



GRAYS HARBOR COUNTY COASTAL FUTURES PROJECT: RECAP, RESULTS AND NEXT STEPS MEETING

DEVELOPMENT STORYLINE

Oregon State University

Policy Scenario Legend

Climate Low Medium High Worst Case Baseline Realign Protect

Assumptions:

- A single time series of county wide population growth rate is used throughout all policy scenarios. The 0.3% growth rate is taken from 2010 Census Data.
- Population growth varies by city and population is allocated relative to current zoning.
- Development capacity is defined as the percentage of undeveloped area that is zoned for future residential development.
- Currently the people per dwelling unit varies throughout the county (approximately 2 to 3), including the incorporated cities and rural areas.
- The FEMA 100-Year Flood Hazard Zone represents areas where there is a 1% chance of flooding in any year, or a likelihood of flooding 1 out of every 100 years.
- In the Realign policy scenario, buildings are removed once they are impacted by flooding if they are located in the FEMA floodplain hazard zone. The buildings are then rebuilt outside of the FEMA hazard zones in areas zoned for development.
- Also within the Realign policy scenario, development restrictions are enacted prohibiting new buildings to be constructed in the FEMA hazard zone.
- For this project, we have used the newest FEMA floodplain mapping product (effective in 2017).

How do development patterns change over time? **Projected Population Growth in Grays Harbor County** Figure 1: County-wide population growth. (Based on extrapolating 2010 Census Data). Population Density Available Development Capacity in Grays Harbor County by City Figure 2: > 5000 Available development capacity under a **Baseline** policy scenario and a medium impact climate scenario. -Ocean Shore Figures 4—7: Current population density (2010) (left) and projected population density in 2100 (right) in **Buildings in Grays Harbor County by City** Ocean Shores (top) and Westport (bottom). Number of Buildings within One Mile of the Shoreline Figure 3: Number ——Aberdeen of new buildings Figure 8: Cumulative number of **Ocean Shores** located within buildings within one mile of the each city under a Outside of Cities shoreline under **all** policy scenarios for medium impact the **high** impact climate scenario climate change (County-wide). Policy scenarios are scenario (Various plotted with the colors denoted in the locations). legend at the top right of the poster (consistent across all results). 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100

Take Home Messages:

- By 2100, the total population of Grays Harbor County increases by approximately 21,000 people (Figure 1), at 0.3%/year.
- Ocean Shores experiences the largest increase in population, followed by Westport and Hoquiam (Figures 3-7).

Year

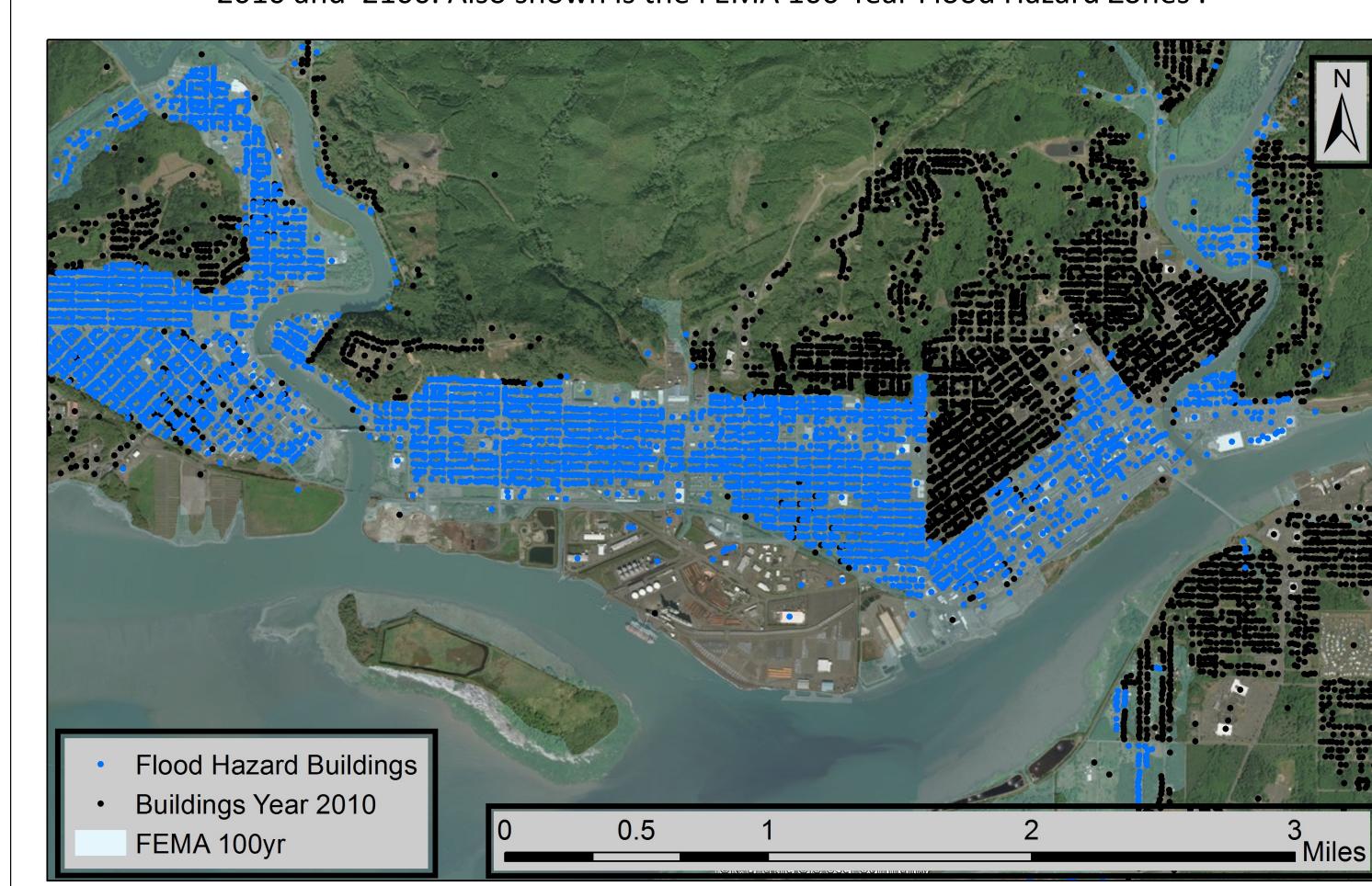
- Current development patterns vary across policy scenarios, since there is no new development within the hazard zone under the Realign scenario.
- Available development capacity in Grays Harbor County varies significantly by city with each location evolving differently through time.
- The number of buildings added within one mile of the shoreline increases in all policy scenarios, with approximately 4000 buildings added by the end of the century (Figure 8).

How does the implementation of hazard alleviation techniques alter development?

Figures 9 and 10: Buildings in Ocean Shores (left) and Westport (right) for the **Baseline** policy scenario — plotted as black for buildings that existed in 2010 and red for buildings added between 2010 and 2100. Also shown is the FEMA 100-Year Flood Hazard Zones.

Buildings Year 2100

Buildings Year 20



Figures 11: Intersection of FEMA 100-Year Flood Hazard Zones and the built environment in Aberdeen in 2010 as represented in Envision. Buildings within the Flood Hazard Zone are plotted as blue while buildings outside of the zone are plotted as black.

Hazard Alleviation Techniques (By Scenario):

Realign:

- FEMA 100-Year Flood hazard zones are implemented, prohibiting further development within the flood hazard zone.
- . Buildings in the hazard zone that are impacted by flooding are removed from the flood zone.
- Buildings outside of the hazard zone are raised to FEMA's Base Flood Elevations (BFE) or relocated to the safest site on the same tax lot (only if the flood hazard persists after being raised to BFE).
 Restore:
- Dune restoration projects (DRP) are used to protect buildings, by constructing/enhancing dunes and/or nourishing dunes and the fronting beach profile.

Protect:

Buildings Year 2100

Buildings Year 2010

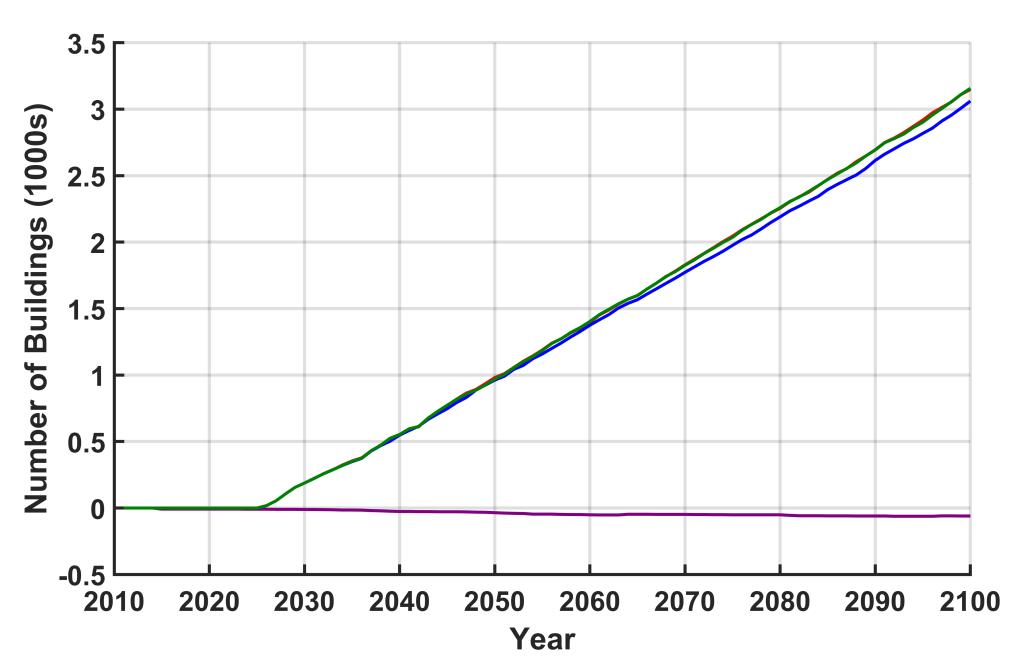
FEMA 100yr

- . Backshore protection structures (BPS) are built to control erosion by armoring the dune face.
- . Buildings that are flooded are raised to FEMA's BFE or relocated to the safest site on the same tax

Note: All policies are now subject to cost constraints and only implemented if the budget allows.

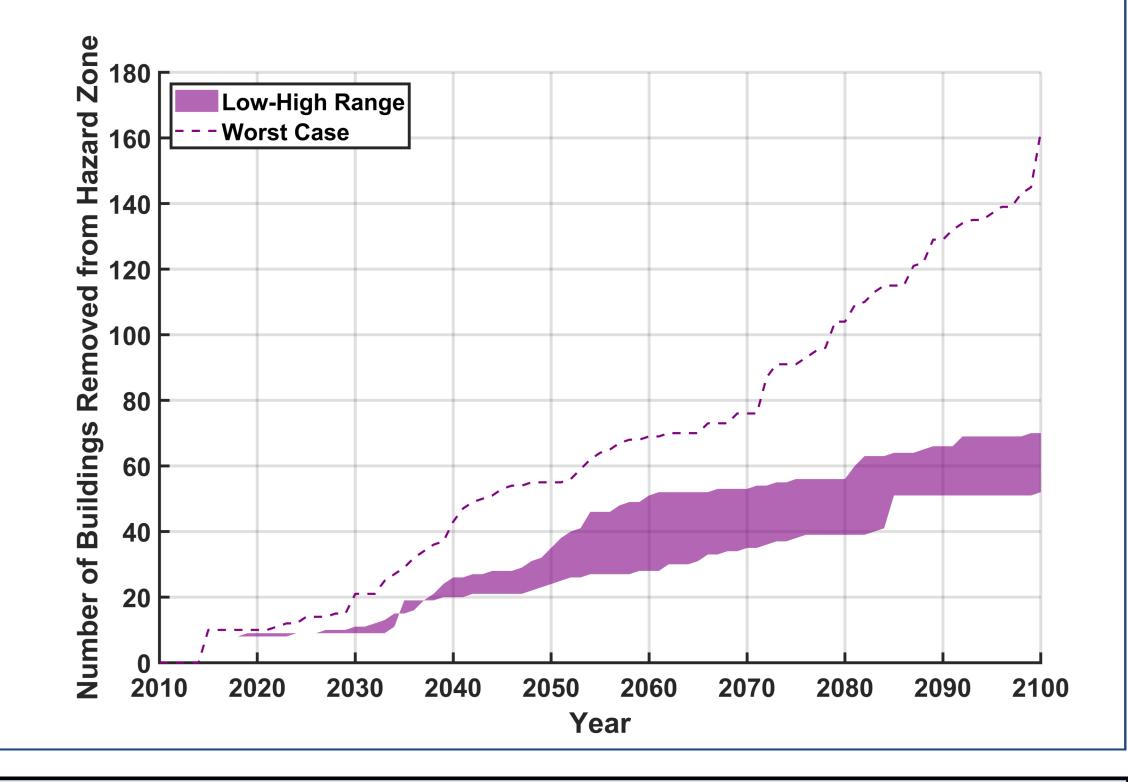
New Buildings Developed within FEMA 100-Year Flood Hazard Zone

Figure 12: Number of new buildings within FEMA 100-year flood hazard zone for all policy scenarios under High impact climate scenario (County -wide).



Annual Number of Buildings Removed from Hazard Zone Under Realign Policy Scenario

Figure 13: Annual number of buildings removed from the hazard zone in the Realign policy under all climate impact scenarios (Countywide).



Take Home Messages:

- As development increases, the number of buildings in the FEMA hazard zone increases for all policies except for Realign.
- A relatively large number of building are within the FEMA Flood Hazard Zone in Aberdeen with less buildings in the hazard zone in Ocean Shores and Westport.
- •For the Realign policy scenario the number of homes in the hazard zone decreases with time as buildings experiencing flooding are relocated (via easements) out of the hazard zone (Figure 12—13).