

CTD data from Bongo plankton net tows from RV Bob and Betty Beyster and RV Shearwater cruises in the Southern California Bight from fall 2020 to spring 2021.

Website: <https://www.bco-dmo.org/dataset/871003>

Data Type: Cruise Results

Version: 1

Version Date: 2022-03-10

Project

» [RAPID: Understanding the unprecedented anchovy response to warm-water conditions in the California Current](#) (RAPID Anchovy Response)

Contributors	Affiliation	Role
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Abstract

Up-casts temperature, salinity and density data from CTD mounted above Bongo net frame sampled aboard RV Bob and Betty Beyster and RV Shearwater cruises in the Southern California Bight from fall 2020 to spring 2021.

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Coverage

Spatial Extent: N:35.0883 E:-117.279 S:32.6789 W:-120.917

Temporal Extent: 2020-10-13 - 2021-04-15

Methods & Sampling

This study is carried out within the temperate to subtropical Southern California Bight and surrounding coastal areas between 32° and 35° N, and 117° and 120° W. Specific locations sampled fall within the CalCOFI and CCE-LTER programs quarterly survey grid from lines 76.7 to 93.4 and stations 26 to 55.

Sampling stations were sampled ~2-7 days after the California Cooperative Oceanic Fisheries Investigations (CalCOFI) & California Current Ecosystem Long-term Ecological Research Program (CCE-LTER) Fall 2020 and Winter 2021 surveys had sampled the same stations. The CalCOFI & CCE-LTER Spring 2021 survey was delayed by ~2 weeks relative to this project.

Each cruise no is composed of one or more day trips using one of two research vessels (RV Bob & Betty Beyster or RV Shearwater). The two-three letters indicate the research vessel, the four digits indicates YYYY.

CTD was attached to a wire and positioned just above a 71cm diameter dual Bongo plankton net system to record depth and physical variables during horizontal net tows at a ship speed of 1.5-2.5 knots down to 13-62 m depth. The CTD was not allowed to acclimate before deployment and the positioning of the CTD caused substantial interference from water mixing and air bubble release from the nets during the down-cast. Therefore, only the up-cast is reported. Following initial data processing (see Data Processing) up-cast Depth ~ Temperature, Salinity, Density profiles were inspected and went through two series of point checking where outlier values were manually removed.

The SonTek CastAway-CTD model CC1403002 was used. Temperature and conductivity sensor calibration date 4/3/2015. Pressure sensor calibration date 3/13/2015.

Data Processing Description

CastAway-CTD software version 1.3 (firmware version v026_r2818) was used for data acquisition and processing using default correction algorithms and binned over 0.3 decibar changes. For more information on data processing please see manual at: <https://www.sontek.com/castaway-ctd> (not open source).

The CTD data report contains some gaps in the temperature, salinity and density data. These gaps result from the removal of outliers.

BCO-DMO Processing Notes:

* Added ISO_DateTime_UTC and ISO_DateTime_PDT columns (ISO formatted DateTimes) by merging the provided date and times of the specific time zones.

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Data Files

File
ctd_data.csv (Comma Separated Values (.csv), 1.22 MB) MD5:bee6aa7bcb462112697d25a86d6716c7 Primary data file for dataset ID 871003

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Supplemental Files

File
CalCOFI75_Station_pattern filename: CalCOFI75_Station_pattern.png (Portable Network Graphics (.png), 101.04 KB) MD5:409b2652fe984fda4848892912878432 Supplemental documentation to dataset 871003. This .png shows the locations of the stations of the CALCOFI75 cruise.

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Related Datasets

IsRelatedTo

Semmens, B. X., Landry, M. R., Swalethorp, R. (2023) **Abundances of larval Northern Anchovy (*Engraulis mordax*), Rockfish (*Sebastes spp.*, and other/unidentified larvae from Bongo plankton net tows conducted in the subtropical Southern California Bight from January to April 2021.** Biological and

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Parameters

Parameter	Description	Units
Cruise	Cruise identifier	unitless
Date.UTC	Sampling date in UTC	unitless
Time.UTC	Sampling time in UTC	unitless
Date.PDT	Sampling date in PDT (local)	unitless
Time.PDT	Sampling time in PDT (local)	unitless
Line	CalCOFI line	unitless
St	CalCOFI station	unitless
Lat	Latitude	decimal degrees
Long	Longitude	decimal degrees
Pres	Water pressure	decibar
Depth	Water depth	meters
Temp	Water temperature	degrees Celsius
Sal	Water salinity	practical salinity scale
Dens	Water density	kilograms per cubic meter
ISO_DateTime.UTC	Sampling date and time (UTC) in ISO 8601 format yyyy-mm-ddTHH:MM:SSZ	unitless
ISO_DateTime.PDT	Sampling date and time (PDT, Pacific Daylight Time) in ISO 8601 format yyyy-mm-ddTHH:MM:SS	unitless

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Bongo Net
Generic Instrument Description	A Bongo Net consists of paired plankton nets, typically with a 60 cm diameter mouth opening and varying mesh sizes, 10 to 1000 micron. The Bongo Frame was designed by the National Marine Fisheries Service for use in the MARMAP program. It consists of two cylindrical collars connected with a yoke so that replicate samples are collected at the same time. Variations in models are designed for either vertical hauls (OI-2500 = NMFS Paironet-Style, MARMAP Bongo, CalVET) or both oblique and vertical hauls (Aquatic Research). The OI-1200 has an opening and closing mechanism that allows discrete "known-depth" sampling. This model is large enough to filter water at the rate of 47.5 m ³ /minute when towing at a speed of two knots. More information: Ocean Instruments, Aquatic Research, Sea-Gear

Dataset-specific Instrument Name	SonTek CastAway-CTD model CC1403002
Generic Instrument Name	SonTek CastAway-CTD
Generic Instrument Description	The Sontek CastAway-CTD (manufactured by Xylem) is a handheld castable instrument that provides instantaneous profiles of temperature, salinity, and sound speed. Each cast is referenced with both time and location using its built-in GPS receiver. The CastAway software displays profiles of the casts in addition to mapping the locations of the data collection points. The CastAway-CTD has a 5 Hz response and sampling rate, accurate to 0.1 (PSS-78), 0.05° Celsius. Conductivity range is 0 to 100,000 µS/cm. Temperature range is -5° to 45° Celsius. Pressure range is 0 to 100 decibars. Further specs and information can be found on the manufacturer's website: https://www.xylem.com/en-us/brands/wtw/wtw-products/castaway-ctd/

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Deployments

BBB2010

Website	https://www.bco-dmo.org/deployment/871648
Platform	R/V Bob and Betty Beyster
Start Date	2020-10-13
End Date	2020-10-25

BBB2101

Website	https://www.bco-dmo.org/deployment/871649
Platform	R/V Bob and Betty Beyster
Start Date	2021-01-23
End Date	2021-01-24

BBB2102

Website	https://www.bco-dmo.org/deployment/871650
Platform	R/V Bob and Betty Beyster
Start Date	2021-02-01
End Date	2021-02-01

BBB2104

Website	https://www.bco-dmo.org/deployment/871651
Platform	R/V Bob and Betty Beyster
Start Date	2021-04-06
End Date	2021-04-07

SW2104

Website	https://www.bco-dmo.org/deployment/871652
Platform	R/V Shearwater
Start Date	2021-04-13
End Date	2021-04-15

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Project Information

RAPID: Understanding the unprecedented anchovy response to warm-water conditions in the California Current (RAPID Anchovy Response)

Coverage: Southern California Bight and surrounding coastal areas between 32° and 35° N, and 117° and 120° W

NSF Award Abstract:

Like many species of small pelagic marine fish, recruitment and productivity of Northern Anchovy fluctuate by orders of magnitude among years. When abundant, the anchovy support a wide range of marine species, including marine mammals, seabirds and a diverse group of marine fishes. Anchovy, which previously thrived during periods of cool-water temperatures and strong coastal upwelling, are currently booming with abundances far in excess of any historical record, even though the California Current Ecosystem is experiencing an unprecedented marine heat wave. This unexpected occurrence challenges the most basic understanding of the mechanisms driving population dynamics in the species. This project is investigating the effects of trophic relationships on population productivity by capitalizing on the immediate research opportunity afforded by the novel, yet ephemeral, state of a local marine heat wave. Findings from the work are being used to develop a mechanistic model of coastal pelagic fish population dynamics generally, and anchovy dynamics in particular. Funded field and lab work are supporting opportunities for undergraduate training and research, and are generating open-access data that serve the research and teaching/training communities into the future.

This RAPID project augments the scheduled Fall research cruises jointly run by the California Cooperative Oceanic Fisheries Investigation and the California Current Ecosystem Long-Term Ecological Research programs. Together, these programs conduct regional oceanographic surveys that include anchovy spawning grounds and larval nursery areas. The RAPID-augmented sampling is designed to test the emerging hypothesis that anchovy populations are trophodynamically mediated at the larval stage, whereby high recruitment results from increased trophic transfer efficiency from the base of the food web. Larval diets and prey selection analyses are being paired with amino acid compound-specific isotope analysis ($\delta^{15}\text{N}$) of the larvae and prey field to generate detailed information on larval trophic ecology. Larval diets and plankton community structure are being related to available data on upwelling and productivity to assess environmental and biological drivers to trophic transfer efficiency. Collectively, these analyses are revealing how food chain length is regulated at the larval level through prey selection, at the prey level through community composition, and at the base of the food chain via coastal upwelling and primary production. Furthermore, this project is establishing whether the current trophic level of anchovy larvae is equal to that of historic population booms and if this is the result of favorable feeding conditions throughout their habitat. Findings from the study are generating a mechanistic understanding of the trophic underpinnings of small pelagic fish population productivity in coastal upwelling systems.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

Location Description:

This study is carried out within the temperate to subtropical Southern California Bight and surrounding coastal areas between 32° and 35° N, and 117° and 120° W. Specific locations sampled fall within the CalCOFI and CCE-LTER programs quarterly survey grid from lines 76.7 to 93.4 and stations 26 to 55.

Project Affiliations:

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-2053719

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