

Ecosystem-based Adaptation in Marine and Coastal Areas



The climate hijack?

GEO4: Environmental decline goes way beyond Climate change

climate change is quite convenient for politicians both at a popular level but also at a political level

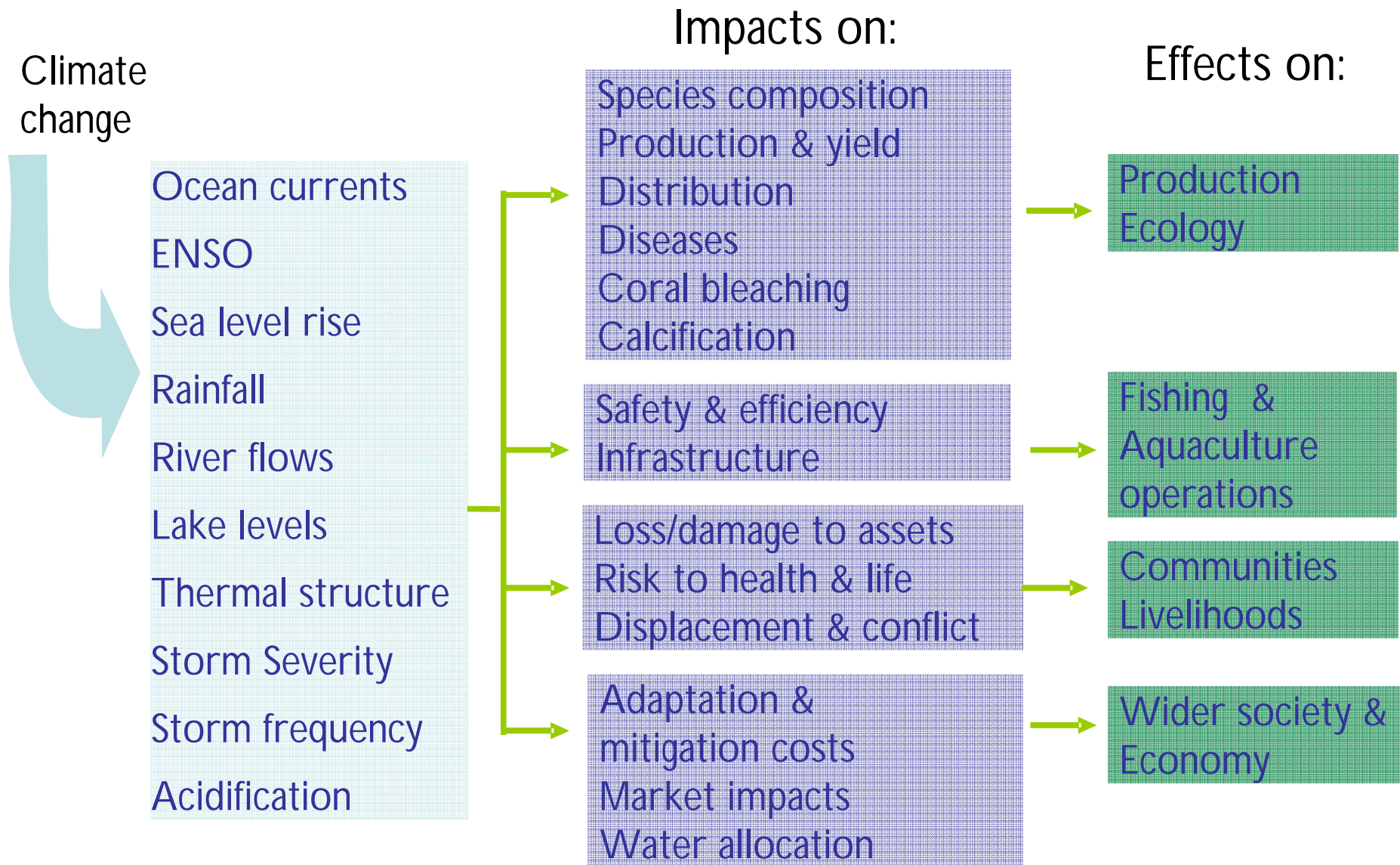
a long-term issue - so decisive action is always posited for some time in the future, at a time that can always be made yet more distant

someone else can always be blamed: EU used to blame the US, the US would blame China and India, and developing countries would blame the entire developed west.

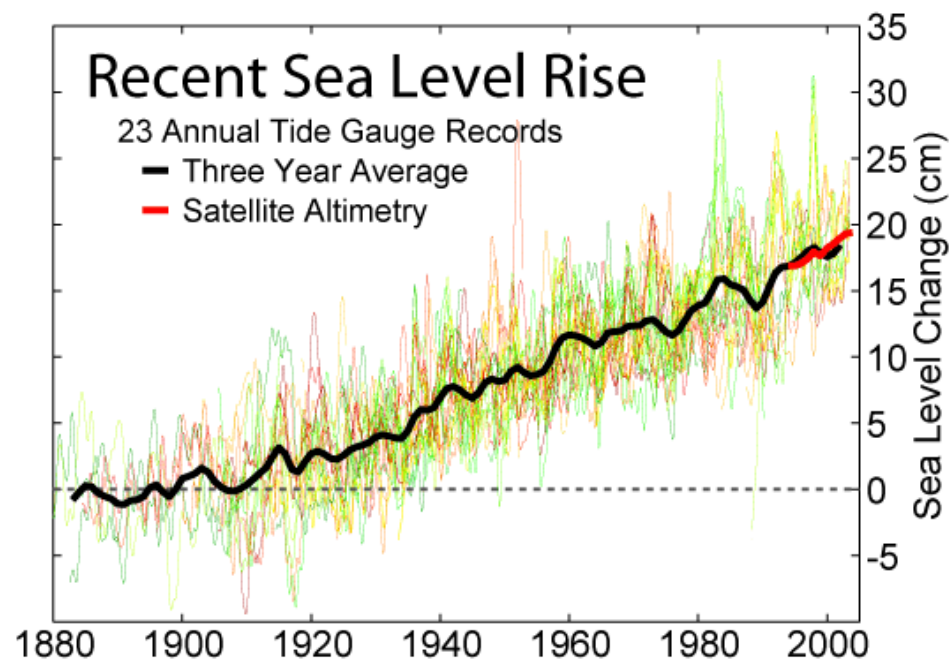
"it's very easy to pass responsibility for failure somewhere else... and in the process of doing that, one is able to keep one's own credibility and record, with the appearance of being much more progressive and constructive."

Certainly more convenient than tackling the issues that underpin everything else, the size of the human population and our unsustainable consumption of the Earth's resources.

Climate change a threat



Since IPCC...Scale of impacts is worsening

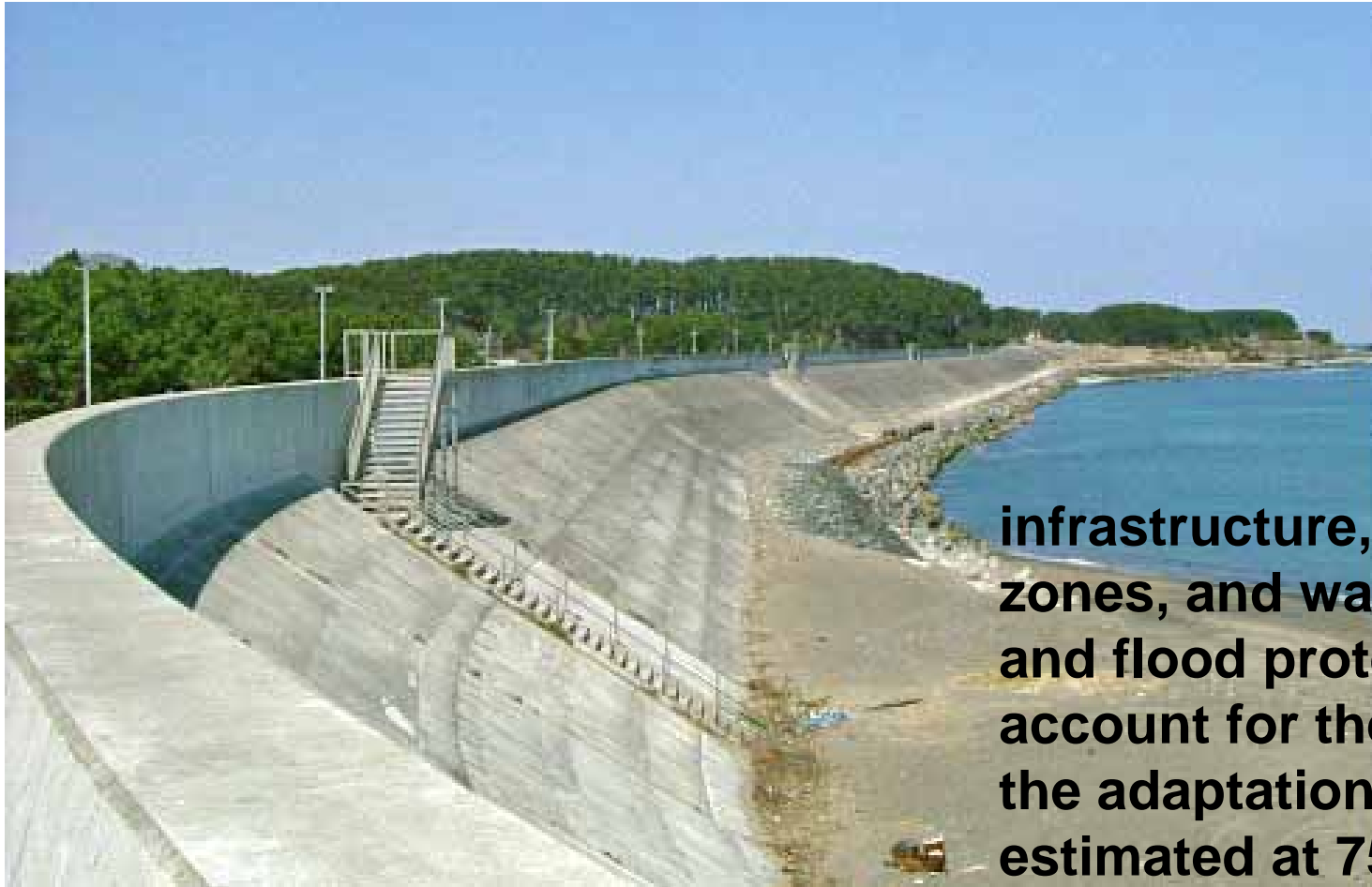


IPCC: SLR between
18-60 cm before end
of century

No integration of ice
sheets information

Current predictions are
for a max between 1-
2m

Human response: an even bigger threat



infrastructure, coastal zones, and water supply and flood protection account for the bulk of the adaptation costs estimated at 75-100 B/y

Ecosystem-based adaptation

What is lost when corals die?



PEOPLE LOSE

Ecosystems provide important services that need to be maintained to help us adapt to climate change

Ecosystem-based adaptation as an important option in response to climate change

Ecosystem-based adaptation



Ecosystem-based adaptation is the use of sustainable ecosystem management to support societal adaptation (CBD 2009)

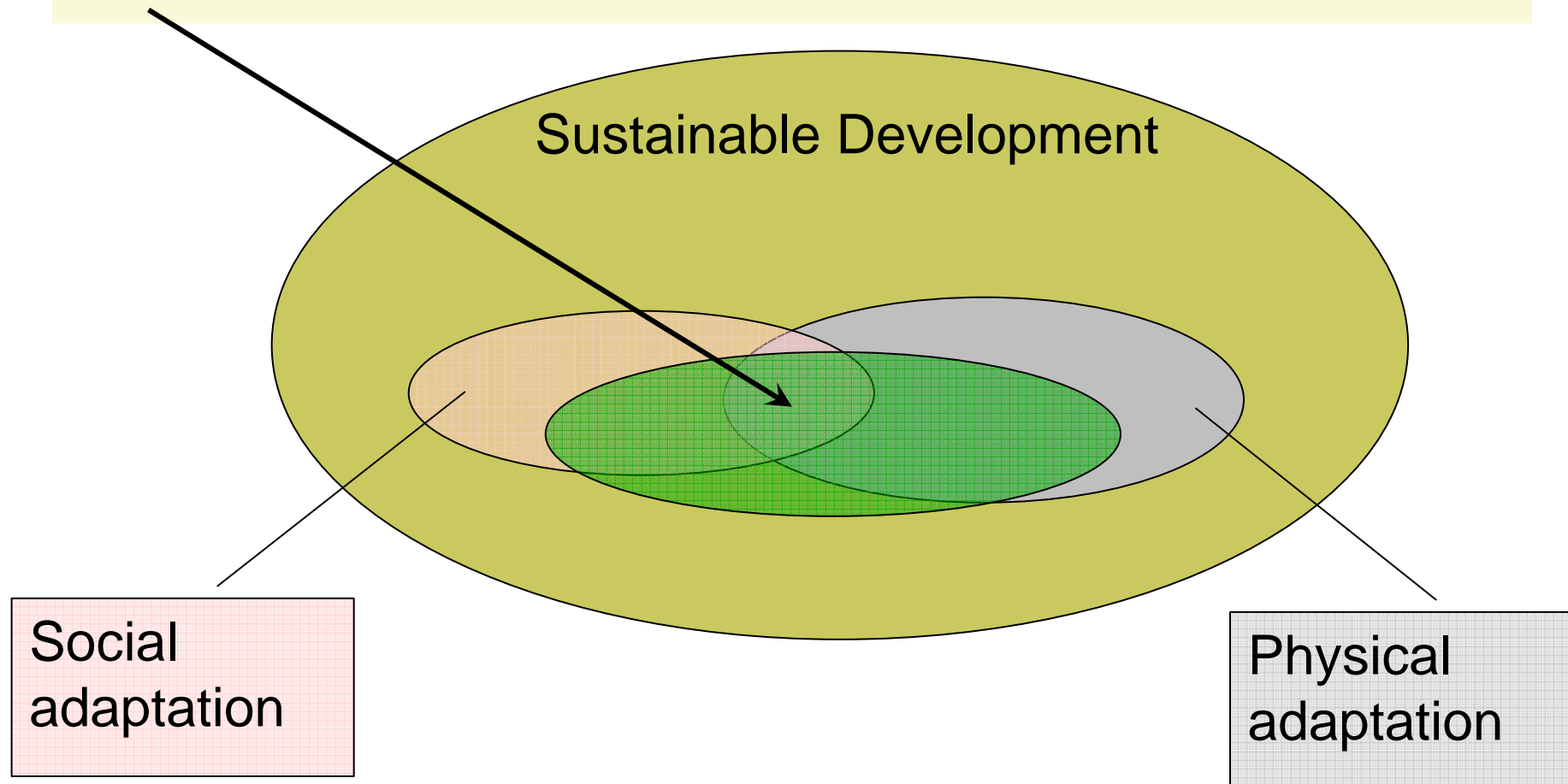
Ecosystem-based adaptation aims to:

Conserve biodiversity and make ecosystems more resistant and resilient in the face of climate change so that they can continue to provide the full suite of natural services.

Preserve and restore natural ecosystems that can provide cost-effective protection against some of the threats that result from climate change

What is Ecosystem-based Adaptation?

EBA should be integrated into an overall adaptation strategy and a broader sustainable development strategy



Cost-effective shoreline protection



Coastal ecosystems play an important role in coastal protection as they dissipate wave energy, reduce erosion and trap sediments

Sustaining local livelihoods and contributing to local economies

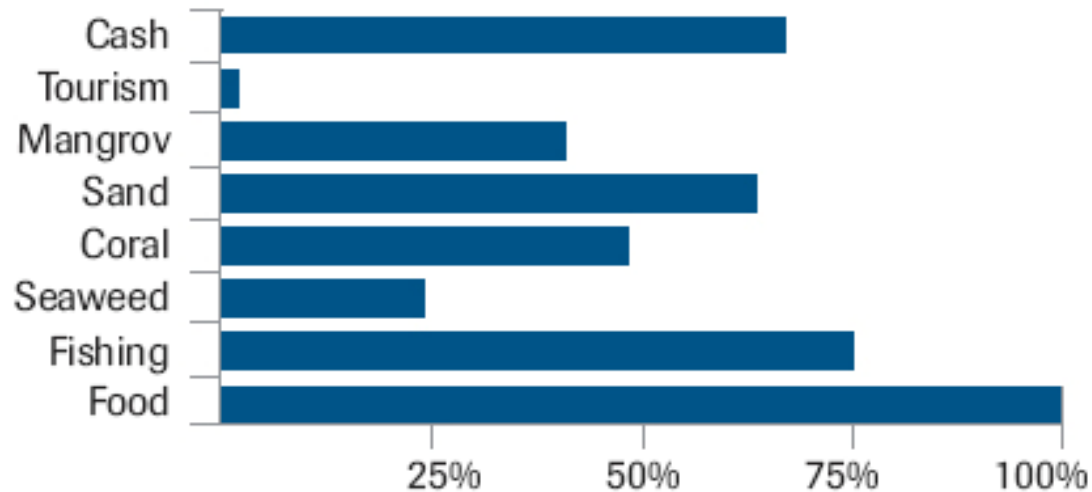


Figure 1: The biodiversity of the Wakatobi Islands underpins local livelihoods



Carbon sequestration and reinforcement of mitigation efforts



Marine angiosperms (including saltmarsh, mangrove and seagrass) contribute some 46% of total organic carbon buried into marine sediments, or some 111 Mt carbon per year

Providing refugia



- high cover
- high diversity
- low disease
- broad size range



- strong recovery
- good substrate
- good water quality
- good herbivores

Contributing to social resilience



- local knowledge and participation
- alternative livelihoods
- learning new skills

- recognition of tenure and responsibility
- good governance
- contributing to developing solutions



Effective management is at the heart of resilience



Coastal Resilience – adapting to rising seas and coastal hazards

COASTAL RESILIENCE LONG ISLAND
A Helping Hand for Human Communities as Sea Level Rise and Coastal Hazards

Join Us On

The Issue
What's At Risk
What Can Be Done
Future Scenarios
Partners
News



Sea level rise and coastal hazards are putting human and natural communities along the coasts at greater risk than ever.

FUTURE SCENARIOS MAPPER

GO

THE ISSUE

GO

WHAT'S AT RISK

GO

WHAT CAN BE DONE

GO

Decision-makers need information to support choices about how to manage natural resources and human communities in the face of the dramatic changes that are already underway.

The purpose of the Coastal Resilience project is to provide communities with easy access to information to assist in coastal planning, zoning, acquisition, and other management decisions regarding resources at risk from sea level rise and coastal hazards. This information is accessible through an interactive decision support tool. With the **Future Scenarios Mapper** you can visualize future flood scenarios and their ecological, social and economic impacts as well as a policy analysis to help identify solutions.

LEARN MORE

Share This Site

SHARE

Latest News

June 11, 2009
Coastal Resilience: Planning for Sea Level Rise and Coastal Hazards
[View Blog Entry](#)









Coastal Institute for Space Studies
New York, NY

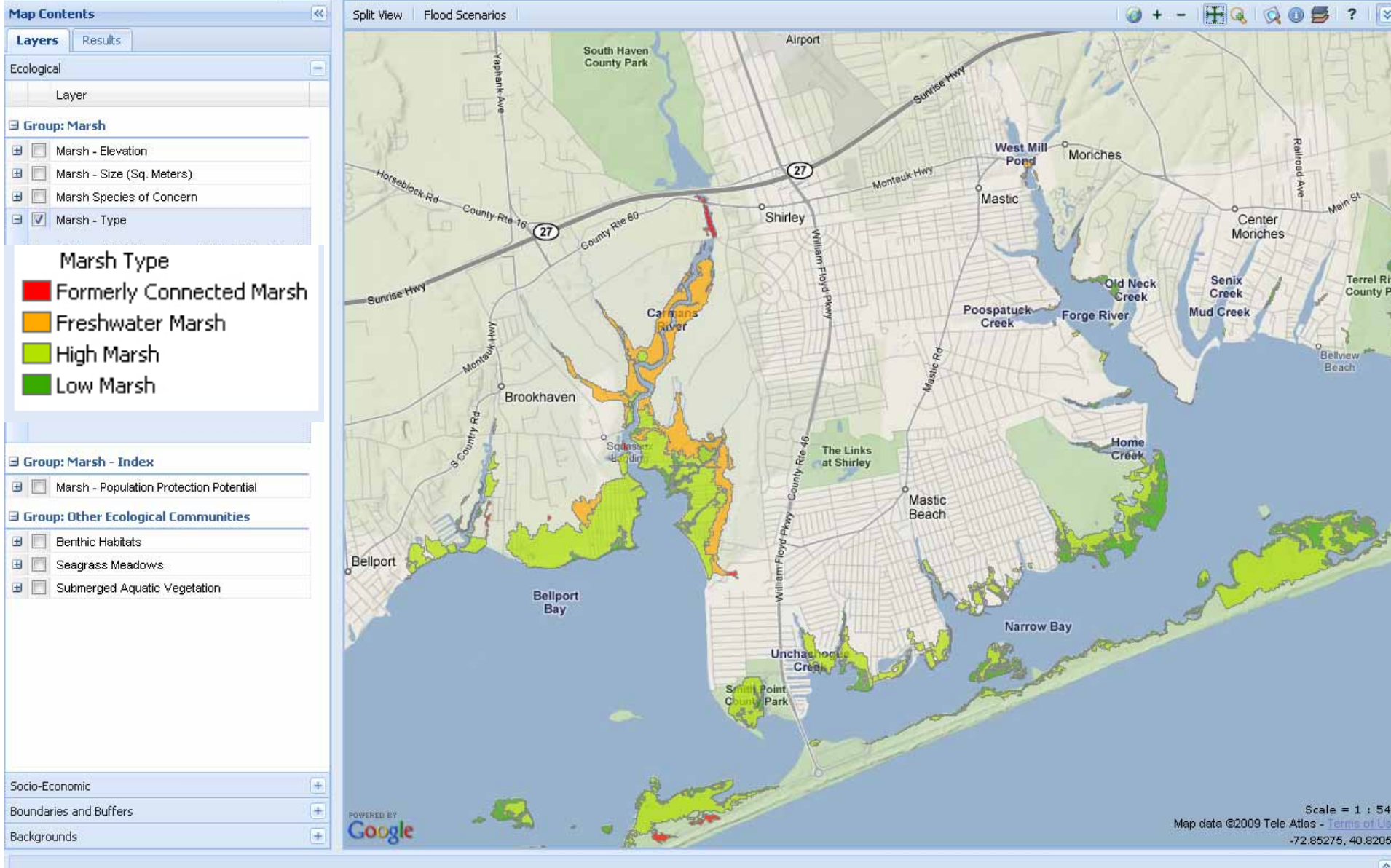




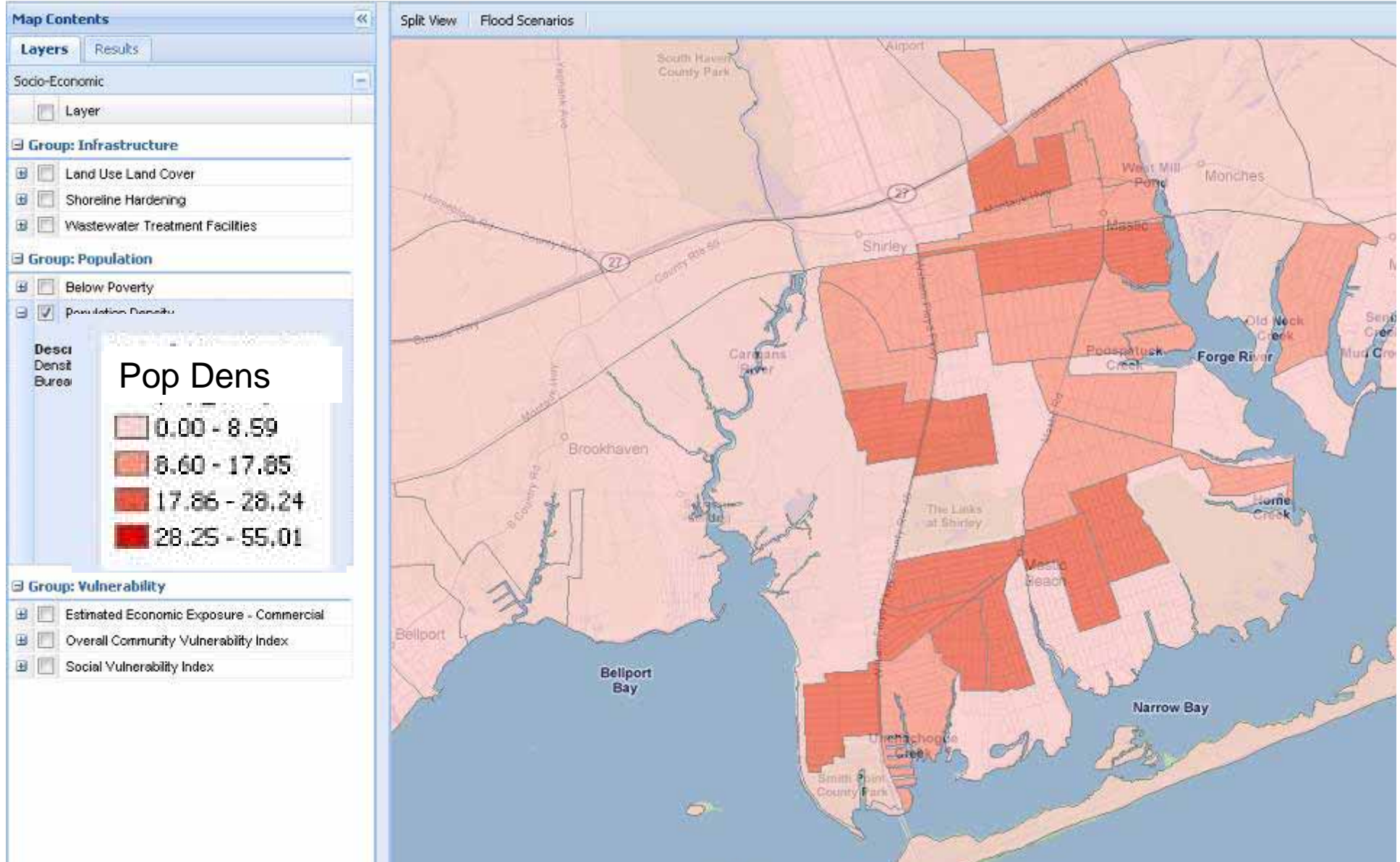


[About](#) | [Contact](#) | [Legal Disclosure](#)

Wetlands Current Conditions



Social – Current Conditions

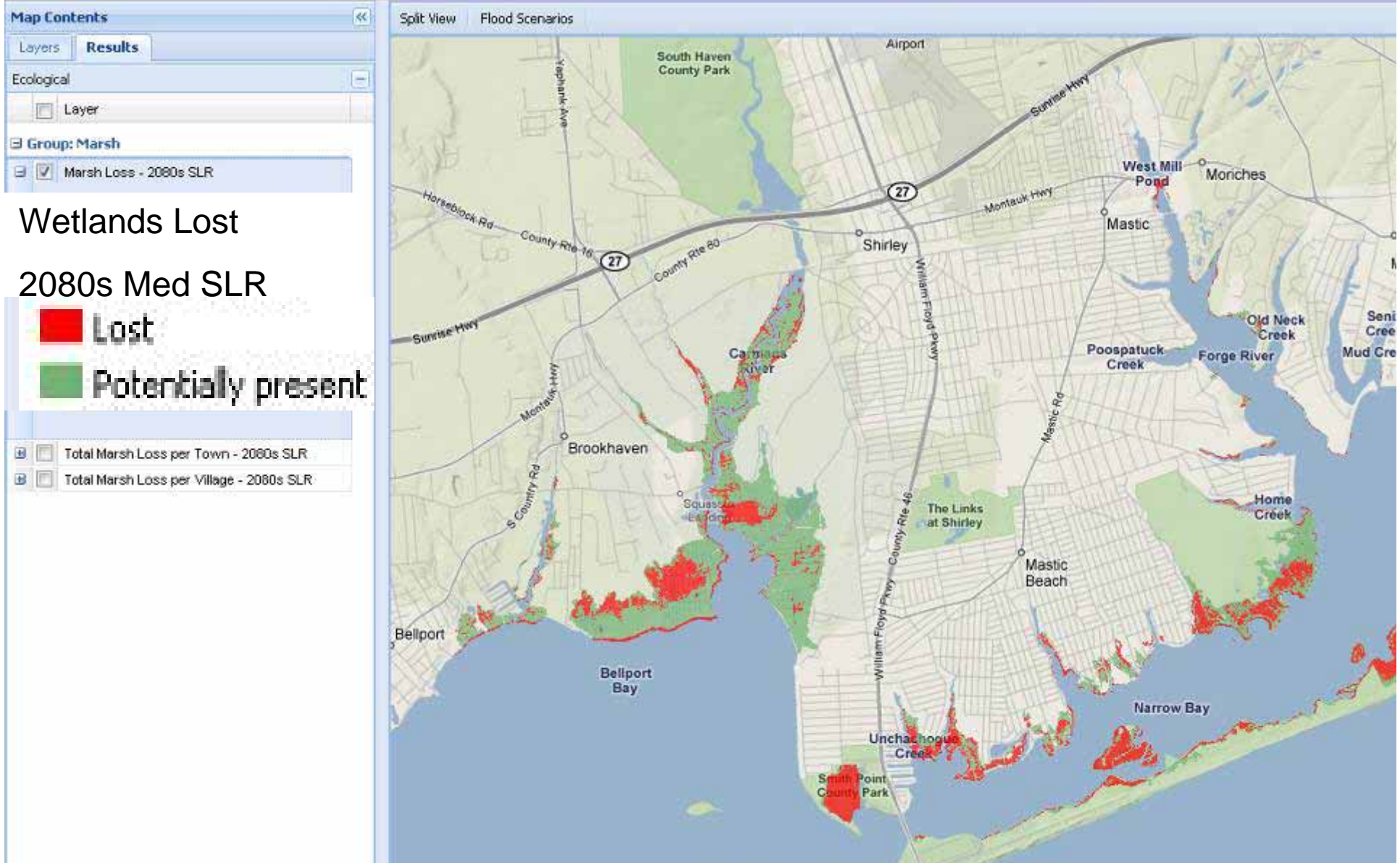


2020s SLR with 20% annual chance flood

2020 A2 mean with 5-year Flood



Coastal wetlands – vulnerability and risk



Wetlands Lost

2080s Med SLR

■ Lost

■ Potentially present

Total Marsh Loss per Town - 2080s SLR

Total Marsh Loss per Village - 2080s SLR

Coastal wetlands – Protection Potential

Map Contents

Layers Results

Ecological

Layer

Group: Marsh

- Marsh - Elevation
- Marsh Species of Concern
- Marsh - Type

Group: Marsh - Index

- Marsh - Long-term Viability Value

Shoreline Protection Potential



Split View Flood Scenarios



Using Decision Support Tools to Plan and Adapt



Outreach to:

- Indonesia
- Solomons,
- PNG
- Mexico
- Bahamas
- Caribbean

Marsh - Type

- Marsh Type
- Formerly Connected Marsh
 - Freshwater Marsh
 - High Marsh
 - Low Marsh

Potential Marsh Migration Impediments (within 50 ft.)

- Impediment Type
- shoreline hardening
 - road
 - steep slopes (> 15 degrees)

Vacant Parcels



Critical Facilities

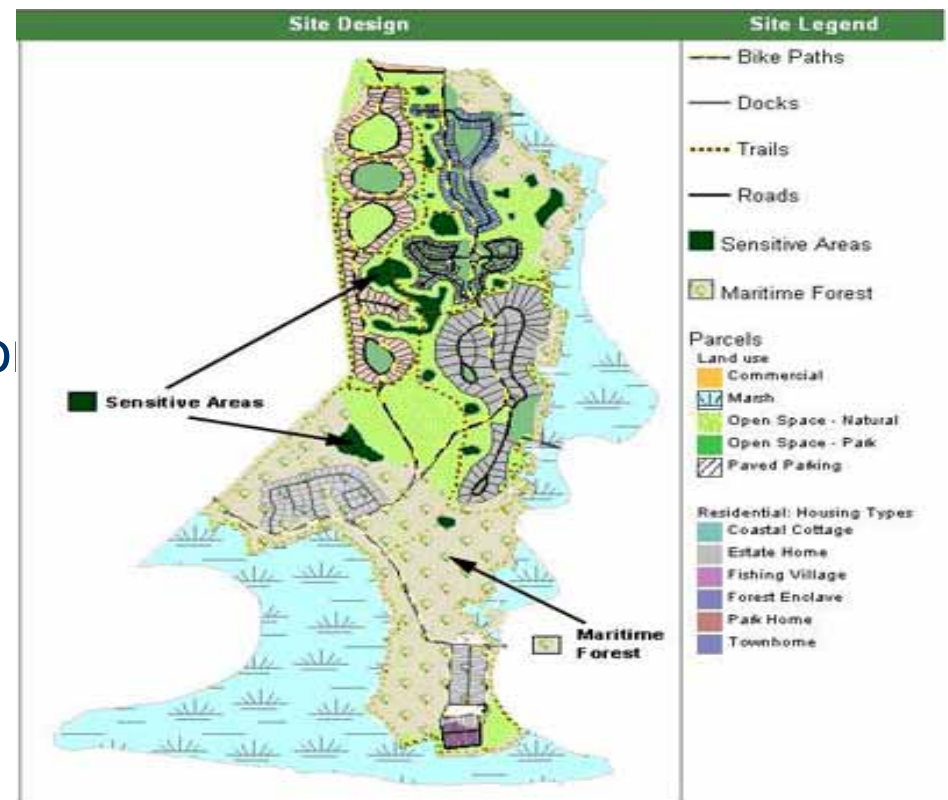
- EfClass
- Emergency Operations
 - Fire Services
 - Police Services
 - Medical Facilities

Regulatory Approaches

Standard buffers/setbacks;
Rolling easements/setbacks;
Allowing retreat
Priority areas for protection based on current conditions;
– Priority areas for conservation
– Bulkhead-free zones

Priority areas for protection based on future conditions;
– Upland buffer areas.

Incentives for risk sharing strategies
(Insurance)



Engaging local communities



local community in the Choiseul province of the Solomon Islands planning their local land and resource management in response to climate impacts.



UK coral crisis meeting



- at today's level of ~387ppm, allowing a lag-time of 10 years for sea temperatures to respond, most reefs world-wide are committed to an irreversible decline.

- Mass bleaching will in future become annual, In addition, ocean acidification will cause reduction of coral growth and calcification.

- If CO2 levels are allowed to reach 450ppm (by 2030-2040 at the current rates), reefs will be in rapid and terminal decline world-wide from multiple synergies arising from mass bleaching, ocean acidification, and other environmental impacts.



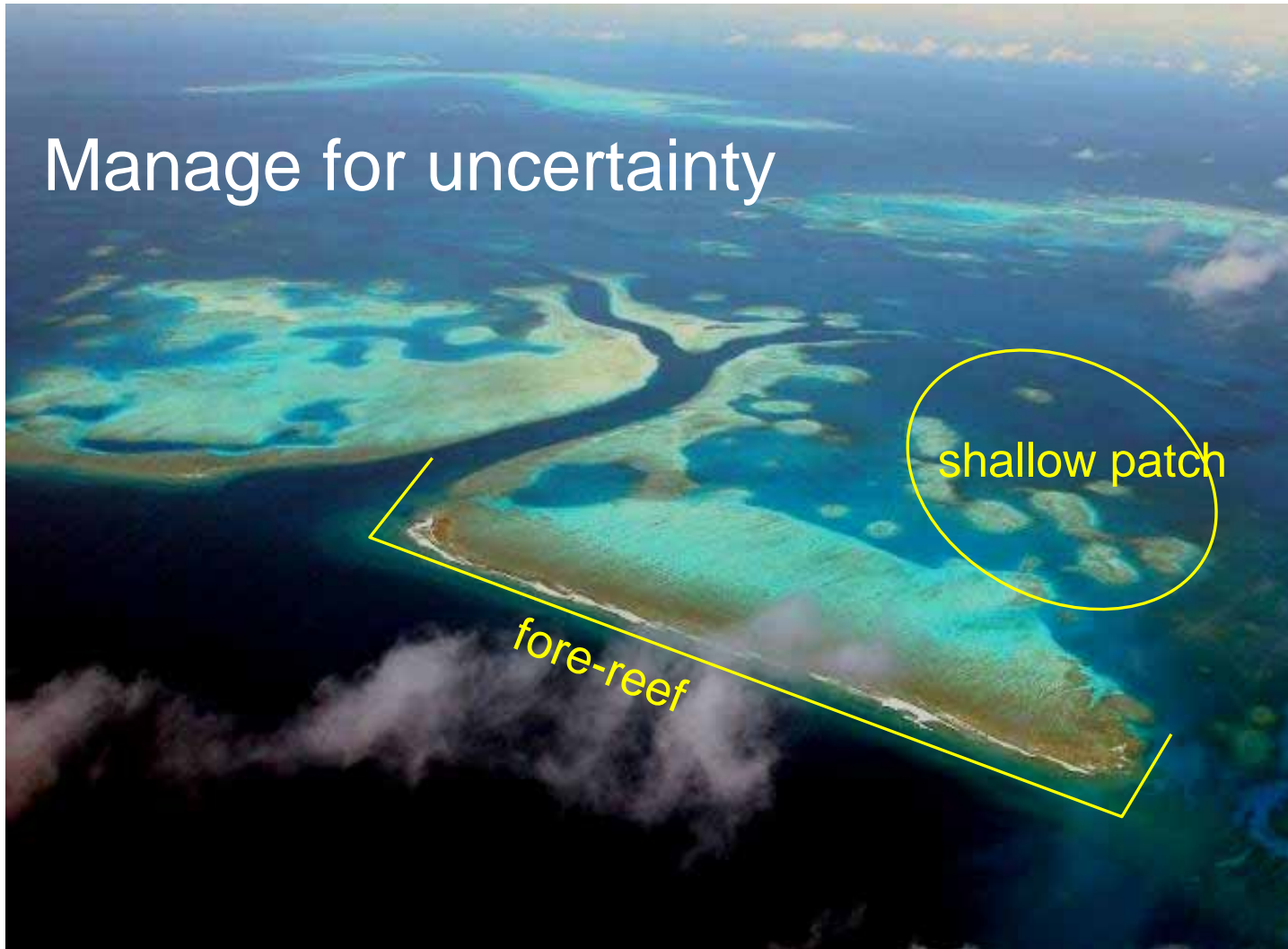
- Reefs will cease to be large-scale nursery grounds for fish and will cease to have most of their current value to humanity. There will be knock-on effects to ecosystems associated with reefs, and to other pelagic and benthic ecosystems.

Resilience: A Strategy to Cope



Spread Risk

Manage for uncertainty



Secure Sources of Seed

Protect refugia



Maintain Connectivity

Link with refuges – recovery



Manage effectively

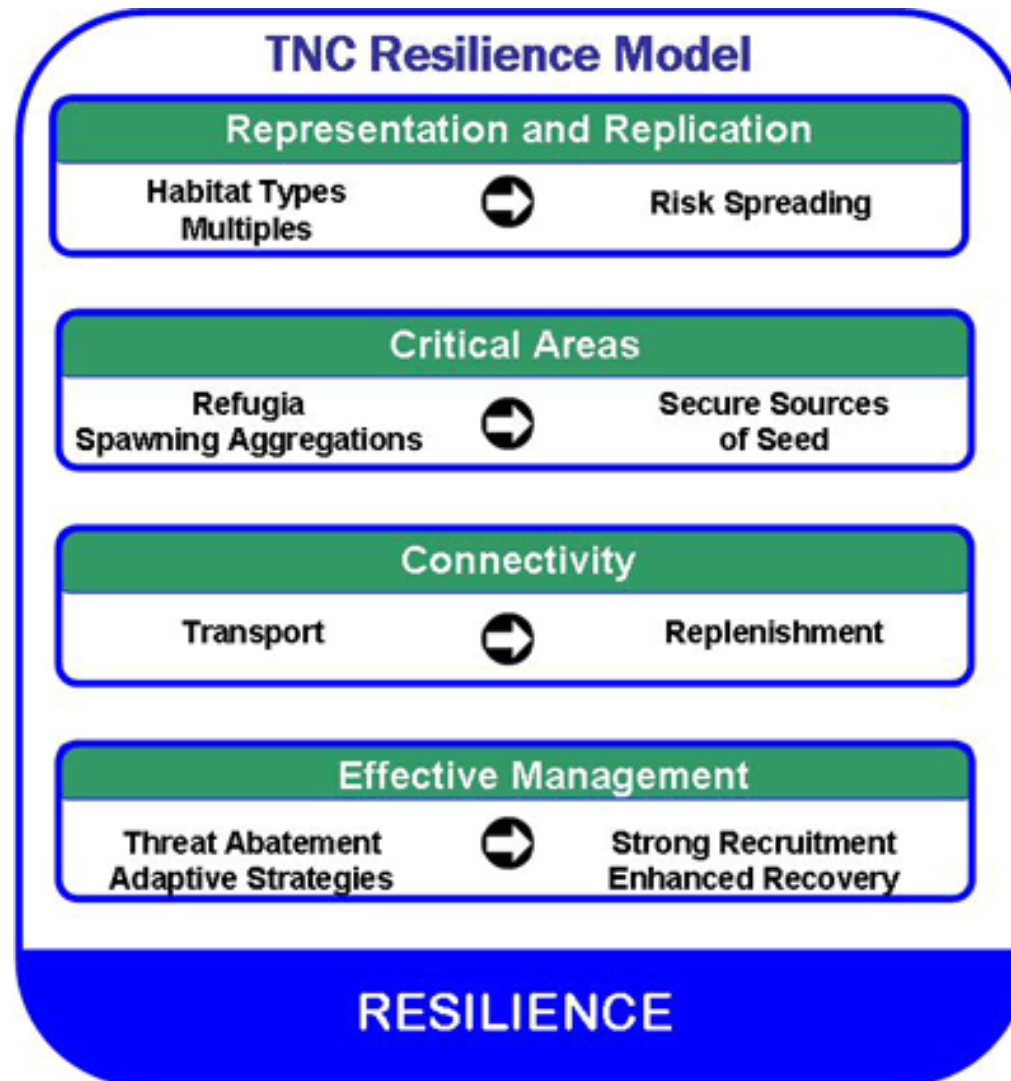
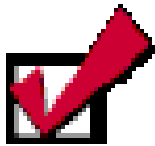


- (a) reducing the harvest of herbivorous fish to sustainable levels
- (b) maintaining an effective trophic pyramid by protecting sharks and other top predators,
- (c) managing all aspects of water quality
- (d) minimising any other direct anthropogenic impacts and stressors.

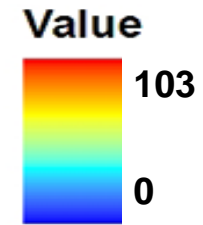
Resilience in Practice: Kimbe Bay, Papua New Guinea



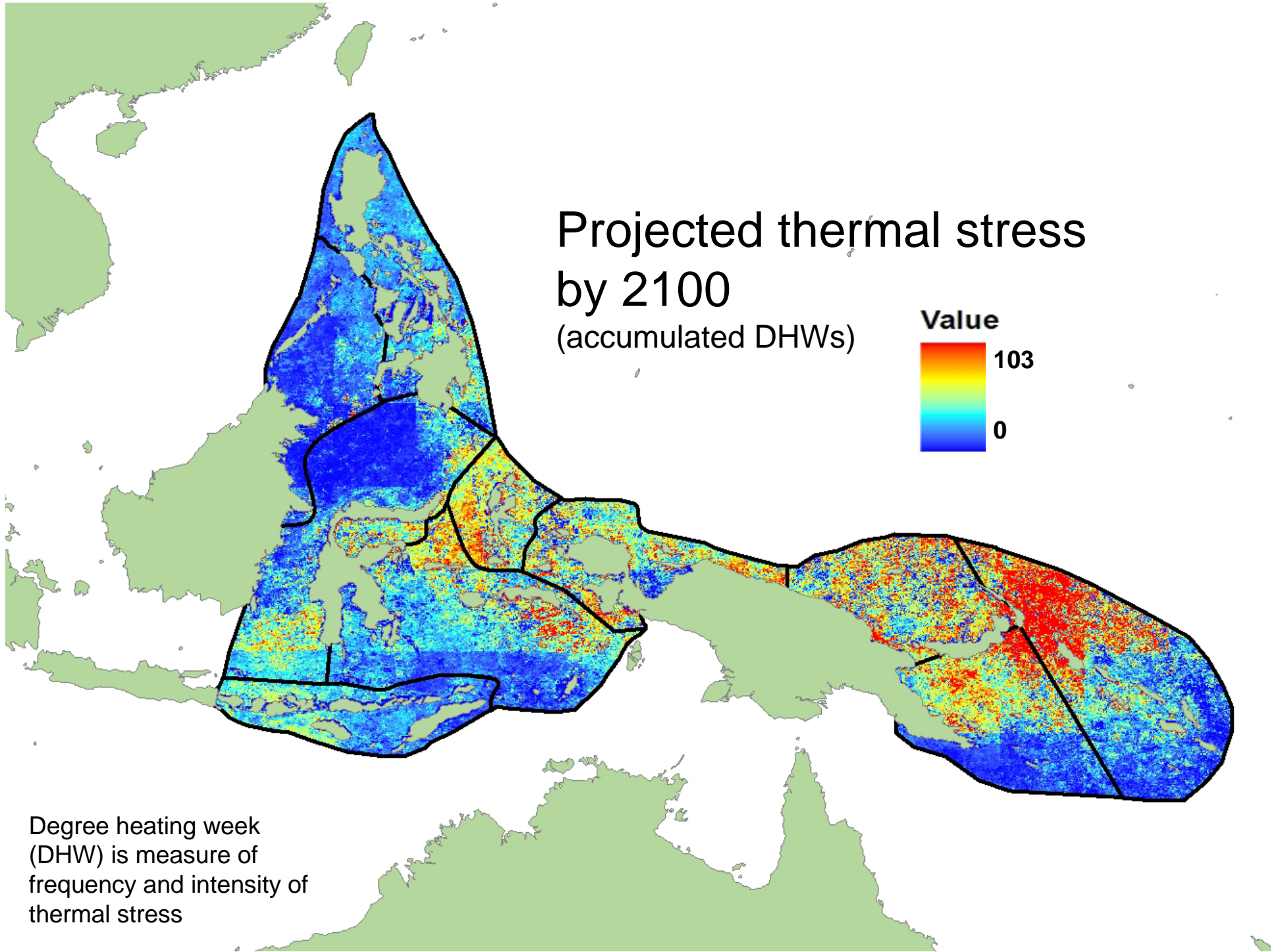
Aim: Design a resilient network of MPAs



Projected thermal stress by 2100 (accumulated DHWs)



Degree heating week
(DHW) is measure of
frequency and intensity of
thermal stress



DNA parentage analysis



(n=400)

42%

Cape Huessner

6%

Kimbe Island

10%

5%

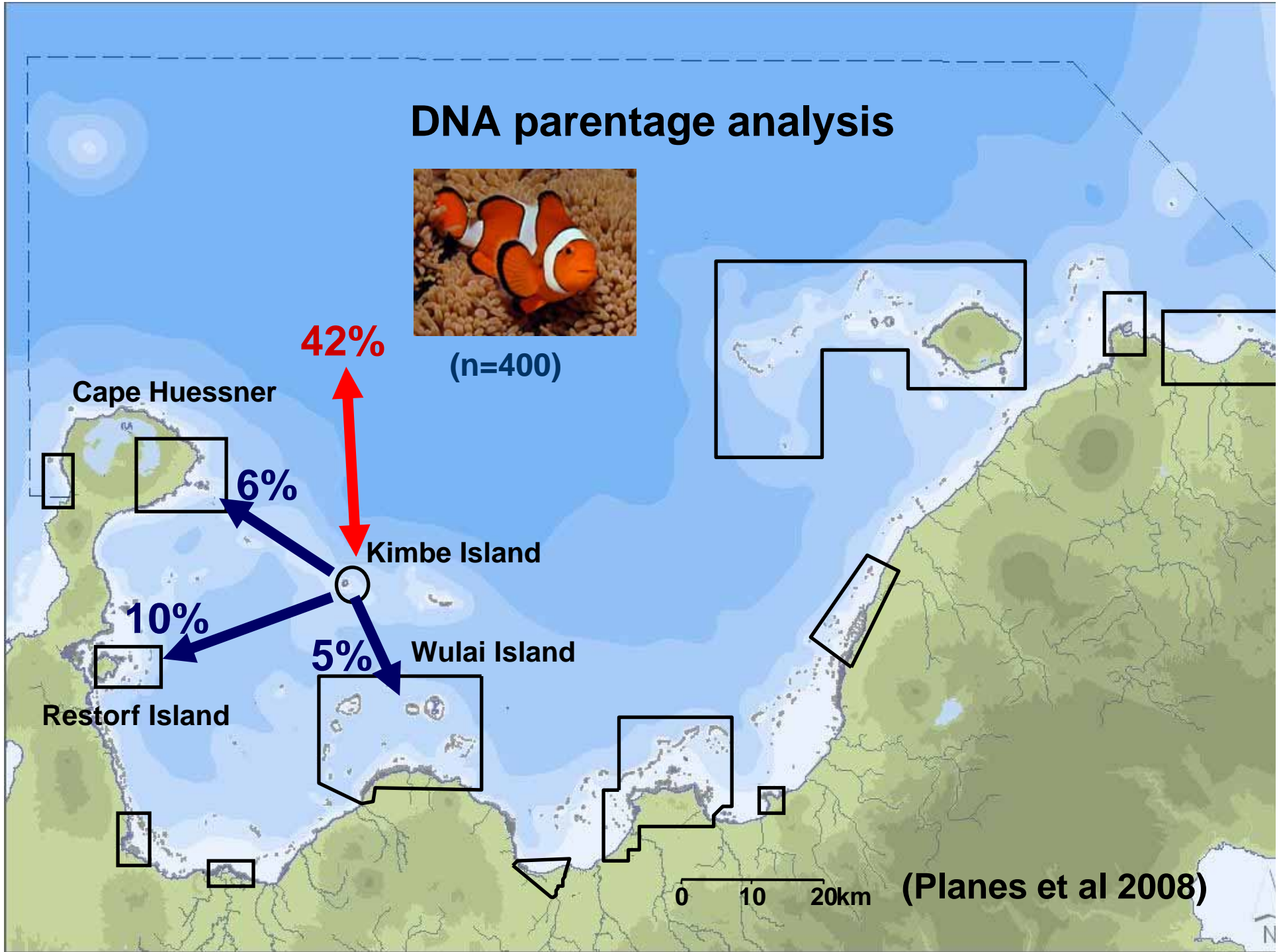
Wulai Island

Restorf Island

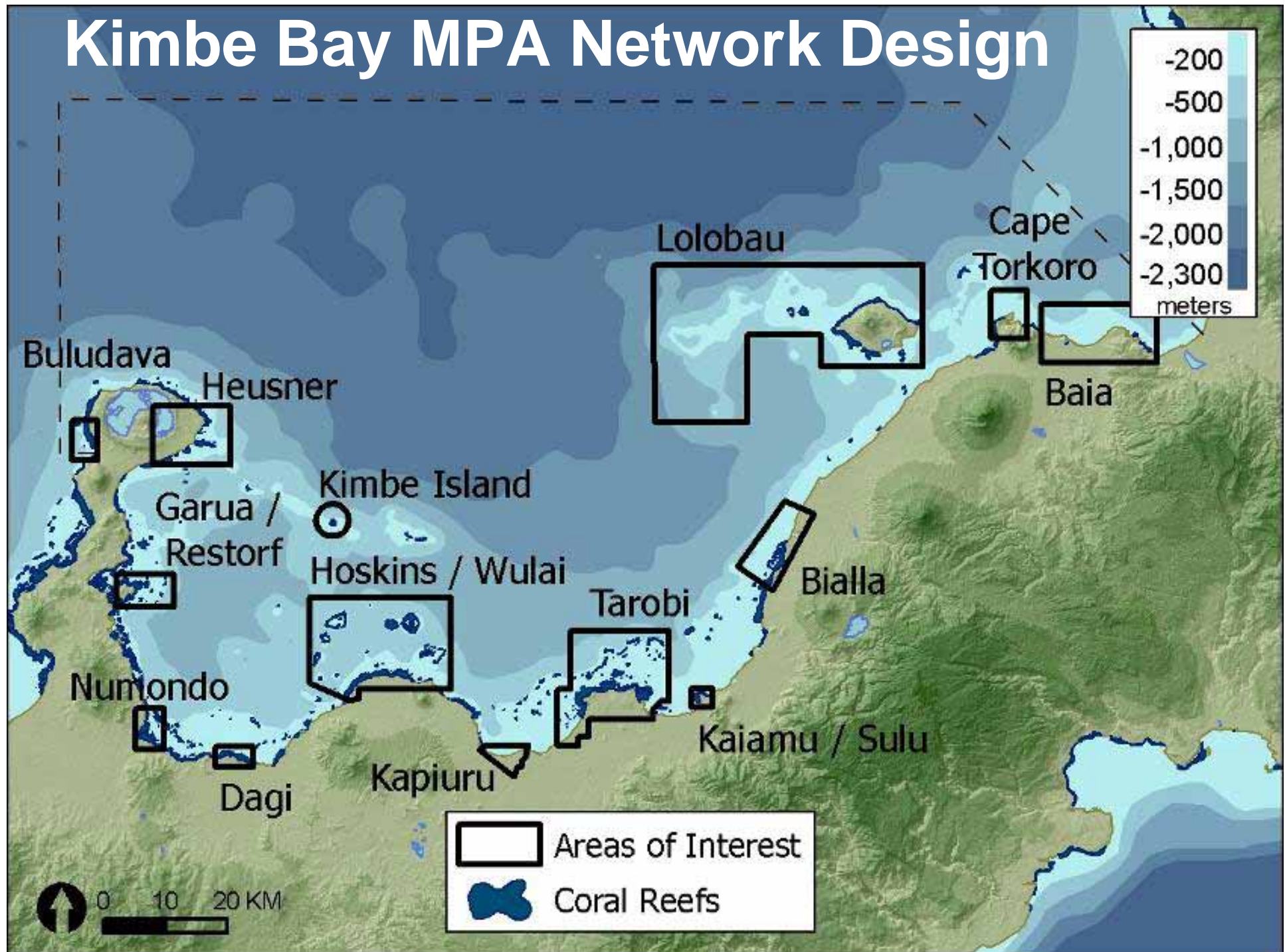
0 10 20km

(Planes et al 2008)

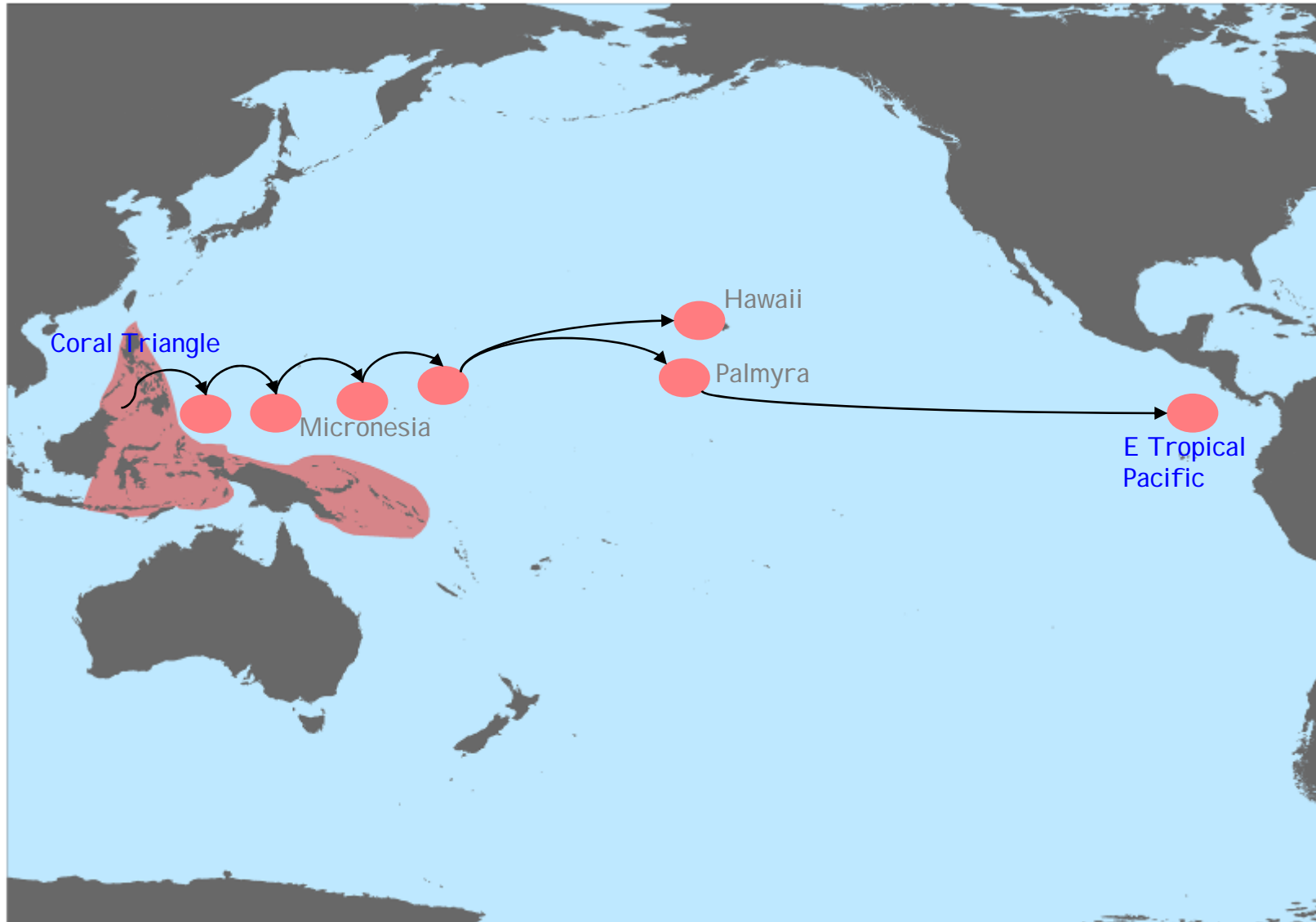
N



Kimbe Bay MPA Network Design



Stepping stones across the Pacific



Developing guidance for EbA

Incorporate ecosystem-based adaptation principles into marine and coastal sectoral development.

Nature's infrastructure should be considered first.

Multiple stressors trade-offs and synergies is central to adaptation planning.

Stakeholders should be involved in strategy development.

Adaptive management is imperative.

Government and the private sector can provide incentives for "climate smart" development

Environmental, ecological, social and economic changes should be measured and mapped.

A regional approach is needed.

