MARINE PROTECTED AREAS:

BUILDING RESILIENCE TO CLIMATE IMPACTS

IUCN WCPA WORLD COMMISSION ON PROTECTED AREAS

NATIONAL Marine Protected Areas CENTER

WHY AND HOW IS CLIMATE CHANGING?

CARBON DIOXIDE

Increasing surface, atmospheric, and oceanic temperatures since the mid-20th century are primarily caused by human activities, especially greenhouse gases emissions such as carbon dioxide, much of which is produced by the burning of fossil fuels.

Earth's average temperature has increased by over **1°C** in the past century, and scientists predict temperatures will continue to rise more quickly over the coming century.

HOW IS CLIMATE CHANGE IMPACTING THE OCEAN?

The ocean has **absorbed over 93% of the excess heat** from greenhouse gases, but its ability to buffer climate change impacts has become overloaded.

WARMING OCEAN

Sea surface temperature has warmed by nearly **0.8° C** since 1900. Warmer waters can damage or kill coral reefs, hold less oxygen to sustain marine life, change ocean currents, and generate more intense storms.

OCEAN ACIDIFICATION

The ocean has become **30%** more acidic over the past 200 years due to increased carbon dioxide, reducing the ability of marine life to form shells and skeletons and affecting the ocean food web.

RISING SEA LEVELS

Rising sea levels caused by warming ocean and melting glaciers affect coastal habitats and threaten coastal communities, including many major cities.

EXTREME WEATHER EVENTS

Stronger storms damage both human and ecological communities. Marine heat waves (extremely warm temperatures over extended periods) can cause mass mortality of marine species.

HOW MARINE PROTECTED AREAS (MPAs) HELP ADDRESS CLIMATE IMPACTS

MPAs can play a key role in promoting climate resilience as part of an ecosystem approach to management.

1. **Protect marine ecosystems** by reducing harmful impacts from non-climate stressors so that healthy resources can better withstand climate impacts and sustain lives and livelihoods.
2. **Protect "blue carbon" habitats** such as seagrasses, mangroves, and salt marshes that store huge amounts of carbon.
3. **Protect coastlines and coastal communities** from storm impacts (e.g., wetland, mangrove, and coral reef buffers).
4. As networks, **protect species on the move** due to climate impacts, and **provide "insurance"** if some MPA resources are harmed by climate-driven warming, disease, or storms by protecting them in other areas.

WHAT IS AN MPA?

MPAs are clearly defined geographic areas in the ocean that are dedicated to and managed for the long-term conservation of nature, together with the ecosystem services and cultural values they provide.

https://climate.nasa.gov/news/2671/long-term-warming-trend-continued-in-2017-nasa-noaa/;
https://www.epa.gov/climate-indicators/climate-change-indicators-sea-surface-temperature;
http://www.noaa.gov/resource-collections/ocean-acidification