Portfolio Substitution between Coastal Pelagic Species under Shifting Target Species Distributions and Policy Constraints

Felipe J. Quezada
UC Santa Cruz
NOAA Southwest Fisheries Science Center

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Co-authors: Desiree Tommasi (UCSC & NOAA SWFSC), Stephen Stohs (NOAA SWFSC), Isaac Kaplan (NOAA NWFSC), Jonathan Sweeney (NOAA PIFSC), Barbara Muhling (UCSC & NOAA SWFSC)

Research Question

How will climate change impact fishing communities?

- Specific questions:
  - How changes in species distribution and regulations (i.e. closures) will affect landings by ports and vessel participation in the *Coastal Pelagic Species (CPS)* fishery?

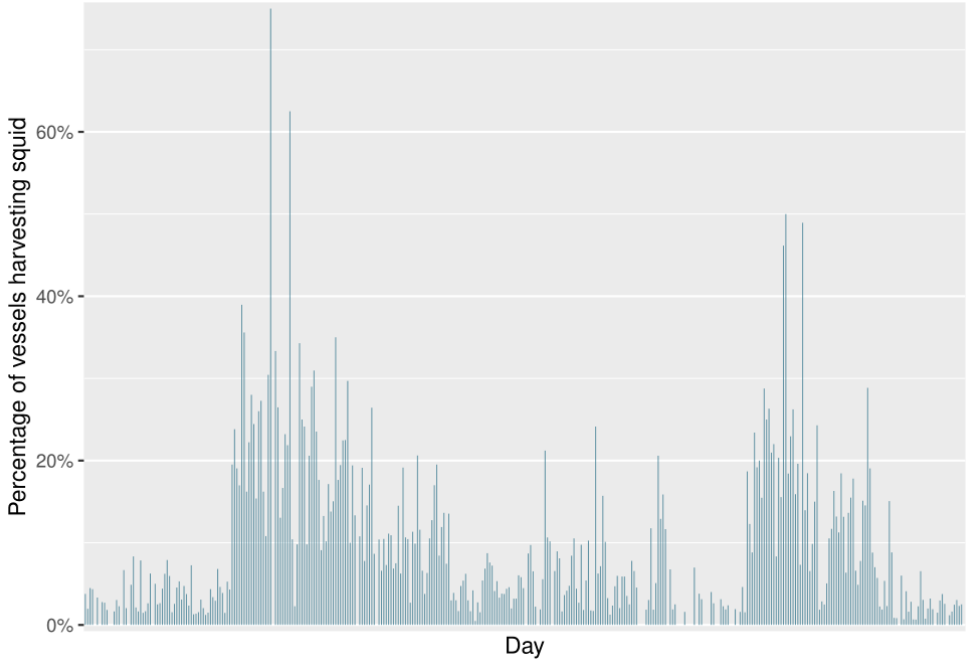
- Contribution:
  - *Previous works has focused generally on one species*
  - *Important to study other species and their interactions in fishers' portfolios to assess climate impacts on the CPS fleet.*
  - *The presence of other species might impact targeting decisions.*

Substitution between species

Variables:

- # of vessels landing sardine
- # of vessels landing squid (c/ landing sardine)
- % of vessels landing squid (c/ landings sardine)

Switching behavior between squid and sardine

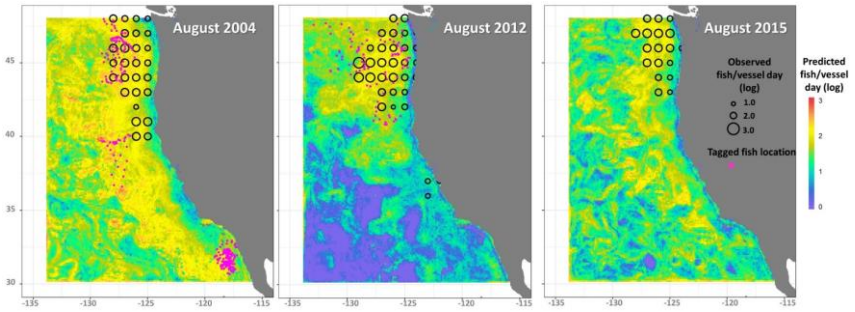


Methodology

- Two approaches
  - Landings model by vessels
    - Separate equation for each species: Squid, Sardine, Anchovy.
    - Results using public aggregate data, but working on individual data.
  - Participation model (no results yet).

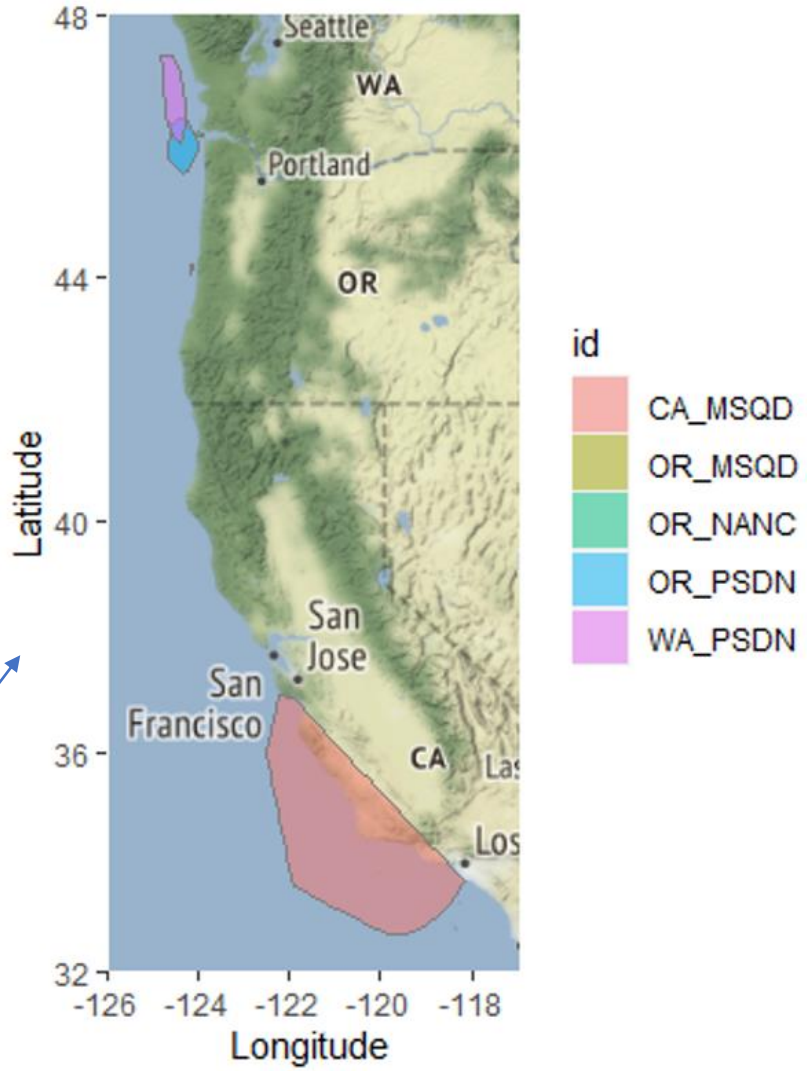
- Main data
  - Fish tickets from The Pacific Fisheries Information Network (PacFIN) from 1980-2020
  - Current and projected species distribution from SDMs over the **1997-2018** period.
  - Logbooks from CFWD, OFWD and WFWD

SDMs link to Landings



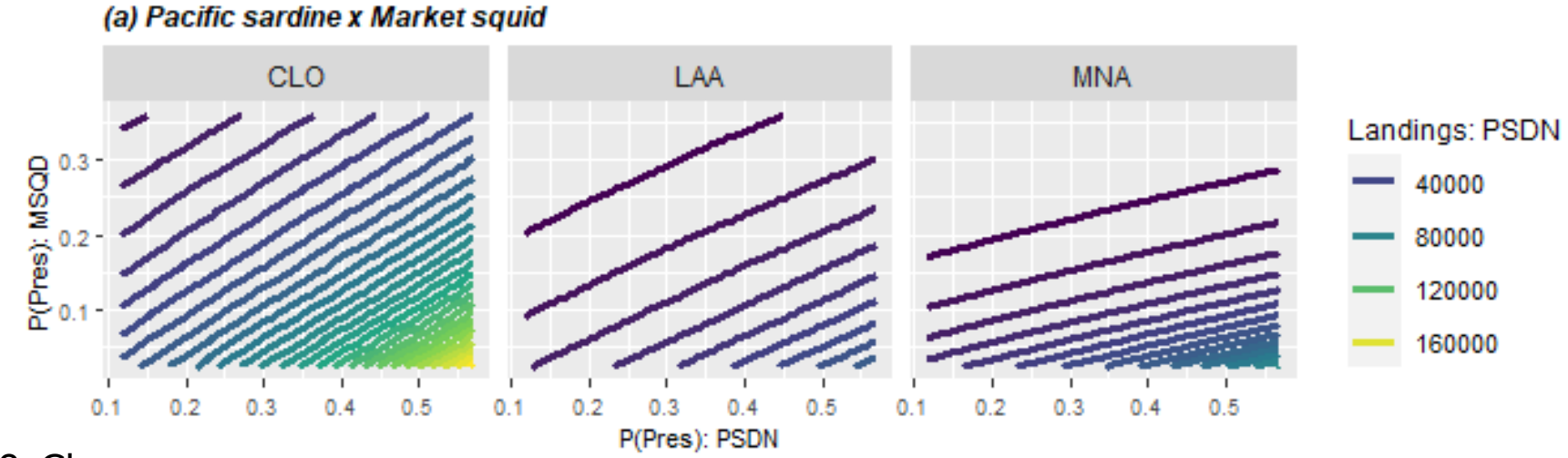
- SDMs to model distribution of sardine, anchovy, market squid, chub and jack mackerel, herring (Muhling et al. 2019, 2020, Brodie et al. 2021)

- SDMs are at the 0.1 degree of resolution.
- We use distance to port to construct our variable of abundance
  - Fishery operates close to shore
  - Mostly undergoing daily trips
  - Data: Logbooks

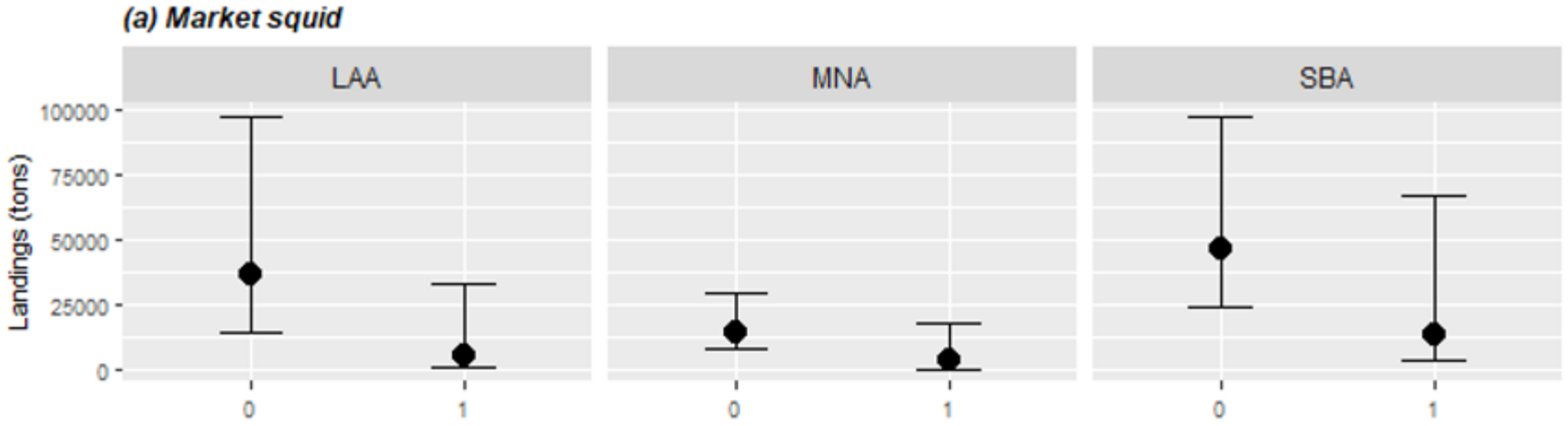


Results: Interaction and closure

1. Interaction between species



2. Closure



Conclusions and Future Work

Preliminary conclusions:

1. Slightly positive effect of presence on landings.
2. Substitution between market squid and Pacific sardine through species abundance.
3. Sardine closure reduce squid landings.

Future Work

- Incorporate individual vessel-level data.
- Estimate a discrete choice model for participation.
- Forecast landings & participation using SDM projections (2050-2099?).

Thanks for your attention!

UC SANTA CRUZ

CAFA
Climate and Fisheries Adaptation

Felipe J. Quezada

Postdoctoral Scholar

UC Santa Cruz & NOAA-SWFSC

felipequezada.com

felipe.quezada@noaa.gov