

Valuing nature's services to inform coastal zone management in Belize

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TAKE HOME MESSAGE

By iterating stakeholder engagement and modeling of ecosystem services we can improve the design of coastal development plans to achieve multiple objectives for people and nature.



BELIZE

PROGRESSIVE PLANNING FOR SUSTAINABILITY OF NATURAL RESOURCES

Caribbean Coast of
Central America



St. Margaret's Village
5 Blues Lake National
Park



THE CHALLENGE





CHANTALLE CLARKE-SAMUELS

Director Coastal Zone Management Authority and Institute

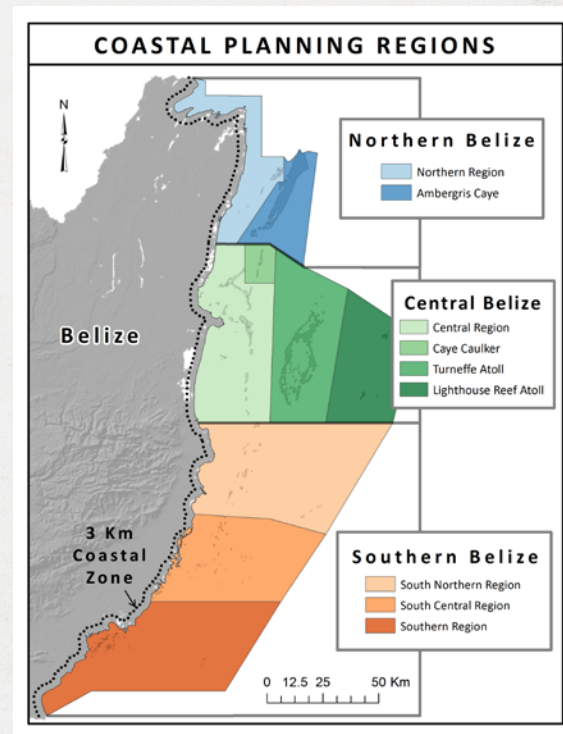


Where should we site coastal and ocean uses to reduce risk to marine ecosystems and enhance the benefits they provide to people?

INTEGRATED COASTAL ZONE MANAGEMENT

InVEST

integrated valuation of
environmental services
and tradeoffs



SCIENCE

STAKEHOLDERS

SCOPE

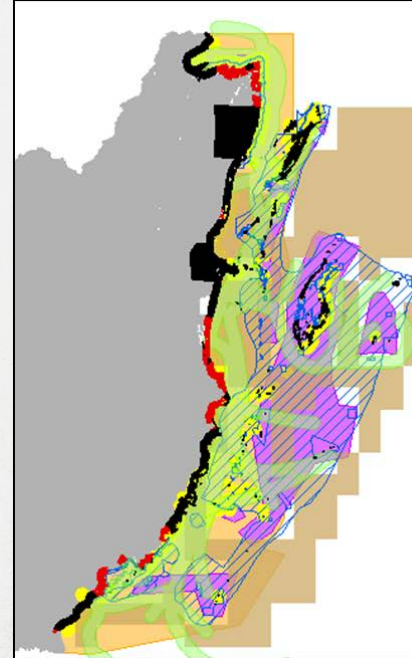
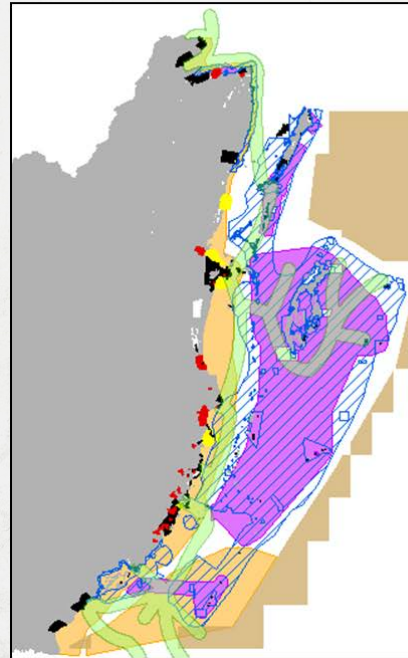
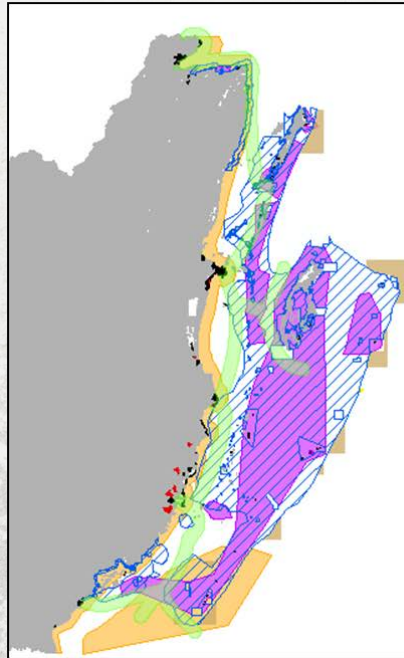
POSSIBLE FUTURE ZONING SCHEMES

CURRENT USES, STAKEHOLDER VISIONS, OTHER PLANS

Conservation

Informed Management

Development



Agricultural run-off



Aquaculture



Coastal Development



Dredging



Fishing



Recreation



Marine Transportation



Oil exploration





Habitats



Fisheries

MULTIPLE OBJECTIVES

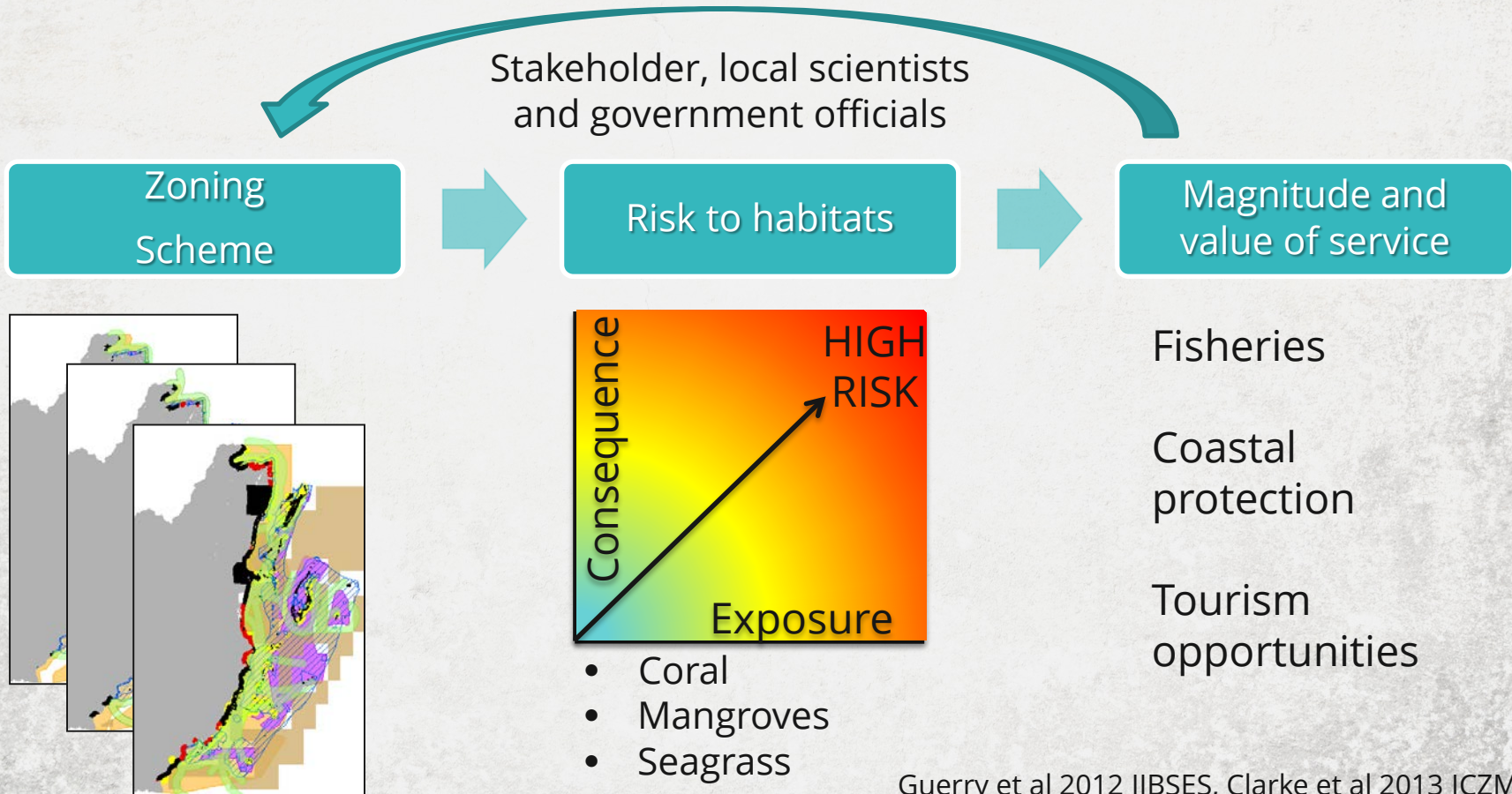


Recreation & Tourism



Storm protection

MODELING APPROACH



Guerry et al 2012 IJBSES, Clarke et al 2013 ICZM Plan

Zoning
Scheme

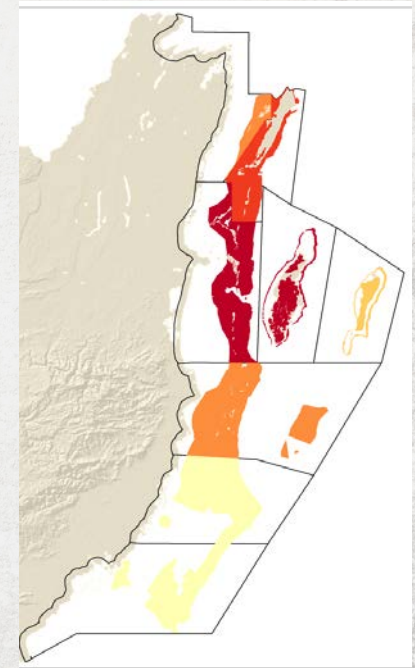
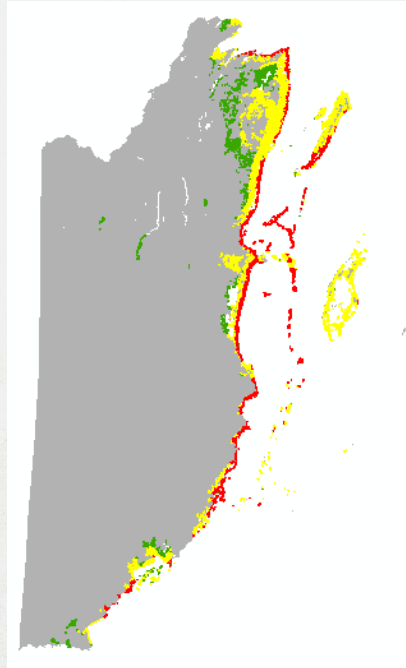
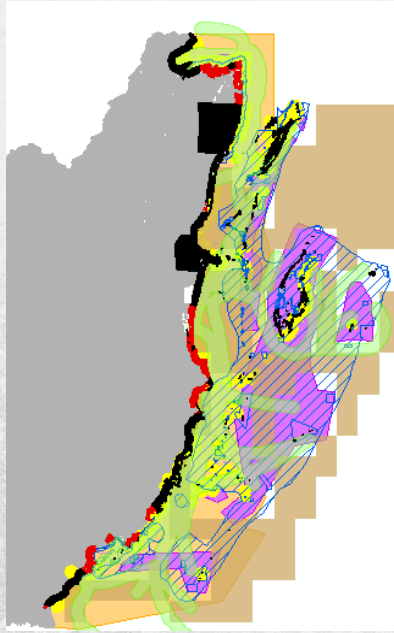
Risk to habitats

Magnitude and
value of service

Development

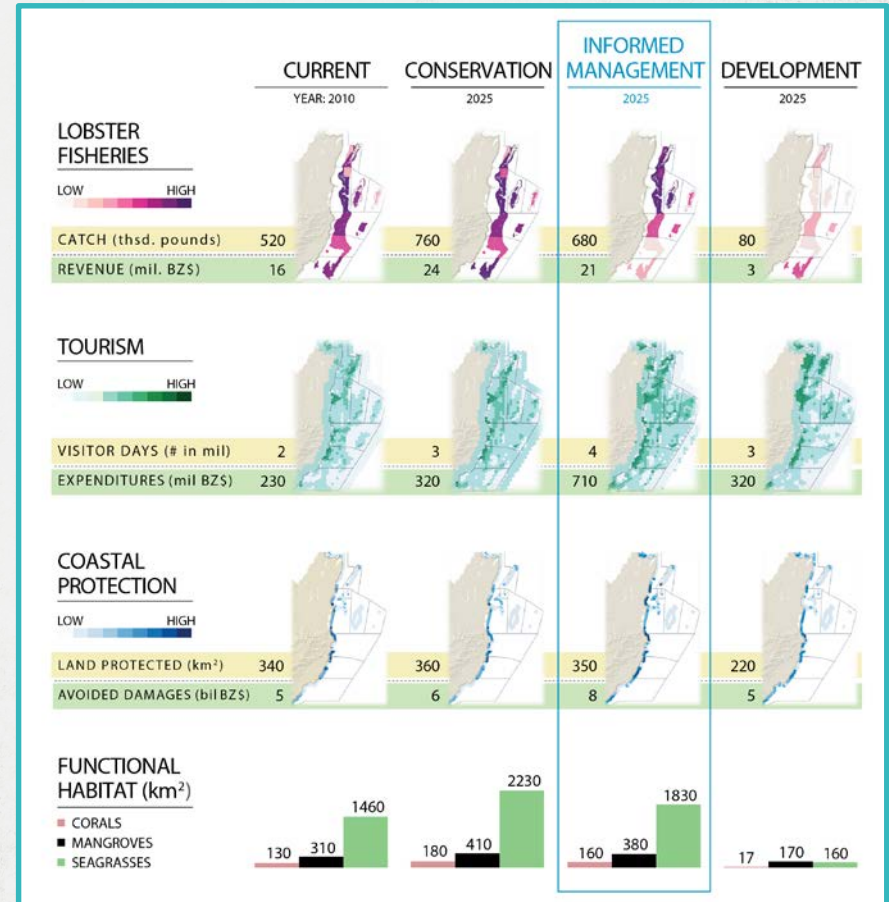
Risk to mangroves

Lobster catch & revenue



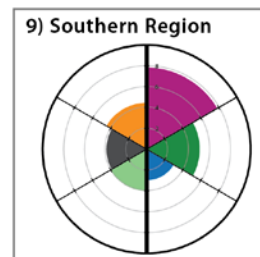
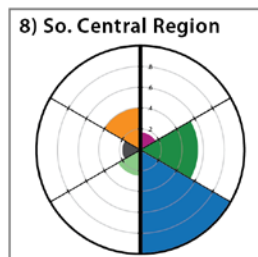
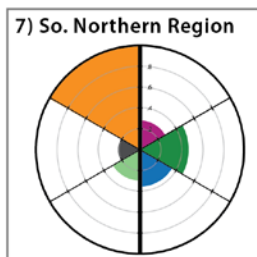
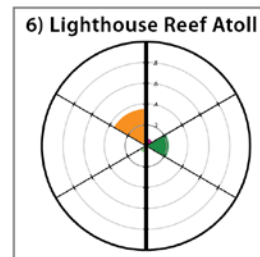
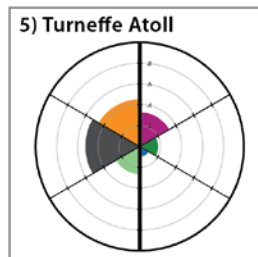
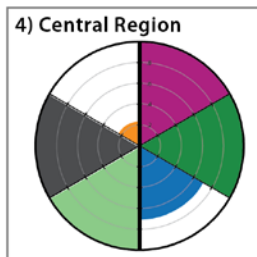
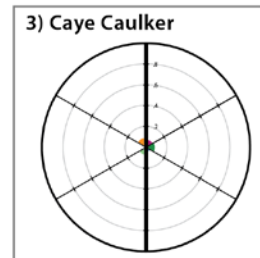
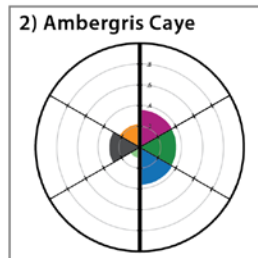
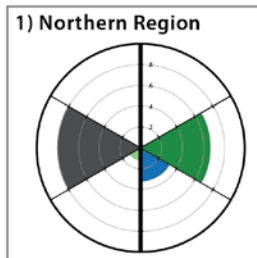
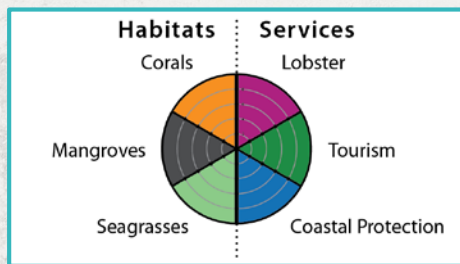
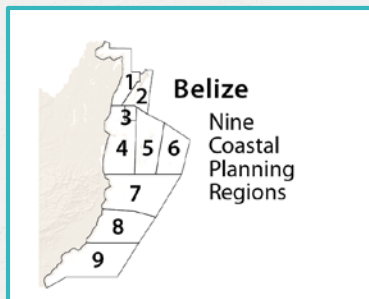
NATIONAL RETURNS AND TRADE-OFFS IN SERVICES

- **Preferred plan** will lead to greater returns from coastal protection and tourism than either conservation or development oriented plan
- **Preferred plan** will lead to greater returns from fisheries and extent of functional habitat than current management.



Arkema et al. in press PNAS

REGIONS 'SPECIALIZE' IN SERVICES AND HABITATS



Arkema et al. in press PNAS

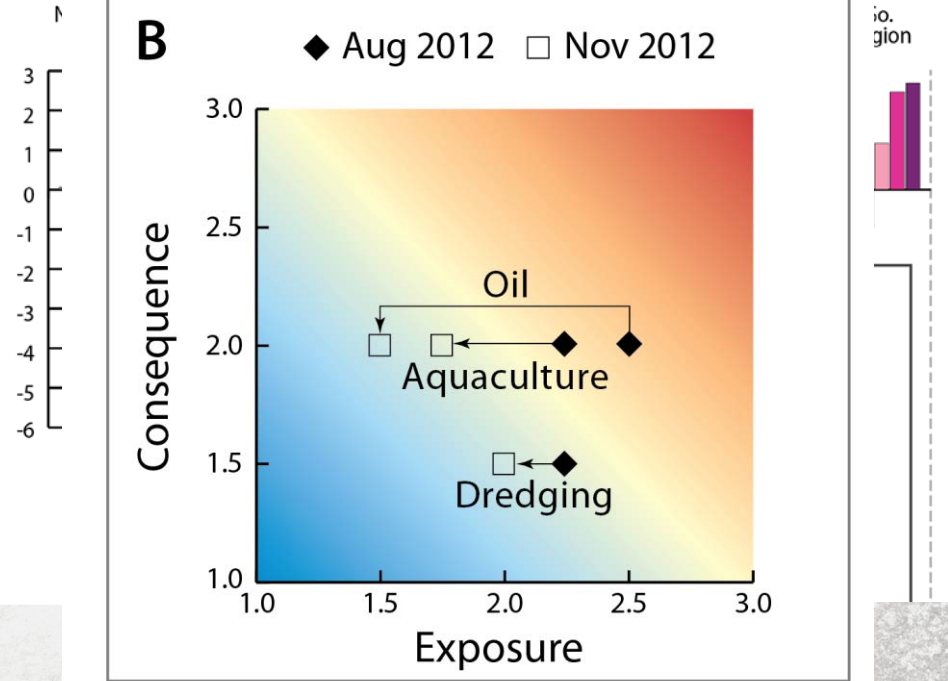
MODELING IMPROVES SERVICE RETURN

August 2012

Nov 2012

Aug 2013

Central Region - Mangroves



Arkema et al. in press PNAS

1

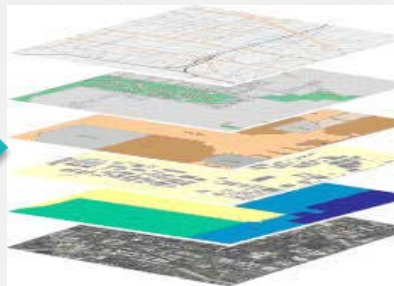
Define Partnerships, Roles & Objectives

2

Compile Data

3

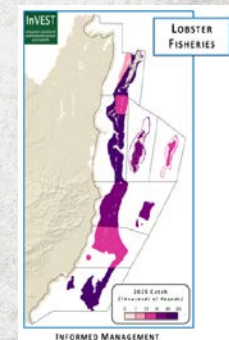
Generate Baseline & Scenarios



4



Assess Outcomes



5

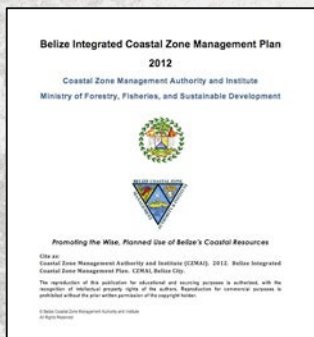
Synthesize Results

6

Iterate & Build Capacity

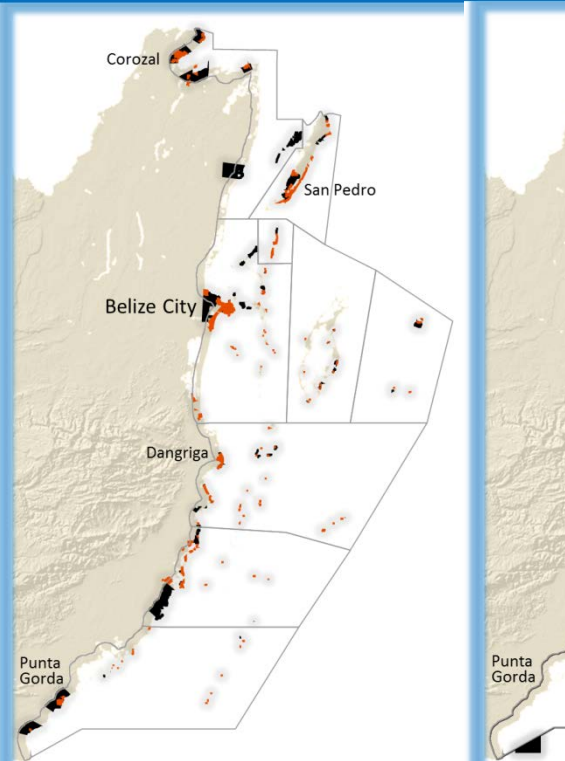
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Inform Decisions



Rosenthal et al. 2014 IJBSESM

Coastal development



Belize Integrated Coastal Zone Management Plan

2013

Coastal Zone Management Authority and Institute

Ministry of Forestry, Fisheries, and Sustainable Development



Promoting the Wise, Planned Use of Belize's Co

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Fishing



TAKE HOME MESSAGE

Through iteration of stakeholder engagement and modeling of ecosystem services we can improve the design of coastal and marine spatial plans to meet multiple objectives for people and nature.

