
Fiji – October 3-7
Jamison Ervin, UNDP

CLIMATE CHANGE ADAPTATION AND RESILIENCE THROUGH PROTECTED AREA INTEGRATION AND MAINSTREAMING

NBSAPs

- 5th National Report
- PoWPA reporting
- PA resilience
- Biodiversity resilience
- PA valuation studies
- Biodiversity valuation studies

- PoWPA Action Plans
- Climate resilience and adaptation plans
- Valuation studies
- Incentives


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

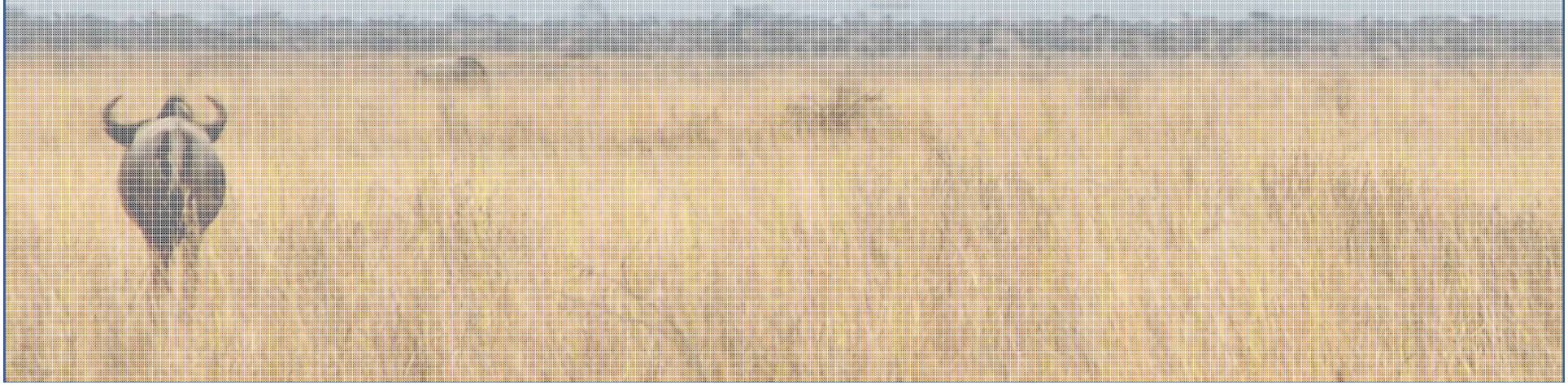
"…biodiversity values have been **integrated** into national and local development…"

"…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"**

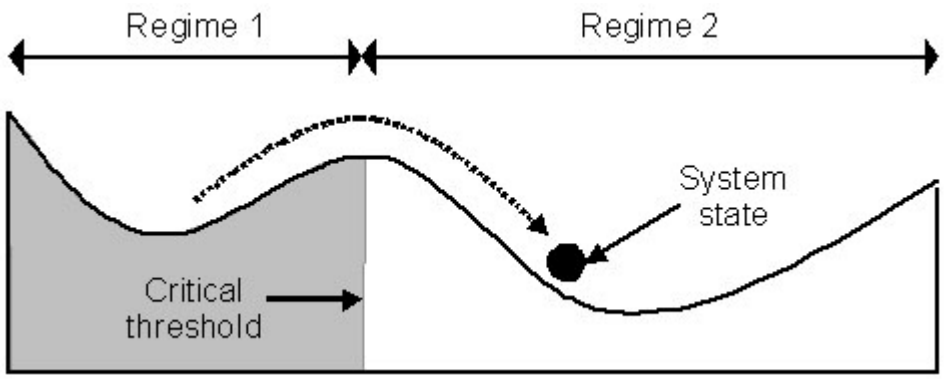


Evolution in protected area thinking

	CLASSIC MODEL 1800s – 1970s	MODERN MODEL 1970s – late 2000s	EMERGING MODEL Late 2000s - now
Objective	"Set aside" from production	Multiple objectives	Maintain life-support systems
Management	Maintain recreation for visitors	Maintain biodiversity for visitors, with local people in mind	Maintain services, regulate climate for local, national and global benefit
Actors	Central governments	Central governments with communities	Many partners, many interests
Value	National tourism treasures	Valuable for biodiversity	Economic, social, and ecologically global value
Relationship w/ surrounding area	Isolated islands	Part of an ecological network	An integral part of national economies, sectors & landscapes

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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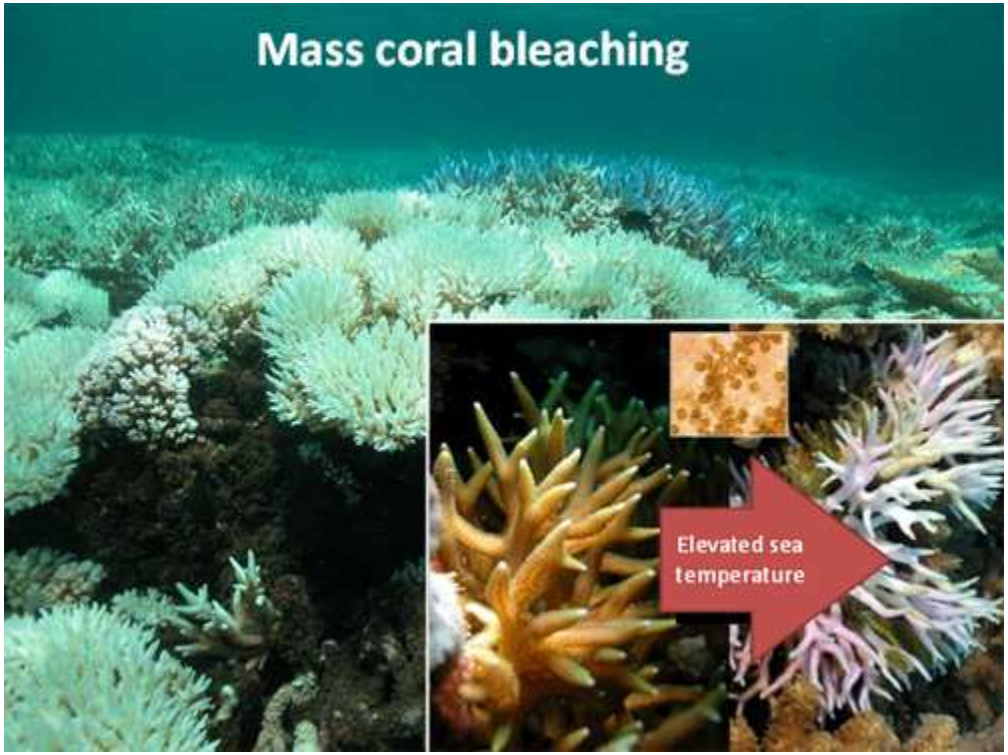

www.regimeshifts.org

Key Concepts

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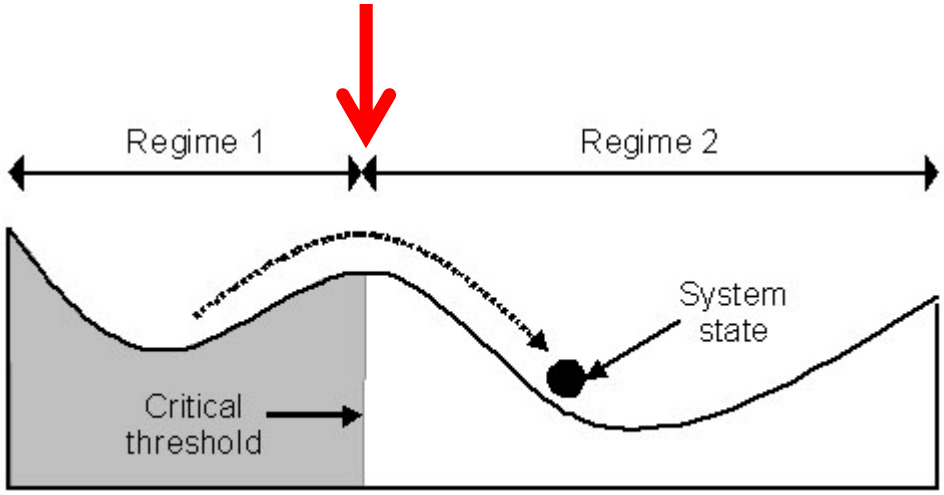


Definition: The point at which a driver causes a significant regime shift that is considered unalterable, or recoverable on only very long timescales

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

Key Concepts

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

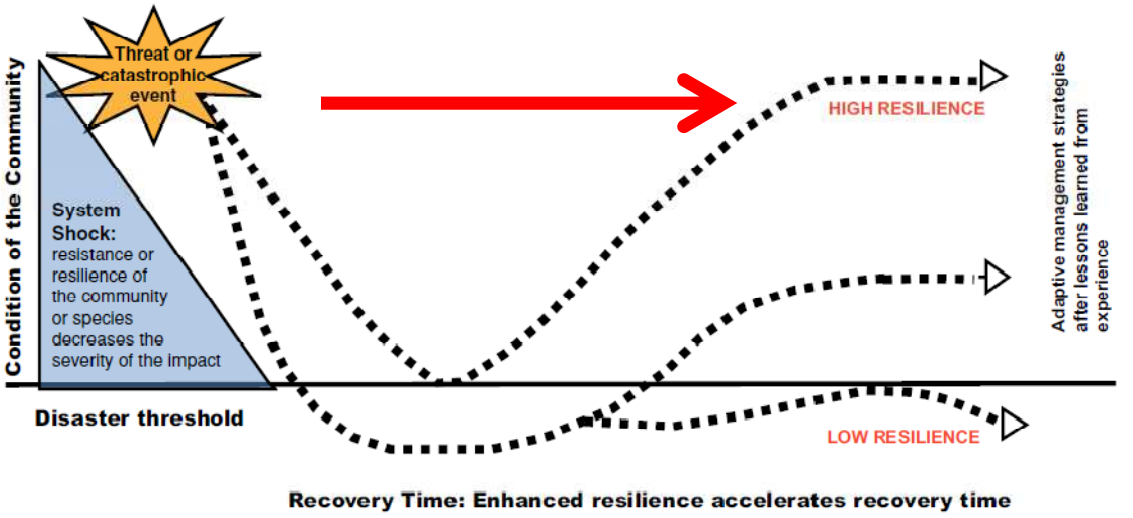
Definition

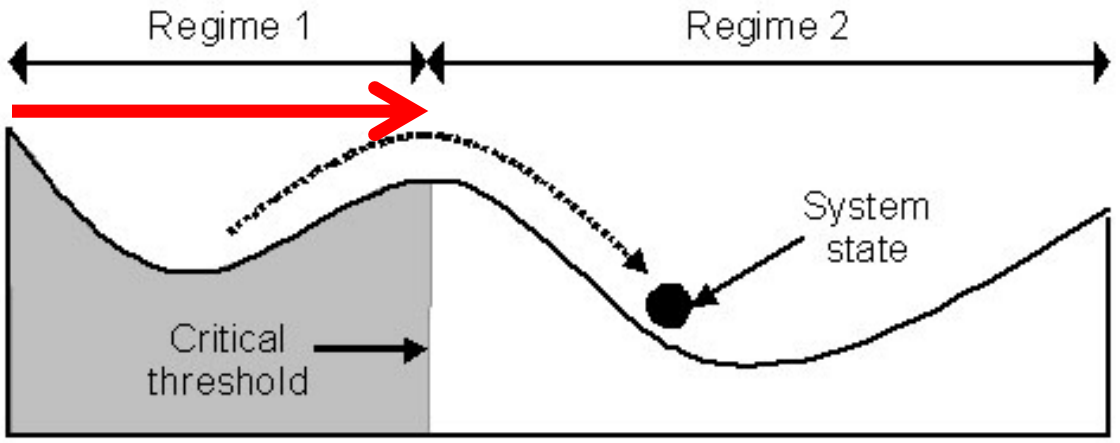
"….the ability of an ecosystem to maintain key functions and processes in the face of stresses, or pressures, by either resisting or adapting to change"

www.reefresilience.org

Key Concepts

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





www.reefresilience.org

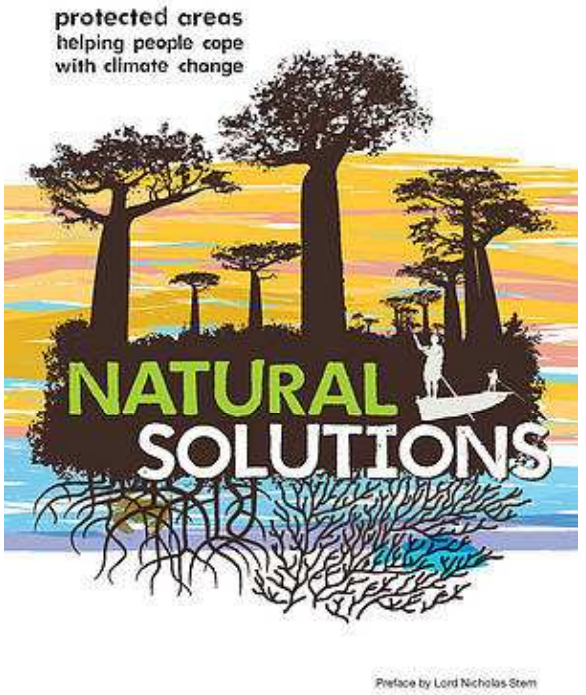
Key Concepts

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

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

Key Concepts

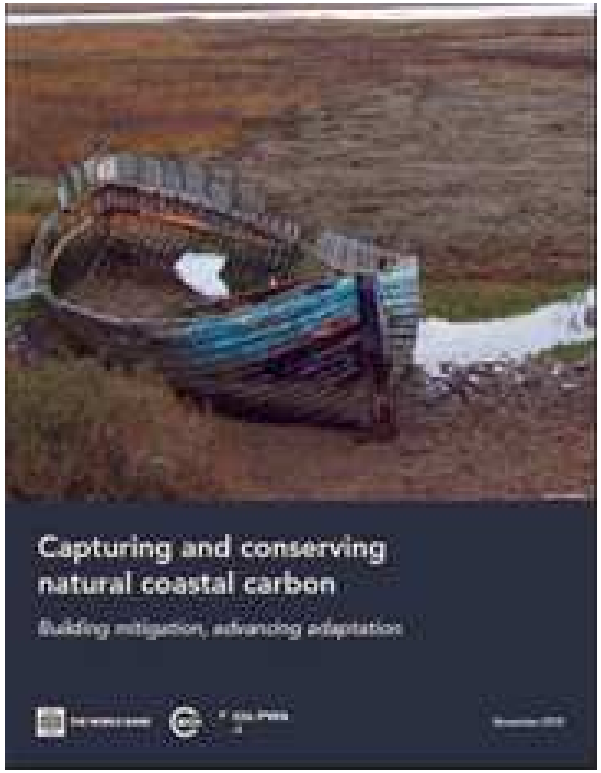
- Regime shift
- Tipping point
- Resilience
- **Adaptation**
- Mitigation



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

Key Concepts

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

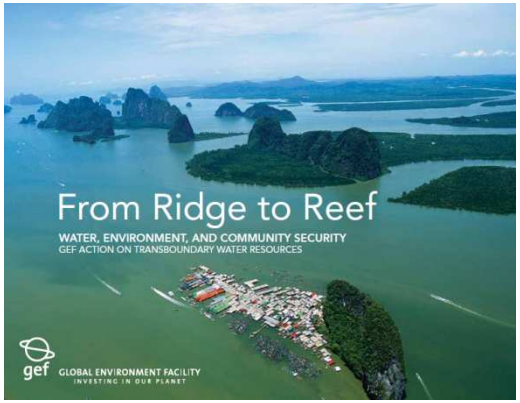


...reducing the scope and magnitude of climate change and its impacts…

CLIMATE RESILIENCE THROUGH PA INTEGRATION AND MAINSTREAMING

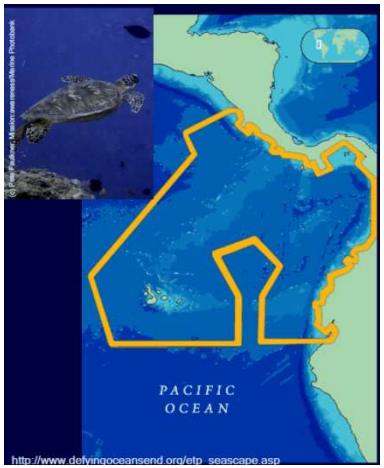
1. **Spatial integration**
2. Sectoral integration

Resilience through PA spatial integration

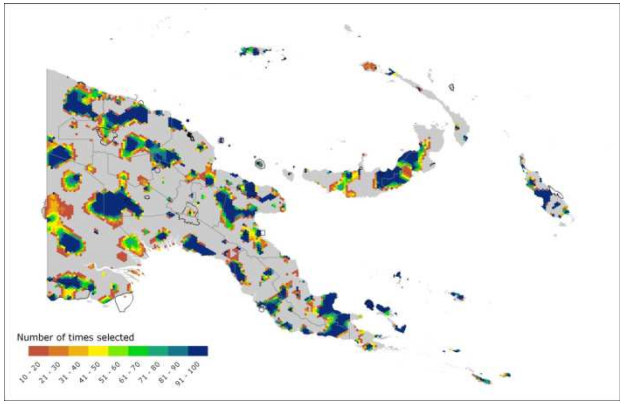


Ridge to Reef Approach

Transboundary areas

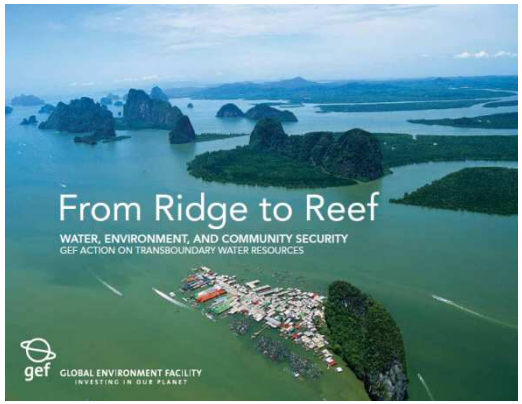


Regional networks



Improved gap assessments

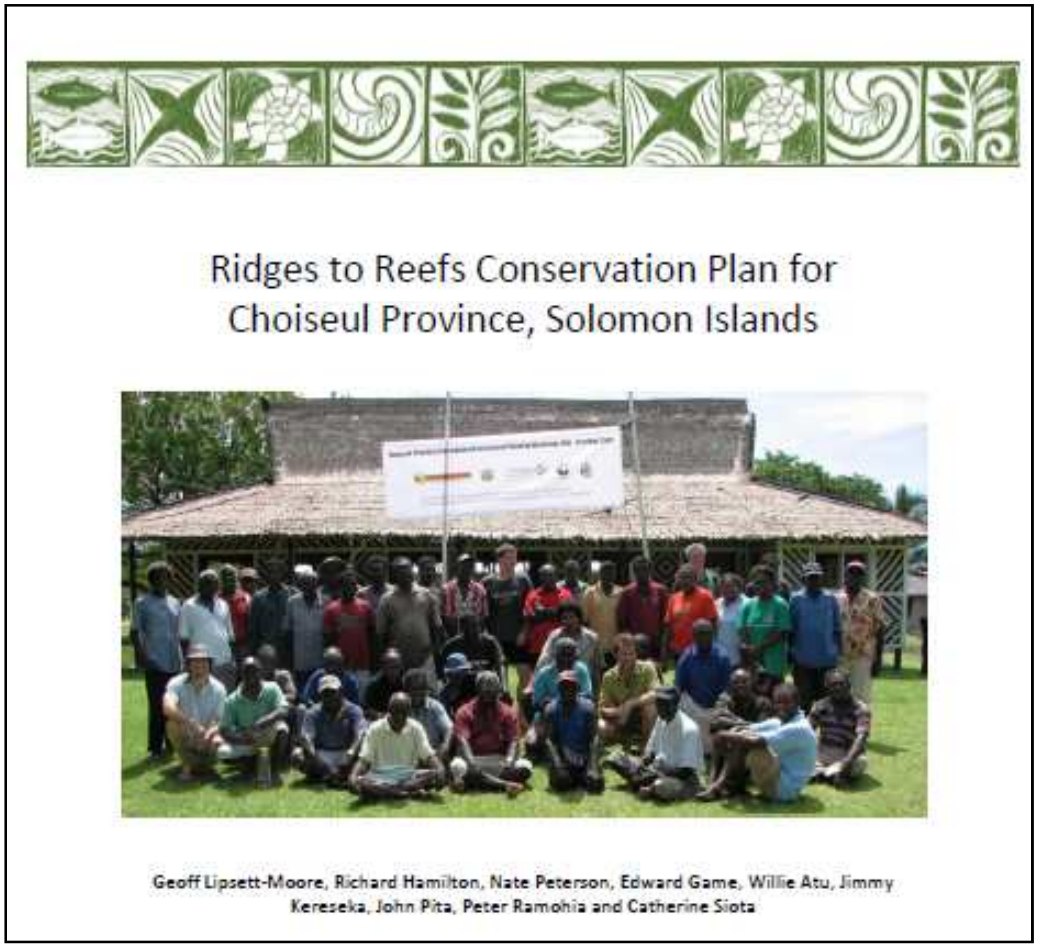
Strengthening climate adaptation by taking a “Ridge to Reef” approach:



Ridge to Reef

Example of a Ridge to Reef Approach

Strengthening climate adaptation by incorporating resilience principles into conservation plans

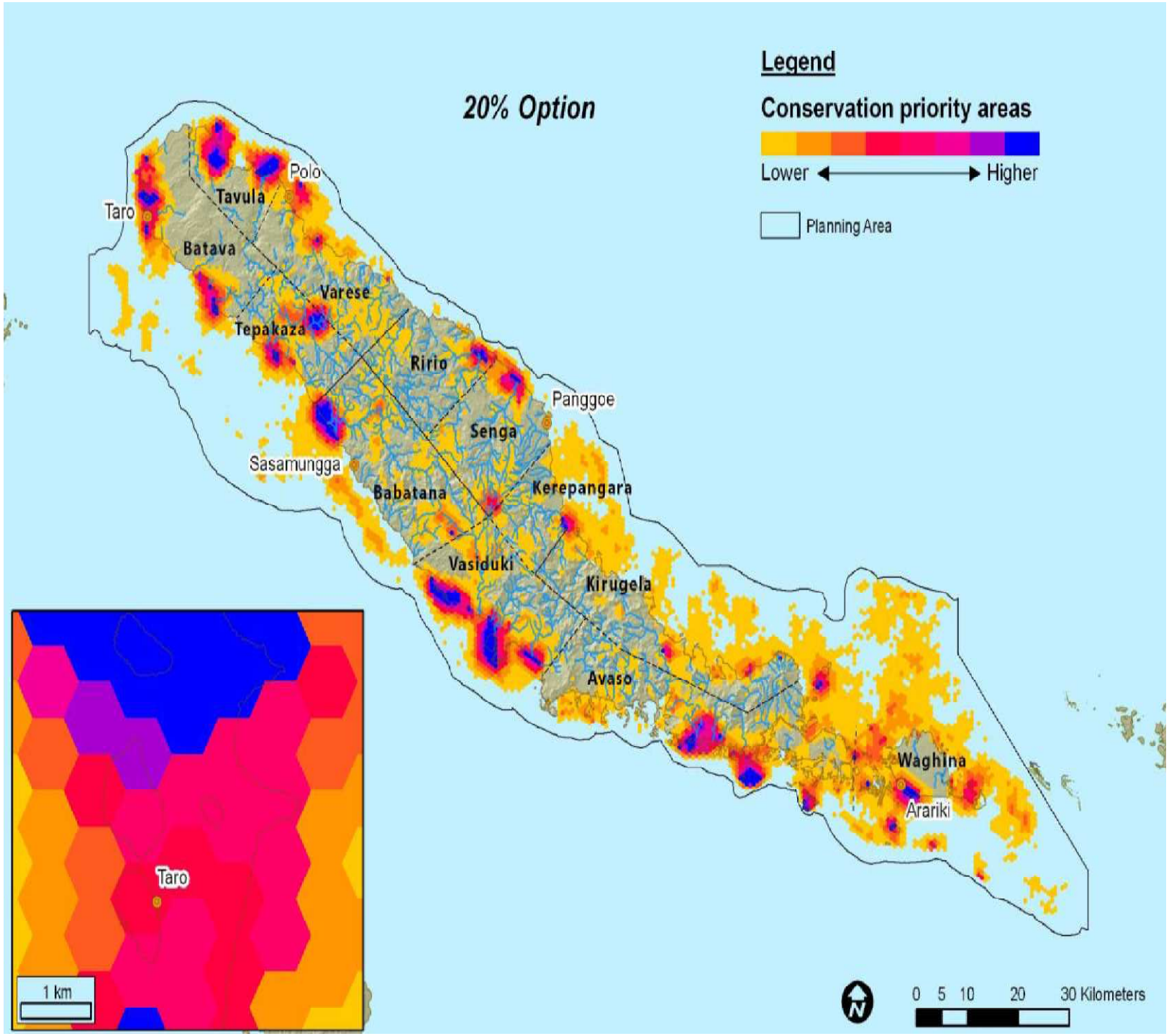


Elements of a Ridge to Reef Approach

- 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

Elements of a Ridge to Reef Approach

- Identifies ecological, social and economic priorities throughout the area, including terrestrial, coastal, marine
- Includes a wide varieties of sectors (e.g., forestry, agriculture, hotel development) and looks at a wide variety of threats


20% Option
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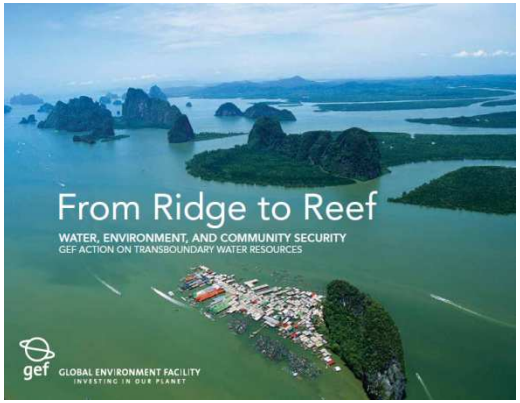
Conservation priority areas
Lower
Higher
Planning Area
Taro
Polo
Tavula
Batava
Varese
Tepakaza
Ririo
Panggoe
Senga
Sasamungga
Babatana
Kerepangara
Vasiduki
Kirugela
Avaso
Waghina
Arariki
Taro
1 km
N
0 5 10 20 30 Kilometers

Discussion Questions

- Is your country adopting a “Reef to Ridges” approach? Explain

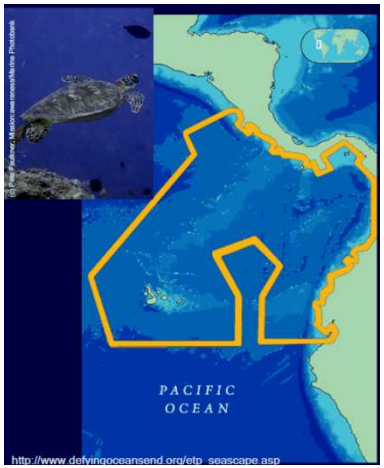
- What aspects of a “Reef to Ridges” approach might be especially helpful in strengthening climate resilience?

Resilience through PA spatial integration

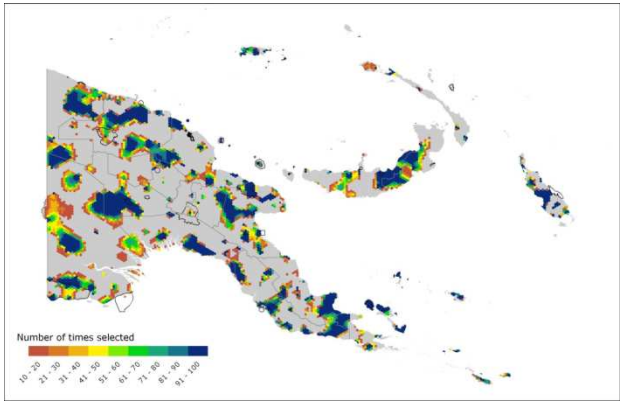


Ridge to Reef

Transboundary areas

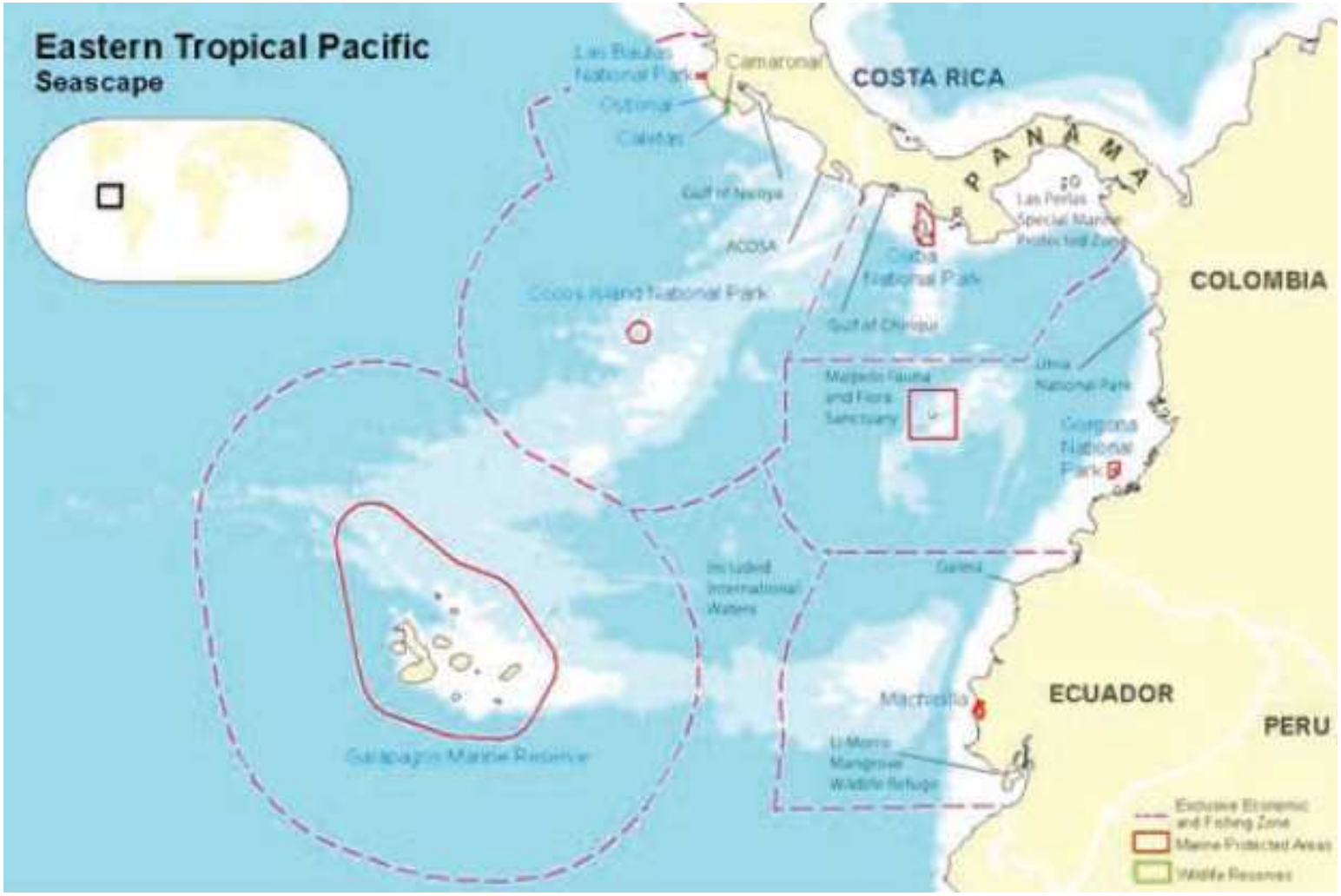


Regional networks

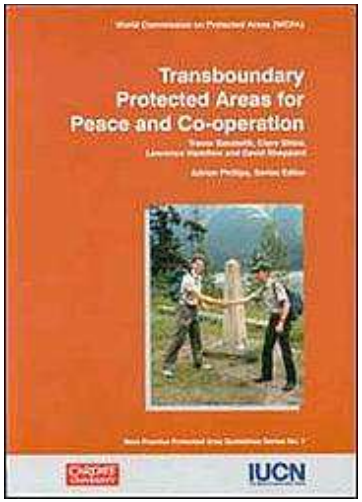


Improved gap assessments

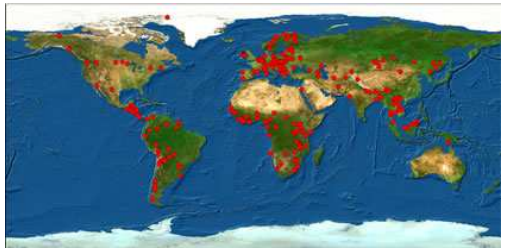
Transboundary MPAs



Transboundary MPAs and transboundary resource management



Transboundary protected area: Area of land or sea that borders two states where both parties are dedicated to the protection and maintenance of biological diversity through legal or other effective means

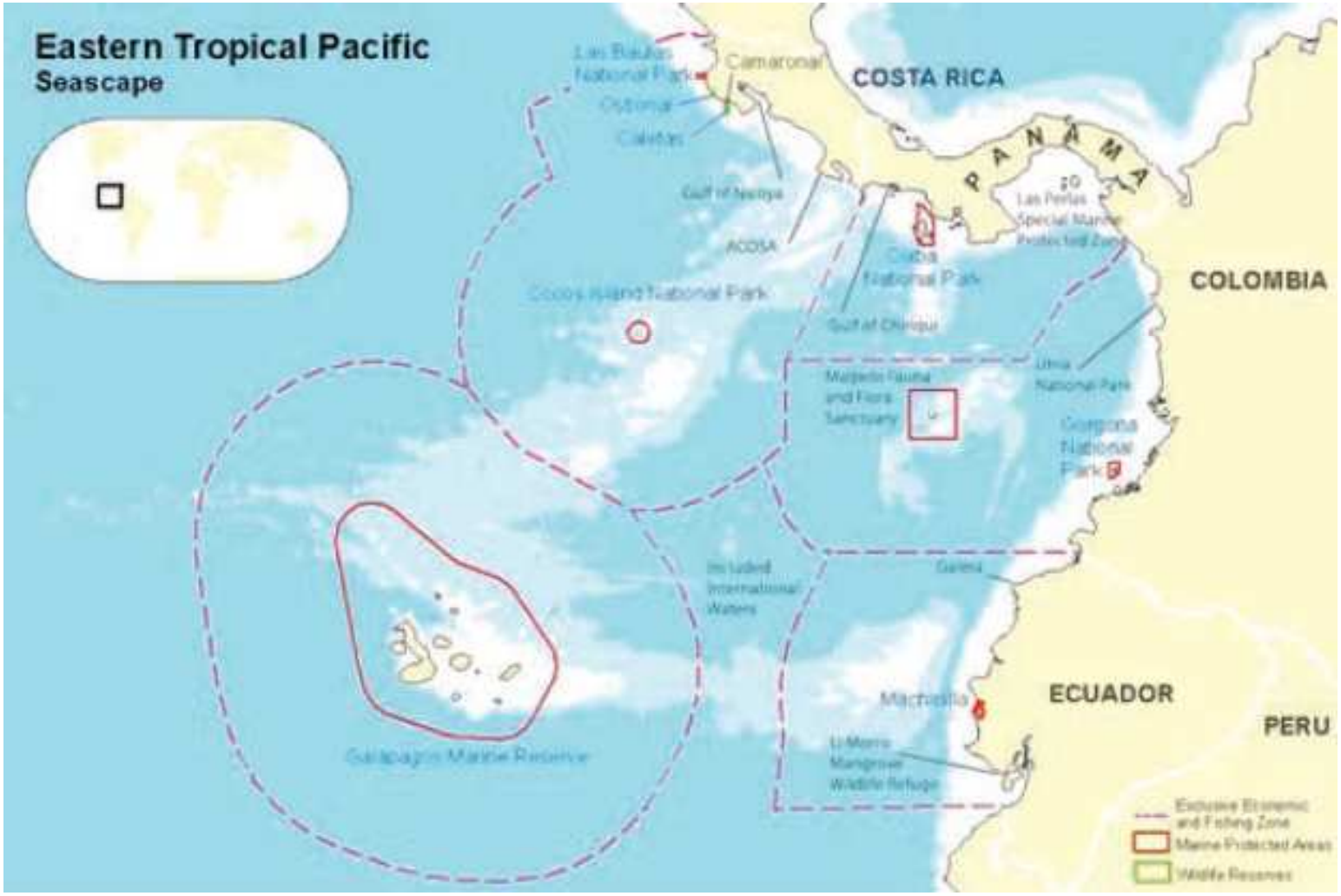


Transboundary resource management: Any collaboration across boundaries that increases the effectiveness of achieving conservation goals

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**
- Reduces **synergistic threats**
- Increases **reproductive success**
- Increases the likelihood of protecting areas of **climate refugia**
- Expands the **diversity of the population gene pool**

Transboundary MPAs: Eastern Tropical Pacific Seascape



Transboundary MPAs: Eastern Tropical Pacific Seascape

Countries: Costa Rica, Panama, Colombia, Ecuador

Area: Complex geography, valuable fisheries, high diversity and endemism

Important coastal habitat: mangroves, estuaries, rocky cliffs, sea grass beds, sandy beaches; major migration corridor

Protection: 4 world heritage sites, numerous MPAs

Transboundary MPAs: Eastern Tropical Pacific Seascape

Rationale: Ecological connectivity; shared uses for fishing, transport, tourism; shared vulnerability to climate events

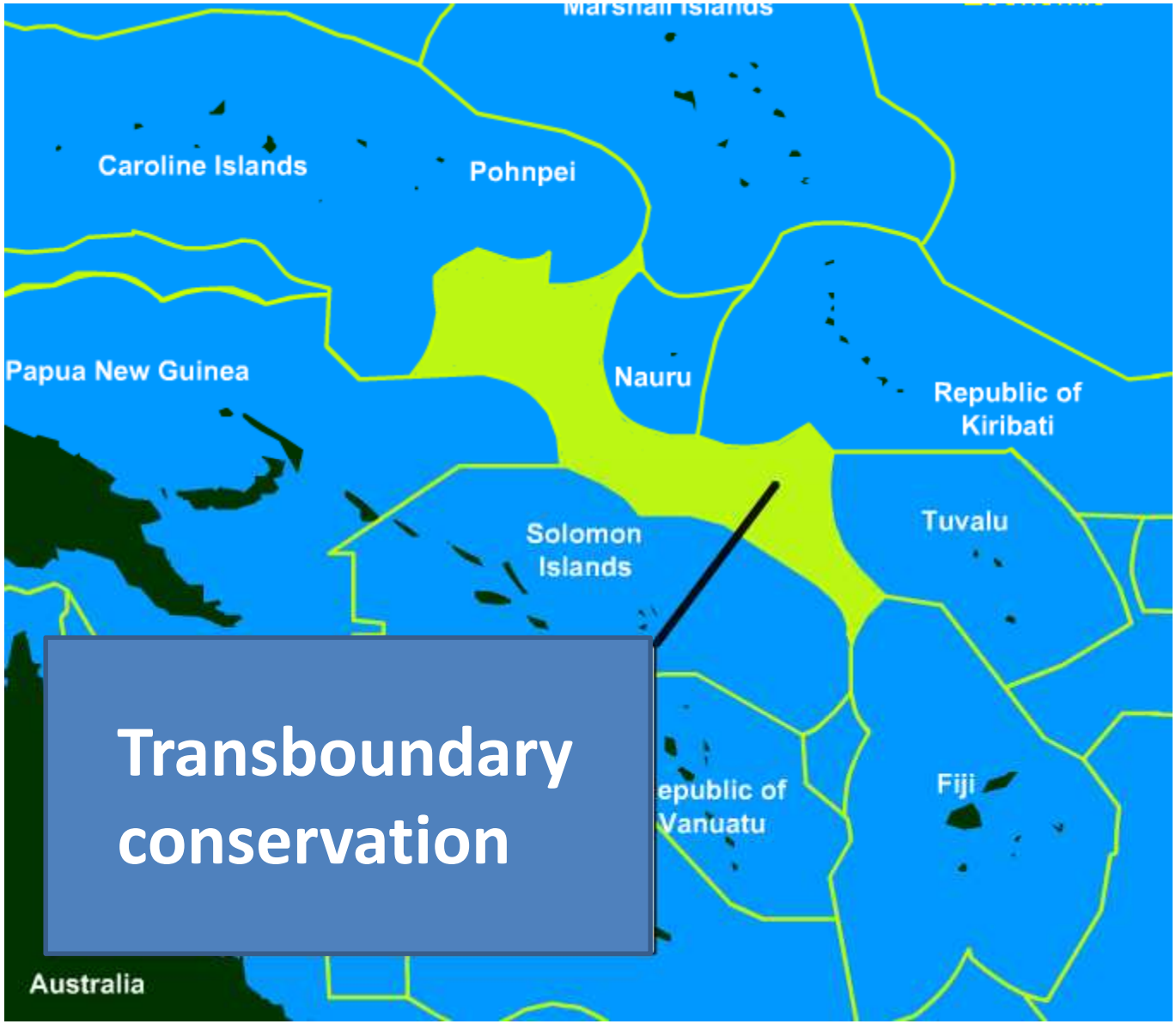
Objectives:

- Establish a regional framework
- Promote multilateral cooperation
- Secure funding
- Promote multi-stakeholder participation

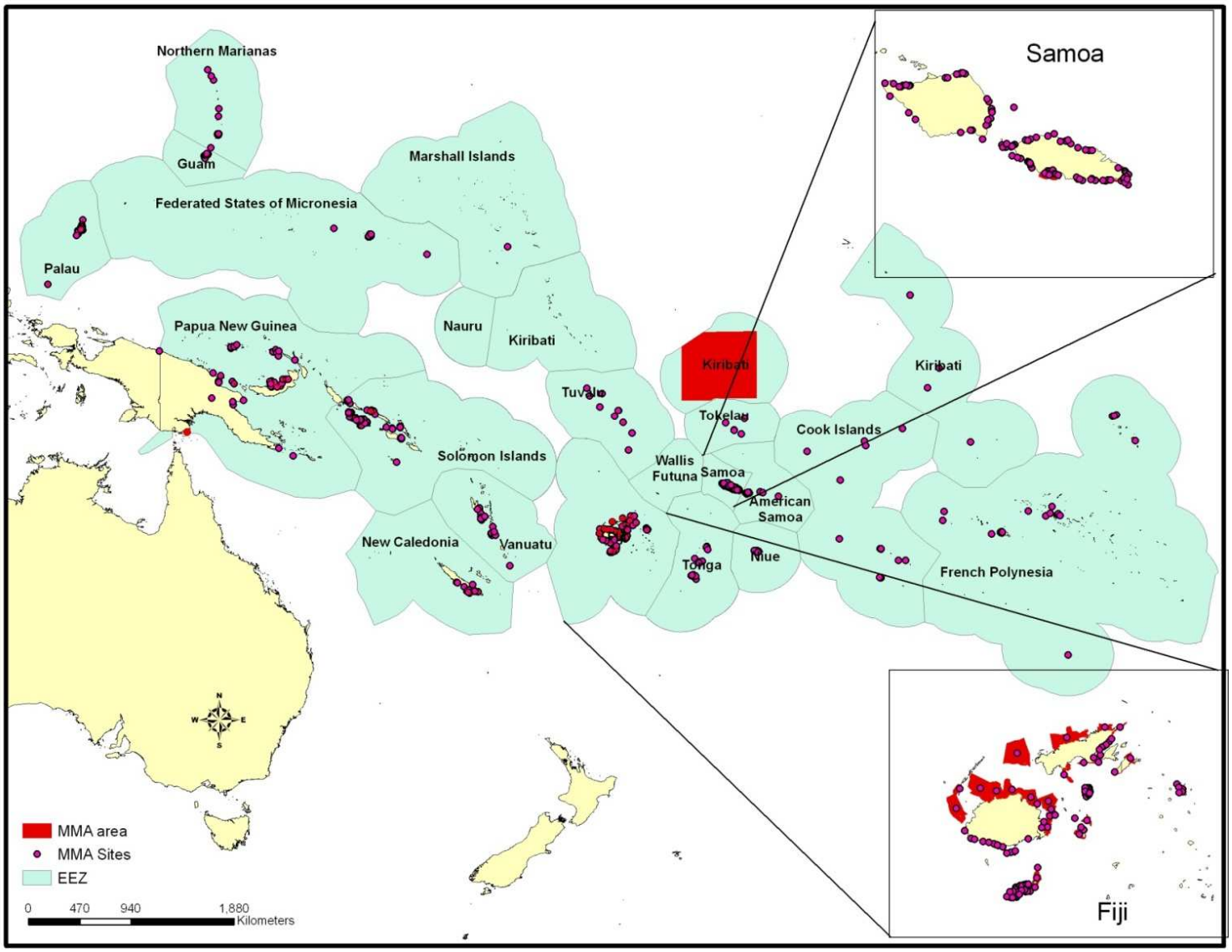
Strategies that improved climate resilience

- Conducted region-wide **climate vulnerability assessments**
- Documented and shared data on **species migration, range** and **habitat shifts**
- Identified pockets of **resistance** and **climate refugia** (e.g., to coral bleaching) and **large intact areas** at a transboundary scale
- Developed plans to address **transboundary-scale threats**
- **Restored habitat** that was regionally critical
- Developed transboundary **agreements on fisheries**

Donut Hole in the Pacific



Donut Holes in the Pacific

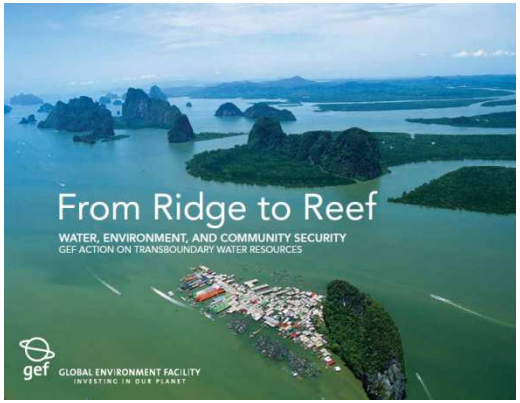


Discussion Questions

- What opportunities are there for you to increase transboundary collaboration and transboundary protected areas?

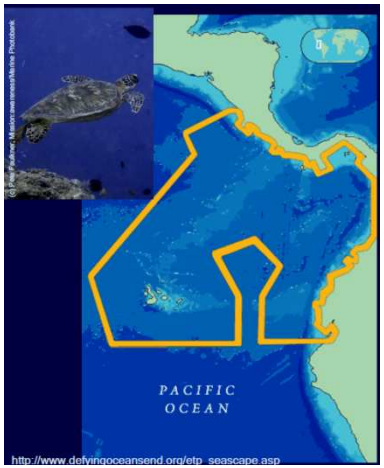
- How important are these areas in your context for strengthening climate resilience and promoting climate adaptation?

Resilience through PA spatial integration

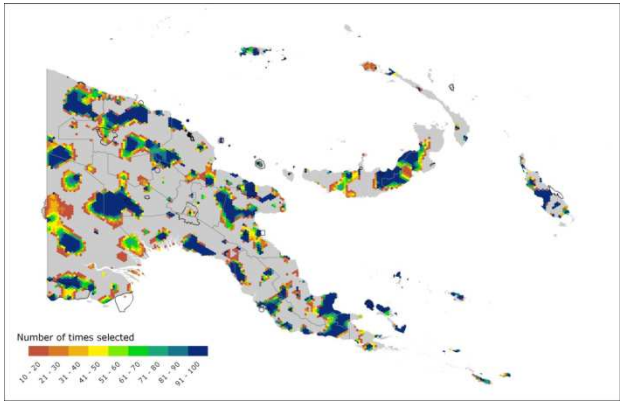


Ridge to Reef

Transboundary areas

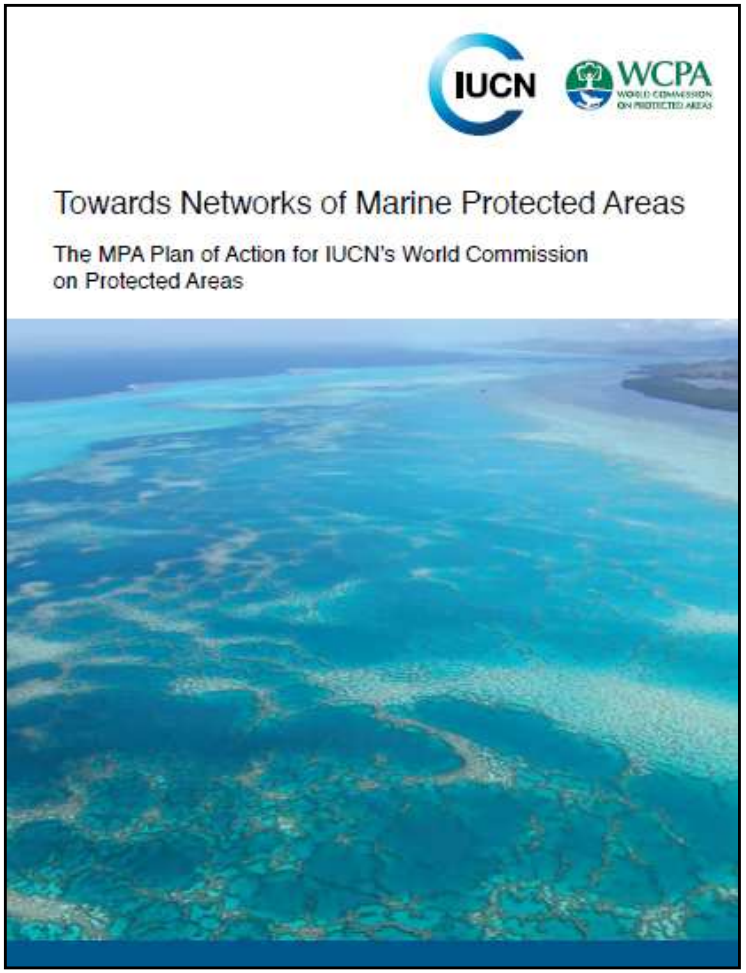


Regional networks



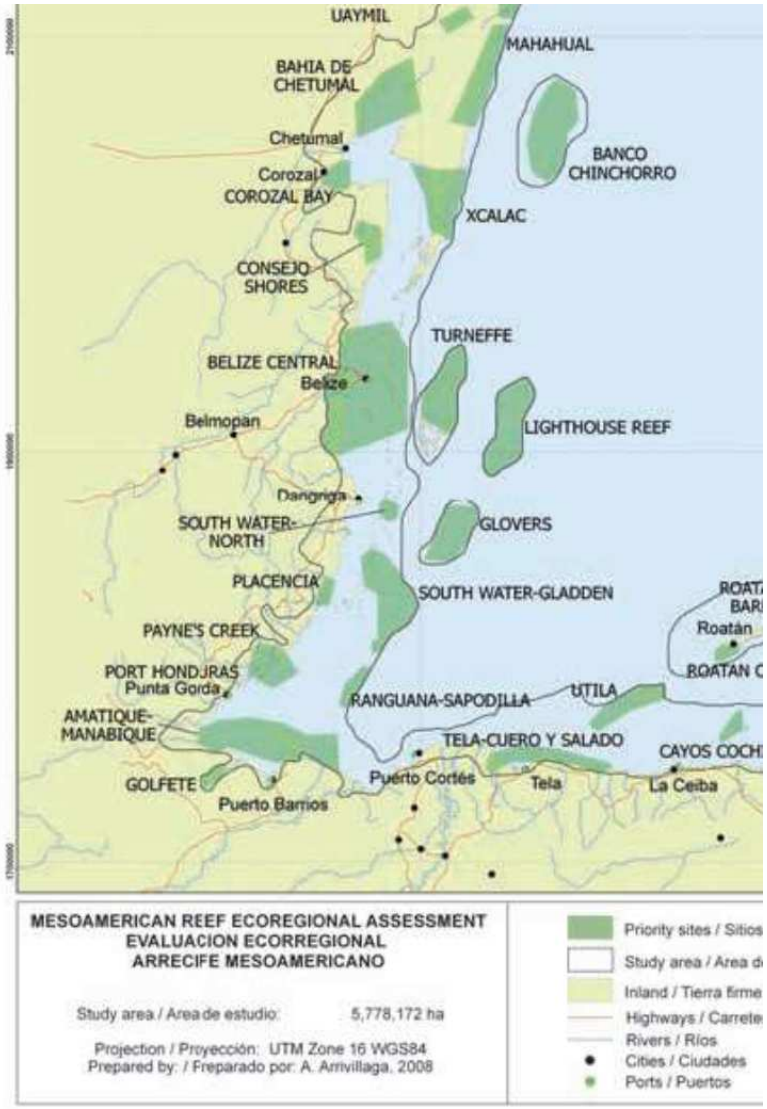
Improved gap assessments

Regional MPA Networks



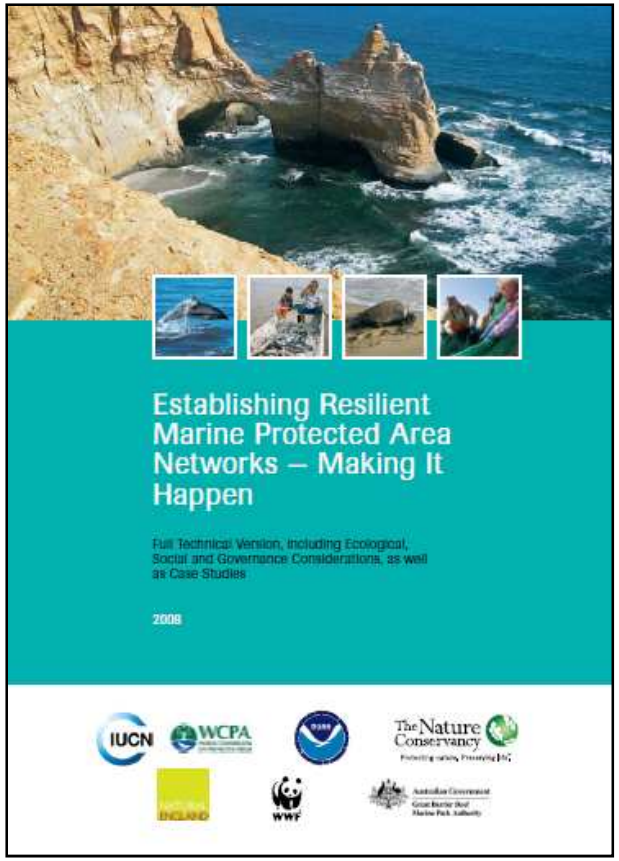
"A collection of individual MPAs or reserves operating co-operatively and synergistically, at various spatial scales and with a range of protection levels that are designed to meet objectives that a single reserve cannot achieve." WCPA/IUCN, 2008

Examples of Regional MPA Networks



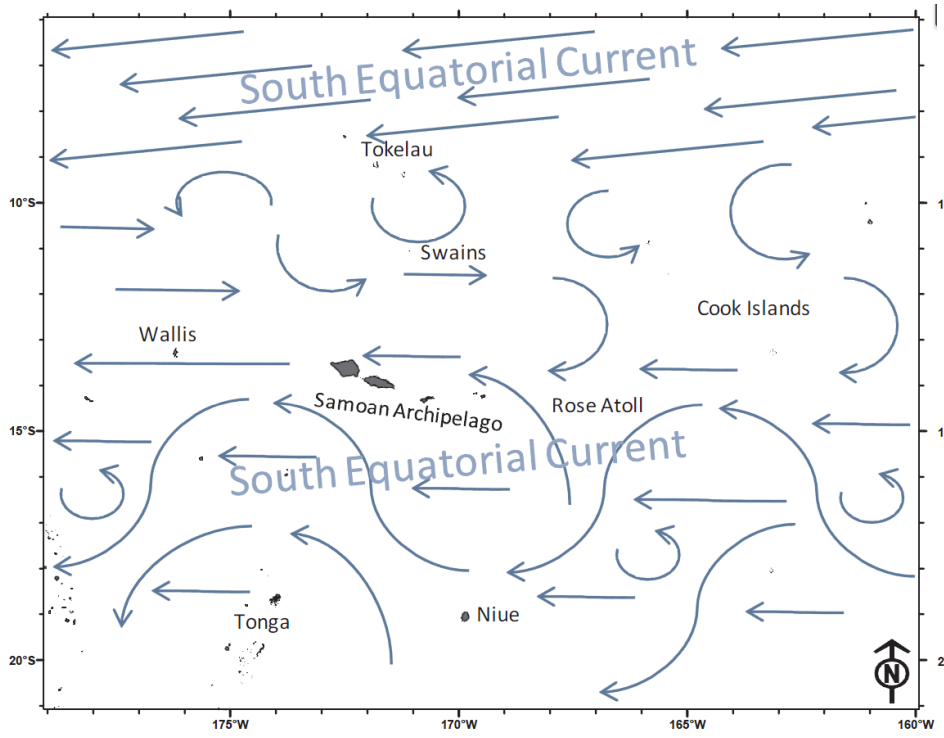
- Meso-American Barrier Reef
- B2B –Baja California to Bering Sea
- Scotian Shelf/Gulf of Maine
- Eastern African Marine Ecoregion (EAME)
- Western Africa Regional Network
- Sulu-Sulawesi Marine Ecoregion
- CMAR –Corredor Marino

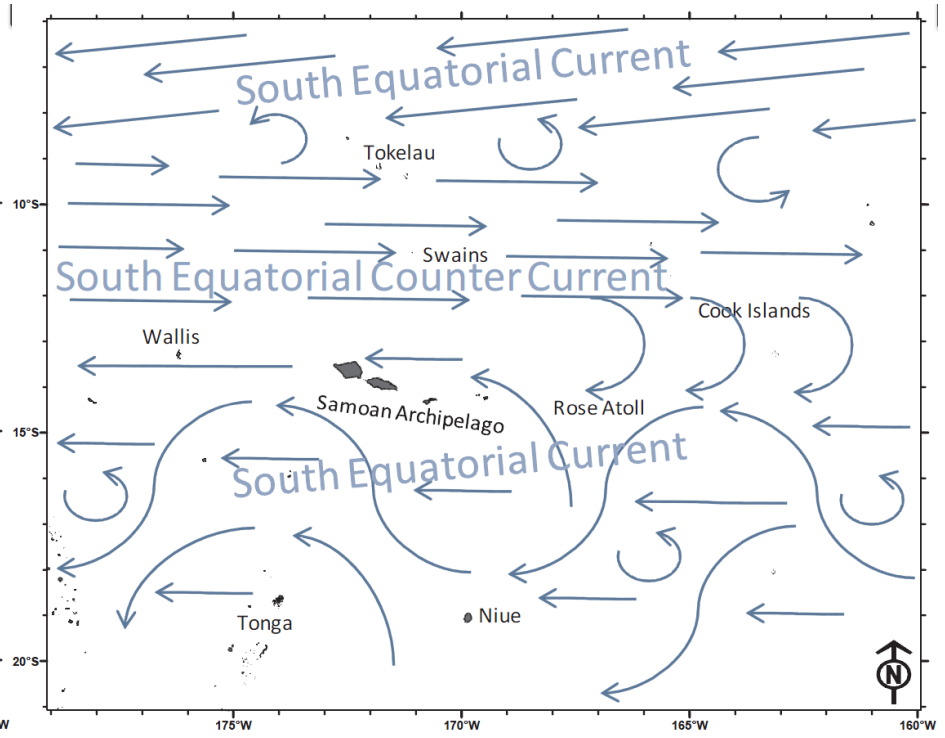
Incorporating resilience principles into MPA network design:



- Plan regional MPA networks at large landscape/seascape, national and regional scales
- Focus on protecting large, intact functioning ecosystems that will serve as biodiversity sources
- Include pockets of marine resilience (e.g., from bleaching events)
- Pay attention to spacing, larval distribution, habitat patchiness
- Focus on connectivity patterns

Incorporating connectivity principles into MPA network design



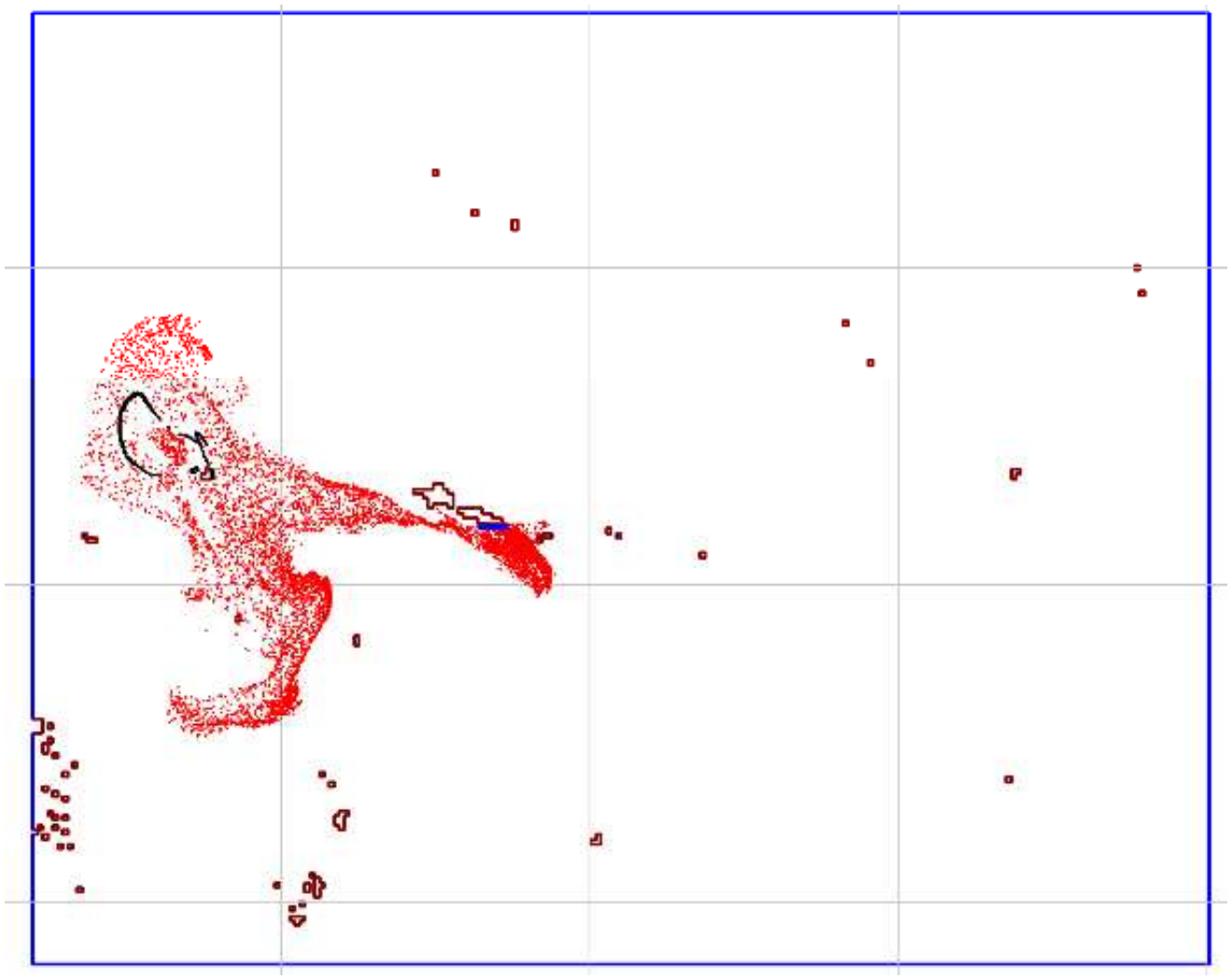


A Biogeographic Assessment of the Samoan Archipelago

Matthew Kendall and Matthew Poti (Editors)

Prepared by NOAA/NOS/NCCOS/CCMA Biogeography Branch with Support from NOAA's Office of National Marine Sanctuaries and Coral Reef Conservation Program

Incorporating connectivity principles into MPA network design




Migratory paths: from Khram Island
Thailand
Cambodia
Vietnam
Malaysia
Indonesia

Migratory paths: from Huyong Island

Incorporating resilience principles into MPA network design: Marine EBSAs

- Uniqueness or rarity
- Special importance for life-history stages
- Importance for threatened species
- Vulnerability, fragility, sensitivity
- Biological productivity
- Biological diversity
- Naturalness

Incorporating social resilience principles into MPA network design:

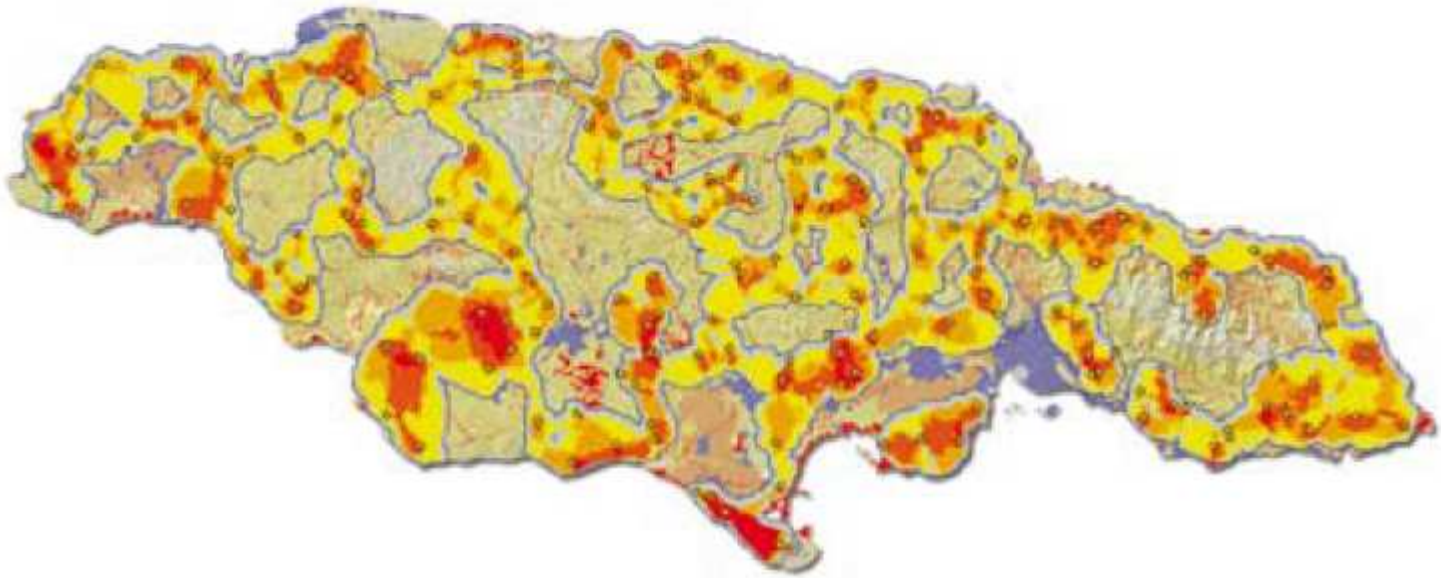
Design the MPA network to:

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

Incorporating resilience principles into MPA network design: California

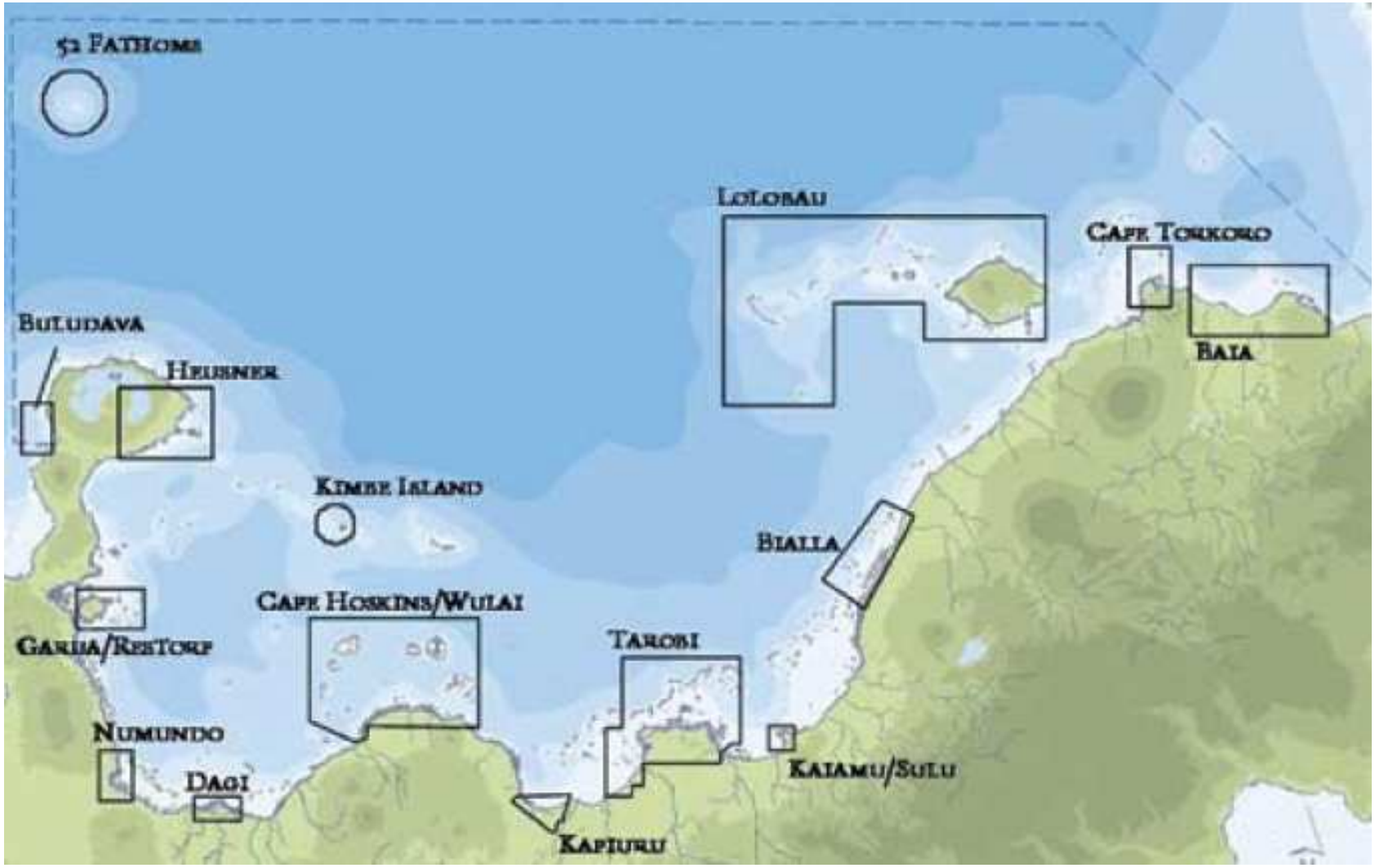
- Minimum size of MPA is 25 km^2; optimal is 45 – 100 km^2
- Minimum shoreline of 5-10 km; optimal is 10-20 km
- Extend boundary of MPA from intertidal zone to deep waters offshore (to protect nursery, spawning and feeding areas)
- Space MPAs no greater than 50 – 100 km from each other to facilitate dispersal

Improving connectivity to promote climate resilience: Jamaica



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

Designing for marine resilience, Kimbe Bay, PNG



Designing for marine resilience, Kimbe Bay, PNG

Representation and risk spreading:

- 20% of each habitat type protected, and distributed these across seascape

Critical areas and key habitats:

- Areas resistant to coral bleaching
- Areas with variety of habitats in close proximity
- Turtle nesting areas
- Key fish aggregation areas

Connectivity

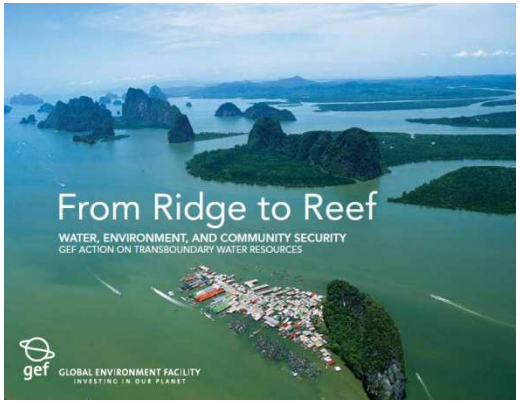
- Used entire ecological units (e.g., whole offshore reefs, seamounts) and large buffers

Discussion Questions

- How well is your protected area network designed for climate resilience?

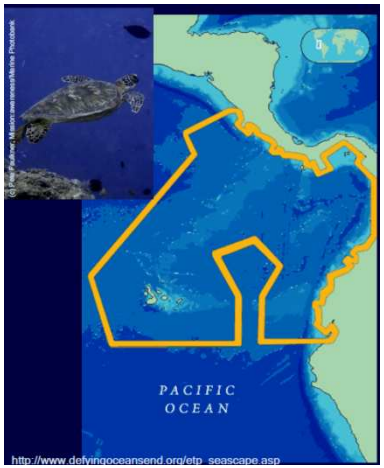
- How well does your protected area network buffer human communities from the impacts of climate change?

Resilience through PA spatial integration

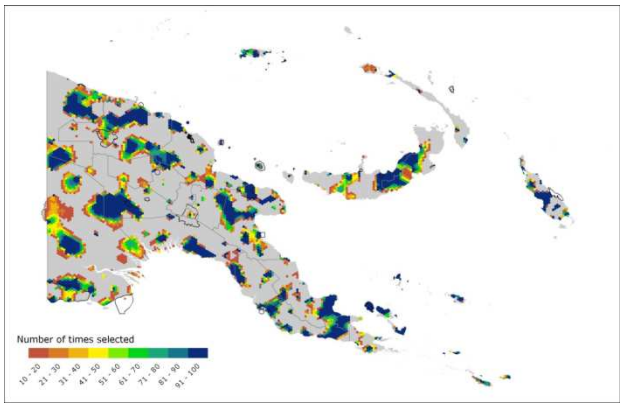


Ridge to Reef

Transboundary areas

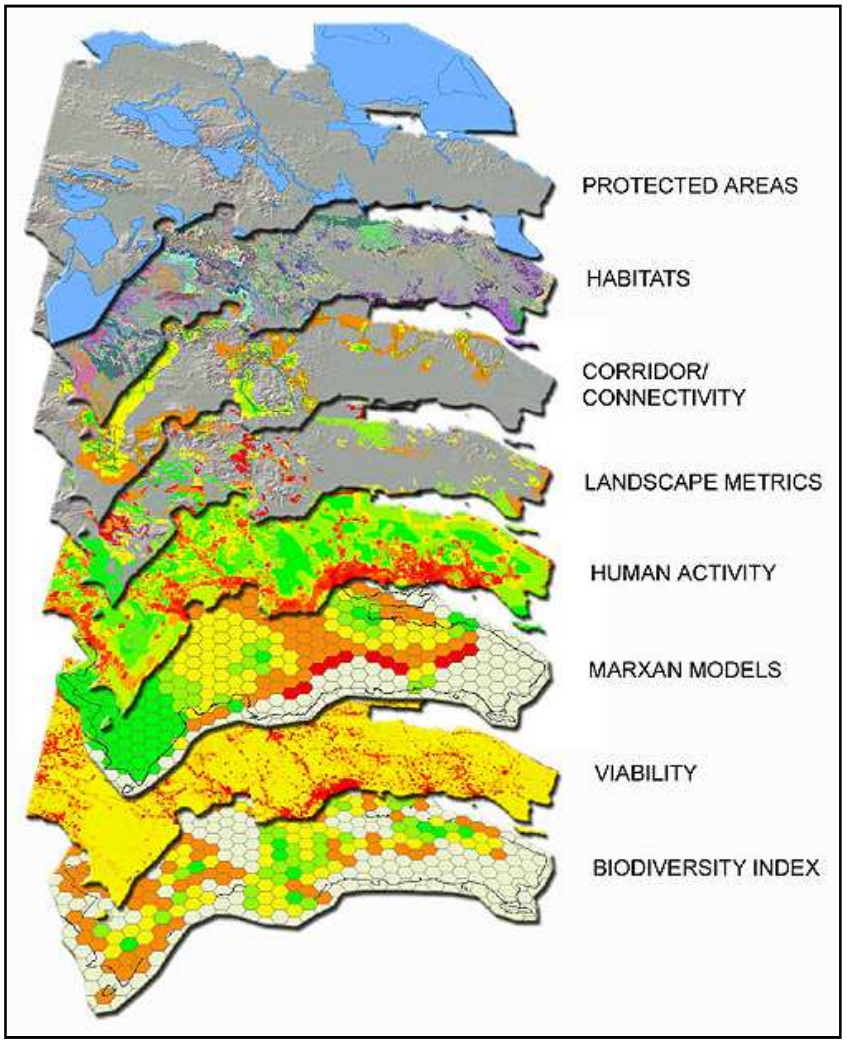


Regional networks



Improved gap assessments

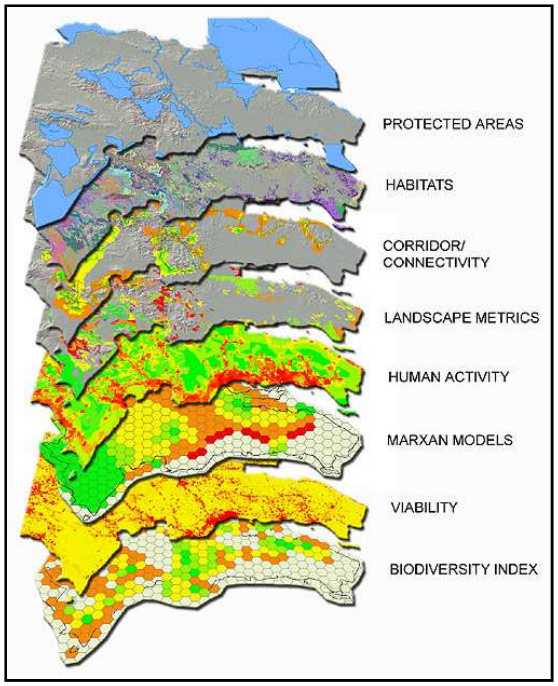
Incorporating resilience principles into gap assessments:



GAP ASSESSMENT:

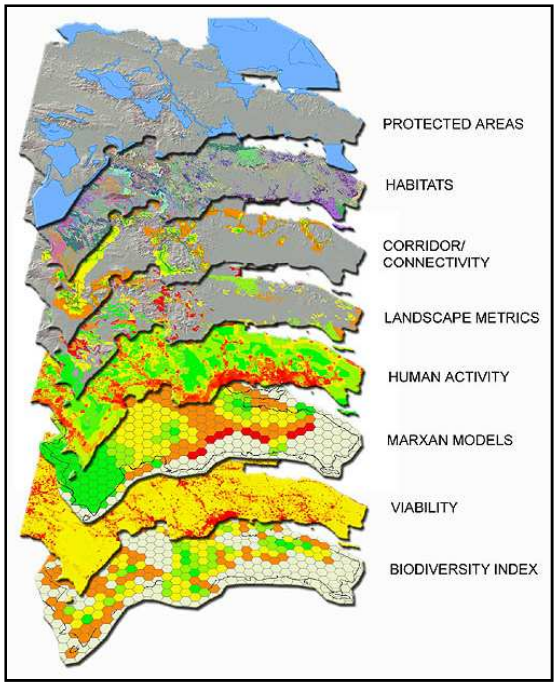
A comparison between the status of **biodiversity** and the status of **protection** within a country

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** to climate change
- Include species and ecosystems most **resistant** to climate change
- Include goals to **diversify the distribution of protection**

Incorporating resilience principles into gap assessments:



- Include **connectivity** under climate scenarios in gap assessment
- Incorporate threats that drive **climate-related regime shifts**, as well as climate-related thresholds and **tipping points**
- Incorporate predict**ive climate modeling** into gap assessment

Climate Change in Pacific Islands

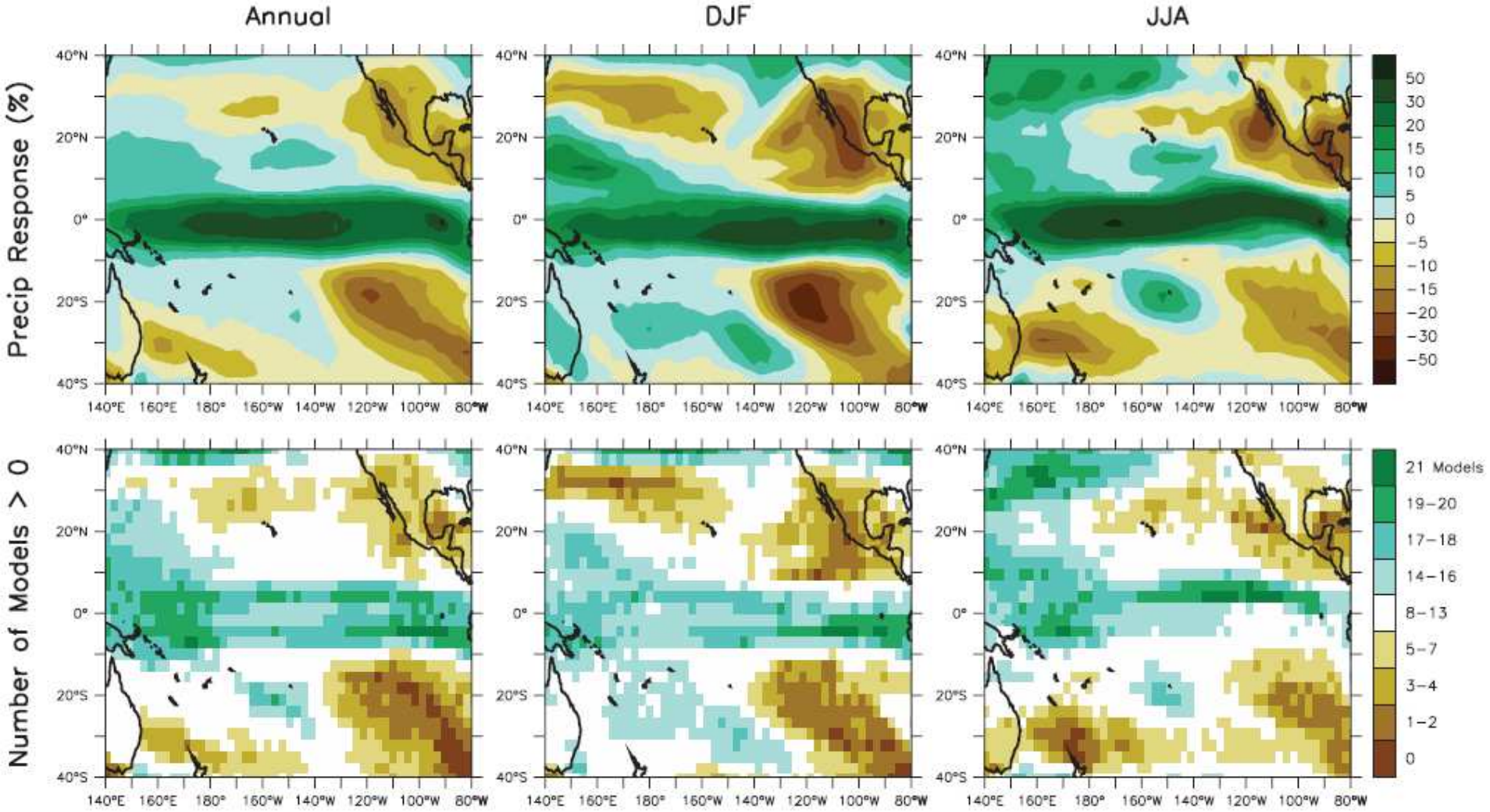


Figure 11.23. *Precipitation changes over the Pacific Ocean. Top row: Annual mean, DJF and JJA fractional precipitation change between 1980 to 1999 and 2080 to 2099, averaged over 21 models. Bottom row: number of models out of 21 that project increases in precipitation.*

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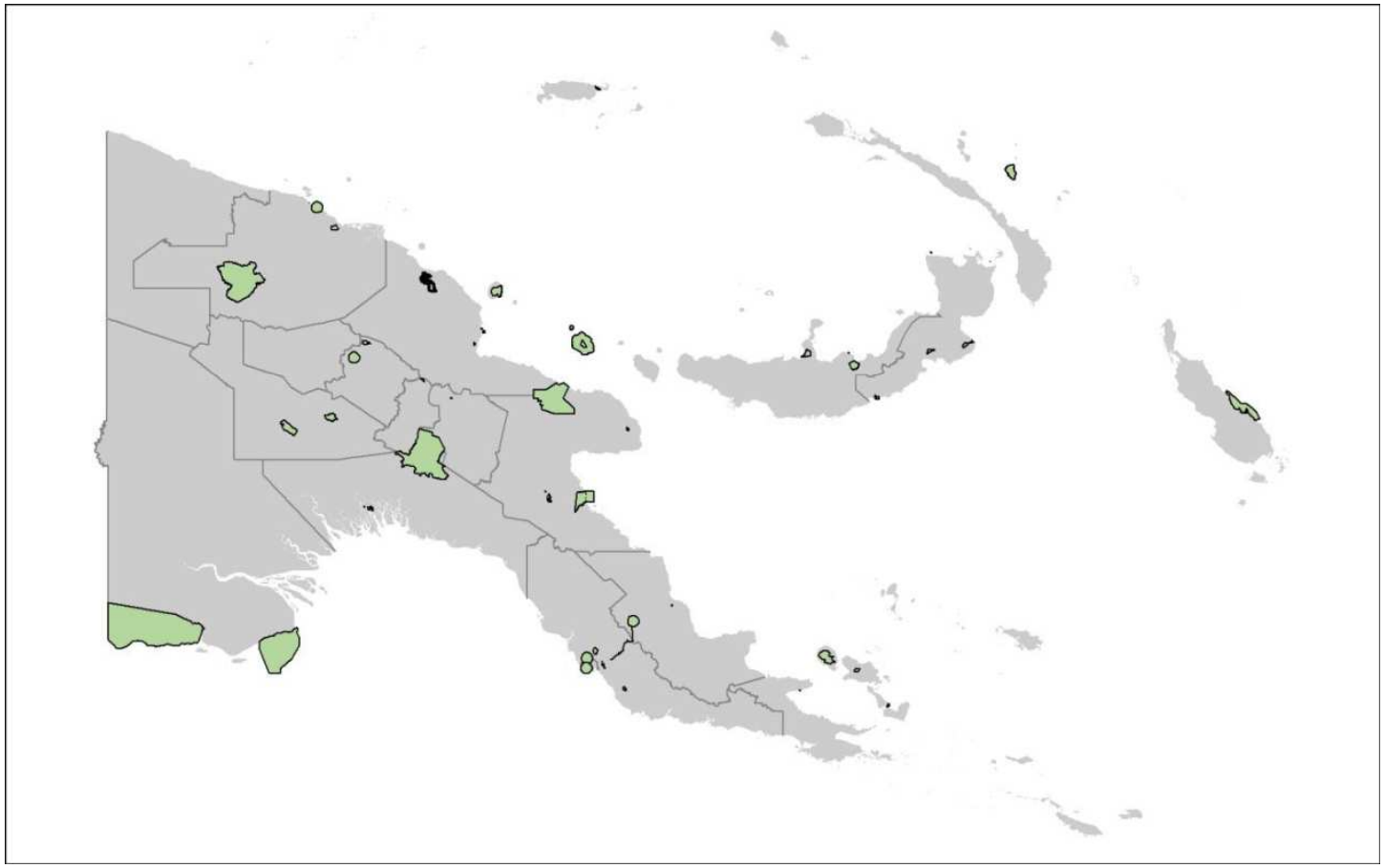
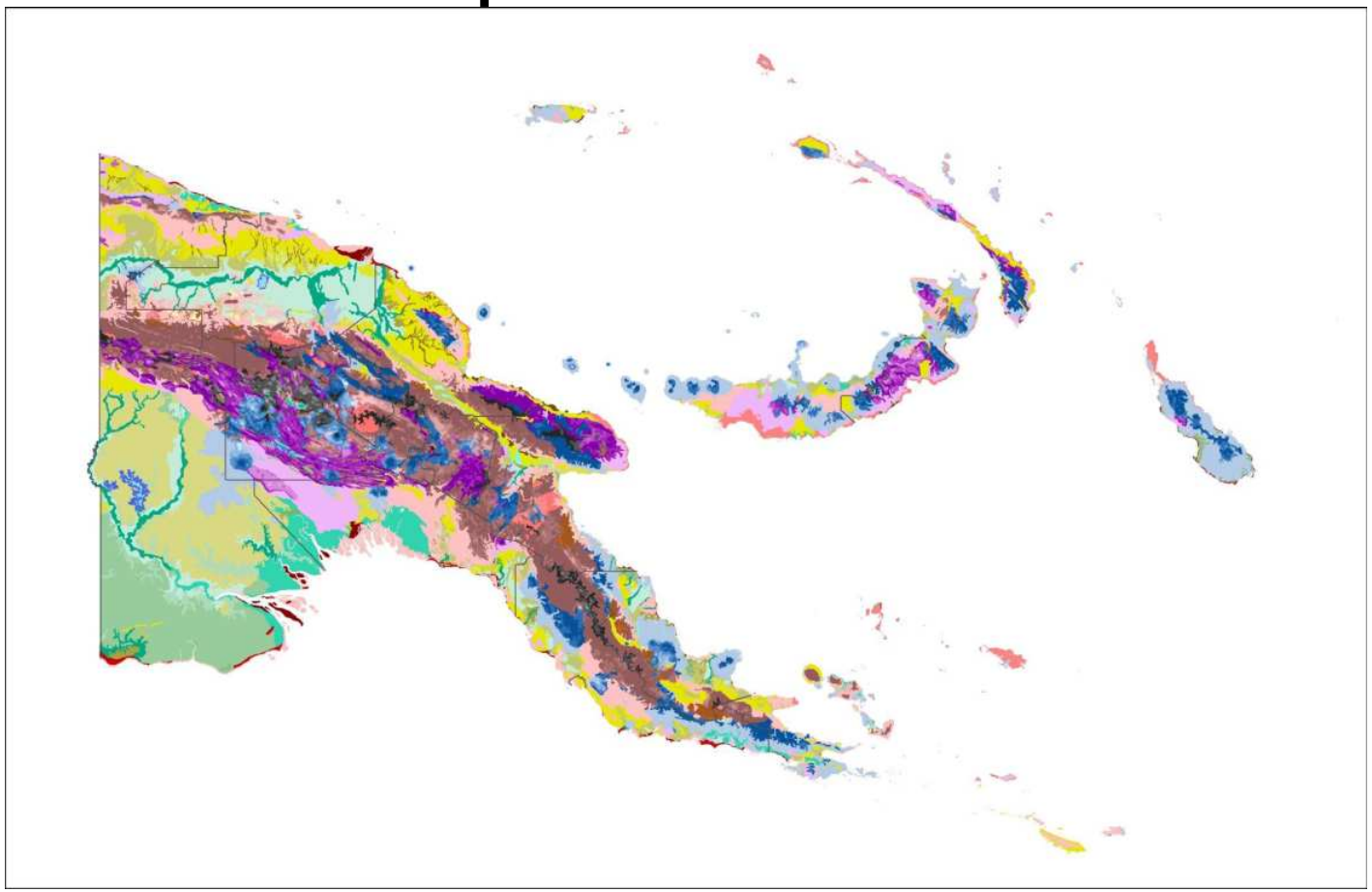
Climate-Ready Ecological Gap Assessment in Papua New Guinea



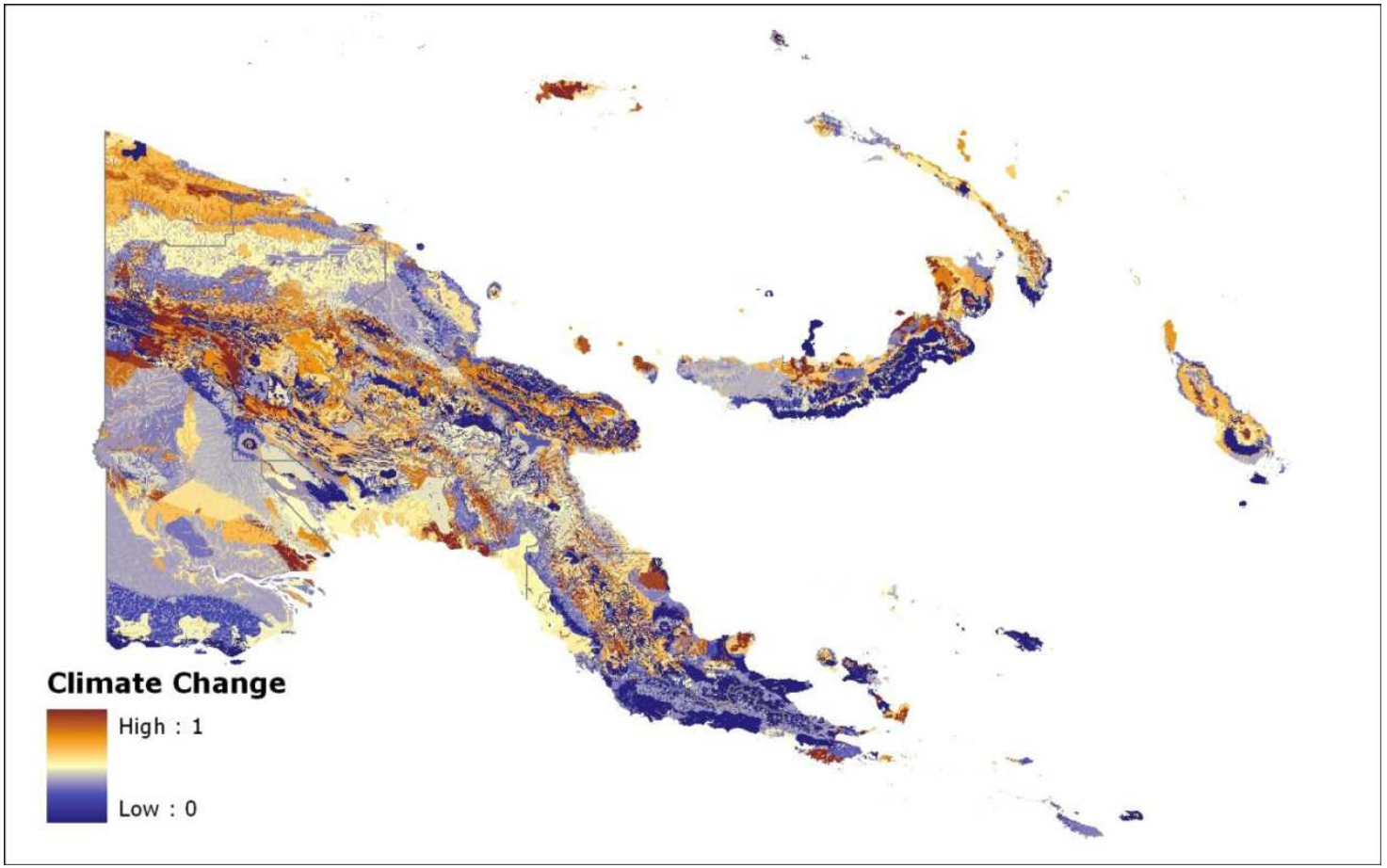
Existing protected areas

Climate-Ready Ecological Gap Assessment in Papua New Guinea



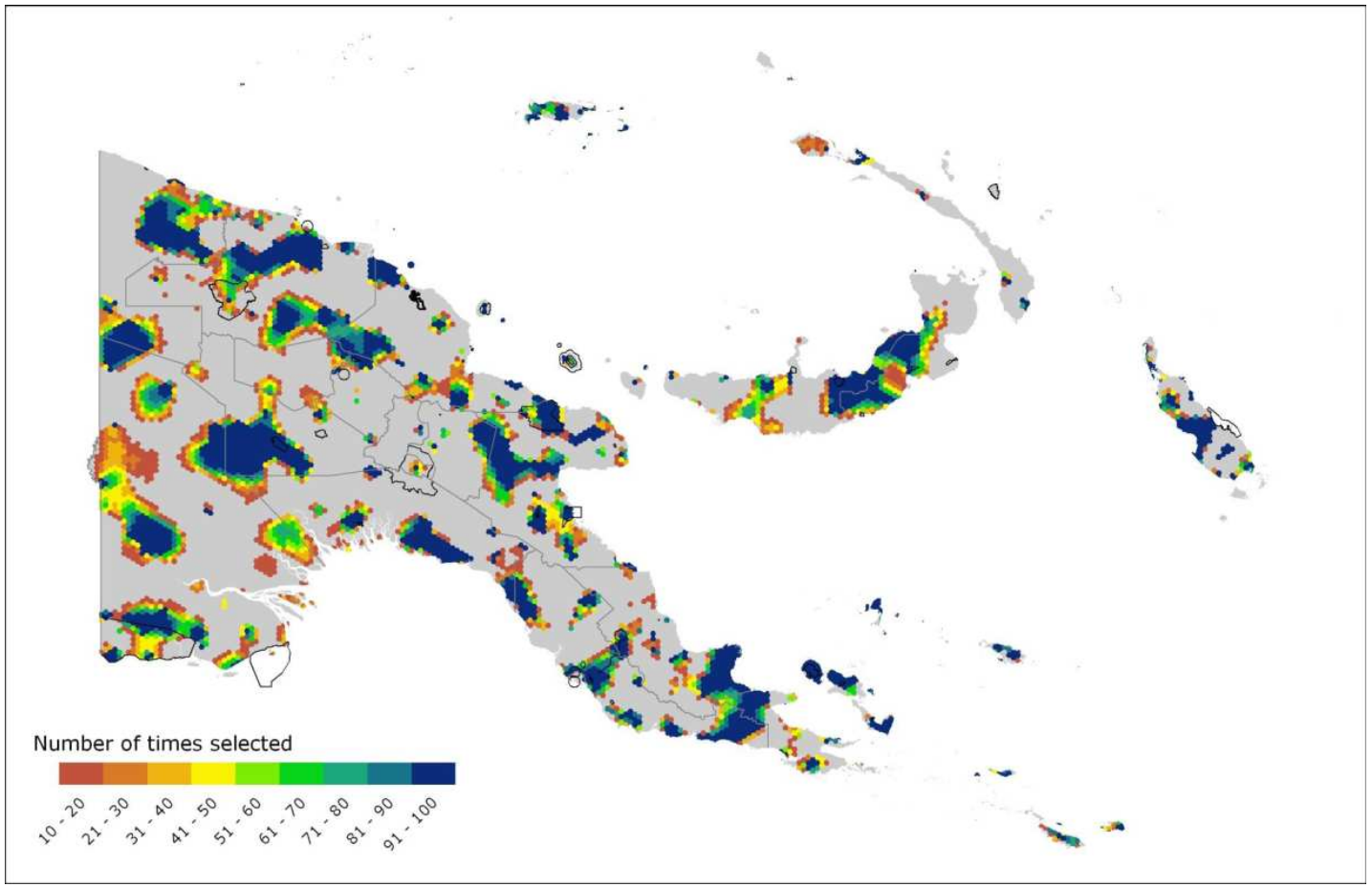
Land systems

Climate-Ready Ecological Gap Assessment in Papua New Guinea



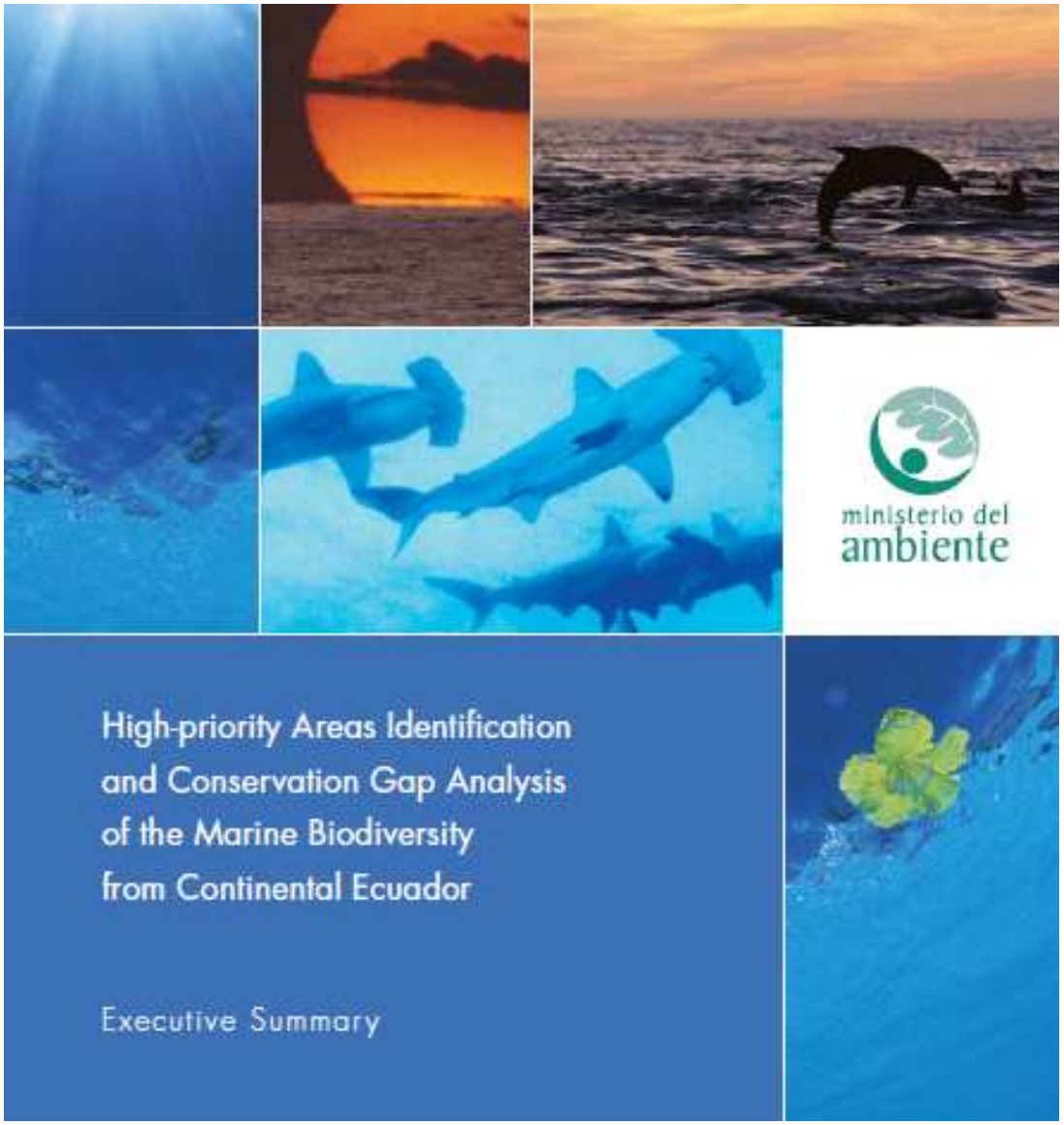
Climate impacts

Climate-Ready Ecological Gap Assessment in Papua New Guinea

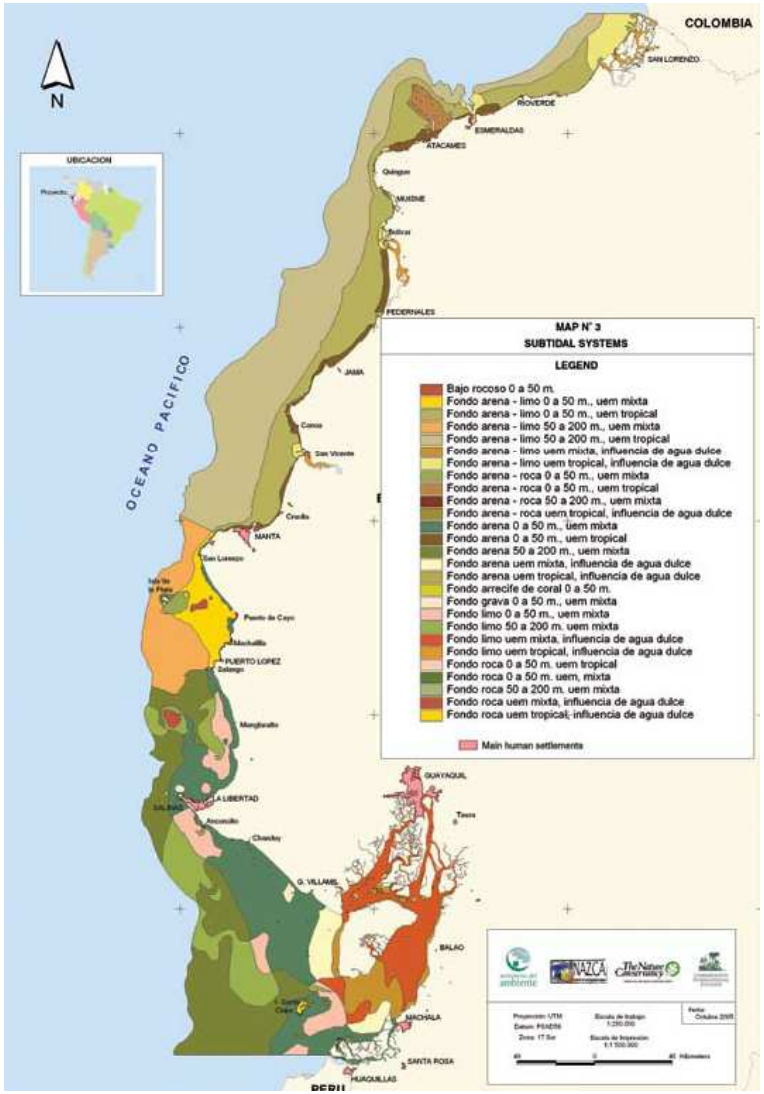


Resulting analysis of climate-ready gap assessment

Marine Gap Assessment for Climate Resilience



Marine Gap Assessment for Climate Resilience



- Distributed ecological units to **spread climate risk**
- Considered impacts from El Niño and included threats **exacerbated by climate change**
- Included systems important for **buffering humans** (mangrove forests, key fisheries,)
- Included species and systems **vulnerable to climate impacts**

Discussion Questions

- How well does your country's gap assessment incorporate issues related to climate resilience and adaptation?

- What practical steps could you take to incorporate climate resilience and adaptation into your terrestrial and marine gap assessments?

CLIMATE RESILIENCE THROUGH PA INTEGRATION AND MAINSTREAMING

1. Spatial integration
2. **Sectoral integration**

Climate Change Adaptation through PA Sectoral Integration and Mainstreaming

Sectoral mainstreaming

Revise PA valuation studies

Integrate into NAPAs

Include in threats assessment

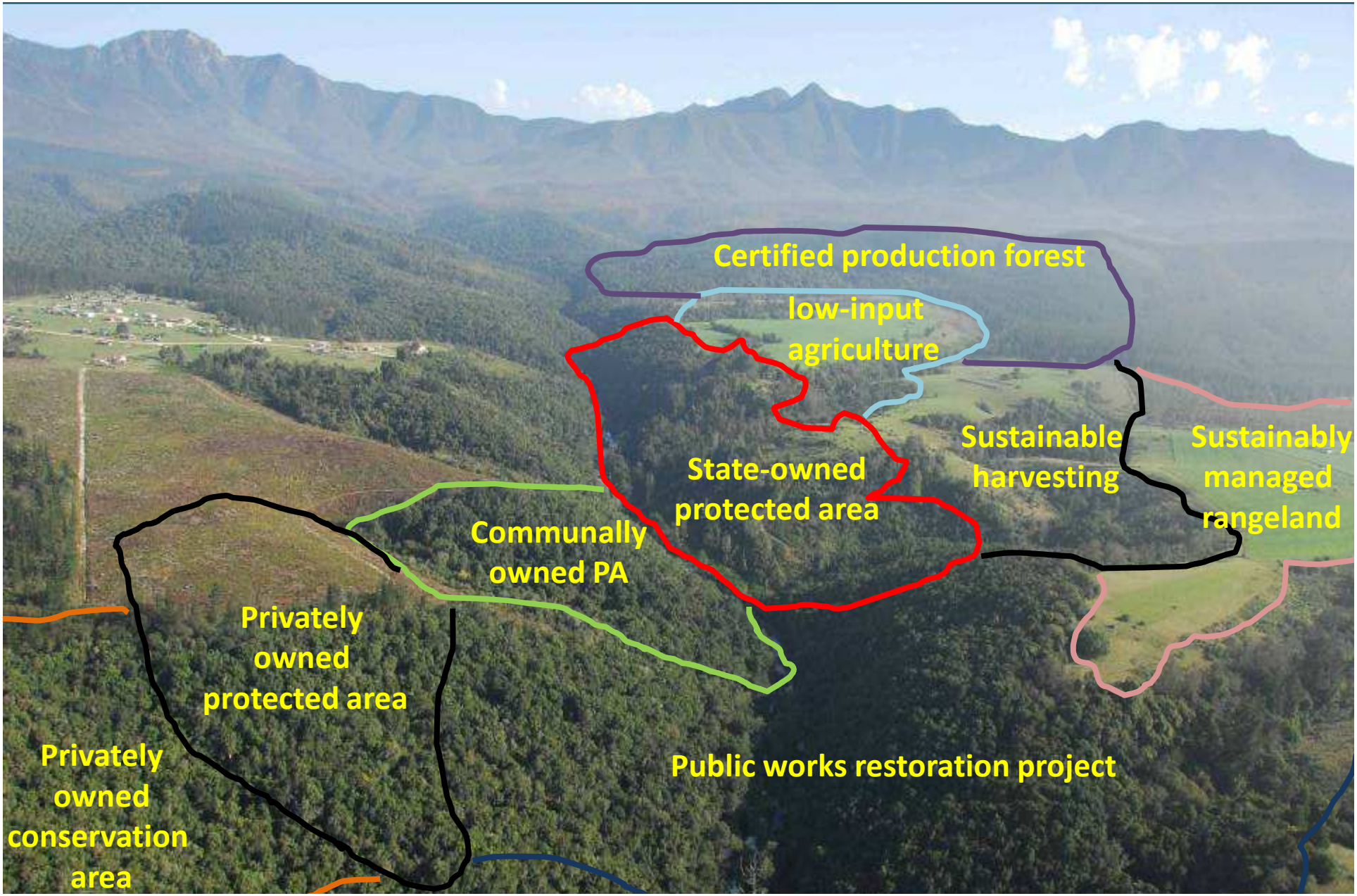
SECTORAL INTEGRATION

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

…to create a climate-resilient landscape



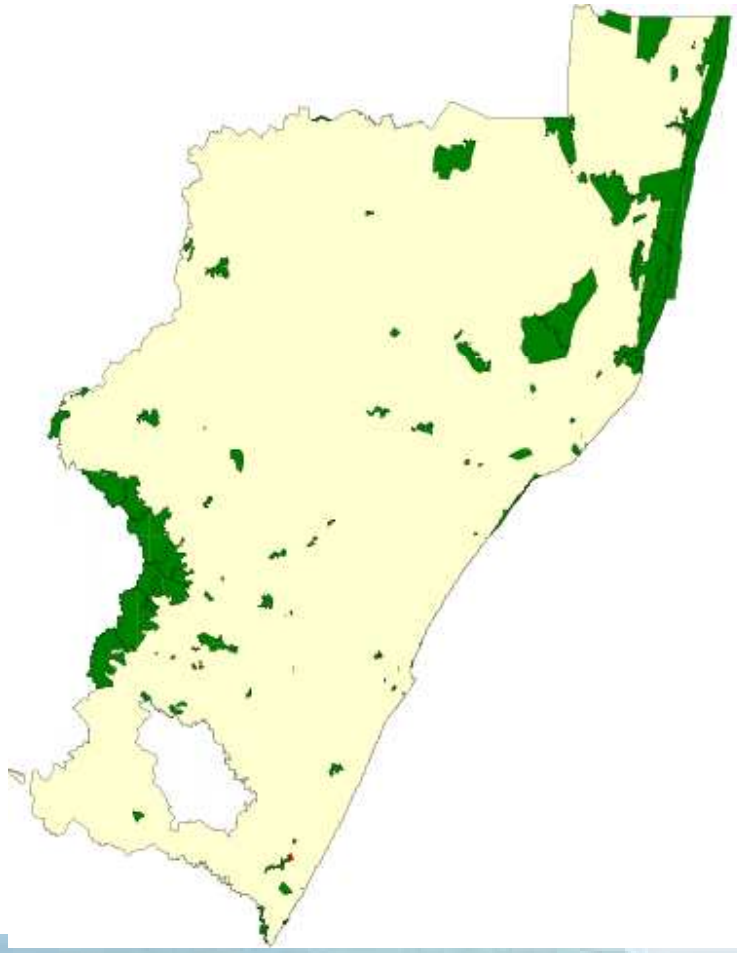
SECTORAL MAINSTREAMING

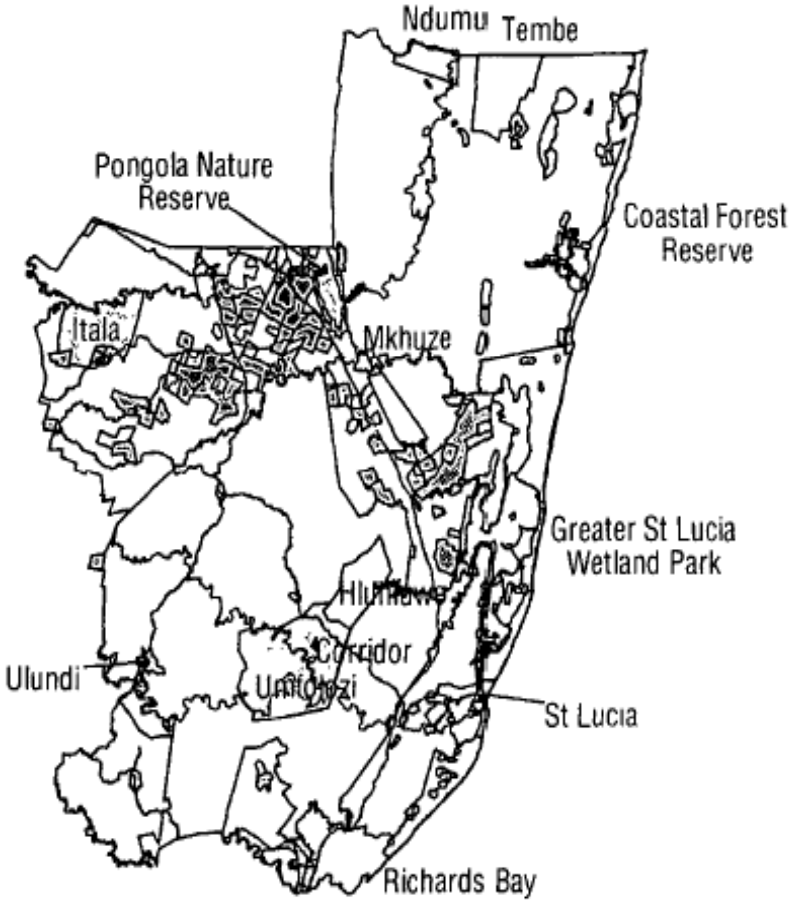
DEFINED AS:

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



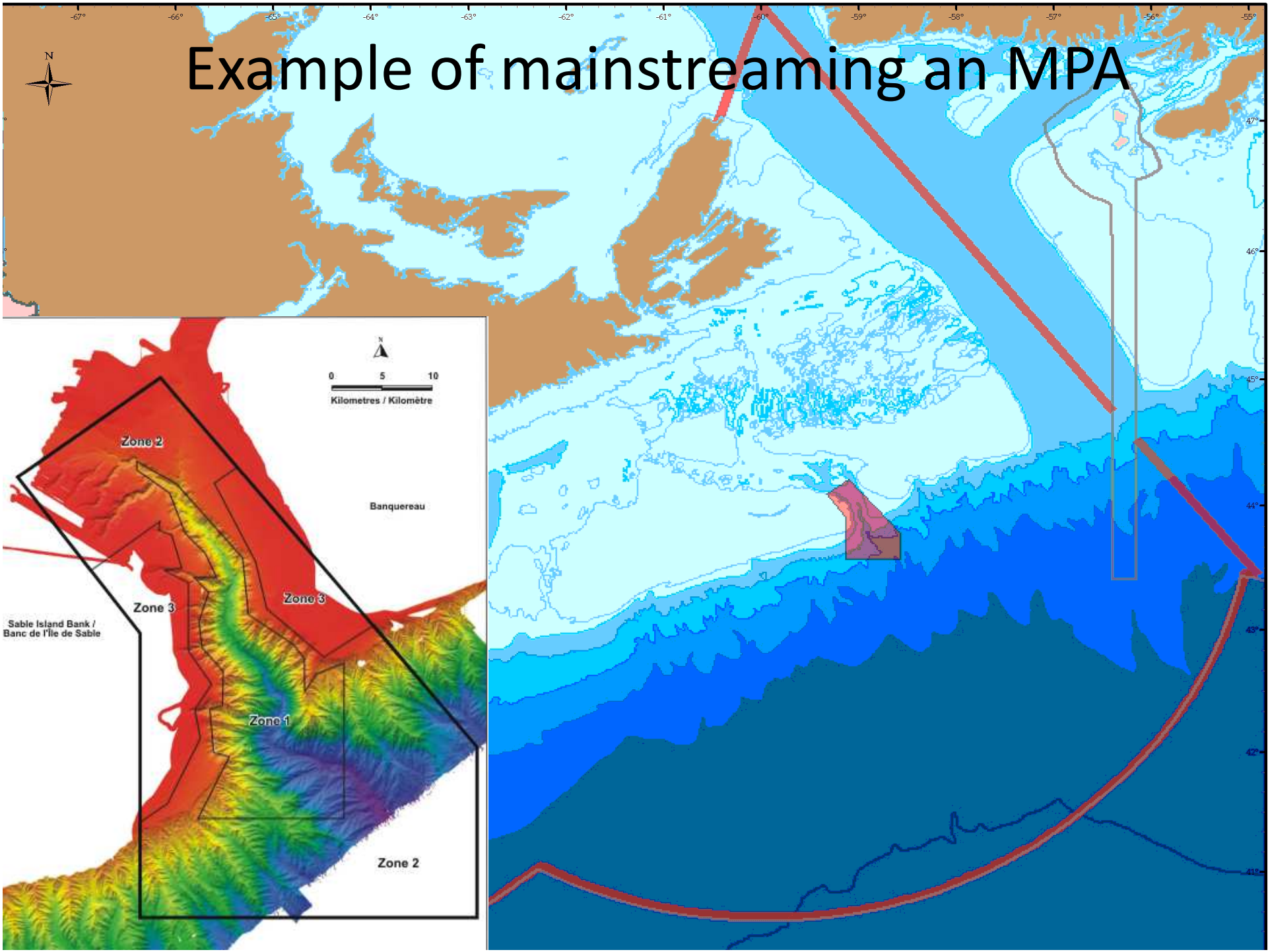


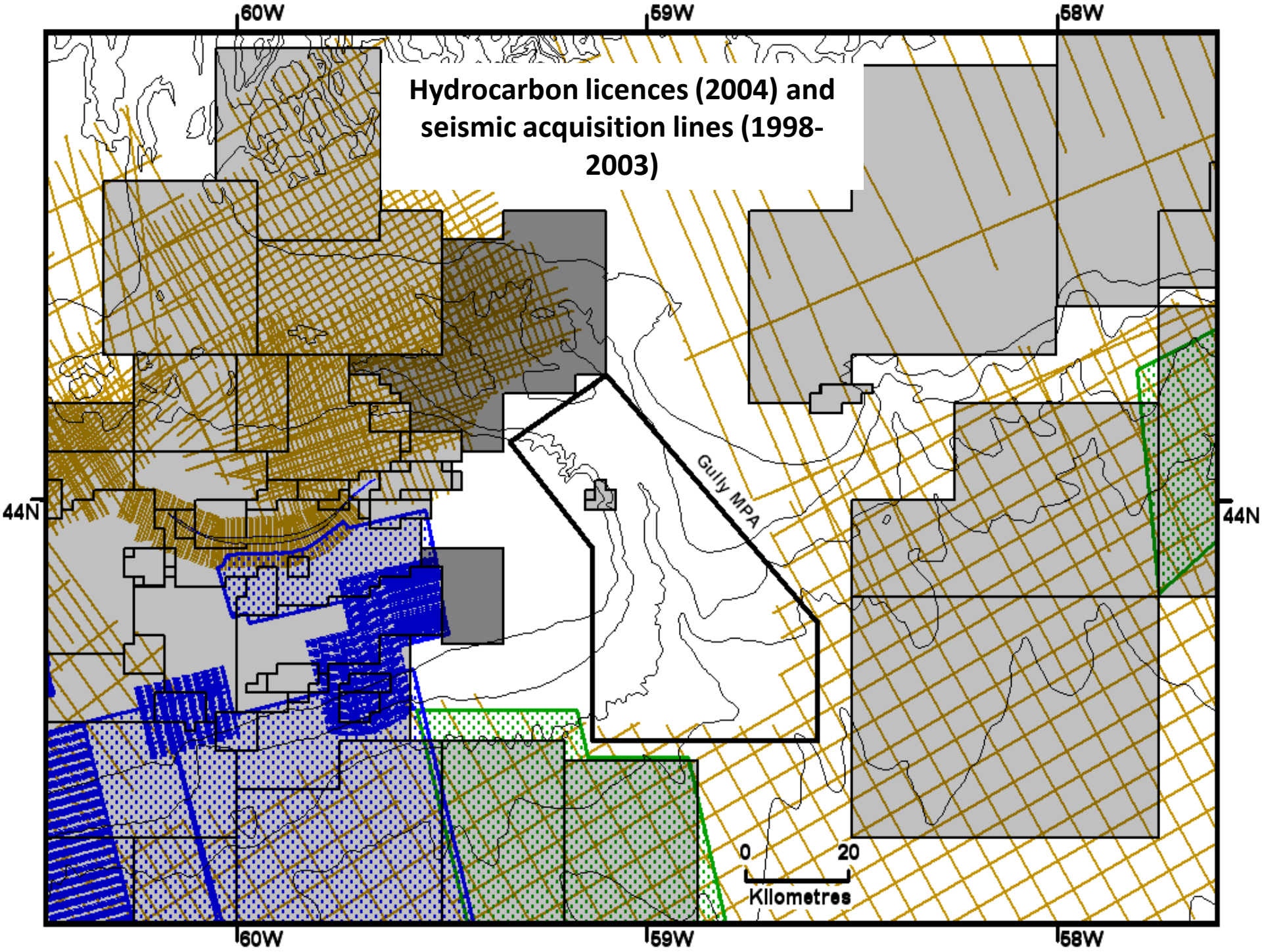
MAJOR OPPORTUNITY:
Landscape linkages between formal protected areas and private game ranches

Example of mainstreaming in S. Africa

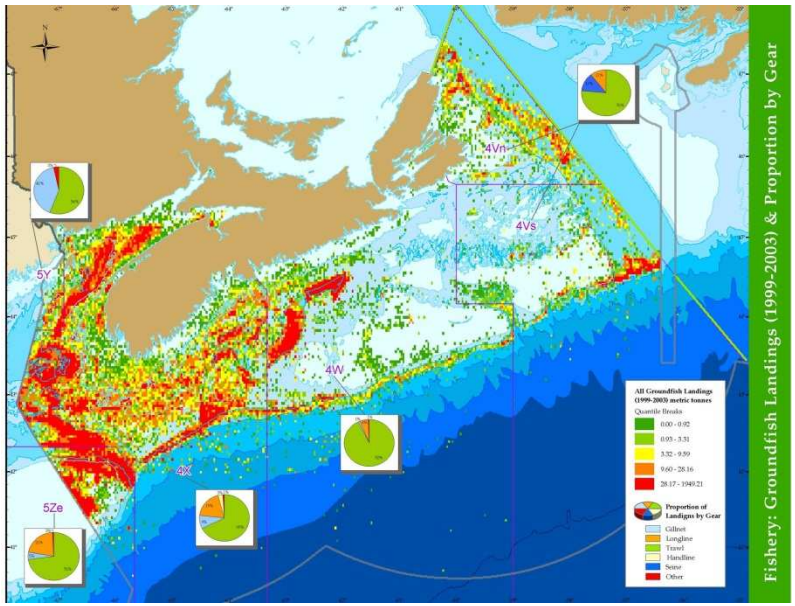
- The focus was on developing a game ranchers' association
- KZN helped create a legal framework to support private ownership of land and wildlife
- They provided technical support to ranchers
- They provided financial incentives for private game ranches
- Ranchers used sales from ranches to help fund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

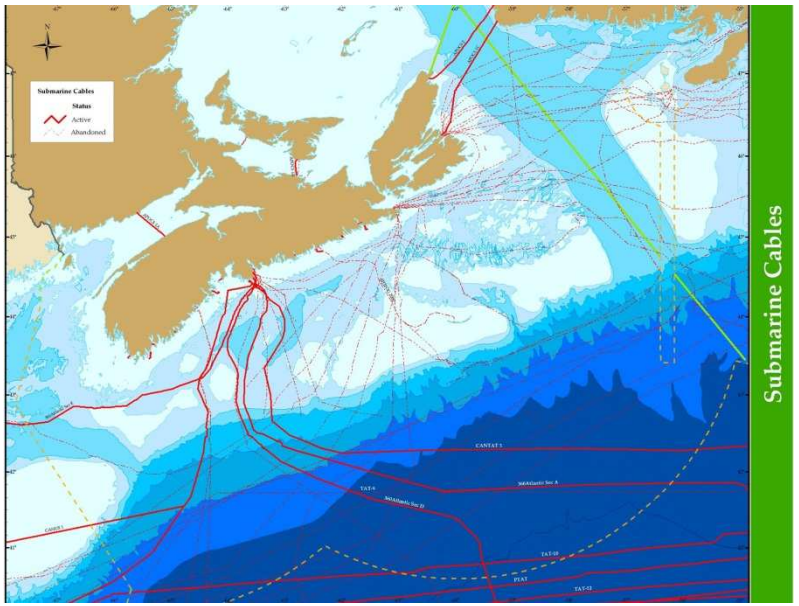
Example of mainstreaming an MPA

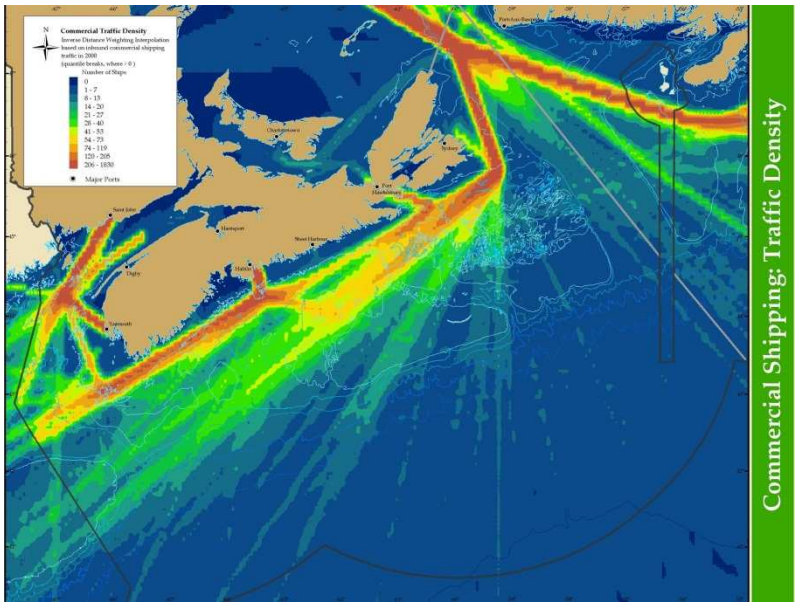


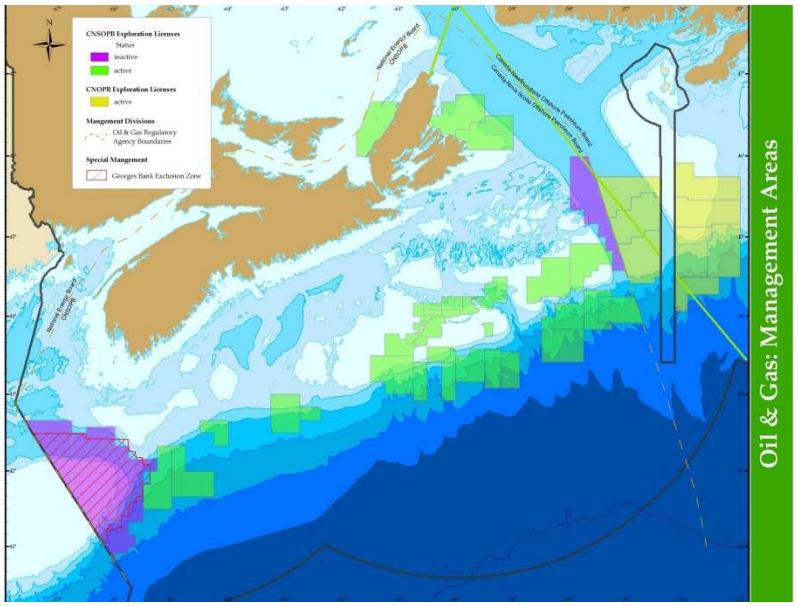

Hydrocarbon licences (2004) and seismic acquisition lines (1998-2003)
60W
59W
58W
44N
Gully MPA
0
20
Kilometres

Example of mainstreaming an MPA

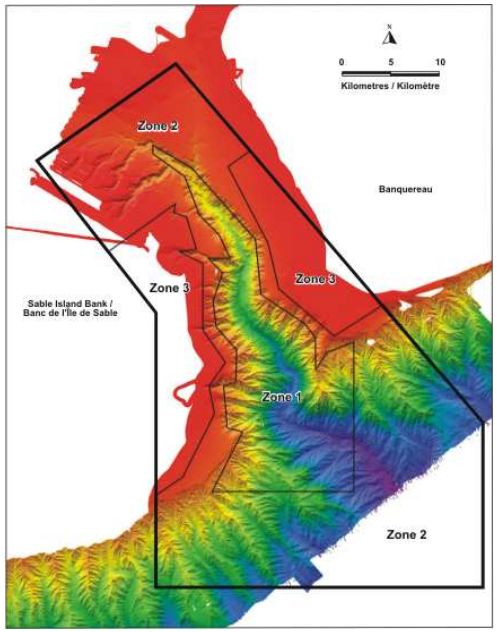








Example of mainstreaming an MPA

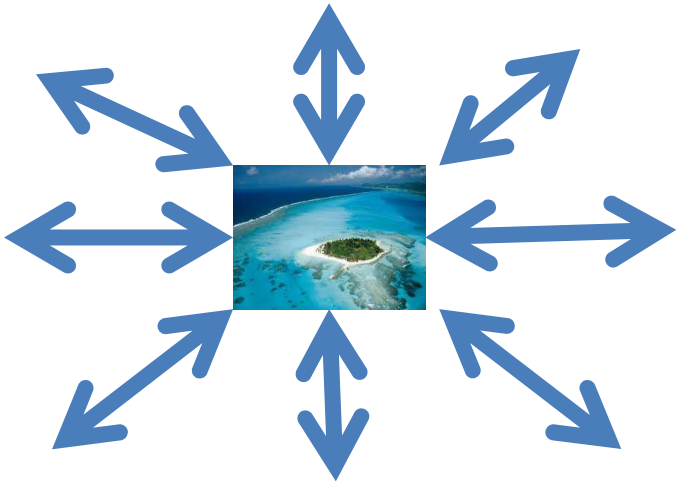


Transportation: New regulations on ballast water exchange; Coast Guard guidance on MPA avoidance, mammals, discharges

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

Fisheries: Automatic detection of unauthorized fishing

Multiple Opportunities for Mainstreaming



Examples of Sectoral Mainstreaming Strategies

- Incorporate mechanisms for payment for ecosystem services (e.g., water) into economy
- Develop biodiversity offset policies for the energy sector
- Develop land use policies that protect coastal areas important for fisheries and storm buffers
- Develop invasive species strategies that account for the role of PAs

Discussion Questions

- What are the sectors that have the greatest impact on protected areas?

- What examples of sectoral mainstreaming and integration can you think of in your country?

- What are some of the challenges and opportunities for sectoral mainstreaming and integration?

Climate Change Adaptation through PA Sectoral Integration and Mainstreaming

Sectoral mainstreaming

Revise PA 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
- **Brazil**: The expected costs of new Amazonian protected areas are offset by expected benefits in reduced disease incidence

Some examples of the value of PAs for climate resilience

- **Armenia**: The Erebuni State Reserve, 89 ha, is known for its diversity of wild wheat, including Triticum urartu, T. boeoticum, T. araraticum and Aegilops spp.
- **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

Discussion Questions

- How well do protected area and biodiversity valuation studies incorporate climate issues in your country?

- What are some practical steps for including climate issues in protected area valuation studies?

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

- **Kiribati**: coastal zone management (13%)
- **Solomon Islands** Coastal protection (18%)
- **Tuvalu**: Resilience of marine areas (35%)

Types of EBA 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

Discussion Questions

- How well do you climate adaptation plans (including NAPAS and other plans) include protected areas and ecosystem-based approaches?
- How does your country intend to use its GEF V allocation for climate change?
- What are some practical steps you could take to include protected areas in climate adaptation plans?

Climate Change Adaptation through PA Sectoral Integration and Mainstreaming

Sectoral mainstreaming

Revise PA valuation studies

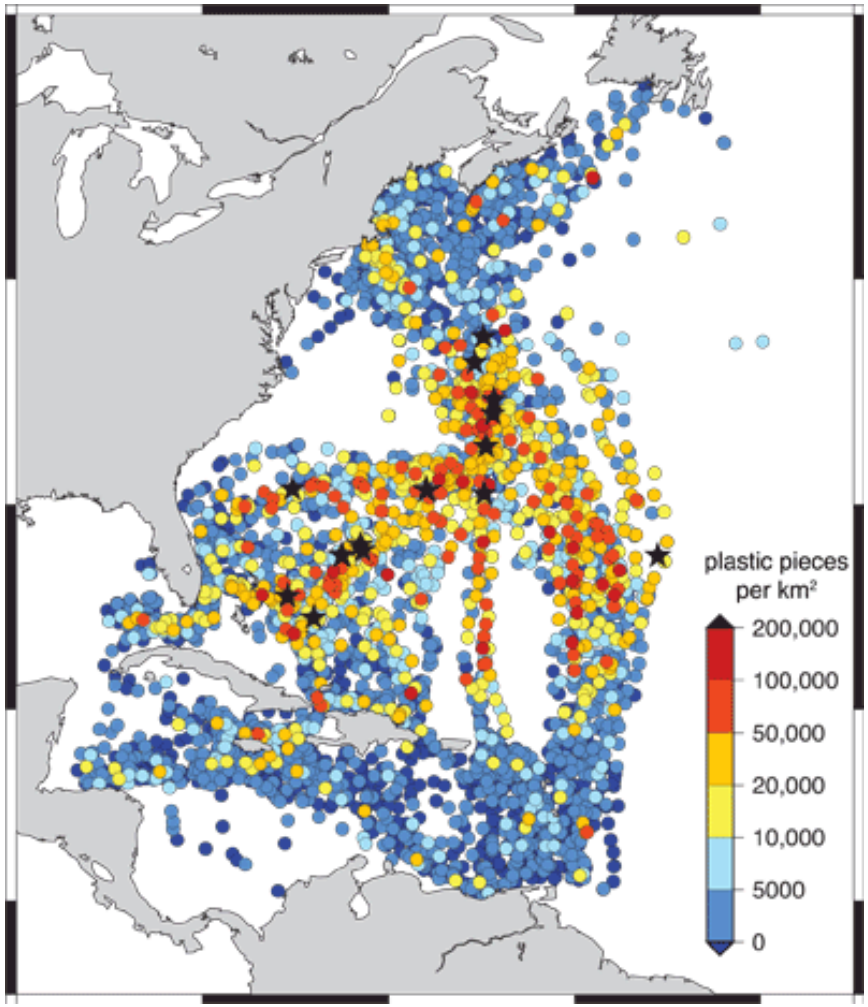
Integrate into NAPAs

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)

Assess threat synergies that will be exacerbated by climate change



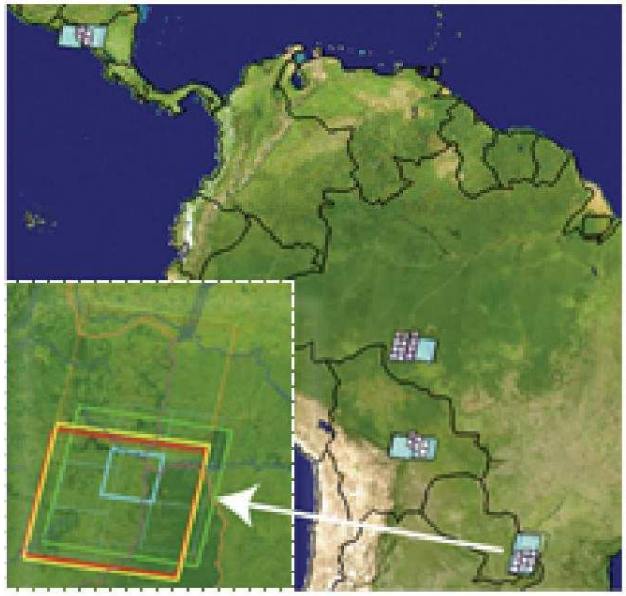
- Acidification
- Eutrophication
- Land cover alteration
- Fire
- Invasive species
- Coral bleaching
- Overfishing
- Illegal logging
- Pollution

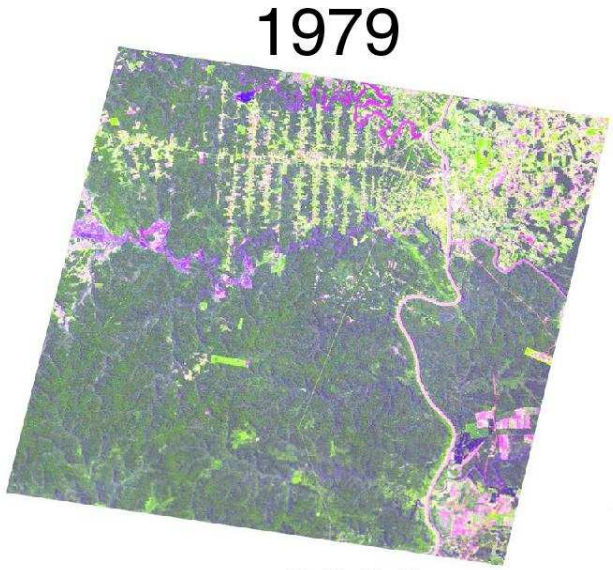
Discussion Questions

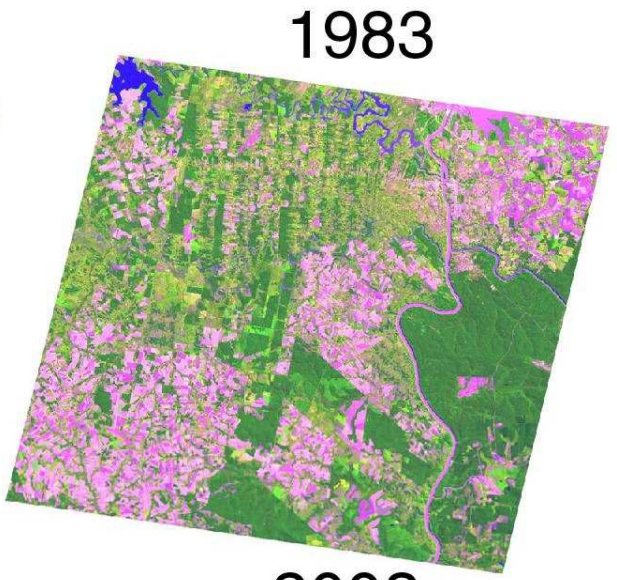
- To what extent are climate issues included in your national biodiversity and protected area threat assessments?

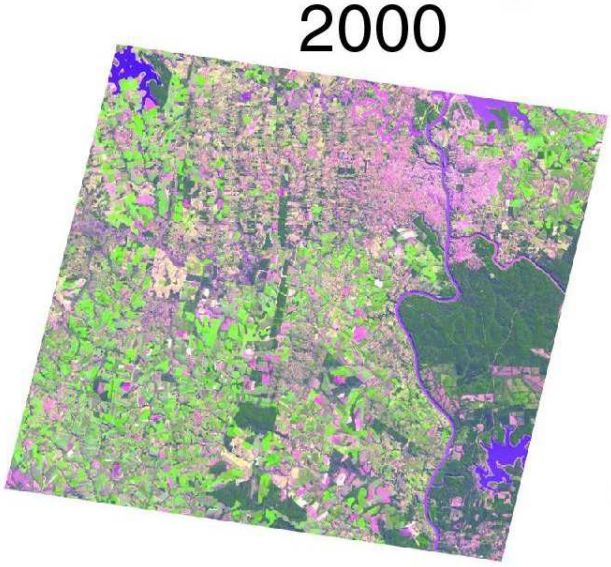
- What are some practical steps you could take to incorporate climate issues into national threat assessments?

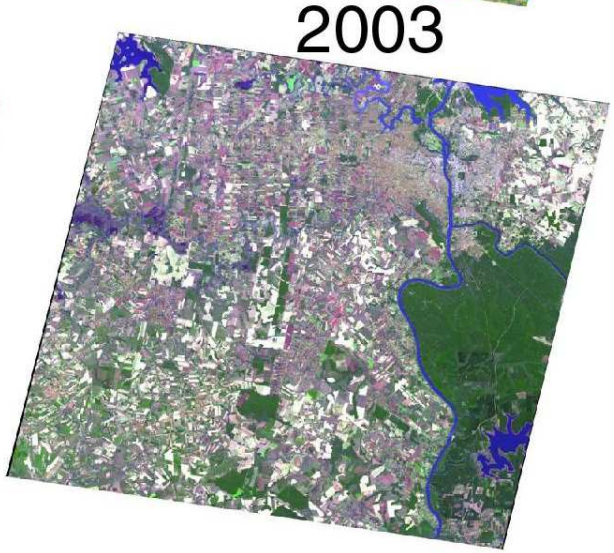
CONSEQUENCES OF NOT INTEGRATING PROTECTED AREAS



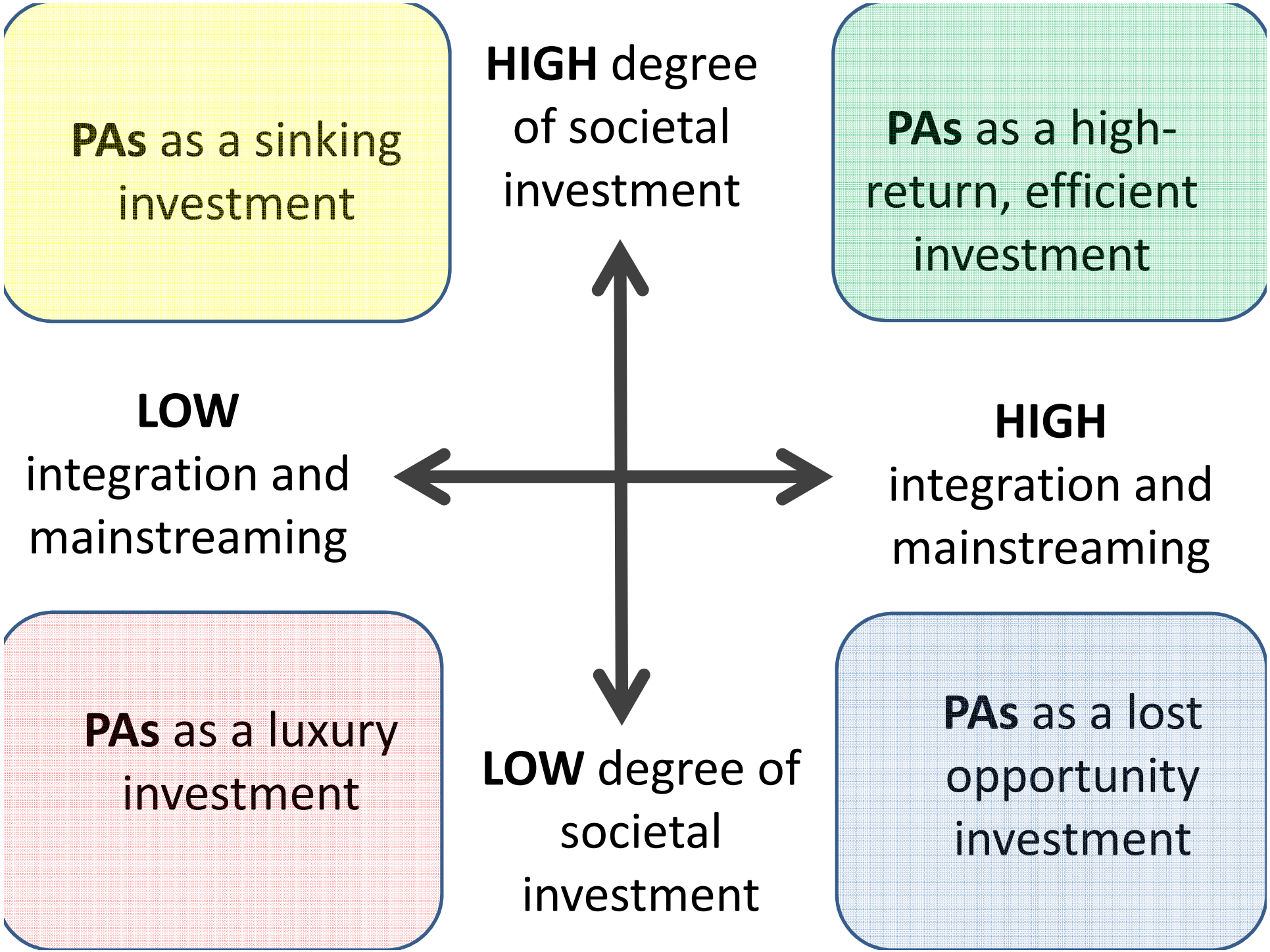








CONSEQUENCES OF NOT INTEGRATING PAS


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