

Oregon Beach Monitoring Program

Summer 2017 Evaluation of Monitoring Sites

March 2017

Laboratory and Environmental Assessment Program

3150 NW 229th Ave.
Suite 150
Hillsboro, OR 97124
Phone: 503-693-5700
Fax: 503-693-4999
Contact: Hannah Moore
www.oregon.gov/DEQ

DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.



State of Oregon
Department of
Environmental
Quality

Last Updated: 04/07/17
DEQ17-LAB-0008-TR
Ver. 1.02

Summer 2017 Evaluation of Beach Monitoring Sites

This report prepared by:

Oregon Department of Environmental Quality
811 SW 6th Avenue
Portland, OR 97204
1-800-452-4011
www.oregon.gov/deq

Contact:
Hannah Moore
503-693-5727

Documents can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request a document in another format or language, call DEQ in Portland at 503-229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696; or email deqinfo@deq.state.or.us.

Table of Contents

Executive Summary.....	1
Introduction	2
Methods and Criteria	4
Bacteria Sample Results Data	4
Beach Use Data	4
Results	5
Bacteria Sample Results	5
Beach Use Results	5
Adaptive Sampling Approach	6
Conclusion.....	6
Useful Links	7
References	7
Appendix A Detailed Bacteria Data & Rank by Beach.....	8
Appendix B Beach Use Summary	10
Appendix C OBMP 2017 Proposed Site List	12

Tables

Table 1 Oregon Beach List.....	3
Table 2 Bacteria Ranking Criteria.....	4
Table 3 Beaches Listed by Rank	5

This page intentionally left blank

Executive Summary

This report describes the process by which the Oregon Beach Monitoring Program (OBMP) compiles the list of Oregon beaches to be monitored. The National Beach Guidance (USEPA, 2002) recommends an adaptive sampling approach which allows monitoring programs to be flexible enough to accommodate new information as the need arises. The Oregon Department of Environmental Quality (DEQ) has limited resources to support monitoring the entire Oregon coast. The OBMP reviews candidate beaches and ranks them according to public health risk (OHA, 2010).

Candidate beaches where the OBMP has data are ranked according to the percent of sample results that exceeded the OBMP recreational water quality criteria (RWQC) (USEPA, 2014) and the geometric mean of those results. The sample results summary is then weighted by the number of people using the beach at the time of sampling.

The result of this evaluation is the list of beaches that will be proposed for the 2017 OBMP sampling schedule. The list will be submitted for public comment at the Oregon Health Authority (OHA) website for 6 weeks in the spring of 2017 (OHA, 2014). The OHA and DEQ will review public comments and finalize the sampling schedule for the season.

The review of the beach list for the sampling schedule is repeated every two years. Data collected during the subsequent sampling seasons are included in the next evaluation.

OBMP Proposed Site List 2017

Beach Name	City	County	North Lat	North Long	South Lat	South Long
Seaside Beach	SEASIDE	CLATSOP	46.006	-123.930	45.976	-123.941
Cannon Beach	CANNON	CLATSOP	45.908	-123.968	45.877	-123.964
Tolovana SP Beach	CANNON	CLATSOP	45.877	124.963	45.8631	-123.963
Short Sands Beach	ARCH CAPE	TILLAMOOK	45.764	-123.972	45.758	-123.965
Rockaway Beach	ROCKAWAY	TILLAMOOK	45.635	-123.943	45.599	-123.949
Twin Rocks Beach	TWIN ROCKS	TILLAMOOK	45.599	-123.949	45.589	-123.951
Neskowin Beach	NESKOWIN	TILLAMOOK	45.159	-123.970	45.094	-123.989
D River Beach	LINCOLN CITY	LINCOLN	44.971	-124.018	44.959	-124.021
Beverly Beach	NEWPORT	LINCOLN	44.738	-124.059	44.715	-124.060
Agate Beach	NEWPORT	LINCOLN	44.673	-124.062	44.649	-124.061
Nye Beach	NEWPORT	LINCOLN	44.649	-124.061	44.628	-124.067
Seal Rock State Rec. Site	SEAL ROCK	LINCOLN	44.496	-124.085	44.488	-124.084
Heceta Beach	FLORENCE	LANE	44.048	-124.131	44.035	-124.134
Bastendorff Beach	COOS BAY	COOS	43.352	-124.345	43.342	-124.359
Sunset Bay	COOS BAY	COOS	43.336	-124.373	43.332	-124.375
Hubbard Creek Beach	PORT ORFORD	CURRY	42.738	-124.482	42.725	-124.468
Harris Beach SP	BROOKINGS	CURRY	42.071	-124.318	42.059	-124.301
Crissey Field State Park	BROOKINGS	CURRY	42.008	-124.058	41.999	-124.212

Introduction

The OHA and DEQ are responsible for monitoring recreational water quality and issuing contact advisories along beaches in Oregon. The collaborative OBMP is a US Environmental Protection Agency (EPA) funded program. The OBMP tests the marine waters at select Oregon beaches for the fecal indicator bacterium (FIB) enterococcus, which has shown to be a useful indicator organism that has greater correlation in marine waters with gastrointestinal illnesses than other bacterial organisms (USEPA, 2013). The program provides public notification and issues a water contact advisory when bacteria levels exceeded Oregon's RWQC of 158 colony forming units (cfu) per 100 milliliters (mL) (ODEQ, 2006). Sites are then resampled within 96 hours in an effort to lift the advisory, and advisories are lifted once values are below the threshold. Starting in 2017 per requirement from EPA, OBMP adopted a new beach action value (BAV) of 70 cfu/ 100mL in replacement of the Oregon RWQC (USEPA, 2014).

The OBMP will begin its fifteenth sampling season starting around Memorial Day 2017 through Labor Day 2017. In the months of May through September 2016, the OBMP collected samples from 16 beaches at 63 sampling locations. Of the 499 samples collected, 34 (6.8 %) exceeded Oregon's water quality standard of 158 cfu/100 mL. The Oregon RWQC is a regulatory criteria to determine if a particular water body is impaired and not meeting its beneficial use. The new BAV is a more conservative, precautionary value for making beach notification decisions such as warning recreators about contact with water during a particular time frame. There were six exceeding results from marine samples and 28 high results were from fresh water samples. From 2002 – 2016 OBMP has collected more than 17600 samples. Of those 17600 samples, 5.5% of all samples have exceeded the RWQC criteria.

The OBMP will use the new BAV criteria of 70 cfu/100mL during the 2017 season. In 2014, the EPA updated its National Beach Guidance and Required Performance Criteria for Grants (USEPA, 2014). New studies determined that waters below the 158 cfu/ 100mL pose a health risk to individuals recreating in water, particularly of swimmers. The updated guidance requires states to adopt a BAV no greater than 70 cfu/ 100mL to receive funding for beach monitoring. The updated guidance can help reduce the number of individuals who become ill when exposed to bacteria contaminated water. Implications of the new BAV, such as an increased exceedance rate, were considered during this assessment. Evaluating the data between 2002-2016 with the new criteria, suggests that 11% of all samples have exceeded the new BAV, while only 5.5% of samples exceeded the Oregon RWQC criteria.

Oregon has more than 360 miles of coastline and more than 80 designated beaches with several potential sampling locations at each beach (Table 1). Available resources and potential implications of the new BAV will limit the number of beaches that the OBMP can sample over the summer season. The OBMP evaluates sampling sites and ranks them according to risk to public health. The program periodically reviews the bacteria test results and beach use data for beaches where sampling has occurred in an attempt to ensure resources are being applied to best protect public health at Oregon beaches. OBMP reviews land use and other relevant information about beach locations where little or no bacteria sampling data is available in order to include new sampling locations for consideration for the routine sampling schedule. Resources will be limited during the 2017 sampling season which will restrict the number of beaches OBMP can cover. Beaches are selected based on a number of parameters, such as recreational use, potential sources of bacterial pollution, proximity to creeks, pipes, and outflows, the number of previous water contact advisories, and logistics and available resources.

Water quality monitoring and beach use data collected by OBMP during previous seasons, land use and potential pollution source information from GIS analysis, public comments and requests, and agency concerns have been reviewed for compiling the 2017- 2018 sampling schedule. This paper discusses the process for evaluating and ranking Oregon beaches to prioritize the sampling schedule. The resulting list of beaches will be made available for public comment for a period of one month after which the sampling schedule will be finalized by OHA and ODEQ.

Table 1 Oregon Beach List

<i>Beach Name</i>	<i>Beach Name</i>
<i>Agate Beach</i>	<i>McVay Rock State Recreation Site</i>
<i>Alsea River Bridge Beach</i>	<i>Meyer's Beach</i>
<i>Arizona Beach State Recreation Site</i>	<i>Mill Beach</i>
<i>Baker and Sutton Beaches</i>	<i>Moolack Beach</i>
<i>Bandon South Jetty County Park</i>	<i>Ponsler Memorial State Scenic Viewpoint</i>
<i>Bandon State Natural Area</i>	<i>Nehalem Bay Beach</i>
<i>Bandon Wayside Face Rock State Park</i>	<i>Nelscott Beach</i>
<i>Barview County Park Beach</i>	<i>Neskowin Beach</i>
<i>Bastendorff Beach</i>	<i>Nye Beach</i>
<i>Battle Rock State Wayside</i>	<i>Oceanside Beach State Wayside</i>
<i>Beachside State Park Beach</i>	<i>Ona Beach</i>
<i>Beverly Beach</i>	<i>Ophir Beach</i>
<i>Bob Straub State Park Beach</i>	<i>Oregon Dunes Horsefall Beach</i>
<i>Buena Vista Ocean State Wayside Beach</i>	<i>Oregon Dunes Umpqua Dunes Beach</i>
<i>Bullards Beach</i>	<i>Oregon Dunes South Jetty Beach</i>
<i>Cannon Beach</i>	<i>Oswald West State Park Beach - Arch Cape</i>
<i>Cape Arago State Park North Cove</i>	<i>Otter Point State Recreation Site</i>
<i>Cape Arago State Park South Cove</i>	<i>Otter Rock Beach</i>
<i>Cape Blanco State Park Sixes River Beach</i>	<i>Paradise Point State Recreation Site</i>
<i>Cape Kiwanda Beach</i>	<i>Pistol River State Scenic Viewpoint</i>
<i>Cape Lookout State Park</i>	<i>Roads End Beach</i>
<i>Carl G. Washburn Memorial State Park</i>	<i>Rock Creek Campground - Roosevelt Beach</i>
<i>Crissey Field State Park Beach</i>	<i>Rockaway Beach</i>
<i>D River Beach State Park Beach</i>	<i>State Scenic Corridor - China Beach</i>
<i>Del Rey Beach State Recreation Site</i>	<i>State Scenic Corridor - Lone Ranch Beach</i>
<i>Devil's Elbow State Park</i>	<i>State Scenic Corridor - Whaleshead Beach</i>
<i>Devil's Punchbowl State Natural Area</i>	<i>Seal Rock State Recreation Site</i>
<i>Driftwood Beach State Recreation Site</i>	<i>Seaside Beach</i>
<i>Florence North Jetty Beach</i>	<i>Seven Devil's State Recreation Site</i>
<i>Fogarty State Beach</i>	<i>Siletz Bay Beach</i>
<i>Fort Stevens Beach</i>	<i>Smelt Sands State Recreation Site</i>
<i>Gleneden Beach</i>	<i>South Beach</i>
<i>Gold Beach</i>	<i>Sporthaven Beach</i>
<i>Governor Patterson State Park Beach</i>	<i>Stonefield Beach State Recreation Site</i>
<i>Harris Beach State Park Beach</i>	<i>Sunset Bay State Park Beach</i>
<i>Heceta Florence Beach</i>	<i>Sunset Beach State Recreation Site</i>
<i>Hubbard Creek Beach</i>	<i>Tillicum Beach</i>
<i>Hug Point Beach</i>	<i>Tolovana State Park Beach</i>
<i>Hunter Creek Beach</i>	<i>Twin Rocks Beach</i>
<i>Indian Cannon Beach</i>	<i>Umpqua Beach</i>
<i>Lost Creek State Recreation Site</i>	<i>Whiskey Run Beach</i>
<i>Manhattan State Park Beach</i>	<i>Yachats Wayside Beach</i>
<i>Manzanita Beach</i>	<i>Yaquina Bay Beach</i>

Methods and Criteria

This report lists candidate beaches for the 2017 sampling season (Table 1). The list is compiled based on the average bacteria sampling results, the percentage of beach sample results that exceeded the states RWQC, and beach use by people on the beach during sampling. The OBMP has collected these parameters through all previous monitoring seasons. Beach use is recorded as people on the beach or in the water. There are several recreational activities that are noted during sampling including swimming, fishing, surfing, body boarding, skim boarding, tide pooling, clamming, dog walking, and wading along the surf zone. Other activities on the beach like kite flying and bike riding are also noted. The physical characteristics of beaches and the proximity of creeks, outfall pipes, and potential pollution sources observed while sampling or reported by public comment are considered to bring together the beach sampling schedule.

Bacteria Sample Results Data

All available sample results collected by the OBMP from the 2002-2016 sampling seasons are considered in this evaluation. The total number of samples, the number of samples that exceeded Oregon’s RWQC, and the geometric mean of bacteria count results were determined for all beaches. Each beach was then ranked by the percentage of total samples that exceeded Oregon’s RWQC and by the geometric mean of bacteria sampling results. These ranks were assigned according to the percent of samples exceeding the RWQC and geometric mean of the sample results (Table 2). Both ranking assignments were added together to produce the total bacteria rank which ranges from 0 (lowest) to 7 (highest). The influence of mean bacterial levels on the overall ranking score is purposely minimized. Most results are non-detects and are not normally distributed and heavily skewed toward lower values.

Table 2 Bacteria Ranking Criteria

Rank Value Assigned	Samples Exceeding RWQC (%)	Mean Bacterial Count (cfu/100ml)
0	No data OR N<5	No data OR N<5
1	0%	<10
2	>0% and <5%	>=10
3	5 - <10%	
4	10 - <15%	
5	15% or more	
Note: No rank value was assigned if there were fewer than 5 samples per beach (N)		

Beach Use Data

The OBMP records beach use during sampling. The requirements of the Beaches Environmental Assessment and Coastal Health Act (BEACH Act) that apply to states and tribes, define “coastal recreation waters” as marine coastal waters used for swimming, bathing, surfing, or similar water contact activities. The OBMP counts anyone wading, swimming, surfing, or in the ocean for any similar activity near the sample collection site to determine the number of people in the water per sample collection. All available beach use observations taken from 2002 through 2016 are considered in the beach evaluation. A total beach ranking that incorporates bacteria presence and beach use at each beach was determined by multiplying total bacteria rank by the beach use rank. The final ranking represents a bacteria rank weighted by beach use. Beaches with higher ranks tend to have higher bacteria levels, higher beach use levels, or both.

Results

Bacteria Sample Results

The Appendix A table is a summary of beach bacteria results and their rank. Approximately 5.5% of all samples from all seasons exceeded Oregon’s RWQC of 158 cfu/100 mL. Among the 57 beaches where OBMP has collected at least 5 samples, 13 were above the average 5.5 % exceedance rate and were given higher rank values in the evaluation. The geometric mean of all of the bacteria sample results was just over 10 cfu/100mL and the average result was just over 35 cfu/100mL. Of the 55 beaches with sufficient sample data, 18 beaches had geometric means greater than the overall geometric mean.

Beach Use Results

The Appendix B table is a summary of beach use and the people in the water per sample calculations. The bacteria sample results rankings (Appendix A) were multiplied by the beach use ratio (Appendix B) to yield the total beach rank. The 56 evaluated beaches are listed by rank in Table 3. Beach monitoring program staff at OHA and DEQ will select 15-20 beaches for the 2017 summer sampling season. That list of beaches will be submitted for public comment (Appendix C).

Table 3 Beaches Listed by Rank

Beach Name	Total Number of Samples	Geometric Mean Rank	Percent Exceeded Rank	Total Bacteria Rank	People in the Water Per Sample	Ranking Score 2017
Cannon Beach – Clatsop County	1547	2	3	5	7.75	38.73
Tolovana SP Beach – Clatsop County	353	2	2	4	6.90	27.60
Seaside Beach – Clatsop County	1039	1	2	3	8.72	26.15
D River State Park Beach – Lincoln County	779	2	3	5	5.11	25.57
Indian Beach – Clatsop County	229	1	2	3	6.36	19.07
Seal Rock Beach	149	2	4	6	2.54	15.22
Oswald West SP Beach – Tillamook County	1858	1	2	3	5.03	15.08
Nye Beach – Lincoln County	1098	2	5	7	2.10	14.68
Fort Stevens – Clatsop County	21	1	1	2	7.28	14.56
Cape Kiwanda SP Beach – Tillamook County	504	1	2	3	4.62	13.87
Siletz Bay – Lincoln County	249	1	2	3	4.18	12.54
Neskowin Beach -Tillamook County	200	1	2	3	4.04	12.11
Oceanside Beach Wayside – Tillamook County	273	1	2	3	3.64	10.93
Beverly Beach – Lincoln County	331	2	3	5	2.11	10.53
Beachside SP Beach – Lincoln County	19	1	1	2	5.24	10.47
Harris Beach SP – Curry County	753	2	3	5	2.08	10.39
Sunset Bay SP Beach – Coos County	1251	2	4	6	1.72	10.29
Manzanita Beach – Tillamook County	15	1	1	2	5.00	10.00
Roads End Beach – Lincoln County	105	1	2	3	3.32	9.97
Rockaway Beach – Tillamook County	537	2	3	5	1.99	9.94
Florence Heceta Beach – Lane County	196	2	2	4	2.24	8.95
Hug Point Beach – Clatsop County	364	1	2	3	2.97	8.92
Governor Patterson SP Beach – Lincoln County	16	1	1	2	4.14	8.29
Cape Lookout SP Beach – Tillamook County	19	1	1	2	4.00	8.00
Whiskey Run Beach – Coos County	15	2	1	3	2.15	6.45

Beach Name	Total	Geometric	Percent	Total	People in	Ranking
Twin Rocks Beach – Tillamook County	207	2	2	4	1.60	6.42
Agate Beach – Lincoln County	629	2	2	4	1.58	6.32
Otter Rock Beach – Lincoln County	378	1	2	3	2.00	6.00
Yaquina Bay – Lincoln County	64	1	2	3	1.98	5.95
Gleneden Beach – Lincoln County	49	1	1	2	2.95	5.91
Bob Straub SP Beach – Tillamook County	22	1	1	2	2.75	5.50
Meyer’s Beach – Curry County	17	1	3	4	1.31	5.23
Bastendorff Beach – Coos County	1057	2	3	5	1.01	5.05
Bandon Beaches – Coos County	96	1	2	3	1.68	5.04
Crissey Field SP Beach – Curry County	65	2	2	4	1.06	4.26
Sporhaven Beach – Curry County	99	1	1	2	2.00	4.00
Florence Dunes South Jetty – Lane County	24	1	1	2	1.91	3.82
Nehalem Bay SP Beach – Tillamook County	15	1	1	2	1.85	3.70
Nelscott Beach – Lincoln City	347	1	2	3	1.20	3.60
Battle Rock Beach – Curry County	96	1	2	3	1.16	3.48
Manhattan Beach SP – Tillamook County	31	1	2	3	1.00	3.00
Umpqua Beach – Douglas County	269	1	2	3	1.00	3.00
Ona Beach – Lincoln County	143	1	2	3	0.91	2.73
Newport South Beach – Lincoln County	212	1	1	2	1.29	2.58
Fogarty Creek Beach – Lincoln County	61	1	1	2	1.25	2.50
Moolack Beach – Lincoln County	18	1	1	2	1.25	2.50
Bullards Beach – Coos County	14	1	1	2	1.00	2.00
Gold Beach – Curry County	78	1	2	3	0.55	1.65
Hunter Creek Beach – Curry County	41	1	1	2	0.74	1.48
Alsea Bay – Lincoln County	34	1	2	3	0.45	1.35
Ophir Beach – Curry County	14	1	1	2	0.67	1.34
Yachats Wayside Beach – Lincoln County	48	1	1	2	0.53	1.06
Barview County Park – Tillamook County	170	1	1	2	0.46	0.92
Florence North Jetty Beach – Lane County	281	1	2	3	0.28	0.84
Mill Beach – Curry County	612	2	4	6	0.14	0.84
Hubbard Creek Beach – Curry County	543	2	2	4	0.20	0.80

Adaptive Sampling Approach

The OBMP considers rotating beaches into the sampling schedule that have not previously been sampled by the program. Information such as potential pollution sources, access to public beaches, reported annual attendance, facility permits, and residential density is reviewed for beaches where the OBMP has not collected data. Public comments and agency concerns are also reviewed to consider new beaches for the sampling schedule. As funding or time allows, OBMP may add beaches of concern into the finalized list of 17 beaches (Appendix C).

Conclusion

The ranking method OBMP used to evaluate the beach list is based on the geometric means of the sample results and beach use as recorded in the field. This method assigns relative bacteria results ranks to each beach and those ranks are weighted by beach use. The final beach selection therefore includes those that have had relatively higher bacteria presence and higher beach use. The final ranking of beaches is then evaluated to insure equal representation of the three coastal basins: north coast, mid coast, and south coast. OBMP will repeat a three week sampling schedule of beaches within the three basins to cover as much of the coast on a regular basis as possible.

The final sampling schedule will be determined considering comments from the public, organizations, and agencies. Those comments will be reviewed, and a final list of beaches for the 2017 summer sampling season will be approved by OHA and DEQ staff.

Useful Links

1. EPA Beach Advisory and Closing On-line Notification (BEACON) website
<http://watersgeo.epa.gov/beacon2/>
2. Oregon Health Authority Beach Water Quality website
<http://public.health.oregon.gov/HealthyEnvironments/Recreation/BeachWaterQuality/>
3. Oregon Department of Environmental Quality Beach Monitoring website
<http://www.deq.state.or.us/lab/wqm/beachpgm.htm>
4. Oregon Coastal Atlas website
<http://www.coastalatlantlas.net/>
5. EPA Nation Beach Guidance and Required Performance Criteria for Grants, 2014 Edition
<https://www.epa.gov/beach-tech/national-beach-guidance-and-required-performance-criteria-grants>

References

- ODEQ. (2006). *Coastal Beach Monitoring DEQ03-LAB-0042-QAPP September 6, 2006, Version 2.0*. Hillsboro, OR: Oregon Department of Environmental Quality LEAD Laboratory.
- OHA. (2010). *Oregon Beach Monitoring Program Summer 2010 Evaluation of Beach Sites*. Salem, OR: Oregon Health Authority (OHA), Public Health Division. Retrieved from http://www.co.tillamook.or.us/gov/Health/Documents/EH/summer2010_beachevaluation_finaldraft.pdf
- OHA. (2014, April). *Oregon Health Authority*. Retrieved from Beaches We Monitor.
- USEPA. (2002). *National Beach Guidance and Required Performance Criteria for Grants*. Washington, DC: U.S. Environmental Protection Agency, Office of Water. Retrieved from http://water.epa.gov/grants_funding/beachgrants/upload/2008_11_24_beaches_grants_guidance_all.pdf
- USEPA. (2013, June 20). *US Environmental Protection Agency*. Retrieved from National Beach Guidance and Required Performance Criteria - Appendix 1C1: Indicator Organisms: http://water.epa.gov/grants_funding/beachgrants/app1c.cfm
- USEPA. (2014, February 21). *US Environmental Protection Agency*. Retrieved from Recreational Water Quality Criteria: <http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/>

Appendix A Detailed Bacteria Data & Rank by Beach

Detailed Bacteria Data & Rank by Beach

Beach Name	Total Samples	Bacteria Geometric Mean	Geometric Mean Rank	Number Exceeded	Percent Exceeded	Percent Exceeded Rank
Agate Beach - Lincoln County	629	10.56	2	25	3.97	2
Alsea Bay	34	9.36	1	1	2.94	2
Bandon Beaches - Coos County	96	6.05	1	2	2.08	2
Barview County Park - Tillamook	170	7.35	1	0	0.00	1
Bastendorff Beach - Coos County	1057	10.22	2	58	5.49	3
Battle Rock Beach - Curry County	96	8.25	1	2	2.08	2
Beachside SP Beach - Lincoln County	19	6.52	1	0	0.00	1
Beverly Beach - Lincoln County	331	11.95	2	25	7.55	3
Bob Straub SP Beach -	22	5.33	1	0	0.00	1
Bullards Beach - Coos County	14	6.21	1	0	0.00	1
Cannon Beach - Clatsop County	1547	12.51	2	94	6.08	3
Cape Kiwanda SP Beach - Tillamook County	504	6.64	1	4	0.79	2
Cape Lookout SP Beach - Tillamook County	19	5.00	1	0	0.00	1
Crissey Field SP Beach - Curry County	65	10.12	2	3	4.62	2
D River SP Beach - Lincoln County	779	14.28	2	54	6.93	3
Florence North Jetty Beach - Lane County	281	6.60	1	2	0.71	2
Fogarty Creek Beach - Lincoln County	61	6.72	1	0	0.00	1
Fort Stevens - Clatsop County	21	5.34	1	0	0.00	1
Gleneden Beach - Lincoln County	49	5.37	1	0	0.00	1
Gold Beach - Curry County	78	6.33	1	1	1.28	2
Governor Patterson SP Beach - Lincoln County	16	9.56	1	0	0.00	1
Harris Beach SP - Curry County	753	15.89	2	68	9.03	3
Heceta Beach - Lane County	196	10.07	2	7	3.57	2
Hubbard Creek Beach - Curry County	543	11.56	2	21	3.87	2
Hug Point Beach - Clatsop County	364	6.24	1	2	0.55	2
Hunter Creek Beach - Curry County	41	6.24	1	0	0.00	1
Indian Beach - Clatsop County	229	6.37	1	1	0.44	2
Manhattan SP Beach - Tillamook	31	6.64	1	1	3.23	2
Manzanita Beach - Tillamook County	15	6.80	1	0	0.00	1
Meyer's Beach - Curry County	17	7.23	1	1	5.88	3
Mill Beach - Curry County	612	23.24	2	91	14.87	4
Moolack Beach - Lincoln County	18	7.33	1	0	0.00	1
Nehalem Bay SP Beach - Tillamook County	15	5.24	1	0	0.00	1
Nelscott Beach - Lincoln County	347	7.52	1	3	0.86	2
Neskowin Beach - Tillamook County	200	7.96	1	4	2.00	2
Nye Beach - Lincoln County	1098	21.24	2	185	16.85	5
Oceanside Beach State Wayside - Tillamook County	273	6.18	1	2	0.73	2
Ona Beach - Lincoln County	143	9.86	1	6	4.20	2
Ophir Beach - Curry County	14	6.40	1	0	0.00	1
Oregon Dunes South Jetty - Lane County	24	5.61	1	0	0.00	1
Oswald West SP Beach - Tillamook County	1858	7.83	1	34	1.83	2
Otter Rock Beach - Lincoln County	378	6.17	1	2	0.53	2

Roads End Beach - Lincoln County	105	6.43	1	1	0.95	2
Rockaway Beach - Tillamook County	537	14.54	2	45	8.38	3
Seaside Beach - Clatsop County	1039	6.68	1	6	0.58	2
Siletz Bay - Lincoln County	249	9.40	1	5	2.01	2
South Beach Newport - Lincoln County	212	6.15	1	0	0.00	1
Sporthaven Beach - Curry County	99	6.84	1	0	0.00	1
Sunset Bay SP Beach - Coos County	1251	23.50	2	163	13.03	4
Tolovana SP Beach - Clatsop County	353	10.82	2	15	4.25	2
Twin Rocks Beach - Tillamook County	207	13.71	2	8	3.86	2
Umpqua Beach - Douglas County	269	6.22	1	2	0.74	2
Whiskey Run Beach - Coos County	15	10.07	2	0	0.00	1
Yachats Wayside Beach - Lincoln County	48	8.22	1	0	0.00	1
Yaquina Bay - Lincoln County	64	6.42	1	1	1.56	2

Appendix B Beach Use Summary

Beach Use Summary

Beach Name	Total Samples	Total People Observed In Water	People Per Sample
Agate Beach - Lincoln County	580	916	1.58
Alsea Bay - Lincoln County	33	15	0.45
Bandon Beaches - Coos County	94	158	1.68
Barview County Park - Tillamook	150	69	0.46
Bastendorff Beach - Coos County	940	948	1.01
Battle Rock Beach - Curry County	94	109	1.16
Beachside SP Beach - Lincoln County	17	89	5.24
Beverly Beach - Lincoln County	281	592	2.11
Bob Straub SP Beach -	20	55	2.75
Bullards Beach - Coos County	12	12	1.00
Cannon Beach - Clatsop County	1396	10814	7.75
Cape Kiwanda SP Beach - Tillamook County	479	2215	4.62
Cape Lookout SP Beach - Tillamook County	17	68	4.00
Crissey Field SP Beach - Curry County	62	66	1.06
D River SP Beach - Lincoln County	681	3482	5.11
Florence North Jetty Beach - Lane County	261	74	0.28
Fogarty Creek Beach - Lincoln County	55	69	1.25
Fort Stevens - Clatsop County	18	131	7.28
Gleneden Beach - Lincoln County	43	127	2.95
Gold Beach - Curry County	76	42	0.55
Governor Patterson SP Beach - Lincoln County	14	58	4.14
Harris Beach SP - Curry County	657	1365	2.08
Heceta Beach - Lane County	164	367	2.24
Hubbard Creek Beach - Curry County	516	103	0.20
Hug Point Beach - Clatsop County	358	1064	2.97
Hunter Creek Beach - Curry County	39	29	0.74
Indian Beach - Clatsop County	225	1430	6.36
Manhattan SP Beach - Tillamook	22	22	1.00
Manzanita Beach - Tillamook County	13	65	5.00
Meyer's Beach - Curry County	13	17	1.31
Mill Beach - Curry County	548	77	0.14
Moolack Beach - Lincoln County	16	20	1.25
Nehalem Bay SP Beach - Tillamook County	13	24	1.85
Nelscott Beach - Lincoln County	297	355	1.20
Neskowin Beach - Tillamook County	196	791	4.04
Nye Beach - Lincoln County	932	1955	2.10
Oceanside Beach State Wayside - Tillamook County	243	885	3.64
Ona Beach - Lincoln County	105	96	0.91
Ophir Beach - Curry County	12	8	0.67
Oregon Dunes South Jetty - Lane County	22	42	1.91
Oswald West SP Beach - Tillamook County	1638	8234	5.03
Otter Rock Beach - Lincoln County	345	690	2.00
Roads End Beach - Lincoln County	74	246	3.32

Rockaway Beach - Tillamook County	481	956	1.99
Seal Rock Beach - Lincoln County	97	246	2.54
Seaside Beach - Clatsop County	938	8175	8.72
Siletz Bay - Lincoln County	216	902	4.18
South Beach Newport - Lincoln County	188	243	1.29
Sporhaven Beach - Curry County	93	186	2.00
Sunset Bay SP Beach - Coos County	1079	1851	1.72
Tolovana SP Beach - Clatsop County	323	2229	6.90
Twin Rocks Beach - Tillamook County	177	284	1.60
Umpqua Beach - Douglas County	248	249	1.00
Whiskey Run Beach - Coos County	13	28	2.15
Yachats Wayside Beach - Lincoln County	45	24	0.53
Yaquina Bay - Lincoln County	58	115	1.98

Appendix C OBMP 2017 Proposed Site List

OBMP 2017 Proposed Site List

Beach Name	City	County	North Lat	North Long	South Lat	South Long
Seaside Beach	SEASIDE	CLATSOP	46.006	-123.930	45.976	-123.941
Cannon Beach	CANNON	CLATSOP	45.908	-123.968	45.877	-123.964
Tolovana SP Beach	CANNON	CLATSOP	45.877	124.963	45.8631	-123.963
Short Sands Beach	ARCH CAPE	TILLAMOOK	45.764	-123.972	45.758	-123.965
Rockaway Beach	ROCKAWAY	TILLAMOOK	45.635	-123.943	45.599	-123.949
Twin Rocks Beach	TWIN ROCKS	TILLAMOOK	45.599	-123.949	45.589	-123.951
Neskowin Beach	NESKOWIN	TILLAMOOK	45.159	-123.970	45.094	-123.989
D River Beach	LINCOLN CITY	LINCOLN	44.971	-124.018	44.959	-124.021
Beverly Beach	NEWPORT	LINCOLN	44.738	-124.059	44.715	-124.060
Agate Beach	NEWPORT	LINCOLN	44.673	-124.062	44.649	-124.061
Nye Beach	NEWPORT	LINCOLN	44.649	-124.061	44.628	-124.067
Seal Rock State Rec. Site	SEAL ROCK	LINCOLN	44.496	-124.085	44.488	-124.084
Heceta Beach	FLORENCE	LANE	44.048	-124.131	44.035	-124.134
Bastendorff Beach	COOS BAY	COOS	43.352	-124.345	43.342	-124.359
Sunset Bay	COOS BAY	COOS	43.336	-124.373	43.332	-124.375
Hubbard Creek Beach	PORT ORFORD	CURRY	42.738	-124.482	42.725	-124.468
Harris Beach SP	BROOKINGS	CURRY	42.071	-124.318	42.059	-124.301
Crissey Field State Park	BROOKINGS	CURRY	42.008	-124.058	41.999	-124.212