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# Envisioning Oregon's Coastal Futures

Advisory Council Meeting

May 19<sup>th</sup>, 2020

# Envisioning Oregon's Coastal Futures



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**3<sup>rd</sup> Advisory Council Meeting**  
19 May 2020 (10:00 am – 11:00 pm)  
Virtual Meeting

## Meeting Objectives:

- Update the Advisory Council on project progress.
- Demonstrate initial capabilities of Envision model to facilitate actionable research on hazard planning for Cascadia Subduction Zone earthquake and tsunami: **focus on transportation sector.**
- Harness the expertise of Advisory Council to develop actionable knowledge to inform statewide policies and localized decision-making.



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## Questions to Consider:

**Q1: Chronic Hazards:** How will projections of future coastal Total Water Levels (including sea level rise) be useful in your coastal resilience work?

**Q2: Equitable Resilience:** Beyond critical facilities such as hospitals and schools, what community assets (e.g., food banks, shelters, nursing homes, etc.) do you think are most important to protect for community hazard resilience and why?

**Q3: Coastal Economics:** What has been the impact of the tsunami blue line project and/or Beat the Wave on public perception of living inside or near the tsunami inundation zone? How has the public reacted to these programs and are they helping individuals to re)evaluate the risks?

**Q4 Acute Hazards:** Several reports indicate that **ISLANDING** is an important issue for coastal communities following a Cascadia Subduction Zone event, meaning that communities will face a sense of isolation or cut off from other communities. What could be some of the specific quantifiable measures of “islanding”? How would these metrics relate to aspects of the built environment (transportation, water, power, communication) and to socio-economic systems?

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## Meeting Agenda:

- 10:00 - Welcome, Introductions (lightning round all), Meeting Overview (Pat)
- 10:10 - Theme updates: progress since last AC meeting (Meredith, Jenna, Amila)  
Discussion
- 10:25 - Envision Demo (John, Dan, and Dylan)  
Discussion
- 10:40 - Discussion/Review of read ahead questions (all)
- 10:55 - Wrap up/next steps/project timeline (Pat and Peter)

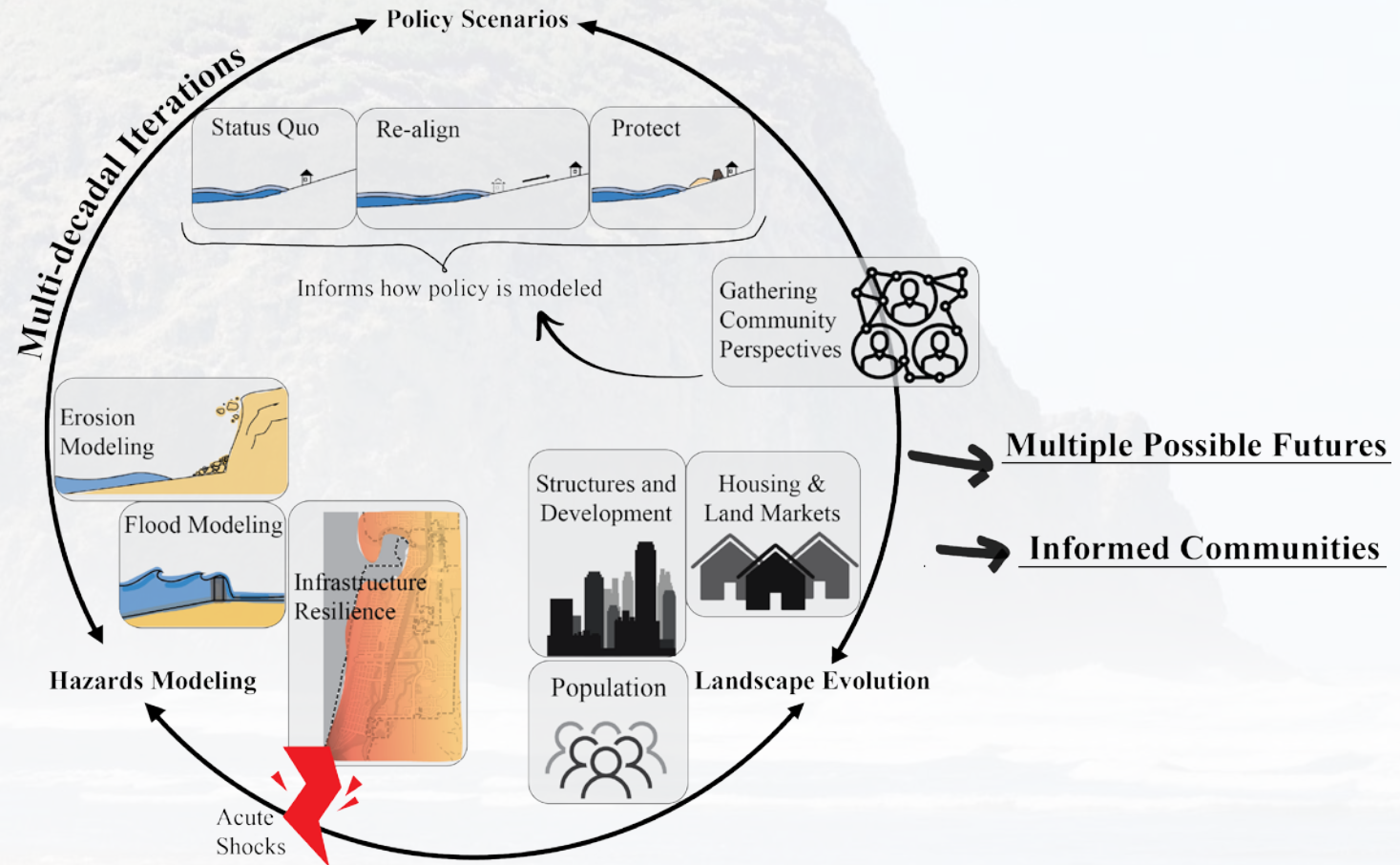
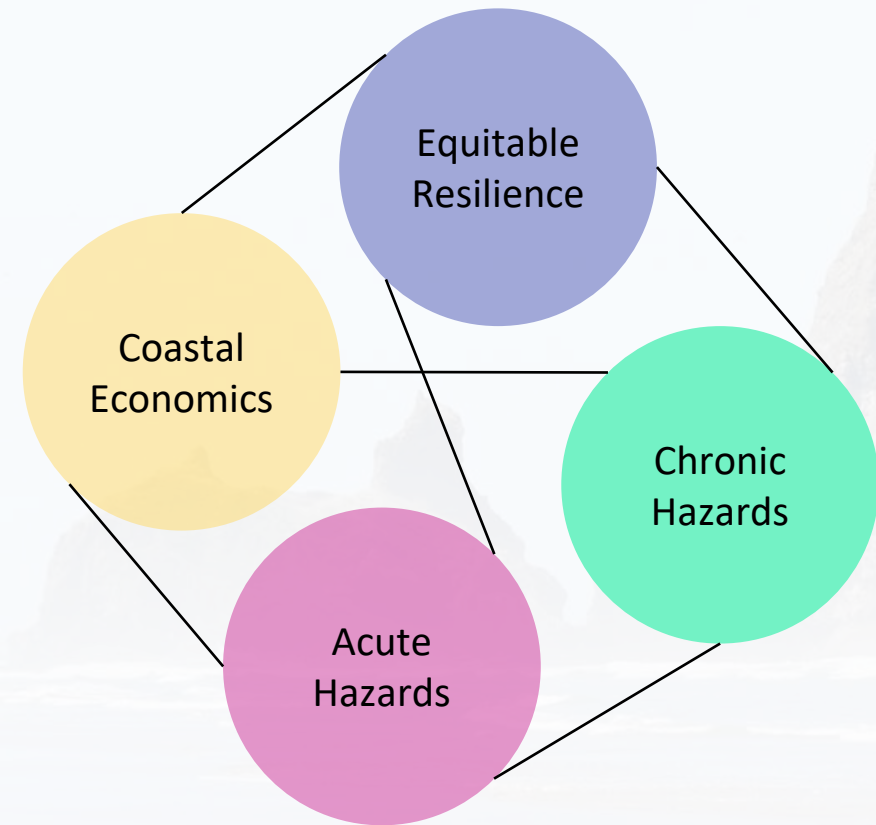
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## Project Framework







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## Chronic Hazards Analysis Update

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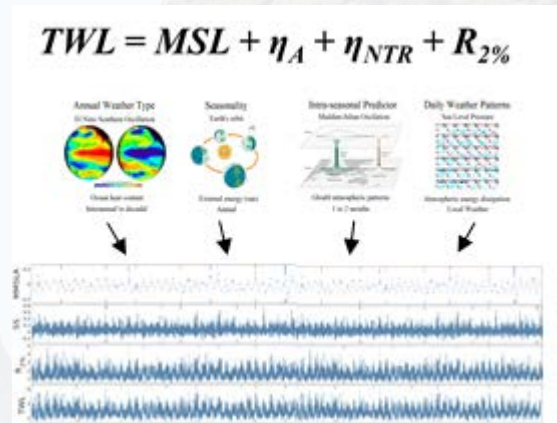
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## Chronic Hazards

### Where we are:

- Built a stochastic climate emulator for Oregon to model TWL inputs to Envision (TESLA)
- Testing coupling of TESLA TWL hindcasts and forecasts



### Where we are headed:

- Provide statewide TWL input to morphologic change models in Envision
- Link up TWLs to peer effects model of coastal armoring in Envision



### Key Questions:

- Feedbacks between drivers of chronic hazards and management strategies (e.g. armoring & ENSO)
- Role of changing climate and climate patterns in extreme chronic hazards on OR coast
- Probabilistic assessment of risk





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## Equitable Resilience Theme Update

Advisory Council Meeting

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## Equitable Resilience

### Where we are:

- Envision modeling: Refining retrofit/relocation scenarios to account for socio-demographic variations
- Qualitative assessment of hazard preparedness and response
  - Nonprofit organizations (n=25)
  - Latinx resident focus groups (n=35)
- Residents perceive critical facilities as places that are SAFE but not necessarily places they BELONG, and are hesitant to access these facilities

### Determining Critical Community Assets—Where we are headed:

- Prioritizing community assets that provide a sense of safety and belonging to model in Envision
  - **Health and Human services:** Preschools, daycares, nursing homes, mental health services, food banks, shelters
  - **Community Resources:** Churches, libraries, community centers, grocery stores



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## Coastal Economics Theme Update

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## Economics of Risk

- Tsunami risk and information shocks
  - No evidence that either the Tohoku earthquake or New Yorker article were capitalized into house prices
  - Next steps: GIS viewshed analysis, better matching procedure
- Tsunami blue line project
  - Goal: Study the effect of tsunami blue line signage on property values
  - Preliminary data collection stage



## Land Use Change

- “Where to move people” model
  - Goal: A population allocation model under the managed retreat policy
  - Use taxlot subdivisions to predict land use change
  - Preliminary data collection stage
- Coastal Armoring
  - Incorporate new TWL data into landowner decision model
  - Link decision model to Envision



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## Acute Hazards Analysis Update

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## Key Analysis Questions

For a combined Cascadia Earthquake/Tsunami event of a given magnitude:

- 1) Where and what level of **building and transportation network** damage results from the event?
- 2) What are life safety impacts resulting from the event?
- 3) Distribution of impacts – what demographics are most, least affected?
- 4) How resilient is the system (i.e. what are anticipated recovery times for various elements of the system) for various levels of investment?
- 5) How is access to **critical facilities** (e.g. hospitals, schools) and **community assets** (e.g. foodbanks, social welfare organizations) affected?
- 6) What policies effectively increase resilience of the system, and what do those policies cost?

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## Approach – Damage to Loss

- 1) Tsunami/Earthquake model damages buildings and road/bridge segments, largely based on HAZUS methods. Repair cost and level of damaged area assessed for all building and road/bridge segments in the study area.
- 2) For roads, damage at each road/bridge segment is used to determine amount and duration of capacity reduction, which in turn is used to assess travel times from specific locations (e.g. city centers) to critical facilities/community assets (e.g. hospitals, schools).
- 3) For roads/bridges, currently assume unlimited repair resources (e.g. \$, labor) are available.
- 4) Life Safety (e.g. casualties) assessed using HAZUS methodologies.

\*Earthquake data from DOGAMI

Tsunami data from DOGAMI (John Bauer)

Road data from ODOT

Bridge data and damage from O-HELP (Patrick Burns, Andre Barbosa, Mike Olsen)



# The Road Network (actually, 2)

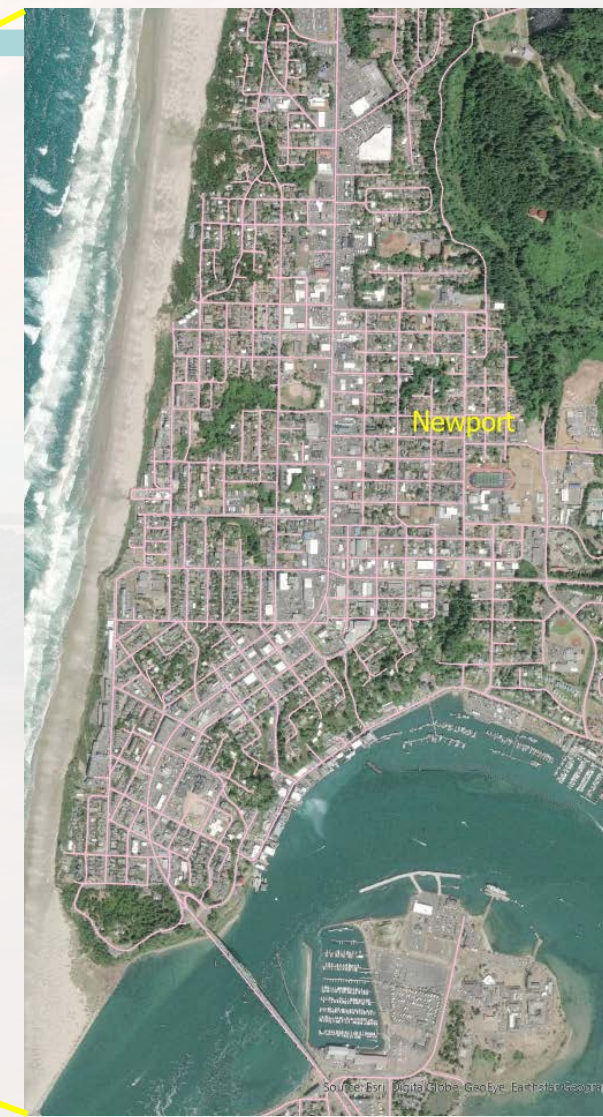
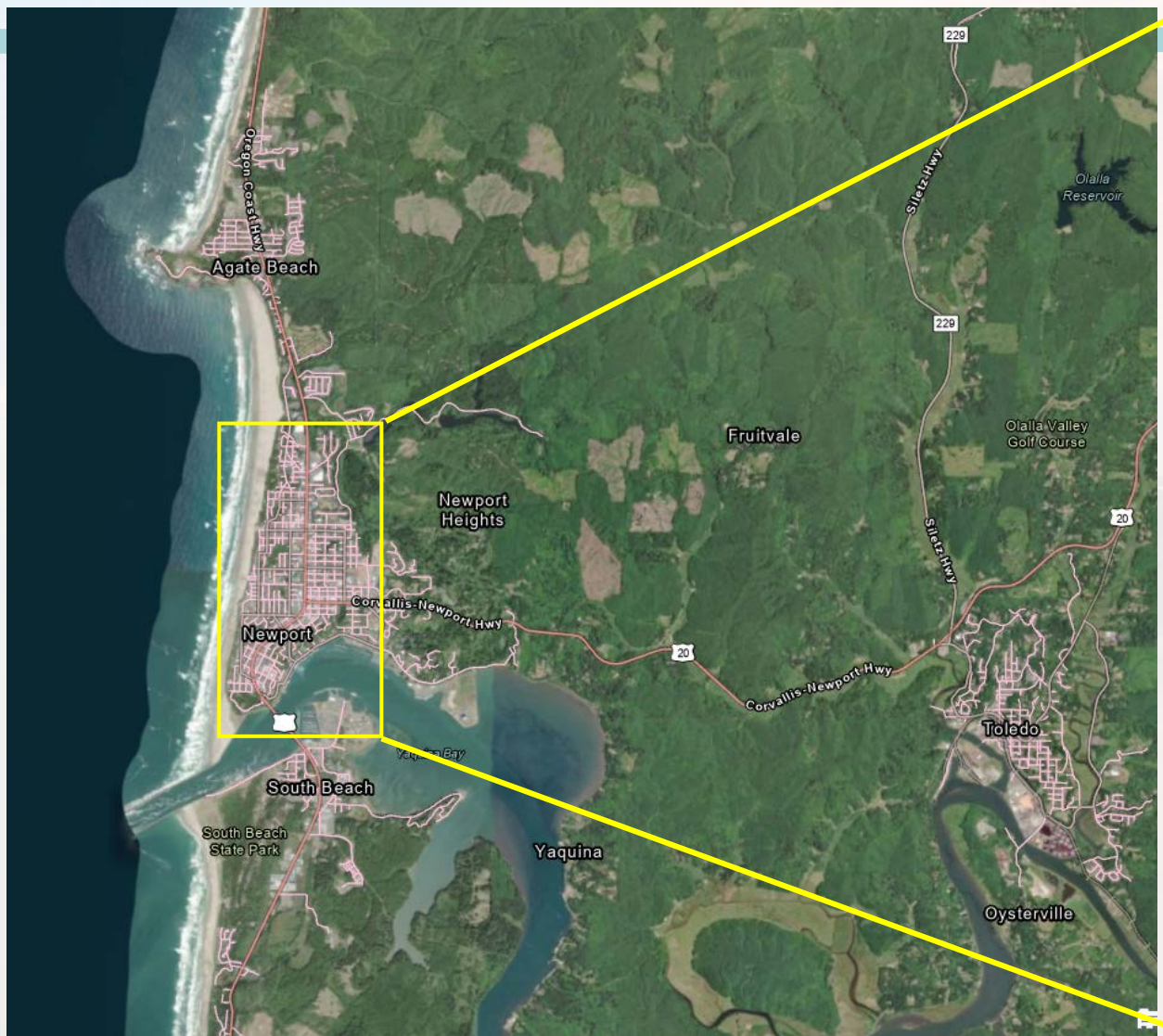
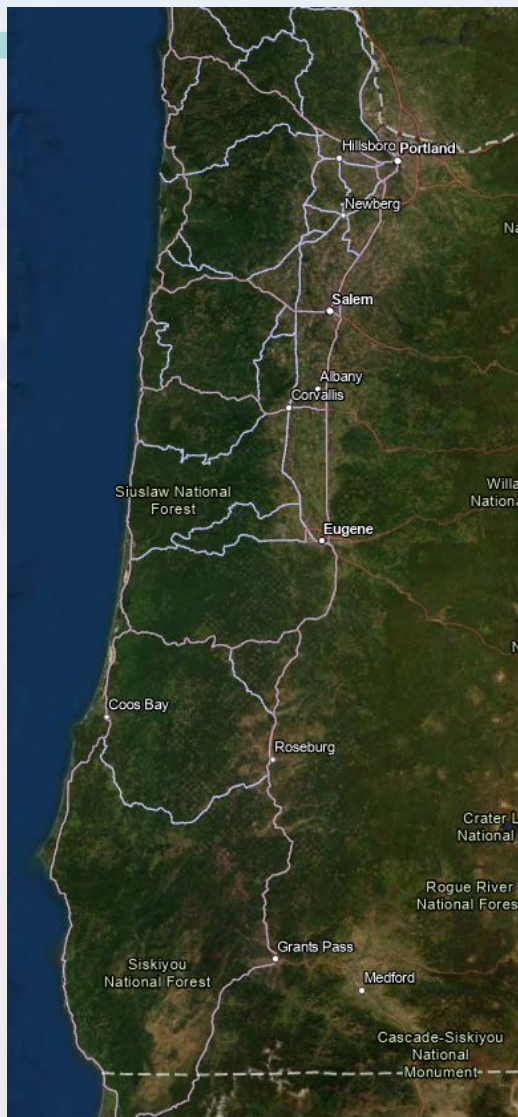


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■ “Highways”

“Full”





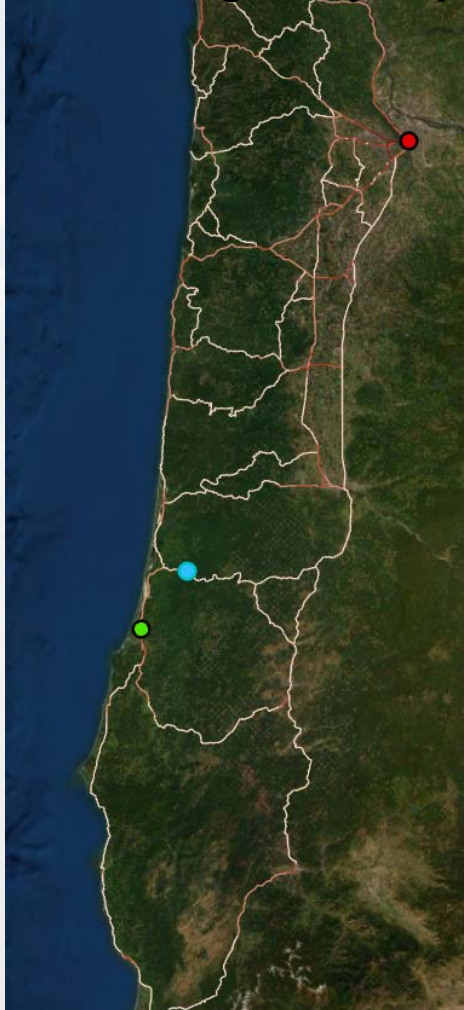
# Example Transportation System Data



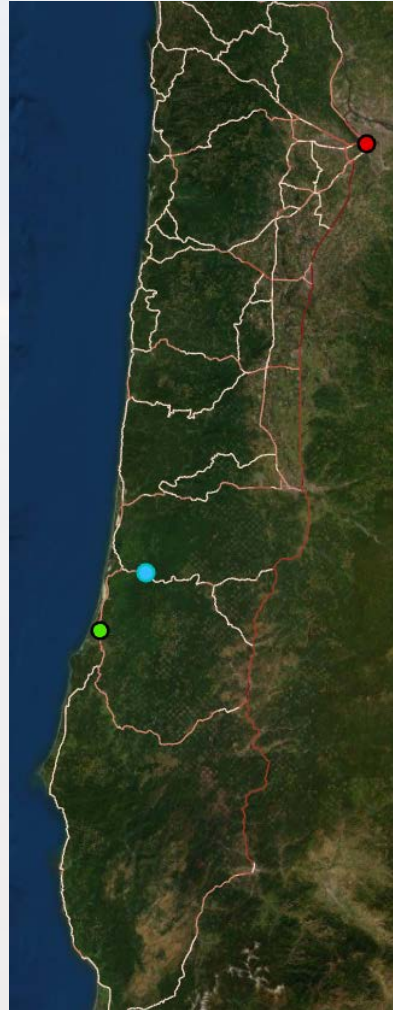
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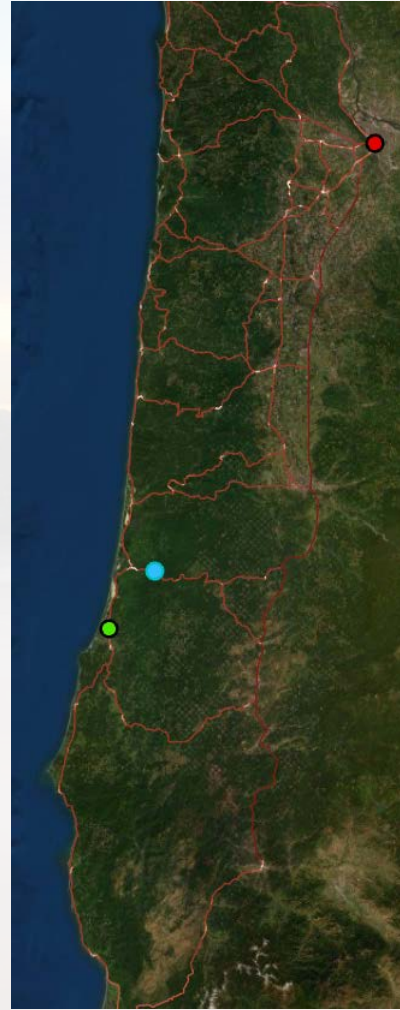
Annual Avg. Daily Trips



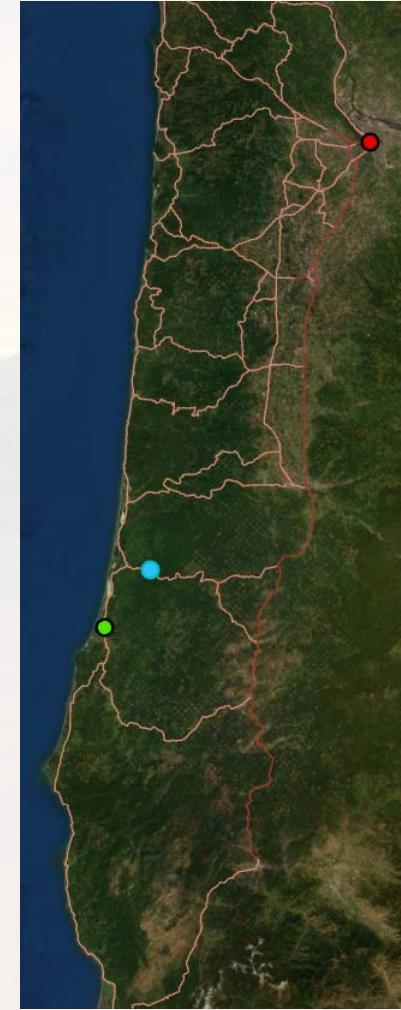
Pct. Trucks



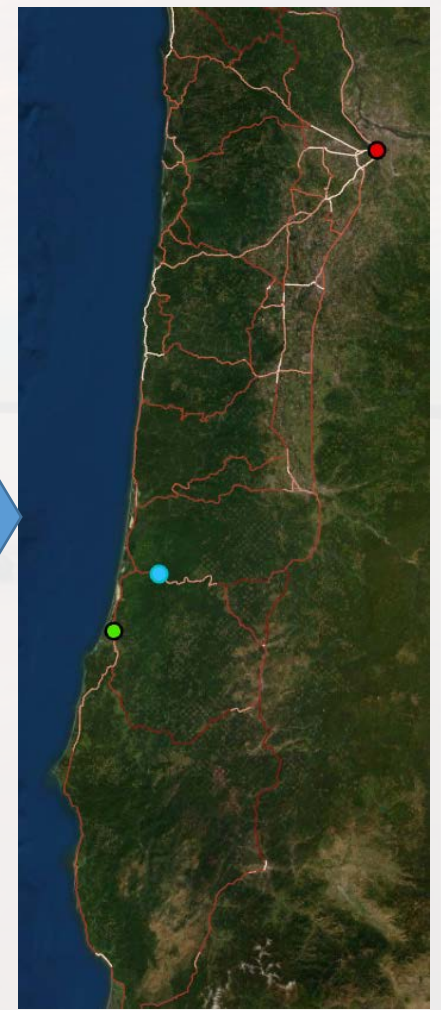
Speed Limit



Capacity (cars/hr)



Travel Times (minutes)





# Highway Damage After M9.0 Earthquake/Tsunami (L)



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## Critical Facilities

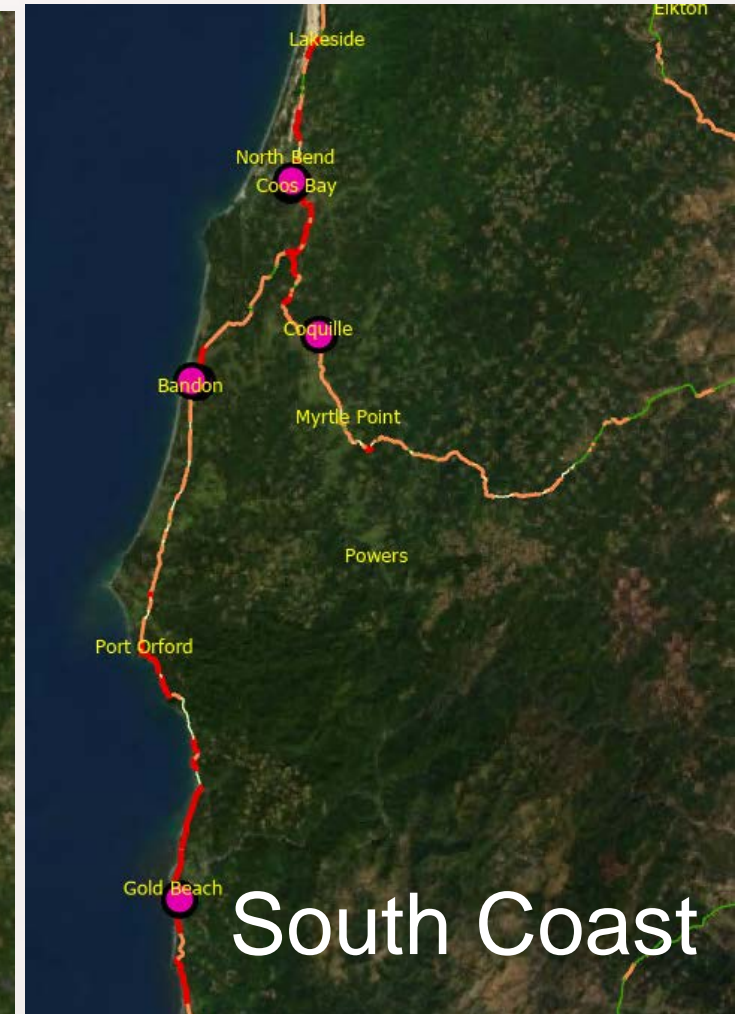
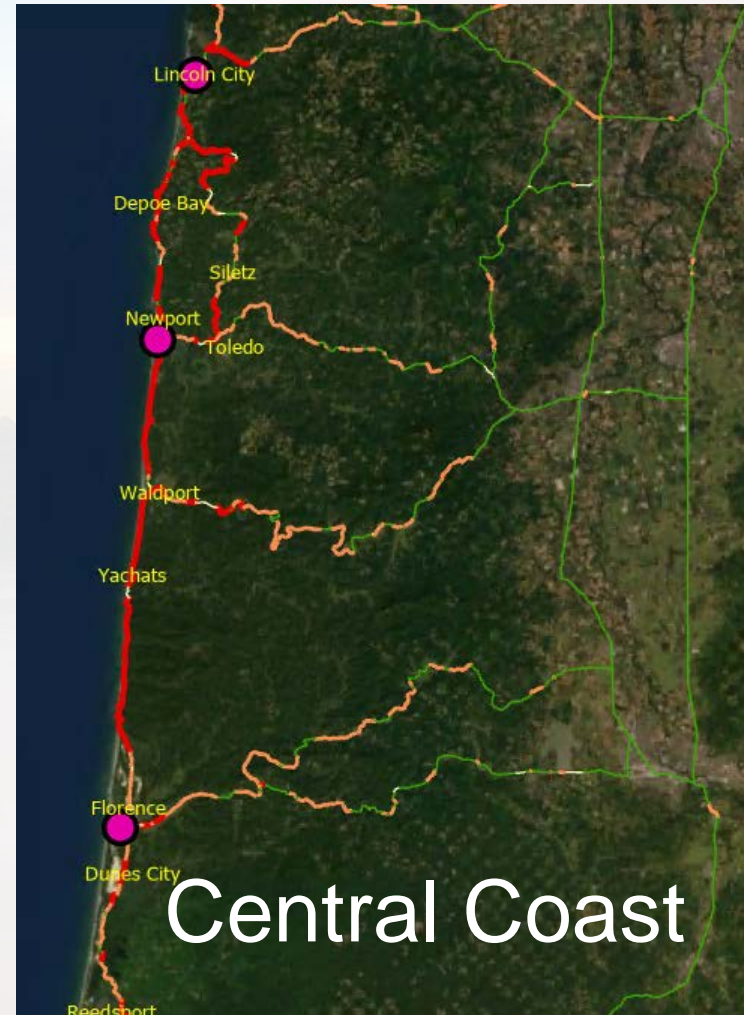
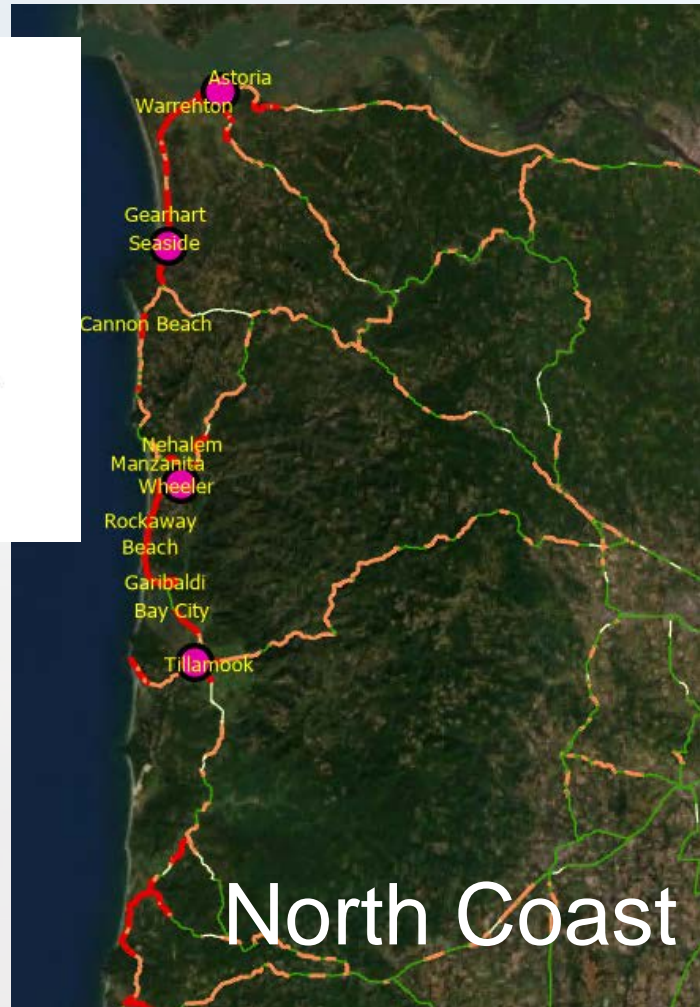
### Site\_Type

● HOSPITAL

### Roads\_Hwys

#### Damage Level

- Extreme Damage
  - Heavy Damage
  - Moderate Damage
  - Low Damage
  - No Damage
- ugb





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## CriticalFacilities

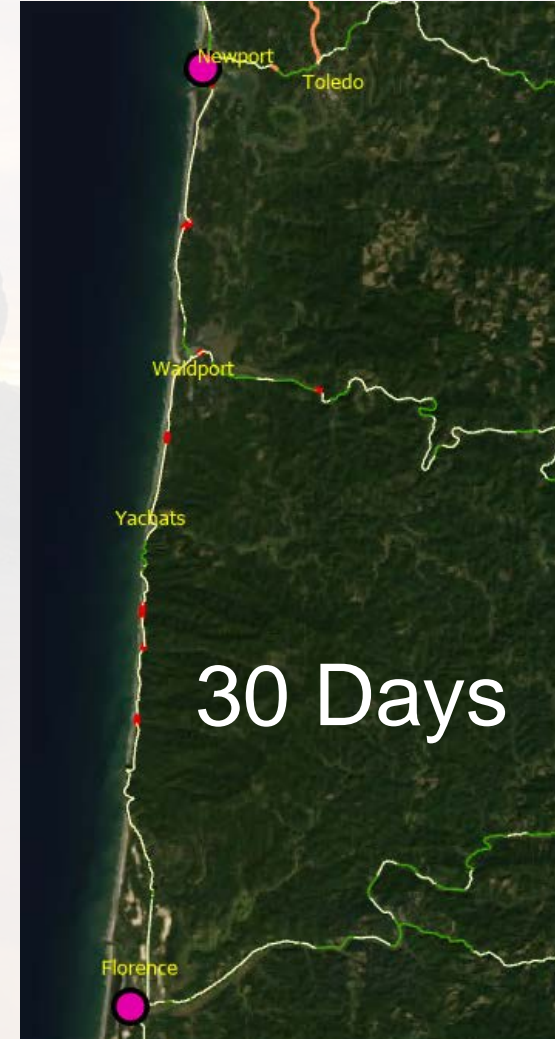
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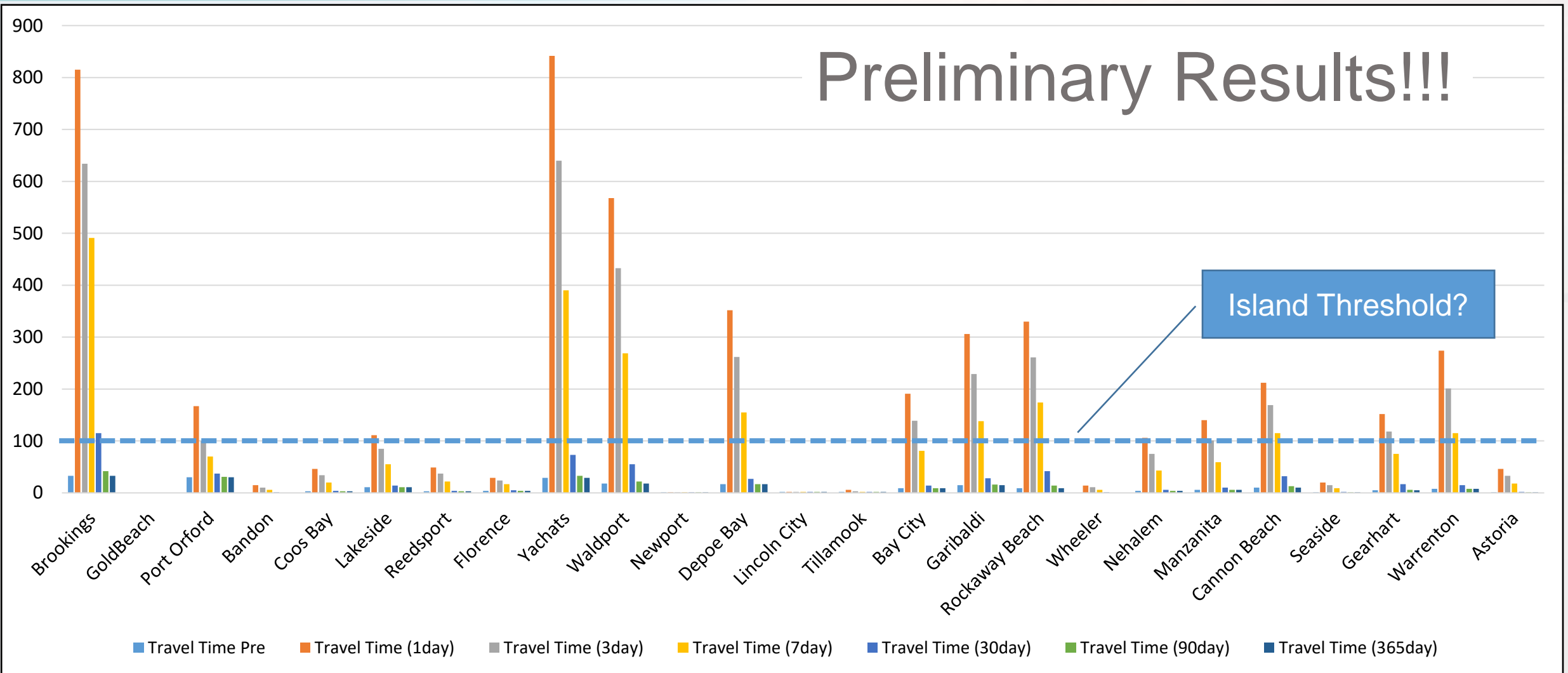
# Travel Times (minutes) to Closest Hospital Pre- and Post-Cascadia Event



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## Preliminary Results!!!



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## Key Questions we'd like your thoughts on...

- Are we in the right ballpark in terms of our overall approach to assessing acute hazards?
- Several reports indicate that ISLANDING is an important issue for coastal communities following a Cascadia Subduction Zone event, meaning that communities will face a sense of isolation or cut off from other communities. What could be some of the specific measures of “islanding”? How would these metrics relate to aspects of the built environment (transportation, water, power, communication) and to socioeconomic systems?
- What are the right time scales in which to assess acute hazard recovery?
- What type of pre- and post-event adaptation/mitigation strategies should we be considering?
- Are there important aspects that we should be examining that we've missed?



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## Questions to Consider:

**Q5: Considering the COVID-19 Crisis:** Are there any new coastal resilience issues we should be considering? Post-pandemic, are there changes that you foresee that will impact what we are doing??

**Q6: Process Question:** How shall we conduct future Advisory Council meetings? We would like to propose a change from bi-annual in person meetings to more frequent (perhaps quarterly) virtual meetings. What are your thoughts? Also, are there significant benefits to splitting up the Advisory Council in terms of interest in our project themes (Acute Hazards, Chronic Hazards, Equitable Resilience, Economics of Risk) or shall we continue to meet as a full group and focus on the integration of the themes. Finally, have you seen or experienced any tips or tricks for these types of zoom/webex/virtual meetings that we should try?