













### **Grays Harbor County Coastal Futures Project:** Policy Scenario Development Meeting

6 June, 2016 (3:15 pm – 6:30 pm) Grays Harbor College, Schermer Building (Room 4134)

**Meeting Objectives:** 

- **1. Review synthesis of the Kickoff Meeting**
- 2. Explore and build draft policy scenarios
- **3. Begin to organize technical working groups**



#### 6 June, 2016 (3:15 pm – 6:30 pm)

### Agenda

- 3:15 3:30 Welcome and Introductions
- 3:30 3:50 Impacts of the 2015-2016 El Niño winter: *Review and Discussion*
- 3:50 4:05 Preliminary look at the *Grays Harbor County Envision* model
- 4:05 4:35 Review and Synthesis of the Kickoff Meeting
- 4:35 4:45 Break



#### 6 June, 2016 (3:15 pm – 6:30 pm)

### Agenda, Cont'd.

- 4:45 6:00 Policy scenario review and policy scenario building breakout sessions.
- 6:00 6:10 Breakout Group Report
- 6:10 6:30 Wrap-Up and Next Steps: Discussion of timeline; Discussion of technical working groups; next workshop
- 6:30 Light snacks provided; Quick Survey and Networking



#### **Project Objectives:**

- •Participate in a **'Knowledge to Action Network'** consisting of a **collaborative team** of stakeholders, researchers, and outreach specialists who will **co-produce knowledge** to inform climate-resilient strategies in **Grays Harbor County**.
- •Collaboratively develop the information and tools necessary to envision future scenarios, assess impacts and vulnerability associated with climate change driven erosion and flood hazards, and quantitatively evaluate a range of adaptation strategies.







### **Envisioning Coastal Futures**



### **Alternative Futures Analysis:**

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



### Impacts of the 2015-2016 El Niño Winter:

### George Kaminsky Washington State Department of Ecology



### Impacts of the 2015-2016 El Niño Winter:

### Discussion/Map exercise





#### **Envisioning Future Scenarios**

• The spatially explicit, multiparadigm modeling framework *ENVISION* is utilized to create and analyze plausible future scenarios.

• Future scenarios analysis allows for the assessment of alternative coastal management options under various population and development trends, coastal and landscape processes and feedbacks, and climate change impacts.



#### Bolte et al., 2007



#### Using Envision to Explore Grays Harbor County Coastal Futures



Grays Harbor County Envision Representation

# County-wide representation

Sea level rise scenarios based upon NRC projections

**Development** operates on Grays Harbor County GIS parcels

**Erosion** and **Flooding** on outer coast uses LIDAR

**Flooding** in Bay based upon NOAA digital elevation map



#### **Endpoint: Number of Buildings Impacted by Coastal Hazards**



 Low SLR

 High SLR

 200
 201
 202
 203
 204
 205
 206
 207
 208
 209
 210

Low SLR — High SLR

**Population increase:** 

0.3% per year based upon Wa. OFM estimates

#### Increasing buildings

in parcels at rate of**2.0** people perbuilding

2110

**Preliminary Outputs** 



#### **Endpoint: Beach Accessibility**

Ability to walk the beach alongshore more than 90% of the year



% Beach Accessibility (County Wide)

% Beach Accessibility (Near Jetty)





#### **Endpoint:** Beach Accessibility (near Jetty)

Ability to walk the beach alongshore more than 90% of the year

Unlimited Limited **Beach Access Beach Access** 2010 2100 North Jetty South Jetty ~5 km (~3 mi) stretch either side of Jetty

Low Sea Level Rise





#### **Further Steps**

- Continue advancing model both data sets and biophysical models
- Continue to work with our partners (you) to explore the effects both a changing climate and management policies have on the coast
- Move toward defining a set of scenarios consisting of policies that can help to **build adaptive** capacity in response to a changing coastline





### Review of Grays Harbor County Coastal Futures Project: Kickoff Meeting

February, 2016

#### **February Meeting Objectives:**

1. Introduce project and process

 Characterize issues and priorities regarding coastal hazards in Grays Harbor County

Begin to explore alternative visions for the future of Coastal Grays Harbor County





### **Endpoints Review**

# Endpoints are metrics that measure how well we are doing at achieving some desirable outcome.

Endpoints provide a way to evaluate how well a given scenario performs



#### **Examples:**

- 1. Value of property impacted by hazard
- 2. Amount of habitat provided for species of concern
- 3. Amount of developable lands
- 4. Costs of hazard mitigation



### **Strategies Review**

# Strategies are decisions or plans of action for accomplishing desired outcomes

Strategies define the **rules** and **management options** that are available to landowners, decision-makers.



#### **Examples:**

- Add riprap when erosion rates are high and structures are impacted
- 2. Restrict new development in areas that have experienced flooding more than twice in the last 10 years
- **3. Move structures** to the safest site on lot when subject to frequent flooding



# Characterize issues and priorities regarding coastal hazards in Grays Harbor County

#### Problems

Brainstormed coastal and bay problems/issues of concern in Grays Harbor County

#### **Endpoints (Metrics)**

For each problem, we discussed how we could measure that issue

#### **Strategies**

We discussed solutions to help fix or mitigate the problems

#### Example:

 Flooding in Grays Harbor

#### **Example:**

- # of acres flooded
- # buildings impacted by flooding
- Cost of buildings impacted by flooding

#### **Example:**

- Increase number or size of pumps
- Raise buildings to 100year flood event level
- Relocate buildings in flood zone



### **Breakout Groups**



### Endpoints

How far water going in land w/ surge aquaculture inundation/suitability Km lost, wetland loss

revenuet placement

- # Structures damaged flooding crossion wind
- Water qualify high days industry closed river Contaminant spikes

Strategies

- purchasing land Surge plains No-build, wild areas
- retreat/protect habitat

- No reverment - Smplan -> communication across wider area - riprop, move the structure lift up - no-build / Setback Zones for Coast - no-build / Setback Zones for Coast - notashed plans - land setback, riparian Zone protection, stammoter watestructure



#### State

### Back at the office, our team captured all of the problems, endpoints and strategies from the small group discussions

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Problems	Endpoints	Sharegies
Sea level rise - flooding aqualities/ apprimate Initiat - clam/fish/bid habitat loss - conde/provity loss - conde/provity loss	How far mater going in land w/ surge aquaculture mandaten/southerlish beach lost wetther loss revented placement - & Stacture chanaged Election guide	- purchasing land - Surge plains > no -build, wild areas - retreat/protect habitat - no reventionat - snotle - summinication acurs where area - viewop, move the sheather 100 op
- beach habibilitatess economy - river Stam ballation Thanky - Bay scherooch	- Wate gan (19) - 149 Corp. macht and 1900 Carlier and 1900 Phillipping - Charles ( danaged Interpreter - 1 and )	- No-build Schart Zones for Coost . - No-build phrs - build subset information - hole hand - build subset information - hole build of flood zone
- Durix over s - Brack Acess -> chinned	by - encagency (School - electric franching - painty system 3)	- Scanalls - Lones / dikes / Water Provident - Wettand press water, fact familiant
	Acard) acres print (and) acres print	- photos in dura - photos in dura - gentubes / begs in duras - functing - funct





### Next we broke the problems into topics, and started grouping endpoints and strategies into these topics

Outer coast flooding

Bay flooding

Outer coast change hazard

Outer coast habitat

Estuarine habitat



#### Finally we began grouping strategies and endpoints together, and identifying questions and model implementation issues to discuss with technical working groups

Endpoints	Model	Strategies
	Implementation Issues	
Topic: Bay Flooding		
<ol> <li>Number of days flooding occurs in bay</li> <li>Bay area impacted by flooding (acres)</li> <li>Infrastructure impacted by flooding (days or length/area)         <ul> <li>Number of buildings</li> <li>Mileage of roads (mi/km)</li> <li>Mileage of railroads (mi/km)</li> <li>Number of bridges</li> <li>Number of port facilities</li> <li>Number of days sewer backs up</li> </ul> </li> <li>4) Cost of flood damage (\$)</li> <li>Length or area of shoreline accessible during flooding</li> <li>Impact of flooding on potable water</li> </ol>	Need criteria         Need criteria         Discussion needed to define         impact for some of these         variables (port facilities in         particular)         Need criteria         Discussion needed to define         accessibility (particular areas?         Particular recreation activities?)         Discussion needed – may be         beyond scope of model	<ul> <li>Prohibit any new protection measures (e.g. revetments, beach nourishment)</li> <li>Build hard structures (e.g. rip rap revetments, geotextile bags) for bay protection</li> <li>Relocate buildings out of flood zone with easements*</li> <li>Raise buildings (personal/public property) to withstand flooding*</li> <li>Raise/update infrastructure (roads, bridges, dikes, tracks) to withstand flooding*</li> <li>Relocate buildings/homes to safest site on their property*</li> <li>Preserve open space for flood mitigation**</li> <li>Increase size/number of pumps for flood management**</li> <li>Update building codes to include flood resistance***</li> <li>Dike/dam river to prevent flooding in bay***</li> </ul>



#### Now we want to review these endpoints and strategies briefly with you, and then we'll break out into small groups to discuss in more detail

Endpoints	Model Implementation	Strategies
	issues	
Topic: Bay Flooding		
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<ul><li>4) Cost of flood damage (\$)</li><li>5) Length or area of shoreline accessible during flooding</li></ul>	Need criteria Discussion needed to define accessibility (particular areas? Particular recreation activities?)	
6) Impact of flooding on potable water	Discussion needed – may be beyond scope of model	



### Feedback

- 1. Did we hear you correctly?
- 2. Is there anything missing?
- 3. Does the organization make sense?





#### A note on parking lot items...

A few important problems we discussed at the first meeting are most likely beyond the scope of this project. We want to be upfront about these issues early, so that we can focus on the issues that we **can** explore in this project.

#### Parking Lot:

- Dredging impacts on shellfish, other biological communities
- Modifications to Chehalis River watershed
- Ocean Acidification
- Community social structure impact
- Land platted out, limits adaptation measures





# **Break**

- Look over the strategies and endpoints sheet
- Participate in the flood map
- Grab coffee, snack



### **Oregon State**

# **Defining Scenarios**

# **Envision Coastal Futures for Grays** Harbor

### John Bolte

**Biological & Ecological Engineering Department Oregon State University** 



#### **Trajectories of Change and Alternative Futures**

Scenario analysis "aims to identify the several most important issues responsive to policy and planning decisions, along with the widest range of options pertaining to these issues... A scenario is then created to reflect choices among the possible options for each policy in the set."

From Steinitz et al. 2003











# **Policies and Strategies**

Landscape policies and strategies are decisions or plans of action for accomplishing desired outcomes.

Policies and Strategies define the **rules** and **management options** that are available to landowners, decision-makers.

Examples:

- 1) Add BPS when erosion rates are high and structures are impacted
- 2) Restrict new development in areas that have experienced flooding more than twice in the last 10 years
- 3) Move structures to the safest site on lot when subject to frequent flooding







# **Climate Scenarios** (Physical Drivers)

# X

# Policy Scenarios (Human Drivers)



# **Draft Scenarios**



- Status Quo continues current trends, policies
- Retreat a set of strategies that emphasize relocating infrastructure out of hazard areas, avoiding new development in impacted areas.
- **Reinforce** emphasis on protecting, hardening existing infrastructure, dunes.
- Green emphasis on protecting, expanding nearshore habitats; soft strategies to reinforce dunes.

Draft Scenario 1 (Status Quo)	Draft Scenario 2 (Retreat)	
<ul> <li>Recent trends, population growth patterns, existing coastal and land use policies continue into the future</li> <li>Serves as a basis that the other scenarios build on</li> <li>Provides a baseline to compare with the other scenarios.</li> </ul>	<ul> <li>Prohibit any new protection measures (e.g. revetments, beach nourishment)</li> <li>Remove dikes to allow for habitat expansion</li> <li>Use easements to allow natural expansion of habitat (more active approach)</li> <li>Allow habitat to retreat into undeveloped areas (more passive approach)</li> <li>Relocate homes from the bay or outer coast</li> <li>Relocate buildings/homes to safest site on their property</li> </ul>	
Draft Scenario 3 (Reinforce)	Draft Scenario 4 (Green)	
<ul> <li>Build hard structures (e.g., riprap revetments, geotextile tubes) for protection</li> <li>Use soft or green strategies for protection <ul> <li>Nourish beaches or rebuild dunes</li> <li>Reinforce dunes through dune grass plantings</li> <li>Add fencing to help trap sediment in dunes</li> </ul> </li> <li>Build or move homes/buildings to safest site on property</li> <li>Raise infrastructure/homes to a base flood level</li> <li>Increase size and/or number of pumps for flood management</li> <li>Increase size and/or number of sandbags available for flood management</li> </ul>	<ul> <li>Prohibit any new protection measures (e.g. revetments, beach nourishment)</li> <li>Remove dikes to allow for habitat expansion</li> <li>Use easements to allow natural expansion of habitat over time (more active approach)</li> <li>Allow habitat to retreat into undeveloped areas (more passive approach)</li> <li>Use soft or green strategies for protection <ul> <li>Nourish beaches or rebuild dunes</li> <li>Reinforce dunes through dune grass plantings</li> <li>Add fencing to help trap sediment in dunes</li> </ul> </li> </ul>	



## **Co-development of Policy Scenarios**



# Small Group Assignment

Your Task: For a given Policy Scenario

- 1) Review the **name** of the scenario does it capture what the scenario is emphasizing?
- Review the strategies that have been attached to the scenario. Feel free to suggest edits, additions, and deletions that better capture the scenario.

You will have two chances at this...



# Wrap up and Next Steps

- Continue to bolster the Grays Harbor County 'Knowledge to Action' Network
  - Organize technical working groups (sign up sheets!!)





# **Technical Working Groups**

- Coastal Development and Planning
- Coastal Ecosystems and Habitats
- Coastal Hazards and Climate Change Scenarios
- Model results visualization/communication



# Wrap up and Next Steps

- Continue to bolster the Grays Harbor County 'Knowledge to Action' Network
  - Organize technical working groups (sign up sheets!!)
- Continue to **Co-develop policy and climate impact** scenarios to incorporate and explore in Envision



# Wrap up and Next Steps

- Continue to bolster the Grays Harbor County 'Knowledge to Action' Network
  - Organize technical working groups (sign up sheets!!)
- Continue to **Co-develop policy and climate impact** scenarios to incorporate and explore in Envision
- Continue to 'Envision' alternative Grays Harbor County Coastal Futures
  - Initiate dialogue regarding how the approach and findings might inform land use planning.













# Last Thoughts??

- Did anything about today's discussion surprise you?
- Is there anything in particular that you would like us to follow up on?
- Who was not here that should have been?
- Our contact information is on the back of your agendas
- Please fill out the short survey we just handed out.

# **Thanks Very Much!!**