Biogeographic Assessment of the Main Hawaiian Islands

To Support the Hawaiian Islands Humpback Whale National Marine Sanctuary

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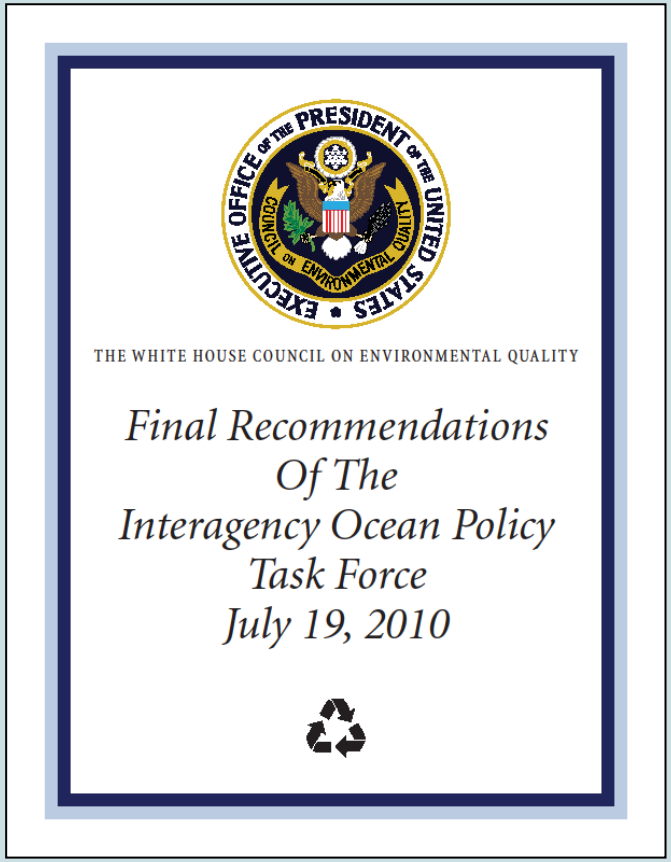
BIOGEOGRAPHY BRANCH
CENTER FOR COASTAL MONITORING AND ASSESSMENT

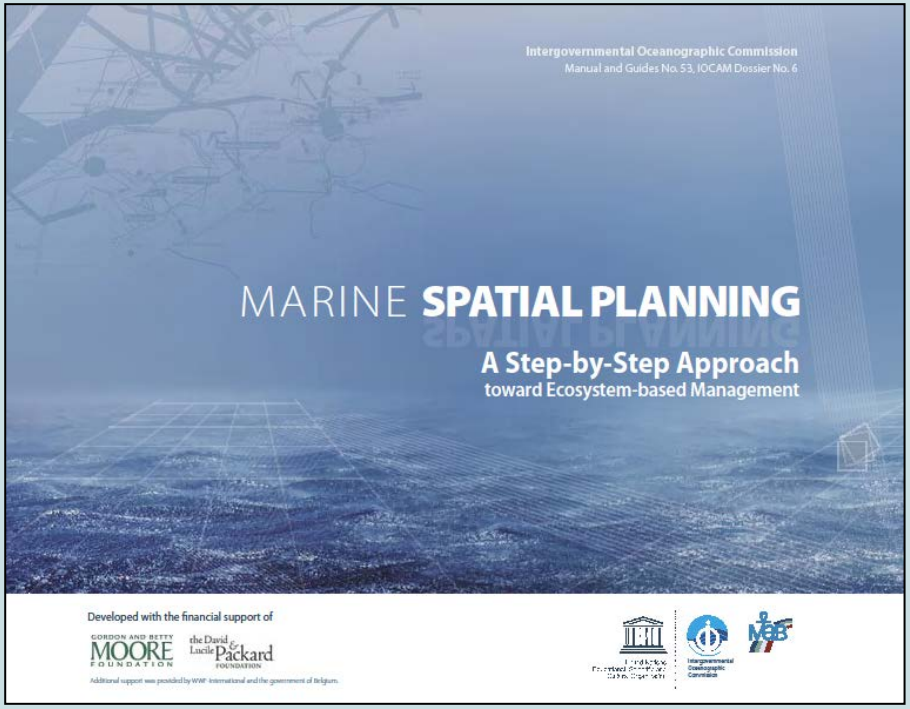
NATIONAL MARINE SANCTUARIES

Agenda

1. Introduction to NOAA's Biogeography Branch
2. Biogeographic Assessment Process (e.g., NWHI)
3. Proposed biogeographic assessment in MHI
4. Project components that have been funded in MHI
5. Relevance to Kona IEA
6. Other projects relevant to Kona IEA

What does NOAA's Biogeography Branch do?

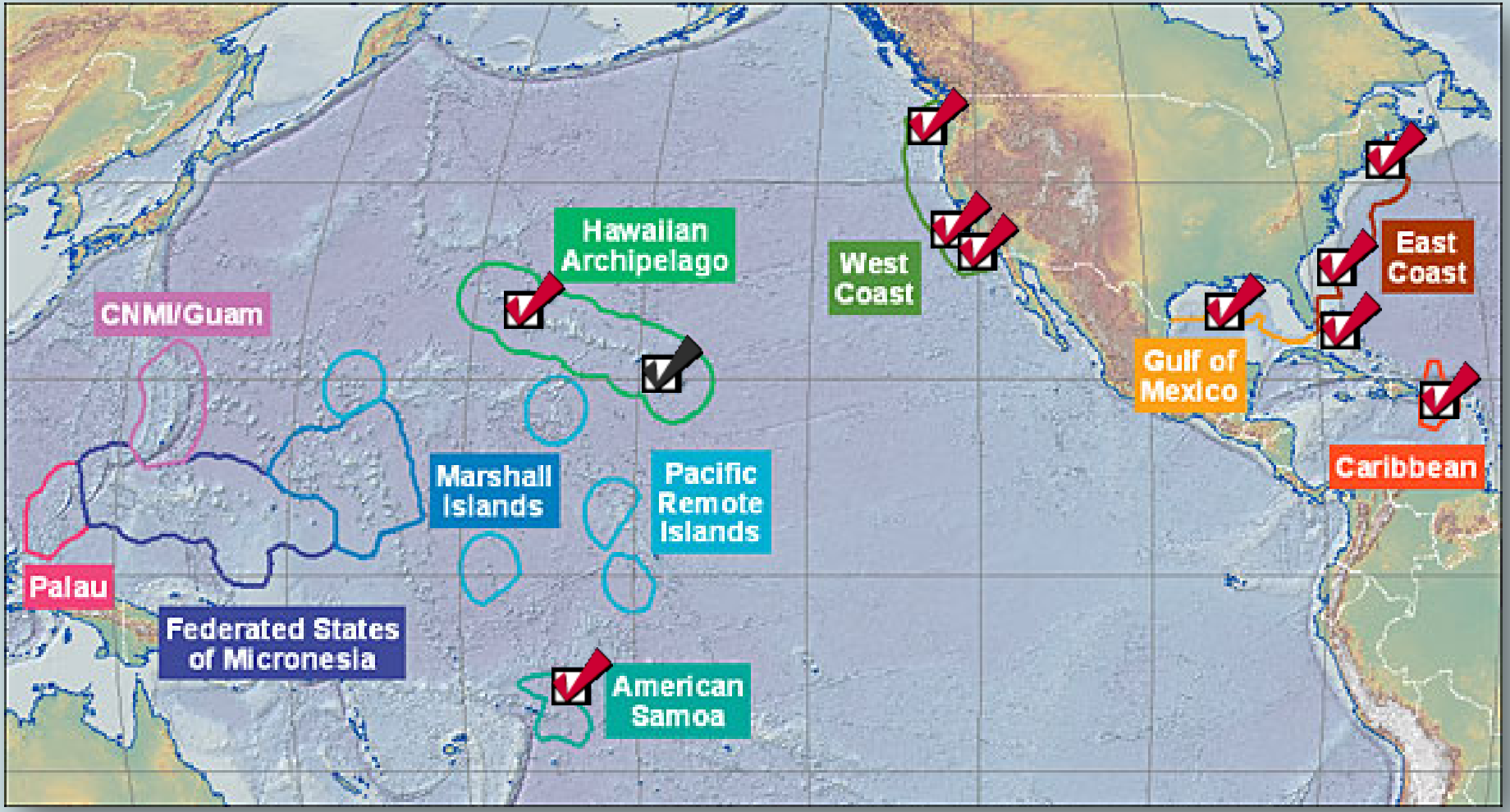




Conduct science to support marine resource management

i.e., MMA monitoring, seafloor mapping, reef fish ecology, ecological characterizations, predictive modeling, software support & development

Where do we work?



- Work throughout U.S. coastal waters, territories & FAS

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Biogeographic Assessment Process

(1) Data Layers

Imagery

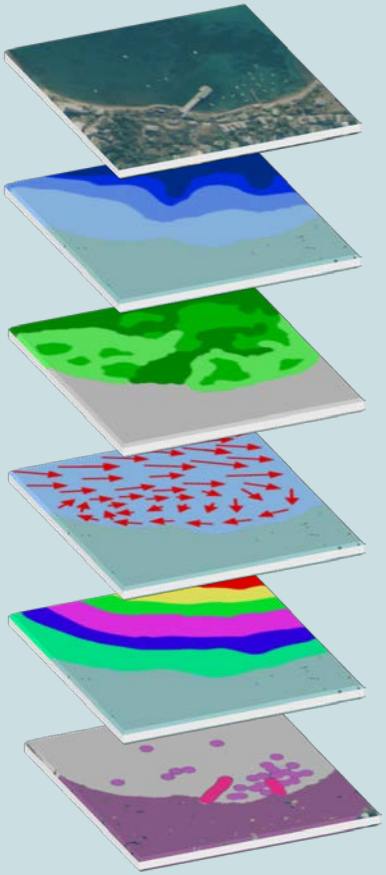
Bathymetry

Bottom Type

Oceanography

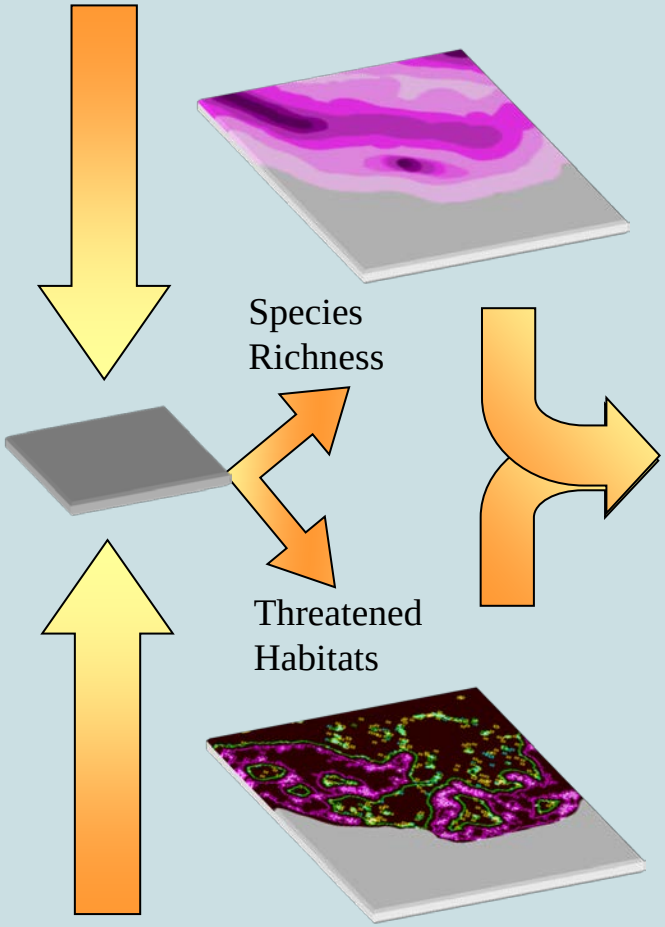
Species Distributions (many layers)

Patterns of Human Use



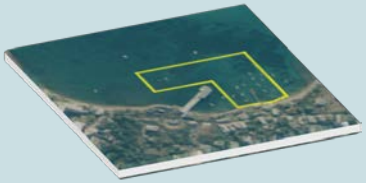
(2) Integrated Analyses*

* Specific analyses targeted to management needs

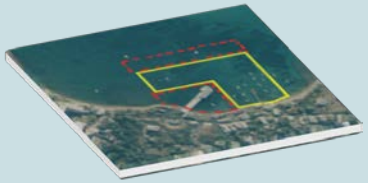


(3) Products to Aid Management

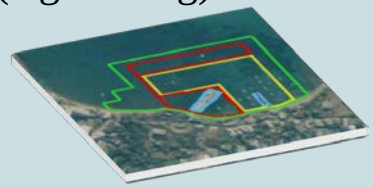
Define & analyze existing conditions



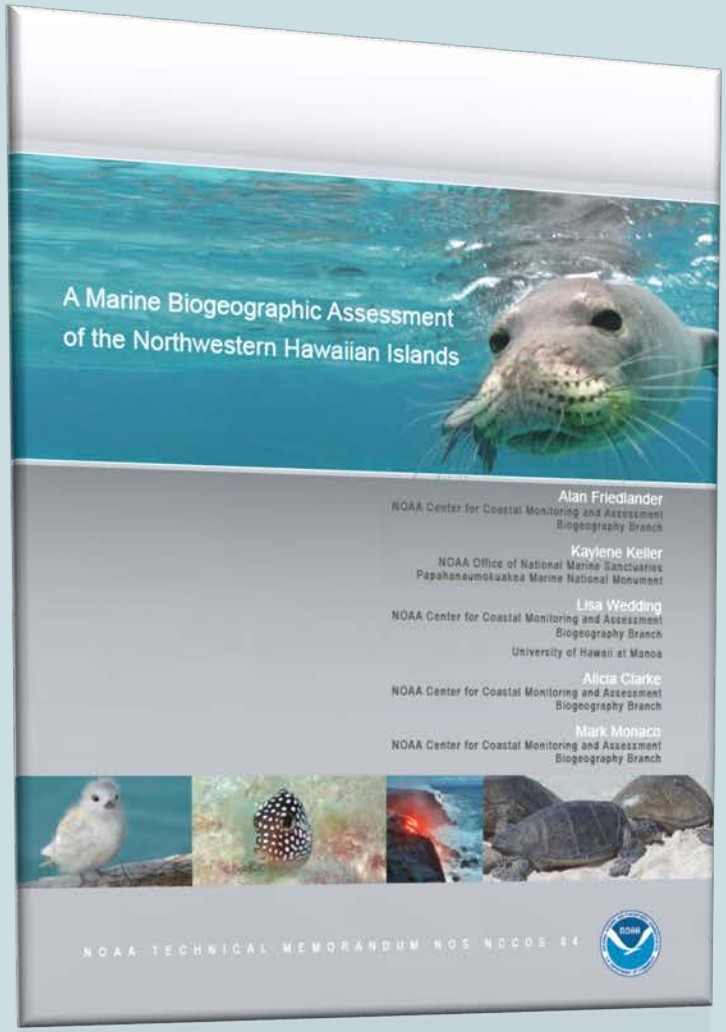
Define & analyze future conditions



Evaluate alternative management strategies (e.g. zoning)



Biogeographic Assessment Example: NWHI



Friedlander et al. 2009

Report Outline

1. Intro. - History of Use & Management
2. Oceanographic & Physical Setting
3. Geology
4. Benthic Communities
5. Fish
6. Marine Protected Species
7. Seabirds
8. Invasive Species
9. Connectivity
10. Management Concerns and Responsibilities

Report Outcomes

1. Support management of PMNM
2. Better understand links between ecosystem components in NHWI
3. Opportunity to compare NWHI & MHI

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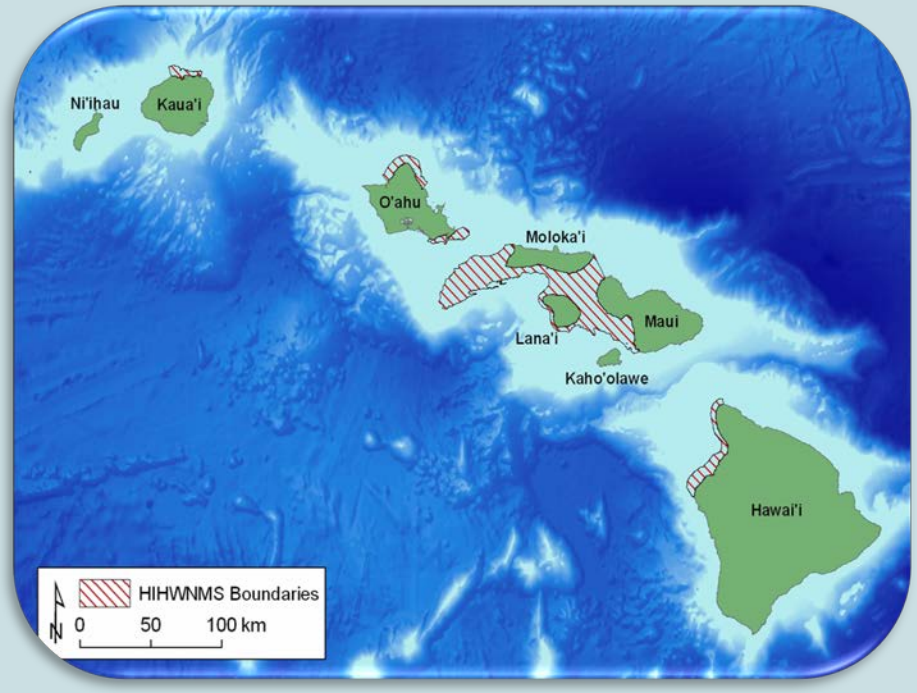
Proposed research in MHI

Proposed Research

<u>Biogeographic assessment of MHI</u>

1. Introduction
2. Oceanography & Geology
3. Living Marine Resources
   - Benthic Communities, Inverts, Turtles, Mammals
4. Ecological Hotspots
5. Cultural Heritage & Human Uses
6. Management Concerns



Proposed Objectives

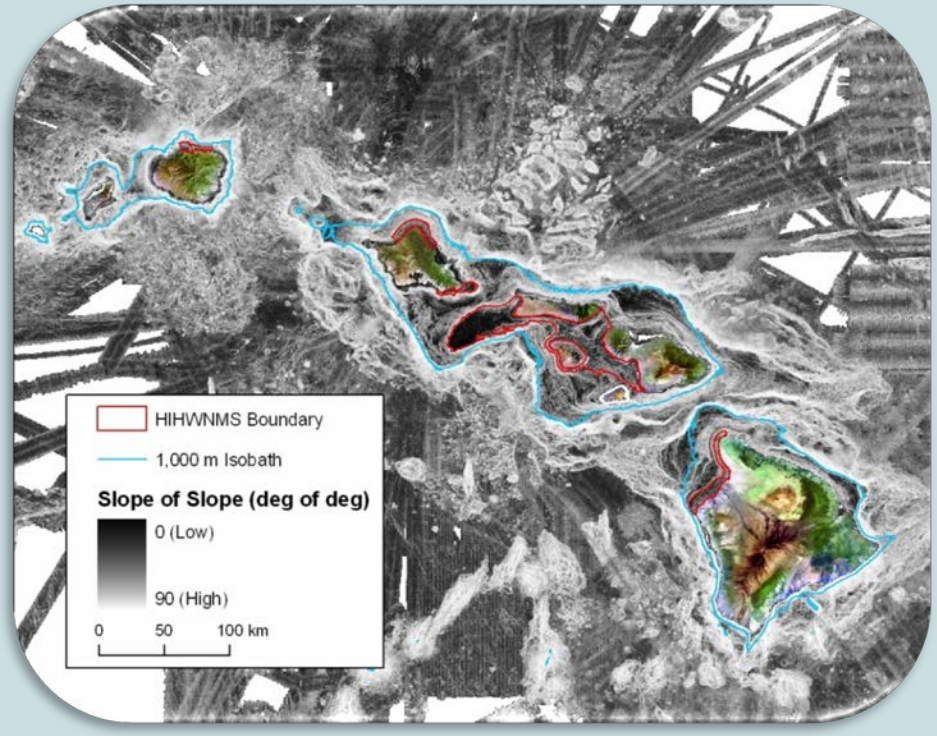
1. Support HIHWNMS management plan review process
2. Broadly support Kona IEA
3. Allow for ecosystem comparisons with NWHI

Research that has been funded in MHI

Funded Research

<u>Characterize MHI seafloor topography</u>

1. Analyze benthic habitats <30m
2. Describe seafloor vertical structure <3,000 m
3. Delineate structurally complex areas that maybe ecologically important



Funded Research Objectives

1. Support HIHWNMS management plan review process
2. Identify data gaps & needs to help guide future research efforts
3. Support Kona IEA

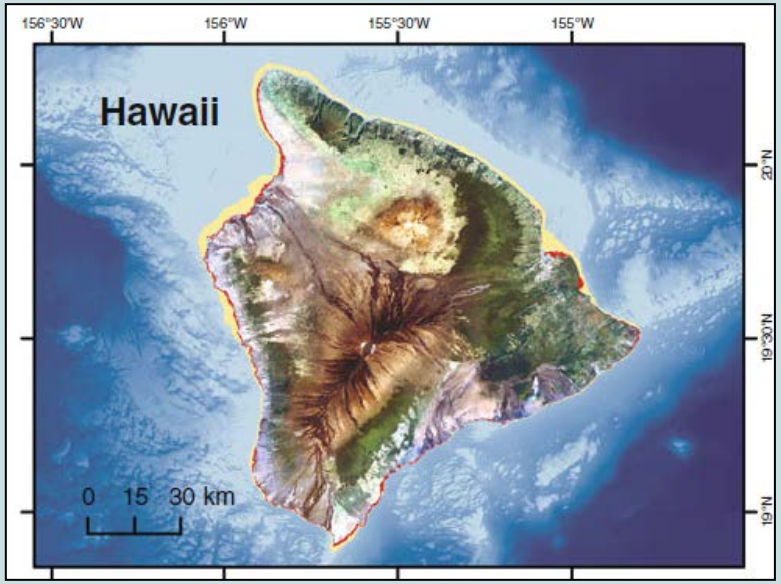
Relevance to Kona IEA

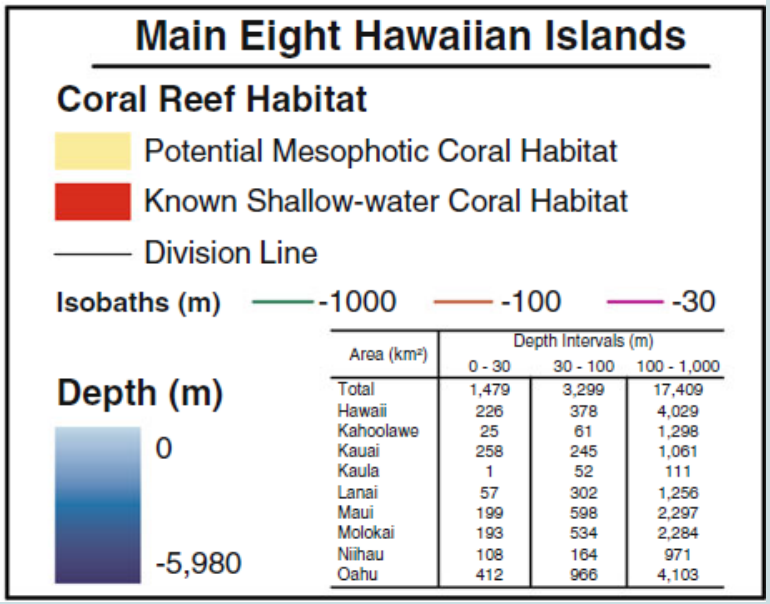
Related Kona IEA Products

- Coastal reef model focusing on processes 0 – 100 m

Biogeography Branch Products

- Extend information about seafloor structure deeper to 3,000 m
- Include additional possible deep-water coral habitat
- 4,029 sq km around Hawaii (Locker et al. 2009)





Area (km²)	Depth Intervals (m) 0 - 30	30 - 100	100 - 1,000
Total	1,479	3,299	17,409
Hawaii	226	378	4,029
Kahoolawe	25	61	1,298
Kauai	258	245	1,061
Kaula	1	52	111
Lanai	57	302	1,256
Maui	199	598	2,297
Molokai	193	534	2,284
Niihau	108	164	971
Oahu	412	966	4,103

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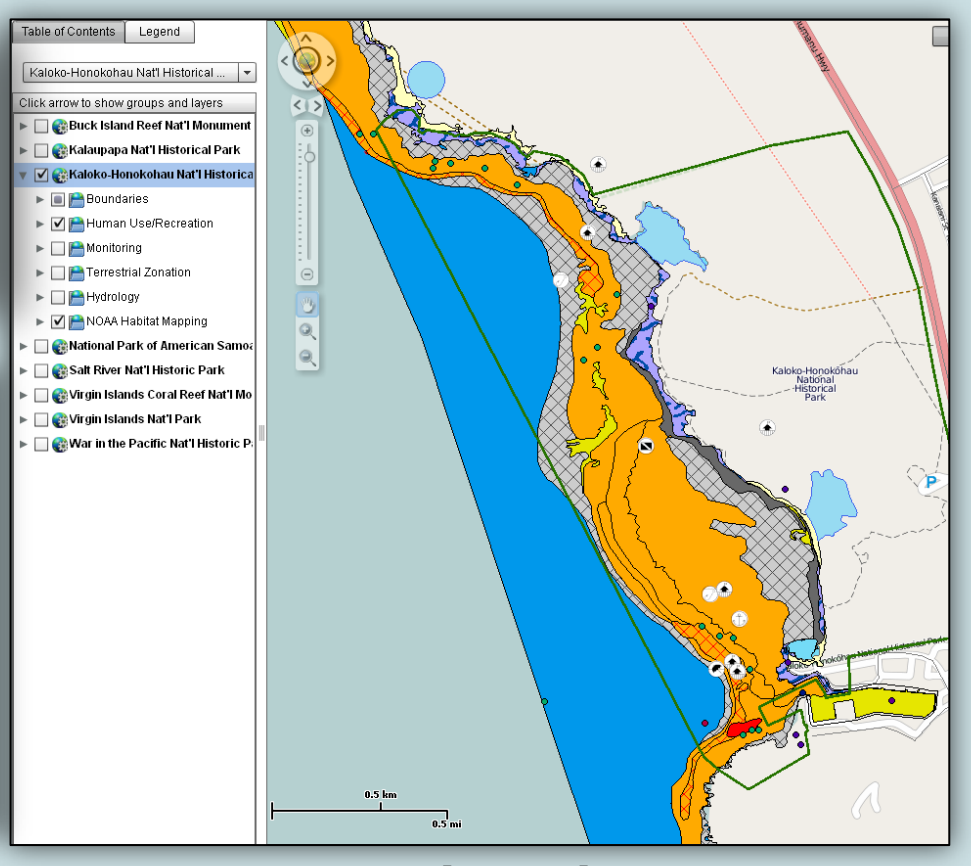
NPS Gap Analysis Project

- Acquire, synthesize & evaluate all existing oceanographic, ecological, socio-economic & cultural datasets available for 8 NPS-managed marine park units (2 in Hawaiian Islands)

Contents | Preview | Metadata

Name	Type
Boundaries	File Geodatabase Feature Dataset
Contours	File Geodatabase Feature Dataset
HumanUse_Recreation	File Geodatabase Feature Dataset
Hydrology	File Geodatabase Feature Dataset
Monitoring_Coral	File Geodatabase Feature Dataset
Monitoring_Fish	File Geodatabase Feature Dataset
Monitoring_Habitat	File Geodatabase Feature Dataset
Monitoring_Intertidal	File Geodatabase Feature Dataset
Monitoring_OtherVertebrates	File Geodatabase Feature Dataset
NOAA_Habitat_Mapping	File Geodatabase Feature Dataset

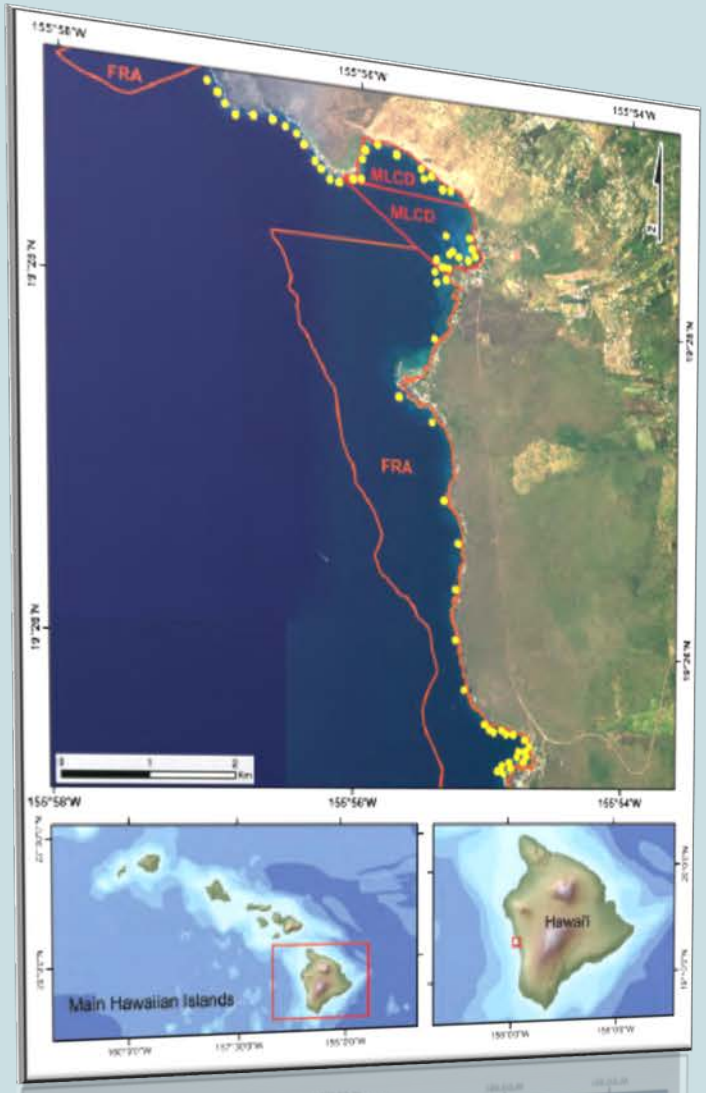
GIS Data Compilation



Web Portal

Web Portal URL: http://ccma.nos.noaa.gov/explorer/gapanalysis/gap_analysis.html

Hawaii's MLCDs



Friedlander et al. 2010

Report Objective

To characterize ecosystem patterns & understand efficacy of 4 of Hawaii's MLCDs:

1. *Hanauma Bay Marine Life Conservation District (MLCD) & Southeast Oahu*
2. *Pupukea MLCD & North Shore Oahu*
3. *Honolua-Mokuleia MLCD &West Maui*
4. *Kealakekua Bay MLCD & South Kona*

Results for Kealakekua (2002-2008)

1. Coral cover same & stable inside/outside
2. Fish biomass increased 7% inside
3. MLCD preserving habitats & fish biomass

Questions?

Acknowledgements

Hawaiian Islands Humpback Whale National Marine Sanctuary

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