

16th Lme

Meeting with
Coastal Partners

Paris (FR) 8 - 11 July 2014



Integrating Nature's Values into Coastal Management: Using InVEST in Belize

Author: **Amy Rosenthal**

Institution: **The Natural Capital Project / WWF**

Session: **2**

Day of presentation: **9 July 2014**

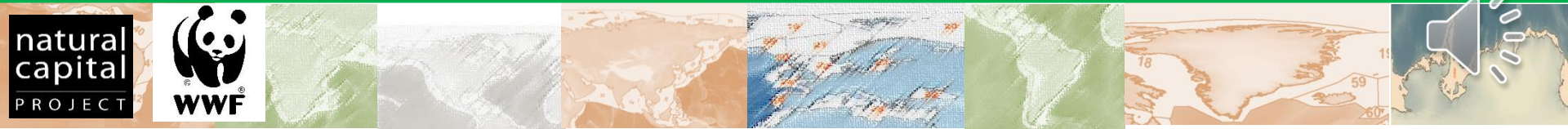


Amy Rosenthal



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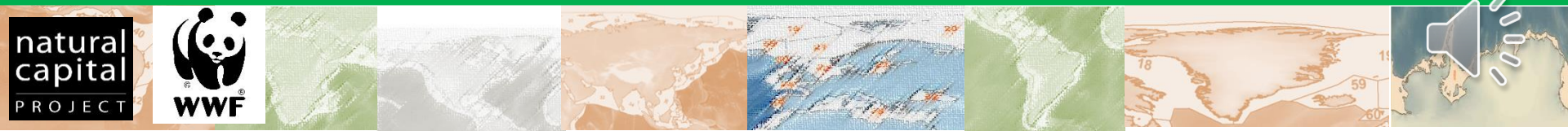
Coastal Management: Challenges and Goals







Aligning economic forces with conservation

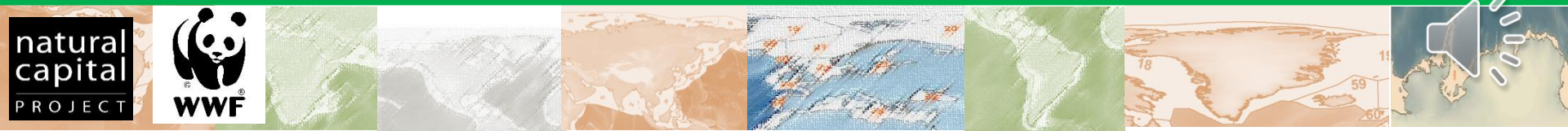


InVEST

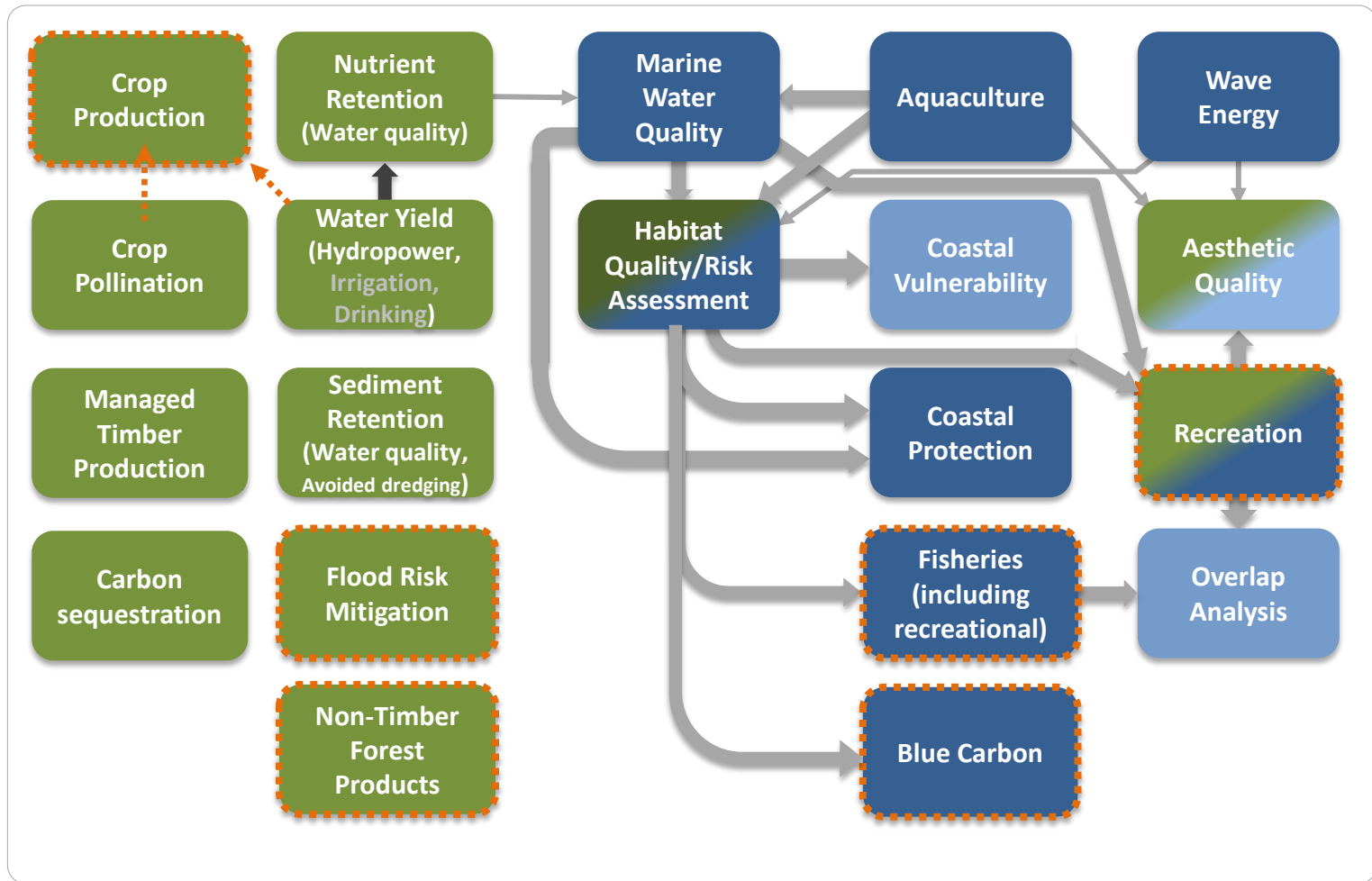
integrated valuation of
environmental services
and tradeoffs






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InVEST Models & Linkages

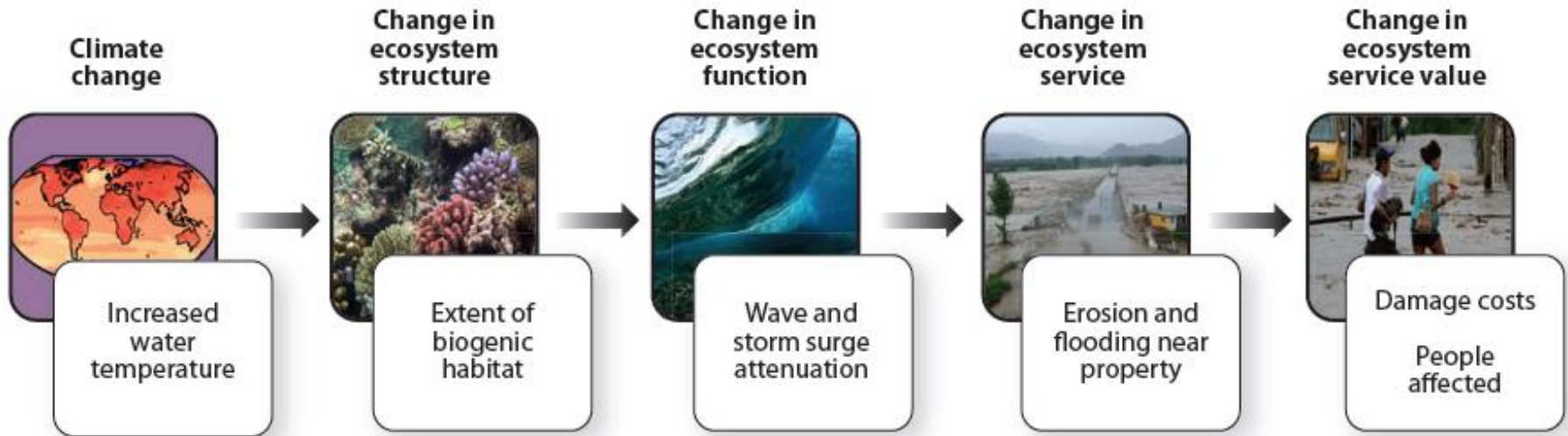
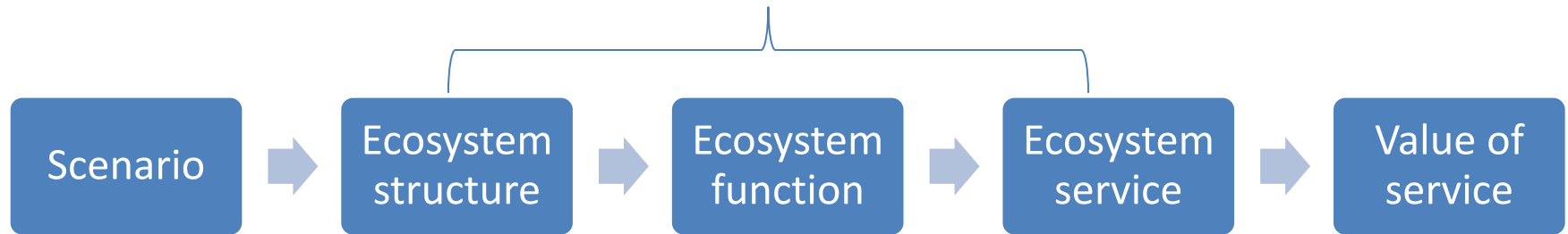


-  Terrestrial/freshwater model: Tier 0
-  Terrestrial/freshwater model: Tier 0
-  Marine model: Tier 1
-  Marine model: Tier 0
-  Model coming soon!

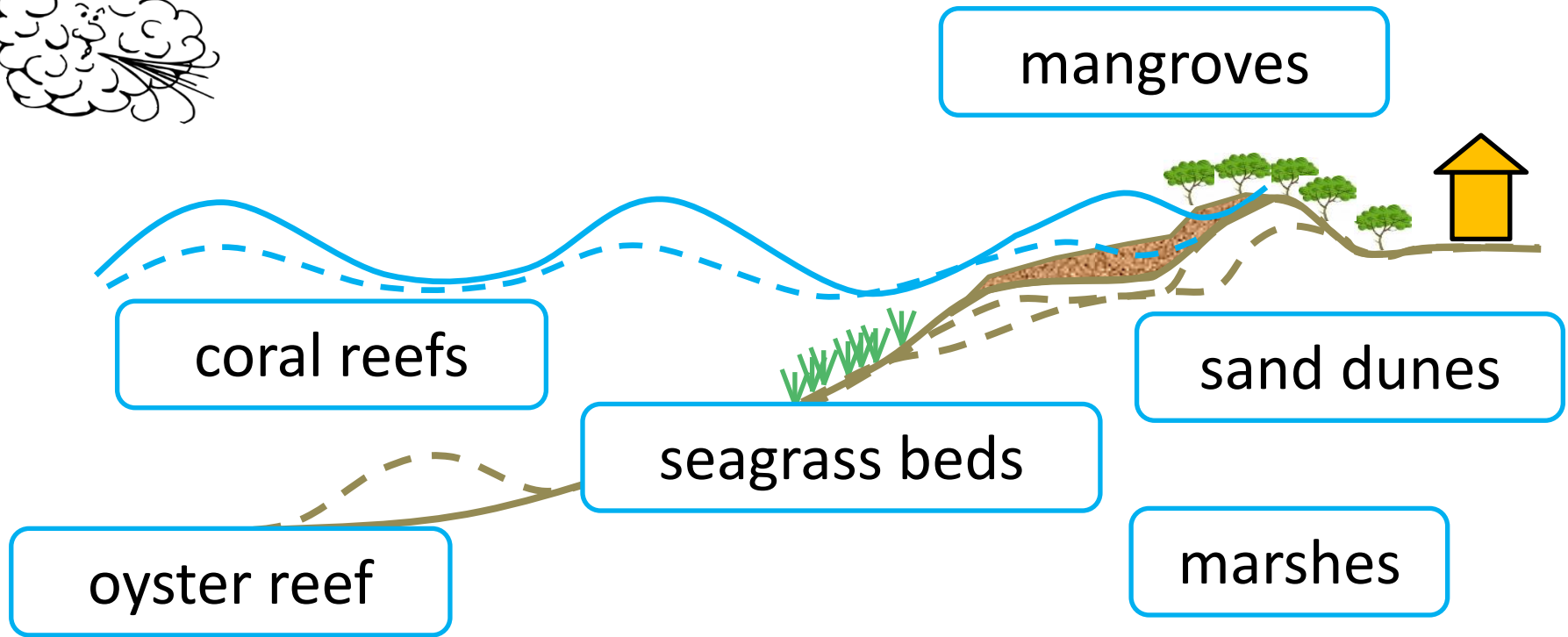
-  Optional model linkage
-  Required model linkage

Conceptual model

Production function



Coastal protection



Area where
erosion &
inundation
avoided

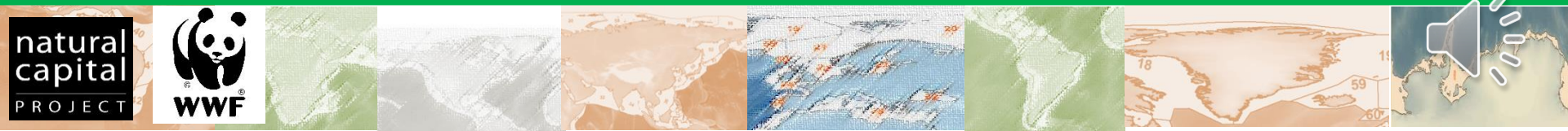


Avoided
number of
people affected



Avoided
property
damage

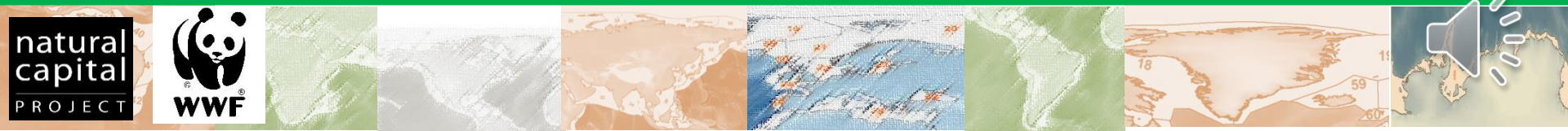
Using InVEST in Belize



Enabling conditions: 5 Ps

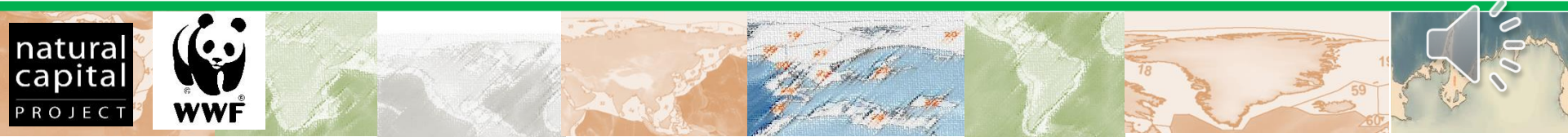
1. Policy question
2. Policy window
3. People
4. Pertinent data
5. iterative science-policy Process

Coastal Zone Planning

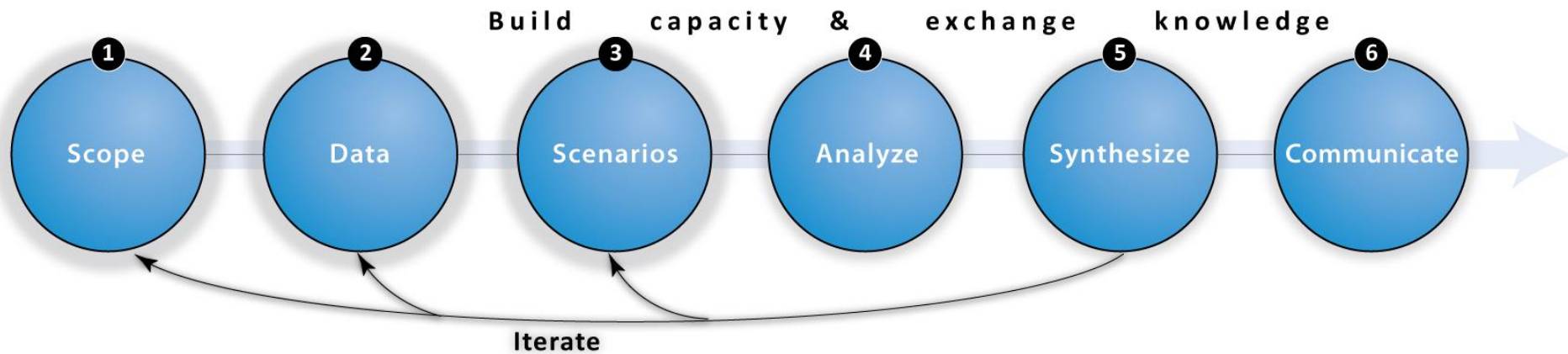


Work team

Scientists
Policymakers
stakeholders

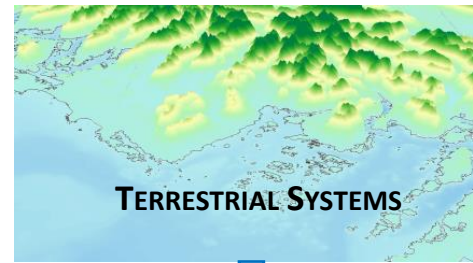


NatCap approach



Data

SCENARIOS



BIO-PHYSICAL

Bathymetry & Topography

Species
distribution

Oceanography

Habitat type



SOCIO-ECONOMIC

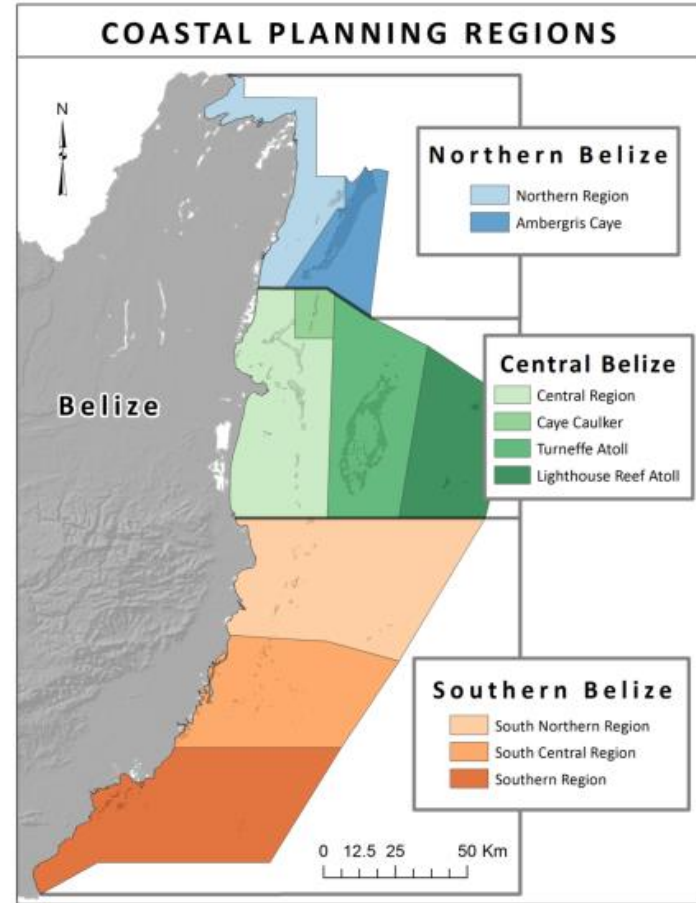
Population density

Demographics

Aquaculture operation costs

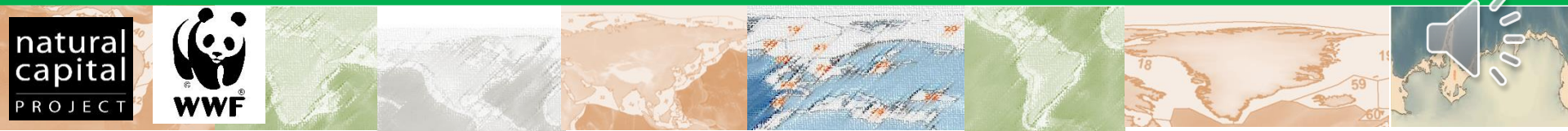
Property values

Stakeholders

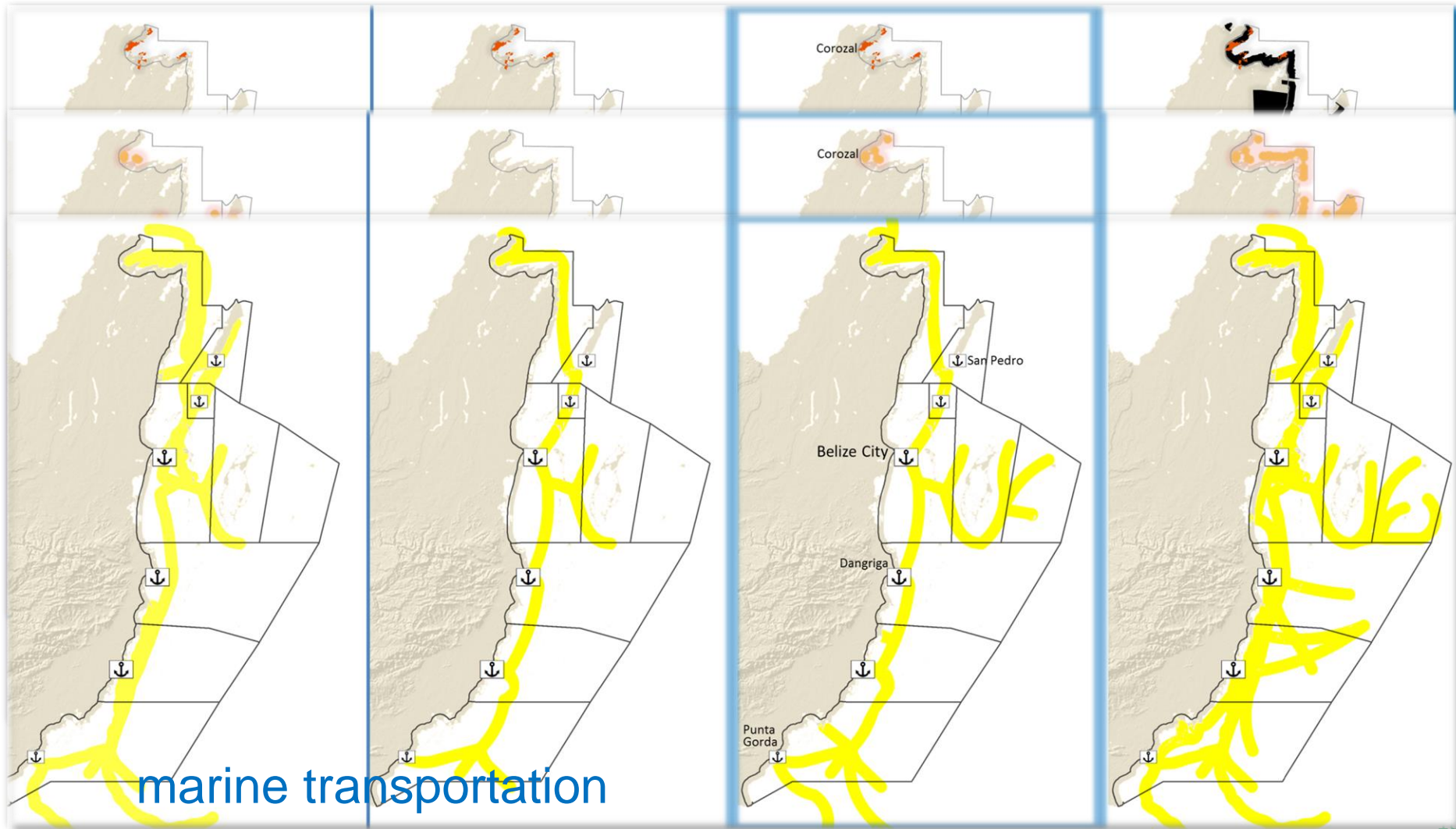


Zones

Marine Transportation
Tourism/Recreation
Conservation
Fishing
Coastal Development
Aquaculture
Agriculture
Dredging
Oil exploration
Cultural & Historical Areas



What if...alternative options



SCENARIO DESCRIPTIONS

2010

2025

CURRENT

CONSERVATION

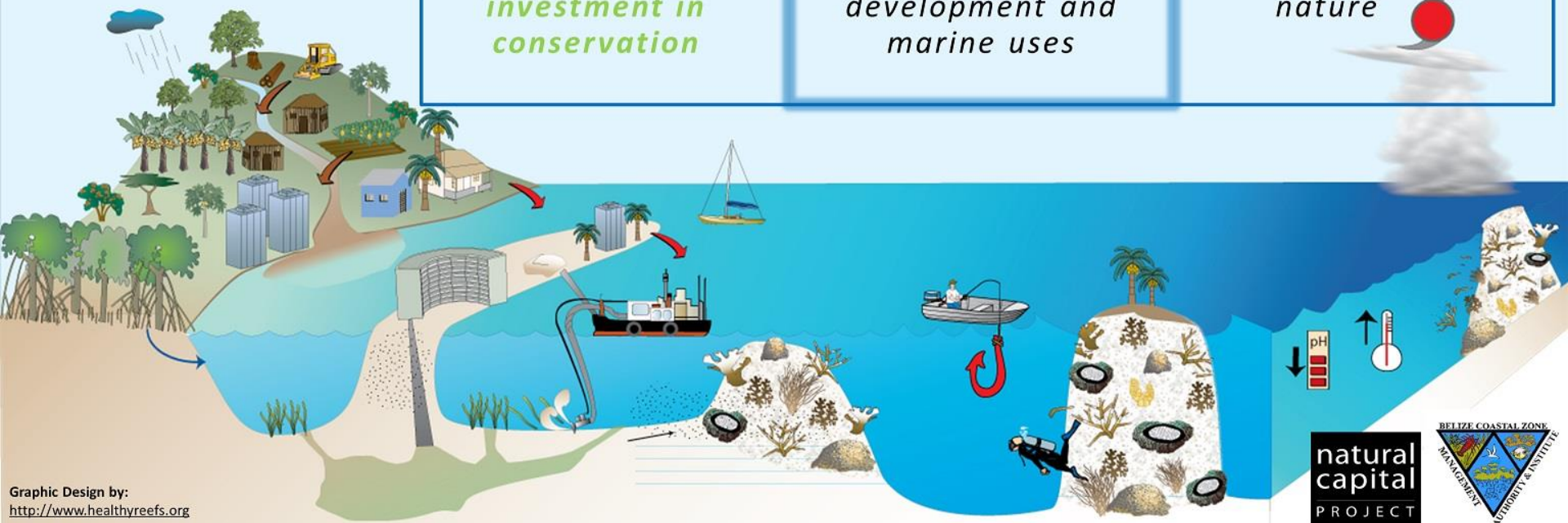
INFORMED
MANAGEMENT

DEVELOPMENT

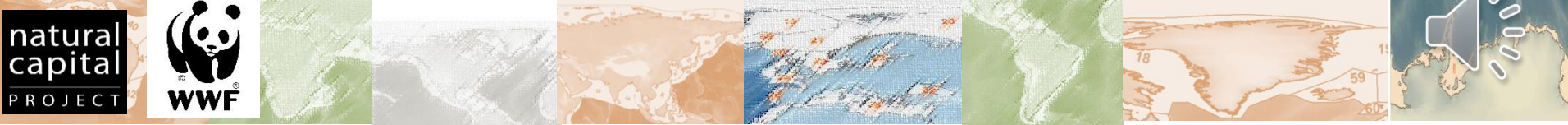
*Presents a vision of
**long-term
ecosystem health**
through
**sustainable use
and
investment in
conservation***

***Blends strong
conservation
goals** with
**current and
future needs**
for coastal
development and
marine uses*

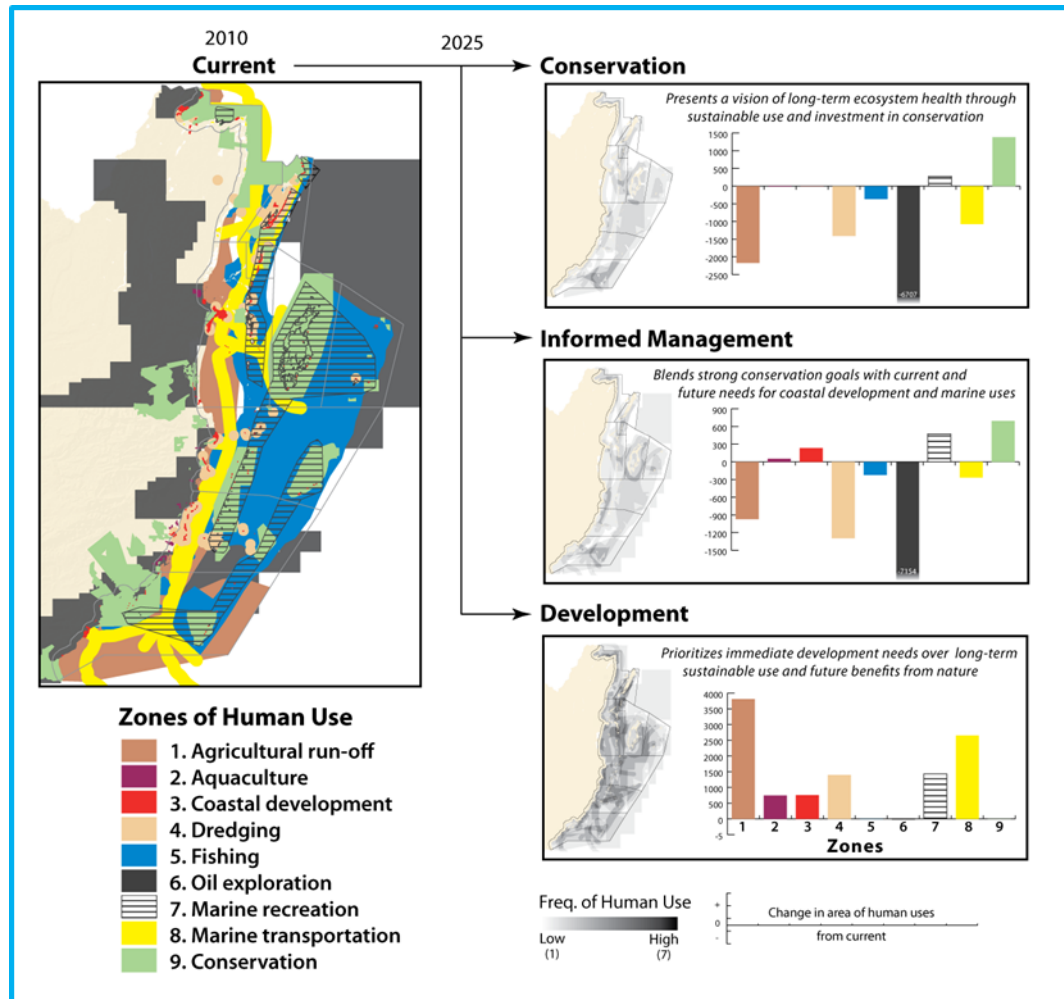
***Prioritizes
immediate
development needs**
over long-term
sustainable use and
future benefits from
nature*



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Scenarios



Nature's Values: InVEST

ECOSYSTEMS

Corals

Mangroves

Seagrasses



ECOSYSTEM SERVICES

Fisheries



Recreation



Coastal Protection

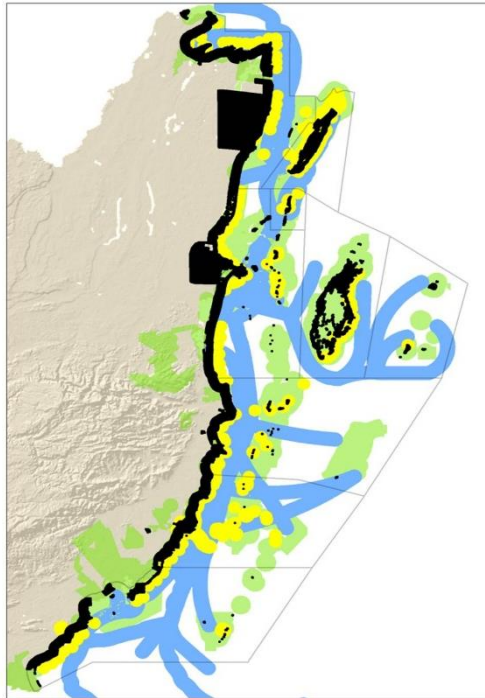


Zoning
Scheme

Risk to habitats

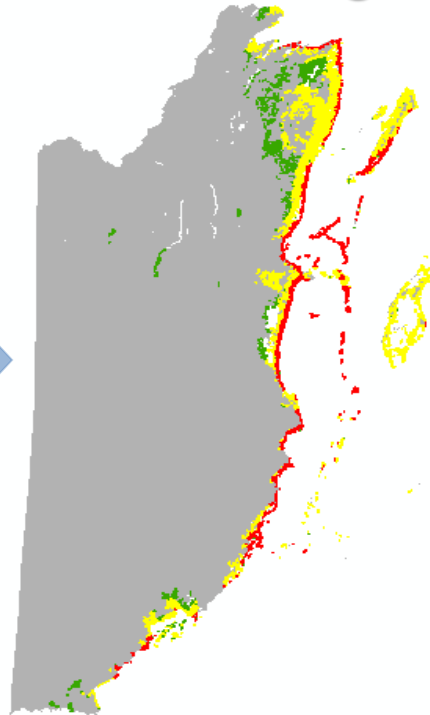
Magnitude and
value of service

Development



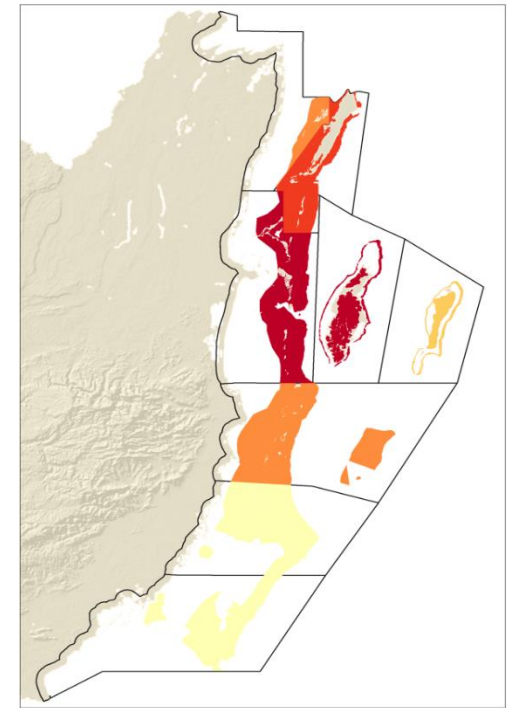
Coastal Development Dredging
Conservation Marine Transportation

Risk to mangroves



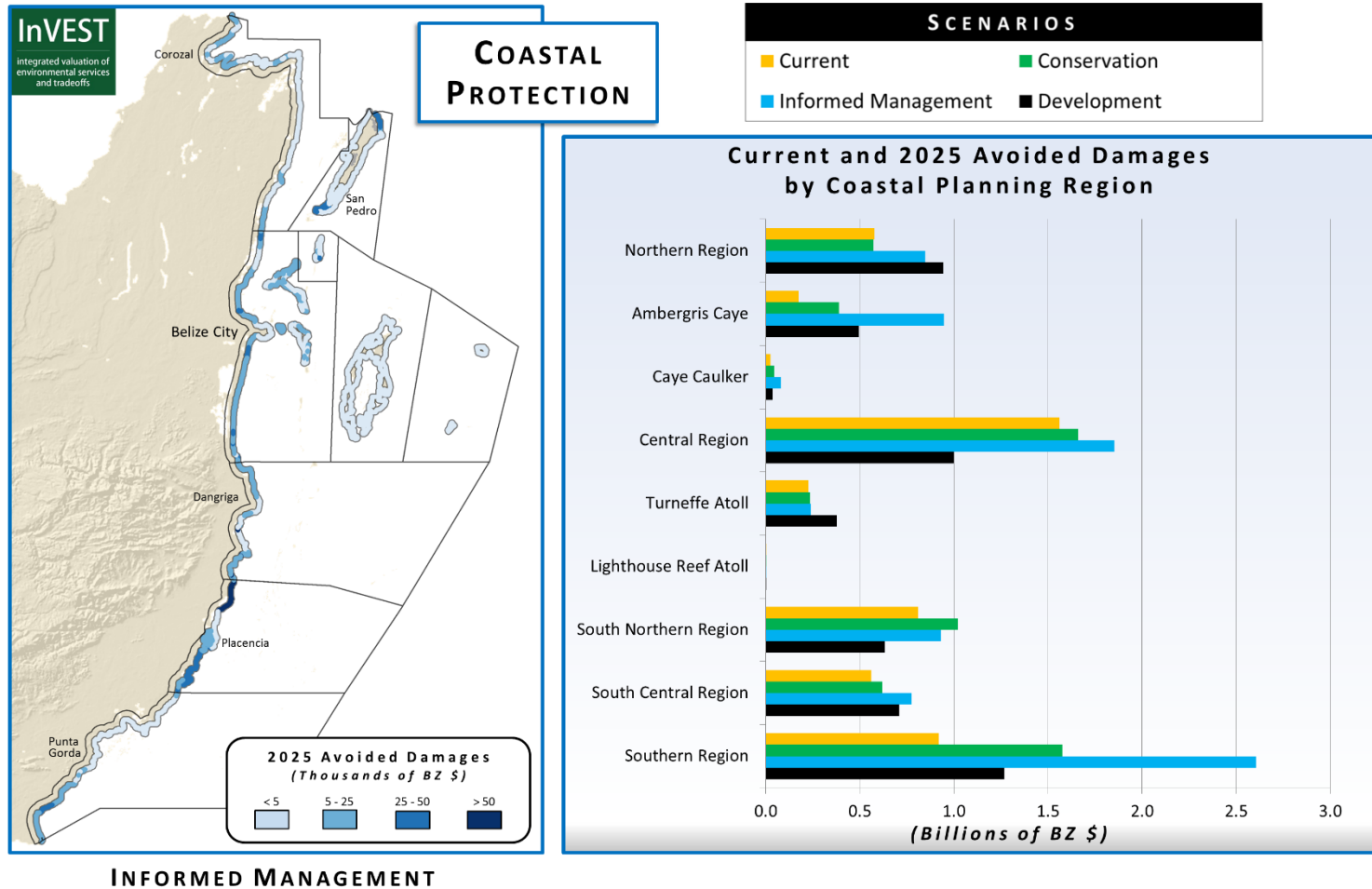
Risk in 2025
Low Medium High

Lobster catch & revenue



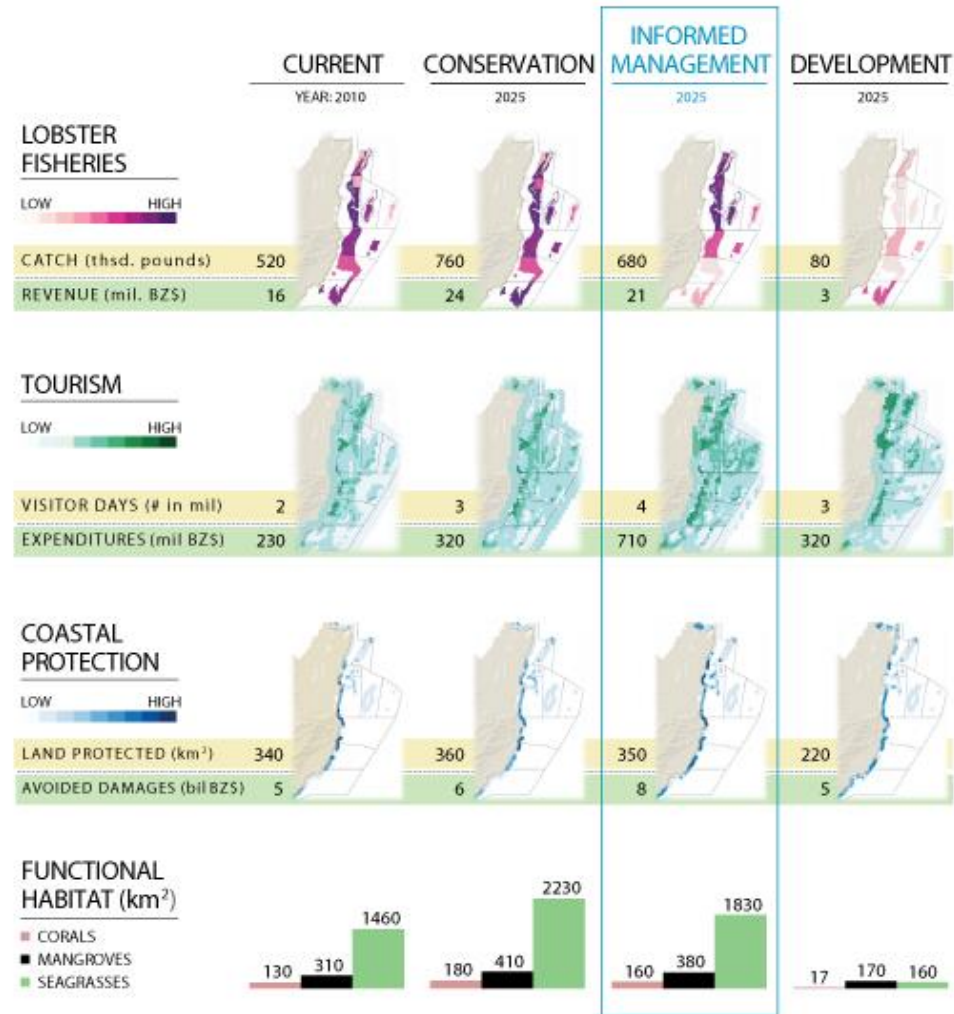
**Annual lobster catch 2025
(thousand lbs)**
100 150 200 250 500

Interpret results



Interpret results

Informed management provides the best outcomes for target ecosystem services.

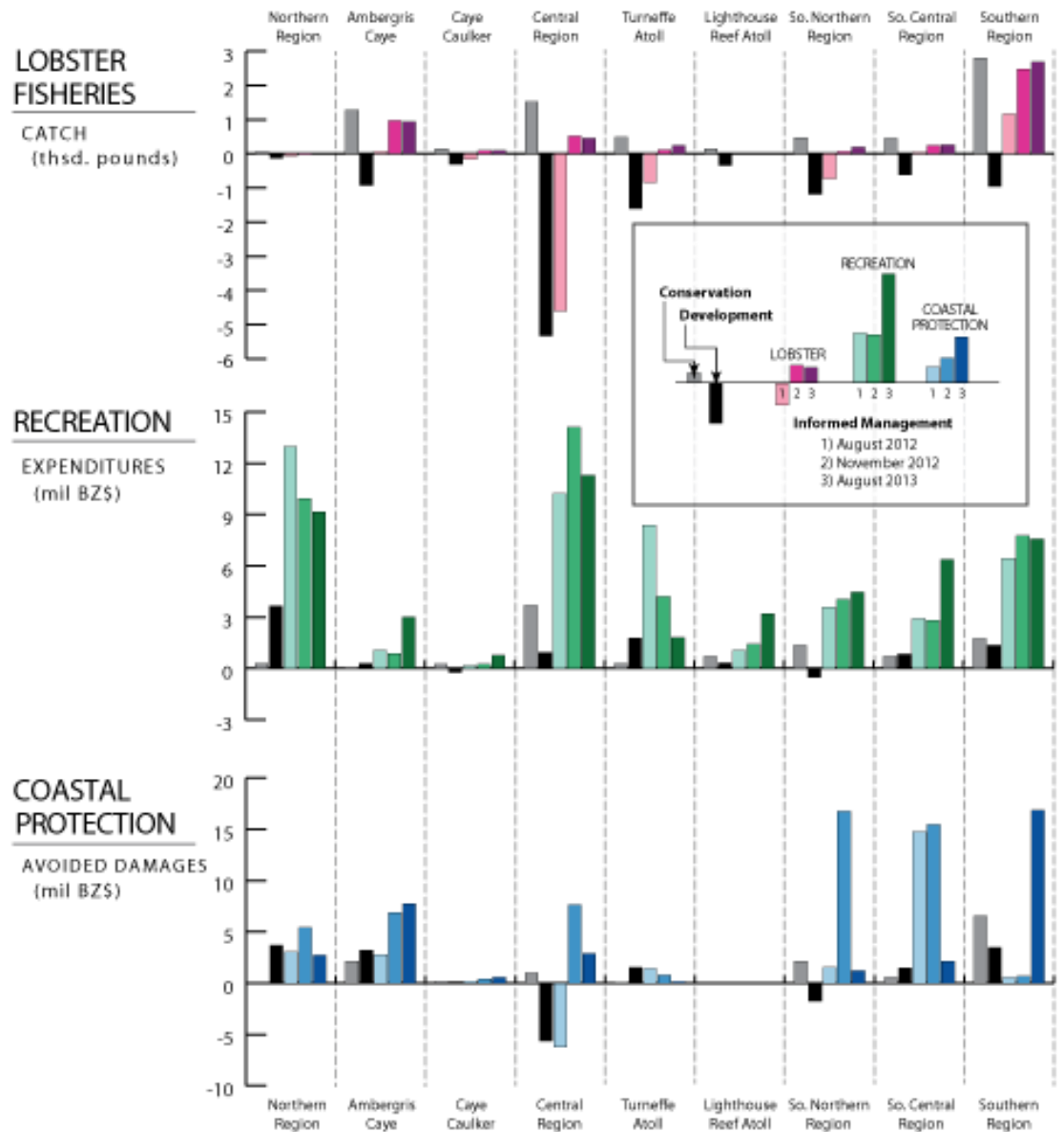


Review

Iterate

Finalize

Iteration from August 2012 to August 2013 to improve outcomes.



Integrating climate change

	No Action	<u>Adaptation Scenarios</u>	
		Integrated	Reactive
NPV of total benefits	\$0.790	\$1.300	\$0.650
NPV Lobster fishing	\$0.008	\$0.009	\$0.006
NPV Tourism & recreation	\$0.782	\$1.273	\$0.702
NPV Carbon storage & sequestration	-	\$0.127	-\$0.061
NPV of total implementation costs	-\$0.005	-\$0.015	-\$0.191
NPV of erosion damages from sea level rise and storms	-\$2.517	-\$2.556	-\$2.005
Total NPV of all benefits, costs and damages	-\$1.731	-\$1.275	-\$1.550
NPV compared to No Action scenario	-	\$0.456 billion	\$0.181 billion

Plan

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 Coastal Resources

Cite as:

Coastal Zone Management Authority and Institute. 2013. Belize Integrated Coastal Zone Management Plan. Coastal Zone Management Authority and Institute (CZMAI), Belize City.

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Next steps

Request an InVEST training: training@naturalcapitalproject.org

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Arkema, K.K. et al. (In review) Improving the margins: Modeling ecosystem services leads to better coastal plans. *Proceedings of the National Academy of Sciences*.

Rosenthal, A. et al. (In review) Process Matters: A framework for conducting decision-relevant assessments of ecosystem services. *International Journal of Biodiversity Science, Ecosystem Services and Management*.

Verutes, G. & Rosenthal, A. (In press) Using gamification to teach ecosystem services synergies and tradeoffs. *Environmental Practice*.

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