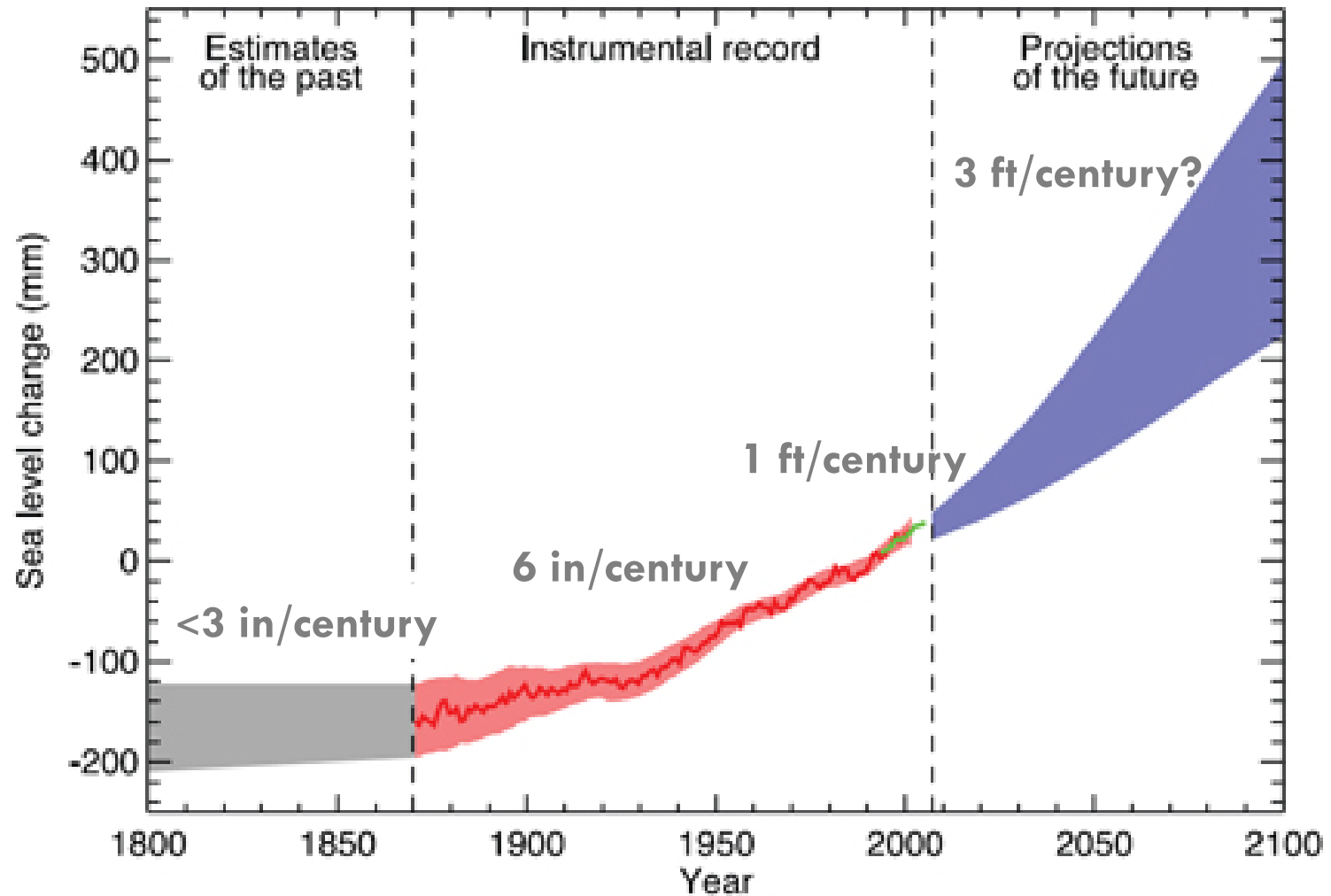


Managing Maui's Shorelines and Existing Development in a Climate Of Sea Level Rise, Coastal Erosion, and Episodic Storms

*Jim Buika, Coastal Resource Planner, Maui County
Marine and Coastal Zone Advisory Council
August 19, 2013*

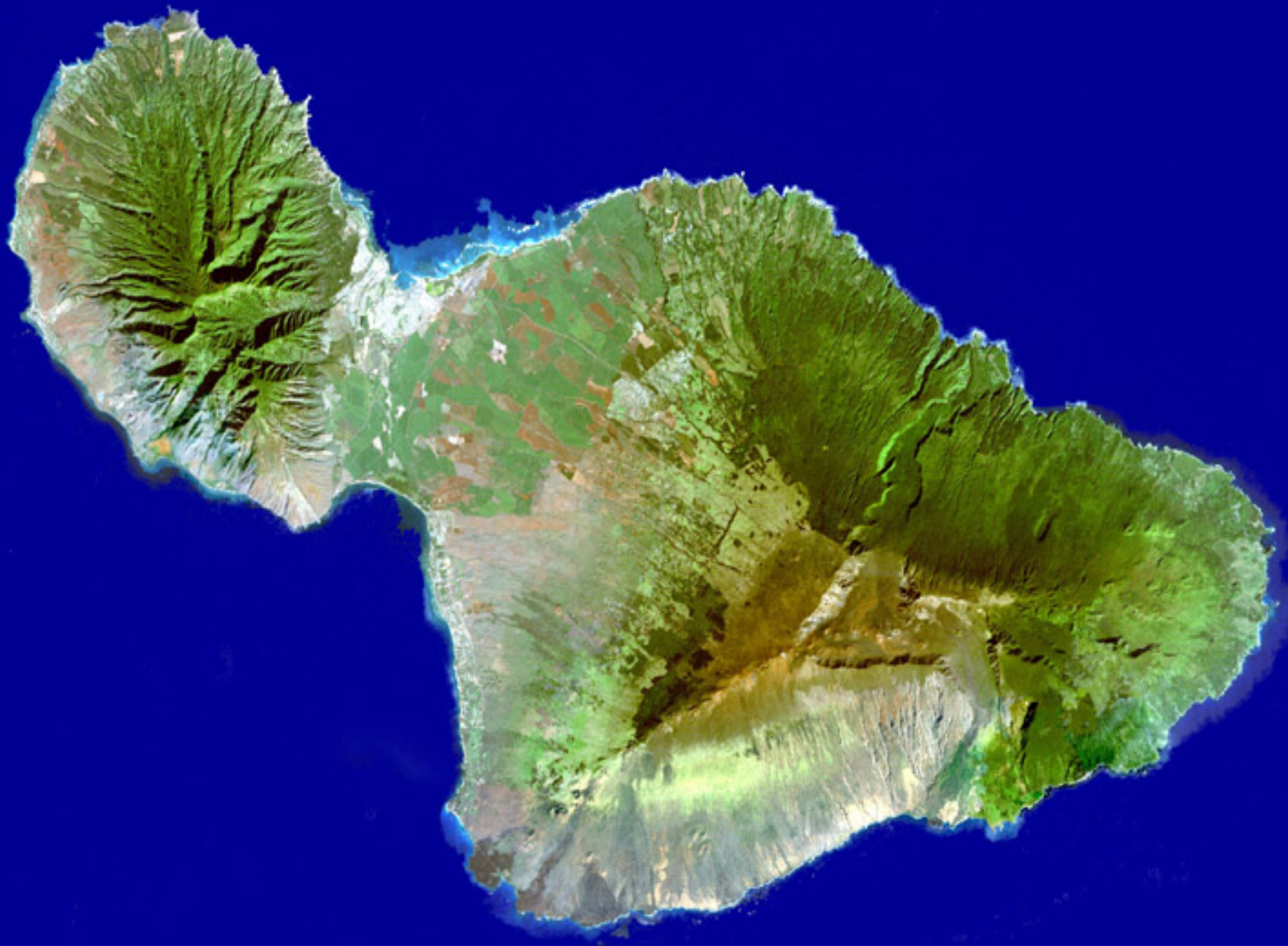
CHANGING SEA LEVEL



Baldwin Beach
August 12, 2011

Baldwin Beach Park, Maui
August 24, 2011





Maui has lost more than four miles of sandy beach in past century — report

By **LEE IMADA**, News Editor

HONOLULU — Eighty-five percent of sandy beachfront has eroded and 4.2 miles has been lost on Maui in the past century, according to a U.S. Geological Survey and University of Hawaii report released this week.

Those percentages were the highest in the report covering 150 miles of sandy shoreline or “essentially every beach” on Maui, Oahu and Kauai.

“The entire Kihei coast is eroding, except for a handful of places where sand is being trapped by walls,” said Charles Fletcher, associate dean of the University of Hawaii School of Ocean and Earth Science and Technology and lead author of the report “National Assessment of Shoreline Change: Historical Shoreline Change in the Hawaiian Islands.”

The “spires of the French Frigate Shoals” will be the inevitable fate of the Hawaiian Islands in millions of years and sea level rise is a natural factor in erosion, the report said. But the erosion is not all natural, and seawalls are among the leading man-made culprits.

In Kihei, which the report said lost 1.2 miles of beaches from 1900 to 2007, Fletcher noted how seawalls sprung up one after another along the Halama Street area near Kalama Park as residents attempted to protect their shorefronts. Erosion rolled north and beaches were lost.

“If you have a beefy seawall, it will protect the land

See BEACHFRONT on the next page

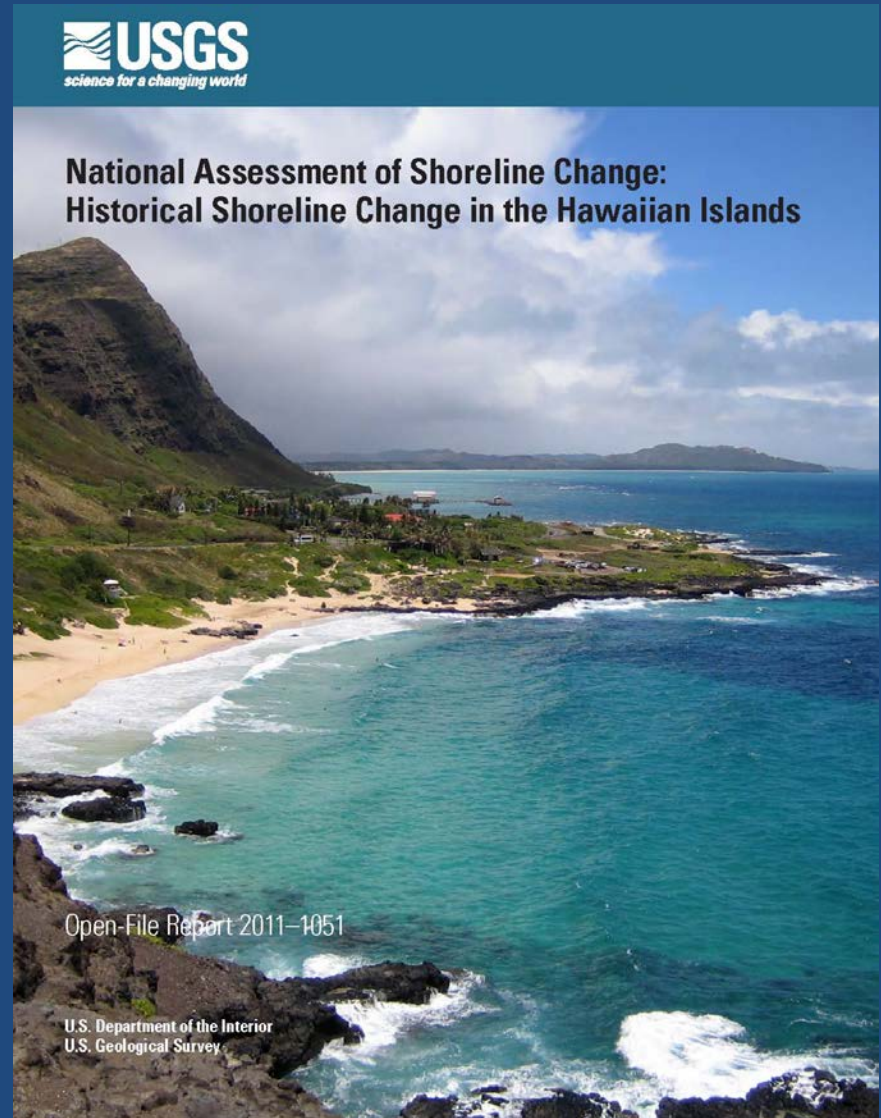


University of Sydney / **ANDREW D. SHORT** photo

Kaanapali Beach has shown an annual erosion rate of 3.2 inches over the last century, according to a U.S. Geological Survey and University of Hawaii report. Maui has lost 4.2 miles of sandy beach in the last century, according to the report, which is titled “National Assessment of Shoreline Change: Historical Shoreline Change in the Hawaiian Islands.”

EROSION IS WIDESPREAD ON MAUI

- 85% of Maui shorelines are experiencing long-term erosion.
- 76% of Maui Shorelines are experiencing short-term erosion.
- Maui's beaches are experiencing the highest rates of erosion for the Hawaiian islands.
- Maui has the highest percentage of beach loss.





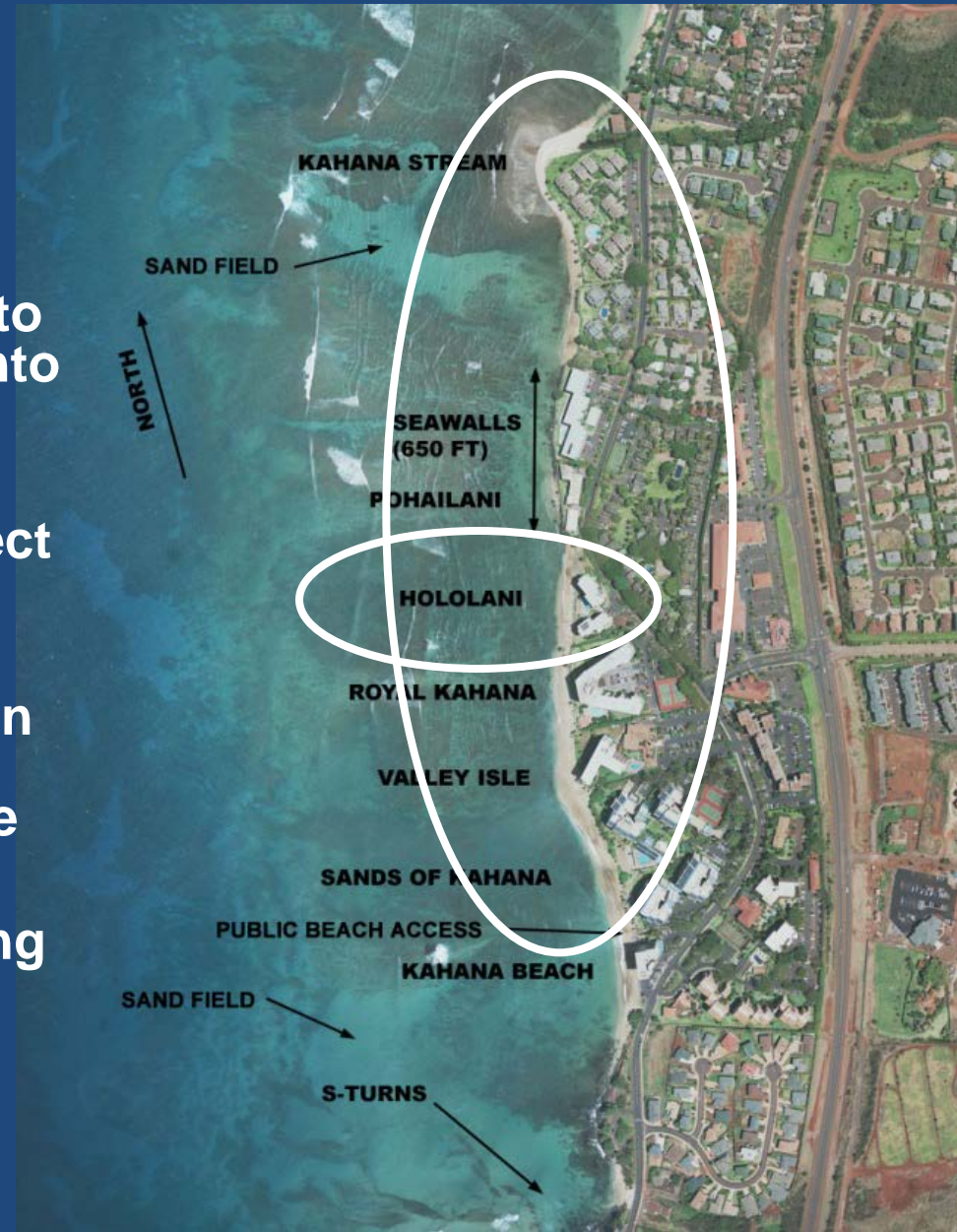
Keawakapu Beach, South Maui

What Gives Hawaii its sense of place?



Existing Problem that requires Legal and Policy Solutions Today

- Problem: Threatened existing development
- Condos, roads, and critical infrastructure, built 30-to-50 years ago, were built too close to the ocean and are now falling into the ocean.
- We do not have adequate solutions in our tool kit to protect threatened development while preserving the coastal zone.
- Without new laws and policies in place to provide for additional mitigation tools, Hawaii will lose its sense of place.
- Our coastal environment is being negatively impacted by our requirements to protect failing development & infrastructure.





Recent Emergency Permit: Kahana Sunset AOA

Life Safety and Potential Structural Collapse



Recent Emergency Permit: Kahana Sunset AOA

Life Safety and Potential Structural Collapse

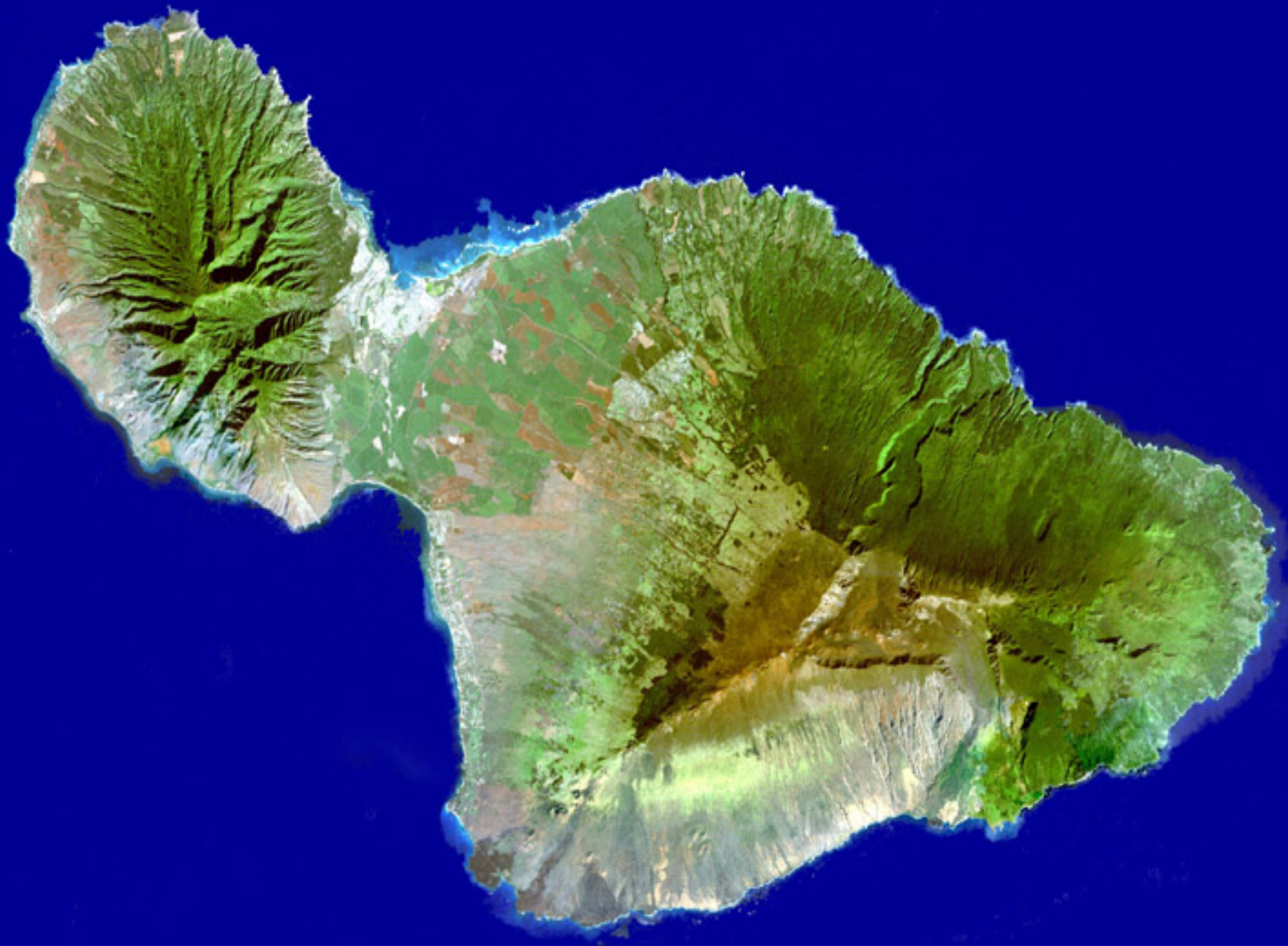




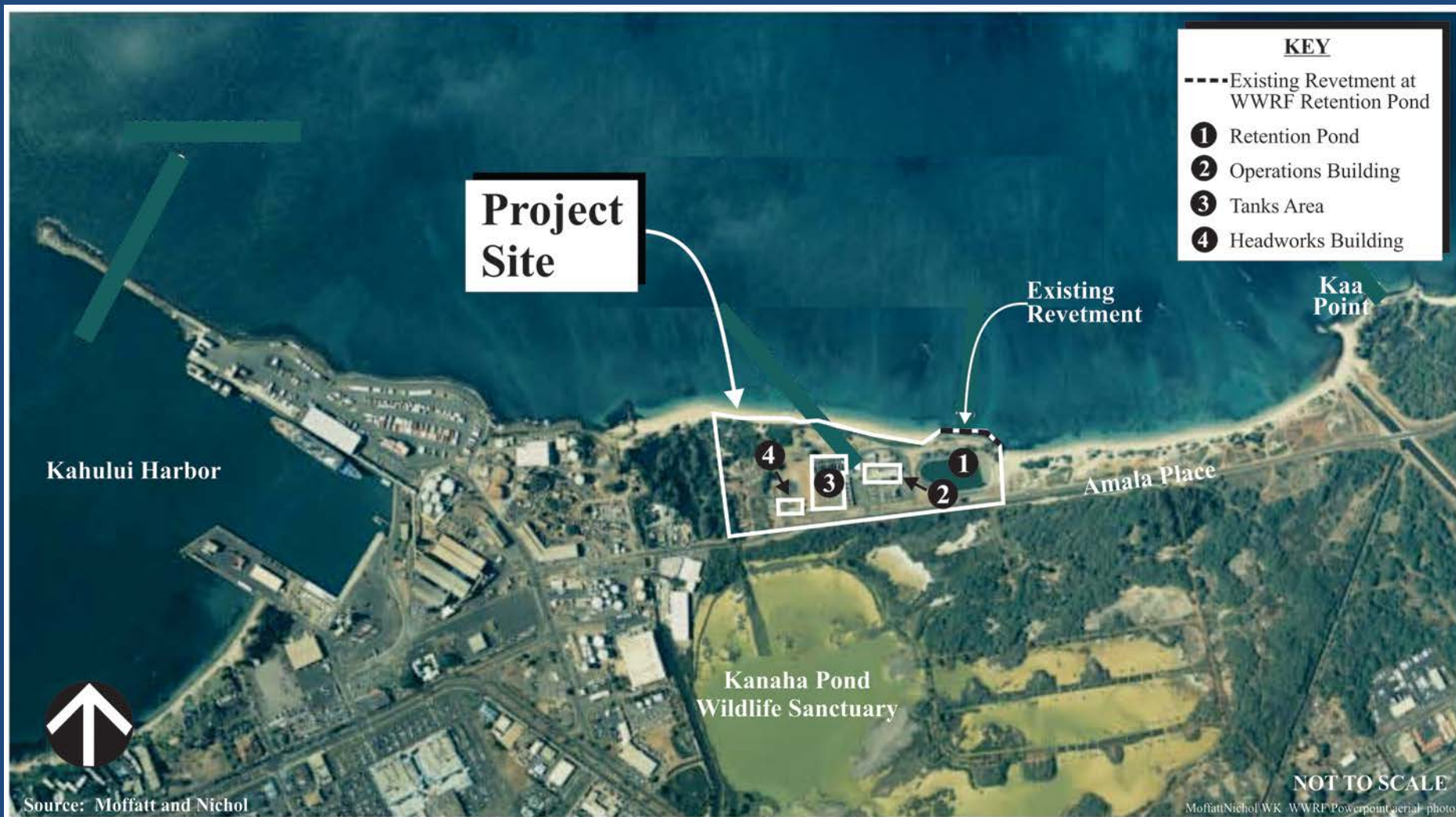
1200-foot revetment completed to protect threatened coastal highway in West Maui. Another 1200-foot revetment is planned for completion along same road.

Over the next several years, Maui will add another mile of sea walls to our shoreline.

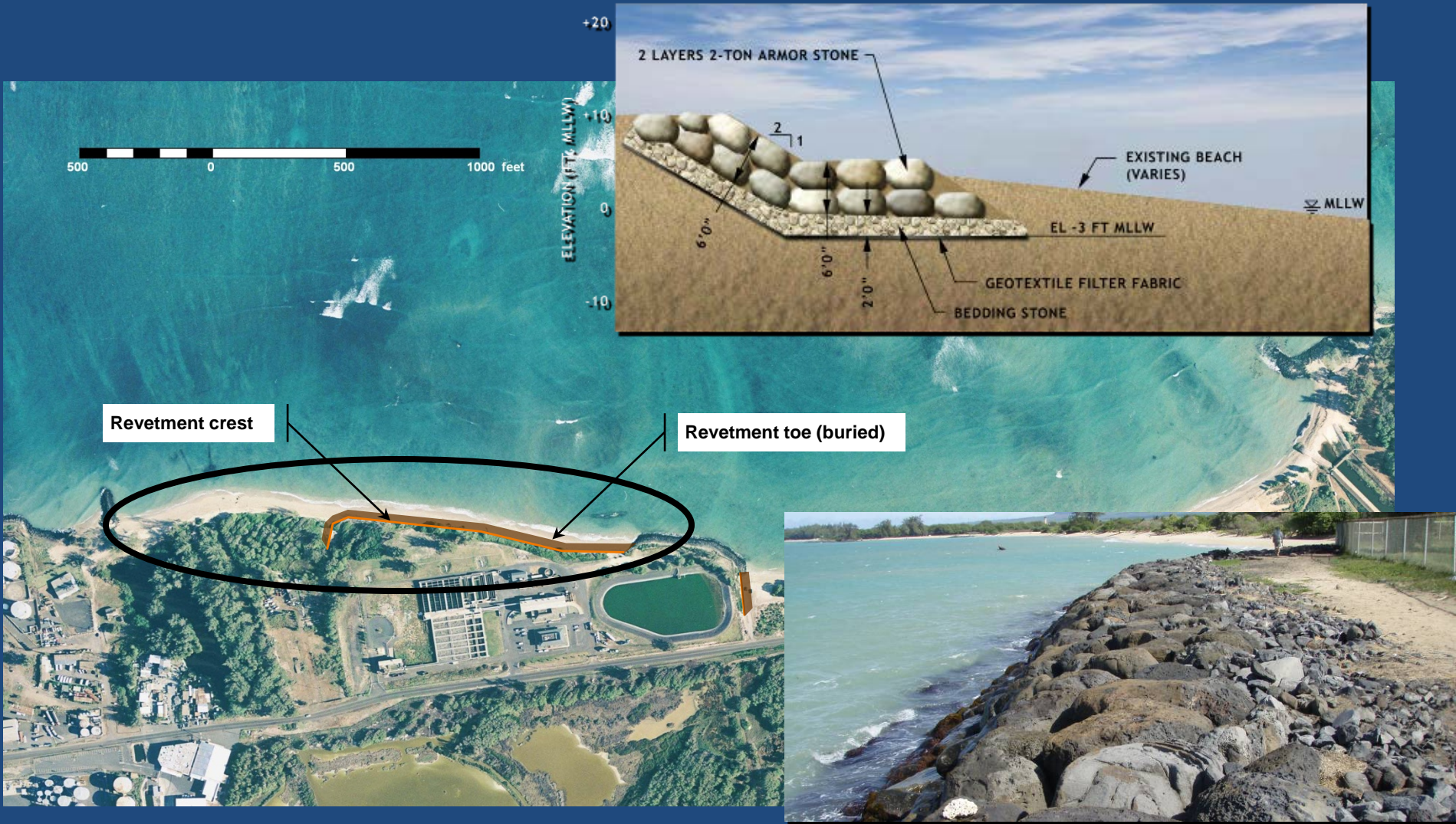
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1100-Foot Additional Revetment Planned to Protect Wastewater Treatment Plant in Maui



1200-Foot Revetment Planned to Protect Wastewater Treatment Plant in Maui



Our Current Tool Kit:

Cost-effective Protection of Threatened Structures

1. Emergency Protection with temporary sand bags (geotubes)
2. Rock revetment with Variance under Shoreline Rules (& State permits)
3. Seawall with Variance under Shoreline Rules (& State Permits)



Result of these limited Protective Solutions:

Loss of beaches with ongoing cumulative impacts to shoreline



Stabilized -
beach lost
land preserved

Unstabilized -
land lost
beach preserved

Expanding Our Current Tool Kit: Laws and Policies to Create **Additional Cost-effective** Options: ***Alternatives to Shoreline Hardening***

1. Interagency policy to expedite & test ***Alternatives to Shoreline Hardening*** such as groins, breakwaters, and reef balls as alternatives to seawalls & revetments.

Alternatives to Shoreline Hardening can be permitted but are not cost effective for property owners & governments.





Beach Nourishment

If We Do...

- Expensive
- Sand Source
- Environmental Impacts
- Water Quality
- Stability

If We Don't...

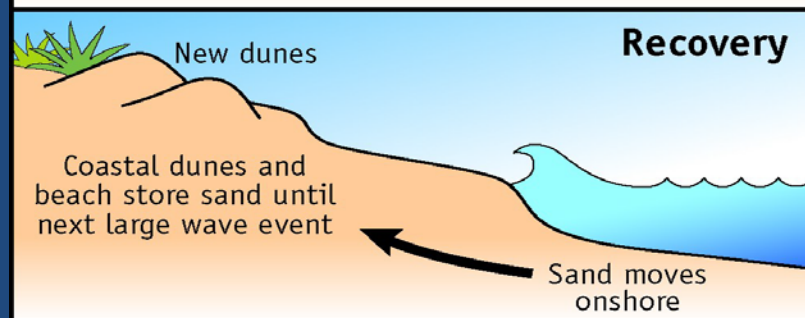
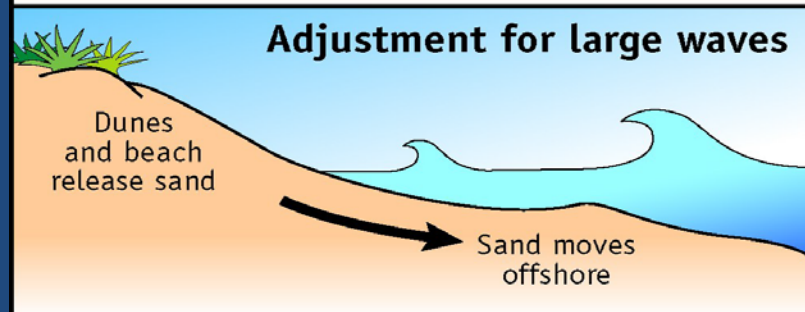
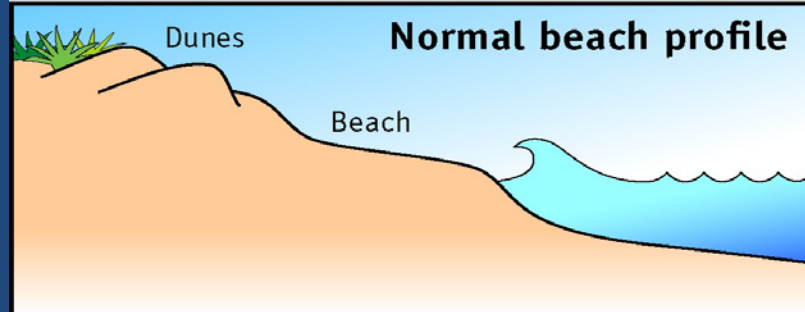
- Shoreline Hardening
- Storm Damage
- Ecosystem Damage
- Shoreline Access
- Tourism/economy



Proactive Takeaway:

Protecting & Restoring Dunes Protects Existing Development

Seasonal beach profile adjustments



Large waves, which tend to occur seasonally in Hawaii, cause a beach to temporarily change its profile.



degraded dunes



healthy dunes

Expanding Our Current Tool Kit: Laws and Policies to Create **Additional Cost-effective** Options: ***Law to Protect our Existing Limited Sand Sources***

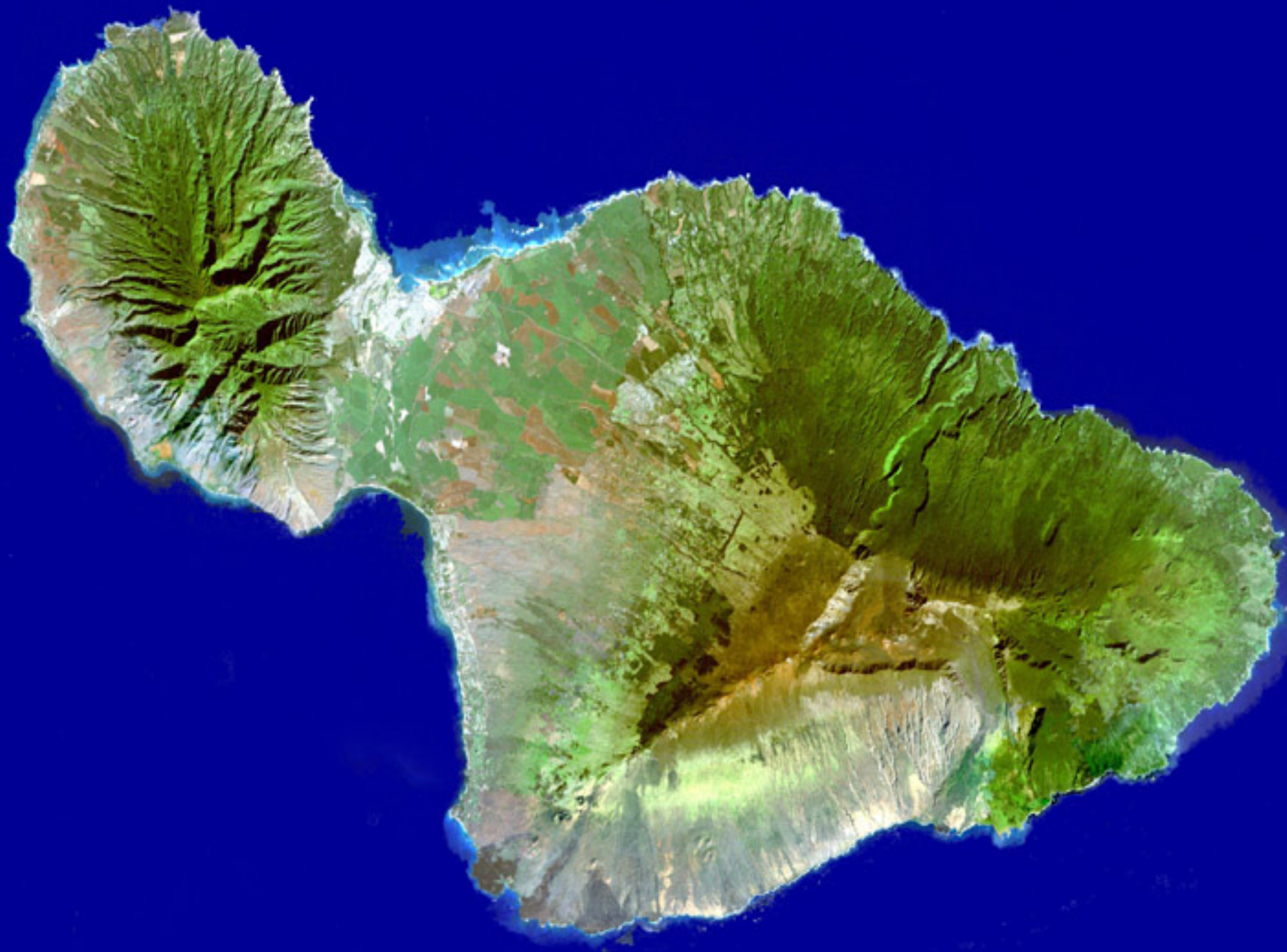


- 1. Preserve existing known sand sources for beach nourishment.**
- 2. Research legal avenues to restrict deportation of ancient sand dune deposits. Stop sand deportation ASAP.**
- 3. Develop Ordinance to require beneficial uses of excavated sand from major public and private developments.**



Conclusion: Expand Our Current Tool Kit with Laws and Policies to Create Additional Cost-effective Options

- 1. Create an interagency policy to research, expedite, and test Alternatives to Shoreline Hardening as solutions to protect development, to include groins, breakwaters, and reef balls**
- 2. Implement new State legislation to subsidize Beach Nourishment for public and private projects**
- 3. Preserve existing known sand sources for Beach Nourishment. Provide local ordinances to stop deportation of ancient sand dunes.**
- 4. Restrict uses of excavated sand, prioritized for public good.**
- 5. Create and fund a program to identify offshore sand deposits for future excavation.**



Q&A...*Mahalo Nui Loa*

**KAMA'OLE III
DUNE
WALKOVER**

Maui Coastal Zone Management Team

Jim Buika, Coastal Resource Planner
Anna Benesovska, CZM Planner
Tara Owens, Coastal Hazards Specialist, UH Sea Grant
Jeffrey Dack, Environmental Section Supervisor



Goal of the SMA Rules



Kama'ole 1 Beach Park
Vegetation Removal
May 18, 2012



Goal of the SMA Rules is to further the policy of the State, through the CZM Program, to preserve, protect, and where possible, restore the natural resources of the coastal zone.



DUNE RESTORATION



Kamaole II Beach Park
March 7, 2011

KAHANA VILLAGE *IN PROGRESS*



DUNE RESTORATION



KAMAOLE III DUNE WALKOVER



