

Time series of avg daily zooplankton concentration in shoal water within the surf zone at Sand City, Monterey Bay, California in 2010 (Surf zone larval transport project)

Website: <https://www.bco-dmo.org/dataset/562015>

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Project

» [Does coupling between the inner shelf and surf zone regulate larval supply to intertidal populations?](#) (Surf zone larval transport)

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Dataset Description

Time series of average daily zooplankton concentration in shoal water within the surf zone at Sand City, CA. (36.615760 degrees N, 121.85485 degrees W).

Methods & Sampling

From 27 June to 15 July we sampled zooplankton within the shoal water within the surf zone at Sand City, California. Sampling occurred during a daytime low tide. Samples were taken with a 200 um mesh 0.25 m² plankton net that was equipped with a flow meter to determine the volume of water filtered. Three replicate samples were collected daily by swimmers. The swimmer carried the net into the center of the shoal and held the net into the on coming waves which forced water through the net. The net filtered an average of 2 m³ per tow. Samples were preserved in buffered formalin. Zooplankton were identified and enumerated using dissecting microscopes.

Data Processing Description

Three samples were collected each day in the waters over the shoals in the surf zone. Counts from the

microscopic analysis of the samples were converted to number per m³ and the average and 95% confidence interval for each daily set of samples were calculated. Note that blanks in the data set represent missing data values (BCO-DMO has changed blanks to 'nd'.)

BCO-DMO Processing:

- Re-formatted date, and added separate columns for month, day, year, and year-day.
- Added column containing site name.
- Added lat and lon (from metadata form).
- Modified parameter names to conform with BCO-DMO naming conventions.
- Replaced blanks (missing data) with 'nd' to indicate 'no data'.

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Data Files

File
SandCity_Shoals_Zoo2010.csv (Comma Separated Values (.csv), 3.39 KB) <small>MD5:a62a6131842739af0f592ff0928d4b5b</small>
Primary data file for dataset ID 562015

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Parameters

Parameter	Description	Units
site_name	Name of the sampling site.	text
lat	Latitude of the sampling site.	decimal degrees
lon	Longitude of the sampling site.	decimal degrees
date	Month/day/year of sample collection.	mm/dd/yyyy
Copepod	Copepod ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Copepod_95CI	Copepod 95% confidence interval.	number per cubic meter (#/m ³)
Copepod_nauplii	Copepod Nauplii ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Copepod_nauplii_95CI	Copepod Nauplii 95% confidence interval.	number per cubic meter (#/m ³)
Harpacticoid	Harpacticoid ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Harpacticoid_95CI	Harpacticoid 95% confidence interval.	number per cubic meter (#/m ³)
Larvacean	Larvacean ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Larvacean_95CI	Larvacean 95% confidence interval.	number per cubic meter (#/m ³)
Cladoceran	Cladoceran ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Cladoceran_95CI	Cladoceran 95% confidence interval.	number per cubic meter (#/m ³)
Barnacle_stg_I_III	Barnacle stage I-III ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)

Barnacle_stg_I_III_95CI	Barnacle stage I-III 95% confidence interval.	number per cubic meter (#/m ³)
Barnacle_stg_IV_VI	Barnacle stage IV-VI ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Barnacle_stg_IV_VI_95CI	Barnacle stage IV-VI 95% confidence interval.	number per cubic meter (#/m ³)
Cyprid	Cyprid ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Cyprid_95CI	Cyprid 95% confidence interval.	number per cubic meter (#/m ³)
Emerita_stg_I	Emerita stage I ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Emerita_stg_I_95CI	Emerita stage I 95% confidence interval.	number per cubic meter (#/m ³)
Bivalves_veligers	Bivalves Veligers ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Bivalves_veligers_95CI	Bivalves Veligers 95% confidence interval.	number per cubic meter (#/m ³)
Gastropod_veligers	Gastropod Veligers ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Gastropod_veligers_95CI	Gastropod Veligers 95% confidence interval.	number per cubic meter (#/m ³)
Spionid_poly_larvae	Spionid Poly Larvae ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Spionid_poly_larvae_95CI	Spionid Poly Larvae 95% confidence interval.	number per cubic meter (#/m ³)
Other_polychaete_larvae	Other Polychaete larvae ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Other_polychaete_larvae_95CI	Other Polychaete larvae 95% confidence interval.	number per cubic meter (#/m ³)
Urchin_larvae	Urchin larvae ave #/m ³ (mean of the 3 replicate samples).	number per cubic meter (#/m ³)
Urchin_larvae_95CI	Urchin larvae 95% confidence interval.	number per cubic meter (#/m ³)
mon	2-digit month of year.	mm (01 to 12)
day	2-digit day of month.	dd (01 to 31)
year	4-digit year.	YYYY
yrday	Consecutive day of year (Jan 1st = 1)	dimensionless

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Deployments

SC_2010

Website	https://www.bco-dmo.org/deployment/560852
Platform	Sand_City_Surf_Zone
Start Date	2010-06-15
End Date	2010-07-15

Project Information

Does coupling between the inner shelf and surf zone regulate larval supply to intertidal populations? (Surf zone larval transport)

Coverage: Sand City Beach and Carmel River State Beach, Monterey Bay, CA

Description from NSF award abstract:

Many intertidal invertebrates and fishes have complex life cycles that include a planktonic larval phase. At the end of their pelagic development, larvae must return to shore and cross the surf zone. The purpose of this study is to investigate for the first time the role of surf zone hydrodynamics in the rate of delivery of cyprids of intertidal barnacles to the shore. To exploit the greater physical oceanographic understanding of the hydrodynamics of sandy beach surf zones, this initial study will focus on cyprid settlement on hard substrates in surf zones associated with sandy beaches. In the first two years of the study, the investigators will carry out an intensive two-month physical and biological study of a reflective and dissipative surf zone, respectively. At each site they will sample cyprids in the waters of the inner-shelf, just outside the surf zone, and within the surf zone and they will measure settlement on plates in the intertidal zone. At the same time they will collect physical oceanographic data with both in-situ instruments and a fleet of GPS-equipped surface drifters to describe the hydrodynamics of the surf zone. The time series of the physical and biological data will be correlated to investigate mechanisms of delivery of cyprids to the shore. To simulate the hydrodynamic processes responsible for the transport of larvae, the investigators will use a 3D model, resolving both the horizontal and vertical structure of the unsteady nearshore flow. To evaluate potential transport of larvae through the surf zone, a biological module describing the spatial distribution of the larvae will be coupled to the hydrodynamic module to predict the pathways of the larvae and compare with observations. Intensive sampling will help provide insight into the actual processes transporting cyprids from the inner shelf, through the surf zone, and to the intertidal zone. During each summer, weekly barnacle recruitment and daily cyprid settlement will be measured for two months to settlement plates at reflective and dissipative beaches in central California and southern Oregon. Population densities at many beaches along the West Coast will be surveyed each year to determine if a latitudinal gradient in wave energy is correlated with adult barnacle population densities.

Because the fundamentals of surfzone dynamics are universal, results of this research will be broadly applicable not only along the West Coast, but worldwide. This project will have significant impacts on education and public outreach. It will support three graduate students and nine undergraduate students and will create new research opportunities for students of diverse backgrounds from three undergraduate institutions, local high schools and the public. The research will be included in the curriculum of intensive hands-on courses, and undergraduates will participate in the research while learning how a real-world research project addresses fundamental questions. Both a website that highlights findings and an interactive display for visitors to the Bodega Marine Laboratory will be developed. A model coupling nearshore hydrodynamics and onshore transport across the surf zone will be made available to the community to stimulate research into this emerging research topic.

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0926923