Edge-lists for all US west coast port-group participation networks and for the entire coast from 2009-2010 for US California Current Large Marine Ecosystem (CCLME)

Website: https://www.bco-dmo.org/dataset/748875
Data Type: Other Field Results
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Project
» Adaptations of fish and fishing communities to rapid climate change (CC Fishery Adaptations)

Contributors	Affiliation	Role
Fuller, Emma	Princeton University	Principal Investigator, Contact
York, Amber D.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
The dataset includes edge-lists for all US west coast port-group participation networks and for the entire coast from 2009-2010 for US California Current Large Marine Ecosystem (CCLME).

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Coverage

Spatial Extent: **N**:48.5061 **E**:-117.1156 **S**:30.542 **W**:-124.580301
Temporal Extent: 2009 - 2010

Dataset Description

The dataset includes edge-lists for all US west coast port-group participation networks and for the entire coast from 2009-2010 for US California Current Large Marine Ecosystem (CCLME).

These data were published in Fuller et al. (2017).

Methods & Sampling

In order to quantify and explore fisheries connectivity in the US California Current Large Marine Ecosystem (CCLME), we first synthesized fisheries landings ticket data for the entire region, from which we defined fisheries and subsequently fisheries connectivity. We analyzed fisheries connectivity using network theoretic metrics applied at the port-group level (i.e. clusters of geographically proximate ports), and relating them to the social vulnerability framework (Adger, 2006), with a focus on sensitivity to change and adaptive capacity. The port-group spatial scale was chosen so as to best represent fisheries connectivity in terms of coastal fishing communities. However, we also calculated fisheries connectivity at larger spatial scales, specifically at the scale of the whole CCLME. All our calculations were performed for a short period (2009–2010); 2 years without El Nino or La Nina conditions, and without major management changes) and in the discussion, we

mention the importance of collecting longer time-series data, from which changes in fisheries connectivity could be observed.

Port-groups were defined as:
NPS (Bellingham Bay, Port Townsend, Port Angeles, Anacortes, Sequim, La Conner, Neah Bay, Friday Harbor, Blaine, other north Puget Sound ports)
SPS (Seattle, Olympia, Everett, Shelton, Tacoma)
CWA (Westport, La Push, Willapa Bay, Grays Harbor, other Washington coastal ports)
CLW (Ilwaco/Chinook, other Columbia River ports)
CLO (Astoria, Cannon Beach, Seaside-Gearhart)
TLA (Tillamook/Garibaldi, Pacific City, Netarts Bay, Nehalem Bay)
NPA (Newport, Depoe Bay, Waldport, Siletz Bay)
CBA (Winchester Bay, Charleston (Coos Bay), Bandon, Florence)
BRA (Brookings, Port Orford, Gold Beach, Crescent City, other Del Norte county ports)
ERA (Trinidad, Eureka, Fields Landing, other Humboldt county ports)
BGA (Fort Bragg, Albion, Point Arena, other Mendocino county ports)
BDA (Bodga Bay, Bolinas, Point Reyes, Tomales Bay, other Sonoma and Marin county ports)
SFA (Princeton/Half Moon Bay, San Francisco, Berkley, Richmond, Oakland, Sausalito, Alameda, other SF Bay and San Mateo county ports)
MNA (Santa Cruz, Moss Landing, Moneterey, other Santa Crus and Monterey county ports)
MRA (Morro Bay, Avila, other San Luis Obispo county ports)
SBA Santa Barbara, Port Hueneme, Oxnard, Ventura, other Santa Barbara Ventura county ports)
LAA (Long Beach, San Pedro, Dana Point, Terminal Island, Newport Beach, Wilmington, other LA and Orange county ports)
SDA (Oceanside, San Diego, other San Diego county ports)

Data Processing Description

Data were processed using R version 3.3.0.

BCO-DMO Data Manager Processing notes:
* added lat/lon bounds to metadata from marine region MRGID 25587 (United States part of the North Pacific Ocean) http://www.marineregions.org/gazetteer.php?p=details&id=25587

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Data Files

File	
participation_networks_all.csv	(Comma Separated Values (.csv), 9.04 KB) MD5:bb6171d7541bd7c958a4145f44d7eebb
Primary data file for dataset ID 748875	

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Related Publications

Adger, W. N. (2006). Vulnerability. Global Environmental Change, 16(3), 268–281. doi:10.1016/j.gloenvcha.2006.02.006
Methods

Fuller, E. C., Samhouri, J. F., Stoll, J. S., Levin, S. A., & Watson, J. R. (2017). Characterizing fisheries connectivity in marine social–ecological systems. ICES Journal of Marine Science, 74(8), 2087–2096. doi:10.1093/icesjms/fsx128
Results

Lavigne H, Gattuso JP (2016) Seacarb: seawater carbonate chemistry with R, R package version 3.3.0. http://CRAN.R-project.org/package=seacarb

Software

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Parameters

Parameter	Description	Units
V1	node 1, a metier code	unitless
V2	node 2, a metier code	unitless
weight	The fisheries connectivity between the two fisheries (see paper for definition details)	unitless
port_group	The port group code for the network described with CCLME = to the entire US west coast	unitless

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Project Information

Adaptations of fish and fishing communities to rapid climate change (CC Fishery Adaptations)

Coverage: Northeast US Continental Shelf Large Marine Ecosystem

Description from NSF award abstract:
Climate change presents a profound challenge to the sustainability of coastal systems. Most research has overlooked the important coupling between human responses to climate effects and the cumulative impacts of these responses on ecosystems. Fisheries are a prime example of this feedback: climate changes cause shifts in species distributions and abundances, and fisheries adapt to these shifts. However, changes in the location and intensity of fishing also have major ecosystem impacts. This project's goal is to understand how climate and fishing interact to affect the long-term sustainability of marine populations and the ecosystem services they support. In addition, the project will explore how to design fisheries management and other institutions that are robust to climate-driven shifts in species distributions. The project focuses on fisheries for summer flounder and hake on the northeast U.S. continental shelf, which target some of the most rapidly shifting species in North America. By focusing on factors affecting the adaptation of fish, fisheries, fishing communities, and management institutions to the impacts of climate change, this project will have direct application to coastal sustainability. The project involves close collaboration with the National Oceanic and Atmospheric Administration, and researchers will conduct regular presentations for and maintain frequent dialogue with the Mid-Atlantic and New England Fisheries Management Councils in charge of the summer flounder and hake fisheries. To enhance undergraduate education, project participants will design a new online laboratory investigation to explore the impacts of climate change on fisheries, complete with visualization tools that allow students to explore inquiry-driven problems and that highlight the benefits of teaching with authentic data. This project is supported as part of the National Science Foundation's Coastal Science, Engineering, and Education for Sustainability program - Coastal SEES.

The project will address three questions:
1) How do the interacting impacts of fishing and climate change affect the persistence, abundance, and distribution of marine fishes?
2) How do fishers and fishing communities adapt to species range shifts and related changes in abundance? and
3) Which institutions create incentives that sustain or maximize the value of natural capital and comprehensive social wealth in the face of rapid climate change?

An interdisciplinary team of scientists will use dynamic range and statistical models with four decades of geo-referenced data on fisheries catch and fish biogeography to determine how fish populations are affected by the cumulative impacts of fishing, climate, and changing species interactions. The group will then use comprehensive information on changes in fisher behavior to understand how fishers respond to changes in species distribution and abundance. Interviews will explore the social, regulatory, and economic factors that shape these strategies. Finally, a bioeconomic model for summer flounder and hake fisheries will examine how spatial distribution of regulatory authority, social feedbacks within human communities, and uncertainty affect society's ability to maintain natural and social capital.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1426746
National Science Foundation (NSF)	GEO-1211972

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