	8	0.5
2012	6	10	0.6
2013	4	11	0.6
2014	8	51	3.3
2015	11	17	1.0
2016	0	0	0
2017	3	5	0.3
2018	7	14	0.8
2019	7	14	0.9
2020	6	42	1.9



Newport Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)

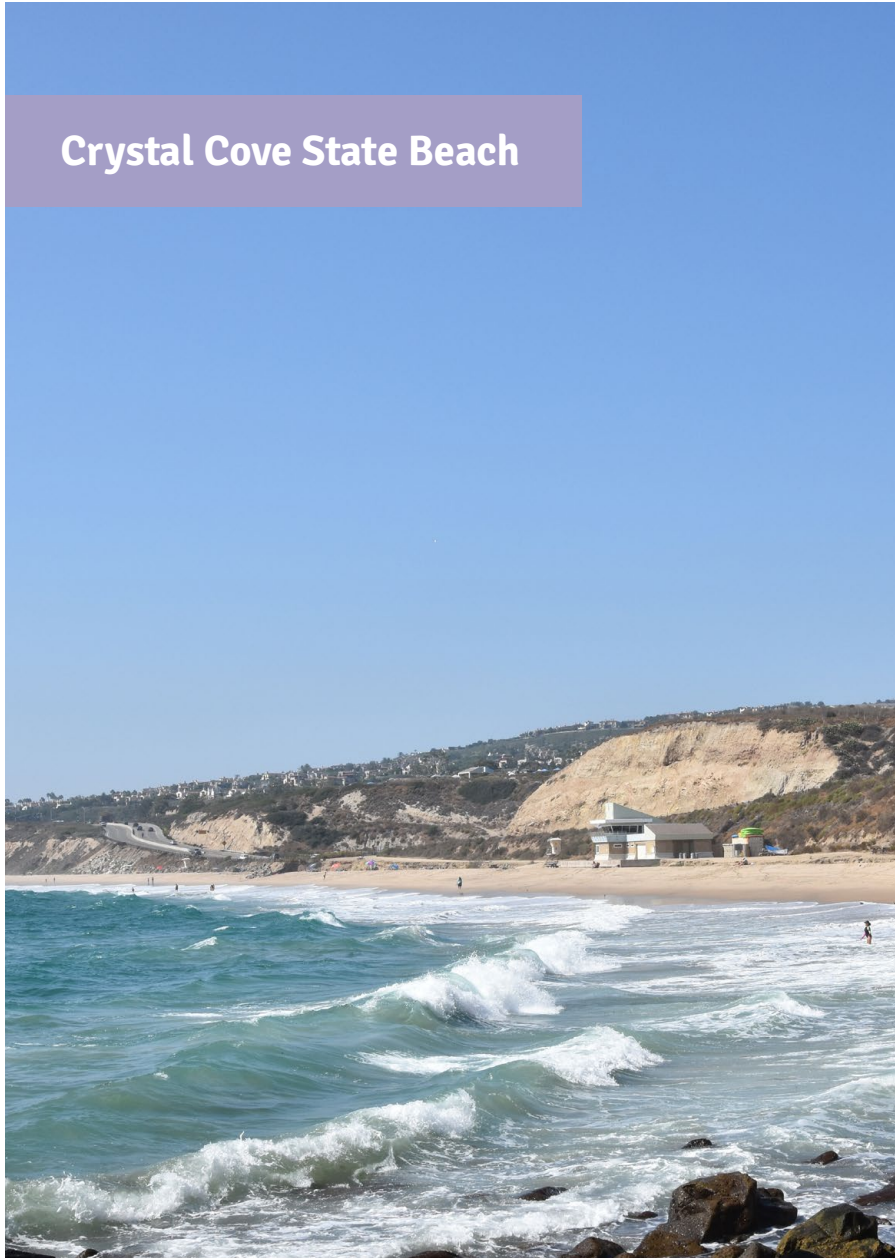


Newport Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
Orange Street	0	0	0.0
52nd/53rd Street	0	0	0.0
38th Street	0	0	0.0
24th Street	0	0	0.0
15th/16th Street	0	0	0.0
Balboa Pier	1	0	0.0
The Wedge	0	0	0.0
Corona del Mar State Beach	0	0	0.0
Little Corona Beach	6	42	1.89



Crystal Cove State Beach

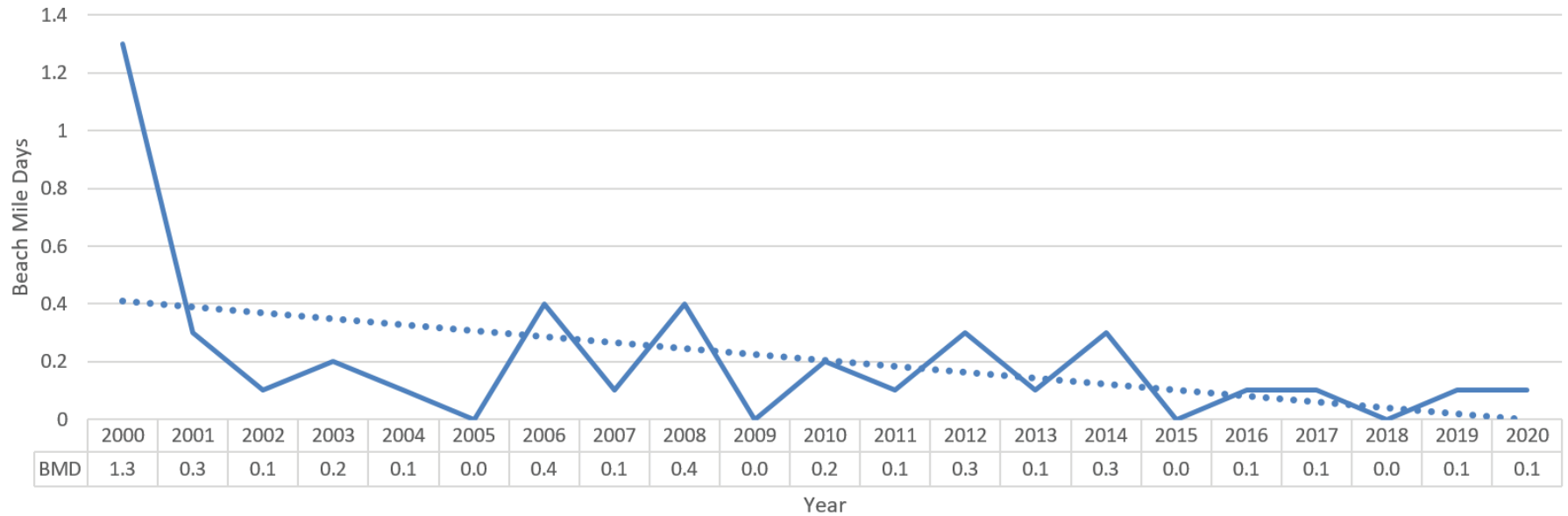


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	9	21	1.3
2001	3	5	0.3
2002	1	1	0.1
2003	1	4	0.2
2004	1	2	0.1
2005	0	0	0.0
2006	1	2	0.4
2007	1	1	0.1
2008	1	2	0.4
2009	0	0	0.0
2010	2	3	0.2
2011	1	1	0.1
2012	2	4	0.3
2013	1	1	0.1
2014	3	5	0.3
2015	0	0	0.0
2016	1	1	0.1
2017	1	2	0.1
2018	0	0	0.0
2019	1	1	0.1
2020	1	2	0.1



Crystal Cove State Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)

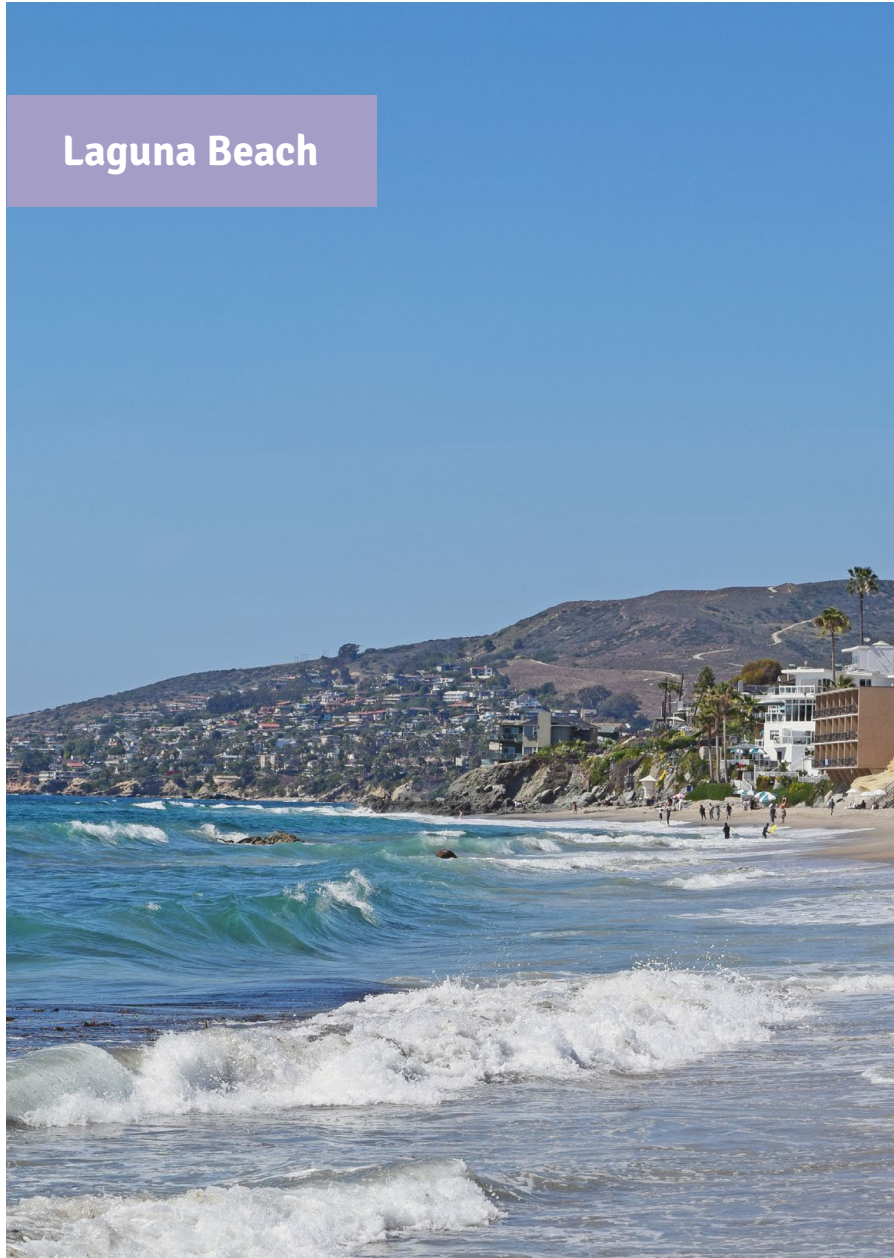


Crystal Cove State Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
Crystal Cove at Pelican Point	1	2	0.11
Pelican Point Beach	0	0	0
Crystal Cove at Los Trancos	0	0	0
Muddy Creek Beach (Reef Point)	0	0	0
El Moro Beach	0	0	0



Laguna Beach

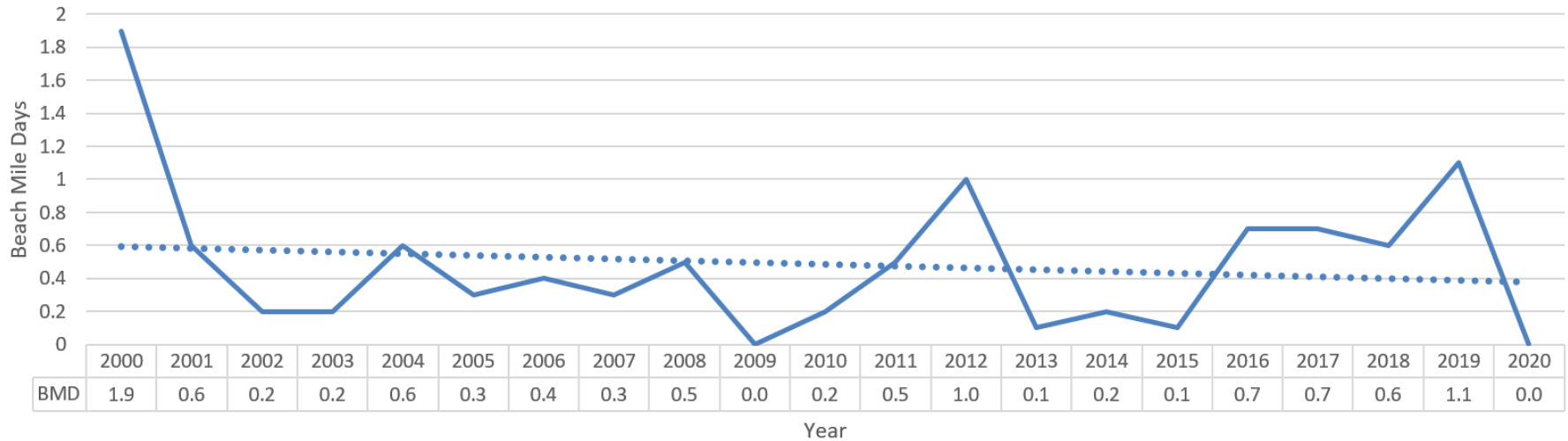


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	15	34	1.9
2001	5	10	0.6
2002	3	4	0.2
2003	2	4	0.2
2004	4	7	0.6
2005	3	6	0.3
2006	4	7	0.4
2007	4	5	0.3
2008	3	8	0.5
2009	0	0	0.0
2010	3	3	0.2
2011	5	7	0.5
2012	8	17	1.0
2013	1	2	0.1
2014	2	4	0.2
2015	1	2	0.1
2016	4	21	0.7
2017	7	13	0.7
2018	4	19	0.6
2019	4	36	1.1
2020	0	0	0.0



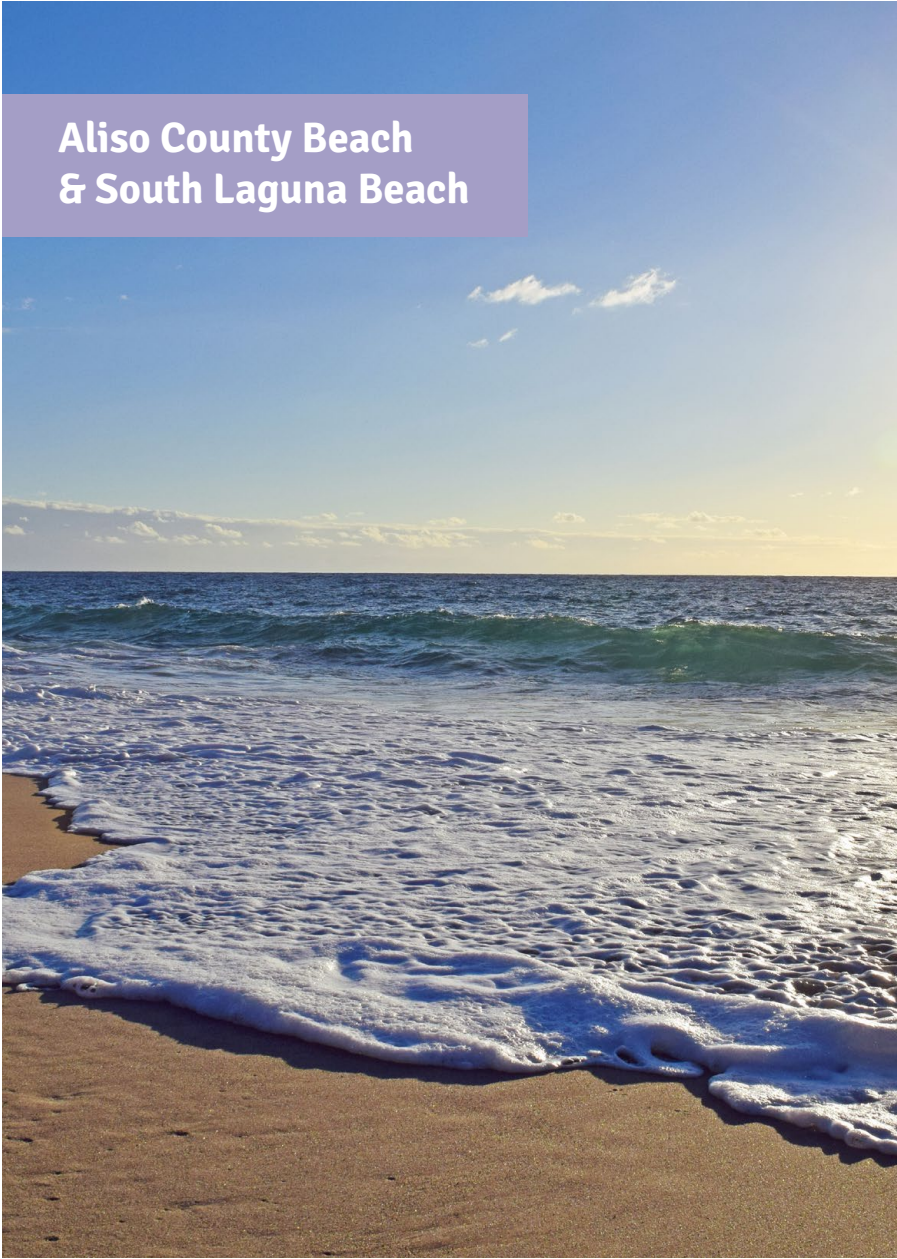
Laguna Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)



Laguna Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
Emerald Bay Beach	0	0	0.0
Crescent Bay Beach	0	0	0.0
Diver's Cove	0	0	0.0
Laguna Main Beach	0	0	0.0
Hotel Laguna	0	0	0.0
Cleo Street	0	0	0.0
Bluebird Canyon	0	0	0.0
Between Pearl & Agate Street	0	0	0.0
Victoria Beach	0	0	0.0
Blue Lagoon	0	0	0.0





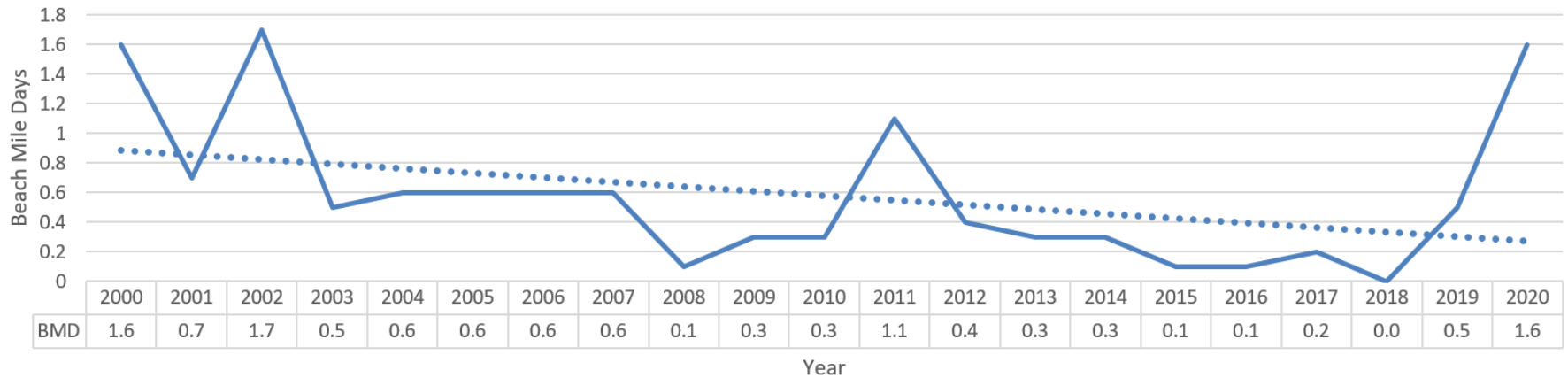
**Aliso County Beach
& South Laguna Beach**

2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	12	22	1.6
2001	4	5	0.7
2002	4	9	1.7
2003	5	9	0.5
2004	4	6	0.6
2005	6	11	0.6
2006	7	11	0.6
2007	3	11	0.6
2008	1	1	0.1
2009	5	5	0.3
2010	3	6	0.3
2011	6	8	1.1
2012	1	2	0.4
2013	3	6	0.3
2014	3	6	0.3
2015	1	2	0.1
2016	1	1	0.1
2017	3	6	0.2
2018	0	0	0.0
2019	3	10	0.5
2020	6	36	1.6



Aliso County Beach & South Laguna Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)



Aliso County Beach & South Laguna Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
Goff Island Beach at Christmas Cove	1	2	0.11
Treasure Island Beach	0	0	0.0
Aliso Beach - North	0	0	0.0
Aliso Creek - Ocean Interface	4	32	1.33
Aliso Beach Middle	0	0	0.0
Aliso Beach South	0	0	0.0
Camel Point	0	0	0.0
West Street	0	0	0.0
Table Rock	0	0	0.0
Laguna Lido	0	0	0.0
9th Street / 1000 Steps Beach	0	0	0.0
Three Arch Bay	1	2	0.11



Dana Point

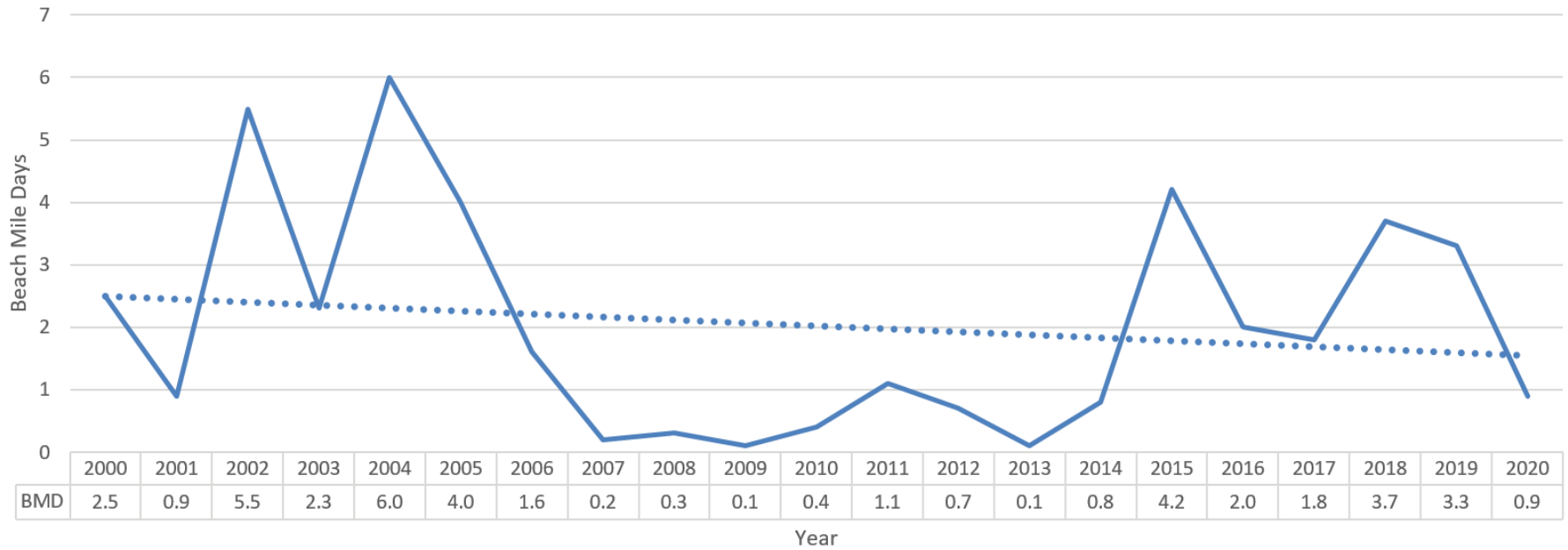


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	4	42	2.5
2001	7	13	0.9
2002	10	95	5.5
2003	6	39	2.3
2004	13	108	6.0
2005	5	63	4.0
2006	8	23	1.6
2007	2	3	0.2
2008	1	5	0.3
2009	1	2	0.1
2010	4	7	0.4
2011	5	18	1.1
2012	4	12	0.7
2013	2	2	0.1
2014	3	14	0.8
2015	5	122	4.3
2016	5	55	2.0
2017	3	58	1.8
2018	8	114	3.7
2019	4	80	3.3
2020	4	31	0.9



Dana Point - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)



Dana Point - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
150' upcoast of Salt Creek	0	0	0.0
Salt Creek Ocean Interface at Monarch Beach	4	31	0.89
Salt Creek Beach - South of Salt Creek	0	0	0.0
Dana Strands	0	0	0.0
Ocean Institute Beach	0	0	0.0



Doheny State Beach

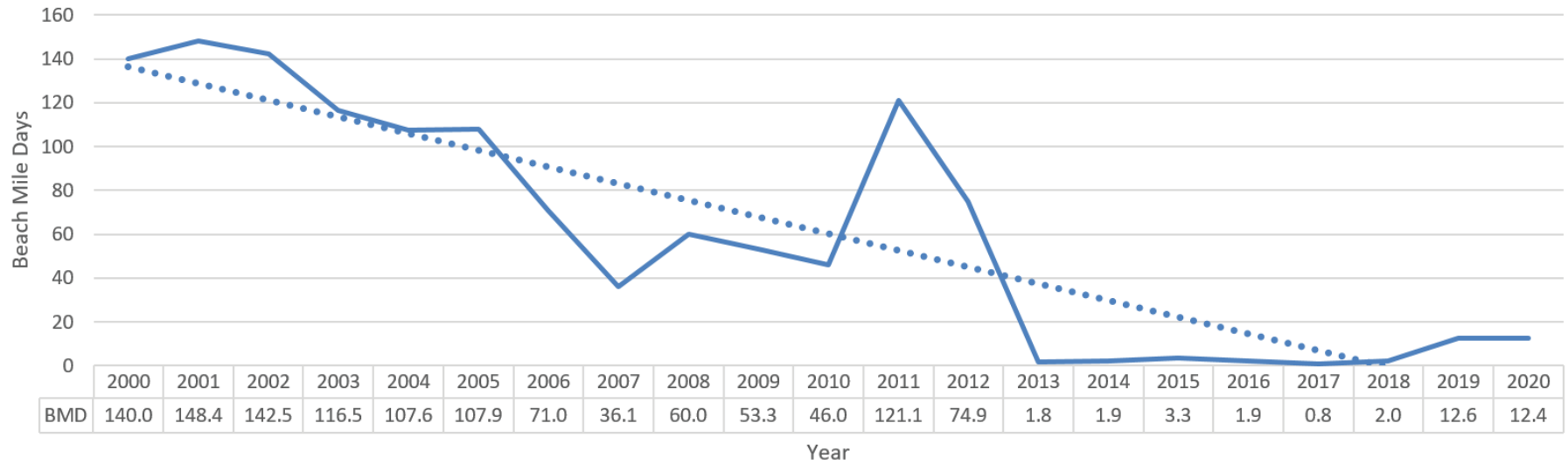


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	9	165	140.0
2001	5	191	148.4
2002	7	216	142.5
2003	6	207	116.5
2004	12	226	107.6
2005	3	123	107.9
2006	11	130	71.0
2007	13	180	36.1
2008	10	183	60.0
2009	11	117	53.3
2010	19	184	46.0
2011	9	234	121.1
2012	12	167	74.9
2013	11	19	1.8
2014	9	19	1.1
2015	11	56	3.3
2016	6	33	1.9
2017	5	13	0.8
2018	7	32	2.0
2019	8	45	12.6
2020	7	118	12.4



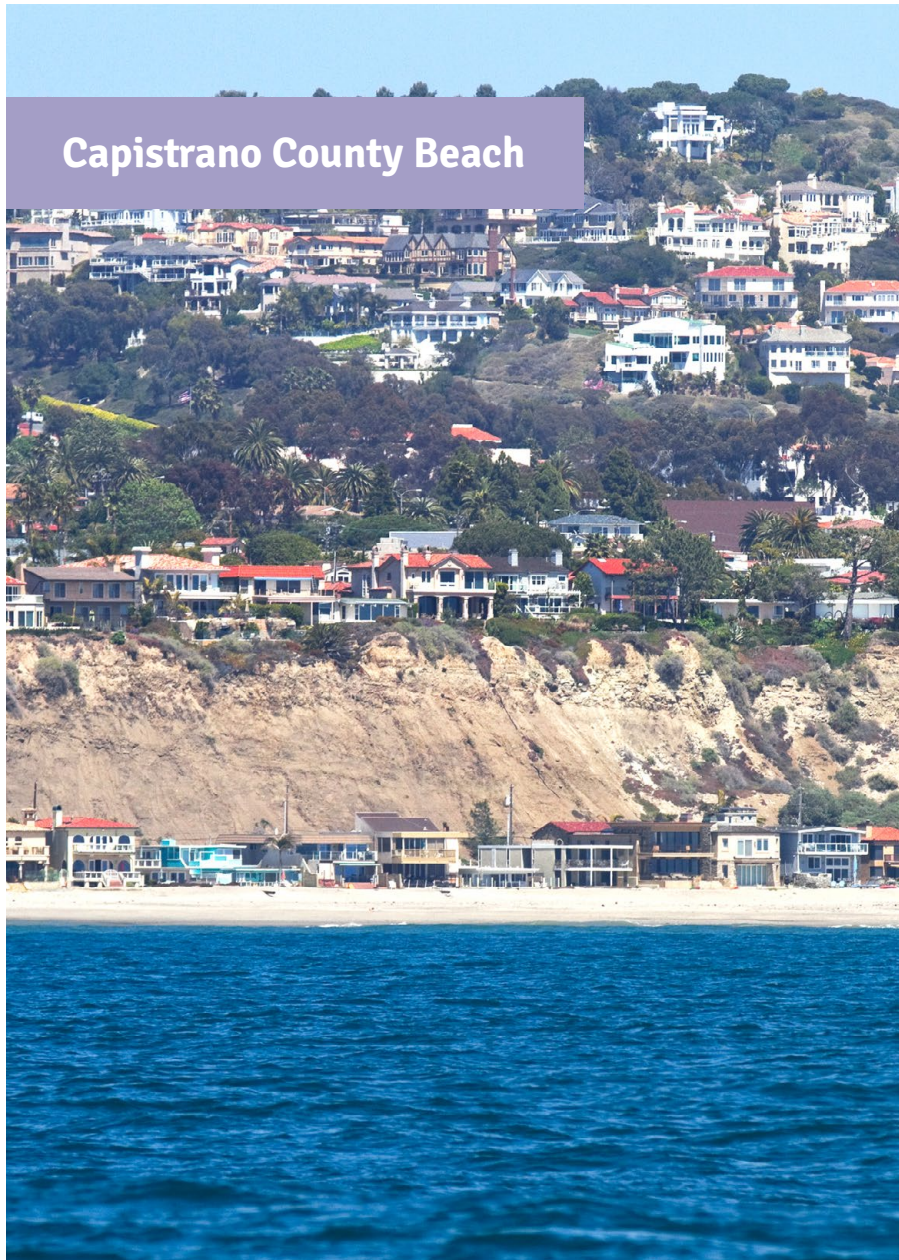
Doheny State Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)



Doheny State Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
North Beach Creek Ocean Interface	2	16	1.68
Mid North Beach	1	7	1.07
San Juan Creek Ocean Interface	2	91	9.39
First Campground	0	0	0.0
Last Campground	0	0	0.0
South Day Use Area Restroom	0	0	0.0
South Day Use Area at Drain	0	0	0.0
Pedestrian Bridge	1	2	0.11
Parking Lot at End of the Park	1	2	0.11





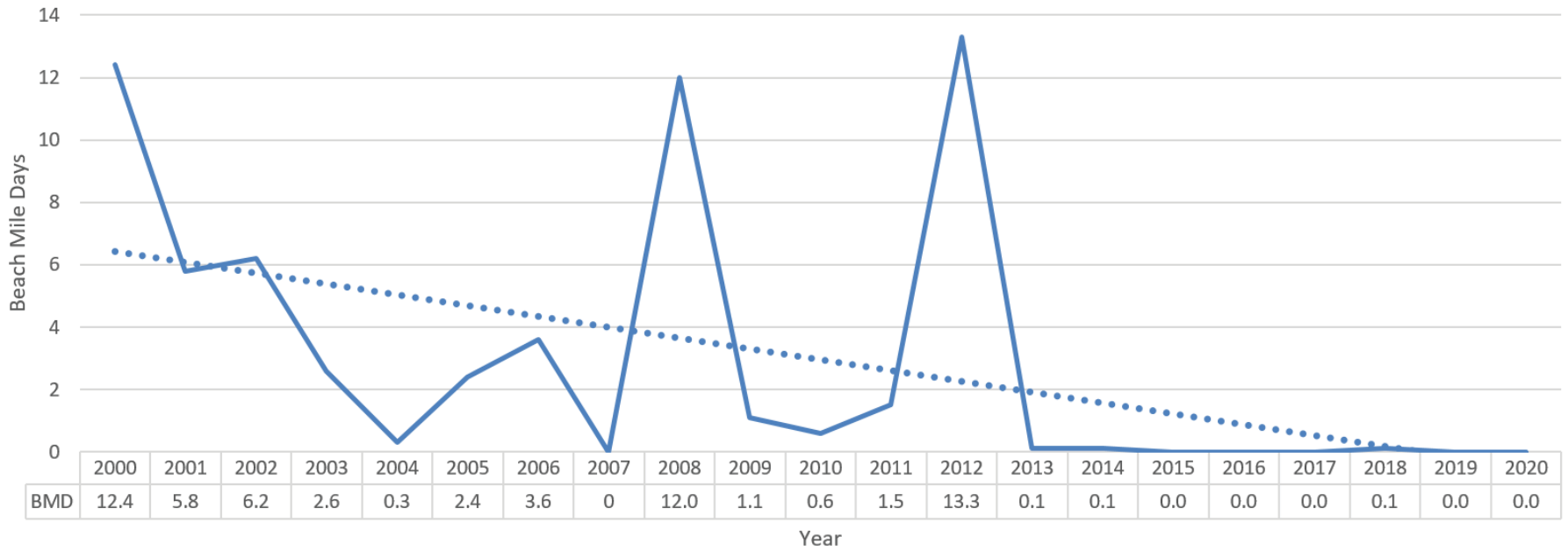
Capistrano County Beach

2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	4	128	12.4
2001	5	98	5.8
2002	7	104	6.2
2003	2	11	2.6
2004	1	2	0.3
2005	4	12	2.4
2006	4	15	3.6
2007	0	0	0
2008	3	48	12.0
2009	3	33	1.1
2010	2	3	0.6
2011	2	27	1.5
2012	2	53	13.3
2013	1	2	0.1
2014	1	2	0.1
2015	0	0	0.0
2016	0	0	0.0
2017	0	0	0.0
2018	1	2	0.1
2019	0	0	0.0
2020	0	0	0.0



Capistrano County Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)

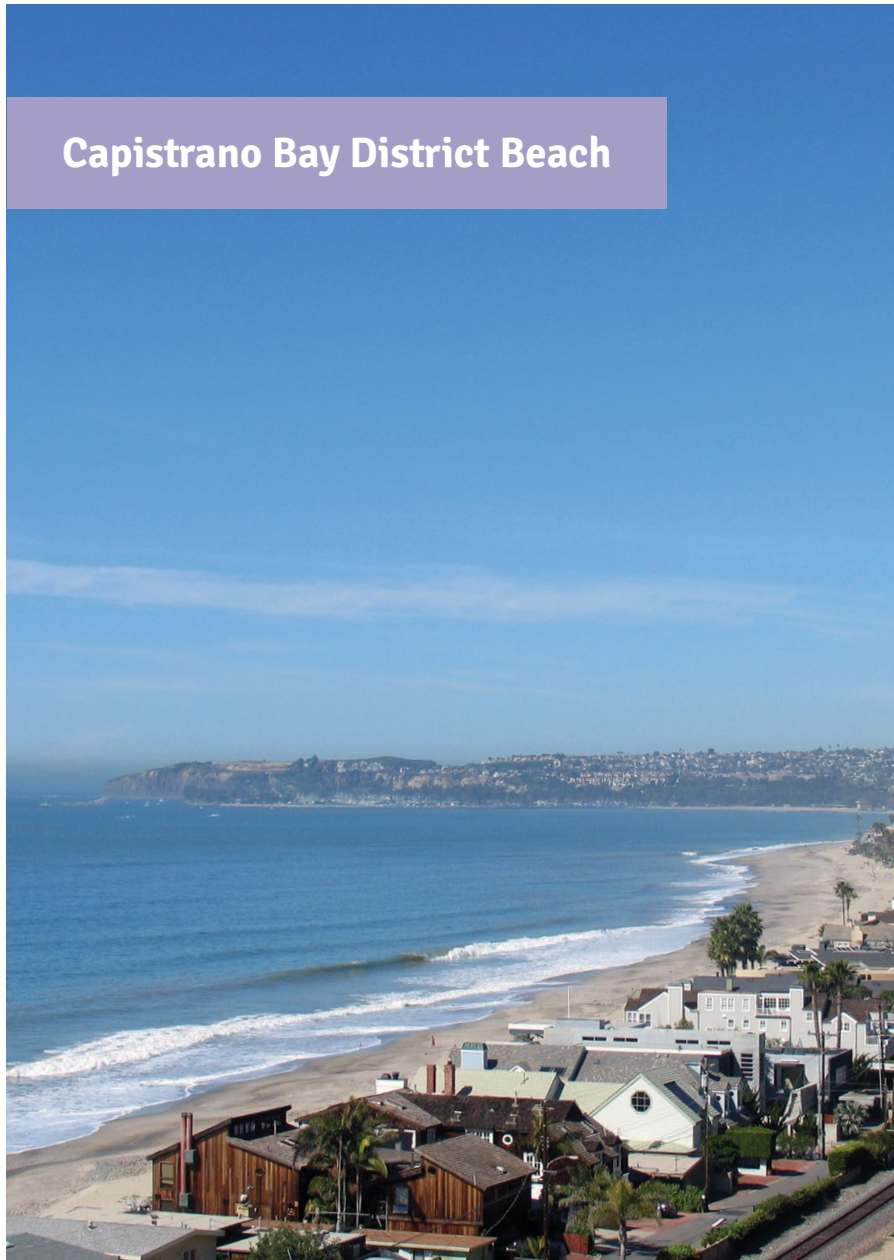


Capistrano County Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
Capistrano County Beach - Guard Shack	0	0	0.0
Drain at Basketball Court	No Access	No Access	No Access



Capistrano Bay District Beach

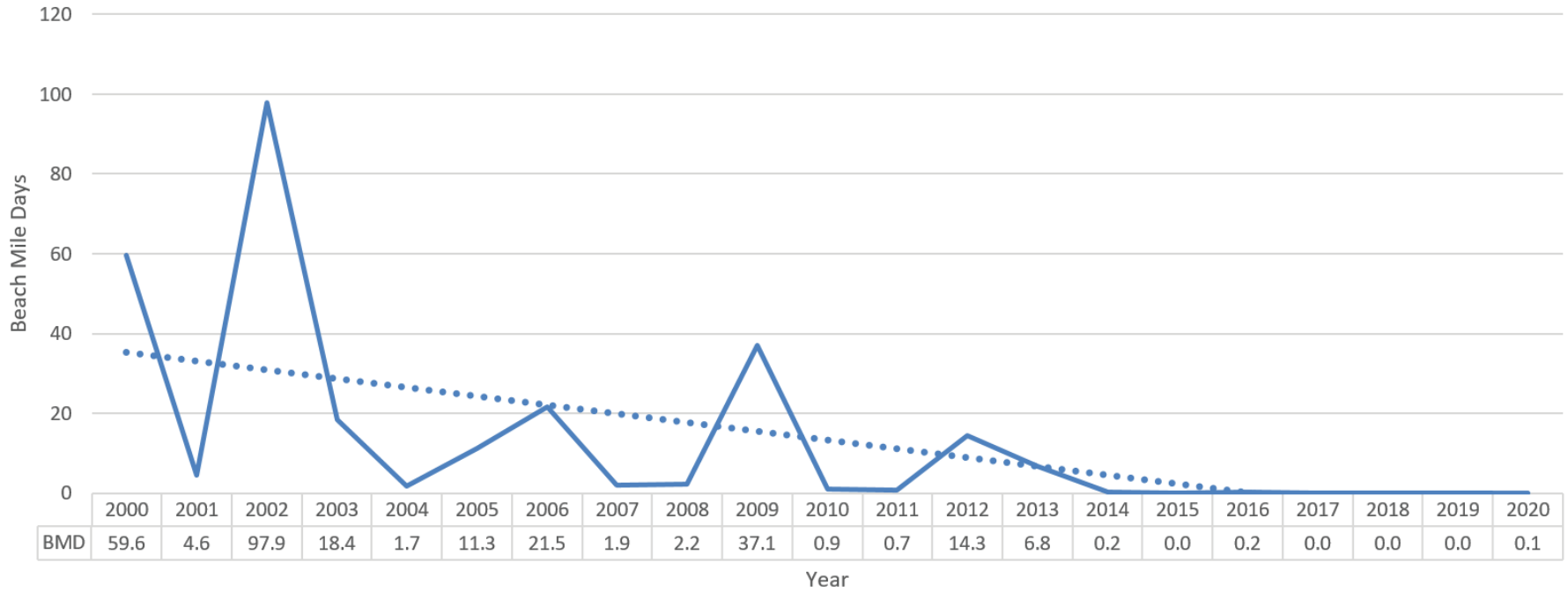


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	2	53	59.6
2001	5	31	4.6
2002	6	77	97.9
2003	5	25	18.4
2004	3	4	1.7
2005	2	9	11.3
2006	6	20	21.5
2007	2	7	1.9
2008	6	38	2.2
2009	6	29	37.1
2010	2	16	0.9
2011	7	13	0.7
2012	2	62	14.3
2013	3	11	6.8
2014	2	4	0.2
2015	0	0	0.0
2016	1	1	0.2
2017	0	0	0.0
2018	0	0	0.0
2019	0	0	0.0
2020	1	2	0.1



Capistrano Bay District Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)



Capistrano Bay District Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
Capistrano Bay Beach Drain	No Access	No Access	No Access
35197 Beach Road	0	0	0.0
35535 Beach Road	0	0	0.0
36077 Beach Road	1	2	0.13



Poche Beach

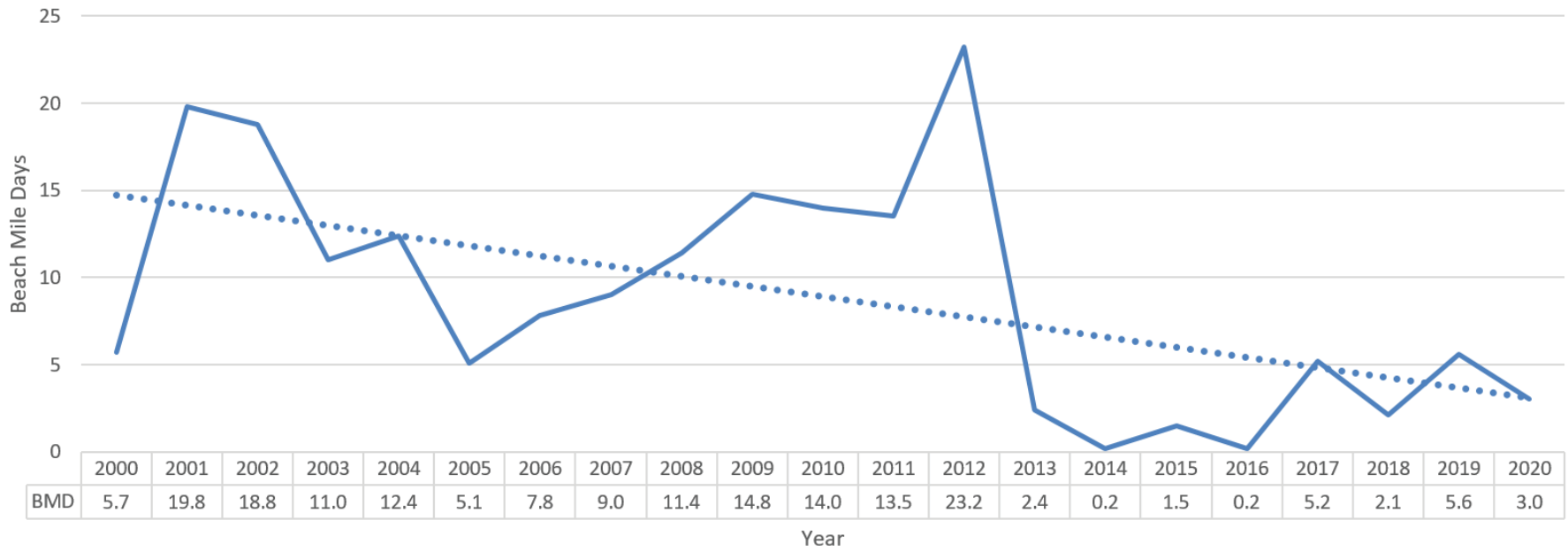


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	3	104	5.7
2001	3	145	19.8
2002	4	153	18.8
2003	7	88	11.0
2004	7	160	12.4
2005	5	68	5.1
2006	4	104	7.8
2007	2	154	9.0
2008	6	147	11.4
2009	2	184	14.8
2010	2	179	14.0
2011	3	153	13.5
2012	2	187	23.2
2013	8	26	2.4
2014	1	3	0.2
2015	4	38	1.5
2016	3	6	0.2
2017	4	177	5.2
2018	8	44	2.1
2019	2	193	5.6
2020	7	93	3.0



Poche Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)



Poche Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
Poche Creek / Ocean Interface	7	93	2.99



San Clemente City & State Beach

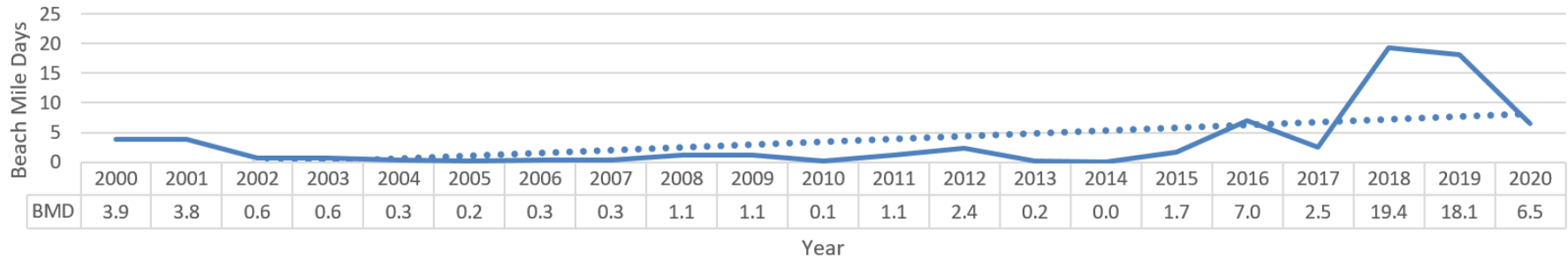


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs

Year	Posted Warnings	Posting Days	BMDs
2000	5	13	3.9
2001	4	13	3.8
2002	6	10	0.6
2003	4	7	0.6
2004	2	5	0.3
2005	2	4	0.2
2006	4	6	0.3
2007	3	6	0.3
2008	6	10	1.1
2009	8	20	1.1
2010	1	2	0.1
2011	7	17	1.1
2012	5	42	2.4
2013	2	4	0.2
2014	0	0	0.0
2015	8	21	1.7
2016	6	148	7.0
2017	8	66	2.5
2018	9	147	19.4
2019	17	162	18.1
2020	10	78	6.5



San Clemente City & State Beach - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)



San Clemente City & State Beach - 2020 Number of Posted Warnings, Posting Days and BMDs

Station Description	Postings	Days	BMDs
Pico Drain at North Beach	3	29	2.71
North Beach	0	0	0.0
El Portal Beach	0	0	0.0
Mariposa Beach	0	0	0.0
Linda Lane Beach	0	0	0.0
South Linda Lane Beach	0	0	0.0
450 Feet North of Pier	0	0	0.0
San Clemente Pier Up	1	2	0.15
San Clemente Pier	4	43	3.41
San Clemente Pier Down	1	2	0.15
Trafalgar Canyon Creek - "T" Street	1	2	0.11
Riviera Beach	0	0	0.0
Avenida Calafia	0	0	0.0
Las Palmaras	0	0	0.0



Annex B

Postings by Harbor and Bay Water Areas

2000 – 2020

The following tables and graphs provide monitoring information between **April 1 and October 31** for each of Orange County’s harbor, bay and slough water areas and is arranged geographically from north to south along the Orange County shoreline. The appendix information provided for harbor, bay and slough water area includes:

- ❖ Total number of posted warnings, total number of posted warning days and total number of BMDs that were posted due to AB 411 standards violations from **April 1 and October 31** in 2000 – 2020; and
- ❖ A trend graph depicting the total number of BMDs that the open coastal water area was posted from **April 1 and October 31** in 2000 – 2020.



Huntington Harbour

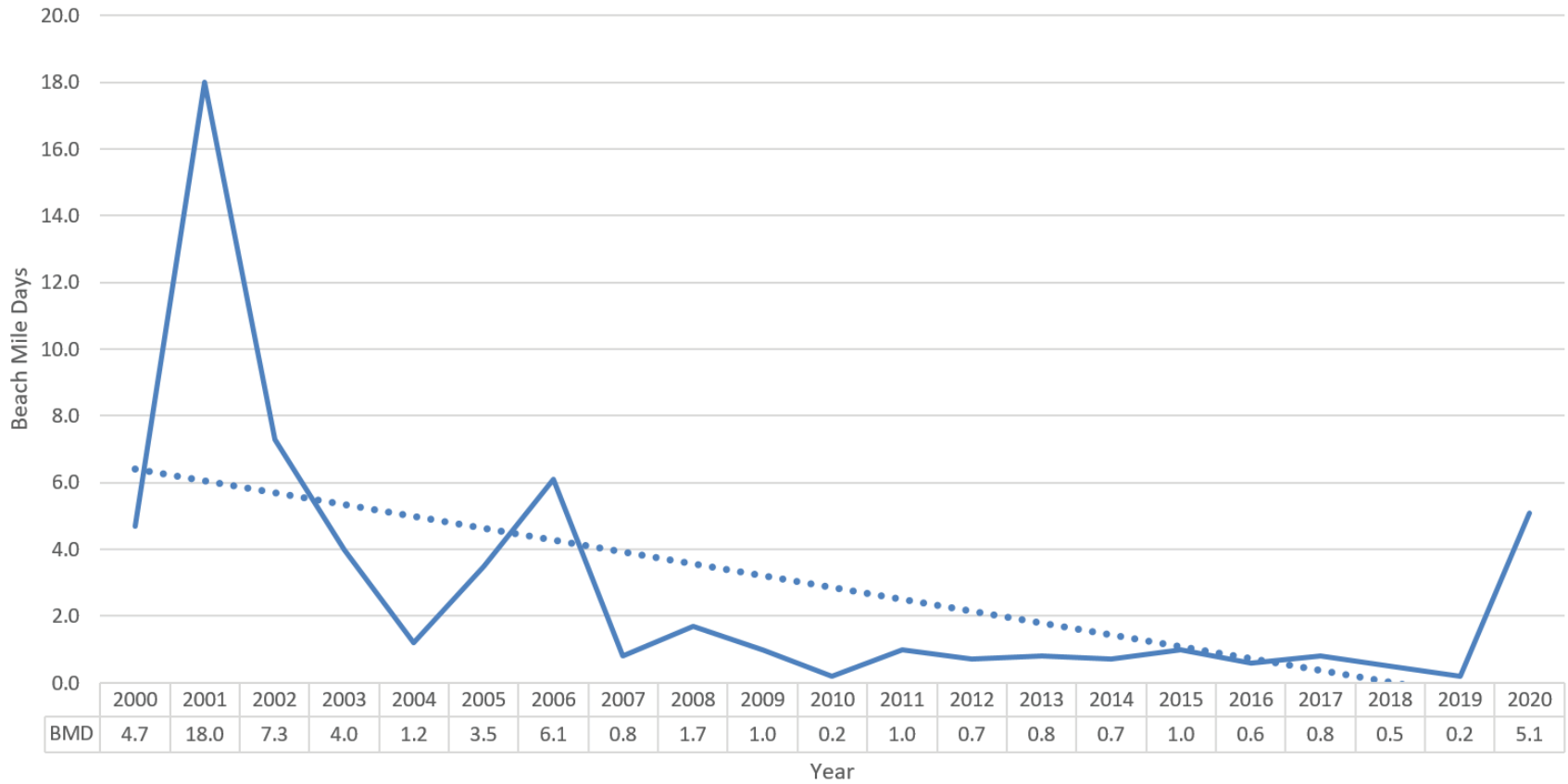


**2000 – 2020 Number of Posted Warnings, Posting Days and BMDs
(April 1 – October 31)**

Year	Posted Warnings	Posting Days	BMDs
2000	16	100	4.7
2001	34	182	18.0
2002	24	134	7.3
2003	15	73	4.0
2004	8	31	1.2
2005	15	68	3.5
2006	21	110	6.1
2007	8	16	0.8
2008	12	34	1.7
2009	5	18	1.0
2010	4	6	0.2
2011	8	19	1.0
2012	4	12	0.7
2013	12	28	0.8
2014	7	12	0.7
2015	10	20	1.0
2016	9	11	0.6
2017	10	15	0.8
2018	8	9	0.5
2019	5	8	0.2
2020	16	117	5.1



Huntington Harbour - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)



Newport Bay

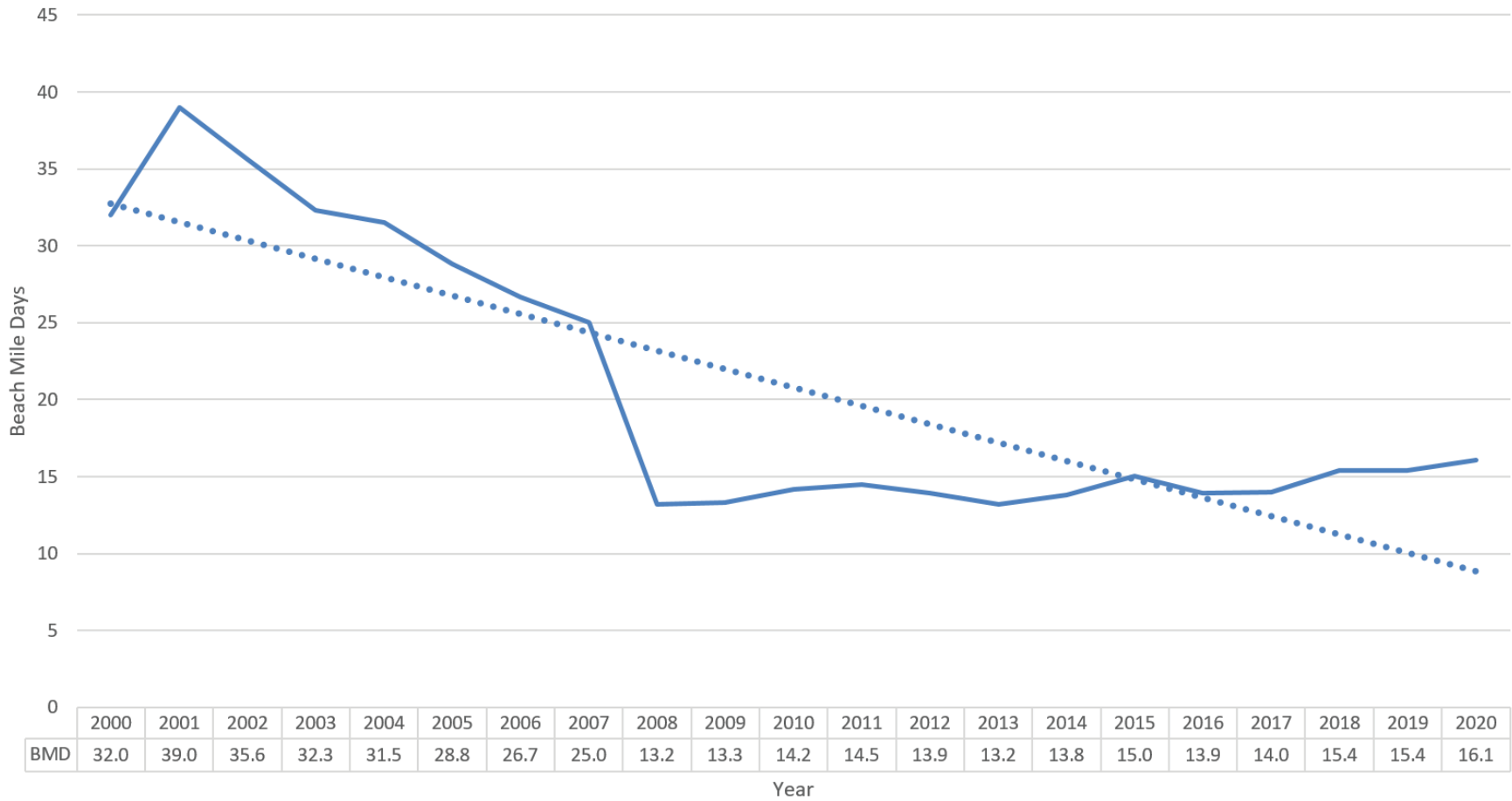


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs
(April 1 – October 31)

Year	Posted Warnings	Posting Days	BMDs
2000	56	929	32.0
2001	68	931	39.0
2002	43	905	35.6
2003	40	730	32.3
2004	31	768	31.5
2005	21	719	28.8
2006	30	492	26.7
2007	18	471	25.0
2008	15	246	13.2
2009	19	266	13.3
2010	18	307	14.2
2011	25	267	14.5
2012	22	263	13.9
2013	21	249	13.2
2014	19	295	13.8
2015	17	271	15.0
2016	10	330	13.9
2017	21	290	14.0
2018	21	310	15.4
2019	18	272	15.4
2020	28	370	16.1



Newport Bay - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)



Newport Slough

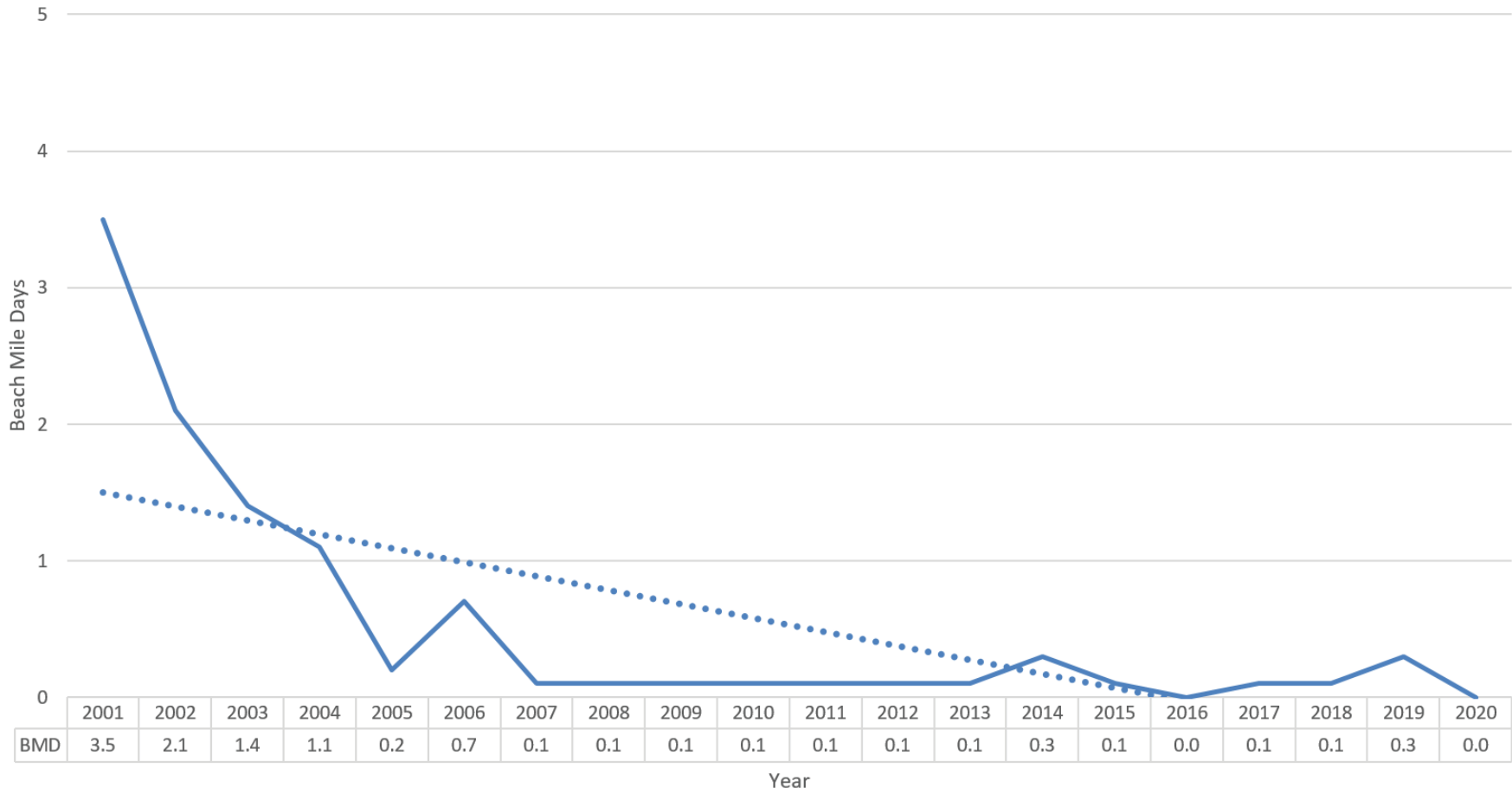


**2001 – 2020 Number of Posted Warnings, Posting Days and BMDs
(April 1 – October 31)**

Year	Posted Warnings	Posting Days	BMDs
2001	6	324	3.5
2002	5	181	2.1
2003	6	111	1.4
2004	3	96	1.1
2005	2	15	0.2
2006	10	61	0.7
2007	1	2	0.1
2008	4	13	0.1
2009	3	6	0.1
2010	2	6	0.1
2011	1	1	0.1
2012	3	12	0.1
2013	1	2	0.1
2014	2	28	0.3
2015	1	2	0.1
2016	0	0	0.0
2017	2	2	0.1
2018	2	3	0.1
2019	5	24	0.3
2020	0	0	0.0



Newport Slough - Number of BMDs Posted & Trend 2001 – 2020 (April 1 – October 31)



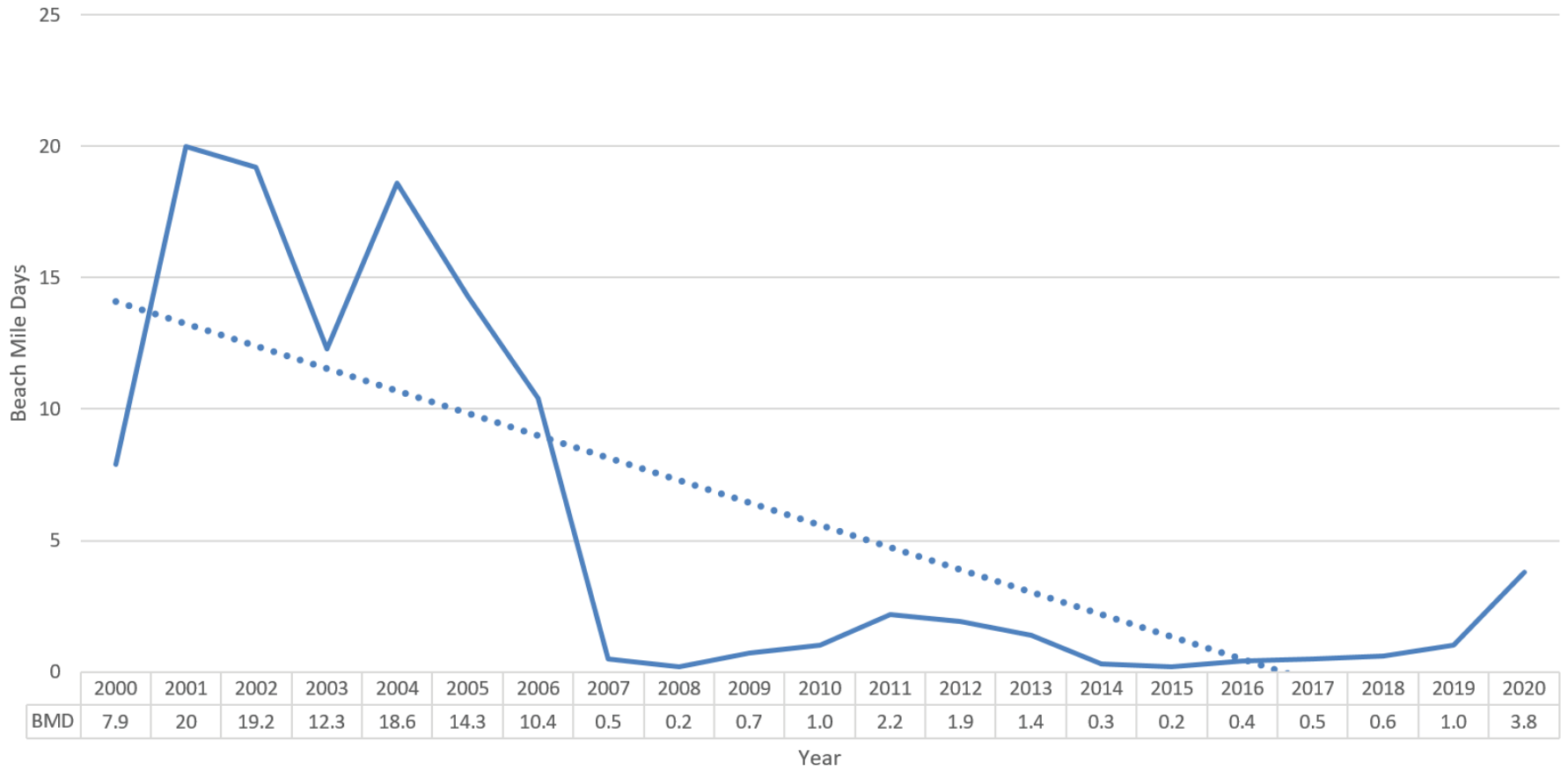


2000 – 2020 Number of Posted Warnings, Posting Days and BMDs
(April 1 – October 31)

Year	Posted Warnings	Posting Days	BMDs
2000	10	206	7.9
2001	8	420	20.0
2002	9	410	19.2
2003	8	298	12.3
2004	9	362	18.6
2005	6	322	14.3
2006	14	264	10.4
2007	9	27	0.5
2008	6	13	0.2
2009	5	53	0.7
2010	12	74	1.0
2011	8	59	2.2
2012	14	82	1.9
2013	10	41	1.4
2014	1	5	0.3
2015	4	9	0.2
2016	3	25	0.4
2017	4	45	0.5
2018	8	36	0.6
2019	12	71	1.0
2020	9	97	3.8



Dana Point Harbor - Number of BMDs Posted & Trend 2000 – 2020 (April 1 – October 31)



Annex C

Unauthorized Discharges of Waste and Ocean/ Harbor/Bay Closures 1987 – 2020

The following table lists both the total annual number of unauthorized discharges of waste reported to the HCA and the total number of ocean, harbor and bay water closures from 1987 – 2020. The total number of unauthorized discharges of waste reported is categorized by sewage type and by waste discharge causes for each year. The total number of ocean, harbor and bay water closures is categorized by waste type and closure causes. In addition, the total number of BMDs for ocean, harbor and bay water closures from sewage spills and miscellaneous causes is shown for 1999 – 2020.



Number of Unauthorized Waste Discharges and Ocean Water Closures 1987 – 2003

Waste Discharges	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
Total Number of Discharges	63	83	59	76	101	118	97	125	120	170	226	252	276	377	412	522	534	
By Waste Type																		
Raw Sewage	60	83	58	70	96	108	91	112	111	117	142	205	236	331	378	404	392	
Primary Treated Effluent	0	0	1	0	0	0	1	1	0	1	1	0	0	1	0	0	0	
Secondary Treated Effluent	0	0	0	3	3	5	0	2	3	1	10	12	2	6	9	3	6	
Tertiary Treated Effluent	0	0	0	1	1	4	3	5	5	47	68	28	31	37	25	114	135	
Miscellaneous	3	0	0	2	1	1	2	5	1	4	5	7	7	2	0	1	1	
Waste Discharge Causes																		
Pipeline Breaks	16	12	13	25	11	17	21	18	20	57	61	60	38	51	60	92	133	
Pipeline Blockages	26	42	32	34	72	86	61	89	72	65	118	139	210	288	308	409	358	
Pump Station Failures	14	26	13	12	12	6	9	9	8	24	15	16	14	8	15	11	17	
Treatment Plant Discharges	0	1	0	2	2	3	0	2	3	1	1	2	0	0	4	2	4	
Storm Surcharge	0	0	0	0	0	1	2	0	10	0	4	14	0	1	0	3	6	
Vessel Pump Stations	0	0	0	0	0	0	1	0	0	1	0	0	0	4	9	3	6	
Miscellaneous	7	2	1	3	4	5	3	7	7	22	27	21	14	25	16	2	10	
Ocean Water Closures																		
Total Number of Discharges	8	12	11	10	15	15	7	17	22	21	17	35	22	40	51	38	27	
By Waste Type																		
Raw Sewage	8	12	11	10	14	13	7	13	21	20	16	30	19	38	49	37	27	
Primary Treated Effluent	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	
Secondary Treated Effluent	0	0	0	0	0	2	0	0	0	0	0	1	1	2	2	0	0	
Tertiary Treated Effluent	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	
Miscellaneous	0	0	0	0	1	0	0	2	1	1	0	2	2	0	0	1	0	
Waste Discharge Causes																		
Pipeline Breaks	2	2	5	3	2	5	2	7	6	2	4	18	2	4	6	2	2	
Pipeline Blockages	3	3	1	5	9	7	2	8	10	8	8	4	11	30	29	31	17	
Pump Station Failures	3	6	5	1	3	1	1	0	3	7	4	3	5	2	6	1	1	
Treatment Plant Discharges	0	1	0	0	0	0	0	2	0	0	0	0	1	0	1	0	0	
Storm Surcharge	0	0	0	0	0	1	1	0	2	1	1	5	0	0	0	0	0	
Vessel Pump Stations	0	0	0	0	0	0	1	0	0	1	0	0	0	4	9	3	6	
Miscellaneous	0	0	0	1	1	1	0	0	1	2	0	5	3	0	0	0	1	
Closure BMDs																		
BMDs	x	x	x	x	x	x	x	x	x	x	x	x	x	51.0	52.0	59.1	18.5	15.1



Number of Unauthorized Waste Discharges and Ocean Water Closures 2004 – 2020

Waste Discharges	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Number of Discharges	496	480	454	394	387	321	290	309	315	299	160	136	129	109	87	123	88
By Waste Type																	
Raw Sewage	362	357	333	287	257	199	180	180	171	165	153	130	127	106	79	100	65
Primary Treated Effluent	2	0	0	0	1	2	3	0	0	0	1	0	0	0	6	19	20
Secondary Treated Effluent	10	9	7	6	4	6	3	0	2	2	3	2	1	3	1	1	0
Tertiary Treated Effluent	122	112	113	101	121	113	102	128	142	132	3	3	0	0	0	0	2
Miscellaneous	0	1	1	0	4	1	2	1	0	1	0	1	1	0	1	3	1
Waste Discharge Causes																	
Pipeline Breaks	114	128	113	94	108	90	118	110	112	103	13	8	10	9	4	10	8
Pipeline Blockages	329	289	277	225	215	170	135	154	140	136	119	110	113	80	69	84	60
Pump Station Failures	12	7	15	10	13	4	8	6	10	5	11	4	2	6	1	0	3
Treatment Plant Discharges	9	4	6	4	9	11	6	1	3	2	0	1	1	1	0	2	0
Storm Surcharge	2	7	3	3	3	1	11	2	0	2	2	1	1	4	0	2	0
Vessel Pump Stations	9	4	1	3	1	1	0	0	0	0	2	1	0	0	1	1	1
Miscellaneous	21	41	39	55	38	44	12	36	50	51	13	5	2	9	12	24	16
Ocean Water Closures																	
Total Number of Discharges	30	36	24	12	18	6	17	6	10	11	16	10	9	13	13	6	2
By Waste Type																	
Raw Sewage	29	35	23	12	18	6	16	5	9	11	16	10	9	13	13	6	2
Primary Treated Effluent	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Secondary Treated Effluent	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tertiary Treated Effluent	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Waste Discharge Causes																	
Pipeline Breaks	3	9	4	0	2	0	4	2	3	0	3	0	2	0	1	1	1
Pipeline Blockages	13	18	16	9	11	6	9	3	3	8	9	7	4	9	12	4	0
Pump Station Failures	0	2	2	0	3	0	1	1	3	1	2	1	1	3	0	0	1
Treatment Plant Discharges	1	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0
Storm Surcharge	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Vessel Pump Stations	9	4	1	3	1	0	0	0	0	0	2	1	2	0	1	1	0
Miscellaneous	4	1	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0
Closure BMDs																	
BMDs	13.5	74.0	15.3	2.0	30.2	6.3	67.5	12.9	6.0	11.0	25.3	18.9	14.0	17.7	11.0	65.0	2.0



Annex D

Sewage Spill Closures for Ocean, Harbor and Bay Water Areas - 2020

The following table provides a summary of each sewage spill that resulted in an ocean, harbor or bay water closure in 2019 and 2020. The table shows the closure dates; number of days closed; number of Beach Mile Days of the closure; the ocean, harbor or bay water area that was closed; the responsible agency or a private property owner (PPO) responsible for the closure; the cause of the sewage spill closure; and the estimated volume of sewage spilled, recovered and released to the ocean, harbor or bay water area.



2019 Beach Closures

	Date Closed	Date Opened	Number of Days Closed	BMDs	Ocean, Bay Harbor Area Closed	Agency/Reason	Amount Spilled*
1	2/6/18	1/6/19	2	1.22	Bayside Dr. Beach to China Cove	City of Newport Beach/line blockage due to roots and grease	~425 gallons/sewage ~50 gallons recovered ~375 gallons released
2	3/13/18	1/12/19	3	0.282	250' upcoast to 250' downcoast from the projection of Upland Road	City of Laguna Beach/main line blockage due to roots	~600 gallons/sewage ~300 gallons recovered ~300 gallons released
3	3/31/18	3/23/19	3	1.83	Bayside Dr. Beach to China Cove	City of Newport Beach/Grease interceptor overflow	~600 gallons/sewage ~300 gallons recovered ~300 gallons released
4	4/13/18	8/30/19	1	4.51	Anaheim Bay, Sunset Aquatic Marine, Portofino Cove, Anderson St. Marina, Mother's Beach & Admiralty Dr.	City of Stanton Public Works/Sewer main blockage	~60,000 gallons/sewage (~60,000 recovered)
5	5/31/18	9/27/19	1	0.11	North Star Beach	City of Newport Beach/Sewer main blockage	~0 released
6a	6/18/18	12/2/19	5	57	Pelican Point at Crystal Cove to Poche Creek in Dana Point/San Clemente 11/29/19 - Reduced to: Closure of El Morro Creek to the southernmost point of Dana Strands	City of Laguna Beach/Force main breakage	~1,400,000 gal/sewage ~0 gallons recovered ~1,400,000 gallons released
6b	8/14/18	12/2/19	5	*Included in BMD above	City of Laguna Beach/Debris in main line	City of Laguna Beach/Debris in the main line	~900 gallons/sewage ~0 gallons recovered ~900 gallons released

2020 Beach Closures

	Date Closed	Date Opened	Number of Days Closed	BMDs	Ocean, Bay Harbor Area Closed	Agency/Reason	Amount Spilled*
1	6/7/20	1/6/19	3	0.36	The ocean water from Sleepy Hollow Lane to Cleo Street in the City of Laguna Beach	PPO/Sewage tank pump motor failure	~600 gallons/sewage ~0 gallons recovered ~600 gallons released
2	6/22/20	1/12/19	3	1.62	All of Huntington Harbour	City of Huntington Beach/Break in the force main	~100 gallons/sewage ~0 gallons recovered ~100 gallons released

