

Surface phytoplankton and plastic counts collected at the Carlsbad Desalination Plant along the coast of Southern California in 2014-2016 (Effluent Impacts on Coastal Ecology project)

Website: <https://www.bco-dmo.org/dataset/716389>

Data Type: Other Field Results

Version:

Version Date: 2017-09-19

Project

» [Brine Discharge From Desalination Plants - Impacts On Coastal Ecology, Public Perception, and Public Policy](#)
(Effluent Impacts on Coastal Ecology)

Contributors	Affiliation	Role
Paytan, Adina	University of California-Santa Cruz (UCSC)	Principal Investigator
Haddad, Brent	University of California-Santa Cruz (UCSC)	Co-Principal Investigator
Potts, Donald	University of California-Santa Cruz (UCSC)	Co-Principal Investigator
Petersen, Karen Lykkebo	University of California-Santa Cruz (UCSC)	Student, Contact
Copley, Nancy	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Coverage

Spatial Extent: N:33.1459 E:-117.336641 S:33.1355 W:-117.35295

Temporal Extent: 2014-12-01 - 2016-11-30

Dataset Description

This dataset contains surface water cell counts of phytoplankton and of plastic pieces collected at the Carlsbad Desalination Plant, obtained in December 2014, Sept. 2015, May 2016 and November 2016.

Related datasets:

[Benthic macrofaunal abundance](#)

[Macrofauna species distribution](#)

[Sediment fauna and plastic](#)

[Sediment grain size](#)

[Water chemistry](#)

Methods & Sampling

Samples were collected in a perimeter of ~1 km offshore of the discharge channel of Carlsbad Desalination Plant, Carlsbad Beach, California (33°08'18.9"N 117°20'21.3"W).

Samples were collected in four trips:

Pre-discharge: Dec 2nd-4th 2014 and Sep 21st-24th 2015.

Post-discharge: May 9th-12th 2016 and Nov 8th-11th 2016

Transect lines were deployed going from the discharge channel (Outflow) and the Intake to 1000 m offshore. Sampling was done every 25 m until 200 m offshore, then at 400, 600, 800 and 1000 m ("stations"). The "Parallel" transect ran continuous parallel to the beach ~200 m offshore and samples stations were deployed every ~100 m. Station 1 is the southern-most sampling point (south of discharge channel). At each station surface (~1 m depth) and bottom water samples were taken and a sediment sample. Bottom samples were collected at a depth range of 4m - 17m.

Unfiltered surface water samples were collected and preserved in formalin. Samples were set to settle over a minimum of 6 hours and species identified and counted by microscopy

Data Processing Description

BCO-DMO Processing:

- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions: Fieldtrip to date_Fieldtrip; Individuals pr kg sediment to individ_kg_sed, Plastic pr. kg sediment to plastic_kg_sed
- added year column
- sorted by year

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Data Files

File
phyto_counts.csv (Comma Separated Values (.csv), 3.17 KB) MD5:158baa5873f031693f66423a5cbdd523
Primary data file for dataset ID 716389

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Parameters

Parameter	Description	Units
year	year of sampling	unitless
date_Fieldtrip	local date formatted as Mon-yyyy	unitless
Site	sampling location relative to inflow and outflow	unitless
Station	distance along transect line from site 0	meters
Total_cell_count_liter	The total amount of cells counted in each samples	cells/liter
Percent_diatoms	The percentage of diatoms in the total cell count	percent
Percent_dinoflagellates	The percentage of dinoflagellates in the total cell count	percent
Plastic_pieces_liter	The amount of identified plastic pieces in each sample	plastic pieces/liter

Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Microscope - Optical
Generic Instrument Description	Instruments that generate enlarged images of samples using the phenomena of reflection and absorption of visible light. Includes conventional and inverted instruments. Also called a "light microscope".

Deployments

Paytan_2014

Website	https://www.bco-dmo.org/deployment/564163
Platform	shoreside Carlsbad Desalination Plant
Start Date	2014-12-02
End Date	2014-12-04
Description	study of desalination plant effluent

Project Information

Brine Discharge From Desalination Plants - Impacts On Coastal Ecology, Public Perception, and Public Policy (Effluent Impacts on Coastal Ecology)

Website: <http://desalinationucsc.weebly.com>

Coverage: Carlsbad, California

Description from NSF award abstract:

Desalination of seawater accounts for a worldwide water production of about 70 million cubic meters per day. Despite the many benefits the technology has to offer, there are concerns over potential negative impacts on the environment. A key issue that has not been thoroughly investigated is the impact of effluent discharge on coastal marine ecosystems. This project will provide quantitative scientific assessment of the potential impacts of effluent discharge on coastal ecosystems in California and assess how such data influences public perception and public policy. The team of social and natural scientists has experience related to coastal pollution, California coastal ecology, marine biogeochemistry, toxicology, environmental policy and economics, water policy and management, and utility-stakeholder communications. Established relations with desalination facilities in California will ensure an integrative framework for research on the human and environmental aspects related to the increasing abundance of desalination facilities along the California coast, and contribute to both securing freshwater resources and sustaining productive and healthy coastal communities and coastal environments.

The objectives of this project are to (1) determine how effluent discharges from facilities for seawater

desalination by reverse osmosis affect key organisms of the California coastal ecosystem with implications for ecosystem structure and function, (2) describe the spatial extent of the effect for different discharge schemes, and (3) evaluate how results from this and similar environmental impact studies influence public perception and decision making regarding desalination plant construction and operation. The project will combine in situ field chemical and biological measurements, controlled laboratory experiments, and assessments of how people and organizations interpret and use this data for making environmentally sound and sustainable decisions. Field studies will be performed at three different desalination plants to identify and quantify the possible effects of stressors associated with effluent discharge on local biota. Observed effects will be validated through controlled laboratory bioassay experiments. The scientific results will be communicated to the general public and decision makers to assess how scientific data is used by different stakeholders.

This project is supported under NSF's Coastal SEES (Science, Engineering and Education for Sustainability) program.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1325649

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