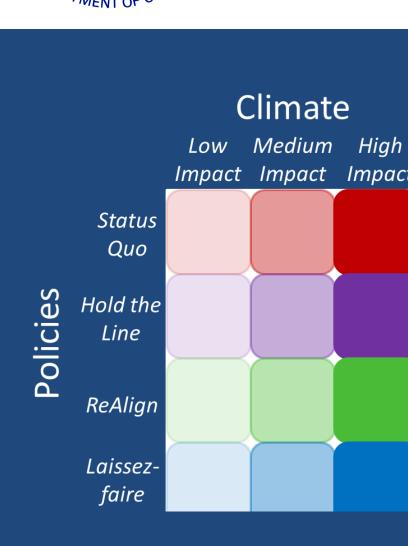


TILLAMOOK COUNTY COASTAL FUTURES PROJECT: SCENARIO REVIEW MEETING

PROPERTY RISK STORYLINE





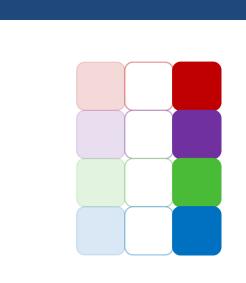


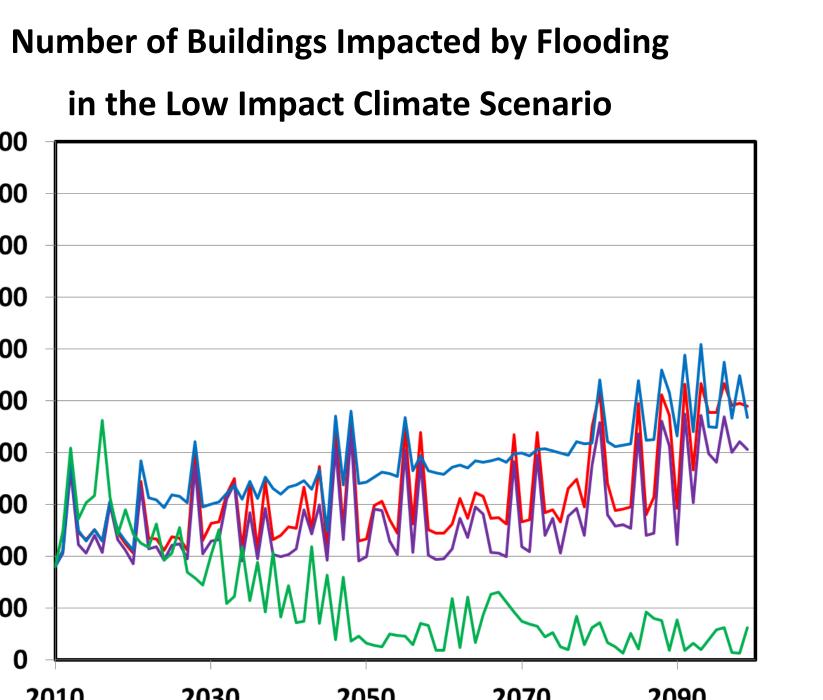
Assumptions: Impact Impact Impact Impact - Underlying development patterns are handled differently for each policy scenario.

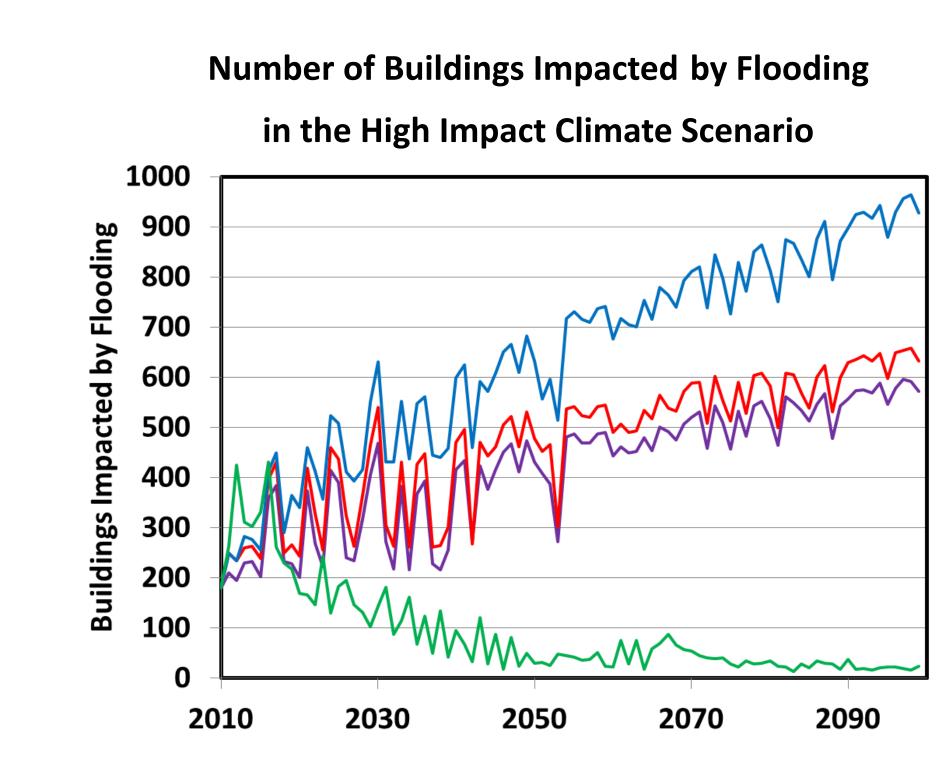
- Costs associated with BPS were calculated based on the engineering analysis report prepared by Environmental Science Associates for Neskowin, OR (ESA, 2013).
- length (ESA, 2013). Maintenance costs are ~10% of the construction costs per year (ESA, 2013).
- The cost of removing a BPS is 2/3rds the price of constructing it, approximately \$83 per vertical foot in elevation per lineal foot in length.
- Lengths of BPS are constructed in ~328 ft (100m) segments, though oftentimes they include several tax lots.
- In the Status Quo and Hold The Line policy scenarios, BPS construction is limited by Goal 18 eligibility.
- The cost of BPS construction is approximately \$125 per vertical foot in elevation by lineal foot in Annually, BPS construction is limited to 30% of qualified (see next bullet) properties to account for permit processing times, resource scarcity, etc.
- BPS are constructed under a specific set of instances:
- The beach is dune-backed AND
- The land behind the dune is developed AND
- The dune toe is impacted by the maximum daily Total Water Level (TWL) >25% of the year OR the building(s) is impacted by erosion >5x in 10 years.
- The cost of establishing an easement is equal to the relocated property's value.

How will buildings be impacted by coastal flood and erosion hazards in the future?

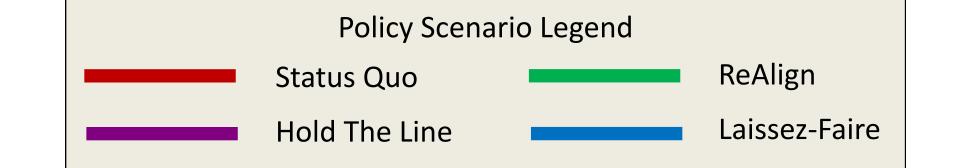
• All dollar amounts are in 2012 dollars.

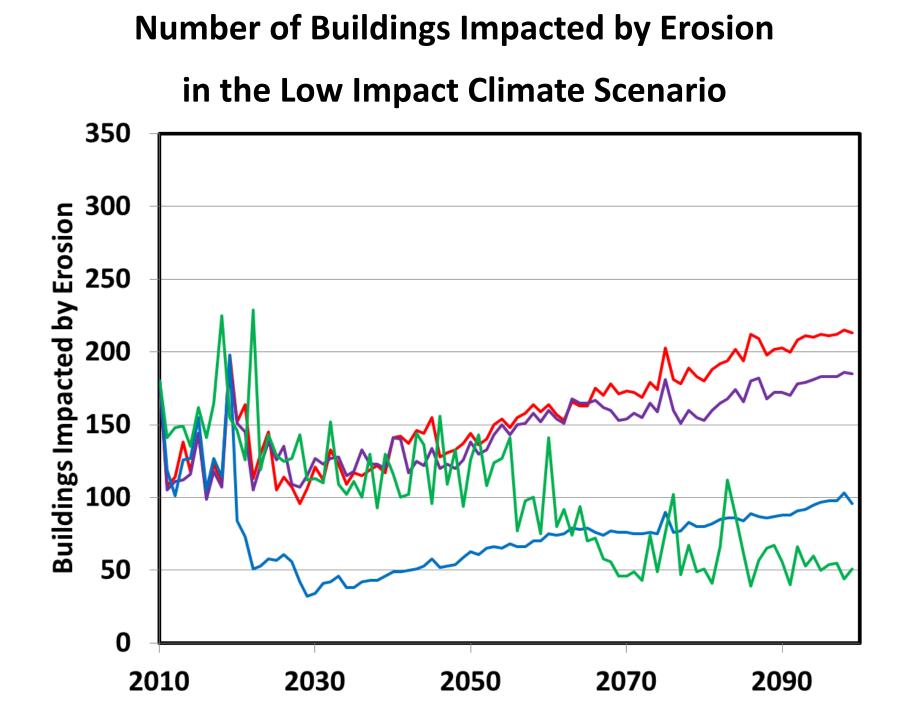


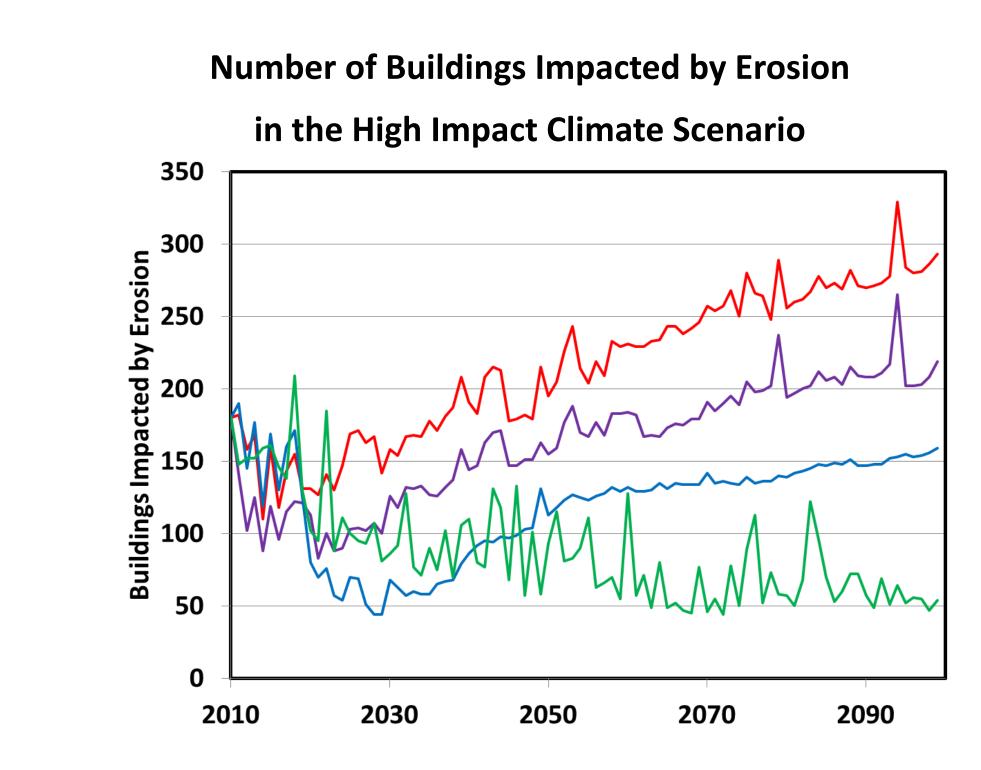




Figures 1 and 2: Number of buildings impacted by flooding under low (left) and high (right) impact climate scenarios from 2010 to 2100 (county-wide).

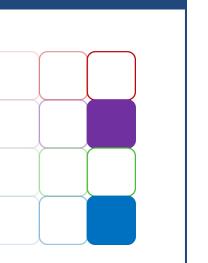




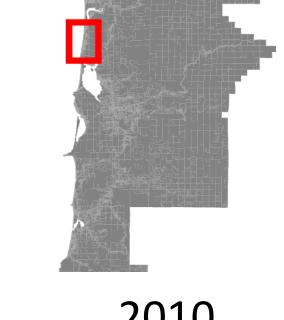


Figures 3 and 4: Number of buildings impacted by erosion under low (left) and high (right) impact climate scenarios from 2010 to 2100 (county-wide).

When will homeowners need backshore protection structures (BPS) to protect their property?



Locations of BPS over time in the Rockaway Beach Littoral Subcell





BPS Legend

Figure 5:

BPS locations as of 2010

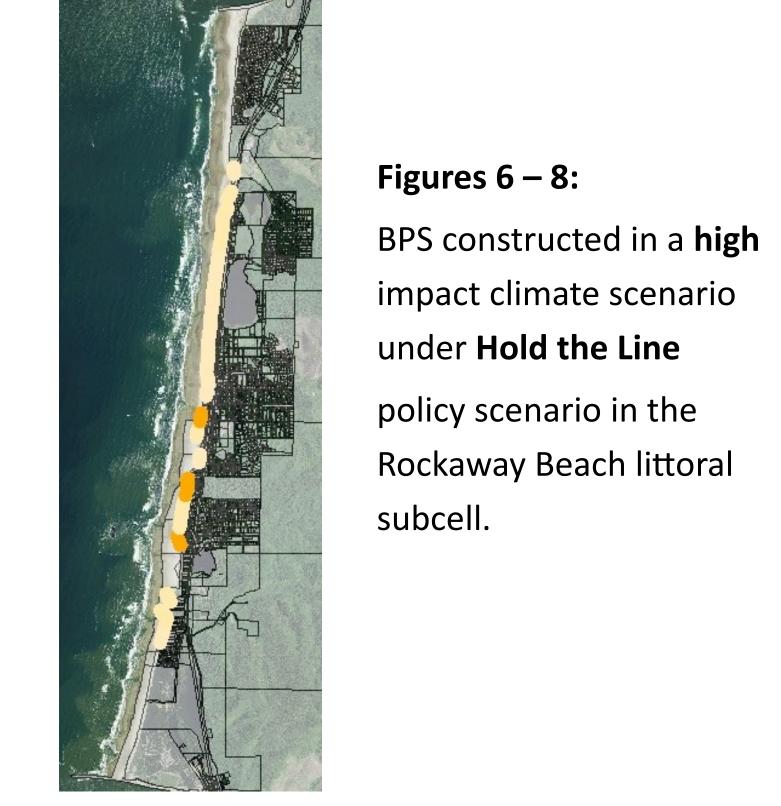
in the Rockaway Beach

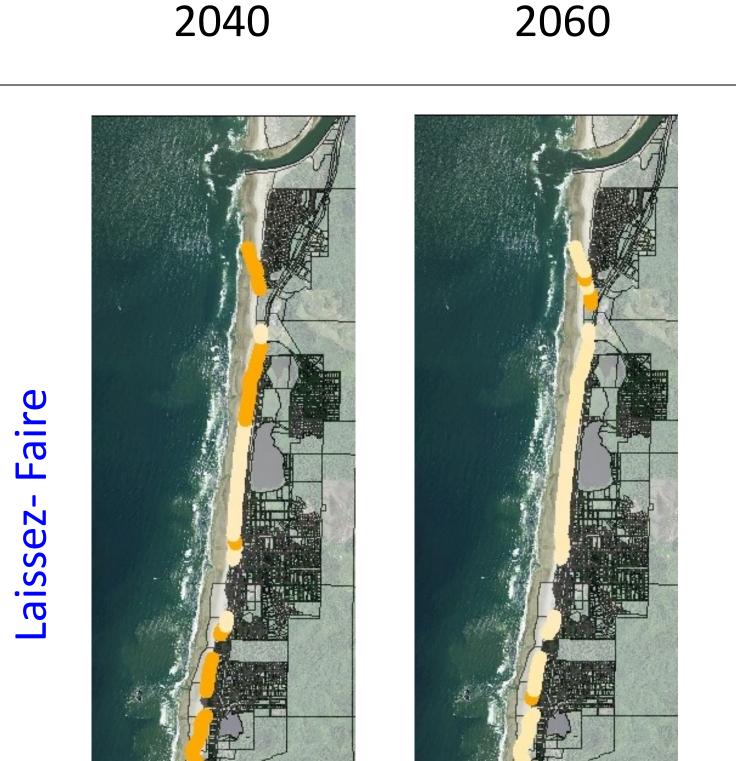
littoral subcell.

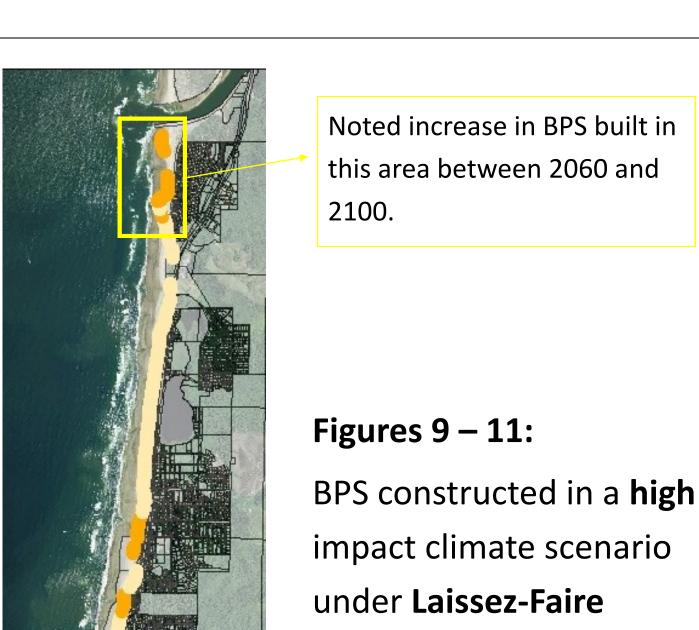
Construction

Construction









Figures 9 – 11: BPS constructed in a high mpact climate scenario under **Laissez-Faire** policy scenario in the Rockaway Beach littoral

Take Home Messages:

- Different policy scenarios have different development patterns and hazard alleviation techniques, influencing the number of buildings impacted by flooding and erosion, with the fewest hazard impacts occurring by 2100 in the ReAlign policy scenario (green line) for both low and high climate scenarios (Figures 1 - 4).
- Flooding and erosion impacts are variable from year to year due to irregular climate events (damaging storms), however, unique trends are evident for all four policy scenarios (Figures 1 - 4).
- The Laissez-Faire policy scenario initially has a lower number of buildings impacted by erosion as property owners construct BPS. However as climate impacts increase, the number of buildings affected by erosion expands in both low and high climate scenarios (Figures 3 - 4).

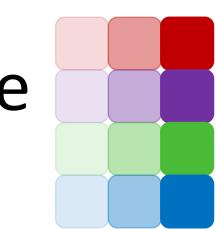
Take Home Messages:

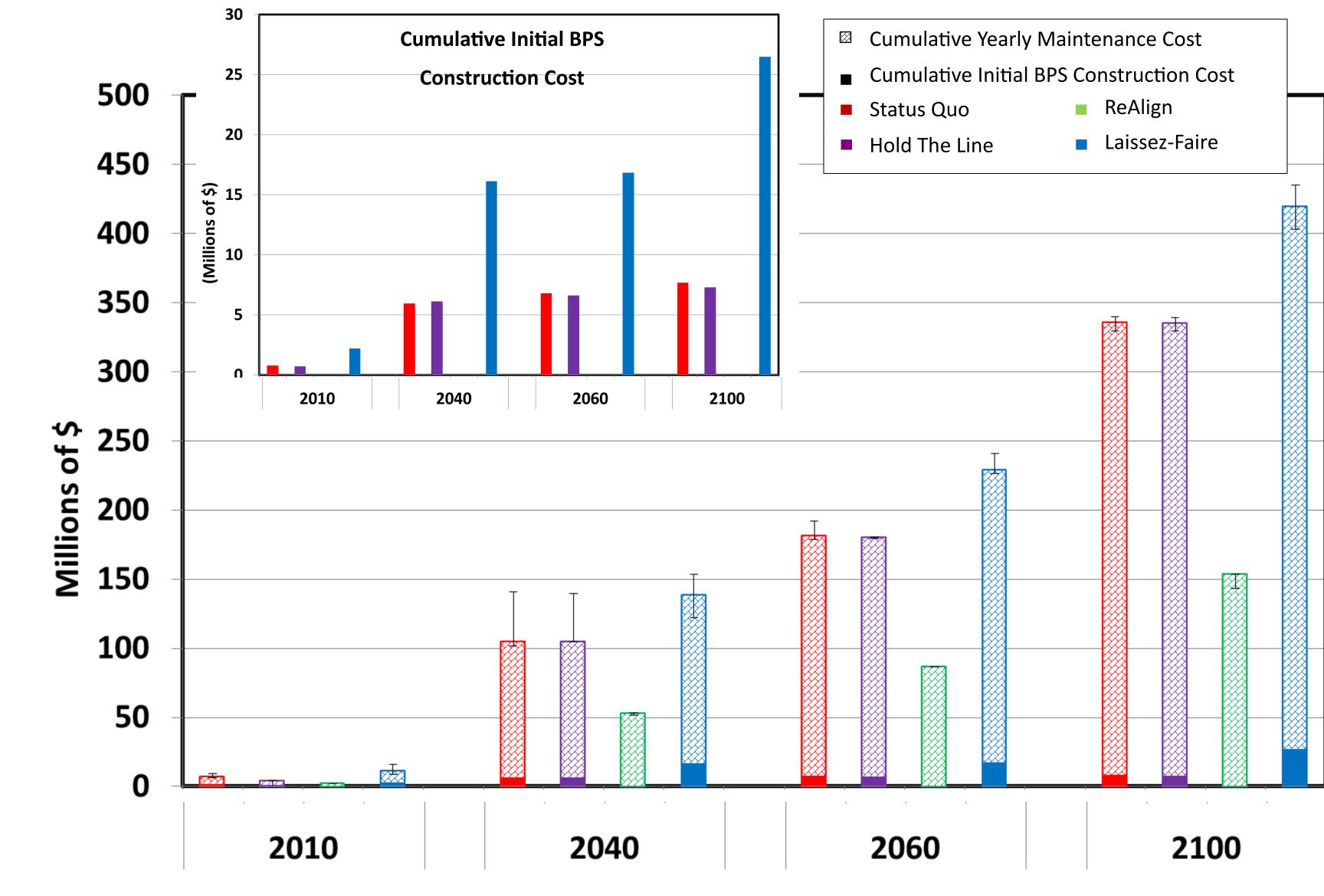
- More BPS are constructed in the Laissez-Faire policy scenario overall, than in the Hold the Line policy scenario (Figures 6 - 11).
- Few BPS are constructed between 2040 and 2060 in both the Hold the Line and Laissez-Faire policy scenarios (Figures 6, 7, 9, and 10).
- · Many new BPS are constructed in the northern portion of the Rockaway Beach littoral subcell by 2100 in the Laissez-Faire scenario (Figure 11).

REFERENCES:

Environmental Science Associates (ESA) (2013), Neskowin Shoreline Assessment: Coastal Engineering Analysis of Existing and Proposed Shoreline Protective Structures.

How do costs associated with protecting property on the coast change over time?





Initial BPS Construction and Maintenance Costs Over Time

Figure 12: Cumulative cost of constructing and maintaining BPS in all four policy scenarios (countywide) The error bars represent the range of costs from low to high impact climate scenarios. As of 2010, 3.9 miles of BPS are in place county-wide. According to our approach, it will cost approximately \$500,000 per year to maintain these structures.

Costs of BPS Removal and Easements Established under the

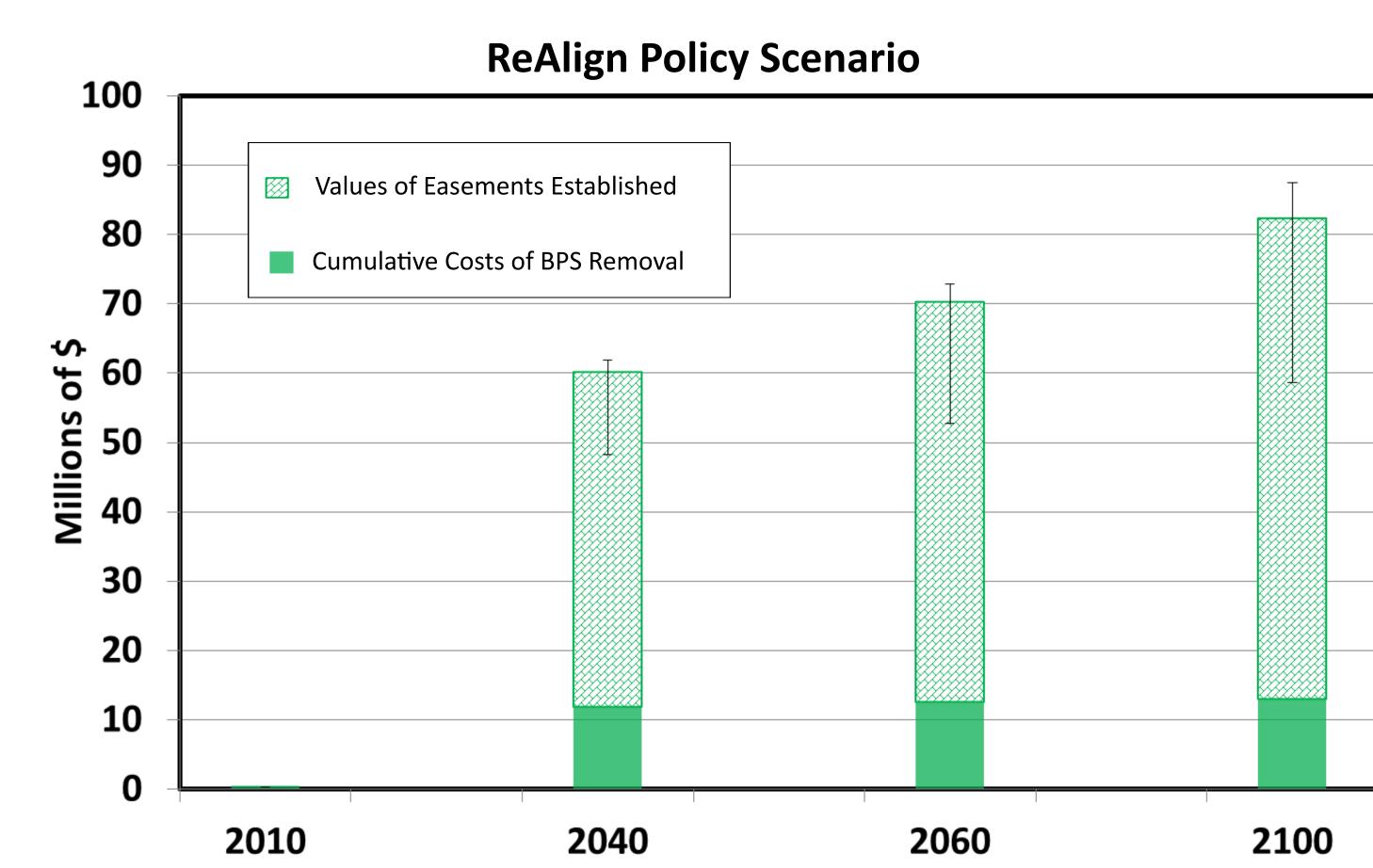


Figure 13: Cumulative costs of BPS removal and value of easements established under the **ReAlign** policy scenario (county-wide). The error bars represent the variability of costs due to low vs. high impact climate scenarios.

Take Home Messages:

- BPS construction and maintenance costs in Status Quo and Hold the Line policy scenarios are similar over time (Figure 12).
- The greatest expenditures for both BPS construction and maintenance occur under the Laissez-Faire policy scenario, costing ~\$400 million between 2010 and 2100 (~\$4.4 million per year) (Figure 12).
- The costs of removing BPS and the values of established easements (~\$80 million) is almost half the cost of maintaining BPS (~\$150 million) in the ReAlign policy scenario by 2100 (Figure 12 and 13).