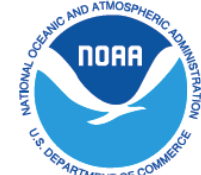




The PIFSC Kona IEA

NOAA Pacific Islands Fisheries Science Center
2570 Dole Street
Honolulu, HI 96822



UNIVERSITY
of HAWAII*
HILO

Kona Pilot Integrated Ecosystem Assessment

Why choose Kona?

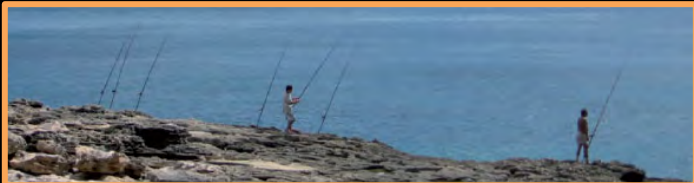
- Kona region natural choice based on dynamic ecology and history of research done in this area
- Kona region contains a diverse group of unique species that have been the subject of many long-term studies
- Several on-going State, Federal, and Academic research projects (Partnership)
- Kona region has many potential management issues now and in the future



Kona IEA Initial Objectives FY10-11

- Identify management issues (internal and external/partners)
- Establish data management and ecosystem-modeling infrastructure
- Develop physical, ecological, and socioeconomic indicators
- Build modeling capacities to understand base physical and ecological systems
- Increase community outreach and work with partners to identify common areas of interest in Kona

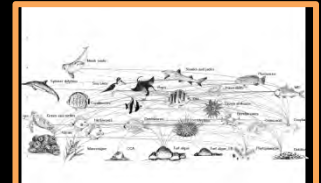
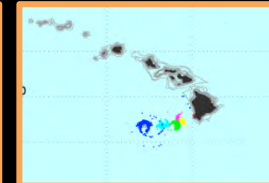
**Step 1:
SCOPING**



**Step 2:
INDICATORS**



**Step 3:
MODELING**



FY10-FY11 Kona IEA timeline - Scoping

Goal: internal and external scoping to understand system and identify key management issues and potential data sources

- Internal working group formed February 2010
 - Comprised of 1-2 people from each research division at PIFSC
 - Met several times to identify issues, pressure points

External scoping FY10 – present:

- Federal: NOAA PSC, Sanctuaries, USGS, NPS
- State: Hawaii Division of Aquatic Resources (Kona)
- Western Pacific Regional Fishery Management Council
- The Kohala Center (Kona), The Nature Conservancy
- University of Hawaii: Manoa, HIMB, Hilo, Sea Grant, PacIOOS, IPRC

- Identified issues/Drivers:
 - Larval connectivity/retention areas
 - Aquaculture (Nutrients, disease, etc.)
 - Fisheries (Recr., Aquarium)
 - Shared use areas
 - Groundwater effects on ecosystem
 - Climate and anthropogenic impacts
 - Marine mammal habitat
 - Sanctuaries re-management plan



IEA Initial Projects FY2010-2011

- **Outreach:**
 - Operational website with prelim data display/use
 - Brochure with information on current IEA and results to date
- **Indicators:**
 - Establish list of socially-valued indicators of the Kona Ecosystem
 - Combination of environmental and socioeconomic variables
- **Modeling:**
 - Ecosystem modeling: construction of reef and coastal communities
 - Addresses top-down, bottom effects, fisheries, groundwater, shared-use
 - Larval transport model (initial: yellow tang (UH, IPRC))
- **Support:**
 - PIFSC-led Kona research cruise July 1-13, 2011
 - Kona Research symposium September 15-16, 2011



Kona IEA website

Management issue: Provide data and information on Kona ecosystem and IEA progress

Deliverables: Completed website, data portal and access to data service

- Initial contract idea to provide site for “data dissemination”
- Website delivered 9/2011, awaiting internal review for launch
- Information on IEA, Kona IEA, projects, events, etc.
- Rudimentary data service (Google) with some public data overlays
- Future desire: Integrate with PacIOOS (ERDDAP)
- Longterm Vision:
 - Allow managers to run circulation and ecosystem model scenarios online

The screenshot shows the NOAA Kona Region Integrated Ecosystem Assessment website. The top navigation bar includes links for NOAA HOME, WEATHER, OCEANS, FISHERIES, CHARTING, SATELLITES, CLIMATE, RESEARCH, COASTS, and CAREERS. The main header features the NOAA logo and the text "NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION" and "KONA REGION INTEGRATED ECOSYSTEM ASSESSMENT". A large banner image shows two people fishing on a rocky shore. A left sidebar contains a menu with links: Home, News, Projects, Circulation Modeling, Ecosystem Modelling, Social Science, Data, Docs, IEA Info, and Symposium. Below the menu is a search bar with a "Go" button. The main content area is titled "Projects" and includes a description of the Pacific Islands Fisheries Science Center's initiatives. It features two project cards: "Circulation Modeling" and "Ecosystem Modeling". To the right, there are sections for "MAPPING SYSTEMS" and "2011 Kona IEA Symposium", each with a brief description and a "read more" link. The date "May 01 2011" is visible at the bottom right.

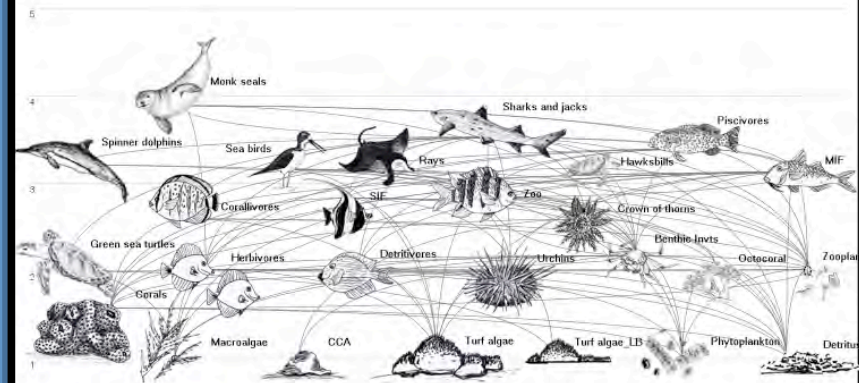
Kona IEA Research Project 1: Ecosystem modeling

Management desire: Understand ecosystem energy flow and effects of top-down and bottom-up pressures on coastal and reef ecosystems (e.g. for shared-use areas, CMSP)

Methodology: Use Ecopath with Ecosim framework to create reef and coastal models. Use these models to map energy flows (path) and drive models (sim) with external pressures

Management use: Models can be used in MSE and risk assessments, CMSP and more

- Contracted Colette Wabnitz (UBC) (FY11)
- Adapt existing Ecopath models (EH-HLFG model, CW-Koloko model)
- Used frameworks to create Kona “reef” and “coastal” Ecopath models
- In testing phase, expected completion Fall 2011
 - Results presented by Colette Wabnitz (UBC) following this talk
- Future work:
 - Data is in place to use Ecosim (dynamic time modeling)
 - Build and run Ecosim scenarios

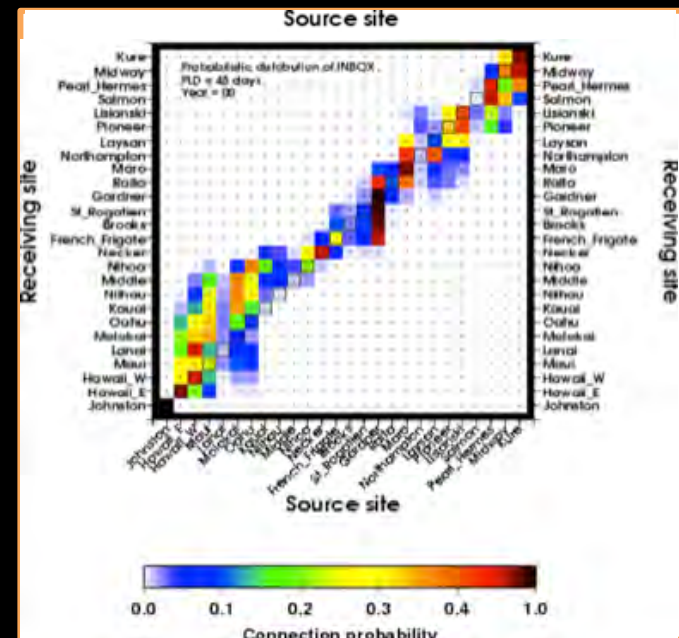
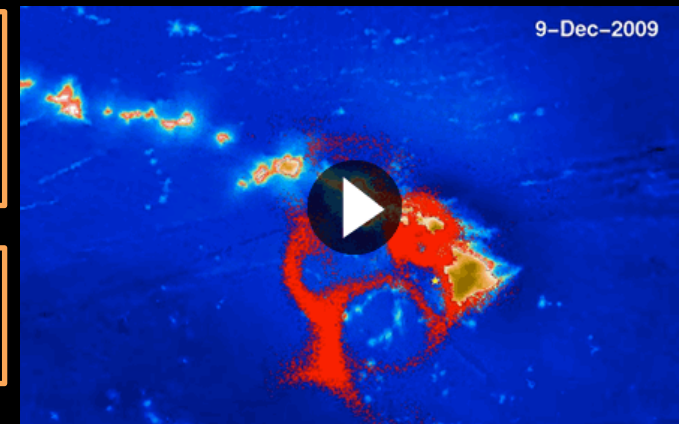


Kona IEA Research Project 2: Circulation modeling

Management desire: understand role of oceanography in pelagic early life history (egg and larval) stages of organisms of interest around Kona (e.g. yellow tang)

Methodology: Examine timing and location of propagule release and pelagic larval duration using coupled HYCOM/tidal/transport models & identify eddy effects

Management use: Models can identify sources, sinks and efficacy of fishing restricted areas currently in use



- Circulation modeling – Contracted Yanli Jia from IPRC to adapt HYCOM model for Hawaii for use in larval transport models.
- Statistical experiment to understand mesoscale effects on larval transport
 - Donald Kobayashi (PIFSC) and Johanna Wren (UH)
- Results: Johanna Wren presentation at 3PM today

Kona IEA Project 3: Social science Indicator development

Management desire: Identify Kona drivers and pressure points & develop indicators to track these through time

Methodology: Identify key user groups of Kona Coast ecosystems and aspects they value. Explore how these values can translate into meaningful and measureable indicators

Management use: Indicators can be used to monitor “health” of ecosystem properties

Project led by Stewart Allen (PIFSC) and Laurie Richmond (JIMAR)

- Key FY2011 results:
 - Developed a framework of key human dimensions indicators for the region with input from Pacific Islands social scientists and Kona coast users and managers

Framework contains eight indicator categories

- Work to populate indicators with existing data and through research initiatives
- Identify information gaps where further data is needed

Human Dimensions Indicators Categories:

1. General Demographic Information

2. Fishing/Harvesting

3. Non-extractive/Recreational Use

4. Development

5. Governance

6. Enforcement

7. Social Capital

8. History and Culture



Photo provided by Carl Berg,
Hanalei Watershed IAU



**Miloli`i: Community-Based
Subsistence Fishing Area**



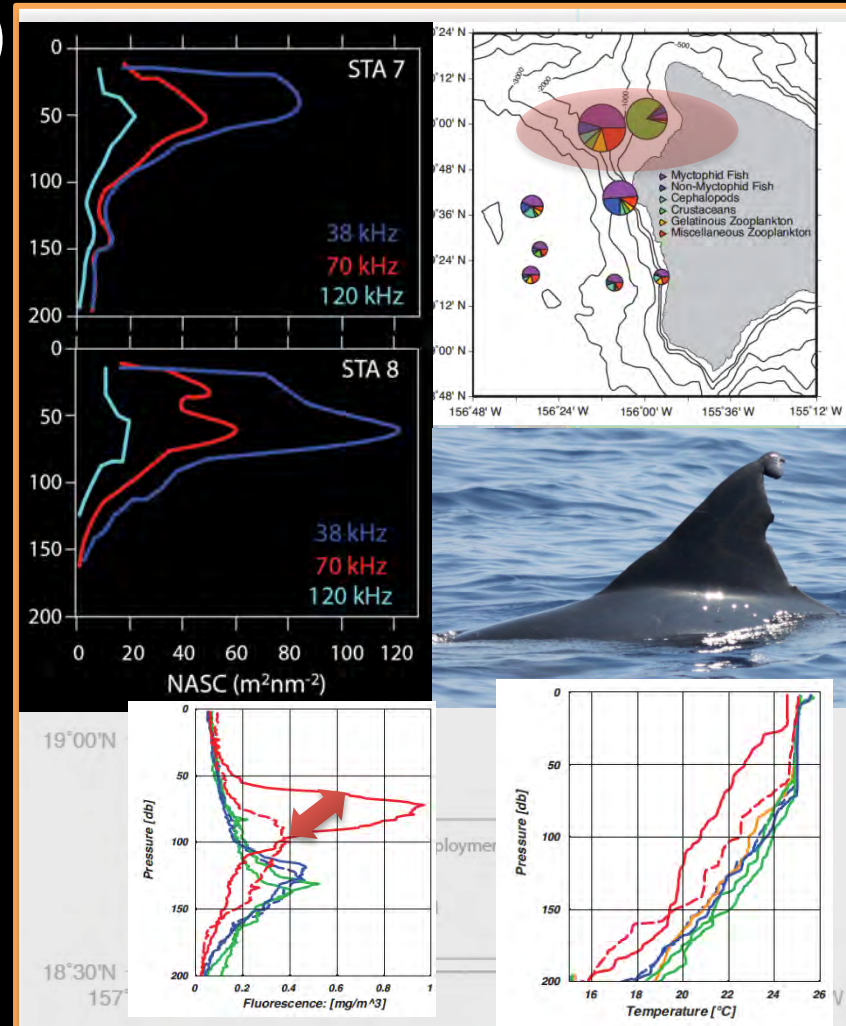
Kona IEA Project 3: Example Social Science Indicators

Indicator	What it measures/importance	Potential data source
3. Non-Extractive Use		
Crowding/Capacity	Information about crowding at particular beach or recreational sites; number and use of moorings	Makai watch data on crowd numbers at sites; Coastal Mapping Project data; trends in mooring use
4. Development		
Urban density and land-use	Indicator for pressure from urbanization; changes in land use patterns over time; ditches, roads, impervious, golf courses	County land-use maps; aerial photos; CZM program (check to see time series available)
3. Enforcement		
International, Federal, State, and Local, Community, or Informal	Information about the extent and effectiveness of rules and regulations relating to the Kona Coast ecosystems; examine enforcement capabilities at different scales or levels	DOCARE statistics number of officers and officer hours for the Kona region; number of arrests/convictions; funding level; Coast Guard/NOAA enforcement statistics; description of informal institutions
6. Social Capital		
Volunteerism, civic responsibility, membership in organizations	Indicates level, nature, and location of citizens taking action to protect reefs and associated resources	Reef Check program, Surfrider Foundation membership in , Makai Watch participants and/or events and communities

Kona IEA Support – 2011 Research Cruise

Goal: Data can help understand “baseline” Kona signals, used in models, cetacean habitat

- PIFSC-led Ecosystem cruise off Kona (1-13 July, 2011)
- Released ocean glider (Jul-Oct 2011)
- Goals:
 - Compare **northern/southern** Kona regions (Kohala shelf hotspot for cetacean activity)
 - Compare offshore/**onshore** (eddy activity can affect offshore)
- Initial results (Comer D1 1640):
- Spatial and temporal variability seen through ecosystem
- Especially **north Kohala shelf area**. Changes in physics, biomass and species composition observed



Kona IEA Support – research symposium

Goal: Additional scoping - Interaction and discovery of current research projects in Kona. Management discussion panel for identification of other potential issues in Kona

- Organizing Research symposium for Kona research September 15-16, 2011
- Over 100 registrants
- 33 scheduled presentations
- Working with multiple partners
- Management panel discussion
- Hope to open new collaborations



Kona IEA Deliverables – FY2011

1. Identify management questions relevant to Kona (aquaculture, spawning/larval retention, groundwater input of nutrients to system, shared resources)
2. Completion of Kona IEA website with preliminary data portal
3. Development of two Ecopath models for the reef and offshore regions of Kona/West Hawaii
4. Do prelim research on oceanographic effect on yellow tang larval distribution and retention in the Kona region
5. Plan and execute 10-day scientific research cruise to study oceanographic eddies in Kona region
6. Convene a symposium on marine research in the Kona region (September 15-16, 2011)

Kona IEA Deliverables – FY2012

1. Identify and develop ecosystem indicators for the Kona region (e.g. eddy strength, groundwater discharge, annual number of trade-wind days, coral reef fish recruitment, CPUE)
2. Develop socioeconomic indicators identified in FY2011 human dimensions study
3. Integrate data portal with existing local data services (e.g. HiOOS/IPRC)
4. Complete research on oceanographic effect on yellow tang larval distribution and retention in the Kona region
5. Continue work on Ecopath models (take to Ecosim)
6. Plan and execute 20-day scientific research cruise to support research in Kona region

