



Orange County Sanitation District
**Ocean Monitoring
Annual Report**

Year 2010-2011



George Robertson
Senior Scientist

We're here for you.



ORANGE COUNTY SANITATION DISTRICT

We protect public health and the environment by providing effective wastewater collection, treatment, and recycling.

February 27, 2012

Kurt V. Berchtold, Executive Officer
California Regional Water Quality Control Board
Santa Ana Region 8
3737 Main Street, Suite 500
Riverside, CA 92501-3339

SUBJECT: Board Order No. R8-2004-0062, NPDES Permit No. CA0110604
2010-11 Marine Monitoring Annual Report

Enclosed is the Orange County Sanitation District's 2010-11 Marine Monitoring Report. This report focuses on the findings and conclusions for the monitoring period July 1, 2010 to June 30, 2011. Overall, the results of the monitoring program document that the disposal of our treated and disinfected effluent into coastal marine waters continues to protect the environment and human health.

The results of the 2010-11 monitoring effort showed that minor to moderate impacts to the benthic infauna community within and adjacent to the zone of initial dilution (ZID) continue. These changes include increased abundances of opportunistic pollution tolerant species and a decreased diversity of large invertebrates taken by trawl. However, no station outside the ZID was classified as degraded and diverse biological communities comparable to reference areas persist in the monitoring area beyond the ZID. In addition, sediment contaminants remained at or near background levels. The low levels of contaminants in fish tissues and the low incidents of external abnormalities and diseases in fish populations demonstrated that the outfall was not an epicenter of disease.

There were limited and minimal changes in the receiving water and sediment conditions. Plume-related changes in temperature, salinity, dissolved oxygen, pH, and transmissivity beyond the ZID were well within the range of natural variability, and compliance with numeric receiving water criteria was achieved over 96% of the time. Consequently, our ocean monitoring program continues to demonstrate that the coastal receiving water environment outside the ZID has not been degraded by the District's wastewater discharge. Finally, the low concentrations of bacteria in water contact zones, together with the limited distributions of ammonia, suggest that the wastewater discharge has had no discernible impact on human health and recreational use.

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Kurt V. Berchtold
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February 27, 2012

As discussed at the Quarterly Regulatory meeting held on January 10, 2011, we have initiated several studies to investigate the potential extent and cause(s) of the observed changes on the benthic community. We have been in regular communication with RWQCB and USEPA staff to discuss the progress of these studies, and a summary of the results to date is forthcoming.

Should you have questions regarding the information provided in this report, or wish to meet with District's staff to discuss any aspect of our ocean monitoring program, please feel free to contact me at (714) 593-7080. However, you may also contact Dean Pasko, the supervisor of our Ocean Monitoring section, who may be reached at (714) 593-7535 or at dpasko@ocsd.com.

Edward M. Torres, P.E.
Director of Operations and Maintenance

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Enclosure

c: Jared Blumenfeld, U.S. EPA, Region IX



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February 27, 2012

Certification Statement

The following certification satisfies Section A.10 and A.15 of the Orange County Sanitation District's Monitoring and Reporting Program No. R8-2004-0062, NPDES No. CA0110604, for the submittal of the attached OCSD Annual Report 2011 – Marine Monitoring.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for known violations.

Edward M. Torres, P.E.
Director of Operations and Maintenance

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ANNUAL REPORT 2011

MARINE MONITORING

**Orange County Sanitation District
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(714) 962-2411**

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ABBREVIATIONS AND ACRONYMS

The following is a list of abbreviations and acronyms used in the Marine Monitoring Volume. A table of metric equivalents is included to allow conversions from metric to U.S. units.

acidity/alkalinity	pH
acoustic Doppler current profiler	ADCP
aluminum	Al
ammonium	NH ₄ ⁺
antimony	Sb
arsenic	As
accelerated solvent extractor	ASE
balanced indigenous population	BIP
Benthic Response Index	BRI
beryllium	Be
biochemical oxygen demand	BOD
cadmium	Cd
California Department of Health Services	CDHS
centimeter	cm
chlorophyll- <i>a</i>	Chl- <i>a</i>
chromium	Cr
Clean Water Act	CWA
conductivity/temperature/depth	CTD
copper	Cu
cubic centimeter	cm ³
cubic meter	m ³
degree Celsius	°C
differential Global Positioning System	dGPS
dissolved oxygen	DO
dry weight	dry wt
effects range low	ERL
effects range medium	ERM
Environmental Laboratory and Ocean Monitoring	ELOM
Environmental Protection Agency	EPA
Environmental Sciences Laboratory	ESL
epibenthic macroinvertebrates	EMI
Effects Range-Low	ER-L
Effects Range-Medium	ER-M
foot	ft
Food and Drug Administration	FDA
gallon	gal
gallons per day	gpd
gas chromatograph with dual electron capture detector	GC/ECD/ECD
gas chromatograph with tandem mass spectrometer	GC/MS/MS
gas chromatography/mass spectrometry	GC/MS
Global Positioning System	GPS
gram	g
greater than	>
greater than or equal to	≥
high-density polyethylene	HDPE
inductively coupled emission spectroscopy	ICPES
inductively coupled mass spectroscopy	ICPMS
inch	in
Infaunal Trophic Index	ITI
iron	Fe
Joint Water Pollution Control Plant	JWPCP
kilogram	kg

ABBREVIATIONS AND ACRONYMS

kilometer	km
lead	Pb
less than	<
less than or equal to	≤
linear alkyl benzenes	LAB
liter	L
liters/day	L/day
magnesium sulfate	MgSO ₄
Margalef Species Richness	d
mass emission rate	MER
mean	\bar{x}
mercury	Hg
meter	m
method detection limit	MDL
metric tons per day	MT/day
metric tons per year	MT/yr
microgram	μg
micrograms per gram	μg/g
micrograms per kilogram	μg/kg
micrograms per liter	μg/L
mile	mi
milligram	mg
milligrams per kilogram	mg/kg
milligrams per liter	mg/L
milliliter	mL
millimeter	mm
million gallons per day	MGD
most probable number	MPN
nanogram	ng
nanograms per gram	ng/g
National Marine Fisheries Service	NMFS
National Oceanic and Atmospheric Administration	NOAA
National Pollutant Discharge Elimination System	NPDES
National Research Council	NRC
National Status and Trends	NS&T
nautical mile	nmi
nickel	Ni
not analyzed	NA
not applicable	N/A
not detected	ND
not significant	ns
oil and grease	O&G
Orange County Sanitation District	District or OCSD
Orange County Health Care Agency	OCHCA
Orange County Water District	OCWD
out-of-range occurrence	ORO
parts per billion	ppb
parts per million	ppm
parts per thousand	ppt
percent	%
plus or minus	±
polychlorinated biphenyls	PCB
polycyclic aromatic hydrocarbons	PAH
pound	lb
practical salinity unit	psu

ABBREVIATIONS AND ACRONYMS

probability	p
publicly owned treatment works	POTW
quality assurance	QA
quality control	QC
Quality Assurance Project Plan	QAPP
quality assurance/quality control	QA/QC
Regional Water Quality Control Board	RWQCB
relative percent difference	RPD
Science Applications International Corporation	SAIC
Scripps Institution of Oceanography	SIO
second	sec or s
sediment quality triad	SQT
selenium	Se
Shannon-Wiener diversity index	H'
silver	Ag
Southern California Association of Marine Invertebrate Taxonomists	SCAMIT
Southern California Bight	SCB
Southern California Bight Pilot Project	SCBPP
Southern California Coastal Water Research Project	SCCWRP
species (singular)	sp
species (plural)	spp
Species Evenness	J'
square centimeter	cm ²
square kilometer	km ²
square meter	m ²
standard operating procedure	SOP
standard reference material	SRM
Statistical Analysis System	SAS
Strategic Process Study	SPS
thallium	Tl
tons per year	tons/yr
total DDT	tDDT
total organic carbon	TOC
total polycyclic aromatic hydrocarbons	tPAH
total polychlorinated biphenyls	tPCB
total suspended solids	TSS
total volatile solids	TVS
U.S. Environmental Protection Agency	USEPA
U.S. Fish and Wildlife Service	USFWS
weight	wt
wet weight	wet wt
year	yr
zinc	Zn
zone of initial dilution	ZID

ABBREVIATIONS AND ACRONYMS

Metric System With U.S. Equivalents		
Metric Unit		U.S. Equivalent
Length		
millimeter (mm)		0.04 inches
centimeter (cm)		0.39 inches
meter (m)		39.37 inches/3.28 ft
kilometer (km)		0.62 miles, 0.54 nm
nautical mile (nm)		1.151 miles
Area		
square centimeter (cm ²)		0.155 sq. inches
square meter (m ²)		1.196 sq. yards
sq. kilometer (km ²)		0.3861 sq. miles
Weight		
milligram (mg)		0.015 grains
gram (g)		0.035 ounces
kilogram (kg)		2.2046 pounds
metric ton (MT)		1.1 tons
Volume		
cubic centimeter (cm ³)		0.061 cubic inches
cubic meter (m ³)		1.31 cubic yards
liter (L)		0.2642 gallons
Capacity, Cubic		
milliliter (mL)		0.06 cubic inches
liter (L)		61.02 cubic inches
kiloliter (kL)		1.31 cubic yards
Temperature		
°C (Centigrade)		$(9/5)(^{\circ}\text{C}) + 32 = ^{\circ}\text{F}$ (Fahrenheit)
Speed		
meters per second (m/s)		2.237 miles per hour (mph)
nautical mile per hour (knot)		1.151 miles per hour (mph)

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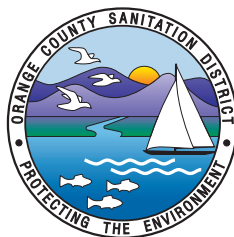
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