THEME **Environmental Governance**

INDICATOR **Terrestrial wildlife protection**

DEFINITION	Level of extractive terrestrial wildlife use by humans
PURPOSE	Increase the safety to species, ecosystems, and people from the sustainable use of terrestrial wildlife
DESIRED OUTCOME	Monitored and sustainable use of wildlife with stable populations; zero use of protected species

Status
Fair

Trend
Unknown

Data confidence
Low

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PRESENT STATUS

The full range of wildlife use in the Pacific islands region is outside of the scope of the present indicator. Many wildlife species are used in modern Pacific societies, on land, at sea, and in coastal areas. Wildlife is used for subsistence, traditional ritual, and in a range of industries, including the aquarium and seashell trade, decorative arts, agrifood, tourism, pet trade, and more (see Box 3.1). Timber, the most widely traded wildlife commodity globally, and fisheries are dominant sectors for Pacific wildlife trade. Birds are traded extensively by some Pacific countries, especially parrots for the pet trade. Some wildlife, such as fisheries species, are examined deeply by agencies within the Council of Regional Organisations of the Pacific. Here, we focus on examples of wildlife that are of particular importance to the region and particularly under-served by CROP agencies.

In this summary, we focus on extractive use of birds and bats in the Pacific islands region. Extractive use, sometimes also called consumptive use, involves taking a wildlife species or parts out of the wild, whether eaten or not (IUCN, 2020). The status of extractive use of defined wildlife species and its management can serve as a proxy for the dependence on, resilience of, and population trends of Pacific wildlife. For future analyses of this indicator, the Pacific islands may wish to identify a regional list of target species for management and monitoring.

In this first assessment of human use of birds and bats in the Pacific islands region, we focused on two main questions:

- What is the share of bat and bird species that are traded, hunted for hide/feathers/teeth/etc., or eaten?
- What is the share of Pacific island countries with accessible legislation governing the international or national trade, consumption, or use of wild bird and bat species?

The present status of this indicator was designated as *fair*. The trend is *unknown*, and the availability of data is *low*. For bats, 42% of the bat species in the Pacific islands that are known to be used for human consumption are at risk (with a Red List status of Vulnerable or worse), and the populations of 48% of them are known to be declining (see below). For birds, only 14% of the 610 bird species in the Pacific islands on the Red List with recorded human use/trade are designated at risk, but 46% of them are known to have declining populations (IUCN 2020).

At present, there is a lack of data and information on the domestic use or governance of domestic use of wildlife in the Pacific islands. There is more information about international trade, particularly the trade in endangered species. As a proxy for the management of wildlife use, Table 3.1 presents a summary of publicly accessible legislation in the Pacific island countries and territories that addresses terrestrial wildlife use or trade.

In some cases, a country might have a policy or commitment to the Convention on Biological Diversity (CBD), such as a National Biodiversity Strategy and Action Plan (NBSAP), or other multilateral agreement but not have national legislation clearly defining what species are protected and rules around use of other species. If a country addresses domestic wildlife management through an NBSAP, the country might not identify a need for separate legislation on wildlife use or consumption. Even in cases with a policy or legislation, its use and enforcement require sustained political will and resources. To identify the share of Pacific NBSAPs that address and monitor domestic use of these species, for domestic or international trade and consumption, a comprehensive review of NBSAPs would be needed.

WHY DOES WILDLIFE USE MATTER?

Using wild species can positively or negatively affect human health and wellbeing. Bushmeat and wild seafood are a valuable resource in many countries and communities, providing local sources of protein. Feathers and other wildlife products are important for local tradition and arts. However, wildlife can be an incubator of infectious disease and can be susceptible to diseases spread by humans.

Wildlife that is sustainably harvested from healthy, intact ecosystems is considered less likely to contribute to the spread of infectious disease (UNEP & ILRI 2020; Gibb et al. 2020). In contrast, greater interactions with stressed wildlife in damaged ecosystems are a direct threat to human health.

Using wild species can shape our relationship with nature. The hunting or consumption of wildlife can, if undertaken sustainably, lead to greater awareness of ecological principles. Undertaken with little consideration, however, wildlife consumption can harm populations and the ecosystem services that they provide.

Those who spend time with wildlife can share that information in the form of traditional knowledge and/or citizen science. Those who overuse without due attention can lower resilience, worsen inequalities, and threaten the health of species populations, the environment, and people.

HOW IS WILDLIFE USE GOVERNED?

Wildlife use can be broken down into individual use, like subsistence hunting, or trade involving the transfer of wildlife or wildlife parts from one person to another within a country or across international borders. A wildlife trade law might not provide protection for all wildlife from all types of consumption or from other drivers of population decline.

For the international trade of species designated as Endangered on the IUCN Red List (see Regional Indicator: IUCN Red List summary) and listed on special appendices, the Convention on the International Trade in Endangered Species (CITES) provides some protection for member countries. However, CITES does not relate to the domestic (within-country) use or trade of such species, except to the extent it might be included in an assessment of sustainability of trade for a CITES Non-Detriment Findings requirement. Importantly, CITES only regulates the use of defined, CITES-listed species, a small fraction of wild species. For example, there are only 1,279 species of birds listed on CITES Appendix II compared with over 11,000 species of birds in existence and 2,508 bird species designated as near threatened to critically endangered.

CITES has annual reporting requirements to monitor illegal international wildlife trade. As of September 2020, seven Pacific island countries were signatories to CITES but no country had submitted a report to CITES (see Regional Indicator: MEA reporting requirements). Four of these seven countries are still finalising their CITES legislation.

Wildlife protection and wildlife trade (domestic or international, with international trade in reference to CITES) are managed under separate legislation in some countries (Table 3.1). As an outside example, New Zealand uses two sets of legislation: one for protecting all wildlife while allowing hunting of some species, mostly introduced species, and a separate piece of legislation for managing CITES trade. In contrast, Solomon Islands has a piece of legislation primarily directed at managing CITES-listed species plus some highly threatened endemic species listed in their legislation, but no general legislation to protect all other wildlife. This could leave a gap in that any other species could be legally traded without a permit, hunted, or killed.

Protections might also refer to specific locations. The highest level of protection of wildlife is for a species to be absolutely protected under the law regardless of whether the individual is present in a protected area, such as a reserve, or not. This method is used in New Zealand for all native species of animal. Exceptions are commonly made relating to game and pests.

Legislation can therefore focus on species or on ecosystems and locations. For example, only specific, listed endangered species are protected in American Samoa (Table 3.1). In the Commonwealth of Northern Mariana Islands, it appears that the ecosystems in which endangered and threatened species occur are provided protection. In cases where ecosystems are protected without defined protection for wildlife species, it is not always clear if certain species or all wildlife could be targeted outside of the protected areas.

In some cases, accession to CITES or derived legislation is the only legislation a country has relating to terrestrial wildlife or wildlife outside of key fisheries species. Generally, under that legislation specific to international trade, that protection is only afforded to defined species (on CITES Appendices). Governance of international or domestic trade does not provide general protection for wildlife within country: for example, people might be able to catch and keep birds for pets but just not trade them unless they have a permit.

TABLE 3.1: Legislation on the conservation and protection of wildlife in Pacific island countries and territories.

This collation is a non-comprehensive, desk-based summary of information that was publicly available online using standardised text searches of the Pacific Island Legal Information Institute database (http://www.paclii.org) and the Pacific Law & Policy Database on Coastal Fisheries & Aquaculture (https://www.spc.int/CoastalFisheries/Legislation/main) in August and September 2020 using the specified search terms. New Zealand's wildlife legislation is shown for comparison. A key difference is in the protection of all wildlife by default unless permitted use is specified (as done in New Zealand) versus wildlife uses assumed to be permitted unless use is specifically prohibited for a defined species, location, or purpose.

COUNTRY	LEGISLATION NAME AND YEAR	RELEVANT REGULATIONS	SUMMARY OF WHAT IS PROTECTED AND WHAT IS NOT	COMMENTS
New Zealand	Wildlife Act 1953 Trade in Endangered Species Act 1989	Marine Mammals Protection Act 1978	Wildlife Act: All wildlife is protected unlesss specified in schedules 1-6 (for hunting, listed introduced species not protected, and species that can be farmed). Certain other species may also be given a lower level of protection to facilitate limited harvest or to manage adverse effects they cause. The Act also provides protection to a small number of terrestrial invertebrates and marine species (other than marine mammals), as listed in Schedule 7 or 7A. Trade in Endangered Species Act 1989 regulates CITES trade in NZ.	Wildlife Act: All native wildlife is protected except where specified in schedules, such as for hunting; the Act prescribes penalties for illegally taking or injuring wildlife. Use of protected species is via a permitting system. Management of international trade in line with CITES is considered separately under the Trade in Endangered Species Act.
Cook Islands	Conservation Act 1975 Environment Act 1994–95 Environment Act 2003	Environment (Atiu and Takutea) Regulations 2008 Environment (Mitiaro) Regulations 2008	Environment Act(s): Applies only to the islands of Rarotonga, Atiu, and Aitutaki. Outer islands are exempt unless specified. Environment Regulations: All native species are protected unless otherwise specified	Acts and Regulations are sometimes specified to an island or group of islands. The Environment Regulationsprotect all native wildlife and place prohibitions on the importation/introduction of new species onto the islands. Unless otherwise given permission by Authorities, introducing an exotic plant or animal requires prior approval.
Federated States of Micronesia	Pohnpei State Endangered Species Act 1975 Pohnpei State Marine Sanctuary and Wildlife Refuge Act 1999	Yap State Code 1987 Title 18	PSMSWR Act 1999: Protects both marine and terrestrial environments for the proper thriving of species that depend on these areas. The Act does not manage use outside of these specified areas.	Yap State Code 1987: Allows for hunting/harvesting seasons for certain species. ESA 1975: Protects all wildlife considered endangered including prohibition for commercial trade and export. Subsistence use for cultural purposes allowed.
Fiji	Endangered and Protected Species Act 2002 Environment Management Act 2005	Endangered and Protected Species Regulations 2003	EPSA 2002: Regulates and controls the International and domestic trade, possession and transportation of species protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). EMA 2005: enforces protection of natural resources through sustainable use and development of natural resources	EPSA 2002: Allows Fiji to enforce the 3 Appendices in the CITES. All flora and fauna listed by CITES are banned from trade. EMA 2005: Does not necessarily focus on wildlife (flora and fauna) per se but allows for the "...preservation and protection of natural water bodies and areas of significant indigenous vegetation and significant habitat of indigenous fauna".
Kiribati	Wildlife Conservation Ordinance 1975 Recreational Reserves Act 1996	Birds fully protected throughout the Gilbert Islands Order 1979 Shark Sanctuary Regulations 2015	WCO 1975: Wild birds and animals can be declared fully or partially protected, excluding fish. An area can be declared a wildlife sanctuary and the sanctuary or an area within the sanctuary a closed area where the take of wildlife is prohibited without a license. SSR 2015: Bans commercial harvest of sharks RRA 1996: Protects and preserves land particularly recreational reserves	WCO 1975: Take of wildlife whether from in a sanctuary or in a closed area is permitted with a license granted by the Minister. There is no mention of provisions for any marine flora and fauna. Order 1979: Birds on the schedule are fully protected in the 1979 Order. RRA 1996: Gives some protection to wildlife within these recreational reserves through the regulations the Act imposes.

COUNTRY	LEGISLATION NAME AND YEAR	RELEVANT REGULATIONS	SUMMARY OF WHAT IS PROTECTED AND WHAT IS NOT	COMMENTS
Marshall Islands	Revised Code 08 CAP 3 (Endangered Species Act 1975) Revised Code 33 CAP2 (Marine Mammal Protection Act 1990)		ESA 1975: Threatened and endangered species are protected. Export and import restrictions are also imposed MMPA 1990: Protects marine mammals listed in the Act and minimises mortalities caused by commercial fishing activities	No specific legislation for the conservation of wildlife.
Nauru	Fisheries Act 1997 Coastal Fisheries and Aquaculture Act 2020		General conservation and management of marine resources	No specific legislation for the conservation of wildlife apart from fisheries-related legislations.
Niue	Wildlife Act 1972 Environment Act 2015		WA 1972: Full or partial protection of any species of animal EA 2015: Establishment of protected areas	EA 2015: Established protected areas protect all flora and fauna in that area.
Palau	Endangered Species Act 1975 (Environmental Protection – Title 24)		ESA 1975: To protect and foster the well-being of these plants and animals by whatever means necessary to prevent the extinction of any species or subspecies in the Republic	ESA 1975: The minister has the authority to issue regulations and include a list of flora and fauna as endangered or threatened. CITES is mentioned in the importation of endangered or threatened species but not mentioned in their export, which may be authorised by the Minister upon issuance of a permit.
Papua New Guinea	Fauna (Protection and Control) Act 1966	Conservation and Environment Protection Authority Act 2014	FPCA 1966: wildlife fully protected with exceptions of an issued permit CEPAA 2014: Offers some protection by prohibiting the removal of any wildlife within a reserve	FPCA 1966: wildlife protection is determined through the type of conservation area. A protected area fully protects wildlife, whereas a wildlife management area may allow the taking of wildlife through a permit issued by the governing authority.
Samoa	Animal Ordinance 1960 Lands, Survey and Environment Act 1989		AO 1960: provides for the control and importation of animals and animal products LSEA 1989: All wildlife is protected including migratory animals	AO 1960: Any animal can be declared partially or fully protected.
Solomon Islands	Wildlife Protection and Management Act 1998	Wildlife protection and management regulations 2008	1998 Act set up for implementing CITES trade. Two schedules: Sch. I prohibited from trade, Sch II trade-controlled species	No general protection for all native species, only those specified in Schedule I. This includes all flying foxes and bats, 25 species of birds, and all parrots except 5 species listed in Sch II for trade.
Tonga	Birds Preservation Act 1915	Environment Management Act 2010 Parks and Reserves Act 1976	BPA 1915: forbids take (kill, shoot, capture, take, or destroy) of bird species in the First Schedule. EMA 2010: ensure observance of international environmental obligations, conservation, and protection of biological diversity, etc. PRA 1976: parks or reserves can be declared to protect, preserve, or maintain any valuable feature, and use and entry can be restricted.	Protected birds include all listed birds, whether imported or indigenous, and their eggs and offspring. Eleven birds listed in the Schedule have protection for part of or the entire year. Take may be permitted. No other legislation for terrestrial wildlife, other than regarding protected areas and reserves.
Tuvalu	Wildlife Conservation Act 1975	Environment Protection Act 2008 Conservation Areas Act 1999	WCA 1975: full or partial protection of declared animals or birds (not fish) including their meat, skin, shell, or any part however cured, treated, polished, carved, or otherwise. EPA 2008: implementation of international environment-related conventions regulating the protection of biodiversity. CAA 1999: areas can be declared for the purpose of preservation of biological diversity, including for species which are endemic, threatened, or of special concern.	Prohibition to hunt, kill, capture, or possess animals or birds and to search, take, willfully destroy, break, or damage eggs and nests. It is not clear which, if any, animals or birds have been declared as protected, partially or otherwise.

COUNTRY	LEGISLATION NAME AND YEAR	RELEVANT REGULATIONS	SUMMARY OF WHAT IS PROTECTED AND WHAT IS NOT	COMMENTS
Vanuatu	Wild Bird (Protection) Act 1962 International Trade (Flora and Fauna) Act 1989	National Parks Act 1993	WBA 1962: protection of individuals or eggs of bird species listed in S2 and the partial protection of species listed in S3,4. Hunting at night for any bird species at any time is unlawful. ITA 1989: provides for the implementation of CITES NPA 1993: protection and preservation in their natural state of areas which meet certain purposes (such as habitat of threatened species).	Protection against killing, harm, capture, sale, purchase, and export without a permit.
Territory/Protectorate				
American Samoa	Endangered Species – Natural Resources and Environment Ecosystem Protection and Development Chapter 7 of Title 24 1982 (Amended 1990) Endangered Species Act 1973 (USA)		Directive for an endangered species list in American Samoa as decided by the American Samoa Natural Resources Commission	The chapter is named Endangered Species and covers any species of fish, plant life, and wildlife that may be considered endangered by the commission unless otherwise considered a pest.
Commonwealth of the Northern Mariana Islands	Endangered Species Act 1973 (USA) Commonwealth Code 2 Div.5 CAP.1 (Fish, Game and Endangered Species Act)	Title 85: Department of Lands and Natural Resources Ch 85-30, SubCh 30.1 (amended, 2009) – Non-commercial fish and wildlife Regulations	ESA 1973: provides a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide for the conservation of such endangered species and threatened species, and to take steps to achieve the purposes of the treaties and conventions set forth in subsection (a). – pg1 Sec. 2 (b) Purposes	The term "fish and wildlife" or "wildlife" as defined in the Act or regulations refers to all members of the animal kingdom. This includes migratory and nonmigratory animals.
Guam	Title 5 – Guam Code Annotated Ch 63 Fish, Game, Forestry & Conservation		Take of wildlife is monitored with the use of permits and licenses.	Wildlife; a list of species is not readily available.
French territories: **French Polynesia (FP),** **New Caledonia (NC),** **Wallis and Futuna (WF)**	France: Environmental Code Legislative part Article L110-1 to L713-9), Book VI: (Articles L611-2 to L656-1) (2016), in addition to specific codes and laws of the given territory.	FP: Environmental Code (legislative: 2017, regulatory: 2018) NC: provincial environmental codes (Northern, 2008, Southern, 2009; Loyalty islands 2016)	FP: uses a list of species; non-specified wildlife appears to be available for uncontrolled use. NC: codes, or territorial regulations, manage hunting and fishing via species, periods, and quota. The codes list protected or invasive species with various prohibitions. Regular (~2 years) review to adjust to the local situation. WF: environmental code (2006) and regulations addressing fishing (2005), including Trochus and sea cucumbers. The fishing regulations also manage the method, such as prohibiting destructive fishing.	FP: bans irresponsible wildlife photography of priority species, as part of controlling consumptive use. NC: codes integrate customary practices, such as use of protected species in ceremonies. Recent effort to translate the objectives and constraints under the Nagoya Protocol, incl. genetic resources, into local regulations. Loyalty Islands use territorial regulations and plan to enact their full environment code re. wildlife in 2021.
Tokelau	Territorial Sea and Exclusive Economic Zone Act 1977	Biosecurity Rules 2003	BR 2003: To control the introduction and spread of exotic pests and diseases.; to protect the environment and the agricultural production of Tokelau. To provide "for biosecurity services for the import and export of animals and plants" TSEEZA 1977: Prescribing measures for the protections, preservation, conservation, and management of the marine environment of the territorial sea and the zone	BR 2003: Legislation to manage the unnecessary introduction of exotic species and to control and manage the pests and diseases already found in Tokelau. TSEEZA 1977: Tokelau is made of many atolls and emphasises the conservation, protection, preservation, and management of its marine environment. Provisions in the Act are generalised and will be enforced until the Governor-General enacts regulations for the conservation of these resources.

The following standard terms were used to search the public databases: *English*: wildlife, flying fox, hunting, wildlife conservation, conservation, preservation, protected species, endangered species; *French*: faune, renard volant, chasse, conservation de la faune, préservation, les espèces protégées, les espèces menacées.

PRESSURES AND OPPORTUNITIES

In addition to value in their own right and status as totem species, Pacific bats and birds play important roles as seed dispersers, in nutrient mobilisation, and in pollination with long-distance movement across islands.

Birds and bats also contribute to island economies across multiple sectors. This contribution can be indirect, such as the benefits provided by their aesthetic qualities or services to agriculture, or direct through sales or consumption.

Both birds and bats are eaten in the region. Bushmeat cannot be thought of simply as survival food. Rather, the consumption of local wildlife is linked to status, tradition, ritual celebration, and complex beliefs and practices about health, sustainability, and our relationship with nature. For example, bushmeat consumption in Samoa is practiced by the wealthy, with the top 10% of households based on financial income consuming 43% of all wild pigeon meat (Stirnemann et al. 2018). Cooperative research and management involving local experts can both identify population trends and encourage sustainability (Oedin et al. 2019).

Similarly, the consumption and trade of other wildlife parts, such as live animals, feathers, fur, and teeth, is complex. Behavioural change to manage wildlife consumption must account for the drivers of consumption. Management measures to ensure the sustainability of use and the long-term survival of Pacific species must account for the multiple, related drivers of wild population trends in a changing world.

Consumption of wildlife is part of our resource footprint and affects SDG 11.3.1, the 'Ratio of land consumption rate to population growth rate'. Wildlife consumption can alter wildlife populations for decades or more (see 'Birds').

Declines in wildlife populations are a global concern (WWF 2020) with the largest single driver considered to be habitat loss, with climate change exacerbating the impacts of changing land use, growing human populations, and growing human alterations of ecosystems. Although direct wildlife consumption is only one of the pressures faced by Pacific species, this consumption exists within a changing web of pressures. The contribution to wildlife decline from illegal trade and use is unknown in the Pacific. There are suspected links with logging which provides ready access to displaced wildlife.

In the past, the sustainability of wildlife consumption has relied heavily on the existence of healthy native habitat. Today, the availability of essential habitat with sustainable levels of pressure cannot be guaranteed, even for species that have tolerated past hunting pressure.

Even in cases where use has historically been sustainable, a combination of consumption with extreme events, changing environmental conditions, and changing socio-economic conditions can threaten the survival of Pacific species. To conserve species in such contexts, bans or regulations on wildlife use can be introduced that are defined for an area, a period of time, or a combination of factors (see Regional Indicators: Protection). Such management measures are part of Pacific traditions.

Birds

Throughout the Pacific islands, birds are used for food, cultural ritual, decorative arts, the pet trade, and many other purposes of social, cultural, and economic importance. Pigeons and megapodes (ground-dwelling birds) are perhaps the most commonly known birds used for bushmeat and eggs today, but many species are used for their feathers or are bycatch during hunting for other target species.

Since the early occupation of the islands, birds have been important food sources. For example, "Megapodes are a socio-culturally, historically and economically important family of birds for many peoples in the Indo-Pacific. Their eggs are an abundant and predictable resource and are heavily harvested" (Sinclair et al. 2010 and references therein). Traditional ecological knowledge of megapodes in Melanesia is also the subject of one of the few comparisons and integrations of scientific and traditional knowledge (Sinclair et al. 2010).

To the best of our knowledge, there has been no regional summary of the share of bird species present in the Pacific islands today that are hunted (for meat, eggs, feathers, or other parts) or traded. Of the 1,262 bird species (Class Aves) on the IUCN Red List associated with the Pacific islands region, 610 species have recorded use or trade for human food (272 species), medicine (3), other household goods (10), handicrafts or jewellery and other uses (40), pets or display animals (498), and sport or specimen hunting (105) (IUCN 2020).[1] Of these 610 species, the populations of 279 species are declining, 217 species are stable, 52 species are increasing in abundance, and the population trends of 53 species are unknown. At least 78 of the species are at risk.

There are known problems with bird trade from the Pacific islands. For example, over 54,000 CITES-listed birds were traded from the Solomon Islands between 2000 and 2010 by being falsely stated as captive-bred when they were in fact caught from the wild (Shepherd et al. 2012).

Historically, wildlife products such as feathers and fur or hides were important parts of the trade of luxury goods throughout Melanesia, Polynesia, and Micronesia. For example, the tevau feather currency made in the Solomon Islands relied on the red feathers of scarlet honeyeaters *M. c. sanctaecrucis*, with a roll of currency requiring feathers from over 300 birds (Houston 2012). Headdress production using red feathers of the Vulnerable Pesquet's Parrot *Psittrichas fulgidus* requires approximately 8% (3,200 birds) of the wild population each year, and now more parrots are represented in headdresses than can be found in the wild in Papua New Guinea (Nugi & Whitmore 2020). Today, such consumption is combined with other pressures on wild populations.

International trade or poaching from outside of the region also impacted Pacific wildlife populations. Spennemann (1998) demonstrated that "between 1897 and 1914 over 3.5 million seabirds were killed on islands in the central Pacific Ocean" to satisfy international demand for feathers, and this consumption has left traces in the distribution of the birds still measurable a century later.

[1] Note that these values include all species in the Aves class, including seabirds.

CRITICAL CONNECTIONS

Birds and bats play a key role in Pacific island ecosystems and also play a role in our food security, cultural heritage, and interactions with nature today.

Access to and interactions with nature give us many benefits and are part of our traditional, cultural, and spiritual practice, promoting wellbeing and physical exercise with associated benefits for mental health. Some of our most important economic sectors, like tourism, take advantage of these benefits. Sustainable practices that help us encounter nature without consuming it can give us many of the benefits of engaging with wildlife without placing direct pressure on wild animals. Many of the challenges that bird and bat species face are the same as those that affect humans and our health. Land-use change, climate change, and invasive species are the top threats to Pacific resilience, for us and for wildlife. In some cases, overuse of wild species can even contribute to greenhouse gas emissions through removal of native trees or degradation of forests.

Just like focusing on hunting alone is not enough to save Pacific birds and bats, focusing on human health alone is not enough to address the underlying causes of our health status and our resulting relationship with wild foods. Focusing on hunting or on environmental change as a technical problem is not enough: we must consider the socio-cultural context of human-induced drivers of ecological change. Indeed, ecological balance was a key component of the *Healthy Islands* vision declared by Pacific health ministers in 1995 (WHO, 2015).

When we work to save ecosystems, we all benefit.

BOX 3.1: ARE SEA TURTLES SAFE FROM OVER-USE?

Marine turtles are an iconic representative of the many coastal and marine wildlife species used in the Pacific islands. Turtles are important to Pacific cultures—as indicated throughout the archaeological and historical record—for subsistence and ritual food, cultural and traditional activities, and export (Allen 2007).

All marine turtles are recognised internationally as species of conservation concern. Of the world's seven marine turtle species, six occur in the Pacific islands region and are on the IUCN Red List of Threatened Species as follows:

Leatherback *(Dermochelys coriacea)*:	Critically endangered (West Pacific subpopulation)
Hawksbill *(Eretmochelys imbricata)*:	Critically endangered
Loggerhead *(Caretta caretta)*:	Vulnerable
Green *(Chelonia mydas)*:	Endangered
Olive ridley *(Lepidochelys olivacea)*:	Vulnerable
Flatback *(Natator depressus)*:	Data Deficient

Green and hawksbill turtles are the most widely recorded species, with confirmed records in nearly all Pacific island countries and territories.

All species of marine turtles are listed in Appendix 1 of CITES, prohibiting the international trade of the animals and their parts due to the threat of extinction.

Although subsistence hunting of turtles may have been sustainable in the past, the combination of increasing human populations, the introduction of new harvesting technologies, and loss of traditional knowledge and practises appears to have shifted that balance (Humber et al. 2014).There is added pressure from other threats such as pollution, invasive species, bycatch, and climate change.

Interventions by CITES have reduced the global trade of turtle products, but direct take of turtles is still widespread throughout the Western Pacific (Humber et al. 2014). Some islands have restricted their take to subsistence only but there is evidence of common illegal captures for domestic and international trade (see Vuto et al. 2019 for an example). The form of legal direct take varies throughout Pacific countries and territories as do the management tools used, including permits, size limits, species-specific rules, seasonal closures, marine sanctuaries, and moratoria. For more information on legislation protecting turtles, see Maison et al. (2010).

Empirical data are limited throughout the Pacific, making assessments difficult. From March 2020 to October 2021, SPREP is undertaking a Pacific marine turtle extinction risk analysis through the Bycatch and Integrated Ecosystem Management project funded by the European Union. The analysis will attempt to consider all sources of mortality to determine if marine turtles in the Pacific are being overused, to identify turtle bycatch rates, and to identify the major drivers of turtle population decline. This project will be at the Regional Management Unit and country level, with a focus on Fiji, Papua New Guinea, Solomon Islands, Tonga, and Vanuatu.

Compiled by Hannah Hendriks and Unity Roebeck

BOX 3.2: PROTECTION LEADS TO RECOVERY IN THE SOLOMON ISLANDS

The foraging and nesting grounds of sea turtles are often separated by thousands of kilometres, but adult turtles periodically make the journey from their foraging grounds back to their natal nesting beaches for the purposes of breeding. In part because of the decades between their hatching and return to lay their own eggs, turtles are sensitive to land-use change and over-harvesting.

The Arnavon Islands, between Isabel and Choiseul Provinces in the Solomon Islands, is the largest rookery for hawksbill turtles in the oceanic South Pacific. This rookery has been severely overexploited over the past 150 years, beginning with Roviana people from New Georgia collecting hawksbills for their shells to trade with European whalers throughout the 1800s.

In 1976, in response to a critical decline in the hawksbill population, the Solomon Islands government declared the Arnavons a sanctuary and commenced turtle monitoring at the islands. However, this top-down, government-led initiative was not supported by the traditional owners. In 1982, a local community member burned down the government infrastructure, and intensive turtle harvesting resumed.

In 1991, local resource owners and the Choiseul and Isabel provincial governments, with support from The Nature Conservancy, worked together to re-establish the Arnavons sanctuary and to conduct routine beach monitoring and turtle tagging to better understand the status of the rookery. In 1993, the Solomon Islands Fisheries regulations were amended to ban the sale, purchase, and export of any turtle product, halting large-scale trade in hawksbill turtle.

Learning from the past, modern regulations were created in consultation with resource owners and users, facilitating traditional use for valuable resources such as megapode eggs, alongside conservation of Arnavons terrestrial and marine habitats and preservation of the critically endangered hawksbill turtles. After extensive community consultations to plan for the Arnavon's future, the Arnavon Community Marine Conservation Area was established in 1995, with the island group renamed as the Arnavon Community Marine Park when it was declared as the Solomon Islands first national park in 2017. It is now illegal to take turtle eggs or destroy their nests during the breeding seasons of June to August and November to January, but subsistence take of turtles is still permitted.

Collaborations between community rangers and researchers produced 4,536 beach surveys and 845 individual turtle tagging histories from the Arnavons between 1991 and 2012. The long-term monitoring showed encouraging results: the first known evidence of recovery for a western Pacific hawksbill rookery. Both the number of nests laid at the ACMCA and the remigration rates of turtles doubled between 1995 and 2012. Beach monitoring also confirmed that nesting on the Arnavons occurs throughout the year, with peak nesting activity coinciding with the austral winter, and many of the hawksbill turtles that nest at the site actually forage in distant Australian waters.

The recovery of a regionally important rookery for one of the most charismatic and endangered species in the Pacific demonstrates the value of a multi-pronged approach to conservation involving inclusive, participatory community engagement, supportive policy, and a long-term commitment by civil society.

Compiled by The Nature Conservancy, Melanesia Program

Source: Hamilton et al. (2015) Solomon Islands largest hawksbill turtle rookery shows signs of recovery after 150 years of excessive exploitation. PLOS ONE 10(4): e0121435. DOI:10.1371/journal.pone.0121435

Bats

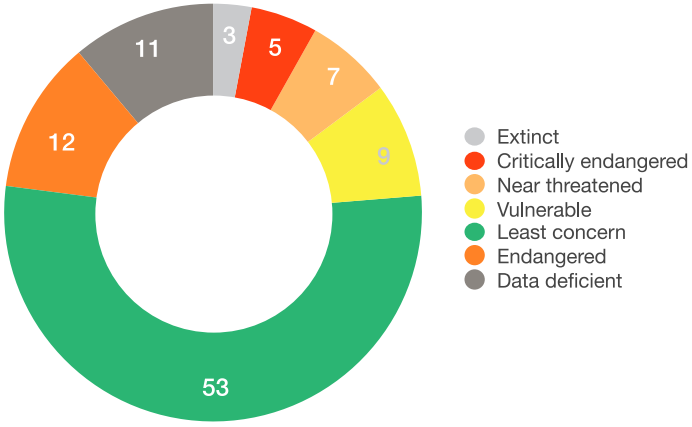
As of 2016, 40 bat species were known to be hunted, making the Pacific islands the region with the highest proportion of hunted bat species, globally (Mildenstein et al. 2016). Bats are eaten in American Samoa, Commonwealth of the Northern Mariana Islands (CNMI), Cook Islands, Federated States of Micronesia (FSM), Fiji, Guam, New Caledonia, Niue, Palau, Samoa, Solomon Islands, and Vanuatu (Mildenstein et al. 2016, Stirnemann et al. 2018, Oedin et al. 2019). Bat teeth are also valued as a decoration and traditional currency in the Solomon Islands (Lavery & Fasi 2019). Hunting and trade are linked: for example, illegal trade of bats hunted in FSM and taken to Guam and CNMI persisted after the 1989 CITES enactment with records up to 2008 (Hayes & Engbring 2020).

In total, 132 bat species present in 15 Pacific countries and territories are listed on the IUCN Red List (IUCN 2020; Figure 3.1). Of those, 21 species have been identified as needing law/policy intervention, and 65 species need land/water protection. The population trends of 59 species are unknown, 32 species are stable, and 40 species are declining (IUCN 2020). As of 2020, 50 bat species present in the Pacific islands region were identified as used for human food (48 species) and handcrafts, jewellery, or art (5 species); 42% of these species are at risk with 14 endangered or critically endangered, and the populations of 48% of these species are known to be in decline.

On islands, bats are 'keystone' pollinators and can spread pollen and seeds over long distances, thereby playing a crucial role in the diversity and survival of plant species on islands (Fleming et al. 2009).

In Fiji, "foraging densities of the Pacific flying fox *Pteropus tonganus*, an important seed disperser, were four times higher in agricultural habitats than in remnants of dry forest, illustrating a strong preference for foraging on abundant food resources in farmland. Resource subsidies provided by farmland were responsible for sustaining high abundances of the species despite severe deforestation across the region"

FIGURE 3.1: Number of bat species in the Pacific islands on the IUCN Red List, by category.



(Luskin 2010). However, the bats would only roost in native forest fragments, showing that native forest is essential for the bats to survive.

Hunting, habitat loss, and climate change are considered among the top threats to bat species worldwide (Frick et al. 2019). Bats are vulnerable to cyclones and the resulting food scarcity. Over 60% of bat species threatened by invasive species are on islands (Frick et al. 2019), and measures to control invasive plants have great benefits for bats alongside other species (Krivek et al. 2020).

Islands are important for bat biodiversity with 60% of species found on islands and 27% endemic to islands, and a greater share of island endemic bats are threatened (Conenna et al. 2017). Bats are the only native terrestrial mammals in 13 Pacific island countries and territories (Carvagal & Adler 2005; IUCN 2020). (Members of eight island groups lacked any native terrestrial mammals: French Polynesia, Kiribati, Line Islands, Marshall Islands, Nauru, Pitcairn, Tokelau, and Tuvalu [Carvagal & Adler 2005].) Despite their value, bats are rarely explicitly included in legislative and regulatory environmental plans and may be missing in the selection of priority landscapes for conservation.

REGIONAL RESPONSE RECOMMENDATIONS

In keeping with the stated goals of Pacific Leaders for sustainable use of environmental resources, countries can take action to:

- Identify needs and gaps in measurements or response to the consumption of terrestrial wildlife,
- Identify needs and gaps in the governance of and legislation regarding wildlife protection, use, and trade,
- Measure the consumption of terrestrial wildlife, including estimates of poaching or illegal trade,
- Plan for sustainable management of wildlife consumption in the context of other pressures, including extreme events, invasive species incursions, and climate change, among others, and
- Partner for environmental management alongside human health management.

Using a One Health approach requires leaders, managers, and knowledge holders to combine knowledge and data collection across multiple sectors to achieve better environmental management for better health outcomes. In the case of wildlife consumption where there is a direct link between human health and wild species through food and physical contact, information and monitoring can directly benefit health and healthcare planning in the Pacific islands region.

INDICATOR IN ACTION

SDG 15.1, 15.5, 15.7, 15.c, 12.2, 2.1 • Convention on the Trade of Endangered Species (CITES) • Convention on Biodiversity • Convention on Migratory Species • Noumea Convention (article 14) • Pacific Regional Environment Outcomes 2.2, 2.3, 4.2 • Pacific Islands Framework for Nature Conservation Objectives 2, 5

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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