

# MANAGING MAUI'S DYNAMIC SHORELINES

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

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04.22.2015

# WELCOME TO MAUI COUNTY

## MAUI COUNTY:



Moloka'i



Lana'i

West Maui  
(Lahaina)

North Shore  
(Paia)

South Maui  
(Kihei)

Kaho'olawe



East Maui  
(Hana)





Kihei, Halama Street, May 2017





South Kihei Road, January 2017





Baldwin Beach, September 2016





Napili Bay, January 11, 2016

Photo credit: Dana Reed





Napili Bay, January 11, 2016

*Photo credit: Pat Lindquist*





Keonenui Bay, October 2016





Keonenui Bay, retaining wall failure, November 2016





North Kaanapali (Kaanapali Beach Club), June 2016





Kahana Beach (Royal Kahana), September 2015





Kahana Beach (Royal Kahana), April 2016





Kahana Beach (Valley Isle), June 2016



"The entire Kihui 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

WEDNESDAY 2/24/16

THE PULSE OF PARADISE

**Star Advertiser**

SHINING A LIGHT

*Lawyers want an investigation into whether Nedra had a part in HECO's decision to kill 3 solar farm projects*

MONEY / 35

Dry Sophie Catches  
[www.dry Sophie Catches.com](http://www.dry Sophie Catches.com)

**A** series of events has increased along Hawaii's coastline, policymakers are grappling with what to do with the hundreds of acres that line coasts and pose a potentially mounting liability risk to the state.

Many sources that were once constructed on private beachfront property are now legally on state land as the high reach of the ocean moves

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**HANDIWORK OF GRAVITATIONAL ATTRACTION**



A photograph showing a beach scene with driftwood in the foreground and people walking in the distance. The beach is sandy with some dark, weathered wood scattered across it. In the background, there are palm trees and a line of people walking along the water's edge. The sky is clear and blue.

**Erosion likely result of supermoon tidal increases rather than storms**

See EROSION on the next page.

# LAHAINA NEWS

A scenic view of a tropical beach. In the foreground, a low stone wall runs along the left side of the frame. The beach is sandy and curves along the shoreline. The ocean is blue with white waves breaking onto the shore. In the background, there are several palm trees and a building with a thatched roof, partially obscured by the trees. The sky is clear and blue.

*A new study on sea level rise cautions that sand will wash away faster by 2050*

By Timothy W. Shaffer



June 5, 2016

# The Maui News

Winner of 14 SPI-Hawaii 2014  
Excellence in Journalism Awards

SUNDAY, June 5, 2016

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The Maui News / CHRIS SUGIDONO photos

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 "elated" 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 slowly disappearing into the ocean.





# September 22, 2016

Mobile: [mobile.lahainanews.com](http://mobile.lahainanews.com)

## LAHAINA NEWS

Your Community News Opinions Features Sports Classi

### Local News

/ News / Local News /

« Rotary Club of Lahaina Sunri... County to hold meeting on r...»

# State hears public concerns over highway seawalls

September 22, 2016  
BY LOUISE ROCKETT, Lahaina News

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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 Awalua, and miraculously their messages, posted on signs along the roadside and on Facebook, are being heard: #nomoreseawalls, #protectourshorelines, #movetheroad.

### Article Photos





May 23, 2017

# The Maui News

Winner of 12 SPJ-Hawaii 2015  
Excellence in Journalism Awards

Maui's Newspaper Since 1900

TUESDAY, May 23, 2017

75 CENTS

## 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.



Photo courtesy of Tara Owens, Hawaii Sea Grant

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-



AP photo

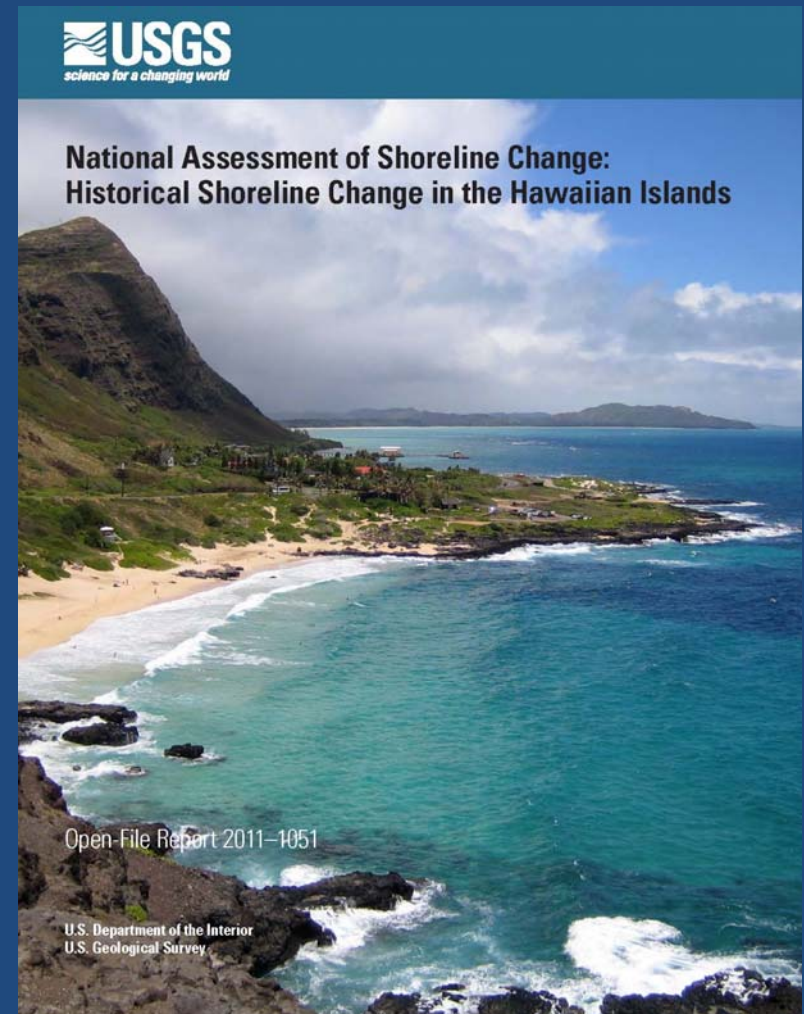
Police work at Manchester Arena after reports of an explosion at the venue during an Ariana Grande concert in Manchester, England, on Monday. At least 22 people have died following reports of an explosion Monday night during the concert in northern England, police said. A representative said the singer 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%).



Fletcher, Charles et. al., 2011. *National Assessment of Shoreline Change: Historical Shoreline Change in the Hawaiian Islands*. U.S. Geological Survey Open-file Report 2011-1051, 55p.



# COASTAL EROSION

## 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 Hawai'i**.
- 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 ADAPTION INITIATIVE

(Act 32, 2017)

- Hawai'i 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

preferred strategies

- 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*)



**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:

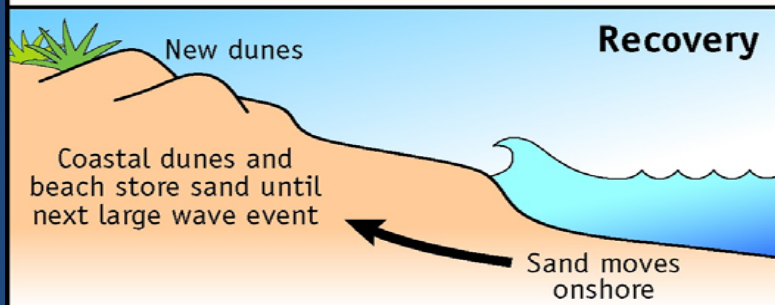
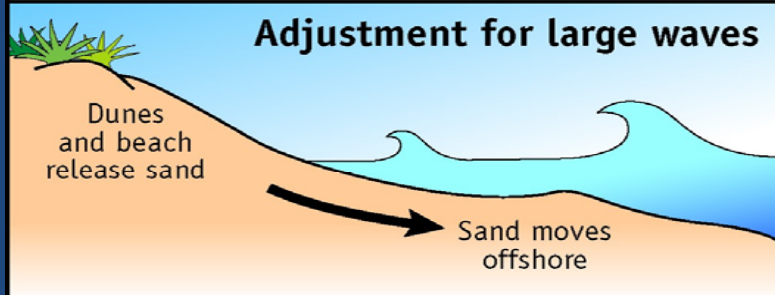
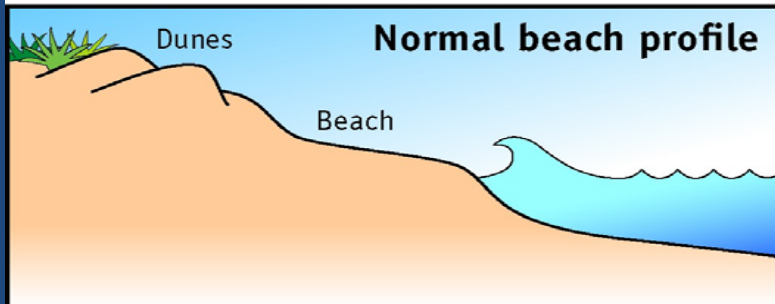
<i>If lot depth is:</i>	<i>Setback is:</i>
100 ft or less.....	25 feet
100 to 160 ft.....	40 feet
160 ft or more.....	25% of avg. lot depth (150 ft max.)

NOTE: Minimum of 25 ft setback for all shoreline lots.



# PROTECT & RESTORE DUNES

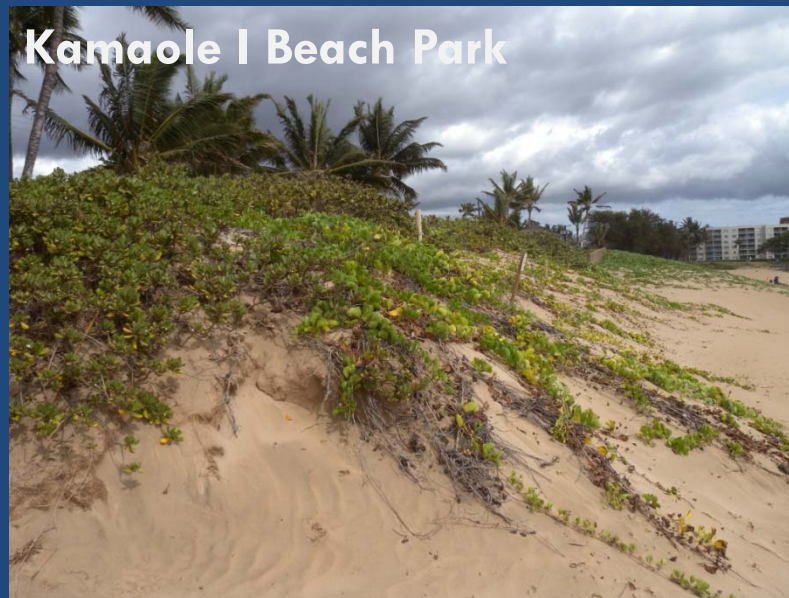
## Seasonal beach profile adjustments



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



degraded dunes



healthy dunes





Paia Park/PYCC, July 2016



# DUNE WALKOVERS

**Kamaole I**



**Kamaole III**





# BEACH NOURISHMENT



**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, North Shore, 2006-2009 (Before Restoration)**



# BEACH NOURISHMENT



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 Beach (Hololani), May 2016



# shore





# KAHANA BAY: SAND SEARCH RESULTS

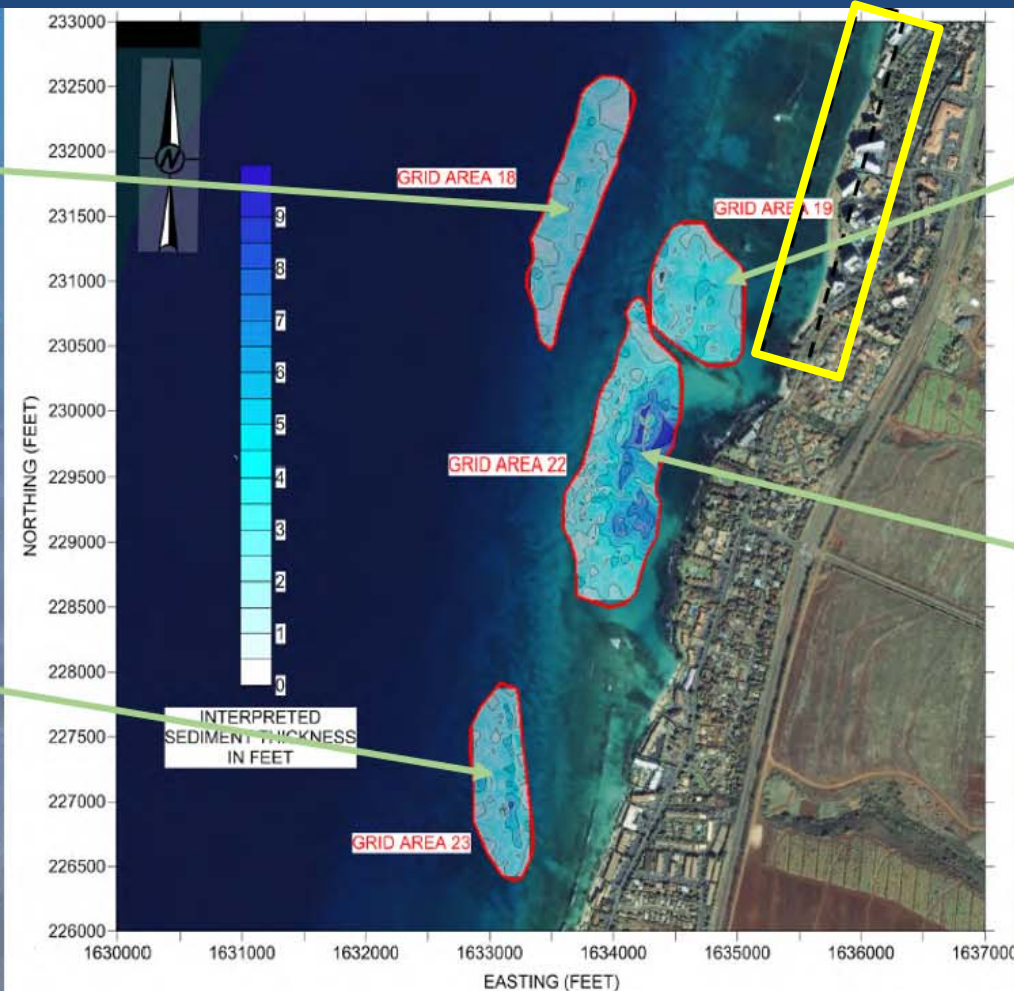
Estimated Sand Volume: 405,000 cubic yards!

## Sand Deposit 18

- 69,000 cy
- 16.4 acres
- 2.6' avg thickness
- 45' deep

## Sand Deposit 23

- 60,000 cy
- 12.0 acres
- 3.1' avg thickness
- 24' 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



# 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

Iroquois Point, Oahu — rock t-head groins



# CRITICAL INFRASTRUCTURE ARMORING



Wailuku-Kahului Wastewater Facility, circa 2011



# CRITICAL INFRASTRUCTURE ARMORING



*Image: Goodfellow Brothers*

Wailuku-Kahului Wastewater Facility, 2015



# MITIGATION: DUNE RESTORATION



Wailuku-Kahului Wastewater Facility, 2016



# CRITICAL INFRASTRUCTURE ARMORING



Honoapiilani Highway, August 2012



# RECENT ARMORING DECISIONS

YEAR	LOCATION	DECISION	COST
2016	Hololani Condominiums (West Maui)	approved, conditions to restore beach and remove	\$3 million
2016	Argyropoulos property (North Shore)	approved, not yet built	\$0.5 million
2015	Wailuku-Kahului Wastewater Reclamation Facility (North Shore)	approved and completed	\$5.8 million
2013	Honoapiilani Highway at Launiupoko (West Maui)	completed under emergency proclamation	\$6 million
2012	Honoapiilani Highway at Ukumehame (West Maui)	completed under emergency proclamation	\$7 million
2011	Honoapiilani Highway at Olowalu (West Maui)	approved, put on hold (2016)	\$2 million







# FAILED ARMORING (25 SINCE 2007)

KAPALUA - 1

KEONENUI BAY - 5

KAHANA BAY - 3

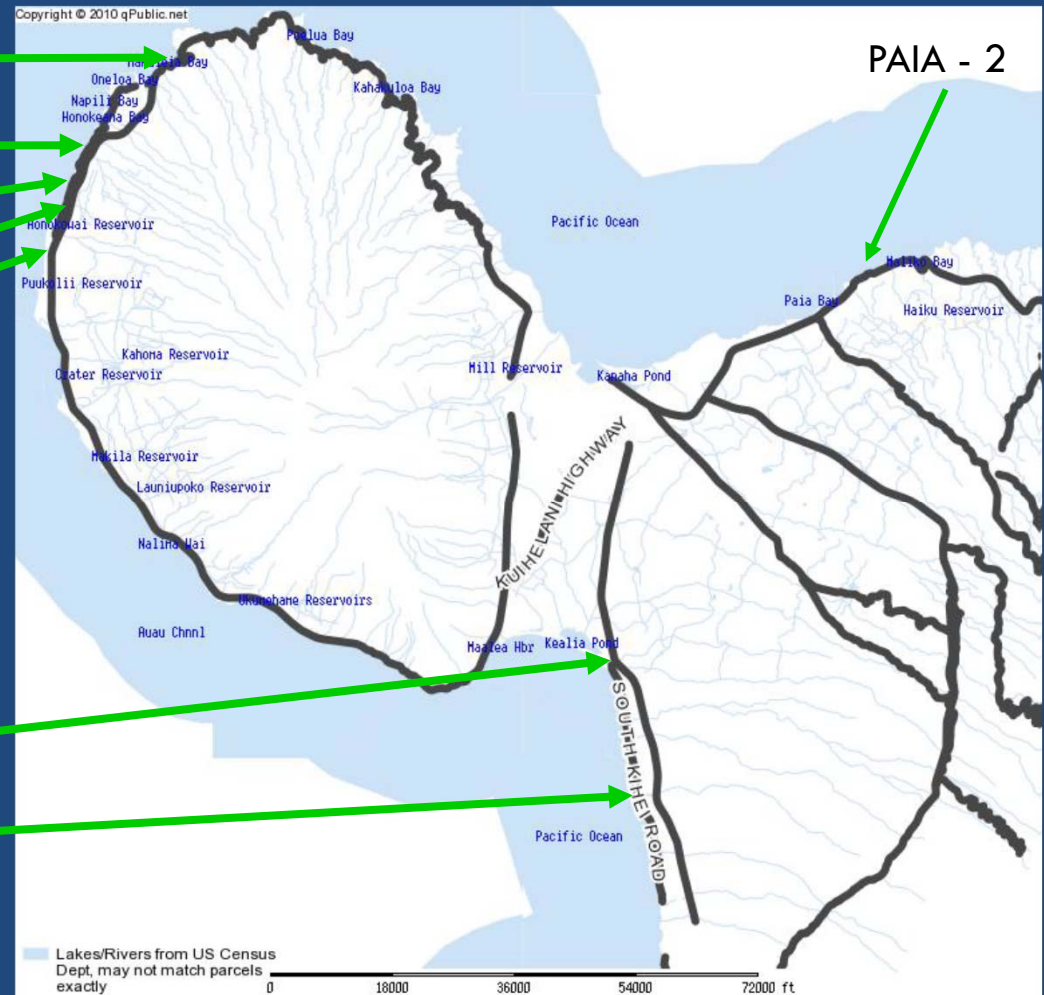
HONOKOWAI - 6

LAHAINA - 3

PAIA - 2

MAALAEA - 2

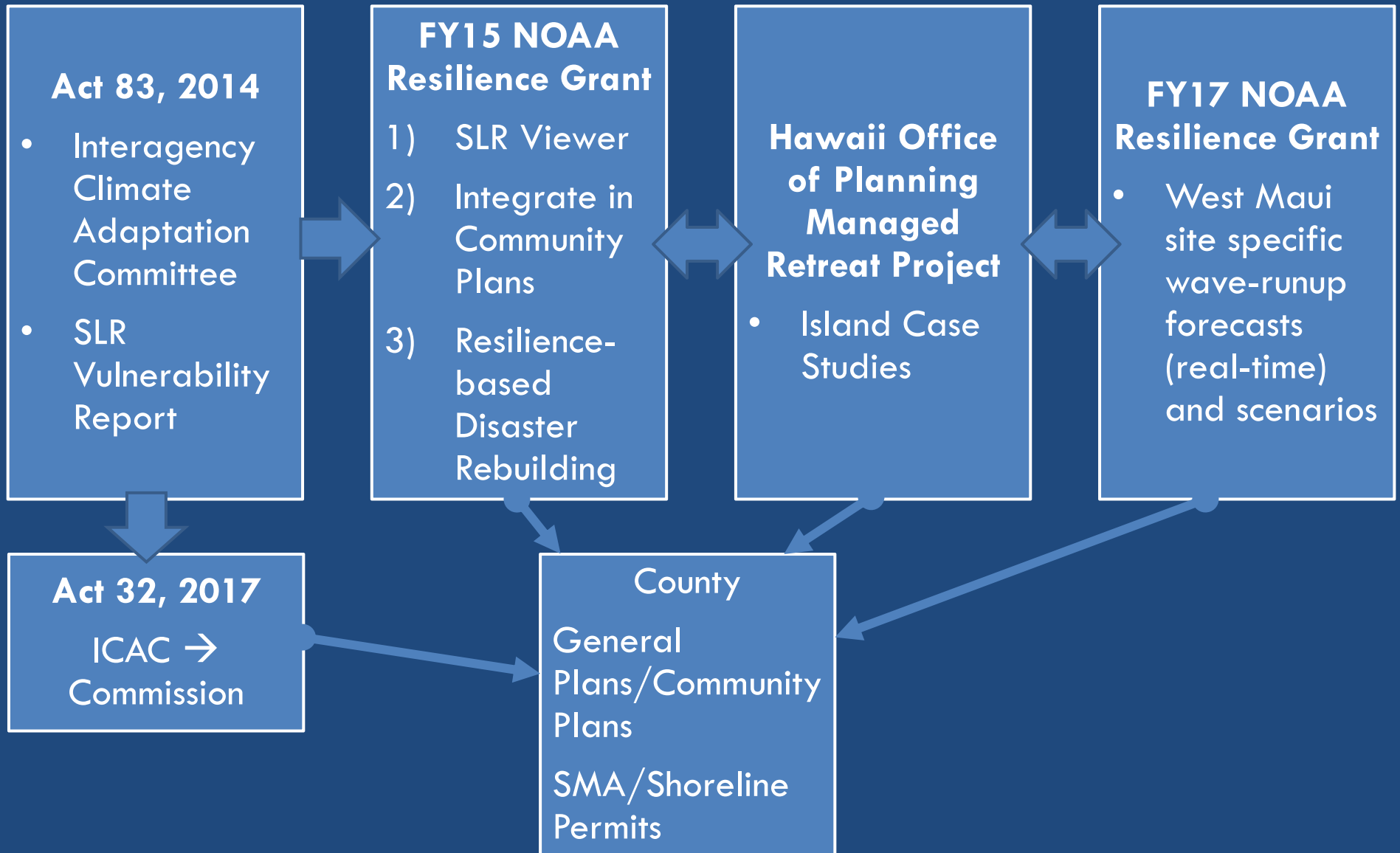
KIHEI - 3



**Shoreline access achieved voluntarily via 3 SM3 permits!**



# RECENT INITIATIVES & PROGRESS







# Key Points Re: Hawaii's Challenge

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**



# WITHOUT PROACTIVE PLANNING

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







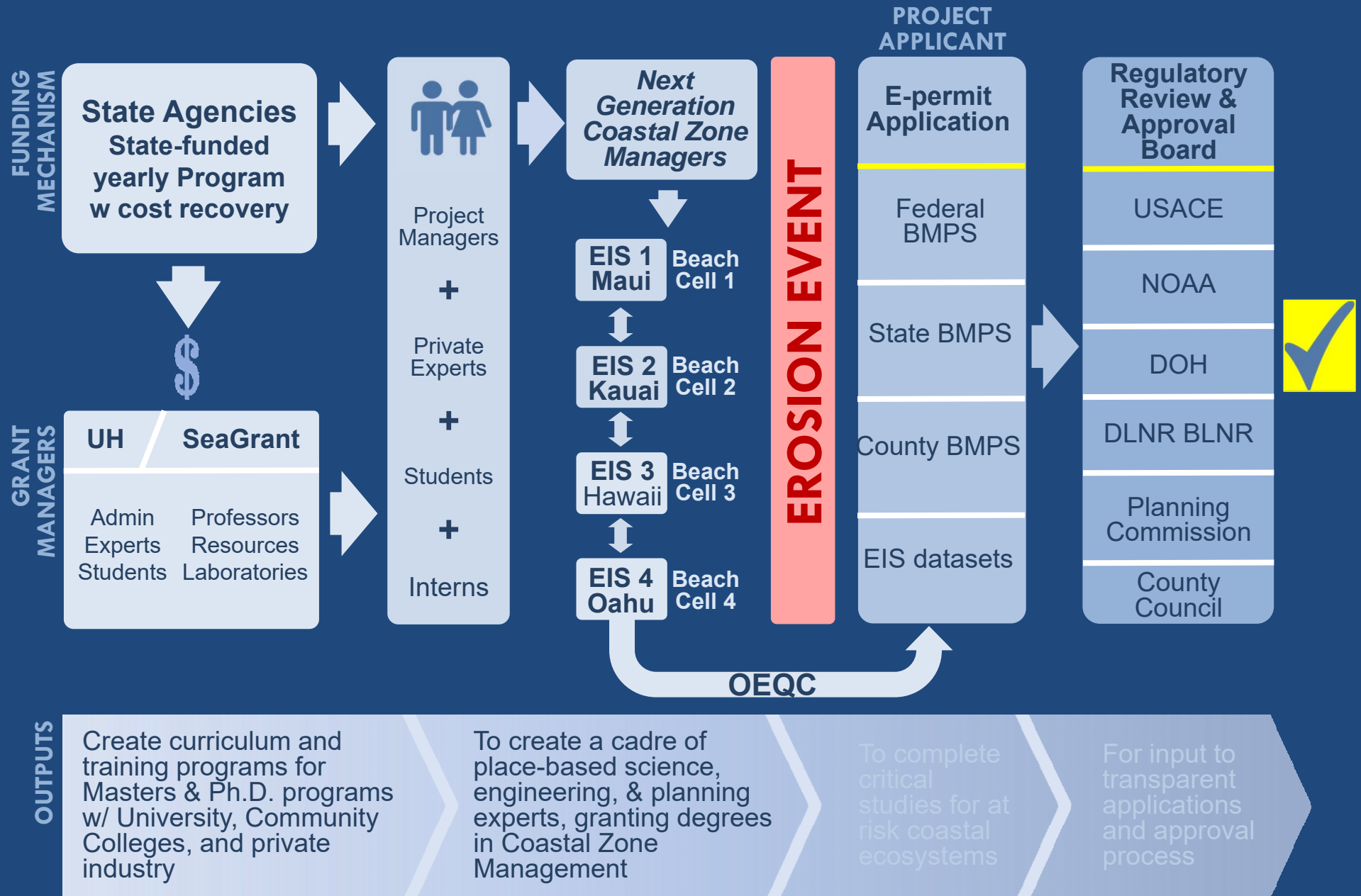
# Shifting from Reactive to Proactive Shoreline Planning Requires State Partnership Resources

## 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





# Mahalo Nui Loa

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