



Alaska Fisheries  
Science Center

# Groundtruthing social vulnerability indices of Alaskan fishing communities PICES 2017

Anna N Santos<sup>1</sup>, Kim Sparks<sup>1</sup>, **Steve Kasperski<sup>2</sup>**, Amber Himes-Cornell<sup>2,3</sup>

<sup>1</sup>Pacific States Marine Fisheries Commission

<sup>2</sup>NMFS, Alaska Fisheries Science Center

<sup>3</sup>Université de Bretagne Occidentale



# Overview

- Social indicators are increasingly used as proxies for complex social phenomena. How reliable are they?
- We utilized ethnographic data collected from 13 representative communities and a capital assets framework to groundtruth social vulnerability indices of Alaska.
- The majority (71.5%) of ranks were in complete, or moderate agreement and the results indicate that most of the indices are reliable, yet some variables utilized to create the indices could be modified to better reflect realities in Alaska.
- Conclusions



# Indices

- Principal component factor analysis (PCFA)
- 14 indices created

Social indices	Fisheries participation indices
Personal disruption	Commercial fishing engagement
Poverty	Commercial fishing reliance
Labor force structure	Recreational fishing engagement
Housing characteristics	Recreational fishing reliance
Housing disruption	Subsistence fishing involvement
Population composition	Commercial processing engagement
Status of schools	Commercial processing reliance

Himes-Cornell, A., Kasperski, S., 2016. Using Socioeconomic and Fisheries Involvement Indices to Understand Alaska Fishing Community Well-Being. *Coastal Management* 44 (1), 36-70.



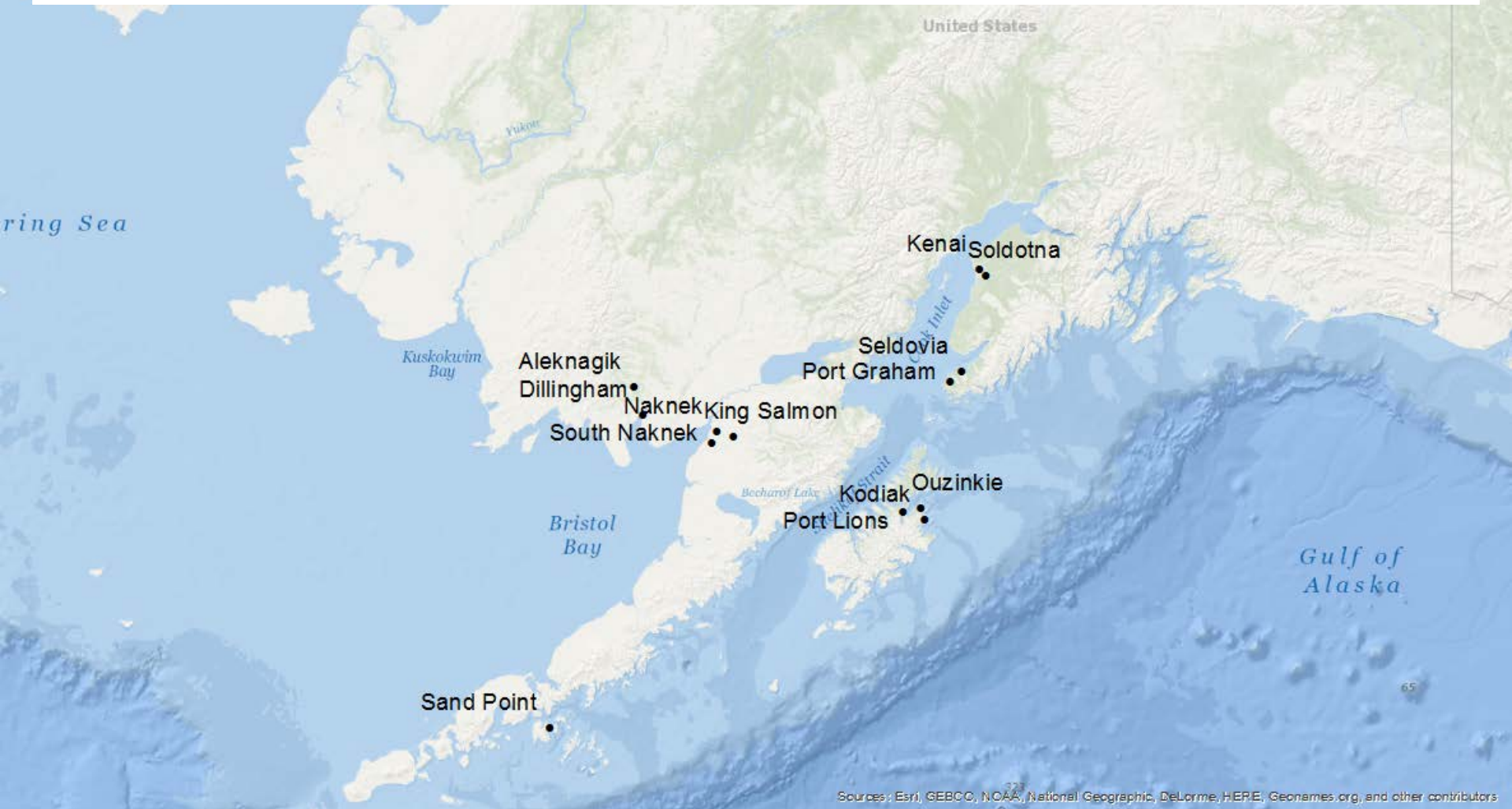


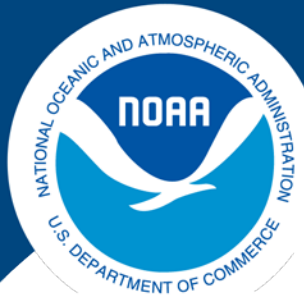
# Groundtruthing

- Purpose of groundtruthing is to independently verify the output of the indices
- Groundtruthing is necessary given that indices are generated with secondary data that may be incomplete, incorrect and/or outdated.
- Agreement between ethnographic assessments and quantitative indicators can ensure validity and reliability

# Cluster analysis was used to determine 13 representative communities to conduct ethnographic fieldwork (2013)

Himes-Cornell et al 2016





# Capital Asset Framework

- Modified grounded Theory
- Inductive Coding process
- Interviews analyzed by community

Capitals	Example metrics
<b>Financial</b>	Sources of income; level of economic diversity; investment and savings
<b>Human</b>	Population composition; available labor force; quality of education; health; quality of life
<b>Natural</b>	Access to natural resources; quality/health of natural resources; dependence on natural resources
<b>Physical</b>	Infrastructure including housing; water; transportation; access to goods and services
<b>Social</b>	Social cohesion; networks and connectedness; shared culture; rules and norms
<b>Political</b>	Policy that supports or constrains livelihoods and access to natural resources; ability to participate in political process; gov't leadership that supports or detracts from growth and development.

Community	Financial	Human	Natural	Physical	Social	Political
Kodiak	<ul style="list-style-type: none"> <li>+ Highly engaged in multiple fisheries</li> <li>+ Economic development</li> <li>+ Diverse economy</li> <li>+ Good market prices</li> <li>+ Homeported boats</li> <li>- Reduced access to fisheries</li> <li>- High cost of living</li> </ul>	<ul style="list-style-type: none"> <li>+ Good education</li> <li>+ Diverse population</li> <li>+ Health care available</li> <li>+ Resident processor labor force</li> <li>+ Coast Guard</li> <li>- Outmigration</li> <li>- Homelessness, drugs, alcohol</li> </ul>	<ul style="list-style-type: none"> <li>+ Highly engaged in commercial fishing</li> <li>+ Sport fishing</li> <li>+ Highly engaged in subsistence activity</li> <li>+ Hatcheries stock some salmon species</li> <li>- Decline in stocks</li> <li>- Increased red tide</li> <li>- Ballast water discharge</li> </ul>	<ul style="list-style-type: none"> <li>+ Good infrastructure</li> <li>+ Good processing infrastructure</li> <li>+ Retail</li> <li>+ Transportation and freighting hub</li> <li>+ Fishery support services</li> <li>- Inadequate housing</li> </ul>	<ul style="list-style-type: none"> <li>+ Fishermen are adaptive in terms of switching gear types</li> <li>+ Family oriented</li> <li>+ Community cohesion</li> <li>+ Native Tribes</li> <li>+ Churches</li> <li>- Conflict between fishery groups</li> </ul>	<ul style="list-style-type: none"> <li>- IFQs are detrimental to the community</li> <li>- Lack of participation in the Council process</li> <li>- Local gov't doesn't represent community</li> </ul>

A plus sign (+) denotes a factor that increases capital (less vulnerability) and minus sign (-) denotes a factor that decreases capital (more vulnerability)

# Supporting Quotes

Community	Financial	Human	Natural	Physical	Social	Political
Kodiak	<p>"It has enough economic diversity that it can handle the little dips pretty well. You know the recession that was hitting the lower 48 wasn't really felt here that much."</p> <p>"People are linked to fishermen. The money fishermen make fuels the town."</p>	<p>"We have 2400 kids in the school district. 210 teachers... Lot of good support for that program. Lots of kids doing great things."</p> <p>"People view the Coast Guard in a positive light because they save so many lives. They are welcome and important."</p>	<p>"What's really unique about living here is that everything's about fishing or the support industry for the fishing industry."</p> <p>"...that's not enough money, even just to eat and pay rent...so people go hunting they go fishing, and it's a big thing here to stock your freezer for the winter."</p>	<p>"This town has done a good job at keeping up a critical mass of infrastructure, so Kodiak is a business hub. Infrastructure is well maintained and keeping up."</p> <p>"Cost of housing too high and housing is inadequate."</p>	<p>"Kodiak fishermen would rather fight than win. They fight publicly amongst each other at the council. Kodiak is labeled as fractious, like a family feud."</p> <p>"There is an amazing amount of giving here. It's a close-knit community, a warm friendly town."</p>	<p>"Being so heavily dependent on the fisheries puts us heavily at risk of these fisheries policies. So fisheries policy, my simple view of it is, fisheries policy will dictate the future of Kodiak, plain and simple. There's no other way to say it."</p>



# Outputs

1. We quantify the level of agreement between quantitative and qualitative information
2. Present contextual narratives of factors effecting levels of vulnerability for each community



# Ranking

- Qualitative Data (Ethnographic Interviews)
  - Subjective rankings high, medium high, medium and low assigned based upon the capital assets framework
- Quantitative Data (Indices Output)
  - Ranked normalized factor scores from the PCFA
  - The higher the score, the higher level of vulnerability/engagement for that score
  - The numeric community scores were converted. Low ( $\leq 0$ ), medium (0 to .49), medium high (.50 to .99) and high ( $\geq 1$ )

	Personal Disruption (Human Capital)	Poverty (Human Capital)	Labor Force Structure (Financial Capital)	Housing Characteristics (Physical Capital)	Housing Disruption (Financial Capital)	Commercial Fishing Engagement (Natural Capital)	Commercial Fishing Reliance (Natural Capital)	Recreational Fishing Engagement (Natural Capital)	Recreational Fishing Reliance (Natural Capital)	Subsistence Harvesting Involvement (Natural Capital)
Kenai PCFA	Low	Low	Low	Low	Medium	High	Medium	High	Medium	Low
Kenai	Low	Low	Low	Low	Low	High	High	Medium	Medium	Medium
Kodiak PCFA	Low	Low	Low	Low	Low	High	High	High	Medium	Medium High
Kodiak	Low	Low	Low	Low	Low	High	High	Medium	Medium	High
Soldotna PCFA	Low	Low	Medium	Low	Medium	High	Medium	High	High	No data
Soldotna	Medium	Medium	Low	Low	Low	Medium	Medium	High	High	Medium
Seldovia PCFA	Low	Low	High	Medium	Medium	High	High	High	Medium	Low
Seldovia	High	High	High	High	High	High	High	Medium High	Medium High	High
Port Graham PCFA	Medium High	High	Medium	Medium High	No data	Medium	Medium	Low	Low	Low
Port Graham	High	High	High	High	High	Medium	Medium	Low	Low	High
Ouzinkie PCFA	Low	Low	Medium High	No data	No data	High	High	Medium High	Medium	Low
Ouzinkie	High	High	High	High	High	High	Medium	Low	Low	High

Indices	
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## Level of Agreement

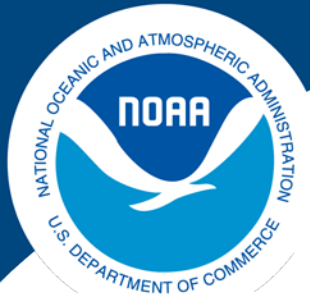
- Commercial and recreational fishing indices were the most consistent, particularly with commercial fishing engagement and reliance
- Subsistence fishing least robust
- The labor force structure and housing characteristics indices appear to be relatively robust, while personal disruption, poverty and housing disruption may be less reliable





## Paragraph narratives developed for each of the communities based upon qualitative data

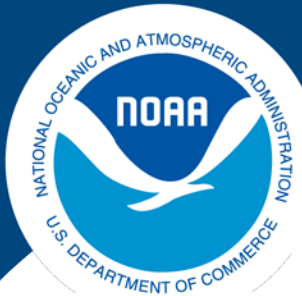
Soldotna's economy mainly revolves around seasonal sport fishing and tourism industry. The community identifies as a "sport fishing community." Recreational fishing engagement and reliance was therefore ranked high and commercial fishing indices medium. Residents have access to jobs in the oil and gas industry in Kenai, as well as other seasonal resource extraction jobs in the State. Therefore, we ranked labor force structure low vulnerability. The main difference in comparison to Kenai is the heavier emphasis on sport fishing. The sport fishery brings in tourists in summer, when most local businesses generate the majority of their revenue. This reliance on tourism meant that Soldotna felt the impact of the 2008 recession more than Kenai, and is still recovering. As with Kenai, there is extreme pressure on fishery resources; multiple respondents stated "*we are loving the resource to death.*"



# Assessing vulnerability

Prominent trends across communities include:

- High dependence upon subsistence resources
- High cost of living
- Out-migration
- Lack of economic opportunity
- Decreased opportunity in commercial fishing



# Challenges

- The capital assets framework highlights the fact that the indices do not measure social capital, political capital or ecological indicators that are important to discussions around vulnerability.
- The social indices appear to be more accurate in larger and more economically diverse communities
- 2 key lessons from this groundtruthing exercise:
  - The quantitative approach is only as good as the data used in the analysis
  - PCFA methodology creates a relative score for all entities.



# Next Steps

- Quantitative social indices are useful tools for assessing community vulnerability and well-being provided that they are grounded and modified where necessary.
- Ideal next step would be to seek external validation by community members (Oulahen et al., 2015)





# Acknowledgement and Thanks

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# Questions?