HOALOHA PARK COASTAL HAZARD EXPOSURE, PARK VULNERABILITIES, AND ADAPTATION PATHWAYS AND OPPORTUNITIES

The coastal hazards assessment analyzed existing and future projected coastal hazards at Hoaloha Park to understand the park's vulnerabilities and model the potential future impacts of coastal hazards including sea level rise and coastal erosion. Using the data from these modeling efforts, the project team evaluated the vulnerability of Hoaloha Park and identified viable adaptation strategies to increase the resilience of Hoaloha Park over the next fifty years.

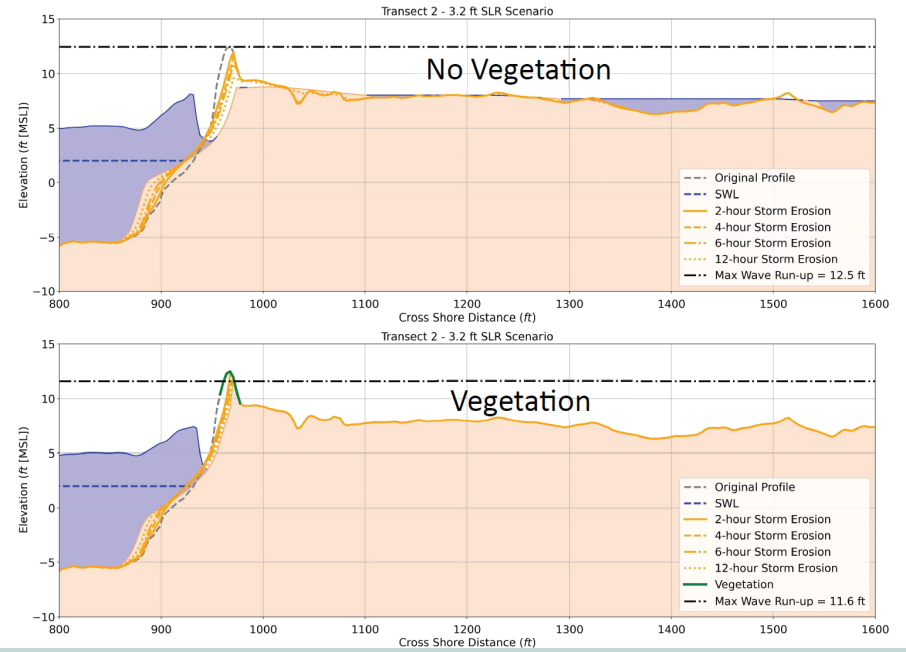
MODELING

Modeling was conducted for this project to develop an understanding of site specific coastal wave run up and the specific extents of existing shoreline vegetation. The project utilized two erosion models to analyze potential impacts from erosion and coastal flooding in three Sea Level Rise (SLR) scenarios:

- Curent Sea Level
- 1.1 ft. of SLR
- 2.0 ft. of SLR
- 3.2 ft. of SLR

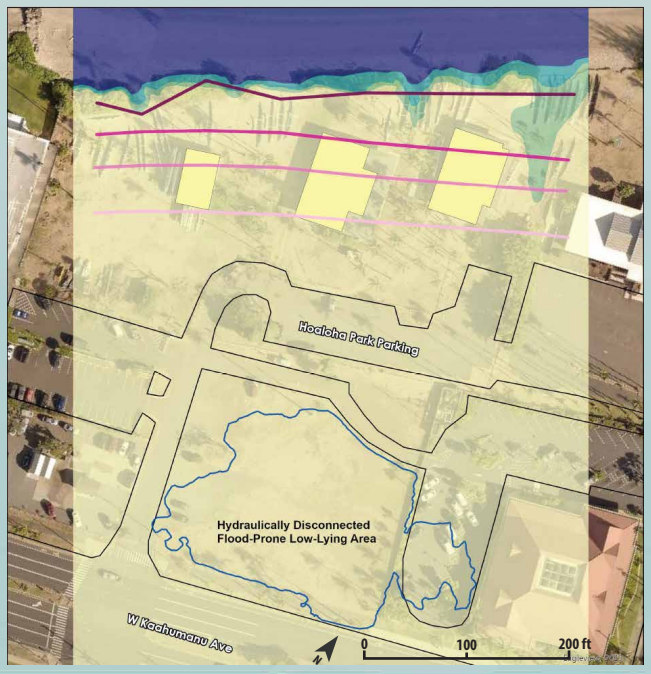
These scenarios used were chosen to mirror the current SLR scenarios used across the State of Hawai'i (Hawai'i Climate Change Mitigation and Adaptation Commission, 2021). Modeling was conducted for this project to develop and understanding of site specific coastal wave run up and the effects of existing shoreline vegetation.

DUNE EROSION & WAVE FLOODING WITH & WITHOUT VEGETATION



SEA LEVEL RISE & STORM EROSION

Shoreline Retreat & Dune Erosion Associated with SLR & 1% Annual Chance Storm Wave Event



Projected Dune Crest with SLR
SLR Elevation (ft)
- 0
- 1.1
- 2
- 3.2

Coastal Wave Hazards with SLR
SLR Elevation (ft)
- 0
- 1.1
- 2
- 3.2

- Low-Lying Flood-Prone Area
- Curb Lines
- Park Building

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HISTORIC SHORELINE CHANGE & SEA LEVEL RISE

Kahului Bay has long been used as a canoe launching and landing area for Hawaiian fisherman and for warring parties landing on Maui. In the late 1800s the Kahului Railroad built its first train line starting in Kahului and in 1905 began building the original eastern breakwater to protect the natural harbor at Kahului bay from trade wind and storm swells. The harbor was dredged, piers were constructed, and by 1918 the western breakwater had also been constructed to limit sediment transport into the harbor.

PROJECTED EROSION IMPACTS

1.1 ft. SLR	The dune crest is expected to enroach upon the existing location of the canoe hale structures.
3.2 ft. SLR	The dune crest is expected to migrate 13 ft. landward, behind the existing canoe hale structures.

Erosion impacts project that the shoreline will migrate inland (FEMA & Bruun Model).

PROJECTED SEA LEVEL RISE IMPACTS

Existing Sea Level	Existing park facilities and infrastructure face minimal risk from flooding and erosion.
1.1 ft. SLR	Moderate shoreline erosion and potential encroachment of coastal hazards on existing structures may occur.
2.0 ft. SLR	Severe erosion, loss of canoe storage areas, and potential structureal damage to existing facilties.
3.2 ft. SLR	Catastropic erosion, loss of structures, and widespread coastal flooding across the park and onto Ka'ahumanu Ave. may occur.

ADAPTATION CONSIDERATIONS

The report identified potential adaptation strategies to mitigate the impacts identified and simulated wave events with these strategies in place to determine their potential effectiveness for the site. The report focused on nature-based solutions only as community and County of Maui feedback demonstrated a desire to avoid hard engineering approaches such as shoreline hardening. Modeling showed that vegetation on the coastal foredune (the dune on the shoreline) plays a significant role in preventing dune erosion and overtopping as vegetated dunes are more resilient to erosion and flooding than non-vegetated dunes. Berms at lower elevations further mauka on the site would also help protect landward areas from coastal flooding. The following interventions were recommended as key components of the adaptation strategy for the site over time.

- **Dune Vegetation Planting:** Maintain and expand existing vegetation in the park. Implement a vegetation maintenance plan and barriers to limit trampling of vegetation.

- **Dune Elevation:** Expand the existing foredune in width and height to increase resilience to erosion and overtopping. Plant additional vegetation to further increase resilience. Modeling shows that the dune would provide protection up to 3.2 ft. of SLR if the dune was elevated to 13 ft. above sea level.

- **Reduce # of Shoreline Access Pathways through Dune:** Pathways through the foredune are vulnerable points where storm waves can erode and overtop the dune and wind can move sand, lowering the dune elevation. Reduce number of pathways while maintaining suitable recreation access for existing users.

- **Add Back Berms in the Mauka Sections of the Park:** Back berms can prevent or lessen flooding in the event that storm waves overtop the foredune. Back berms should be located where they can restrict or cut off coastal flood water flow paths that may enter the park through dune low points or offsite.

- **Elevate the Site:** Consider elevating the mauka parcel to 10ft. above sea level rise. This would increase the resilience of the park by raising a portion above projected sea level rise impacts.

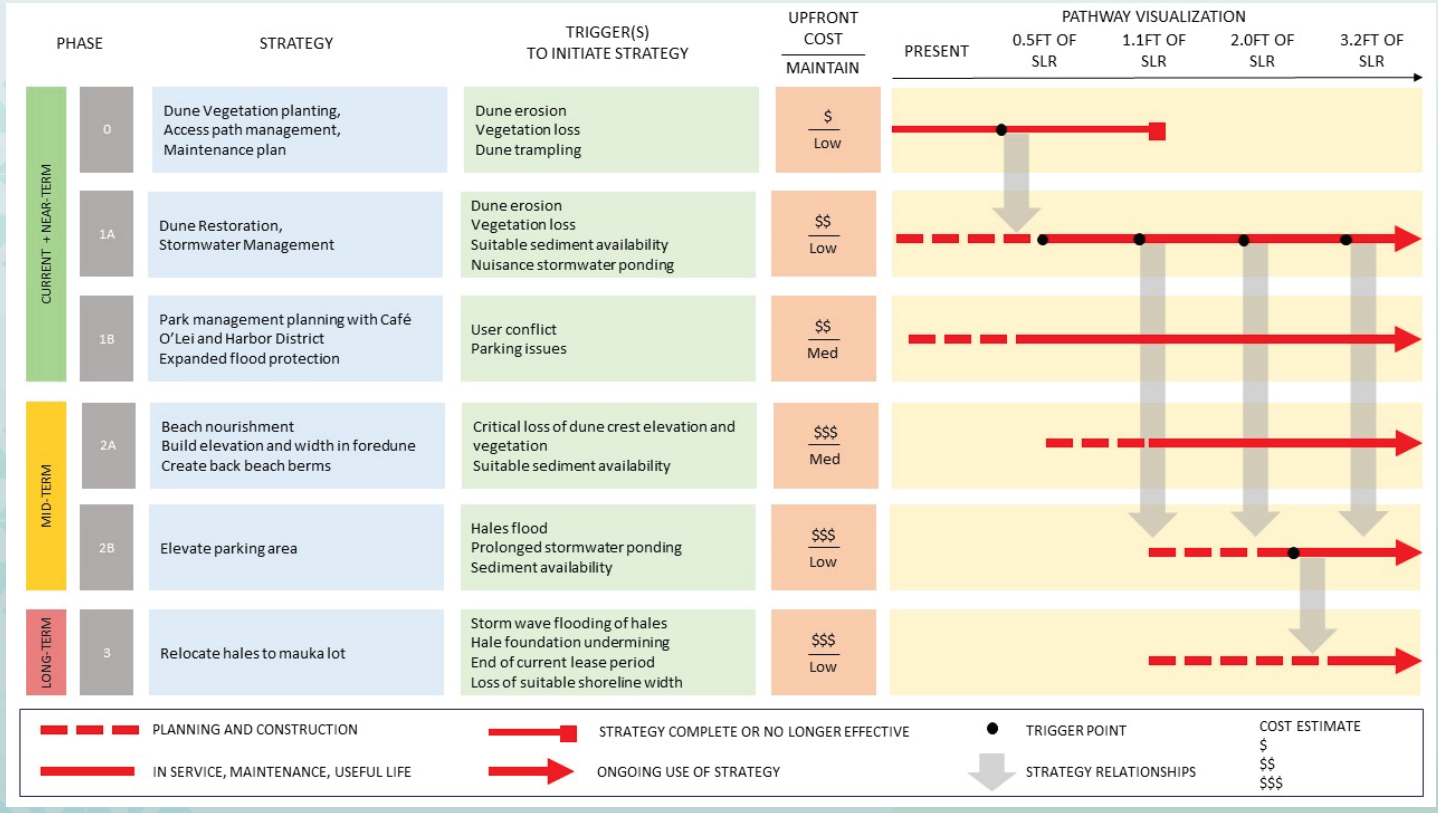
- **Retreat the Structures:** Move the existing canoe hale mauka in the park, to limit impacts to the hale and canoes from coastal erosion, flooding, and sea level rise.

HOALOHA PARK COASTAL HAZARD EXPOSURE, PARK VULNERABILITIES, AND ADAPTATION PATHWAYS AND OPPORTUNITIES

ADAPTATION PATHWAYS

It is important to note that the adaptation strategies identified would not be implemented all at once. Instead, the strategies would be implemented over time as sea level rise impacts are seen and specific indicators are triggered. This approach is referred to as an adaptation pathway.

An adaptation pathway is a roadmap that identifies feasible and acceptable adaptation strategies for a given site, articulates what actions or impacts should trigger the next phase of implementation, and considers factors such as economic, environmental, and social costs. A sample adaptation pathway has been created for Hoaloha Park that shows the implementation of the above strategies over time from near to long term. This pathway is being used to develop site-specific concepts for the adaptation of Hoaloha Park over time. These will be included in the Hoaloha Park Adaptation Plan.



HOW TO GET INVOLVED

Community input will be critical to shape the vision and adaptation plan for Hoaloha Park. There will be a variety of ways to get involved and make your voice heard.

- **Visit the Project Website**
  Visit www.mauicounty.gov/2787/Hoaloha-Park-Adaptation-Plan to learn more about the project and sign up for emails.
- **Attend Community Events**
  Share your mana'o at an upcoming public event or online open house.
- **Send Us Your Comments**
  Submit your comments on the draft plan or email us directly.

For more information, please contact

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