

InVESTing

in Belize's Natural Capital



InVESTing in Belize's Natural Capital:

**Creating a Blueprint for Conservation and Development using
Ecosystem Services Valuation**



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Caribbean Region NBSAP Workshop

St. George's, Grenada

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BELIZE's Coastal & Marine Wealth



Ecosystem Services

Marine ecosystems provide a wide array of goods and services from which people derive benefit



COASTAL CAPITAL of BELIZE

Economic Contribution of Belize's Coral Reefs and Mangroves

o Tourism: US\$150-\$196 million/yr
(snorkeling, diving, sport fishing, etc)



o Fisheries: US\$14-\$16 million/yr
(lobster, conch, finfish, aquaculture)



o Shoreline Protection: US\$231-347 million/yr
(avoided damages via mangroves, coral reefs)



Source: Cooper, E., L. Burke and N. Bood. 2009. "**Coastal Capital of Belize. The Economic Contribution of Belize's Coral Reefs and Mangroves.**" Working Paper, World Resources Institute.

REAPING the BENEFITS but little InVESTment in Nature?



Coastal Zone Management Authority & Institute

MISSION:

- o “To support the allocation, sustainable use and planned development of Belize's coastal resources through increased knowledge and the building of alliances for the benefit of all Belizeans and the global community”.



A Coastal Zone Management Plan for Belize

Key Components:

- o Development Suitability Guidelines
- o Biological monitoring guidelines for species, communities and habitats
- o Preservation and management of cultural resources
- o Conservation of threatened, potentially threatened or endangered species
- o Preservation of land and marine environs
- o Increased public participation in ICZM

A Coastal Zone Management Plan for Belize

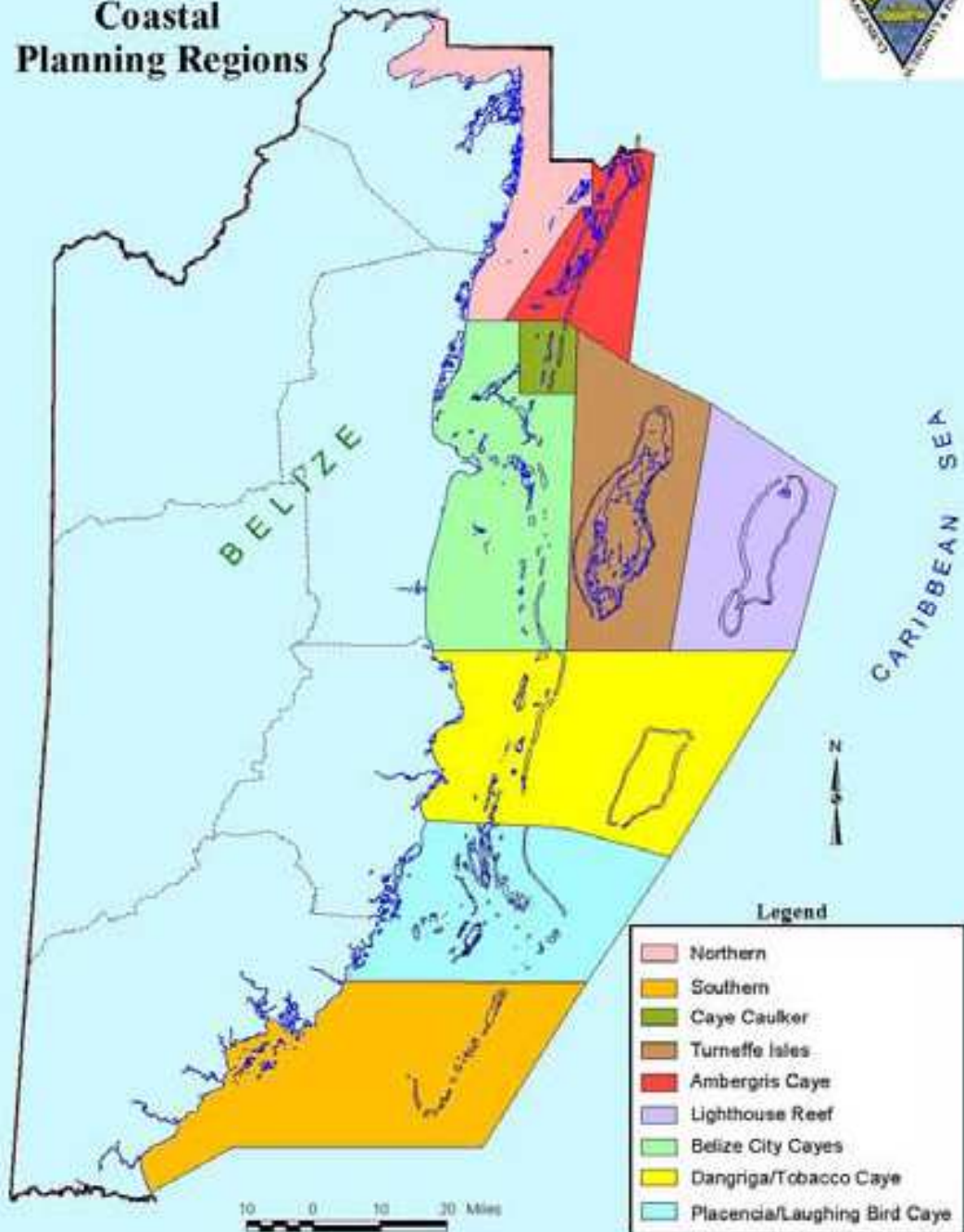
THEN...

- o Strong focus on the development & conservation of land mass on atolls and cayes
- o Criteria used for recommended conservation and development areas subjective (expert advice)
- o No spatially explicit plan

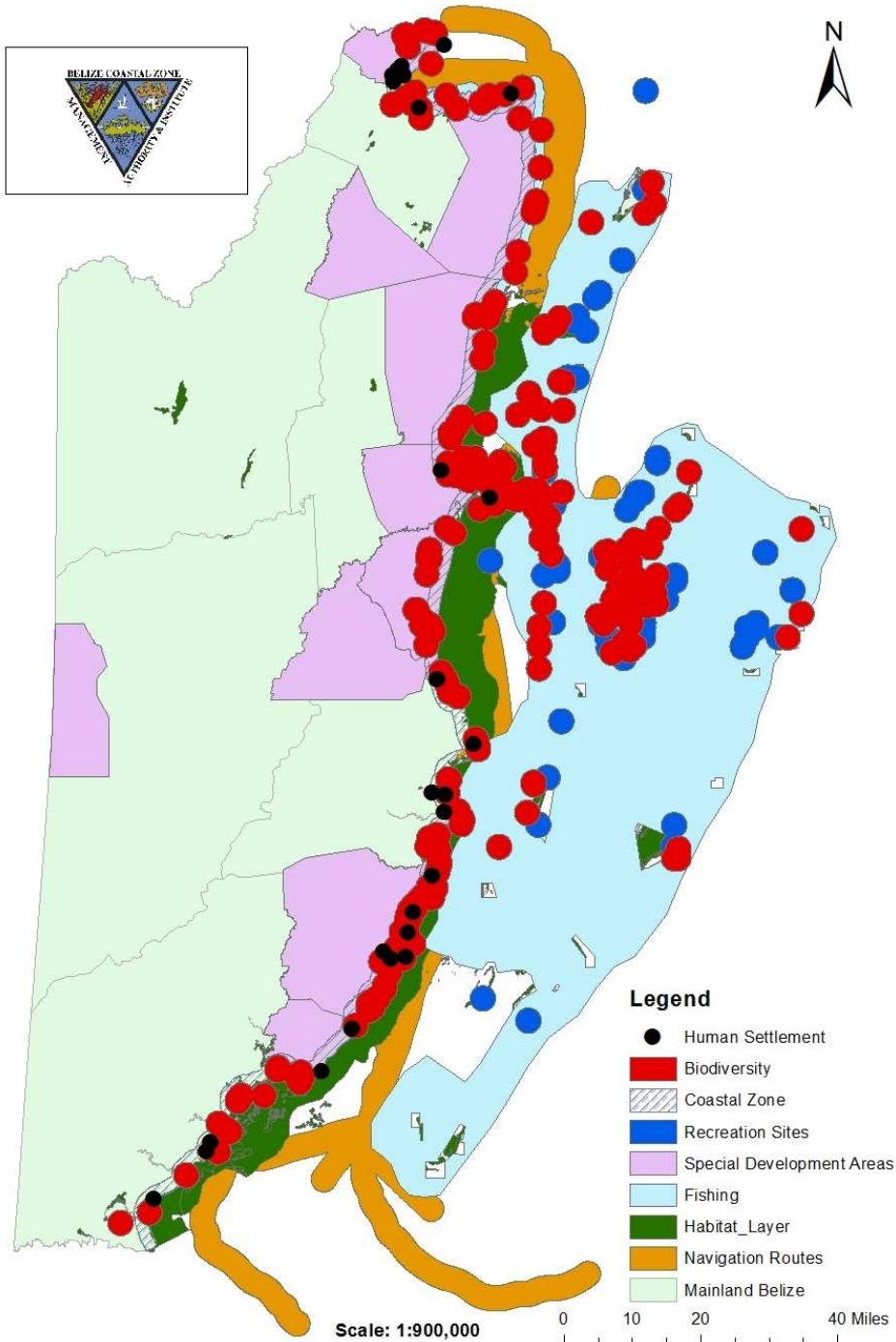
NOW...

- o Emphasis on ecosystem-based management of both coastal and marine environs
- o Combination of objective science-based tool and expert advice is informing development and conservation areas
- o Spatially explicit coastal and marine spatial plan

Coastal Planning Regions



Belize Coastal and Marine Zones

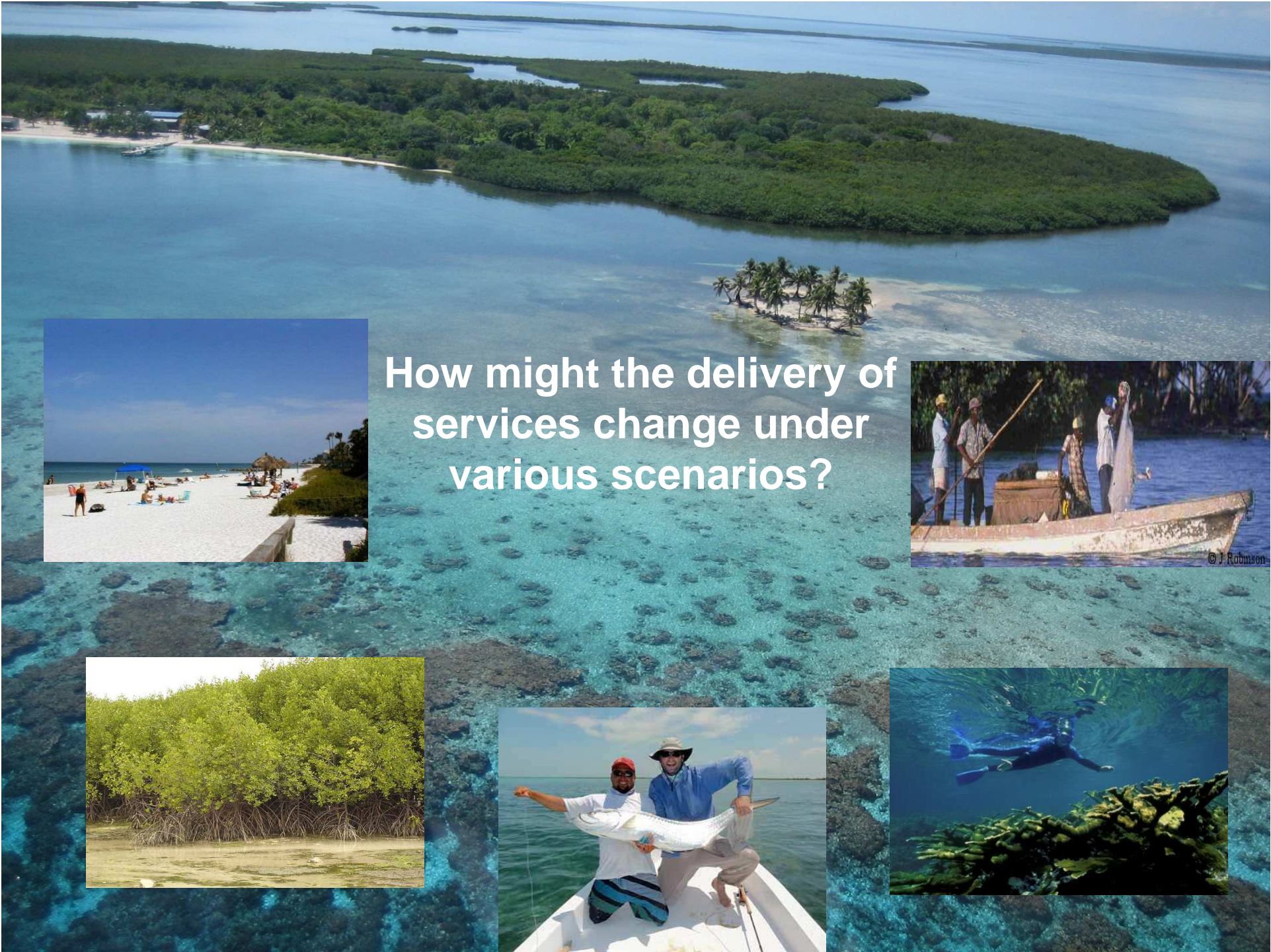


Legend

- Human Settlement
- Biodiversity
- ▨ Coastal Zone
- Recreation Sites
- Special Development Areas
- Fishing
- Habitat_Layer
- Navigation Routes
- Mainland Belize

Scale: 1:900,000

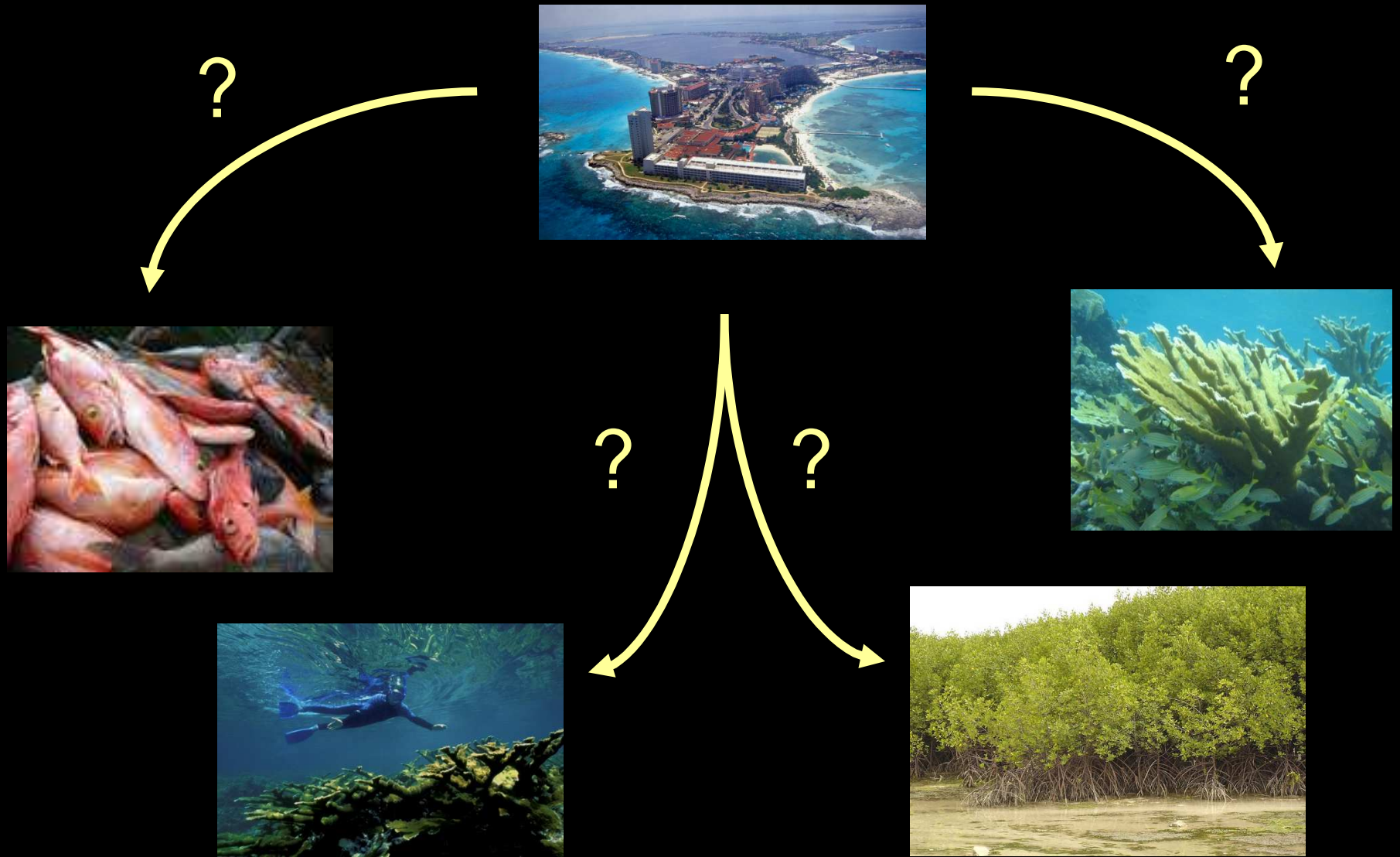
0 10 20 40 Miles



How might the delivery of services change under various scenarios?

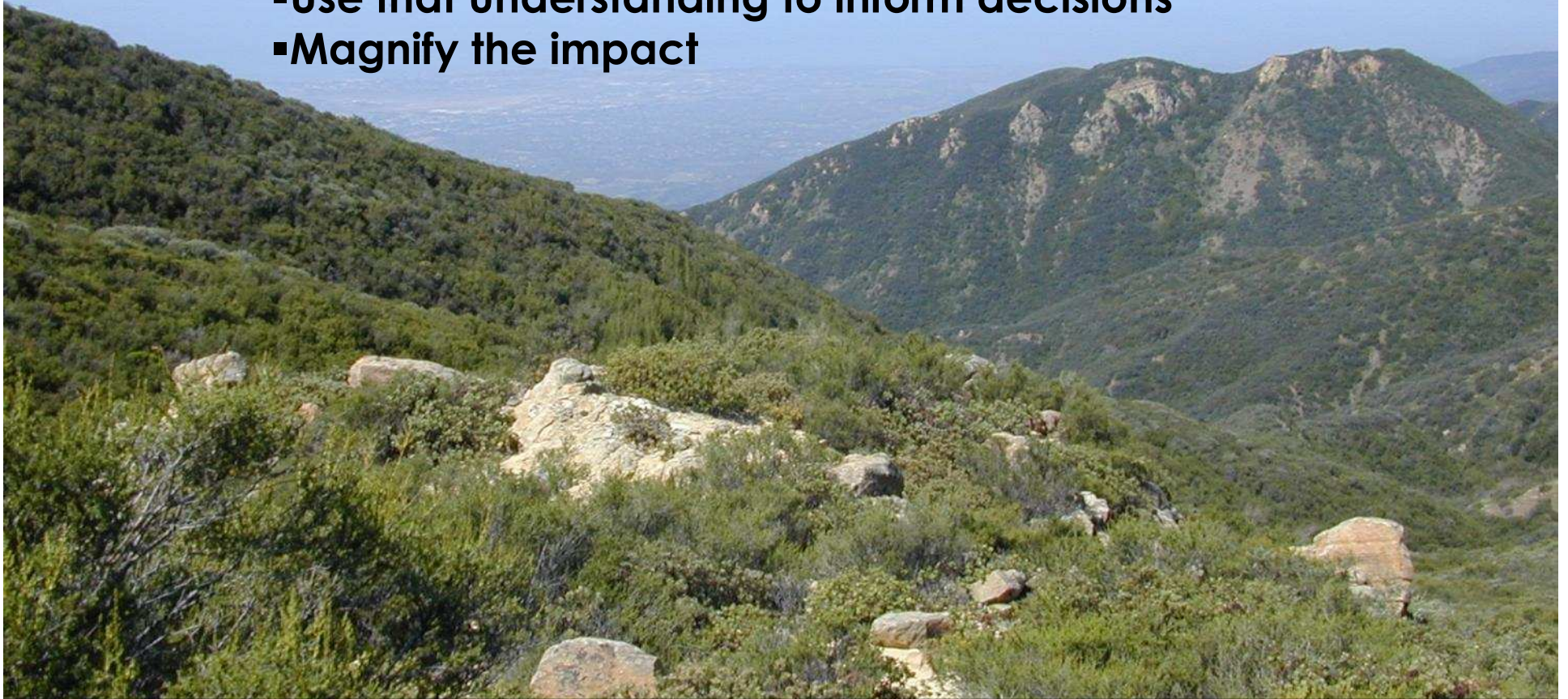


How do management decisions influence delivery of services?



The Natural Capital Project

- Help people understand what we get from nature
- Use that understanding to inform decisions
- Magnify the impact



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InVEST

Integrated Valuation of
Ecosystem Services and
Tradeoffs



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InVEST

- Multiple services and biodiversity
- Scenario-based analysis
- Biophysical and economic currencies
- Applicable globally with minimal data
- Relevant to many kinds of decisions



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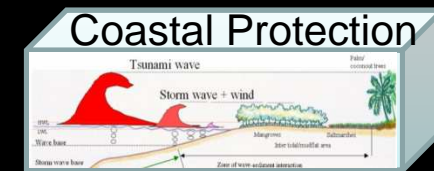
The Nature
Conservancy 

Multi-Service Approach

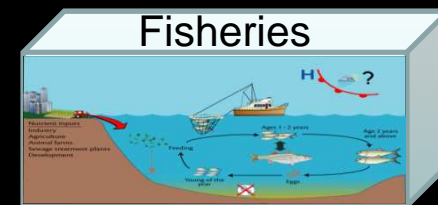
Energy from waves



Protection from coastal hazards



Fisheries Production



Aquaculture production



Recreation and tourism



Multi-Service Approach

Nursery habitat



Filtration



Carbon storage & sequestration



Biodiversity/Habitat quality



Water quality



Modeling and valuing ecosystem services to inform the

Belize Coastal Zone Management Plan



- **Tourism/recreation**
snorkeling, diving, sport fishing, etc
- **Fisheries**
lobster, conch, finfish
- **Shoreline protection**
mangroves, corals, seagrasses

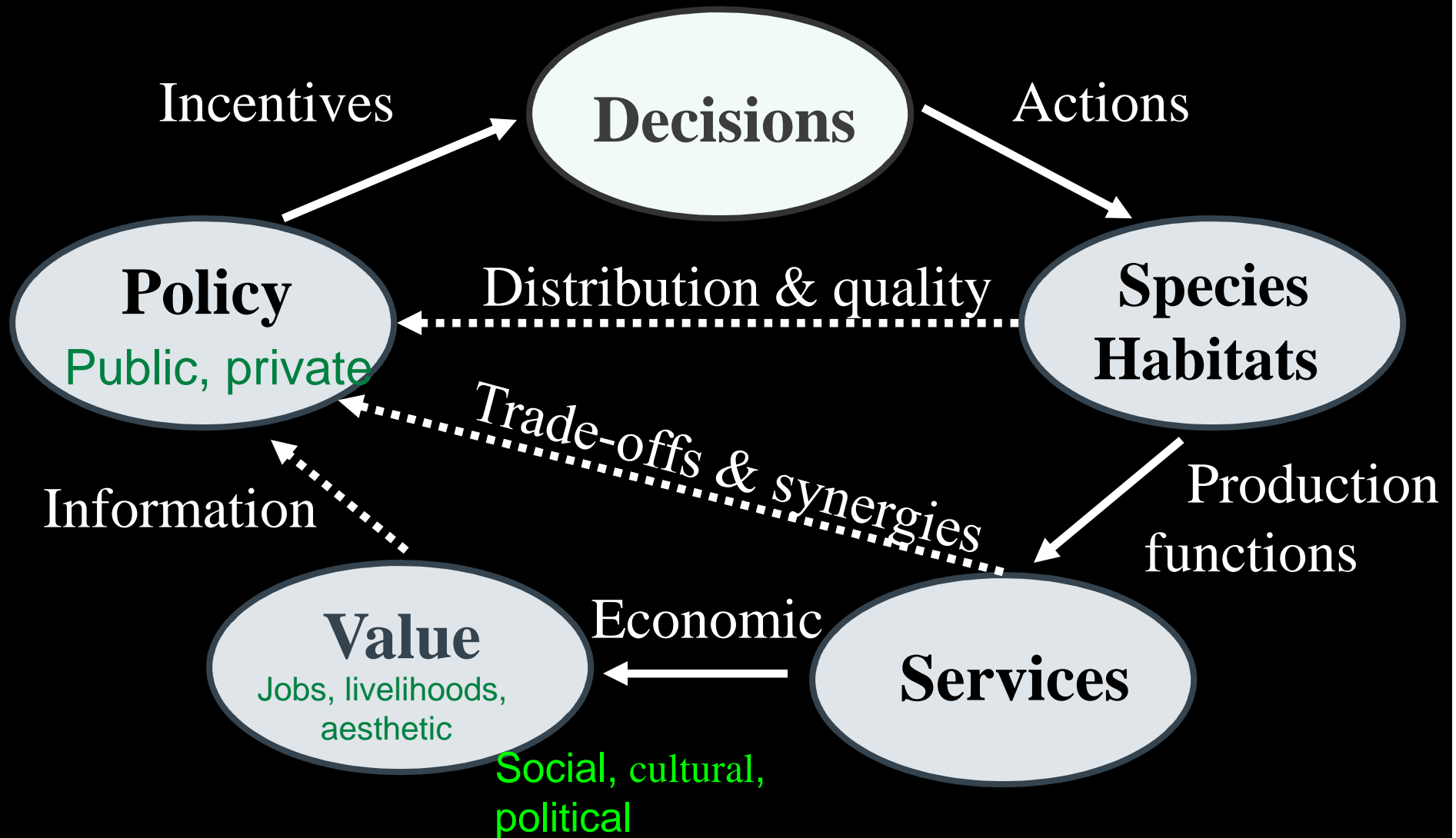


WHY Coastal and Marine Spatial Planning?

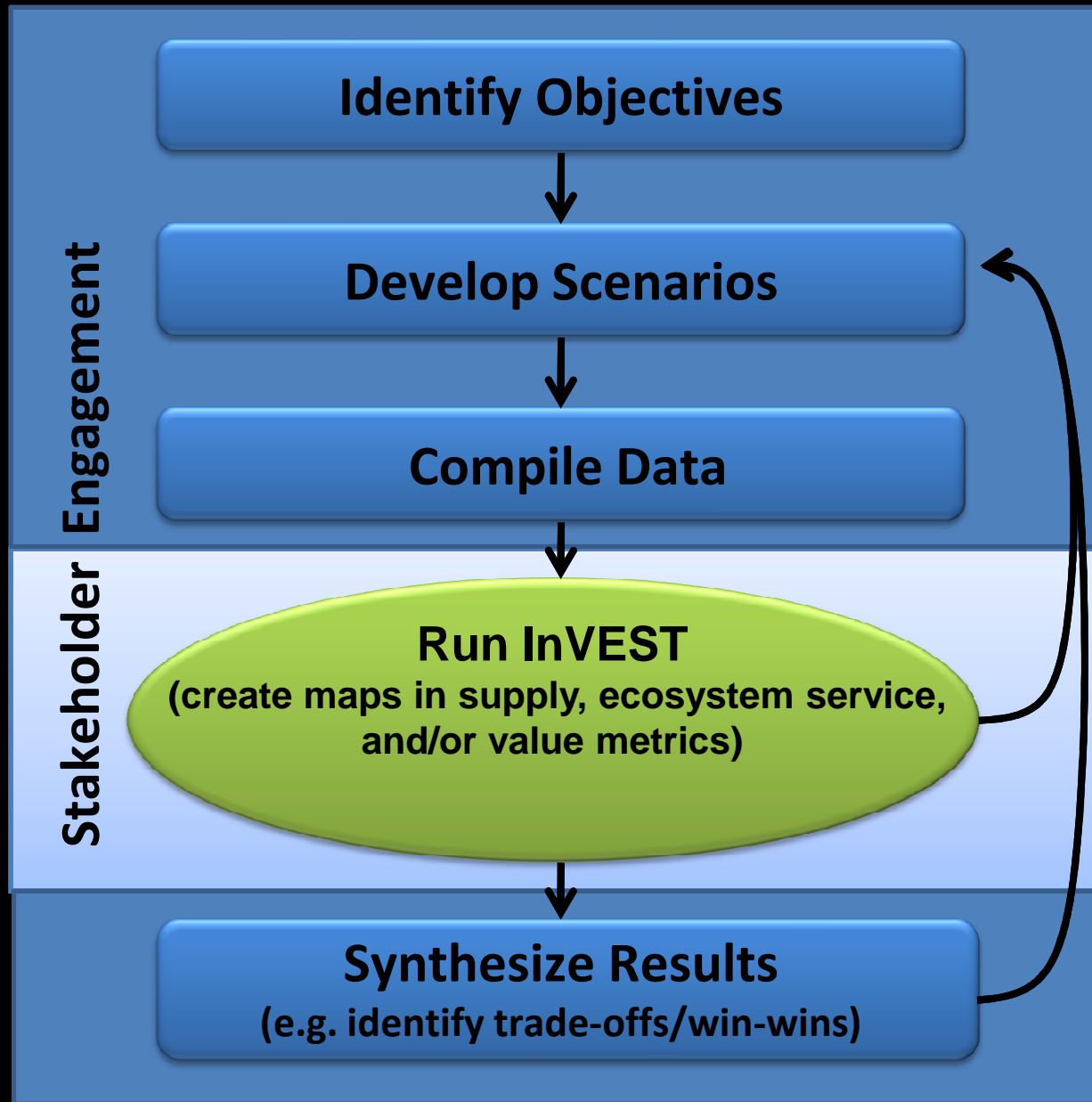
- o analyzes current and anticipated uses
- o identifies areas most suitable for various activities to:
 - reduce conflicts
 - reduce environmental impacts
 - preserve critical ecosystem services
- o provides a process to better determine how marine environment can be sustainably used and protected



CONCEPTUAL APPROACH



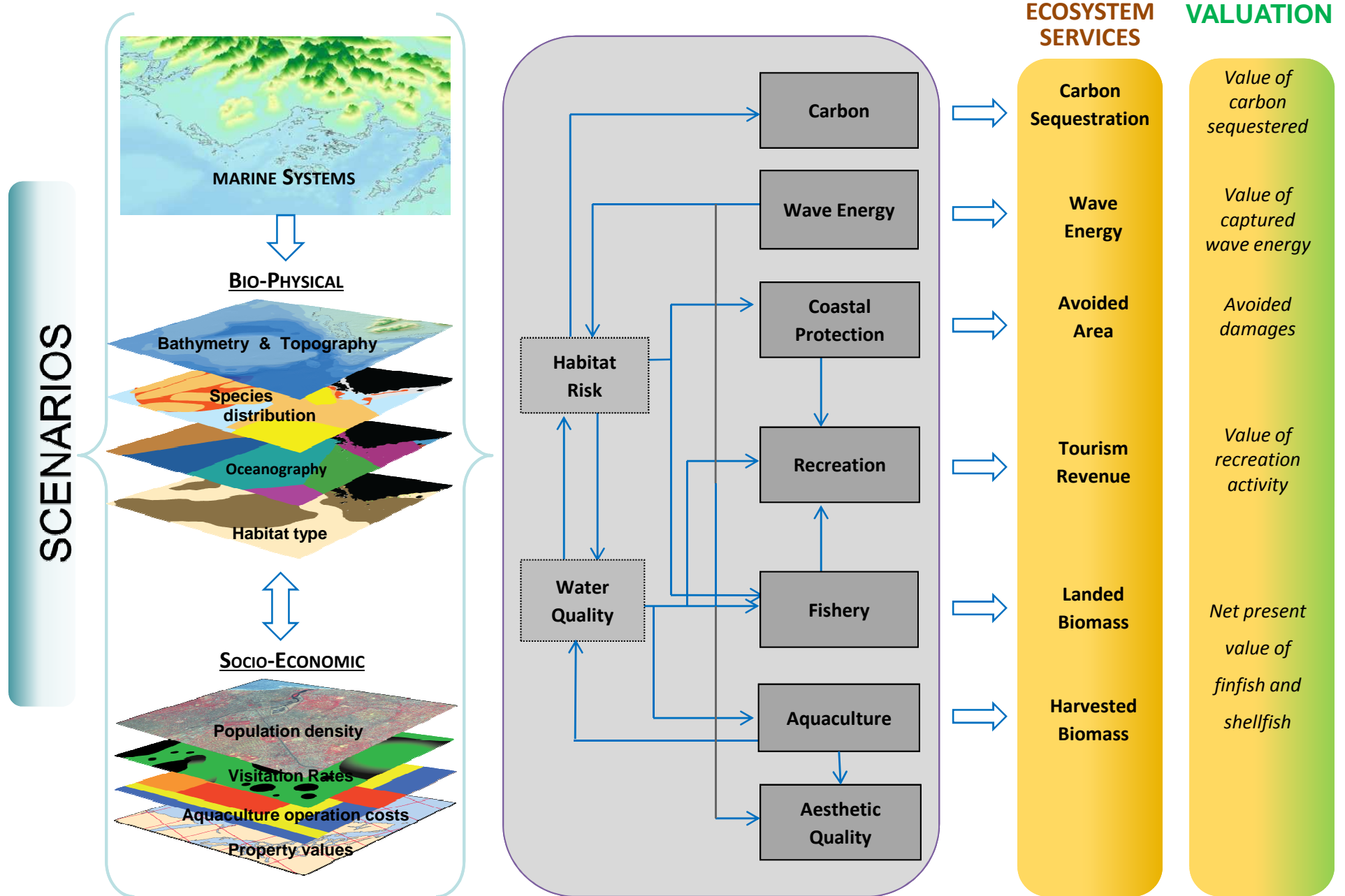
PROCESS



Input Data (reflect scenarios)

Marine InVEST Models

Model Outputs
(ecosystem services & values)



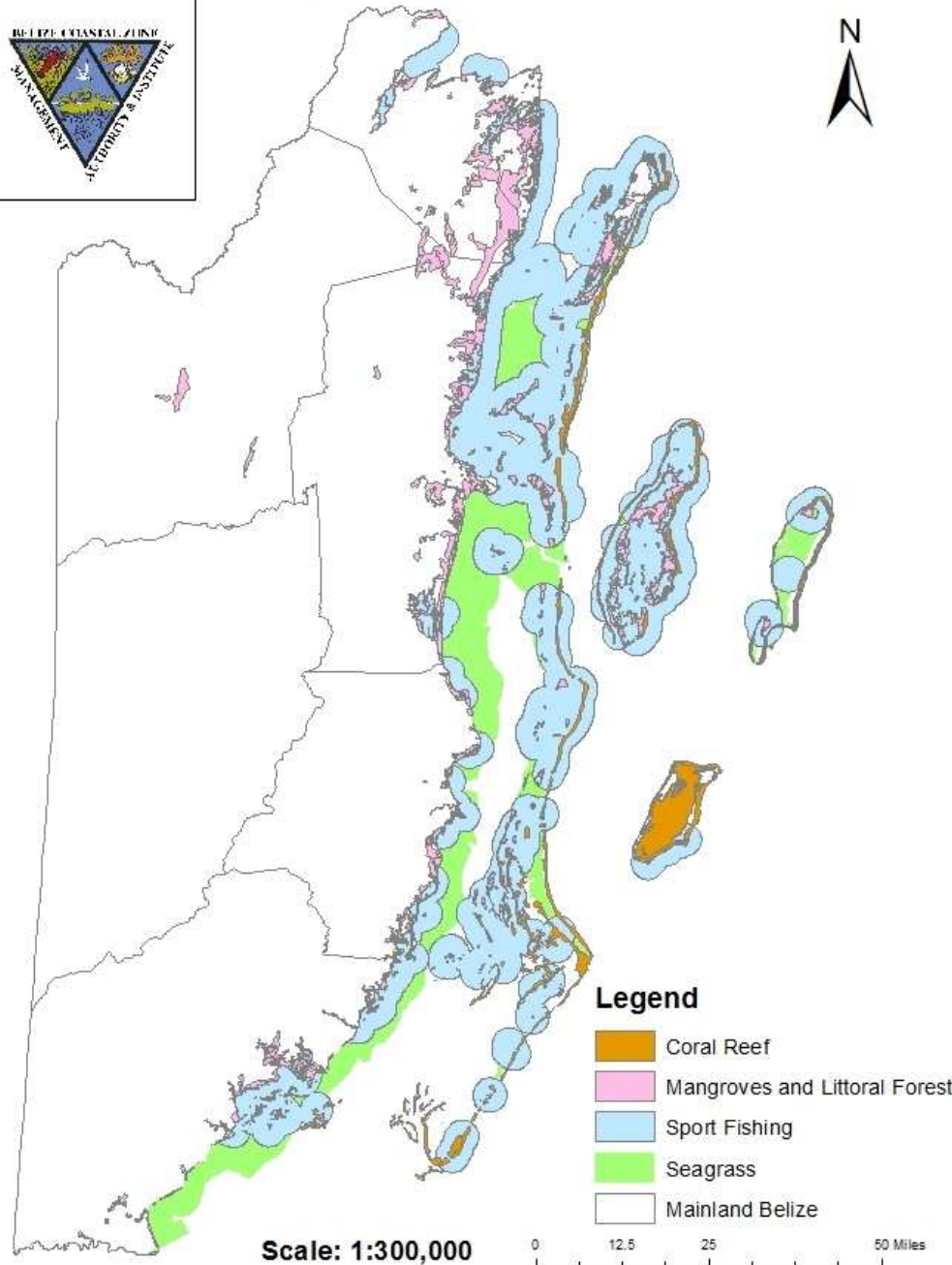
Habitat Risk Assessment Model

Assess:

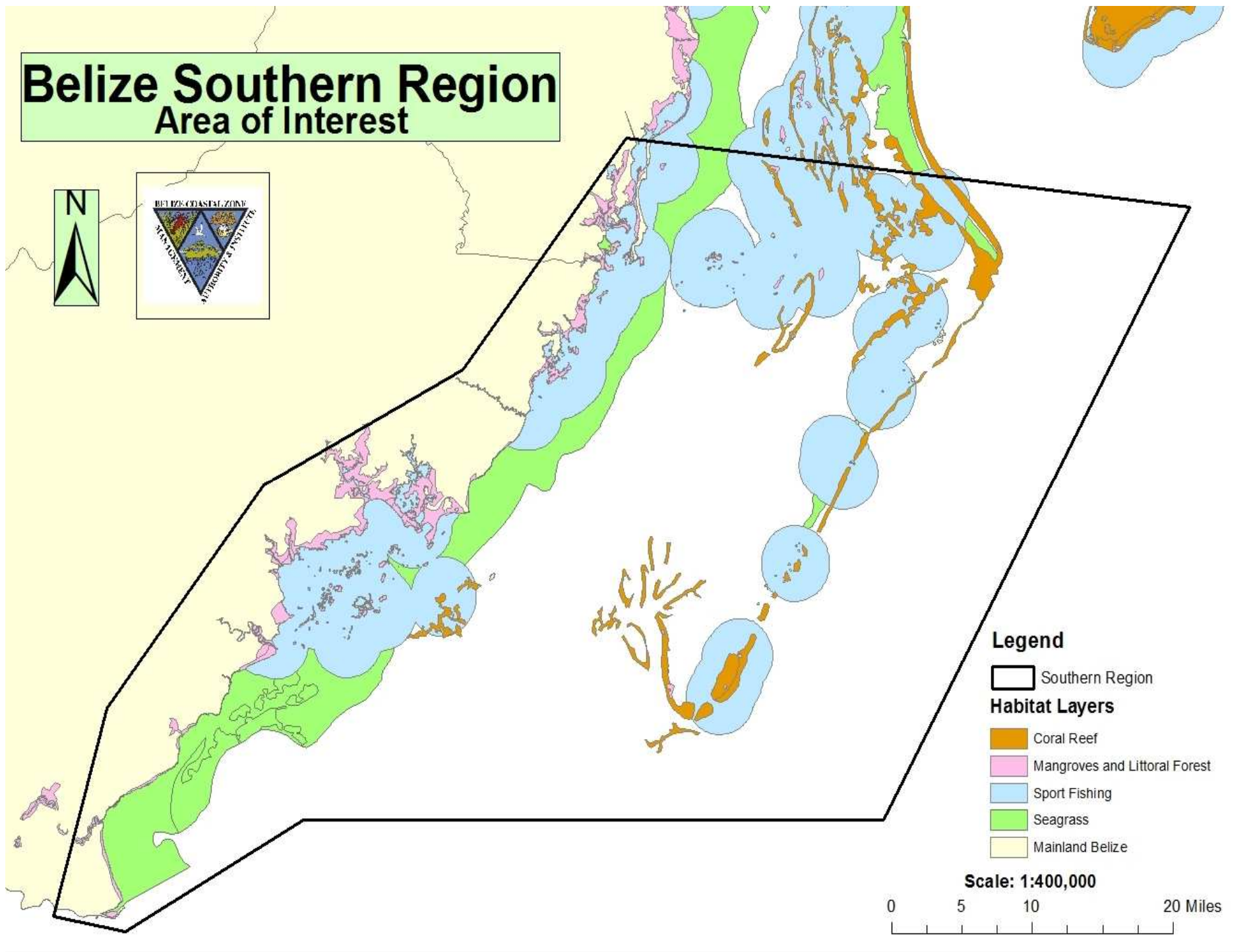
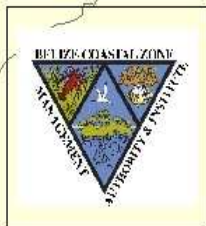
- o risks posed to coastal and marine habitats by human activities
- o potential consequences of exposure for the delivery of ecosystem services and biodiversity

Habitat Risk Assessment Model

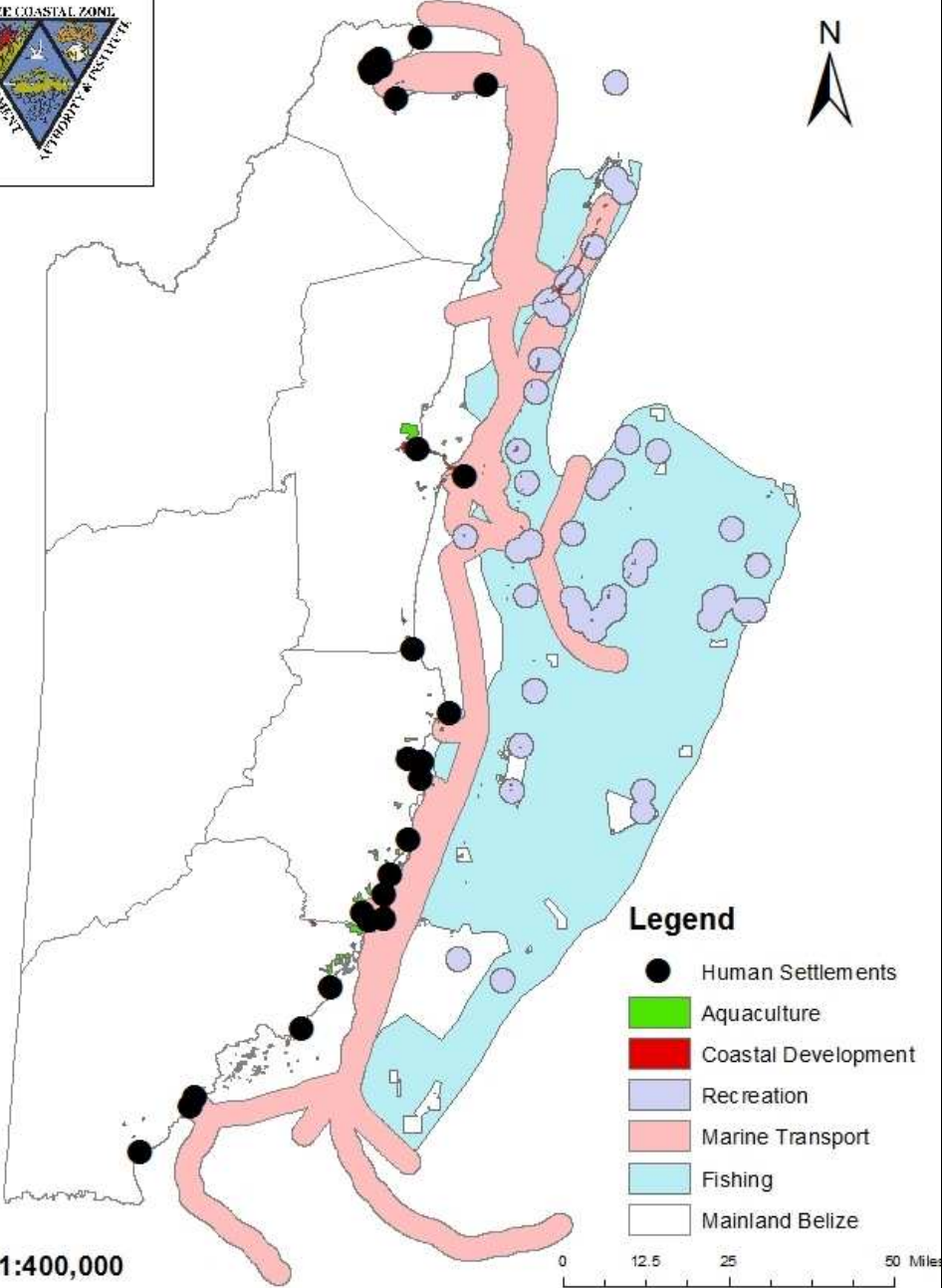
Habitat Layers



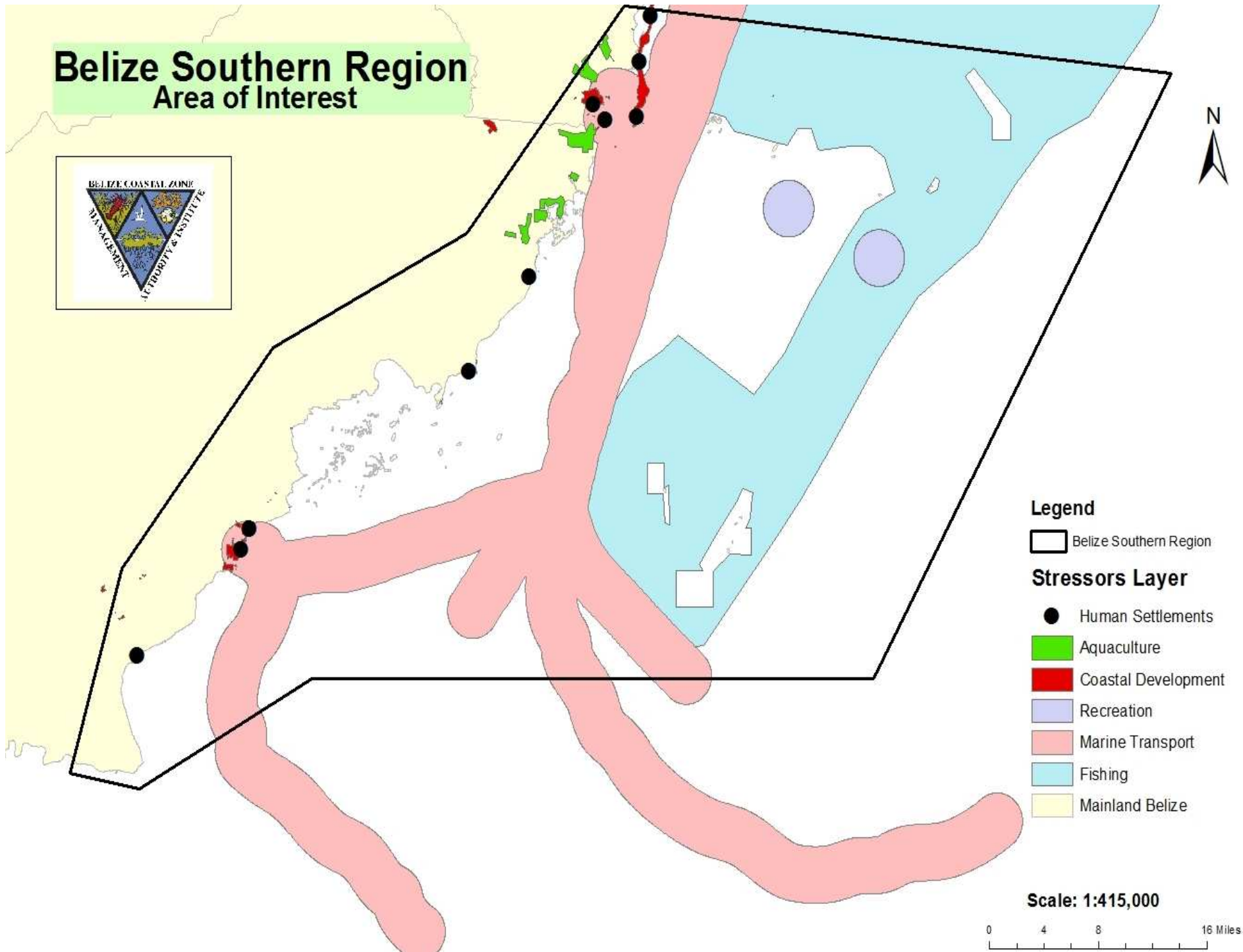
Belize Southern Region Area of Interest



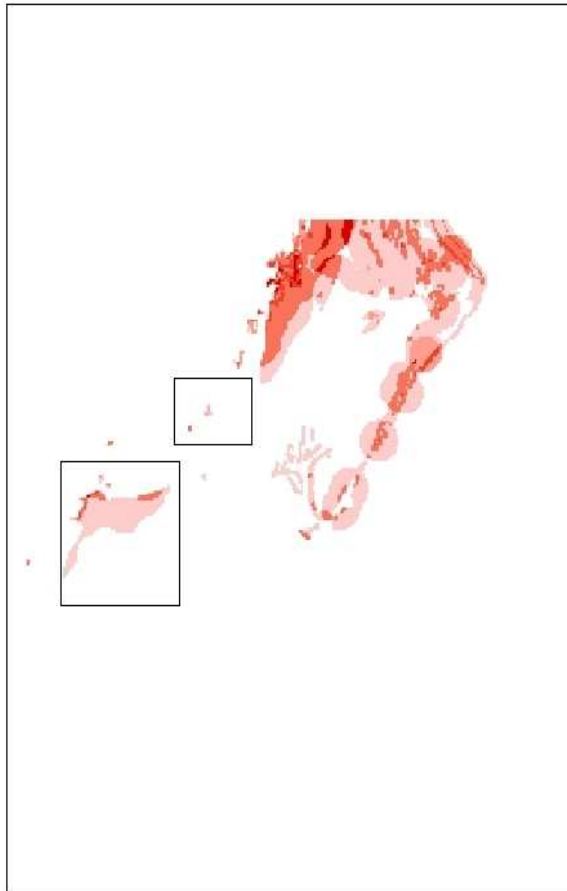
Habitat Risk Assessment Model Stressors Layer



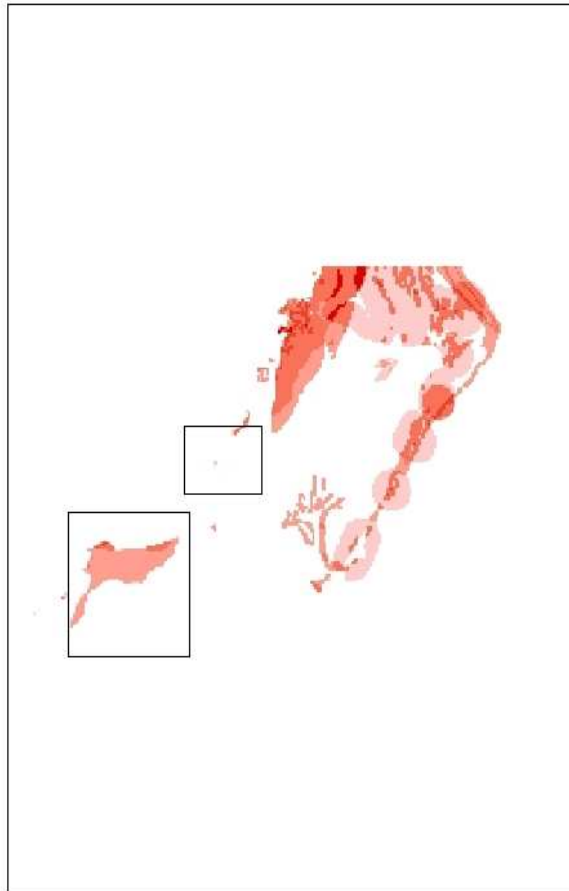
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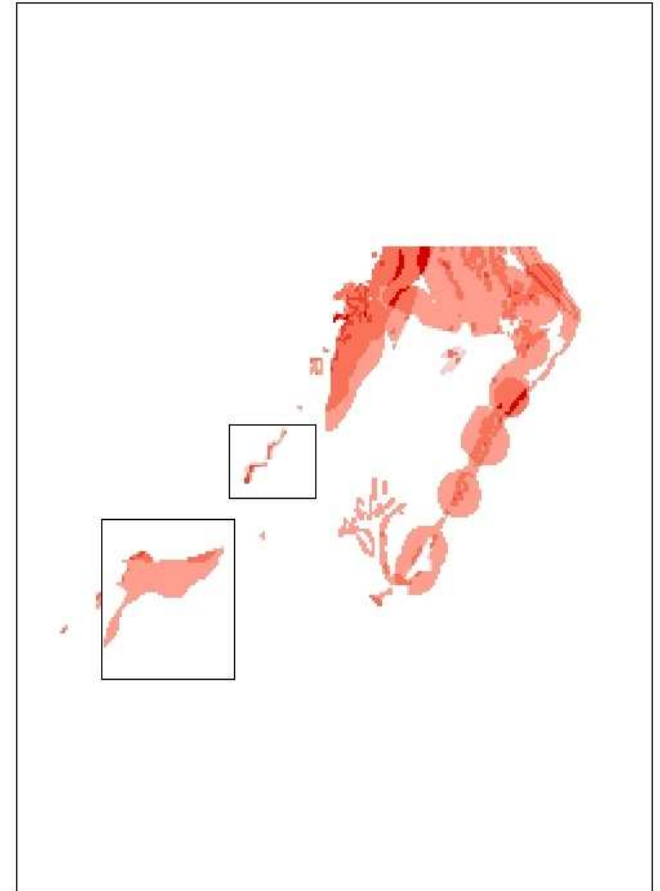
A. Current



B. Conservation

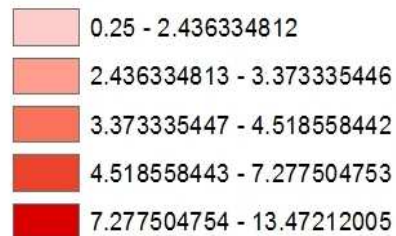


C. Development



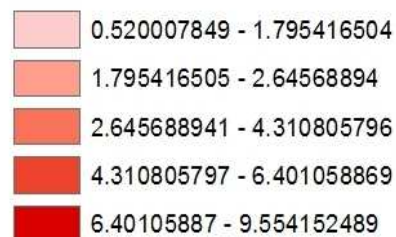
Ecosystem Risk

<VALUE>



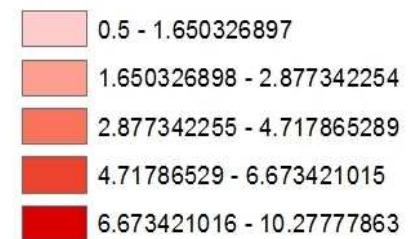
Ecosystem Risk

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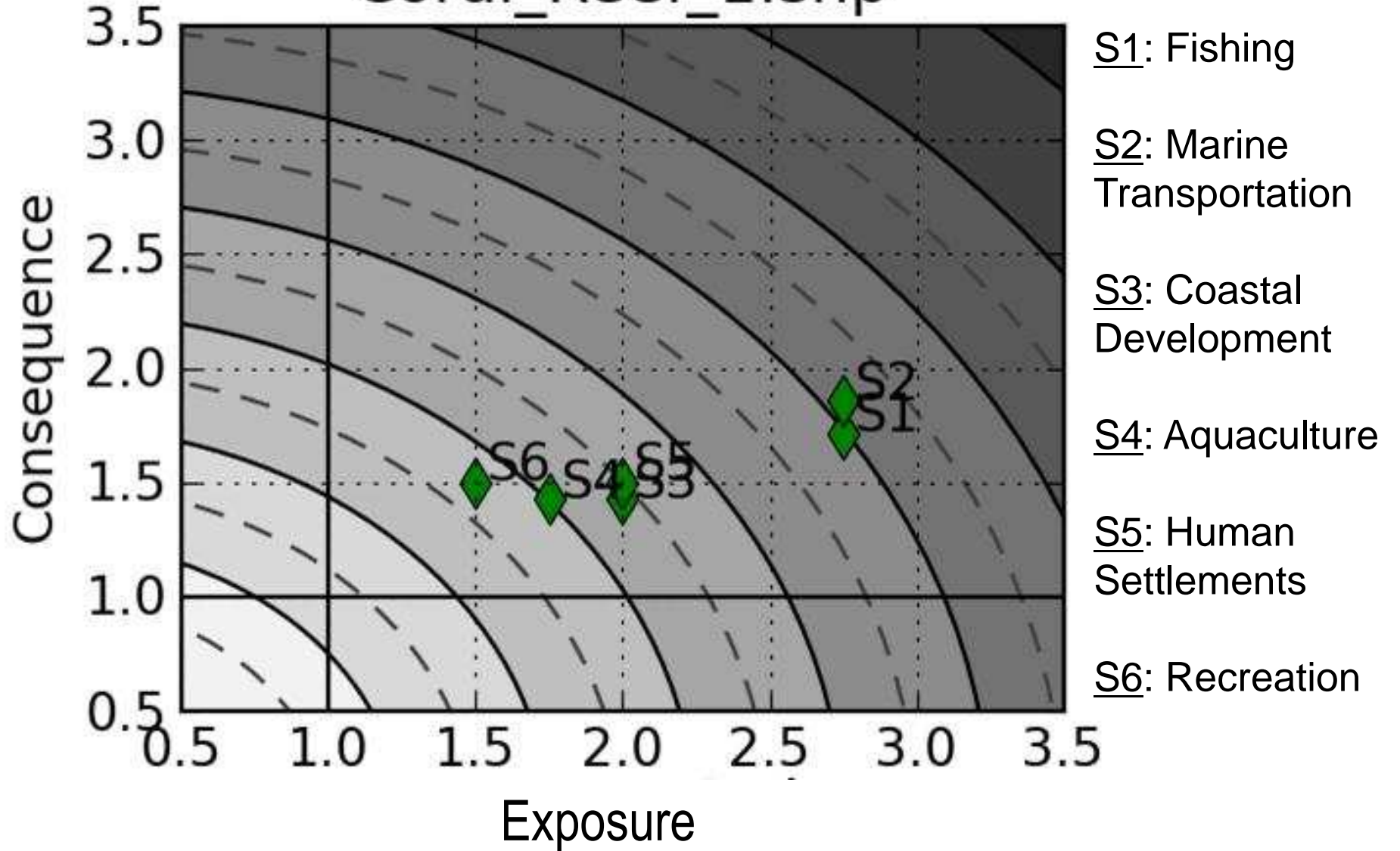


Ecosystem Risk

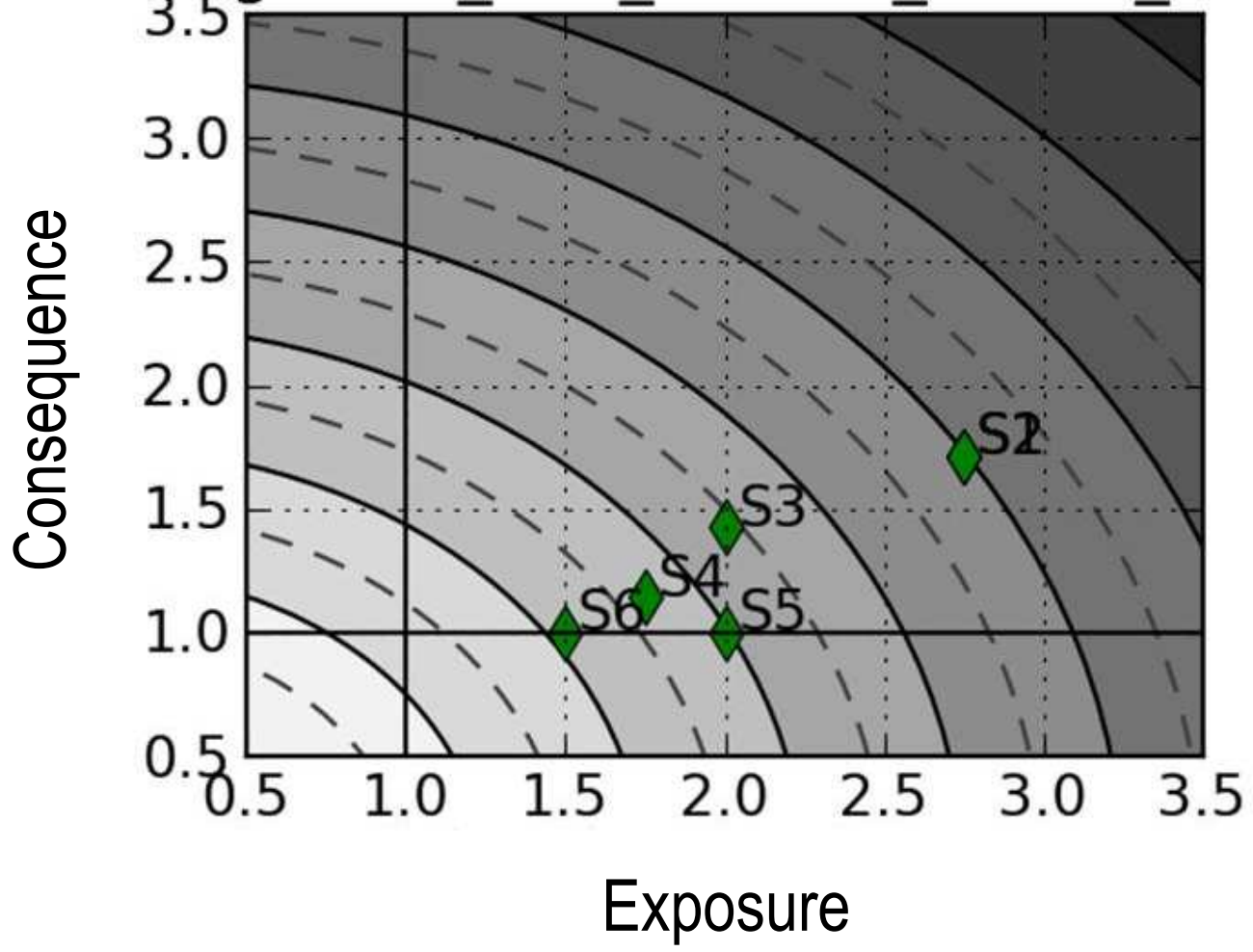
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Coral_Reef_1.shp

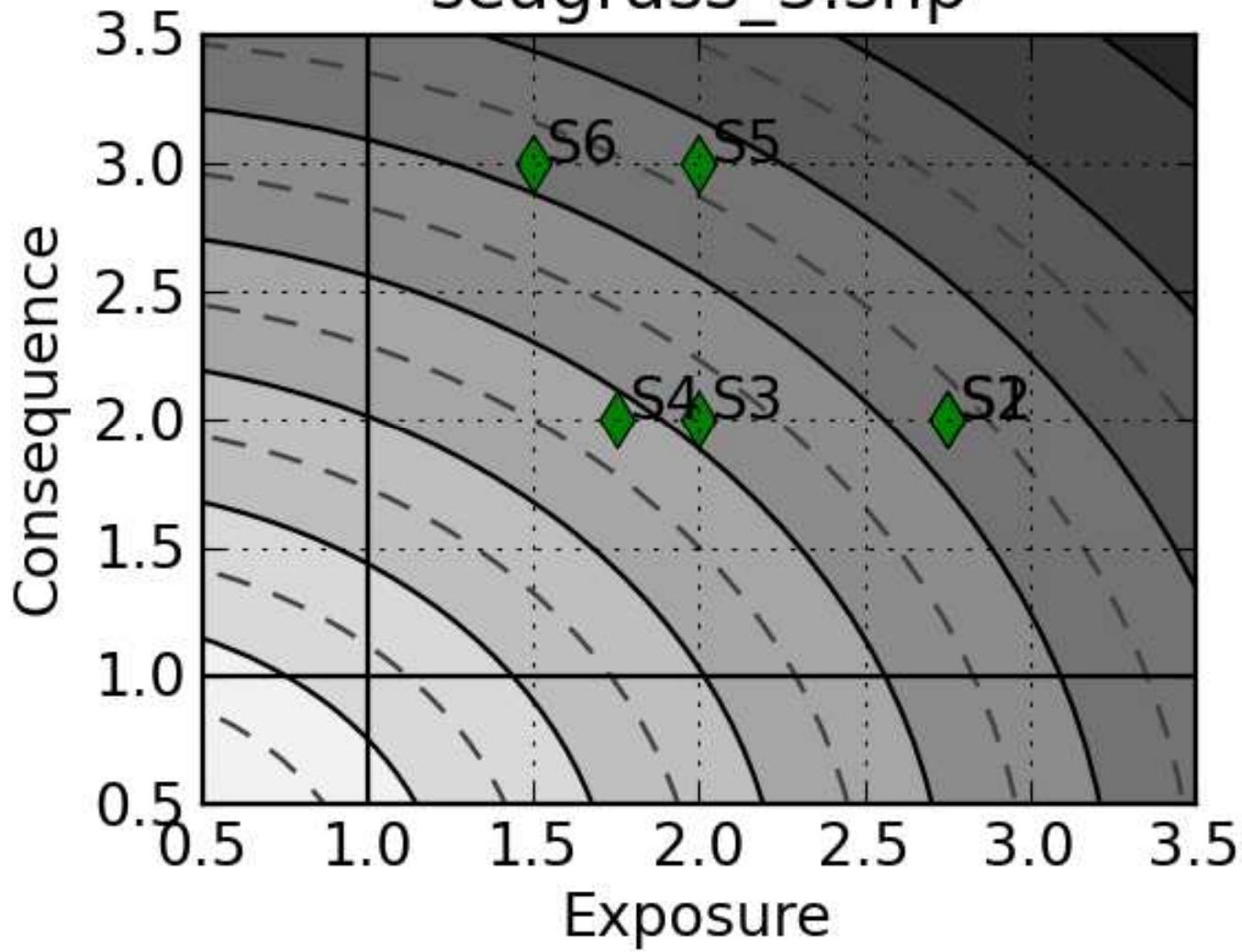


Mangroves_and_Littoral_Forest_2.shp



- S1: Fishing
- S2: Marine Transportation
- S3: Coastal Development
- S4: Aquaculture
- S5: Human Settlements
- S6: Recreation

seagrass_3.shp



S1: Fishing

S2: Marine Transportation

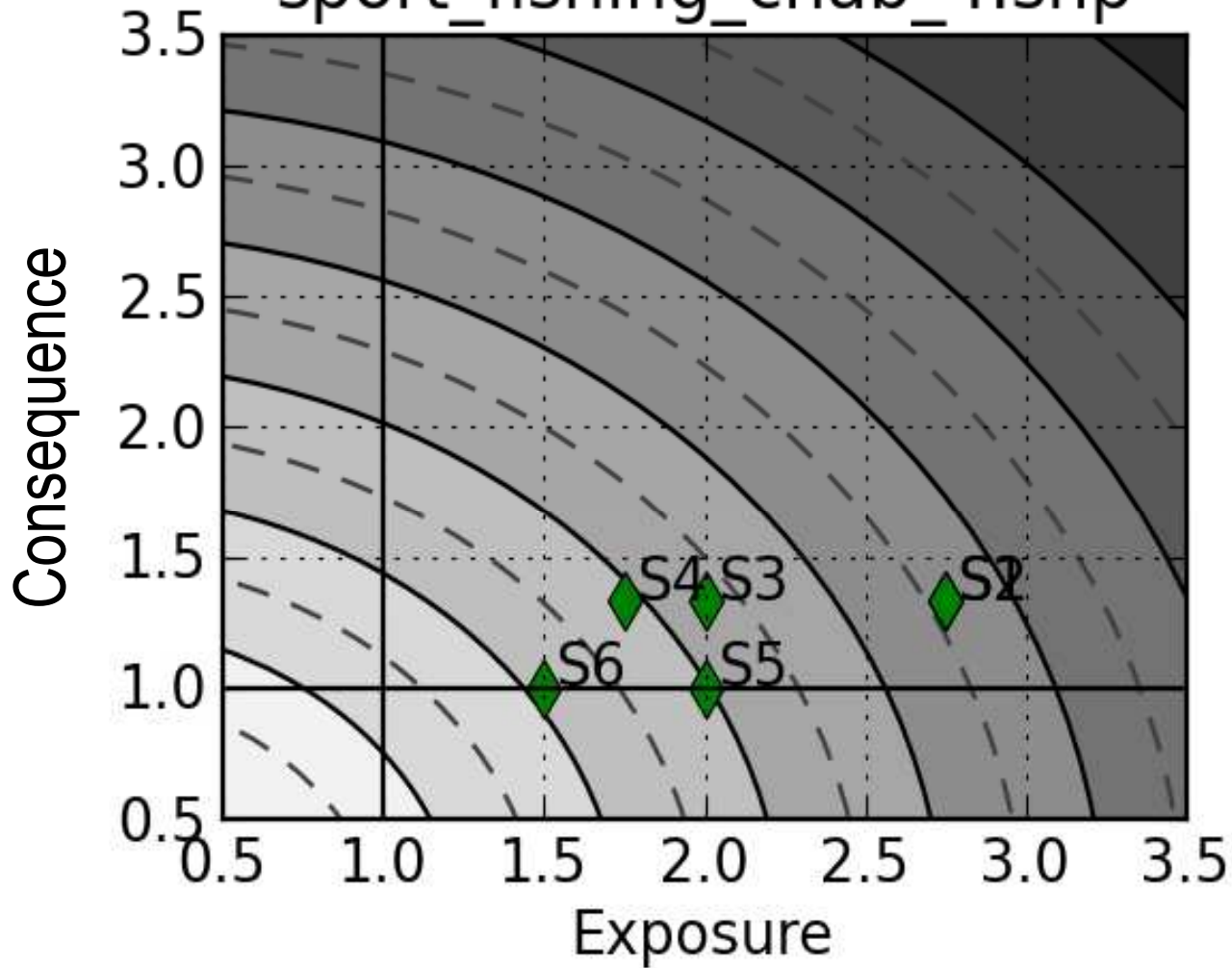
S3: Coastal Development

S4: Aquaculture

S5: Human Settlements

S6: Recreation

sport_fishing_chab_4.shp



S1: Fishing

S2: Marine
Transportation

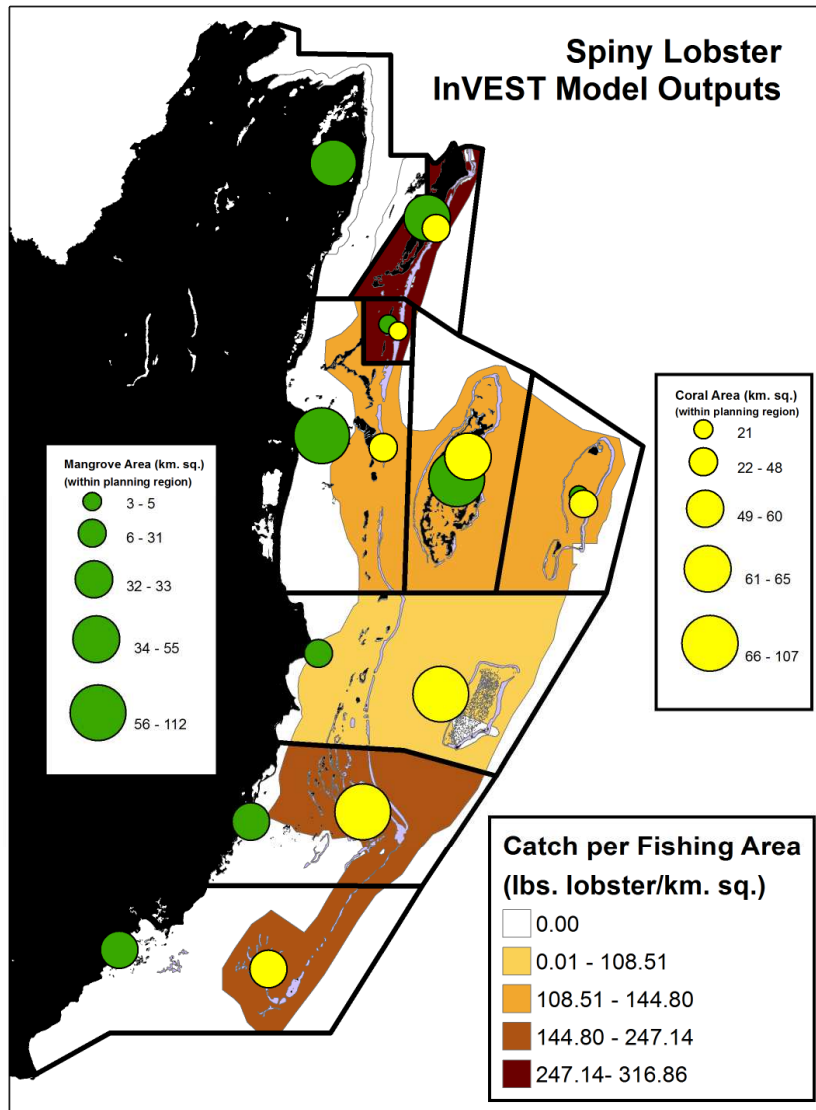
S3: Coastal
Development

S4: Aquaculture

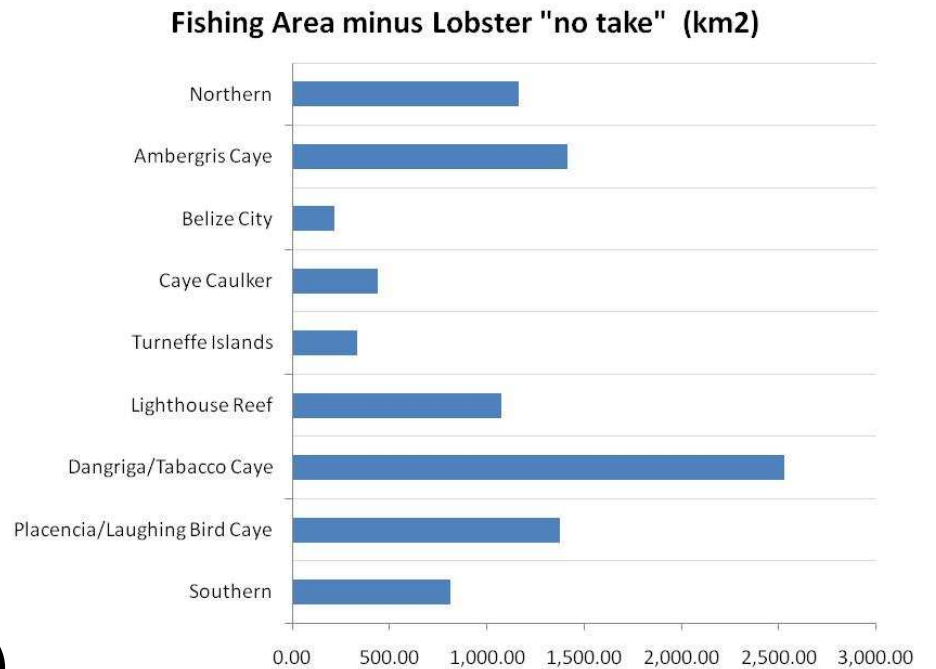
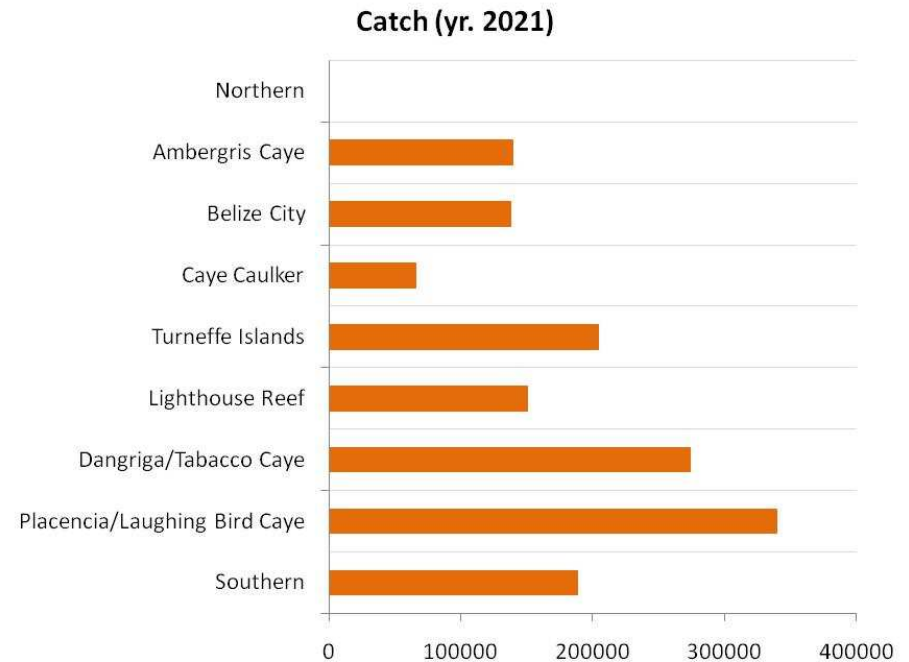
S5: Human
Settlements

S6: Recreation

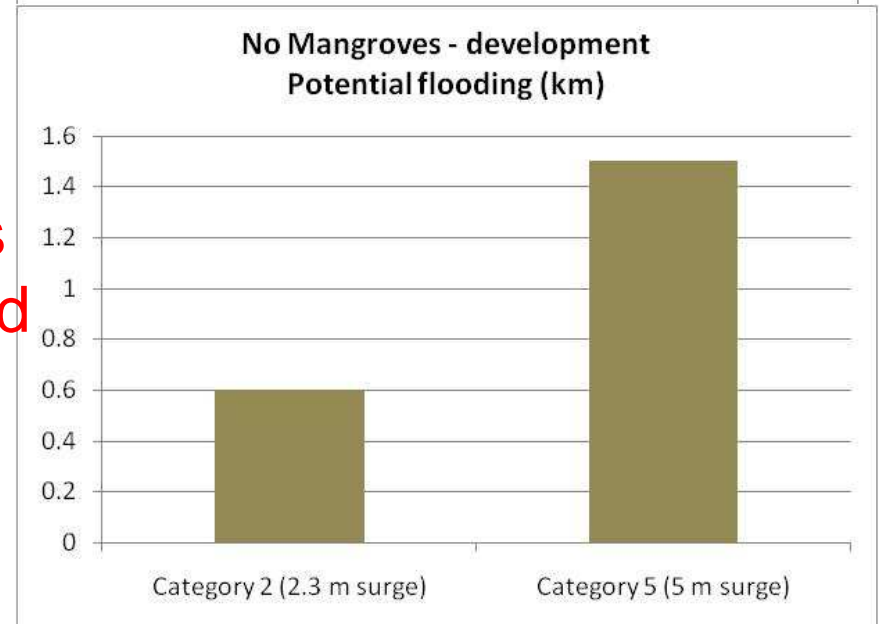
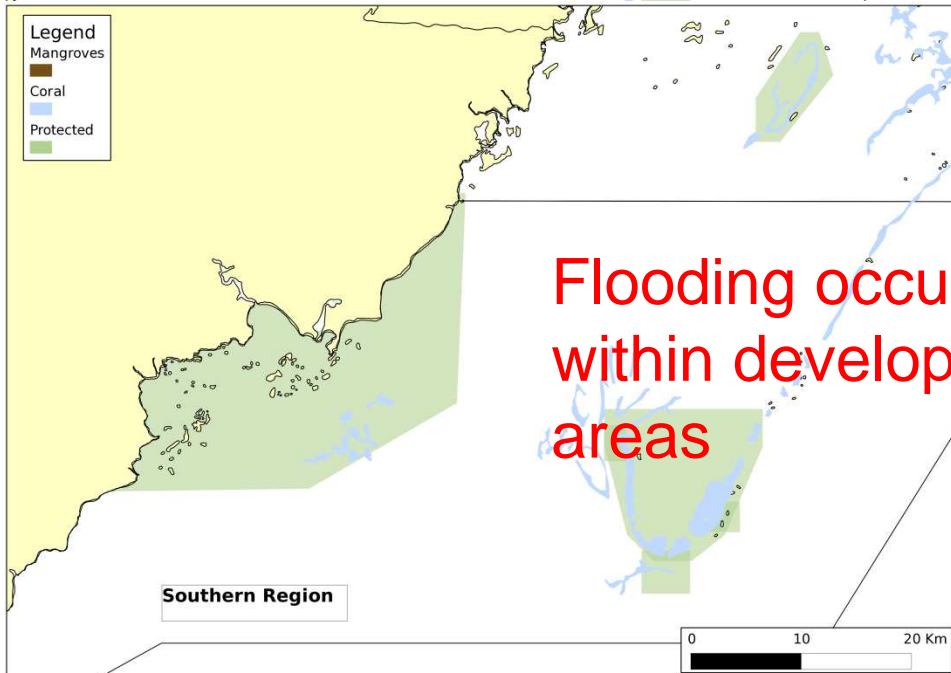
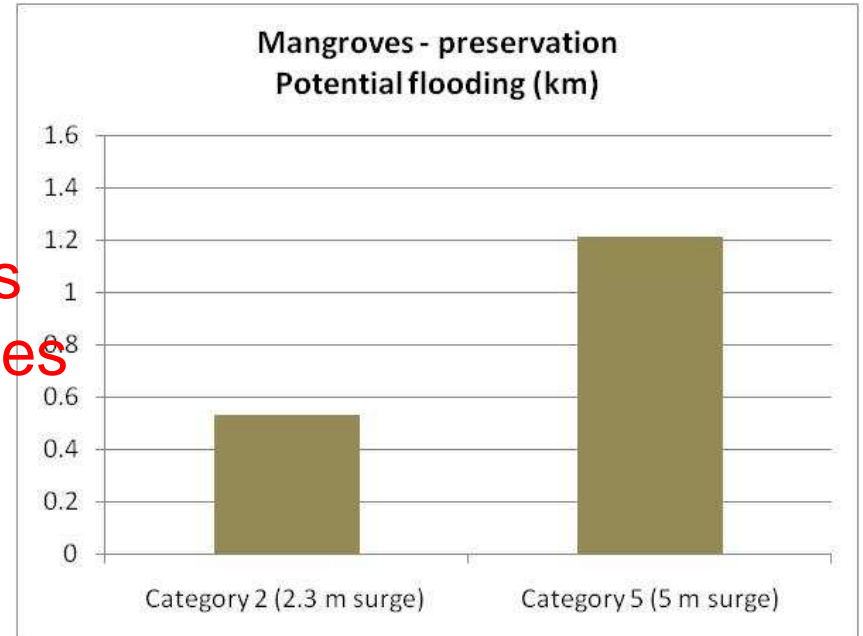
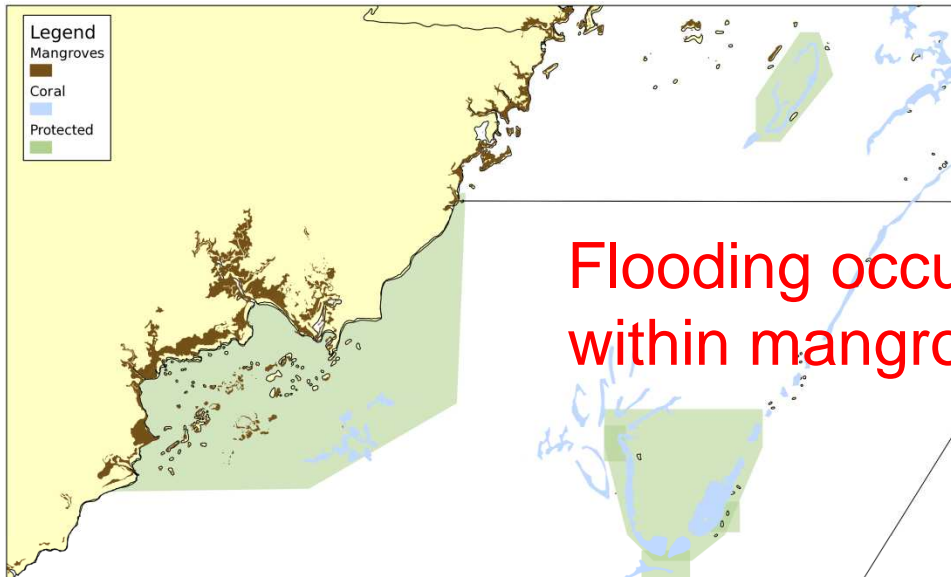
What habitat areas are important for catch of spiny lobster?



Catch in year 2021 (lbs/km²)



How will more coastal development in southern zone affect potential flooding from storms?



Current Visitors

Model Inputs

protected areas



land vs sea



population



natural elements



cultural elements



superstructure



industrial elements



coral



mangrove



Legend

districts_ccad



Visitors (%)

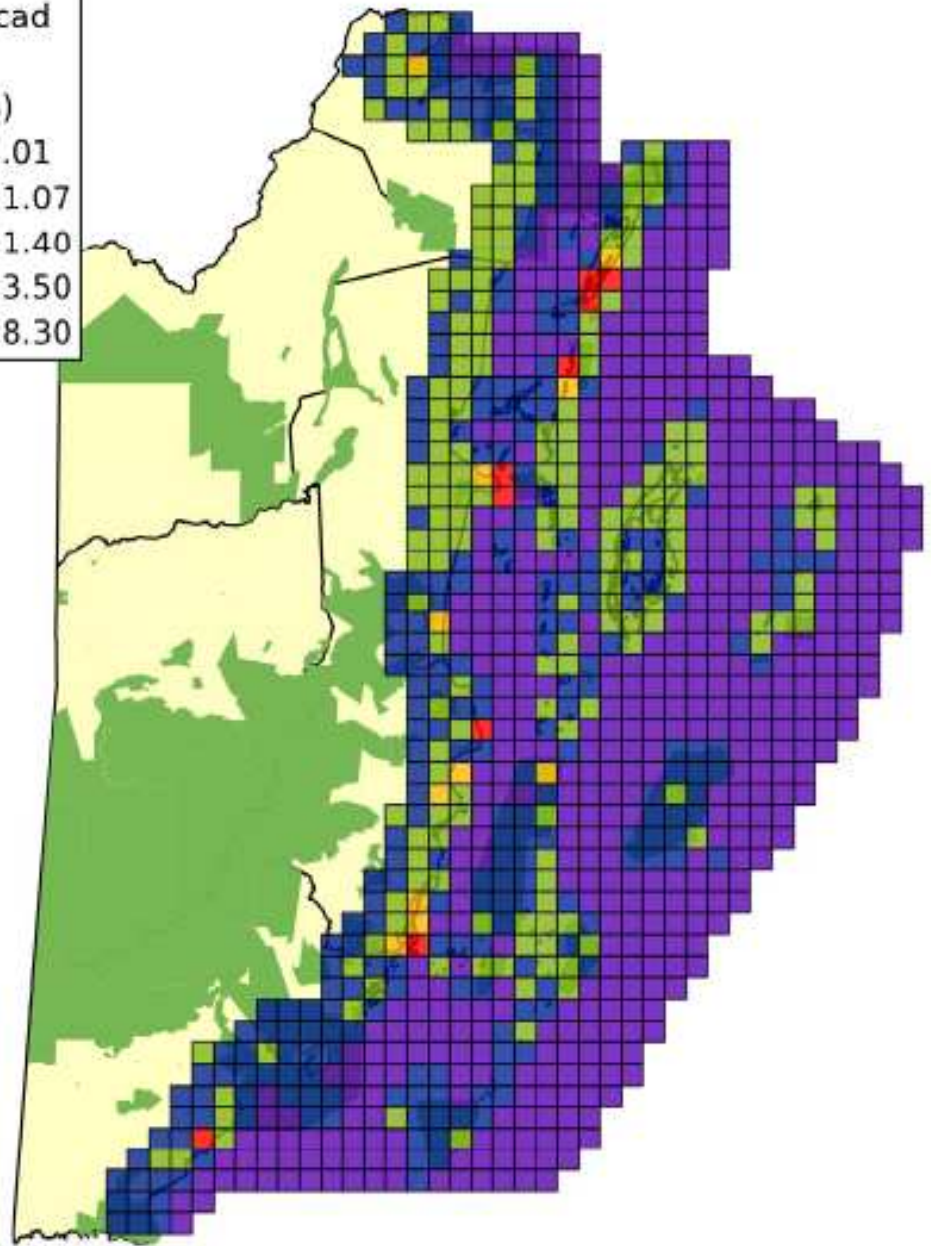
0.0 - 1.01

1.01 - 1.07

1.07 - 1.40

1.40 - 3.50

3.50 - 8.30



ACKNOWLEDGEMENTS...

o CZMAI Coastal Planning Team

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-Gregg Guannel

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-Anne Guerry

-Mary Ruckelshaus



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“Promoting the wise, planned use of Belize’s coastal resources”



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