

Climate Change Adaptation and Zoning in Hawaii

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Experts indicate that the direct impacts of climate change on Hawaii include sea level rise, increased frequency of extreme storm events, degradation of native ecosystems and ocean acidification. Of these, sea level rise presents the most immediate concern to coastal managers. The 2007 United Nations Intergovernmental Panel on Climate Change (IPCC) report notes the dangers facing island communities: "Sea-level rise is expected to exacerbate inundation, storm surge, erosion and other coastal hazards, thus threatening vital infrastructure, settlements and facilities that support the livelihood of island communities."

Estimates of the magnitude of sea level rise Hawaii will face in the next 40-50 years vary. The State of Hawaii's 2007 Multi-Hazard Mitigation Plan cites an estimate of 0.24 meter mean sea level rise. However, the plan notes that for sandy shorelines, a multiplier of 150 should be applied. Applying such a multiplier would result in retreat of 36 meters to some vulnerable beaches by mid-century.

Hawaii uses several types of coastal spatial management mechanisms to manage coastal uses and activities and to reduce the impacts of coastal flooding and other hazards:

- Under Hawaii's state Land Use Law, all land in the state is within one of four districts: Urban, Agriculture, Conservation or Rural.
- Land in the state Urban District is subject to multiple layers of regulation by local governments [counties in Hawaii]. Most of the counties administer more than 20 urban zones, each of which permits different uses, densities, building heights and bulk and lot coverage among other things.
- Coastal land is subject to further regulation by the counties within a Special Management Area that extends a minimum of 100 yards inland from the shoreline.
- Shoreline setbacks on each island establish a narrow coastal "no-build zone" of variable depth.



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- Designated coastal hazard zones, based on projected flood frequency and depth, prohibit building in some areas and compliance with stricter building standards in others.

In addition to managing coastal hazards, Hawaii uses zoning to promote biodiversity [marine protected areas], protected important cultural sites, such as Hawaiian fishponds, promote offshore aquaculture, and manage conflicts among near-shore recreational uses. Zoning is also the primary management tool for the federally managed Hawaiian Islands Humpback Whale National Sanctuary in the main Hawaiian Islands and the Papahānaumokuākea Marine National Monument, a marine reserve of 362,075 km² situated in the northwestern portion of Hawaiian Archipelago.

The use of zoning on land or in marine environments requires a clear management purpose, careful technical analysis to establish boundaries, specification of allowable resource uses [and users] within zones, and the means to detect and enforce non-complying behavior.