Alaska Adapting to Changing Environments: Approaching Social-Ecological Dynamics on the Kenai Peninsula

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UNIVERSITY OF ALASKA ANCHORAGE

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Southcentral Testcase
Welcome to the Southcentral Alaska Science Catalog

Your one-stop portal for the discovery, distribution and visualization of scientific and spatial data for Southcentral Alaska and the Kenai Peninsula.

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Alaska ACE
Alaska EPSCoR improves Alaska’s scientific capacity with "Alaska Adapting to Changing Environments"

News & Events
18 July, 2013 - We’re Going Live Beta testing and development on Southcentral Alaska Catalog is wrapping up. We hope to be “Live” in the coming weeks.... Read more...

19 June, 2013 - Share Data The Southcentral Alaska Catalog is looking for geospatial and scientific data, reports and maps to include in the Cat... Read more...

1 May, 2013 - Alaska EPSCoR Southcentral Test Case Workshop May 7-9th: EPSCoR-ACE Southcentral test case workshop and site visits on the Kenai Peninsula. This w... Read more...

2 June, 2013 - Kenai River Festival June 7-9: Celebrate the Kenai River with a weekend filled with free family fun for everyone. The Read more...
place-based examination of the role and interaction of multiple drivers of social-ecological change in the Kenai River watershed
Kenai River Watershed

- global and regional temperature and precipitation changes
- salmon population fluctuations
- recent tourism downturn
- recreational pressure from Anchorage
- shrinking wetlands and successional change
- forest fire dynamics, incl. spruce BB kill

Collapsing King Salmon Runs Devastate Kenai Tourism Economy
Near-Record Sockeye Run May Help
July 29, 2012 | By Dan Fiorucci | Channel 2 News

Background | Hydro/Aquatic Ecology | Social | Next Steps
Spruce Bark Beetle Outbreaks <> Fire History
(cumulative area impacted in acres)

Source: KPB, USFS, Alaska Division of Forestry (merged), KWF
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Cumulative Natural and Anthropogenic Change

Source: KPB, USFS, Alaska Division of Forestry (merged), KWF

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Human population (Source – US Census Bureau)

Source: KPB, USFS, Alaska Division of Forestry (merged), KWF
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Background  Hydro/Aquatic Ecology  Social  Next Steps
Southcentral Research Objectives

- **Changing Environment**: Understand how hydrological and landscape change affect fluvial dynamics, water quality and salmon populations in the Kenai River watershed.

- **Societal Consequences**: Understand the consequences of these changes on the use and values of salmon fisheries and tourism for communities in the watershed.

- **Adaptive Capacity**: Evaluate the capacity of Kenai River communities to perceive, project and respond to anticipated change.
Southcentral Hydrologic change
- 60-year continuous discharge record for main stem
- Re-activation of gaging stations on three sub-basin tributaries to provide 40-year time-series
- 10-year water temp record
- 60-year air temp and precip record
- Partner: KWF
The effects of climate-driven landscape changes on rearing habitats of juvenile Chinook salmon

Study objectives

1. Determine if summertime variables become unsuitable in Chinook rearing habitats (Kenai R. watershed)
2. Determine how sub-drainage type affects discharge, temperature, DO, food supplies in rearing habitats.
3. Determine if rearing habitat types are more vulnerable to unfavorable conditions (e.g., high temperature, low DO or food) than others.
4. Develop an "index of vulnerability" for Chinook salmon rearing habitats (based on discharge, temperature, DO, food abundance).
Initial Findings
(2013 field season)

Background

Hydro/Aquatic Ecology

Social

Next Steps

Moose River

Beaver Creek

Funny River

Crooked Creek
Finding: Stream temperatures peaked in late July (15-22°C) and steadily decreased through Aug.
**Initial Findings (2013 field season)**

**Finding:** Stream temperatures peaked in late July (15-22°C) and steadily decreased through Aug.

**Implications:** Stream temperatures approached upper tolerance limits of juvenile Chinook in some habitats, suggesting that some rearing habitats may become unsuitable during warm summers.
Societal Impacts

**Prediction:** The perception of consequences of hydrologic and landscape change will vary according to the extent of place attachment and core values of residents.

**Approach:**

*Values:*
- *Ethnographic:* to understand core values of Kenai fishing groups and managers
- *Social-ecological landscape values* mapping & place attachment
- *Focus groups:* examine perceptions of hydrographic and landscape change, community values and capacity
Focus Groups

• To explore changes in environmental and community and discuss responses/barriers to change

• Themes
  o Demographic change
  o Development
  o Values
  o Capacity
  o Resource use
  o Comparison to PNW fisheries

• Input for broader survey

• Implications
  o Adaptive capacity prediction: Core values of residents will influence the kinds of adaptive strategies that are adopted or suggested
Questions

• How to approach a situation where core values seem may potentially be at odds with protective regulations, & policymakers may not act?

• Approaches:
  o Summit
  o Analysis of 50 ft setback
  o Further data collection: mailout survey with mapping component

• How to approach a summit when highly charged issues are involved (such as fish)?
## Next Steps

### Aquatic Ecology
- Tracking stream DO, temperature, and food supplies: understand if certain habitats become unsuitable for rearing Chinook salmon.
- Bioenergetic modeling: determine how food abundance, stream flow, and temperature affect juvenile Chinook in rearing habitats.

### Social
- Case study on 50 ft setback
- Demographic and landscape values mailout survey
- Economic: data collection (fish run, etc.), experiments
- Local knowledge mapping with Kenaitze youth
- Decision maker interviews
- User group core value interviews

### Other
- Road ecology, demographics, land change

### Outreach
- Community events, summit