

Promoting Ecosystem-based Approaches to Fisheries Conservation in LME's

- GEF-funded MSP;
- Phase I:
2004-2006
- Phase II:
2007-2008



- Ecosystem modeling training and application for GEF-LMEs

GEF-LME 9th CC,
Paris, July 10-11, 2007

Villy Christensen,
UBC



GEF-LME Ecosystem Modeling

A dark, moody photograph of a whale breaching the ocean surface. The whale's head and back are visible above the water, creating a large splash. The background is a dark, overcast sky and sea.

- On the use of ecosystem modeling;
- MSP project activities:
 - Training in use of Ecopath for GEF projects;
 - Construct Ecopath models for all LMEs.

Ecosystem effects

- We evaluate ecosystem effects of fishing and environmental factors (incl. nutrient loading) and fit models to observations
 - Use rather simple models
 - emphasize ‘major’ interactions and dependencies
- The models form part of the ecosystem-based management process:
 - Focus on policy questions
 - Evaluating trade-off’s calls for prediction of how impacts may vary with policy choices
 - No way to avoid predictive models

Relevant policy questions

- How do we evaluate trade-offs in resource exploitation?
- How do we optimize exploitation of marine resources?
- How may future land and sea use patterns impact marine resources?
 - Impact on biodiversity?
- How may climate change impact fisheries in a given region?

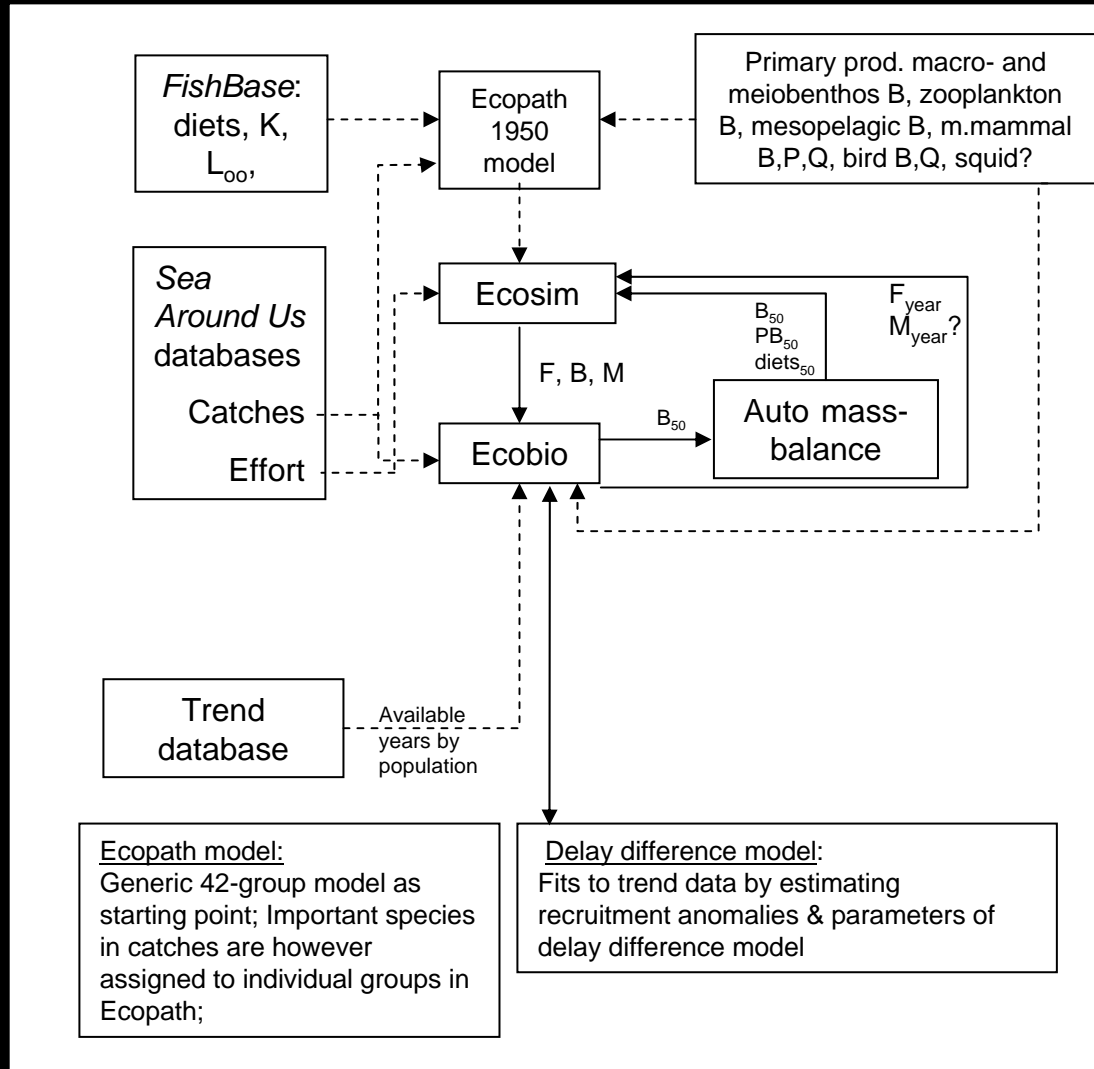
LME Ecosystem modeling training-WS

- 4WFC training course, May 2004;
 - Baltic RSP workshop, Oct 2004
 - Benguela Current workshop, Dec 2005
 - Guinea Current workshop, April 2006 + ?
 - SE/E Asia workshop, Winter 2007/8
 - Other?
-
- Follow up?

Database-driven model construction

- Spatial models
 - Time period: 1950 – present;
 - Spatial resolution: $\frac{1}{2}^{\circ}$ x $\frac{1}{2}^{\circ}$;
 - One aggregate model for each LME's;
- Databases
 - Biomass of benthos, plankton, mesopelagics, marine mammals and birds;
 - Fish diversity, growth parameters, diets;
 - Primary production (1958-present+future);
 - Effort, (1950-present)
 - Catches, prices (1950 – present).

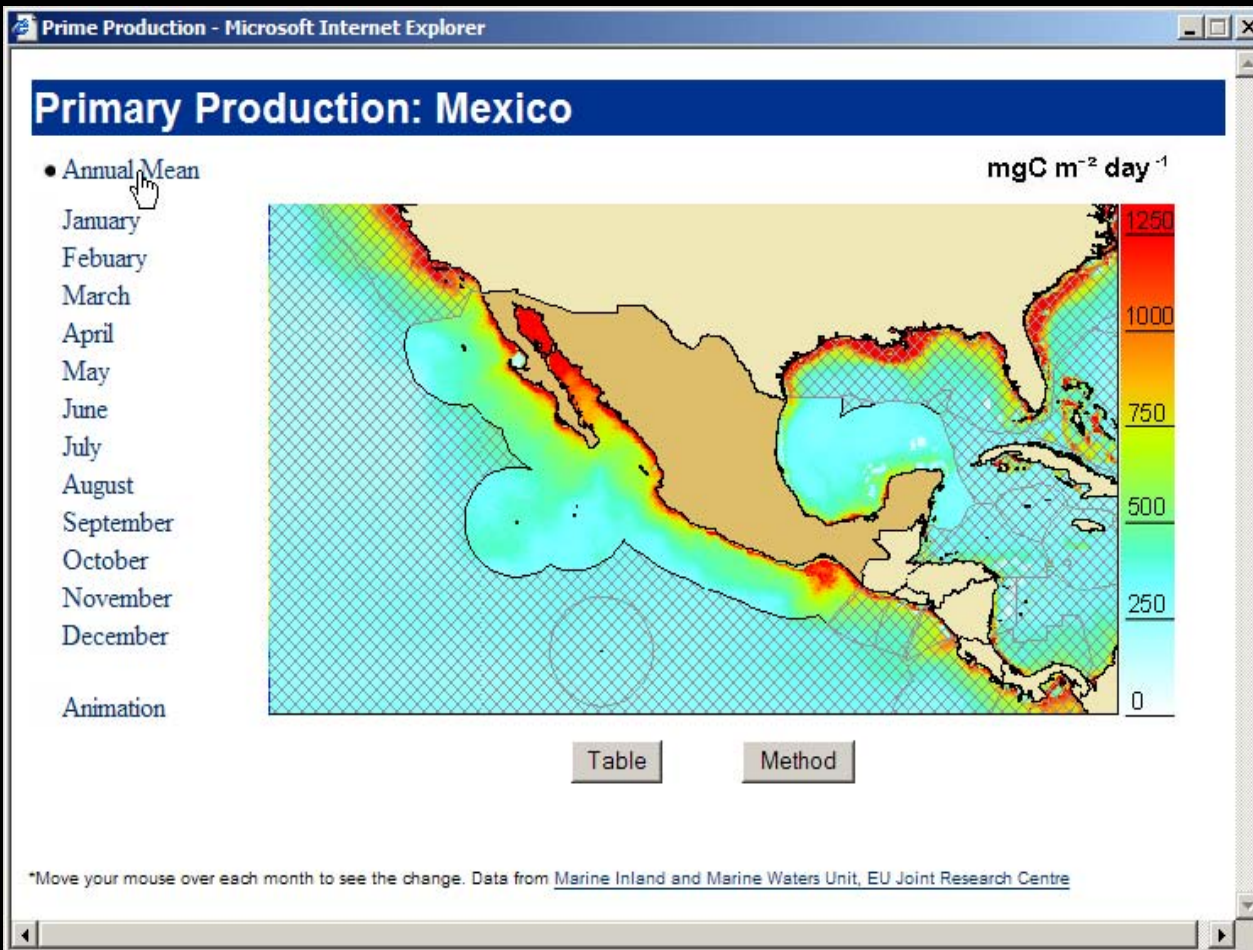
LME model construction



Used once
 ----->
 Used iteratively
 ----->

Primary productivity: Princeton/NOAA GFDL

- SeaWiFS, 1997 ~ 2005 for tuning
- Sec. & prim. prod., T, currents, from linked climate & NPZ models from 1958 through 21th Century



For each of 64(?) LME:

- Description, incl. area of coral reefs, seamounts, primary production, and list of estuaries;
- Ecopath model;
- Description of published Ecopath models;
- Biodiversity: commercial fish, cephalopods, marine mammals and marine birds;
- Trophic pyramid and marine trophic index;
- Catches and value of catches by species and country fishing (1950–);
- Carrying capacity estimates for major groups
- Governance profile.

www.seaaroundus.org



Web Products: Large Marine Ecosystems

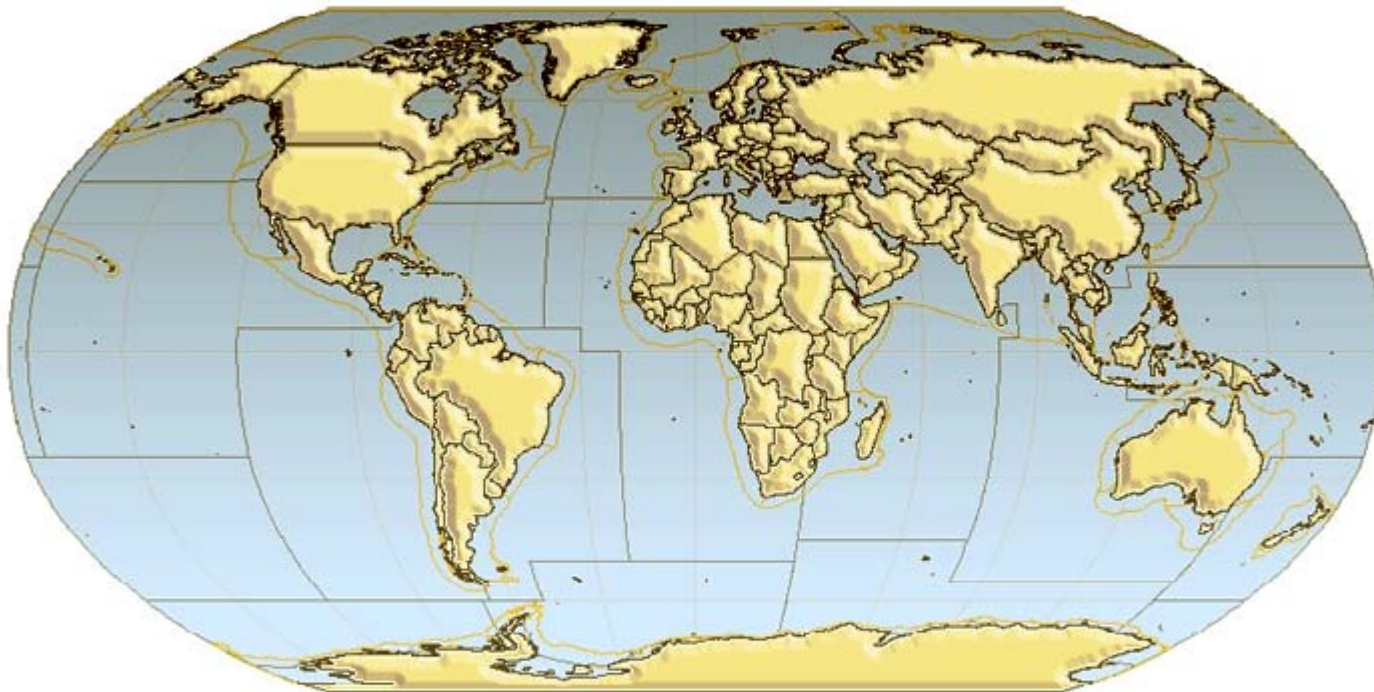
[FAQ](#) [GIS map](#) [Project page](#) [Web products](#)

LME

Bay of Bengal

Go!

[Version 2.2](#)



The Fisheries Centre

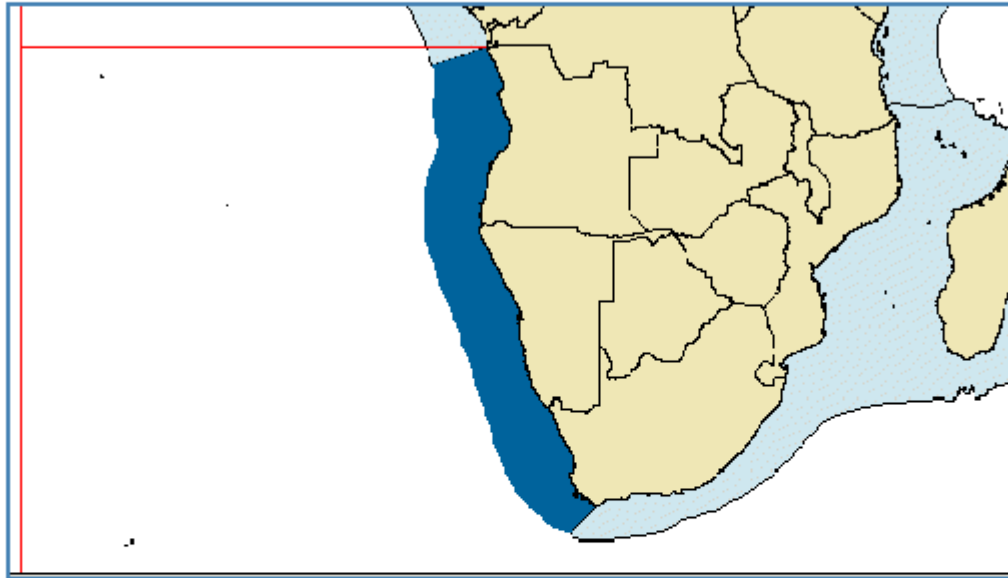
THE PEW CHARITABLE TRUSTS



The University of
British Columbia



LME: Benguela Current



Legend FAO areas

Area:	1,456,812 km ²
Coral Reefs:	0 % of world
Sea Mounts:	0.0600 % of world
Primary Production:	1158 mgC·m ⁻² ·day ⁻¹

📁 Catches by:

📁 Values by:

- Species
- Higher groups
- Functional groups
- Country fishing

📁 Biodiversity

- Marine fishes
- Cephalopods
- Marine mammals
- Commercial species

📁 Ecosystems

- Primary production
- Fish parameters
- Trophic pyramid
- Coral reefs
- Estuaries
- Ecopath models
- Marine trophic index

📁 Governance

- LME profile
- Treaties & Coven.





Primary aims

- Increase capabilities for ecosystem-based management
- Make modeling more database-driven

NOAA celebrates 200 year

NOAA CELEBRATES
200 YEARS of SCIENCE, SERVICE, and STEWARDSHIP



[Home](#) [Foundations](#) [Transformations](#) [Visions](#) [Top Tens](#) [Collections](#)

About the Celebration

Events and Activities

Feature Stories

Collections

NOAA Historical Resources

For Kids and Educators

- This site
- NOAA

[Top Tens](#): The Breakthroughs

The Breakthroughs

"The [ECOPATH] model's simplicity and its ability to accurately identify ecological relationships have revolutionized scientists' ability worldwide to understand complex marine ecosystems."

"In the late 1960s, NOAA's Geophysical Fluid Dynamics Laboratory ... developed the first-of-its-kind general circulation climate model that combined both oceanic and atmospheric processes. Scientists were now able to understand how the ocean and atmosphere interacted with each other to influence climate."



Multibeam sonar (illustrated below the ship) was a major breakthrough in hydrographic surveying. Data acquired with multibeam sonar have revolutionized human understanding of the seafloor and the efficiency of NOAA's Office of Coast Survey offshore surveying.

"While ecologists have long studied and taught the concept of ecosystems, the concept of large marine ecosystems is a breakthrough in understanding how best to manage large ocean areas for sustained biological productivity."

View Top Tens

- History Makers
- The Breakthroughs
- Historic Events
- Foundation Data Sets

Also View:

- Breakthroughs
- Honorable Mentions

Top Ten Breakthroughs

- Climate Model
- Coronagraph in Space
- ECOPATH Modeling
- Global Positioning System
- Hydrographic Survey Techniques
- Large Marine Ecosystems