BACK TO THE FUTURE: SCENARIO DEVELOPMENT FOR ECOSYSTEM SERVICES

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WHAT ARE SCENARIOS?

Scenarios for InVEST

SCENARIOS

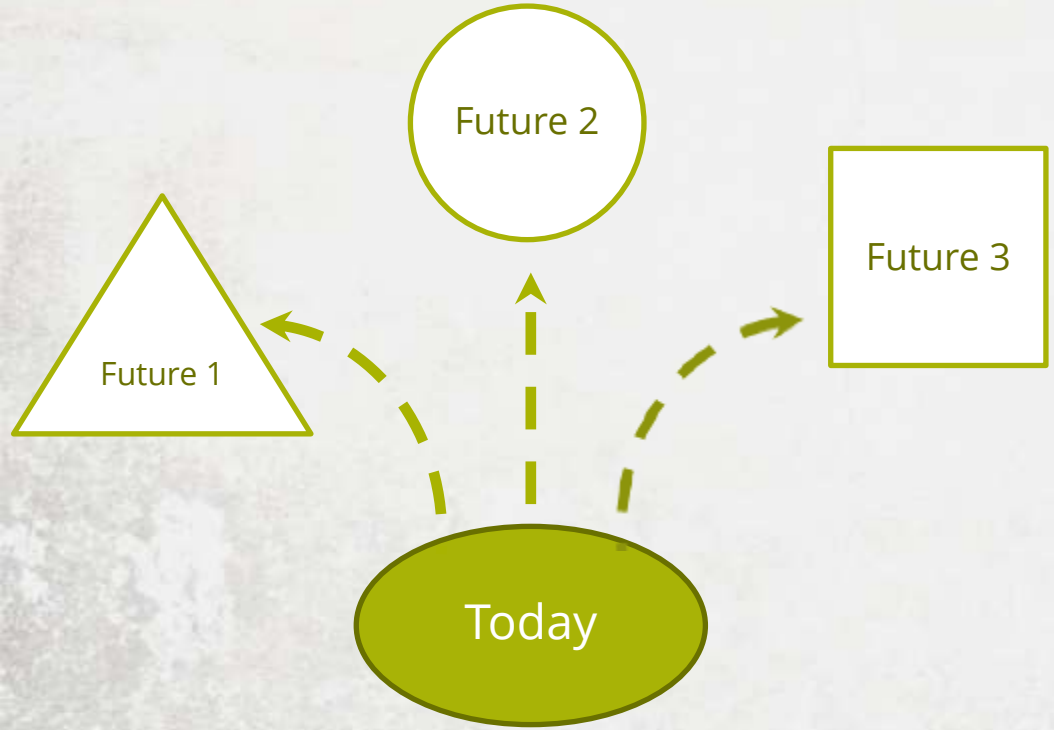
TELL A STORY ABOUT THE FUTURE

Scenarios describe possible futures. They should be plausible, but are not necessarily predictions.

They explore aspects of, and choices about, the future that are uncertain. They can be described by narratives, numbers, or maps.

Scenarios can be developed using participatory methods and by technical experts.

SCENARIOS
FOR ECOSYSTEM SERVICE ASSESSMENT



Scenarios

for InVEST

- Describe a possible future
- Reflect important and uncertain future developments or choices
- Are plausible, internally consistent, and relevant to the questions being addressed
- Have a spatially explicit component or can include one

SCENARIO CHARACTERISTICS

WHAT MAKES FOR A USEFUL SCENARIO?

- **Relevant:** Do the scenarios align with the problems and questions of interest to stakeholders and decision-makers?
- **Participatory:** Are stakeholders involved meaningfully in the process of developing scenarios and assessing their ecosystem service impacts?
- **Legitimate:** Does the scenario development process include diverse stakeholder views and beliefs?
- **Plausible:** Do the scenarios tell coherent stories that could conceivably happen?
- **Understandable:** Are the scenarios accessible to the target audience?
- **Distinct:** Are the scenarios sufficiently dissimilar to show contrasting ecosystem service impacts?
- **Scientifically credible:** Are scenario storylines and maps scientifically robust and credible
- **Comprehensive:** Do the scenarios consider all relevant drivers?
- **Iterative:** Are the scenarios refined and revised on the basis of stakeholder input and emerging trends?
- **Surprising:** Do the scenarios challenge assumptions and broaden perspectives about unexpected developments?

WHY DO SCENARIOS MATTER?

Framing, communication, and uptake

SCENARIOS

CLARIFY & INFLUENCE RESULTS

The process of scenario development and analysis can have as much – or more – impact on decision-makers as the final results.

Scenarios help focus ecosystem service analyses on issues of concern, specific policies or management questions.

With scenarios, InVEST assesses comparative change in ecosystem services. It can inform real choices and involve stakeholders in a powerful learning process.

SCENARIOS IN PRACTICE

The case of Belize

ONE EXAMPLE
DEVELOPING SCENARIOS FOR BELIZE

Coastal management
Belize

OUR GOALS

- Understand and map current uses,
- Map and value coastal and marine ecosystem services now and in the future,
- Create an ecosystem-based plan for multiple uses.

THE DEVELOPMENT PROCESS
IN THREE PARALLEL WORK STREAMS

DATA GATHERING

Environmental, socioeconomic, and other data were collected and synthesized.

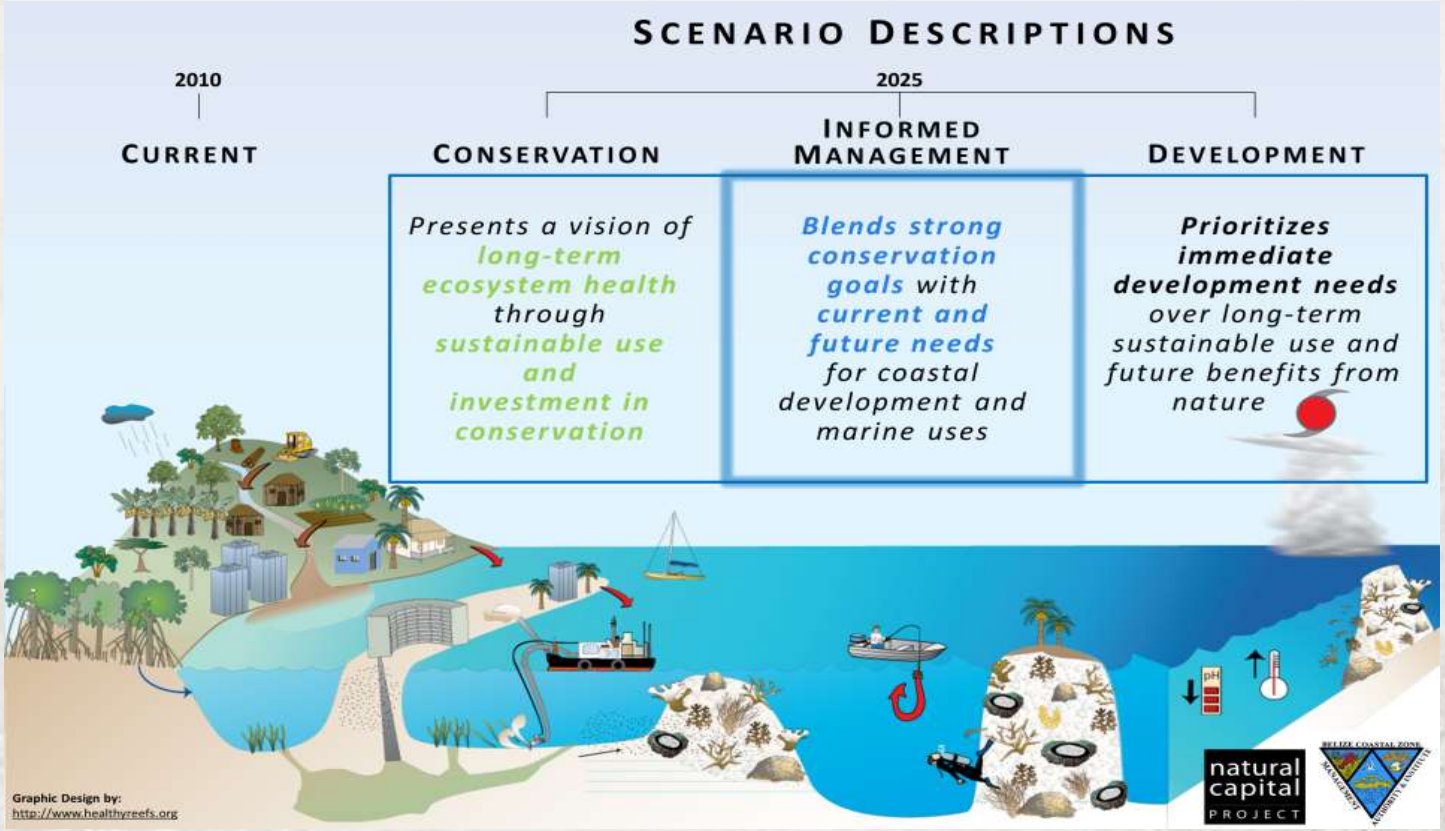
STAKEHOLDER ENGAGEMENT

Stakeholders provided valuable knowledge and validated results at each step.

MODELING & MAPPING

With InVEST, maps made with stakeholders were refined to answer key questions and develop the plan.

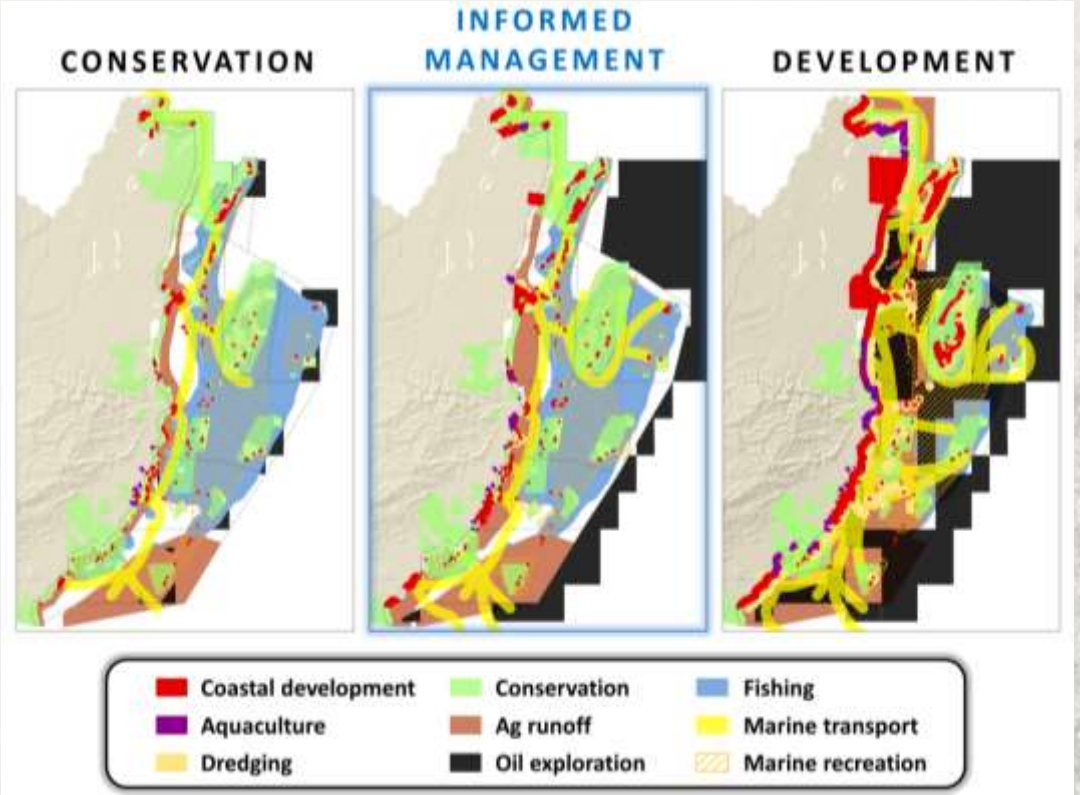
COASTAL ZONE PLANNING
DESIGNING ALTERNATIVE SCHEMES



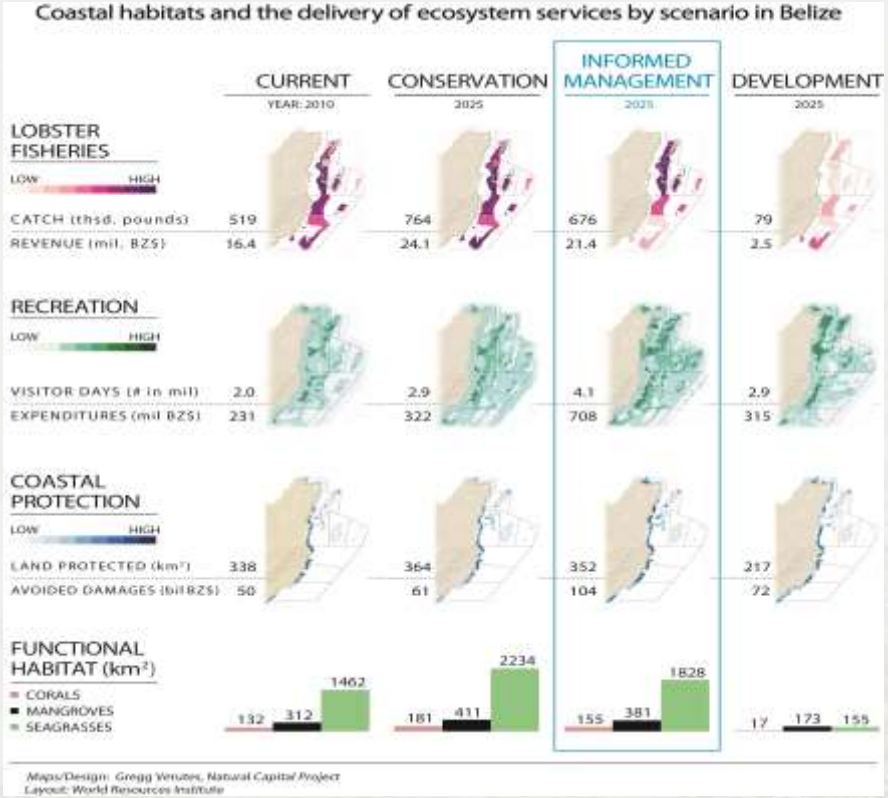
COASTAL ZONE PLANNING
DESIGNING ALTERNATIVE SCHEMES

Options for coastal use & zoning in Belize

- 3 alternatives
- 9 zones
- 2010-2025



INVEST RESULTS BY SCENARIO
INFORMED MANAGEMENT SELECTED



HOW WERE SCENARIOS USED?

SCENARIOS WITH INVEST HELPED:

- **Understand** how a variety of human activities affect ecosystems and ecosystem services now and in the future.
- **Compare** alternative planning options.
- **Engage stakeholders** to inform the planning process and learn from results.
- **Provide evidence** that "informed management" better achieved the goals than either "conservation" or "development" approaches.
- Support **improved environmental and economic outcomes** of planning.
- **Set a foundation** for future planning and monitoring changes.

HOW DO I CREATE SCENARIOS?

Tools & approaches

DEVELOPING SCENARIOS

THE FIVE STEPS TO CREATE YOUR SCENARIO

KNOW WHY

Set objectives, consider options, understand implications

DECIDE HOW

Establish clear & attainable goals, select tools & approach, designate resources

REACH OUT

Design stakeholder engagement process, obtain stakeholder input & review of scenarios

GET DATA

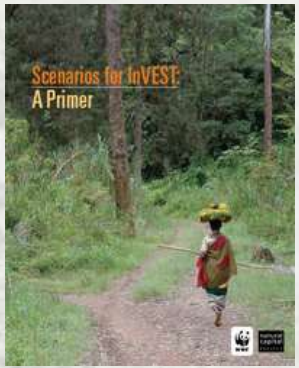
Compile data & apply tools, verify sources & management options

REFINE RESULTS

Ensure scenarios are distinct & contrasting, iterate with new data and stakeholders, learn as you go

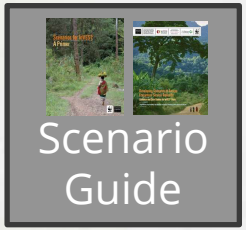
SETTLING WITH COMPROMISE. Scenario development is as much art as science. There are many options available. It helps to accept that there are no perfect scenarios; it will always be a compromise.

SCENARIO DEVELOPMENT
THE NATCAP APPROACH – CASES AND GUIDANCE



Step 1: Understand scenarios	Sections 2 & 3
Step 2: Select the right scenario approach	Section 4
Step 3: Develop scenario storylines	Section 5
Step 4: Create scenario maps	Section 6
Step 5: Assess ecosystem service outcomes	InVEST User Guide
Step 6: Use and communicate results	Section 7

NATCAP TOOLS
FOR SCENARIO DEVELOPMENT



SCENARIO TOOLS. Many others have been used, including sensitivity analysis, climate modeling, and Land Change Modeler.

Q&A

USING SCENARIO TOOLS

Using the Scenario Generator

SCENARIO TOOLS

MANY OPTIONS!

- Metronamica
- PoleStar
- IMAGE
- WaterGAP
- AIM
- GLOBIOM
- CLUE-S
- GTAP/MAGNET
- LandSHIFT
- International Futures Model
- IDRISI Land Change Modeler
- Marxan
- Dinamica
- GEOMOD

THE BIG QUESTIONS

natural capital PROJECT

Demand

Quantity of change

Allocation

Where does change occur?

BOTTOM LINE

Change analysis

- What drives change? What are the factors? What can history tell us?

Transition potential

- How good is this parcel for change?
- Uses neural networks, logistic regression, machine learning OR Expert Knowledge
- Produces transition map

Change prediction

- Uses historical rates of change and transition potential to create predicted changes
- Apply decision rules
- Keep an eye on the demand

TERMINOLOGY

- Storylines
- Drivers
- Factors
- Constraints
- Overrides

TRANSITION MATRIX

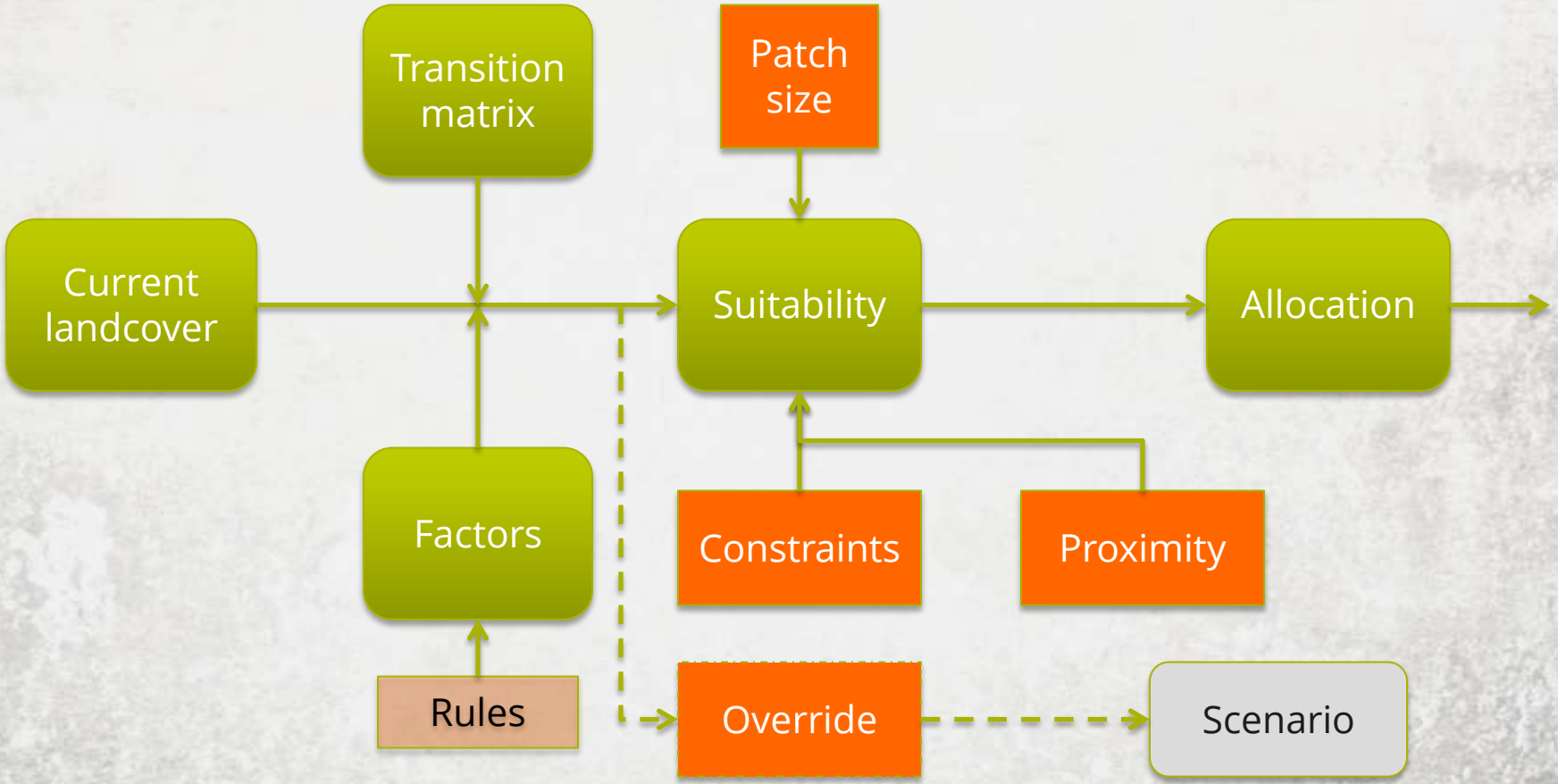
		FOREST	GRASSLAND	AGRICULTURE	URBAN	CHANGE	PROXIMITY	PRIORITY
LOSS	Forest	0	1	7	2	-30%	0	0
	Grassland	0	0	3	1	-40%	0	0
	Agriculture	0	0	0	0	50	1000	2
	Urban	0	0	0	0	10	2000	1

GAIN

Loc

Quantity

COMPONENTS AND PROCESS



DEMO

THE GAME
FOR SCENARIO GENERATOR

The scenario generator game trains users how to use the tool and teaches basic concepts of scenario development for ecosystem service assessments.

LOW CARBON DEVELOPMENT
WIN A $10,000,000 AWARD FROM THE WORLD BANK

- The World Bank wants to promote “low carbon development” and “climate smart agriculture” in your landscape.
- They’re offering a US$10 million award to the team that creates the scenario plan with the greatest increase carbon sequestration and food production.
- Given the existing mix of land covers, what changes in use would result in the highest returns in carbon and food?

POINT SCALE

ES POINTS EARNED FOR EACH LC CLASS

	CARBON POINTS	FOOD POINTS
Tropical forest	4000	1000
Woodland	3000	800
Grassland	1500	500
Degraded land	1000	500
Urban	100	100
Large-scale agriculture	500	4000
Small-scale agriculture	750	2000

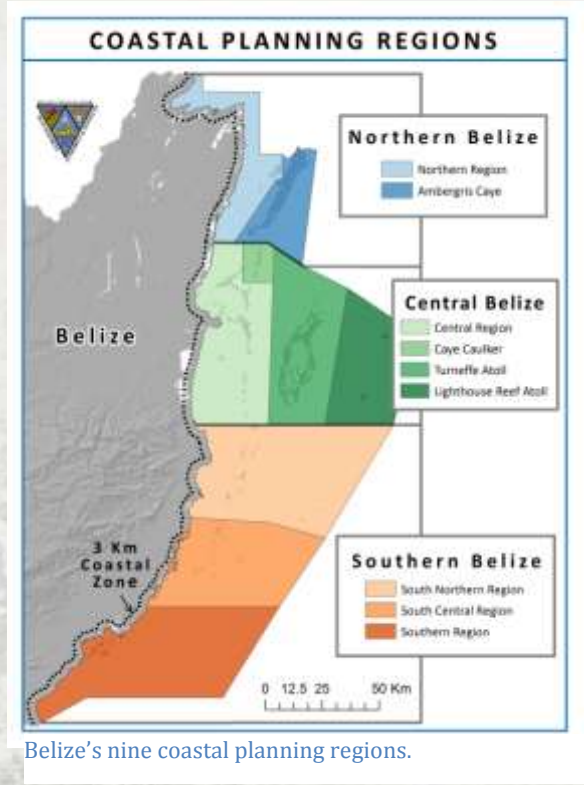
LOW CARBON DEVELOPMENT
WIN A $10,000,000 AWARD FROM THE WORLD BANK

- In the next *15 minutes*, your team will be able to create 3 scenarios – and pick the best of those 3 – to win the $10 million.
- You will be able to do 2 things: (1) change the percent of land under each of the 7 land cover types and (2) turn on or off the constraint (or protection factor) for your protected area.
- When you make these changes and run your scenario, you'll get a 'receipt' of your results and score. Check these for each scenario run and see what your best of 3 is.
- Remember, the winning team will win the prize!

TIME'S UP!!

Results and discussion about the game

GRAPHIC
AND TEXT ON THE SAME PAGE



Belize's nine coastal planning regions.

First level indent

Second level indent

- Third level indent is a bullet
- Let's don't go crazy with bullets. Your audience will thank you

CZMAI staff and stakeholders