Envisioning the Coast of the Future

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CLATSOP COUNTY EXTENSION SERVICE

Introductions

Desired Outcomes for Tonight

Identify the range of values people associate with “the beach” and try to find “metrics” that try to precisely describe, quantify, or categorize these desired values.

Consider a research model that helps think through in a data-driven, structured way, multiple future scenarios mixing environmental changes and development policies. See how today’s policy choices influence future outcomes on the beach.

Explore community and economic development in the coming decades and how we might maintain enduring beach values in a changing environment.

What I Value About the Beach

What do you **value** about Oregon's beaches, shorelines, dunes, etc?

Can you more precisely describe, quantify, or categorize these values? Why do you value them? What is gained? What could be lost?

How would you notice a change in these values over time? Can that be measured?

4X6 Cards

On one side of the card write ONE personal value or benefits that you associate with “the beach” broadly defined.

On the other side, try to precisely describe it, or categorize it, or quantify something about it. Just try…

Complete as many cards as you want. One value per card.

What We Value About the Beach

Debrief

Neskowin Story: Local committee

Conflicting values: protect homes / maintain the beach

First Coastal Futures project

Continuing challenges… New Coastal Futures project

Coastal Futures Projects

Climate

Policy

Alternative Futures Analysis:

Explore how complex coupled natural and human systems dynamically respond to varying adaptation strategies and driving forces.

Key Points of Futures Modeling

Allows communities to more deeply consider how todays choices playout through time.

Begins with clarification of community values and desired future conditions. Articulating and quantifying what you want is essential.

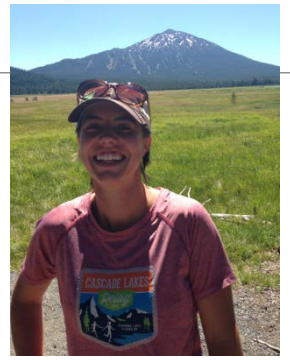
Generates a wide range of internally consistent policy packages: things that can be done through economic and social policy to most likely preserve values and expressed desired outcomes.

And then, simulate how those policy sets unfold, on the ground, over time without interruption. So we can compare “apples to apples” using a variety of maps and visualizations.

Envisioning a Resilient Oregon Coast

OSU Project Team: Principal Investigators

Steven Dundas: Environmental economist focused on non-market valuation, coastal ecosystem services, climate change adaptation, and policy evaluation.

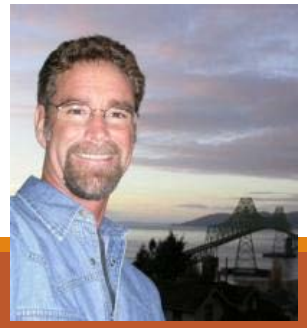


Jenna Tilt: Research social scientist focused on the relationship between environmental management, land use planning, and human behavior.

Dan Cox: Coastal hazards engineering and Director of the Cascadia Lifelines Project (CLiP).

John Bolte: Professor and Head of the Department of Biological and Ecological Engineering and is the lead developer of *Envision.*

Peter Ruggiero: Lead, takes an interdisciplinary approach to assessing the magnitude, frequency, and impacts of coastal hazards.



Pat Corcoran: Coastal hazards extension specialist with significant experience working with coastal stakeholders and the project team.

OSU Project Team: Students and Postdocs

Meredith Leung: PhD student in CEOAS

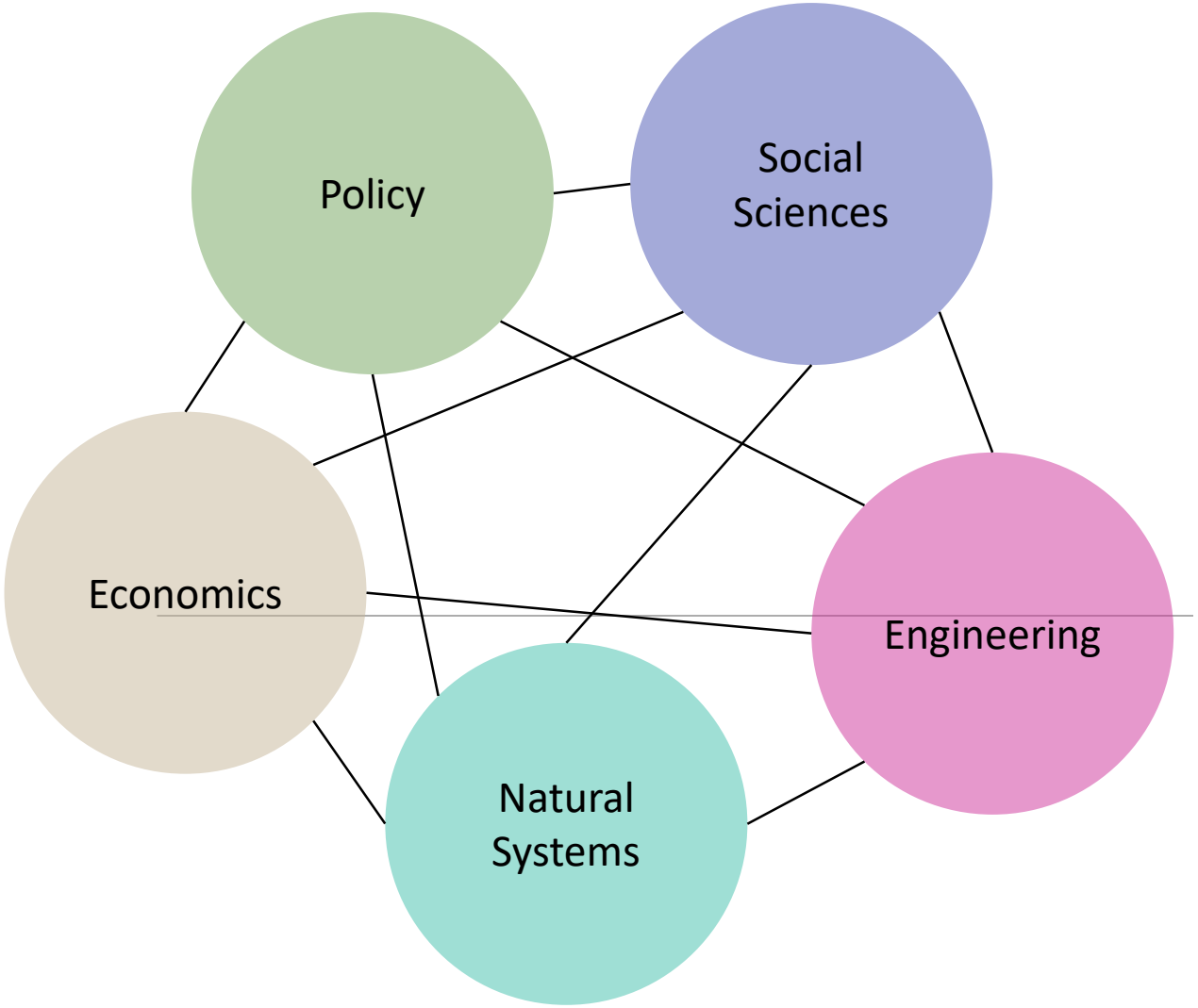
Katherine Stanton: Graduate Student in the Anthropology Department under the School of Language, Culture and Society under the College of Liberal Arts

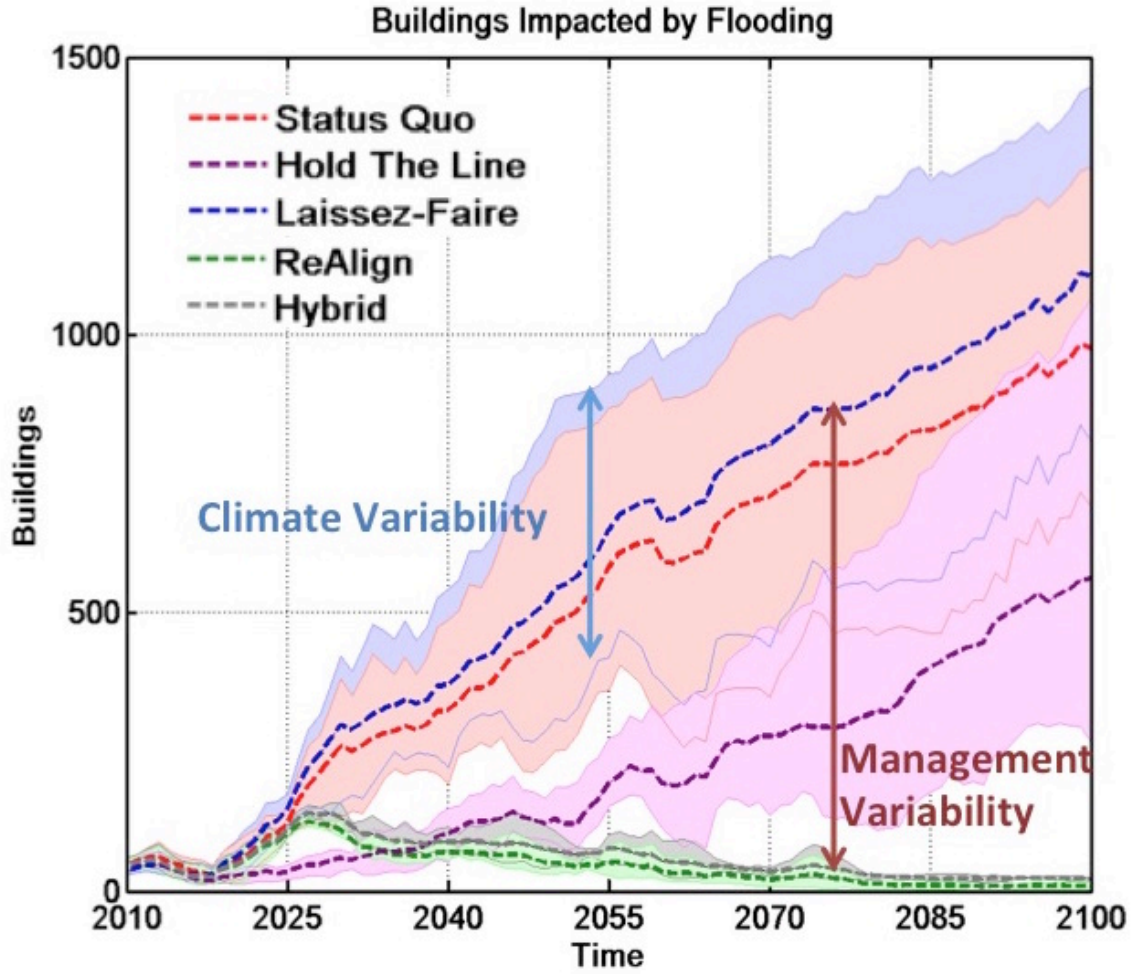
Dylan Sanderson: PhD student in CCE

Sabarethinam Kameshwar: Postdoc in CCE – soon to be Assistant Professor at LSU!

Amila Hadziomerspahic: PhD Student in Applied Economics

The Approach





Chronic Hazards
Flooding and Erosion

Handout

Alternative Futures Analysis: *Envision*

Data Sources

- Landscape Data

Landscape Change Models

- Population Growth
- Development
- Total Water Level
- Coastal Change Models

Scenarios

- Policy Scenario Narratives
- Climate Impact Change Scenarios

Agent Based Model: Envision

Resilience Metrics

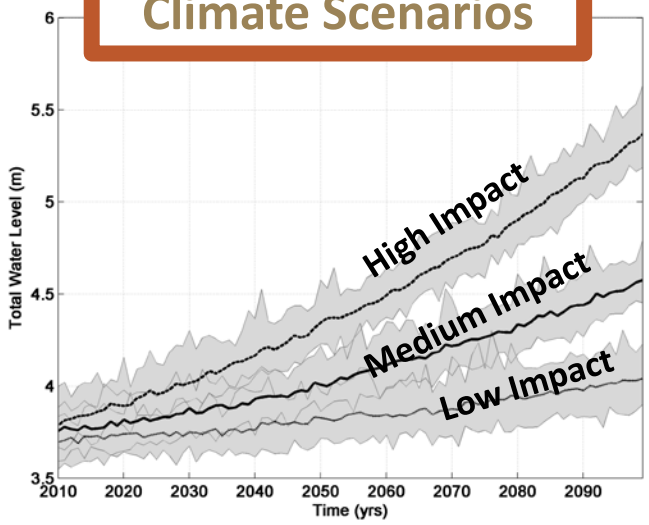
Flooding
- Structures & Infrastructure Impacted
- Economic Value of Property
- Impacted

Erosion
- Structures & Infrastructure Impacted
- Economic Value of Property
- Impacted

- Percent Shoreline Hardened
- Beach Accessibility

Bolte et al., 2007

Climate Scenarios



Physical

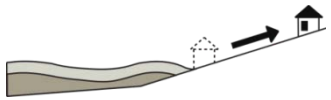
1. Status Quo

2. Hold the Line

3. Laissez-Faire

4. ReAlign

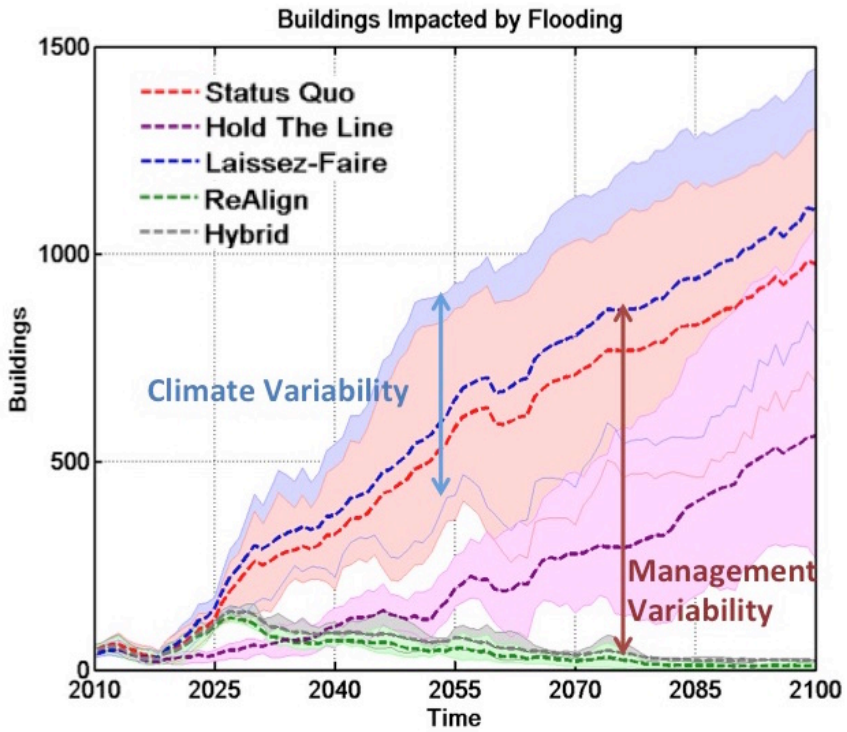
5. Hybrid



Human

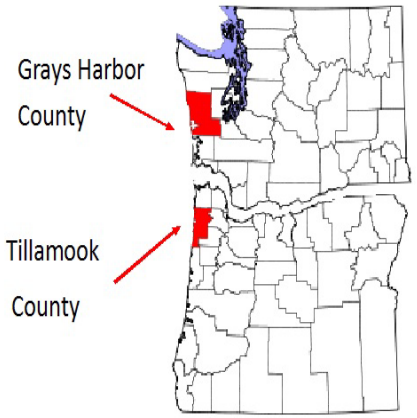
Policy Scenarios

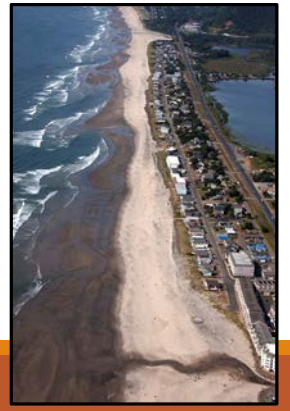
Which drivers (human or physical) cause the greatest variation in resilience metrics?

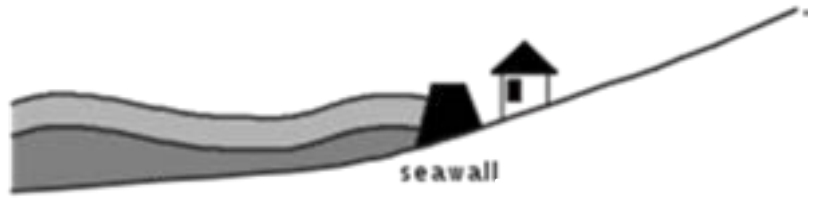


Coastal Futures Projects

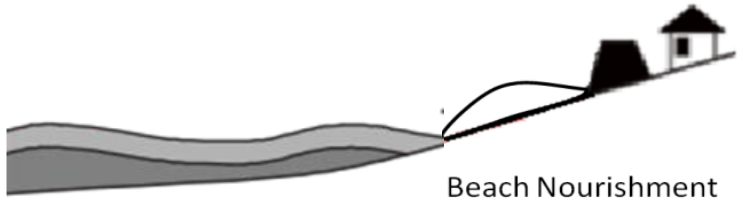
Envisioning Alternative Coastal Futures: Develop the information and tools necessary to envision future scenarios, assess impacts and vulnerability associated with erosion and flood hazards, and initiate adaptation strategies.







More riprap?



Nourish our coastline?

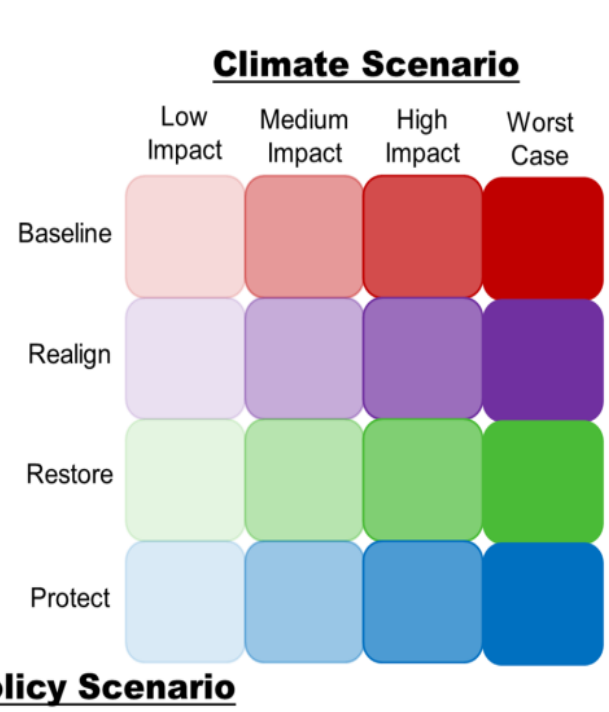
Move away from coast?

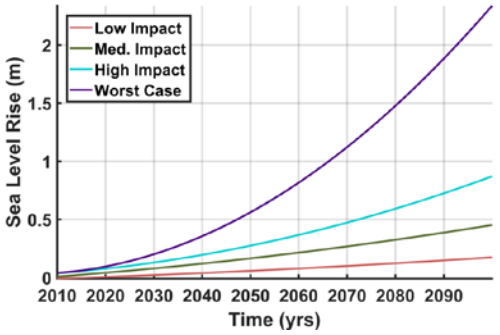
Coastal Futures Projects

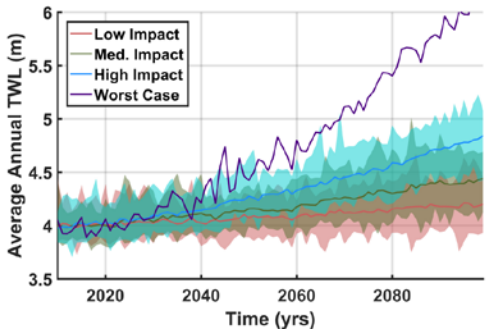
Individual Policies

Policy	BL	RA	RS	PR
BPS Constr.				
BPS Mainten.				
BPS Nourish.				
DRP Constr.				
DRP Mainten.				
DRP Nourish.				
Hazard zone development restrictions				
Remove Buildings From Hazard Zone				
Remove Critical Infrastructure from Hazard Zones				
Raise or Move structure to a new location in the same tax lot				
Raise Critical Infrastructure				

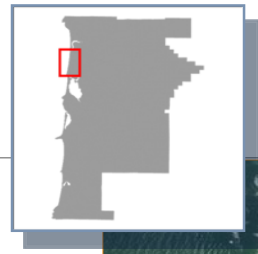
Climate Driven Forcing







Chronic Hazards



Medium Climate Impact Scenario

Beach Accessibility

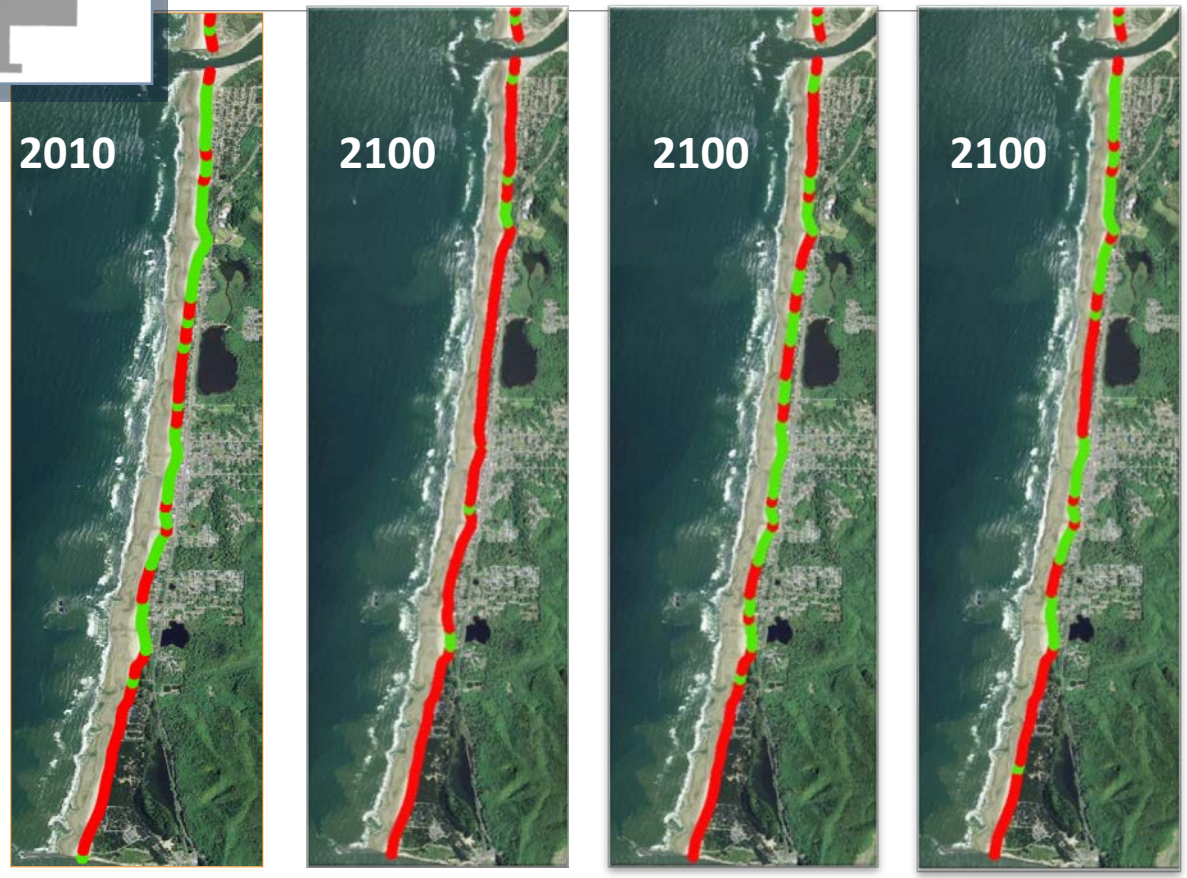
Unlimited Beach Access
Limited Beach Access

Hold the Line

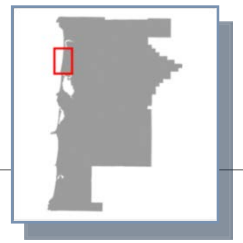
Maintain current backshore protection structures (BPS) and allow more BPS to be built on Oregon Goal 18 eligible lots.

Realign

Prohibit repetitive repairs of buildings severely impacted by erosion or flooding and remove buildings from the shoreline after they reach a predetermined repair limit using buyouts.



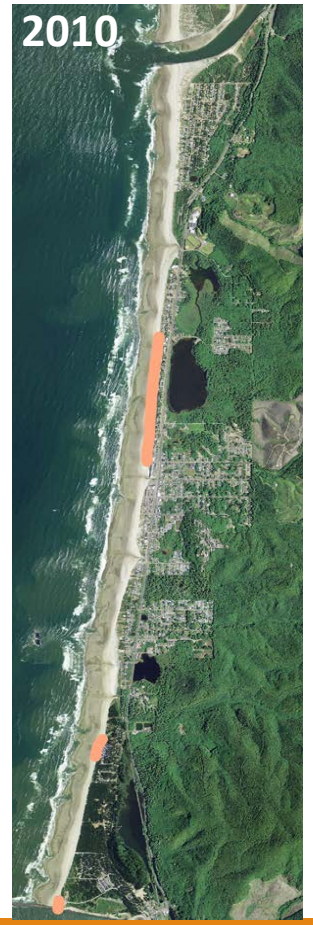
Present Day | Status Quo | Hold the Line | Realign



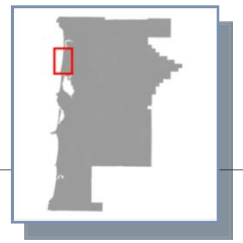
Coastline armored in response to erosion

Rockaway Beach Littoral Sub-Cell

Existing BPS New BPS



Present Day



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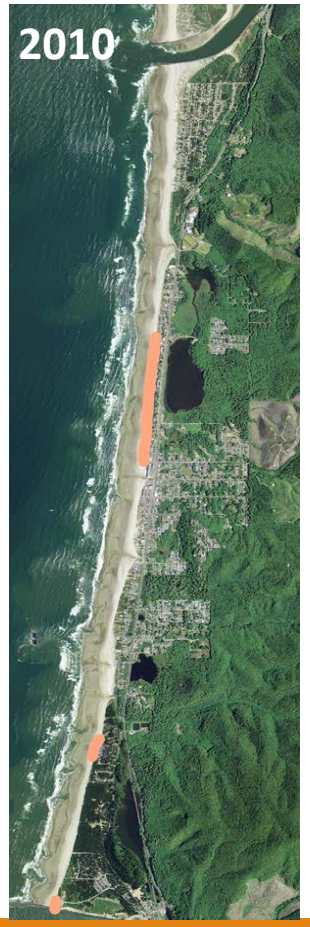
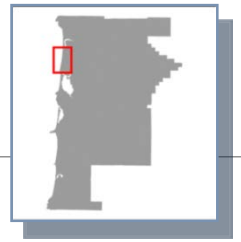


Medium Climate Impact Scenario

Present Day Status Quo



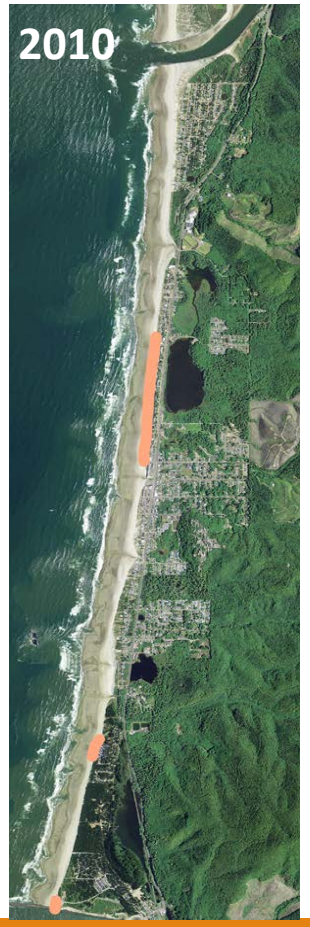
Coastline armored in response to erosion

Rockaway Beach Littoral Sub-Cell

Existing BPS

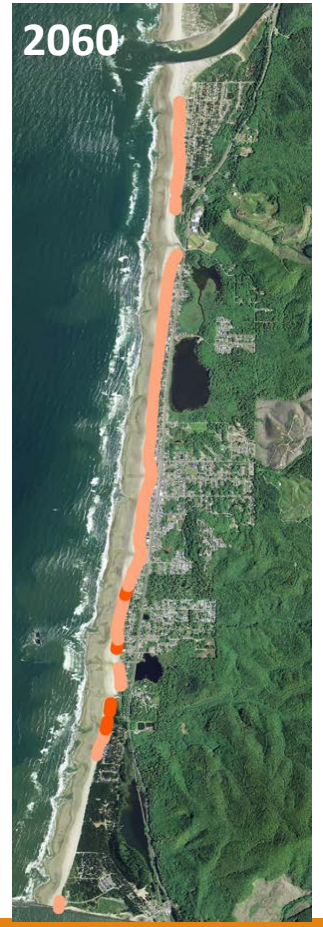
New BPS

Present Day



Status Quo

Status Quo



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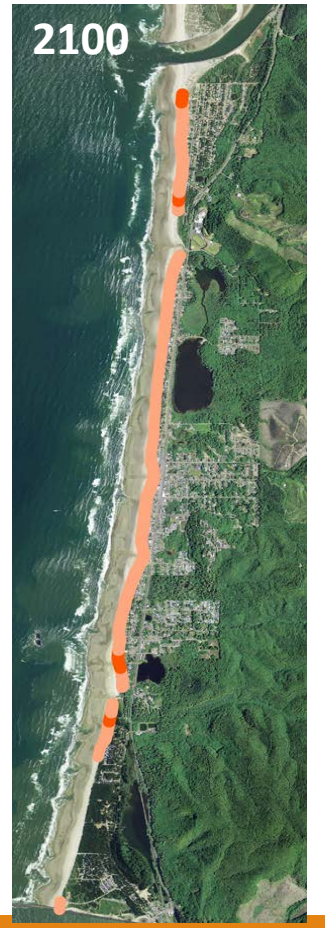
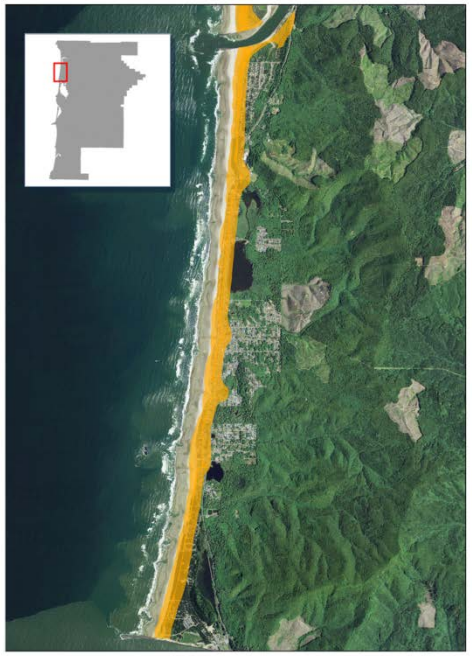


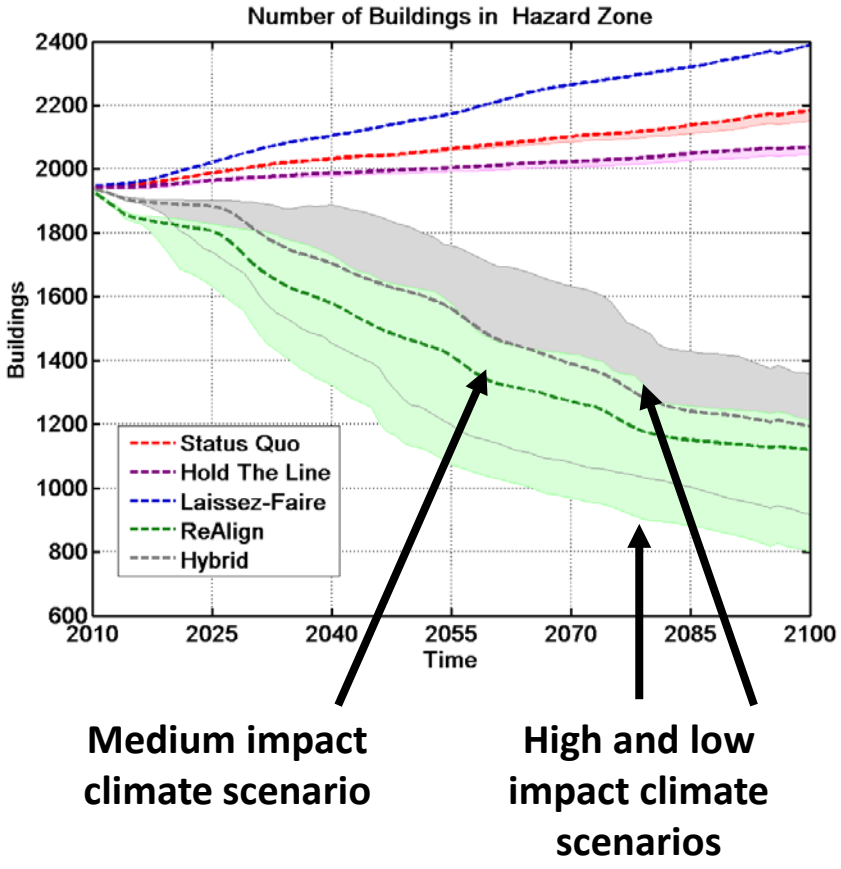
The effect of policies on development patterns

Neskowin

Rockaway Beach

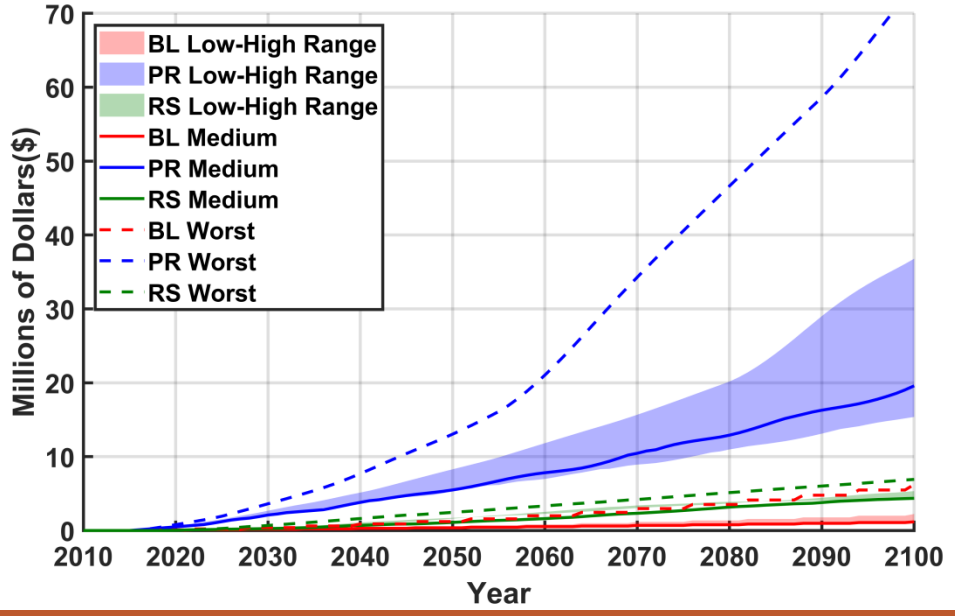


DOGAMI Hazard Zone



How expensive will adaptation options be in the future?

Limited Beach Access

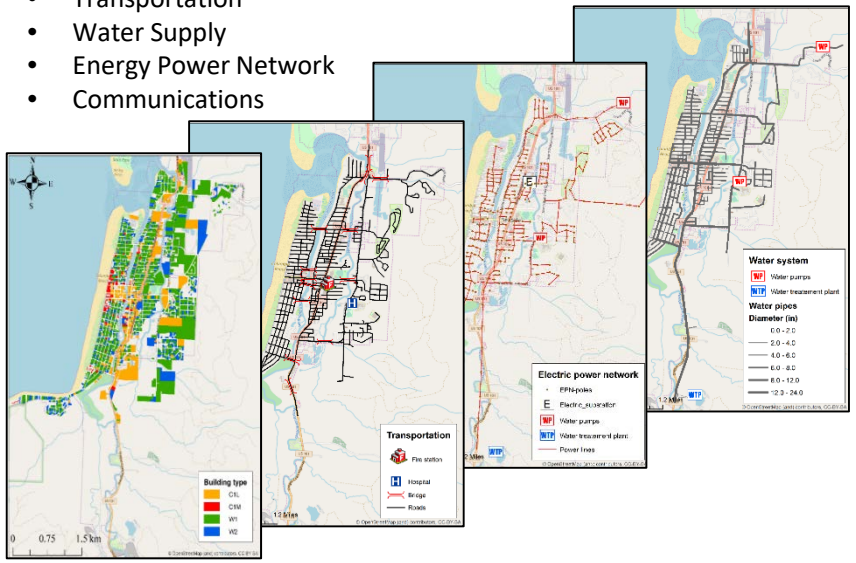


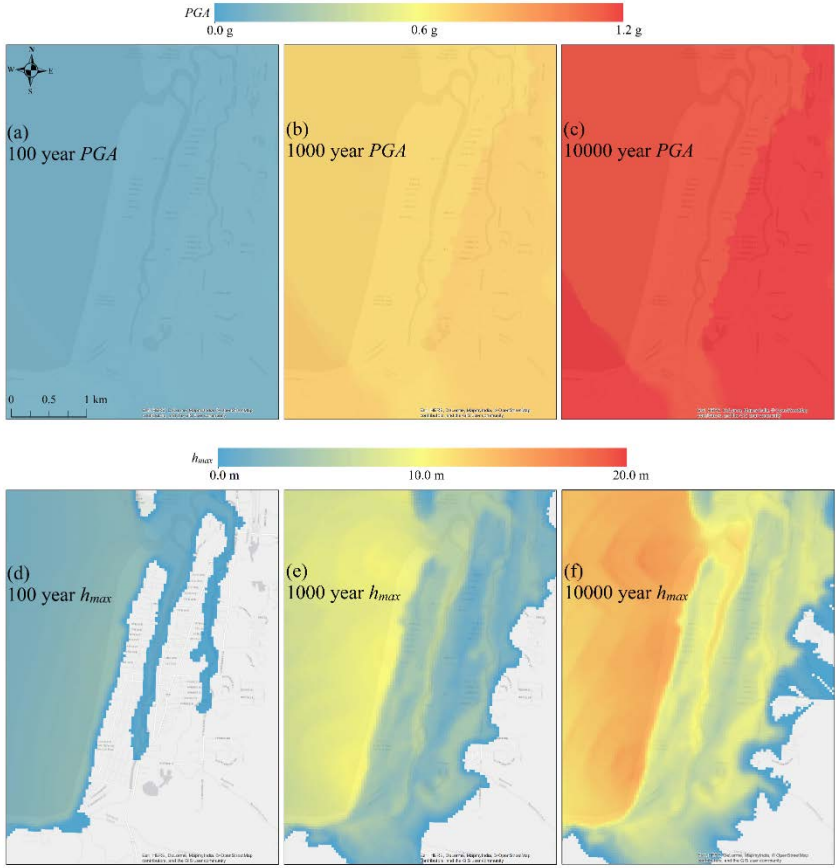
Acute Hazards
Earthquake and Tsunami

Issues

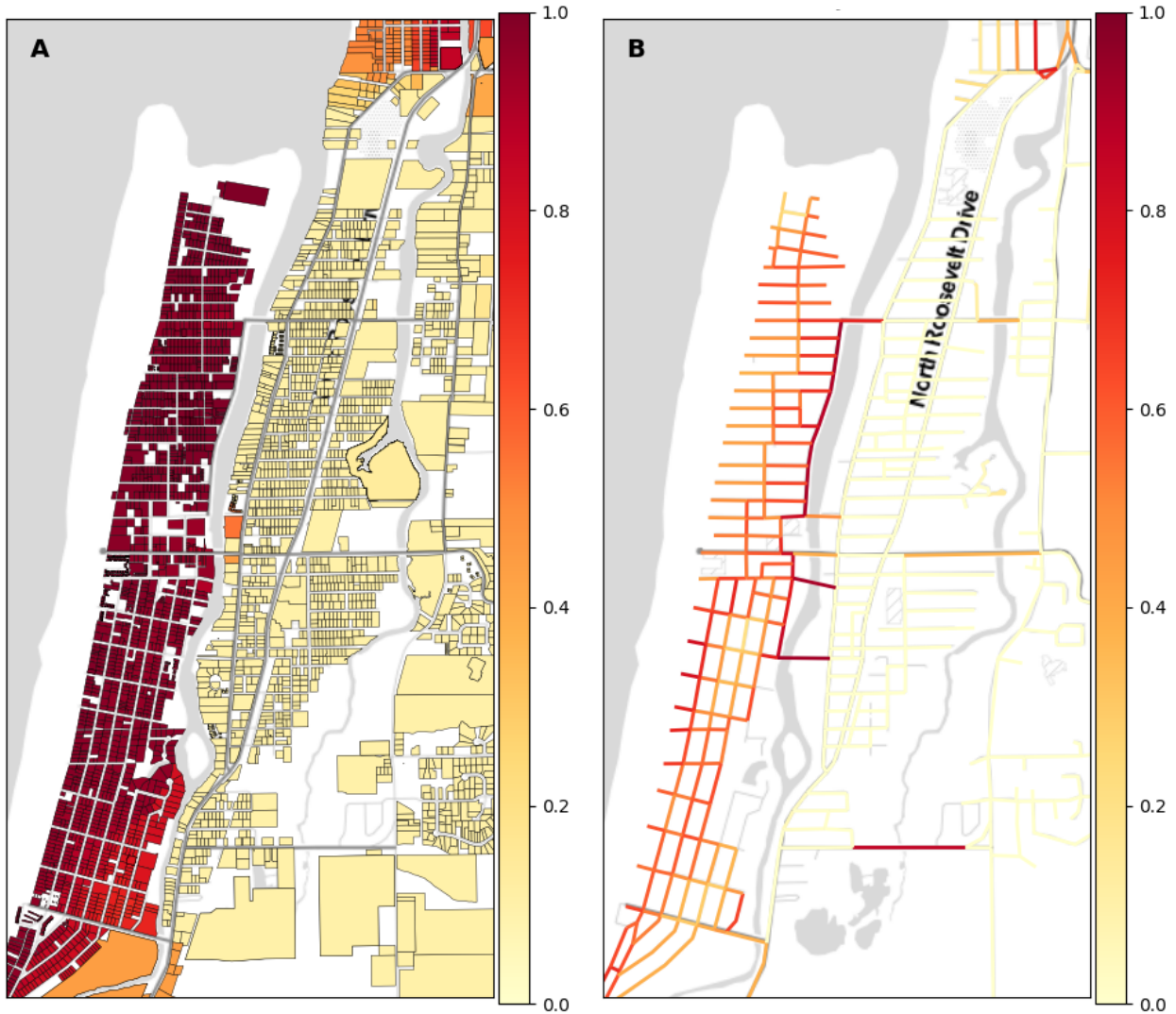
- Multiple hazards:
  - Earthquake and ground shaking
  - Tsunami
  - Liquefaction
  - Landslides

- Critical Infrastructure Systems:
  - Buildings
  - Transportation
  - Water Supply
  - Energy Power Network
  - Communications





- Cascadia Subduction Zone
  - Earthquake and Tsunami
- Built environment
  - Buildings
  - Networked Infrastructure
    - Electric Power
    - Water
    - Transportation
- Impact of Hazards on Built Environment
  - Economic Losses
  - Connectivity
- Extend to entire coast



Probability of tax-lot disconnection

Probability of link failure

Social Sciences and Equity of Resilience

Tentative Observational Findings

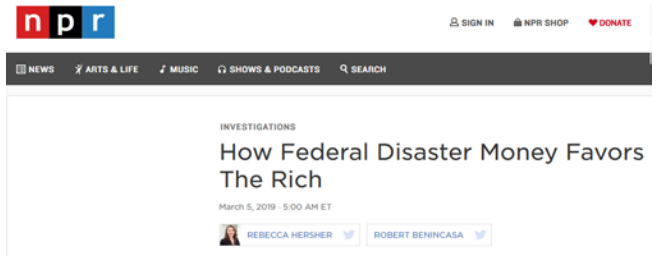
- Income, age, and education levels play roles in choosing "critical infrastructures" versus "community assets" and "civic infrastructures" such as non-profits, churches, parks etc.

Equitable Resilience

"Equitable resilience….. takes into account issues of **social vulnerability** and **differential access to power**, **knowledge**, and **resources**; it requires starting from **people's own perception of their position within their human-environmental system**"…. Matin et al. (2018)

Wealthy's use of private firefighters ignites debate in wildfire country
NBC News 4/4/18

'I Got Stuck': In Poor, Rural Communities, Fleeing Hurricane Michael Was Tough
NYT: 10/11/18



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