



HAWAIIAN HOME LANDS

HAWAIIAN HOMES COMMISSION • DEPARTMENT OF HAWAIIAN HOME LANDS

# Draft South Molokai Shoreline Erosion Management Plan (SM-SEMP) Community Open House

November 14, 2022

# **DRAFT SOUTH MOLOKA'I SHORELINE EROSION MANAGEMENT PLAN**

## **COMMUNITY OPEN HOUSE STATIONS**

**☑ Please sign in at Sign-In Table and get your copy of “Homeowner’s Handbook to Prepare for Natural Hazards” Fourth Ed., by Sea Grant (Stations arranged going clockwise)**

### **STATION I**

**Introduction / Project Overview**

### **STATION II**

**Project Area & Existing Conditions**

### **STATION III**

**Shoreline Erosion Management Options**

### **STATION IV**

**Draft Recommendations**

### **STATION V**

**Implementation & Next Steps**





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# **SOUTH MOLOKA'I SHORELINE EROSION MANAGEMENT PLAN**

## **SM-SEMP Purpose:**

Provide a roadmap to enable DHHL to proactively plan for and manage shoreline erosion.

## **The plan does this by:**

1. Investigating the underlying causes of shoreline erosion, and the likely future progression;
2. Identifying effective and sustainable shoreline erosion management strategies that maintain natural processes and consider community needs; and
3. Educating the community as to the causes of shoreline erosion and appropriate management responses.



## **Planning Goal:**

*Work with the beneficiary community to create a shoreline erosion management plan that is informed by Native Hawaiian knowledge and values, is respectful of the project area's unique communities, and leads to a healthier and more resilient shoreline for generations of homesteaders and the broader community.*

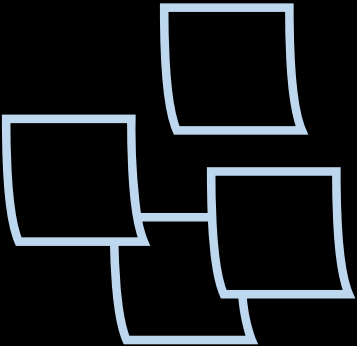
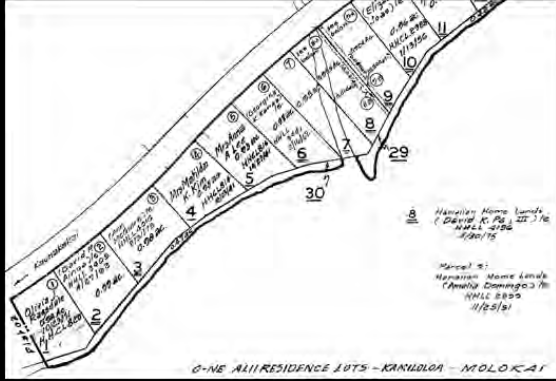
## **Planning Principles:**

- ❖ **Traditional Ecological Knowledge**
- ❖ **Ahupua'a based, Mauka a Makai Approach**
- ❖ **Place Based (culture, nature, history)**
- ❖ **Littoral Beach Cell – not Parcel by Parcel**
- ❖ **Opportunities for Community Based Implementation**

**'A'ohe hana nui ke alu 'ia.  
No task is too big when done together by all.  
Pukui, 'Olelo No'eau #142**

# DRAFT, SOUTH MOLOKA‘I SHORELINE EROSION MANAGEMENT PLAN

## Planning Process:



PHASE 1 Desktop Research	PHASE 2 Field Surveys	PHASE 3 Stakeholder Outreach	PHASE 4 Stakeholder Vetting of Draft Recommendations	PHASE 5 Prepare the Draft and Final SM-SEMP
Document the project area’s mo’olelo, history, terrestrial environment, physical coastal processes, and erosion hotspots within the context of the project area’s ahupua’a.	Conduct field observations of shoreline conditions to gather valuable background data and photographs of past flooding, shore conditions, shore reference features, and shoreline change.	Work with Hawaiian Homestead beneficiaries, lineal descendants, government, and community stakeholders to identify shoreline erosion threats and appropriate management responses.	Prepare conceptual draft recommendations for vetting by a diverse group of Hawaiian Homesteaders and other stakeholders.	Prepare the Draft and Final SM-SEMP using information generated through the first four phases.



# DRAFT SOUTH MOLOKA'I SHORELINE EROSION MANAGEMENT PLAN

Kalama'ula, Kaunakakai (Malama Park) Kapa'akea, Kamiloloa and One Ali'i  
Hawaiian Home Lands Along the Shoreline that Comprise the Project Area.

Island of Moloka'i



Kalama'ula

Kaunakakai Harbor & Wharf

Malama Park

Kamehameha V Highway

Kaunakakai

Moloka'i Shores

Kamehameha V Highway

Kapa'akea

Kaloko'eli Fishpond

Hotel Moloka'i

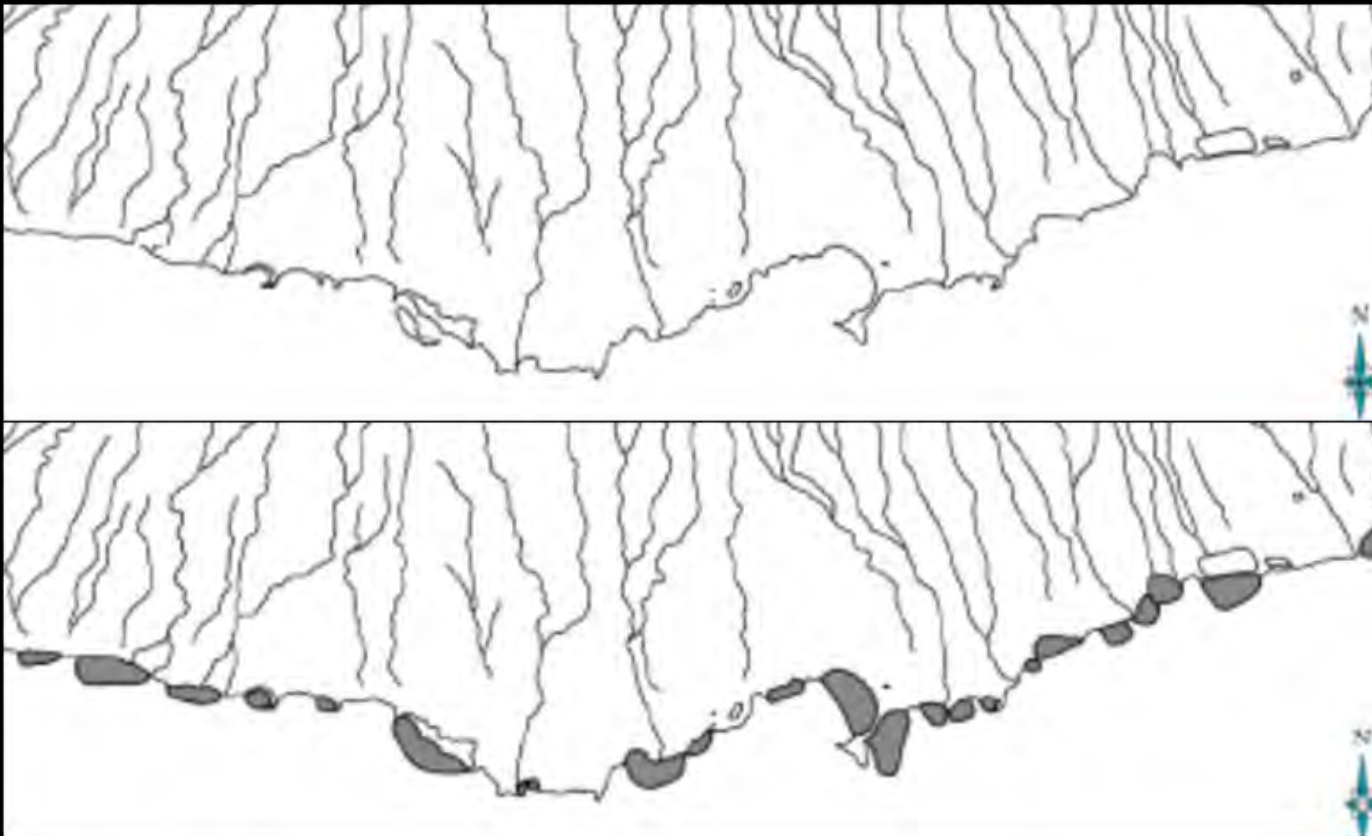
Kamiloloa-One Ali'i

Ali'i Fishpond

Project Area



# Human Induced Change An Evolving Shoreline



Portion of the Southeastern coast of Moloka'i with and without fishponds.  
(Roberts, Lucile M., 4)

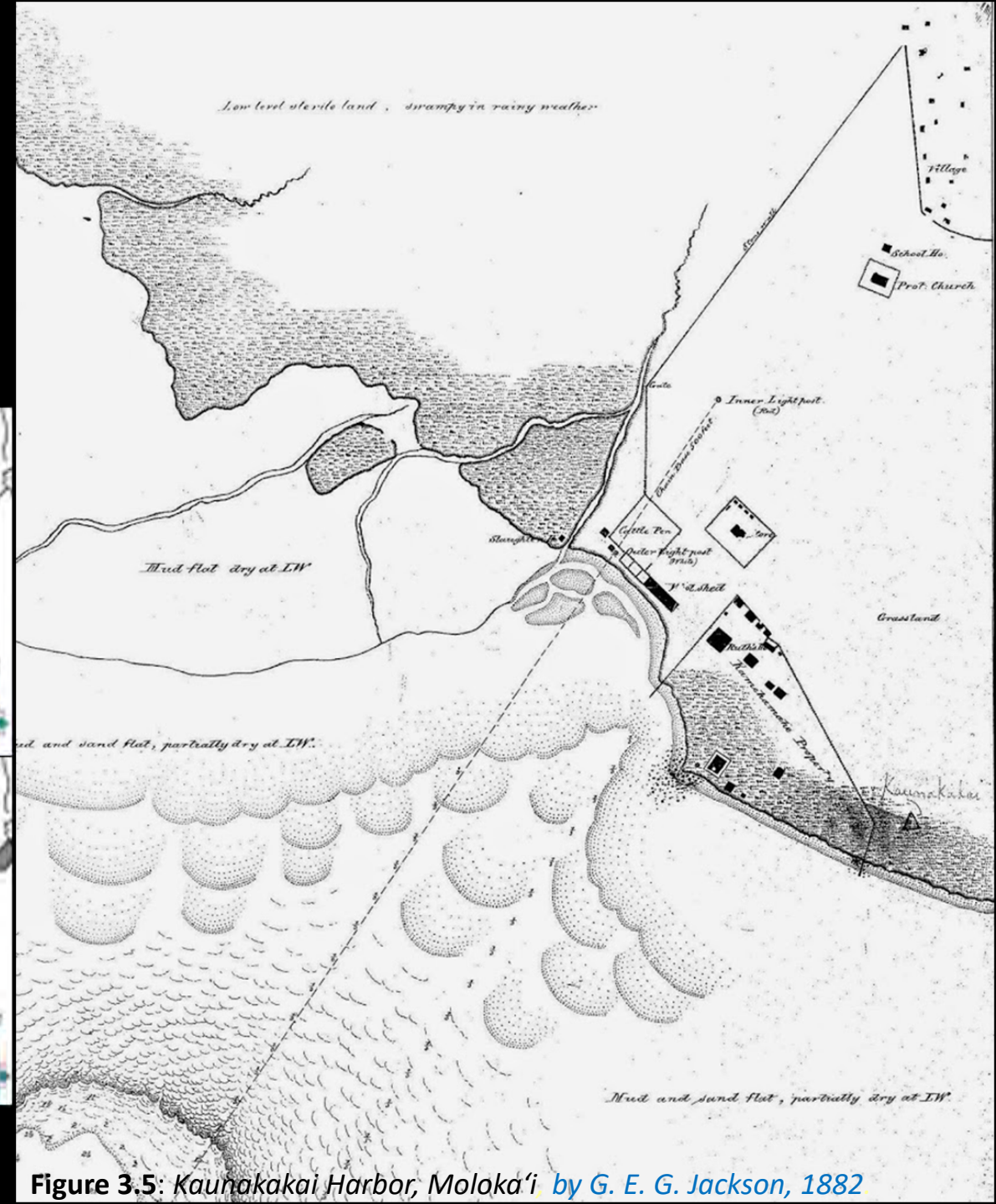


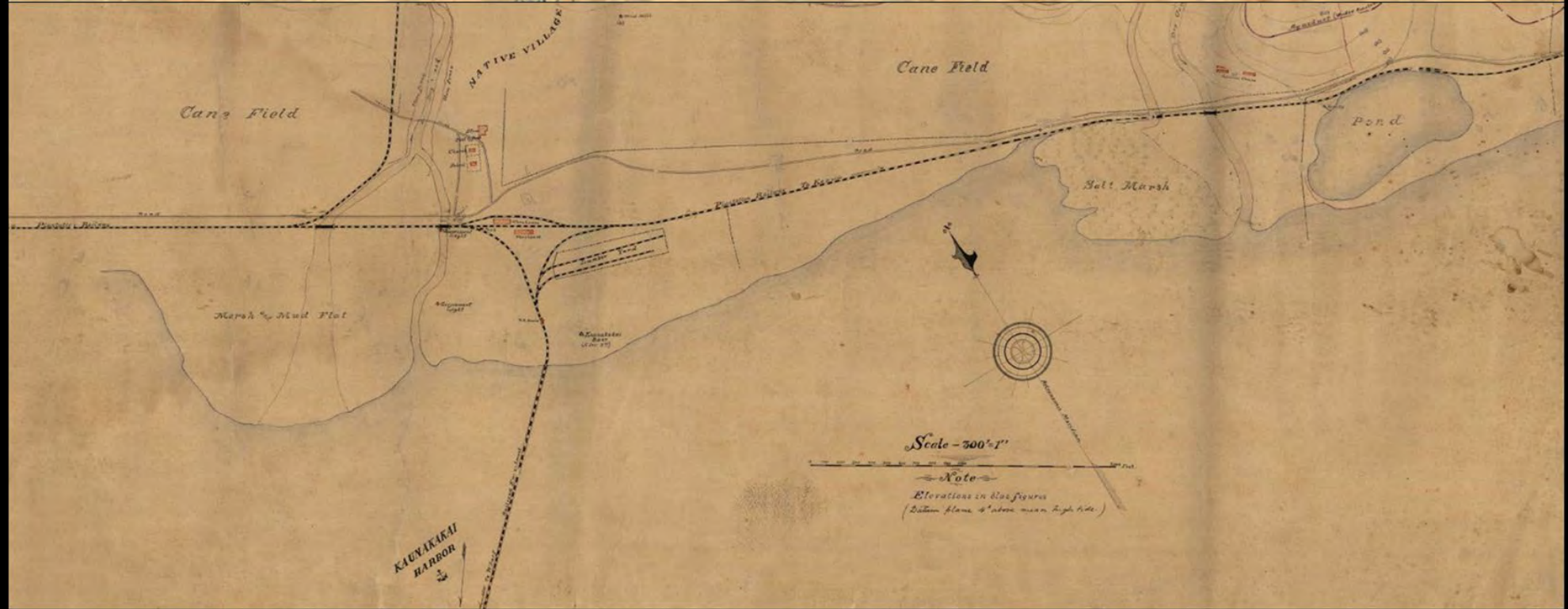
Figure 3.5: Kaunakakai Harbor, Moloka'i by G. E. G. Jackson, 1882



Hawaiian Government Survey,  
Molokai Middle & West Section, M.D.  
Monsarrat 1886.



Kaunakakai and Vicinity, American Sugar  
Co., Molokai Hawaiian Islands, May 1900.





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# **SOUTH MOLOKA'I SHORELINE EROSION MANAGEMENT PLAN**



*USGS, aerial imagery of Kaunakakai and adjacent coastline. February 27, 1950.*



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# **SOUTH MOLOKA'I SHORELINE EROSION MANAGEMENT PLAN**



*Aerial Imagery, South Shore Moloka'i, 2021 (Google Earth Image 2021 Maxar Technologies, Data SOEST/UHM)*



# DRAFT SOUTH MOLOKA'I SHORELINE EROSION MANAGEMENT PLAN

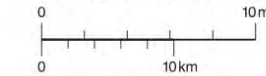
## Coastal Hazards & Vulnerabilities

### Molokai and Lanai

Damaging high waves\* and high waves due to hurricanes

**Statewide high waves that probably affected Molokai and Lanai**

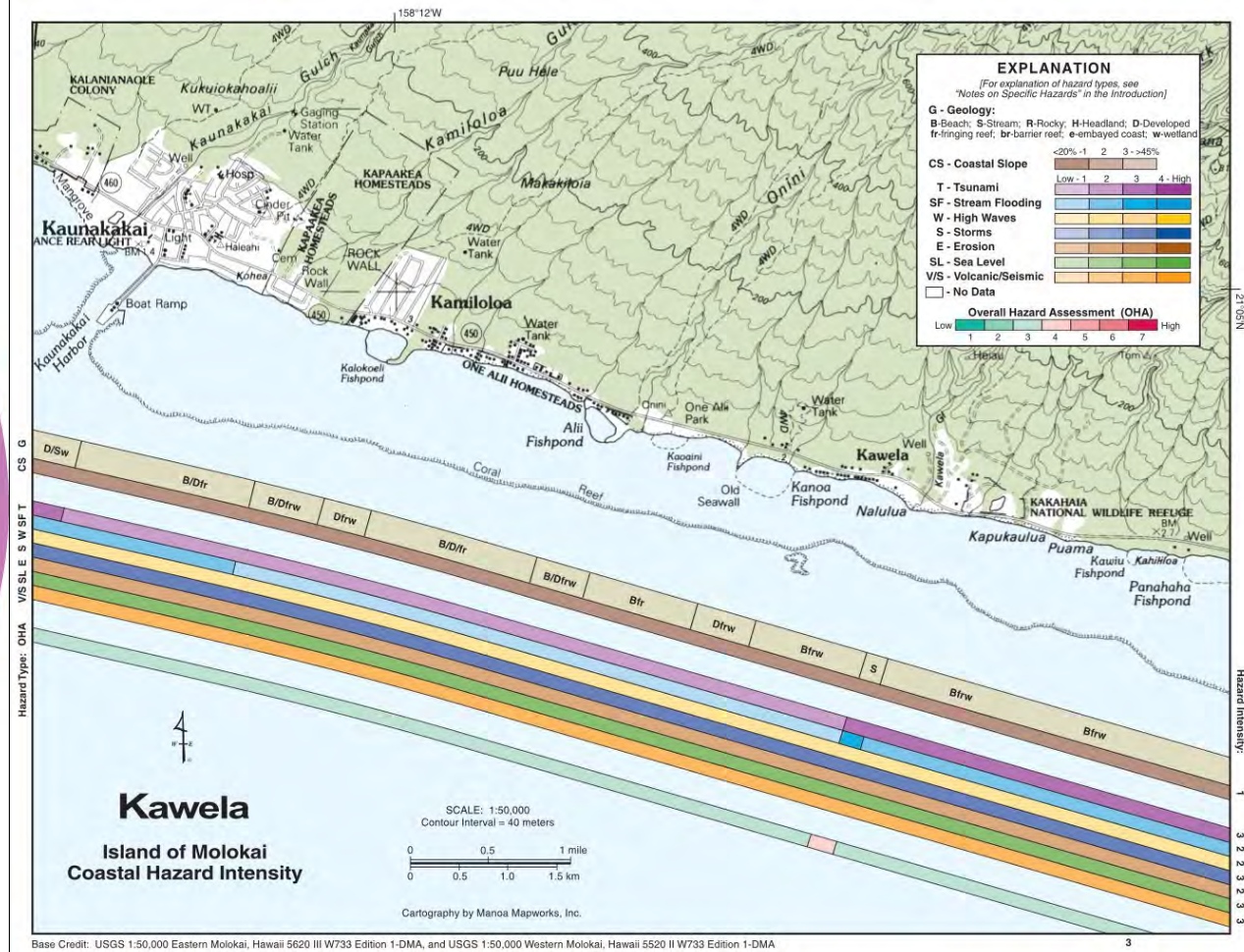
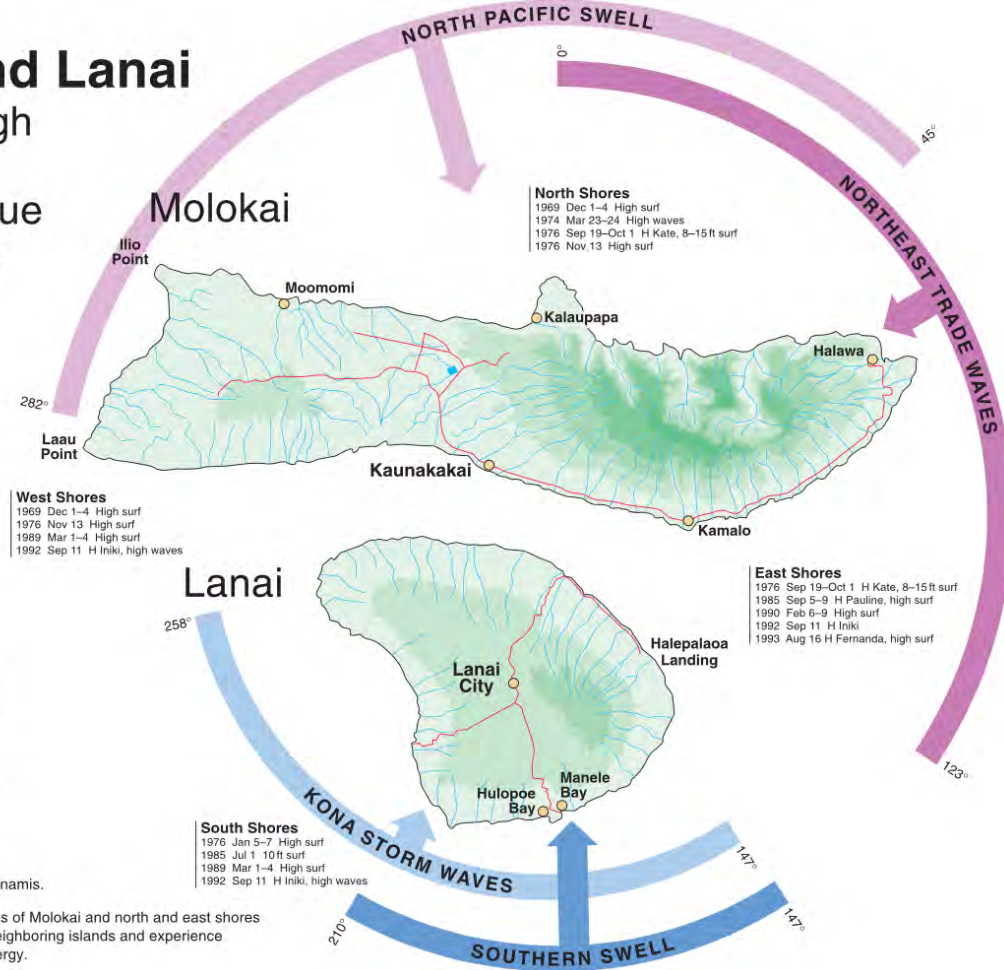
1959 Jan 17-18 High surf  
1959 Aug 4-7 H Dot, high waves  
1964 Dec 19-23 High seas  
1968 Dec 5-8 High waves  
1978 Jul 17-28 H Fico, high waves 8-12 ft  
1980 Jan 8-11 High waves  
1982 Nov 23 H Iwa, high waves  
1983 Sep 29 TS Nareia, high waves  
1985 Mar 1-11 High surf  
1986 Jul 21 H Estelle, high surf  
1993 Aug 16 H Fernanda, high surf



- Lakes and reservoirs
- 0-1000 feet
- 1000-2000 feet
- 2000-3000 feet
- 3000-4000 feet
- over 4000 feet
- Urban areas
- Highways
- Streams
- Canals
- H Hurricane
- TS Tropical storm
- 10ft Height of surf (feet)

\*Does not include waves due to tsunamis.

NOTE: East, west, and south shores of Molokai and north and east shores of Lanai are protected by neighboring islands and experience reduced seasonal wave energy.



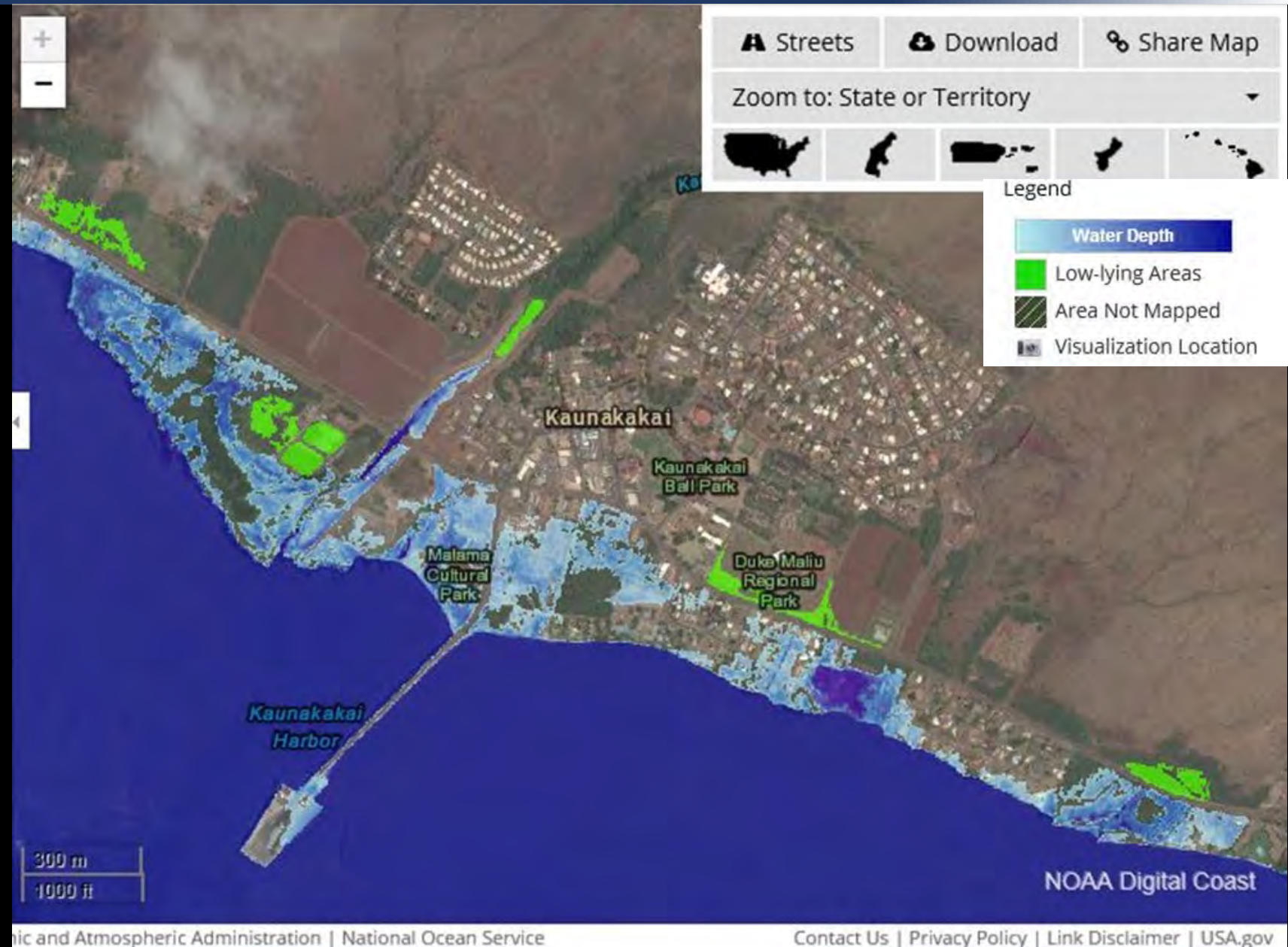
Base Credit: USGS 1:50,000 Eastern Molokai, Hawaii 5620 III W733 Edition 1-DMA, and USGS 1:50,000 Western Molokai, Hawaii 5520 II W733 Edition 1-DMA



# DRAFT SOUTH MOLOKA'I SHORELINE EROSION MANAGEMENT PLAN

## Sea Level Rise Issues and Challenges

- Coastal flooding and erosion
- Impact on community infrastructure such as Kamehameha V Highway and parks
- Loss of land and structures
- Damage to property
- Cesspool and septic system failure
- Impact on native flora and fauna
- Impact on cultural resources
- Access to and along the shoreline
- Diminished coastal water quality



Projected Sea Level Rise of 3.2 Feet by Year 2100



**Realign**



**Accommodate**



**Protect**

## **Shoreline Erosion Management Options**

### **1. Adaptive realignment**

Relocate, reorient, reposition, retreat, redevelop & rebuild

### **2. Hazard accommodation**

Elevate, reconfigure, waterproof, reinforce & strengthen

### **3. Protection from coastal hazards**

Nature-based restoration, rock sill & sedge, dry stack wall, rubble mound, groin, revetment & seawall



# SOUTH MOLOKA'I SHORELINE EROSION MANAGEMENT PLAN

## Adaptive Realignment

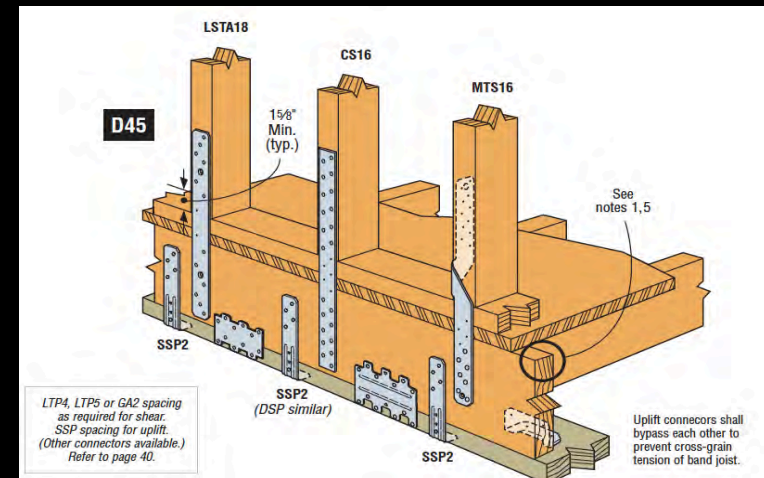
- *Relocate* or *Rebuild* on higher locations of a property
- *Reorient* dwellings and *Reposition* buildings to be perpendicular to the shore rather than parallel to it
- *Reposition* buildings to reduce exposure to coastal hazards
- *Retreat* to mauka lands
- *Redevelop* further inland and out of harm's way



# SOUTH MOLOKA'I SHORELINE EROSION MANAGEMENT PLAN

## Hazard Accommodation

- **Elevate** the building and use the first floor for parking and live upstairs
- **Reconfigure** a dwelling so that the kitchen, major appliances, and utilities are on the mauka or inland side of a house
- **Prohibit** or **Limit** slab on grade construction in flood and sea level rise inundation zones
- **Reinforce** and **Retrofit** dwellings to **strengthen** the building with hurricane clips and continuous load path to minimize damage





# SOUTH MOLOKA'I SHORELINE EROSION MANAGEMENT PLAN

## Protection from Coastal Hazards

### GREEN - SOFTER TECHNIQUES

### GRAY - HARDER TECHNIQUES

#### *Living Shorelines*



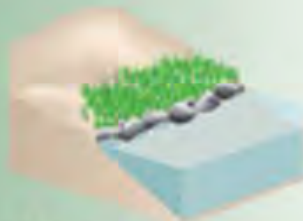
##### **VEGETATION ONLY -**

Provides a buffer to upland areas and breaks small waves. Suitable only for low wave energy environments.



##### **EDGING -**

Added structure holds the toe of existing or vegetated slope in place.



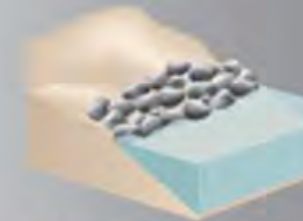
##### **SILLS -**

Parallel to existing or vegetated shoreline, reduces wave energy, and prevents erosion. Suitable for most areas except high wave energy environments.



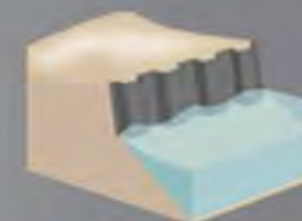
##### **BREAKWATER -**

(vegetation optional) - Offshore structures intended to break waves, reducing the force of wave action, and encourage sediment accretion. Suitable for most areas.



##### **REVETMENT -**

Lays over the slope of the shoreline and protects it from erosion and waves. Suitable for sites with pre-existing hardened shoreline structures.



##### **BULKHEAD -**

Vertical wall parallel to the shoreline intended to hold soil in place. Suitable for areas highly vulnerable to storm surge and wave forces.



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## WHAT IS UNDER THREAT

Carport & garage  
Rear yard pavilion  
House – episodic erosion  
House – chronic erosion  
Kalaniana'ole Hall  
Roadways  
Park infrastructure  
Kapuāiwa Coconut Grove

## RESPONSE or REMEDY

Soft & Green  
Sandbags  
Rock Sill & Sedge  
Rock Gabions  
Boulder Mound  
Dry Stack Wall  
Sheet Pile Bulkhead  
Seawall  
Rock Revetment  
Groin  
Realign / Retreat

## ANALYZE or FILTER

Desktop  
Research  
Stakeholder  
Interviews  
Focus Group  
Meeting 1

## PREFERRED RESPONSE or REMEDY

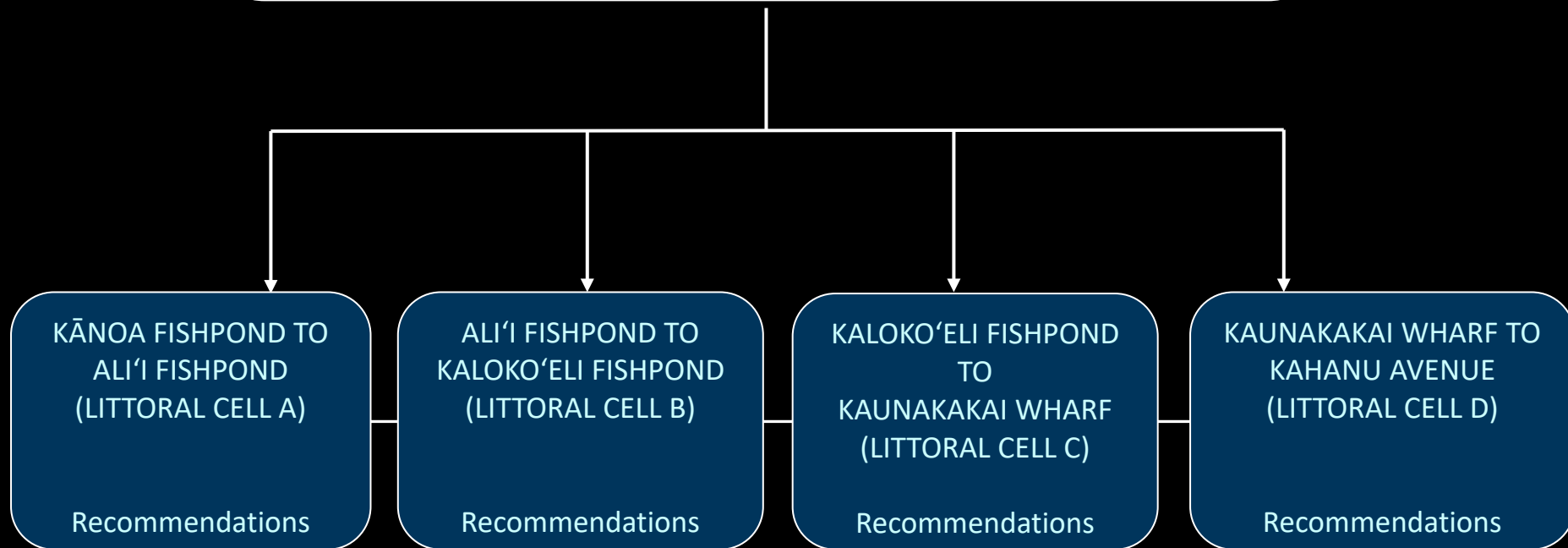
Soft & Green  
Rock Sill & Sedge  
Hawaiian Style  
Dry Stack Wall  
Rock Groin  
Realign / Retreat



## **Chapter 6: Recommendations**

### **Overall SM-SEMP Area**

- **Core Strategies**
- **Actions**



# DRAFT SOUTH MOLOKA‘I SHORELINE EROSION MANAGEMENT PLAN

## OVERALL SM-SEMP CORE STRATEGIES AND ACTION HIGHLIGHTS

### CORE STRATEGIES

### Action Highlights<sup>1</sup>

Restore natural shoreline function.

- Remove and replace invasive plants and trees with climate adapted, drought tolerant native grasses, shrubs, and trees such as ‘aki‘aki grass, pōhuehue, naupaka, and milo.
- Develop a detailed vegetation management plan to guide shoreline and dune restoration within the SM-SEMP Area.
- Remove man-made debris between the high and low water line including tires, appliances, vehicle parts, concrete and asphalt rubble, CMU blocks, pallets, steel and plastic drums, and other non-indigenous materials and dispose of it properly.

Educate beneficiaries on the causes and consequences of sea level rise and coastal erosion, including appropriate mitigation measures.

- Provide beneficiaries living in flood prone areas with the following information:
- “Answers to Questions about Substantially Improved / Substantially Damaged Buildings”, FEMA publication 213, August 2018.
  - “Homeowners Handbook to Prepare for Natural Hazards” 4th Edition, by Dennis Hwang and Darren Okimoto, Sea Grant, University of Hawai‘i.
  - Flood zone and sea level rise exposure maps.

Strengthen the regulation and management of shoreline resources.

- Recommend consistency with identified State of Hawai‘i and Maui County regulations governing buildings and construction, the shoreline, and flood hazard areas.
- Recommend consistency with Federal and State DLNR regulations regarding shoreline surveys, armoring, and coastal construction on submerged lands.



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Adapt structures and systems to better withstand coastal hazards.

- Require new dwellings to be elevated above flood hazard zones (base flood elevation, SLR inundation) by more than one foot in elevation (freeboard).
- Encourage lessees to reconfigure dwellings by moving the kitchen mauka and elevating food preparation areas so that stove, refrigerator, and appliances are elevated or located at the highest, driest part of the property.
- **Convert cesspools to septic systems wherever feasible to reduce the risk of contaminated water and protect beneficiary health.**

Prepare for the relocation, or retirement, of structures out of areas threatened by sea level rise and coastal erosion.

- **Prepare a community-based plan for the relocation of vulnerable buildings, infrastructure, and public facilities away from area's threatened by sea level rise and/or coastal erosion.**
- Prepare and implement a planned obsolescence strategy for infrastructure at risk of damage from SLR, coastal erosion, and flooding including roads, drainages, wastewater treatment, and centralized utility systems and services.

<sup>1</sup> This table includes a sample of the SM-SEMP's highlighted actions. A complete list of the SM-SEMP's actions is in Chapter 6.

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Littoral "Beach" Cells  
A - D

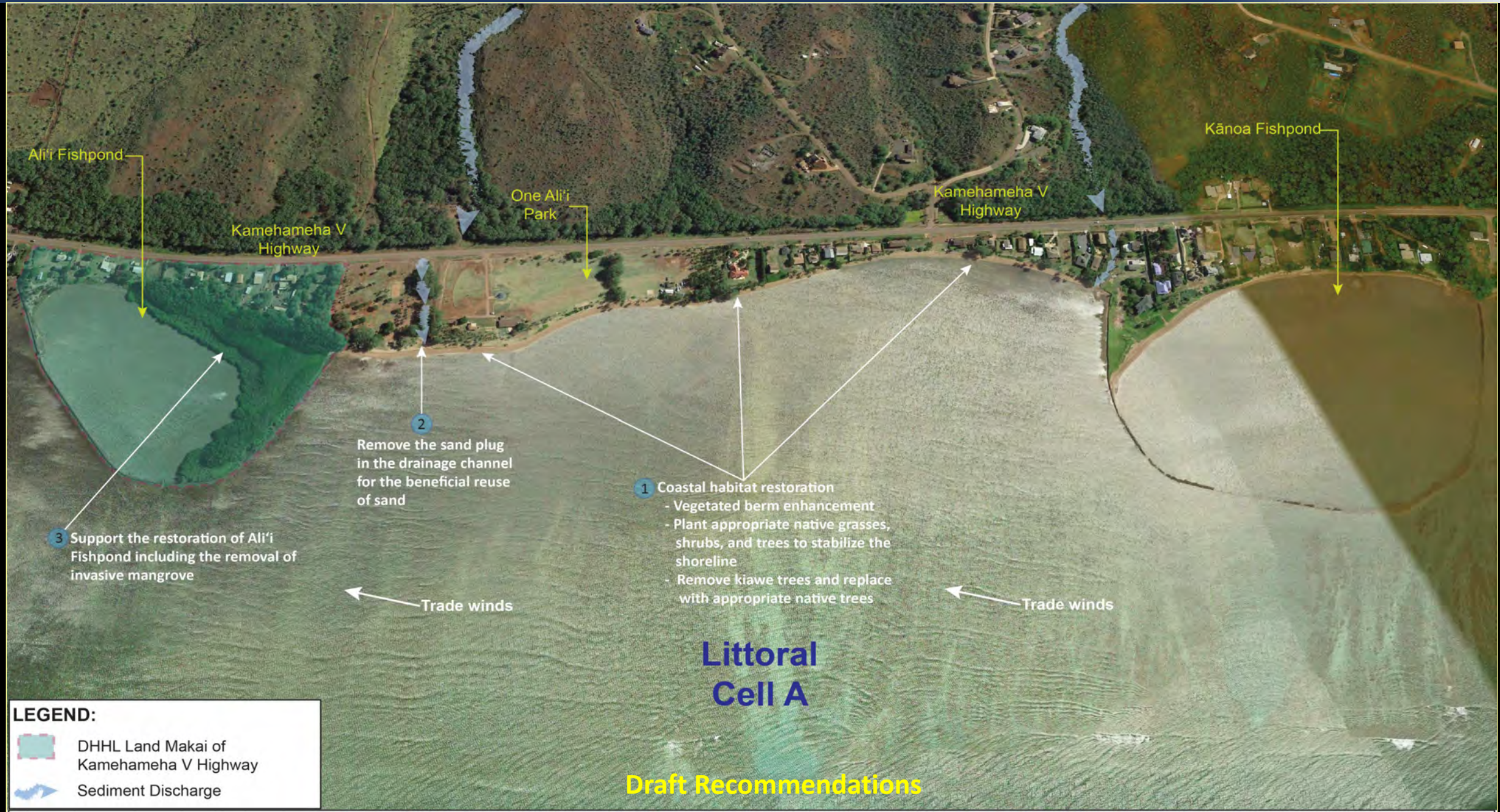


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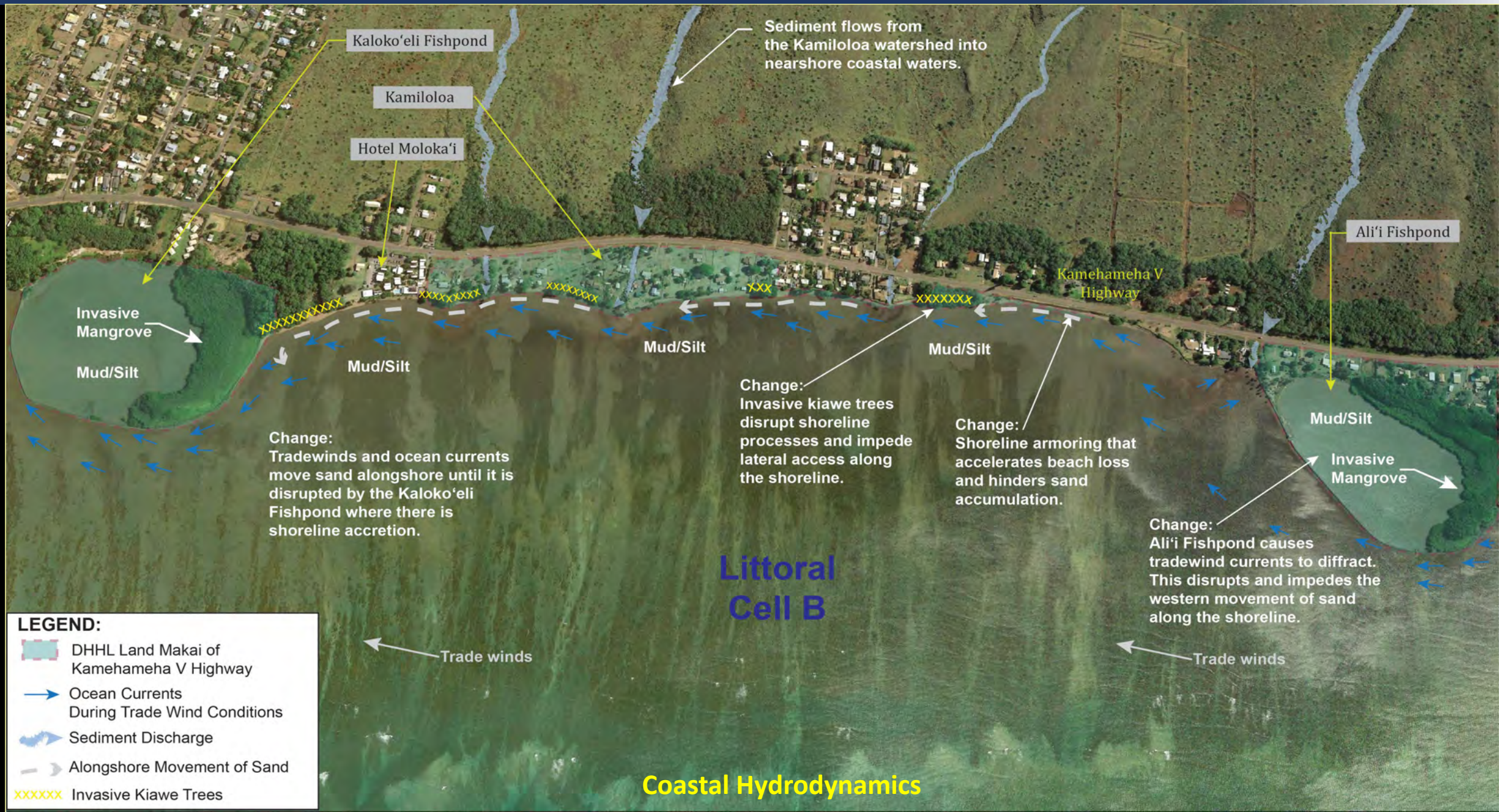


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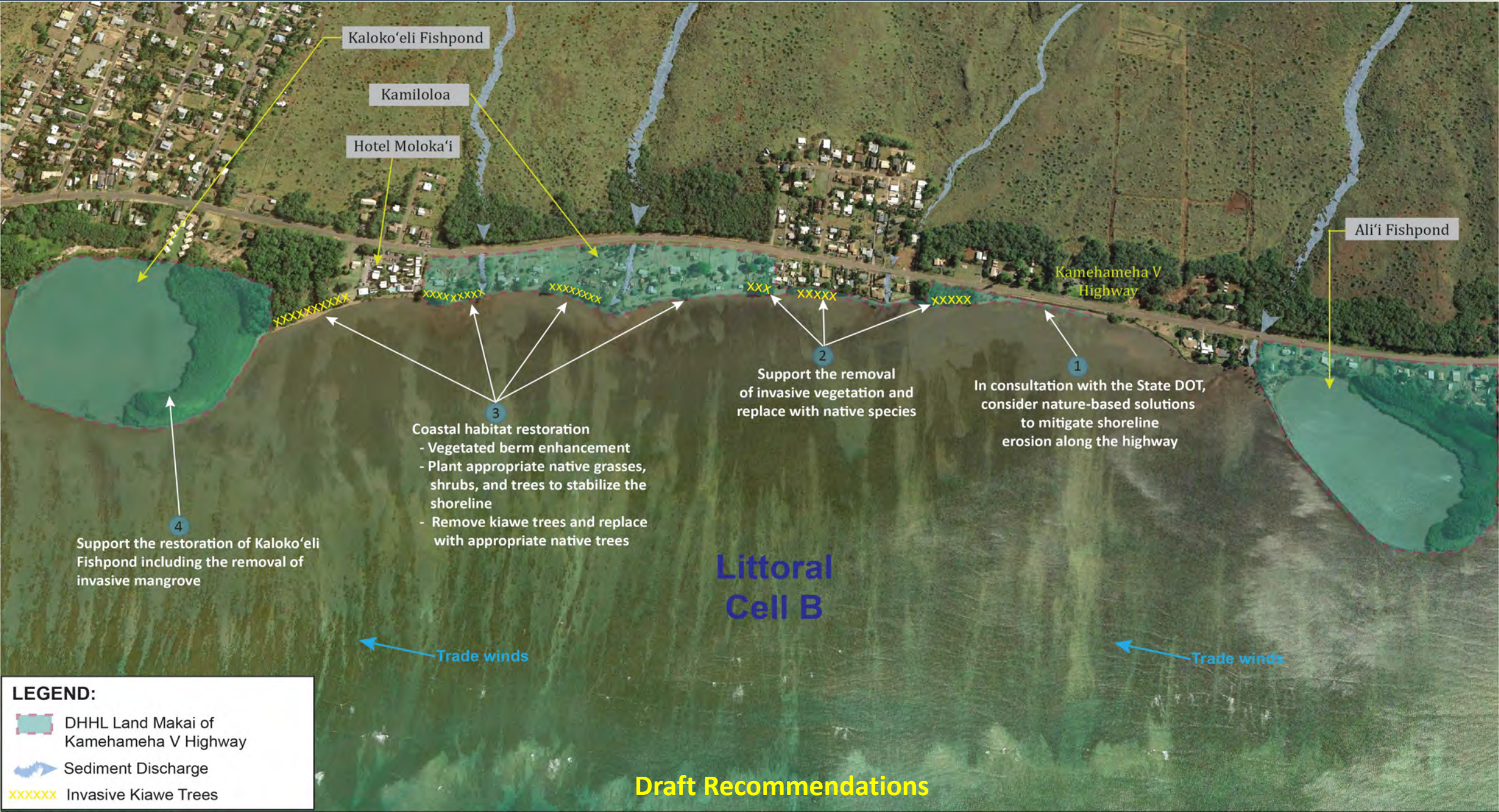


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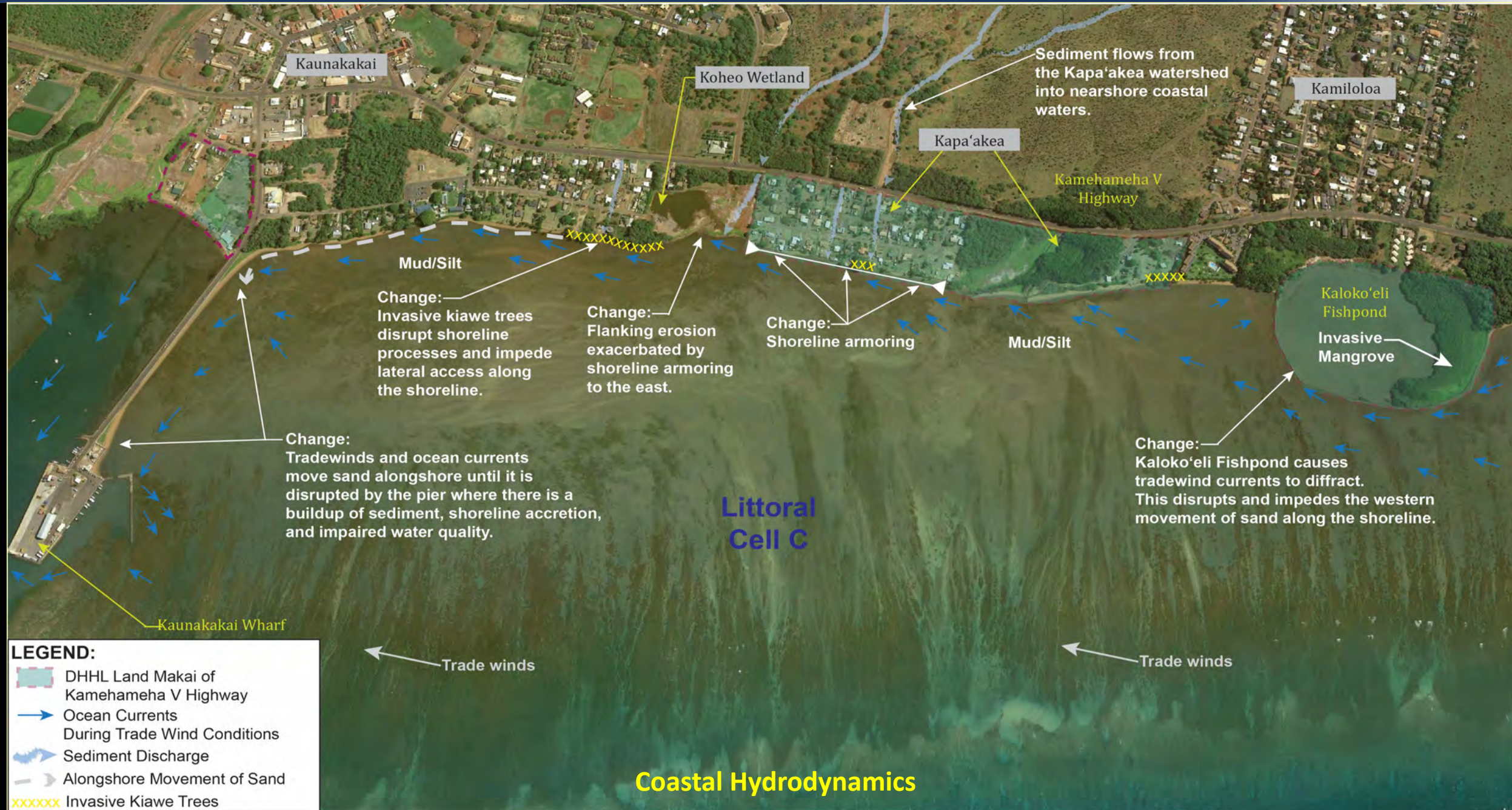


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# Next Steps

- Feedback from Open House will be analyzed and discussed in submittal requesting approval of SM-SEMP at Hawaiian Homes Commission meeting on December 19-20, 2022.
- 
- The background of the slide features a photograph of two individuals standing in shallow ocean water, engaged in fishing. The water is a deep blue, and the horizon is visible in the distance under a clear sky. The text is overlaid on this image in a white, bold, sans-serif font.
- PO procuring consultant services for “Developing Community Resilience for Molokai Coastal Homesteads” Community Resilience Plan project (starting early 2023).
  - DHHL participating in meetings of County-funded Molokai CCSLR.



# MAHALO

