Climate-SMART
Marine Protected Areas

Designing marine protected areas with explicit consideration of climate change impacts empowers communities to adapt to climate change. The first climate-SMART MPA in the country has been established by the municipalities of Lubang and Looc in Occidental Mindoro, Philippines.

CONSERVATION INTERNATIONAL
PHILIPPINES

Sustainably
Managed,
Adaptive,
Resilient,
Targeted

Marine
Protected
Areas

Climate change in the Coral Triangle

The Coral Triangle has the most diverse marine ecosystems in the world, with more than 500 species of coral, at least 3,000 species of fish and the greatest remaining mangrove forests on Earth, benefiting more than 150 million people. Its high biodiversity is only paralleled by the diverse threats to its persistence.

Climate change further aggravates local pressures through:

- sea surface temperature (1-4°C warmer by 2100)
- sea levels (~30-60cm rise by 2100)
- typhoons / storms (frequent and intense)

[Hoegh-Guldberg et al. 2009]

Protecting seascapes, corridors, and habitats remain the most efficient mechanism for buffering against climate change impacts. How does MPA design change if climate change threats are considered?

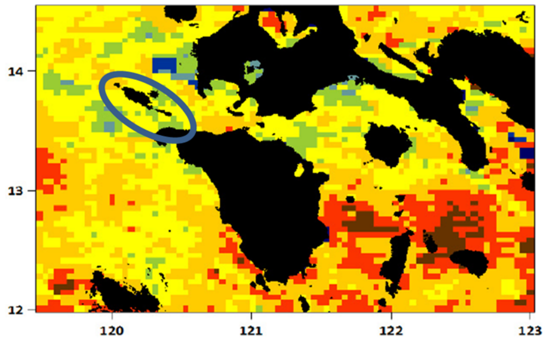
Designing resilient MPAs

Resilience is the capacity of a system to recover to its pre-disturbance state following perturbations. Given the costs and effort put into establishing MPAs and MPA networks, it is important to ensure that the areas selected for protection can withstand or recover from natural disturbances and improve ecosystem functioning.

Principles of resilience in MPA design [adapted from McLeod et al. 2009]:

1. Spread the risk: protect major habitats and replicate across different scales
2. Protect critical areas: migration routes, spawning aggregations, turtle nesting sites, etc.
3. Consider connectivity patterns: choose mutually replenishing sites and set proper size and spacing of MPAs
4. Encompass in a broader management framework: maintain minimum ecological functioning outside the MPA by regulating pressures

Vulnerability Assessment: identifying climate-resilient MPAs



Sea surface temperature increase in the Verde Island Passage Marine Biodiversity Corridor from 1985-2006. Areas marked in green have lower temperature changes over the last 21 years compared to red areas. [David et al. 2009]

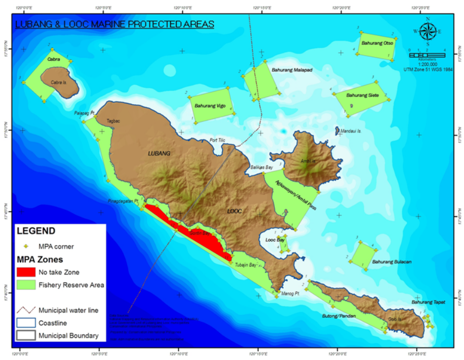
Identifying areas for protection that can better withstand the impacts of climate change require knowledge of the possible vulnerabilities of various habitats to these impacts. Information derived from historical satellite images, biodiversity surveys, and socioeconomic scoping provide measures of sensitivity and exposure to climate change projections. Vulnerability is assessed when these potential impacts are weighed against the ability of ecological and social systems to cope with expected changes (i.e., adaptive capacity).

On top of previous information requirements for establishing resilient MPAs, identification and incorporation of sites with low climate impact vulnerabilities for protection results in climate-resilient MPA configurations. Conservation International's vulnerability assessment of the Verde Island Passage represents the first comprehensive analysis of climate change impacts in the Philippines at a corridor scale.

Climate-SMARTing MPAs

Climate-SMART MPAs move beyond identifying areas that are inherently resilient to potential climate change impacts by incorporating social acceptability, adaptive management, and response mechanisms in the MPA management plan. "Resilience" and "adaptation" are both targeted to sustainably manage climate-SMART MPAs. These MPAs benefit from rigorous selection of climate-resilient areas and is further enhanced through adaptation mechanisms that actively respond to extreme climatic events (e.g., policies geared towards responsive and reactive, as opposed to passive, management). Governance also scales up as climate-SMART MPAs require large areas for protection that entails active inter-government collaborations and resource sharing.

Sustainably **M**anaged	- Maintaining ecological function, economic benefits, and socio-cultural identity for the well-being of most number of people and for the next generation
Adaptive	- Setting active response systems to climate change impacts while addressing the most pressing issues relating to fisheries and marine conservation
Resilient	- The area should have the inherent capacity to recover after a disturbance and remain ecologically functional in the face of changing climate
Targeted	- Site selection was targeted in order to achieve the primary objectives of MPA establishment



The Lubang-Looc Marine Protected Areas (Philippines) is the first climate-SMART MPA in the country and it is also the first MPA which is contiguous and jointly managed by two LGUs. It applied CI's climate change vulnerability assessment of the Verde Island Passage in its design and has explicit provisions for allowing full closure of fishery management areas when needed.

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