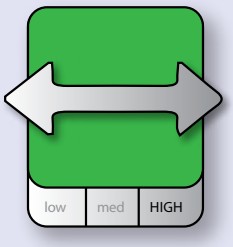
THEME **Coastal and Marine**

INDICATOR **Commercial Pelagic Fish**

DEFINITION	Trends in biomass of tuna species
PURPOSE	Track the health of this important component of the ocean ecosystem
DESIRED OUTCOME	Stable biomass catch



Status
Good

Trend
Stable

Data confidence
High

CRITICAL CONNECTIONS

The many social and socio-environmental benefits of pelagic fisheries are threatened by losses of Pacific biodiversity and ecosystem health. There has been significant effort to ensure that the economic benefit from fisheries resources is directed to Pacific people; these benefits must also be used to support the Pacific environments, species, and ecosystems that underpin the fishing economy.

With their time at sea, fishers are important allies in the journey to understand, measure, and monitor Pacific species. Fishing vessels can also carry modern data collecting instruments to monitor biological, chemical, and physical processes in the ocean, particularly important in the vast and remote Pacific region. The rate of bycatch and status of threatened species that are at risk from fishing gear are useful proxies for the health of Pacific biodiversity and fishing practices.

Fishing and fishing vessels are a potential source of waste, including plastics, that affect marine life and the people using those marine species. Between 2013 and 2017, WCPFC observer reports of waste disposal, including fishing nets, fell from 48.8% of reports in 2013 to 9.2% of reports in 2017 on vessels monitored by observers, showing reduced fisheries-based marine pollution at least on observer-monitored vessels (Ewell et al. 2020).

Tuna are an essential component of Pacific food security, itself integral to island resilience and independence. The safety of tuna as a food relies on international cooperation to prevent pollution: for example, women in six Pacific island countries showed high body loads of mercury linked with their seafood-intensive diet and the far-reaching, transboundary nature of mercury pollution (Bell 2017).

PRESENT STATUS

Fishing is a complex topic with many species and ecosystem components as well as social, cultural, political, and economic components. Here, we focus on the defined indicator regarding tuna, considering the biomass of these pelagic fish as well as the ecosystems that support these fish. For information about coastal and nearshore fisheries, please see Regional Indicator: Coastal fish biomass.

The dominant Western and Central Pacific Ocean industrial fisheries include skipjack tuna (*Katsuwonus pelamis*; last assessed in 2019), yellowfin tuna (*Thunnus albacares*; assessed in 2017), bigeye tuna (*T. obesus*; assessed in 2017/2018) and South Pacific albacore tuna (*T. alalonga*; assessed in 2018) (Brouwer et al. 2019; FFA 2019). Pacific bluefin tuna are rarely caught by Pacific islands fleets or in the Exclusive Economic Zones (EEZs) of Pacific island countries.

At the global level, these four species are listed on the IUCN Red List as follows:

SPECIES	COMMON NAME	GLOBAL STATUS	POPULATION TREND
Katsuwonus pelamis	skipjack	Least concern	stable
Thunnus albacares	yellowfin	Near threatened	decreasing
Thunnus obesus	bigeye	Vulnerable	decreasing
Thunnus alalonga	albacore	Near threatened	decreasing

Data regarding tuna biomass and catch in the Pacific islands region are routinely collected and reported by the Western and Central Pacific Fisheries Commission (see WCPFC Tuna Fishery Yearbooks), Pacific Islands Forum Fisheries Agency (FFA), and key partners including the Oceanic Fisheries Programme of the Pacific Community (SPC) Division of Fisheries, Aquaculture and Marine Ecosystems. Data are available for the WCPFC area and some national stocks at the Pacific Data Hub at https://pacificdata.org/. Although fisheries summary data are provided with annual interpretation, it is more difficult to obtain biomass estimates of natural populations, in addition to the fisheries catch, for each Pacific country. Nevertheless, the quality and availability of data regarding tuna populations represents one of the best data management systems in the Pacific islands region.

Based on the concept of maximum sustainable yield, all four main tuna stocks are considered healthy by the WCPFC and FFA. In 2017, the assessment of bigeye tuna populations resulted in a positive upgrade of the stock status. The present status of this regional indicator is considered *good*. The overall tuna catch is increasing with increasing or stable trends in the catch of most species, without overfishing; for this reason, the trend is considered *stable*.

From a fisheries perspective, it is considered satisfactory that the fish stocks are available and within the measure of maximum sustainable yield. From an ecosystem perspective, it is concerning that all major pelagic stocks in the region are fully exploited and that the populations of three of the main species are declining.

Discussions of this indicator should consider the desired outcome: stable catch in terms of biomass alongside reliable income and food security for Pacific people. One projection suggested tuna must supply 25% of the protein 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). The Regional Roadmap for Sustainable Pacific Fisheries adopted by Pacific Islands Forum Leaders in 2015 called for an additional 40,000 tonnes

of tuna to be available for regional consumption in 10 years, by 2025. The actual take for consumption within the region is not adequately reported, although one estimate from 2016 suggested 29,000 tonnes entered local market, equivalent to 0.8% of the total catch by locally based vessels in the region (SPC 2020).

From projected climate change scenarios and forecasted temperature patterns, we expect to see uneven trends in countries within the region benefiting from the tuna resource. Layering on the uncertain impacts of ocean acidification, pollution, and other environmental challenges alongside the known role of tuna as keystone pelagic species, there is cause for concern for the Pacific Ocean ecosystems under continued socio-ecological change alongside continued fishing pressure.

Management must consider these factors to ensure that Pacific people and Pacific ecosystems are resilient into the future.

National trends in the biomass of tuna species might differ from the regional trend given where tuna live, which shows evidence of spatial variation with climate change. For example, the Cook Islands (State of Environment Report 2018) consider that albacore and skipjack remain vulnerable even though catches are within maximum sustainable yield, bigeye tuna are considered overfished, and yellowfin are considered fully exploited. The overall increase in total tuna catch is interpreted as more pressure on this natural resource. In response, the Ministry of Marine Resources increased their effort for data collection and fisheries observers on long liners.

PRESSURES & OPPORTUNITIES

The EEZs of Pacific island countries and territories provide about 30% of the world's tuna catch, with Pacific catch counting more than 1.5 million tonnes in 2016 (Johnson et al. 2018). License fees for foreign distant-water fishing vessels have increased by 400% in the last two decades, creating economic gains for the islands, but comparable future increases are less likely (White et al. 2018; Bell et al. 2015).

Illegal, unreported, and unregulated (IUU) fishing is a direct threat to tuna populations and to other Pacific species. The large size of Pacific EEZs and limited capacity for enforcement are priority challenges in the fight against IUU fishing.

Fishing is expected to be the largest pressure on tuna populations at least until the middle of this century. That said, attention to other drivers of ecosystem health will benefit tuna populations and attention to sustainable fishing practices will benefit many other marine species and ecosystems.

Whether the catch is 'sufficient' to meet the needs of Pacific people and goals of Pacific governments depends not only on the biomass of the fish species but also on the human population growth and the balance of economic benefit. In the Pacific, multiple organisations take on the task of advocating for equitable socio-economic benefits from tuna fisheries.

In contrast, the environmental aspects of tuna fisheries are less known and receive fewer management resources. Tuna rely on the underlying health of many species and marine environments. In turn, sustainable fishing practices benefit Pacific biodiversity as a whole.

Unintentional harm to non-target species is perhaps the most obvious hazard associated with tuna fisheries, although progress has been made to reduce bycatch and protect threatened Pacific species (see Regional Indicator: Status of migratory species of concern). Bycatch is addressed through the use of Conservation Management Measures and alterations in fishing gear or practices, including the location and time of fishing with specific gear. The present WCPFC ban on the use of either shark lines or wire traces in longline sets may help reduce the catch of silky and oceanic whitetip sharks, but a ban on both would be more effective (Brouwer et al. 2019).

Tuna are caught in large commercial fisheries and small-scale tuna fisheries, some of which use fish-aggregating devices (FADs) that can affect the rate of bycatch (Box 10.1). Fishing gear, including FADs, as well as vessel fuel and wastes are potential contributors to Pacific pollution levels, carbon emissions, and air quality. Marine pollution and ship-derived air pollution affects human and marine life in the Pacific islands.

Climate change will have direct and indirect effects on tuna (Johnson et al. 2018). These changes will have varying impacts across the region: "Cook Islands, French Polynesia, Fiji and Vanuatu might benefit from future opportunities for greater engagement in supply chains. The progressive eastward shift in skipjack tuna is likely to have negative effects on the contributions of tuna fishing to government revenue and tuna processing to GDP for other nations in the western Pacific (e.g. Papua New Guinea, Solomon Islands)" (Johnson et al. 2018). Our knowledge of the impacts of ocean acidification on juvenile and adult tuna is only emerging.

Practices onboard, including sustainability and conservation measures, are monitored by fisheries observers. Since 2010, 100% observer coverage of the purse seine fleet has been mandated with a temporary exception in 2020 due to the COVID-19 pandemic. In contrast, less than 5% of the roughly 3,000 longline vessels in the WCPO carried observers as of 2018. On a small number of vessels, observers can face intimidation or worse: observers reported intimidation or obstruction on only 1.5% of trips in 2017, down from nearly 6% in 2013, although the WCPFC stopped reporting of crew mistreatment in 2015 (Ewel et al. 2020). The Association of Professional Observers notes ten deaths of Pacific island fishery observers at sea in the past decade. To protect regional observers, the 2017 *Conservation and Management Measure for the protection of WCPFC Regional Observer Programme Observers* was adopted by WCPFC Members. The security of onboard observers is essential for the sustainable management of healthy tuna populations and other Pacific biodiversity.

BOX 10.1: IMPROVING THE SUSTAINABILITY OF FADS

The Western and Central Pacific Ocean has the largest number of drifting fish-aggregating devices (FAD) deployments in the world with over 30,000 deployed each year (Escalle et al. 2019 and references therein). Nearshore FADs can help improve access to tuna by small-scale fishers (Bell et al. 2018).

However, FADs can create entanglement and bycatch problems and contribute to marine pollution. These are significant hazards to priority Pacific migratory species (see Regional Indicator: Status of migratory species of concern), and bycatch avoidance is a key consideration in FAD design, specifically referenced in the 2018 WCPFC *Conservation and Management Measure of Sea Turtles*.

There has been less effort in the Pacific to ensure the use of biodegradable FADs, which can reduce pollution and shorten the time of bycatch risks although even biodegradable FADs can cause damage to fragile habitats such as coral reefs. In 2019, the International Seafood Sustainability Foundation (ISSF) released a Non-Entangling and Biodegradable FADs Guide. The first two workshops in the Pacific region were held in Federated States of Micronesia and Papua New Guinea in 2019 supported by ISSF and Common Oceans ABNJ Tuna Project. Skills and available biodegradable materials to replace FADs after storm damage or wear can be assets for the resilience of small-scale fishers (Bell et al. 2018).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REGIONAL RESPONSE RECOMMENDATIONS

The environmental aspects of fish and their habitats and supporting ecosystems are considered by three main CROP agencies in the Pacific: the Pacific Islands Forum Fisheries Agency, Pacific Community, and the Secretariat of the Pacific Regional Environment Programme.

At the regional scale, Pacific islands and partners are encouraged to:

- Identify needs for the biomass assessments of tuna populations and the underlying physical and biogeochemical forcing of tuna populations;
- Measure spending on environmental aspects of fisheries management, distinct from development and infrastructural aspects;
- Conserve and restore essential habitat and ecosystems that support tuna;
- Monitor and report the biomass and health of natural tuna populations, in addition to fisheries catch, to identify priority habitats, source species, and systems for management of tuna life stages;
- Mitigate illegal, unreported, and unregulated fishing to protect Pacific biodiversity and economies;
- Measure the pollutant levels within tuna and the related impacts on human populations;
- Maintain and strengthen positive environmental management within the fisheries fleet in the Pacific region using Conservation Management Measures and other approaches to ensure the safety of Pacific biodiversity and of the regional observers who influence and report compliance;
- Increase the coverage and compliance with fisheries observers on the longline fleet;
- Plan environmental management of tuna populations and tuna-dependent economies, including preparedness such as disaster risk reduction;
- Partner to address transboundary issues affecting tuna, such as pollution and global greenhouse gas emissions; and
- Partner for holistic management of tuna populations as part of Pacific ecosystems.

INDICATOR IN ACTION

SDGs 2.4, 14.4, 14.7, 14.c • UN Fish Stocks Agreement • SAMOA Pathway • Noumea Strategy 2015 (*New Song*) • Convention for the conservation and management of highly migratory fish stocks in the western and central Pacific Ocean • Pacific Regional Environment Objectives 2.1, 2.2 • Pacific Islands Framework for Nature Conservation Objectives 2, 5

FOR MORE INFORMATION

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Brouwer S, Pilling G, Hampton J, Williams P, Vincent M, Peatman T (2019) The western and central Pacific tuna fishery: 2018 overview and status of stocks. Tuna Fisheries Assessment Report, no. 19. Noumea: Pacific Community.

Escalle L, Phillips JS, Brownjohn M, Brouwer S and others (2019) Environmental versus operational drivers of drifting FAD beaching in the Western and Central Pacific Ocean. Nature Scientific Reports 9:14005 DOI: 10.1038/s41598-019-50364-0

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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