



NOAA
FISHERIES

U.S. West Coast fishing communities and climate vulnerability in an ecosystem-based management context

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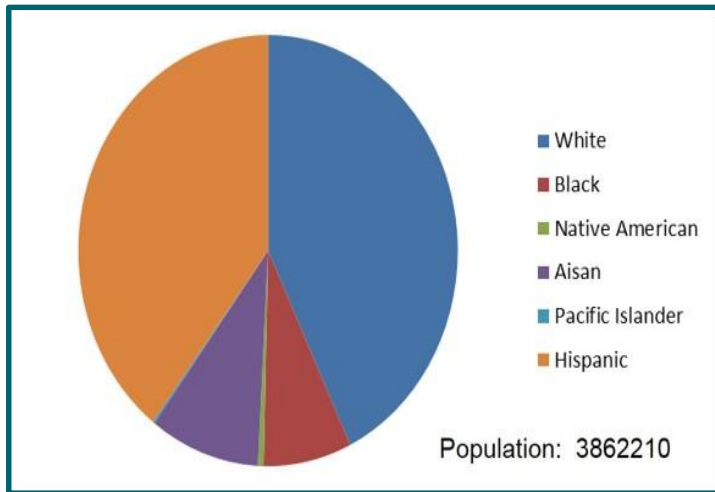
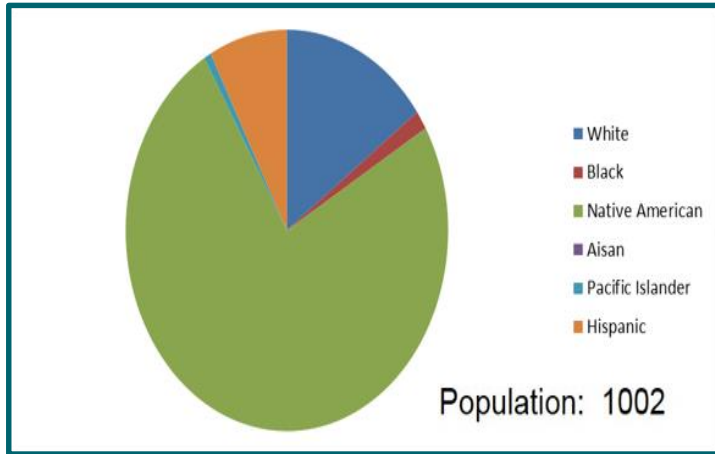
Pacific States Marine Fisheries Commission

IIFET
July 17, 2018

NOAA Fisheries social science problem:

- How to capture the diverse social, demographic and economic aspects of communities in coastal areas?
- How to tie these communities to the marine ecosystem – through fishing, for example?
- How to do both in a way that is comparative + provides useful community measures to natural science colleagues and managers concerned with ocean conditions?





Neah Bay, WA



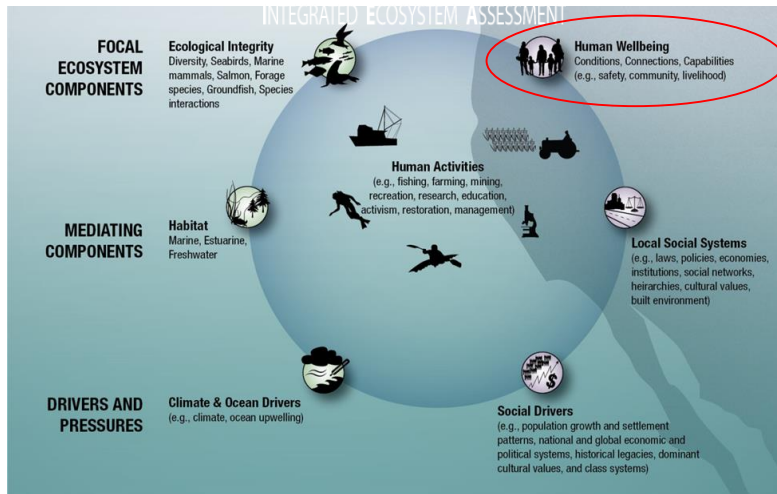
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Oregon



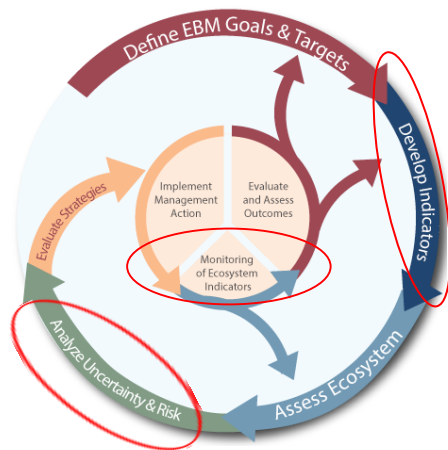
Los Angeles, CA

Why community-level approaches?

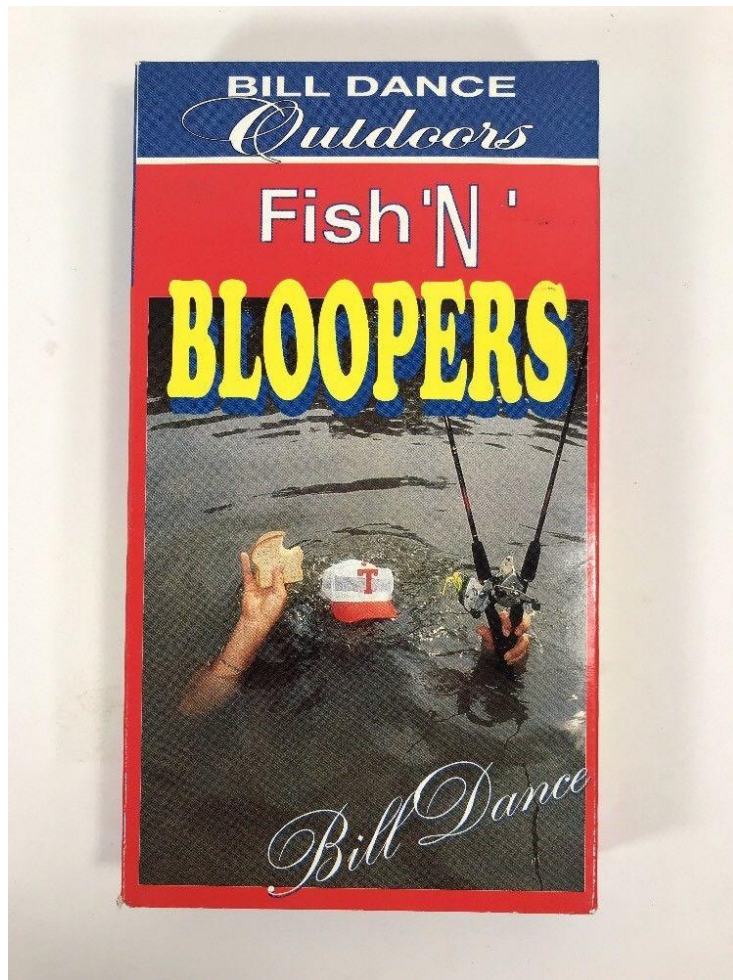


MSA National Standard 8:

“Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities”



CSVI : This is not a VCR



Community Social Vulnerability Indices (CSVI)

Step 1: variable screening

Variable name	Variable Description
GEO_ID2	Geography Identifier
GEO_NAME	Community Name
County	County (ies) in which community is located
TOTPOP	Total population based on census count
TOTPOP_EST	Estimated total population based on SF3 or ACS data
PCTMALE	Percent Males based on census count
PCTMALE_EST	Estimated Percent Males based on SF3 or ACS sample data
PCTFEMALE	Percent Females based on census count
PCTFEMALE_EST	Estimated Percent Females based on SF3 or ACS sample data
POPCHPCT	Pop Change (per cent)
POPDENS	Population Density calculated using Census Count (residents / sq. mile - see notes)
POPDENS_EST	Estimated Population Density calculated using SF3 or ACS pop estimate (residents / sq. mile - see notes)
POP0_5PCT	Percent Population age under 5 based on census count data
POP0_5PCT_EST	Estimated Percent Population age under 5 based on SF3 or ACS sample data (see notes)
POP85PCT	Percent Population 85 and over, based on census count
POP85PCT_EST	Estimated Percent Population 85 and over, based on SF3 or ACS sample data
MEDAGE	Median Age based on census count
MEDAGE_EST	Estimated Median Age based on SF3 or ACS sample data
POPWAPCT	Percent White Alone population based on census count
POPWAPCT_EST	Estimated Percent White Alone population based on SF3 or ACS sample data
POPBAPCT	Percent Black Alone population based on census count
POPBAPCT_EST	Estimated Percent Black Alone population based on SF3 or ACS sample data

CSVI

Step 2: quantitative criteria

-Single factor solutions- (our indices!)

Armor's Theta Reliability Coefficient above .500

Kaiser-Meyer-Olkin Measure of Sampling Adequacy above
.500

Percent Variance Explained at least 45%

CSVI factor analysis approach results

Social Vulnerability Indices:

- *Personal disruption*
- *Population composition*
- *Poverty*
- *Labor force structure*
- *Housing characteristics*
- *Natural resource*
- *Wealth and education*

factor scores

Fishing Indices:

- *Commercial fishing reliance*
- *Commercial fishing engagement*

factor scores



CSVI: Social Indices

Social Index	Factor Loadings	% Variance Explained
Population Composition (+)		
Percent white alone	-0.876	65.63
Percent female single headed households	0.849	
Population age 0-5	0.65	
Percent that speak English less than well	0.845	
Poverty (+)		
Percent receiving assistance	0.663	58.56
Percent of families below poverty level	0.908	
Percent over 65 in poverty	0.566	
Percent under 18 in poverty	0.871	

Community Social Vulnerability Indices (CSVI): % in poverty vs. community poverty index

Community	Percent in Poverty
1. Valley Ford, California	85.2
2. Blyn, Washington	73.3
3. Isla Vista, California	68
4. Cuyama, California	62.6
5. Loma Mar, California	57
6. Glacier, Washington	56.2
7. Langlois, Oregon	53.7
8. Carmet, California	53.3
9. Little River, California	52.1
10. Clallam Bay, Washington	49.7

Community	CSVI Poverty Index Results
1. Blyn, Washington	17.9533
2. Sereno del Mar, California	8.5977
3. Langlois, Oregon	8.381
4. Queets, Washington	7.5111
5. Little River, California	7.2127
6. Fort Lewis, Washington	5.5946
7. Carmet, California	5.1908
8. Skamokawa Valley, Washington	4.9874
9. Neah Bay, Washington	3.9716
10. Lake Hughes, California	3.9591



Beyond commercial fishing: data sources for recreational fishing indices

Washington Department of Fish and Wildlife

Oregon State Marine Board

California State Parks Division of Boating and Waterways

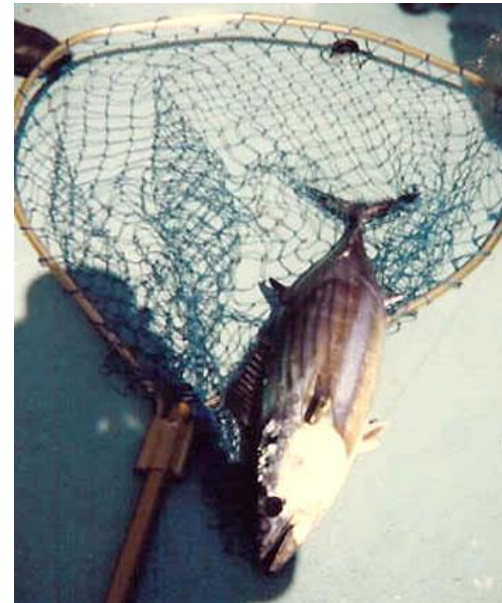
Washington State Recreation and Conservation Office

California Department of Fish and Wildlife

PSMFC's Recreational Fisheries Information Network (RecFIN)

ESRI's US Business Location Data

Southwest Fisheries Science Center (SWFSC)



Commercial Fishing vs. Recreational Fishing Indices

Commercial Fishing Engagement Variables

Commercial fishery landings

Commercial fishery revenue

First receivers (buyers)

Permits

Rec Fishing Engagement Variables

Number of boat launches within the community

Number of charter boat and fishing guide license holders within community

Number of annual charter boat trips within community

Count of recreational fishing support businesses within the community

Commercial Reliance

Commercial landings per capita

Commercial value per capita

First receivers (buyers) per capita

Permits per capita

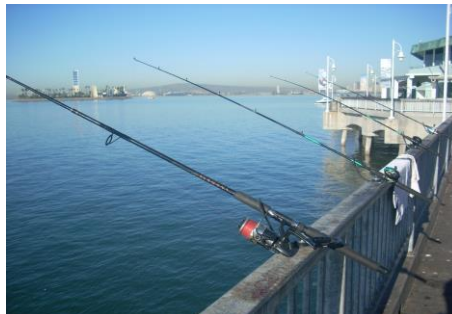
Rec Reliance

Number of boat launches within the community per capita

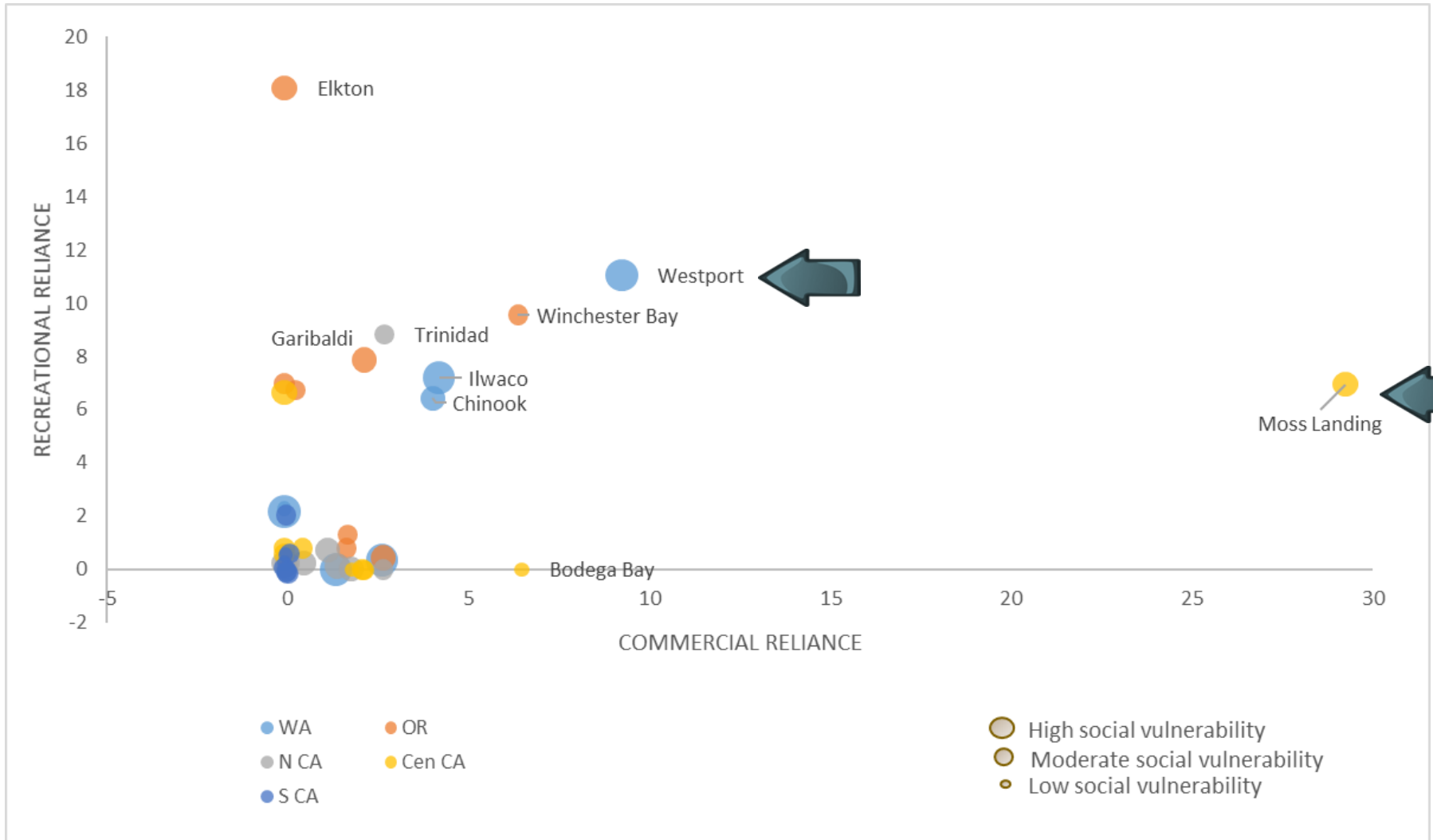
Number of charter boat and fishing guide license holders within community per capita

Number of annual charter boat trips within community per capita

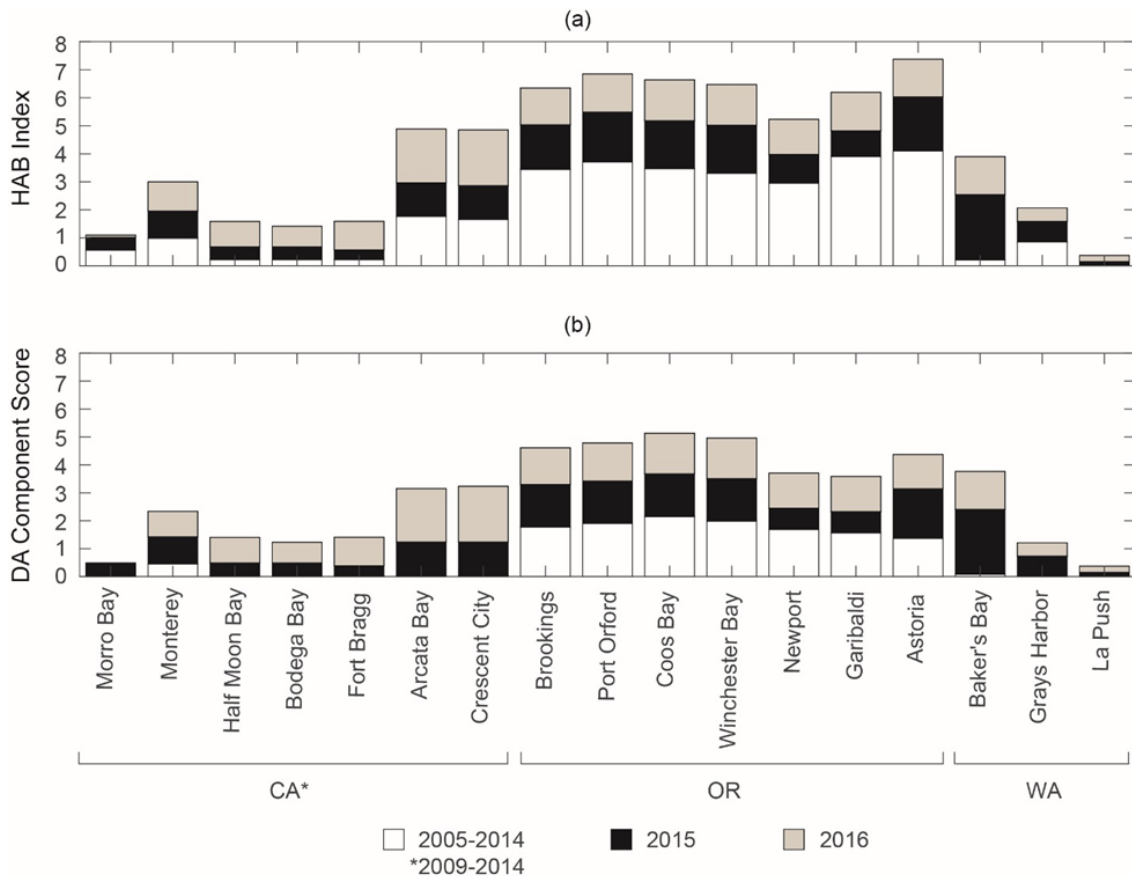
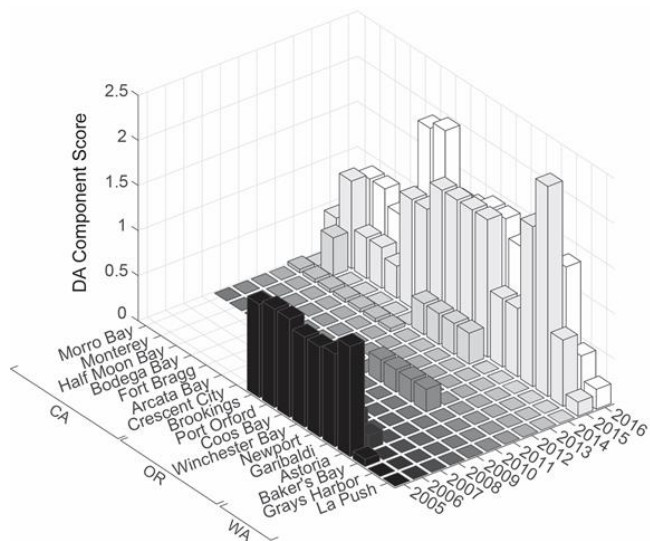
Count of recreational fishing support businesses within the community per capita



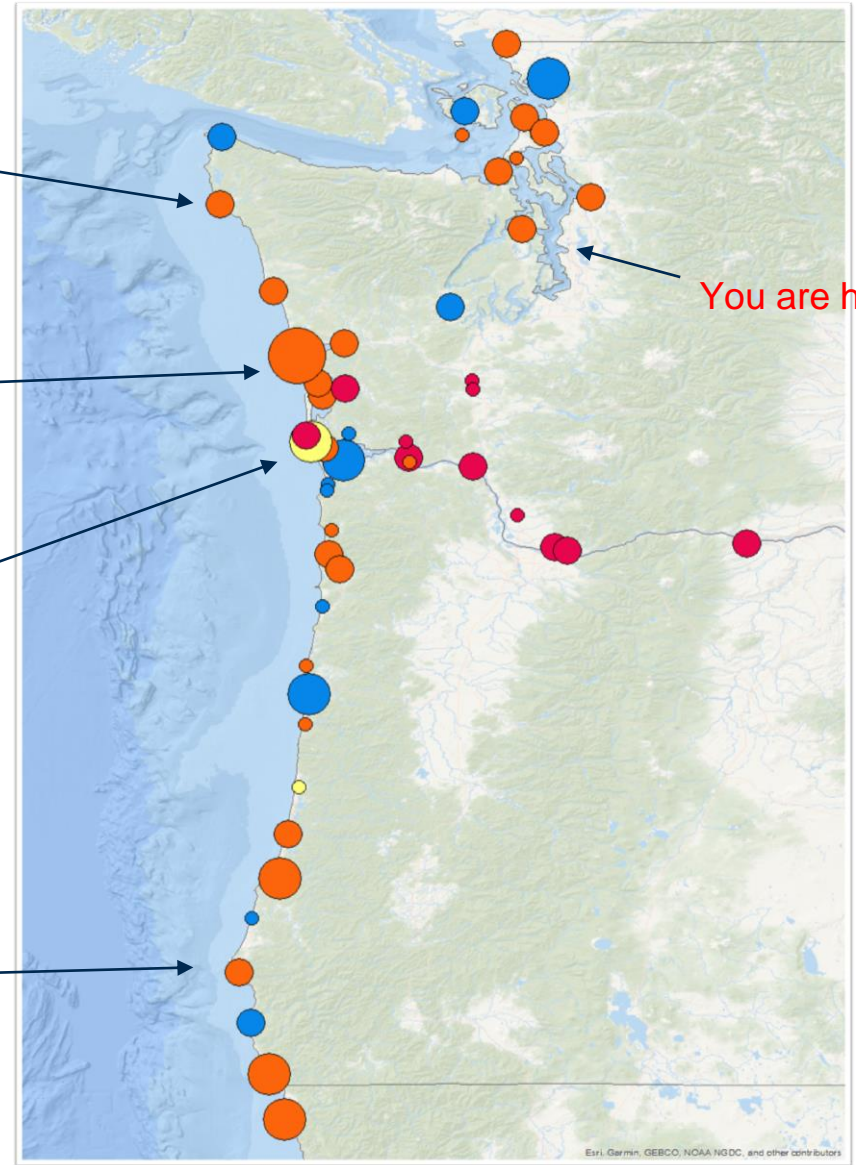
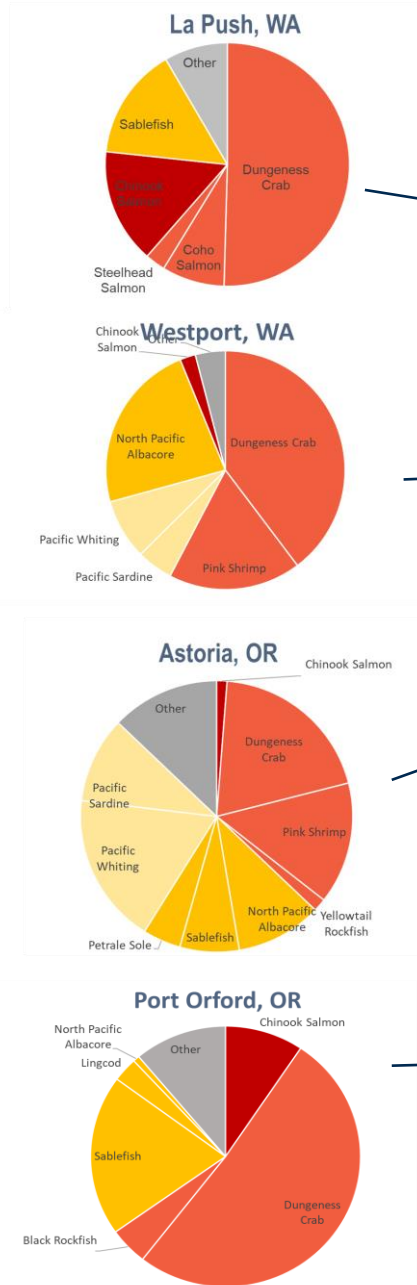
Recreational Fishing vs. Commercial Fishing Reliance

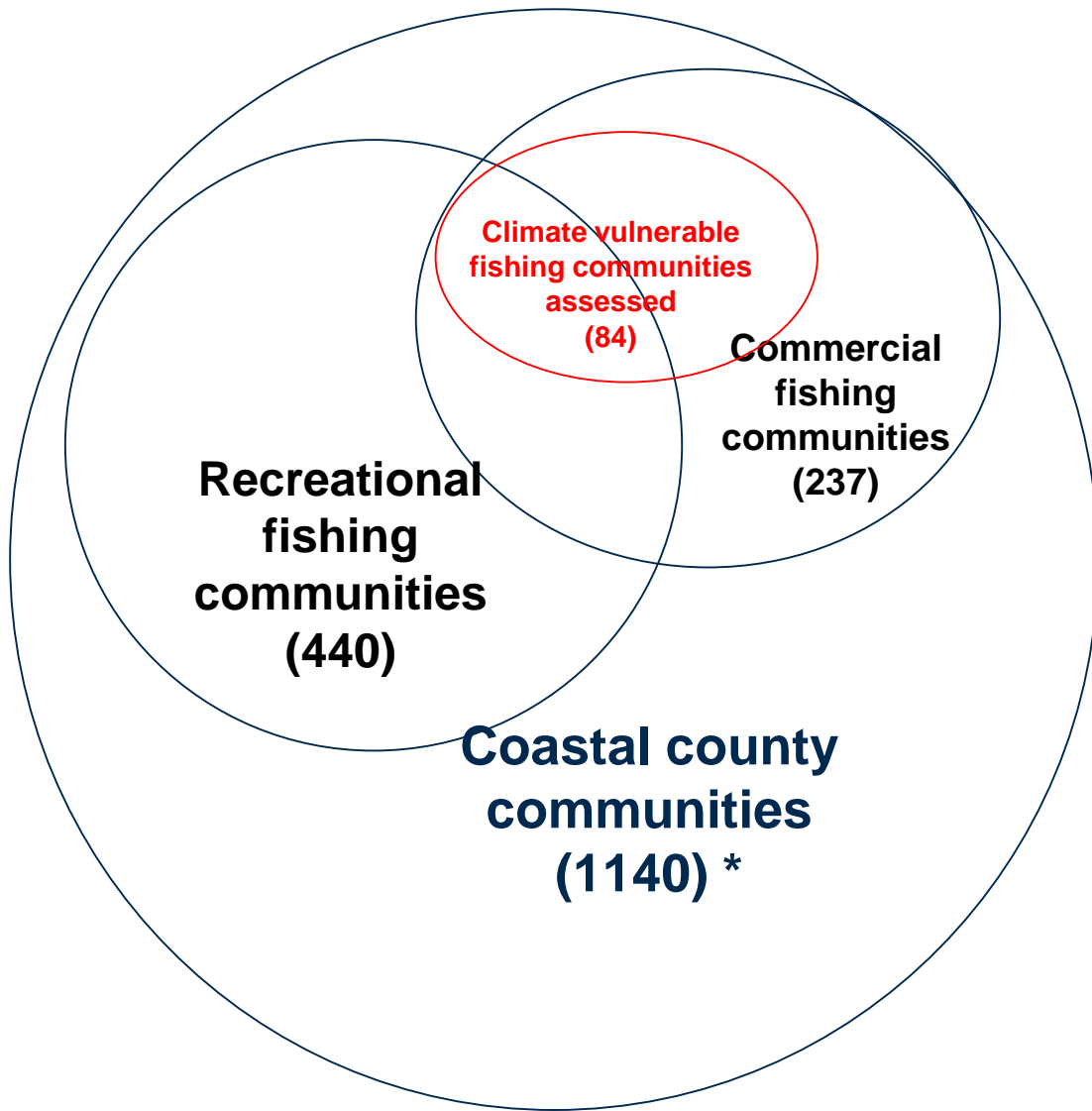


Community-level indices and climate: “Harmful Algal Bloom (HAB) exposure” index



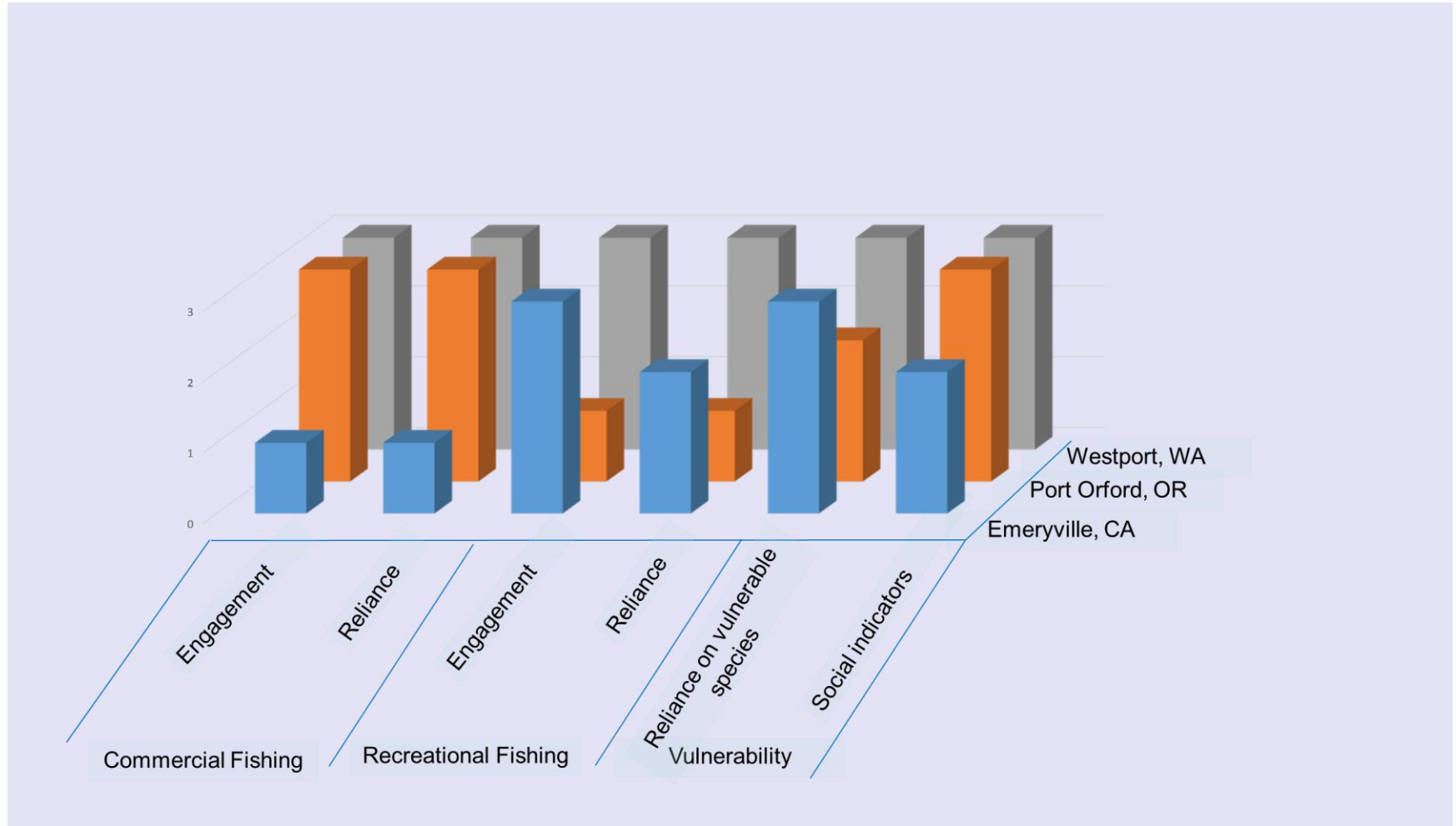
Species climate vulnerabilities in WA and OR communities





* Social vulnerability indices for all coastal county communities

Climate vulnerability assessments (CVAs) for commercial/rec considered among other community-level indices



Conclusions/Future Directions

- CSVI approach useful for comparisons among commercial fishing communities
- CSVI approach applicable beyond commercial fishing (rec fishing, climate/species vulnerabilities)
- CSVI results being empirically tested via fishery permit holder survey responses and “ground-truthed” with field visits (*emic* data)



“I’m not sure how much the government would be able to significantly help Westport if there is a big change in ocean conditions. My advice is to just let the commercial fishermen fish for whatever species the ocean provides and not try to fix our industry” – Westport fishermen

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Questions/Discussion