



## Danielle Boudreau

*Coastal Management  
Specialist, Tijuana River NERR*

## Syverine Bentz

*Coastal Training Program  
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National Estuarine  
Research Reserve System  
Science Collaborative

# Overcoming Uncertainty through Climate Scenario Planning

## Notes:

Dani Boudreau is Coastal Management Specialist at Tijuana River National Estuarine Research Reserve (Imperial Beach, California).

Syverine Bentz is Coastal Training program Coordinator at Kachemak Bay National Estuarine Research Reserve (Homer, Alaska).

Our presentation shared how multiple barriers hinder effective adaptation planning in Southcentral Alaska, including the uncertainty around future climate trajectories and limited capacity for interagency collaboration, and how they used climate scenario planning to overcome these issues and also resulted in multiple unexpected outcomes for the Kenai Peninsula community.





## NOTES

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## NOTES



Blooms of Harmful Algae



Forest Fire Frequency



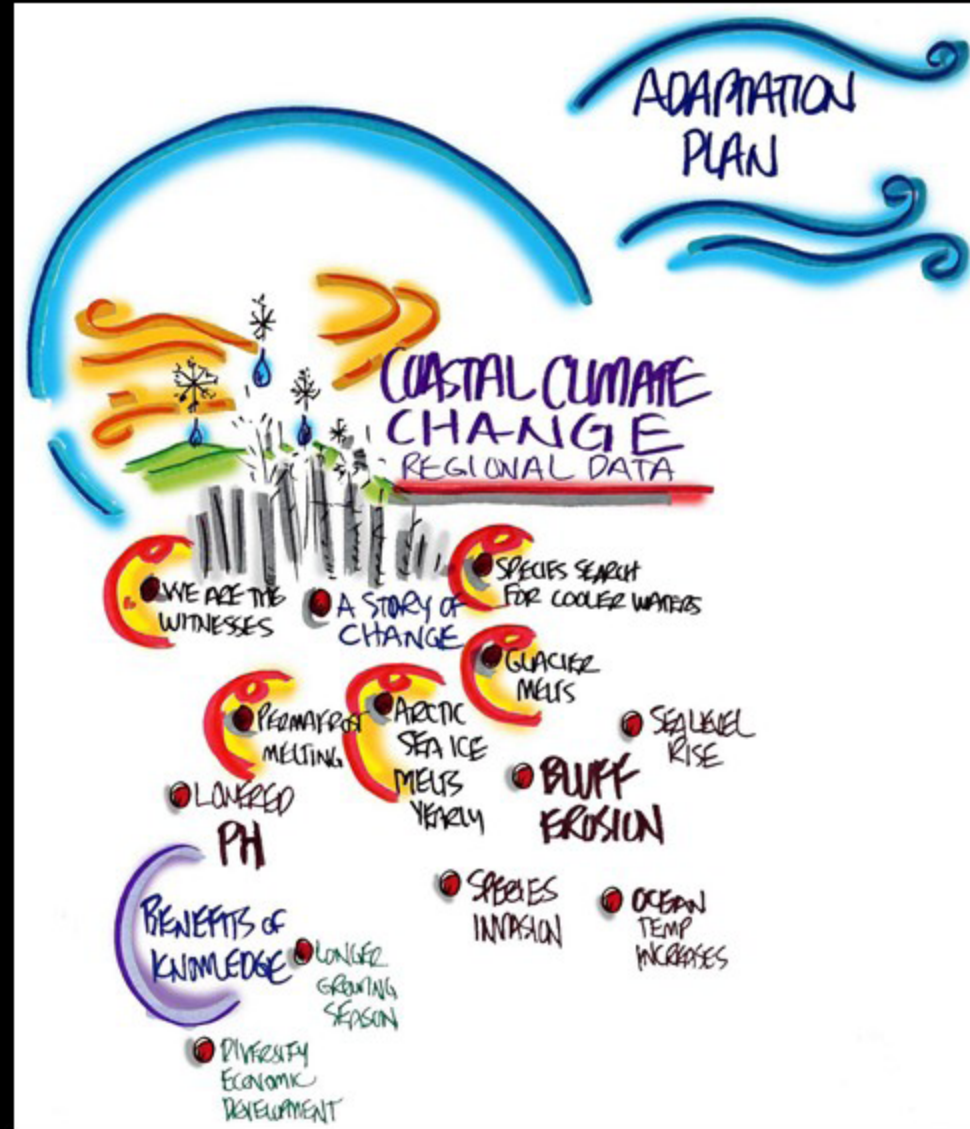
Growing Season Length



Ocean Acidification & Temperature

# Aligning multiple opportunities

- NERRS Science Collaborative Transfer grant
- NOAA Office for Coastal Management CACC training
- Successful Adaptation Indicators & Metrics (SAIM) project





# Bringing it all together

NOTES

**March 2016**

## CLIMATE ADAPTATION FOR COASTAL COMMUNITIES

Introduction to  
climate change science –  
Observed and projected  
changes

Basics steps of the  
adaptation planning  
process

Communicating  
climate change and  
adaptation



**Framework**

**October 2016**

## SCENARIO PLANNING AND PATHWAYS TO SUCCESSFUL ADAPTATION

Vision for Homer & Kenai  
Peninsula

Climate scenarios

Pathways &  
Trigger points



**Vision &  
Pathways**

**April 2016**

## SUCCESSFUL ADAPTATION PART II: STRATEGIES, PATHWAYS, AND EVALUATION

Climate-sensitive  
strategies to solve  
existing problems

Transparent adaptive  
decision-making

Indicators of progress and  
success, and building  
capacity for ongoing  
learning



**Indicators  
& Metrics**

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## High Groundwater Recharge

### Sitka (SE Alaska)



*Mud slide buries  
Two Sisters Bakery*

### Wet & Wetter



*Future for salmon uncertain*

Steady Surface Flow

Extreme Surface Flow

Current  
State

### Steady Flow & Dry Below



*Sucking Us Dry:  
Lacking groundwater  
recharge blamed for  
economic decline*

### Drier Landscape & Flashier Floods



*Community stability?  
Change is the new norm*

Low Groundwater Recharge

## NOTES

Scenario development

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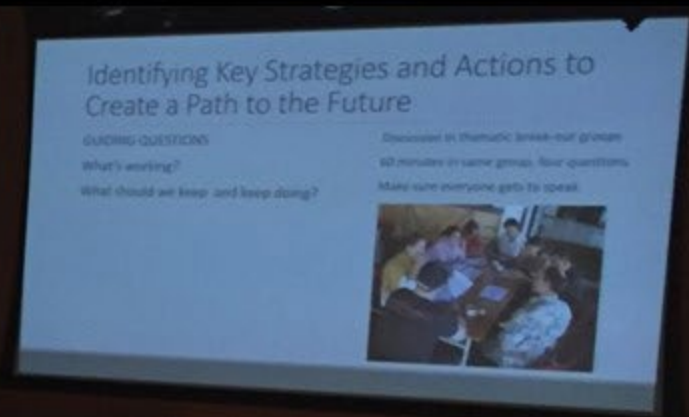




## NOTES

- Games of futures





## NOTES

• Reciprocity circle



# Engagement Activity

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## Poll Results

Poll Questions: What methods of engagement are you interested in learning more about?

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## NOTES

- Improve networks

*“A real value is that this is cross pollinating.*

*Because we are in the same room we are aware of others”*

*-Stream Ecologist*



*“I feel 100% more empowered to talk about climate change with a wide variety of people” –Municipal Planning Staff*

## NOTES

- Support local planning

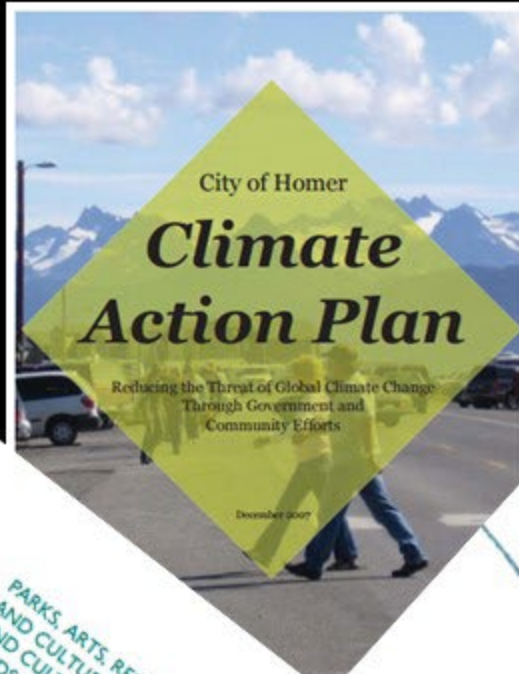


City of Homer  
All-Hazard  
Mitigation Plan

2016 Upd



PARKS, ARTS, RECREATION  
AND CULTURE (RECREATION)  
NEEDS ASSESSMENT  
Prepared for the City of Homer, Alaska  
by American Recreation Planning  
Spring 2015



City of Homer Beach Policy  
2016



Woodward Creek  
Watershed Plan

WOODWARD CREEK COALITION  
Homer, Alaska  
January, 2017



## NOTES

Connect with policymakers through Youth and Artists



Alaska Lt. Governor Byron Mallott

Like This Page · March 20 · Edited ·

I chose the artwork of Homer Student Beatrix Strobel. She illustrated on silk the "Blooms of Alexandrium Catenella", which looks like a red tide along our coast, but is actually algae. Algae which can cause paralytic shellfish poisoning or PSP. Warmer oceans and elevated sea levels can cause the amount of the algae to rise. — at [Alaska State Capitol](#).



*"So empowering and beautiful to be able to create art about a challenging topic"*  
—Parent of art student



## A photograph of several fishing boats in a harbor at sunset. The sky is a mix of orange, yellow, and pink, with the sun low on the horizon. A large, dark mountain is visible in the background. In the foreground, a large white fishing boat with red buoys is on the left. Other smaller boats are visible in the distance. The water is calm, reflecting the colors of the sky. The shoreline is rocky and dark.

- .....

**Fisheries Business Resilience** **Partners:** Alaska Sea Grant, Alaska Marine Conservation Council





## NOTES

- Identify Research Gaps
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- 
- Need - Gaps in knowledge to inform groundwater hydrology decisions
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- Solution – Develop tools that promote holistic watershed management





### Case Study: Tyonek Grown Community Gardens

Complementing subsistence harvests with community gardens in Rural Alaska

Rural Alaska residents participate in a subsistence lifestyle including activities such as salmon fishing, moose hunting, berry picking, and more. The availability of fresh healthy produce to complement healthy wild foods is limited. Gardens provide healthy, locally-sourced food while promoting self-reliance and community well-being. Gardening in rural communities in Alaska can often be a challenge due to lack of materials, weather, and short growing seasons. However, one of the benefits of a warming climate is a longer growing season, and communities are finding ways to work together to overcome logistical limitations to and promote gardening.



### Coastal Erosion Threatens Habitat & Infrastructure

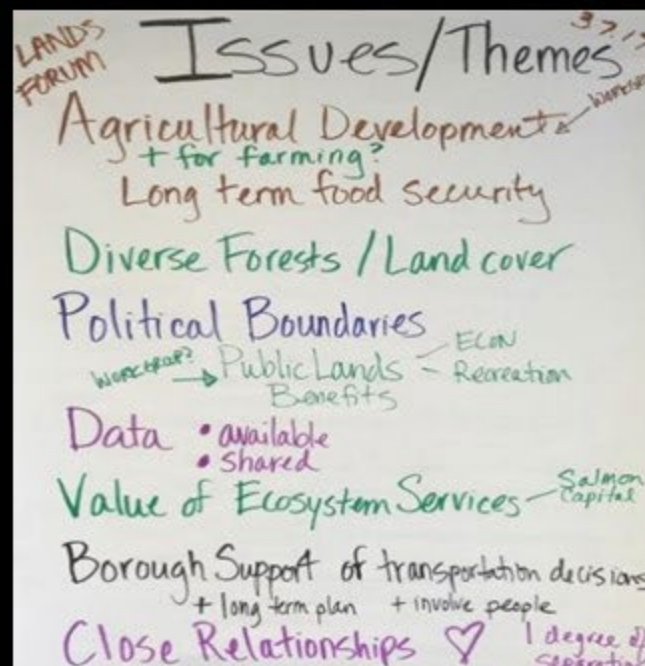
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# Sharing Success Stories



**Case Study:**  
Climate Art + Science Collaborative



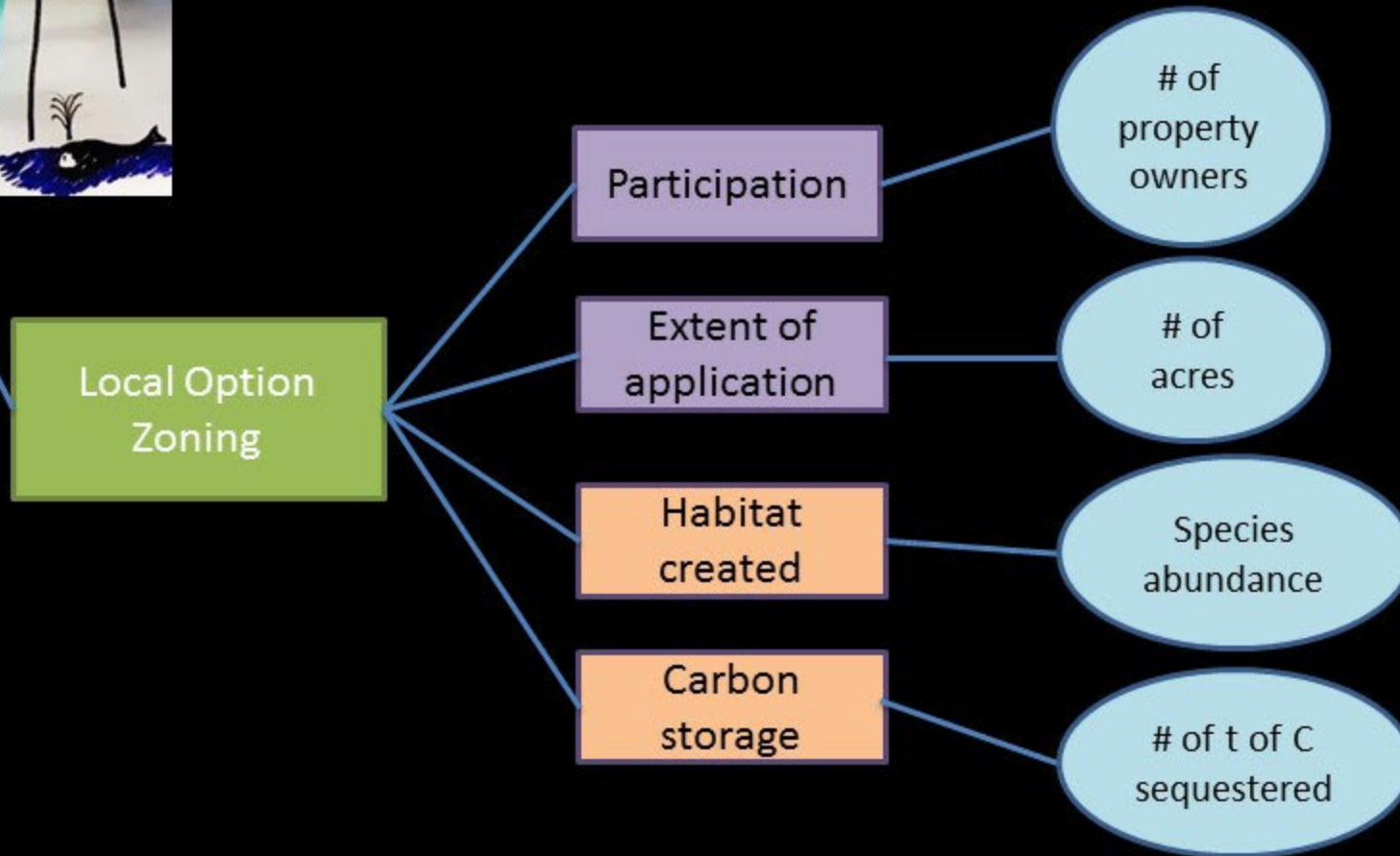
**Case Study:**  
Kenai Lands Forum

## NOTES

- Foster New Collaborations



# Tracking Adaptation Strategies



## NOTES

- Inform indicators and metrics we should be tracking in light of future potential scenarios
- Vision element- Strategy-progress and outcome indicators- metrics



# Thank you!

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## Additional assistance provided by

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James Arnott, University of Michigan  
Gwen Shaughnessy, NOAA Office for Coastal Mgmt

## For more information

- [accs.uaa.alaska.edu/kbnerr/climate-resilience](https://accs.uaa.alaska.edu/kbnerr/climate-resilience)
- [trnerr.org/climate-scenario-planning-alaska/](https://trnerr.org/climate-scenario-planning-alaska/)

*Thank you to our funder the  
NERRS Science Collaborative!*



NATIONAL ESTUARINE  
RESEARCH RESERVE SYSTEM  
SCIENCE COLLABORATIVE



## NOTES

- Please contact us if you have any follow-up questions or comments. We'd love to hear from you.