Evaluating Management Strategies for Ecosystem Services in a Hawaiian Islands Coral Reef IEA

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PICES, October 2019

Integrated Ecosystem Assessment

Through IEA Framework

1. Understand the dynamics of the natural and human-related drivers including climate change
2. Develop an ecosystem model to simulate these dynamics
3. Quantify socio-ecological tradeoffs for different marine resource users

NOAA photo; Kevin Lino

Ecosystem Services

Ecosystem Services

ECOSYSTEM STRUCTURE & RESILIENCE	DIVE TOURISM	FISHERIES

Equally exposed

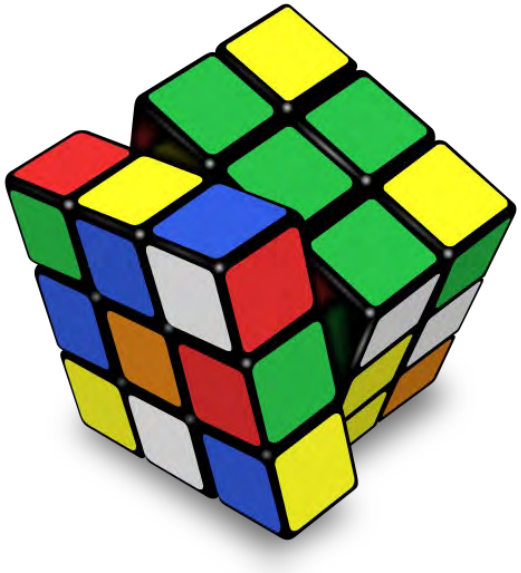
Less sensitive
More adaptive

More sensitive
Less adaptive

Evaluating Alternative Management

Evaluated the performance of six management scenarios over the next 15 years.

1. Current Management (i.e. no change)
2. Reduce fishing effort to 90% of estimated MSY
3. Reduce land-based sources of pollution by 50%
4. No take of herbivorous fishes
5. Limit fishing gear to line only
6. Create a fully protected MPA

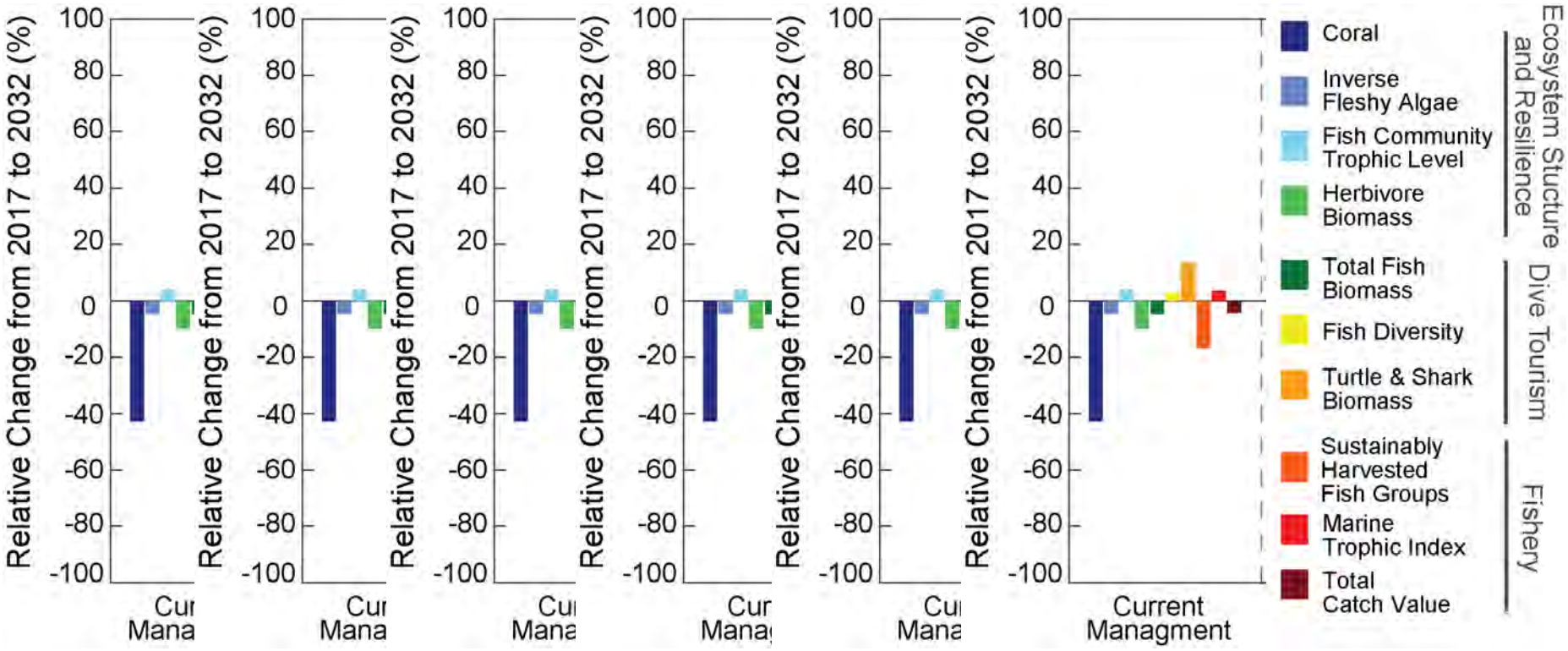


Ecopath with Ecosim (EwE) modeling framework

Used for:

- Ecological descriptions
- Evaluating tradeoffs in (fisheries) management options
- Environmental impact assessments
- Predict impact of climate change

Estimating Future Ecosystem Changes



Evaluating Alternative Management Scenarios

Decision support matrix for assessing the efficacy of each management scenario

	Current Management	90% MSY	50% LBSP	No Herbivore Fishing	Only Line Fishing	No Take MPA
Ecosystem Structure and Function	-13.3%	6.5%	3.6%	34.2%	32.9%	35.4%
Dive Tourism	3.8%	10.1%	-0.9%	4.8%	22.4%	26.8%
Fishery	-5.8%	2.9%	0.1%	-15.8%	-13.6%	-27.8%

Relative Change

> 15%
5% – 15%
±5 %
-5% – -15%
< -15%

Summary

Ecosystem models in IEAs make it possible to:

1. **Integrate natural and social science;**
2. **Take climate change impacts to the ecosystem into consideration**
3. **Evaluate socio-ecological tradeoffs of alternative management scenarios**

Results published in J. Applied Research 2018

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QUESTIONS?

Photo: Mark Sullivan NOAA