

Using systematic planning to assess the existing coverage of MPAs on the insular shelf of Cuba



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Today's Presentation





Marine Protected Areas (MPAs)

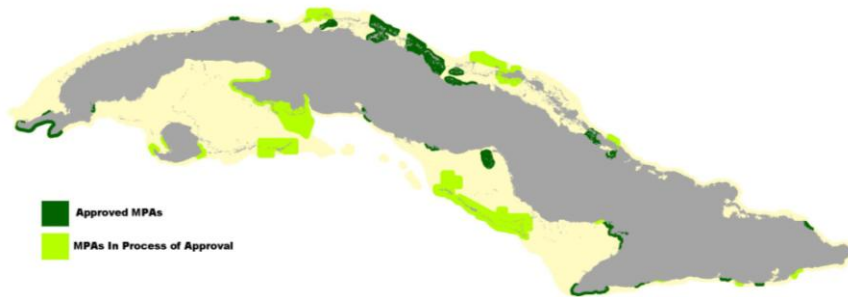
- Globally recognized as tools for biodiversity and fisheries conservation
- Essential part of an ecosystem-based approach to management of marine resources
- International and National commitments on Networks of MPAs



Marine Protected Areas in Cuba

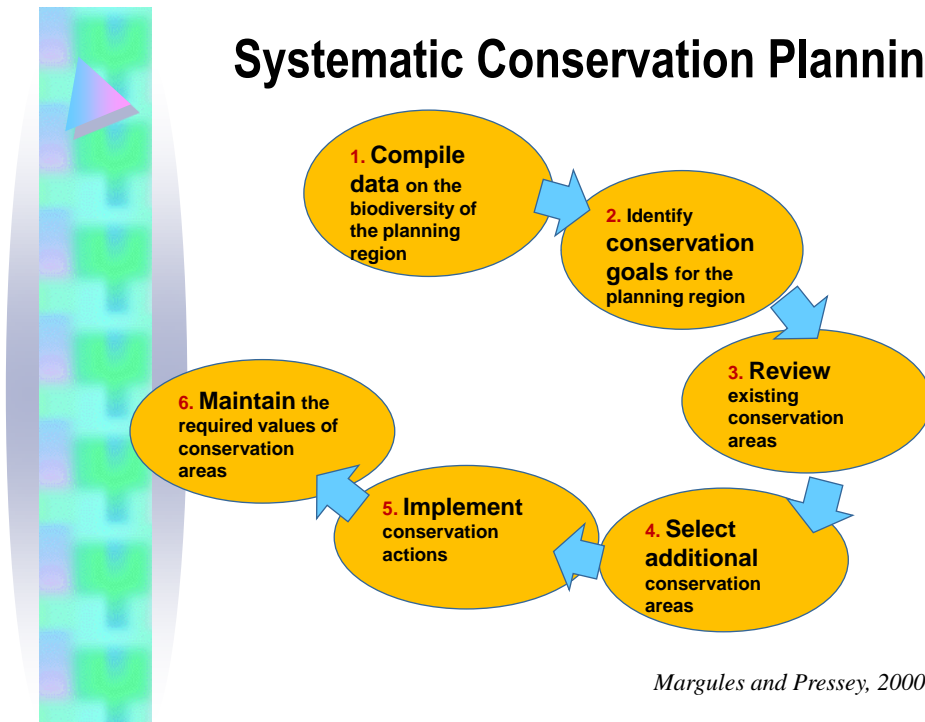
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|----------|---|
| 1970s | First Terrestrial Proposals |
| 1990s | Terrestrial PA Extensions...
Focus on corals, species, fisheries |
| 2000.... | New (delphic) Proposals
15% of the shelf
25% coral reef areas |

The Cuban MPA System



	No.	Area (Ha)	Prop of Shelf
Approved MPAs	18	198,934	3.5%
MPAs in Process of Approval	12	404,693	7.1%
Existing System SUB-TOTAL	30	603,607	10.6%
Additional Proposals*	45	192,704	3.4%
TOTAL	75	796,311	14.0%

Systematic Conservation Planning





Systematic Conservation Planning

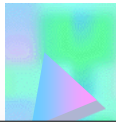
Main Elements

- Planning within Bio-regional/Eco-Region
- Explicit Goals/Site Selection Criteria
- Representation Focus
- Selection of a ‘portfolio of sites’
- Consideration of connectivity
- Socio-economic values/conflict/alternatives
- Efficiency (least area/cost)
- GIS, Decision Support/Optimization tools (e.g. MarXan)



Analysis Objectives

- Review the existing system of MPAs with regard to meeting explicit sets of conservation/representation targets
- Compare existing system of MPAs with a more systematically (Data/DSS) derived site selections
- Determine gaps, guide the future development of MPAs in Cuba



Technical Working Group (TWG)

- CNAP, IDO, CIP, IES
- Technical Support WWF-Canada/ Env. Defense

Series of Workshops

- Define goals/criteria, representation targets, review of results...



Overview of Process

Goals of MPA System



Criteria for Site Selection



Compile Data / Conservation Features (CFs)



Set Targets for representation of CFs



- Gap Analysis
- Site Selection DSS (MARXAN)
- Comparisons



MPA System Goals

GOAL 1: To protect representative samples of Cuba's coastal and marine biodiversity

GOAL 2: To contribute to enhancing sustainable fisheries

GOAL 3: To represent unique geographical features and important historical and cultural sites

Site Selection Criteria

Goal 1: Biodiversity...

Eco-region Representation, Habitat Representation, Environmental Gradients, Habitat Heterogeneity, Critical Areas for Selected/Endangered Sp.

Goal 2: Fisheries...

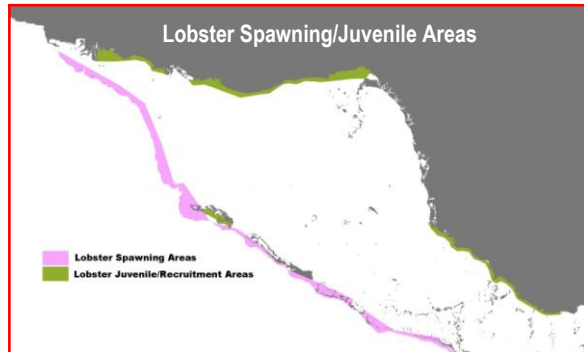
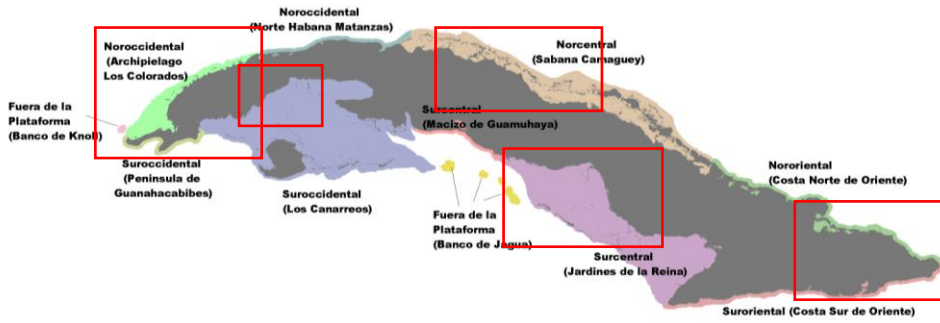
Spawning Areas, juvenile/rearing sites for fished species

Goal 3: Historical/Cultural...

Unique geological/geomorphic features (caves, blue holes), Cultural sites, Historical Sites, Aesthetic Sites

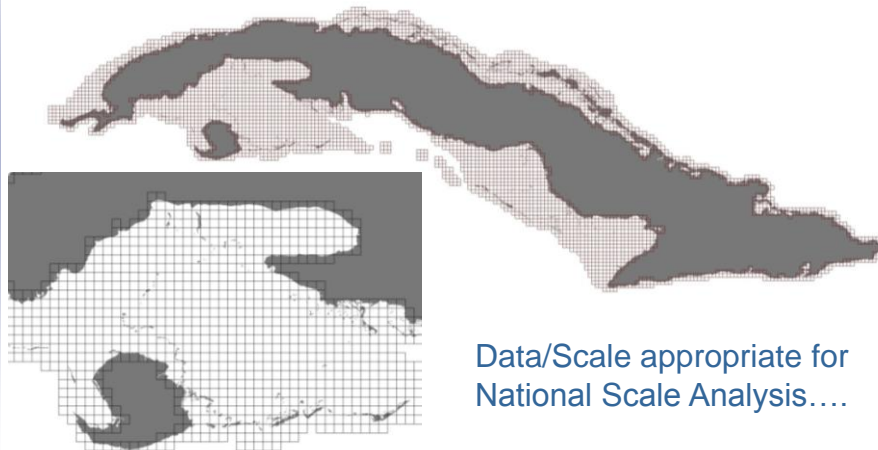
Conservation Features Data/Targets

Criterion	Conservations Features/Data
GOAL 1: BIODIVERSITY	
<i>Eco-region Representation</i>	11 Ecoregions (on shelf)
<i>Habitat Representation</i>	7 Marine (submerged) Habitat Types 7 Terrestrial (shoreline)Habitat Types
<i>Environmental Gradients</i>	8 Seabed Geology Types 6 Depth Ranges
<i>Critical Areas for Species</i>	2 Types Turtle Nesting Beaches Distribution Crocodiles (endemic/predator)
GOAL 2: FISHERIES SUSTAINABILITY	
<i>Spawning Areas</i>	7 species of Snapper and Grouper Spawning Areas for Lobster and Shrimp
<i>Juvenile Areas</i>	Juvenile areas Lobster and Shrimp
TOTAL 53 Conservation Features	



GAP/MARXAN Analyses

- 3347 Planning Units (PU) 5x5km (2500ha)



Data/Scale appropriate for National Scale Analysis....

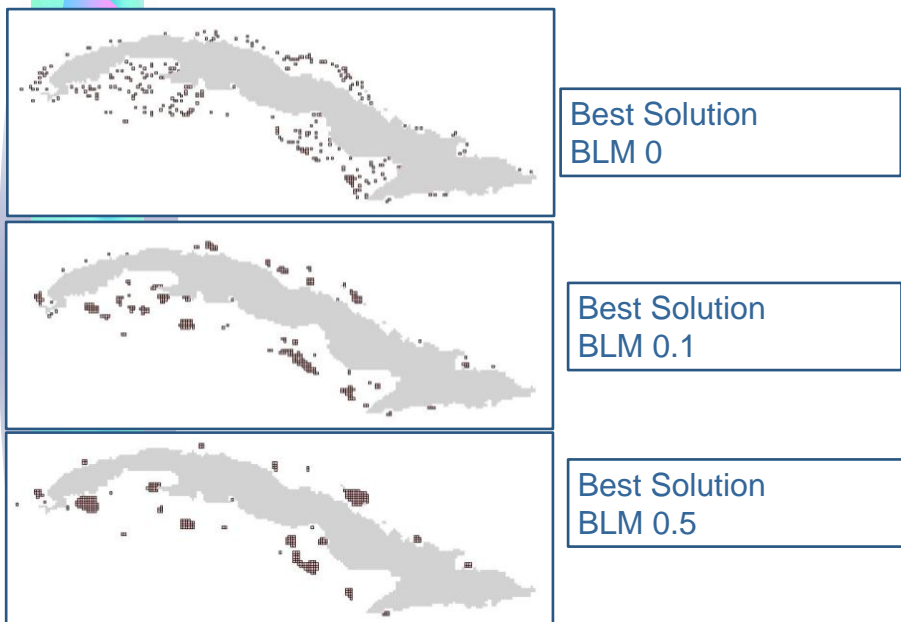
Results: Representation within the current system

Eco-Region	% within MPA System	No. of Consv. Features	CFs Represented in MPA system
Noroccidental (Archipelago Los Colorados)	0.1	34	0
Norcentral (Sabana Camaguey)	17.7	32	26
Surcentral (Jardines de la Reina)	13.2	46	28
Suroccidental (Los Canarreos)	6.5	36	20
Noroccidental (Norte Habana Matanzas)	1.3	20	3
Nororiental (Costa Norte de Oriente)	1	21	0
Suroriental (Costa Sur de Oriente)	5.5	18	6
Surcentral (Macizo de Guamuhaya)	0	17	0
Suroccidental (Peninsula de Guanahacabibes)	31.8	21	10
Fuera de la plataforma (Banco de Knoll)	0	1	0
Fuera de la Plataforma (Banco de Jagua)	0	8	0

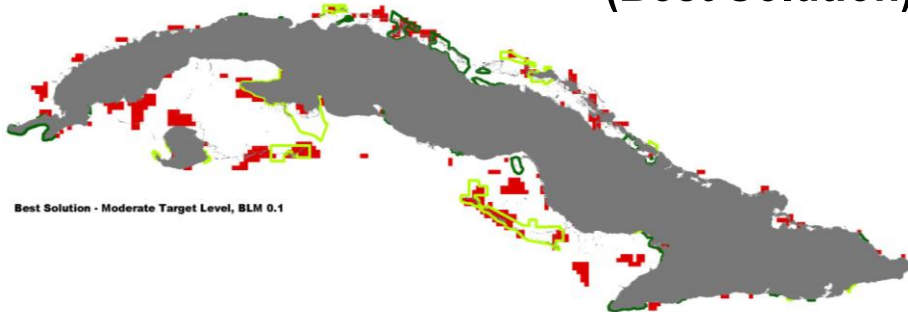
In ecoregions with MPAs: Depth Ranges – (10-30m, >150m), Fish Spawning Aggregations, Turtle Nesting Beaches – GENERALLY NOT Adequately Represented

In some ecoregions – Marine Habitats, Shoreline habitats are OVER represented...

Effects of BLM at set Target Level



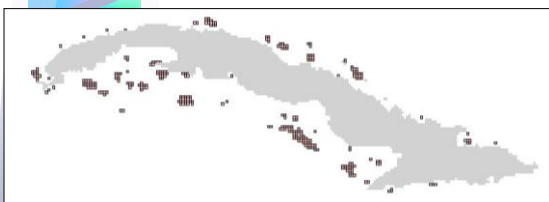
Results: Unconstrained Selection (Best Solution)



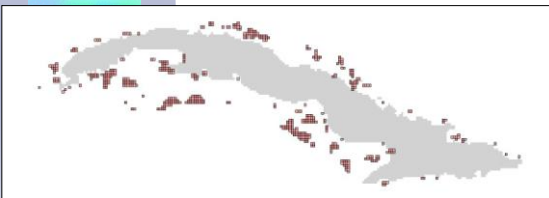
Target Scenario	Total Planning Units (PU) selected	% of Planning area	% of Selected PU with MPAs
LOW	292	8.7%	23.3%
MODERATE	470	14.0%	21.7%
HIGH	894	26.7%	20.9%



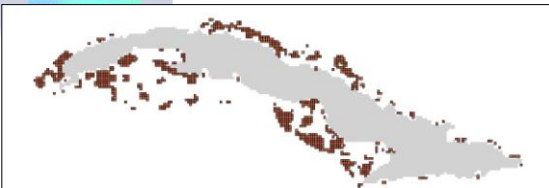
Increasing Target Levels



Low (5% - 50%)
8.7% of Area

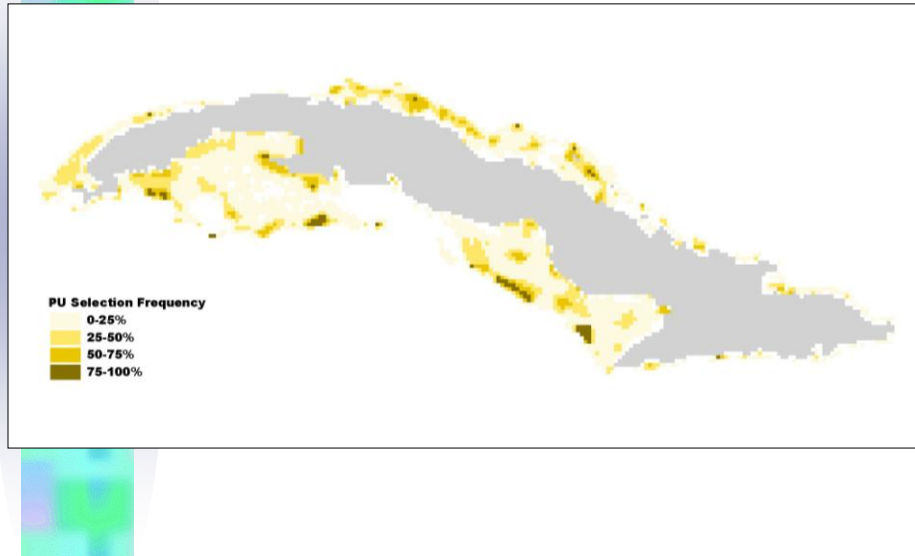


Moderate (10% - 50%)
14% of Area



High (15% - 100%)
27% of Area

Summing different Scenarios

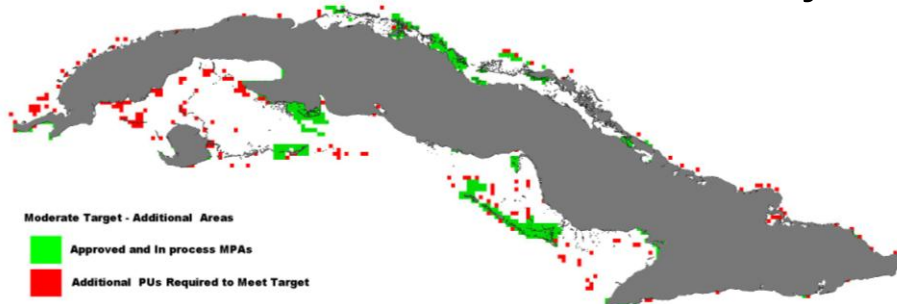


Results: Unconstrained Selection (Irreplaceable areas)



Target Scenario	Irreplaceable PU (selection frequency \geq 75%)	Irreplaceable PU with MPAs	% with MPAs
LOW	44	25	56.8%
MODERATE	102	58	56.7%
HIGH	438	183	41.8%

Results: Selection Considering existing MPA system



Target Scenario	Planning Units (PU) Selected	Prop of Planning Area	PU with existing MPAs	Additional PU
LOW	445	13.3%	356	89 (x25%)
MODERATE	563	16.8%	356	207 (x58%)
HIGH	946	28.3%	356	590 (x170%)

Results Summary

The existing system....

- Does not meet more robust targets
- Does not contain 45-60% of irreplaceable areas
- Would need to increase by 0.25 to 1.7 times more to meet all targets

Take home message...

- Without a framework for representation, selection of MPAs remains arbitrary
- Important to get systematic planning into the process early
- Delaying the implementation systematic planning framework means you will need more area to meet all your targets

Acknowledgements

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