# PACIFIC COASTAL WETLANDS: MARSHES, MANGROVES, SEAGRASSES, CORAL REEFS

OCEAN BIODIVERSITY CONSERVATION

## KEY POINTS

- Wetlands face many threats but are resilient ecosystems that benefit from integrated, ridge-to-reef management across sectors and within communities. Wetlands draw global attention because of their diversity, beauty, and valuable ecosystem services.
- Maintaining healthy coastal systems is important for adapting to and mitigating climate change impacts and for sustainable development. Coastal wetland ecosystems
  1. sequester substantial amounts of carbon and
  2. provide critical ecosystem services, livelihoods, and economic wellbeing for coastal peoples.
- Coral reefs are iconic Pacific habitats and living organisms that form the base of local economies, contribute to food security, coastal security and cultural identity.
- Global changes from sea level rise, rising sea surface temperature and ocean acidification are progressively reducing the biological and structural complexity of reefs and marine biodiversity. This could limit or even eliminate access to critical food sources.

## HOW ISSUE LINKS TO/IMPACTS SDGs BEYOND SDG14 LIFE BELOW WATER

- SDG1, 2: Sustainable management of our wetland resources is vital to achieve food security and to maintain local economies, primarily through fisheries and tourism.
- SDG12, 15: Responsible consumption and production with integrated terrestrial to marine management can help maintain wetland ecosystem function.

## BACKGROUND

1. **Wetlands are under pressure from local and global factors.** The main drivers of change in Oceania are unsustainable development, invasive species, and climate change. Specific impacts include nutrient loading, sedimentation, disease, predator outbreaks, overfishing, destructive fishing, and ocean acidification. Coastal habitat loss is between 0.5% and 3% of their global area each year, resulting in the release of 0.15–1.02 billion tonnes of $CO_2$ (equivalent to burning 423 billion litres of petrol).[1] Preservation of coastal habitats is globally valuable as a climate change mitigation measure.
2. **The value of wetlands is extensive and crosses many sectors.** Healthy wetlands are an important source of resources today and in the future. From shoreline stabilization, to the fisheries species that grow and feed in wetlands, to the bioprospecting possibilities of diverse reefs[2], Pacific wetlands provide essential ecosystem services and wealth.
3. **Wetlands feed us.** About 70% of the protein in the diet of Pacific islanders is from near-shore pelagic and inshore reef and lagoon fisheries. Wetlands are structurally complex habitats that support many species. Threats to wetlands also threaten nutrition, livelihoods, and incomes from reef fisheries and tourism. Pacific communities will need increased adaptation capacity, including access to alternate livelihoods, with particular attention to the food security gap created by the need to reduce fishing on reef systems.
4. **Wetlands protect our islands.** Coral reefs reduce the wave energy that reaches shores by >95% on average. Maintaining healthy wetlands is the most cost-effective method of stabilising shorelines.[3] At least 50% of Pacific islanders live within 1.5 km of the coast, and sustainable, integrated coastal development that maintains reef ecosystems is vital.
5. **We can boost resilience by reducing local pressures.** Wetland system resilience can be strengthened by removing local pressures, such as poorly managed development, overfishing or destructive fishing, eutrophication, sedimentation. Doing so requires commitments to management that ensure the sustainability of the values and resources that the wetlands provide, and incorporates environmental impact assessments.

SPREP PROE

UN environment

6. **Wetlands can provide some of their own solutions.** Hard engineering, watershed changes or poor agricultural practices can increase the levels of sediments and nutrients that enter the water, making the water murky from suspended soils or algal blooms, reducing the light available for coral endosymbionts or seagrasses to photosynthesise, and supporting algae that overgrow coral. Healthy littoral wetlands, such as marshes and mangroves, reduce the sediment load that reaches lagoons and reefs. This sediment accretion also buffers against sea level rise. Wetlands are key for freshwater provision.
7. **However, there is no "impact-free zone"**, and the complexity of balancing development with the needs of ecosystems requires informed, integrated planning. There is a risk of valuing structurally complex environments over environments that appear "simple", such as sandflats, despite the greater diversity and biomass of organisms on sandflats.[4] The Pacific region requires assistance in creating knowledge and Pacific capacity for Pacific-led management, incorporating local and traditional knowledge and practice.
8. **Wetlands are remarkably resilient.** As global changes proceed, the community structure of wetlands will change, but diverse ecosystems support each other. Creating spaces for wetlands to recover, by reducing external pressures, can support the ecosystems and therefore support Pacific communities that depend on wetlands.

## WETLAND FACTS

Seagrasses cover less than 0.2% of the ocean floor but store ~10% of the carbon annually buried in ocean sediments, and can locally buffer ocean acidification. Seagrasses are being lost at a rate of 1.5% per year and have lost approximately 30% of historical global coverage. The world's seagrass meadows can capture 24.9 million tonnes of carbon each year. An average hectare of seagrass stores 139.7 tonnes of carbon in its soil.[5] The tropical Indo-Pacific has the highest seagrass diversity in the world.[6]

Tidal marshes are being lost at a rate of 1–2% per year. They cover roughly 140 million hectares of Earth's surface, after a loss of more than 50% of their historical global coverage.

Mangroves are being lost at a rate of 2% per year and presently cover ~0.7% of land surface. Carbon emissions from mangrove deforestation form up to 10% of global deforestation emissions, while the remaining healthy mangroves export ~10% of particulate terrestrial carbon to marine sediments.[7] The Pacific islands contain 3% of the global mangrove area, supporting unique mangrove communities that provide valuable site-specific services and products. Papua New Guinea has the highest global mangrove diversity and hosts over 70% of the region's mangrove area.[8]

Reefs are being lost at 1% per year, although this pace may increase rapidly as bleaching events increase. See Pacific coral reef factsheet for further details.


1 Spalding et al. 2016. Atlas of Ocean Wealth. The Nature Conservancy
2 The Nature Conservancy, Reef Resilience website
3 Ferrario et al. 2014. The effectiveness of coral reefs for coastal hazard risk reduction and adaptation. Nature Communications 5:3794
4 Sheaves et al. 2016. Biotic hotspots in mangrove-dominated estuaries: macro-invertebrate aggregation in unvegetated lower intertidal flats. Marine Ecology Progress Series 556:31–43
5 Fourqurean et al. 2012. Seagrass ecosystems as a globally significant carbon stock. Nature Geosci 5:505–509
6 Short et al. 2007. Global seagrass distribution and diversity. J Exp Mar Biol Ecol 350:3–20
7 Alongi et al. 2014. Carbon cycling and storage in mangrove forests. Annu Rev 6:195–219
8 Gilman et al. 2006. Pacific island mangroves in a changing climate and rising sea. UNEP Regional Seas Reports and Studies No. 179