HAWAII REGIONAL SEDIMENT MANAGEMENT

FY13 WORKSHOP: HALEIWA REGION

JUNE 20, 2013

UPDATE

U.S. ARMY CORPS OF ENGINEERS
HONOLULU DISTRICT

HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS

Haleiwa Region Workshop

- Bottom Line Up Front
- Potential RSM Projects
  - Processes
  - Implementation
  - Environmental
- Background Information
- Aerial Photography
- Workshop Photographs

BOTTOM LINE UP FRONT

ACTION ITEMS

PROCESSES

- Incorporate the findings of the City & County of Honolulu's (C&C) Haleiwa Beach Park (HBP) study into an RSM Technical Note. C&C study to include sand source investigations.
- Conduct a shoaling analysis to determine where sediment pathways are depositing sand in the region and use those areas as sustainable sand sources.
- Investigate natural mineral tracers that may indicate where the sand is going.
- Identify the source of the problem and look for natural clues that may provide solutions.
- Intercept excess sand before it goes over the breakwater at Alii Beach.
- Consider construction of dunes along portions of the region's shoreline to reduce wave inundation.
- Provide public outreach on coastal processes and beach nourishment.

IMPEMENTATION

- Sand tighten the Haleiwa Beach Park groin, nourish beach and monitor to determine effectiveness.
- Investigate O&M requirements for the HBP shore protection project.
- Indentify likely sand sources for nourishment of HBP.
- Conduct a sand tracer study for HBP prior to construction of new coastal structures to determine where the sand is going.
- Conduct a pilot bypassing project of sand from Alii Beach to HBP.
- Grade the profile along the harborside of Alii Beach periodically to reduce wave overtopping of breakwater.
- Conduct a pilot project to clean marginal quality sand.
- Stockpile material dredged from HSBH for subsequent cleaning and eventual placement on the beach. Need to investigate/coordinate potential stockpile locations.

ENVIRONMENTAL

- Engage applicable environmental agencies (including but not limited to NMFS, USFWS, USACE, EPA and DLNR-DOH) that oversee marine habitat.
- Continuously engage with DOH and other environmental agencies on the benefits of managing sediment on a regional scale.
- Develop and execute a programmatic agreement to place beach quality sand from harbors (i.e. Haleiwa Small Boat Harbor) onto adjacent shorelines.
- Coordinate the use of offshore sand sources in the region with environmental agencies.
- Identify species of concern include corals, sea turtles, monk seals, shorebirds, etc.
- Conduct surveys to quantify the density of marine resources.
- Quantify impacts to organisms within and adjacent to the HSBH breakwater and HBP groin.

POTENTIAL RSM PROJECTS

- HALEIWA BEACH PARK NOURISHMENT
- HALEIWA BEACH PARK T-HEAD GROINS
- SAND TIGHTEN HALEIWA BEACH PARK GROIN
- SAND TIGHTEN HARBOR BREAKWATER ROOT
- DEVELOP SAND SOURCES

PRP 1: HALEIWA BEACH PARK NOURISHMENT

PRP 1: HALEIWA BEACH NOURISHMENT

PROCESSES	IMPEMENTATION	ENVIRONMENTAL
• Erosion is not uniform throughout Haleiwa Beach Park (HBP). • Northern reach is eroding faster than central and southern reaches. • Shoreline might not be stable without additional structures. • Need to investigate where the sand from the HBP shoreline is going (18,000cy since 1988) and reclaim it if possible. • Incorporate the finding of the Honolulu City & County study into the RSM reports. C&C study to include sand source investigations. • Provide public outreach on coastal processes and beach nourishment. • Flows from the Anahulu River may be jetting sediments out into deepwater. • Beach nourishment may only be a short-term solution. Take a proactive approach, identify the source of the problem and look for natural cues that may provide solutions.	• Nourish HBP shore protection project. • Investigate O&M requirements for the HBP shore protection project. • Indentify likely sand sources for nourishment of HBP. • Sand tighten the HBP groin. • Sand tighten groin, nourish beach and monitor to determine effectiveness. • Sand may need to be dewatered prior to placement on the beach. • May have to wash the sand prior to placement on the beach. • Portions of HBP may be able to be used as construction staging areas. • The HBP pavilion is an historic structure. Relocate or demolish the pavilion and let the beach erode. Meet with community to discuss (i.e. Haleiwa Town Hall Meeting). • Backpassing sand from south to north. • Reduce flow velocities from the Anahulu River. • Phase the construction of groins.	• Attaining a water quality certification for placement of sand on the beach may potentially be on the critical path. • At some point, erosion may expose and mobilize material that is not beach quality (i.e. red dirt). • Beach nourishment may impact habitat values. • Species of concern include corals, sea turtles, monk seals, shorebirds, etc. • Native species may not be quick to adapt to the impacts of beach nourishment and invasive species may have an advantage.

PRP 1: HALEIWA BEACH PARK NOURISHMENT

PRP 2: HALEIWA BEACH PARK T-HEAD GROINS

PRP 2: HALEIWA BEACH PARK T-HEAD GROINS

PROCESSES	IMPEMENTATION	ENVIRONMENTAL
• Reduce the rate of erosion at HBP. • Need to identify the sediment pathways in the region. • Intercept excess sand before it goes over the breakwater at Alii Beach and truck it to the eroding areas at HBP on an annual basis.	• Tuned T-head groins are a proven method of increasing the retention time of beach nourishment. • Groins would impact recreation along the HBP shoreline (i.e. canoe paddling). • Minimize number of groins based on wave transformation study. • Construct a stem to connect the existing breakwater to the shoreline and add heads to the groin and the northern headland (see slide of modified groin field). • Conduct a sand tracer study for HBP prior to construction of new coastal structures to determine where the sand is going. • Construct a sand dune along the HBP shoreline. • Take advantage of HBP's backshore area instead of competing with nature. • Conduct a pilot bypassing project of sand from Alii Beach to HBP.	• Coral reef and marine surveys will be required. • Mitigation for resources lost may be required. • US Army Corps of Engineers' regulatory process will require evaluation of all practicable alternatives.

PRP 2: HALEIWA BEACH PARK T-HEAD GROINS

PRP 3: SAND TIGHTEN HALEIWA BEACH PARK GROIN

PRP 3: SAND TIGHTEN HALEIWA BEACH PARK GROIN

PROCESSES	IMPEMENTATION	ENVIRONMENTAL
• Coastal structures are designed to be porous to allow energy dissipation. Will there be negative consequences if the groin is "sand tightened"? • Is there a difference in the carbonate component percentage of erosive beaches and accretive beaches? If so, this can be measured and tracked. There may be natural mineral tracers that tell exactly where the sand is going.	• Unravel armor layer of groin and rebuild with suitable sized underlayer. • Place a marine mattress on one of the groin side slopes and stabilize with large stone. • Pump quick setting grout along the centerline of the groin. • Place grout bags along the groin centerline and pump in place. • Grout one of the groin's side slopes (i.e. concrete rubble masonry).	• Quantify impacts to organisms within and adjacent to the groin. • BMPs will require that the grout is contained and does not leach into the adjacent water.

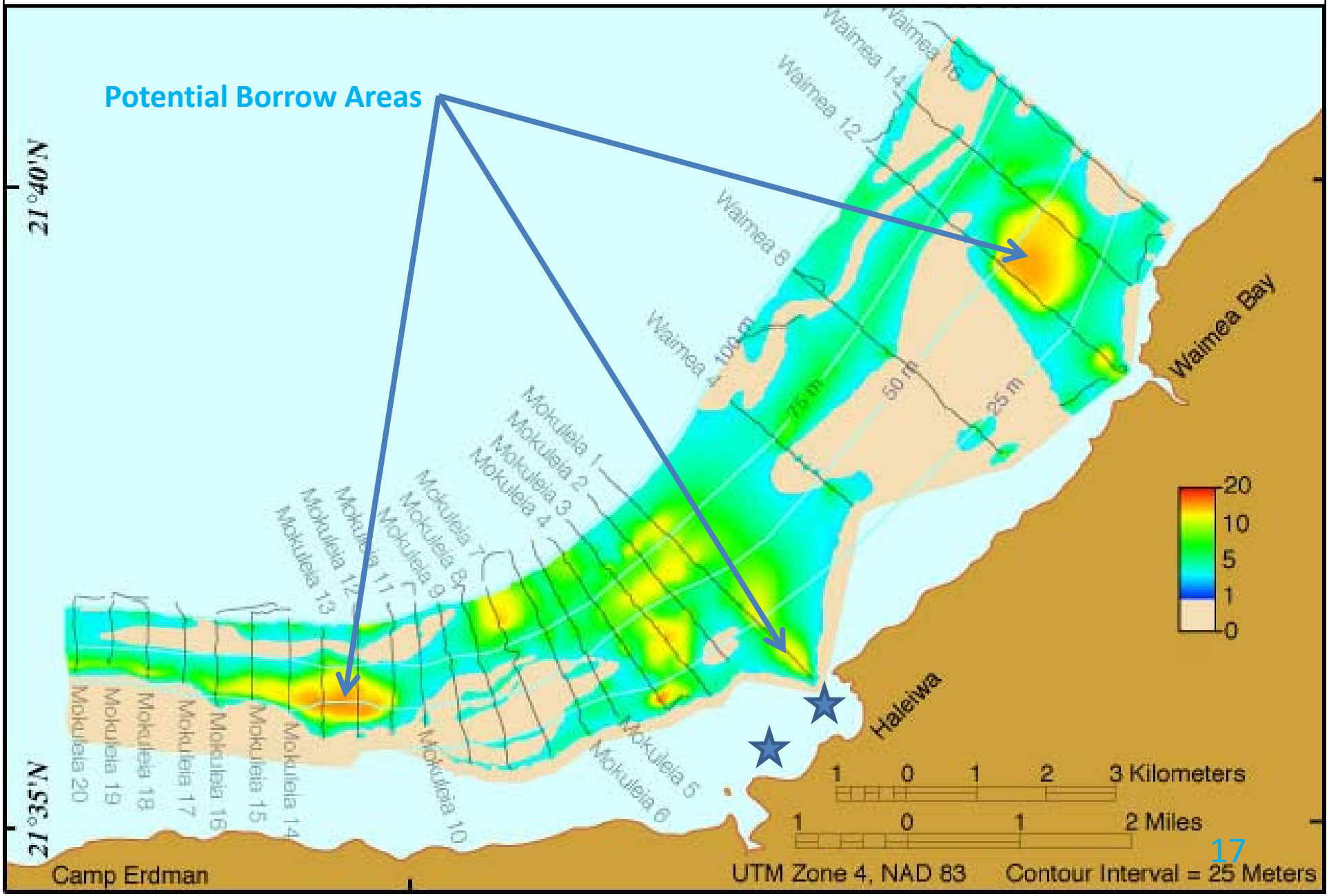
PRP 3: SAND TIGHTEN HALEIWA BEACH PARK GROIN

PRP 4: SAND TIGHTEN HARBOR BREAKWATER ROOT

PRP 4: SAND TIGHTEN HARBOR BREAKWATER ROOT

PROCESSES	IMPEMENTATION	ENVIRONMENTAL
• Sand is currently being washed over the breakwater root and into the harbor by wave action. • Once in the harbor, the sand's quality is compromised through mixing with marginal material. • Headland in the center of Alii Beach enhances the retention time of sand on the beach. • O&M dredging in 2009 demonstrated that there can be beach quality material in the harbor entrance channel.	• Extend and raise the breakwater root. • Grade the profile along the harborside of Alii Beach periodically to reduce wave overtopping of breakwater. • Scrap the beach to reduce wave overtopping of breakwater. • Backpass sand from the harborside of Alii Beach to the west. • Bypass sand from Alii Beach to Haleiwa Beach Park. • Taking sand from Alii Beach and putting it on HBP may not be a publicly acceptable alternative. • Plant native vegetation on the backshore to catch sand.	• Similar to environmental considerations noted for sand tightening of the HBP groin. • Backpassing and bypassing of sand will require a State of Hawaii's Department of Health water quality certificate and a Department of the Army permit.

PRP 5: DEVELOP SAND SOURCES
USGS SEDIMENT THICKNESS MAP



PRP 5: DEVELOP SAND SOURCES
HALEIWA SMALL BOAT HARBOR DREDGED MATERIAL

PRP 5: DEVELOP SAND SOURCES

PROCESSES	IMPEMENTATION	ENVIRONMENTAL
• Identify where sediment pathways are depositing sand in the region and use those areas as sustainable sand sources. • Coastal processes modeling may indicate where sand is being deposited offshore. • Sand has been transported over, through and around the HBP groin.	• Offshore Sources: The USGS study identified sand fields in relatively deep water (-100' to -150' deep). C&C is investigating the channel leading from the HSBH. Kaiaka Channel could also be a sand source. There may be excess sand in Waimea Bay. • Upland Sources: Hawaiian Cement still has material from the 2009 O&M dredging of HSBH and Makai Ranch is selling "tsunami deposited" sand. • Recovering sand from the mouth of Anahulu River may not be an option since that area is currently a surfing and paddling beginner's spot. • A pilot project to clean marginal quality sand should be conducted. • Stockpile material dredged from HSBH for subsequent cleaning and eventual placement on the beach. Need to investigate/coordinate potential stockpile locations.	• To date, no significant work has been done to coordinate the use of offshore sand sources in the region with environmental agencies. • Engage applicable environmental agencies (including but not limited to NMFS, USFWS, USACE, EPA and DLNR-DOH) that oversee marine habitat. • Programmatic agreement to place beach quality sand from HSBH onto adjacent shoreline is needed. • Return water flowing back into the ocean from a sand dewatering area is not permitted .

GENERAL COMMENTS

PROCESSES	IMPEMENTATION	ENVIRONMENTAL
• Sand dunes can be constructed in portions of the region to reduce wave inundation.	• The RSM program does provide funding for implementation of projects. • Next Steps: How do we move forward from here on some of the sediment related issues in the region? Finds of the FY13 investigations will be documented in USACE Technical Notes for future use. Determine stakeholders for nourishment of Haleiwa Beach Park. Conduct a post-workshop survey to ascertain participants perceptions and commitment to the region. • Conduct a pilot project at HBP with geotextile bags to determine if additional groins are needed. • Potential aesthetic issues associated with construction of groins at HBP. • Construct a sand dune along Kaiaka Beach.	• Water quality issues will be associated with beach nourishment. What criteria will be used to determine when water quality is compromised? • Need to continuously engage with DOH and other environmental agencies. • Public outreach is required to provide education on the benefits of beach nourishment.

BACKGROUND INFORMATION


HAWAII REGIONAL SEDIMENT MANAGEMENT
HALEIWA REGION
PUAENA POINT BEACH
HALEIWA BEACH
HALEIWA SMALL BOAT HARBOR
ALII BEACH
KAIAKA BEACH

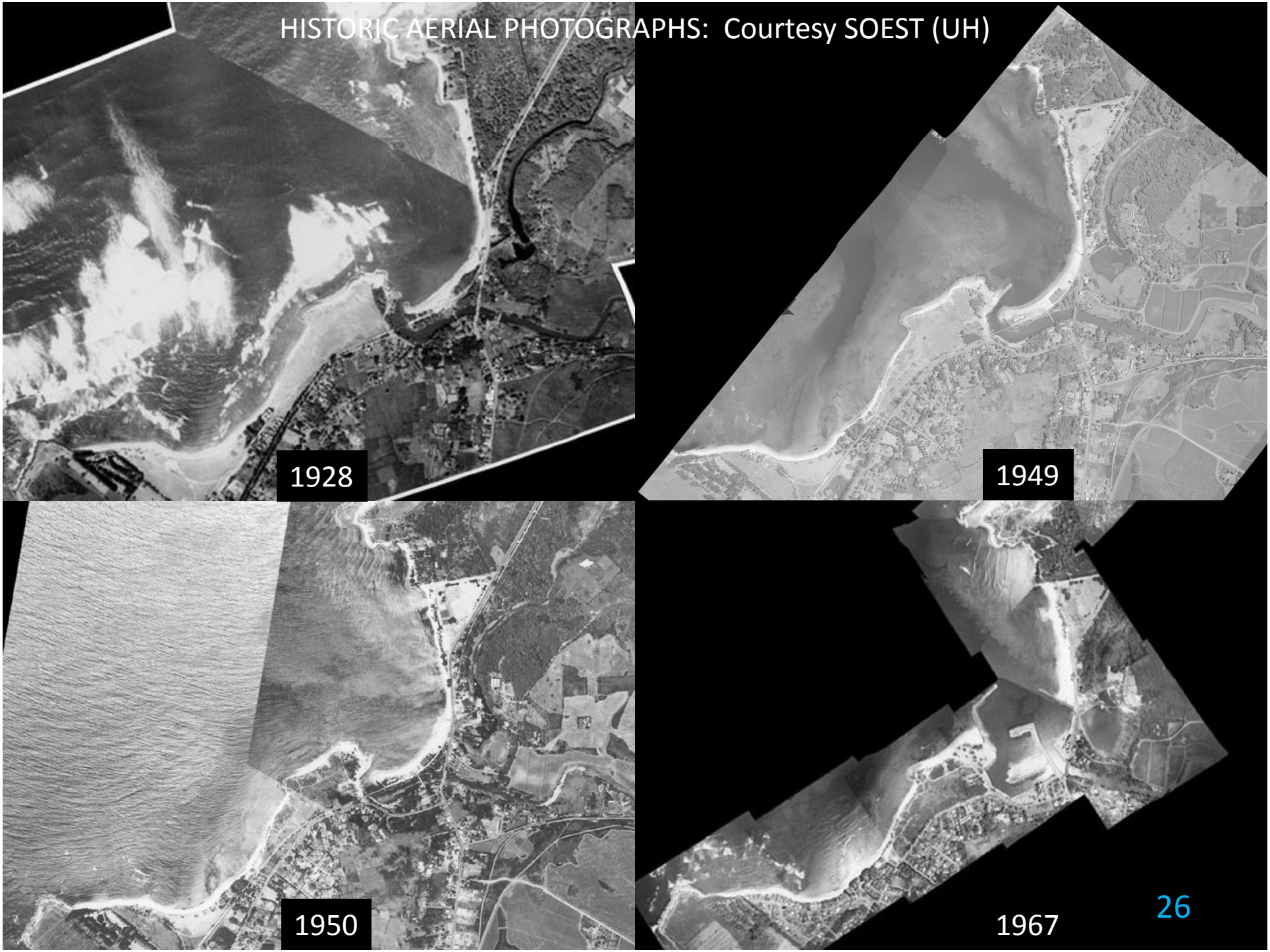
HALEIWA SMALL BOAT HARBOR

HALEIWA SMALL BOAT HARBOR

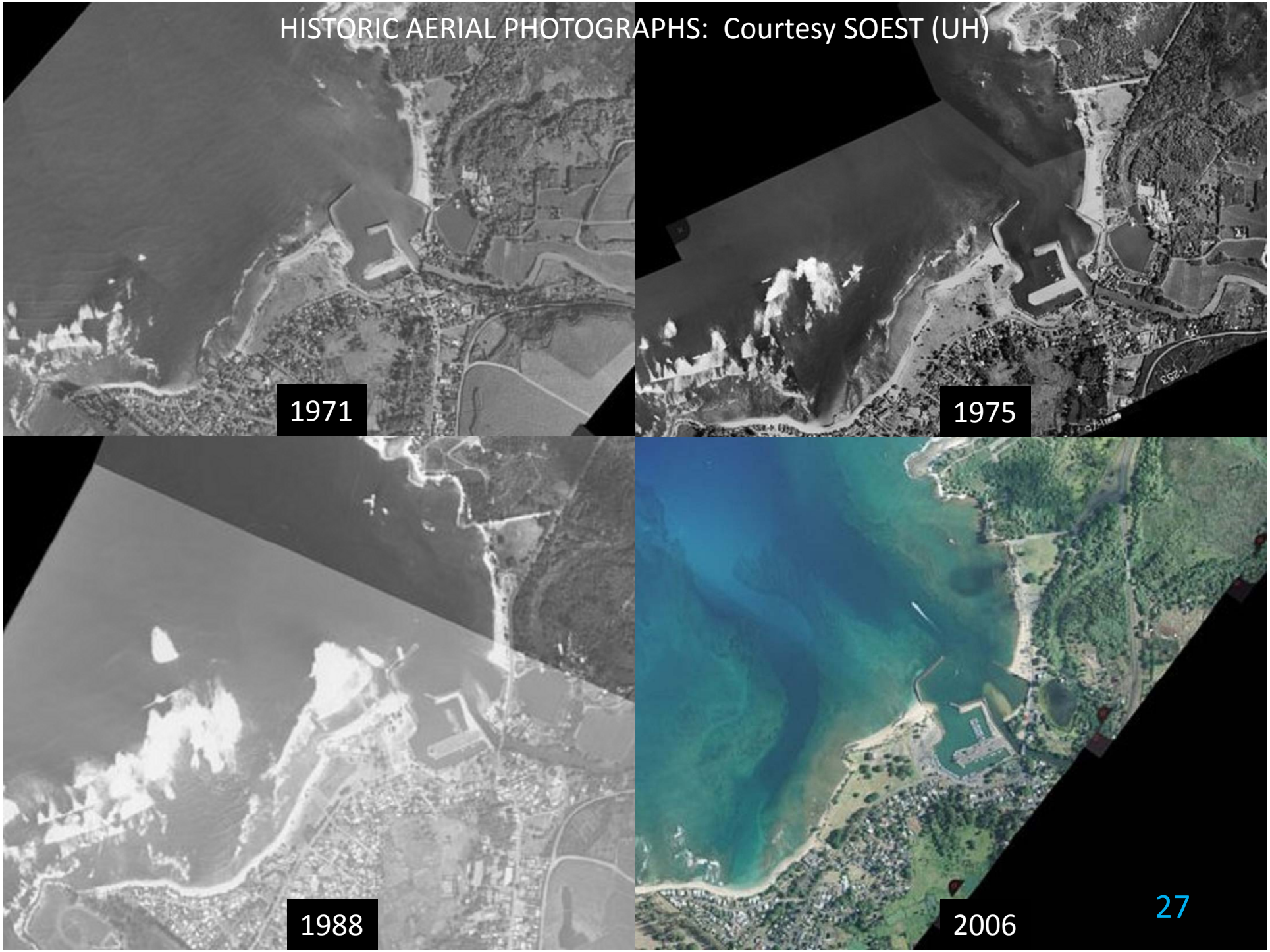
HALEIWA BEACH PARK SPP

HALEIWA BEACH PARK SPP

AERIAL IMAGERY


HISTORIC AERIAL PHOTOGRAPHS: Courtesy SOEST (UH)
1928
1949
1950
1967

HISTORIC AERIAL PHOTOGRAPHS: Courtesy SOEST (UH)

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1928

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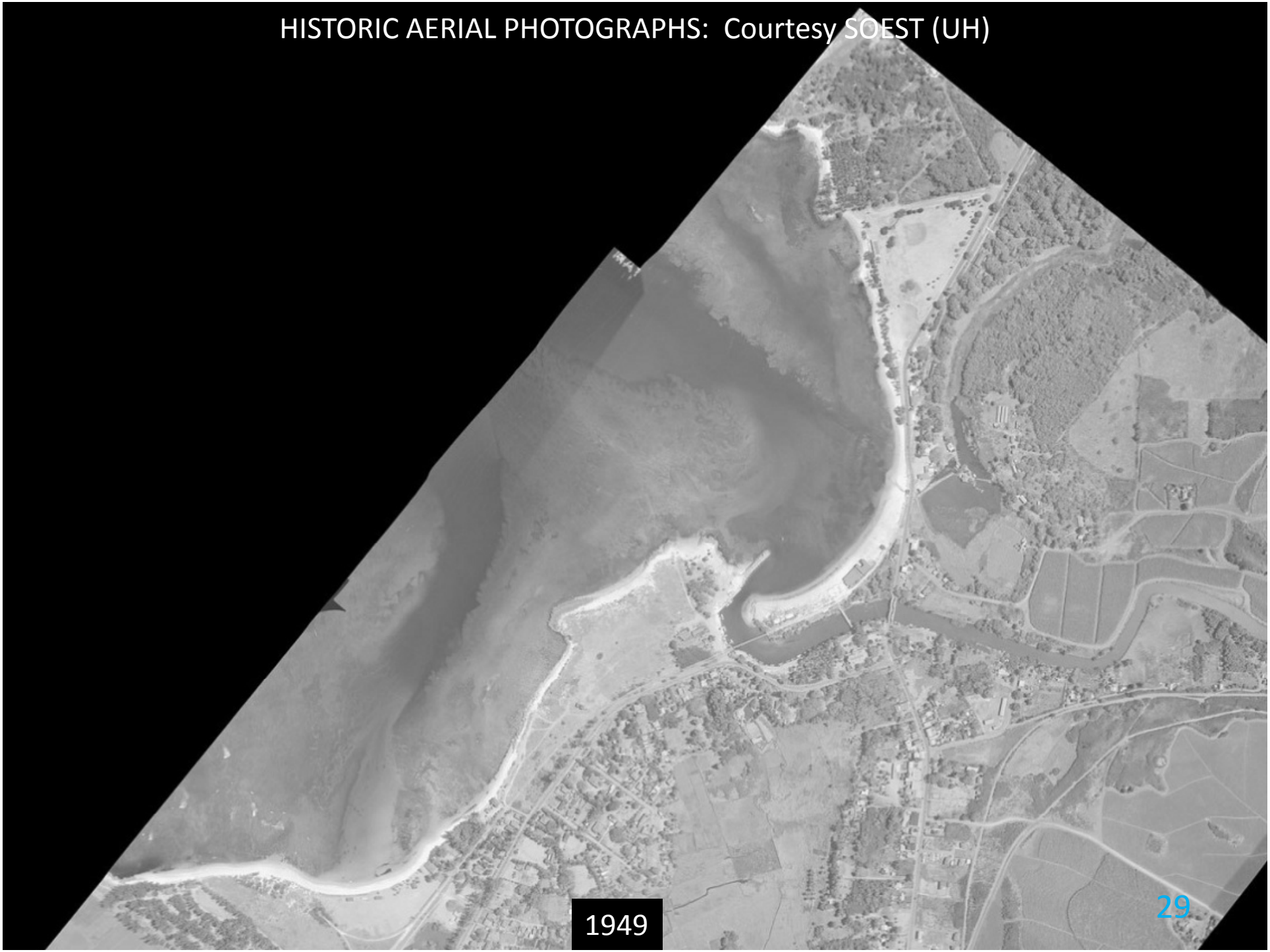


1949


HISTORIC AERIAL PHOTOGRAPHS: Courtesy SOEST (UH)
1950


HISTORIC AERIAL PHOTOGRAPHS: Courtesy SOEST (UH)
1967


HISTORIC AERIAL PHOTOGRAPHS: Courtesy SOEST (UH)
1971


HISTORIC AERIAL PHOTOGRAPHS: Courtesy SOEST (UH)
1975


HISTORIC AERIAL PHOTOGRAPHS: Courtesy SOEST (UH)
1988

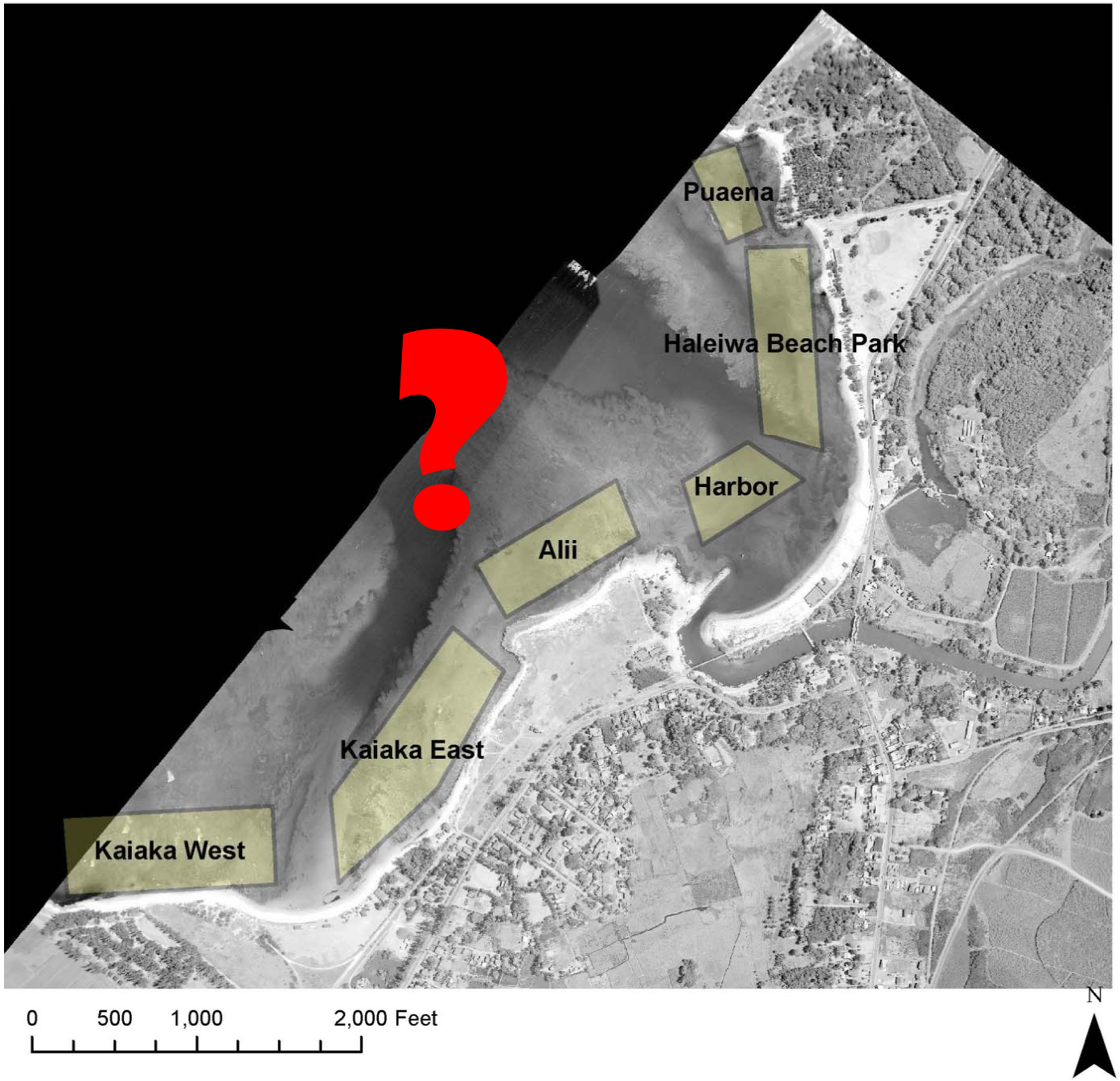

HISTORIC AERIAL PHOTOGRAPHS: Courtesy SOEST (UH)
2006

COASTAL PROCESSES

PRE-PROJECT

REGIONAL SEDIMENT BUDGET

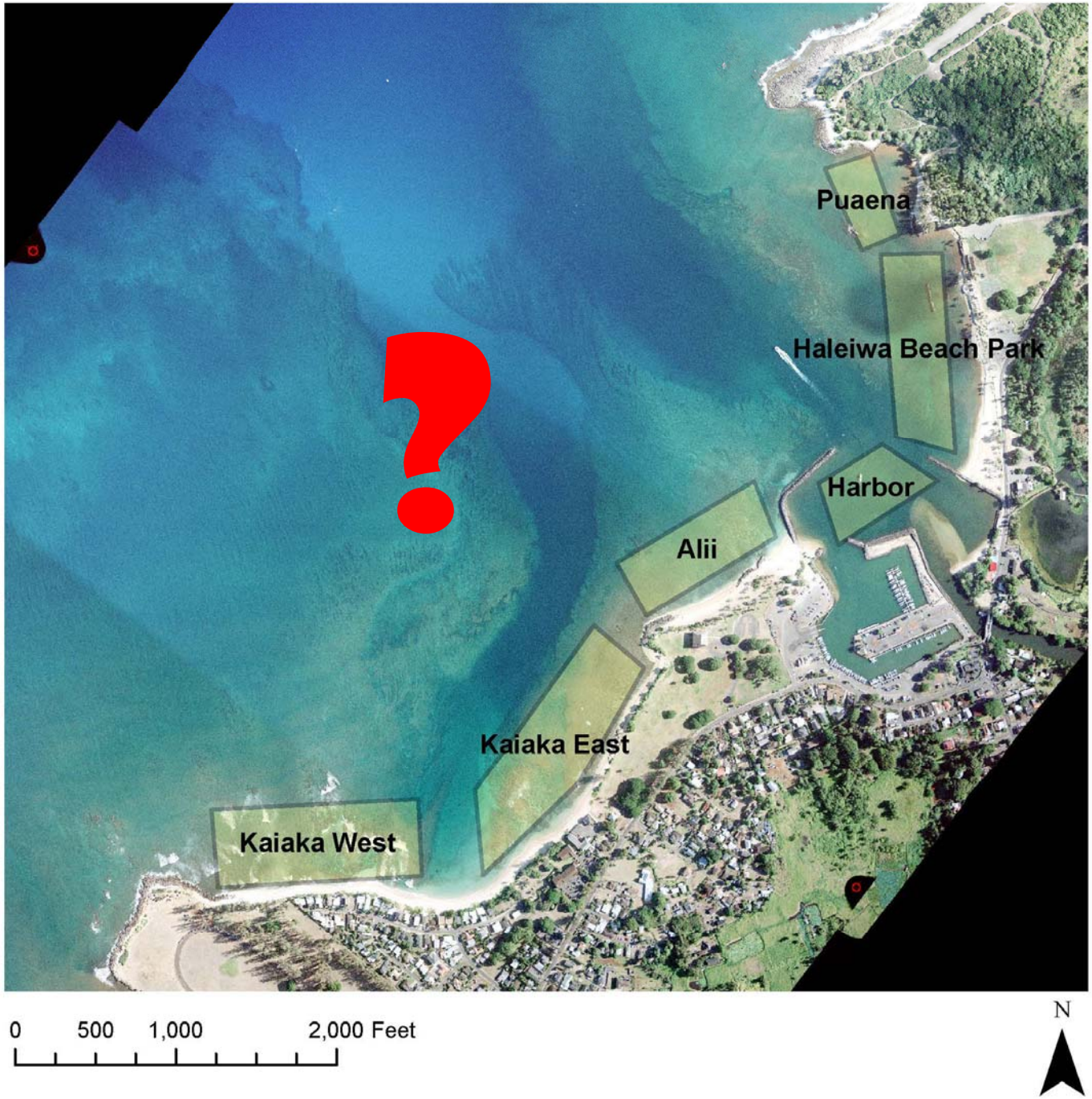
1949 Aerial Photograph (Prior to Harbor Construction)

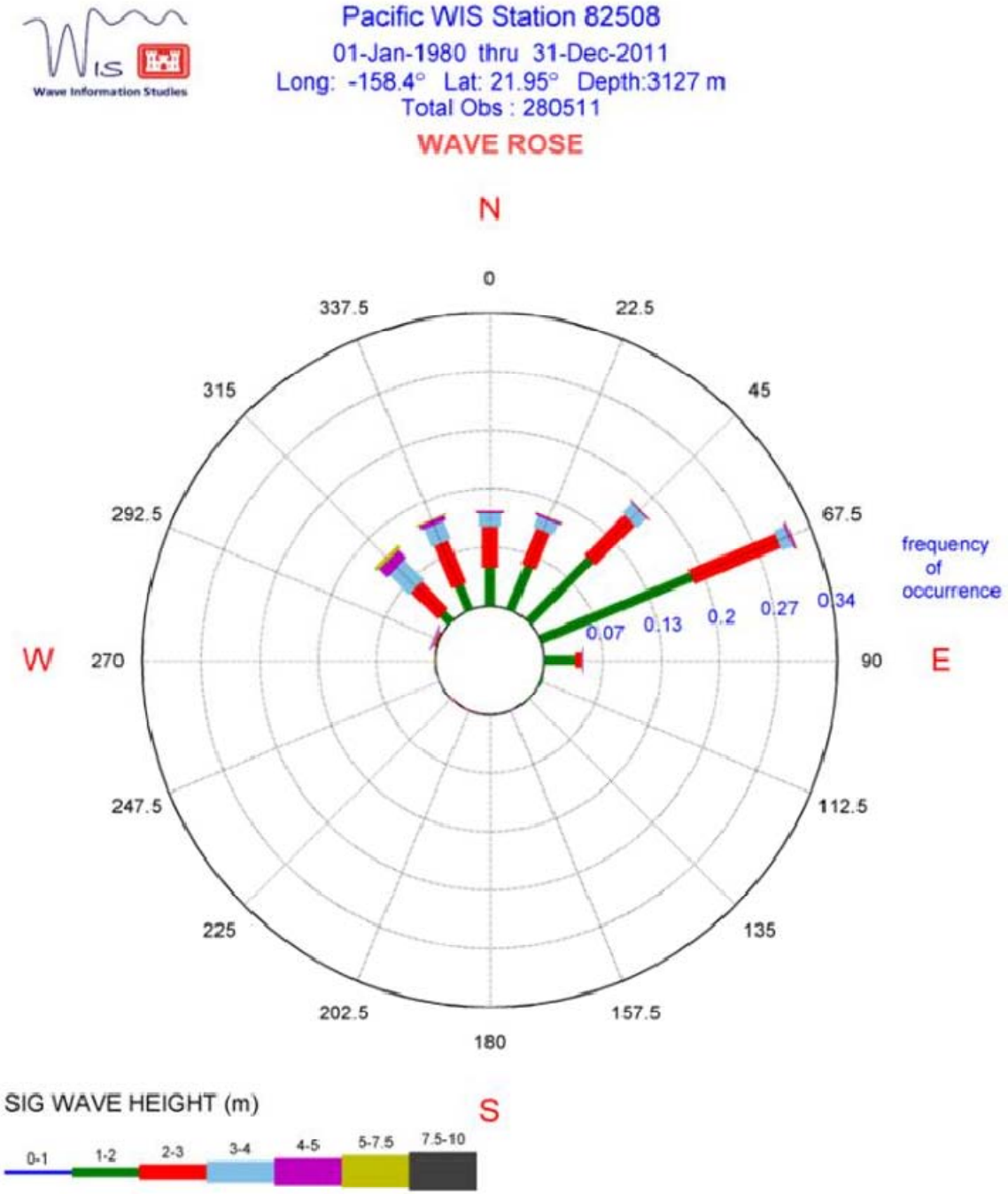


POST-PROJECT

REGIONAL SEDIMENT BUDGET

2006 Aerial Photograph (After Harbor Construction)

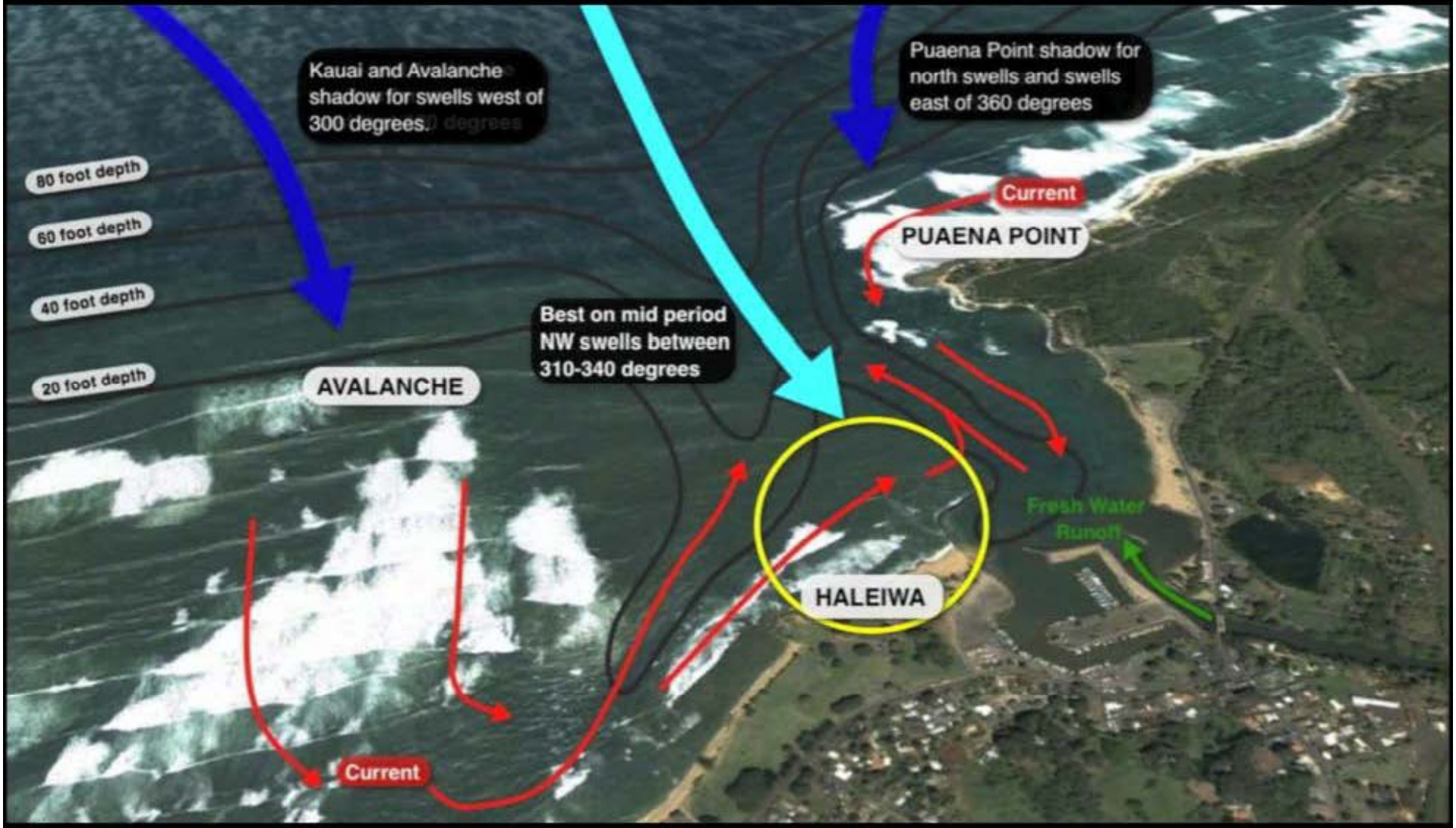



Wave Information Studies
Pacific WIS Station 82508
01-Jan-1980 thru 31-Dec-2011
Long: -158.4° Lat: 21.95° Depth:3127 m
Total Obs : 280511
WAVE ROSE
N
0
22.5
45
67.5
90
E
112.5
135
157.5
180
S
202.5
225
247.5
270
W
292.5
315
337.5
frequency of occurrence
0.07
0.13
0.2
0.27
0.34
SIG WAVE HEIGHT (m)
0-1
1-2
2-3
3-4
4-5
5-7.5
7.5-10

HALEIWA REGION OFFSHORE DEPTH CONTOURS

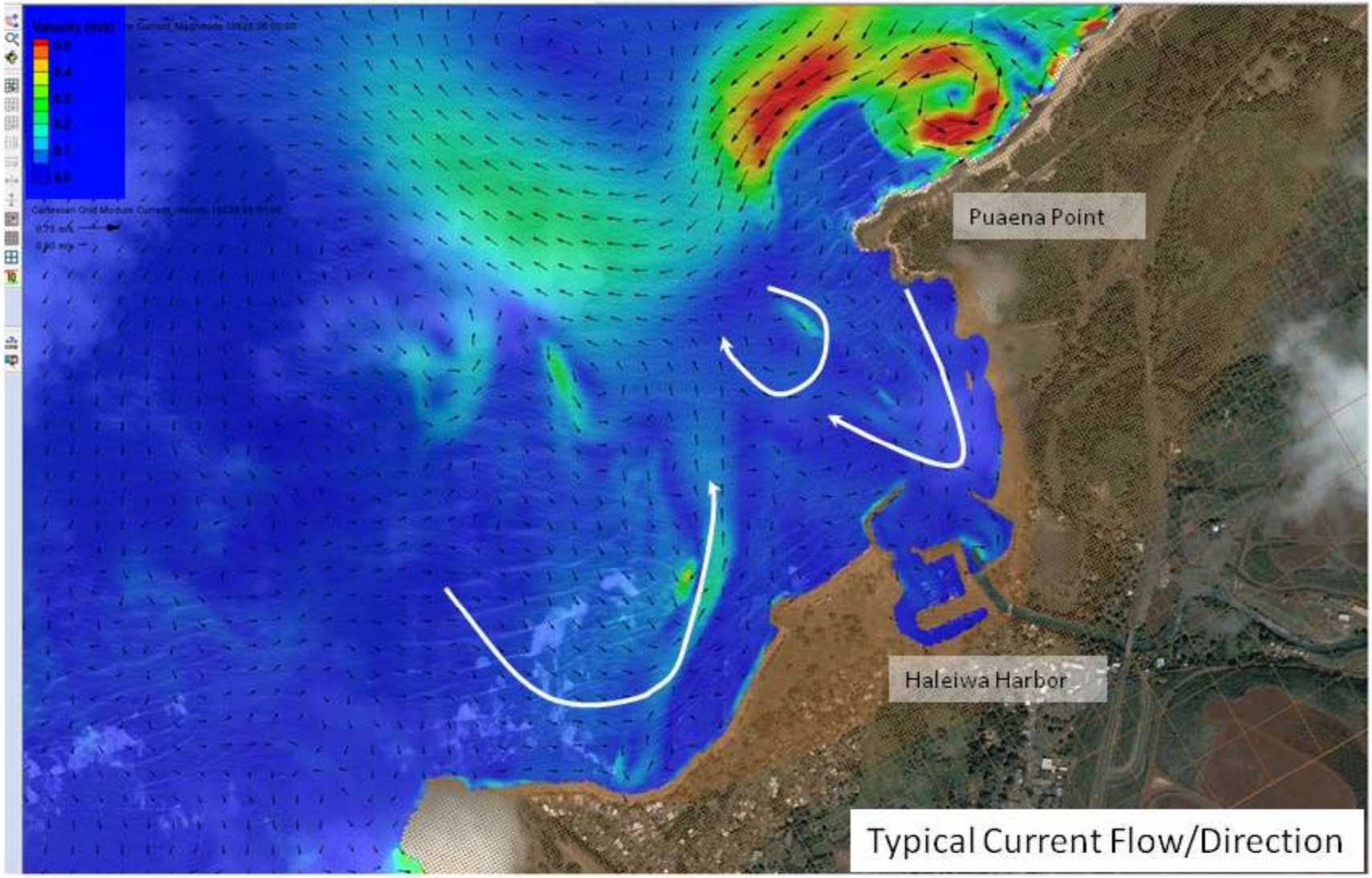
Prepared by: SURFLINE

HALEIWA REGION WAVES AND CIRCULATION

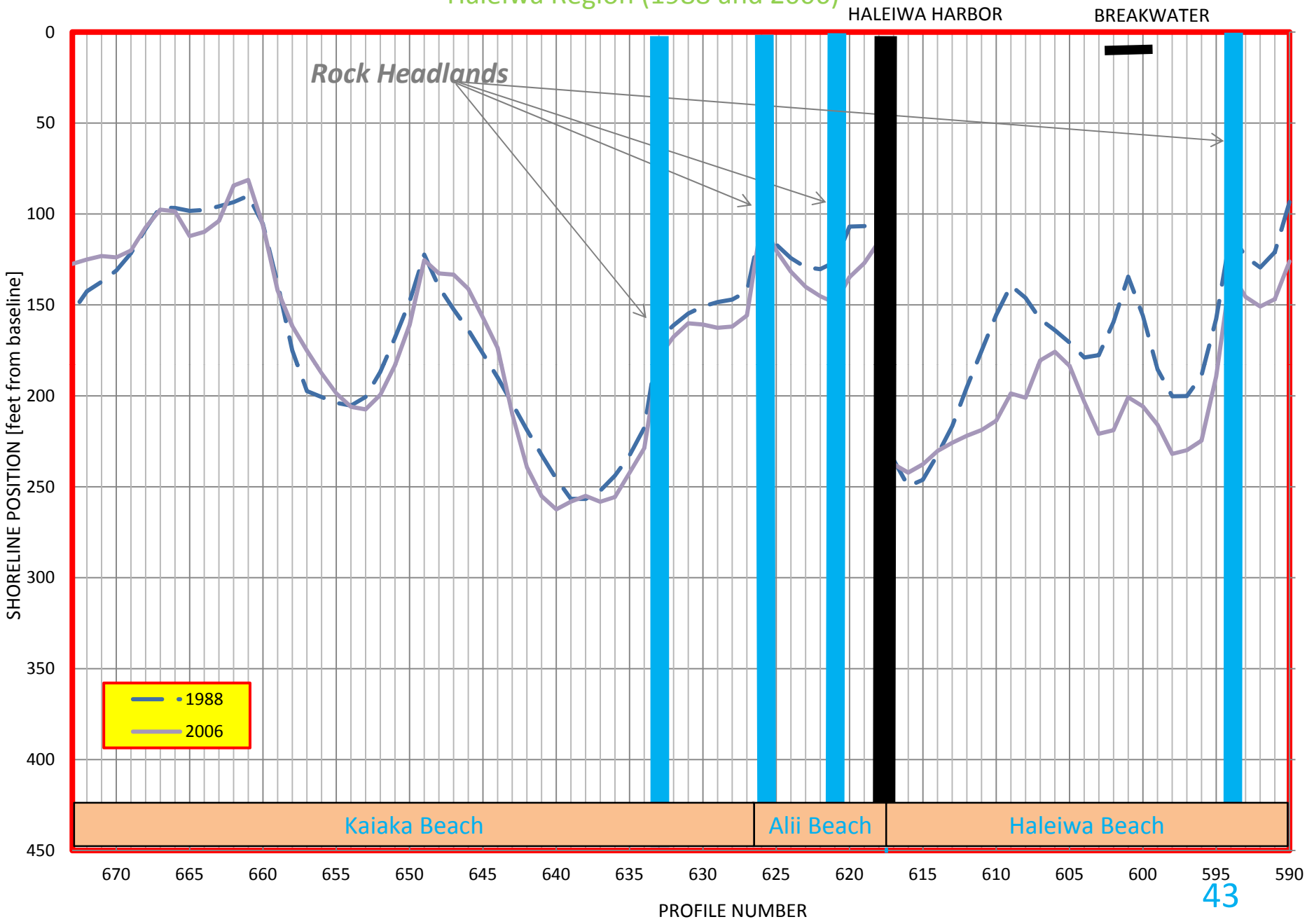


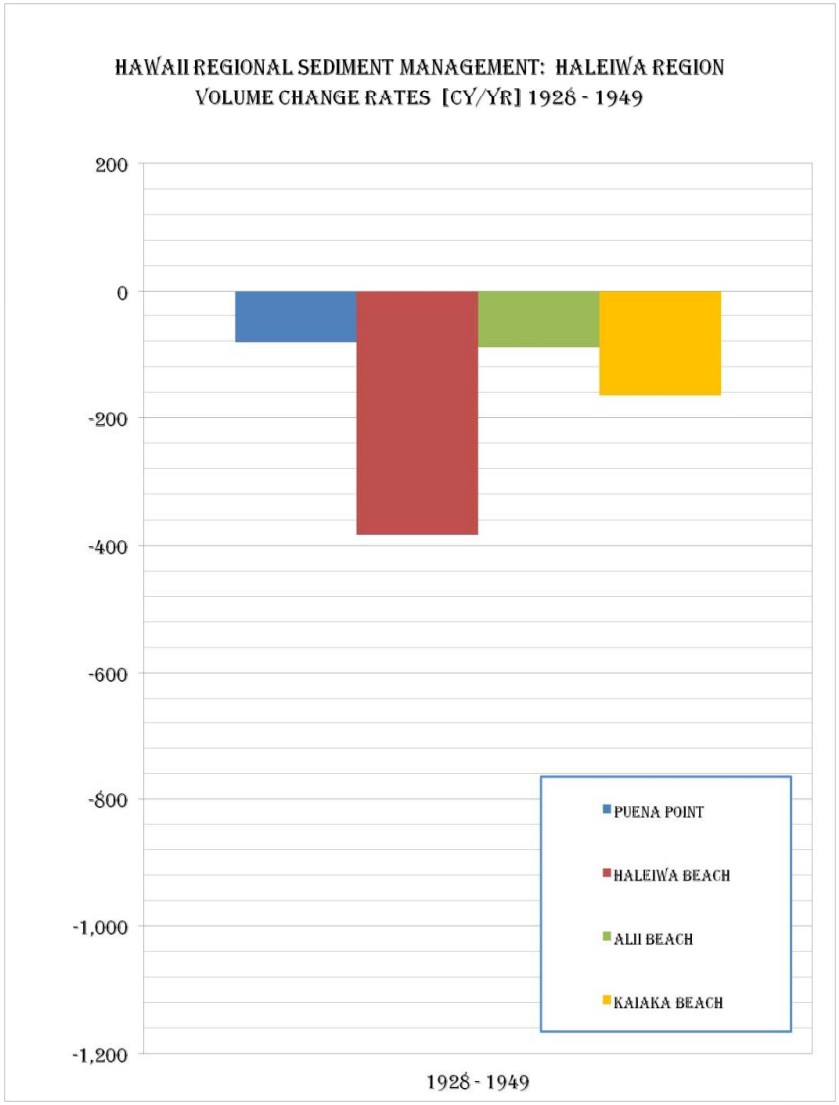
CMS Steering Runs

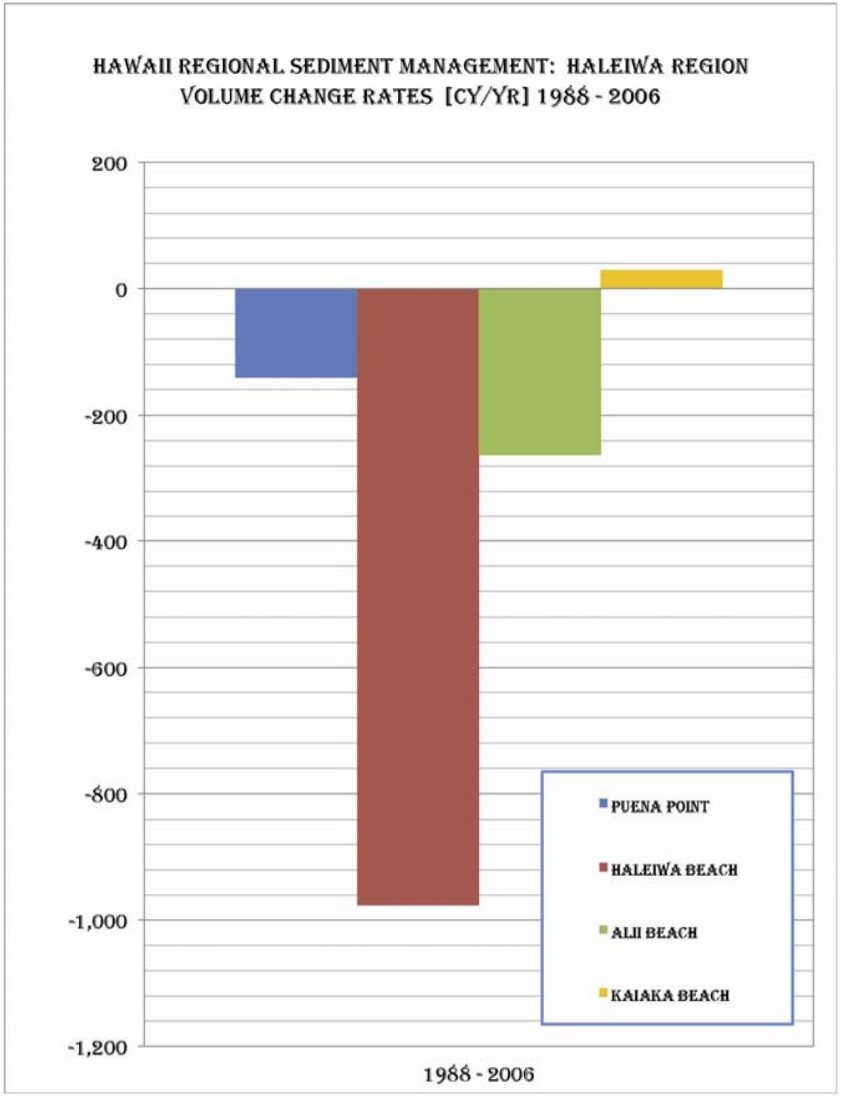
- Radiation stress from CMS-WAVE wave breaking => longshore current in CMS-FLOW
- Varying water level and tide induced currents in CMS-FLOW => water depth and current/wave interaction in CMS-WAVE



HAWAII REGIONAL SEDIMENT MANAGEMENT - SHORELINE POSITIONS
Haleiwa Region (1988 and 2006)




HAWAII REGIONAL SEDIMENT MANAGEMENT: HALEIWA REGION
VOLUME CHANGE RATES [CY/YR] 1928 - 1949
200
0
-200
-400
-600
-800
-1,000
-1,200
PUENA POINT
HALEIWA BEACH
ALII BEACH
KAIAKA BEACH
1928 - 1949


HAWAII REGIONAL SEDIMENT MANAGEMENT: HALEIWA REGION
VOLUME CHANGE RATES [CY/YR] 1988 - 2006
200
0
-200
-400
-600
-800
-1,000
-1,200
PUENA POINT
HALEIWA BEACH
ALII BEACH
KAIAKA BEACH
1988 - 2006

Workshop Photographs

WORKSHOP PHOTOGRAPHS


NORTH SHORE HUI WA`A
patagonia


Chip,
Chip
Hooray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THANK YOU
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