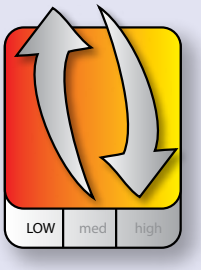
THEME **Coastal and Marine**

INDICATOR **Coastal fish biomass**

DEFINITION	Fish biomass for inshore fish populations
PURPOSE	Indicates inshore fish population status and reef health
DESIRED OUTCOME	Stable level of biomass; or juvenile fish are not overrepresented in markets



Status
Poor to fair

Trend
Mixed

Data confidence
Low

PRESENT STATUS

Inshore fish populations are complex, exist in variable and rapidly changing ecosystems, and are harvested and impacted by a broad range of users, making their management complex.

Coastal and inshore resources used for food, livelihoods, and cultural purposes are diverse and include more than the generic 'fish' as finfish. These resources are used by different people within Pacific societies; for example, women dominate in the collection and use of sea vegetables, crab, and shellfish, and coastal invertebrates are priorities for the cultural and commercial arts. For the purpose of this indicator summary, we focus on inshore vertebrate fish but as a proxy for the wide range of other organisms and resources.

At the regional level, coastal fish biomass data are limited and are not regularly collated in a single regional mechanism; historical assessments found 'average-to-low' or 'poor' condition of demersal fish stocks in about half of the studied sites (Johnson et al. 2018). Catch data are not reliable alone for coastal fish biomass measures due to the anticipated underestimation of subsistence catch. National State of Environment reports contain fish biomass assessments: several countries see the impacts of fishing pressure, declining sizes of fish particularly reef finfish, and boosts in fish biomass in areas with spatial protection or with lower fishing pressure due to risks of ciguatera poisoning or culture and diet shifts.

> **"The populations of many Pacific island countries and territories are growing but coastal fisheries resources, which provide the primary or secondary source of income for up to 50 per cent of households and 50–90 per cent of the animal-sourced protein consumed, are declining."**
>
> Noumea Strategy (SPC 2015)

As of 2015, large areas of the Pacific islands region were not under effective coastal fisheries management with at least 90% of coastal communities lacking viable coastal fisheries management systems (SPC 2015).

At the regional level, the status of this indicator was considered *poor to fair* with a *mixed* trend among sites. Due to the scattered and limited data available in a region with diverse coastal fish populations and heavy reliance on them, the confidence in the available data was ranked *low*.

Offshore oceanic fisheries have received a greater share of scientific monitoring and assessment than inshore fish populations. For more about oceanic fish, please see Regional Indicator: Commercial pelagic fish. Coastal ecosystems are also essential to the early life stages of many pelagic species.

1 Quoted in The Guardian, 11 June 2020, "'I raised hell': how people worldwide answered the call of World Oceans Day"

CRITICAL CONNECTIONS

Coastal fisheries, livelihoods, economies, and Pacific identities are intertwined. Coastal fish populations, their uses, and their users are diverse, and fisheries management must represent the communities who rely on them. Pacific men, women, and youth have different interactions with coastal species and ecosystems. There is a growing push to mainstream considerations of inclusivity in national and project-based management, for equitable access to benefits and decision making (SPC 2015).

Community-led and ecosystem-based approaches to coastal management are in line with Pacific traditions and with the best of modern, inclusive fisheries management.

Sustainable fisheries take has innumerable benefits for Pacific ecosystems and biodiversity. In today's changing world, sustainable fishing practices alone might not be sufficient to ensure the survival of Pacific fisheries. We can no longer expect stable fish biomass without attention to ecosystem health from land to sea.

Maintaining and restoring healthy coastal ecosystems and biodiversity will support Pacific people and the Pacific development pathway. In contrast, the loss of biodiversity and habitat has disproportionate, poorly quantified, and emerging impacts on coastal fish biomass with flow-on effects for people.

The dominant threat of climate change affects habitats and species through ocean warming, extreme events, and ocean acidification. These factors can change the prevalence of disease and where species live, including the ranges of invasive species.

We know much less about marine invasive species compared to terrestrial invasives. We do already know that invasive species on land affect watersheds and coastal environments, including water quality. Ridge-to-reef or watershed scale management can support coastal fisheries from the habitat up.

Waste management is a fisheries problem, with land run-off affecting water quality and with plastics already found in the guts of most studied Pacific species (see Regional Indicator: Marine plastic pollution). Fisheries itself can be part of the waste management problem through discarded or abandoned fishing gear and through practices such as the use of car batteries as weights or anchors.

Today's threats to coastal fish and habitats are both local and global, area-based and transboundary. Unified regional approaches have a unique power in calling for international protection of marine life and habitats. Pacific leaders recognize this protection as essential to their chosen development pathways. As an anonymous conservation coordinator in Hawai'i said, "Subsistence fishing is their birthright; the degradation of the marine environment is a violation of this right."[1]

PRESSURES & OPPORTUNITIES

The biomass of fish is only one factor when considering fisheries sufficiency: the demand for fish by a growing human population with changing demands must be considered. A stable trend in coastal fish biomass might be insufficient to feed a growing Pacific population if traditional dependence on ocean foods is maintained (SPC 2015). Eleven of the 21 Pacific countries and territories are projected to have 'fish deficits' by 2035 with another five expected to face challenges in redistribution (Bell et al. 2009; six of nine Pacific members of the Commonwealth, see Table 5.4 in Govan 2017).

Tuna might be needed to supply 25% of the demand for Pacific food security by 2035 given the projected shortfall from coastal fisheries in 16 of 22 Pacific island countries and territories (Bell et al. 2015). A study in 38 USA-affiliated Pacific islands showed a relationship between human population density and steep size spectra of reef fish (Robinson et al. 2016), providing more evidence that growing populations and fishing intensity is changing reef communities and affecting local food security.

In combination with fishing pressure, coastal fish in the Pacific islands face the challenges of habitat loss, climate change, invasive species, and pollution, particularly water quality and marine plastics. Many of these new threats cross boundaries.

Fish populations depend on other species and habitats for their survival, with their requirements varying throughout their life stages. Coastal fish habitats, particularly vegetated wetlands, are declining throughout the Pacific islands region; for more, see Regional Indicator: Wetlands. To save habitats and species, spatial protection can be a powerful tool and has a long traditional history in the Pacific; for more, see Regional Indicators: Protection of Pacific spaces..

Community-led and community-based approaches focused on maintaining and restoring habitats and source populations, in combination with diversified fishing, are recommended as a key element of sustainable Pacific fisheries and food security (Bell et al. 2018). With Pacific traditions of land tenure and community management, spatial protection of fishing areas has been adopted at many sites and times in the islands

serving as a global example (Box 11.1). Sustaining and monitoring the impacts of this protection, on fisheries and on all sectors of society, is a key information challenge for the islands (Michalena et al. 2020).

Disaster risk management at the subsistence, artisanal, and local commercial fisheries scale is essential in this remote and vulnerable region. Coastal habitats, fisheries fleets, and coastal infrastructure such as ports can suffer heavy impacts from natural disasters, such as flooding and cyclone damage, with these risks increasing under climate change. Coastal fisheries are also an essential ingredient of resilience and food security under any disruption, as early findings during the COVID-19 pandemic are already illustrating (LMMA Network 2020).

Aquaculture is still relatively uncommon in the Pacific islands region, but communities are exploring culturing options as part of their local food systems (for example, see Kinch et al. 2019).

Only 8% of coastal communities receive coastal fisheries management support (Govan 2017) despite their dependence on fishing. Support for development is rarely distinguished from support for actions to improve ecosystem health. In addition, many national budgets report combined instead of disaggregated accounts of income from agriculture, forestry, and fishing, which together contribute about 15% on average of the national GDP for Pacific island countries, reaching up to 25% for countries like Federated States of Micronesia and Vanuatu (World Bank's World Development Indicators). For more about budgeting for environmental management, see Regional Indicator: Environment Ministry budget allocation.

BOX 11.1: COMMUNITY CONSERVED AREAS (SUCH AS LMMAS)

A large share of land and marine areas in the Pacific islands region are under customary ownership and traditional land tenure. Community engagement is not only beneficial, as it is in other regions, but is also part of a long-standing Pacific tradition.

A Locally Managed Marine Area (LMMA) is an area of nearshore waters and its associated coastal and marine resources that is largely or wholly managed at a local level by the coastal communities, land-owning groups, partner organisations, and/or collaborative government representatives who reside or are based in the immediate area. LMMAs place communities at the centre of marine management.

As of 2017, over 600 communities spanning 7 countries had established 420 community managed areas, most of which include some form of 'closed' marine protected area (MPA). The primary motivation has been the "community desire to maintain or improve livelihoods, often related to perceived threats to food security or local economic revenue." In Fiji, more than 250 villages had established LMMAs by 2009, covering some 10,745 square kilometres of coastal fisheries, or more than 25% of Fiji's inshore area. Most anecdotally report rapid and appreciable increases of marine resources within closed areas, and an increasing body of literature confirms these observations.

This traditional approach to conservation, in the form of community conserved areas, must be considered when assessing protected area coverage. These areas have played a fundamental role in the conservation of biodiversity in the Pacific islands region and will continue to do so. LMMAs are a contributor to biodiversity conservation, and their implementation by over 600 communities in the region represents a unique achievement. However, while important, LMMAs cover only approximately 13,000 square kilometres, making a relatively small contribution to the overall protected area.

Source: LMMA statistics from Alifereti Tawake, 2017

REGIONAL RESPONSE RECOMMENDATIONS

In accord with national and regional recommendations from the Noumea Strategy (*New Song*; SPC 2015) and other national and regional frameworks, Pacific island countries and territories and their partners are encouraged to focus their efforts on the following tasks to support progress towards the desired outcome:

- Identify needs for inshore fish population measurement and management, in consultation across sectors and with consideration of sustainable self-reporting or citizen science;
- Monitor coastal fish populations in terms of biomass and individuals, recording size-at-sale and size-at-age data for market fish, and collate biomass data at the regional level;
- Conserve and restore essential coastal fish habitat, in consultation and ensuring sustainable access of priority stakeholders for priority uses;
- Measure spending on the environmental aspects of fisheries management as separate from the governance and development or infrastructure of fisheries;
- Facilitate learning exchanges among countries, particularly for effective fish biomass monitoring;
- Plan for management of inshore fish populations under changing conditions, including aspects of resilience and preparedness such as disaster risk reduction and food security in the context of extreme events;
- Partner for environmental management of inshore fish populations, their essential habitats, and the ecosystems and biodiversity that support inshore fish populations; and
- Partner for mitigation of regional and transboundary hazards that threaten coastal fish populations, with attention to the Pacific priorities of climate change, invasive species, and waste management.

There are multiple active projects in the region and multiple agencies tasked with the management of Pacific fisheries. The environmental aspects of coastal fish and their habitats and supporting ecosystems are considered by two main CROP agencies in the Pacific: Pacific Community (particularly the Coastal Fisheries Programme in the Division of Fisheries, Aquaculture and Marine Ecosystems) and the Secretariat of the Pacific Regional Environment Programme. Regional non-governmental organisations are also key players, alongside national and community-led initiatives. Communication and harmonisation of efforts among all these actors is a growing priority for the region.

INDICATOR IN ACTION

SDGs 2.4, 14.4, 14.7 · SAMOA Pathway · Convention for the conservation and management of highly migratory fish stocks in the western and central Pacific Ocean · Noumea Strategy 2015 (*New Song*) · Regional Environment Objectives 2.1, 2.2 · Pacific Islands Framework for Nature Conservation 2, 5

FOR MORE INFORMATION

SPC Fisheries Newsletters, Women in Fisheries bulletins, and other information bulletins provide a source of island-specific information for the region; see: https://coastfish.spc.int/en/publications/bulletins

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Kinch J, Yabakiva M, Waqainabete P, Nalasi U, Pickering T, Ravunamoce P, Romeo A (2019) Exploring the market potential for Fiji's Rewa River oysters. SPC Fisheries Newsletter #160 - September–December 2019

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SPC (2015) A new song for coastal fisheries – pathways to change: The Noumea strategy. Compiled by the Secretariat of the Pacific Community, Noumea.

SPREP PROE

The Secretariat of the Pacific Regional Environment Programme (SPREP) supports 14 countries and 7 territories in the Pacific to better manage the environment. SPREP member countries and members of the Pacific Roundtable on Nature Conservation (PIRT) have contributed valuable input to the production of this indicator.
www.sprep.org

National and regional environment datasets supporting the analysis above can be accessed through the Pacific Environment Portal.
pacific-data.sprep.org

For protected areas information, please see the Pacific Islands Protected Area Portal.
pipap.sprep.org