Ecological Gap Assessment: An Overview

Conservation International

Wildlife Conservation Society

The Nature Conservancy
Protecting nature. Preserving life.™

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BirdLife International

WWF

WCPA
World Commission on Protected Areas

1. **What is a gap assessment?**
2. **Why is it important?**
3. **What are some general principles?**
4. **What are the major steps?**
5. **What can we learn from gap analysis?**

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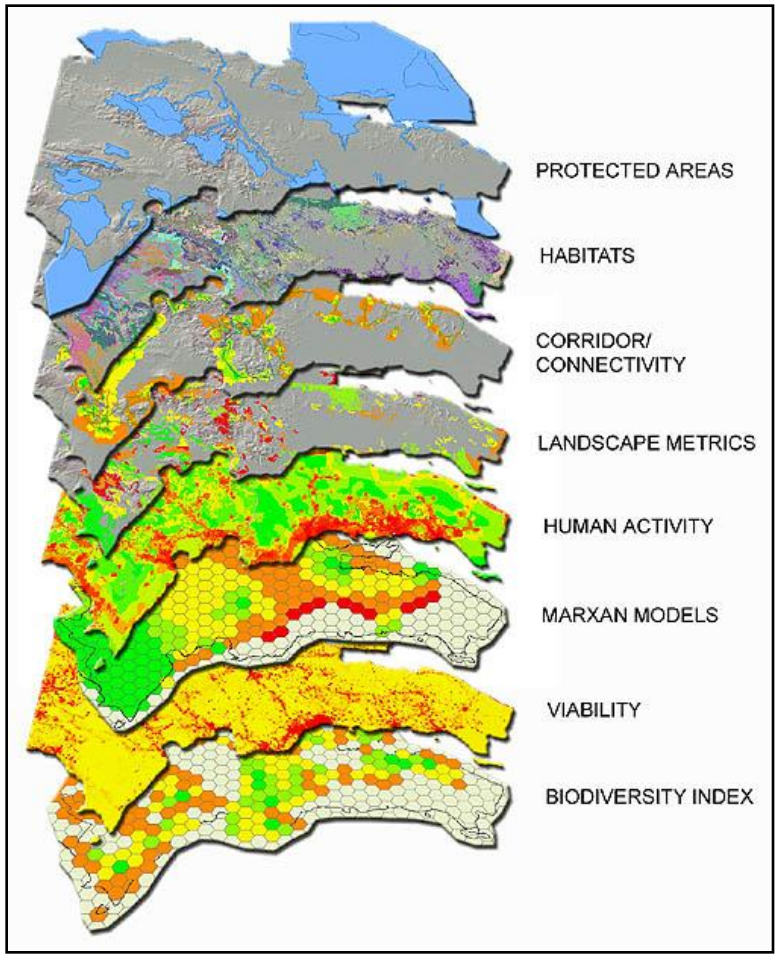
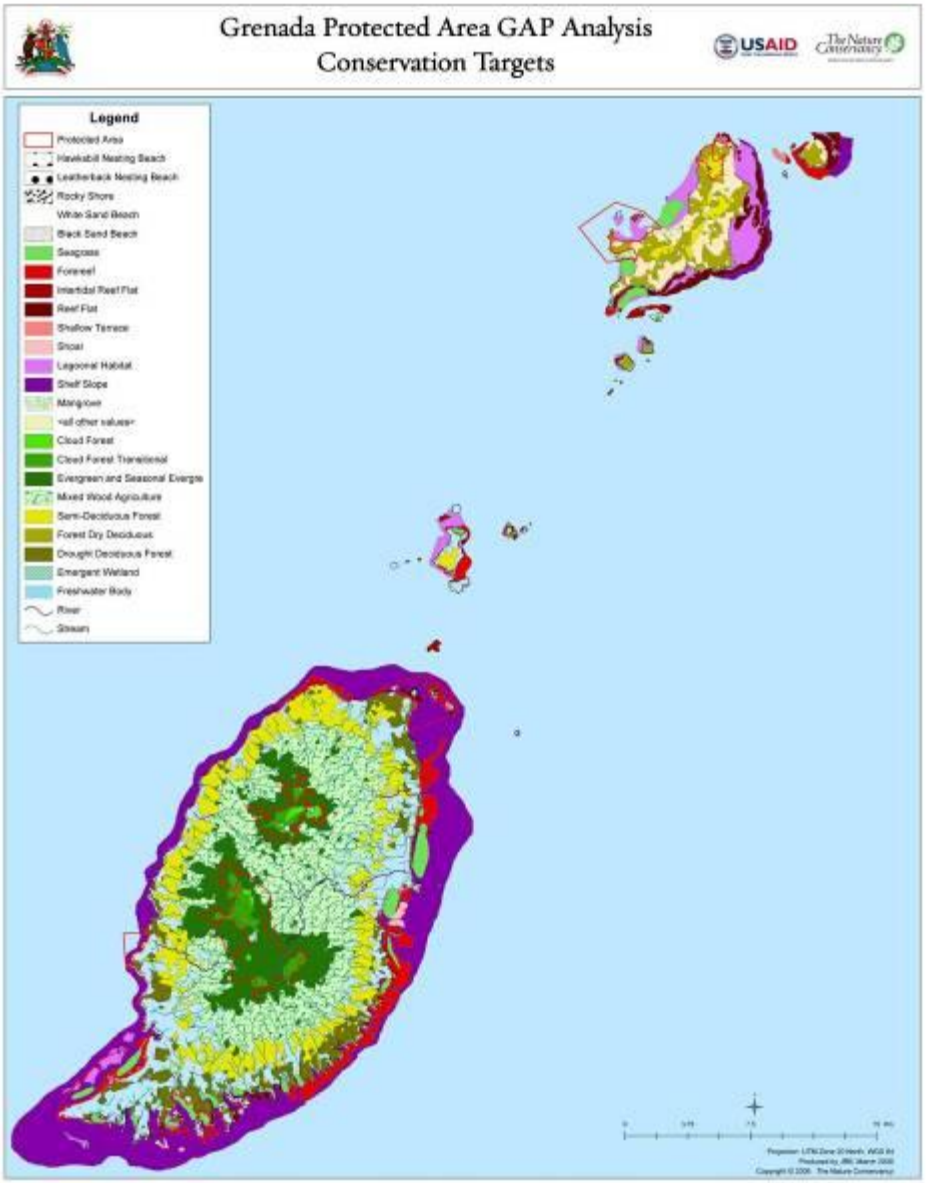
1. What is a Gap Assessment?

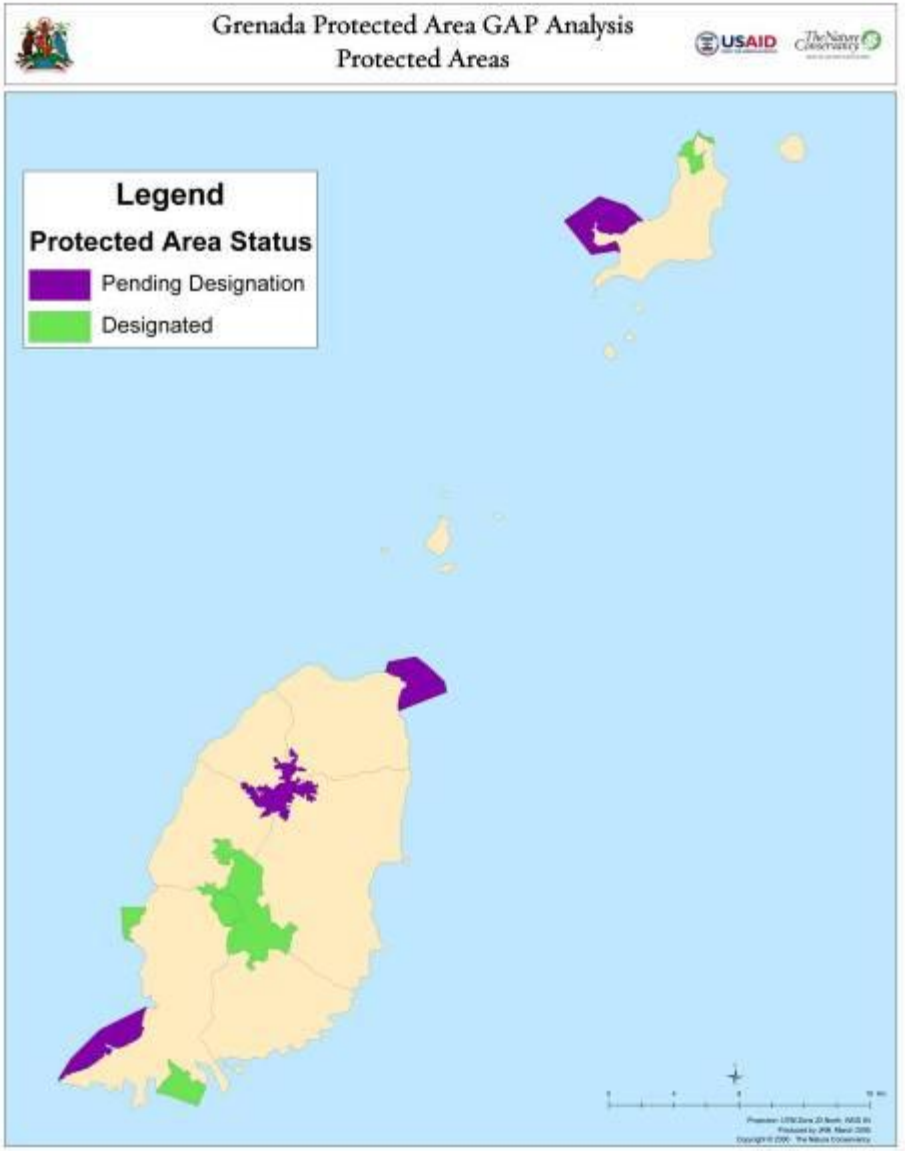


In this case: a comparison between the distribution of **biodiversity** and the status of **protection / conservation** within a country

- For example: this is the distribution of significant biodiversity in Grenada…



- …compared with existing and planned protected areas – comparison shows where biodiversity remains unprotected

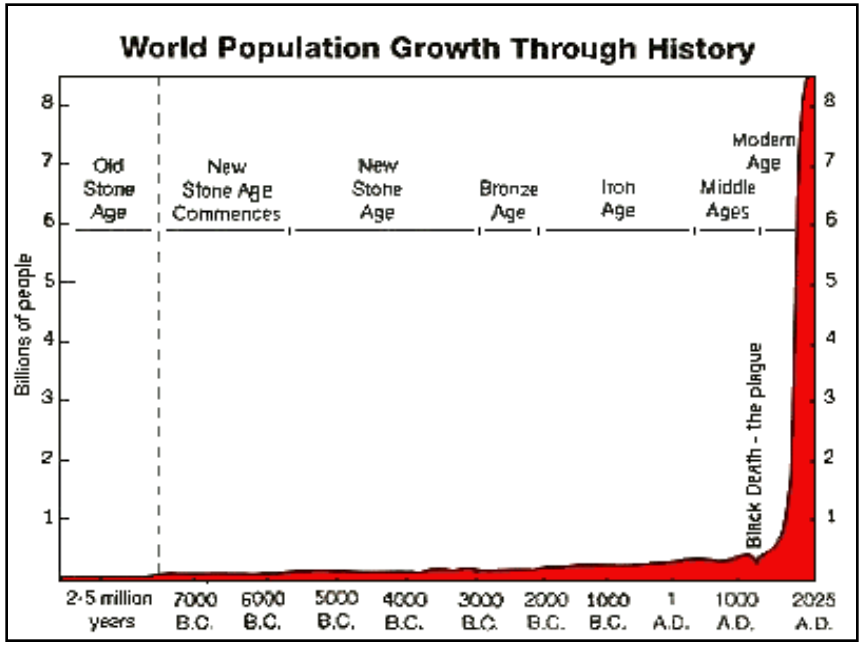


2. Why conduct a gap assessment?

To identify biodiversity (*i.e., species, ecosystems and ecological processes*) **not adequately conserved within a protected area network** or through other effective and long-term conservation measures.

2. Why conduct a gap assessment?

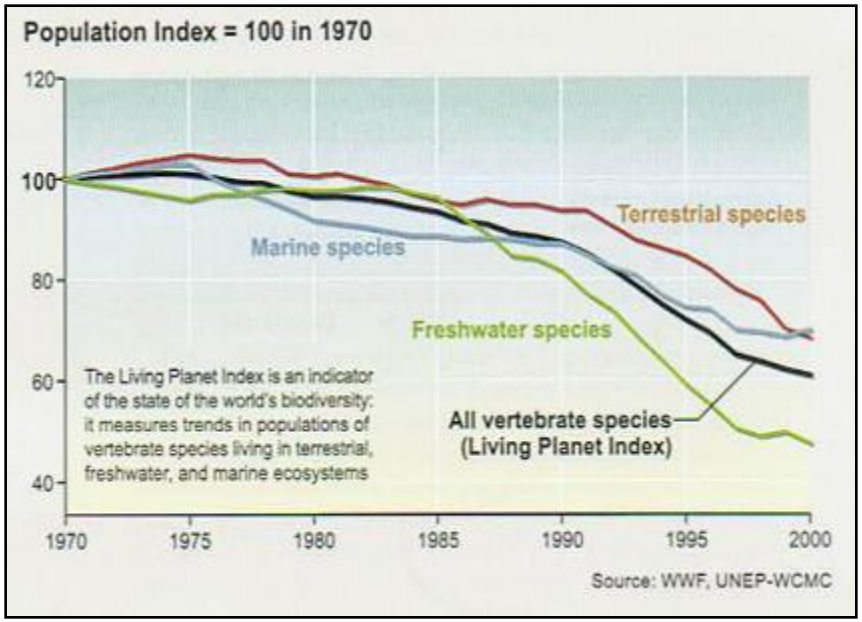
- **Human population and pressure continue to increase**



Most of the pressure comes from people born in the rich countries

2. Why conduct a gap assessment?

- Human population and pressure continue to increase
- **Biodiversity is in rapid decline**



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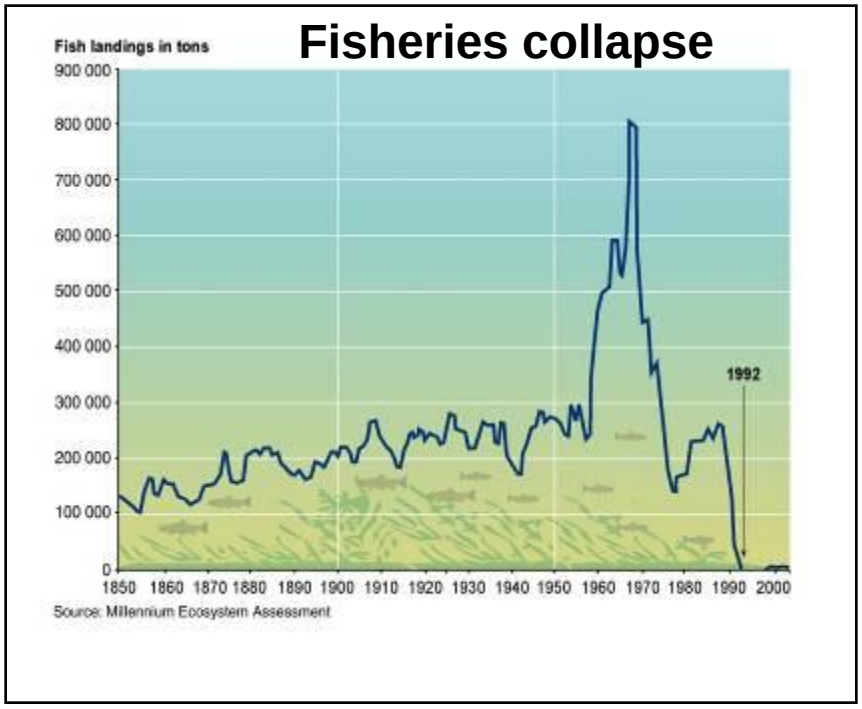
- Human population and pressure continue to increase
- Biodiversity is in rapid decline
- **Change is non-linear**



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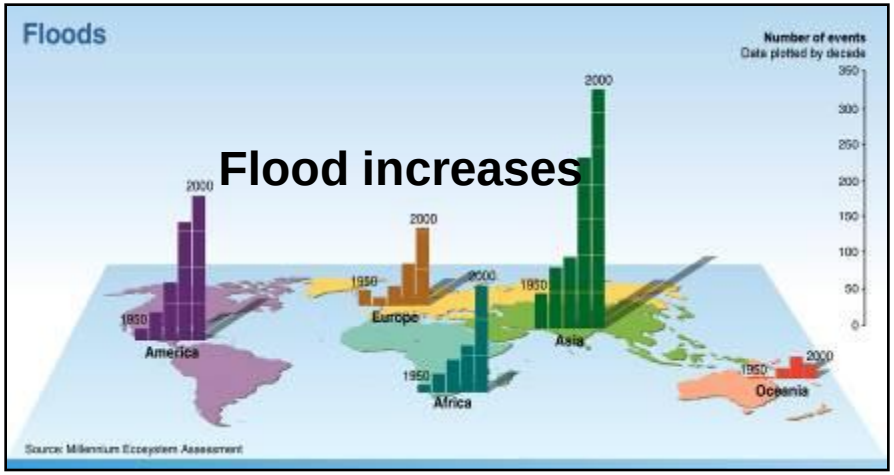
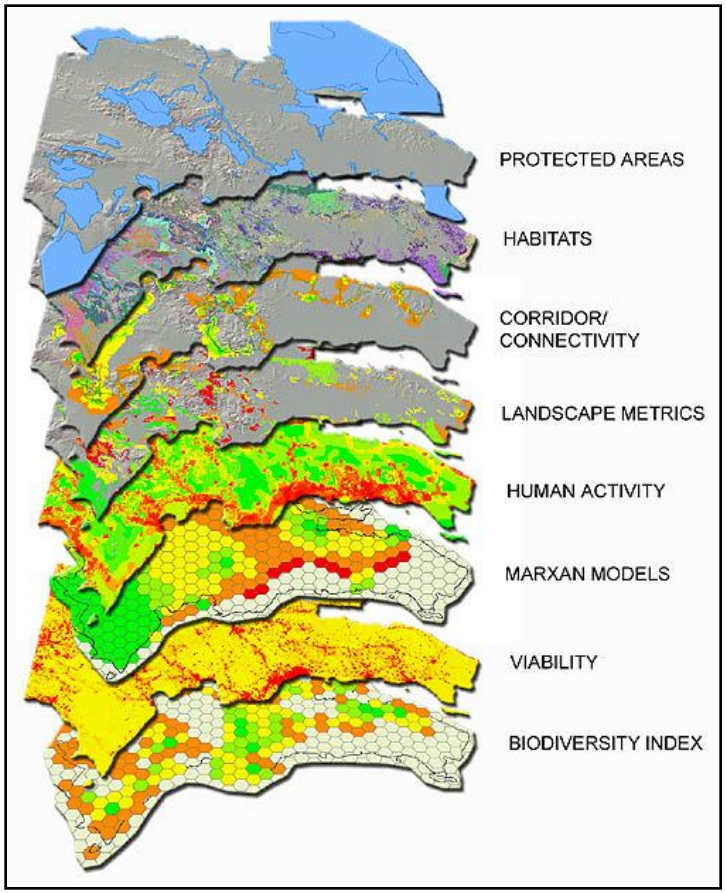
- Change is non-linear
- **Human well-being is linked to ecology**



Although biodiversity is our starting point, protected areas offer important additional benefits


save water... we are
me!bourne

- **Gap analysis is important because although over 10% of the world's land surface is in protected areas it has proven easier to protect deserts and ice-caps than many high biodiversity areas such as lowland forests**



A gap assessment lets us be more focused, strategic and efficient with our conservation investments

3. Principles for Gap Assessments

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1. **Representation – is all of biodiversity represented in the PA system?**
2. **Resilience**
3. **Redundancy**
4. **Multiple gaps**
5. **Participation**

3. Principles for Gap Assessments

1. **Representation**
2. **Resilience – are there enough high quality examples to withstand change?**
3. **Redundancy**
4. **Multiple gaps**
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3. Principles for Gap Assessments

1. **Representation**
2. **Resilience**
3. **Redundancy – are there multiple examples distributed across system?**
4. **Multiple gaps**
5. **Participation**

3. Principles for Gap Assessments

1. **Representation**
2. **Resilience**
3. **Redundancy**
4. **Multiple gaps – are representation, functional & management gaps built in?**
5. **Participation**

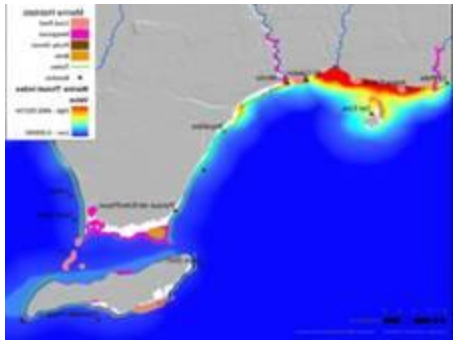
3. Principles for Gap Assessments

1. **Representation**
2. **Resilience**
3. **Redundancy**
4. **Multiple gaps**
5. **Participation – are stakeholders involved in an iterative process?**

4. What are the major steps?

A. Assess biodiversity status

- **Identify focal biodiversity elements**
- **Assess current distribution**
- **Assess viability**
- **Map threats**
- **Set biodiversity and conservation goals**



B. Assess protection status

- Map distribution of all PAs by type and governance
- Map results of PA management effectiveness

C. Analyze results

- Key data sets
- Critical questions

D. Fill gaps

- Prioritize key gaps
- Develop strategies to fill gaps
- Develop cost estimates

4. Key Steps in Gap Assessment

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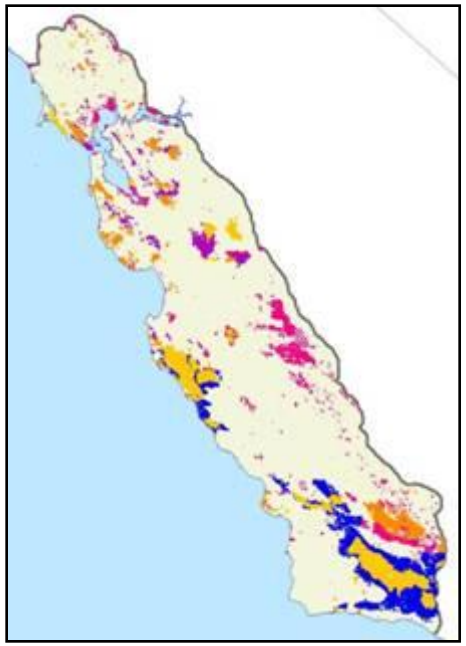

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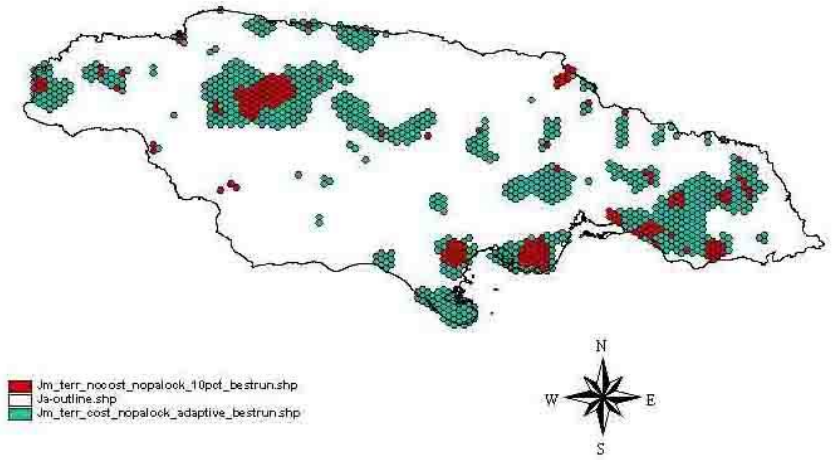

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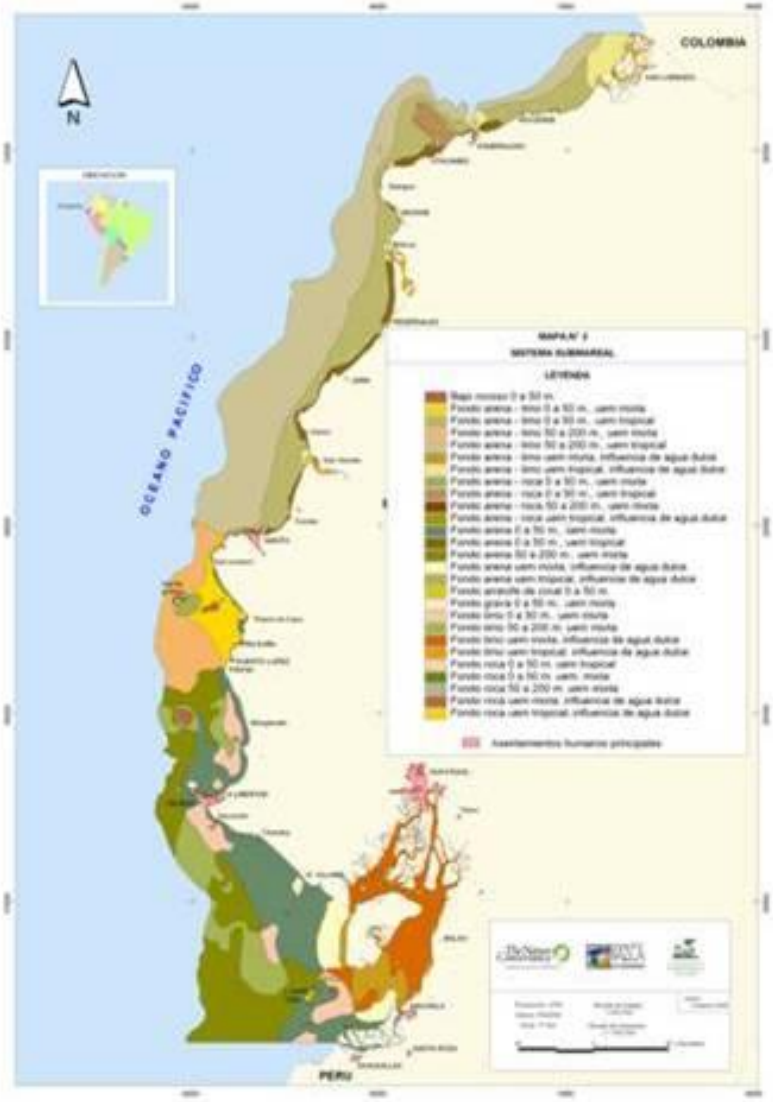
Identifying focal biodiversity elements

- Represent full suite of biological complexity
- Capture irreplaceable and vulnerable species
- Capture ecological functions
- Include all biological realms
- Include multiple spatial and biological scales

Capturing ecosystem elements in Ecuador

12 INTERTIDAL

27 SUBTIDAL SYSTEMS



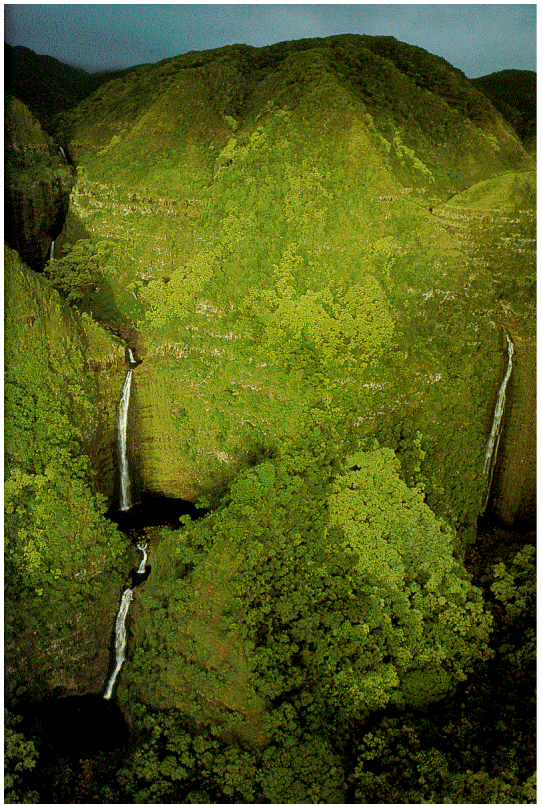
Capturing species elements in Ecuador

Selection criteria for species:

- Threatened
- Endemic
- Habitat builders
- Keystone species
- Migratory

Total 53 species: mammals, fish, birds, crustaceans, molluscs, reptiles

Assessing current distribution and viability



Factors include:

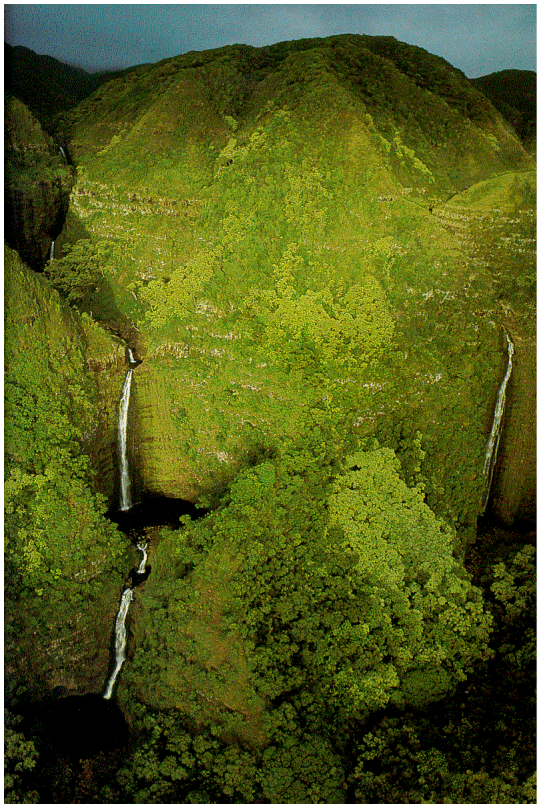
a) Size (minimum dynamic area, minimum viable population)

b) Condition

c) Landscape context (fragmentation, isolation)

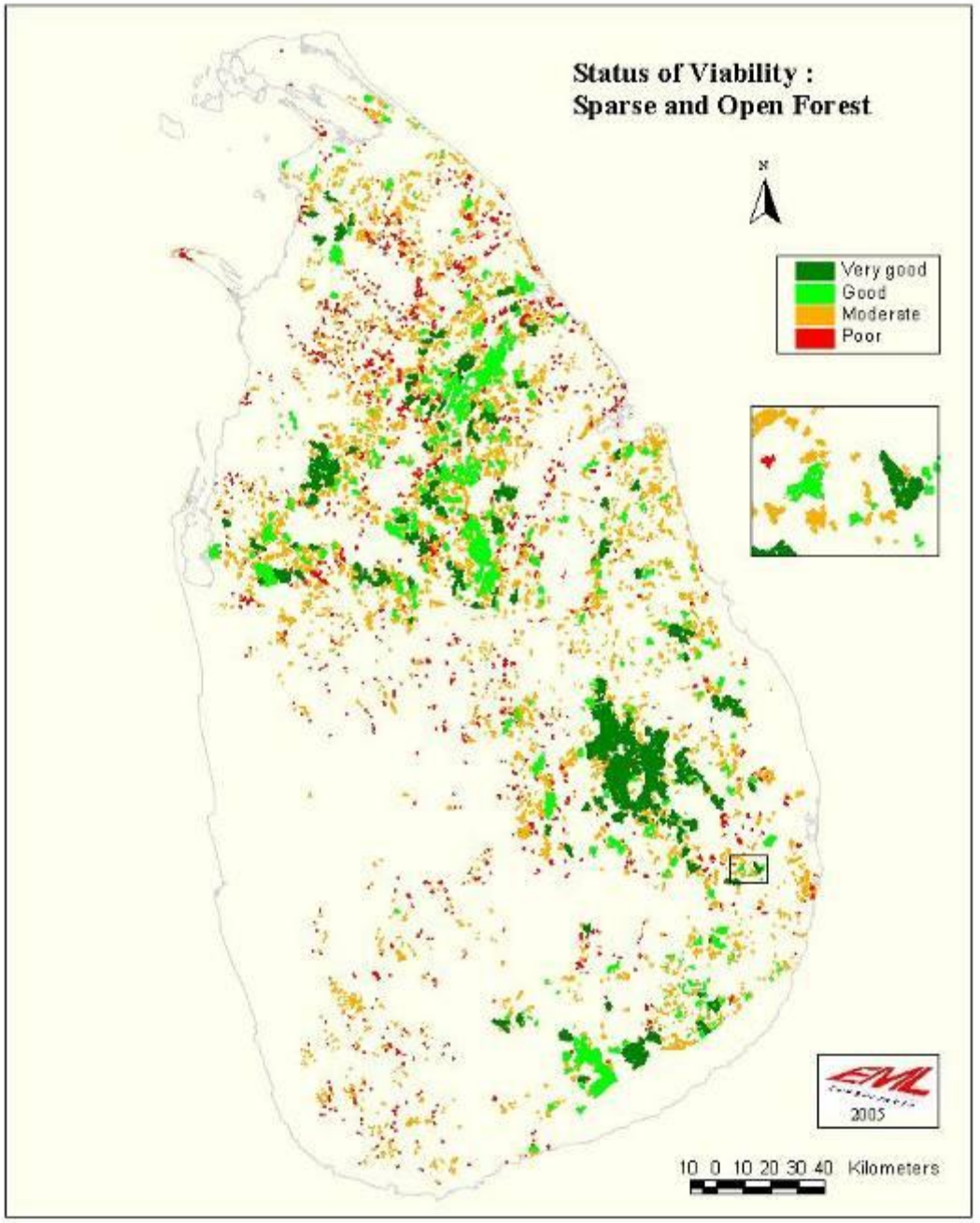
d) Configuration

Assessing current distribution and viability

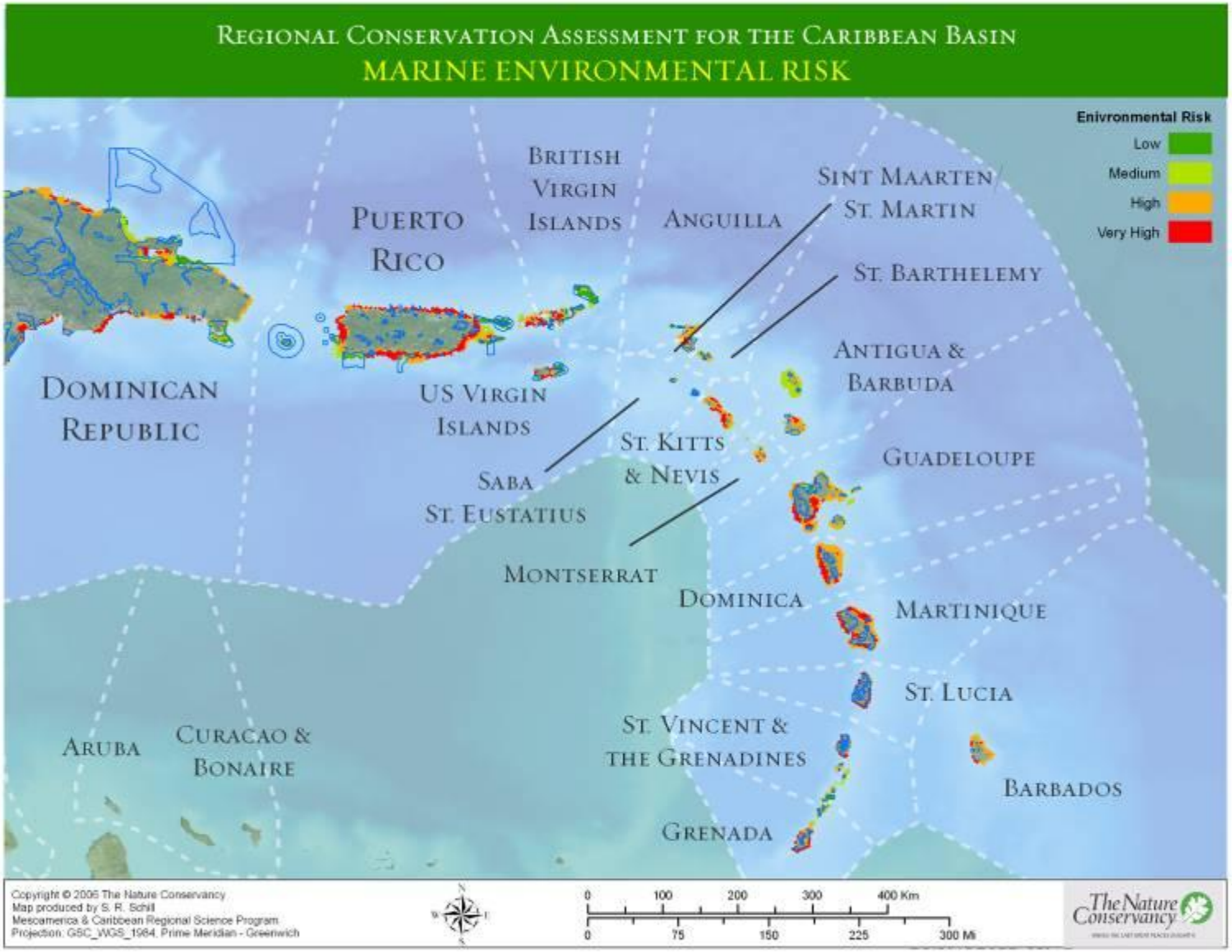


Overall Viability Summary					
East Molokai - Hawaii					
Conservation Targets		Landscape Context	Condition	Size	Viability Rank
1	North Shore Forests & Cliffs	Fair	Good	Fair	**Fair**
2	Montane Wet Forest	Fair	Very Good	Fair	**Good**
3	South Slope Mesic Forest & Shrubland	Poor	Good	Poor	**Fair**
Overall Biodiversity Health Rank					**Fair**

Viability of sparse and open forests in Sri Lanka



Assessing threats



Setting biodiversity and conservation goals

Factors in Setting Goals:

- Ecological needs and thresholds
- Threat status of biodiversity
- Distribution and rarity
- Protection goals may be categorical (e.g. 10-20% of the ecosystem)
- Consider restoration goals

Example of setting goals from Grenada

Level 1: Biome	Level 2: Major Habitat Type	Level 3: Ecoregions	Level 4: Focal biodiversity elements
Terrestrial	Tropical Moist Forest	Windward Island Moist Forest	Cloud Forest
			Cloud Transitional Forest
			Evergreen Forest
			Mixed Wood Agriculture
	Tropical Dry Forest	Lesser Antillean Dry Forest	Dry Deciduous Forest
			Drought Deciduous Forest
			Semi Deciduous Forest
Freshwater	Tropical Island Fresh Water Systems	Fresh Water Bodies	Emergent Wetlands
			Open Water Bodies
		Streams	Class 4-6 Streams
			Class 7-8 Streams

Example of setting goals from Grenada

Level 1: Biome	Level 2: Major Habitat Type	Level 3: Ecoregions **Goal: ≥ 25%**	Level 4: Focal biodiversity elements **Individual Goals**
Terrestrial	Tropical Moist Forest	Windward Island Moist Forest	Cloud Forest –**: 99%**
			Cloud Transitional Forest–**: 85%**
			Evergreen Forest–**32%**
			Mixed Wood Agriculture: **20%**
	Tropical Dry Forest	Lesser Antillean Dry Forest	Dry Deciduous Forest : **25%**
			Drought Deciduous Forest: **25%**
			Semi Deciduous Forest : **25%**
Freshwater	Tropical Island Fresh Water Systems	Fresh Water Bodies	Emergent Wetlands: **50%**
			Open Water Bodies: **75%**
		Streams	Class 4-6 Streams: **75%**
			Class 7-8 Streams: **100%**

B. Assess protection status

- Map distribution of all protected areas by type and governance
- Map results of protected area management effectiveness if available

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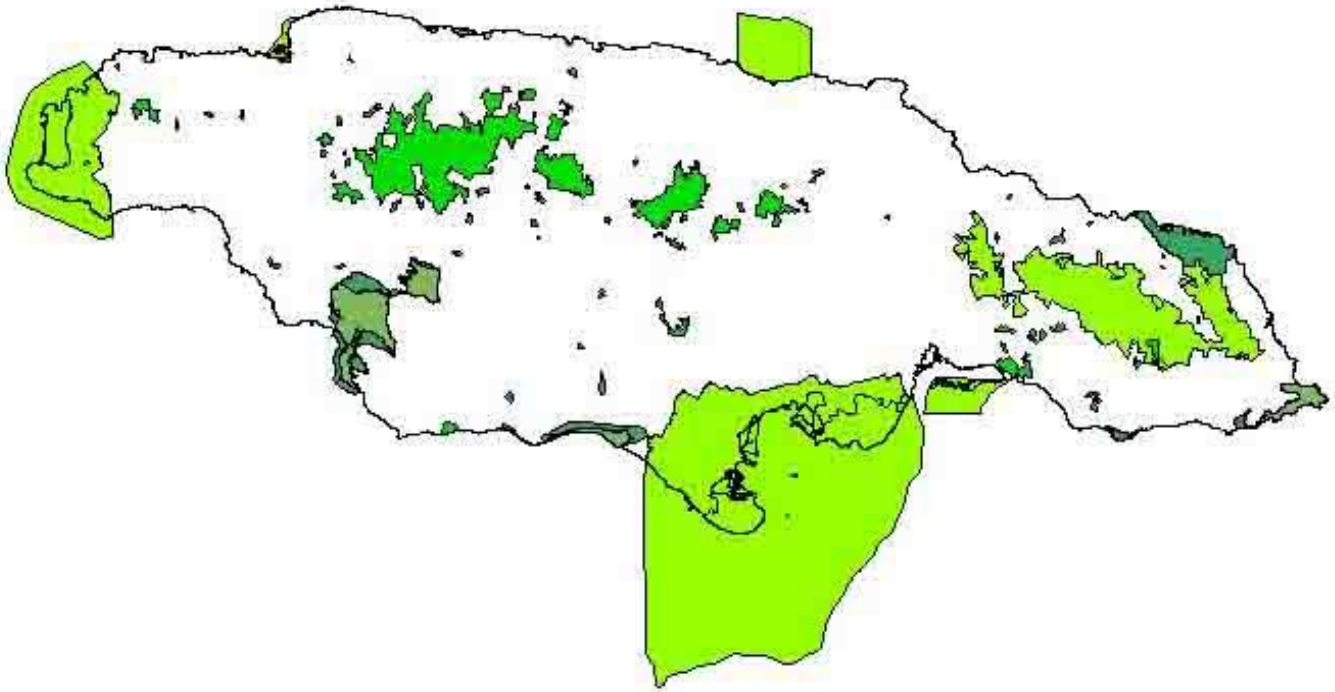
Distribution of existing protected areas in Jamaica

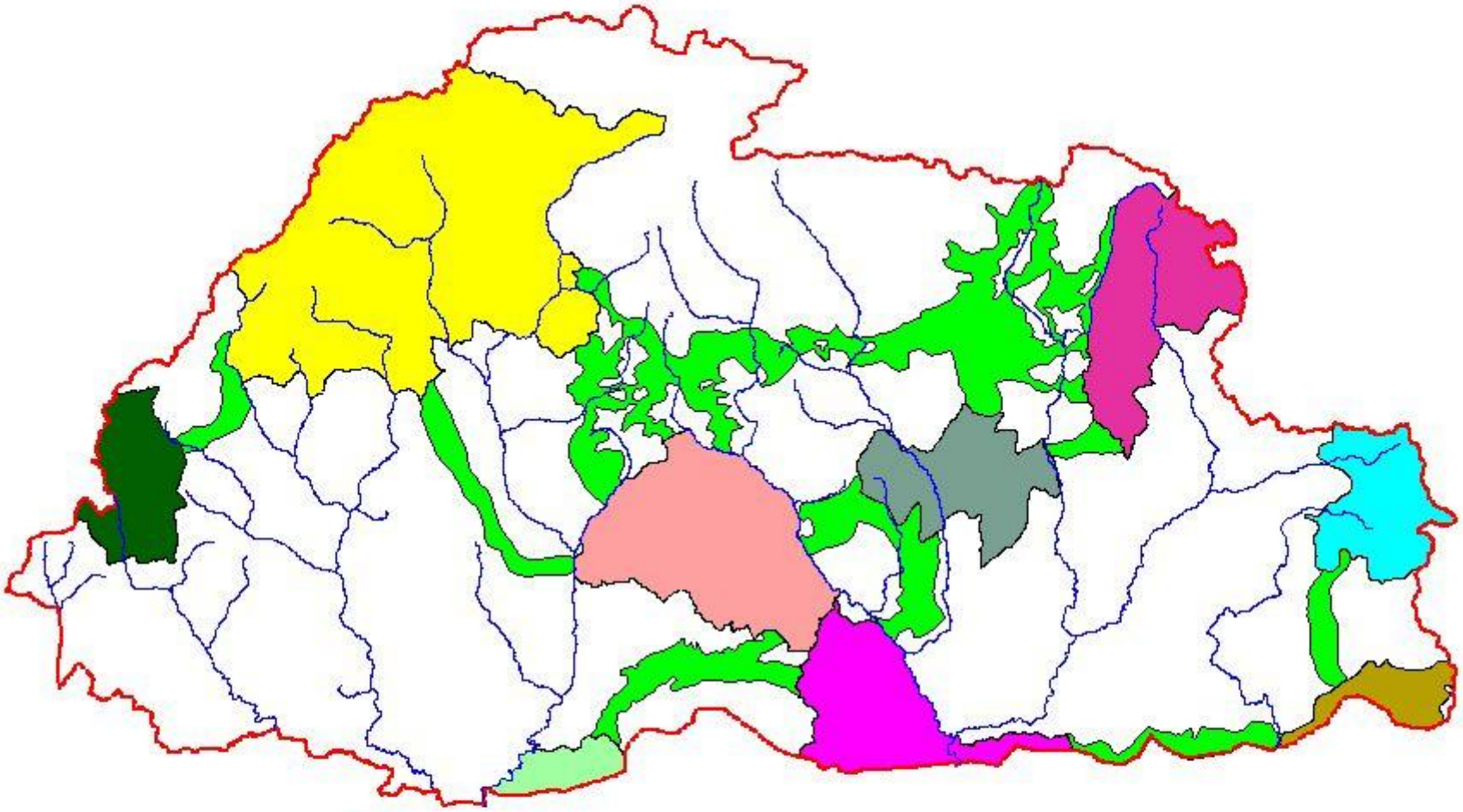


Ja-outline.shp
Ja_pa_all_protected_areas_24mar06.shp
Declared PA (NRCA Act)
Fish Sanctuary
Forest Reserve
Game Reserve
Proposed PA

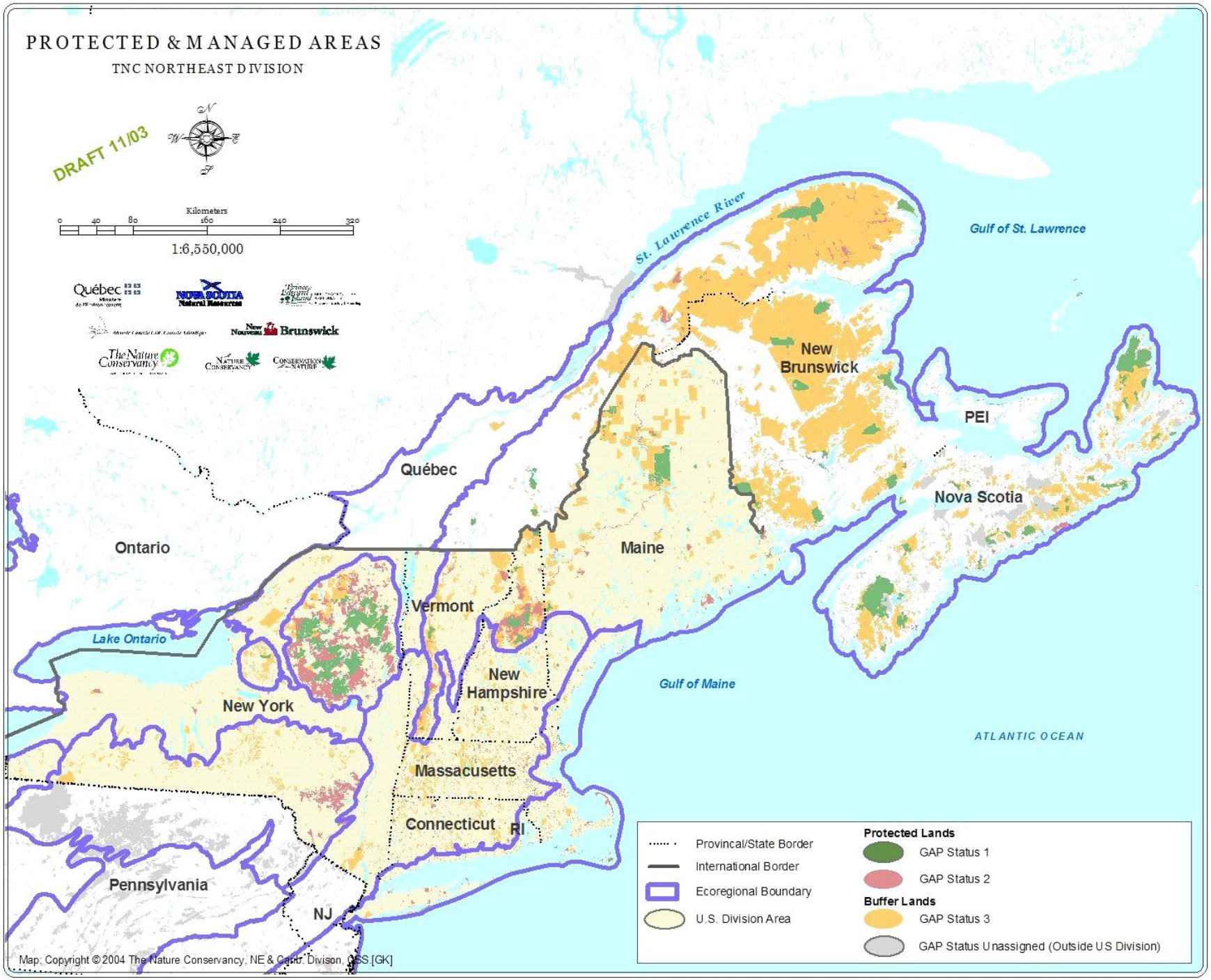
N
W
E
S

Biological Corridors linking Protected Areas
A Gift to the Earth from the People of Bhutan

WWF



Mexico: 155 PAs under federal jurisdiction in seven regions


PROTECTED & MANAGED AREAS
TNC NORTHEAST DIVISION
DRAFT 11/03
Kilometers
0 40 80 160 240 320
1:6,550,000
St. Lawrence River
Gulf of St. Lawrence
New Brunswick
PEI
Nova Scotia
Québec
Ontario
Maine
Vermont
New Hampshire
Lake Ontario
New York
Gulf of Maine
ATLANTIC OCEAN
Massacusetts
Connecticut
RI
Pennsylvania
NJ
Provincal/State Border
International Border
Ecoregional Boundary
U.S. Division Area
Protected Lands
GAP Status 1
GAP Status 2
Buffer Lands
GAP Status 3
GAP Status Unassigned (Outside US Division)
Map: Copyright © 2004 The Nature Conservancy, NE & Caro. Divison. GSS.[GK]

1:6,550,000

V. Low
Low
Medium
High
V. High

PA Management Effectiveness

runswick

Québec

New Brunswick

PEI

Nova Scotia

Maine

Vermont

New Hampshire

New York

Massacusetts

Gulf of Maine

ATLANTIC

C. Analyze results – key data and critical questions

a) Biodiversity status – for each element:
   a) Goals
   b) Distribution and viability
   c) Threat status

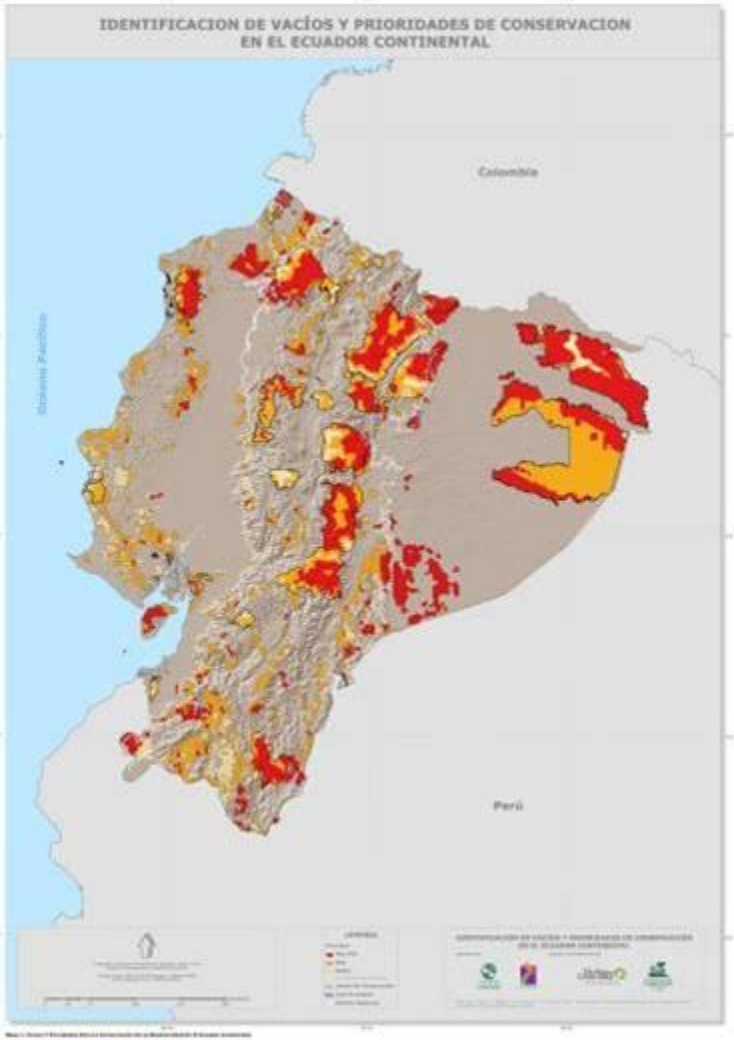
- Protection status – for each element:
  - Protected area type/governance
  - Protected area management effectiveness

D. Fill gaps

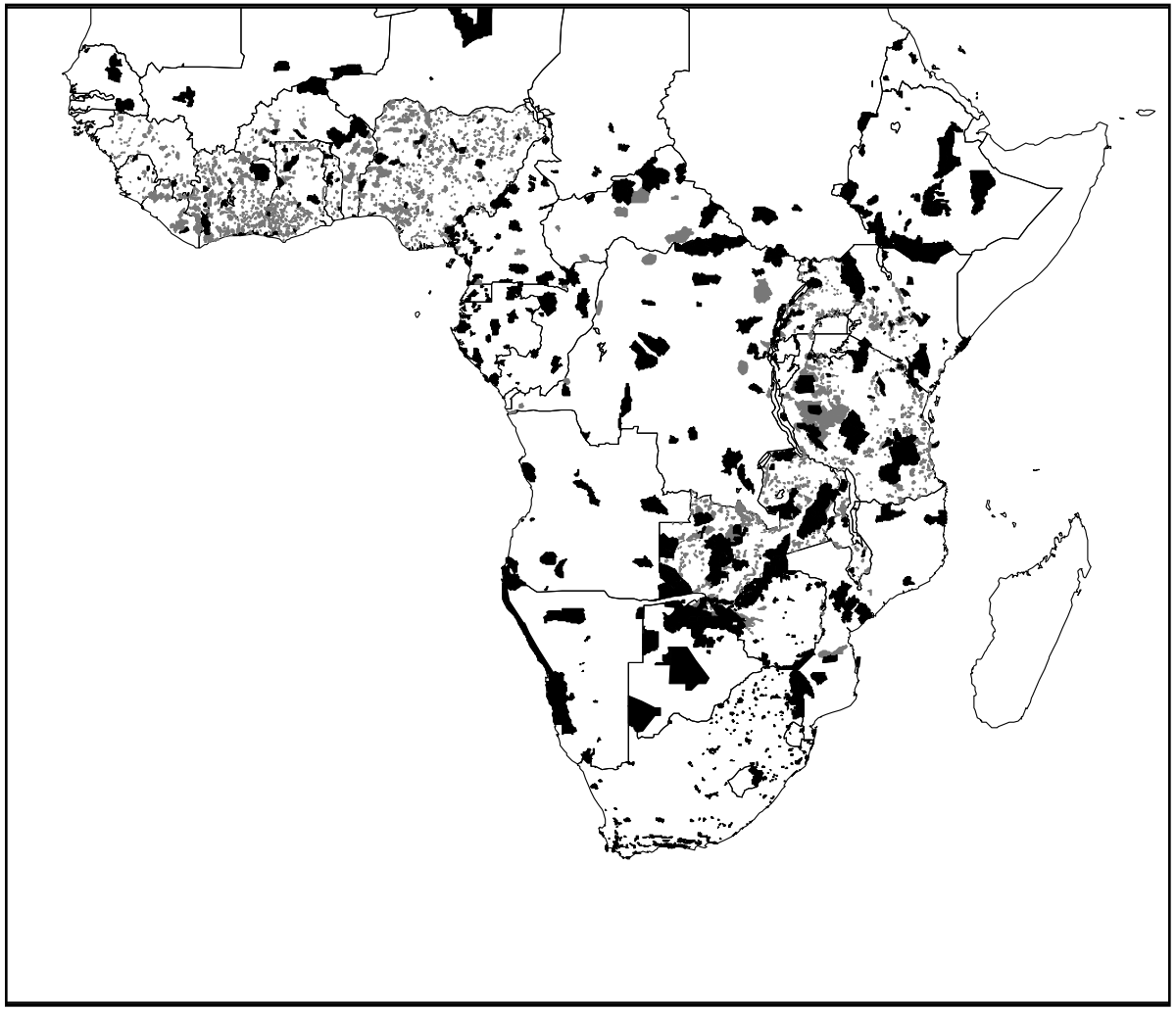
- Prioritize key gaps
- Develop strategies to fill gaps
- Develop cost estimates and action plan

Prioritize key gaps

- All gaps cannot be filled at once.
- Prioritize areas based on **threat, leverage, opportunity, irreplaceability, feasibility**
- Consider early wins to build momentum and enthusiasm for protected areas locally and nationally



Forest reserves in Africa



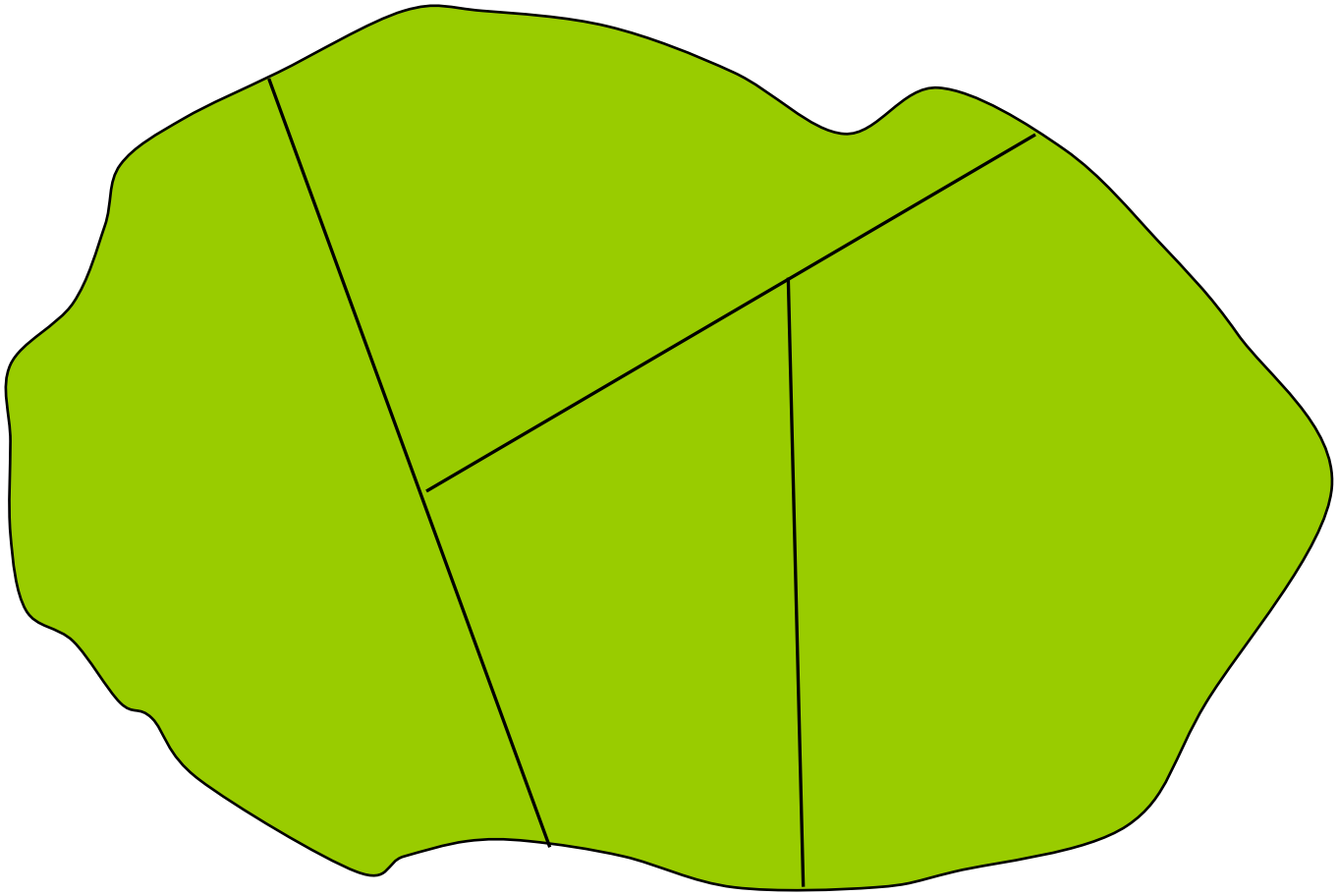
Develop strategies to fill gaps

- Create new protected areas and corridors
- Expand or reconfigure existing protected areas
- Change designation
- Improve management
- Restore degraded protected areas
- Look at other options for filling gaps

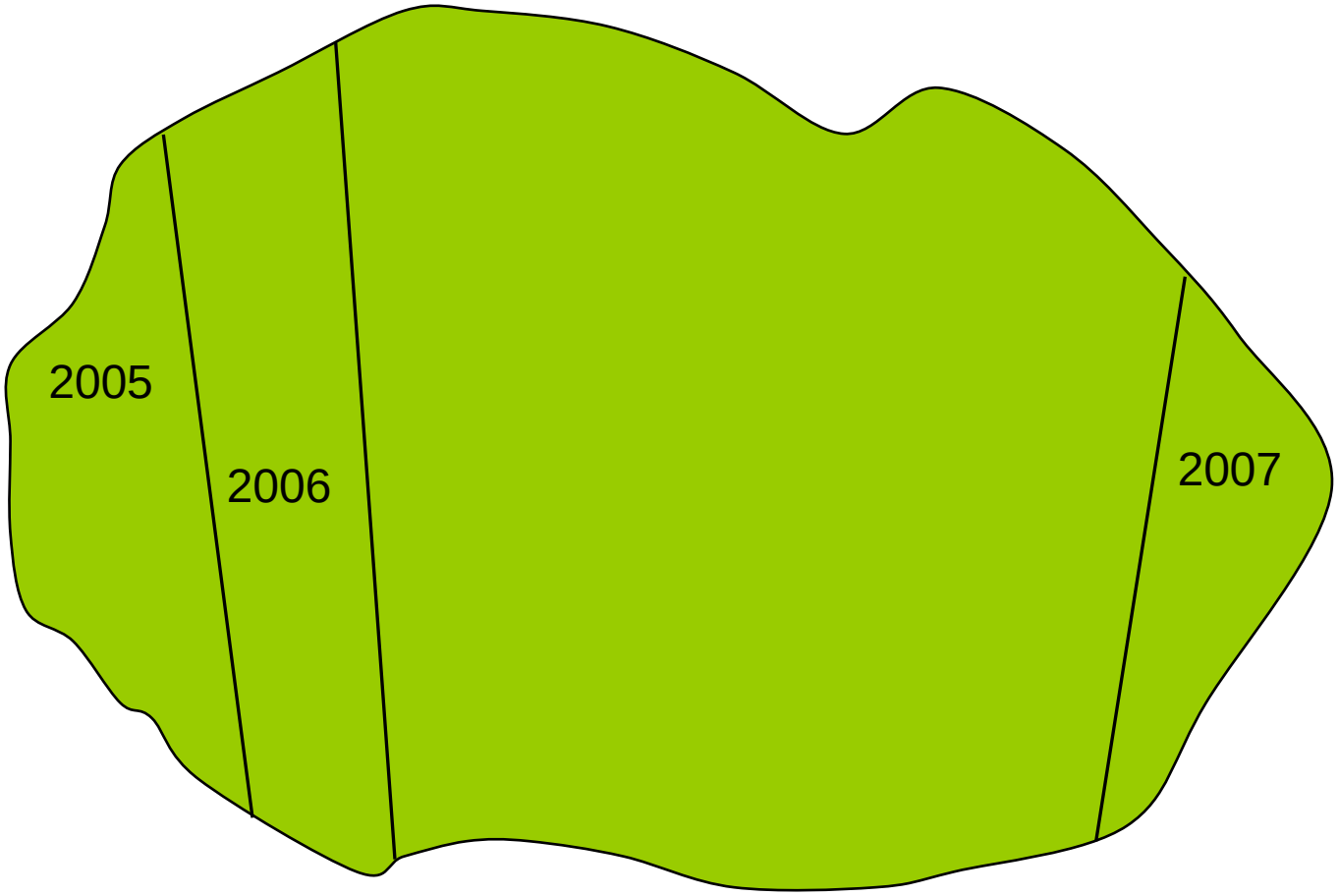
IUCN matrix of protected areas categories and governance types

Governance type / Category (management objective)	A. Government Managed Protected Areas			B. Co-managed Protected Areas			C. Private Protected Areas			D. Community Conserved Areas	
	Federal or national ministry or agency in charge	Local/ municipal ministry or agency in change	Government-delegated management (e.g. to an NGO)	Trans-boundary management	Collaborative management (various forms of pluralist influence)	Joint management (pluralist management board)	Declared and run by individual land-owner	…by non-profit organisations (e.g. NGOs, universities, etc.)	…by for profit organisations (e.g. corporate land-owners)	Declared and run by Indigenous Peoples	Declared and run by Local Communities
I - Strict Nature Reserve/ Wilderness Area											
II – National Park (ecosystem protection; protection of cultural values)											
III – Natural Monument											
IV – Habitat/ Species Management											
V – Protected Landscape/ Seascape											
VI – Managed Resource											

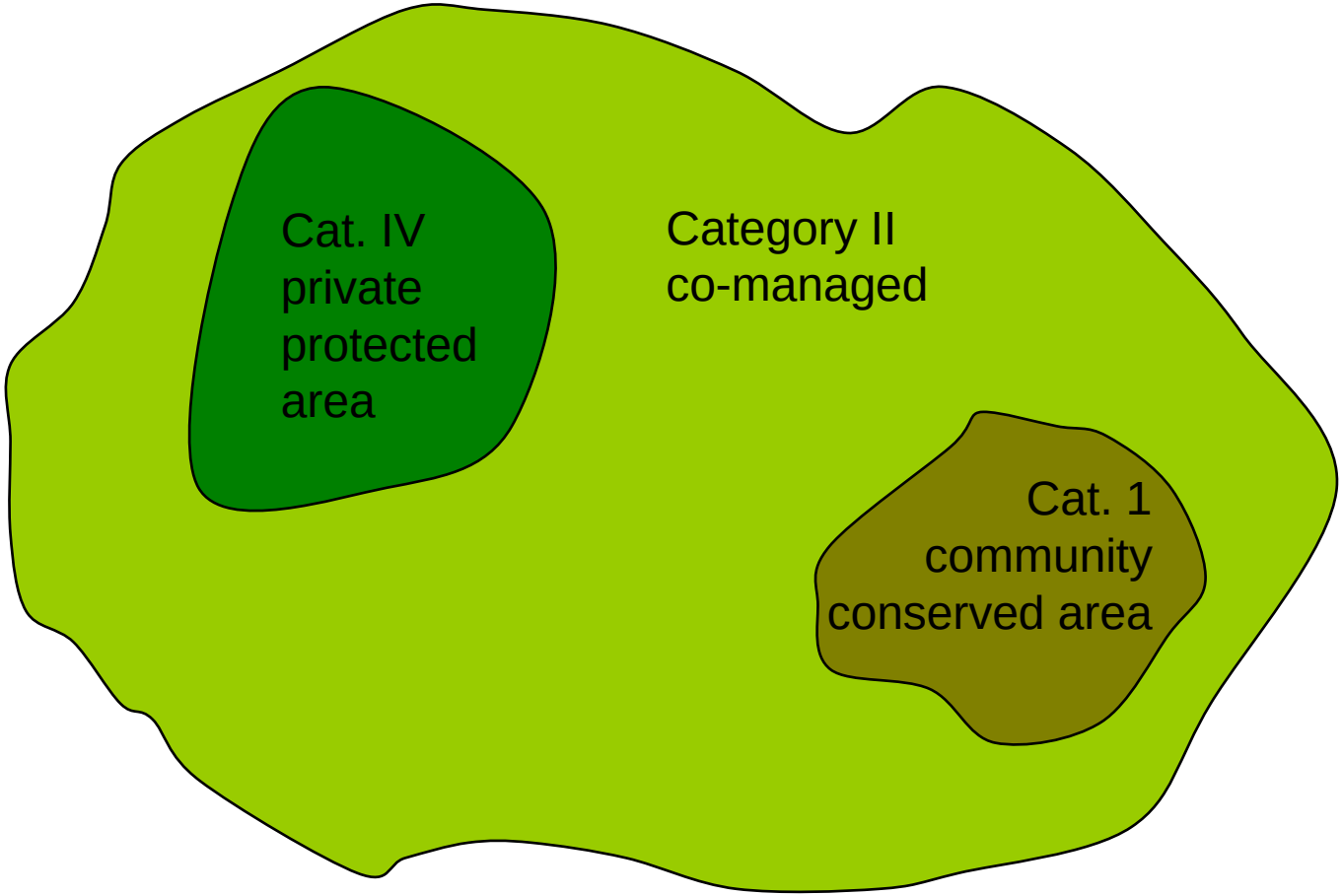
Within a single protected area, several zones with different management objectives can be agreed if this helps overall management



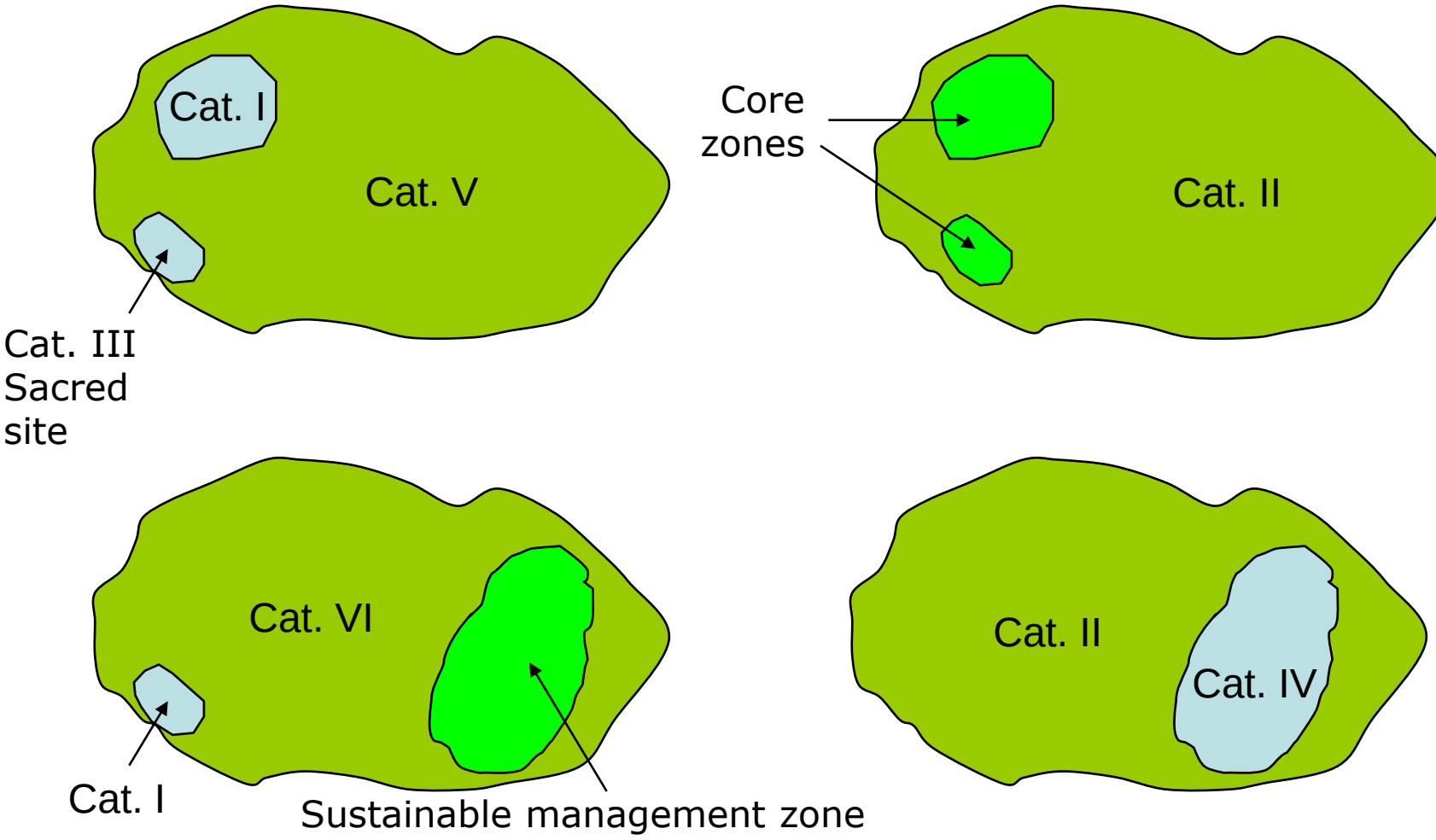
Temporary zones are also possible (e.g. to allow sustainable management of non-timber forest products by local communities).



A single protected area can have several categories and governance types



A protected area can conserve biodiversity by using a range of management objectives.



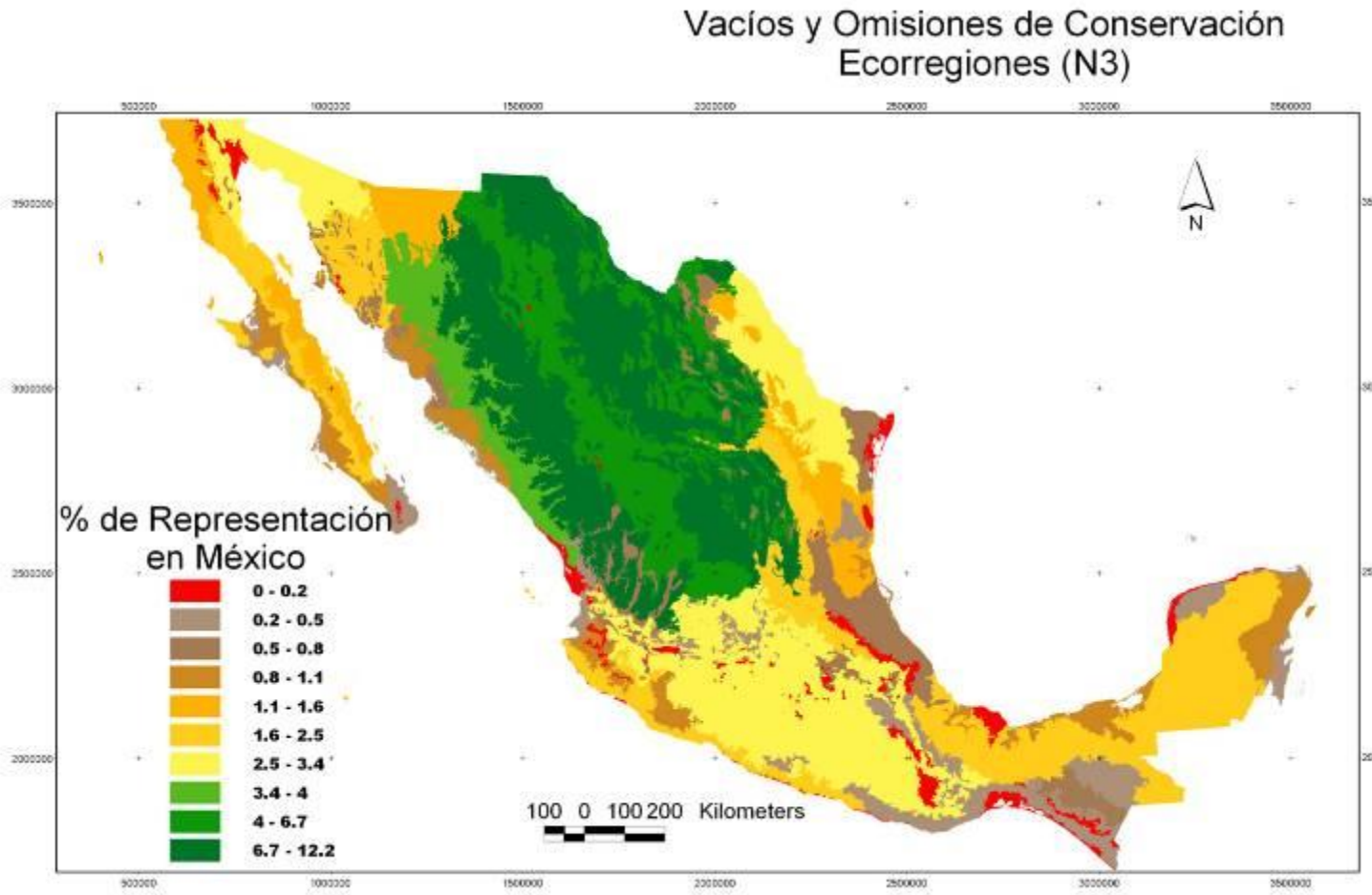
Develop cost estimates and an action plan

5. What can we learn from gap analysis?

1. **What are the biases in the PA system?**
2. **What elements of biodiversity are most at risk?**
3. **How far are elements from their goals?**
4. **What is the significance of each PA?**
5. **Where should new PAs be added?**

Mexico's Gap Assessment

- ***11 Ecoregions with no formal PA.***
- ***Deserts and shrublands with higher representation in existing PA.***
- ***Tropical dry forests severely under-represented.***



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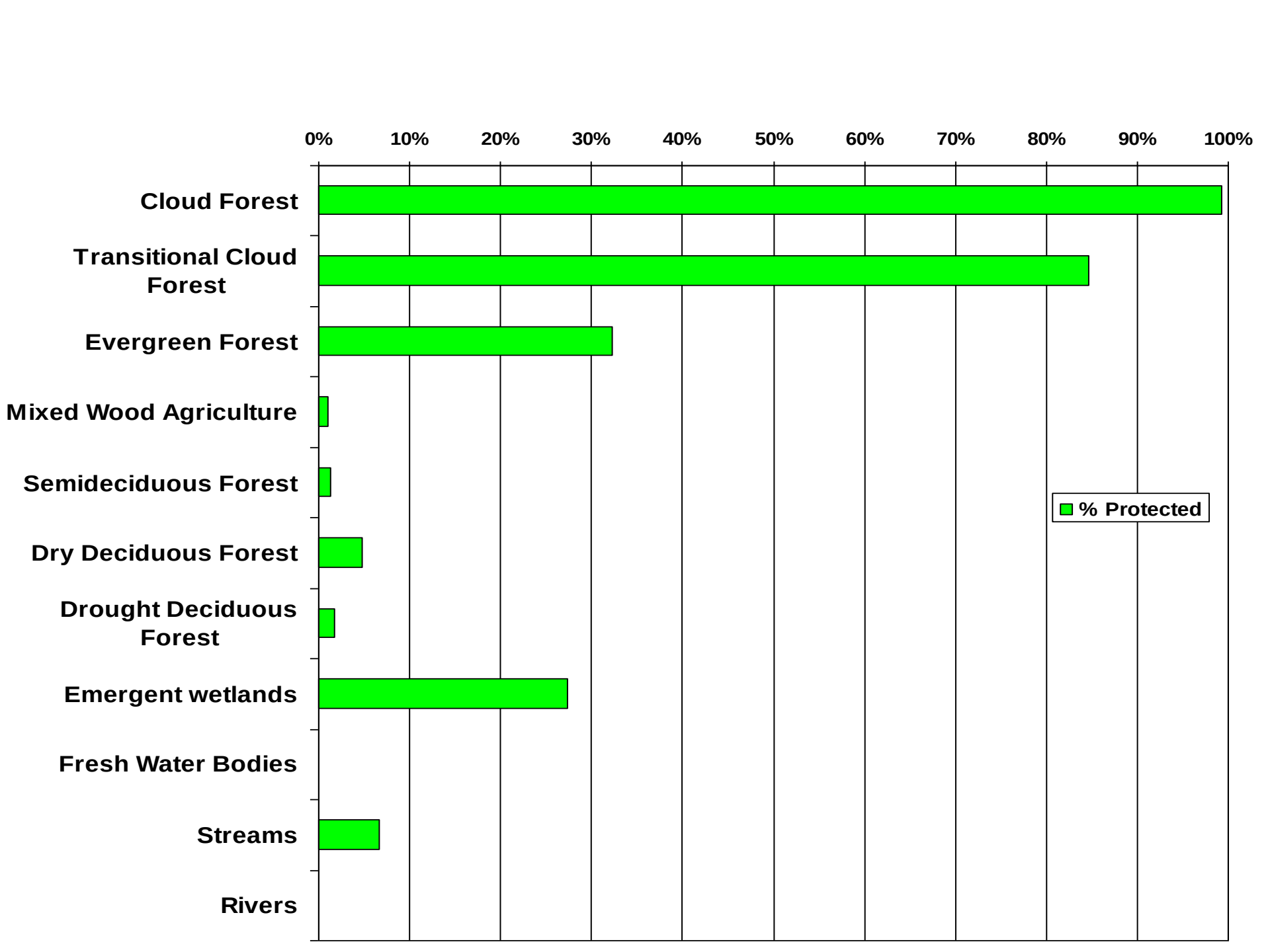
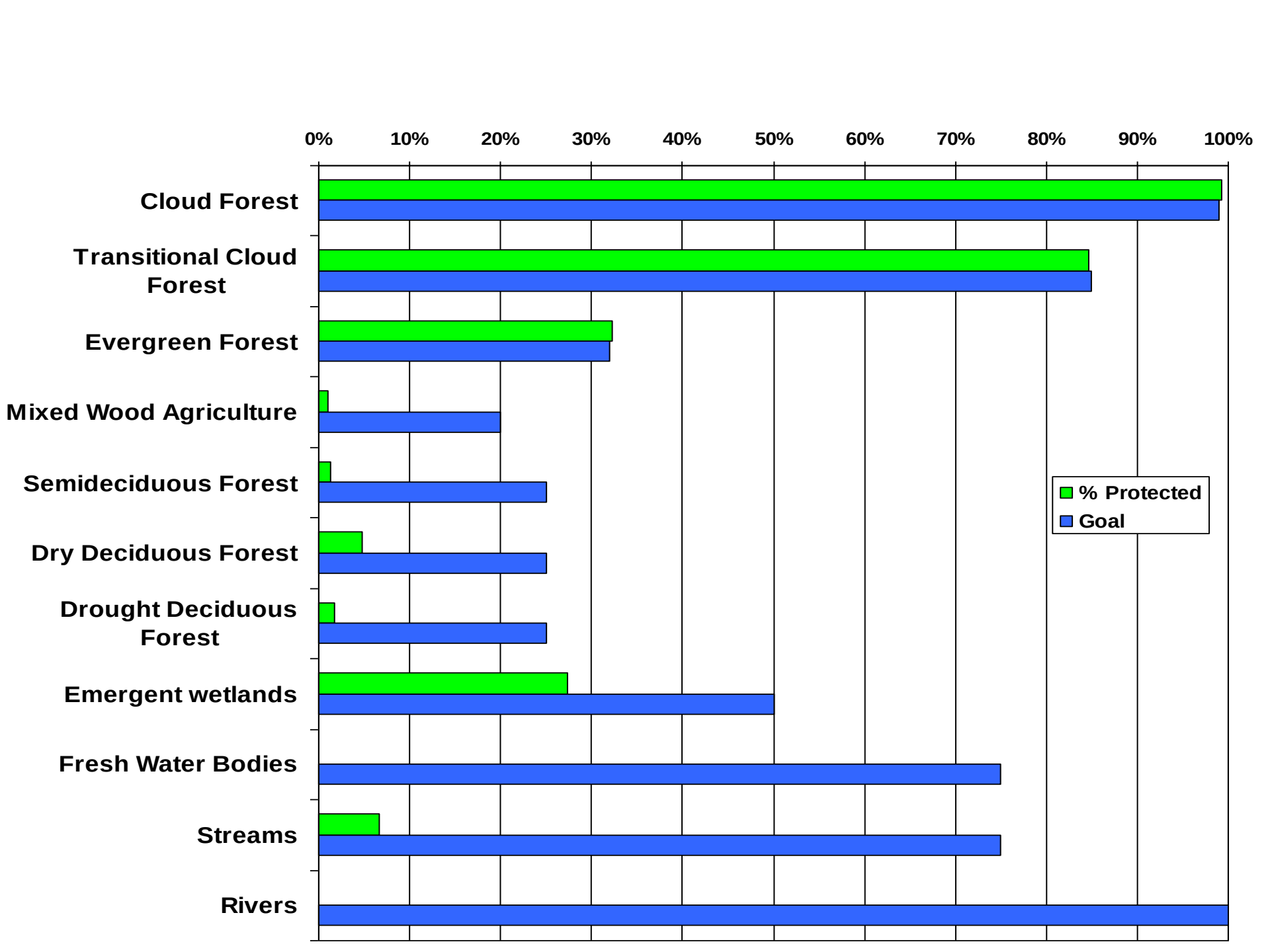

0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Cloud Forest
Transitional Cloud Forest
Evergreen Forest
Mixed Wood Agriculture
Semideciduous Forest
Dry Deciduous Forest
Drought Deciduous Forest
Emergent wetlands
Fresh Water Bodies
Streams
Rivers
% Protected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Goal

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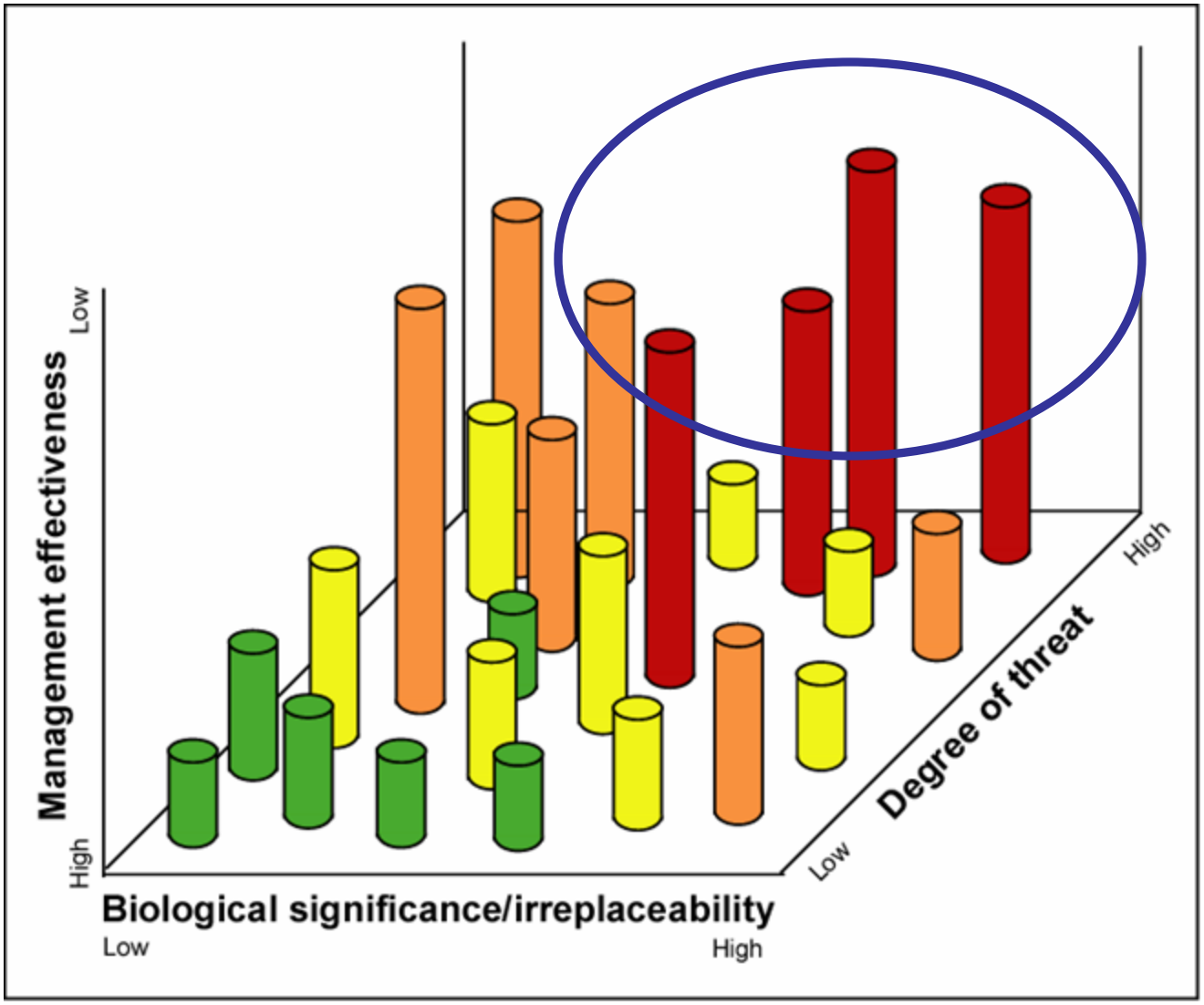
PA EFFECTIVENESS, SIGNIFICANCE, THREAT



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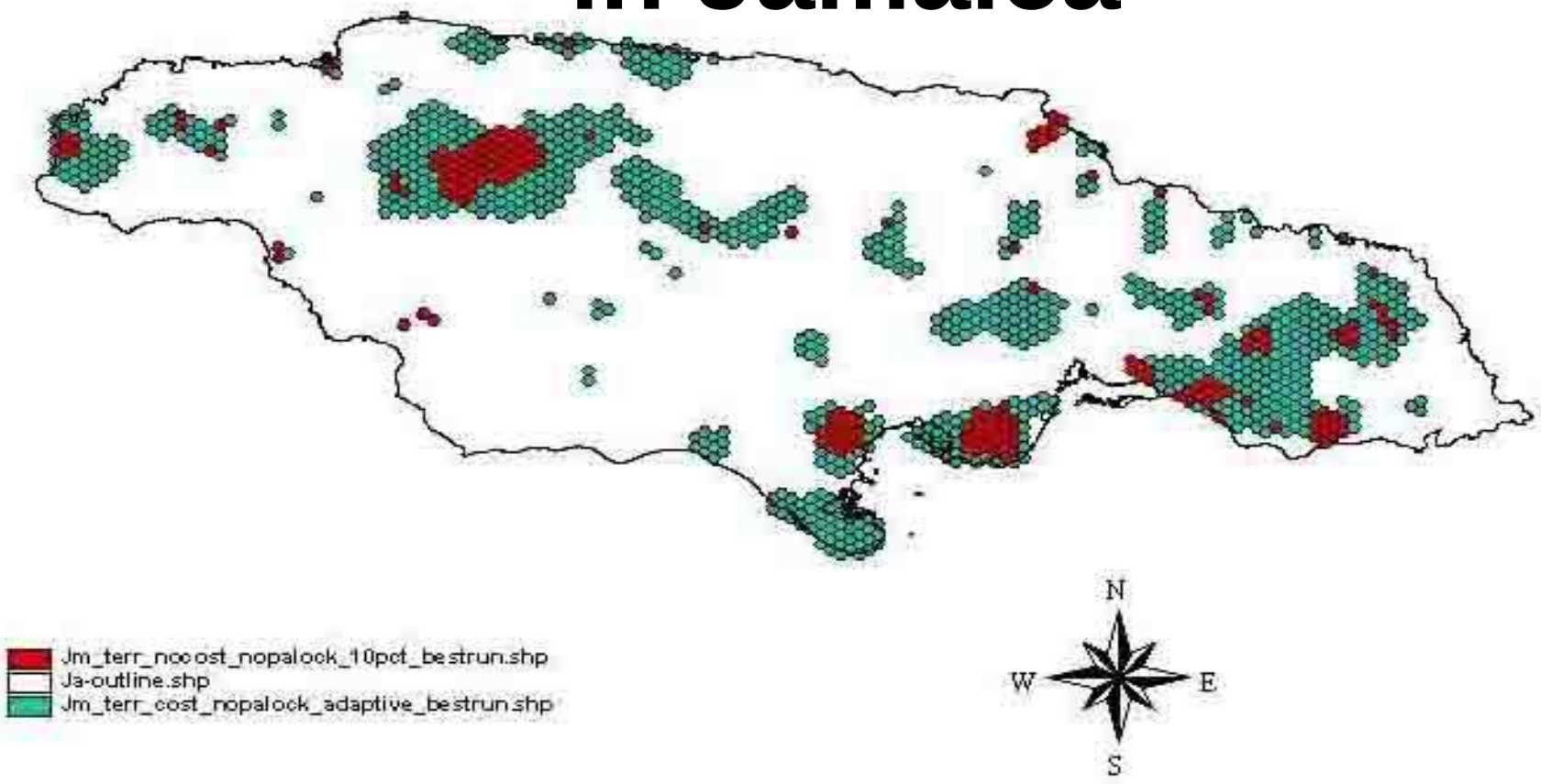
Proposed new protected areas in Jamaica



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Wildlife Institute of India

WCPA
WORLD COMMISSION ON PROTECTED AREAS

WWF

CBD

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

WILDLIFE CONSERVATION SOCIETY

An effective “system” of protected areas

- is ***complete*** — protects all key ecosystems and species (gap analysis)
- is ***biologically well connected*** — if necessary by restoration initiatives
- conserves associated ***natural and cultural*** values

but an effective and equitable system of protected areas is also...

- ***socially welcome*** - merges with and benefits society…
- ***cost effective*** - as resources are not infinite…
- ***flexible and secure*** **-** as global change is ubiquitous and clearly under way…

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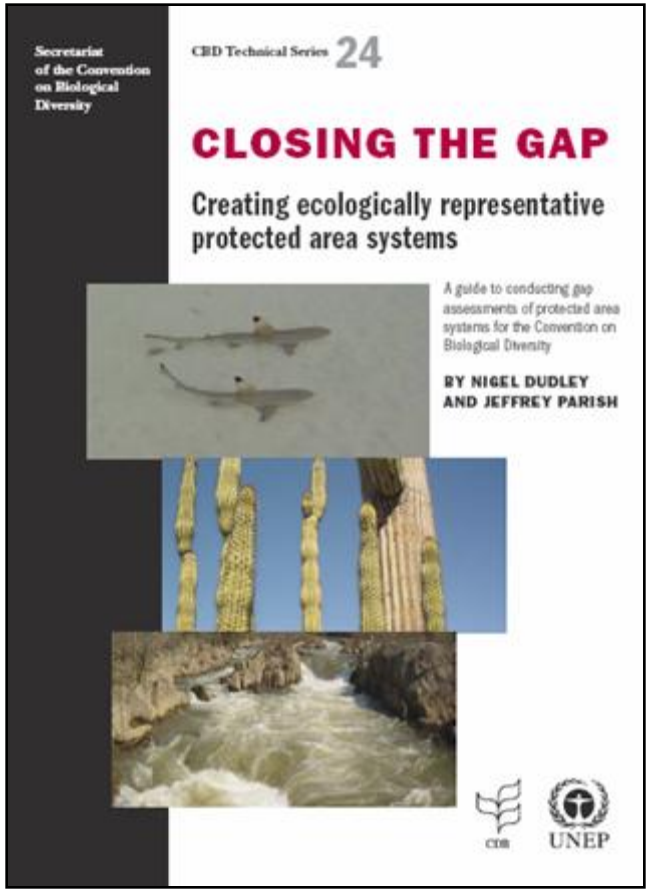

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