



Fiji - October 3-7  
Jamison Ervin, UNDP

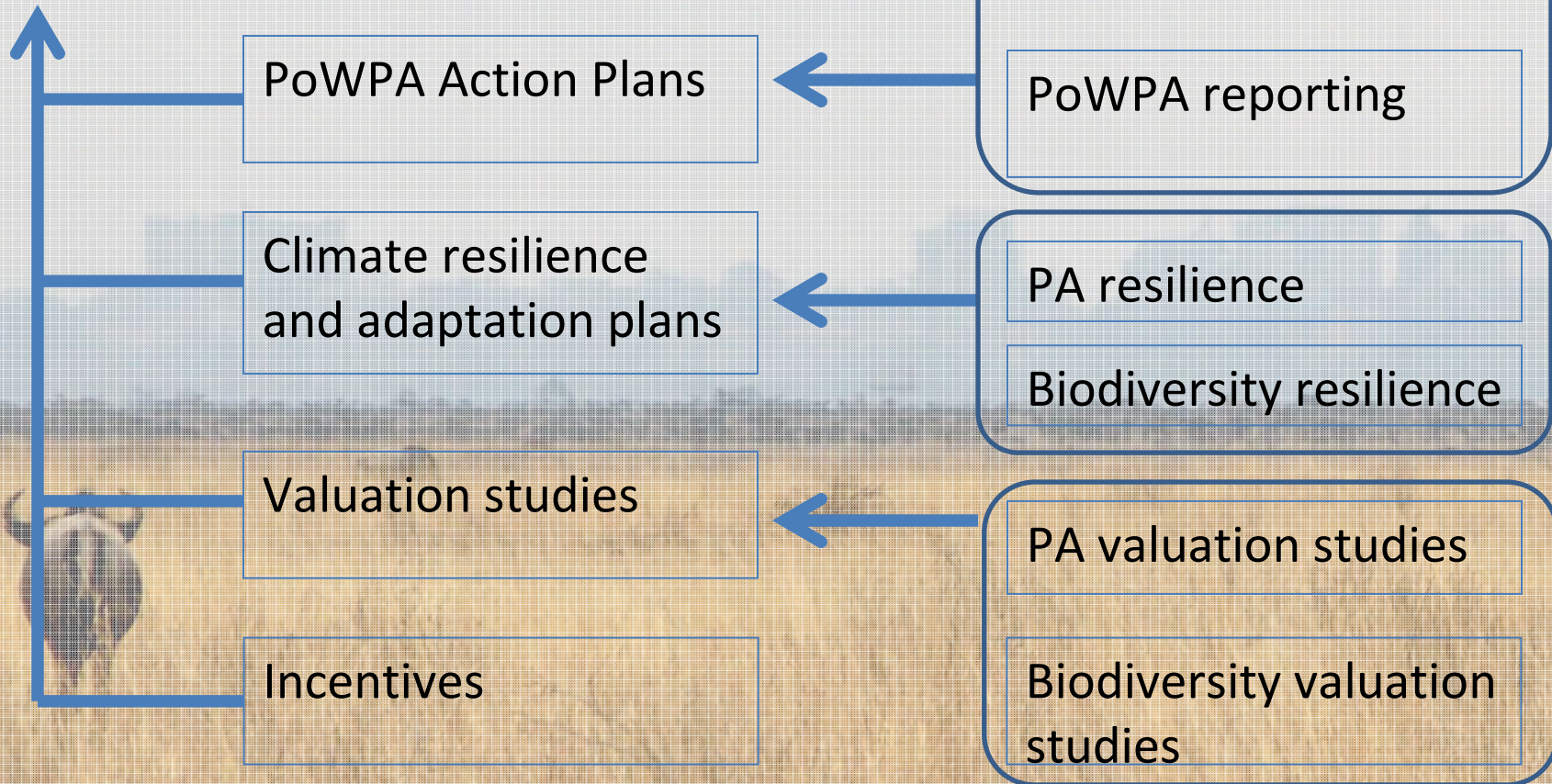
An aerial photograph showing a coastal town and a large body of water. The town is situated on a green, hilly landscape with numerous small buildings and roads. A large, dark blue body of water is visible on the right side of the image. The background features rolling hills and mountains under a cloudy sky. A semi-transparent blue banner is overlaid at the bottom of the image, containing white text.

# CLIMATE CHANGE ADAPTATION AND RESILIENCE THROUGH PROTECTED AREA INTEGRATION AND MAINSTREAMING





## NBSAPs













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...”

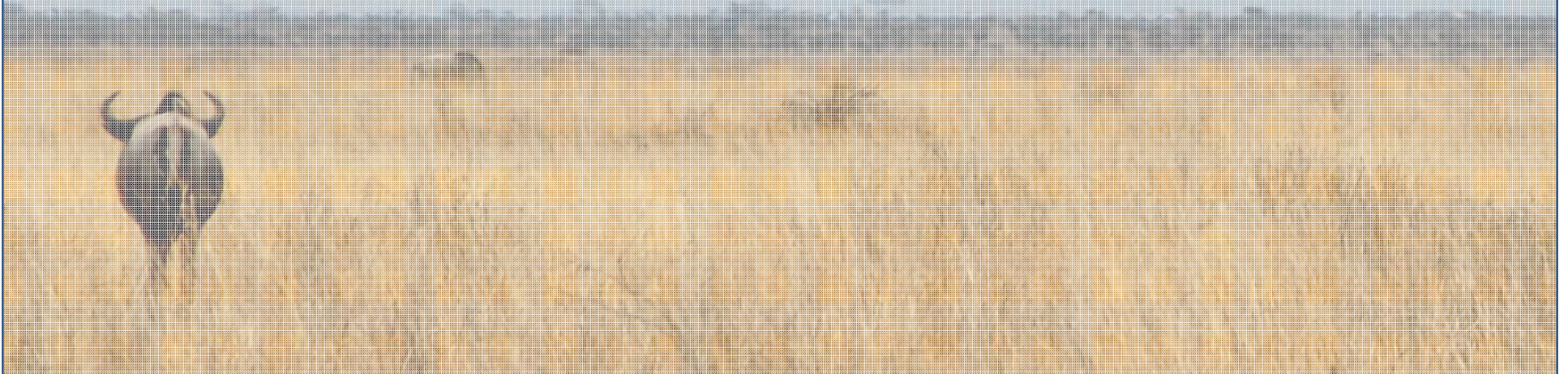
“...at least 17% of terrestrial and inland water, and 10% of coastal and marine areas....are **well connected systems** of protected areas and...**integrated into the wider landscapes and seascapes.**”

“....**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**”





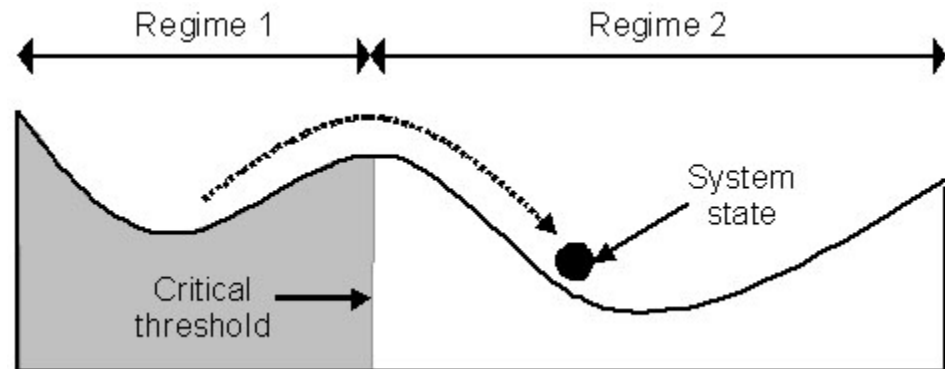
# Evolution in protected area thinking

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



# Key Concepts

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



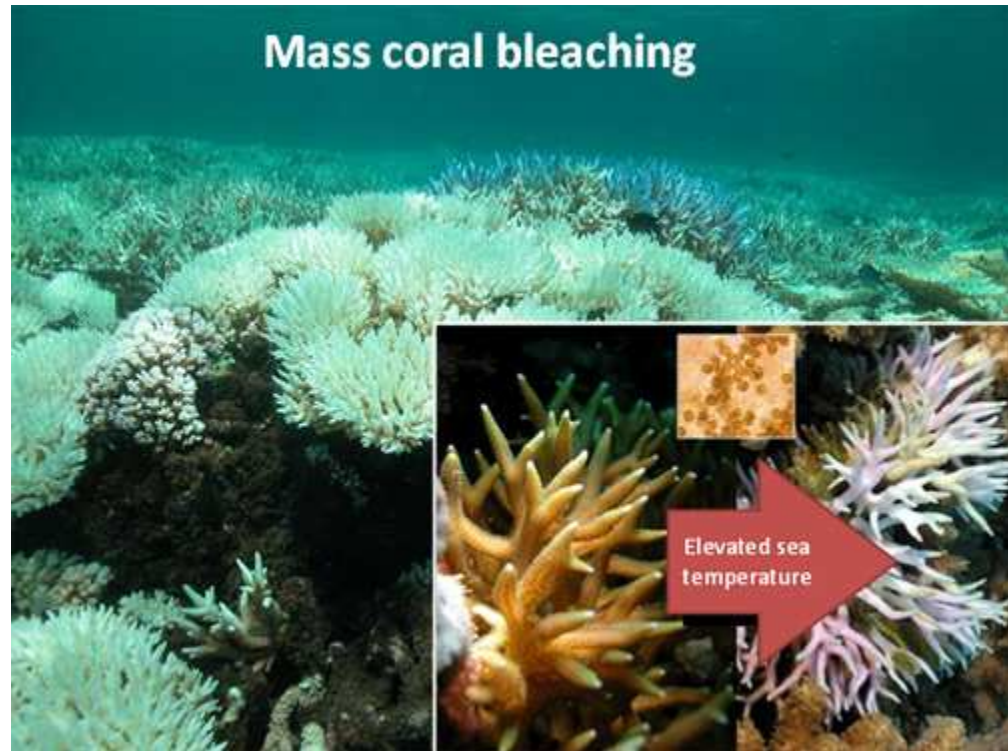
“...large, persistent changes in the structure and function of ecological systems”

[www.regimeshifts.org](http://www.regimeshifts.org)



# Key Concepts

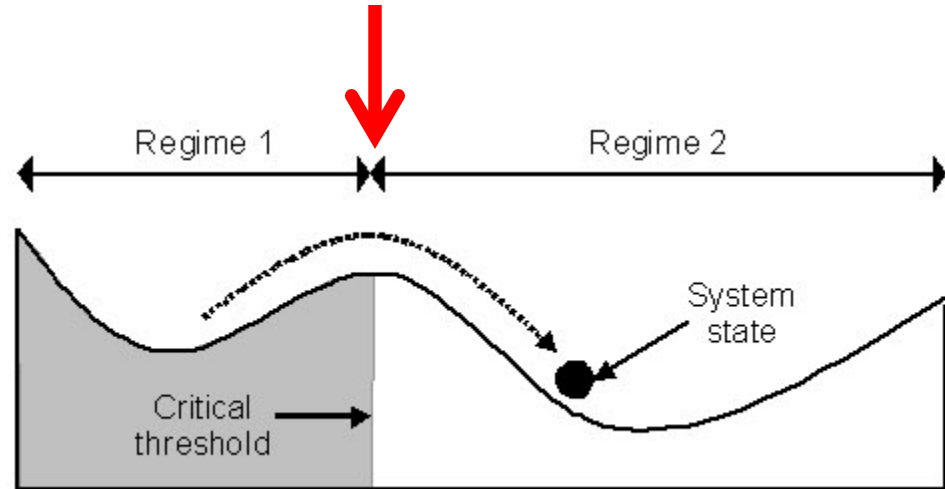
- **Regime shift**
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[www.regimeshifts.org](http://www.regimeshifts.org)

# 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

## Definition

- Tipping point

- **Resilience**

“...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”

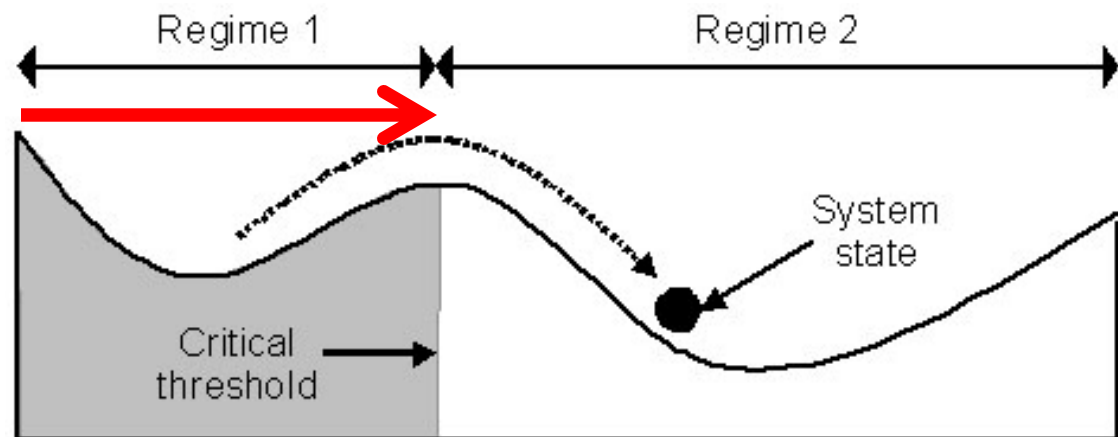
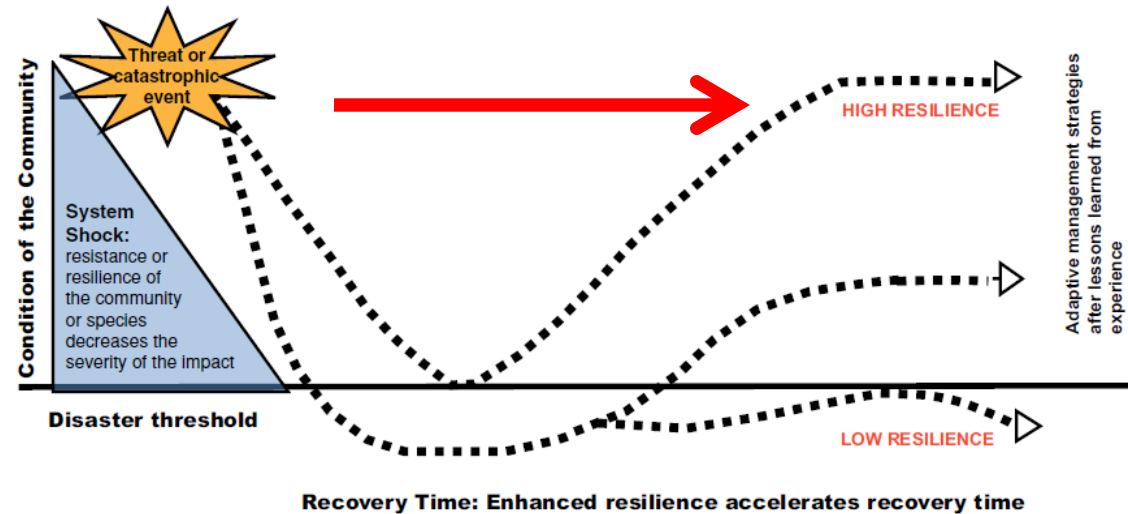
- Adaptation

- Mitigation

[www.reefresilience.org](http://www.reefresilience.org)

# Key Concepts

- Regime shift
- Tipping point
- **Resilience**
- Adaptation
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# Key Concepts

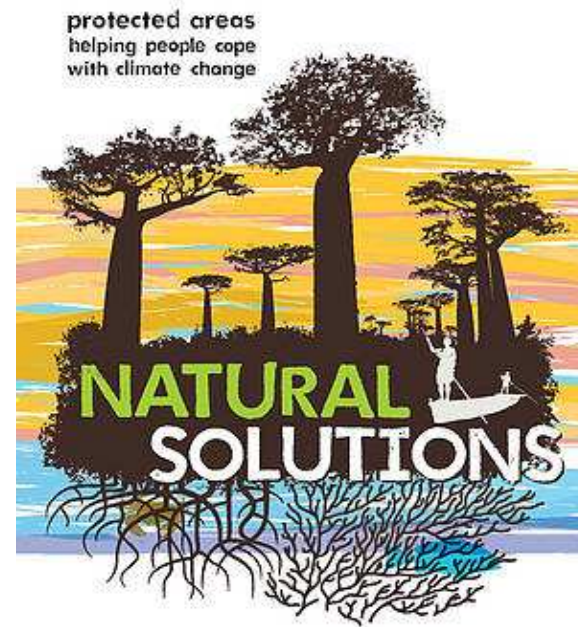
- Regime shift
- Tipping point
- Resilience
- **Adaptation**
- Mitigation



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

# Key Concepts

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



- Preface by Lord Nicholas Stern
- **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...

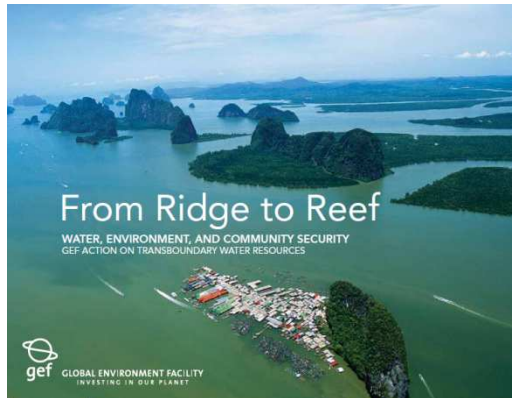
# **CLIMATE RESILIENCE THROUGH PA INTEGRATION AND MAINSTREAMING**

- 1. Spatial integration**
2. Sectoral integration





# Resilience through PA spatial integration



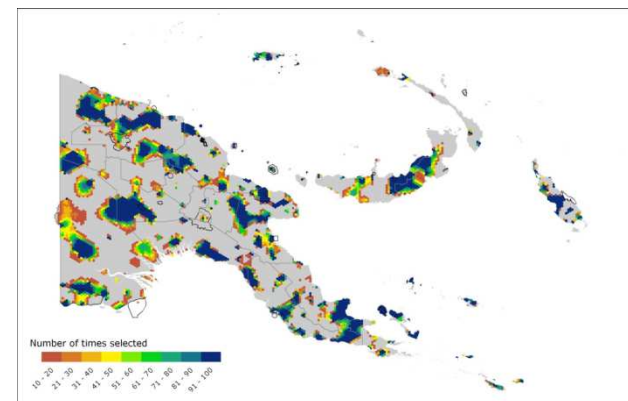
Ridge to Reef Approach



Transboundary areas

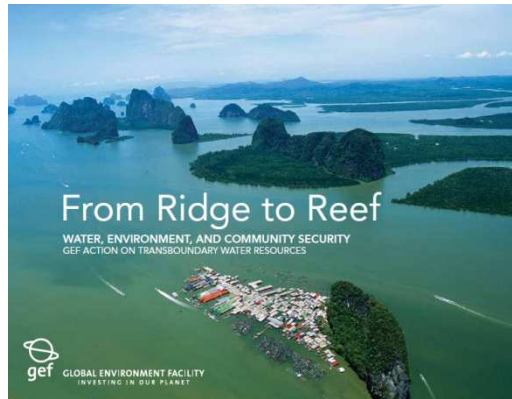


Regional networks



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



## Ridges to Reefs Conservation Plan for Choiseul Province, Solomon Islands



Geoff Lipsett-Moore, Richard Hamilton, Nate Peterson, Edward Game, Willie Atu, Jimmy Kereseka, John Pita, Peter Ramohia and Catherine Siota



# 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



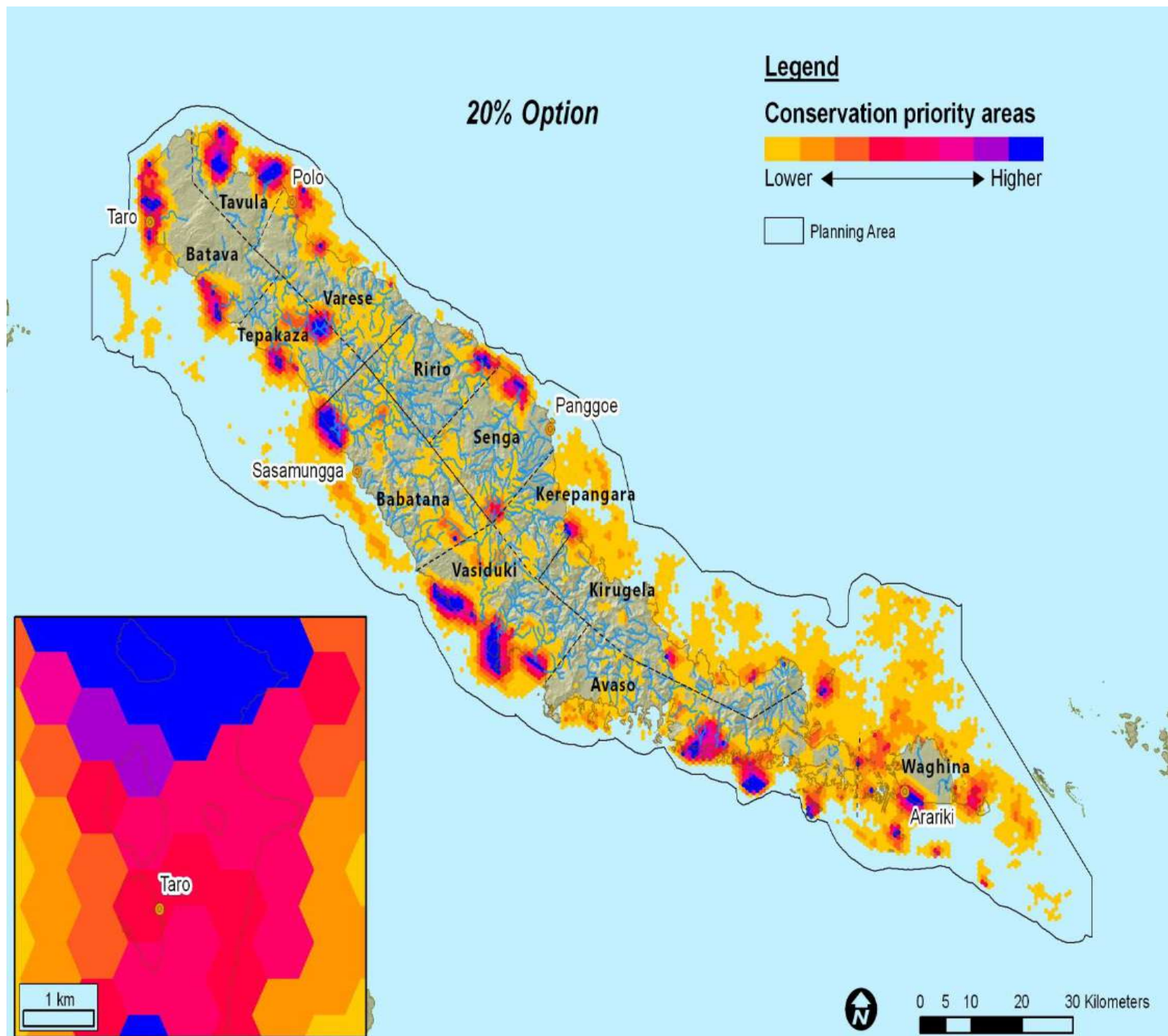


# Elements of a Ridge to Reef Approach

- 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





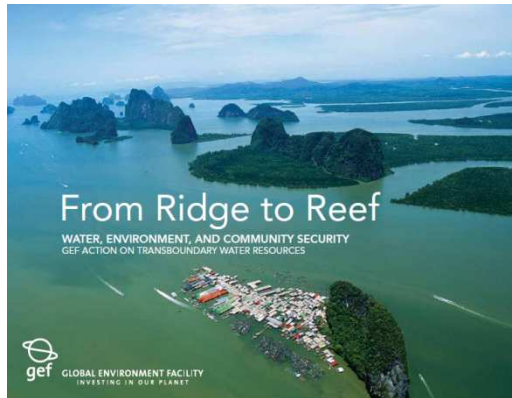




# Discussion Questions

- 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



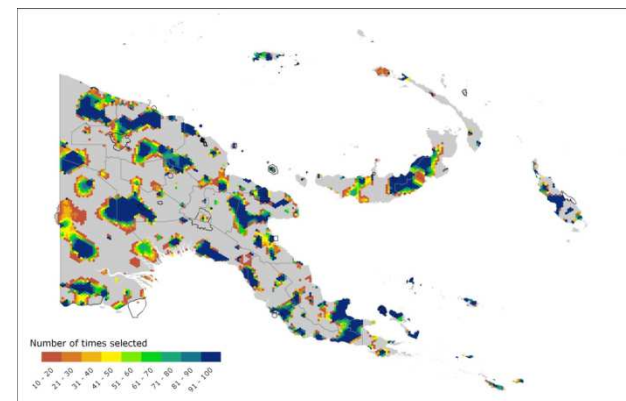
Ridge to Reef



Transboundary areas



Regional networks



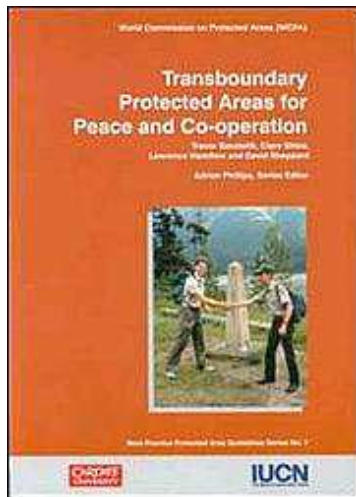
Improved gap assessments



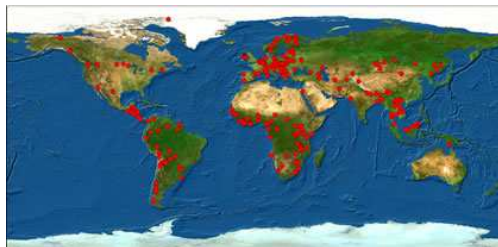
# Transboundary MPAs



# 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



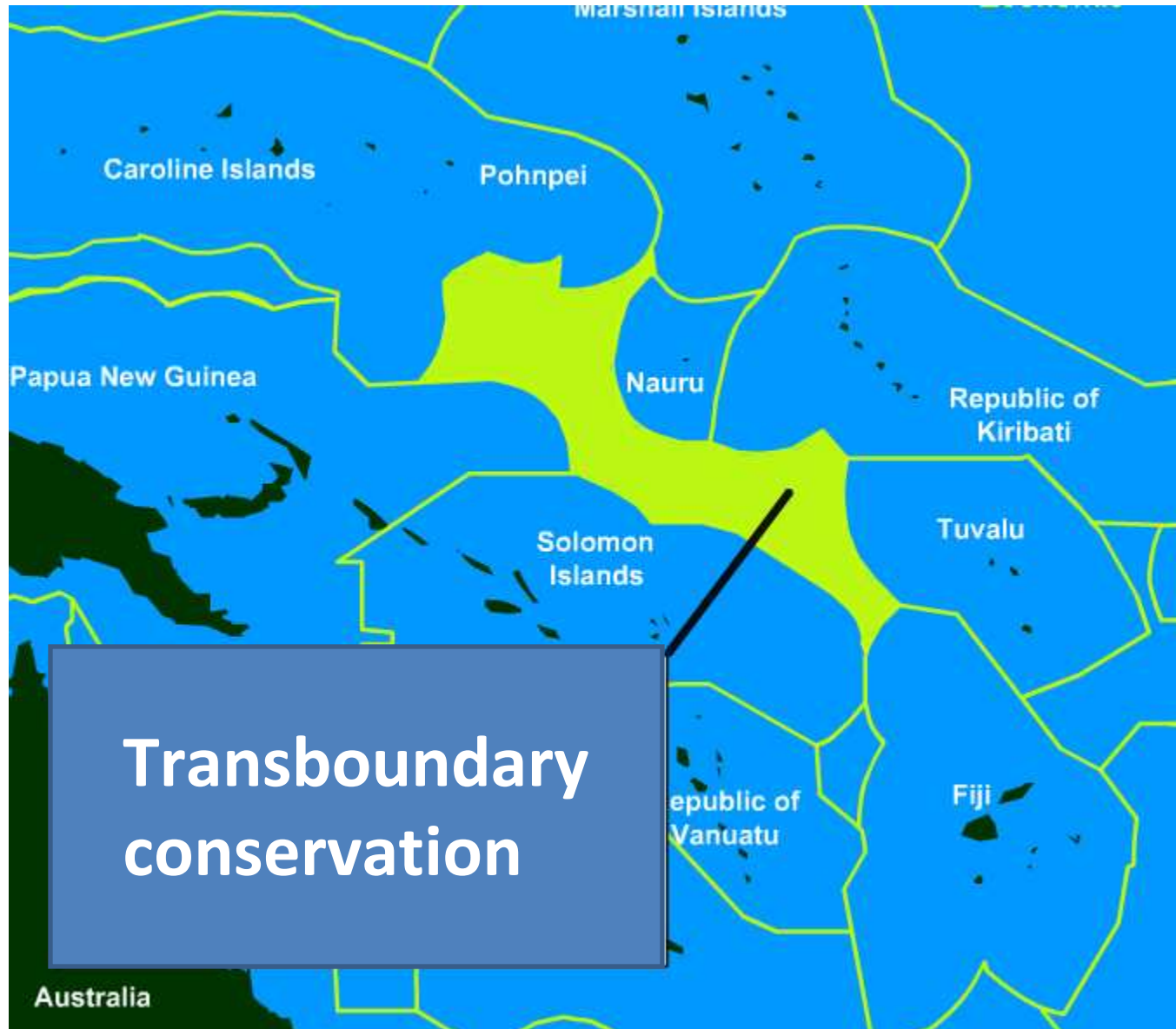


# Strategies that improved climate resilience



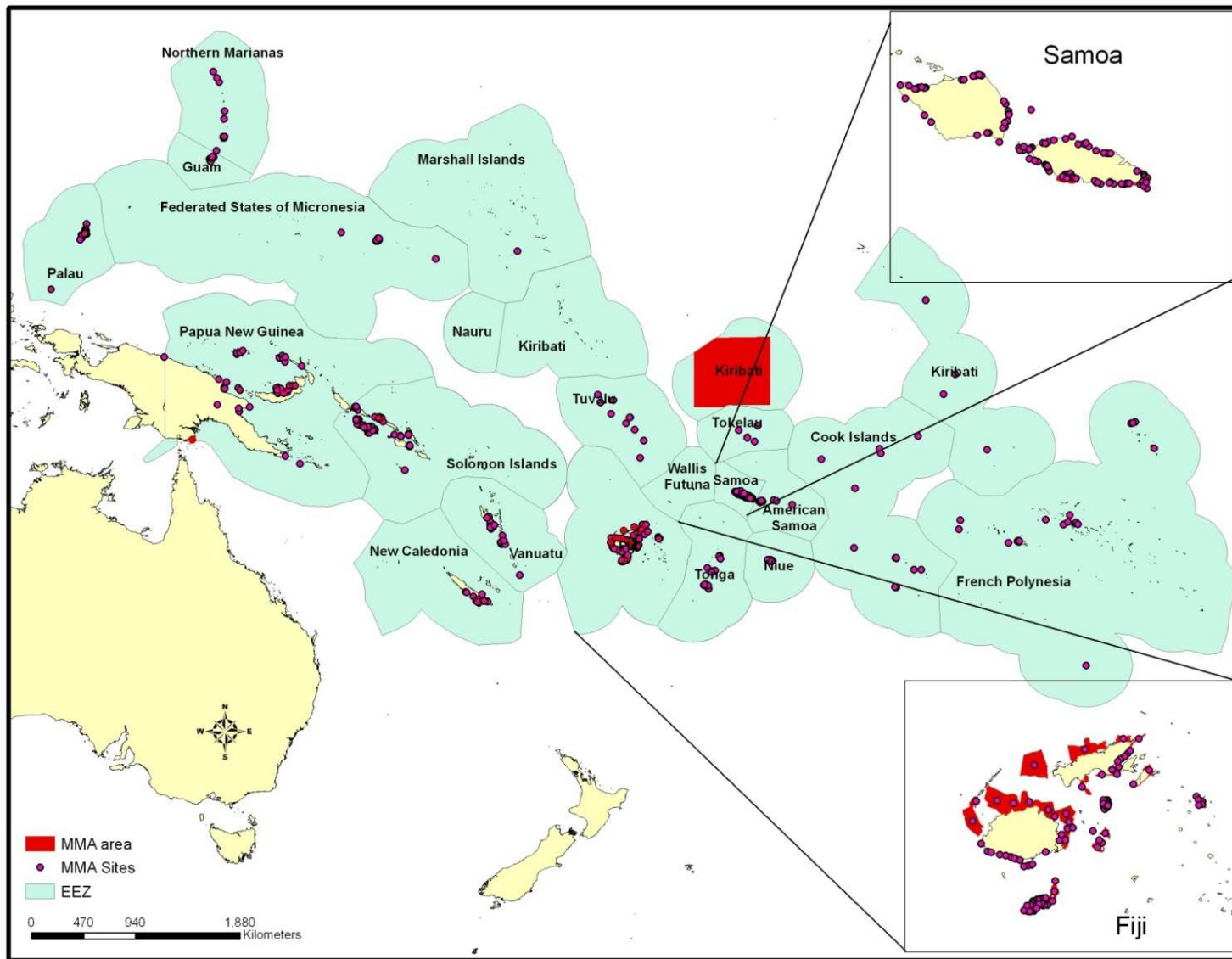
- Conducted region-wide **climate vulnerability assessments**
- Documented and shared data on **species migration, range and habitat shifts**
- Identified pockets of **resistance** and **climate refugia** (e.g., to coral bleaching) and **large intact areas** at a transboundary scale
- Developed plans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

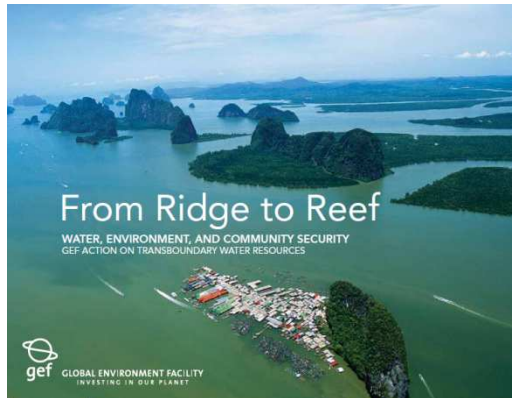


# Discussion Questions

- 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



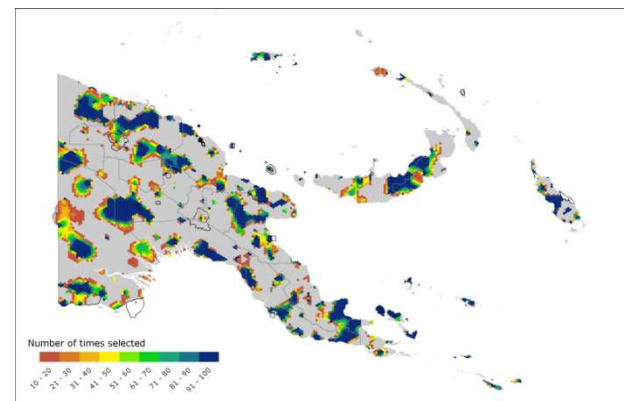
Ridge to Reef



Transboundary areas

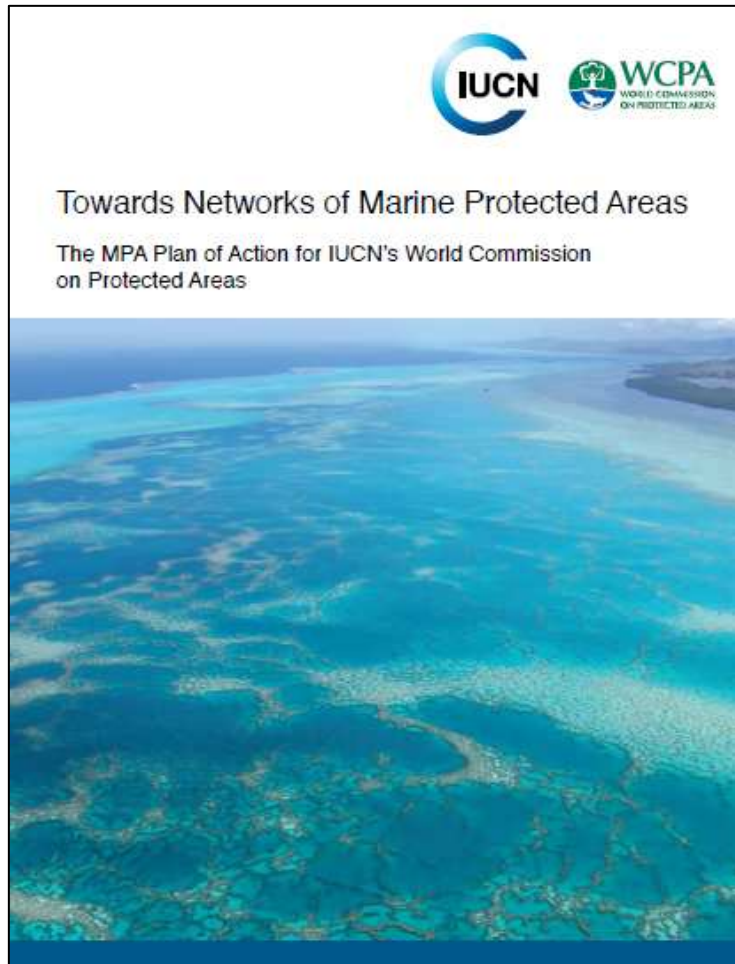


Regional networks



Improved gap assessments

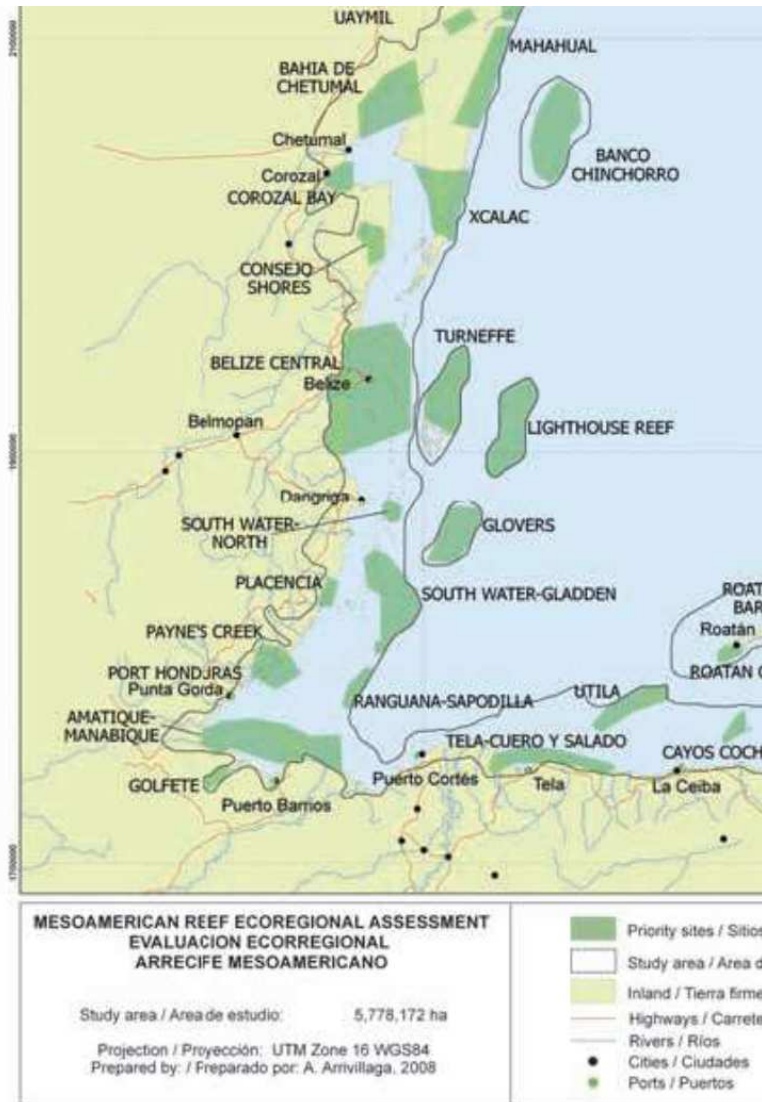
# Regional MPA Networks



“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

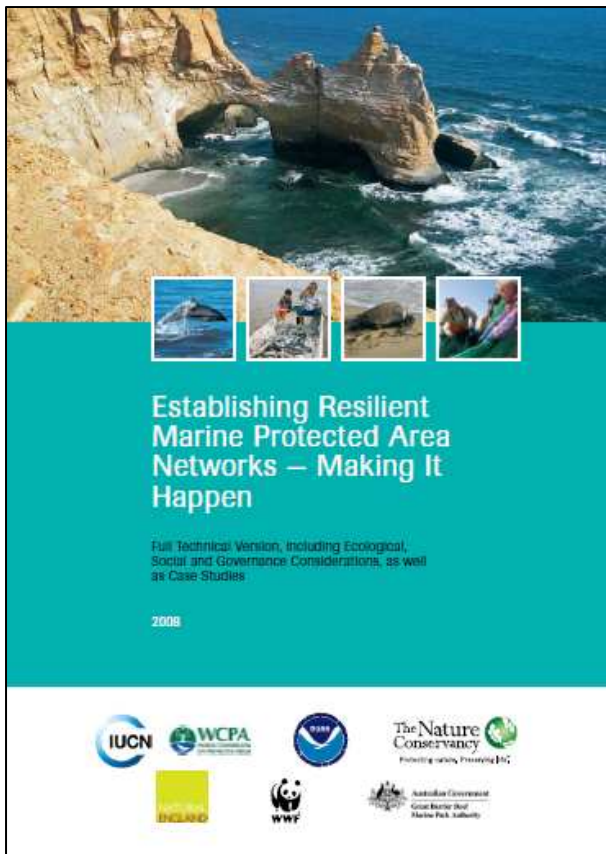


# Examples of Regional MPA Networks



- 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

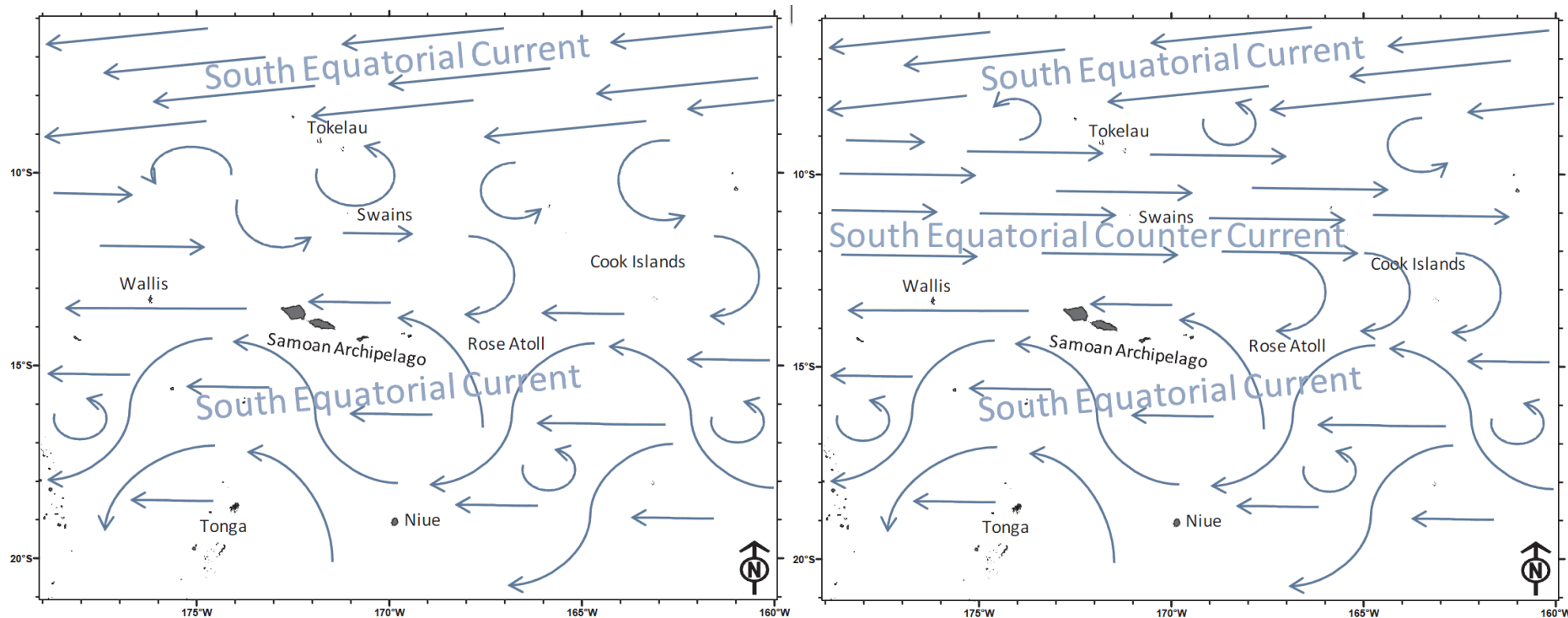
# Incorporating resilience principles into MPA network design:



- 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



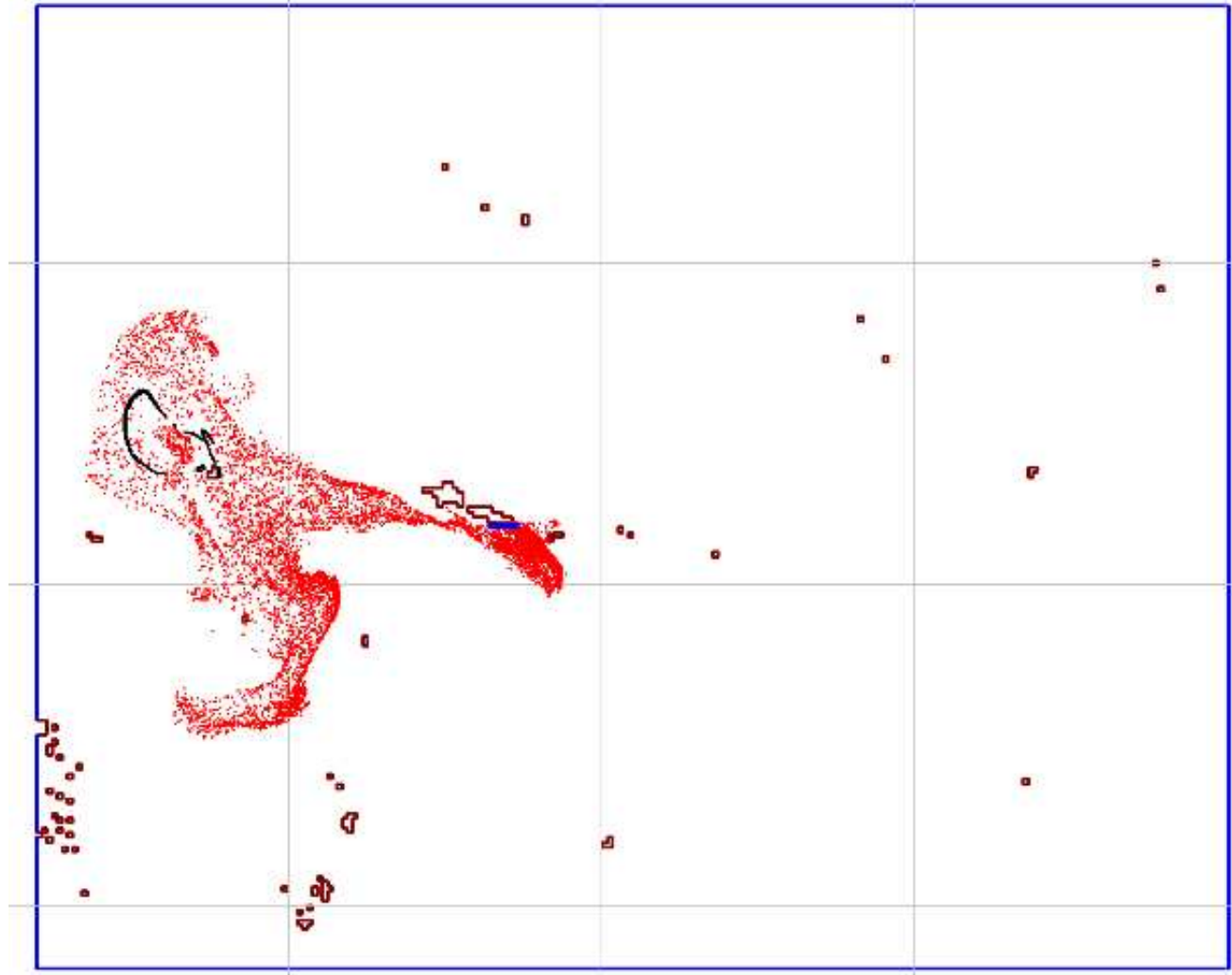
## A BIOGEOGRAPHIC ASSESSMENT OF THE SAMOAN ARCHIPELAGO

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





Thailand

# Migratory paths: from Khram Island

Cambodia

Vietnam

Malaysia

Indonesia



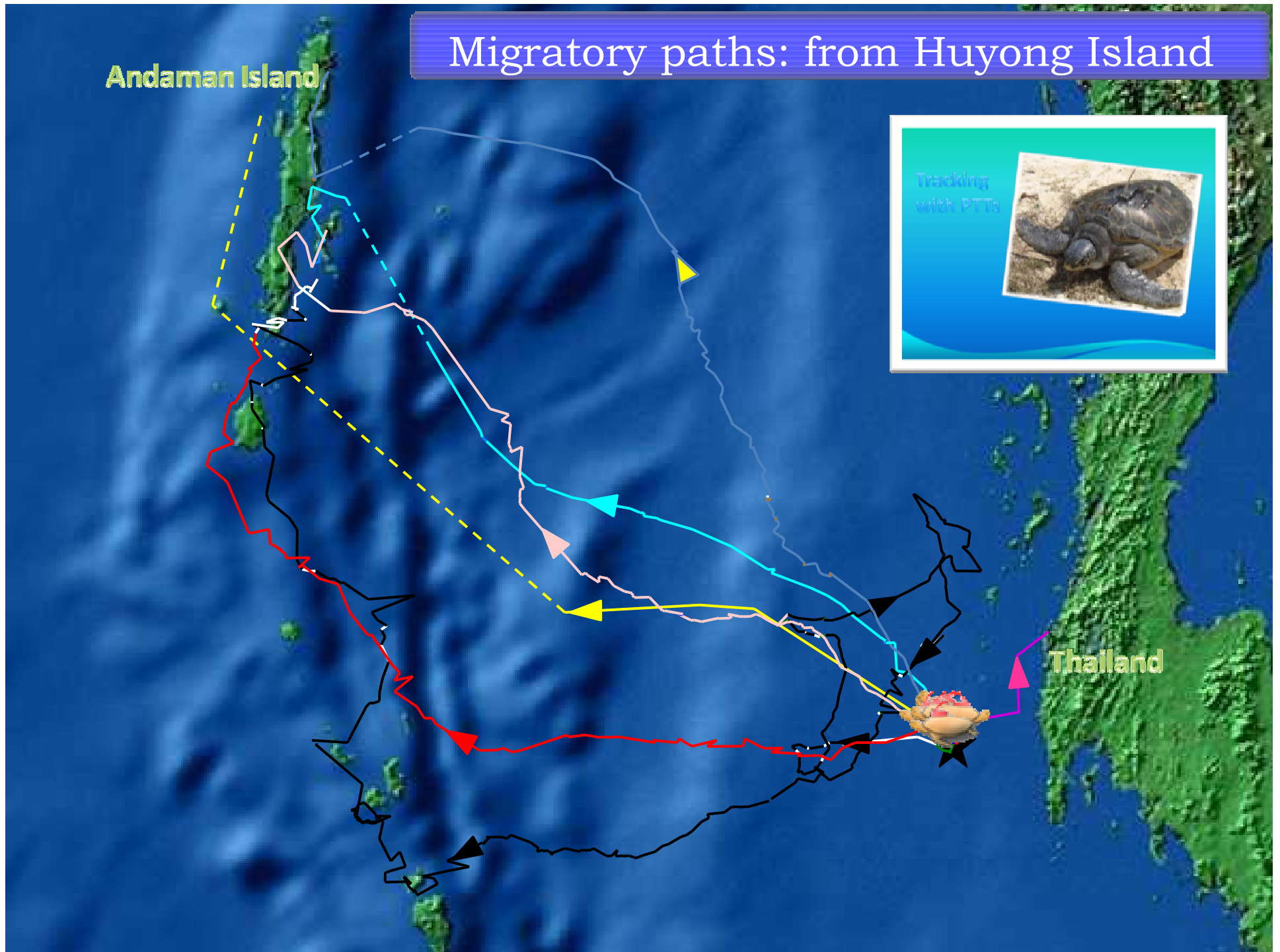
# Migratory paths: from Huyong Island

Andaman Island

Tracking  
with PTTs



Thailand



# 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:

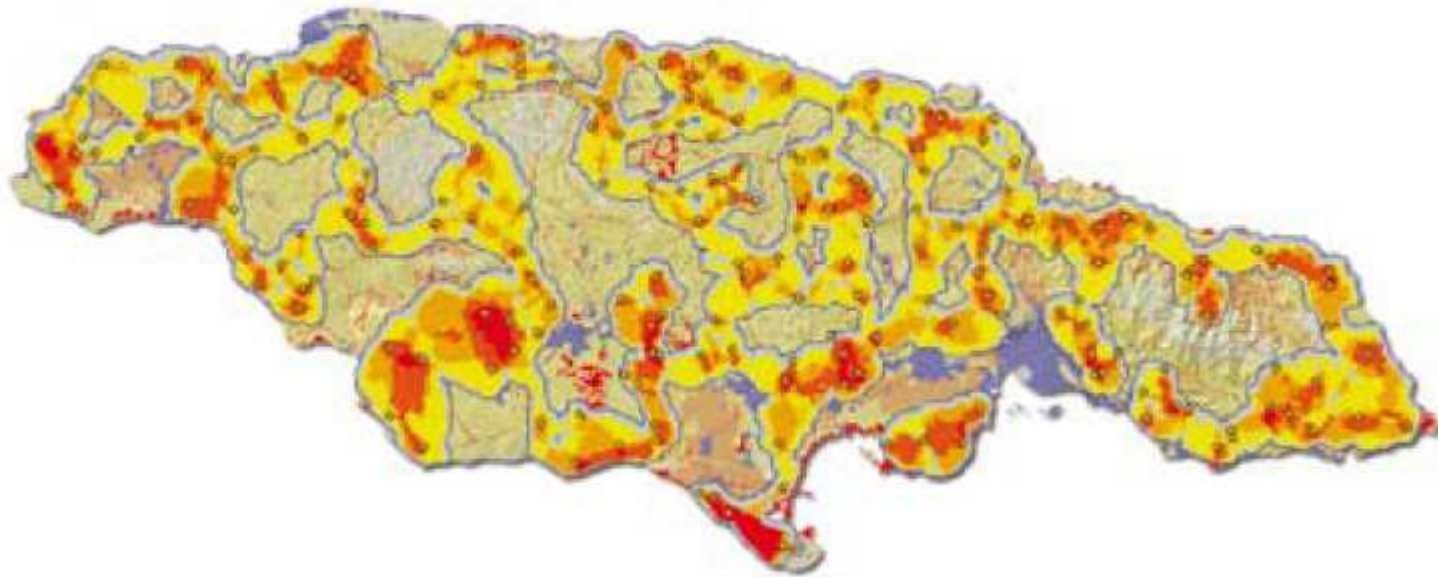
- Buffer human communities from **natural disasters**
- Protect areas important for **food security**
- Protect **water resources**
- Sustain **livelihoods**

# Incorporating resilience principles into MPA network design: California



- Minimum size of MPA is 25 km<sup>2</sup>; optimal is 45 – 100 km<sup>2</sup>
- 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

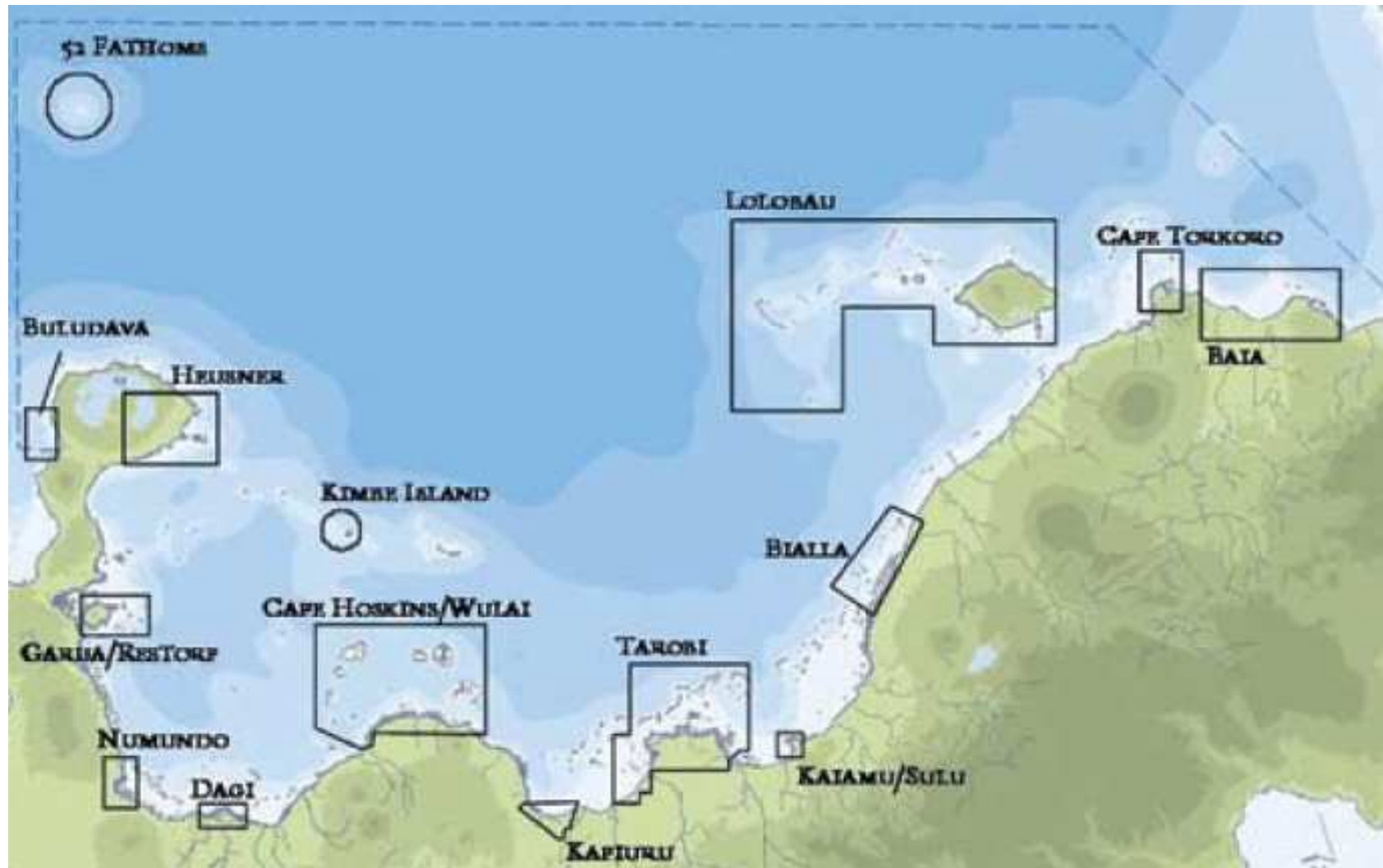
# Improving connectivity to promote climate resilience: Jamaica



- 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**

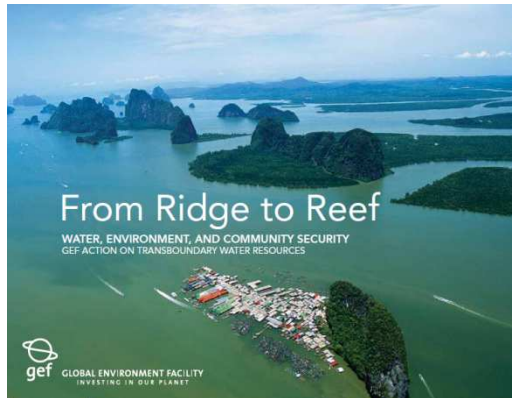
- Used entire ecological units (e.g., whole offshore reefs, seamounts) and large buffers

# 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



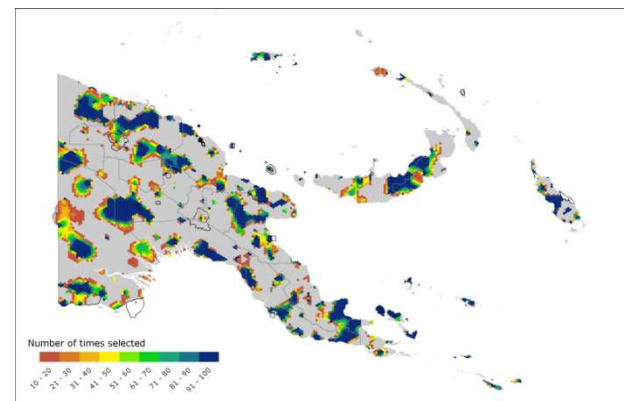
Ridge to Reef



Transboundary areas

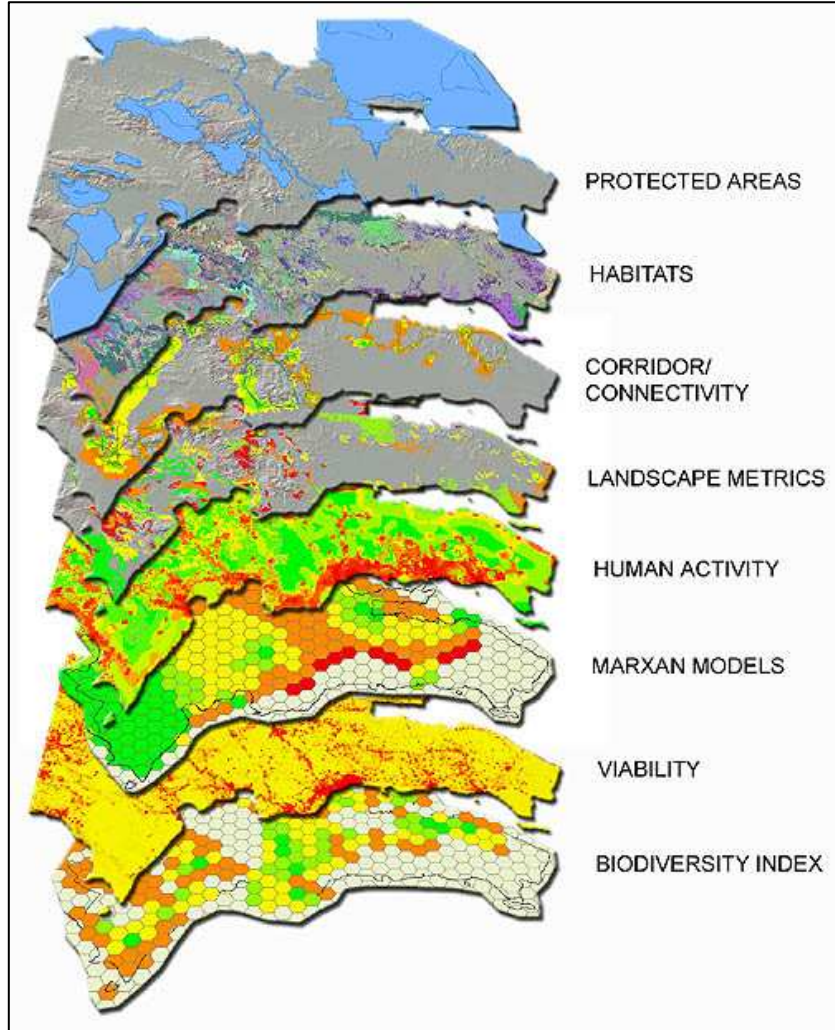


Regional networks



Improved gap assessments

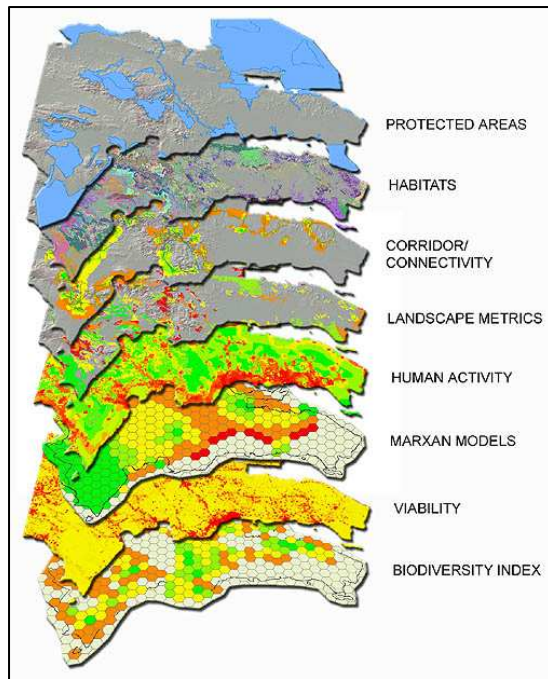
# Incorporating resilience principles into gap assessments:



## GAP ASSESSMENT:

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

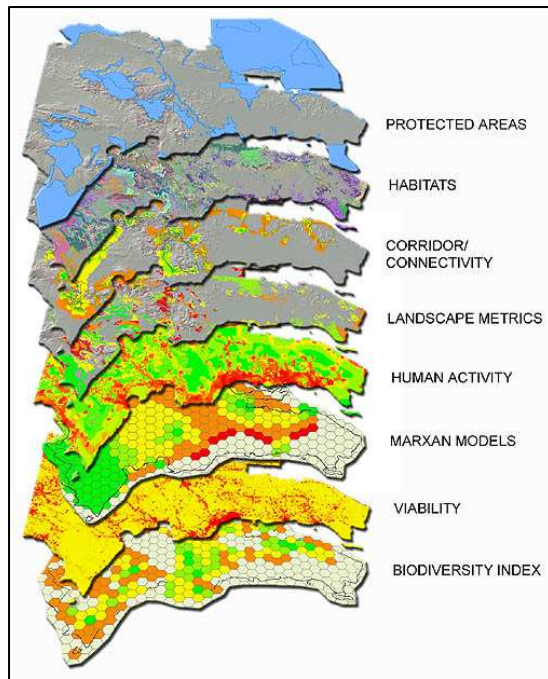
# Incorporating resilience principles into gap assessments:



- 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 predictive **climate modeling** into gap assessment

# Climate Change in Pacific Islands

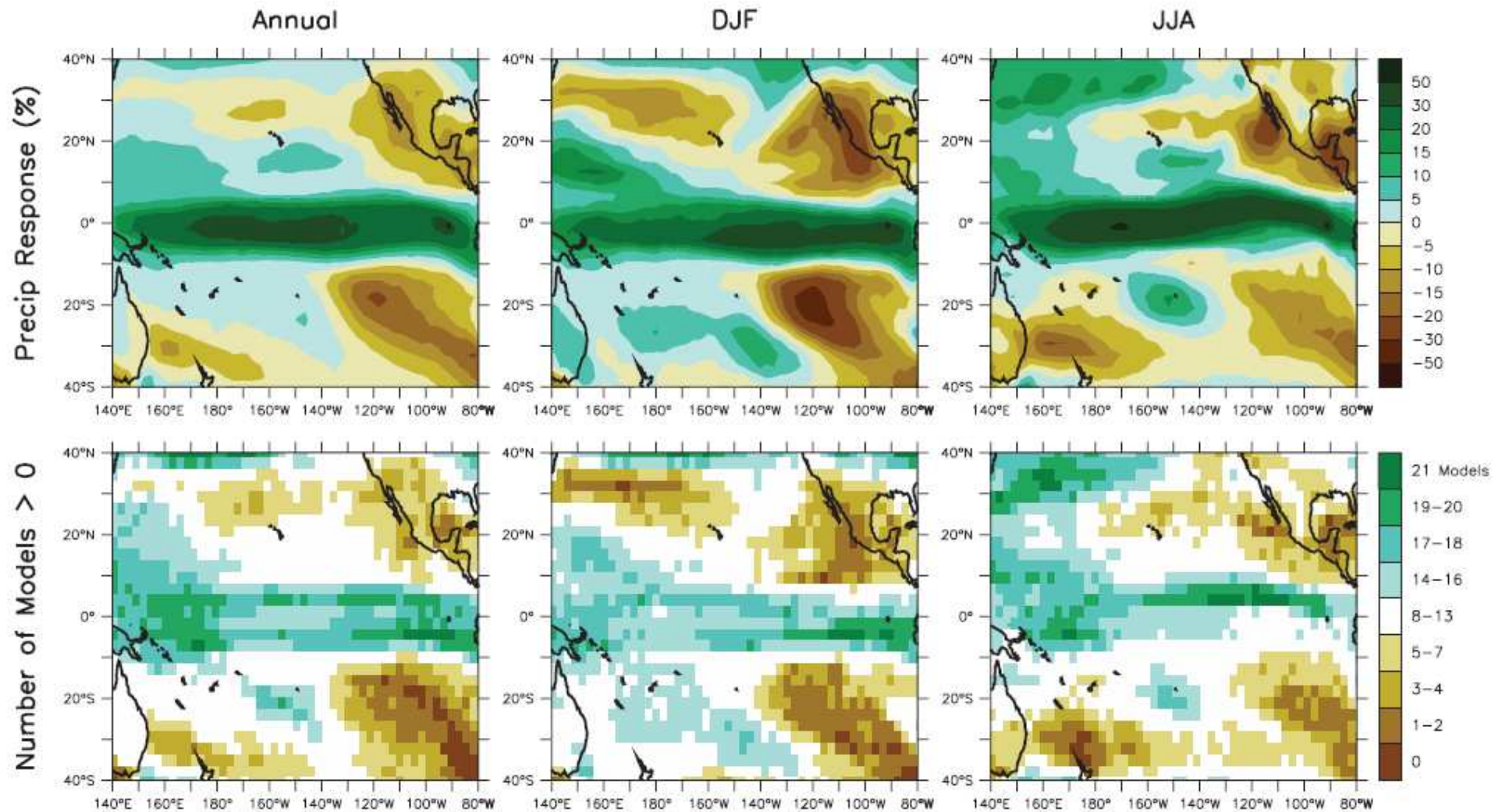
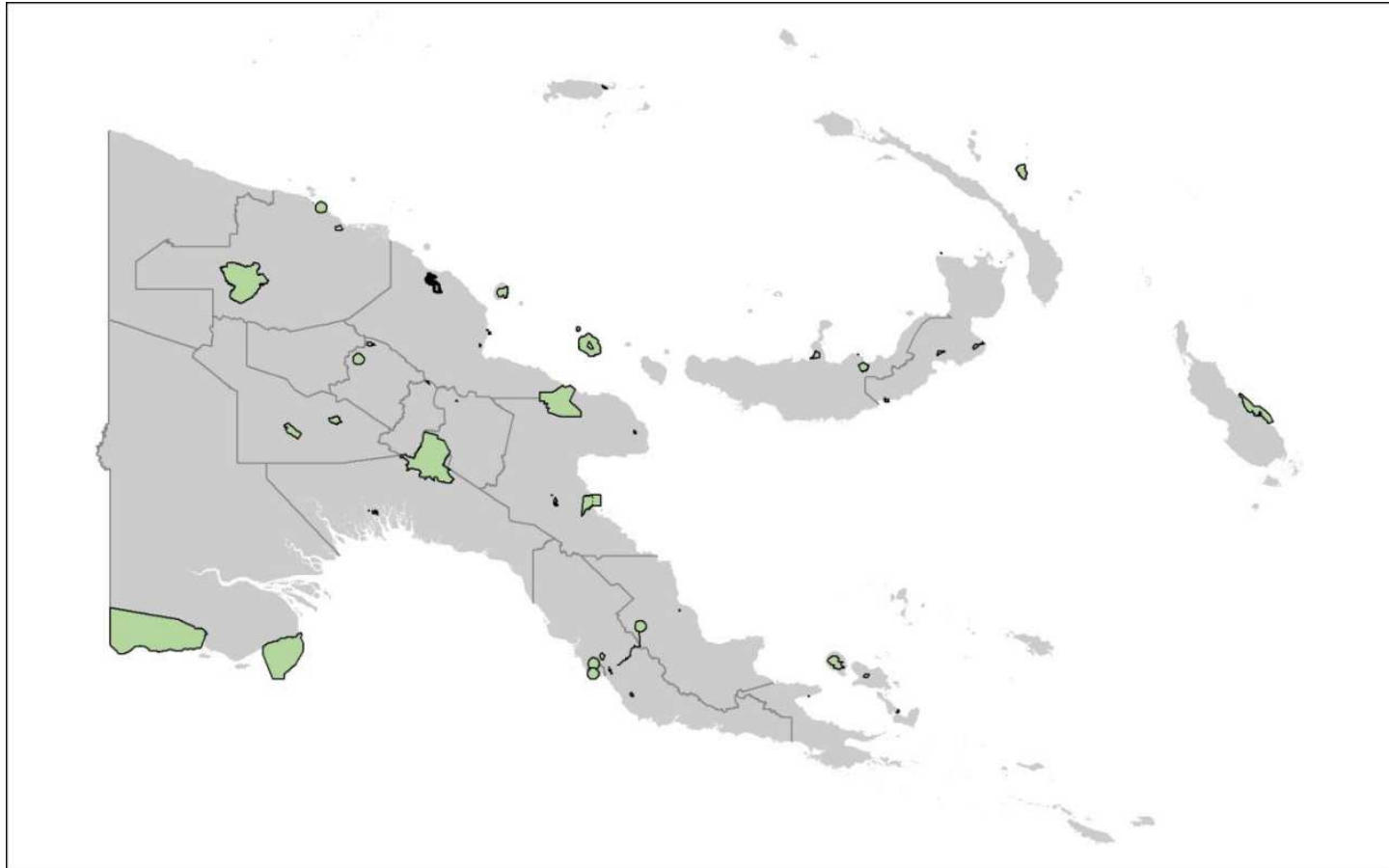


Figure 11.23. Precipitation changes over the Pacific Ocean.

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.

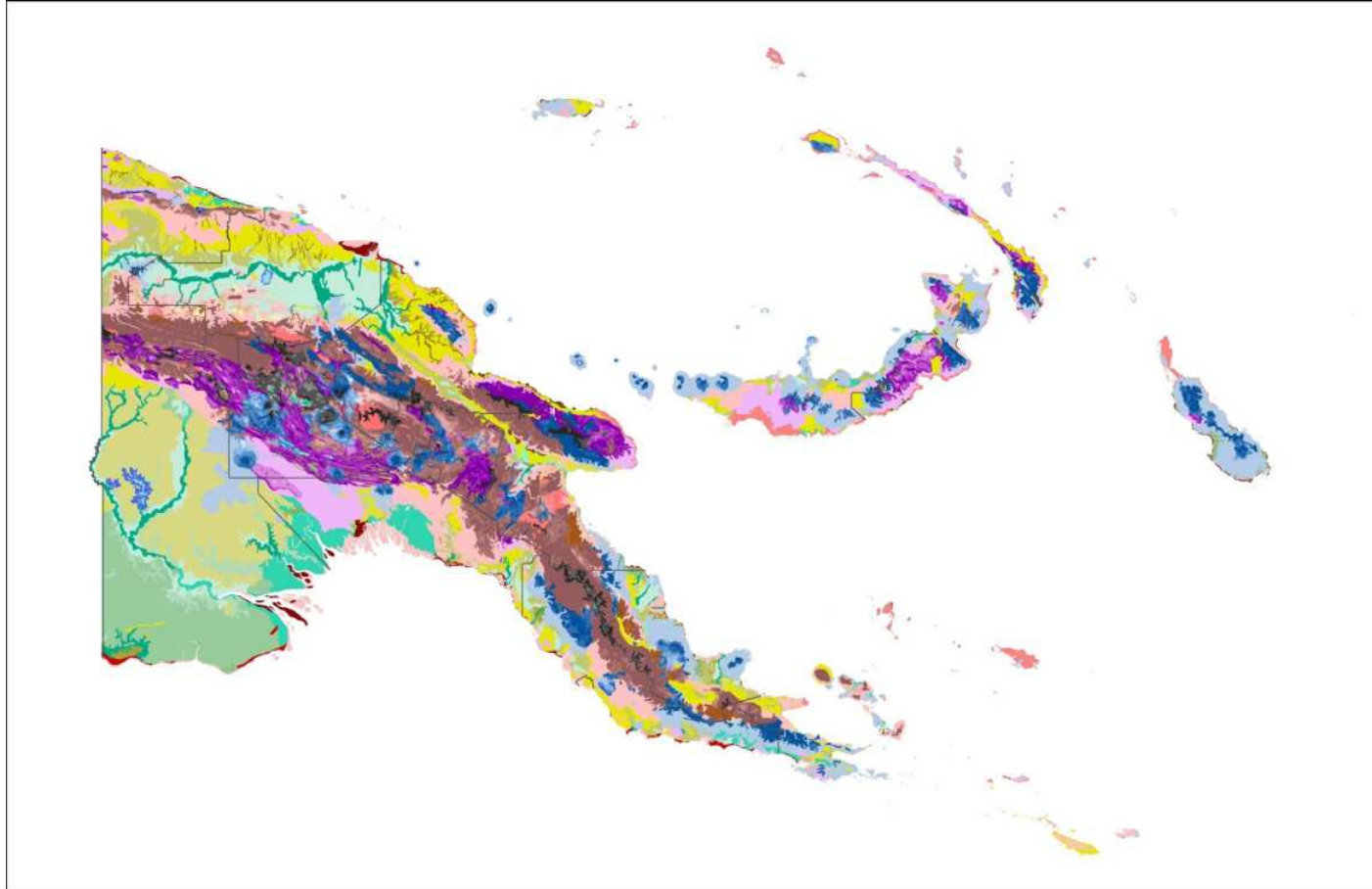
# Climate-Ready Ecological Gap Assessment in Papua New Guinea



Existing protected areas

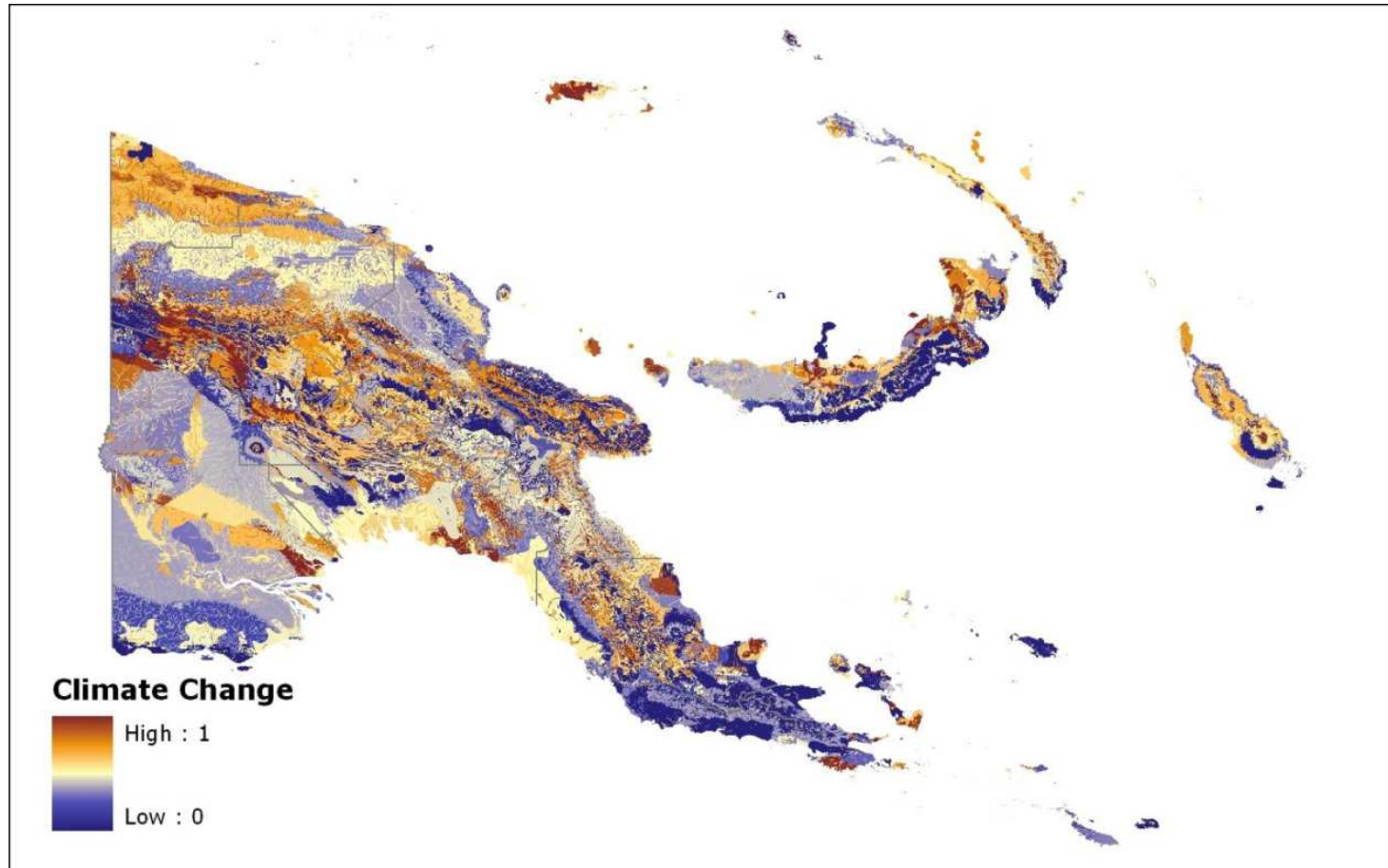


# Climate-Ready Ecological Gap Assessment in Papua New Guinea



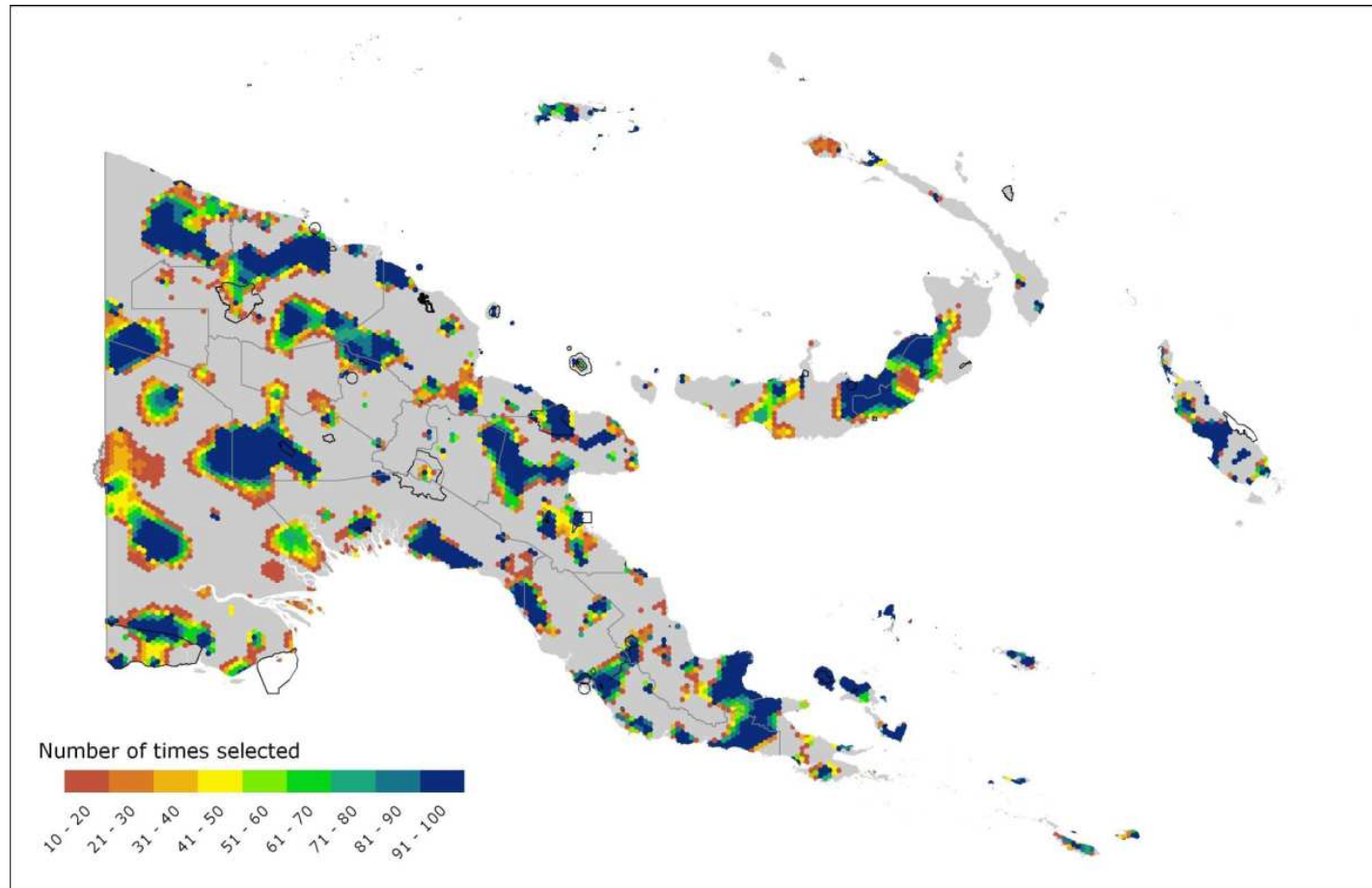
Land systems

# Climate-Ready Ecological Gap Assessment in Papua New Guinea



Climate impacts

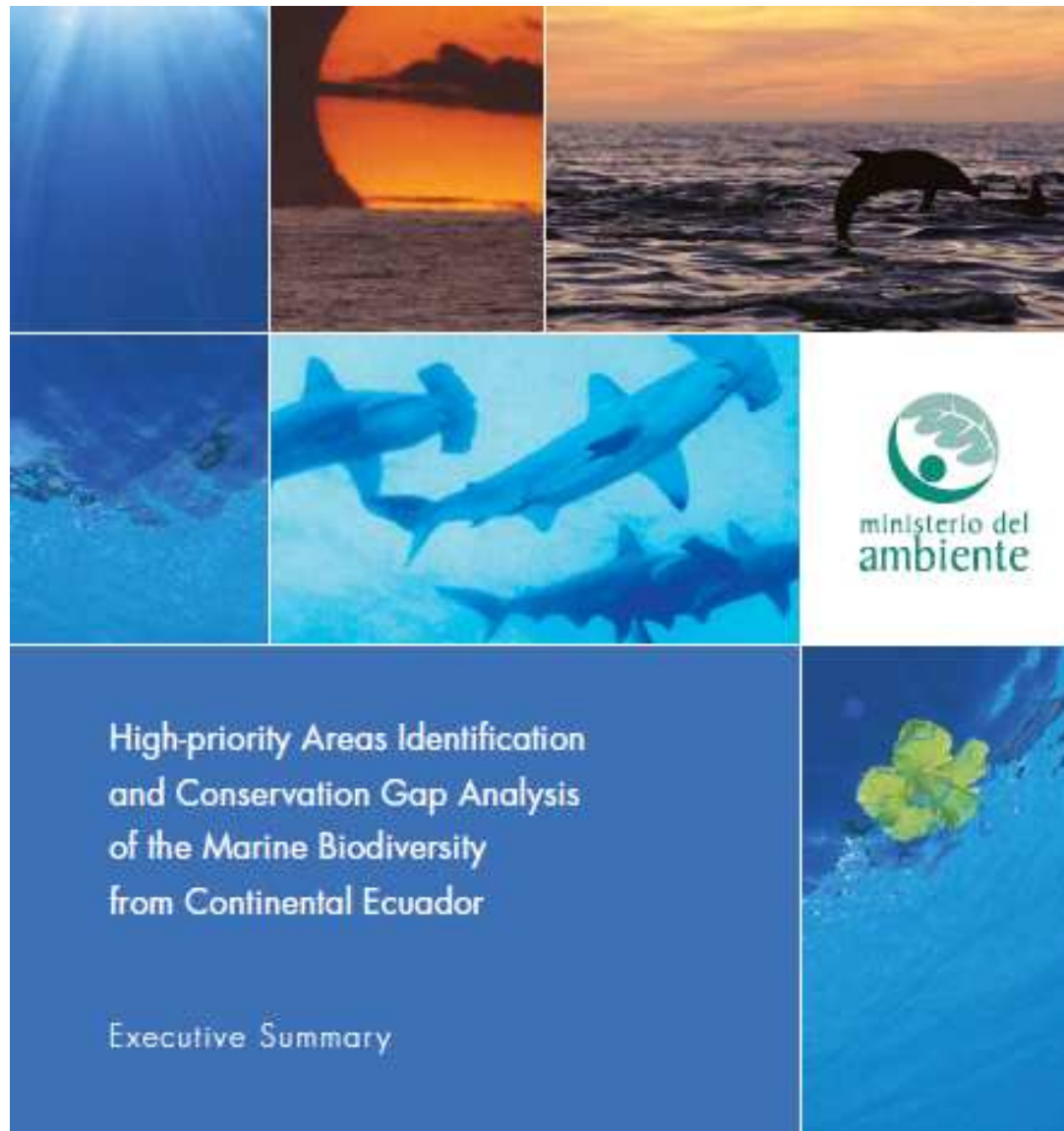
# Climate-Ready Ecological Gap Assessment in Papua New Guinea



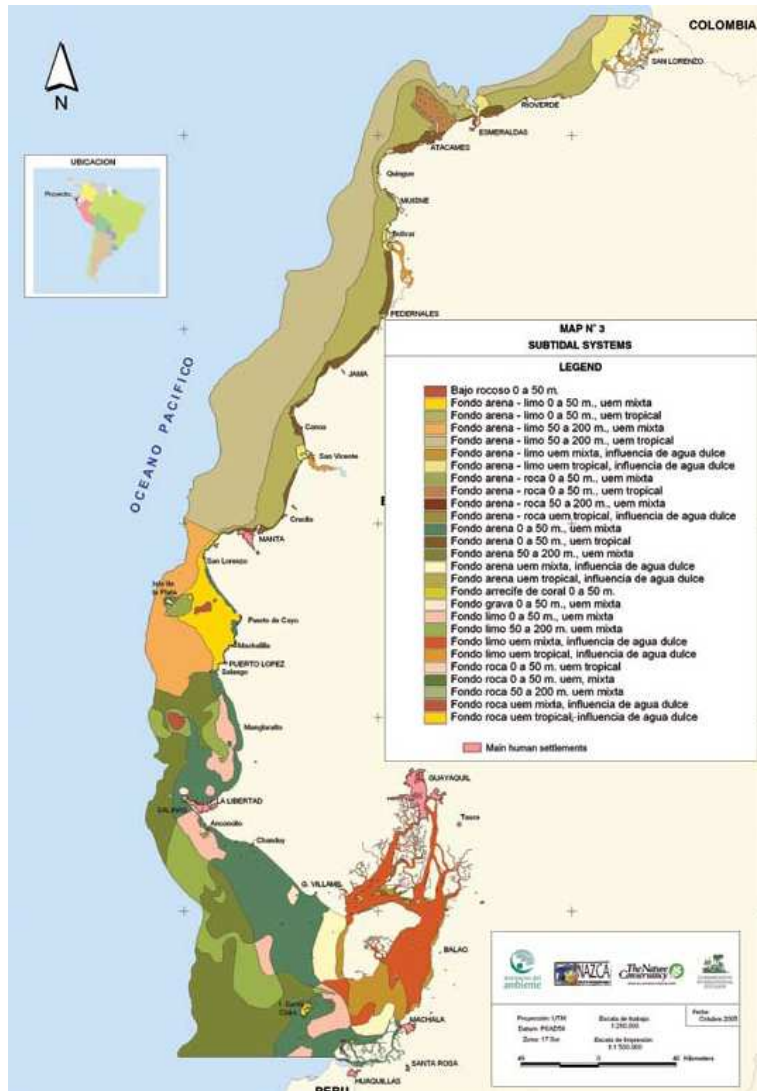
Resulting analysis of climate-ready gap assessment



# 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



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

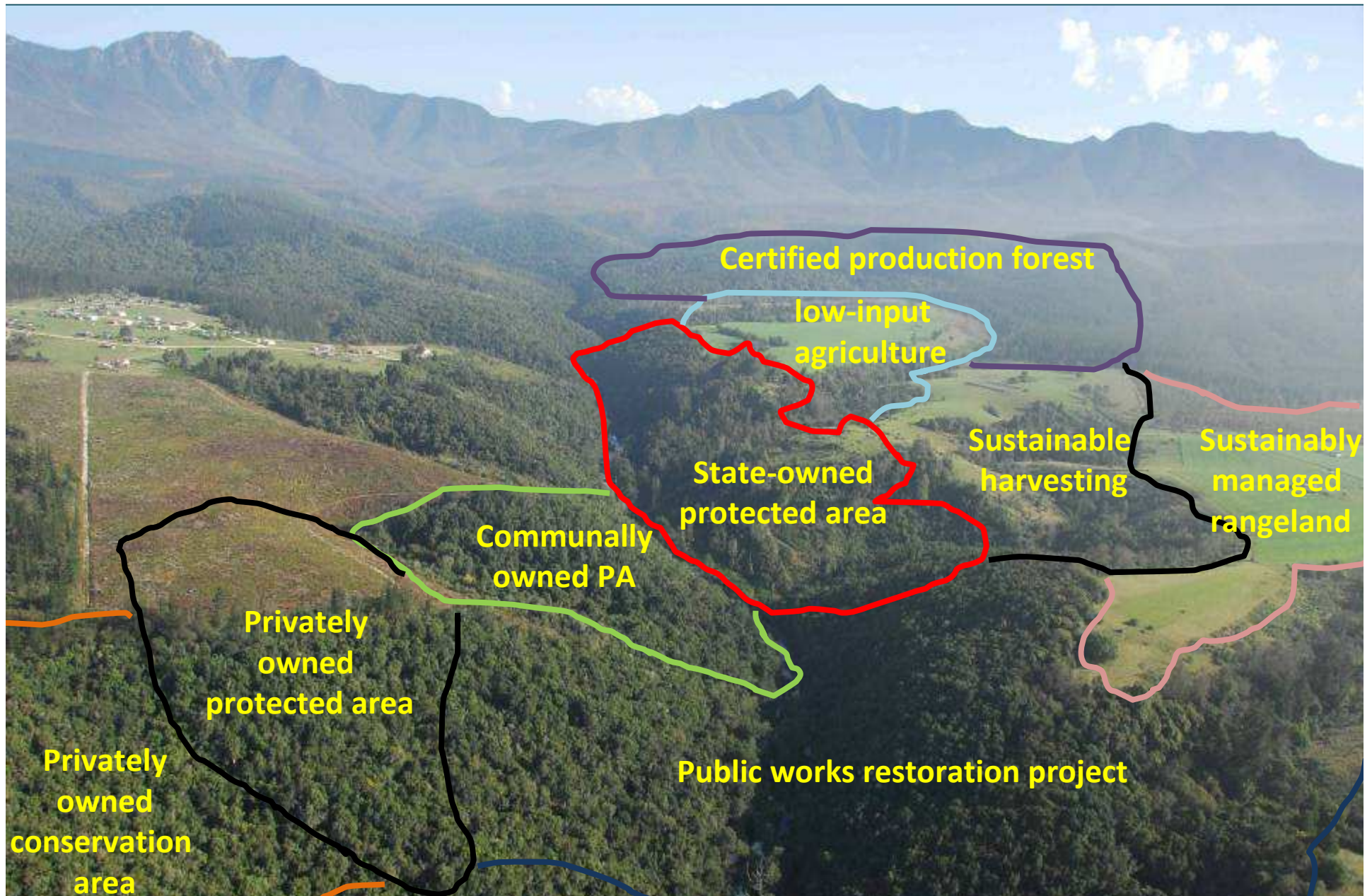
Water management

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.

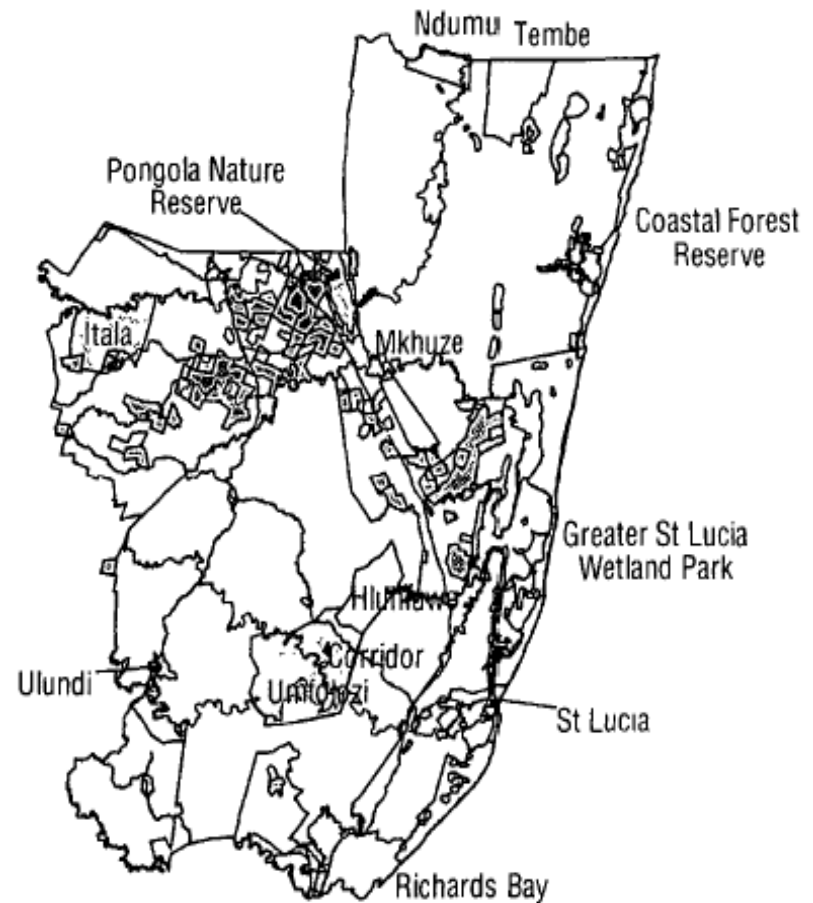
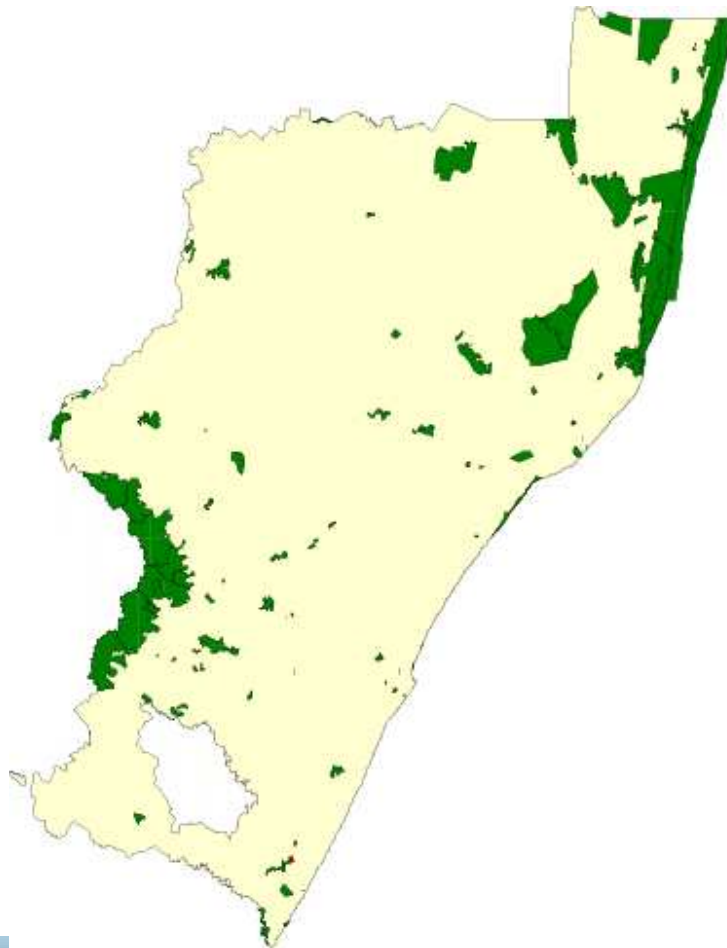




# Mainstreaming biodiversity in South Africa



# The importance of game reserves in KZN





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



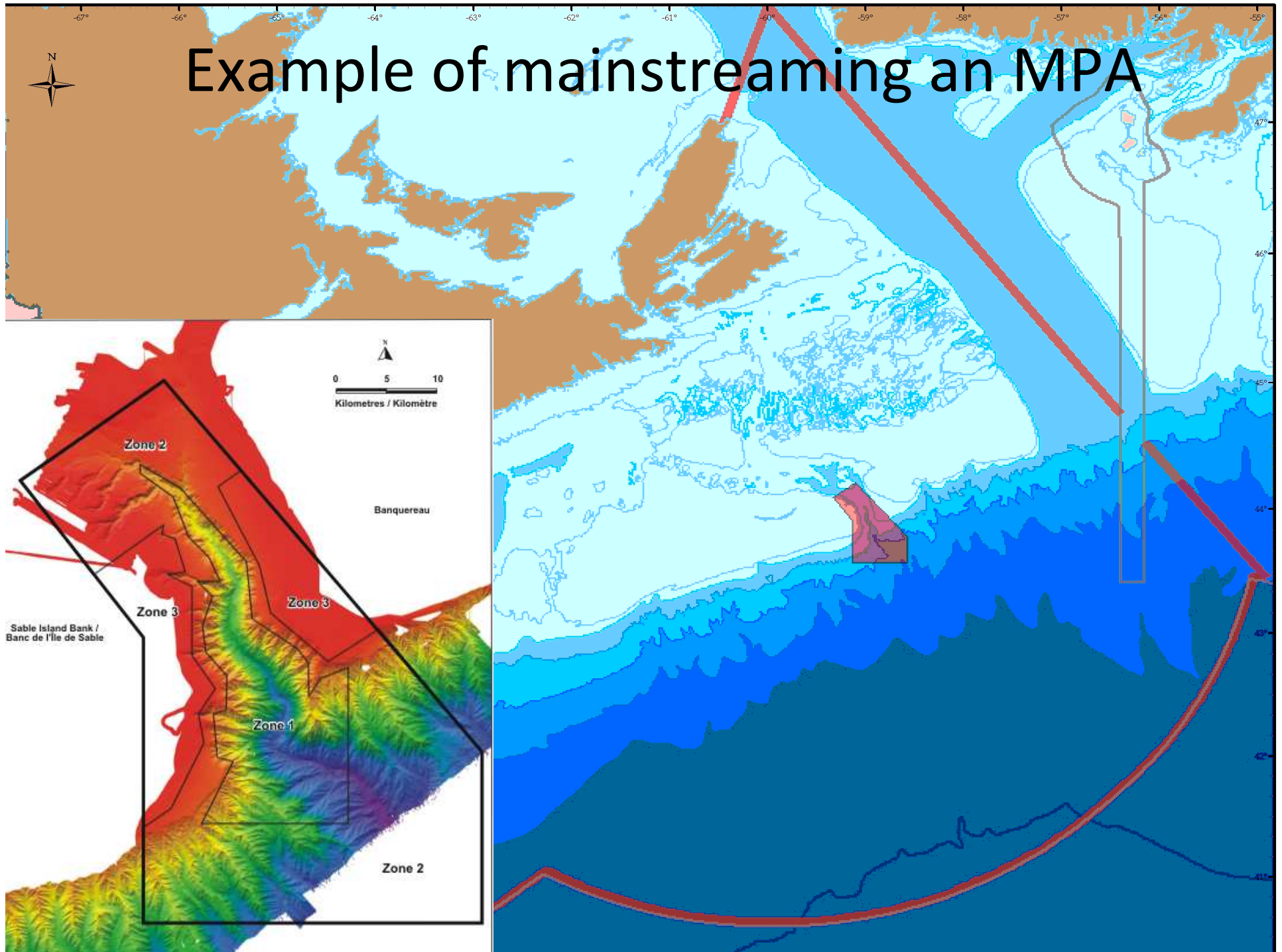


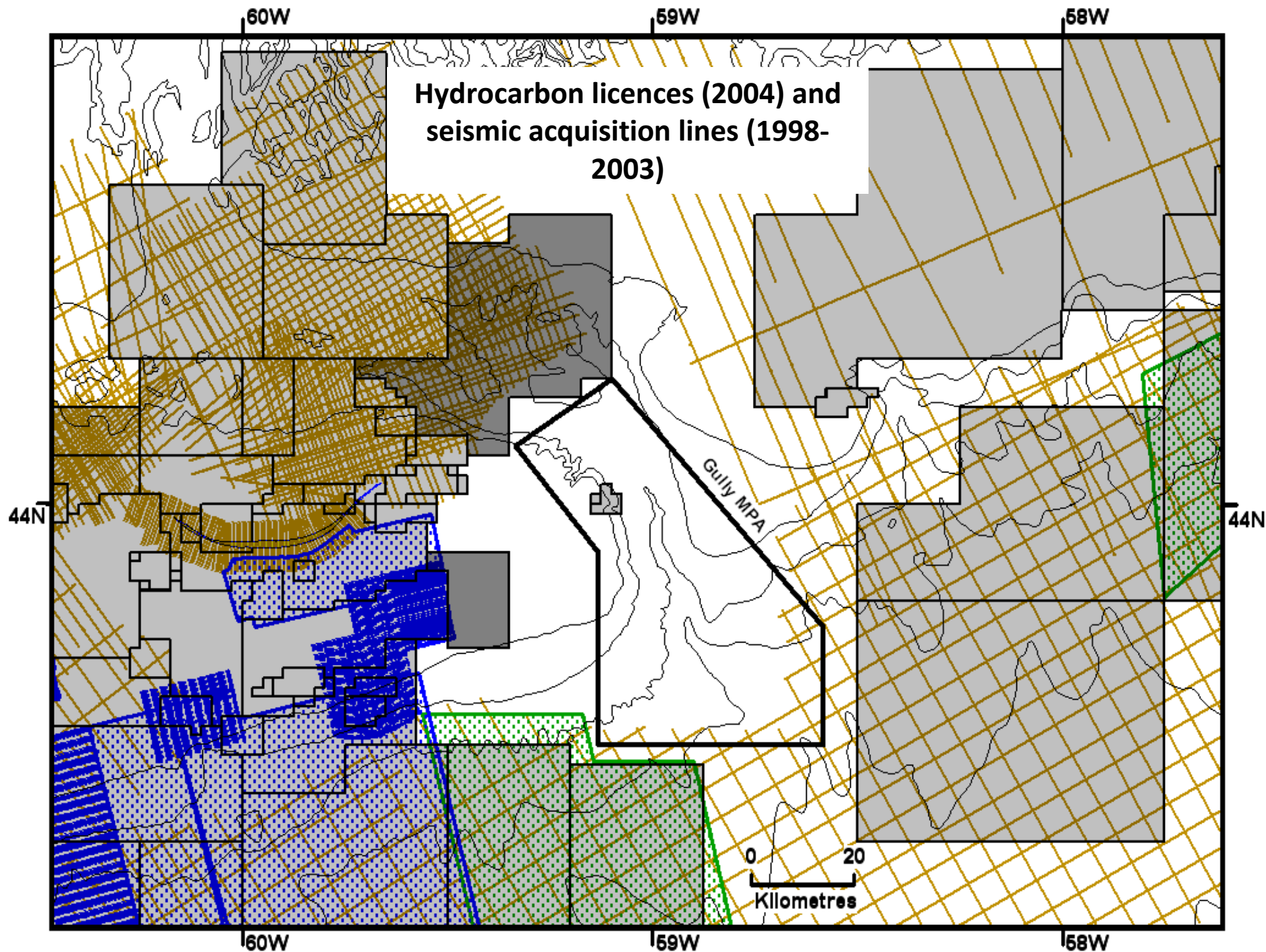
# Example of mainstreaming in S. Africa

- 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



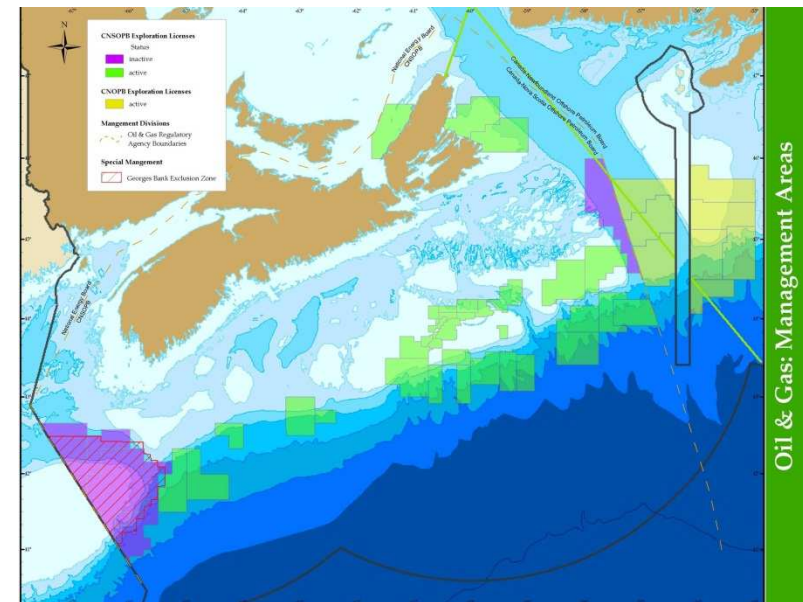
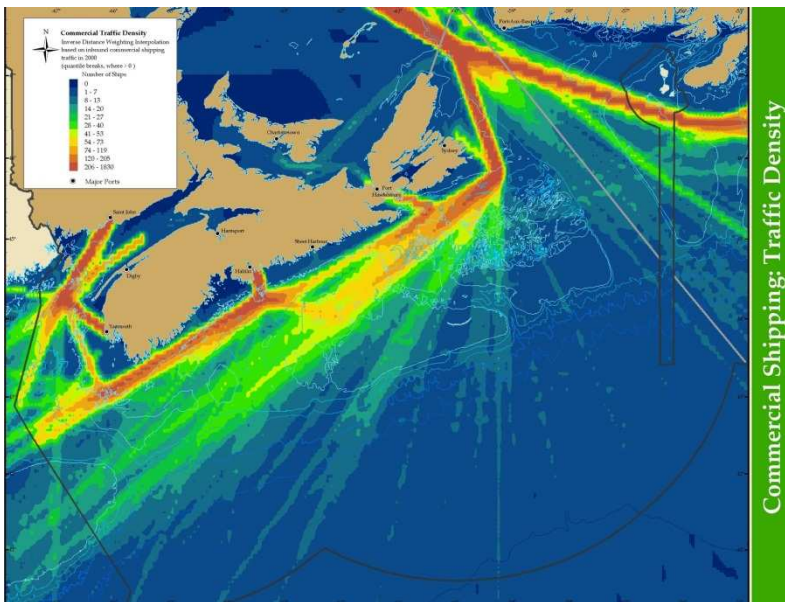
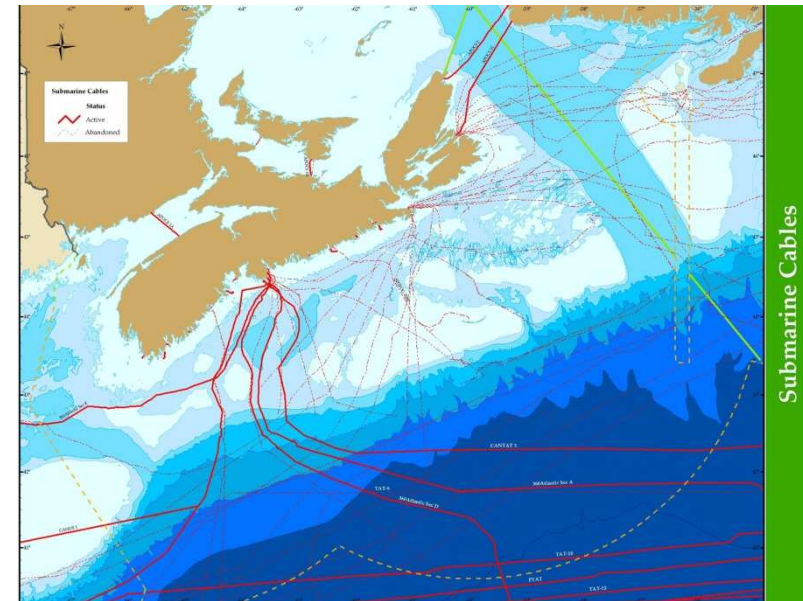
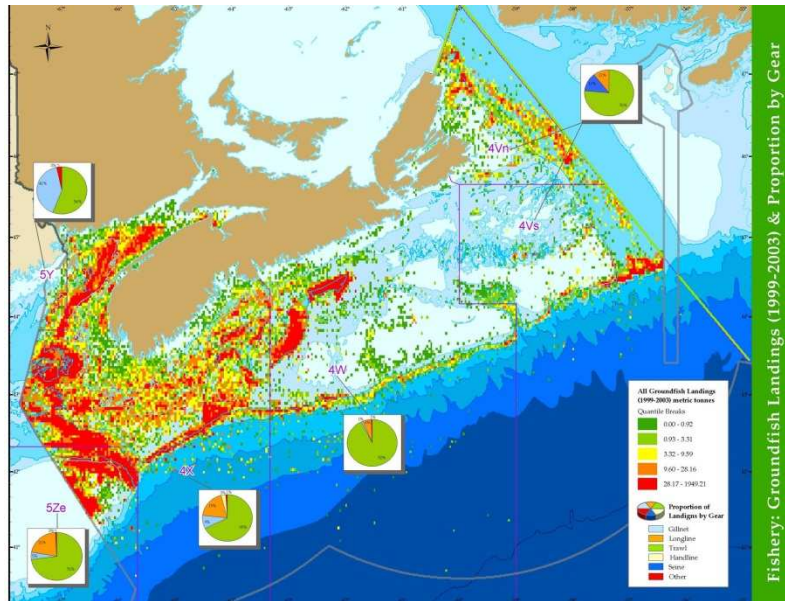
# Example of mainstreaming an MPA



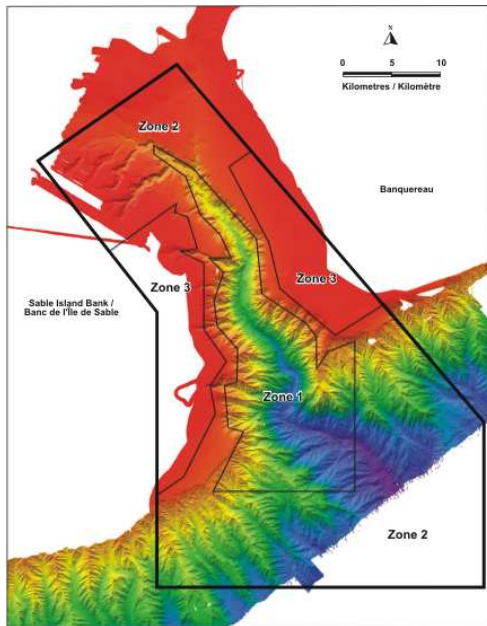




# Example of mainstreaming an MPA



# Example of mainstreaming an MPA



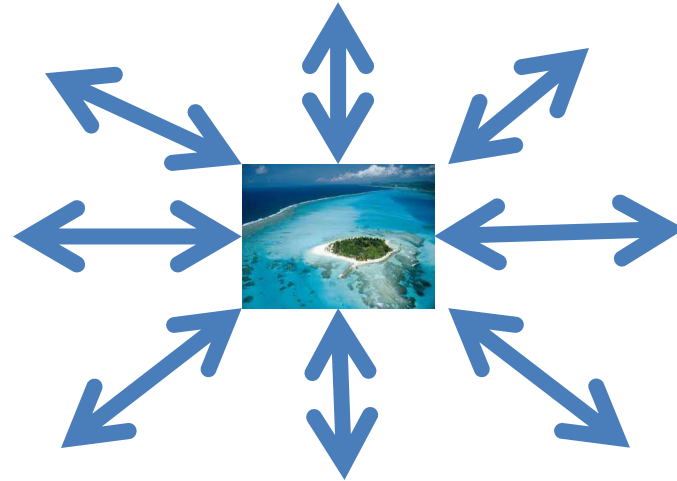
**Transportation:** New regulations on ballast water exchange; Coast Guard guidance on MPA avoidance, mammals, discharges

**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



Integrate into NAPAs



Revise PA valuation



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



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 your 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



Integrate into NAPAs



Include in threats assessment

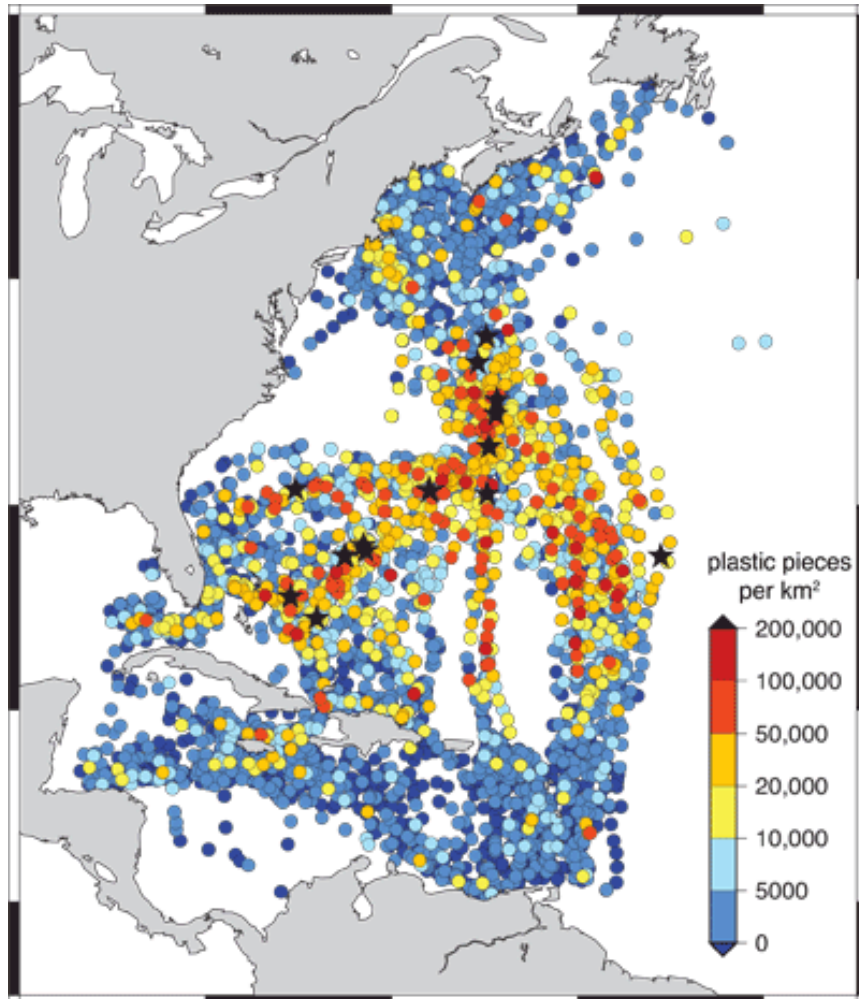


# Incorporate climate into PA and biodiversity threat assessments



- 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

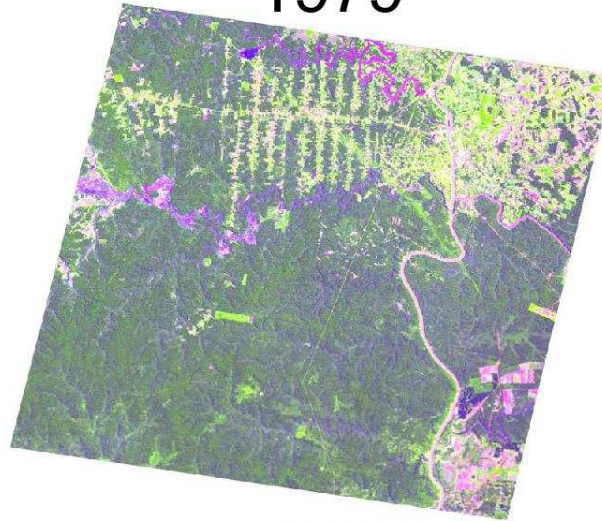
# Discussion Questions

- 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?

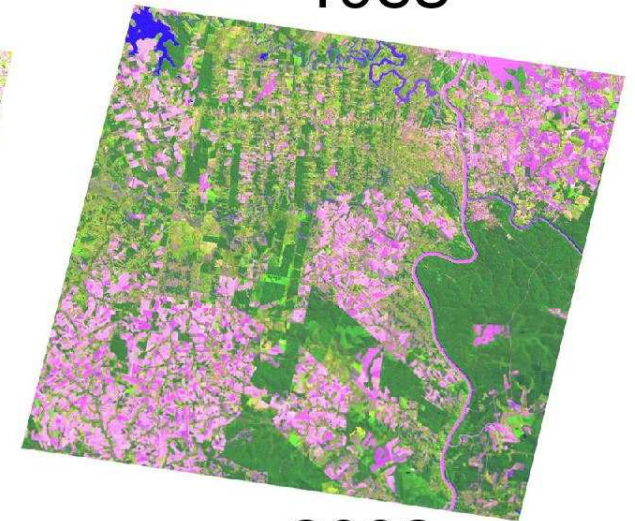


# CONSEQUENCES OF NOT INTEGRATING PROTECTED AREAS

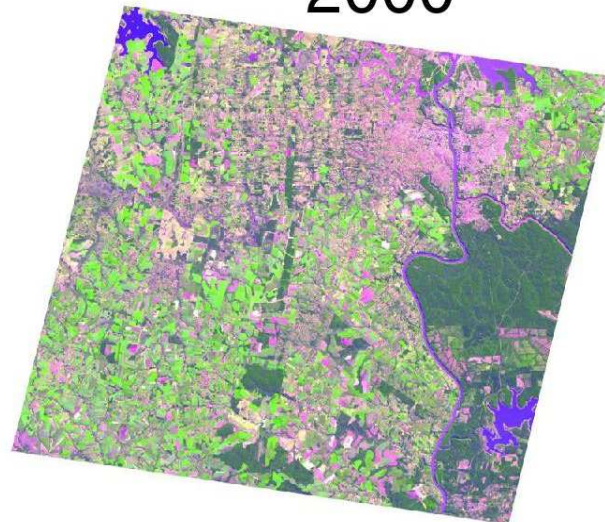
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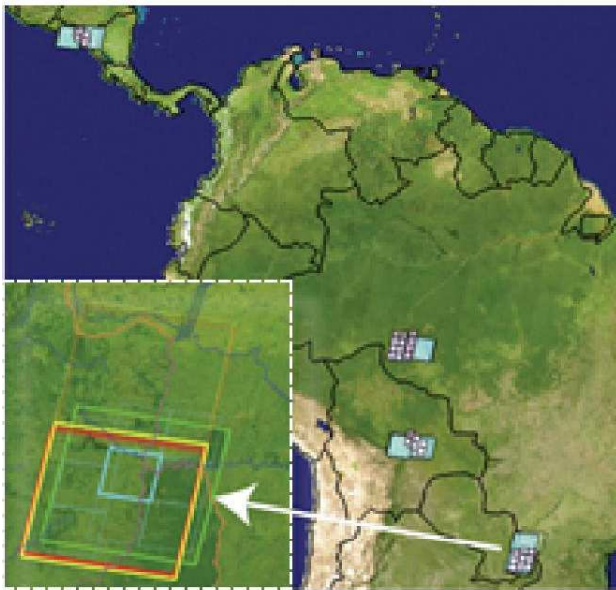
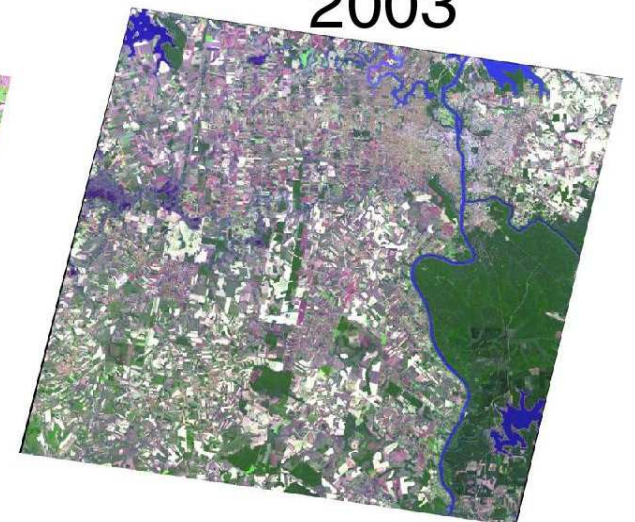
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**CONSEQUENCES OF NOT INTEGRATING**

**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

