MANAGING MAUI’S DYNAMIC SHORELINES

Status and Trends Briefing for the Maui Coastal Zone Advocacy Council
August 4, 2017

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WELCOME TO MAUI COUNTY

MAUI COUNTY:

Moloka‘i

West Maui (Lahaina)

North Shore (Paia)

Lana‘i

South Maui (Kihei)

East Maui (Hana)

Kaho‘olawe
Baldwin Beach, September 2016
Keonenui Bay, retaining wall failure, November 2016
Kahana Beach (Royal Kahana), April 2016
Maui has lost more than four miles of sandy beach in past century — report

By LEE IRVING, Honolulu Star-Advertiser

HONOLULU — Higher-than-normal erosion of its beaches has taken 3.2 miles of sand from Maui in the past century, according to a U.S. Geological Survey and University of Hawaii report released this week.

“Beaches are being lost everywhere but it’s not being tracked by us,” said Charles Fletcher, associate dean of the University of Hawaii’s 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.”

Kaanapali Beach has shown an annual erosion rate of 3.2 miles over the last century, according to the report, which is titled “National Assessment of Shoreline Change: Historical Shoreline Change in the Hawaiian Islands.”

New research predicts a doubling of coastal erosion by mid-century in Hawai‘i

March 23, 2016  |  Marie Onizuka  |  Comments

New research from scientists at the University of Hawai‘i at Mānoa and the Hawai‘i Department of Land and Natural Resources brings into clearer focus just how dramatically Hawai‘i’s beaches might change as sea level rises in the future. Over 70% of erosion dominates the sandy beaches of Hawai‘i’s coastal communities, causing beach loss as it encroaches homes.

WALLS NO MATCH FOR WAVES

HANDWORK OF GRAVITATIONAL ATTRACTION

Erosion likely result of supermoon tidal increases rather than storms

February 23, 2016  |  Louise Roque  |  Lahaina News

KAPAA — On Monday, Feb. 22, a full moon is setting and another high surf warning has been issued by the National Weather Service for the north shore of Maui and north and west shores of Kauai until Tuesday at 6 a.m.

“A combination of strong northeast winds associated with a fast moving cold front and a very large winter-time southwest swell will generate life-threatening surf along north and west facing shores through Tuesday morning. Ocean water may periodically surge and sweep over beaches and coastal roadways, especially from midnight to dawn. Surfers are urged to keep a distance of at least 100 yards away from surf zones. Surf along the north-facing shores of Maui and Kauai is projected to reach 45 to 70 feet.

Hotel tax might be tapped to fix eroding beaches

A bill to allow hotel operators to establish a tax on hotel rooms to help pay for coastal projects failed to advance out of committee at the state Capitol.

Supporters of the measure say it makes sense to let the folks who benefit from tourism fund some of the projects that benefit from tourism. Opponents say the tax adds to the burden on visitors and is unnecessary as there’s already a tax on hotel rooms.

The bill is sponsored by state Sen. Romy Fernandez, D-9th District, and Rep.intendo Driscoll, D-5th District. The measure would allow a hotel tax of up to 1% to be levied on hotel rooms in the county to be used to plug holes in the state’s budget and to fund projects like beach replenishment.
June 5, 2016

Rising tides and strong waves eroded part of the Royal Kahana Resort's pool deck, allowing water to pour into its cabana building in April.

‘Beach-quality sand’ discovered as erosion reaches ‘crisis’ level

Mayor says county not responsible for threat to West Maui condos

By CHRIS SUGIDONO, Staff Writer

KAHANA BAY — Maui County shoreline planners are “alarmed” after discovering more than 300,000 cubic yards of “beach-quality sand” off Kahana Bay, which could replenish the beachfronts of numerous condominiums that have been

The Maui News / CHRIS SUGIDONO photos
State hears public concerns over highway seawalls

September 22, 2016
BY LOUISE ROCKETT, Lahaina News

WEST MAUI - Driving to Lahaina is a gamble these days, with Honoapi‘ilani Highway, between Puamana and the Pali, under attack from fire, flooding, landslides, reckless drivers, road closures, sinkholes, seawalls, high tides, waves and gridlock.

But now a positive, enlightened force has come forward to lead the way and forge a new path.

Occupy Olowalu, a West Side social media phenom, has taken a stand. For the past week (as of deadline Sept. 19), the determined activists have camped out on the shoreline just south of Awälua, and miraculously their messages, posted on signs along the roadside and on Facebook, are being heard: #nomoreseawalls, #protectourshorelines, #movetheroad.
Local forecasters predict annual ‘king tides’ will have extra punch

Perfect storm of high tides, above-average sea levels, strong south swell could cause damage, flooding

By COLLEEN UECHI
Staff Writer

It’s not unusual for Hawaii to see the highest tides of the year during the summer, but the ocean conditions that come with them this season could put coastal areas more at risk.

Known as “king tides,” this annual ocean event is expected along Hawaii beaches Thursday and Friday, as well as at the end of June and July. That, combined with above-average sea levels and a south swell forecast, has experts preaching caution.

“We can’t always predict exactly what localized impacts will be, so it’s helpful to spread awareness broadly so property owners and beachgoers can anticipate possible impacts,” said Tara Owens, coastal processes and hazards specialist with the University of Hawaii Sea Grant College.

High tides flood the parking lot of Kealia Pond in Maalaea last month. Scientists believe lingering conditions from an El Nino in 2015 have created higher-than-normal seas along the shoreline.

Police work at Manchester Arena after reports of an explosion at the venue during an Ariana Grande concert in Manchester, England, on Monday. At least 22 people have died following reports of an explosion Monday night during the concert in northern England, police said. A representative said the singer was not injured.

U.K. police say apparent suicide bomber killed 22 at end of concert
EROSION IS WIDESPREAD ON MAUI

- 85% of Maui shorelines are eroding over the long-term.
- Maui’s beaches are experiencing the highest rates of erosion for the Hawaiian islands.
- Maui has the highest percentage of beach loss (11%).

Combination of Causes:

1. Sea-Level Rise *(chronic erosion)*

2. Seasonal Wave Conditions & Storms that Move Sand *(episodic erosion)*

3. Human Impacts to Sand Supply & Transport

West Maui, Pohailani Condominiums
A GLIMPSE OF THE FUTURE

Honoapiilani Hwy, Olowalu MM14, May 2017

photo credit: Asa Ellison
HAWAI`I CLIMATE ADAPTATION INITIATIVE
(Act 83, 2014)

- “Climate change is the paramount challenge of this century.”
- Address the effects of climate change to protect the State’s economy, environment, and way of life.
- Establishes an Interagency Climate Adaptation Committee (ICAC).
- Initial focus of this act is to develop a Sea Level Rise Vulnerability and Adaptation Report for Hawaiʻi.
- Authorizes the Office of Planning to coordinate development of a Statewide Climate Adaptation Plan. Coming December 2017!

http://climateadaptation.hawaii.gov
HAWAII CLIMATE CHANGE MITIGATION AND ADAPTATION INITIATIVE
(Act 32, 2017)

• Hawaiʻi becomes the first state to enact legislation that implements portions of the Paris climate agreement

• Establishes a Hawaii Climate Change Mitigation and Adaptation Commission continuing the work of ICAC

• Provide policy direction, coordination, and planning among agencies

• Shall establish climate change mitigation and adaptation strategies
RESPONSE OPTIONS

- Do nothing
- Managed retreat (*setbacks, relocation*)
- Adaptation (*elevate, reconfigure*)
- Beach nourishment and/or Dune Restoration
- Temporary or permanent erosion control (*sand pushing, geobags, groins*)
- Armoring (*permanent rock revetment or seawall*)

Preferred strategies:

- Do Nothing
- Adaptation
- Armor / “Hold the Line”
RETREAT: MAUI’S SHORELINE SETBACKS

Setback is the greater of A or B:

A. Erosion-based Setback

Current Calculation:
50 yrs x AEHR + 25 feet

Example if AEHR = 1.4 ft/yr:
(50 yrs x 1.4 ft/yr) + 25 ft = 95 ft setback

B. Lot Depth-based Setback

Current Calculation:
If lot depth is: Setback is:
100 ft or less........25 feet
100 to 160 ft.........40 feet
160 ft or more........25% of avg. lot depth (150 ft max.)

NOTE: Minimum of 25 ft setback for all shoreline lots.
PROTECT & RESTORE DUNES

Seasonal beach profile adjustments

- Normal beach profile
- Adjustment for large waves
- Recovery

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

Kamaole I Beach Park

- Degraded dunes
- Healthy dunes
DUNE WALKOVERS

Kamaole I

Kamaole III
BEACH NOURISHMENT

Stable Road, North Shore, 2006-2009 (Before Restoration)

Beach and Land Erosion at Project Beach Looking East, 22 August 2006 - before geotube groins.

Beach and Land Erosion Causing Pollution at Project Beach, 4 August 2009 – before geotube groins
Stable Road, July 2017 (~5 years after nourishment & groins)
KAHANA BAY COASTAL EROSION

- Older existing condos were built close to the ocean & are now threatened by erosion.
- Long-term erosion of 0.7 ft/yr has led to narrowed beaches.
- Armoring has contributed to erosion.
- Episodic (seasonal) erosion is now more damaging.
- The formerly wide sandy beach has protected condos through the years.
KAHANA BAY IN 1949
KAHANA BAY: SAND SEARCH RESULTS

Estimated Sand Volume: 405,000 cubic yards!

Sand Deposit 18
- 69,000 cy
- 16.4 acres
- 2.6’ avg thickness
- 45’ deep

Sand Deposit 19
- 71,000 cy
- 14.1 acres
- 3.1’ avg thickness
- 15’ deep

Sand Deposit 22
- 205,000 cy
- 28.5 acres
- 4.5’ avg thickness
- 12’ deep

Sand Deposit 23
- 60,000 cy
- 12.0 acres
- 3.1’ avg thickness
- 24’ deep
KAHANA BAY: RESTORATION CONCEPTS

- 50,000 cy
  50 feet of beach
  Groins at every property

- 100,000 cy
  100 feet of beach
  Groins at every other property

Image: Moffat & Nichol
IROQUOIS POINT

- Boulder groins increased structural complexity of nearshore area.
- Year 1 monitoring results:
  - New coral cover (from 0% to 0.6%)
  - Fish species richness increased 10x at groins
  - Fish abundance doubled for the area, and increased 25x at groins
CRITICAL INFRASTRUCTURE ARMORING

Wailuku-Kahului Wastewater Facility, 2015
MITIGATION: DUNE RESTORATION

Wailuku-Kahului Wastewater Facility, 2016
CRITICAL INFRASTRUCTURE ARMORING

Honoapiilani Highway, August 2012
# Recent Armoring Decisions

<table>
<thead>
<tr>
<th>YEAR</th>
<th>LOCATION</th>
<th>DECISION</th>
<th>COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>Hololani Condominiums (West Maui)</td>
<td>approved, conditions to restore beach and remove</td>
<td>$3 million</td>
</tr>
<tr>
<td>2016</td>
<td>Argyropoulos property (North Shore)</td>
<td>approved, not yet built</td>
<td>$0.5 million</td>
</tr>
<tr>
<td>2015</td>
<td>Wailuku-Kahului Wastewater Reclamation Facility (North Shore)</td>
<td>approved and completed</td>
<td>$5.8 million</td>
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<tr>
<td>2013</td>
<td>Honoapiilani Highway at Launiupoko (West Maui)</td>
<td>completed under emergency proclamation</td>
<td>$6 million</td>
</tr>
<tr>
<td>2012</td>
<td>Honoapiilani Highway at Ukumehame (West Maui)</td>
<td>completed under emergency proclamation</td>
<td>$7 million</td>
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<tr>
<td>2011</td>
<td>Honoapiilani Highway at Olowalu (West Maui)</td>
<td>approved, put on hold (2016)</td>
<td>$2 million</td>
</tr>
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</table>
FAILED ARMORING (25 SINCE 2007)

KAPALUA - 1
KEONENUI BAY - 5
KAHANA BAY - 3
HONOKOWAI - 6
LAHAINA - 3

MAALAEA - 2
KIHEI - 3

PAIA - 2

Shoreline access achieved voluntarily via 3 SM3 permits!
### RECENT INITIATIVES & PROGRESS

#### Act 83, 2014
- Interagency Climate Adaptation Committee
- SLR Vulnerability Report

#### FY15 NOAA Resilience Grant
1. SLR Viewer
2. Integrate in Community Plans
3. Resilience-based Disaster Rebuilding

#### FY17 NOAA Resilience Grant
- West Maui site specific wave-runup forecasts (real-time) and scenarios

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#### Hawaii Office of Planning Managed Retreat Project
- Island Case Studies

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#### County General Plans/Community Plans
- SMA/Shoreline Permits

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#### Act 32, 2017
- ICAC → Commission
1. Shift from reactive vs. proactive (stovepipe vs. streamlined)

2. Shoreline now managed by parcel

3. Shift to regional beach cell approach

4. Shift requires public–private partnerships

5. Promote adaptation and alternatives to armoring
Hawaiian coastal ecosystems and sandy shorelines will continue to be degraded and Hawaii will continue to lose its sense of place…

... Reactive shoreline planning protects threatened development at expense of coastal ecosystems
Shifting from Reactive to Proactive
Shoreline Planning Requires State Partnership Resources

Proactive Planning Vision
1) Institute an ePermit System to expedite shoreline projects
   • Goal is to reduce shoreline rehabilitation time by 75%
   • Goal is to reduce permit costs by 75% (Google JARPA)
2) Proactively conduct EIS studies for at-risk beach cells
   • Vision is to train next-generation, place-based experts: Next Generation Hawaii Coastal Zone Managers
   • Partner with U of Hawaii & Sea Grant Program & Industry
Proposed Proactive Planning Process

FUNDING MECHANISM
State Agencies
State-funded yearly Program w/ cost recovery

GRANT MANAGERS
UH / SeaGrant
Admin Experts
Professors
Students
Resources
Interns

OUTPUTS
Create curriculum and training programs for Masters & Ph.D. programs w/ University, Community Colleges, and private industry

PROJECT APPLICANT
E-permit Application
- Federal BMPS
- State BMPS
- County BMPS
- EIS datasets

Regulatory Review & Approval Board
- USACE
- NOAA
- DOH
- DLNR BLNR
- Planning Commission
- County Council

EROSION EVENT
EIS 1 Maui
Beach Cell 1

EIS 2 Kauai
Beach Cell 2

EIS 3 Hawaii
Beach Cell 3

EIS 4 Oahu
Beach Cell 4

Next Generation Coastal Zone Managers
- Project Managers
- Private Experts
- Students
- Interns

To create a cadre of place-based science, engineering, & planning experts, granting degrees in Coastal Zone Management

To complete critical studies for at risk coastal ecosystems

For input to transparent applications and approval process

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Mahalo Nui Loa

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