

Identifying strategies and targets for building climate resilience



Jamison Ervin, Senior Advisor, UNDP



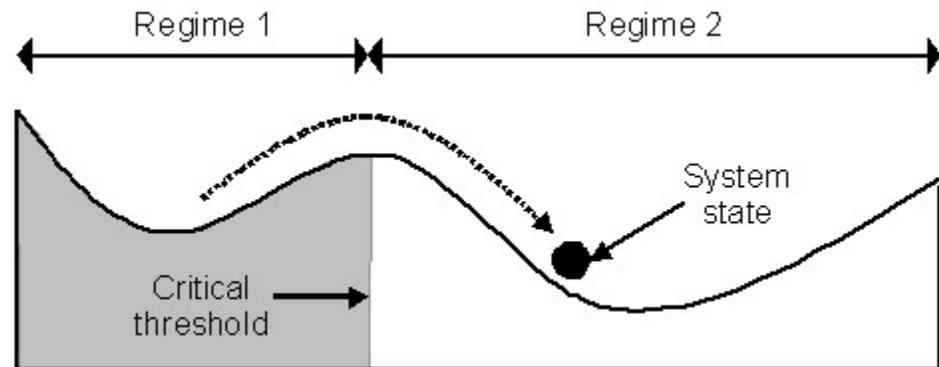


An aerial photograph of a coastal town and a large lake. The town is built on a valley floor, surrounded by green hills. A white outline is drawn on the right side of the image, highlighting a specific area on a hillside. The lake is in the foreground, and the sky is overcast.

CLIMATE CHANGE ADAPTATION AND RESILIENCE THROUGH SITE-LEVEL MANAGEMENT

Key Concepts

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

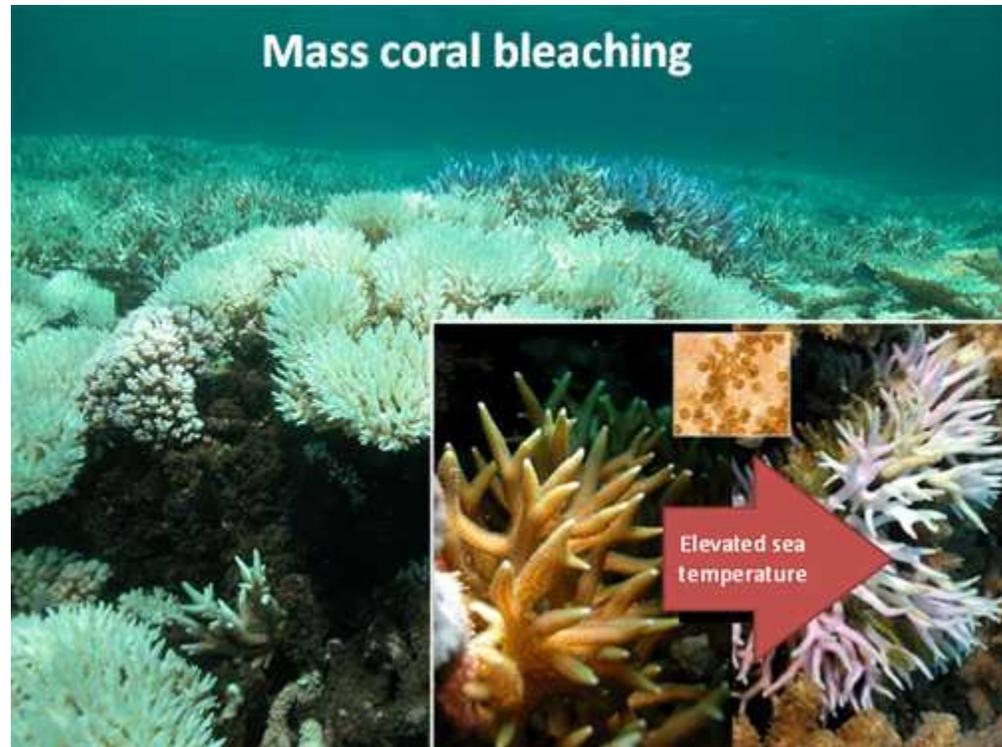


“...large, persistent changes in the structure and function of ecological systems”

www.regimeshifts.org

Key Concepts

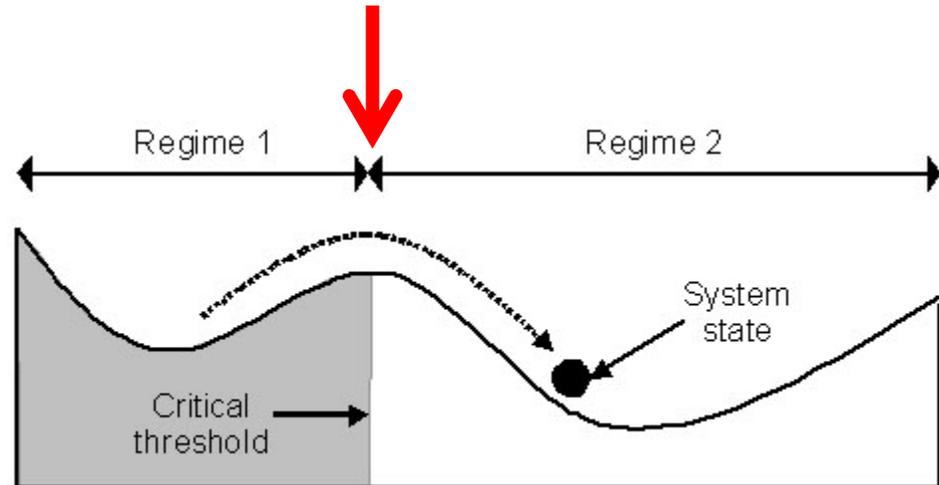
- **Regime shift**
- Tipping point
- Resilience
- Adaptation
- Mitigation



www.regimeshifts.org

Key Concepts

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



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

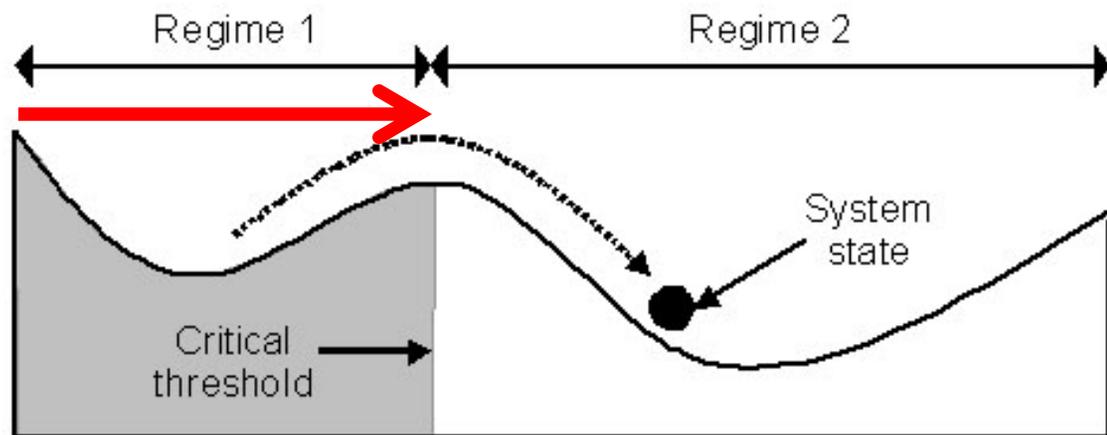
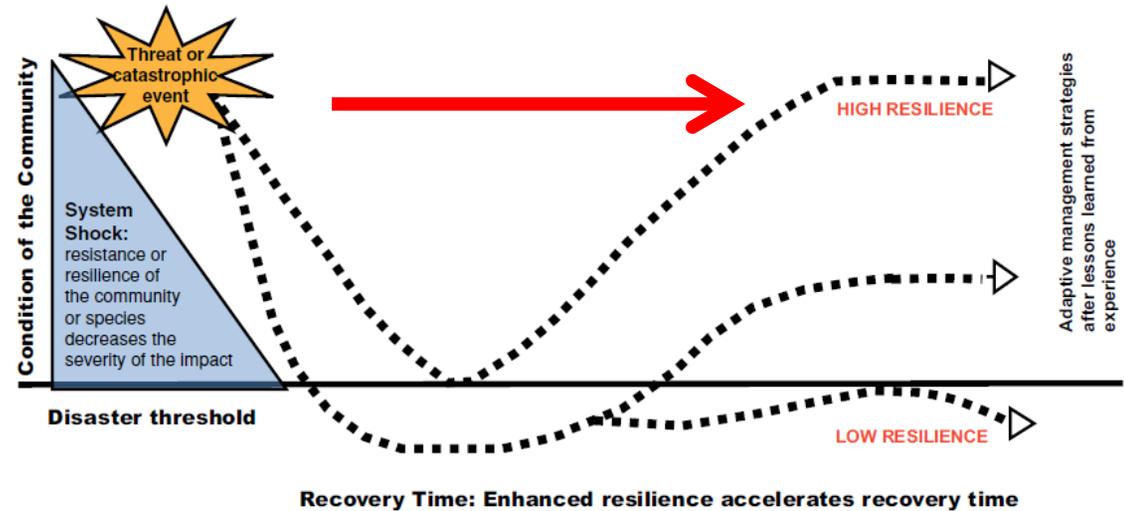
Definition

“...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

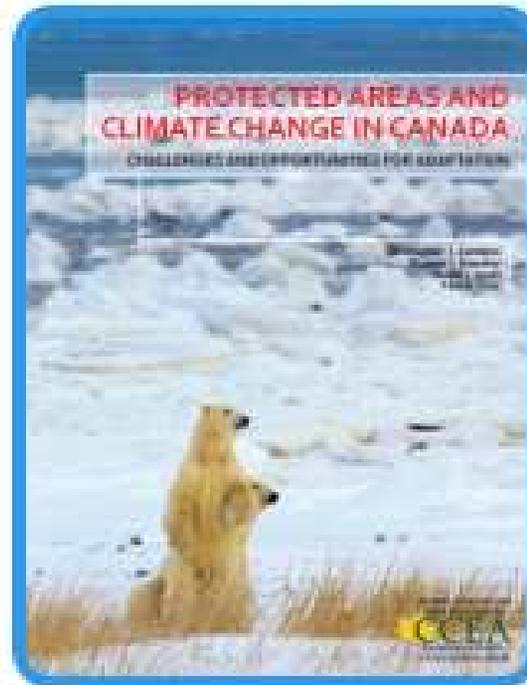
Key Concepts

- Regime shift
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Key Concepts

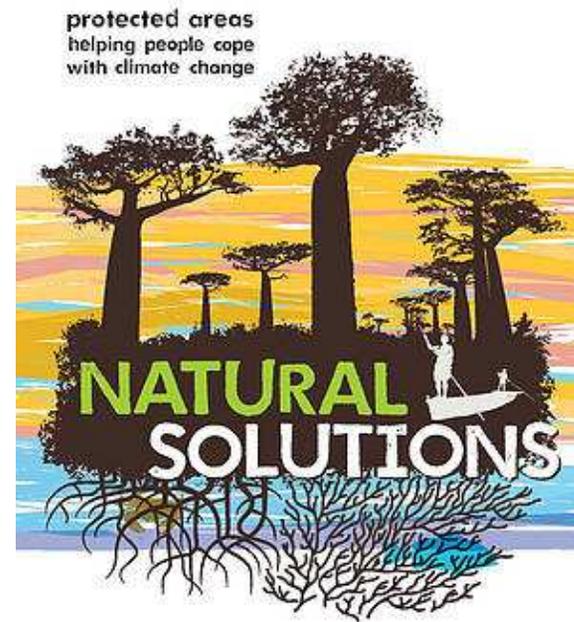
- Regime shift
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- Resilience
- **Adaptation**
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➤ **Nature's** ability to adapt to climate impacts (often through human intervention); and....

Key Concepts

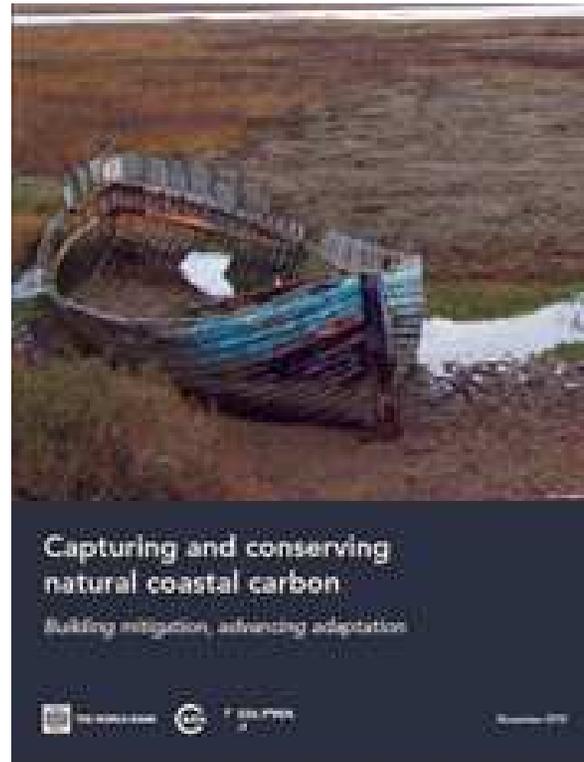
- Regime shift
- Tipping point
- Resilience
- **Adaptation**
- Mitigation



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

Key Concepts

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

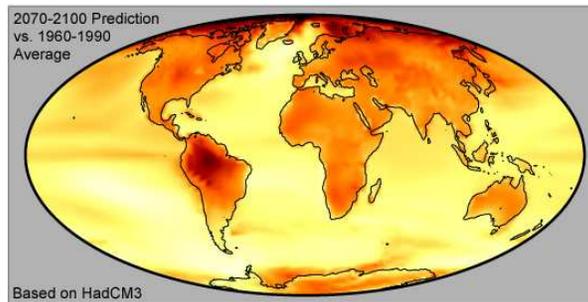
Management
effectiveness

Threat
assessments

Research and
monitoring

Restoration
plans

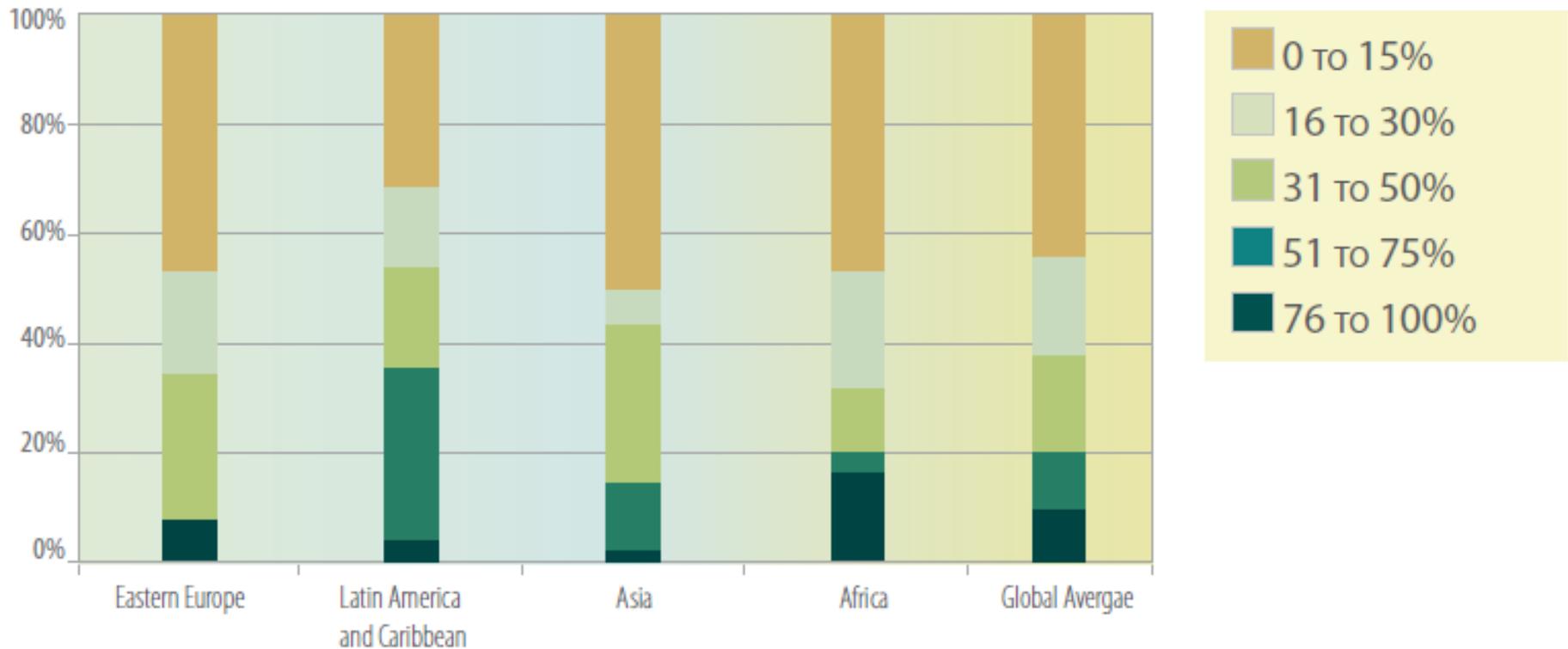
Capacity needs
assessments



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

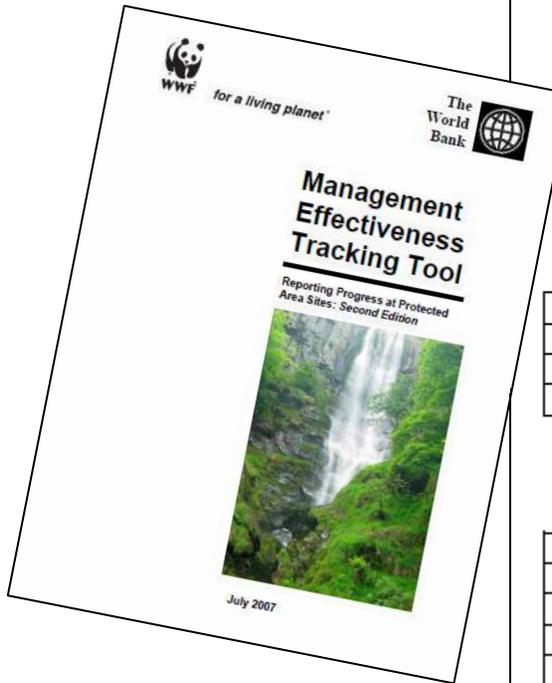


Threats Assessment



- **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

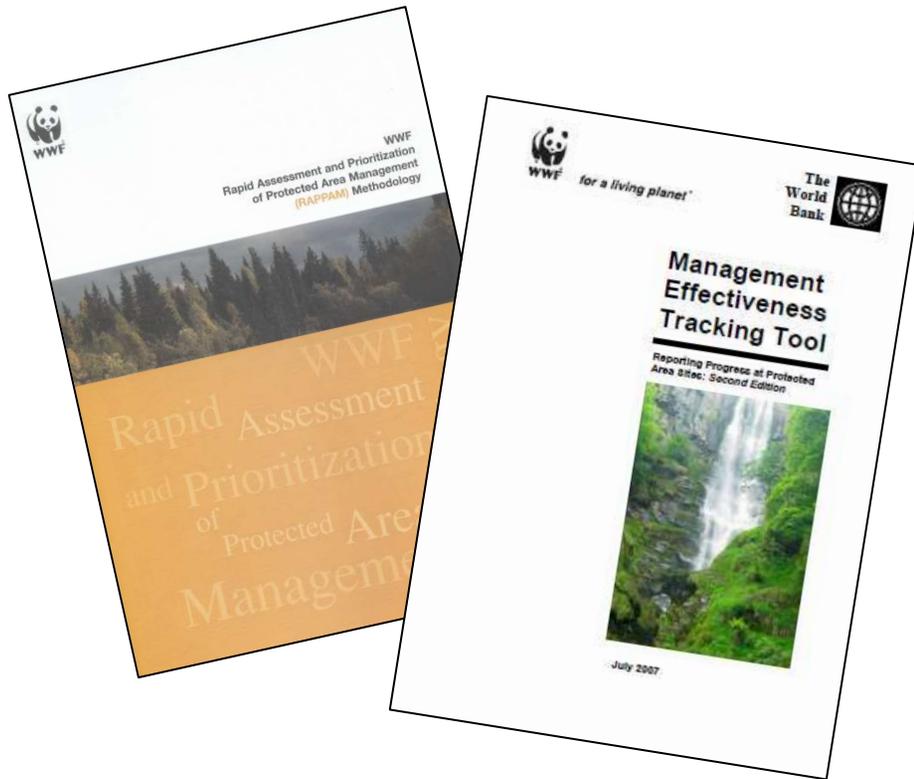
Resource management

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

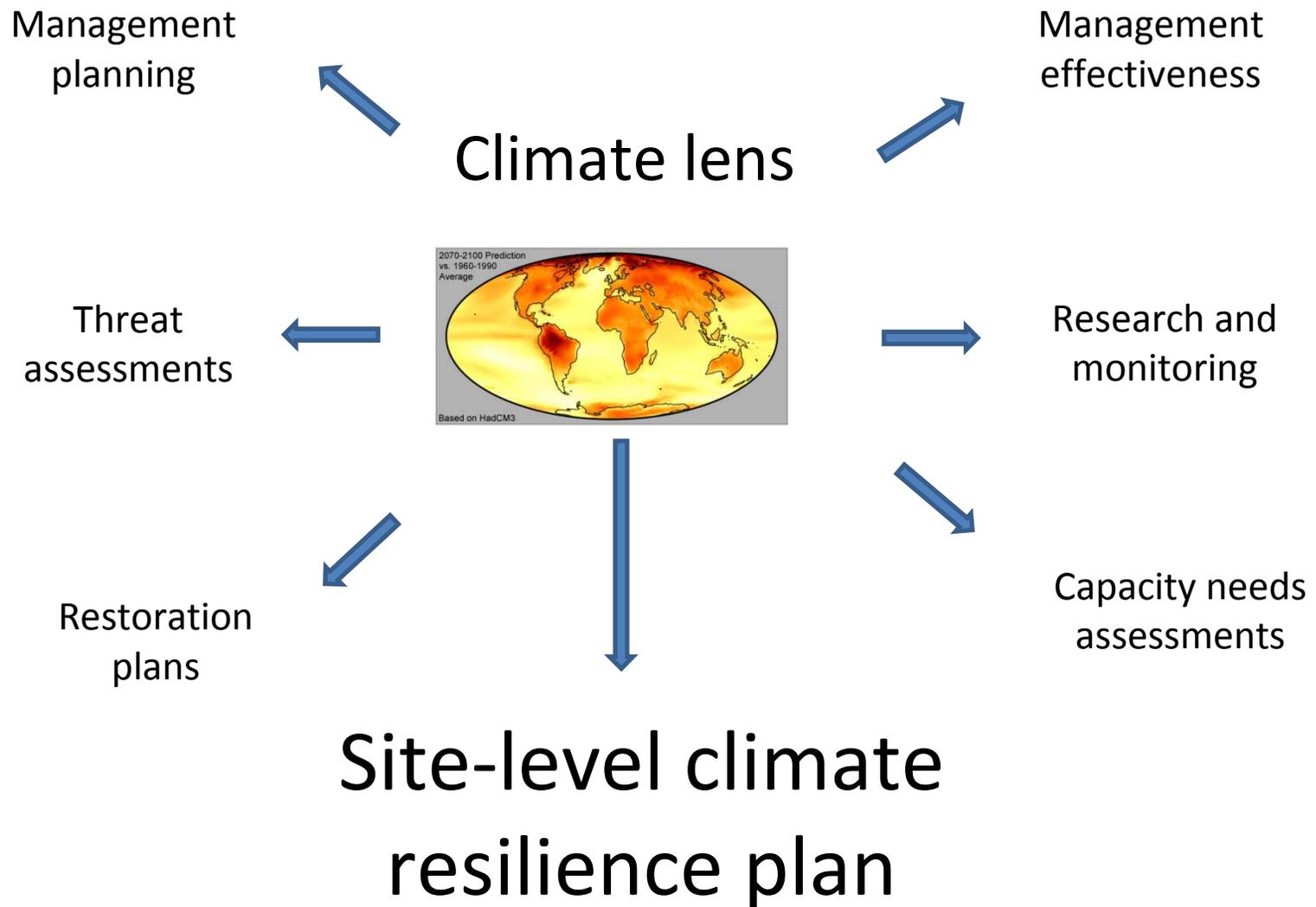


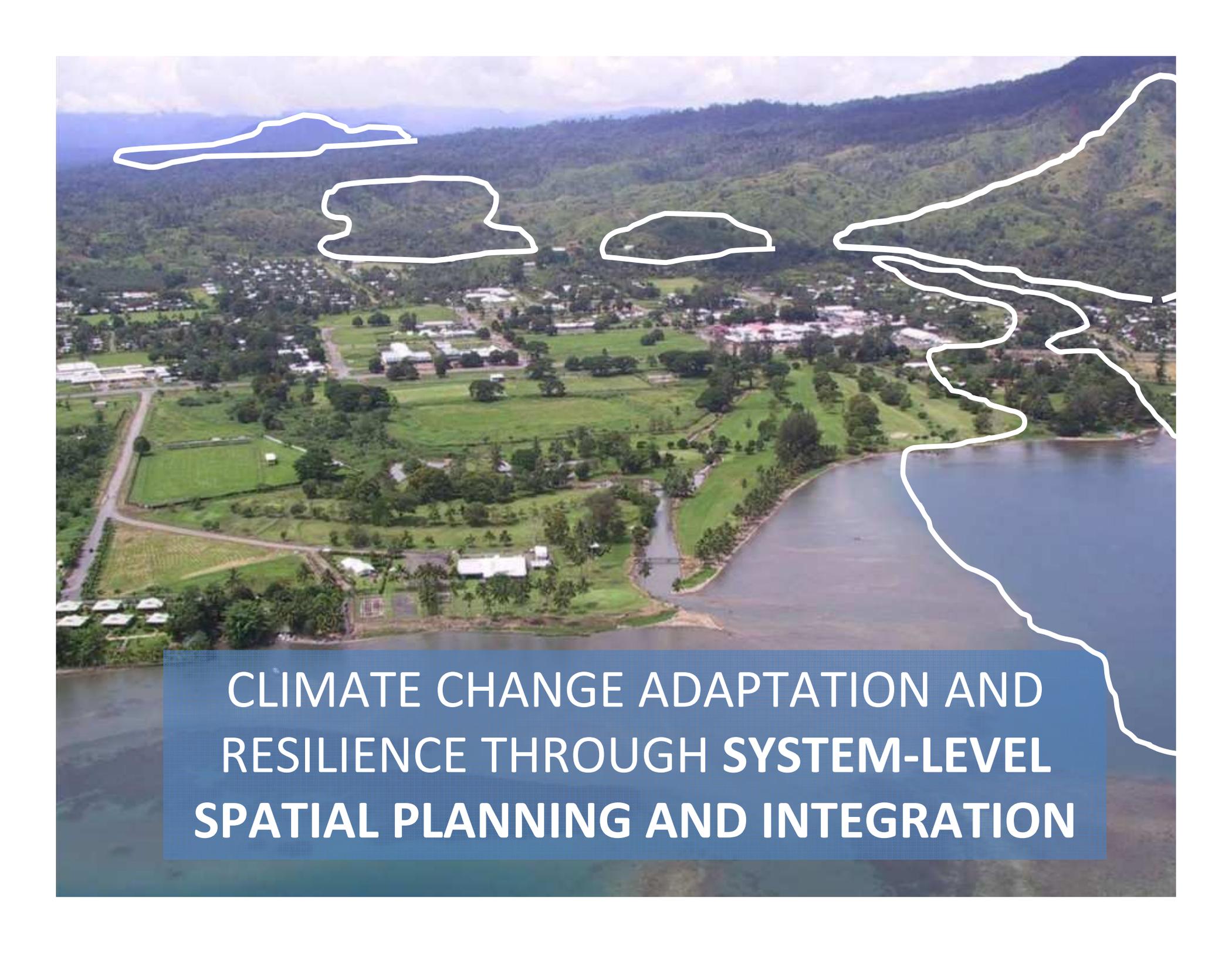
- Traditional monitoring focuses on current **status and trends in biodiversity health**
- Research priorities are largely driven by researcher interests and funding

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:



An aerial photograph of a rural landscape. In the foreground, a large, calm lake occupies the right side. To the left of the lake, there are green fields, some buildings, and a road. In the background, rolling green hills and mountains are visible under a cloudy sky. Several white, hand-drawn outlines of clouds are superimposed on the sky area. A dark blue semi-transparent banner is at the bottom of the image, containing white text.

**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.**”

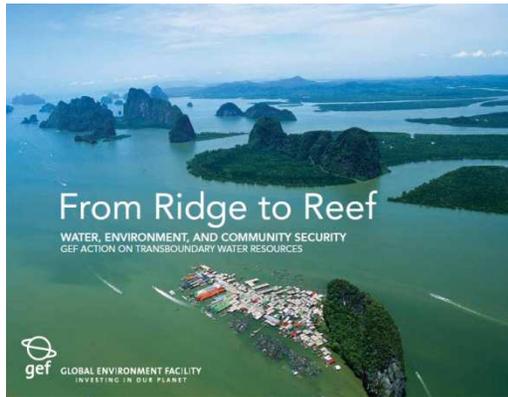
“....**ecosystem resilience** has been enhanced”

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**”



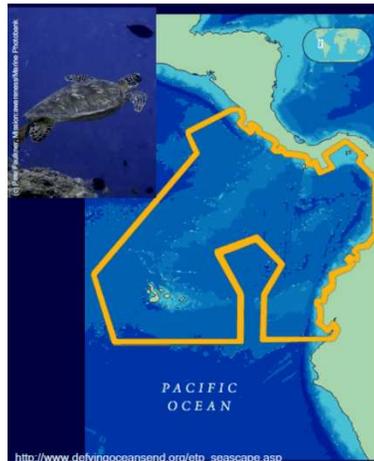
Resilience through PA spatial integration



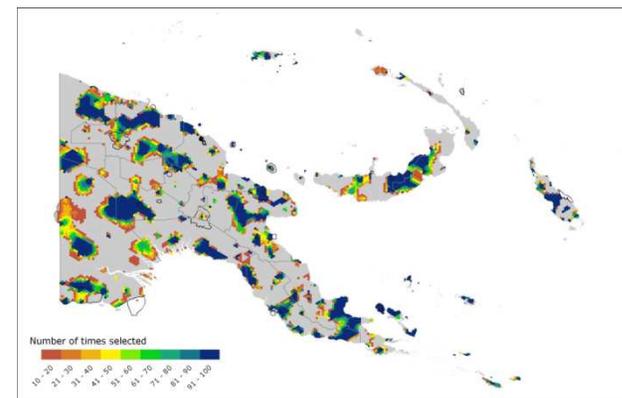
Ridge to Reef Approach



Transboundary areas

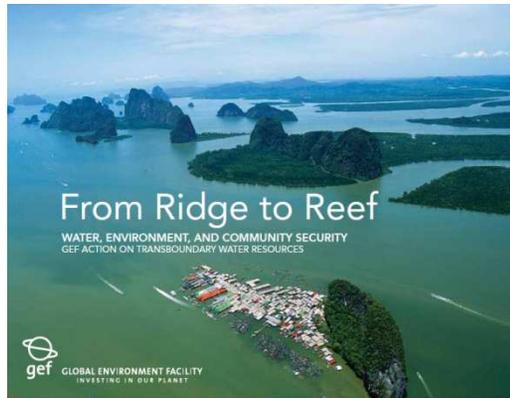


Regional networks



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



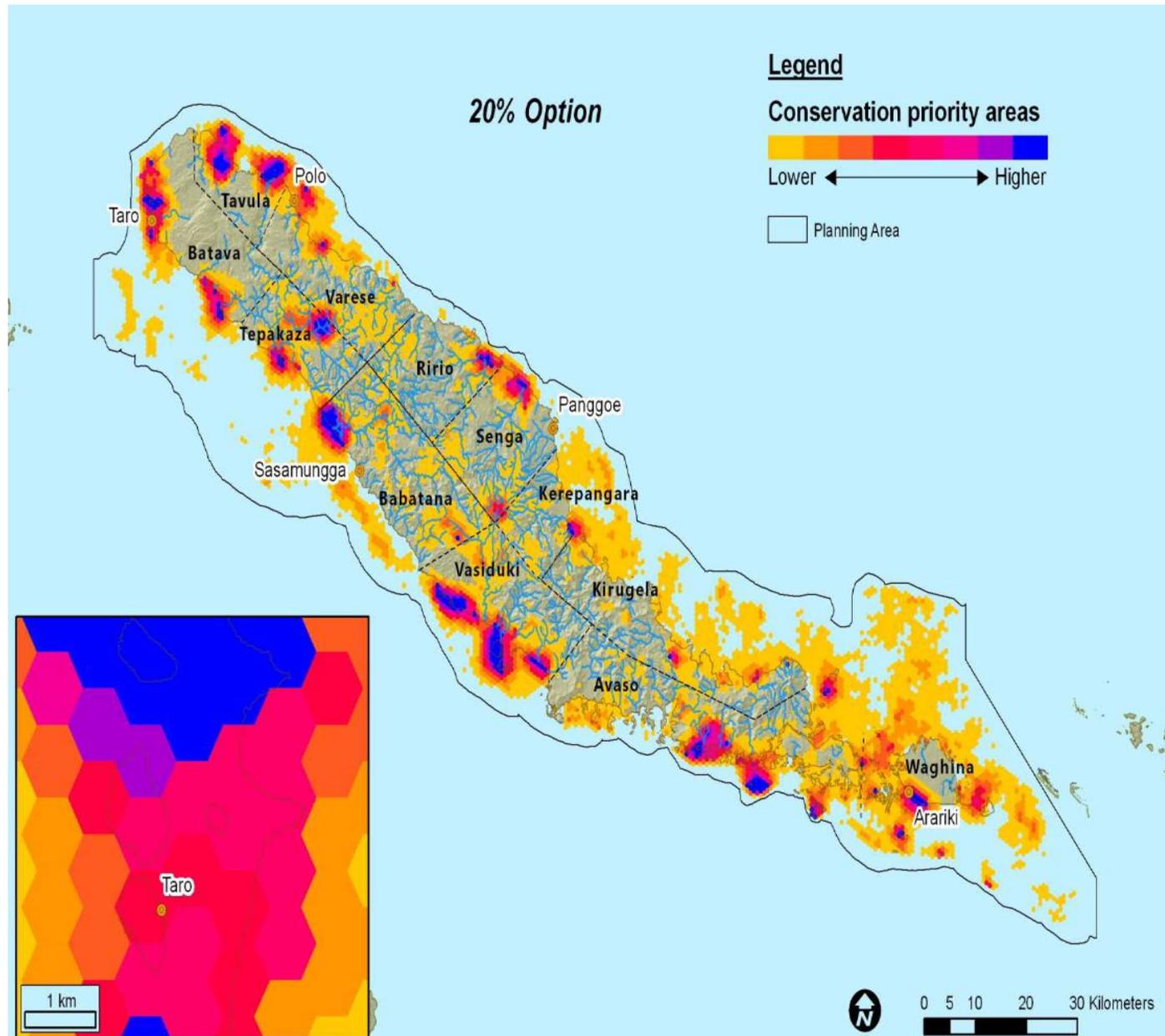
COVER STORY

Shigeatsu Hatakeyama on his oyster cultivation farm in Kesennuma Bay

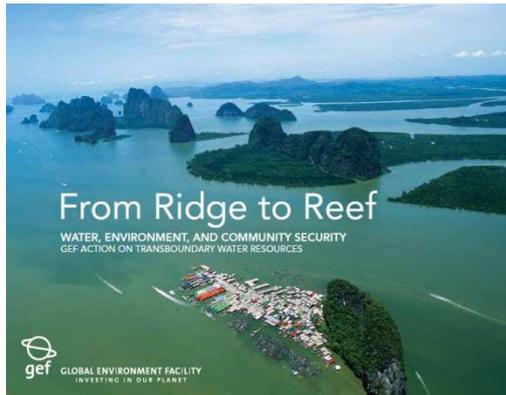
**Forests
Are Lovers
of the Sea**

ALL PHOTOS TAKEN BY ADO

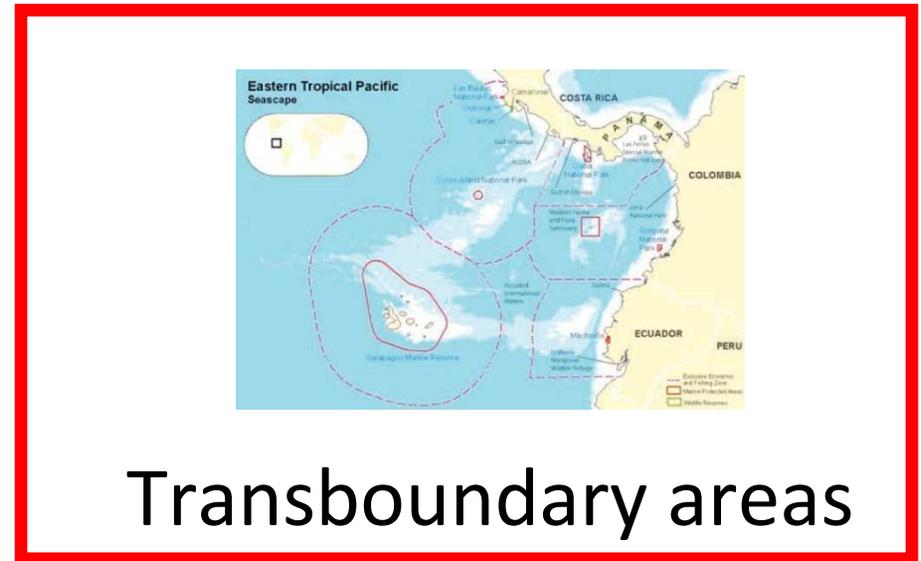
Ridge to Reef Approach in Pacific Islands



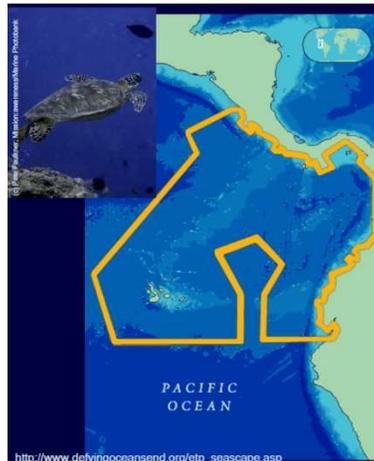
Resilience through PA spatial integration



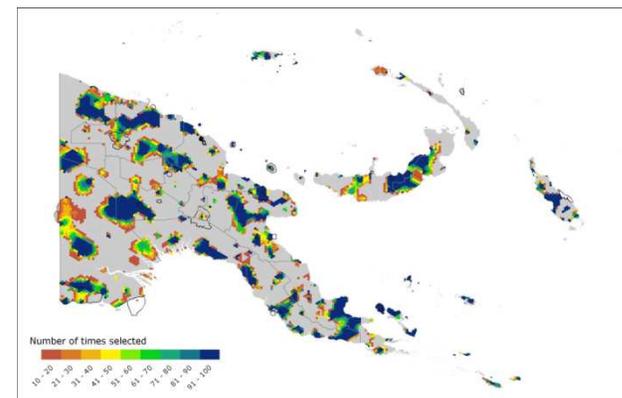
Ridge to Reef



Transboundary areas



Regional networks



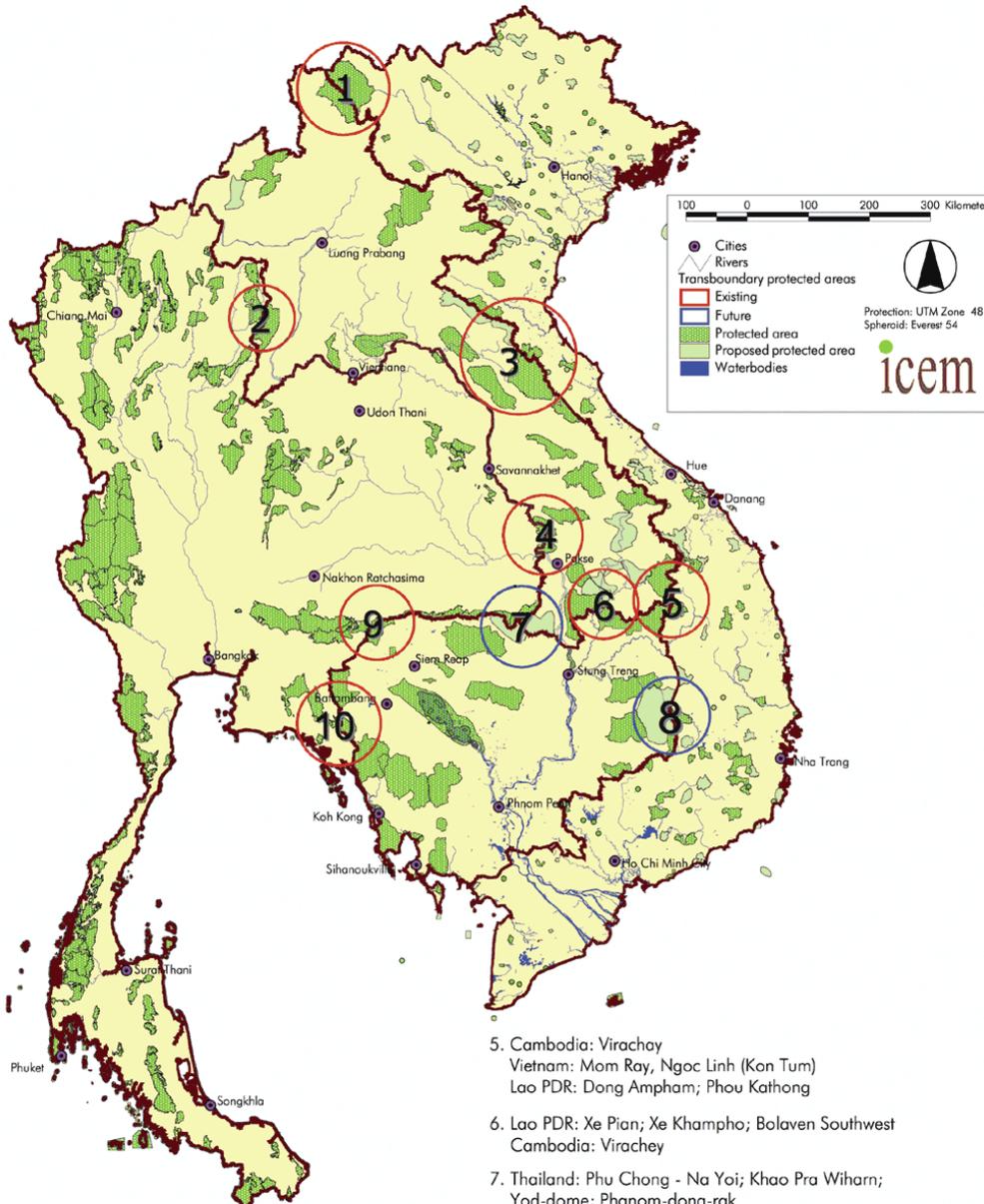
Improved gap assessments

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 Chauan; 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 Chhmor

10. Thailand: Klong Krue Whay Chalerm Prakiate
Cambodia: Samlaut

Transboundary MPAs: Eastern Tropical Pacific Seascape

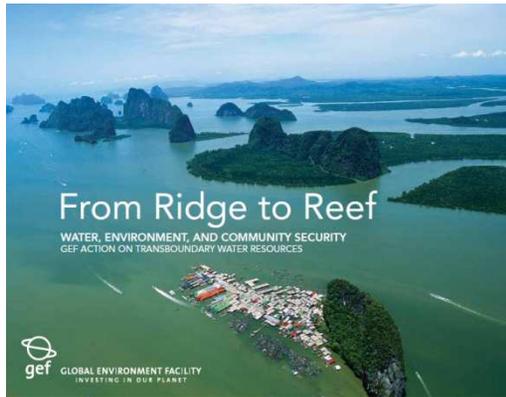


Strategies that improve climate resilience



- 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**

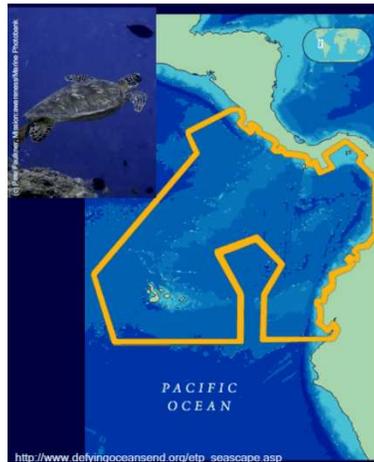
Resilience through PA spatial integration



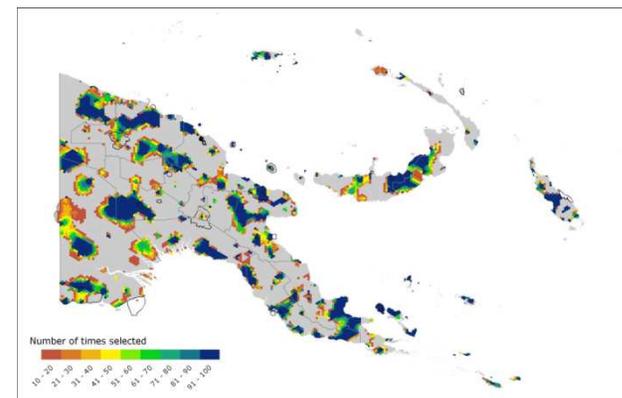
Ridge to Reef



Transboundary areas



Regional networks



Improved gap assessments

Thailand

Migratory paths: from Khram Island

Cambodia

Vietnam

Malaysia

Indonesia



Migratory paths: from Huyong Island

Andaman Island



Thailand



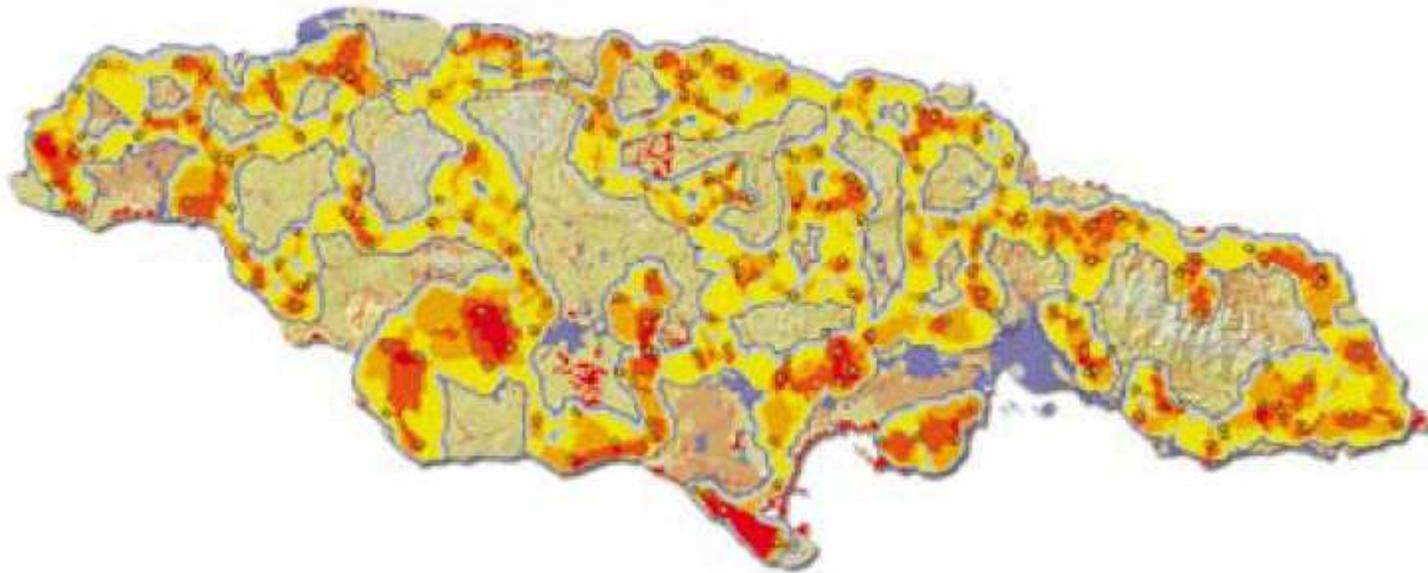
Incorporating social resilience principles into PA network design:



Design the PA network to:

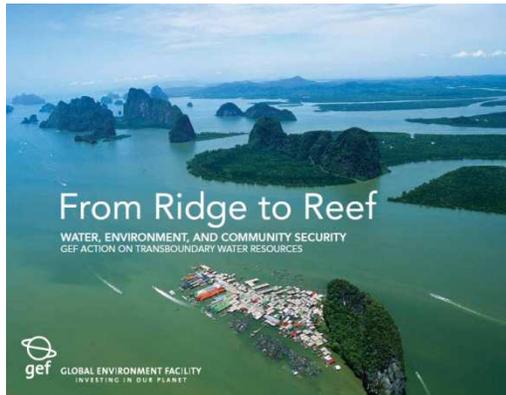
- Buffer human communities from **natural disasters**
- Protect areas important for **food security**
- Protect **water resources**
- Sustain **livelihoods**

Improving connectivity to promote climate resilience: Jamaica



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

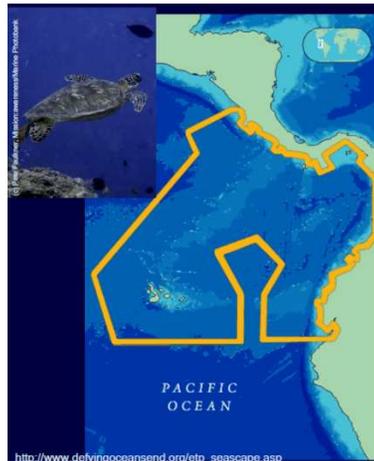
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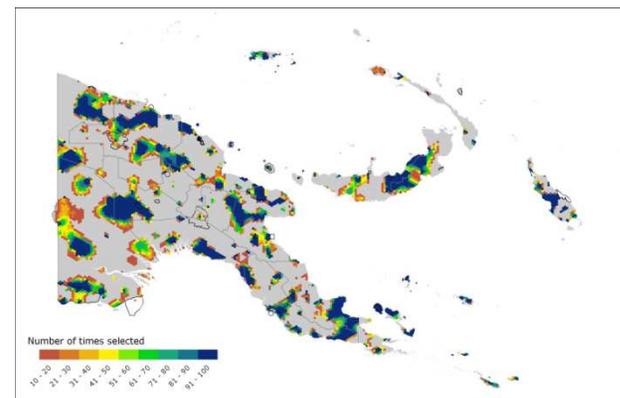
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Transboundary areas

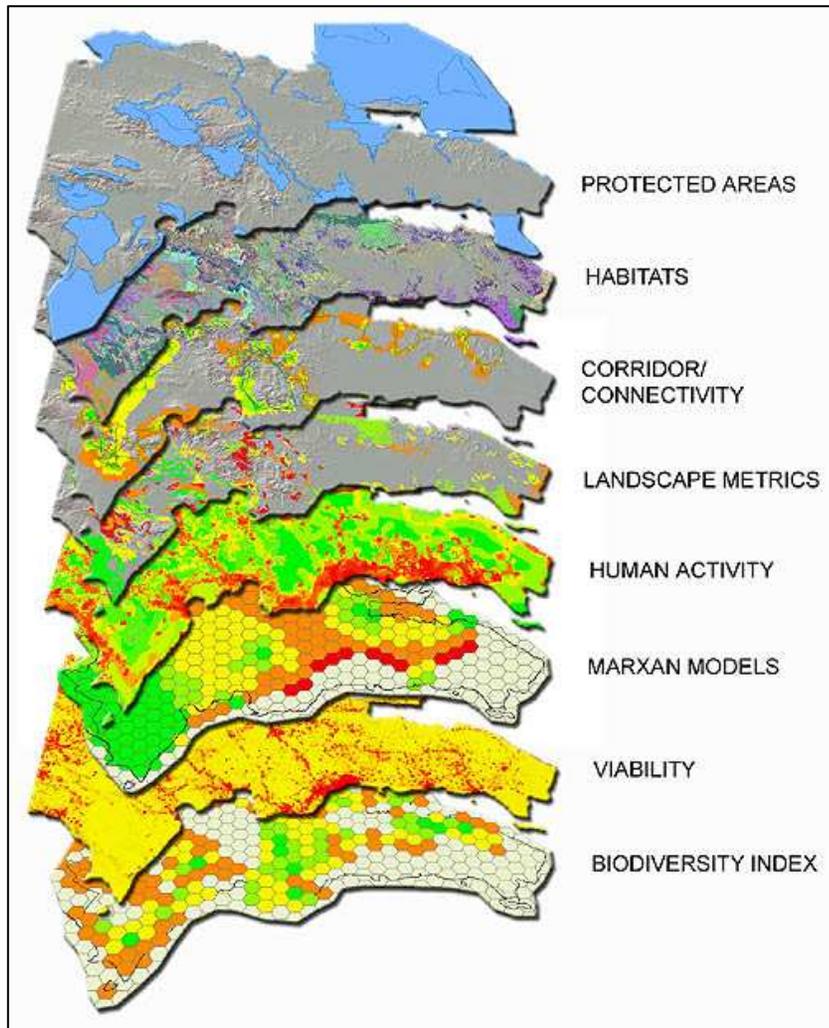


Regional networks



Improved gap assessments

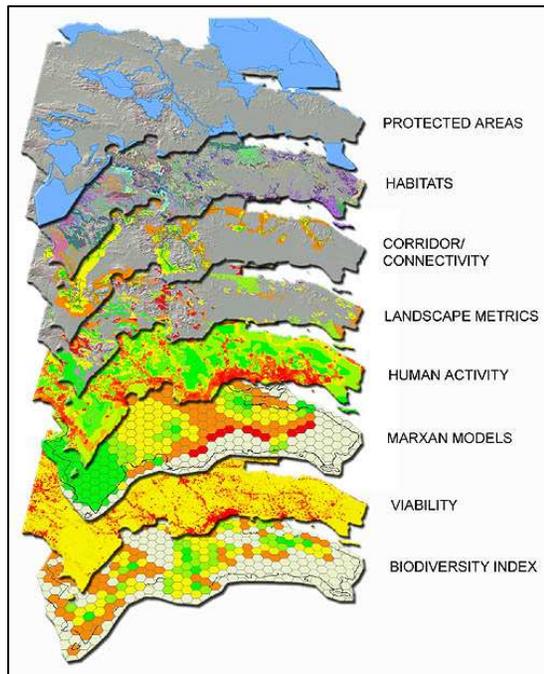
Incorporating resilience principles into ecological gap assessments:



GAP ASSESSMENT:

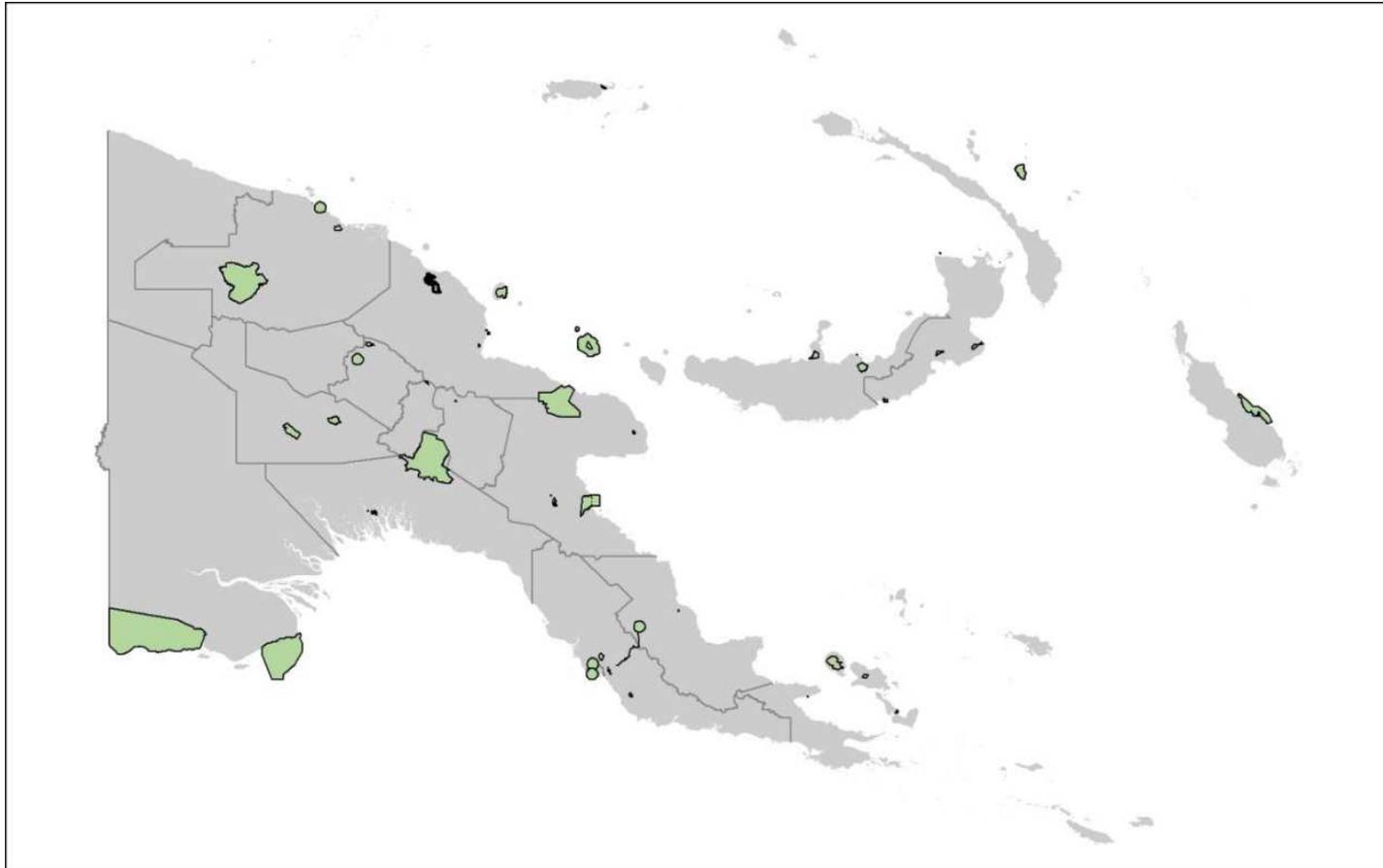
A comparison between the status of **biodiversity** and the status of **protection** within a country

Incorporating resilience principles into gap assessments:



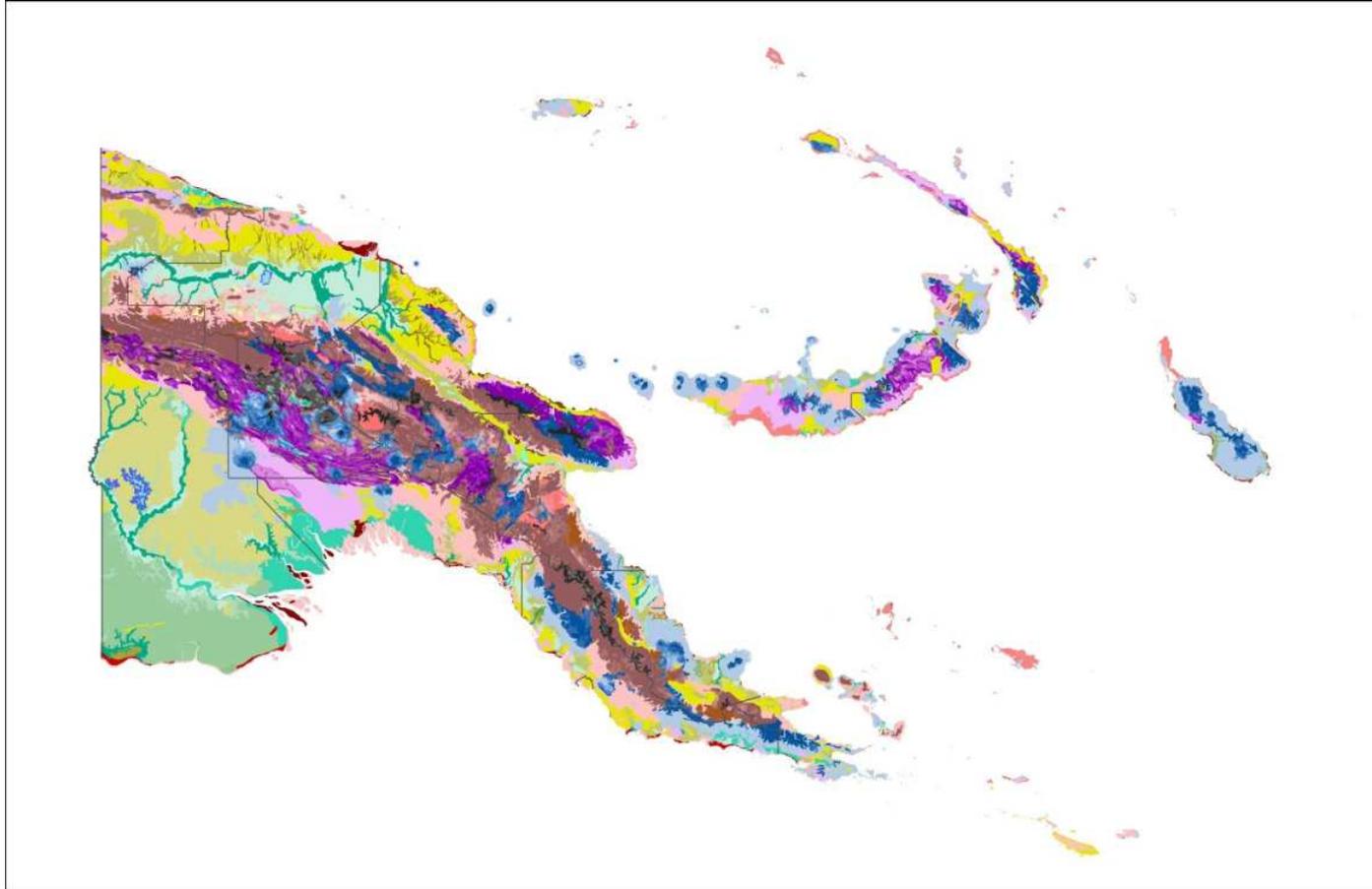
- Focus on **underlying features** (e.g., intertidal systems, coral reefs, upwellings, sea mounts)
- Include species and ecosystems most **vulnerable** and most **resistant** to climate change
- Incorporate **climate modeling**, including **connectivity** under climate scenarios, in gap assessment

Climate-Ready Ecological Gap Assessment in Papua New Guinea



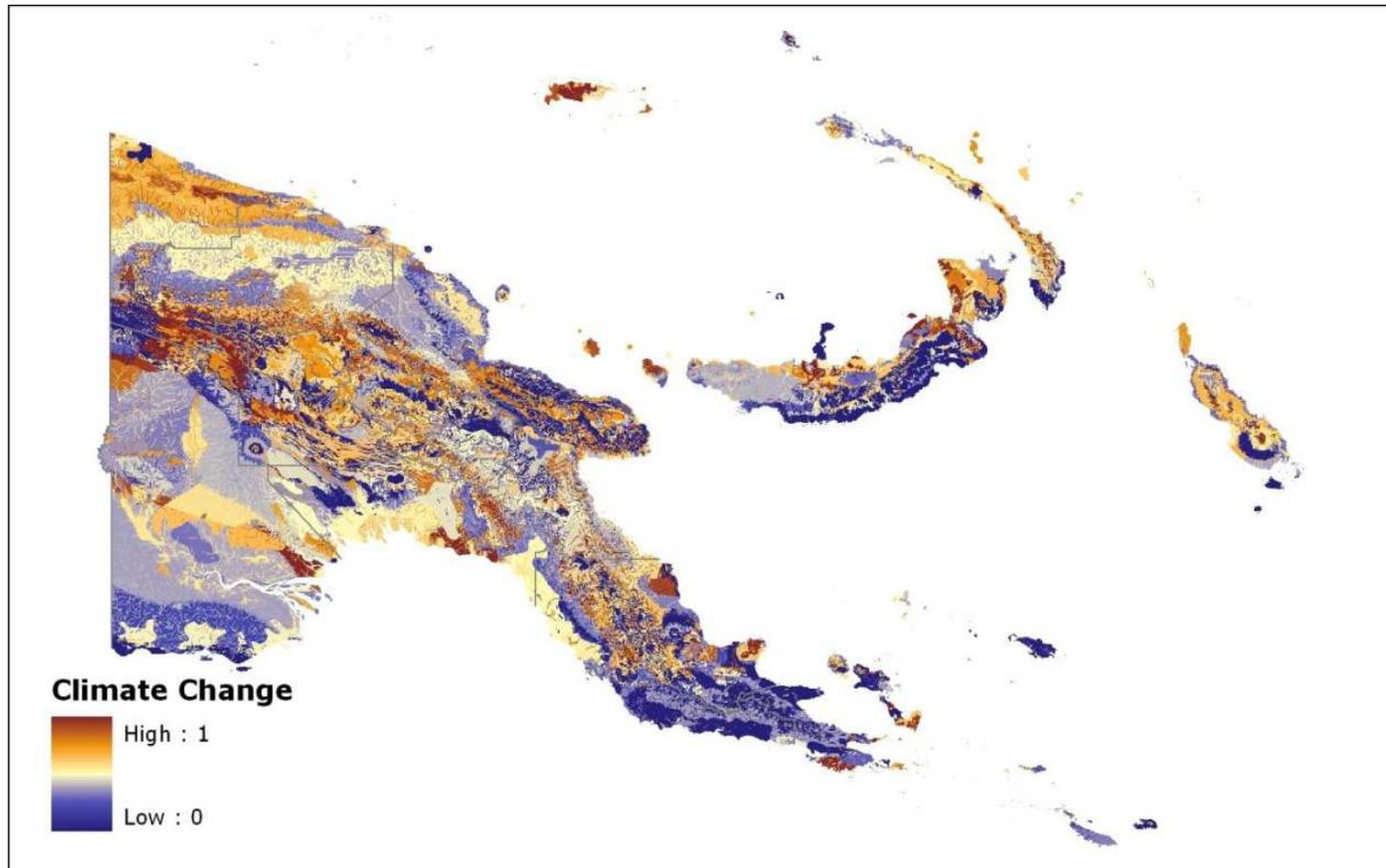
Existing protected areas

Climate-Ready Ecological Gap Assessment in Papua New Guinea



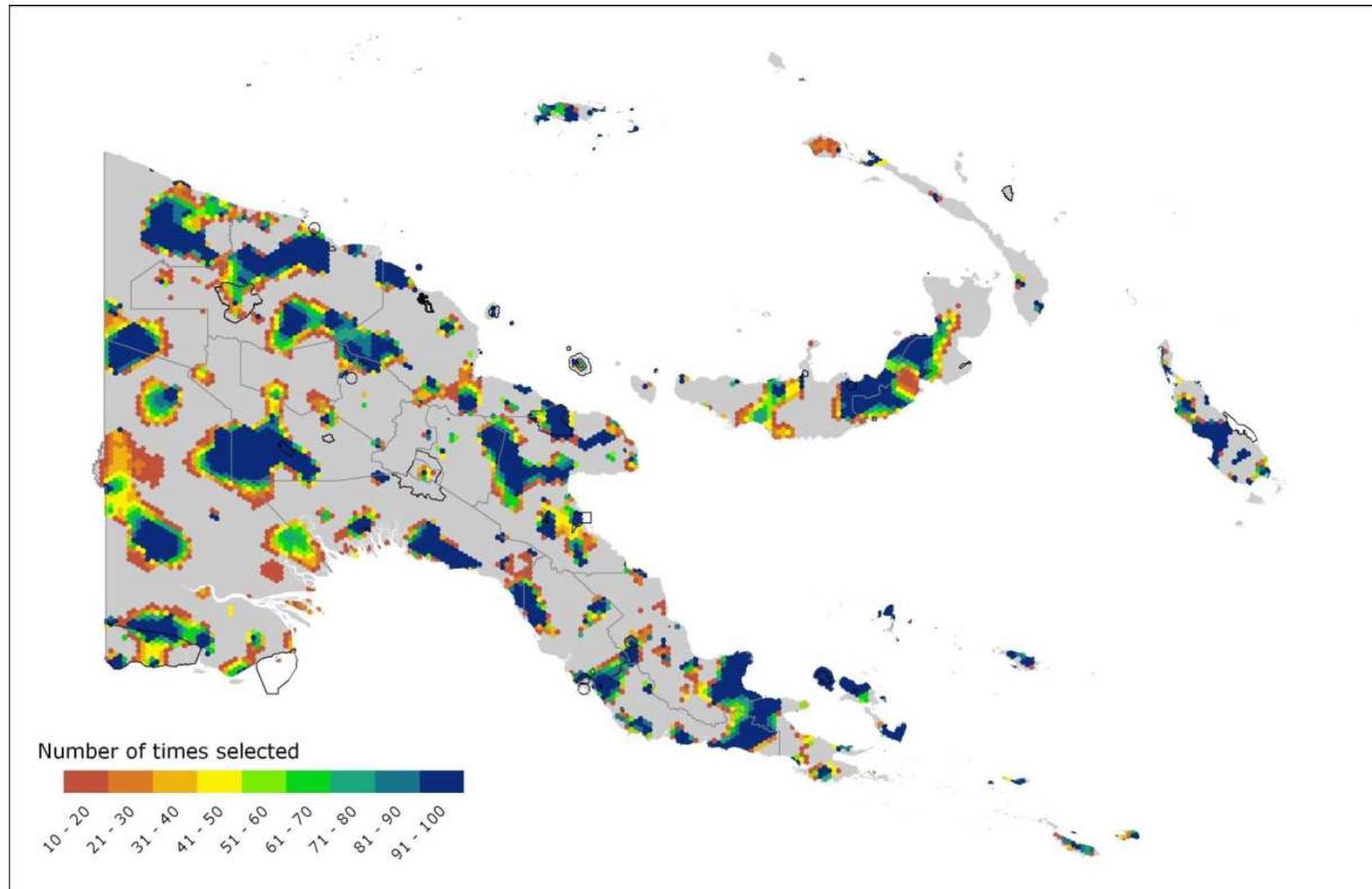
Land systems

Climate-Ready Ecological Gap Assessment in Papua New Guinea

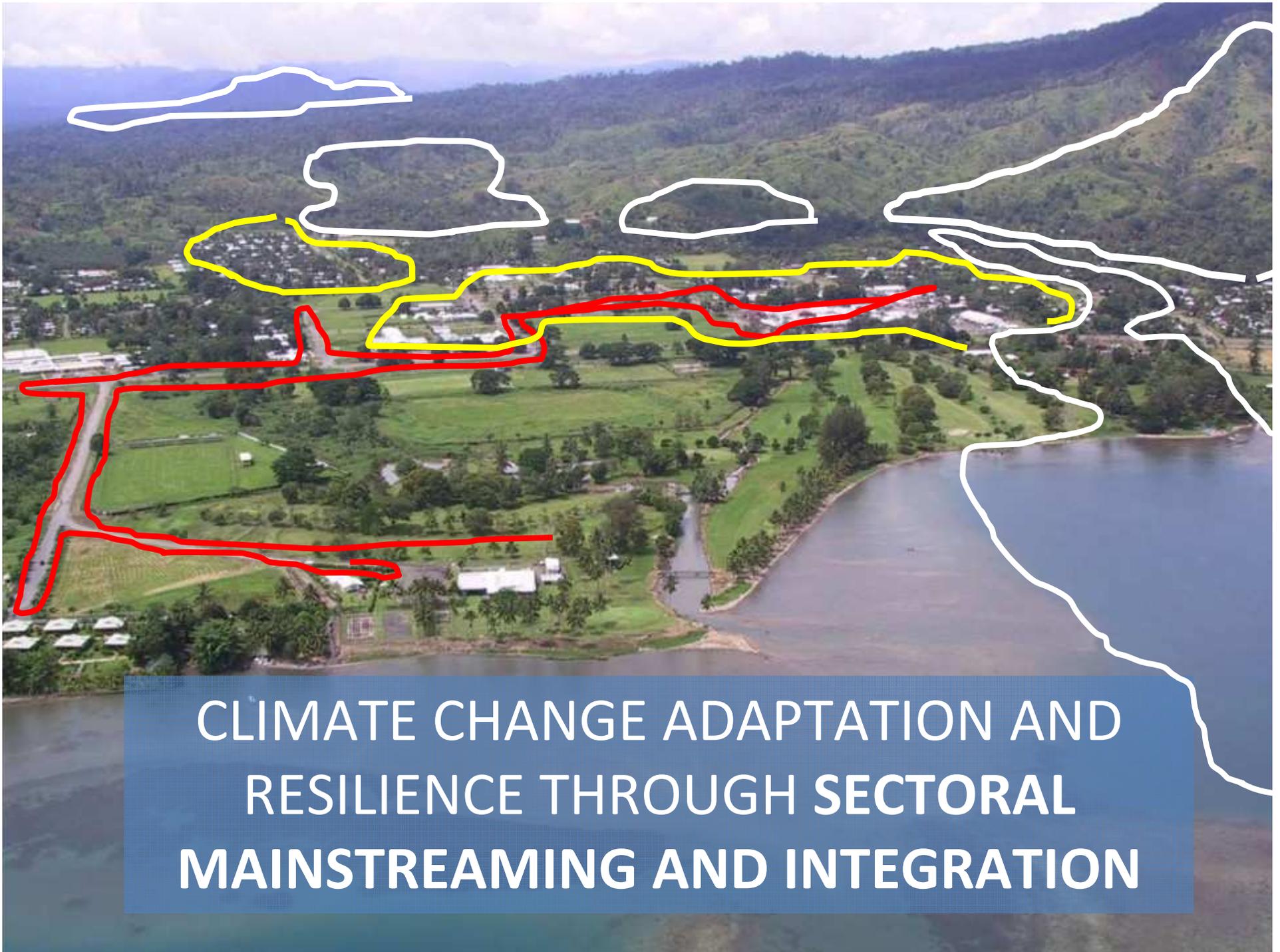


Climate impacts

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:

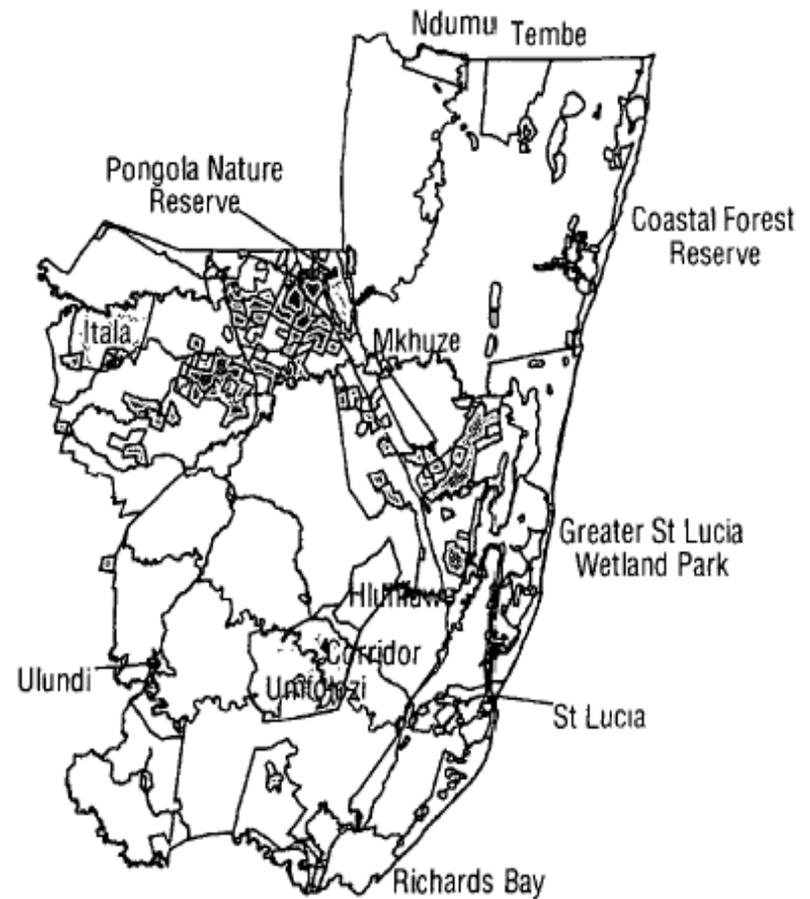
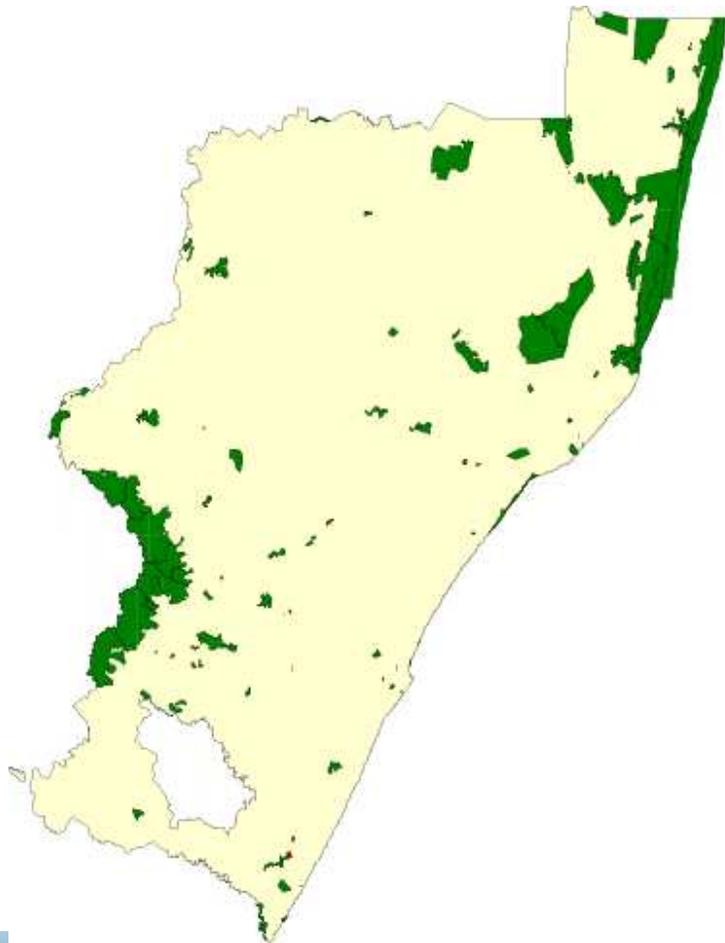
The internalization of biodiversity conservation goals into economic and development policies and programs, so that they become an integral part of the functioning of these sectors.



Mainstreaming biodiversity in South Africa



The importance of game reserves in KZN



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

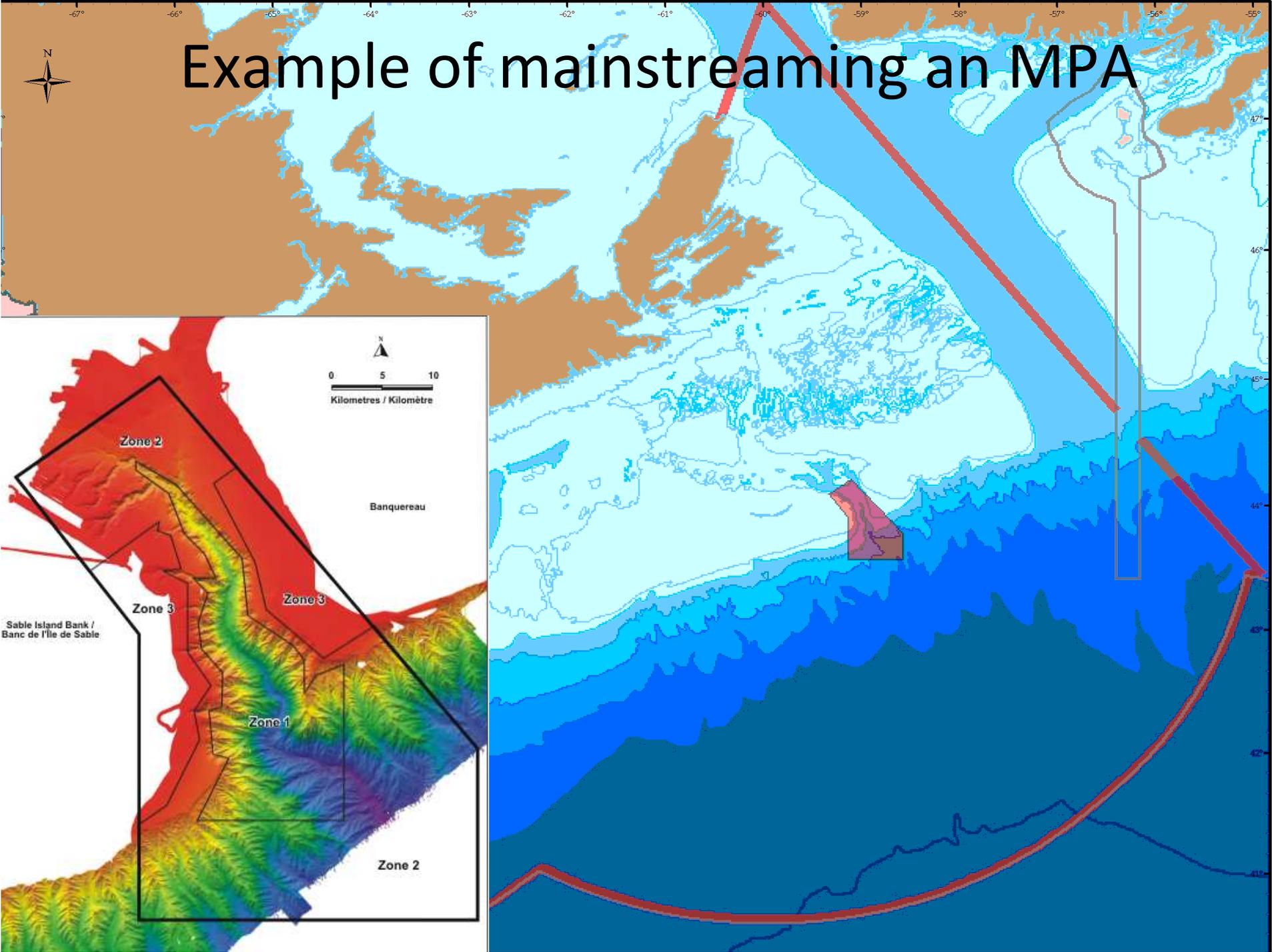


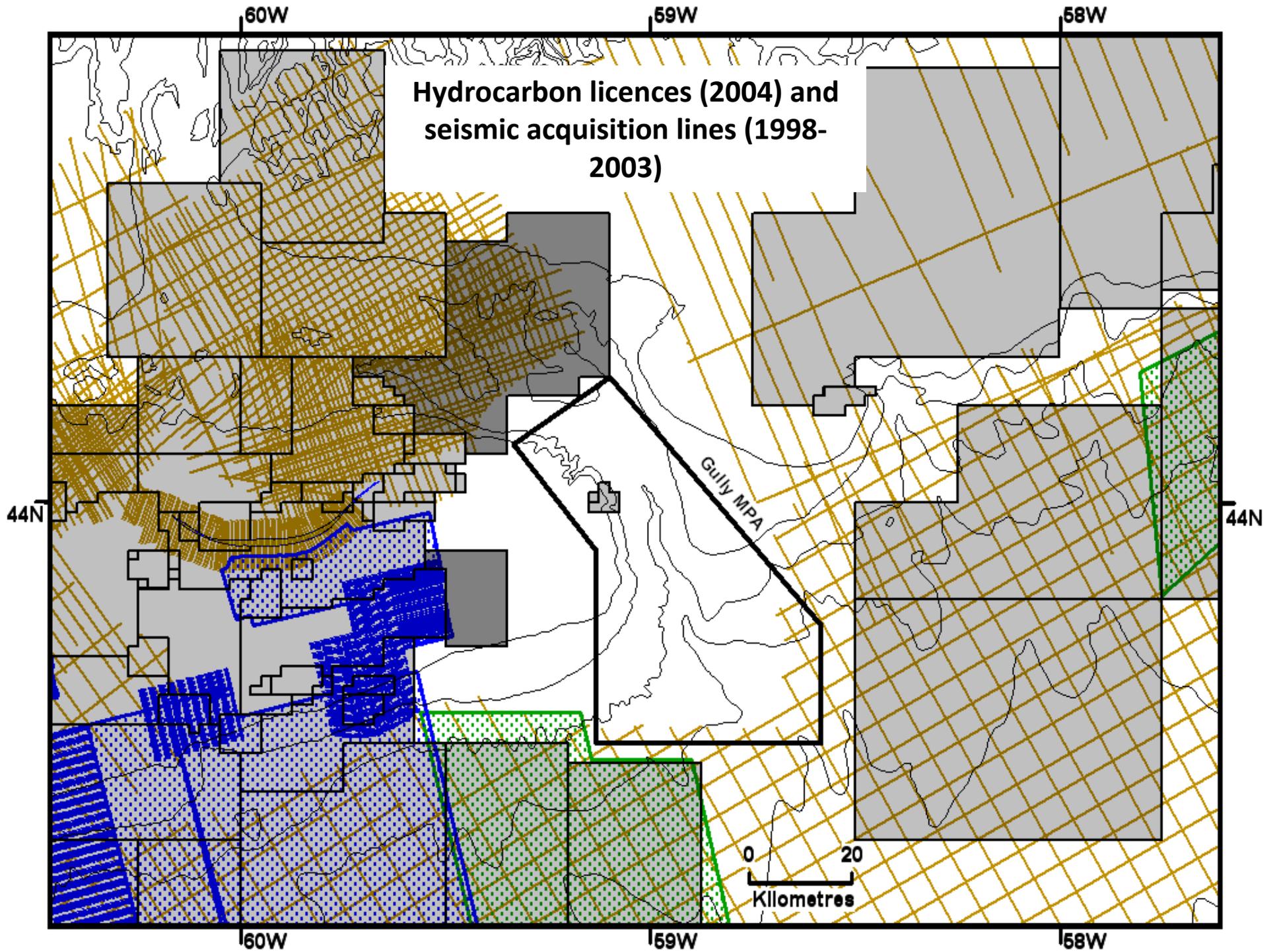
Example of mainstreaming in S. Africa

- 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

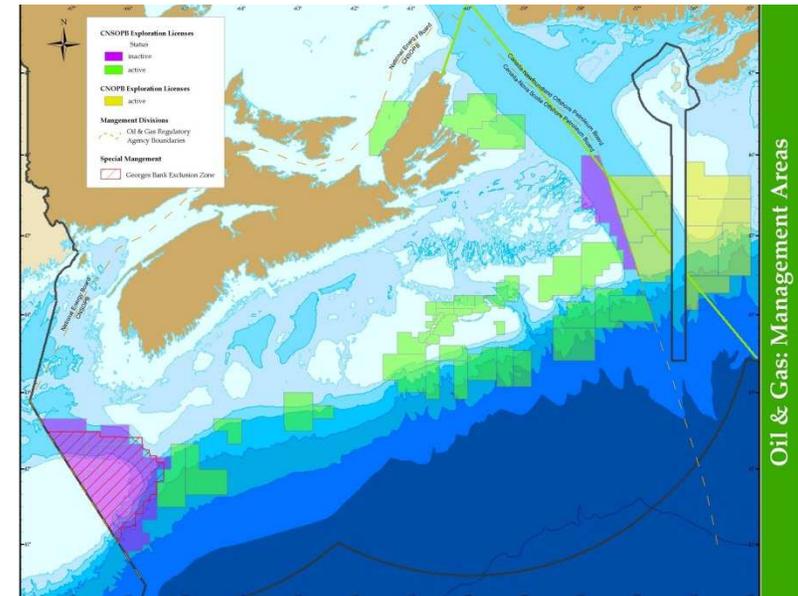
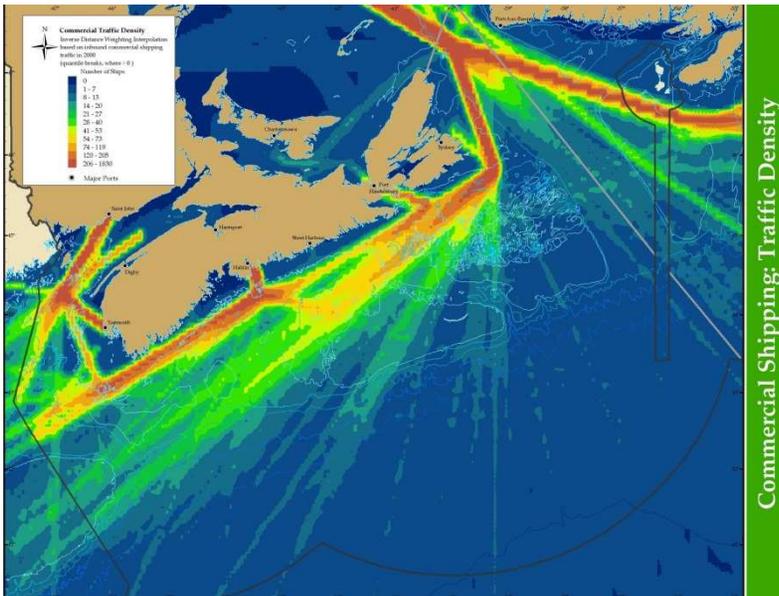
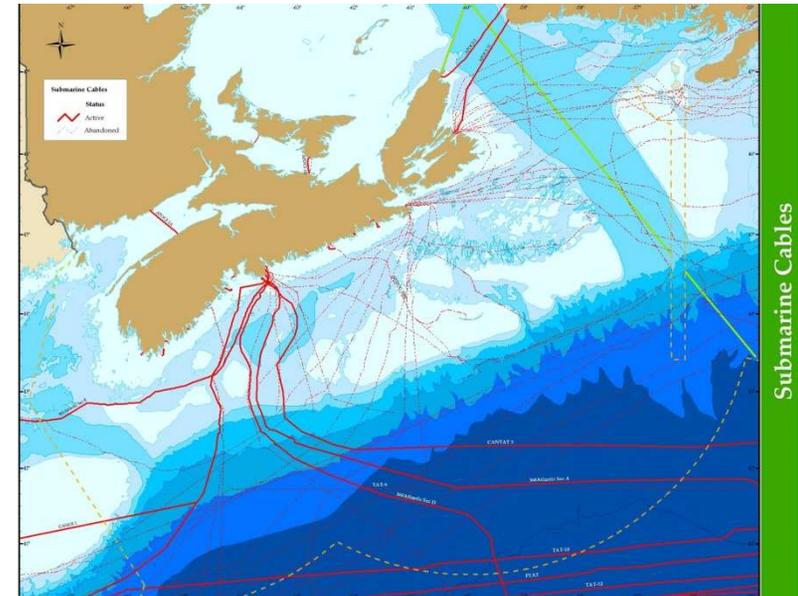
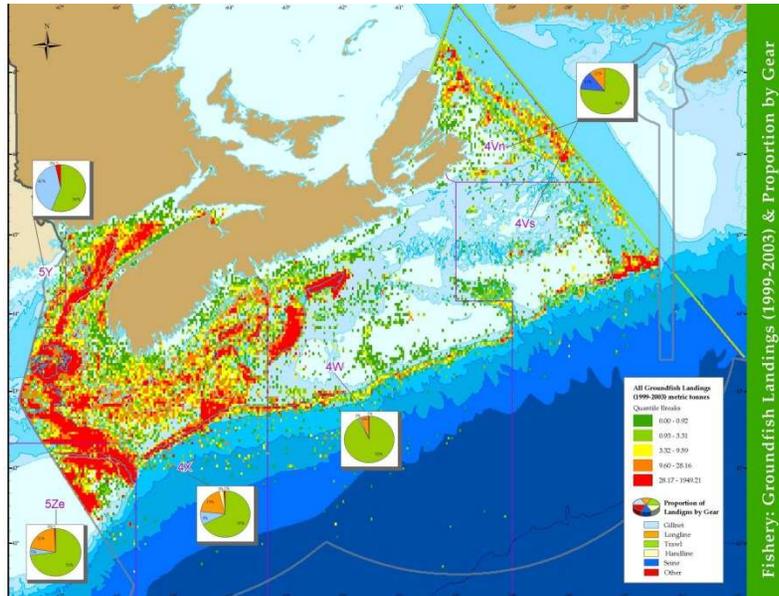


Example of mainstreaming an MPA

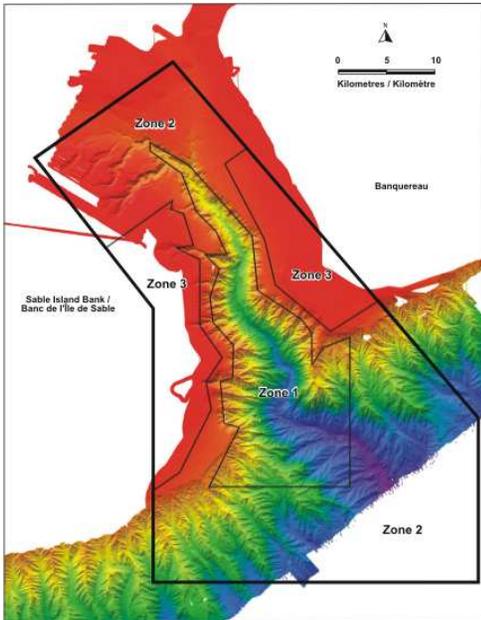




Example of mainstreaming an MPA



Example of mainstreaming an MPA

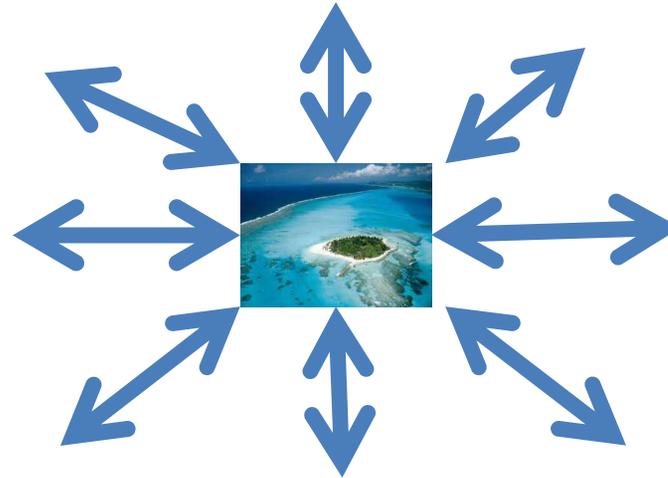


Transportation: New regulations on ballast water exchange; Coast Guard guidance on MPA avoidance, mammals, discharges

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



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



Revise PA valuation

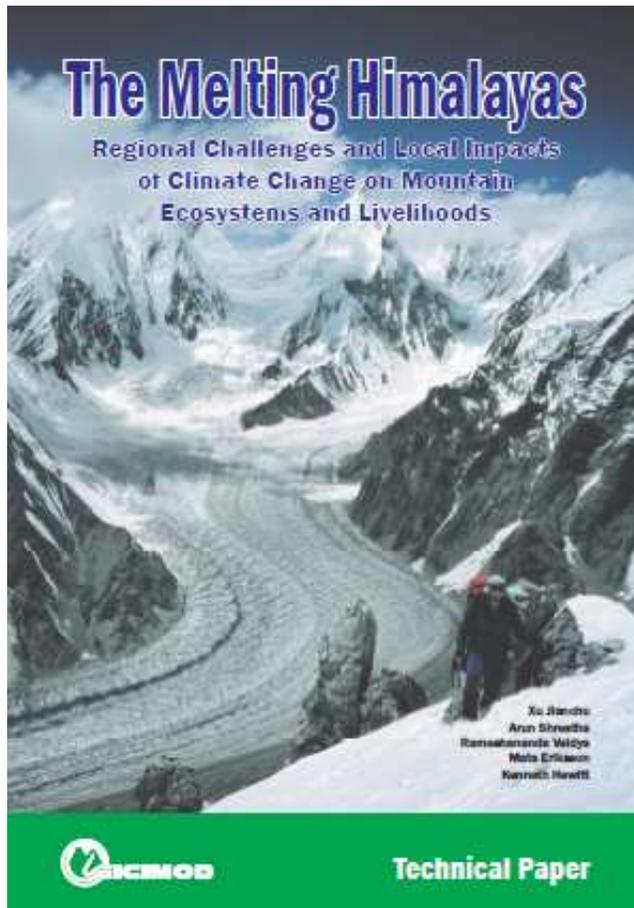


Integrate into NAPAs

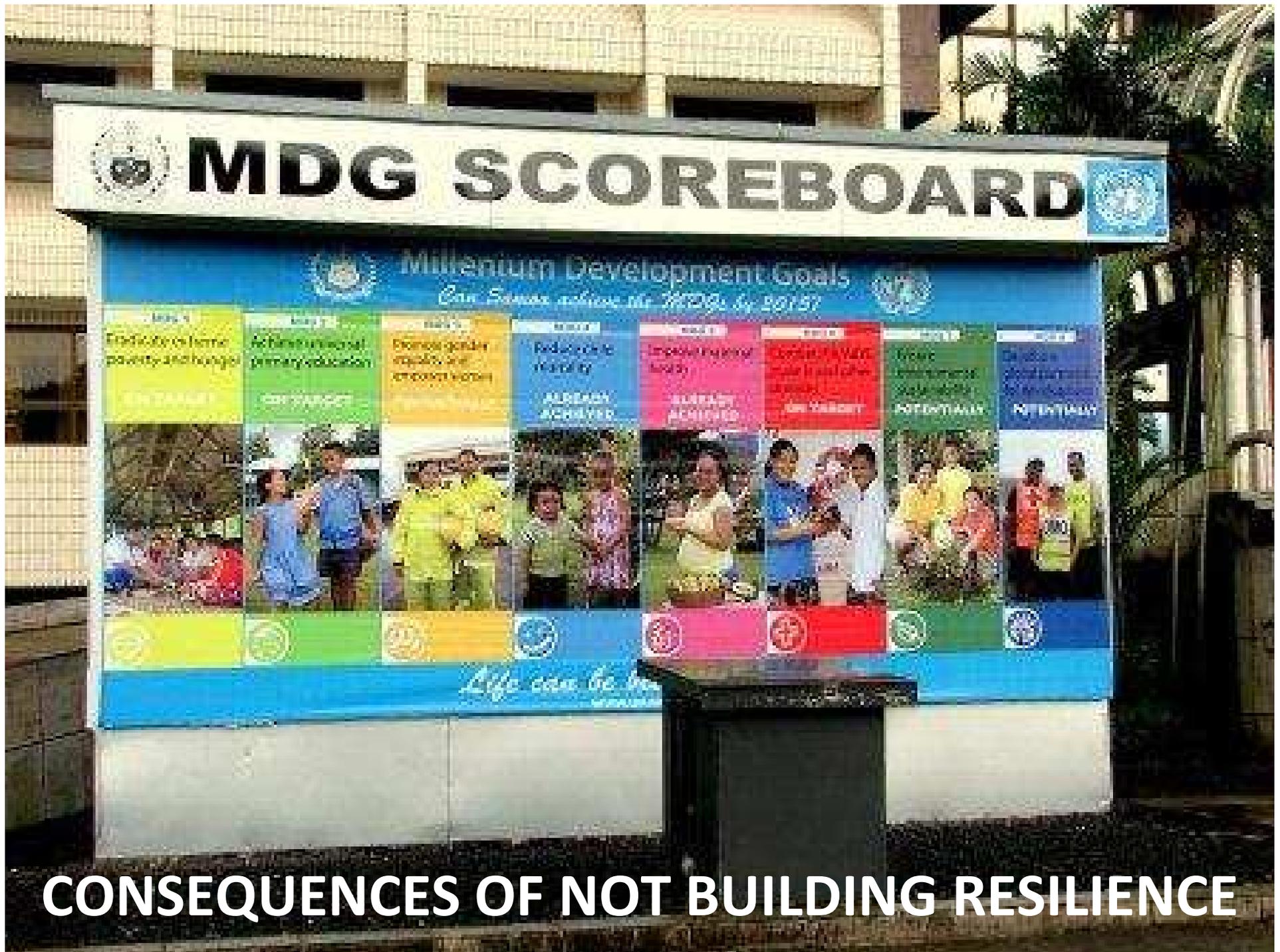


Include in threats assessment

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

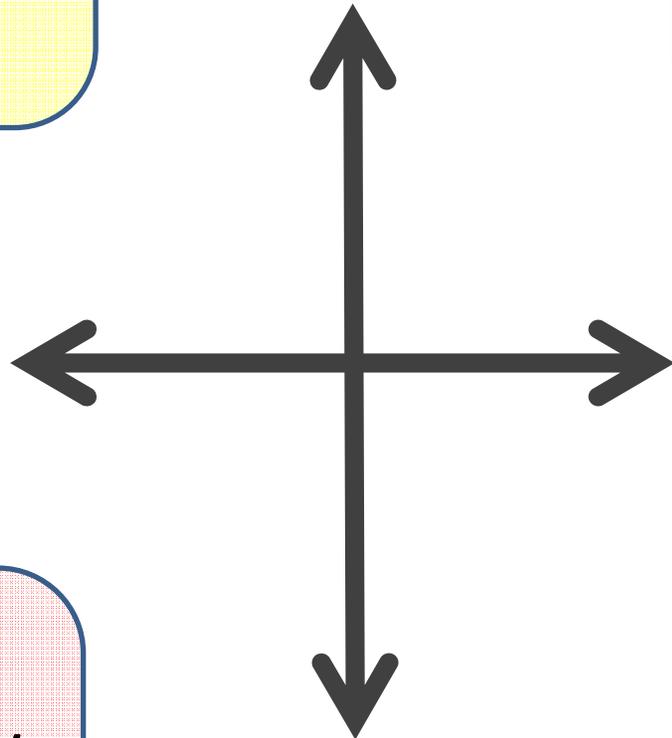
LOW integration and mainstreaming

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

