HAWAII REGIONAL SEDIMENT MANAGEMENT

FY13 WORKSHOP: HALEIWA REGION

JUNE 20, 2013

U.S. ARMY CORPS OF ENGINEERS
HONOLULU DISTRICT

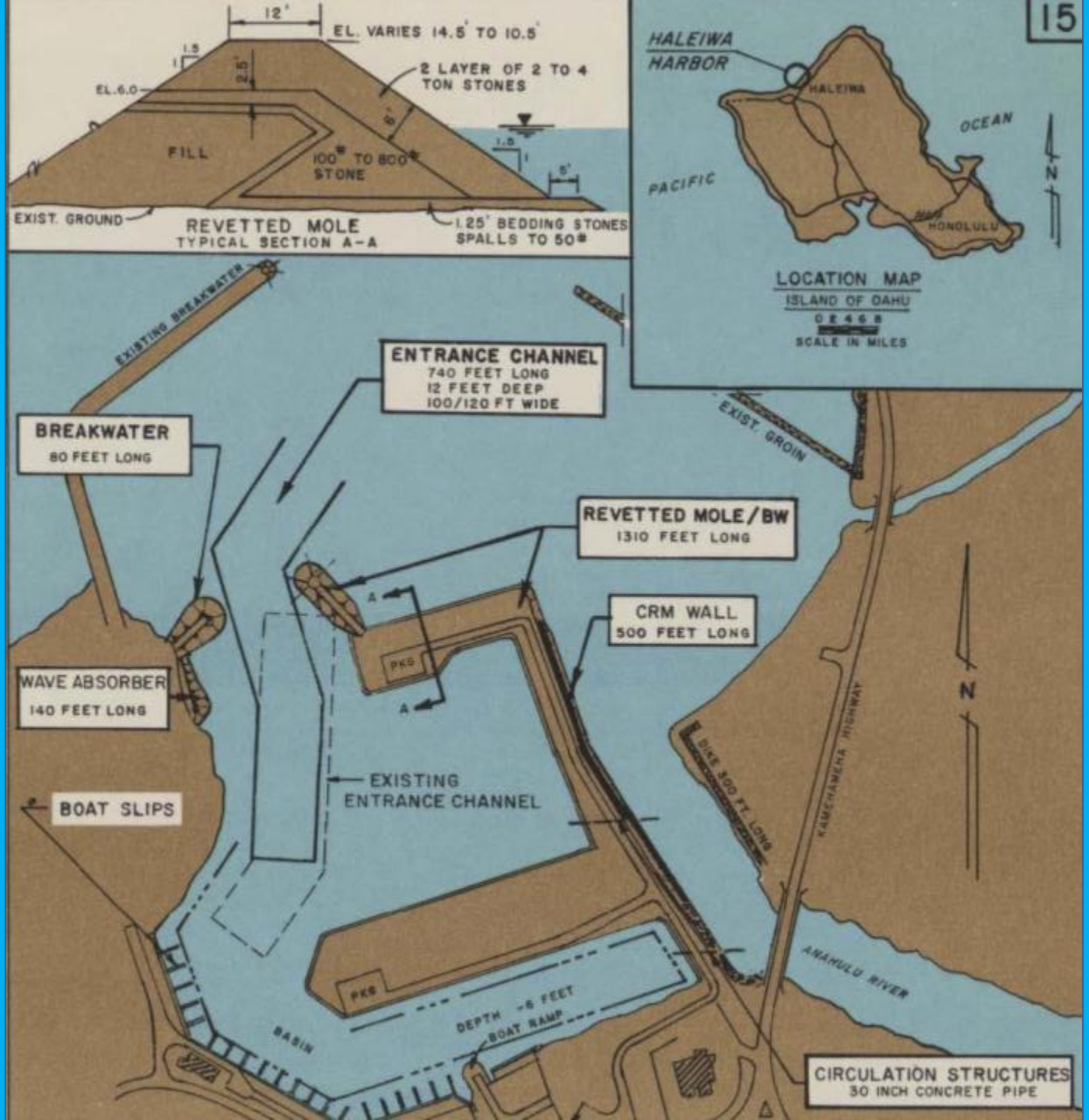
HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS

Hawaii RSM Workshop

- Haleiwa Region: Background
- Coastal Processes
- Potential RSM Projects
- Environmental
- Questions

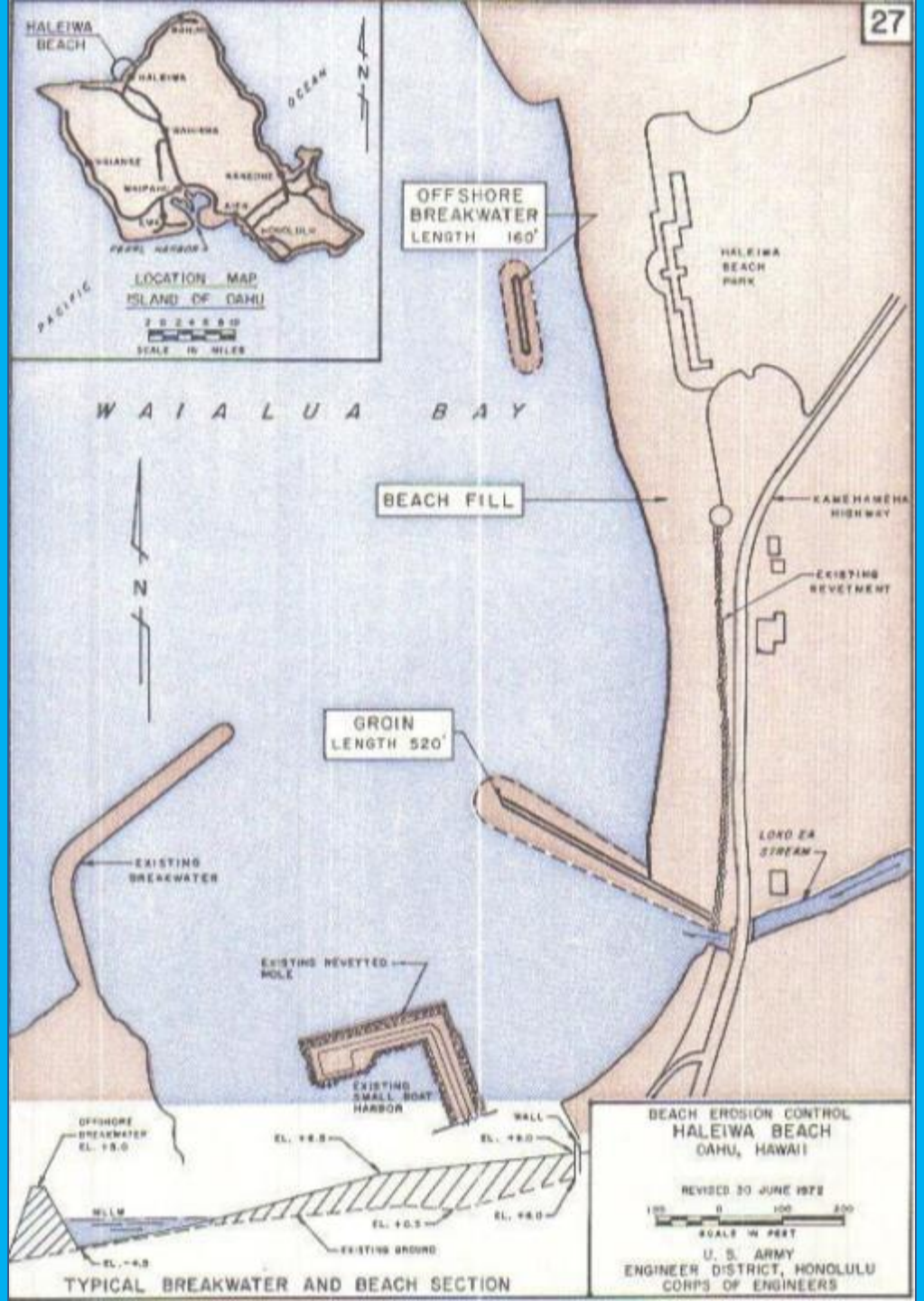
HAWAII REGIONAL SEDIMENT MANAGEMENT
HALEIWA REGION

HALEIWA SMALL BOAT HARBOR



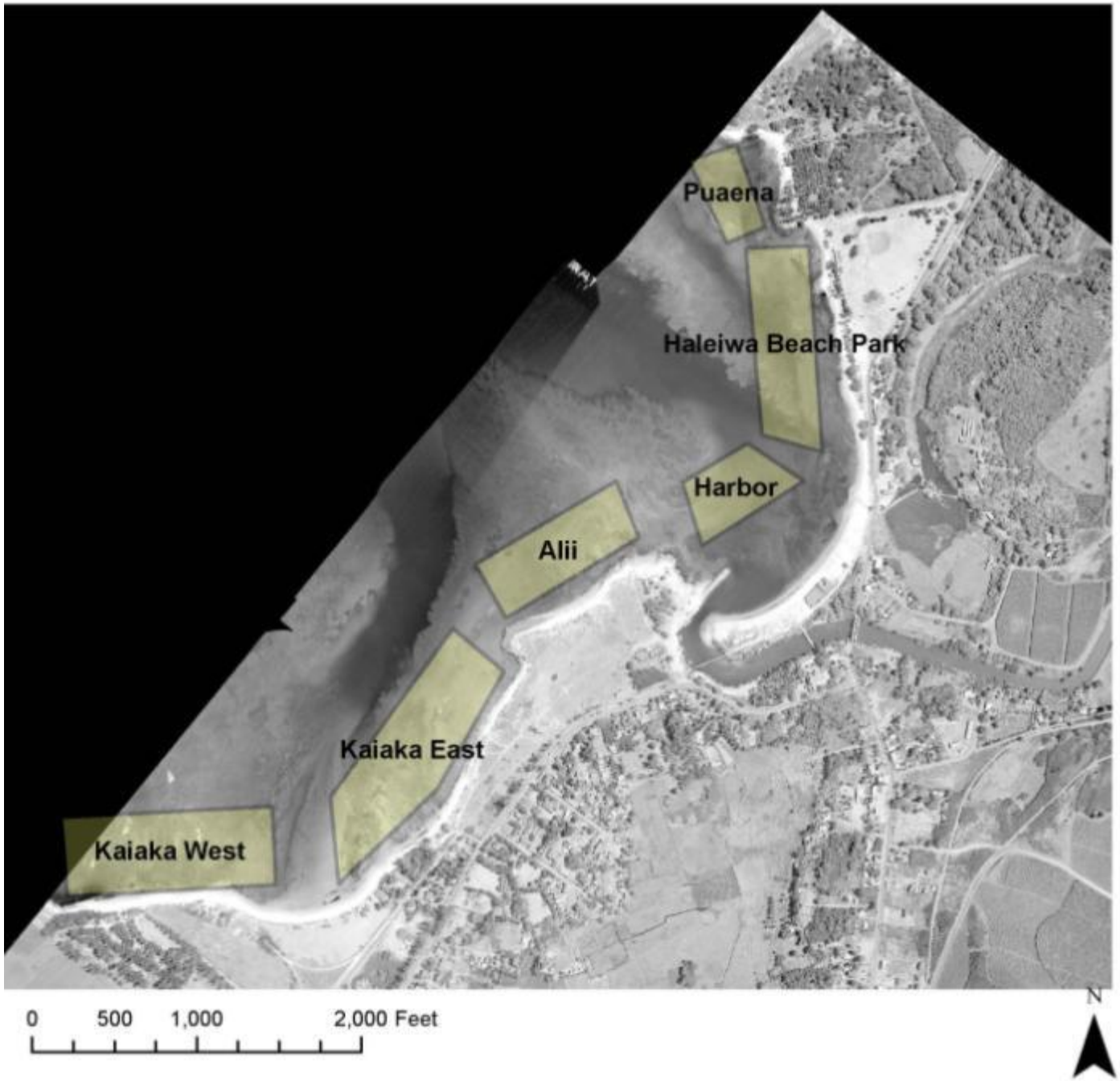
HALEIWA SMALL BOAT HARBOR

HALEIWA BEACH PARK SPP

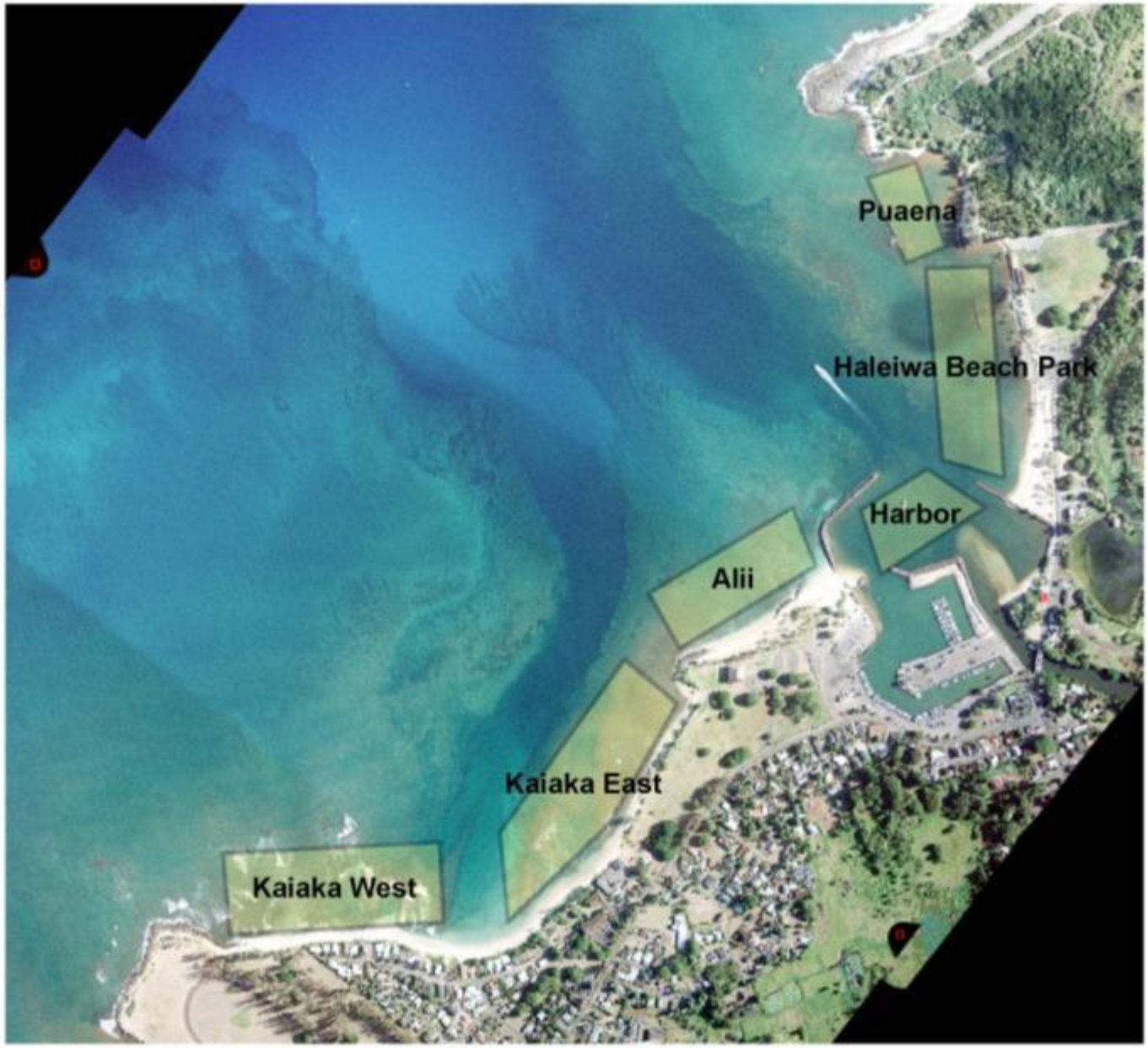


HALEIWA BEACH PARK SPP

1949 Aerial Photograph (Prior to Harbor Construction)



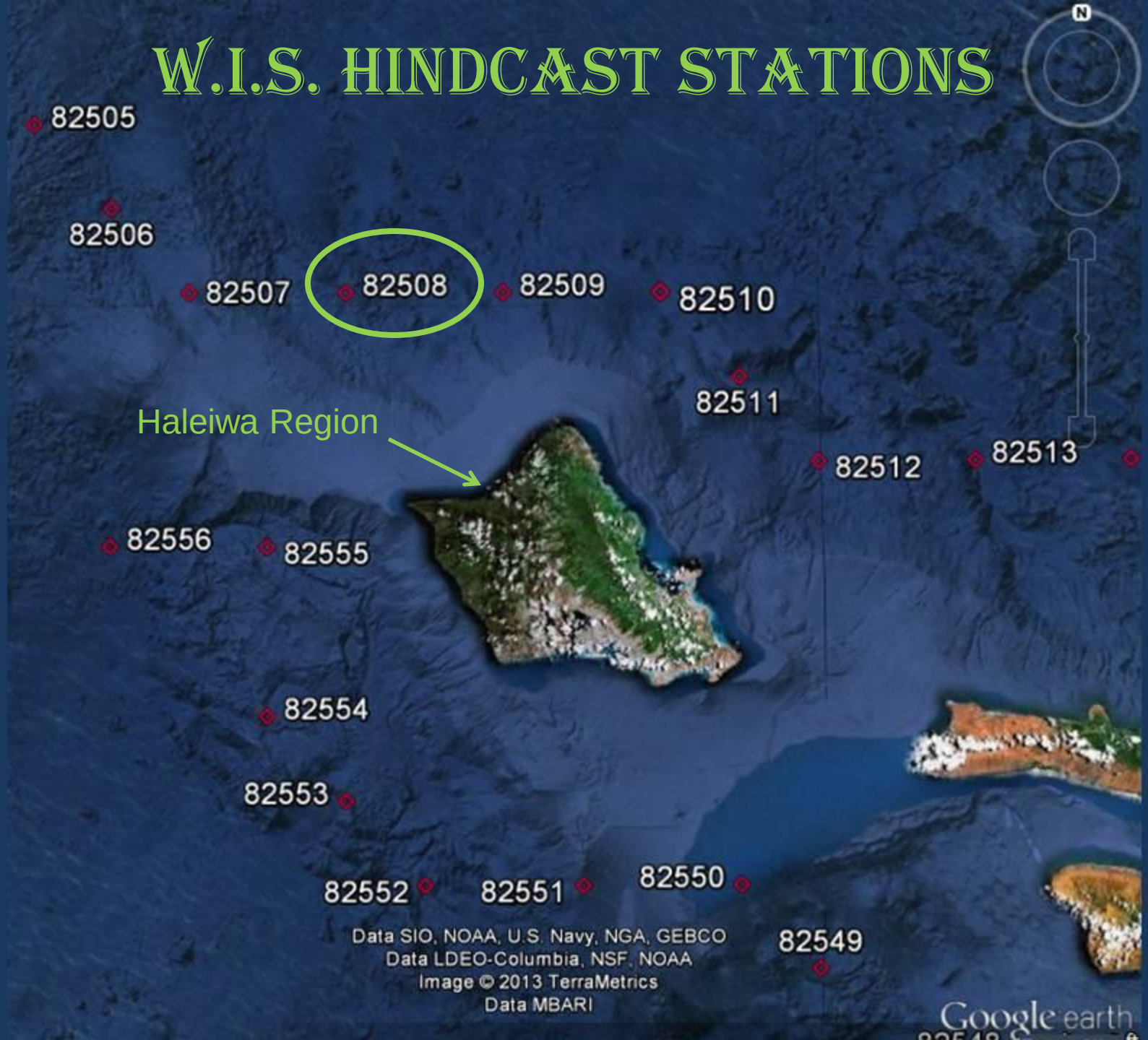
2006 Aerial Photograph (After Harbor Construction)



0 500 1,000 2,000 Feet

N

W.I.S. HINDCAST STATIONS



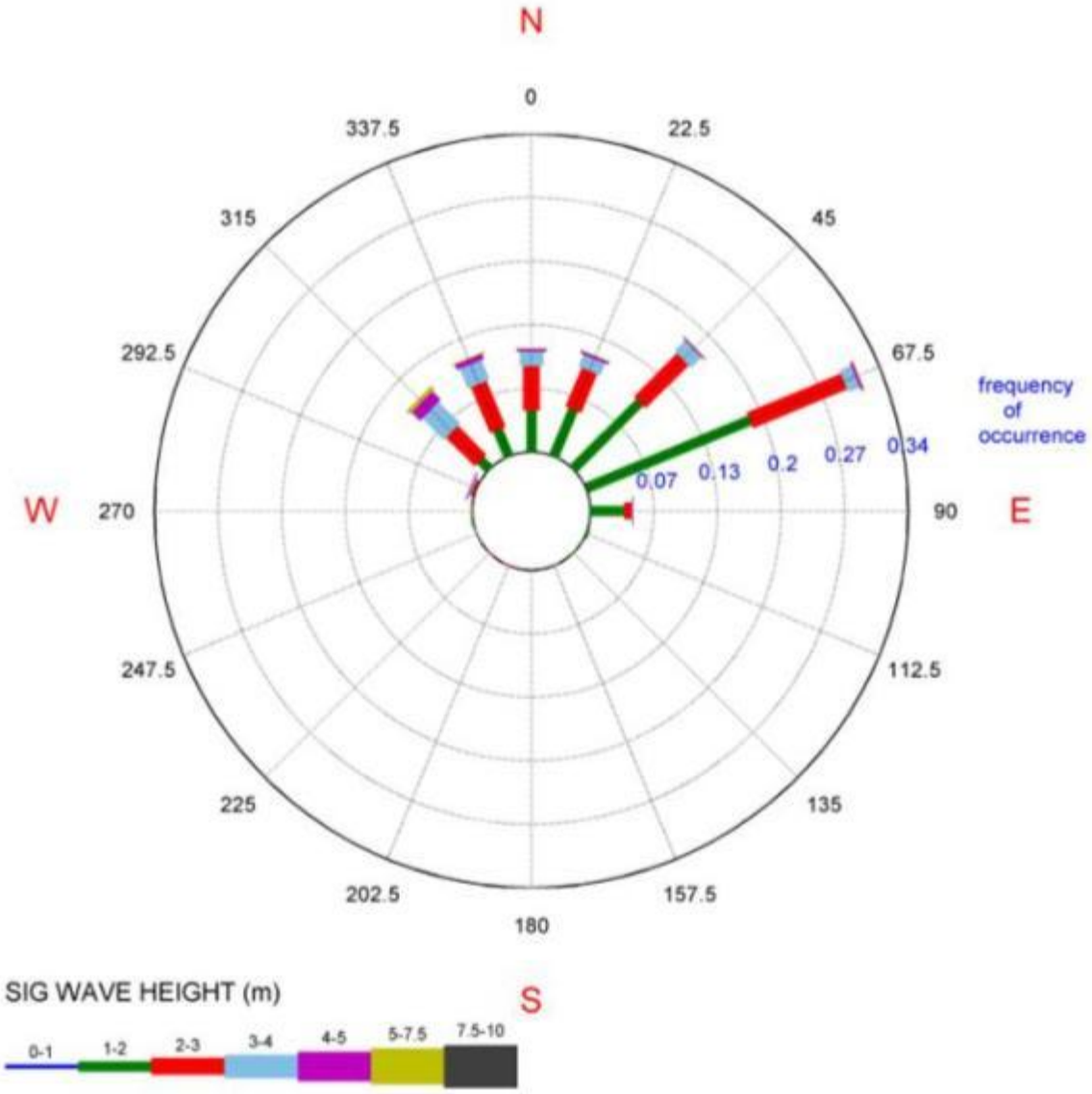
Pacific WIS Station 82508

01-Jan-1980 thru 31-Dec-2011

Long: -158.4° Lat: 21.95° Depth:3127 m

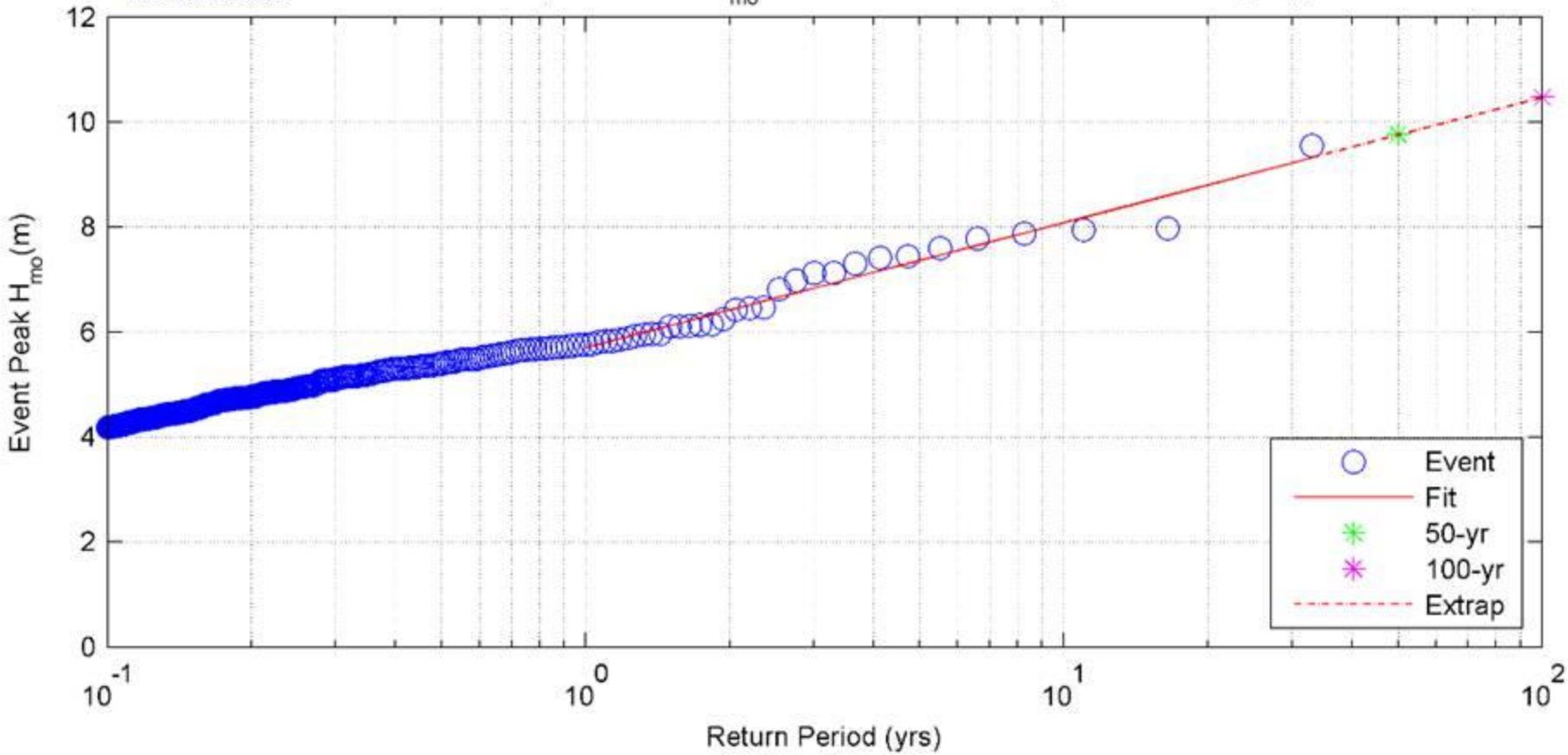
Total Obs : 280511

WAVE ROSE



Wave Information Studies

Storm Event Return Period of 32-yr (1980-2011) Wave Hindcast
Pacific Station 82508 : Lat: 21.950° Lon:-158.400° Depth: 3127m
Linear Fit to top 21 events: H_{mo} = 5.7062 + 1.0348 • ln [Return Period(yrs)]



Top 10 events based on Peak H_{mo}

Event	Date/Time(UTC)	H_{mo}	T_p	θ_{mean}	Event	Date/Time(UTC)	H_{mo}	T_p	θ_{mean}
1	1992/09/12 03:00	9.55	14.45	181.0	6	1986/02/23 10:00	7.60	19.45	307.0
2	1998/01/28 15:00	7.98	21.15	321.0	7	1987/01/10 04:00	7.45	18.94	317.0
3	1983/02/10 21:00	7.94	18.09	321.0	8	1980/02/17 06:00	7.41	17.54	319.0
4	1985/01/15 03:00	7.88	16.78	312.0	9	2003/01/05 12:00	7.30	17.72	315.0
5	1981/01/20 09:00	7.78	18.16	323.0	10	1982/11/24 07:00	7.13	12.96	237.0

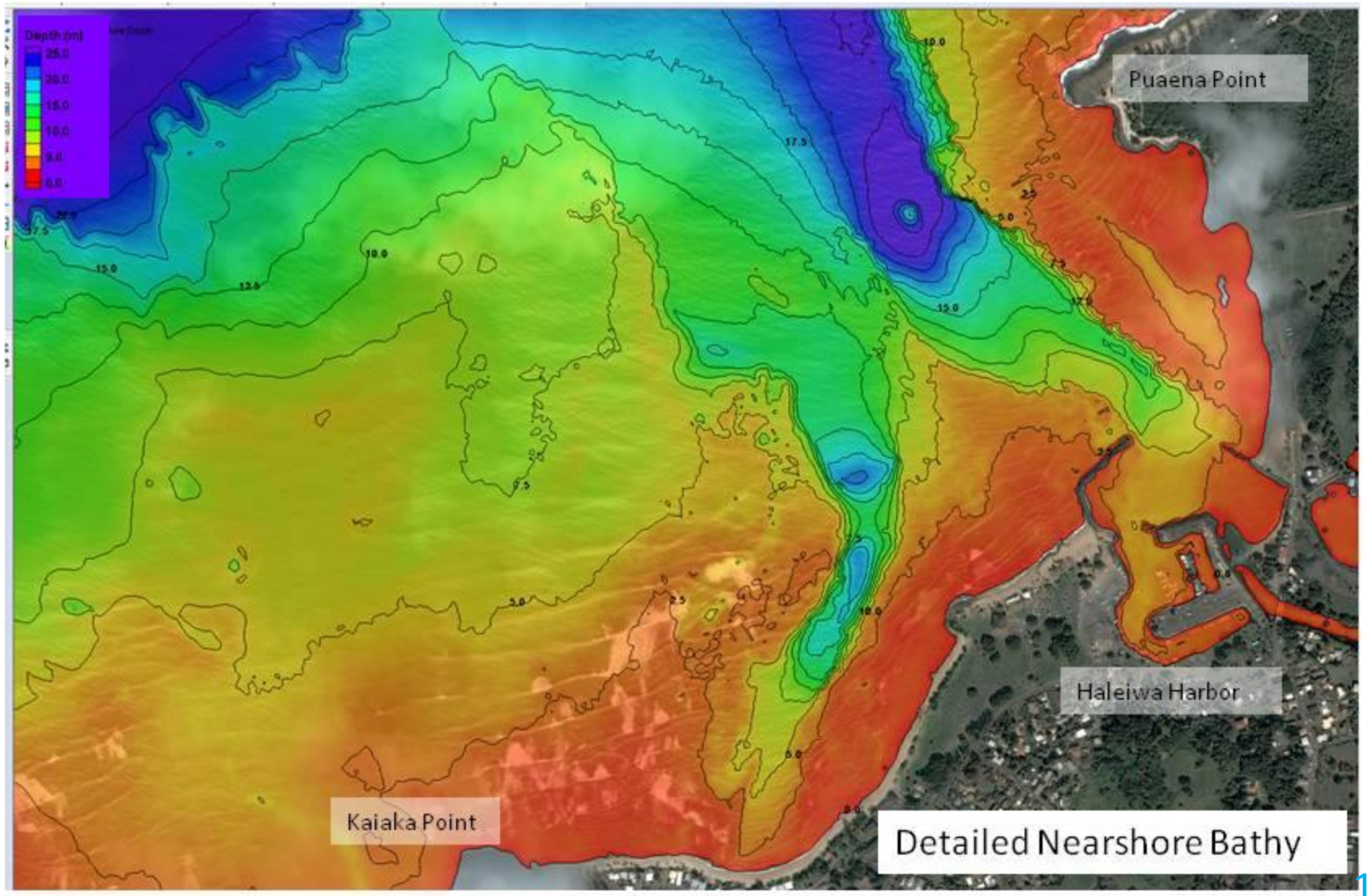
An event is defined as any period when H_{mo} > 4.00m

θ_{mean} is direction that waves are arriving from

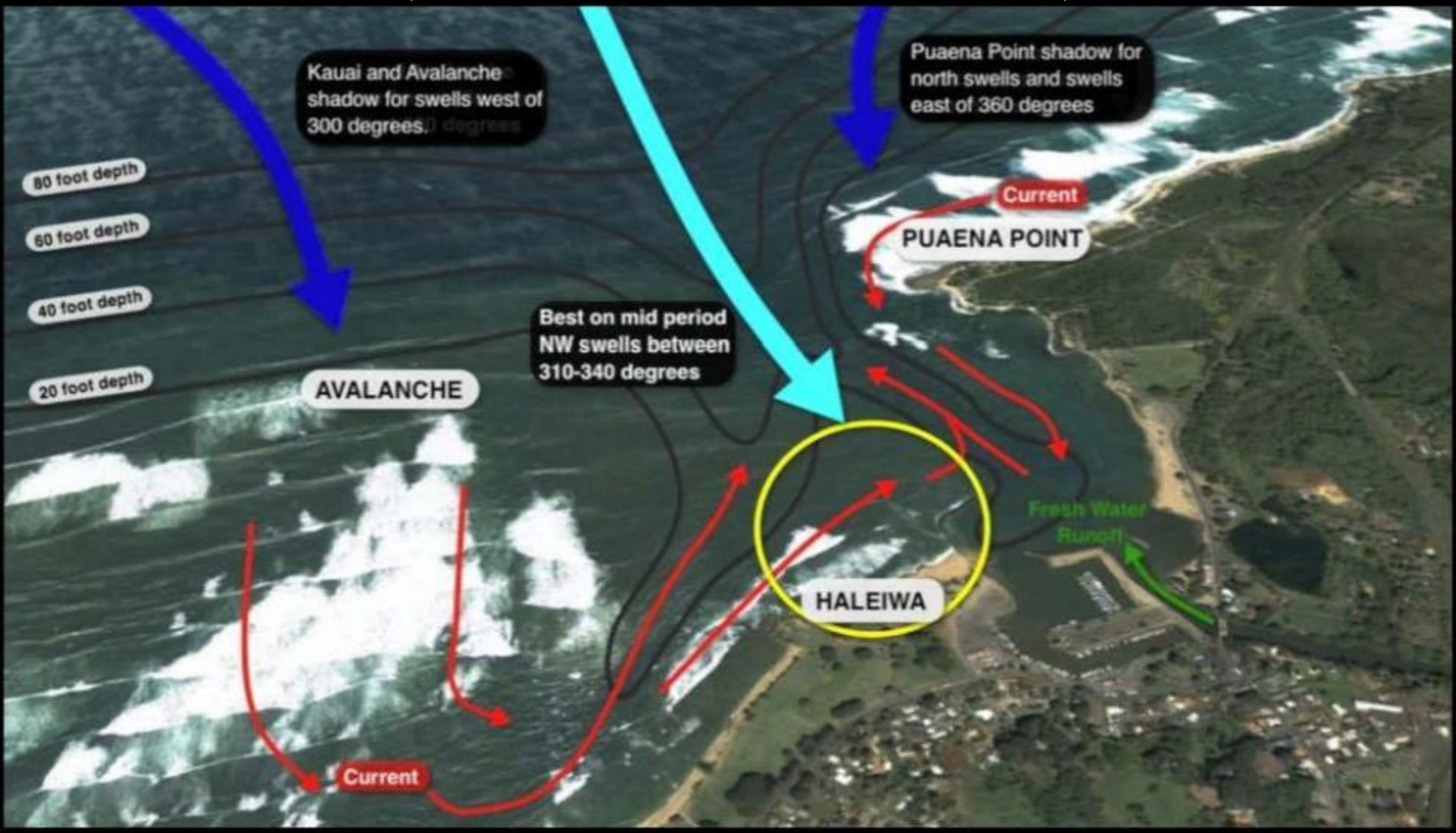
HALEIWA REGION OFFSHORE DEPTH CONTOURS

CMS-Wave

- Wave forcing from offshore WIS Station
- Wind forcing from offshore WIS Station
- Manning's n friction coefficient of 0.20 over reefs



HALEIWA REGION WAVES AND CIRCULATION

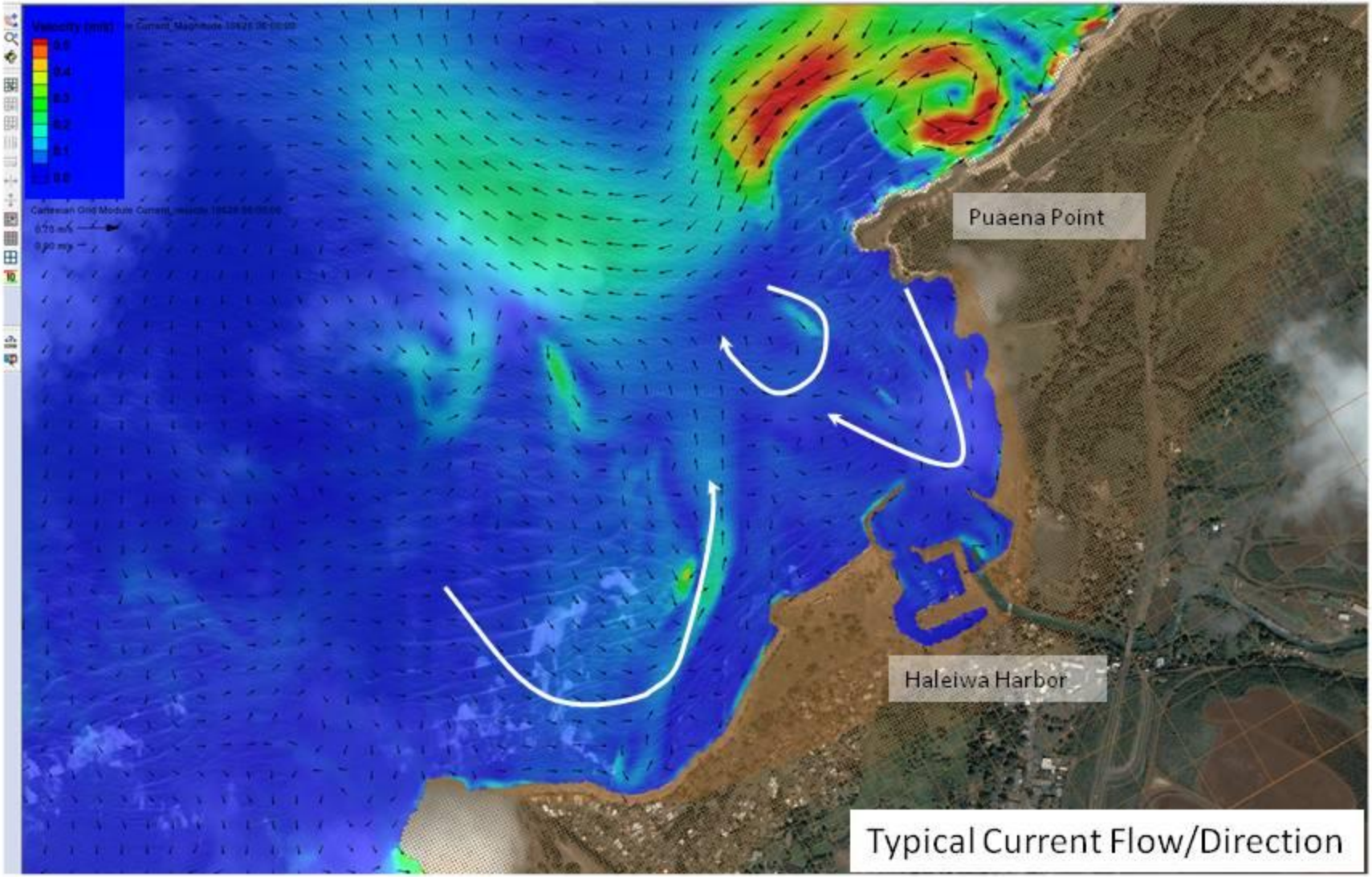


CMS-FLOW

- Water level forcing from NOAA Haleiwa tide sub-station
- Wind forcing from offshore WIS Station
- Manning's n friction coefficient of 0.20 over reefs

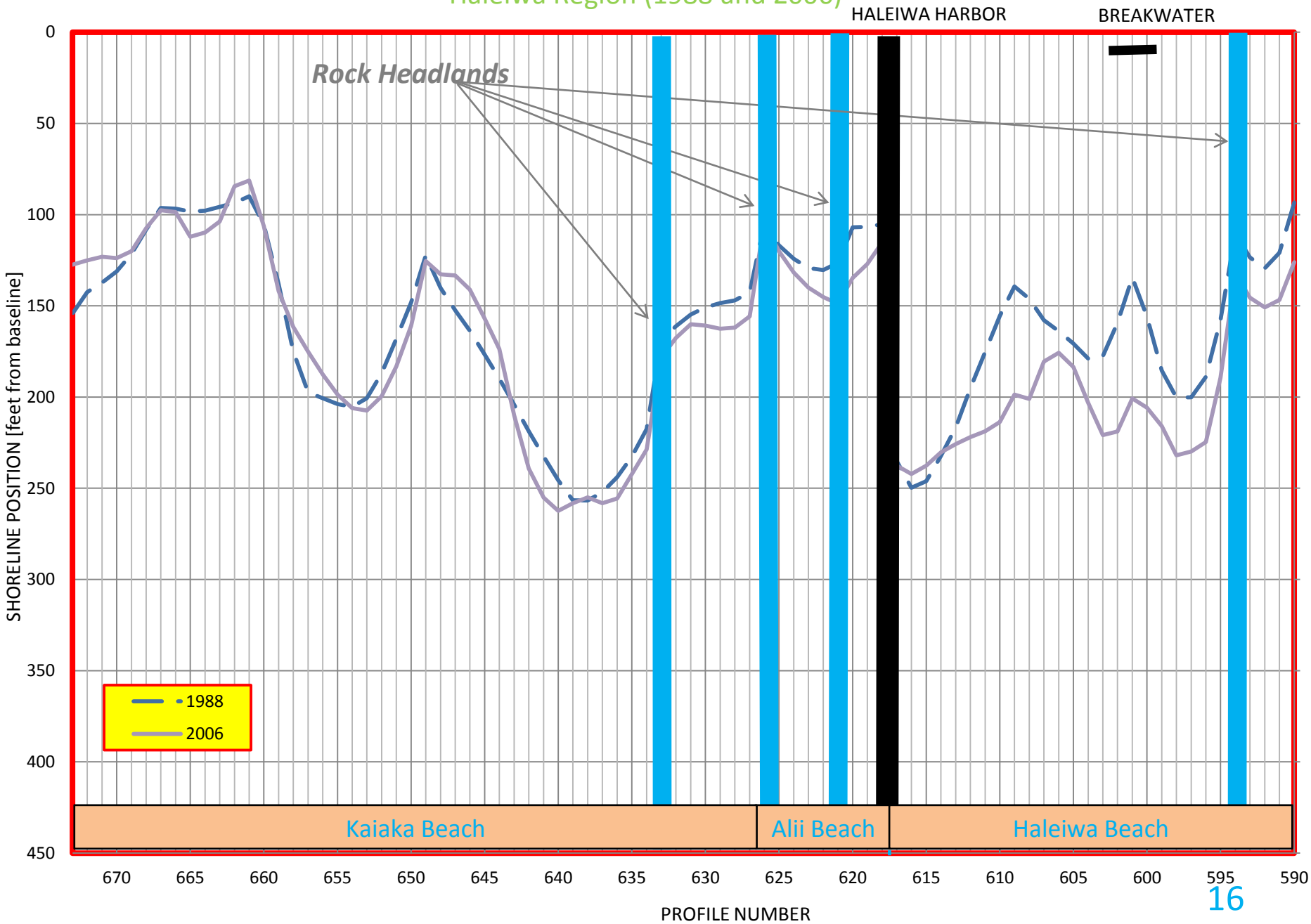
CMS Steering Runs

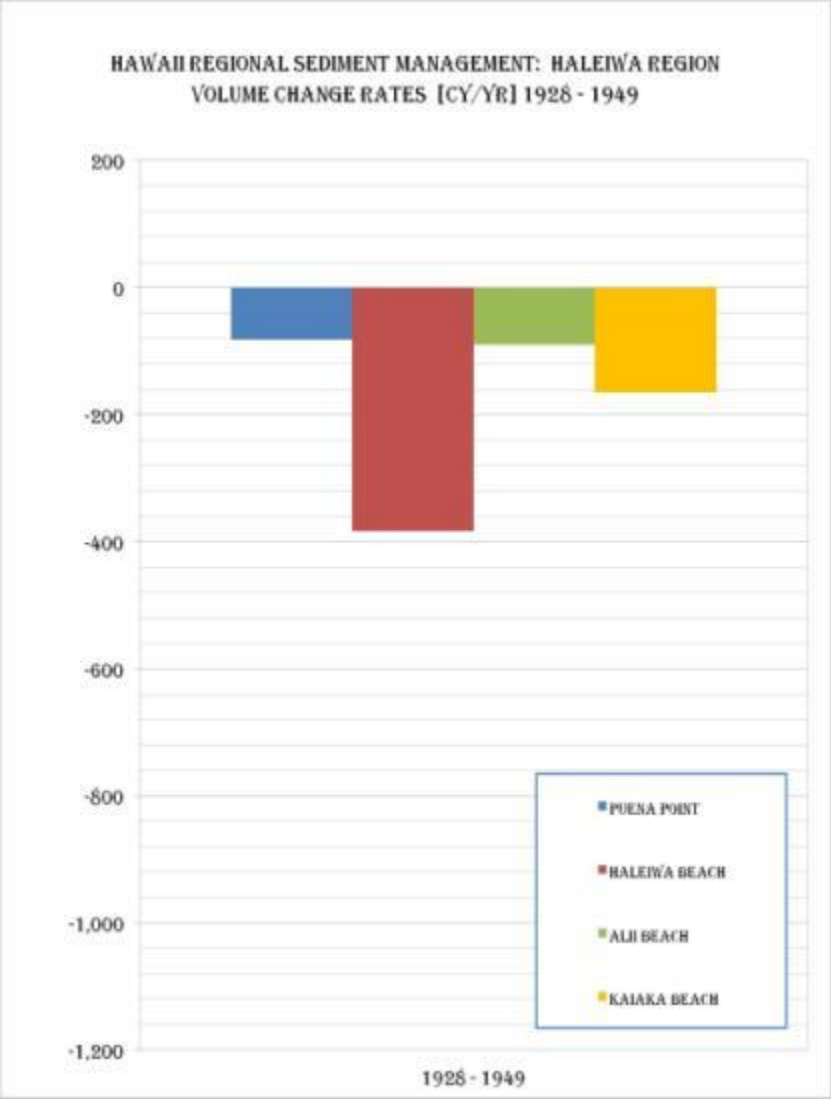
- Radiation stress from CMS-WAVE wave breaking => longshore current in CMS-FLOW
- Varying water level and tide induced currents in CMS-FLOW => water depth and current/wave interaction in CMS-WAVE

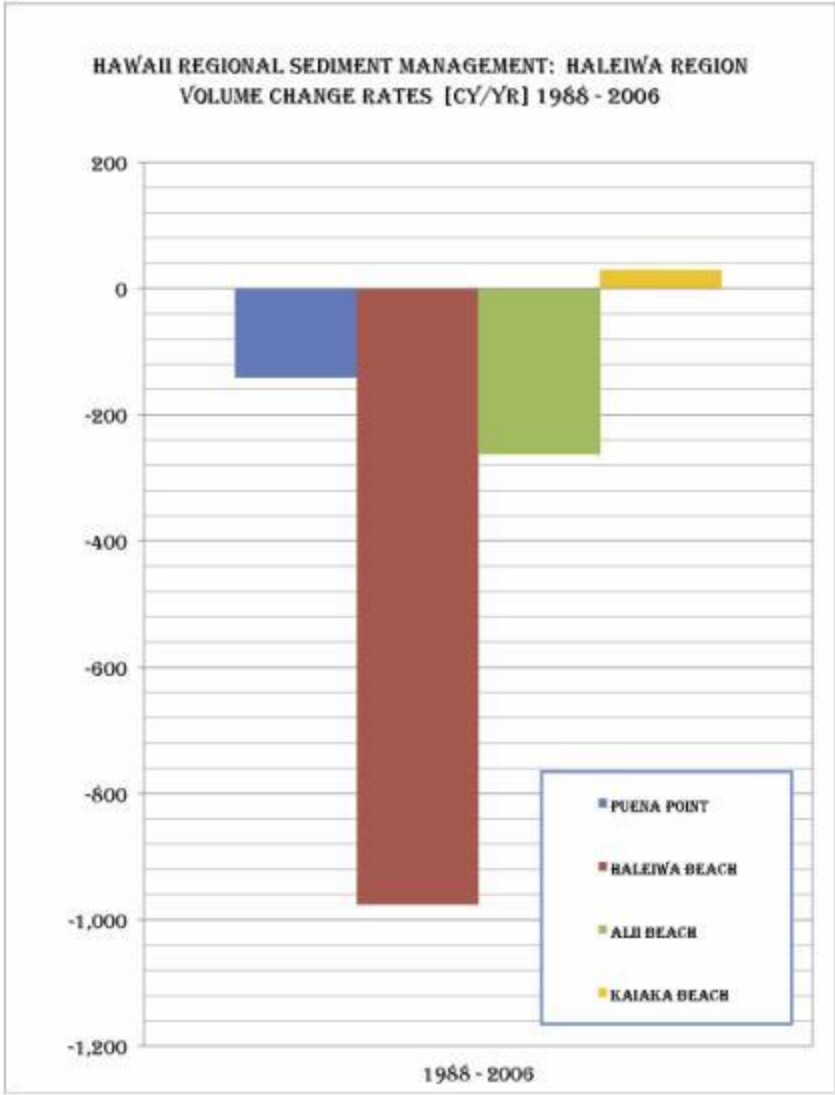


HAWAII REGIONAL SEDIMENT MANAGEMENT - SHORELINE POSITIONS

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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-1,000
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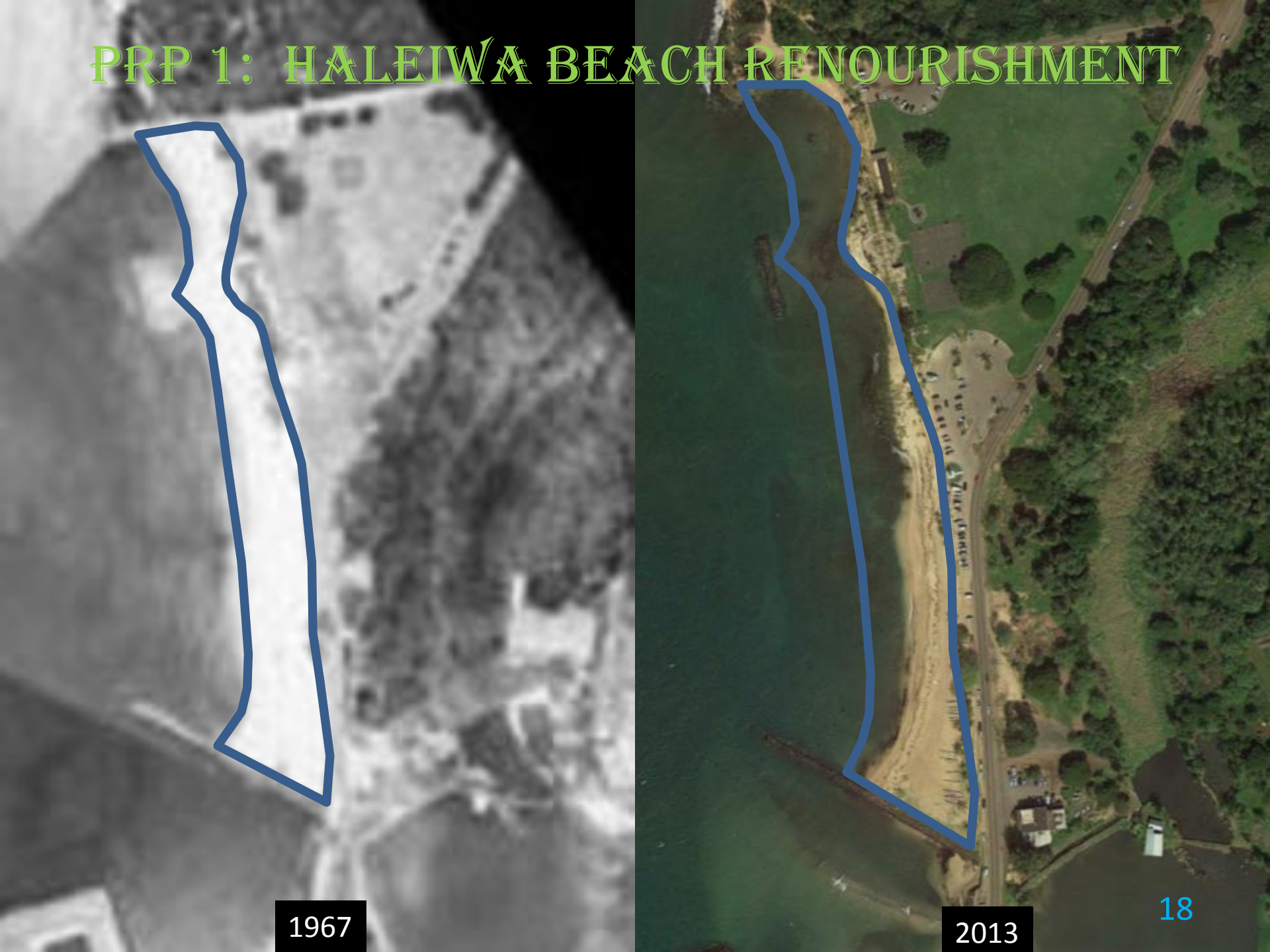
PUENA POINT
HALEIWA BEACH
ALII BEACH
KAIAKA BEACH
1988 - 2006

PRP 1: Haleiwa Beach Renourishment



PRP 2: HALEIWA BEACH T-HEAD GROINS

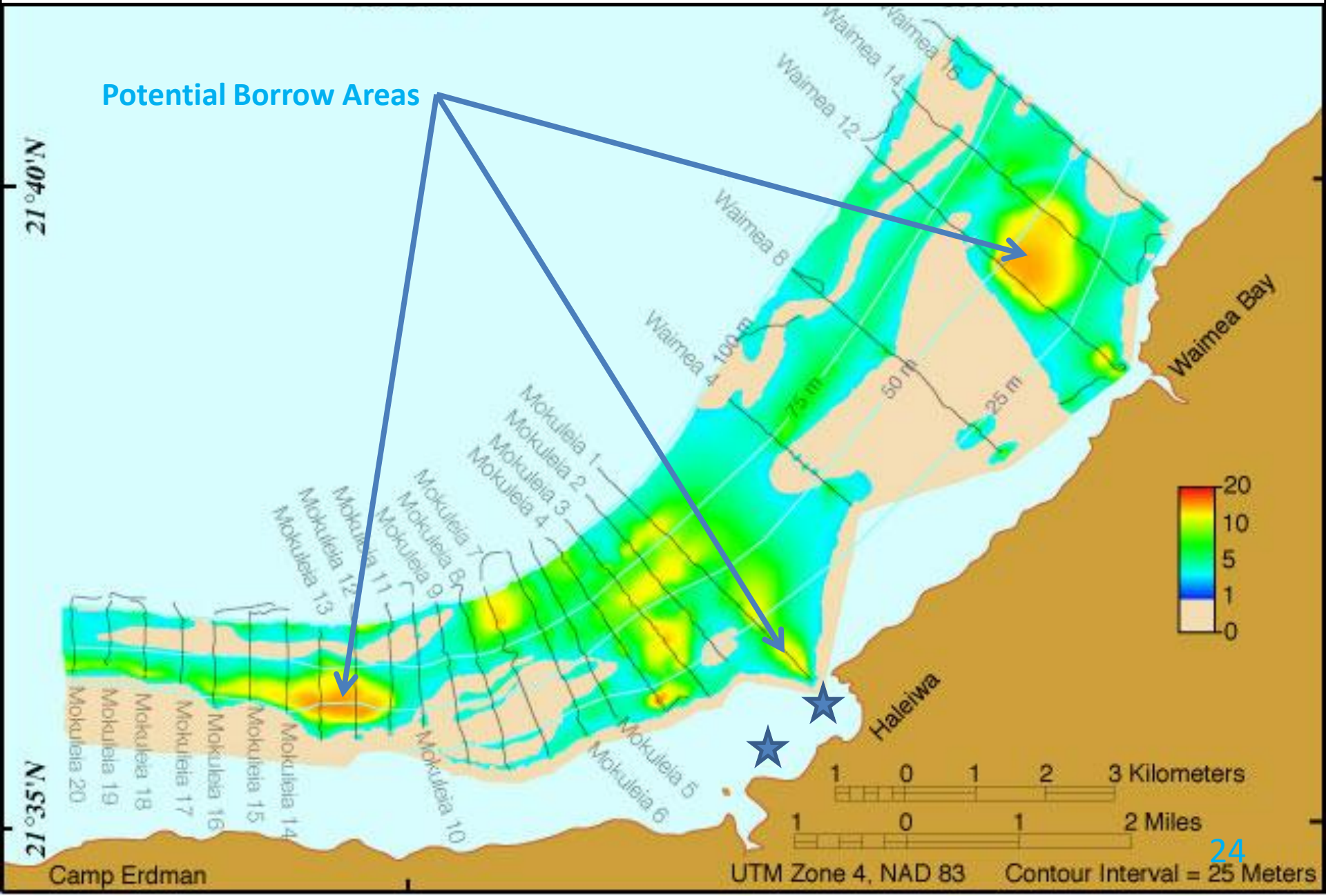
PRP 2: HALEIWA BEACH T-HEAD GROINS

PRP 3: HALEIWA BEACH GROIN POROSITY

PRP 3: HALEIWA BEACH GROIN POROSITY

PRP 4: HALEIWA SBH MAIN BREAKWATER

PRP 5: SAND SOURCES
USGS SEDIMENT THICKNESS MAP



PRP 5 (CONTINUED): SAND SOURCES
HALEIWA SMALL BOAT HARBOR DREDGED MATERIAL

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THANK YOU

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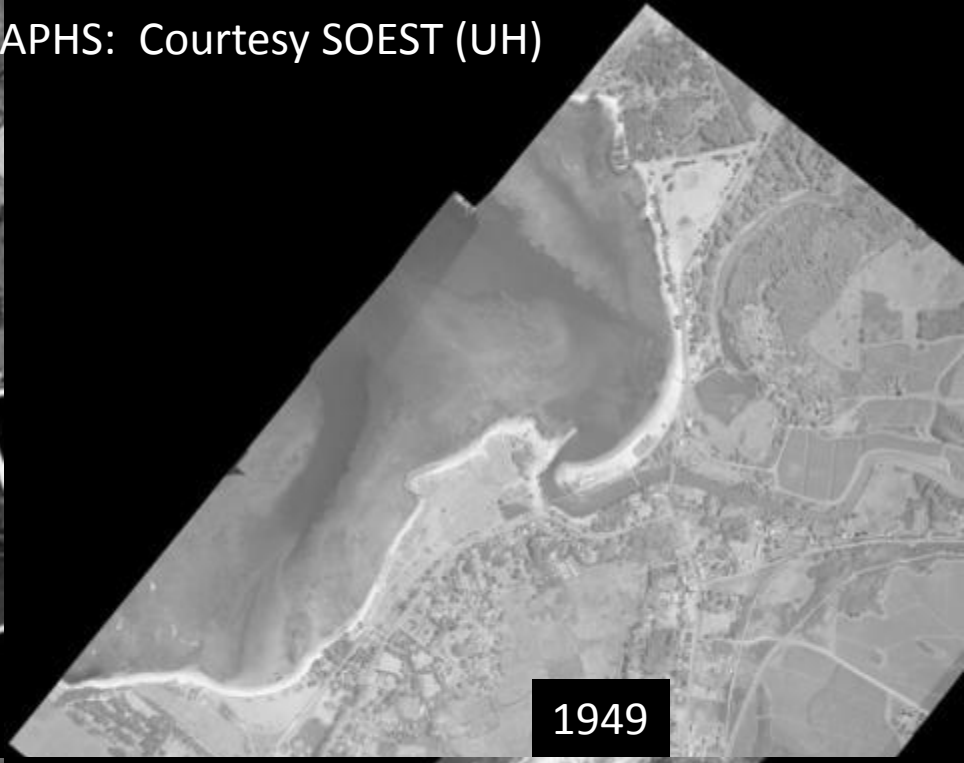
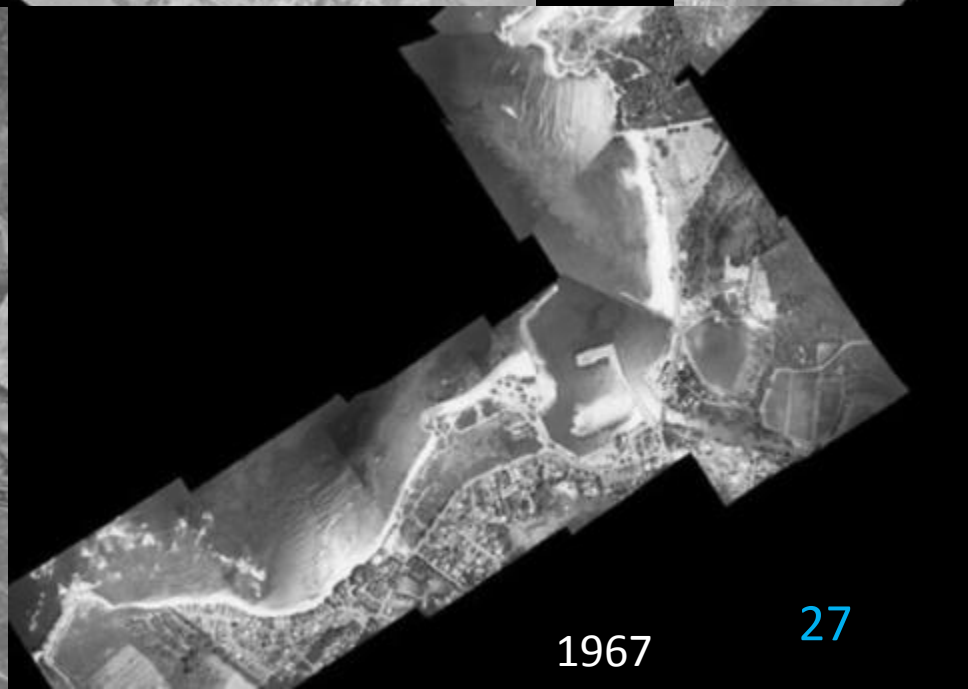
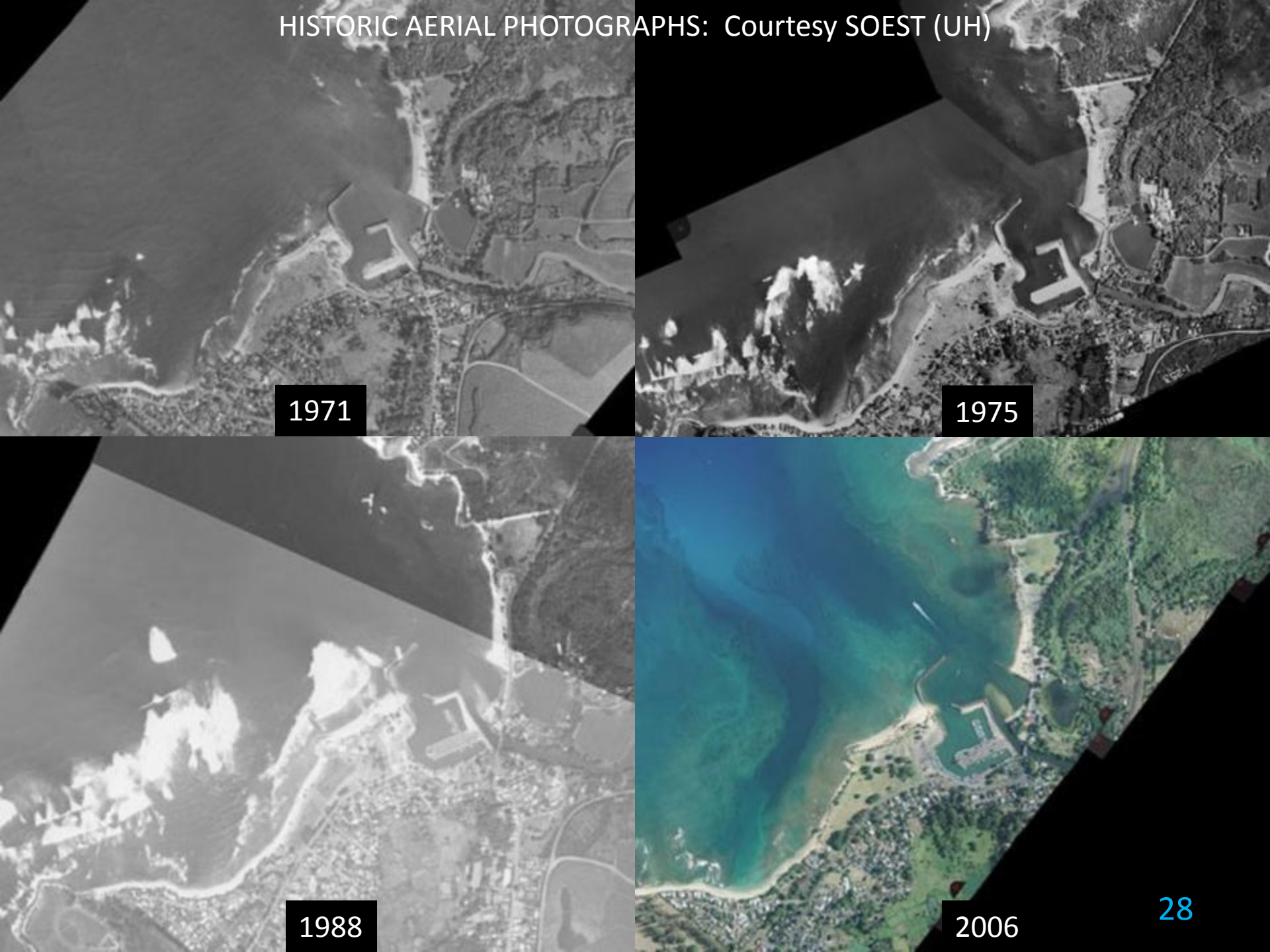
HISTORIC AERIAL PHOTOGRAPHS: Courtesy SOEST (UH)

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