Survey of fish species, number and size from transects near Carmel and Monterey Bays, CA, 1999-2015 (Larval Dispersal in Kelp Rockfish project)

Website: https://www.bco-dmo.org/dataset/684484
Data Type: Other Field Results
Version: 1
Version Date: 2017-03-17

Project
» Integrative evaluation of larval dispersal and delivery in kelp rockfish using inter-generational genetic tagging, demography and oceanography (Larval Dispersal in Kelp Rockfish)

Program
» Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO)

Contributors	Affiliation	Role
Carr, Mark	University of California-Santa Cruz (UCSC)	Principal Investigator
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Abstract
This dataset contains fish survey component of the project. Fish sampling consists of recording the number and size of all non-cryptic fishes on "transects". Ancillary data include the GPS location of each area, underwater visibility on the bottom, water temperature, and sea state (surge).

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Coverage

Spatial Extent: **N**:36.6405 **E**:-121.8946 **S**:36.3977 **W**:-121.9825
Temporal Extent: 1999-09-07 - 2015-10-01

Methods & Sampling

Sampling consists of visual surveys of the number and size of all non-cryptic fishes by SCUBA divers. Surveys are conducted at sites distributed throughout the study region (Carmel Bay and southern Monterey Bay). Each sample site is divided into four "zones" (by depth - 20m, 15m, 10m, 5m - or from offshore to inshore at sites with little depth variation) to assure that samples are distributed across the face of a reef from inshore to offshore. Where possible, fish are counted on 12 transects per site (defined as a fixed stretch of coastline, occupying approximately 500m). Each "transect" includes a 2m x 2m x 30m "bottom" transect and a "mid-

water" transect. Sampling is conducted by a pair of divers surveying the bottom and mid-water transects simultaneously. Surveys are designed to measure year-to-year site-wide variability in population structure and density. Density and size-structure estimates derived from these surveys are multiplied by habitat area measurements to estimate species abundance and, using published size-fecundity relationships, generate estimates of larval production.

Data Processing Description

Data are entered by hand and double checked for accuracy. Dataset is checked for valid entries and completeness.

BCO-DMO Processing Notes:
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- blank values replaced with no data value 'nd'
- added latitude and longitude data from dataset "Site Code Key"

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Data Files

File
fish_surveys_latlon.csv (Comma Separated Values (.csv), 6.83 MB) MD5:d6b2d81fff0e3e765109ca43b8ecc6f1 Primary data file for dataset ID 684484

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Related Publications

Baetscher, D. S., Anderson, E. C., Gilbert-Horvath, E. A., Malone, D. P., Saarman, E. T., Carr, M. H., & Garza, J. C. (2019). Dispersal of a nearshore marine fish connects marine reserves and adjacent fished areas along an open coast. Molecular Ecology, 28(7), 1611–1623. doi:10.1111/mec.15044
Results

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Related Datasets

IsSupplementedBy

Carr, M., Edwards, C., Garza, J. C. (2021) **Fish species code key for data collected along the shore of Monterey and Carmel from 1999-2015 (Larval Dispersal in Kelp Rockfish project).** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2017-03-17 doi:10.26008/1912/bco-dmo.684512.1 [view at BCO-DMO]

Carr, M., Tinker, T. (2021) **Site code key for kelp forest community data collected along the coast of Monterey and Carmel, CA from 1999-2015 (Kelp Forest Resilience project).** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2017-08-16 doi:10.26008/1912/bco-dmo.661175.1 [view at BCO-DMO]

IsRelatedTo

Carr, M., Edwards, C., Garza, J. C. (2021) **Species, sample date, location individual size and sample disposition of adult fish surveyed near Carmel and Monterey Bays, CA, 2013-2016 (Larval Dispersal in Kelp Rockfish project).** Biological and Chemical Oceanography Data Management Office (BCO-

DMO). (Version 2) Version Date 2017-08-15 doi:10.26008/1912/bco-dmo.684426.2 [view at BCO-DMO]

Carr, M., Edwards, C., Garza, J. C. (2021) **Species, sample date, location individual size and sample disposition of juvenile fish surveyed near Carmel and Monterey Bays, CA, 2013-2016 (Larval Dispersal in Kelp Rockfish project).** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2017-03-17 doi:10.26008/1912/bco-dmo.684453.1 [view at BCO-DMO]

Carr, M., Garza, J. C., Edwards, C. (2018) **Rockfish microhaplotype sequence accessions from samples near Carmel and Monterey Bays, CA, 2013-2016 (Larval Dispersal in Kelp Rockfish project).** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2018-02-27 http://lod.bco-dmo.org/id/dataset/684944 [view at BCO-DMO]

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Parameters

Parameter	Description	Units
year	The year that the survey was done in local time; YYYY format	year
month	The month that the survey was done in local time; M or MM format.	month as numeral
day	The day that the survey was done in local time; D or DD format	day of month
site	The unique site code where the survey was performed. (as defined in the site information table) This site code refers to a specific GPS location defined by a bounding box and is likely associated with a placename (i.e there may be multiple sitecodes at the 'Jalama Beach' placename).	unitless
side	A division of the site into two or three areas; referred to as sides. Sides may be East (E), West (W), South (S), North (N), or CEN (central)	unitless
zone	A division of the side into 2 or 4 categories representing onshore-offshore stratification or targeted bottom depths for transects. Zones may be INNER, INMID, OUTMID and OUTER.	unitless
level	Letter code for the relative depth of the sample (BOT, MID, CAN)	unitless
transect	A number representing one of the parallel transects through the site area along which are located the sampling segments.	transect
classcode	The unique taxonomic or functional classification code that is being counted; as defined in the PISCO classification table. Refers to a Genus and species. See 'species codes' dataset for definitions.	unitless
count	The number of individuals of a given species of a given size; indicated by the class code.	individuals

fish_tl	The total length of an individual or group of individuals (of the same length) OR the average total length for a group of fish where a range in lengths is specified (rounded to the nearest cm)	cm
min_tl	The minimum size of the sampled class; used only when a range of sizes was recorded for a group of individuals of a species.	cm
max_tl	The maximum size of the sampled class; used only when a range of sizes was recorded for a group of individuals of a species.	cm
observer	The diver taking these samples.	unitless
depth	Average depth of the transect estimated by the diver. Each level is measured.	m
vis	The diver estimation of horizontal visibility on each transect. Measured by reeling in the tape and noting the distance at which the end of the tape can first be seen.	m
surge	diver estimation of magnitude of horizontal displacement on each transect; recorded at depth. (L)ow, (M)edium, (H)igh.	unitless
lat_WGS84	latitude derived from WGS84 system; north is positive	decimal degrees
lon_WGS84	longitude derived from WGS84 system; east is positive	decimal degrees

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Deployments

Carr_1999

Website	https://www.bco-dmo.org/deployment/661099
Platform	Long Marine Lab UCSC
Start Date	1999-09-22
End Date	2015-07-24
Description	Sites of Kelp Forest Resilience project. Nearshore waters of southern Monterey Bay and Carmel Bay, California. 36 N, 121 W.

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Project Information

Integrative evaluation of larval dispersal and delivery in kelp rockfish using inter-generational genetic tagging, demography and oceanography (Larval Dispersal in Kelp Rockfish)

Website: http://research.pbsci.ucsc.edu/eeb/rclab/kelp-rockfish-pbt-project/

Coverage: Monterey Bay and vicinity

Description from NSF award abstract:
The spatial structure and dynamics of coastal marine fish populations are strongly influenced by the transport and recruitment of larvae. However, the scale and patterns of larval dispersal are among the most difficult demographic parameters to quantify in marine systems, due to the inability to tag and track the movement of larvae. In particular, the extent of local retention of larvae versus regional dispersal to other locations and populations is currently a hotly debated topic in the field of marine ecology and has profound implications for the design and effectiveness of Marine Protected Areas (MPAs). The research will identify patterns of larval dispersal and use those patterns to test predictions of dispersal generated by state-of-the-art circulation models.

The PI team brings together ecologists, geneticists, statisticians, and oceanographers with expertise in population demography and field sampling, mark/recapture data from genetic tags, and empirical and model-based evaluation of oceanographic processes to answer the following questions:
1. Do observed patterns of dispersal and connectivity of larval kelp rockfish correspond to patterns predicted by high spatial resolution regional ocean circulation models? Model predictions will be tested empirically using larval settlement samples. Parentage analysis will be used to verify the occurrence of larvae derived from genetically tagged source populations.
2. Is there evidence for local retention of larval kelp rockfish within the study area? To test the hypothesis that local retention of juvenile kelp rockfish from source populations is greater than expected by existing larval transport models, the PIs will compare the proportion of recruits that are genetically identified to have been produced from within three focal sites with the proportion of larval production that was tagged in those sites.
3. Is the relative recruitment of recently settled kelp rockfish to focal sites in the study region proportionate to the relative larval production of those focal sites? The PIs will compare the proportion of tagged recruits with the proportion of larval production generated from tagged adults at varying spatial scales. They will use goodness of fit models to compare expected and observed connectivity matrices under varying hypotheses of larval dispersal. Alternatively, if the relative contribution of focal sites to larval replenishment of themselves, one another, and more distant populations is disproportionate to their relative production, can this discrepancy be explained by oceanographic processes that could facilitate particular trajectories of larval dispersal?

To determine if differences in self recruitment and connectivity can be attributed to local oceanographic features, the PIs will examine spatial and temporal correlations between these features and the spatial distribution and timing of recruitment.

Related websites:
http://piscoweb.org
http://research.pbsci.ucsc.edu/eeb/rclab/kelp-rockfish-pbt-project/ (broken link)
http://rockfish.ucsc.edu/
http://oceanmodeling.ucsc.edu

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Program Information

Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO)

Website: http://www.piscoweb.org/

Coverage: West coast of North America from Mexico to Alaska

The Partnership for Interdisciplinary Studies of Coastal Oceans is a long-term ecosystem research and monitoring program established with the goals of:

- understanding dynamics of the coastal ocean ecosystem along the U.S. west coast
- sharing that knowledge so ocean managers and policy makers can make science based decisions regarding coastal and marine stewardship

- producing a new generation of scientists trained in interdisciplinary collaborative approaches

Over the last 10 years, PISCO has successfully built a unique research program that combines complementary disciplines to answer critical environmental questions and inform management and policy. Activities are conducted at the latitudinal scale of the California Current Large Marine Ecosystem along the west coast of North America, but anchored around the dynamics of coastal, hardbottom habitats and the oceanography of the nearshore ocean – among the most productive and diverse components of this ecosystem. The program integrates studies of changes in the ocean environment through ecological monitoring and experiments. Scientists examine the causes and consequences of ecosystem changes over spatial scales that are the most relevant to marine species and management, but largely unstudied elsewhere.

Findings are linked to solutions through a growing portfolio of tools for policy and management decisions. The time from scientific discovery to policy change is greatly reduced by coordinated, efficient links between scientists and key decision makers.

Core elements of PISCO are:

- Interdisciplinary ecosystem science
- Data archiving and sharing
- Outreach to public and decision-making user groups
- Interdisciplinary training
- Coordination of distributed research team

Established in 1999 with funding from The David and Lucile Packard Foundation, PISCO is led by scientists from core campuses Oregon State University (OSU); Stanford University's Hopkins Marine Station; University of California, Santa Cruz (UCSC); and University of California, Santa Barbara (UCSB). Collaborators from other institutions also contribute to leadership and development of PISCO programs. As of 2005, core PISCO activities are funded by collaborative grants from The David and Lucile Packard Foundation and the Gordon and Betty Moore Foundation. Core support, along with additional funding from diverse public and private sources, make this unique partnership possible.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1260693

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