Climate Change and Ocean Governance: Protecting Special Places in an Era of Change

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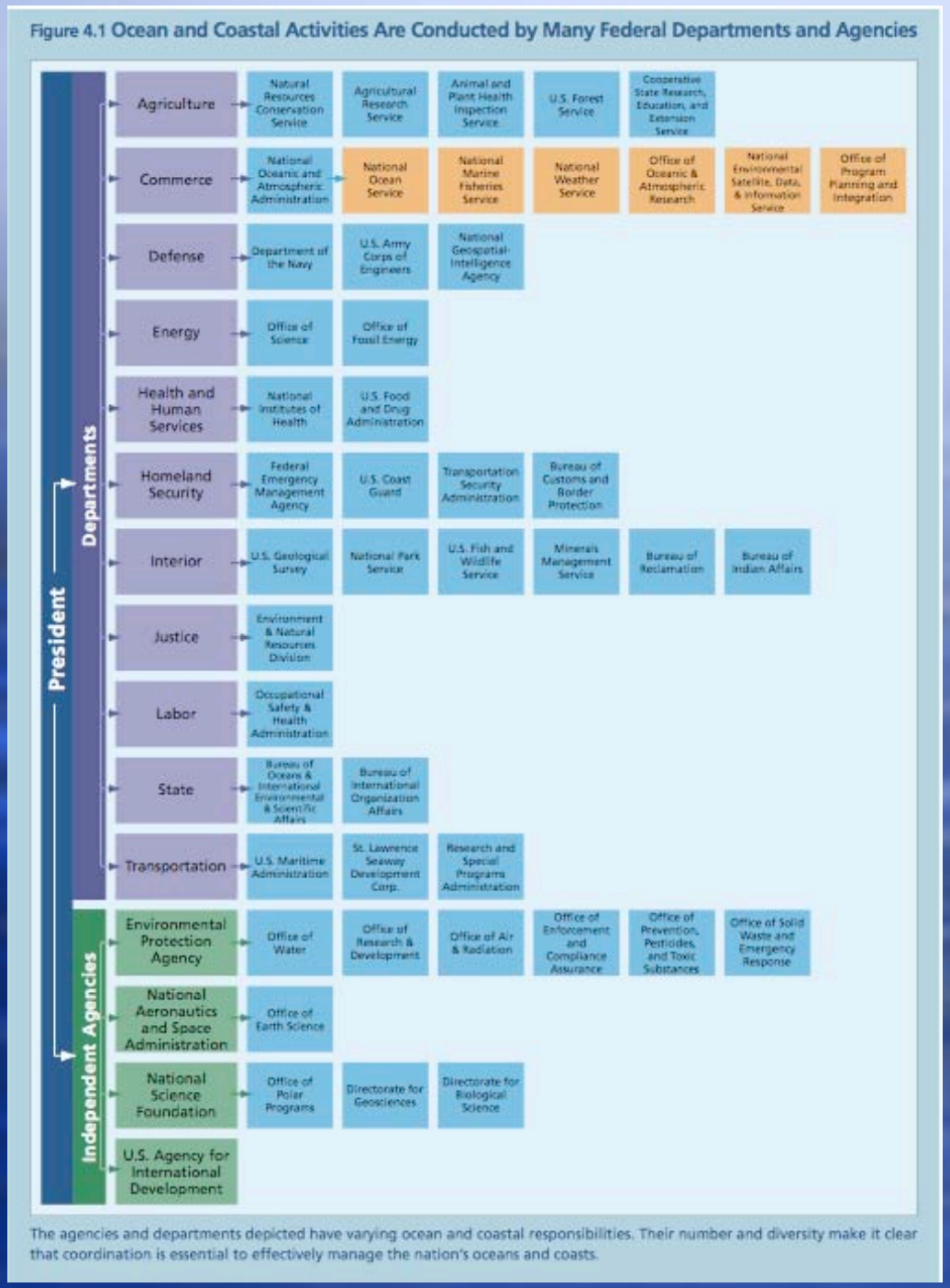
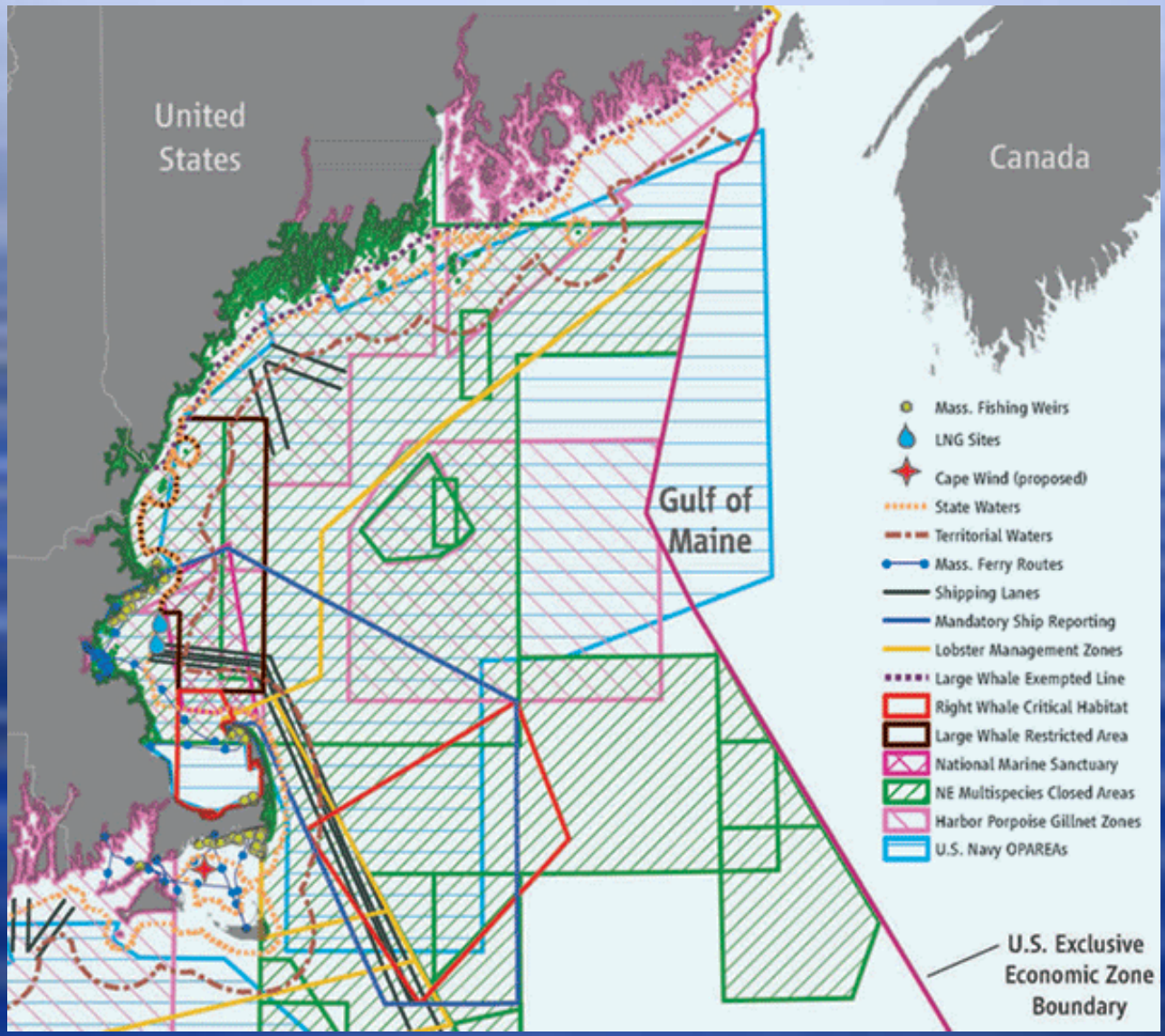


The agencies and departments depicted have varying ocean and coastal responsibilities. Their number and diversity make it clear that coordination is essential to effectively manage the nation's oceans and coasts.

Our Biggest Ocean Governance Challenge

- Regulatory fragmentation, or "too many cooks"
- In 2004, the U.S. Commission on Ocean Policy noted that 11 of 15 Departments + numerous sub-agencies + 3 independent agencies had some authority over ocean policy--and that's just the feds!

What Regulatory Fragmentation Creates



The Proposed Solution: Marine Spatial Planning

MSP in the U.S.: The Ocean Stewardship ive Order

The term "coastal and marine spatial planning" means a comprehensive, adaptive, integrated, ecosystem-based, and transparent spatial planning process, based on sound science, for analyzing current and anticipated uses of ocean, coastal, and Great Lakes areas. Coastal and marine spatial planning identifies areas most suitable for various types or classes of activities in order to reduce conflicts among uses, reduce environmental impacts, facilitate compatible uses, and preserve critical ecosystem services to meet economic, environmental, security, and social objectives. In practical terms, coastal and marine spatial planning provides a public policy process for society to better determine how the ocean, our coasts, and Great Lakes are sustainably used and protected--now and for future generations.

- July 19, 2010
- "America's stewardship of the ocean, our coasts, and the Great Lakes is intrinsically linked to environmental sustainability, human health and well-being, national prosperity, adaptation to climate and other environmental changes, social justice, international diplomacy, and national and homeland security."

Marine Spatial Planning and Climate Change

- Marine spatial planning (MSP) was introduced before governments really began to address climate change.
- MSP cannot do much to help with climate change *mitigation*.
- In addition, MSP runs the risk of creating static governance systems that will not keep pace with climate change impacts.
- My argument is that MSP can help and already is helping with climate change *adaptation*, but that MSP can be made more climate change adaptable.

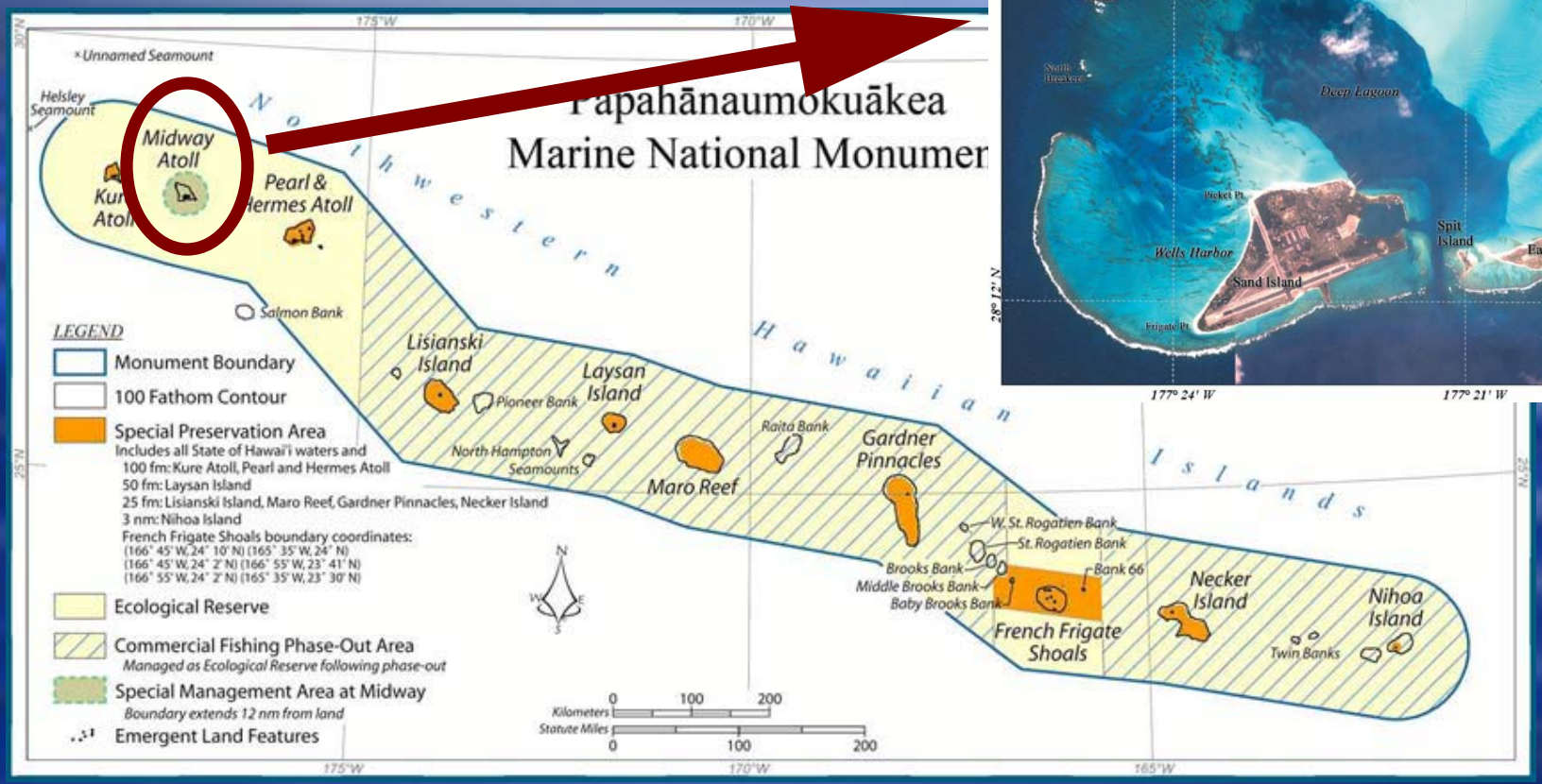
Three Climate Change Problems for MSP

- Changing ocean temperatures
  - Species move their ranges, especially poleward.
  - Certain uses also need to move, like salmon mariculture (Tasmania)
- Ocean acidification
  - Increases vulnerability of some ecosystems (coral reefs) and species (shellfish)
  - Interferes with certain uses, like mariculture (Puget Sound)
- Changing winds and currents
  - Changes upwelling patterns, which can shift species and/or create “dead” (hypoxic) zones
  - Change change use patterns, as in fishing or offshore wind developmemt

Adapting Marine Spatial Planning to Climate Change Adaptation

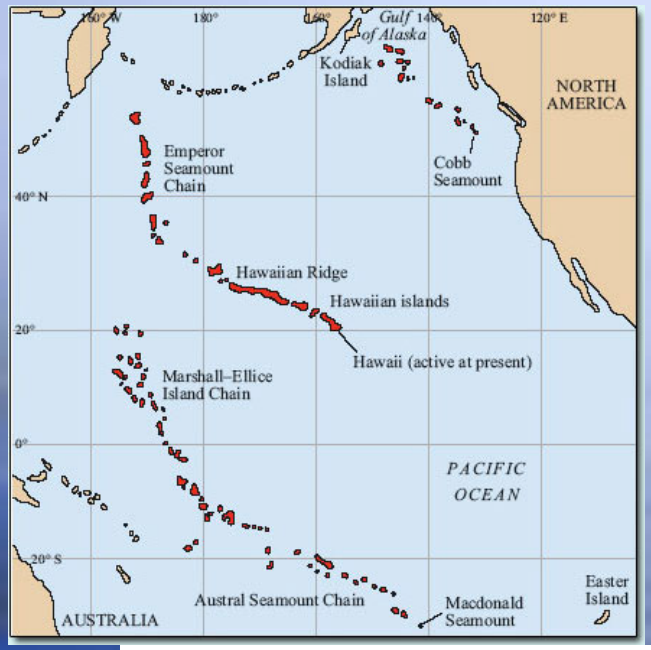
- Accidental Adaptation: How do existing (and generally static) marine protected areas and marine reserves set up for other purposes contribute to climate change adaptation?
- Conscious Adaptation: How are coastal nations incorporating climate change adaptation into MSP or vice-versa?
- Flexible Zoning: How can marine spatial planning be made more flexible to respond to climate change impacts?

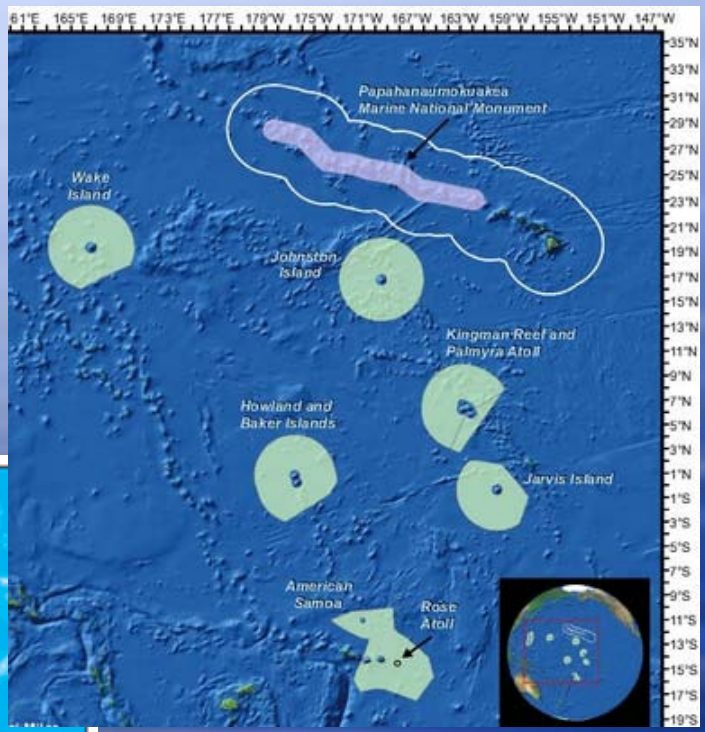
ACCIDENTAL ADAPTATION: The Papahānaumokuākea Marine National Monument



Adaptability to Existing Stressors

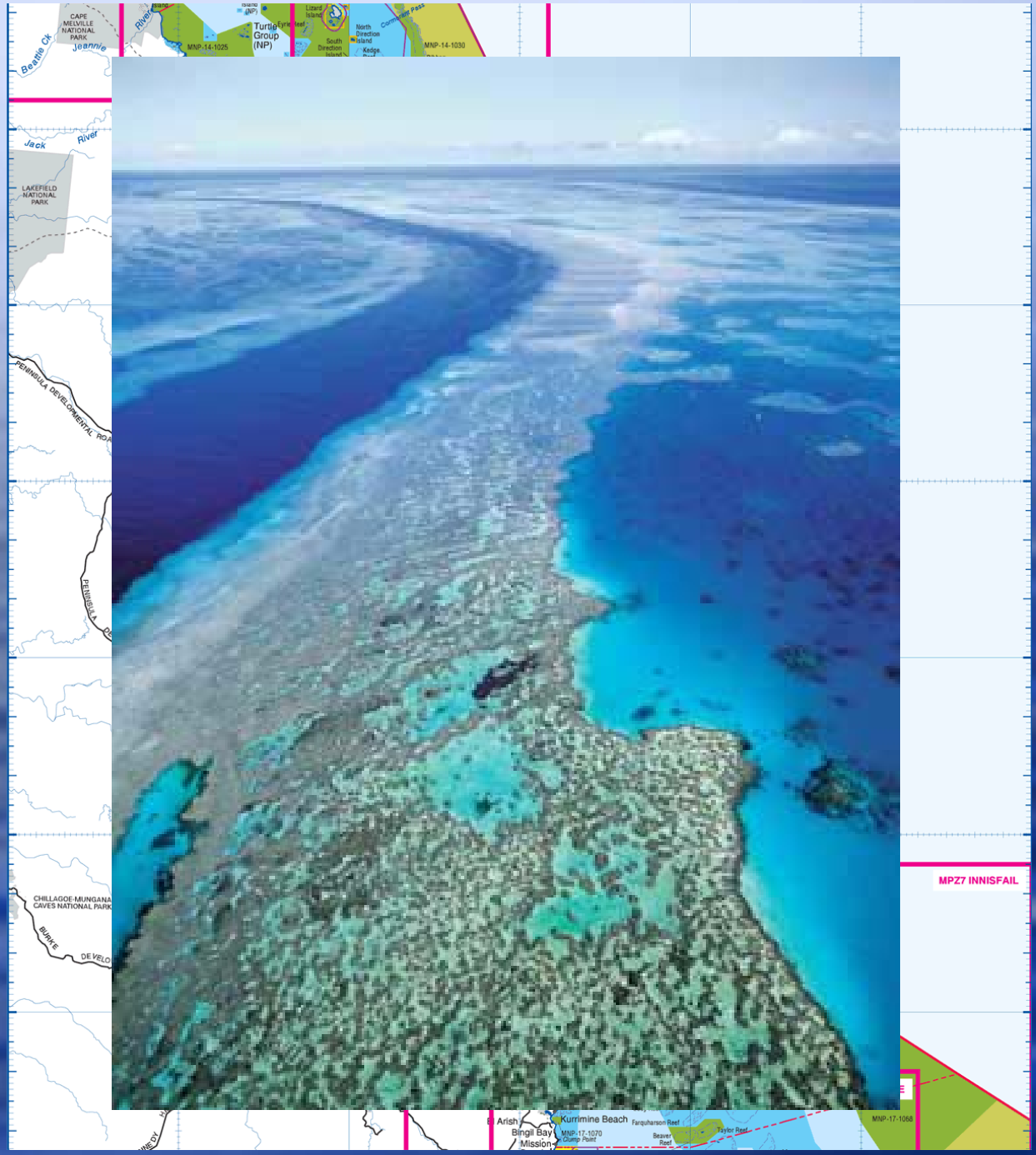
Reservoir & Refuge?





The Last Survivor?

CONSCIOUS ADAPTATION: The Great Barrier Reef



Climate Change and the GBR

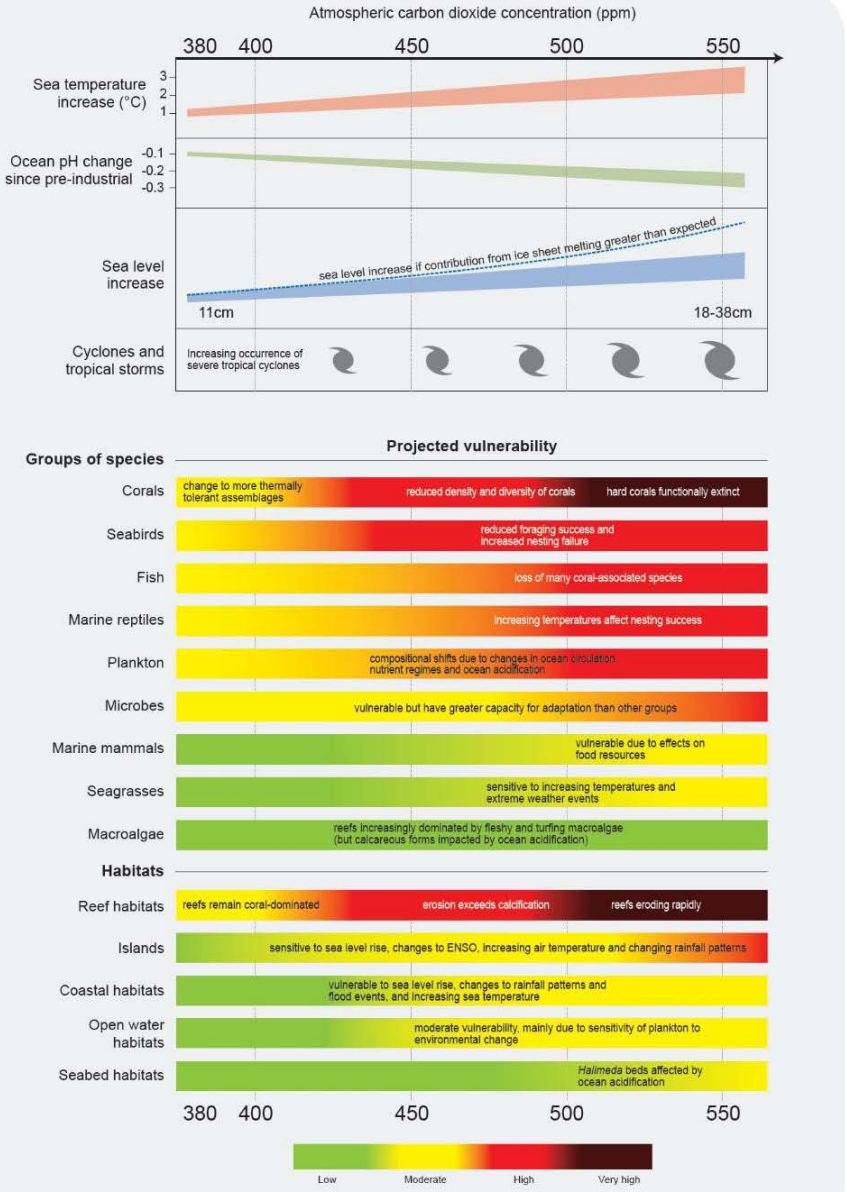
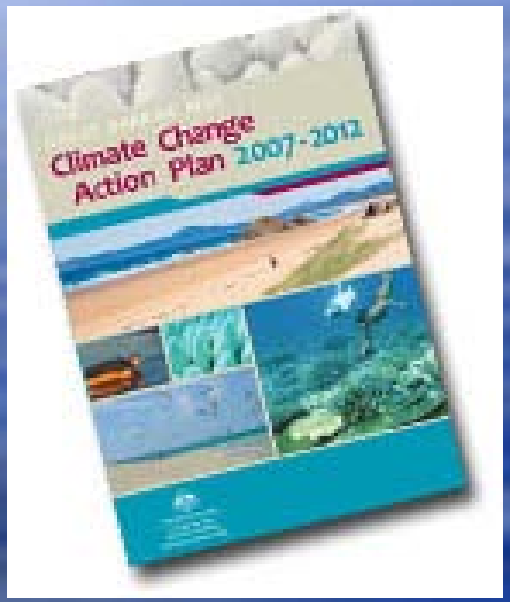


Figure 5.7 Projected vulnerabilities of components of the Great Barrier Reef ecosystem to climate change

This diagram shows projected vulnerability across a range of carbon dioxide concentrations. Changes in sea temperature, pH and sea level are indicative only, intended to demonstrate the scientific uncertainty around the likely values. The worst case scenario presented (550ppm) is equivalent to the Intergovernmental Panel on Climate Change scenario B1which was predicted to be reached by about 2100. (Figure adapted from values presented in IPCC 2007[1], Hoegh-Guldberg *et al.* 2007[4], and Johnson and Marshall[19])



Extending Promotion of Resilience to Existing Land-Based Stressors

- *Climate Shifts*, June 2009:

"In a major step to protecting the inshore reefs of the GBR, the Queensland Government have inacted fairly dramatic legislation on the use of fertilisers and pesticides on farms in the reef catchment. Under the new rules, farmers in the Mackay-Whitsunday, Burdekin Dry Tropics and Far North's Wet Tropic catchments must keep records on fertiliser usage and apply 'no more than the optimum amount of fertiliser to their soil'. The use of the pesticides Atrazine, Diuron, Ametryn, Hexazinone or Tebuthiuron are also subject to an array of new rules and regulations.

"Although not without controversy, this is great news for the reefs on the GBR. Over 32,000 tonnes of fertiliser (worth $32 million) leaches out into the Great Barrier Reef lagoon every year through overfertilisation on farms. There is strong scientific evidence showing that elevated pesticide and nutrients from the land associated with flood waters induce coral bleaching and mortality during flood years . . . ."

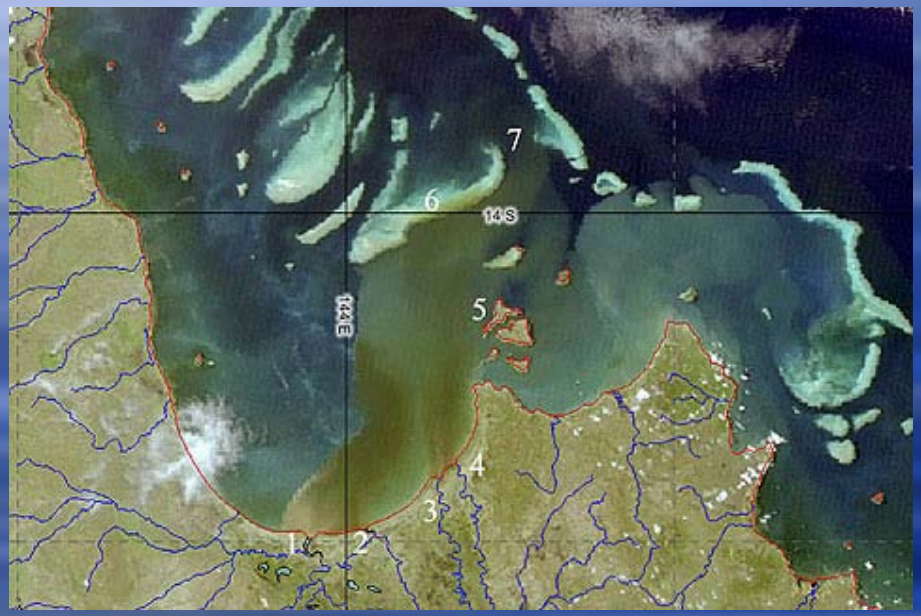


Photo Care of *Climate Shifts*

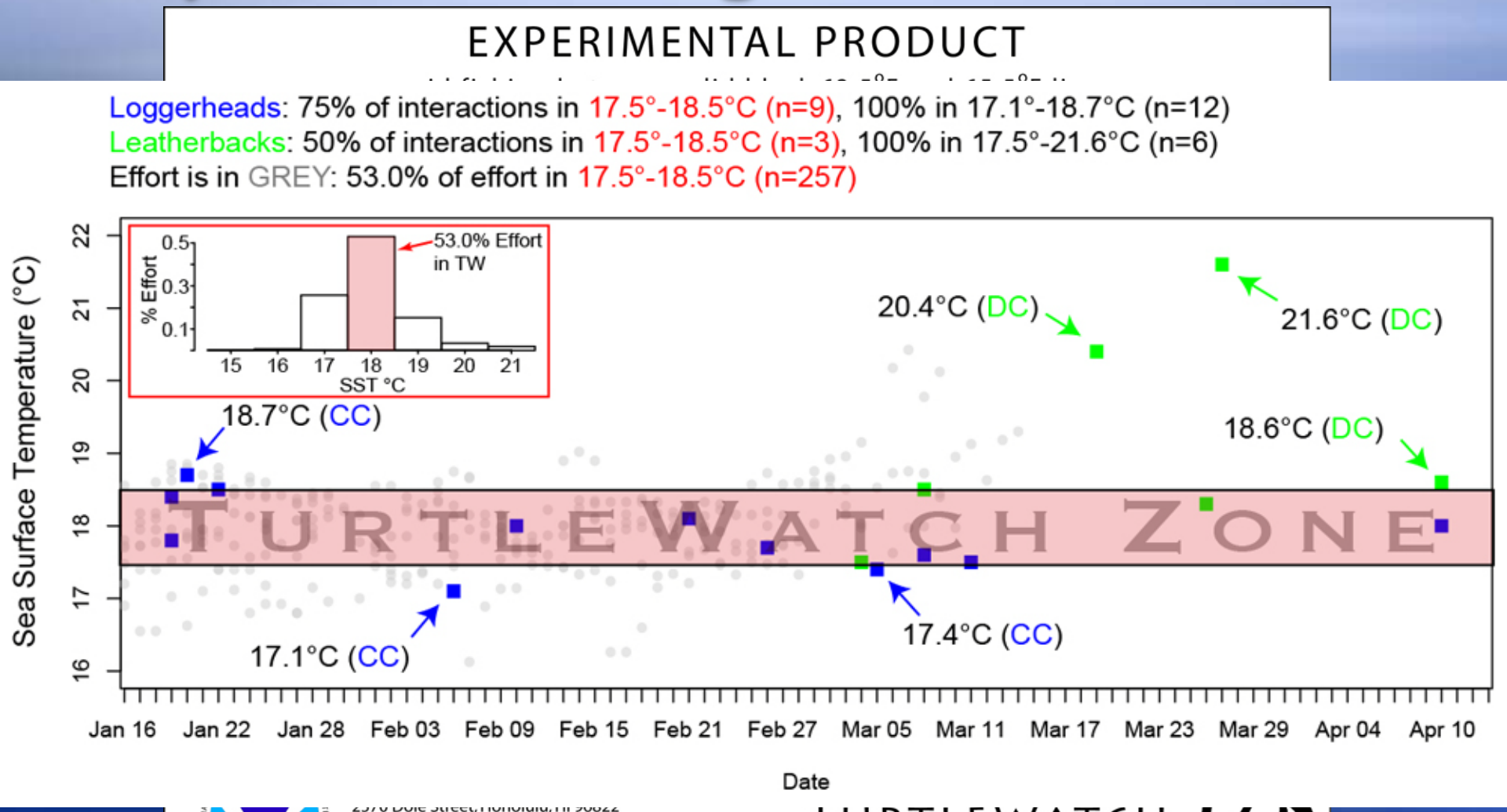
More Flexible Zoning: Anticipatory Zoning

The Arctic is one of the areas of Earth most dramatically affected by climate change.

Nations are already anticipating the opening of the Arctic Ocean to fishing, drilling, and travel.

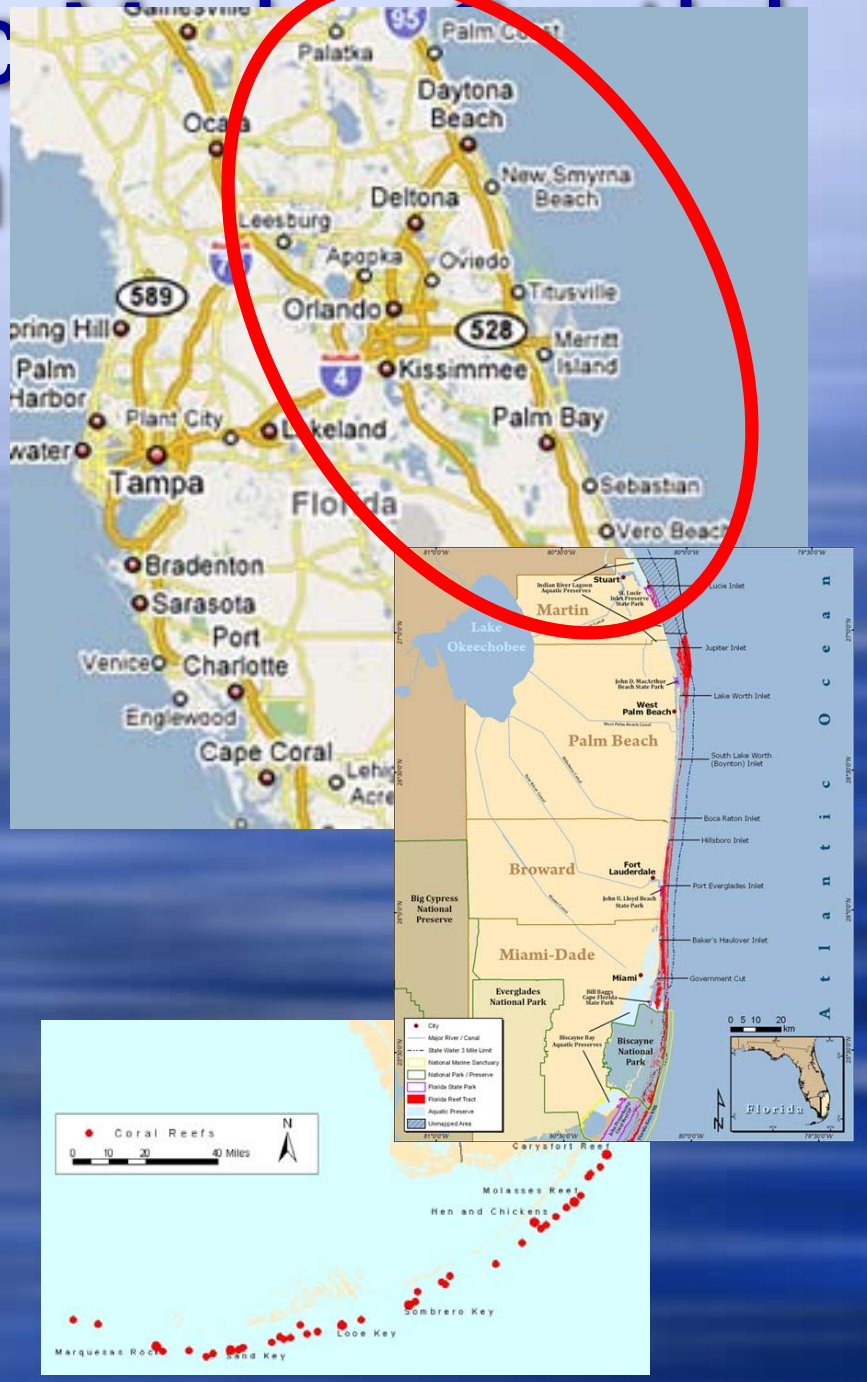
On August 20, 2009, the U.S. Secretary of Commerce, following recommendations of the North Pacific Fisheries Management Council pursuant to the Magnuson-Stevens Act, anticipatorily closed the Arctic waters off Alaska to fishing.

More Flexible Zoning: Dynamic Zoning & Turtle Watch



Toward Dynamic [illegible] Plann

- Eagle & Thompson et. al: After zoning, assign use rights to particular individuals/groups.
- Allows for bargaining over problems and needs to shift uses--e.g., land-based pollution or known shifts in fishing (El Niño)
- What if the concept were extended to areas that currently are not valuable but could become so under climate change impacts?



QUESTIONS?

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