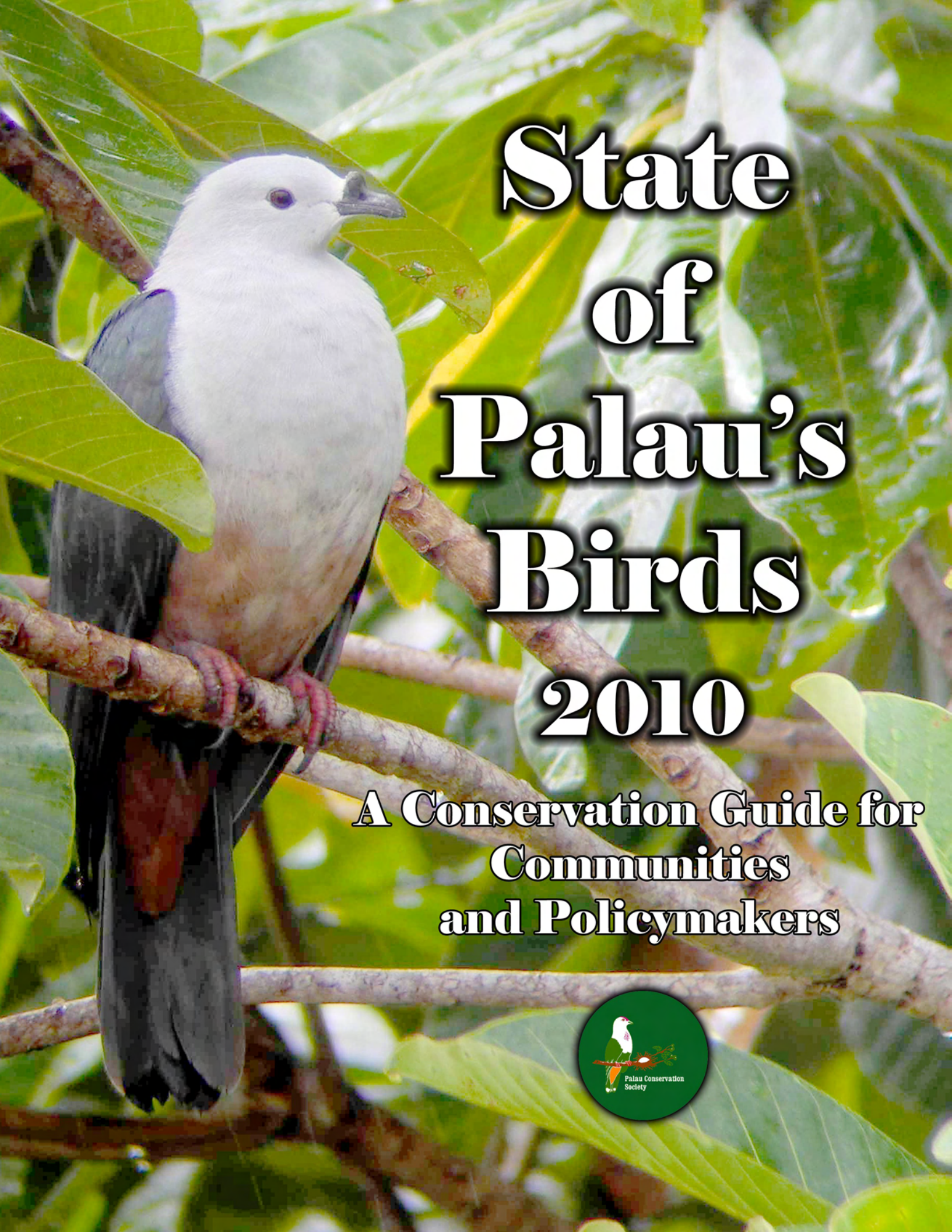

State of Palau's Birds 2010

A Conservation Guide for Communities and Policymakers

Palau Conservation Society

Palau Fantail ©PCS

State of Palau's Birds 2010
A conservation guide for communities and policymakers

Written by:
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Book Design by Heather Ketebengang

The mission of the Palau Conservation Society is to work with the community to preserve the nation's unique natural environment and perpetuate its conservation ethic for the economic and social benefit of present and future generations of all Palauans and for the enjoyment and education of all.

BirdLife International is a federation of national non-government organizations committed to conserving birds and biodiversity for the benefit of people.

Cover photo courtesy of Jon Vogt. ©Jon Vogt.

Special Message

Every meaningful icon in our culture is represented by a bird – gods, money, our migration stories, our celebration of birth. Birds represent all that is most meaningful to us as Palauans. From the delarok, representing the flow of support between clans and communities, to the dudek, representing the organizational structure of our 4000-year old culture, birds symbolize the best of who we are.

Palauans have long protected birds and our other natural resources, from the age-old tradition of bul to the modern-day protected area. We have much to be proud of. At the same time, however, is the sad reality that those birds that are most precious to us are in decline and under threat. Biib, long a symbol of Palau's natural and human beauty, and belochel, a vital part of our children's cultural growth, have had sharp declines in population in the last twenty years. What is even more sobering is that birds are linked to all other biodiversity and ecosystems in Palau. When birds decline, it means that our natural systems (and the human systems that are linked to those) are hurting.

We have much in place to stop the decline of birds and other biodiversity, and we have made many commitments to ourselves to do so. States and communities have protected huge areas of land, and the national government has established the Protected Areas Network (PAN) to support them in their efforts to conserve our collective resources. Palau has joined our Micronesian neighbors, as part of the Micronesia Challenge, and 192 other countries, as Parties to the Convention on Biological Diversity, in agreeing to effectively conserve 20% of our terrestrial resources.

We must honor our commitments, especially those we make to ourselves. This may be hard, but it is the right thing to do. It may be hard to stop eating belochel, when people love the taste. It is hard to implement the PAN as the law states, when it offers such an easy and shining carrot. But sometimes, doing the hard thing means doing the right thing. It is right, and fair, to respect our communities, our traditions, our creatures, and our own laws.

This book, "State of Palau's Birds 2010: A guide for communities and policymakers" offers both exciting and sobering news about Palau's birds. More importantly, it outlines what we need to do to protect our birds and biodiversity. By doing so, we can ensure that birds thrive and continue to represent the best of what it means to be Palauan.

Senator Surangel Whiips, Jr.

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OVERVIEW

Birds are important parts of ecosystems. They are seed and pollen dispersers and predators of insects and other small animals. Birds are prey to other animals, and provide an important link in food chains. Birds are also excellent "indicators" of biodiversity and environmental health. Not only are they important to biodiversity and ecosystems, they are important culturally and traditionally. This book will show how Palau's birds are doing, what pressures they face, and what we can do to protect them. The book is divided into three parts: State, Pressure, and Response. State pages are marked with Orange and provide information on Palau's birds. Pressure pages are marked with Red and highlight problems that may negatively influence birds. Response pages are marked with Green and show what we can do to help protect birds and other biodiversity.

STATE: What do birds tell us?

There have been 162 bird species recorded from Palau so far. Some of these birds are special because they are endemic (found only in Palau). Some are special because they are threatened and need extra care. Birds are important to Palau's traditions and environment. Birds are found everywhere in Palau, but some sites–Important Bird Areas–are particularly important. Birds are useful indicators of a healthy environment.

PRESSURE: Why are birds declining?

There are many reasons why birds are declining in Palau. Many pressures affect birds directly or indirectly. Many problems causing birds to decrease in number and habitat range are caused by humans. Bird declines are caused by hunting, habitat destruction and degradation, introduction of alien invasive species, and climate change, among others.

RESPONSE: What can we do to improve the status of birds?

There are laws and restrictions to stop the decline of birds and other species. However, restrictions are only useful if we follow them accordingly. There are many other ways we can help Palau's birds and biodiversity, including establishing protected areas, doing careful land planning, preventing and controlling invasive species, and monitoring animals and plants.

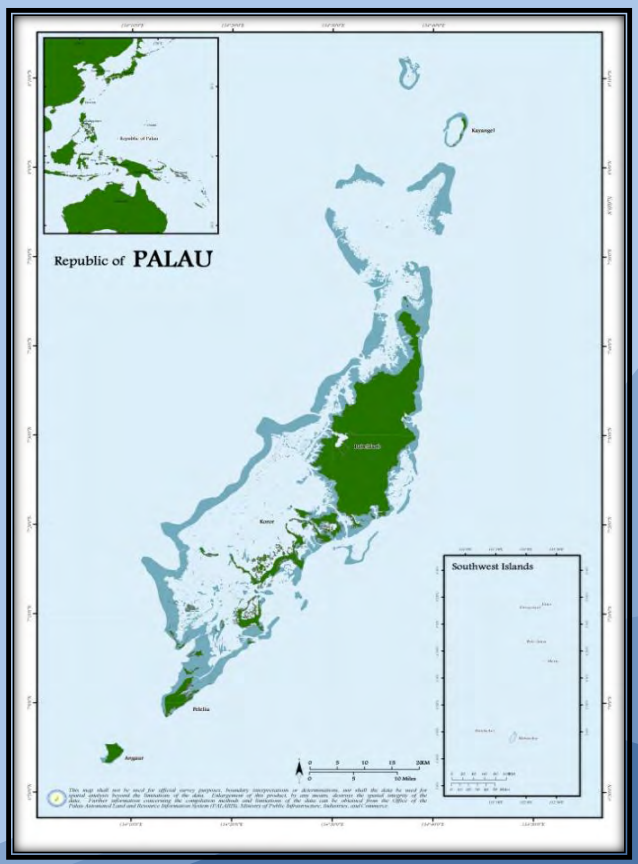
Photos (top to bottom): Little Egret; Development puts pressure on biodiversity; Learning about birds is a great way to help them. All ©PCS

INTRODUCTION

Palau is an island nation located in the western Pacific. It is found in the Oceanic sub-region known culturally as Micronesia. Palau is located at approximately 7 degrees north latitude and 134 degrees east longitude. The Palau archipelago consists of 586 islands, of which only 12 are continuously inhabited. It is 741 kilometers southeast of Mindanao, Philippines and about 800 kilometers northwest of Indonesia. Palau has a total land area of 540 km^2 with an Exclusive Economic Zone that extends 320 kilometers seaward and comprises an area of over 600,000 km^2 (TNC 2002). The climate for this archipelago is humid subtropical, with annual precipitation averaging 381 cm per year. Palau has lush rainforests and abundant terrestrial life. There are many endemic, endangered, and unique species found only in Palau.

Palau's terrestrial ecosystem is composed of volcanic forest, limestone forest, grasslands and savannas, freshwater streams and lakes, freshwater wetlands, and mangroves. A large percentage of Palau's forest is still intact. About 87% of Palau is forested with 75% of that native tropical lowland rainforest and 12% agroforest (Donnegan *et al.* 2003). Palau's forests are the most species-diverse in Micronesia with more than 1,400 species of plants. At least 830 of those species are native, while at least 194 species have been identified as endemic. Palau's rich terrestrial biodiversity also includes over 130 species of fungi, an estimated 5,000 insects, 92 snails, 46 reptiles and amphibians, 47 freshwater fish and 162 species of birds, with more documented yearly.

Palau's terrestrial biodiversity is thought to be extremely high given its small size. This has been attributed to Palau's proximity to the biodiversity hotspots of Papua New Guinea and Indonesia, to interim periods of isolation, and to the old age of Palau's islands. Isolation and time have led to niche specializations and a high rate of endemism. Marine biodiversity is also higher in Palau compared to the rest of Micronesia.



Photos (left to right): Seabirds in the Southwest Islands ©PCS; Map of Palau ©PALARIS

STATE

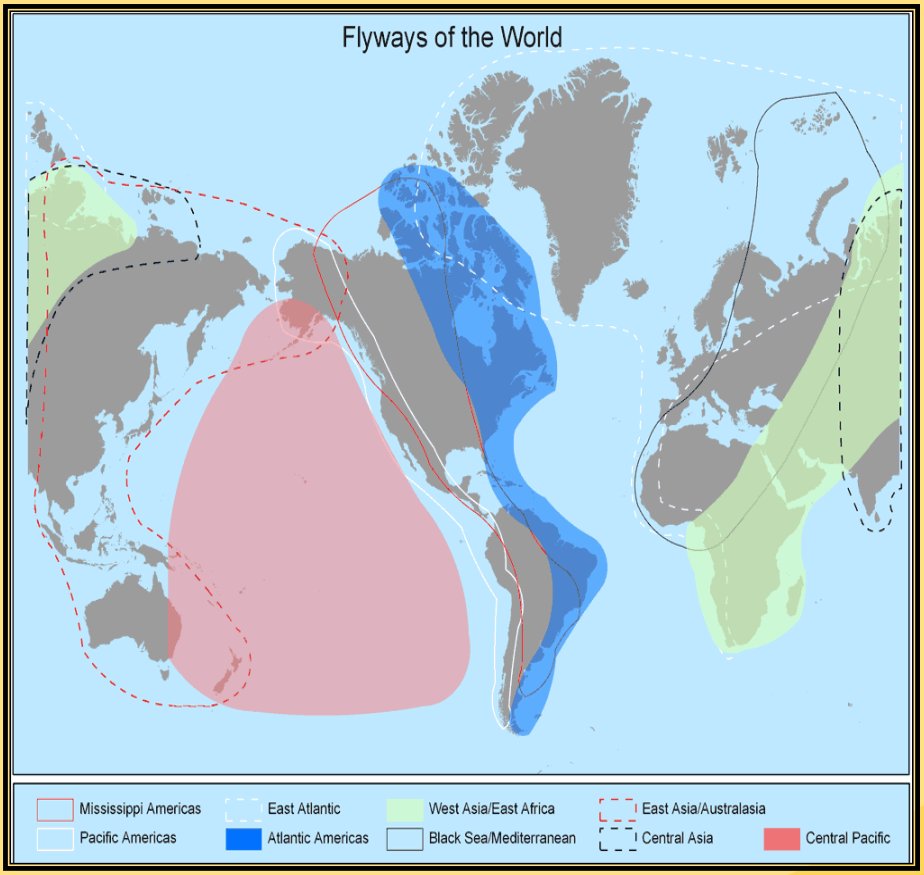
Palau has a rich avifauna

Palau is world famous for its spectacular biodiversity on land and in the sea, and birds are an important part of that biodiversity. Palau is home to 161 confirmed bird species (the introduced Nutmeg Mannikin was last seen in the 1940s). Of these, 51 are resident birds and the remaining are either migrants or vagrants. Out of the 51 resident birds, 37 are land or wetland species and 14 are nesting seabirds (Engbring 1992; Wiles 2004; VanderWerf *et al.* 2006; Olsen and Eberdong 2011). There are also 5 introduced species.

Some of Palau's birds are related to birds in nearby countries. DNA analysis of endemic birds in Palau suggests close affinities between some Palau taxa and their relatives in the Solomon Islands, Philippines and Indonesia (Oliveros 2010). Some birds have complex affinities, with extremely old lineages (Oliveros 2011).

There are no endemic seabirds in Palau, but there are many resident and migrant seabirds. These birds are found throughout Palau's archipelago. However, large colonies of seabirds are only found on three islands (Ngaruangel Atoll in the north and Fanna and Helen islands in the Southwest Islands).

Palau is a hotspot for migratory birds. Migratory birds leave their breeding areas to find warmer places during the winter months. Palau falls along the East Asia/Australasia Flyway. As migratory birds make their way up and down the flyway, they sometimes stop in Palau. Some birds stay in Palau during the winter months of October to April. Others will make a quick stop and leave within days, weeks, or even months. Occasionally, other birds find their way to Palau accidentally. Such birds include raptors, cuckoos, thrushes, wagtails, pitpits, and others. In 2009, for instance, a majestic Glossy Ibis was observed in Palau. This is the first confirmed record of a Glossy Ibis in Micronesia and the oceanic Pacific (Olsen and Eberdong 2011).



Graphic (left): Flyways of the World ©USGS. Photos right (top to bottom): Palau Flycatcher ; Swift Tern; Common Sandpiper. All ©PCS.

STATE

Some birds are found only in Palau

Although all birds in Palau are important, there are some that are particularly special. They are special because they are endemic, meaning that they can only be found in Palau and nowhere else in the world. Palau has 12 recognized endemic birds (Pratt and Etpison 2008). Aside from the endemic birds, there are other endemic subspecies found in Palau. Subspecies are a subpopulation of a species. Subspecies can interbreed, but are usually geographically isolated other subpopulations. Different subspecies have small, but persistent, variations from other subdivisions of the same species living in different geographical regions.

Endemic Birds

Common Name[1]	Scientific Name[1]	Palauan Name	Population Estimate (1991)[2]
Palau Ground Dove	*Gallicolumba canifrons*	Omekrengukl, Doldol	164
Palau Fruit Dove	*Ptilinopus pelewensis*	Biib	46,980
Palau Owl	*Pyrroglaux podarginus*	Chesuch	Unknown-common
Palau Swiftlet	*Aerodramus pelewensis*	Chesisekiaid	42,928
Rusty-capped Kingfisher	*Todiramphus cinnamominus pelewensis*	Cherosech, Ongelimadech	3,805
Palau Cicadabird	*Coracina tenuirostris monacha*	Kiuidukall	12,642
Morningbird	*Colluricincla tenebrosa*	Tutau	11,900
Palau Fantail	*Rhipidura lepida*	Melimdelebdeb, Chesisirech	27,154
Palau Flycatcher	*Myiagra erythrops*	Charmelachull	46,254
Palau Bush Warbler	*Cettia annae*	Wull, Chesisebarsech	21,521
Dusky White-eye	*Zosterops finschii*	Chetitalial	150,315
Giant White-eye	*Megazosterops palauensis*	Charmbedel	13,876

[1] Pratt and Etpison 2008; [2] Engbring 1992

Endemic Subspecies

Common Name	Scientific Name[1]	Palauan Name	Population Estimate
Micronesian Megapode (aka Palau Megapode)	*Megapodius laperouse senex*	Bekai	497
Purple Swamphen	*Porphyrio porphyrio pelewensis*	Uek	Unknown-rare
Nicobar Pigeon	*Caloenas nicobarica pelewensis*	Laib	722
Jungle Nightjar (aka Gray Nightjar)	*Caprimulgus idicus phalaena*	Chebacheb	Unknown-uncommon
Collared Kingfisher	*Todiramphus chloris teraokai*	Tengadidik	4,439
Micronesian Honeyeater (aka Micronesian Myzomela)	*Myzomela rubratra kobayashii*	Chesisebangiau	56,692
White-breasted Woodswallow[2] (aka Palau Woodswallow)	*Artamus leucorhynchus pelewensis*	Mengaluliu	Unknown-rare
Citrine White-eye	*Zosterops semperi semperi*	Charmbedel	35,362
Micronesian Starling	*Apolonis opaca orii*	Kiuid	176,209
Blue-faced Parrotfinch	*Erythrura trichroa pelewensis*	None	1,023

[1] Pratt and Etpison 2008; [2] Under investigation to determine whether a full endemic species (Pratt and Etpison 2008)

Note: Most common and all scientific names in this book follow Pratt and Etpison (2008), the most recently published authoritative text on Palau's birds. Common names that do not follow Pratt and Etpison were selected due to familiarity in Palau's communities (e.g. Micronesian Honeyeater rather than Micronesian Myzomela). Naming conventions for birds change frequently and as such names in this book may differ from those on the IUCN Red List or other sources.

Some birds in Palau need extra care

Although most resident birds in Palau are abundant, there are some birds that need special care. Several birds in Palau are Threatened or Endangered, both locally and globally. These species have small population sizes, live in restricted or fragmented habitats, or they have past, current, or perceived future population or habitat declines (BirdLife 2004). The International Union for Conservation of Nature (IUCN) Red List of Globally Threatened Species has four threat categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU), and Near Threatened (NT). The Micronesian Megapode is listed by the IUCN as Endangered. Four other resident birds are listed as Near Threatened: Palau Ground Dove, Nicobar Pigeon, Giant White-eye, and Micronesian Imperial Pigeon (belochel). Several other threatened birds safely migrate through Palau regularly or as vagrants, including the Black-tailed Godwit (NT), Oriental Darter (NT), Great Knot (VU), Japanese Night Heron (EN), Far Eastern Curlew (VU), Black-footed Albatross (EN), Tahiti Petrel (NT), and Providence Petrel (VU) (IUCN 2011).

There are some birds that are restricted to a region, island, or habitat, and thus are sensitive to changes and vulnerable to extinction. In addition to 12 endemic birds restricted to Palau, there are 4 restricted-range birds that are limited to just a few islands in Micronesia (Citrine White-eye, Micronesian Imperial Pigeon, Micronesian Megapode, and Micronesian Starling). In Palau, some birds are limited in their use of habitats. For example, the rare White-breasted Woodswallow has only been found on savannahs of Babeldaob and the Common Moorhen is restricted to Palau's few lakes.

Threatened Species	Palauan Name	Status (IUCN, 2011)
Micronesian Megapode *Megapodius laperouse*	Bekai	Endangered
Micronesian Imperial Pigeon *Ducula oceanica*	Belochel	Near Threatened
Nicobar Pigeon *Caloenas nicobarica*	Laib	Near Threatened
Palau Ground Dove *Gallicolumba canifrons*	Omekrengukl	Near Threatened
Giant White-eye *Megazosterops palauensis*	Charmbedel	Near Threatened

The endangered Micronesian Megapode is smaller than a domesticated chicken and is the largest wild bird in Palau. Megapodes are known for their unusual nesting habits of creating mounds to incubate their eggs. It is a member of a group called gallinaceous, or chicken-like birds. The Micronesian Megapode in Palau is an endemic subspecies, with vocal and ecological differences to the Micronesian Megapode found in the Mariana Islands. As ground dwelling birds, megapodes are susceptible to predation from introduced species such as rats. Humans also harvest their eggs and habitat alterations threaten the birds and their nests.

Photos left box (Clockwise from top left): Black-tailed Godwit ©PCS; Micronesian Imperial Pigeon ©PCS; Giant White-eye ©Mandy Etpison; Palau Ground Dove ©Mandy Etpison; Nicobar Pigeon ©Mandy Etpison. Photo right: Micronesian Megapode ©PCS

STATE

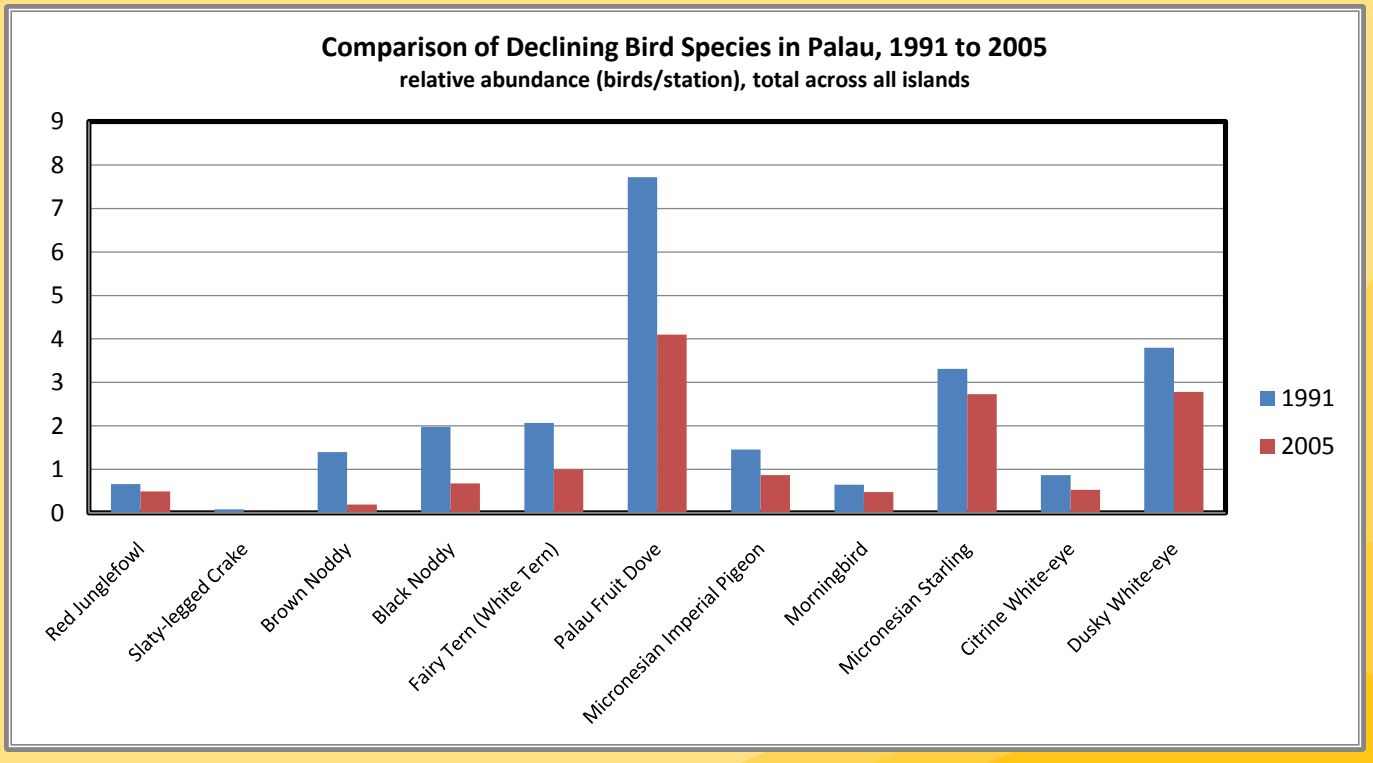
Many birds are declining in number

Many birds declined in number between 1991 and 2005, when National Bird Surveys were completed by PCS and the US Fish & Wildlife Service (USFWS) between Babeldaob and Angaur (VanderWerf 2007). 11 bird species declined significantly. Micronesian Imperial Pigeons (belochel) continue declining (Olsen and Eberdong 2011).

Belochel declined by 40% between 1991 and 2005, from estimated populations of 13,718 in 1991 to only 8,175 birds in 2001. More recently, in 2010 belochel were observed at fewer locations than in 2005. Palau's national bird monitoring program has 20 stations in Babeldaob that overlap with the PCS and USFWS stations from 2005. In 2005, belochel were observed at all 20 of these stations. In 2010, belochel were observed at only 13 of these stations (Olsen and Eberdong 2011), suggesting a further restriction in their range. The belochel was "uplisted" on the IUCN Red List of Globally Threatened Species from "Least Concern" to "Near Threatened" in 2002, because of recorded declines in the Marshall Islands and suspected (now confirmed) declines in Palau and decreasing habitat availability. In Palau, belochel are hunted for food and nestlings are sometimes taken for pets. Although belochel have declined, national laws have still been introduced to allow for hunting.

Other birds declining between 1991 and 2005 were the endemic Palau Fruit Dove, Morningbird, and Dusky White-eye, the restricted range Micronesian Starling and Citrine White-eye, the resident Slaty-legged Crake, Brown Noddy, Black Noddy, and White Tern, and the introduced Red Junglefowl. Illegal hunting and consumption, habitat loss and degradation, and predation by introduced species are suspected drivers of bird declines. Micronesian Starlings are hunted for food and for sport.

Although key species declined between 1991 and 2005, three native species increased, including the Near-Threatened Nicobar Pigeon, the restricted-range Micronesian Honeyeater, and the native Banded Rail. Many other species appeared to be stable between 1991 and 2005 (VanderWerf 2007).



STATE

Birds are important to Palau's culture and traditions

Palauans have an ancient conservation ethic and the protection of natural resources is integral to Palauan culture. Palauans believe that taking more than needed is wasteful and selfish. In some instances where a particular resource shows signs of decline, a chief has the authority to implement a *bul,* traditional restriction, until the resource has recovered. Communities and traditional leaders continue to utilize traditional conservation practices, and indeed many conservation areas throughout Palau were initially established and are managed through some form of traditional means. Today, both traditional and modern government systems work together to manage resources.

Birds hold symbolic and tangible importance in Palauan culture and traditions. For example, bird symbols are found in Palauan state flags and on beams within a *bai*, traditional men's house. Birds are also featured in Palauan legends that impart life lessons or provide useful information. For example, when a fisherman observes that the Pacific Golden Plover has arrived, it is time to fish for a certain type of fish, and when a jungle nightjar is calling, it means that there is a pregnant woman nearby. The Audubon Shearwater serves as a powerful protector and guide for the state of Ngchesar, and Palauans are very conscious of not causing any harm to the bird. Feathers of the White-tailed Tropicbird are used for the headdress of a woman during her first birth ceremony if she is from a certain clan in Palau. Other birds are important to the Palauan diet. The Micronesian Imperial Pigeon (belochel) is traditionally reserved for high status individuals and its leg is often served to babies for their first introduction to solid food. Seabirds and their eggs continue to be important food sources for people living in remote outlying islands.

The Palau Conservation Society logo is a Biib, or Palau Fruit Dove. The biib is one of Palau's most beloved endemic birds. Palauan legend has it that the biib was once a beautiful, heartbroken young girl, who calls forlornly to the clam, her mother. You can hear the sad "cooing" of the shy dove when you enter Palau's forests.

Palau has a traditional conservation ethic: Omengereomel, which means "to use wisely." The Society's name, Palau Conservation Society, was born of this ethic, befitting a group that believes in both protection of biodiversity and the sustainable use of resources. One of the first activities of PCS was a national election to select a National Bird. The Biib was elected as the National Bird by students, and was subsequently selected as the PCS logo.

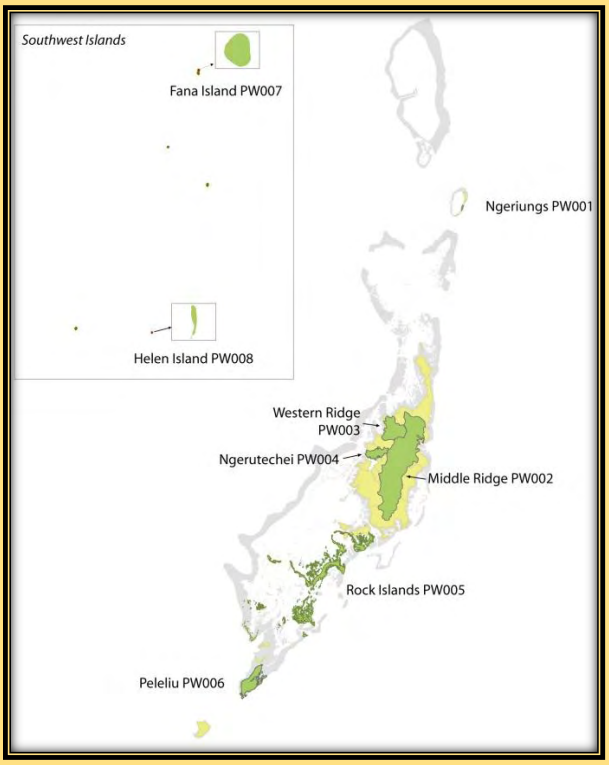
Images (top to bottom): Traditional first-born ceremony (ngasech) using the tail of the White-tailed Tropicbird as a headdress ©H.Ketebengang; State flags of Palau with bird symbols

STATE

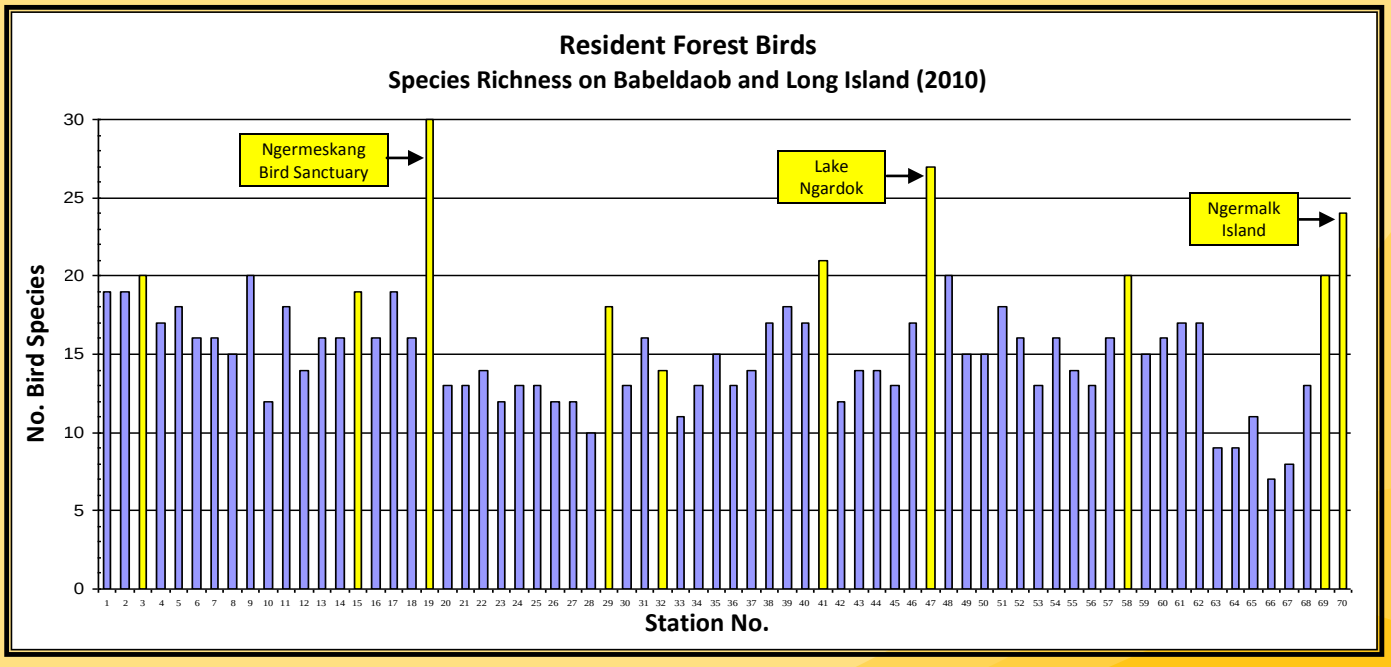
Birds are found everywhere, but some sites are more important

Birds are found everywhere in Palau, and thus are important in all terrestrial and marine ecosystems. However, birds are not distributed evenly. Some areas have more diversity or higher populations of birds, and thus are important sites for conservation and monitoring.

Palau has eight Important Bird Areas (IBAs), all globally recognized because they are home to significant numbers of threatened or endemic birds, or because they have large numbers of nesting seabirds (Holm et al. 2006). These eight IBAs have a total combined area of 216 km2 and cover about 47% of Palau's total land area. About 32% (70 km2) of Palau's IBAs are protected through legislation or traditional decree. Research from Palau and across the globe has found that IBAs protect birdsand other biodiversity. All of Palau's terrestrial habitats and globally endangered terrestrial species (including bats, crocodiles, sea turtles, snails, and plants) are found within one or more IBA.



As part of the National Program for Monitoring Forest and Coastal Birds, managed by the Belau National Museum, birds are monitored monthly. Museum scientists have conducted over 600 bird counts at stations on Babeldaob, Koror, and Peleliu. Their data show that Palau has "hotspots", or areas with high species richness (high bird diversity). Hotspots include the Ngeremeskang Bird Sanctuary (30 resident species; more than half of Palau's 51 resident birds), Ngardok Nature Reserve (27 resident species) and Ngermalk Island (24 resident species). Because these three hotspots are currently protected, they can be compared against other sites to determine relative biodiversity importance, and as such can provide advice about the impacts of future development or conservation activities on Palau's biodiversity (Olsen and Eberdong 2011).



Graphics (top to bottom): Palau's 8 Important Bird Areas (Holm *et al.* 2008); Graph of bird species richness on Babeldaob and Koror (Olsen and Eberdong 2010)

STATE

Birds are important to Palau's ecosystems and economy

Birds are critical to Palau's future, both environmentally and economically. Birds play an important role in forested ecosystems by moving seeds from place to place. The role that birds play may be specialized to species. For instance, there is some evidence to suggest that at Lake Ngardok, it is the Micronesian Starling (kiuid) that is solely responsible for translocating seeds of the Orredakl tree (*Dracaena multiflora*), which is one of the few native trees that can take root on degraded land and lead to regeneration of forest. The Kesiamel (*Osmoxylon packyphyllum*), a Palau endemic understory tree that grows in dense volcanic forests and limestone forests, is also spread by the endemic Micronesian Starling and the Palau Fruit Dove. Birds are part of all of Palau's food webs, including in marine systems.

Birdwatching is already a beneficial economic practice for Palau and has the potential to become a larger industry. Current estimates are that birdwatchers in Palau spend at least $200 per person per day, more than twice the average. Birdwatchers travel the globe looking for endemic and elusive species. With Palau's 12 endemic birds, easily viewed restricted-range species, and high number of rare migrants, Palau is both attractive and accessible to birdwatchers. Birdwatchers are also low-impact tourists, requiring only a native forest and a pair of binoculars to be satisfied. The requirements of birdwatchers, such as global travel and expensive viewing and photographic equipment, also means that most birdwatchers are high end tourists and spend relatively high amounts of money per person per trip.

Photos (clockwise from top): Micronesian Starling eating Kesiamel fruit; Kayaking offers unique birdwatching opportunities; A group of birdwatchers. All © PCS.

PRESSURE

Habitat degradation and destruction threaten birds and biodiversity

All of Palau's endemic birds use forests during some part of their life cycle (Pratt and Etpison 2008). Changes to habitat can stress birds by removing food sources, nesting sites, and safe havens. Development is responsible for rapid changes to habitats. Construction of Palau's Compact Road resulted in a loss of 1.43 km^2 upland forest, 0.28 km^2 wetland, and 1.30 km^2 mangrove (Kitalong *et al.* 2008), representing 1% of all forests. The completion of the road in 2008 has allowed easy access to parts of Babeldoab that were previously inaccessible, and new homes, roads, and farms have developed, with more planned. Forest loss, degradation, and fragmentation will continue. Peleliu, Koror, and Angaur also show trends of decreasing forest (Kitalong *et al.* 2008) and coastal habitats. Rare atoll and strand forests have also been destroyed and degraded in many places due to increased erosion, exacerbated by construction and climate change. Many of Palau's Important Bird Areas occur on private lands, and thus are at risk of unsustainable development.

Fire is an increasing problem, particularly on Babeldaob. Fires, started on purpose or by accident, occur regularly on Babeldaob. Fires kill trees directly, but also stress nearby seedlings and microorganisms that are essential in increasing soil fertility. In volcanic soil, which covers most of Babeldaob, the topsoil holds essential nutrients. Burning decreases the nutrients in the topsoil and removes the protective cover, and erosion subsequently degrades the soil further (Kitalong *et al.* 2008).

Map left: Babeldaob, highlighting the Compact Road and areas of potential development (1995);
Photos right (top to bottom) New housing development in Babeldaob; Remnants of a fire along a forest edge. Photos ©PCS.

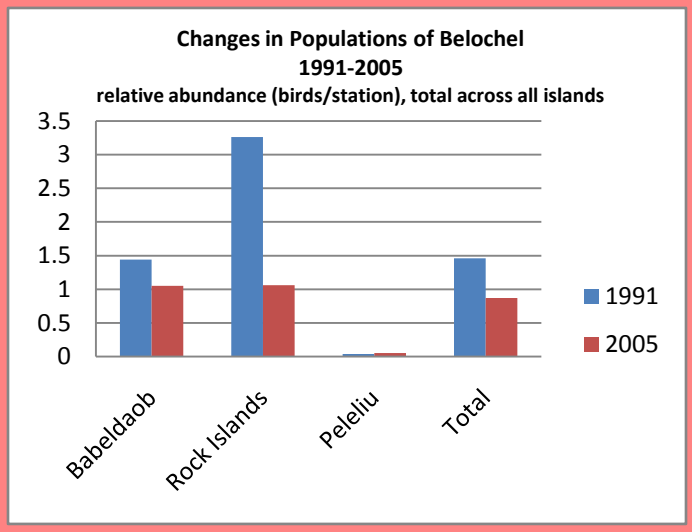
PRESSURE

Illegal hunting and consumption is causing Pigeon (Belochel) declines

Illegal hunting and consumption are driving forces behind the decline in Micronesian Imperial Pigeons (belochel). During bird surveys between 2003 and 2005, hunters were regularly encountered in the forest and were consulted for information on bird locations. Informal surveys of hunters have also indicated that demand for belochel is high. The 2005 National Bird Survey also showed that belochel were most common in remote areas far from human populations, and less common on transects near towns and roads, suggesting that hunting pressure is responsible for their decline. Hunting of most bird species is illegal as is the use of firearms, but poaching often occurs. Both hunters and law enforcement officers also report that hunting is modernized, with hunters using digital devices to playback bird calls and quickly attract belochel to close shooting distances.

Even though birds are protected by national law, hunting and consumption continue. The United Nations Food and Agriculture Organization suggested that the national law is severely limited (FAO 2011). First, the agency in charge of law enforcement is understaffed and cannot patrol all important areas or respond to all suspected violations. Therefore, the birds cannot be protected effectively. Also, the maximum penalty for violation of the law is only $100 and/or six months imprisonment. The commercial sale of belochel generates incomes much higher than penalties associated with getting caught ($20-25 per bird). Therefore, the fine is seen simply as a part of the business costs associated with hunting. Enforcement of sections of the law regarding possession and consumption are extremely rare, and many people keep belochel in cages.

Photo (clockwise) from top left: A pet caged Belochel ©PCS; Belochel in the wild ©Mandy Etpison; Hunter with an air rifle ©PCS



Traditionally, a man asked an elder if he could go hunting for belochel. The elder would go and read the field – he looked for signs from the gods that it was a good time for opening the hunting season. He looked for trees in fruit to see if the belochel's favorite foods were available, he checked if the birds were no longer nesting; he looked to see if there were enough birds to sustain a hunt. If he saw the right signs, he opened the hunt. He monitored the catch, and would close the hunting season when he thought enough birds had been caught.

PRESSURE

Alien invasive species and diseases are spreading and threaten birds

An estimated 500 alien species have been introduced to Palau (TNC 2002). Of those, around 200 plants are considered invasive or pose a threat to the environment. At least 20 animals are invasive (although this number may underestimate agricultural pests). Humans are responsible for the transport and introduction of alien invasive species. Many alien invasive species, including disease-causing microorganisms, pose a direct threat to birds, while others pose indirect threats by altering their habitats. Invasive species are the main cause of most recent bird extinctions across the globe. Small islands are particularly vulnerable, as birds on islands have few natural predators and invasive species can spread rapidly. Although Palau has a National Invasive Species Committee, there is no Coordinator and not enough funding to combat invasive species.

Alien invasive mammals, including rats, mice, cats, monkeys, goats, and dogs, kill or harass birds and eat bird eggs. This is most evident on Angaur, where monkeys and rats have left the island with Palau's lowest bird populations and bird diversity. Lessons from Guam also show that if the Brown Tree Snake ever makes it to Palau, it could wipe out Palau's birds. Alien invasive species also causes damage to agriculture and infrastructure and are costly to the economy. Invasive vines and plants (both native and introduced) pose an indirect threat by altering bird habitats. Invasive vines such as Kebeas (*Merremia peltata*) smother trees and kill them, replacing native forests with inferior habitat. The kelelacharm tree, which is a major food source for fruit-eating birds, is found to be very susceptible to kebeas (Miles 2011). Other invasive plants (*Chromolaena odorata, Imperata cylindrical,* and others) increase the risk and intensity of wildfires that could cause expansion of grassland and reduction of forest (Miles 2011). Development and clearing of forests often creates opportunities for invasive plants to spread.

Palau has five introduced birds, including the Sulfur-crested Cockatoo, Eclectus Parrot, Chestnut Mannikin, Red Junglefowl, and Eurasian Tree Sparrow. These birds may compete with or threaten Palau's native birds and are impacting bird habitats. The Sulfur-crested Cockatoo is responsible for reducing the populations of an endemic palm tree, almost to extinction.

Several native birds in Hawaii have gone extinct or have declining populations due to introduced diseases such as Avian Malaria and Avian Pox. Palau's proximity to Indonesia makes it vulnerable for the introduction of Avian Influenza (AI). This disease has been known to decimate domesticated bird populations and also infect humans.

Photos: Kebeas vines smother forest; Wild cat. All ©PCS.

PRESSURE

Climate change and our response could impact birds and biodiversity

Climate change can be detrimental to birds directly and indirectly, and climate change makes other threats worse. The effects of climate change on birds in Palau are poorly understood. In Palau, there is growing speculation that climate change has altered the fruiting time of trees and the abundance of arthropods in the forest, negatively affecting bird feeding behavior and changing their distribution. However, there are no studies to confirm this. Birds elsewhere in the world are already experiencing the effects of climate change. Extreme weather events have caused large-scale die-offs of adults, eggs, and young due to exposure, starvation, or structural failure of nests (WWF 2006). Birds that are limited in their distribution, like restricted-range birds, are expected to decline and to be outnumbered by invasive species (WWF 2006).

Indirect effects on birds and other biodiversity can include changes in temperature and intensity of storms that destroy or alter habitats. Sea level rise and shoreline erosion may destroy coastal habitats. Bleaching and ocean acidification may reduce availability of marine foods for seabirds. Indirect effects of weather can reduce bird breeding success. Climate change will also cause some of its most serious but least predictable impacts by shifting the timing of natural events and by shifting species geographical distributions. This will re-arrange plant and animal communities and ecosystems, and disrupt birds' relationships with predators, competitors, prey, and parasites (WWF 2006). These changes are expected to alter the makeup and functioning of most, if not all, the world's ecosystems.

People in Palau cannot stop climate change. However, how people in Palau react to and adapt to climate change can impact birds and biodiversity. The conversion of native forest to biofuel crops could remove important bird habitats. Development on shorelines, and the eventual construction of seawalls to protect those developments, could damage shorebird foraging areas. An increase in fires could have devastating effects on birds and forests. Human adaptation to climate change that does not consider Palau's biodiversity could make all threats worse.

Graphic left: An adaptation logo encourages consideration of all species and ecosystems from ridge to reef. D. Yobech ©PCS.
Photos (right): Flooding in a taro patch ©PCS; The effects of sea level rise on homes ©Takeshi Mita.

PRESSURE

Loss of traditional practices alters habitat and causes overconsumption

Wetlands are extremely rare in Palau, yet some of Palau's rarest birds require wetlands to survive. Traditional taro patches have provided wetland habitat for these birds throughout time. However, the traditional lifestyle of Palauan women has changed over the years. More women are now in the workforce and spend less time in their mesei, resulting in taro patches that are filled in with sediment. Additionally, commercial farms are now growing taro on drier upland areas. Abandoned taro patches and dry-land farms cannot support wetland species such as the Purple Swamphen, Slatey-legged Crake, Ducks, Yellow Bittern, and Common Moorhen.

Traditional agroforestry maintained forest diversity and provided habitat for diverse bird species. Although farming is essential to food security, many newer farms remove natural vegetation and are situated in rare riparian areas. Removal of forest for farming decreases available habitat, and conversion of native forest to monoculture farming creates habitats that are not valuable to many bird species. For example, between 2001 and 2006 many forested areas were converted to monoculture noni farms. Now abandoned due to decreasing global demand, these unattended noni farms still only support very few bird species.

In the past, consumption of birds, particularly belochel and the eggs of the Micronesian Megapode, was reserved for special occasions and required the permission of traditional chiefs. This practice of involving elders in resource decisions has declined, and birds are now consumed for many insignificant reasons.

Photos (clockwise from top left): Purple Swamphen; Common Moorhen; Yellow Bittern; Rufous Night Heron; Commercial dryland farm; Abandoned taro patch. All ©PCS.

RESPONSE

Laws and restrictions already protect birds, but more are needed

The Palau Constitution states that responsibilities of the national government include "conservation of a beautiful, healthful, and resourceful natural environment." The 1982 Protected Land Life Act on the Conservation of Birds states that "no birds shall be taken, intentionally killed or harmed, nor their eggs taken". The Protected Land Life Act excludes two introduced species (Sulfur-crested Cockatoo and Red Junglefowl) and two native species (Purple Swamphen and Collared Kingfisher). The 1979 National Firearms Control Act banned the possession or use of firearms. The Endangered Species Act of 1975 prohibited the taking or possession of any threatened or endangered species, although no national list of endangered species has been promulgated. The law also prohibited the importation of exotic (nonnative) species without a permit. Title 34 of the Palau National Code authorized quarantine and prohibited the transport of monkeys between any islands in Palau. National regulations restrict fires. Palau is also signatory to the Convention on Biological Diversity, Convention to Combat Desertification and Land Degradation, Ramsar Convention on Wetlands, Convention on International Trade of Endangered Species, and the Convention on Migratory Species.

The Palau Constitution gave the 16 states ownership of natural resources on land and to 12 miles from the traditional coastal baselines. As such, many states have passed legislation protecting forests or areas important to biodiversity. The 2003 Protected Areas Network (PAN) Act supports these state protected areas. Bul, a restriction declared by traditional chiefs, is also applied to certain resources or areas when needed.

National laws are in need of review and update. Native species exemptions under the Protected Land Life Act should be removed, as the Purple Swamphen is already rare and both the Swamphen and Collared Kingfisher are endemic at the subspecies level, and the $100 fine reassessed and raised. An Endangered Species List should be adopted. No laws allowing for hunting of pigeons should be passed until pigeons have recovered.

New state laws are needed to protect forests, rare habitats such as riparian buffer zones and coastal habitats, and Important Bird Areas. To be a member of PAN, states must pass legislation adopting the PAN act and establishing protected areas. State laws mandating and authorizing land use plans, zones, and management plans are also needed. Even when laws have been passed, they lack regulations that dictate how that law will be implemented and enforced. Regulations must be developed and adopted.

Photo: Ngchesar State leaders signing an agreement to join the Belau Watershed Alliance ©PCS.

The picture on the left shows the leaders of Ngchesar state signing the Master Cooperative Agreement (MCA). The MCA is a partnership agreement between BWA (Belau Watershed Alliance) members. Each member (state) agrees to protect the water resources of Palau for the benefit of the people. Ngchesar was the 6th state to join the BWA. Also pictured (standing, 2nd and 3rd from left) are the governors of Ngardmau and Aimeliik, two states that were already members of the Alliance.

RESPONSE

Enforcement and compliance of laws should be improved

Although illegal, hunting, possession, and consumption of Micronesian Imperial Pigeons (belochel) are prevalent. Enforcement of the Protected Land Life Act, at all levels from hunters to buyers, must be improved or belochel will continue to decline. Laws restricting fires and prohibiting the importation or transport of invasive species must be better enforced. Enforcement of state protected area laws must be improved.

Increasing compliance with laws, through increased awareness and social pressure, will reduce enforcement needs. Individual and societal compliance are also keys to bird survival, such as through personal choices to respect existing bul, not to eat or buy belochel, and not to transport invasive species.

Many national and state entities are authorized to enforce these laws but lack adequate personnel or equipment. Although marine protected areas have some degree of enforcement, greater focus on terrestrial resources and areas is needed at the state level. A targeted investment in enforcement and compliance is necessary by national and state governments in order to stop bird declines. Funds for enforcement and compliance can be availed by fully implementing the PAN Act or by better participation in international conventions. Improving enforcement also requires improved authorization processes, training for Conservation Officers, and prosecution of those people who have broken laws and restrictions.

Improved enforcement works. Enforcement of the National Firearms Control Act led to a measurable increase in Fruit Bats (Wiles 1994). A floating outpost in Ngardmau's Ngermasech Conservation Area reduced poaching of marine resources and the area has some of Palau's highest sea cucumber densities. Koror State has active enforcement and surveillance, and some of Palau's most pristine sites.

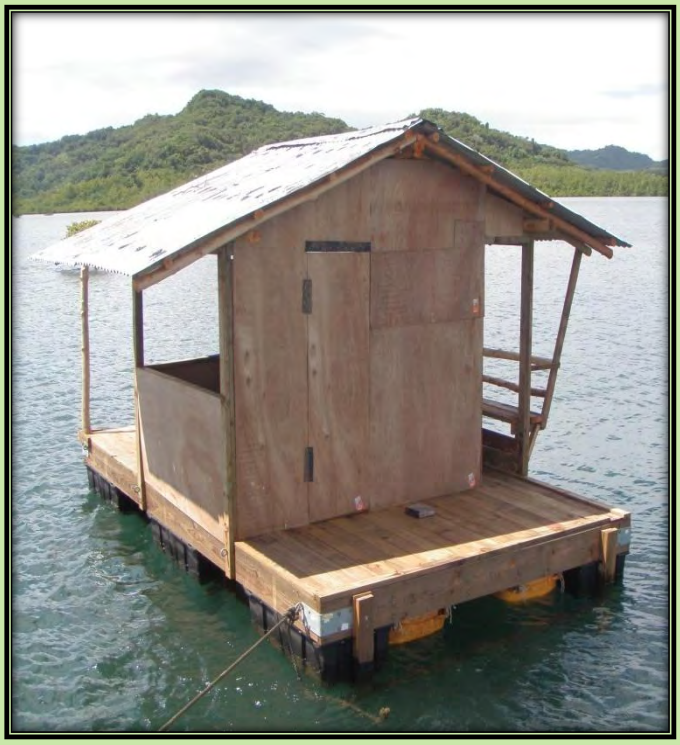


Photo (left to right): Floating outpost in Ngermasech Conservation Area ©PCS; Koror rangers at work in the field. K.Sam ©KDCLE.

RESPONSE

Community-based plans and their implementation help birds

How we use our land and manage our protected areas will have consequences for birds and natural resources. Careful planning, and full implementation of those plans, can prevent and mitigate threats and safeguard habitats and birds. Careful planning can prevent habitat loss and degradation and increase resilience to climate change in environmentally friendly ways.

Targeted planning for protected areas, such as through development of a Management Plan, can identify threats and actions to protect birds, biodiversity, and habitats. Protected areas usually have specific populations of endangered or endemic species, and so specific actions such as awareness and enforcement are needed to make sure those species are effectively conserved. The Palau Conservation Society offers assistance to states and communities to develop community-based Management Plans that are acceptable to land-owning communities and meet the criteria for funding from the PAN, thus enabling implementation of those plans.

Broader plans for a state or watershed is termed a Land Use Plan, and usually results in the development of restrictions, zones, and codes for how development can proceed. Through Land Use Planning, communities can look at their environment (including ecosystems and social habitats) holistically, and plan for development that balances their economic and natural resource needs. Airai State has completed a Land Use Plan that includes a number of zones, from commercial to conservation. The Airai State Land Use Plan can be used as a model for other states wanting a Land Use Plan. Koror State also follows a zoning map.

Efforts are underway to consolidate existing laws and regulations and to identify and fill gaps for a national Sustainable Land Management (SLM) Policy. The SLM Policy will need to be approved by Congress, and when implemented will ensure that sustainable land planning and use remain national priorities.

Photos (clockwise from top left): Airai Legislature ©Airai State Government; Airai waterfall. W. Perryclear ©PCS; Babeldaob forests from ridge to reef ©PCS.

RESPONSE

Alien invasive species must be prevented, controlled, or eradicated

Prevention is the first step towards protecting Palau from Alien Invasive Species, by stopping the introduction of nonnative species. The Quarantine Office has the huge responsibility of manually checking all incoming flights and ships to Palau, but without enough manpower and modernized equipment, it is difficult for them to inspect all shipments or to detect all introduced species.

Individual compliance is important. Individuals should not bring introduced species into Palau. Even ornamental plants can become invasive or harbor harmful bacteria or pathogens. Individuals should also not transport monkeys out of Angaur, and pets (such as monkeys, cats, and dogs) should never be released into the wild. More awareness about the effects of introduced species is needed.

Once introduced species make it to Palau, early detection systems and controls are needed to stop their spread. This includes monitoring for diseases. Wildlife that die of suspicious causes can be taken to the Koror State Veterinarian for analysis. Introduced plants and animals can be reported to the Bureau of Agriculture.

Many control efforts need a lot of manpower and so community efforts are crucial. There are many opportunities for community members to help with cleanups of kebeas and other invasive vines. In some cases, eradication of invasive species is possible. Rats and Singapore Ants were successfully eradicated from Helen Island and in 2011 rats will be eradicated from Kayangel. Following quarantine laws on these individual islands will stop reintroduction of invasive species.

Palau has a National Invasive Species Committee, which is a network of agencies and offices that work together to manage invasive species. Funding the committee and hiring an experienced National Coordinator will help align invasive species efforts among agencies and improve awareness.

A 1972 law prohibits transport of monkeys from Angaur to other islands in Palau. However, the law is not well followed or enforced. If monkeys are released on Babeldaob or the Rock Islands, they may harm the birds as well as agriculture and tourism.

Photos (left to right): Rat trapped in Ngerebelas, Kayangel; A pet monkey in Koror. All ©PCS

RESPONSE

Conservation of key sites and IBAs will protect birds and biodiversity

Protected areas established by law or traditional decree create safe spaces or sanctuaries for birds and other biodiversity. Protected areas increase resiliency to climate change by reducing other threats and serving as a source habitats for numerous species.

Although Palau has over 40 protected areas, few protect Palau's forests and more are needed. Important Bird Areas (IBAs) are excellent guides for terrestrial conservation. Currently, IBAs on the Rock Islands, Fanna Island, and Helen Island are fully protected. Only 24%, 1%, and 16% of Babeldaob's Middle Ridge, Western Ridge, and Ngerutechei IBAs, respectively, are protected. No parts of the Ngeriungs or Peleliu IBAs are protected. Additional protected areas on Babeldoab, Kayangel, and Peleliu are needed to protect birds.

Protected areas must be effectively conserved to reduce threats. Palau committed to the effective conservation of terrestrial biodiversity by ratifying the Convention on Biological Diversity (CBD) and by starting the Micronesia Challenge. The Micronesia Challenge states that parties shall effectively conserve 20% of their terrestrial resources by 2020. Palau has defined "effectively conserved" as being a member of the Protected Area Network (PAN) and meeting certain criteria (such as public support for conservation and steady or increasing natural resources). Becoming a member of PAN, developing a management plan, and implementing conservation actions are key steps towards effective conservation of protected areas. The Palau Conservation Society offers support to communities in all these areas.

Efforts are underway to identify Marine IBAs, which are areas used for foraging by seabirds. Marine IBAs usually include large swaths of open ocean beyond the reef. Protection of Marine IBAs can help Palau meet its obligations to the CBD, such as Aichi Biodiversity Target #11 (at least 10% of marine areas).

The Ngermeskang Bird Sanctuary in Ngaremlengui State is Palau's only area protected specifically for birds. The site has Palau's highest bird diversity and is important economically because of visits from birdwatchers. Studies by the Belau National Museum have shown that an area immediately south of the Sanctuary also exhibits high levels of bird diversity. The state is considering expanding the boundary of the sanctuary.

Photo (right): The Rock Islands are an Important Bird Area ©Kevin Davidson.

RESPONSE

A "Green" Palau will support livelihoods, culture, and birds

Palau is well-regarded across the globe for its conservation efforts. The country's number one industry, tourism, is based on Palau's fantastic environment and its excellent conservation track record.

Conservation of birds and biodiversity can improve local livelihoods. Creation of more bird sanctuaries and establishment of support structures (such as trails, viewing spots, local guidebooks, and presence of Conservation Officers) can employ more local experts and guides, especially in Babeldaob. Conservation of habitats also improves quality of life. When effectively conserved, birds, protected areas, and sustainably managed land can provide ecosystem services critical for life, such as pollination and water regulation. A green Palau also increases resilience to climate change by diversifying the economy and reducing the impacts of certain threats.

In efforts to adapt to climate change, in 2010 Palau's President Johnson Toribiong launched a "Green Revolution" to focus and streamline conservation efforts, particularly through solid waste management, replanting projects to boost food production and strengthen food security, and renewable energy initiatives. Part of the Green Revolution includes planting fruit-bearing trees on degraded areas of Babeldaob. This will improve habitat for birds, provide employment for people, and increase food production. Continuing traditional practices, such as maintaining taro patches and mixed agroforests, will also support cultural traditions and provide habitat for birds.

In 2009 Palau became a Shark Sanctuary. International dive agencies widely applauded Palau's status as a Shark Sanctuary, which boosted tourism income. Indirectly, this helps protects birds by maintaining the ocean's apex predators and ensuring a functioning ecosystem that includes provision of food for seabirds. As a Party to the Nauru Agreement, Palau has established limits on tuna fishing in its waters, ensuring that lucrative tuna resources are available over the long-term for the Palauan people, and indirectly, ensuring that ecosystems continue to function and seabirds thrive.

Photos (left to right): Coconut plantation in Ngardmau; Seabirds feeding in open water. All ©PCS.

RESPONSE

Research and monitoring of birds helps inform management

Birds are found in every habitat from ridge to reef and beyond. Each bird is unique in its distribution and can serve as a valuable indicator for global environmental change. Birds can show when the environment is under serious strain and when conservation actions have been successful. Changes in bird populations, richness, or distribution can indicate that there is a problem or show whether the problem has been solved.

The National Program for Monitoring Forest and Coastal Birds has selected land and coastal indicator species. The Palau Fruit Dove, Micronesian Imperial Pigeon, and Bush Warbler are monitored to detect potential threats to forest ecosystems. The Rufous Night Heron, Little Pied Cormorant, and Pacific Reef Heron are monitored to detect threats to marine ecosystem health. Comparison of birds at potential development sites to monitoring data from the Program's hotspots will also provide the Environmental Quality Protection Board and developers with rationale for approving or recommending conditions on permit applications.

Some highly technical conservation actions require specialized research studies. For instance, invasive species eradication operations using toxic rodenticides require careful study of the diet and habits of birds and the effects of toxins to ensure that there is no non-target loss of birds. All eradication efforts require a full feasibility study. Any efforts to allow for hunting of belochel should only be made after careful analysis of the existing monitoring data and after ruling out confounding factors, requiring additional special study. Reforestation and land restoration efforts can benefit from specialized study of seed and pollen dispersers. Investment in research and monitoring programs, and in young Palauans studying the natural and social sciences, is necessary to ensure that Palau's long-term information needs are met.

National Program for Monitoring Forest and Coastal Birds

Land Bird Indicator Species

Coastal Bird Indicator Species

Photos box (Clockwise from top left): Palau Fruit Dove ©PCS; Micronesian Imperial Pigeon ©BNM; Palau Bush Warbler ©BNM; Rufous Night Heron ©PCS; Pacific Reef Heron ©PCS; Little Pied Cormorant ©BNM. Photos right (top to bottom): A research team on Kayangel ©PCS; Study photo of a Micronesian Megapode ©USDA.

RESPONSE

The future depends on the actions that we make today

Everything in life is connected. Like a human body, we can't function fully when a part of our system is missing. Like us, the environment is a system that can also malfunction if a part of it is missing or broken. Hence, to keep the unique environment of Palau for future generations to appreciate, we have to take good care of it.

There is a saying in Palau that says "*A chimad a dodersii, a chimal a chad el lodersii*". Translated, this means that "a hand that you lend, is a hand that is returned to you". This means that when you help a person, that person will help you in return. This is an idiom to teach the act of reciprocating. Although this saying is specific to people, it may be used for our actions towards the environment. If we help the environment to flourish, it can help us in return. For example, if we replant an area with fruiting trees, it will one day provide us with food that could either be the fruits or birds that eat the fruits.

Another Palauan saying is "*A sengsond a mrecherchii a klengoes*". Translated, this means that "twigs can boil a pot". This saying means that little things can make a difference. This proverb can be used in a good or bad situation. Meaning, if we keep doing bad things to the environment, they can all add up into one big problem. In contrast, every little thing that we can do to help the environment can help to make a difference in the long run.

Palau has an active civil society, with over 200 nongovernmental and community-based organizations. They work together and in partnership with government to raise awareness, conduct scientific studies, and implement conservation actions. Each organization's small contribution adds up to a strong community-based will to protect Palau's environment. Supporting Palauan civil society will ensure that birds and biodiversity continue to thrive. The Palau Conservation Society is a leading advocate for community-based conservation. We offer services to help communities plan for and implement effective conservation of their natural resources.

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