Climate Change and Coastal Hazards in the Kaua`i General Plan Update

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SEA LEVEL RISE

Increasing severity and extent of:

- Coastal erosion
- Wave overwash
- Groundwater flooding
- Drainage failure
- Hurricane and tsunami inundation

Photos: Dolan Eversole, Hawaii Sea Grant; unknown; Shellie Habel, Hawaii and Pacific Islands King Tides Project
Hansen et al., 2015; Church and White, 2011; Nerem et al., 2010; Hay et al., 2015; Yi et al., 2015
CONTRIBUTIONS TO SEA LEVEL RISE

Global mean sea level budget since 1993

Bulletin of the American Meteorological Society, State of the Climate in 2014 report

Integration and Application Network, University of Maryland Center for Environmental Science
SEA LEVEL RISE PROJECTIONS

Representative Concentration Pathways (RCP) characterize a range of global Greenhouse Gas (GHG) emissions scenarios through the 21st century from RCP2.6 (dramatic GHG emission reductions after 2020) to RCP8.5 (increasing GHG emissions through 21st century).

Intergovernmental Panel on Climate Change (IPCC), 2013: Fifth Assessment Report (AR5)
Technical Study Recommended Planning Targets of:

At least 1 foot by 2050

At least 3’ by 2100
Sea level rise forecasts continue to evolve with the science.

- NASA December, 2015: “Given what we know now about how the ocean expands as it warms and how ice sheets and glaciers are adding water to the seas, it’s pretty certain we are locked into at least 3 feet of sea level rise, and probably more.”

- Recent results regarding Antarctic and Greenland ice-sheet instability indicate that such outcomes may be more likely than previously thought.
"Physically plausible" global mean sea level rise in the range of 2.0 to 2.7 m (6.5 to 8.6 ft) by the end of this century.
Sea Level Rise

1' 1' 3' + 3' +

Now 2050 2100

Time
GENERAL PLAN PLANNING
TARGET = 3 FEET

New future growth areas on land use map outside of 0-3’ inundation areas and FEMA flood zones
GENERAL PLAN POLICIES AND ACTIONS REFLECT THESE ADAPTATION PLANNING PRINCIPLES

- USE BEST AVAILABLE SCIENCE
- ADAPTIVE MANAGEMENT
- SCENARIO PLANNING APPROACHES
- MOVE FORWARD IN FACE OF UNCERTAINTY
GP SETS THE STAGE FOR COMMUNITY BASED VULNERABILITY ASSESSMENTS

- HAZARD
  - Past recurrence intervals
  - Future probability
  - Speed of onset
  - Magnitude
  - Duration
  - Spatial extent
  - Intensity

- VULNERABILITY
  - People
  - Property
  - Essential services
  - Environment
  - Economy

RISK
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