Climate Adaptation for Kachemak Bay and the Kenai Peninsula

Community priorities and needs to inform scenario decision-support tools

To create a foundation for a climate scenario planning process on the Kenai Peninsula, Kachemak Bay National Estuarine Research Reserve (KBNERR) collected stakeholder information to gain insight into community priorities related to climate adaptation. Regional climate observations, risk perceptions, preparedness, and perceptions of successful community adaptation were gleaned from input by a broad range of stakeholders.

Purpose

KBNERR is not a land manager, and the focus of our projects are to serve the land and resource managers in our ecoregion. However, this work will closely connect our research and monitoring priorities to community needs, and should inspire new directions and revisions to our management plan.

Identifying community priorities and needs

Responses were used from a Climate Adaptation for Coastal Communities workshop held in 2016, as well as informal informational interviews once workshop results and local climate science was synthesized. Stakeholder responses helped to identify needs, barriers and primary climate change uncertainties that are central to decision-making and the scenario planning framework development was informed by the kinds of adaptation measures stakeholders identified as possibilities.

Priority areas of concern were identified from climate stressors and assets:

- Infrastructure protection
- Fresh water conservation
- Flood management
- Fisheries management
- Shellfish restoration
- Fire management
- Agriculture development

Climate Stressors

Assets

Guiding assumptions grounded in climate science

A synthesis of local climate science was used to outline a few assumptions or predictions that aided in narrowing the focus of decision tool development:

- Air and water temperatures will rise
- Precipitation will fall as rain instead of snow
- Growing season will lengthen
- Winter storms will increase in frequency and intensity
- Local land level rise will outpace sea level rise for the near future

Identifying the primary drivers of change

Given these community priorities, and lessons from climate science, it was clear that **primary drivers of change that shape the landscape were inextricably linked to water**. Understanding how water moves is the basis for looking at how climate may impact current functionality and inform coastal planning and management decisions.

Barriers

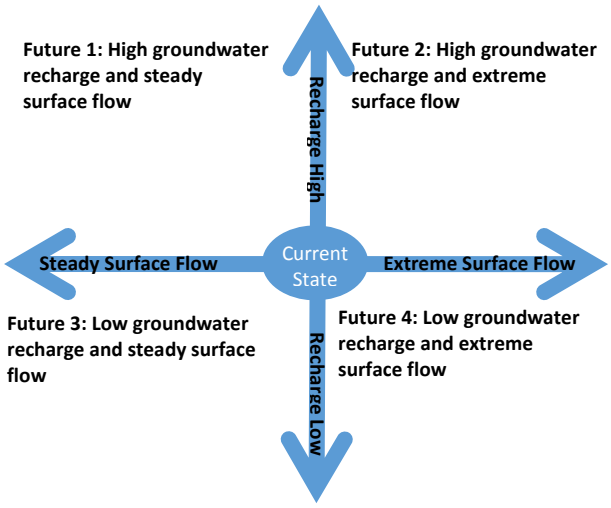
Adaptation Measures

The drivers of change for these local issues were identified as variables for scenario framework development using the following criteria:

- Have associated uncertainty: Decided direction of change but a range of magnitude
- Interact with each other: Consider how multiple variables interact, instead of considering climate change impacts in isolation
- Driven by both climate and management: Capture uncertainties related to broader socio-ecological drivers of change

This process ensures the final decision-support products meet local needs, allowing room for the consideration of both climatic and non-climatic stressors on the biophysical and socioeconomic characteristics of the communities. Several possible water-related variable pairs were identified by stakeholders:

1. Hydrology
    - Extreme surface flow
    - Groundwater recharge
2. Coastline
    - Frequency of extreme river discharge
    - Changes in coastal sediment supply
3. Watershed Habitat
    - Increase in fire frequency and intensity
    - Changes in available freshwater
4. Marine Habitat
    - Ocean Acidification
    - Ocean Temperature



Given these potential possibilities two primary drivers of change were chosen for the scenario process, with feedback from local scientists and researchers, which focused on hydrology drivers and how water relates to so many aspects of climate change in our region. Two drivers of change that capture these effects are **extreme surface flow events** and increasing or decreasing **groundwater recharge**.

Local freshwater is distributed unevenly across the landscape, throughout the seasons, and from year to year. Climate change impacts local hydrology through temperature increases, changing precipitation rates, vegetation changes and sea level rise. Management practices including water use, development of impervious surfaces and alteration of wetlands can also impact water distribution on the landscape.

Next steps

This scenario framework was the basis for a series of workshops in 2016-2017 in collaboration with Tijuana River NERR and the NERR Science Collaborative Successful Adaptation Indicators and Metrics project.