Identifying strategies and targets for building climate resilience





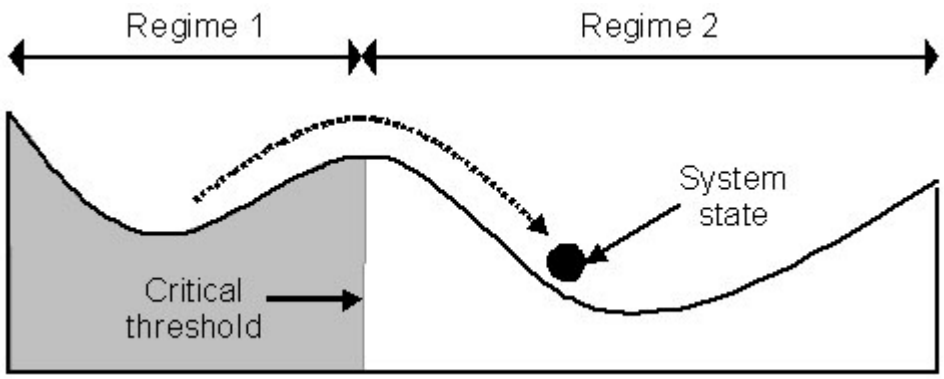



Jamison Ervin, Senior Advisor, UNDP

CLIMATE CHANGE ADAPTATION AND RESILIENCE THROUGH **SITE-LEVEL MANAGEMENT**

Key Concepts

- **Regime shift**
- Tipping point
- Resilience
- Adaptation
- Mitigation



"…large, persistent changes in the structure and function of ecological systems"

www.regimeshifts.org

Key Concepts

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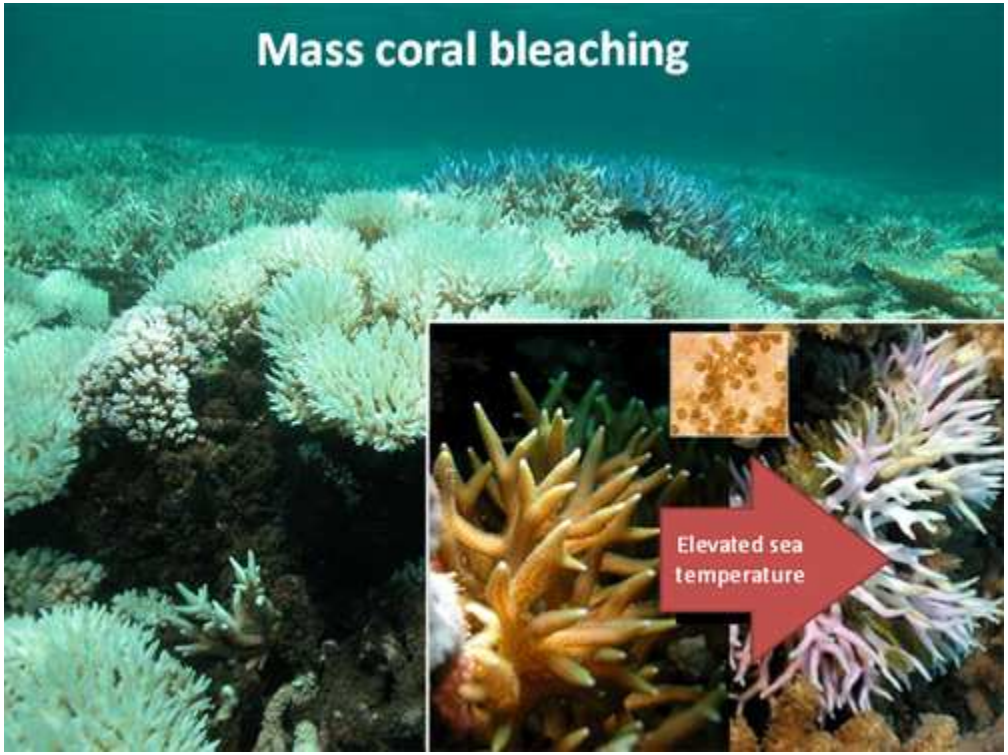

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Key Concepts

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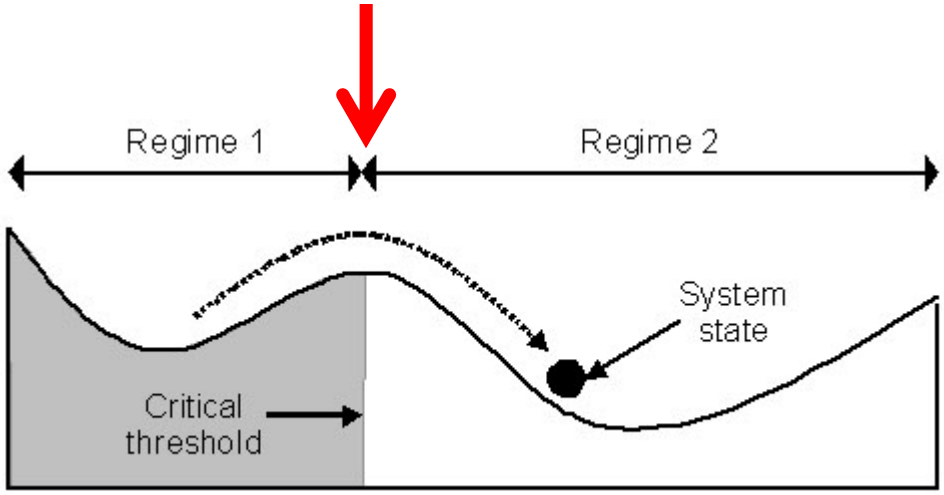


Definition: The point at which a driver causes a significant regime shift that is considered unalterable, or recoverable on only very long timescales

Drivers: Overfishing, disease, invasive species, climate-related event

Key Concepts

- Regime shift
- Tipping point
- **Resilience**
- Adaptation
- Mitigation

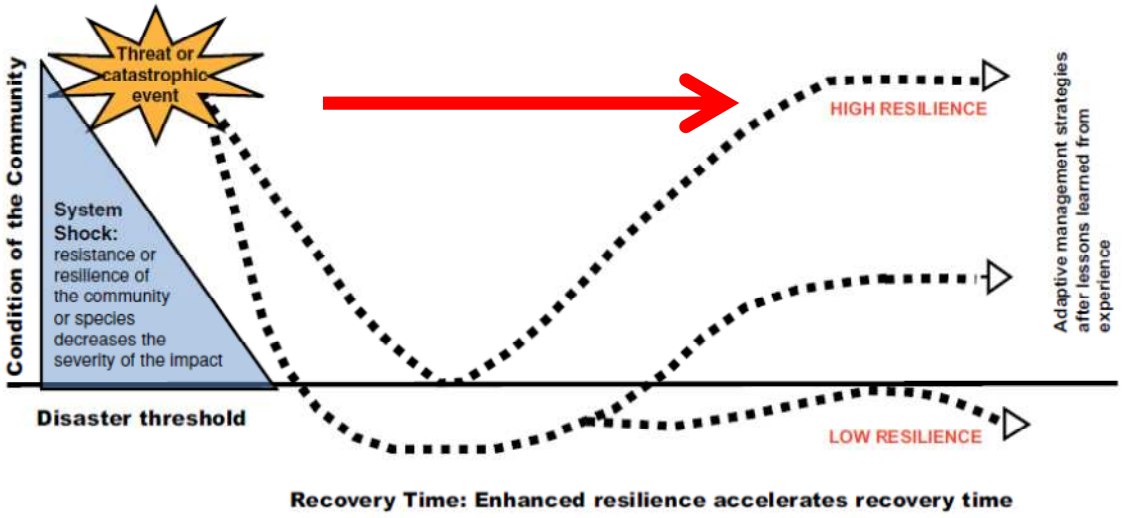
Definition

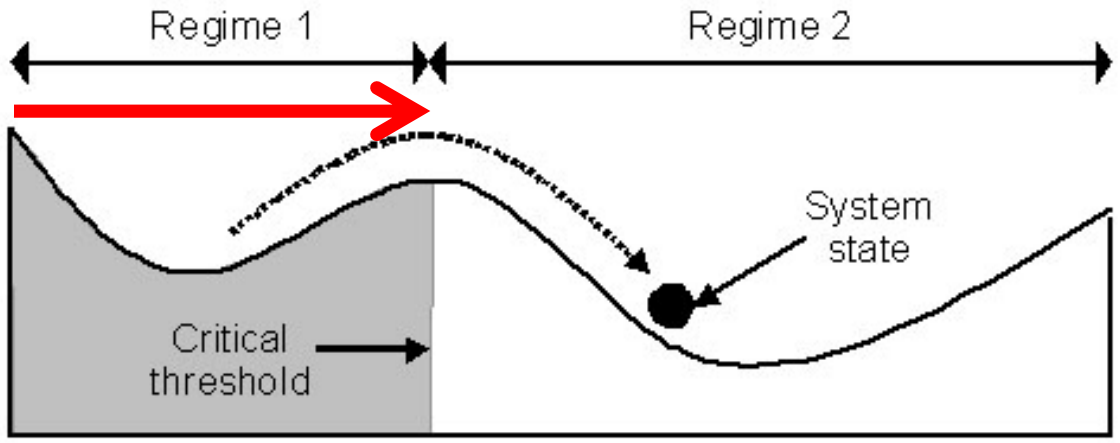
"….the ability of an ecosystem to maintain key functions and processes in the face of stresses, or pressures, by either resisting or adapting to change"

www.reefresilience.org

Key Concepts

- Regime shift
- Tipping point
- **Resilience**
- Adaptation
- Mitigation





www.reefresilience.org

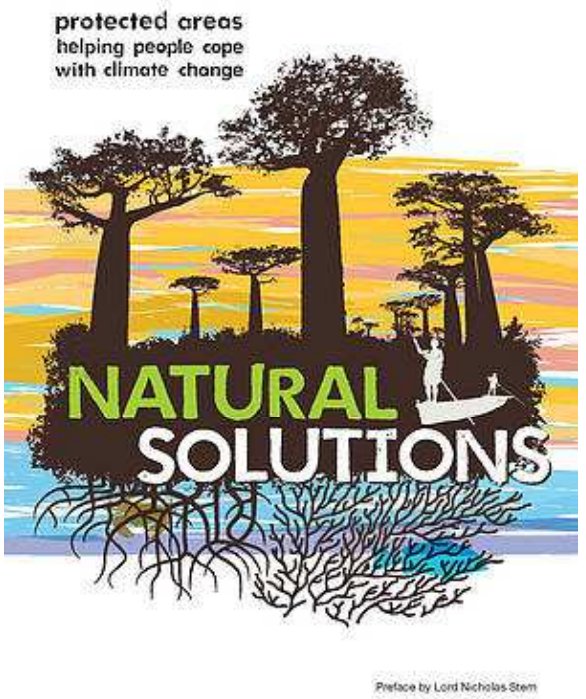
Key Concepts

- Regime shift
- Tipping point
- Resilience
- **Adaptation**
- Mitigation

- **Nature's** ability to adapt to climate impacts (often through human intervention); and….

Key Concepts

- Regime shift
- Tipping point
- Resilience
- **Adaptation**
- Mitigation



- **Human's** ability to adapt to climate impacts (often through nature's buffering and provisioning services)

Key Concepts

- Regime shift
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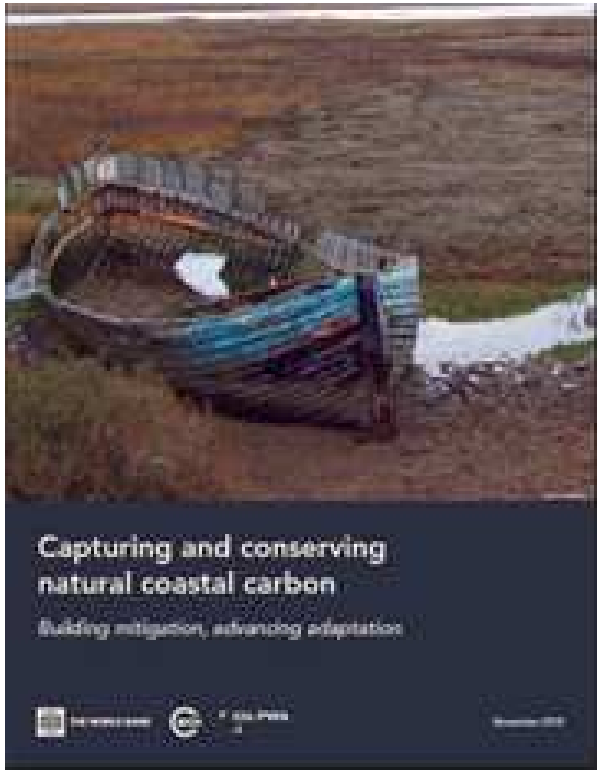
- **Mitigation**



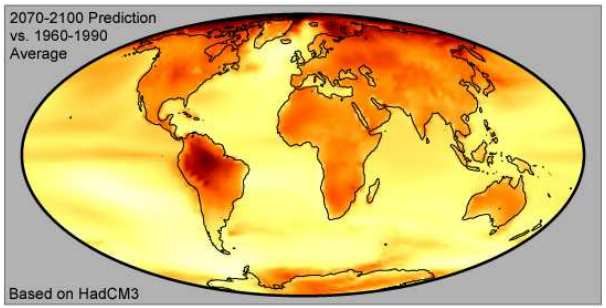
...reducing the scope and magnitude of climate change and its impacts…

Strengthening resilience by incorporating climate into site-level PA management:

Climate lens

Management planning

Management effectiveness



Threat assessments

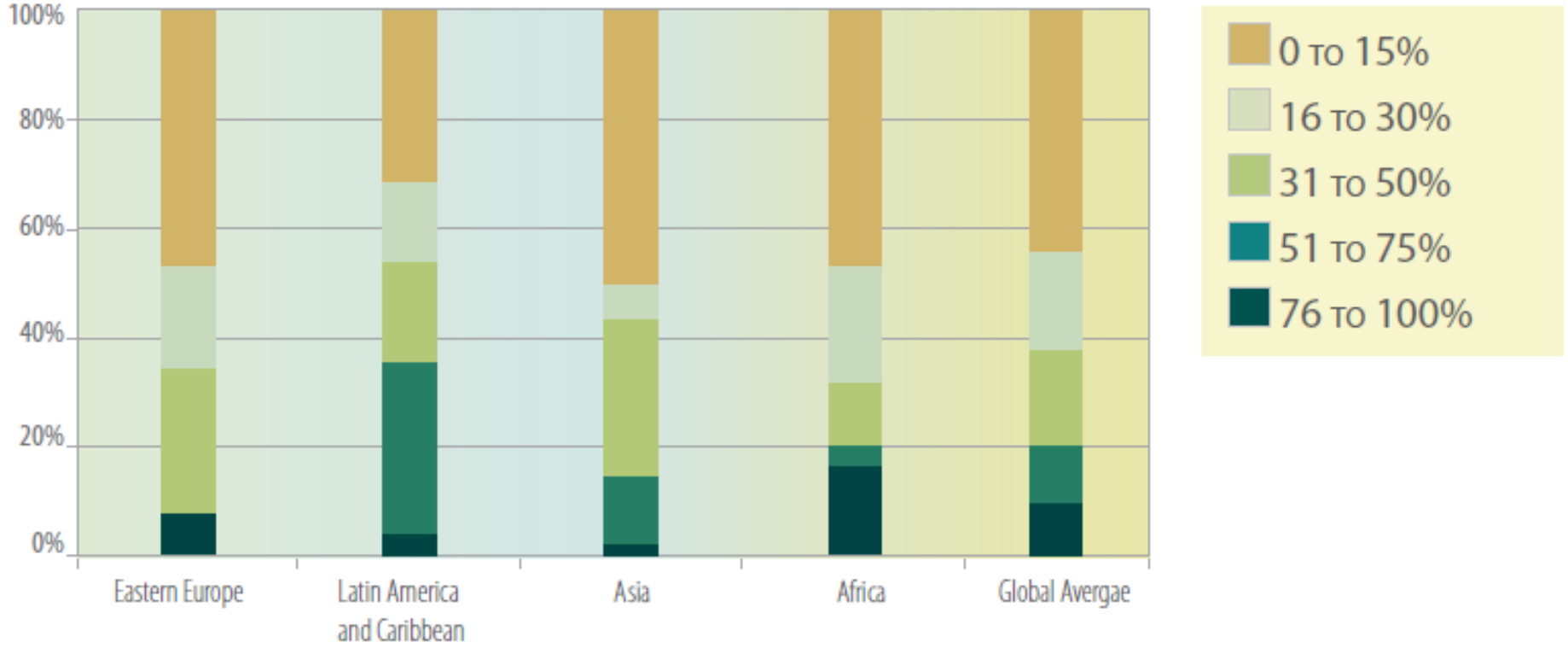
Research and monitoring

Restoration plans

Capacity needs assessments

Management Planning

Management Planning



- About 90,000 (>2/3) of the world's protected areas do not have management plans
- Of those plans that do exist, only a miniscule fraction incorporate climate change issues

Management Planning – typical elements

- Specific **goals and objectives**
- Important **areas and species**
- Identify **key threats**
- Prioritize **critical actions**
- Create protected area **zones and regulations**
- Develop **indicators** for measuring biodiversity

Management Planning for resilience

- Develop **specific goals and objectives** for improving climate resilience
- Identify **areas and species** of particular importance to climate adaptation, mitigation and resilience
- Identify and prioritize **threats** that exacerbate climate impacts
- Identify and prioritize **critical actions** for strengthening resilience
- Identify areas important for climate change adaptation and mitigation into **protected area zones and regulations**
- Develop **indicators** of climate resilience

Threats Assessment






- **Threat assessment**: An assessment of the degree to which human activities impact the integrity of biodiversity

Threats Assessment

Protected Areas Threats: Data Sheet 2

Please tick all relevant existing threats as either of high, medium or low significance. Threats ranked as of **high** significance are those which are seriously degrading values; **medium** are those threats having some negative impact and those characterised as **low** are threats which are present but not seriously impacting values or **N/A** where the threat is not present or not applicable in the protected area.

1. Residential and commercial development within a protected area

Threats from human settlements or other non-agricultural land uses with a substantial footprint

High	Medium	Low	N/A	
√				1.1 Housing and settlement
				1.2 Commercial and industrial areas
		√		1.3 Tourism and recreation infrastructure

2. Agriculture and aquaculture within a protected area

Threats from farming and grazing as a result of agricultural expansion and intensification, including silviculture, mariculture and aquaculture

High	Medium	Low	N/A	
				2.1 Annual and perennial non-timber crop cultivation
		√		2.1a Drug cultivation
				2.2 Wood and pulp plantations
√				2.3 Livestock farming and grazing
	√			2.4 Marine and freshwater aquaculture

- Typical protected area threat assessments are a one-page (or a one-paragraph) summary of existing threats within the protected area

Threat assessments – incorporating climate

- Conduct species and ecosystem climate **vulnerability assessments**
- Assess the **synergies** between a variety of threats, including climate
- Incorporate **resilience thresholds** and **tipping points** into threat assessments

Protected Area Restoration

- Most restoration efforts focus on the past, not the future
- Few restoration plans or actions consider climate resilience or adaptation

Setting traditional restoration targets and priorities

- Focus on **historical ranges of variation**
- Focus on areas of **high threat**
- Areas important for **species habitat**
- Restore **large and potentially intact habitat** patches
- Focus on **vulnerable species**

Incorporating climate into restoration priorities

Focus on:

- **Resilience thresholds** as well as historical ranges of variability
- Those areas most likely to have **negative synergistic threats** and impacts
- Areas important for **species adaptation**, including ecotones, altitudinal, latitudinal and longitudinal gradients, and riparian and connectivity corridors
- **Refugia and areas important for climate resilience**, including large and intact habitat patches, particularly areas with a history of resilience and resistance to stressors
- Those species most **vulnerable to the impacts of climate change**

Protected Area Capacity

Traditional Capacity Areas:
Protected area policy
Management planning
Threat assessment
Communication
Participation
Site design
Resource management
Monitoring and research

Protected Area Capacity

Capacity Areas:	New skills needed:
Protected area policy	Designing new policies and working with new sectors to address climate change
Management planning	Incorporating climate issues into management plans; assessing species vulnerability to climate change
Threat assessment	Incorporating climate into threat assessments; understanding climate impacts and predictions
Communication	Communicating the value of protected areas in terms of climate change resilience and adaptation
Participation	Identifying new constituencies
Site design	Adapting site design for improved resilience
Resource management	Understanding tipping points and thresholds, and managing natural resources for climate resilience
Monitoring and research	Identifying climate-related indicators for vulnerable species and ecosystems, and for affected human communities

PA Management Effectiveness Assessments

- Traditional focus on degree to which management achieves PA objectives (biodiversity conservation)

PA Management Effectiveness Assessments

Management Effectiveness Elements
Threats
Planning and design
Inputs (staff, funding)
Processes (management planning, participation, resource management)
Outputs (resource management, restoration)
Outcomes (ecological integrity)

PA Management Effectiveness Assessments

PAME Elements	New Questions to Consider
Context & Threats	How are climate-related threats impacting, or likely to impact, biodiversity and ecosystem services within the protected area? How important is the site for climate resilience and adaptation?
Planning	How suitable is the PA design for climate resilience? Do landscape/seascape linkages account for climate change?
Inputs	Are there adequate data systems for monitoring climate impacts?
Processes	How well do PA staff understand climate-related issues, and how well are these issues incorporated into management plans? Are research and monitoring priorities aimed at climate resilience?
Outputs	Are restoration efforts aimed at climate resilience?
Outcomes	Is the protected area resilient to climate change? Does it enable adaptation of human and natural communities

PA Research and Monitoring

- Traditional monitoring focuses on current **status and trends in biodiversity health**

- Research priorities are largely driven by researcher interests and funding

PA Research and Monitoring – Emerging priorities

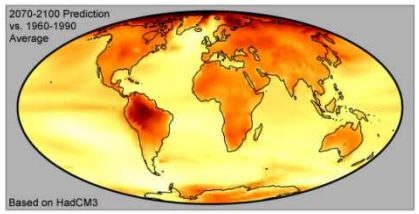
- Predict ecosystem structures, functioning and services under **different climate scenarios**
- Research the relationships between **climate change, biodiversity and poverty**
- Determine **resilience thresholds, tipping points and regimes shifts** for a variety of ecosystems
- Estimate the cascading effects and negative **synergies of multiple threats**

Strengthening resilience by incorporating climate into site-level PA management:

Management planning

Management effectiveness

Climate lens



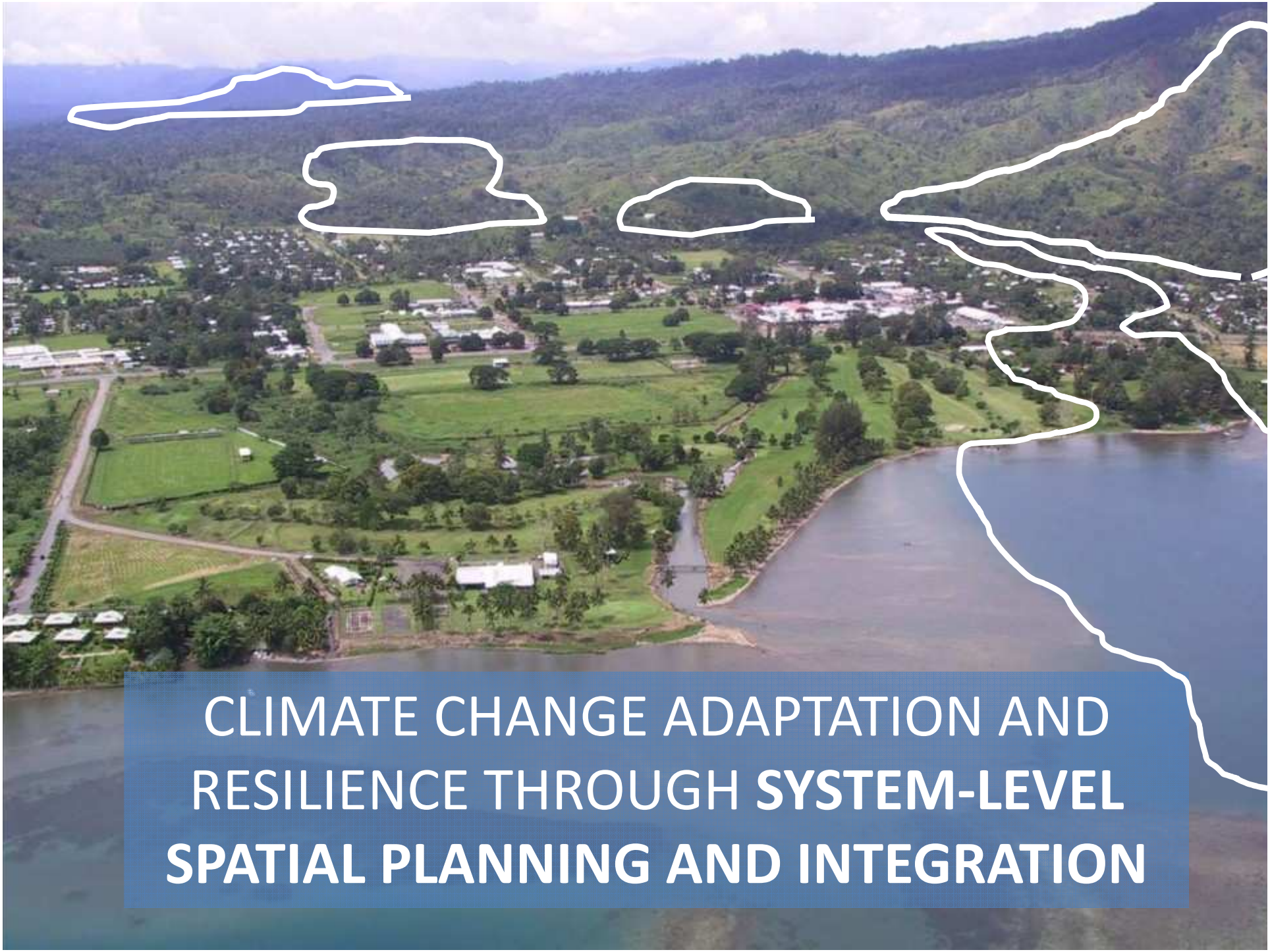
Threat assessments

Research and monitoring

Restoration plans

Capacity needs assessments

Site-level climate resilience plan



CLIMATE CHANGE ADAPTATION AND RESILIENCE THROUGH **SYSTEM-LEVEL SPATIAL PLANNING AND INTEGRATION**


Protected areas in isolation will not be enough to sustain biodiversity….


…or to sustain human communities
into the future…


…especially under increasing climate change impacts.

The primary mechanism for enabling climate change adaptation and resilience….


…is a well-designed protected area network that is fully integrated into landscapes, seascapes and sectors.

Aichi Target #2,11, 15

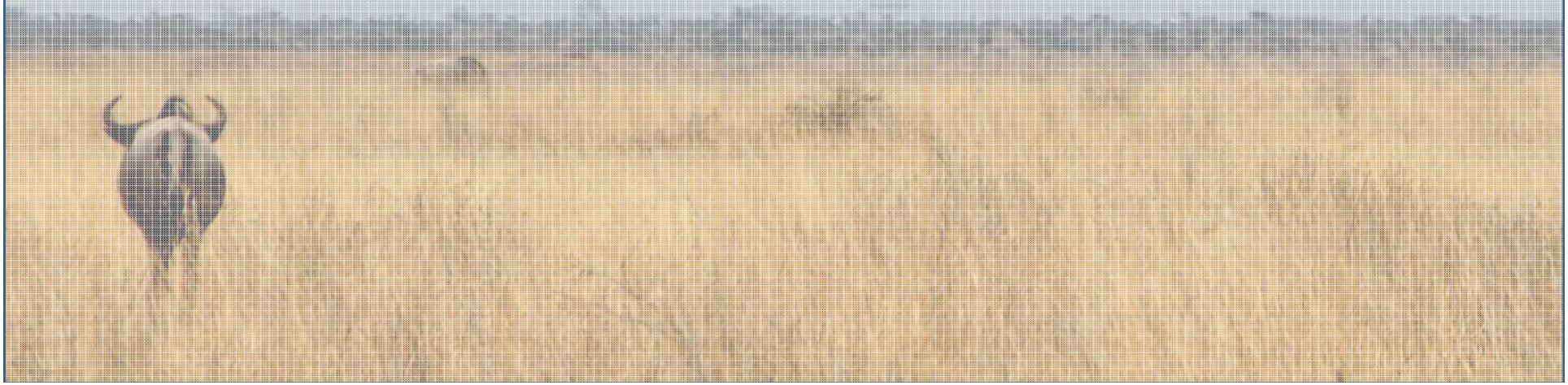
"…biodiversity values have been **integrated** into national and local development…"

"…at least 17% of terrestrial and inland water, and 10% of coastal and marine areas….are **well connected systems** of protected areas and…**integrated into the wider landscapes and seascapes**."

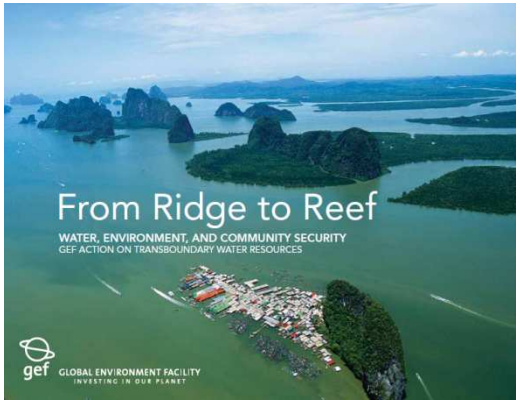
"….**ecosystem resilience** has been enhanced"

CoP-10 (X/31)

"Achieve target 1.2 of the PoWPA by 2015, through concerted efforts to **integrate protected areas into wider landscapes and seascapes and sectors**....in order to address climate change impacts and increase **resilience to climate change"**

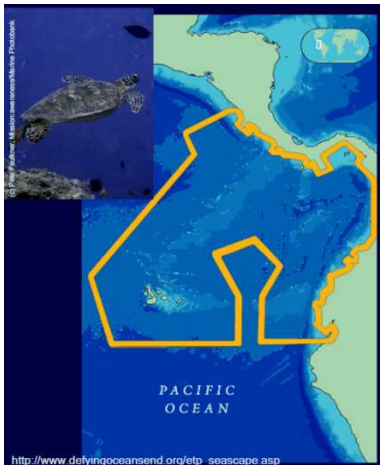


Resilience through PA spatial integration

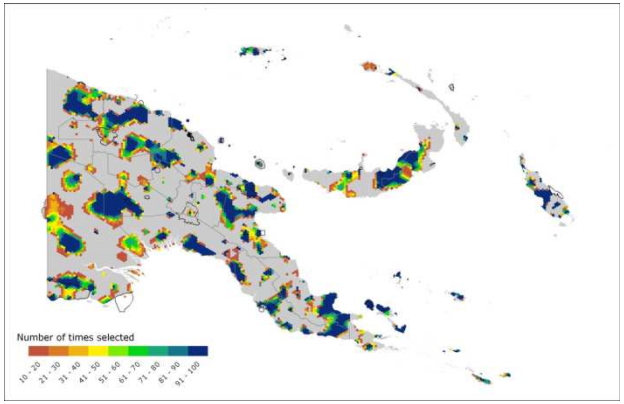


Ridge to Reef Approach

Transboundary areas

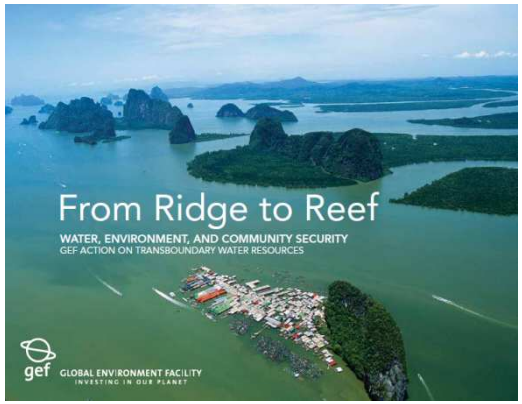


Regional networks



Improved gap assessments

Strengthening climate adaptation by taking a “Ridge to Reef” approach:



Ridge to Reef

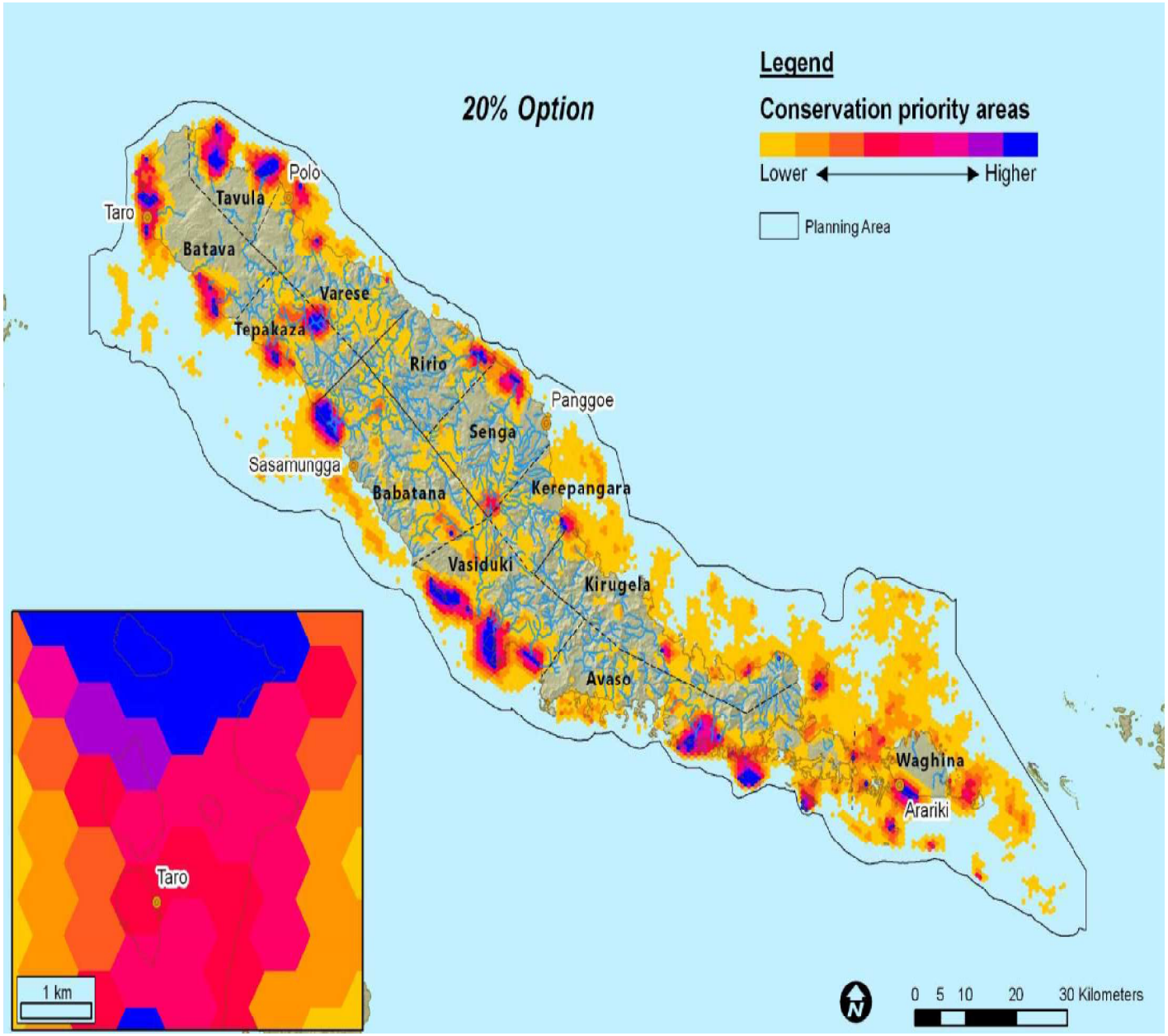
Example of a Ridge to Reef Approach

Elements of a Ridge to Reef Approach

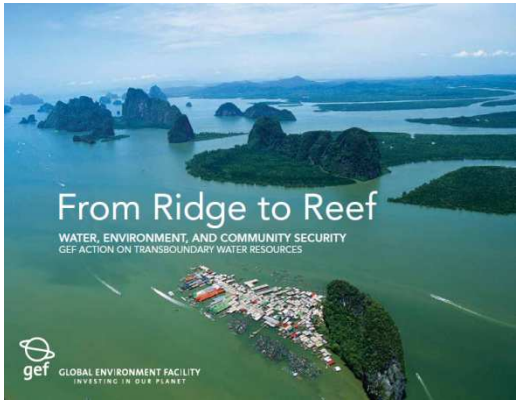
- Considers the entire island, coast, near shore and ocean as one entity
- Focuses on the overall resilience of the entire set of ecosystems
- Examines upstream impacts on downstream and coastal processes

Ridge to Reef Approach in Japan

Ridge to Reef Approach in Pacific Islands

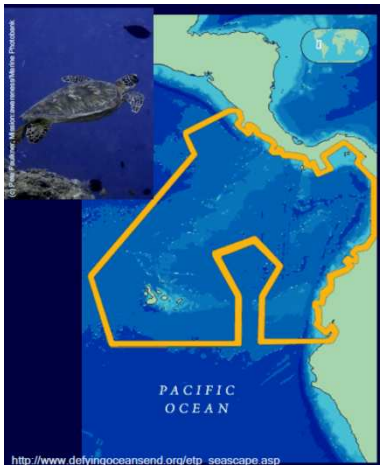


Resilience through PA spatial integration

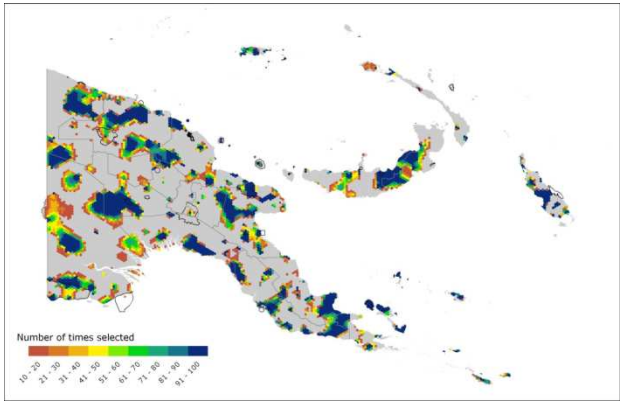


Ridge to Reef

Transboundary areas



Regional networks



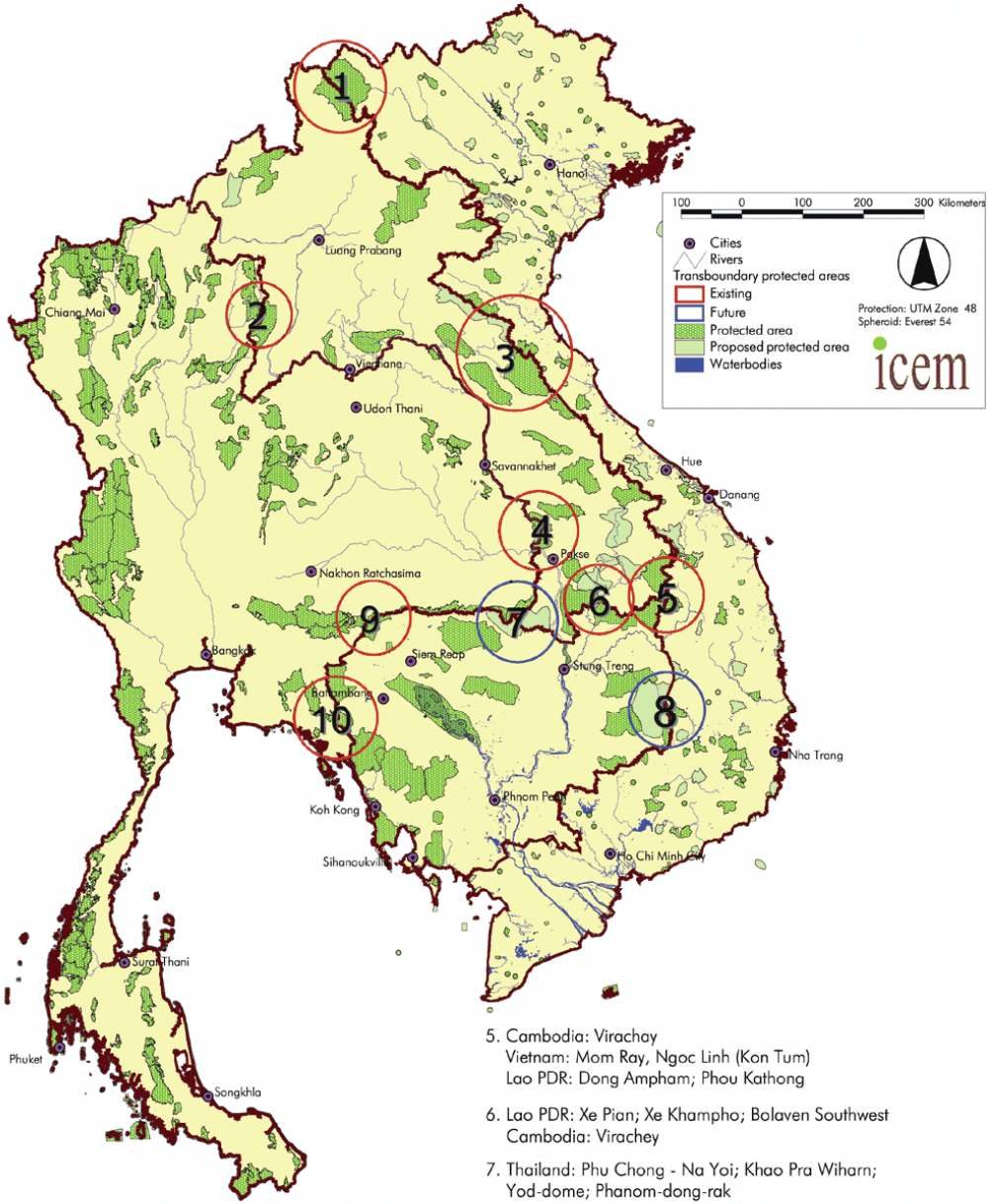
Improved gap assessments

The role of transboundary protected areas in strengthening resilience

- Allows species to **shift their distribution ranges**
- Allows for **natural processes** to occur at large scales
- Increases **resilience to extreme events** and disturbance
- Increases **species population viability** and **reproductive success**
- Expands the **diversity of the population gene pool**

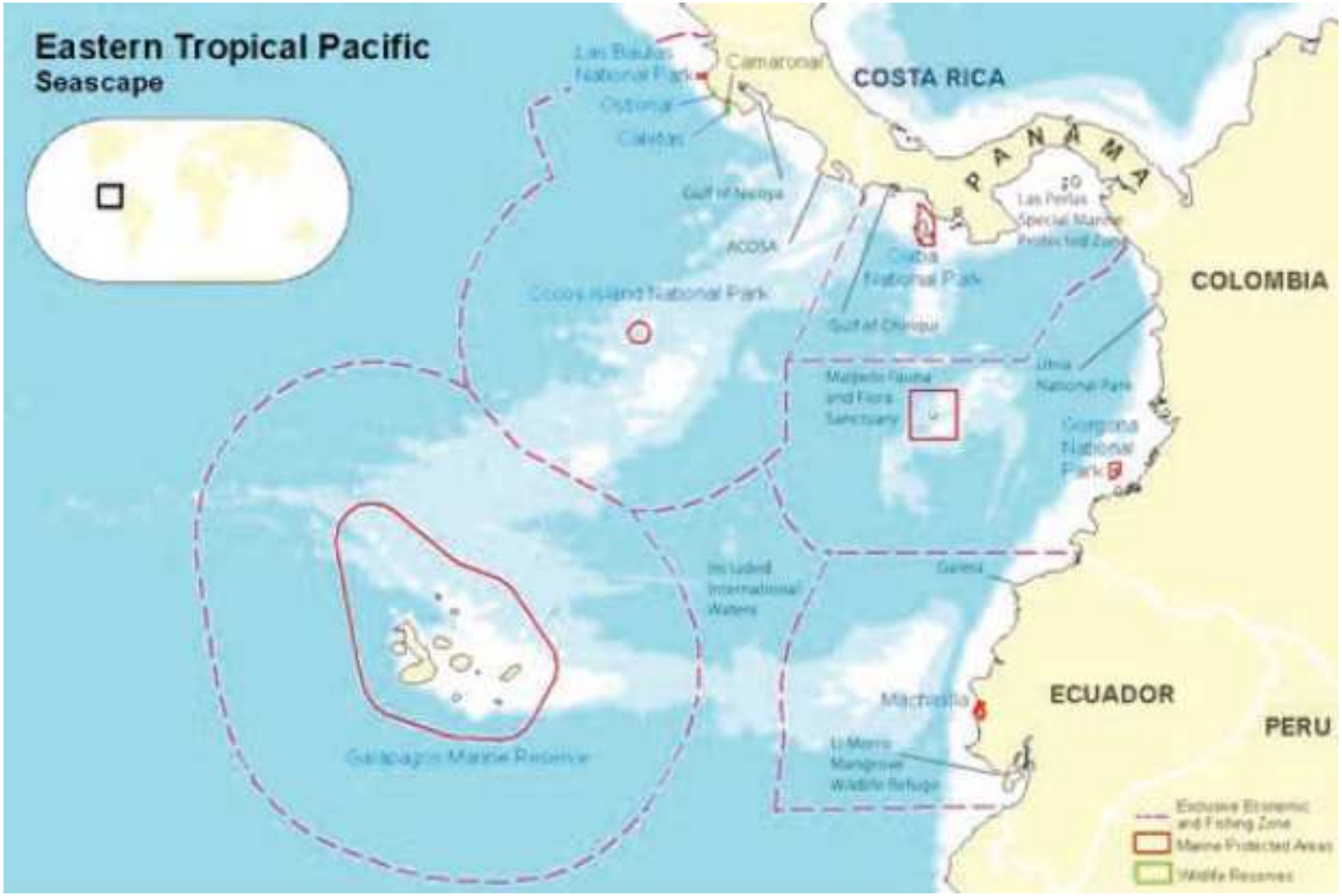
Transboundary MPAs

- 10 transboundary protected areas
- Vietnam, Lao PDR, Cambodia, Thailand



1. Vietnam: Muong Nhe
   Lao PDR: Phou Dene Din
2. Thailand: Doy Phu Kha
   Lao PDR: Nam Phouy
3. Vietnam: Pu Mat, Vu Quang; Phong Na; Nui Giang Man
   Lao PDR: Nam Chouan; Nakai Nam Theun; Hin Nam No
4. Lao PDR: Phou Xiang Thong
   Thailand: Pha Tam; Kaeng Tana
5. Cambodia: Virachay
   Vietnam: Mom Ray, Ngoc Linh (Kon Tum)
   Lao PDR: Dong Ampham; Phou Kathong
6. Lao PDR: Xe Pian; Xe Khampho; Bolaven Southwest
   Cambodia: Virachey
7. Thailand: Phu Chong - Na Yoi; Khao Pra Wiharn; Yod-dome; Phanom-dong-rak
   Cambodia: Preah Vihear
   Lao PDR: Dong Khanthung
8. Vietnam: Yok Don
   Cambodia: Phnom Nam Lyr
9. Thailand:Tapraya; Hual Tabtan-Hual Samran
   Cambodia: Banteay Chhmar
10. Thailand: Klong Krue Whay Chalerm Prakiate
    Cambodia: Samlaut

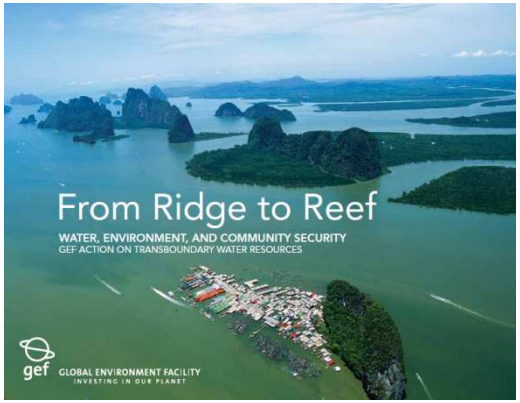
Transboundary MPAs: Eastern Tropical Pacific Seascape



Strategies that improve climate resilience

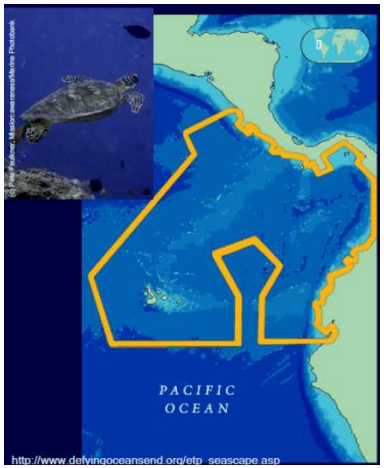
- Conduct region-wide **climate vulnerability assessments**
- Document and share data on **species migration, range** and **habitat shifts**
- Identify pockets of **resistance** and **climate refugia** (e.g., to coral bleaching) and **large intact areas** at a transboundary scale
- Develop plans to address **transboundary-scale threats**
- **Restore habitats** that are regionally critical
- Develop transboundary **agreements on fisheries**

Resilience through PA spatial integration

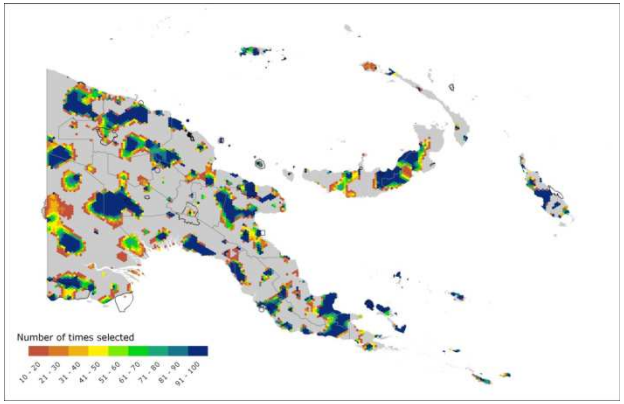


Ridge to Reef

Transboundary areas

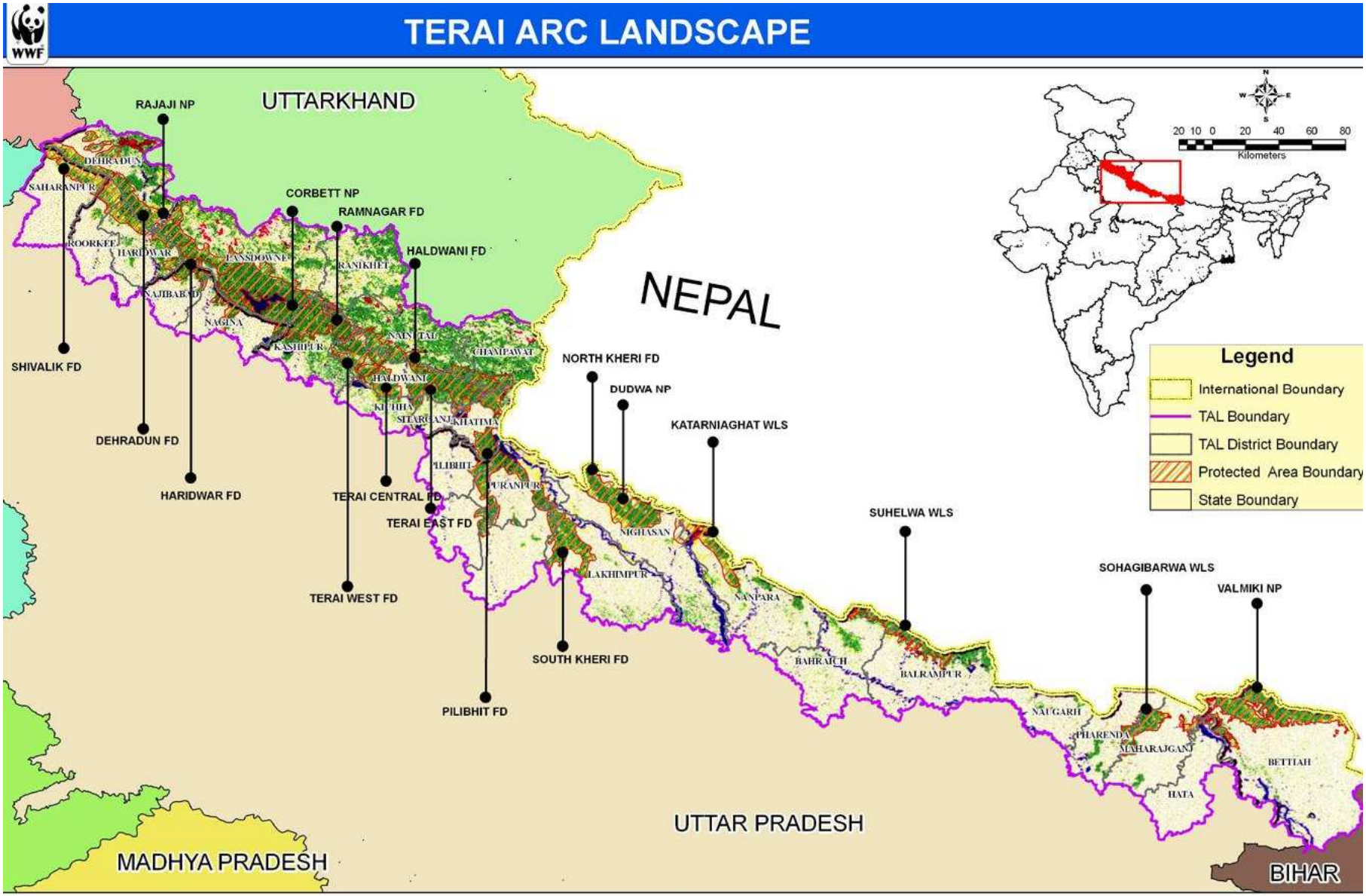


Regional networks



Improved gap assessments

Examples of a Regional PA Network




Migratory paths: from Khram Island
Thailand
Cambodia
Vietnam
Malaysia
Indonesia

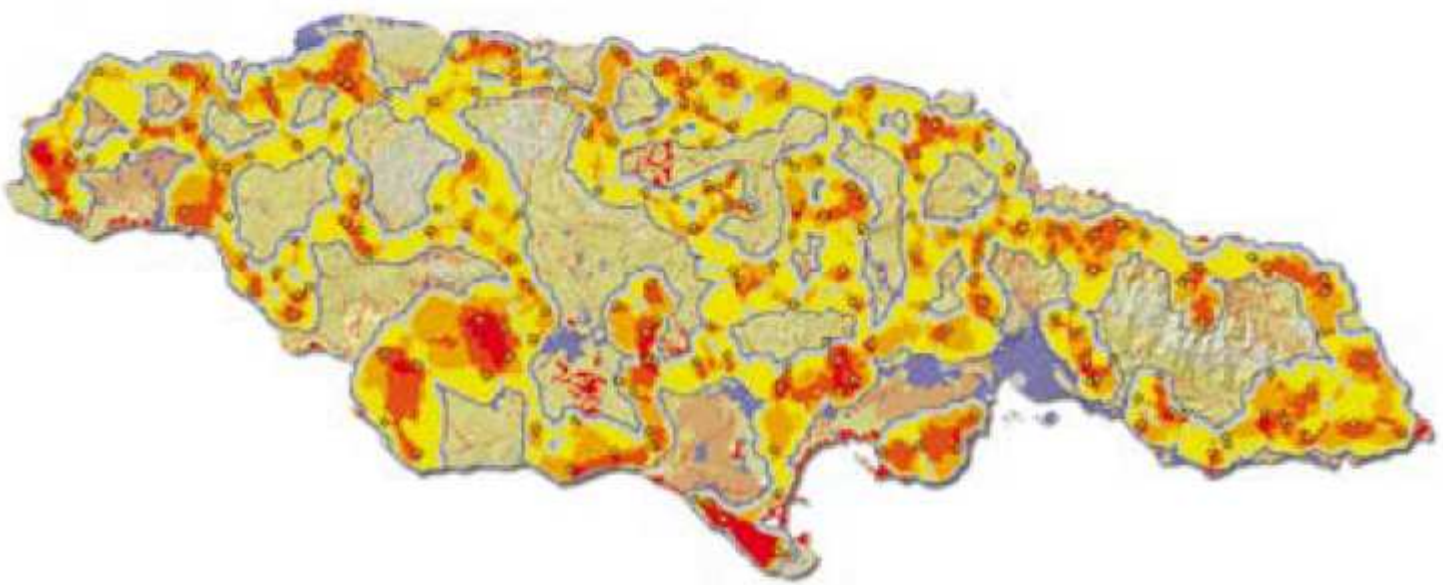
Migratory paths: from Huyong Island

Incorporating social resilience principles into PA network design:

Design the PA network to:

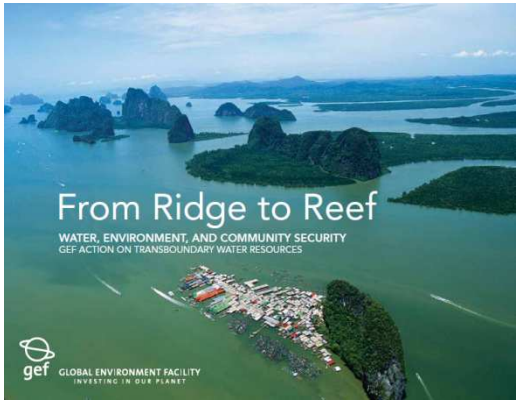
- Buffer human communities from **natural disasters**
- Protect areas important for **food security**
- Protect **water resources**
- Sustain **livelihoods**

Improving connectivity to promote climate resilience: Jamaica



- The planning process explicitly included the **connectivity needs** for a range of species under **various climate scenarios**

Resilience through PA spatial integration



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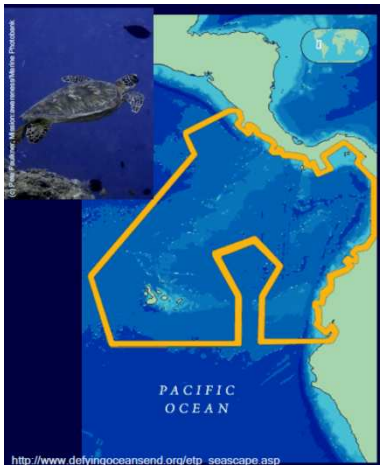

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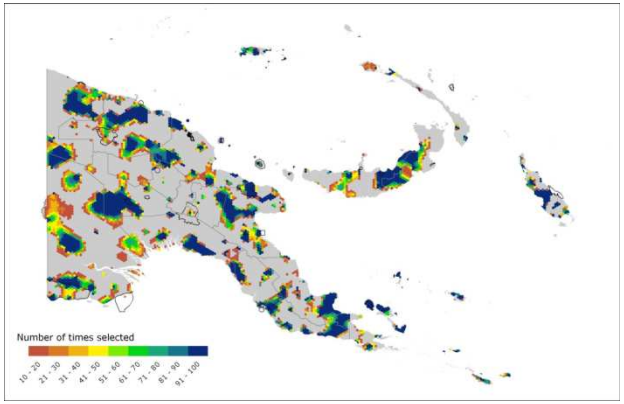
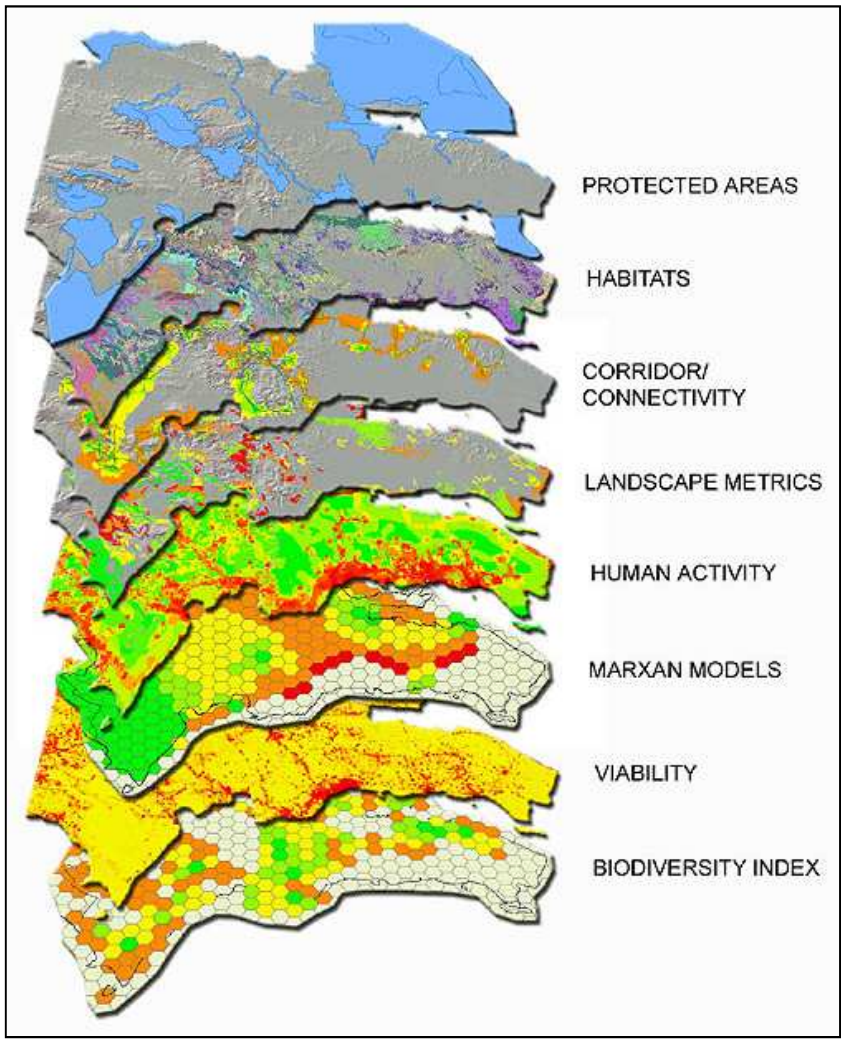


Improved gap assessments

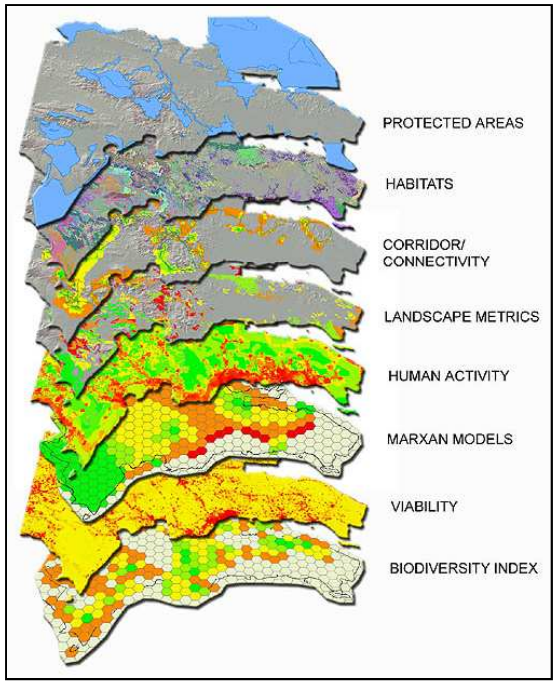
Incorporating resilience principles into ecological gap assessments:



GAP ASSESSMENT:

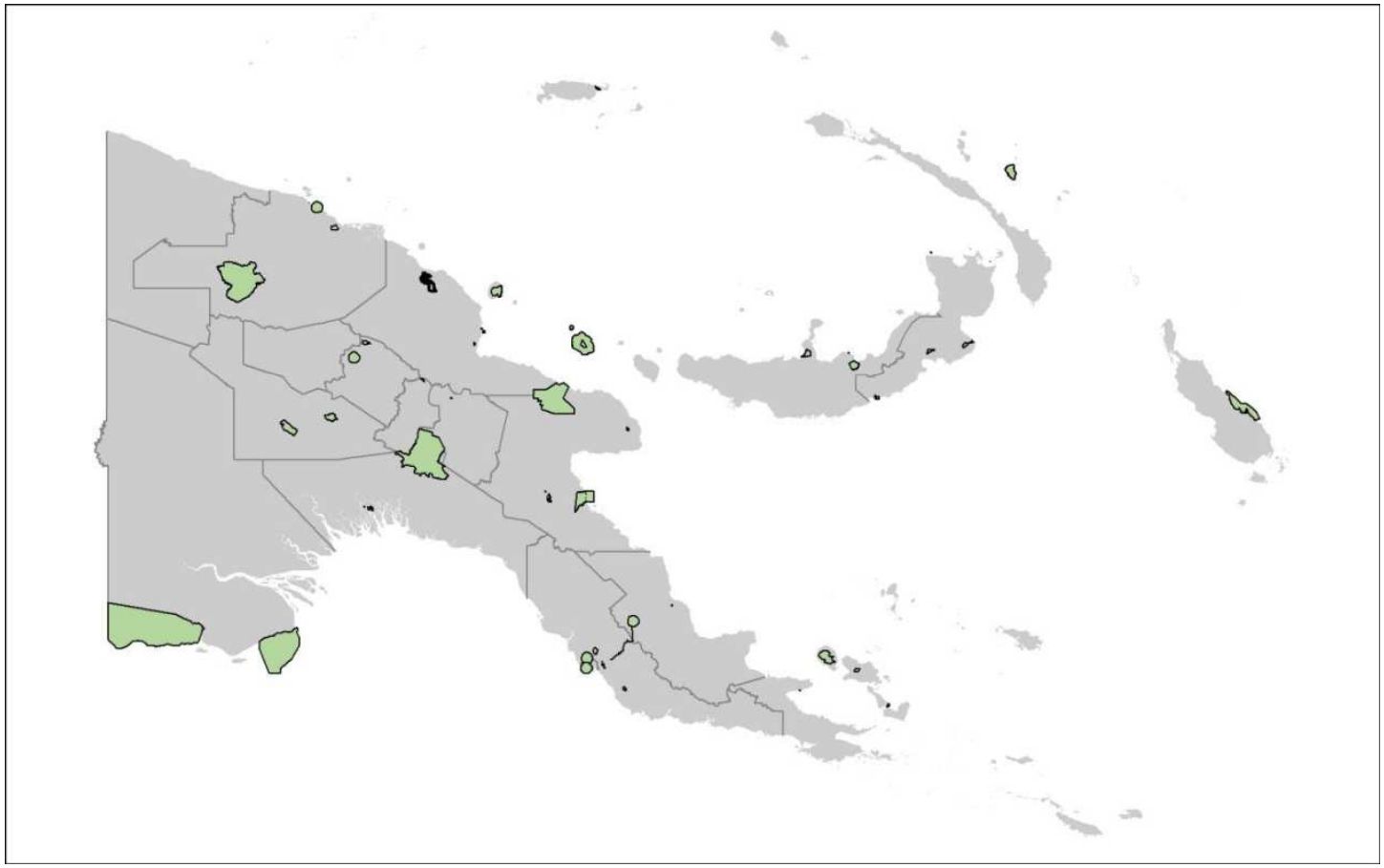
A comparison between the status of **biodiversity** and the status of **protection** within a country

Incorporating resilience principles into gap assessments:



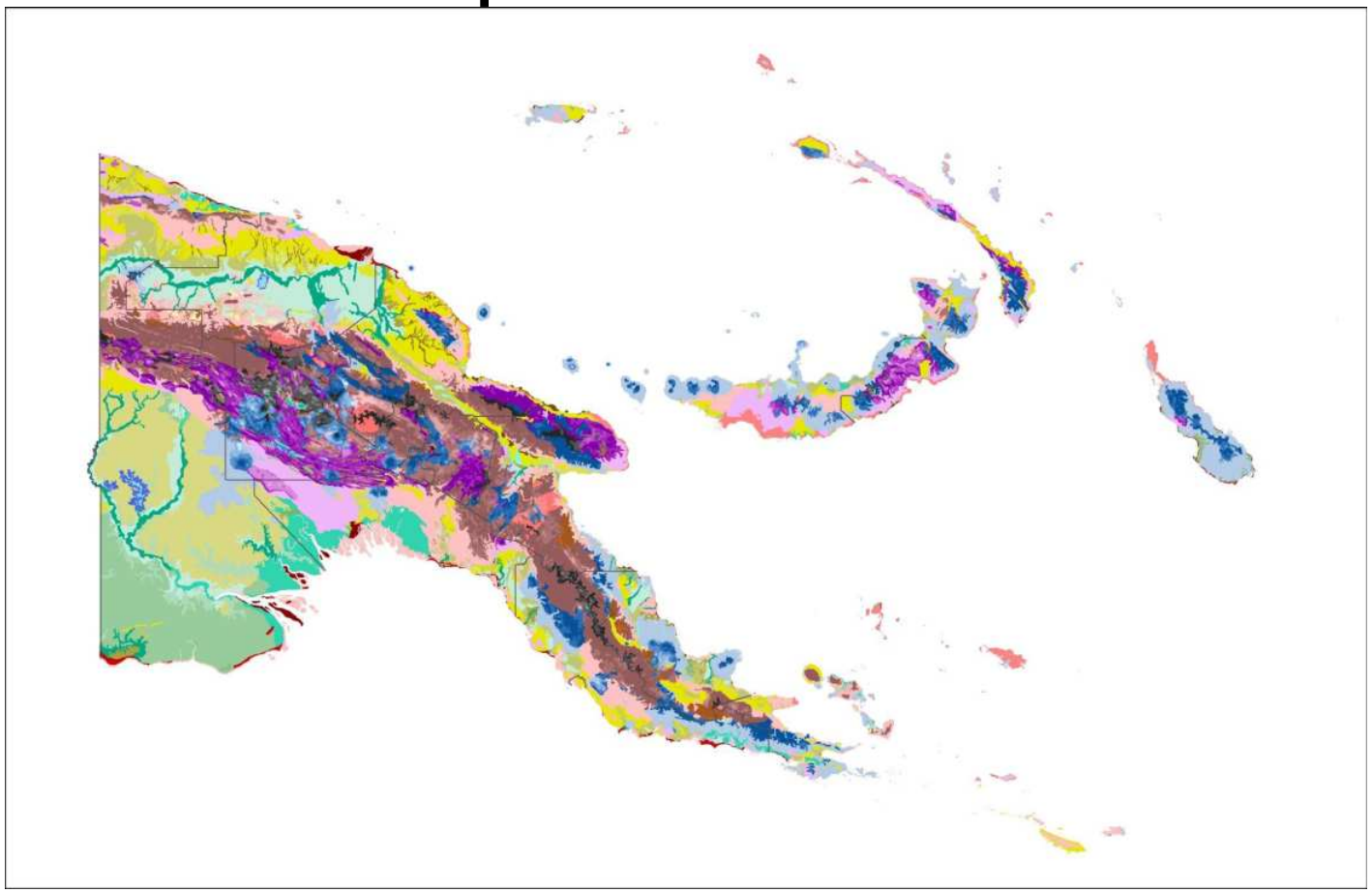
- Focus on **underlying features** (e.g., intertidal systems, coral reefs, upwellings, sea mounts)
- Include species and ecosystems most **vulnerable** and most **resistant** to climate change
- Incorporate **climate modeling**, including **connectivity** under climate scenarios, in gap assessment

Climate-Ready Ecological Gap Assessment in Papua New Guinea



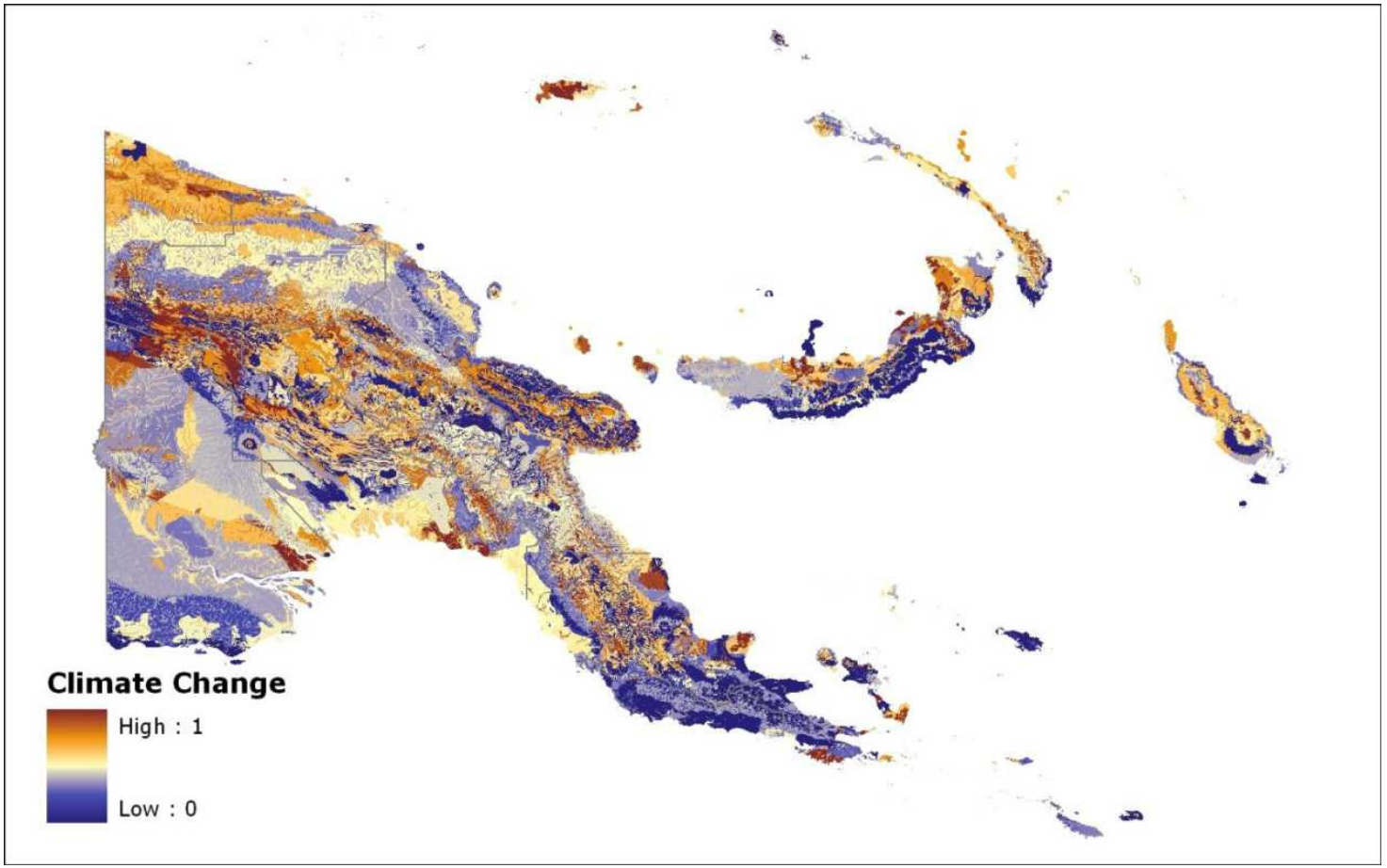
Existing protected areas

Climate-Ready Ecological Gap Assessment in Papua New Guinea



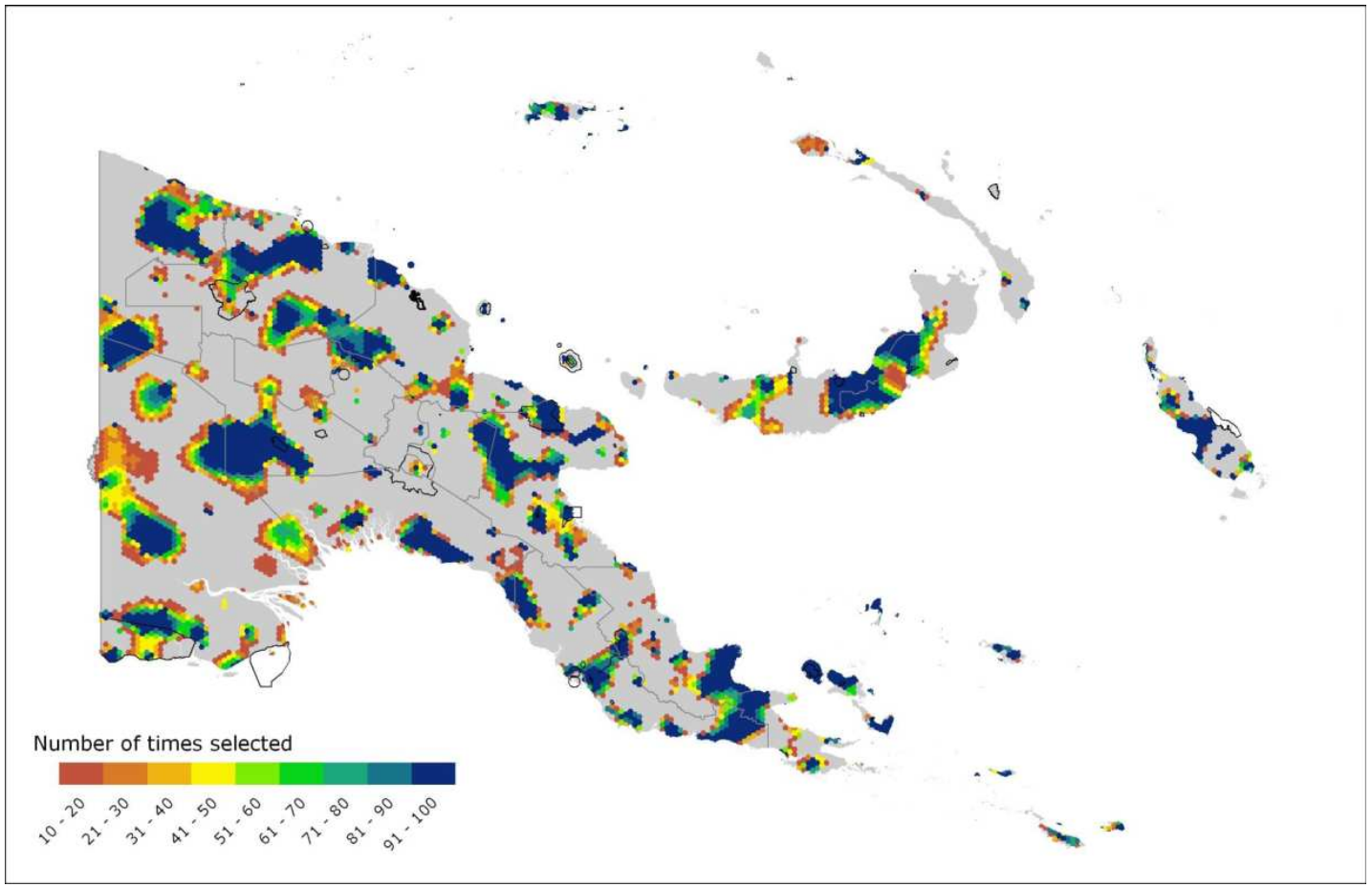
Land systems

Climate-Ready Ecological Gap Assessment in Papua New Guinea

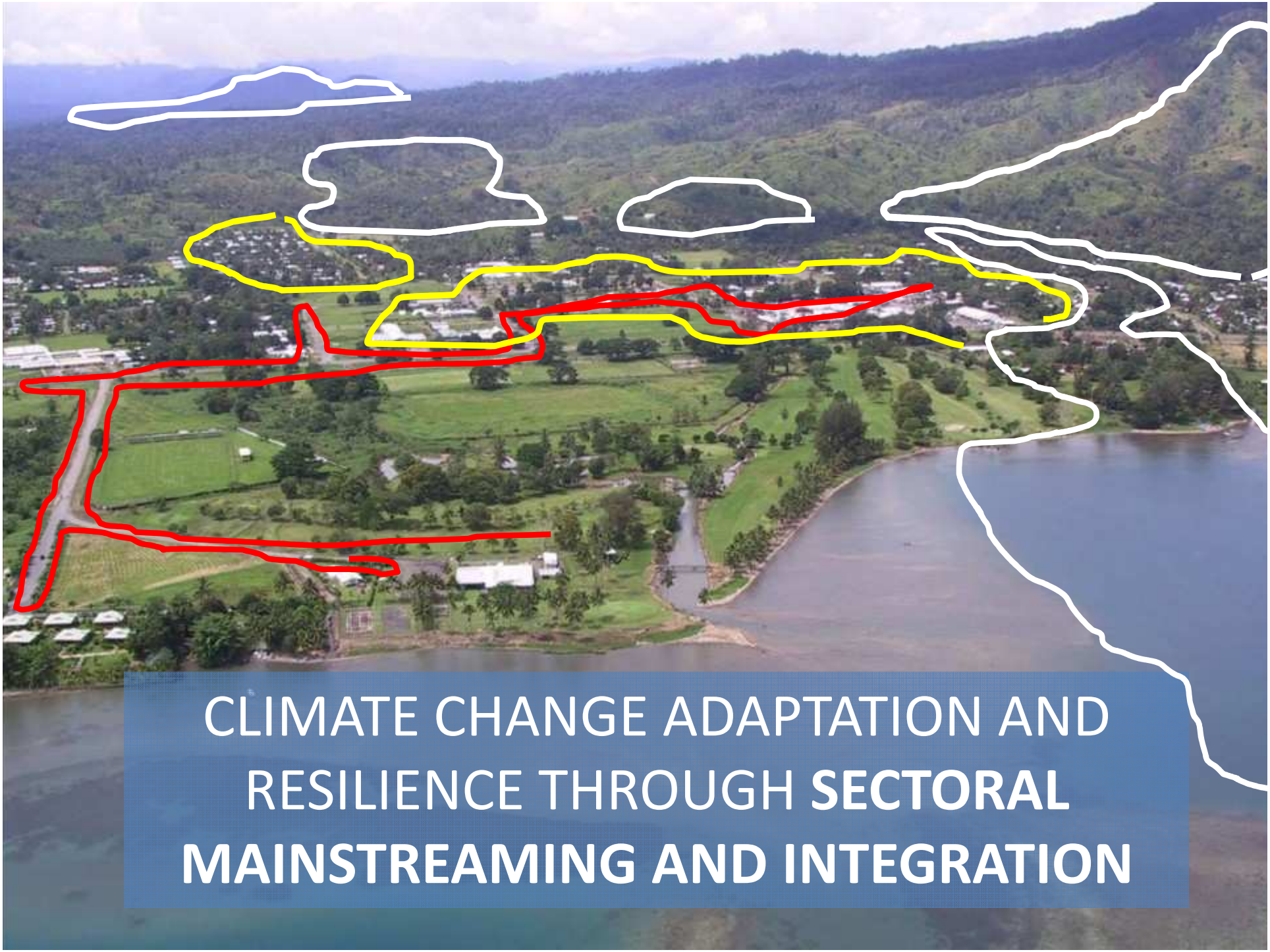


Climate impacts

Climate-Ready Ecological Gap Assessment in Papua New Guinea



Resulting analysis of climate-ready gap assessment



CLIMATE CHANGE ADAPTATION AND RESILIENCE THROUGH **SECTORAL MAINSTREAMING AND INTEGRATION**

Climate Change Resilience through Sectoral Integration and Mainstreaming

Sectoral mainstreaming

Revise valuation studies

Integrate into NAPAs

Include in threat assessment

SECTORAL INTEGRATION

Ensuring that related sectors minimize impacts on biodiversity within protected areas….

…which involves many key sectors….

Land use planning	Agriculture	Waste management
Transportation	Grazing	Invasive species policies
Energy	Forestry	Legal environment
Tourism	Agroforestry	Water management
Wildlife policies	Fisheries	National security

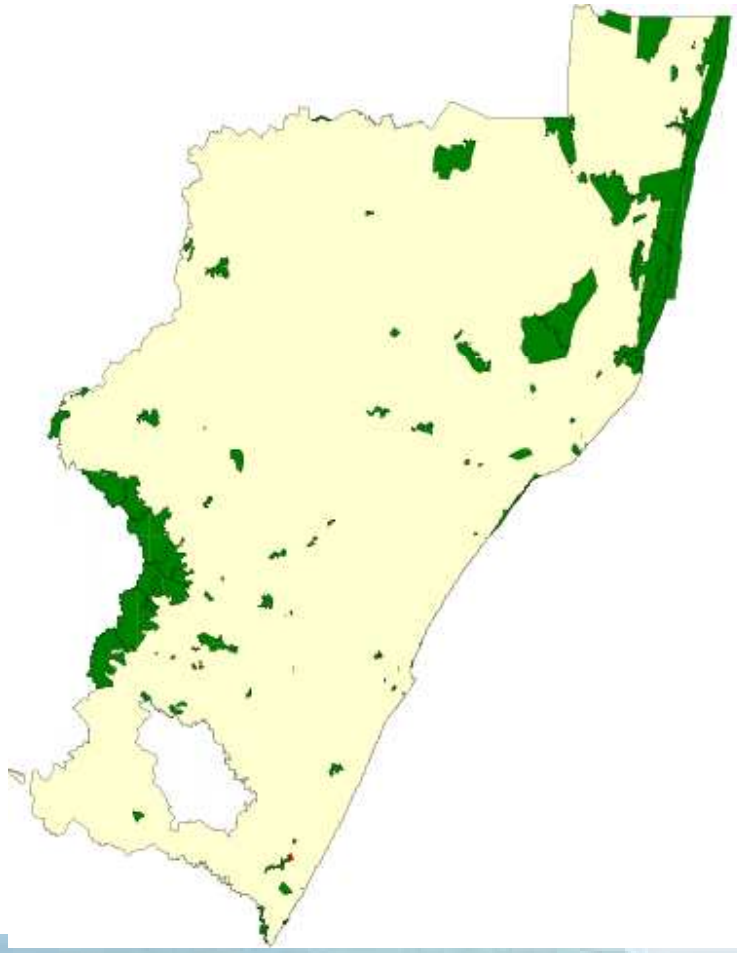
SECTORAL MAINSTREAMING

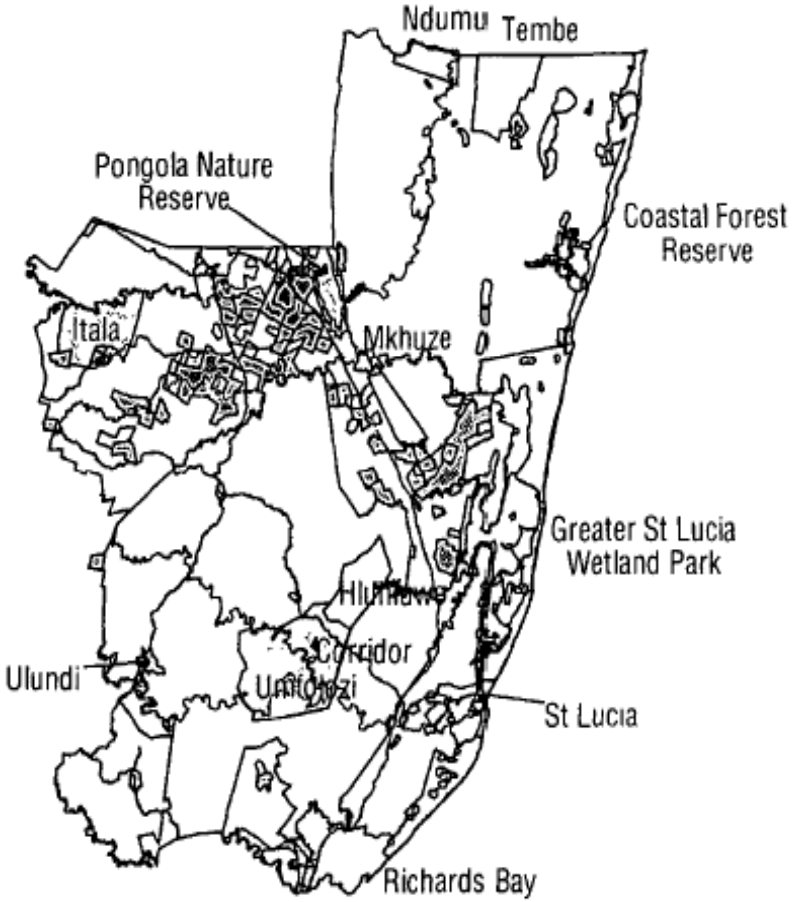
DEFINED AS:

The internalization of biodiversity conservation goals into economic and development policies and programs, so that they become an integral part of the functioning of these sectors.

Mainstreaming biodiversity in South Africa

The importance of game reserves in KZN



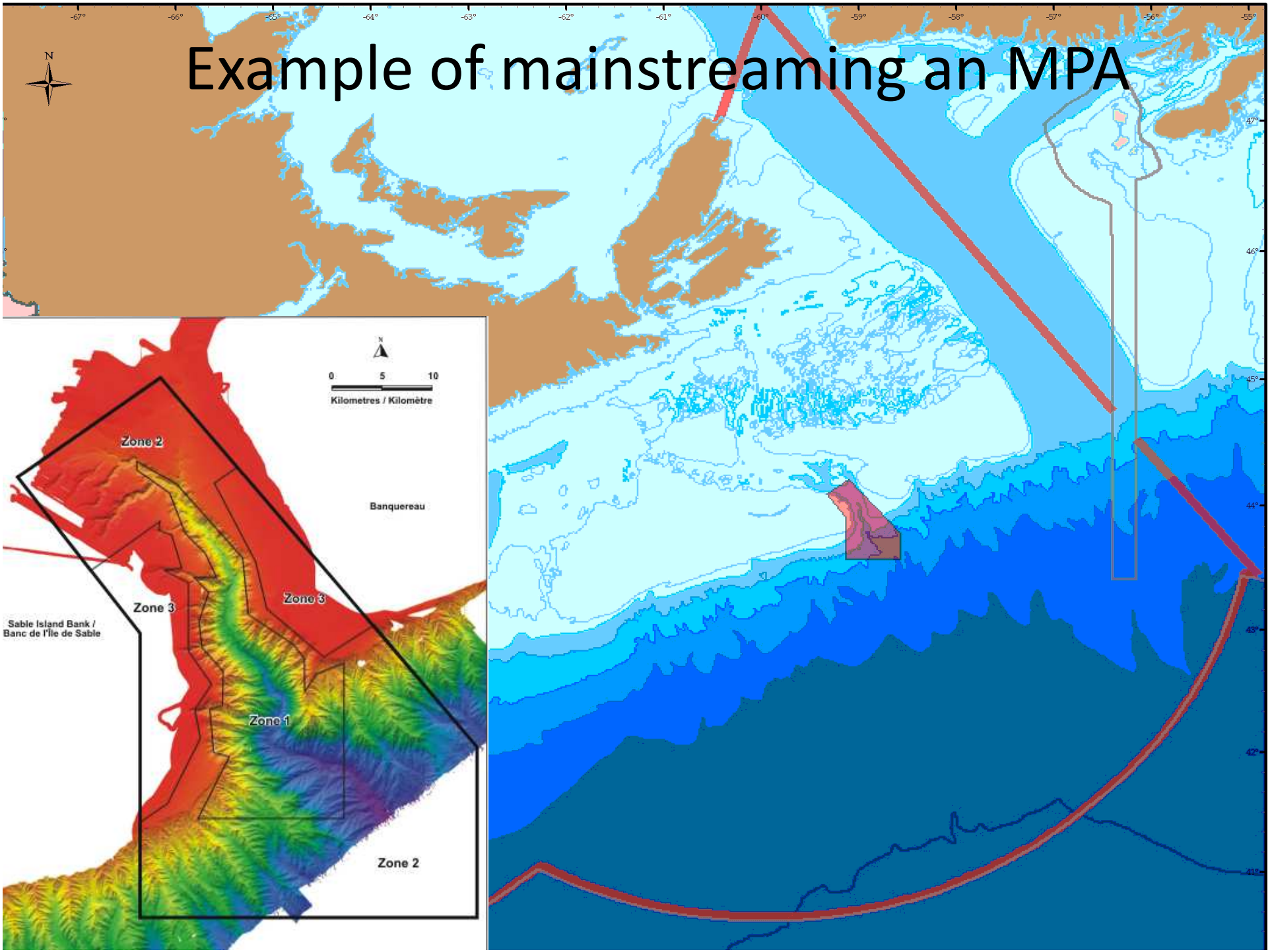


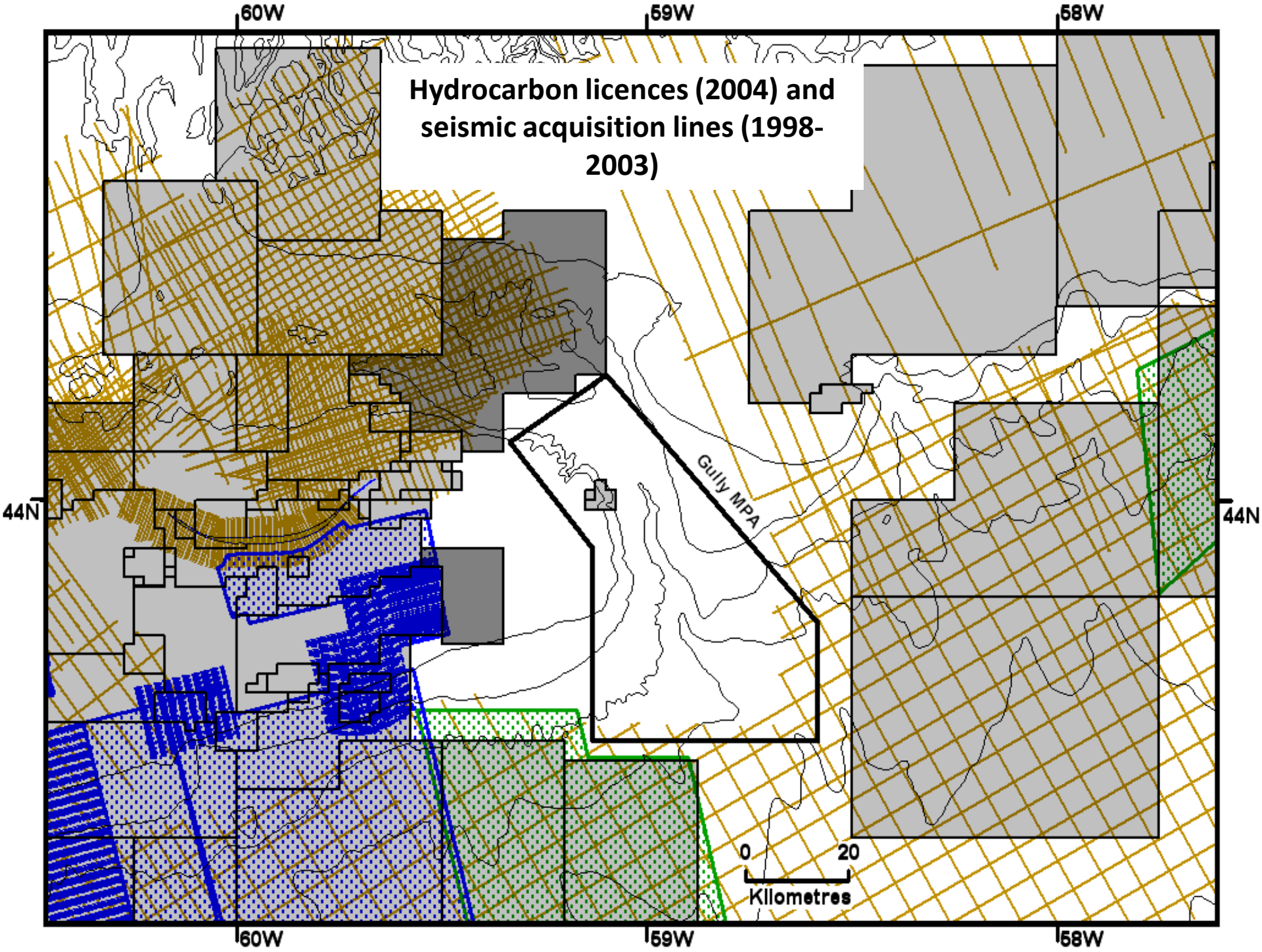
MAJOR OPPORTUNITY:
Landscape linkages between formal protected areas and private game ranches

Example of mainstreaming in S. Africa

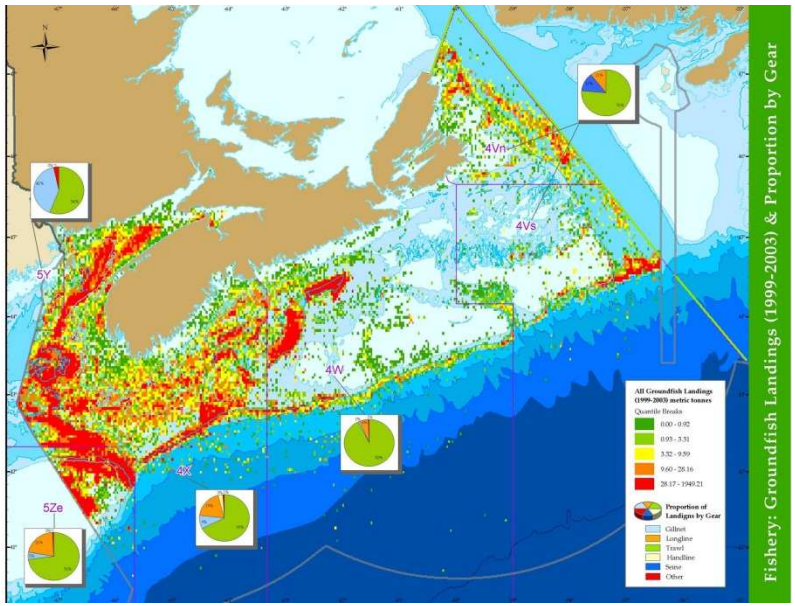
- The park service focused on developing a game ranchers' association
- They helped create a legal framework to support private ownership of land and wildlife
- They provided technical support to ranchers
- They provided financial incentives for private game ranches
- Ranchers used sales from ranches to help fund protected areas
- KZN helped to remove physical barriers between reserves

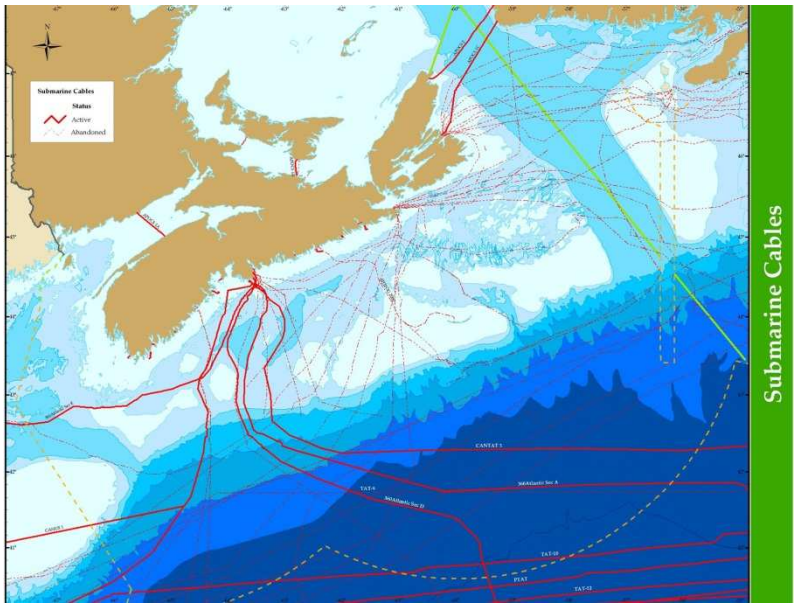
Example of mainstreaming an MPA

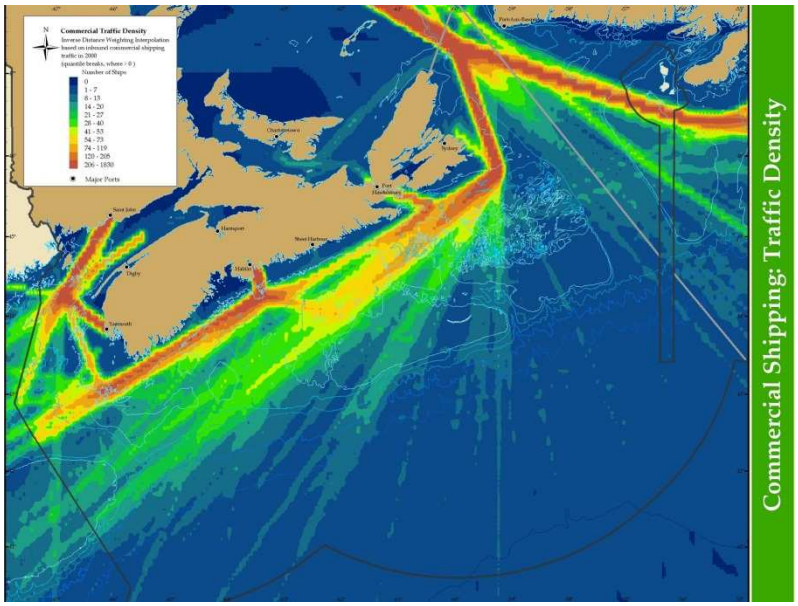


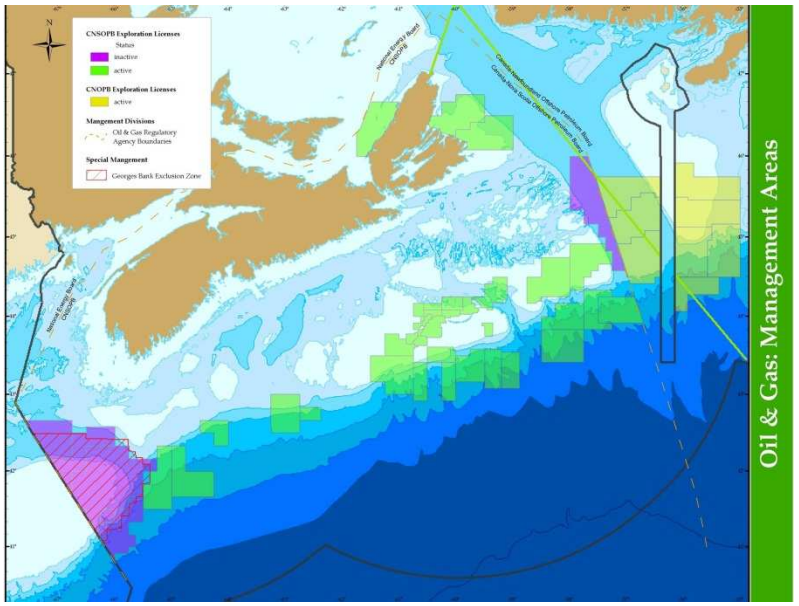

Hydrocarbon licences (2004) and seismic acquisition lines (1998-2003)
60W
59W
58W
44N
Gully MPA
0
20
Kilometres

Example of mainstreaming an MPA

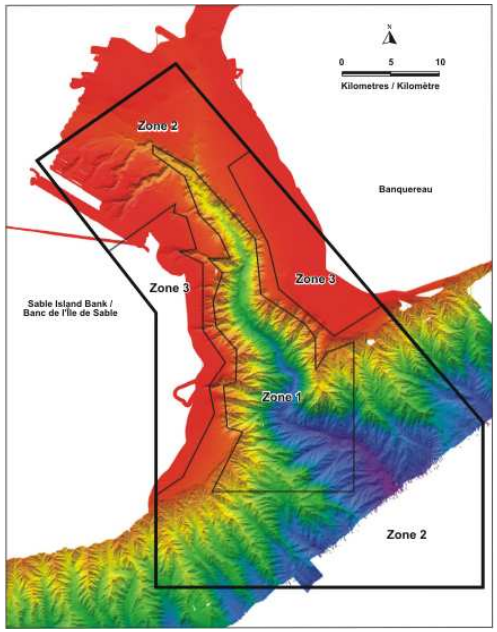








Example of mainstreaming an MPA

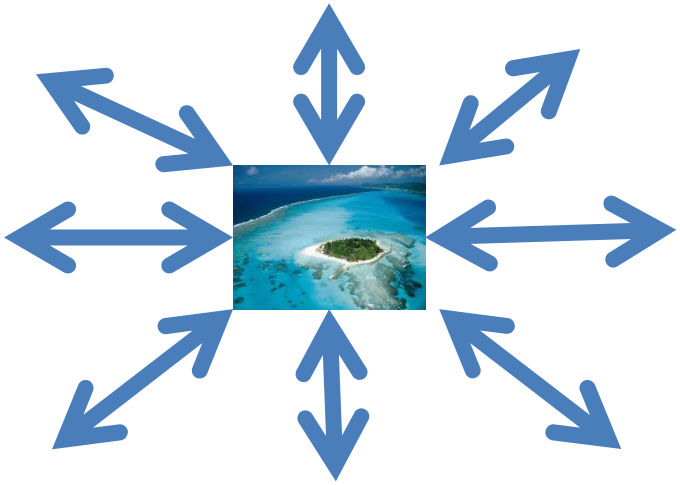


Transportation: New regulations on ballast water exchange; Coast Guard guidance on MPA avoidance, mammals, discharges

Oil and Gas: Adjacency protocols, voluntary codes of conduct, collaborative research

Fisheries: Automatic detection of unauthorized fishing

Multiple Opportunities for Mainstreaming



Climate Change Adaptation through PA Sectoral Integration and Mainstreaming

Sectoral mainstreaming

Revise valuation studies

Integrate into NAPAs

Include in threats assessment

Integrate climate-related issues into PA and biodiversity valuation studies

- Incorporate **food security**
- Incorporate **water security**
- Incorporate **energy**
- Incorporate **carbon storage**
- Incorporate **human health and wellbeing**
- Incorporate **national security** issues and disaster readiness plans

Some examples of the value of PAs for climate resilience

- **Cambodia**: mangrove protected areas provide fuel wood and fishing that supports up to 60% of household incomes
- **Canada**: Approximately 4.43 gigatonnes of carbon are sequestered in Canada's national parks
- **Indonesia**: Protected mangrove areas contribute US$ 600 per household annually in erosion control.
- **Venezuela**: The fresh water needs of 19 million people (or 83%) of Venezuela's urban population comes from 18 national parks

Climate Change Adaptation through PA Sectoral Integration and Mainstreaming

Sectoral mainstreaming

Revise PA valuation studies

Integrate into NAPAs

Include in threats assessment

Integrate protected areas into NAPAs

- Percentage of all 434 actions that are ecosystem-based: <25%
- Percentage of strategies that reference protected areas: <8%
- Percentage of total budget for protected area actions: <4%

Range of NAPA actions:

- Health
- Early warnings
- Food security
- Infrastructure
- Insurance
- Tourism
- Energy
- Ecosystem-based management

Integrate protected areas into NAPAs

Bangladesh: Reduction of climate change hazards through coastal afforestation with community participation – $23,000,000 (25%)

Types of ecosystem-based NAPA actions:

- Establish new forest reserves
- Create buffer zones and corridors
- Restore and protect critical fisheries habitat
- Eradicate invasive species likely to exacerbate climate impacts
- Expand existing protected areas

Climate Change Adaptation through PA Sectoral Integration and Mainstreaming

Sectoral mainstreaming

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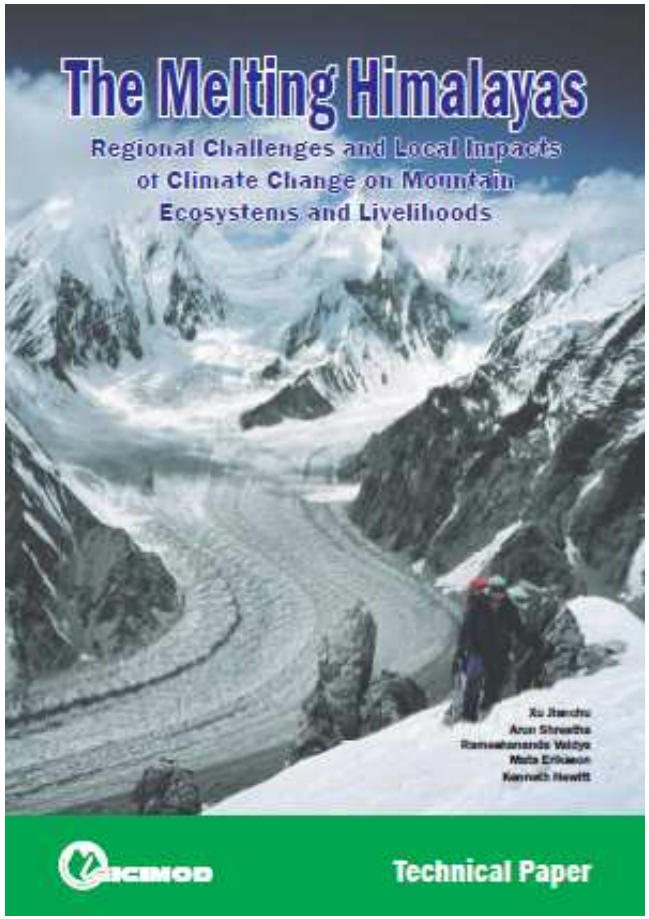
Integrate into NAPAs

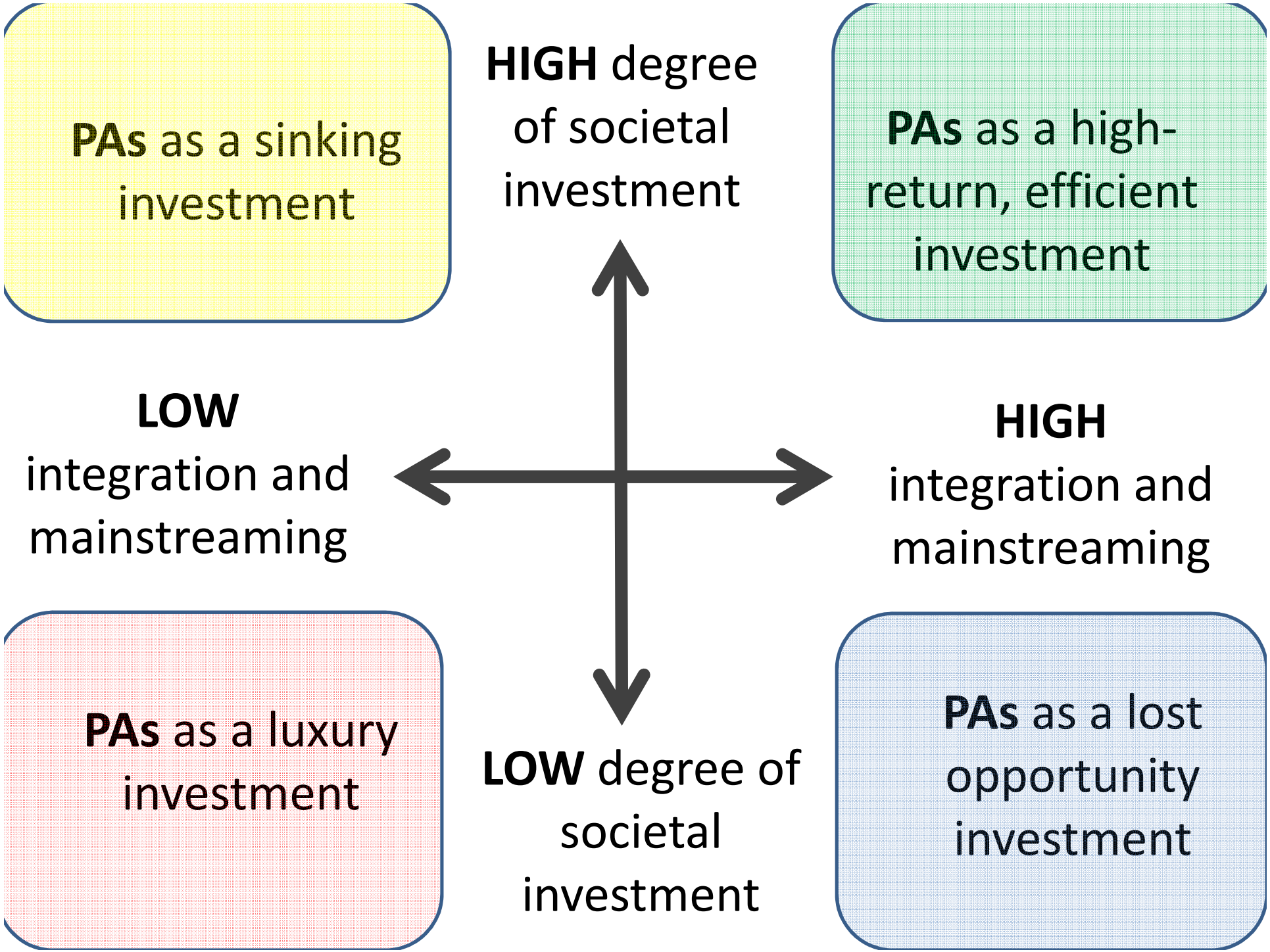
Include in threats assessment

Incorporate climate into PA and biodiversity threat assessments



- Include an assessment of **ecosystem services that are vulnerable** to climate impacts
- Include climate-related **range and distribution shifts** in threat assessments
- Incorporate **climate-related thresholds and tipping points**
- Incorporate climate-related issues into **environmental impact assessments** (EIAs) and **strategic environmental assessments** (SEAs)

CONSEQUENCES OF NOT BUILDING RESILIENCE


PAs as a sinking investment
HIGH degree of societal investment
PAs as a high-return, efficient investment
LOW integration and mainstreaming
HIGH integration and mainstreaming
PAs as a luxury investment
LOW degree of societal investment
PAs as a lost opportunity investment

Exercise

1. Choose the topic that most interests you
2. Form small groups, based on sub-regional interests, around each wall board
3. Identify the 1-3 most important strategies for building resilience
4. Develop national sub-targets and indicators
5. Post your strategies and sub-targets on the wall and present to the other small groups
6. One person will report back

Exercise

1. Country:
2. Description of strategy:
3. Proposed national target/s:
4. Potential indicators:

Exercise

1. **Country**: Cambodia
2. **Description of strategy**: Incorporate ecosystem-based approaches and protected areas into NAPA (National Adaptation Plan of Action)
3. **Proposed national target/s:** By 2015, Cambodia's NAPA fully incorporates ecosystem-based marine resilience (e.g., protection of coral reefs, sea bed grasses, upwelling, sea mounts)
4. **Potential indicators:** Percent of NAPA funds allocated to ecosystem-based approaches