Redesigning Conservation for Climate Change

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New Approach and Conservation

Climate change requires a new conservation paradigm. We can no longer just consider those factors that have already altered the physical environment; we must also consider the shape of things to come with a threat that is global in nature. Climate change will result in the loss of available habitat (such as sea ice in the Arctic), rising temperatures, altered precipitation patterns, sea level rise, acidification of the oceans and a host of other related effects. Traditional conservation approaches afford some buffer from these challenges but they may prove insufficient if we do not start considering what global, regional and local changes lay ahead.

As a conservation organization it is vitally important that WWF develop strategies for incorporating climate change into all of our activities if we want long term success. In order to do this WWF has developed an approach predicated on four basic tenets:

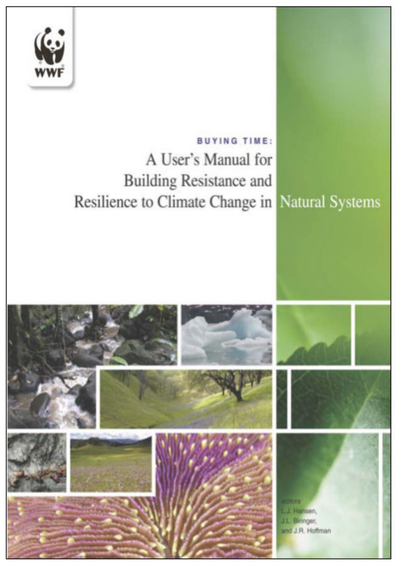
1. **Protect Adequate and Appropriate Space**
   Conservation has long relied on reserves and other protected areas. Climate change will require that we not only think about what species need now but what will they need as the ecosystem changes with the climate. Can we identify locations that are natural climate refugia? Can we hedge our bets, selecting locations with high heterogeneity (genetic, taxonomic and physical), including buffer zone, latitudinal, altitudinal, depth and other climatological gradients? Can we create corridors to allow species to move as they need to in response to climate change?

2. **Limit all Non-Climate Change Stresses**
   Climate change is not occurring in a vacuum. There are myriad stresses affecting our ecoregions, including habitat fragmentation, overharvest, invasive species and pollution. A limited body of research on interactions between climate and non-climate stresses exists and the bulk of the findings indicate that the interactions are negative. Therefore, to support ecosystem resilience you must reduce the number of simultaneous insults faced by an ecosystem. Fortunately many stresses are more locally controllable than climate change. Reducing these other stresses is not easy, but limiting overall stress can increase resilience.

3. **Start Adaptive Management Implementation of Strategies Today**
   Given uncertainty about the exact nature of ecosystem impacts from and response to climate change, effective management will require a proactive and flexible approach. The efficacy of various conservation approaches should be continually reassessed, and approaches adjusted as new information becomes available. We have enough information to begin implementing "do no harm" approaches. We run a greater risk of doing nothing and having windows of conservation opportunity close, leaving no options to protect ecosystems.

4. **Reduce the Rate and Extent of Climate Change**
   For some ecosystems it is not clear what actions can be taken to increase resilience. Loss of arctic sea ice, upslope migration of alpine meadows, rapid climate change on the edge of continents, all seem insurmountable for the species that live in these habitats. Even for other habitats we know that climate change above a 2°C global average will be a hard challenge to meet. The best hope for all systems is that we act quickly to limit the rate and extent of climate change.

Planting young mangrove trees helps build coastal resilience.



WWF Publication available at www.panda.org/climate/pa_manual

WWF provides additional detail on these approaches for the world's ecoregions in the book "Buying Time: A User's Manual for Building Resistance and Resilience to Climate Change in Natural Systems" (Available on-line at www.panda.org/climate/pa_manual).

Field Projects

Our aim is to have all conservation projects incorporating climate change into its conservation planning, and monitoring the effectiveness of adopted strategies. However many practitioners still feel at a loss for how to approach climate change. In order to provide further guidance we are steadily developing field projects. In addition to the mangrove and reef projects described on this poster, we are working to develop freshwater projects in the Himalayas and East Africa, and a marine project in the Barents Sea. We also want to work on places with some of the world's highest biodiversity like the Amazon, which are not immune to climate change. We aim to have field projects around the globe formalizing WWF's commitment to meet this dire conservation challenge.

WWF is already starting to test these approaches in the field. We highlight 2 examples on this poster:

1. Creating a Generalizable Model for Mangrove Resilience

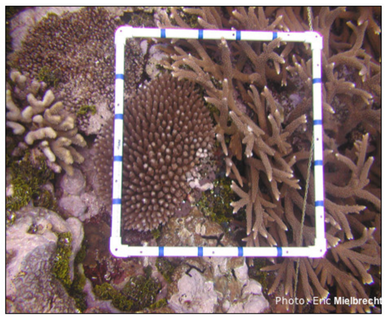
WWF is testing its approach to build resilience with Global Environment Facility (GEF) and partner co-financing in tropical mangrove areas of high biodiversity importance.

Mangroves live in estuaries at the interface of marine, terrestrial, and freshwater ecosystems, and are predicted to experience among the most dire consequences of climate change. They act as buffers between systems, which makes them hugely important for biodiversity and human communities. Mangroves are also indicators of the health of each system and of their interconnections. They act as nurseries for fish and invertebrate species that later live on coral reefs and in the pelagic zone, and they control aspects of water chemistry in estuaries and coastal zones. They can also serve as a buffer against storm surges and rising tides associated with climate change. Sadly, mangroves are among the most damaged and degraded of all ecosystems. Climate change is anticipated to make conditions even worse, adding a level of urgency to the need to take action to better protect them.

This project aims to build the capacity of natural resource managers to assess vulnerability and to adapt management strategies to respond to expected climate change impacts. Vulnerability assessments will be conducted in each focal area and this information will be used to craft adaptation responses.

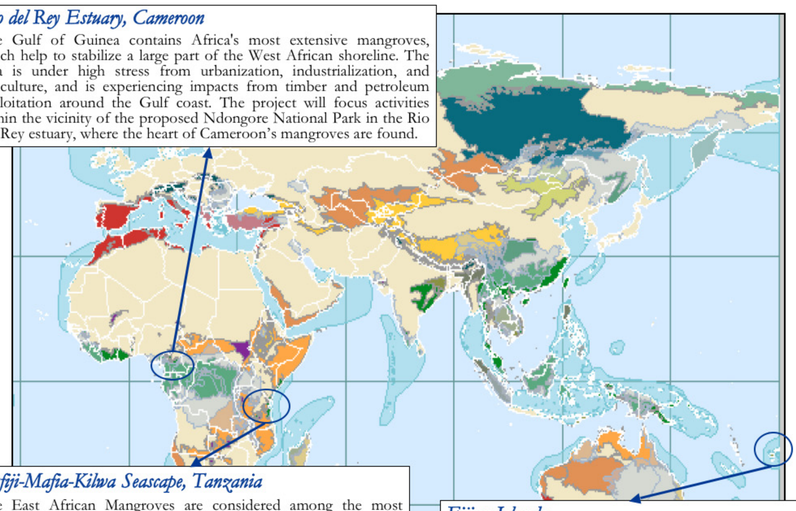
Initial vulnerability assessments and adaptation planning point to the need for mangrove protection, reforestation with "climate-smart species", integrated land-use and marine planning, as well as activities to improve resource use technology. Coordinating the testing of adaptation methods in geographically diverse locations within a common habitat type aims to increase the replicability so that the project results can be transferred to other conservation efforts around the globe.

Reforested mangrove.



Coral reef research, American Samoa.

Rio del Rey Estuary, Cameroon
The Gulf of Guinea contains Africa's most extensive mangroves, which help to stabilize a large part of the West African shoreline. The area is under high stress from urbanization, industrialization, and agriculture, and is experiencing impacts from timber and petroleum exploitation around the Gulf coast. The project will focus activities within the vicinity of the proposed Ndongore National Park in the Rio del Rey estuary, where the heart of Cameroon's mangroves are found.

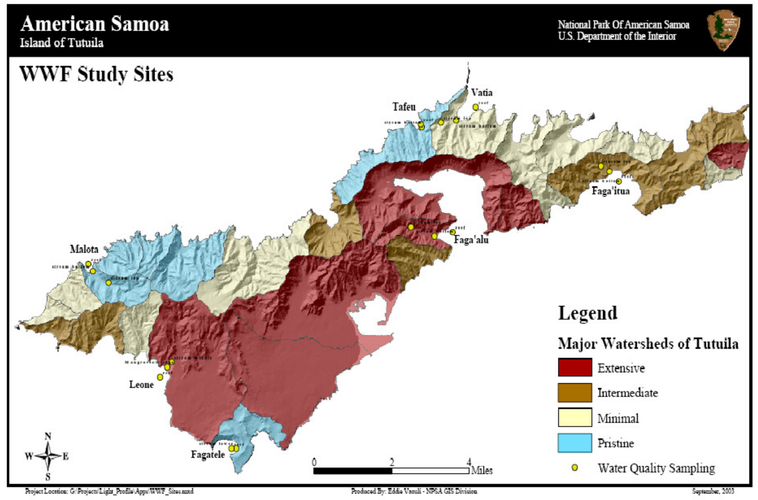


Rufiji-Mafia-Kilwa Seascape, Tanzania
The East African Mangroves are considered among the most threatened habitats in the world, with charcoal and timber industries, urban growth pressures, and mounting pollution problems confounding climate change impacts. Intensive shrimp farming and abundant coral reefs in the area present an opportunity to integrate marine and terrestrial assessments and resource management adaptation strategies. Project activities will concentrate on the mangroves of Rufiji Delta and the adjacent coral reef areas on the west side of Mafia Island.

Fijian Islands
Fiji has the third largest mangrove area in the Pacific Island region. Climatic variation across the larger islands in Fiji influences mangrove distribution and ecology, and different locations are expected to experience distinct effects of climate change. Project activities will take place across sites in five areas, including Verata, Votua, Viti Levu, Vanua Levu, and Yaqara.

2. Building Coral Reef Resilience in American Samoa

In a three year study supported by WWF, EPA, NOAA and the Territorial of American Samoa, we are exploring what factors can increase the resilience of American Samoa's coral reefs to coral bleaching due to climate change. Over time we have been monitoring coral reef responses to annual temperature cycles (often above the bleaching threshold), terrestrial run-off (especially nutrients), and level of protection. We are also examining variation between locations in the inherent properties of the corals themselves including protective compounds in their tissue and their associated zooxanthellae clades.



For more information on building resilience to climate change, please contact *WWF Climate Change Programme*:

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