# Intertidal community data from California and Baja California, Mexico across tidal elevations (2022-23)

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**Project**
» Predicting impacts of coastal species redistribution in a changing climate (CoastalRedistImpacts)


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**Abstract**
This dataset includes information on species found in the intertidal zone on a rocky shoreline during community surveys conducted at 23 sites along the coast of California and Baja California, Mexico in 2022 and 2023.

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### Methods & Sampling

We conducted field surveys at 23 sites across California, USA and Baja California, Mexico between April 2022 and October 2023. Sites in northern California and Mexico were surveyed once per year in the spring (total n = 2 surveys per site), and sites in southern California were surveyed in the spring and fall each year (total n = 4 surveys per site). At each site, we laid a 25 m horizontal transect at the top of the intertidal zone (i.e., parallel to the water at the top of the barnacle zone) and 5 vertical transects (perpendicular and extending toward the waterline) at random locations along the horizontal transect. Along each vertical transect, we placed 0.25 m × 0.25 m (0.0625 $m^2$) quadrats every 0.25 m drop in vertical elevation. Within each quadrat, we conducted community diversity surveys where we assessed the relative abundance of all species, both mobile and sessile, as percent cover. Tidal elevation was determined using an Apache Tools Mesa SL101 laser level with reference to tidal predictions from the National Oceanic and Atmospheric Administration.

### Problem Description

Gaps in sampling are most likely due to: (1) tidal and weather conditions, or that allowed us to survey plots to a lower elevation during some sampling events and not others, and/or (2) inundation of areas by sand, that allowed us to survey plots during some sampling events and not others.

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## Parameters

*Parameters for this dataset have not yet been identified*

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## Project Information

**Predicting impacts of coastal species redistribution in a changing climate (CoastalRedistImpacts)**

*NSF Award Abstract:*
This project will improve our ability to anticipate the impacts of shifts in the geographic range of coastal species in a changing climate. Although range shifts may be necessary for some species to avoid extinction as the climate warms, the arrival of new ones to an ecosystem can also lead to population declines and loss of biodiversity. The investigator is developing approaches to predict the impacts of range shifts along Pacific shorelines using techniques that have been previously validated for risk assessments for invasive species. The research objectives of this study are integrated with educational activities: engagement of undergraduate and graduate students in data collection and analysis and implementation of a hierarchical mentoring program to serve English Language Learners within the investigator's Minority Serving Institution. The investigator is also partnering with outreach organizations in the U.S. and Mexico to educate K-12 students and multiple stakeholder groups about climate-driven range shifts and tools for predicting outcomes of redistribution, which can assist practitioners in creating management plans and policies.

This study is developing a framework for understanding the impacts of marine species redistribution with a focus on poleward-moving carnivorous whelk species in rocky shorelines from Northern California to Baja, Mexico. Project goals are to 1) quantify the impacts of shifting species on populations and communities in the expanded range; 2) assess whether impacts of shifting species differ between their native and expanded ranges; and 3) predict future impacts under climate warming. The investigator is addressing fundamental questions in community ecology about the degree to which species interactions are density- and context-dependent. She is combining observational and experimental approaches with a broader data synthesis effort to test whether the impacts of species redistribution can be predicted by key indicators of invasion impacts: abundance, trophic level, and impacts in the native range. Empirical data combined with paired demographic and distribution modeling will be used to project future impacts across the expanded ranges of these coastal marine species.

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