Benthic macrofaunal abundance along transects by scuba divers at the Carlsbad Desalination Plant, Southern California 2014-2016 (Effluent Impacts on Coastal Ecology project)

Website: https://www.bco-dmo.org/dataset/564195
Data Type: Other Field Results
Version: 3
Version Date: 2016-09-21

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

Contributors	Affiliation	Role
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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 the average count of individual benthic macrofauna organisms counted along transect lines by scuba divers at the Carlsbad Desalination Plant, obtained in December 2014, Sept. 2015, May 2016 and November 2016. The total number of organisms is averaged to the amount per square meter.

Related datasets:
Macrofauna species distribution
Phytoplankton cell count
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.

The benthic surveys were done continuously at the first 200 m offshore if water conditions allowed. At station 400, 600, 800 and 1000 and on the parallel stations, ten 1x1m quadrates were deployed. Organisms larger than 2.5 cm were counted. Organisms identified in the following classes were counted: Sponge, Anthozoa, Gastropoda, Clam, octopus, Polychaete, Echinodermata, Arthropoda, fish and algae.

Data Processing Description

Survey counts were averaged and normalized to the area surveyed.

BCO-DMO Processing:
- added conventional header with dataset name, PI name, version date
- modified parameters to BCO-DMO standard
- sorted records by date and site
- reduced five abundance values to 3 decimal places to match rest of data

Version: 2017-10-04 (earlier data revised and 2016 data added)
Version: 2016-09-21 (revised 2014 data and added 2015 data)
Replaced v.2015-08-03, original version

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Data Files

File	
benthic_macrofaunal_abund_2017.csv	(Comma Separated Values (.csv), 7.06 KB) MD5:9745ea89e9b004247950ca0bf82db7a3
Primary data file for dataset ID 564195	

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Parameters

Parameter	Description	Units
year	year of sampling	unitless
site	sampling location relative to inflow and outflow	unitless
date_Fieldtrip	local date formatted as Mon-yyyy	unitless
station	distance along transect line from site 0	meters
Latitude	latitude either at start or transect of at actual position; north is positive	decimal degrees
Longitude	longitude either at start or transect of at actual position; east is positive	decimal degrees
abundance	organism density on the biological swath calculated for each 10 meter mark on the transects	organisms/m^2

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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

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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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