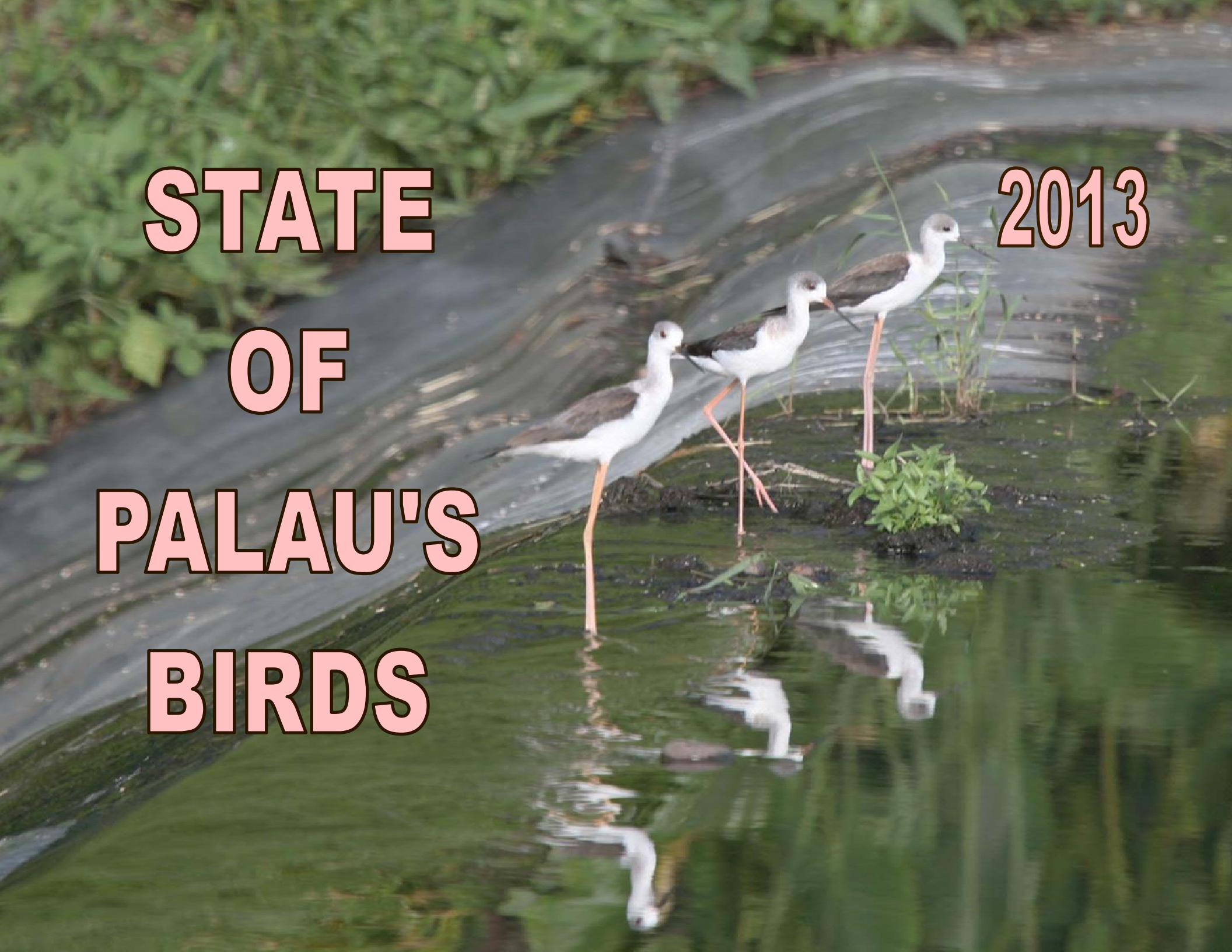


**STATE
OF
PALAU'S
BIRDS**

2013



Bird diversity is a reliable indicator of overall biodiversity



USP Library Cataloguing-in-Publication Data

State of Palau's Birds, 2023/ Alan R. Olsen and Milang Eberdong, editors.
– Koror, Palau : Belau National Museum, 2014.

xx p. ;xx cm.

ISBN xxx-xxx-xxxx-xx-x

1. Birds--Palau I. Olsen, Alan R. II. Eberdong, Milang III. Belau National Museum.

QL672.73.Pxxxx 2014

598.xxxxx

State of Palau's Birds 2013

4th Annual Report of the National Program for Monitoring Forest and Coastal Birds

*Conservation is a cause that has no end.
There is no point at which we say, "Our work is finished."
~ Rachel Carson*

Natural History Section



Belau National Museum

Introduction: The Importance of Palau's Birds and Biodiversity

Mapping Palau's Bird Diversity

Starting in 2013, the National Program began a fine-scale field survey of the bird diversity of Babeldaob Island by sampling 1-kilometer cells throughout the island. The goal of the five-year project is to collect bird diversity data for every square kilometer of Palau. The survey data will be used to develop detailed range maps for endemic birds and other bird species of concern and as an indicator of the biodiversity of each cell. The squares on the map (right) show which 1-km cells have been surveyed so far.

Birds – A Quality of Life Indicator in Koror

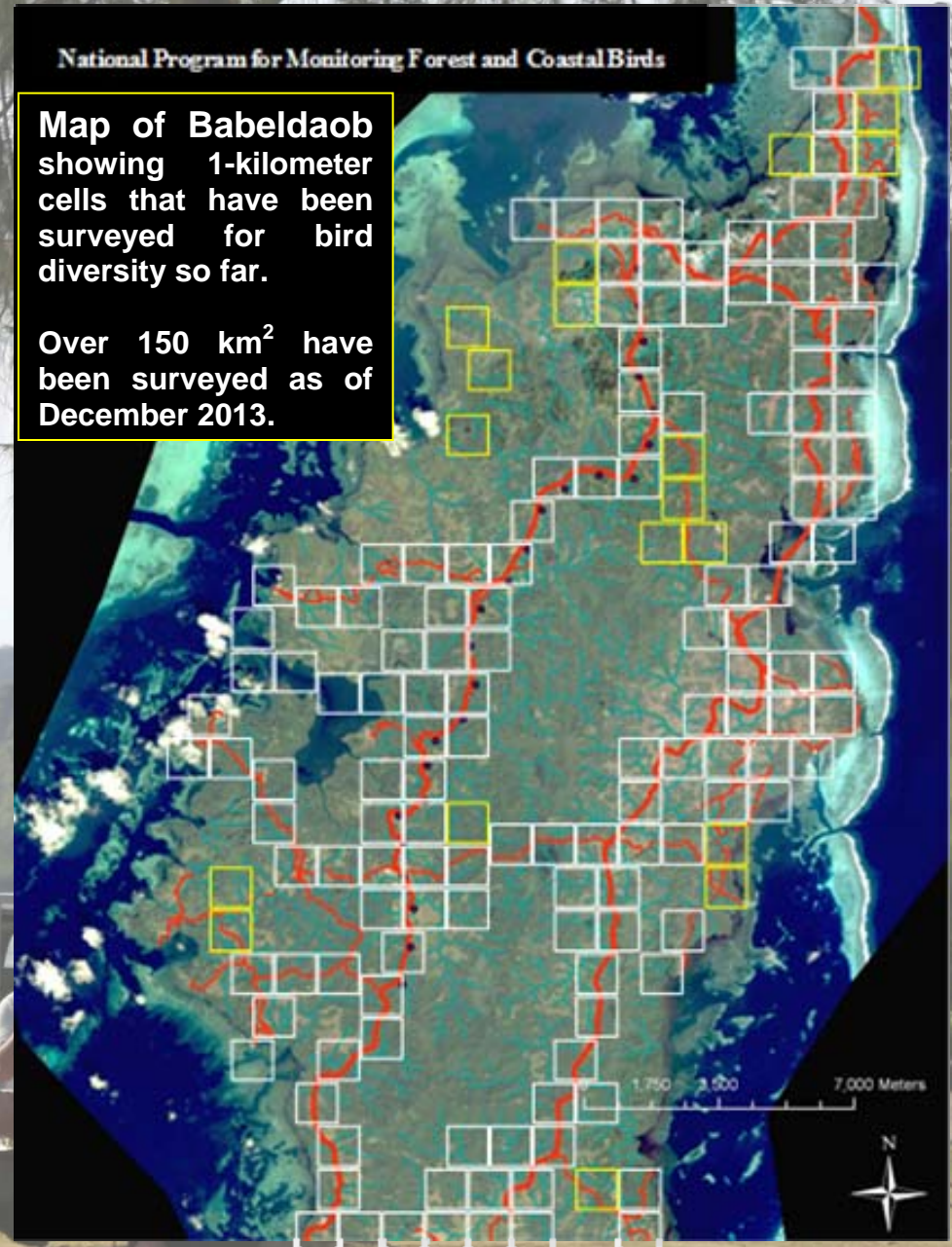
Birdwatchers are welcome to join staff from Belau National Museum on the first Saturday of every month at 6:00 AM under the ironwood tree at Long Island Park to experience Koror's bird diversity along the park's bird trail. The Long Island Bird Days project is sponsored by the museum and Koror State Government. Bring your own binoculars!



National Program for Monitoring Forest and Coastal Birds

Map of Babeldaob showing 1-kilometer cells that have been surveyed for bird diversity so far.

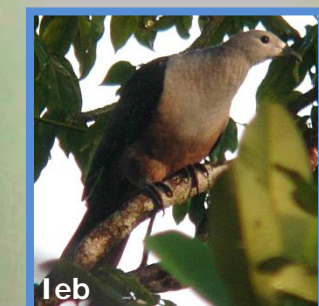
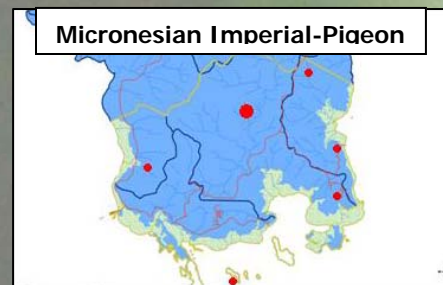
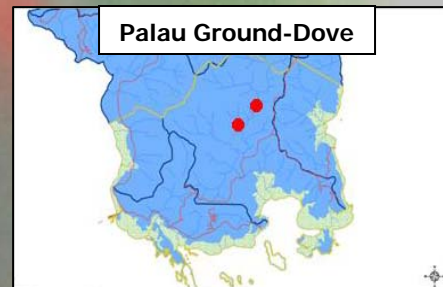
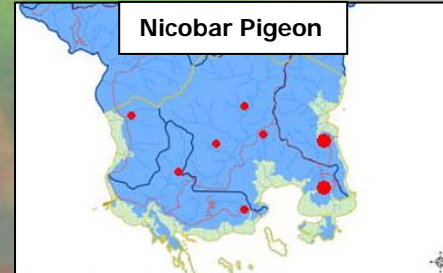
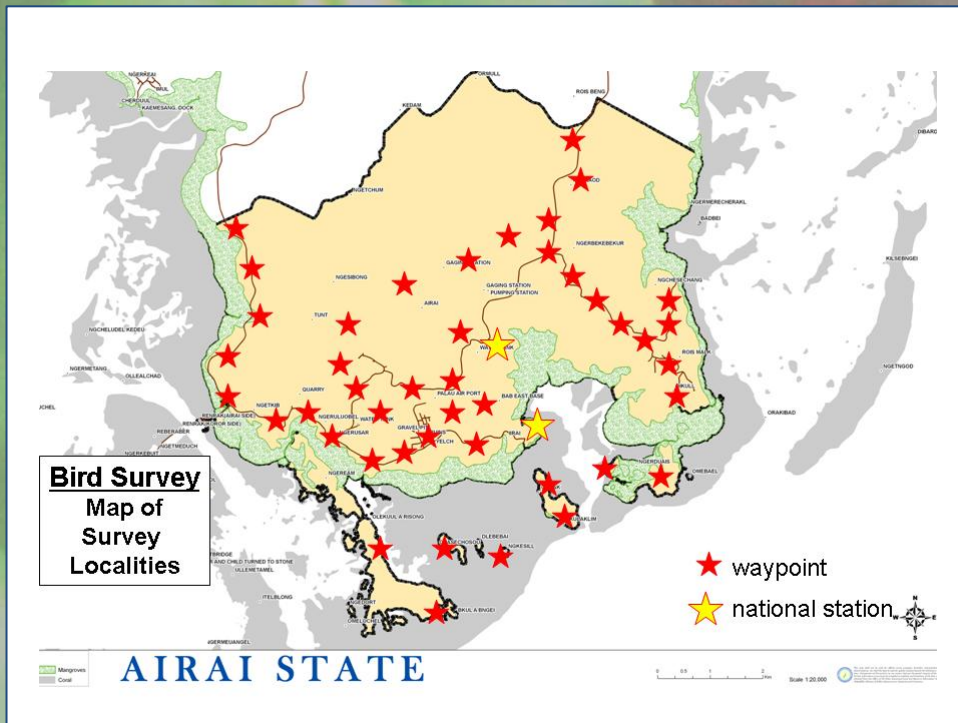
Over 150 km² have been surveyed as of December 2013.



Introduction: The Importance of Palau's Birds and Biodiversity

Bird Diversity Survey – Airai State

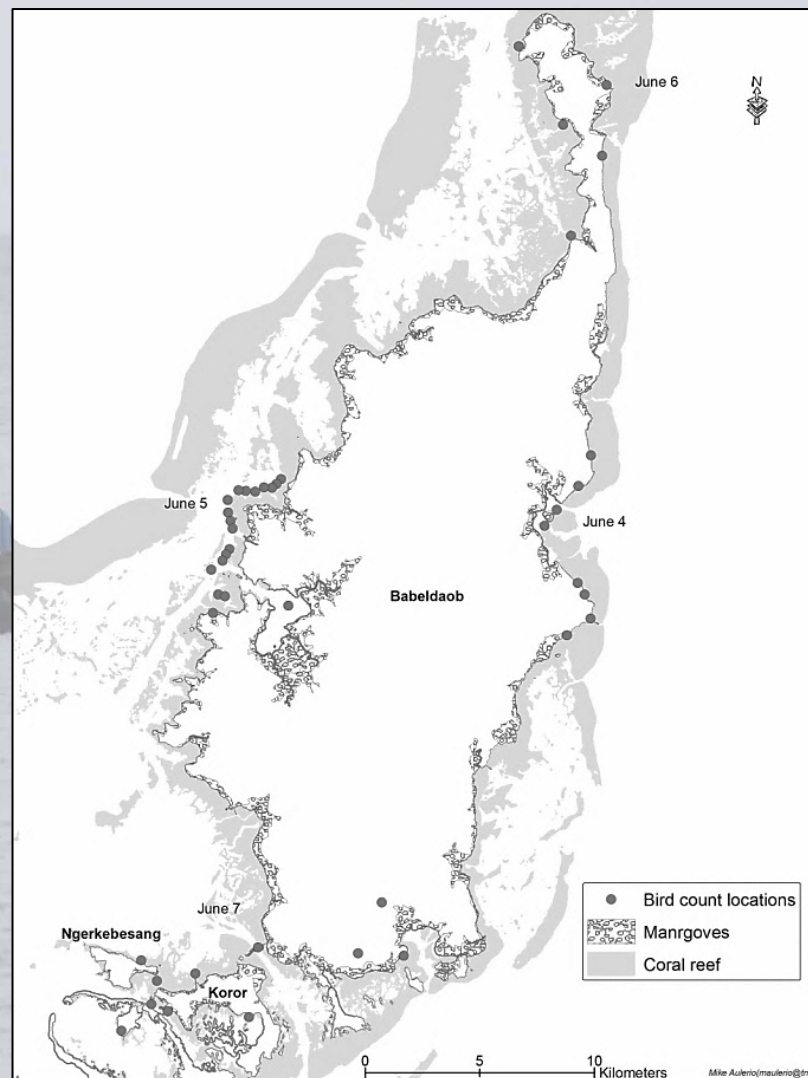
The first state survey for bird diversity was completed in 2013 in Airai. The survey found a total of 27 species of forest birds, including four endangered or threatened species. The map below shows the locations of survey sites. The maps on the right show the locations (red dots) where endangered or threatened species were observed. The larger dots indicate nesting grounds.



Introduction: The Importance of Palau's Birds and Biodiversity

Rufous Night-Heron Census

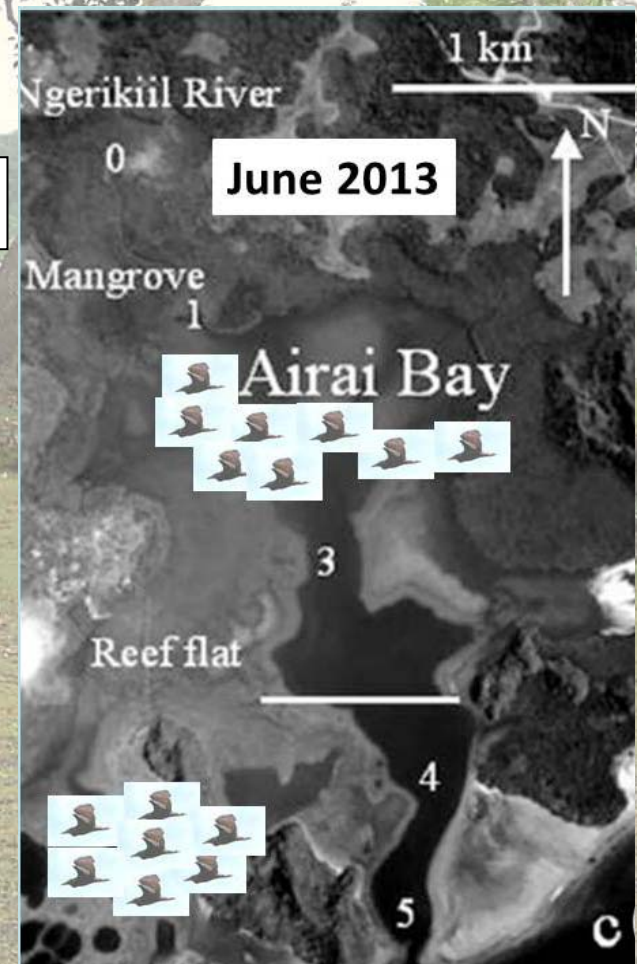
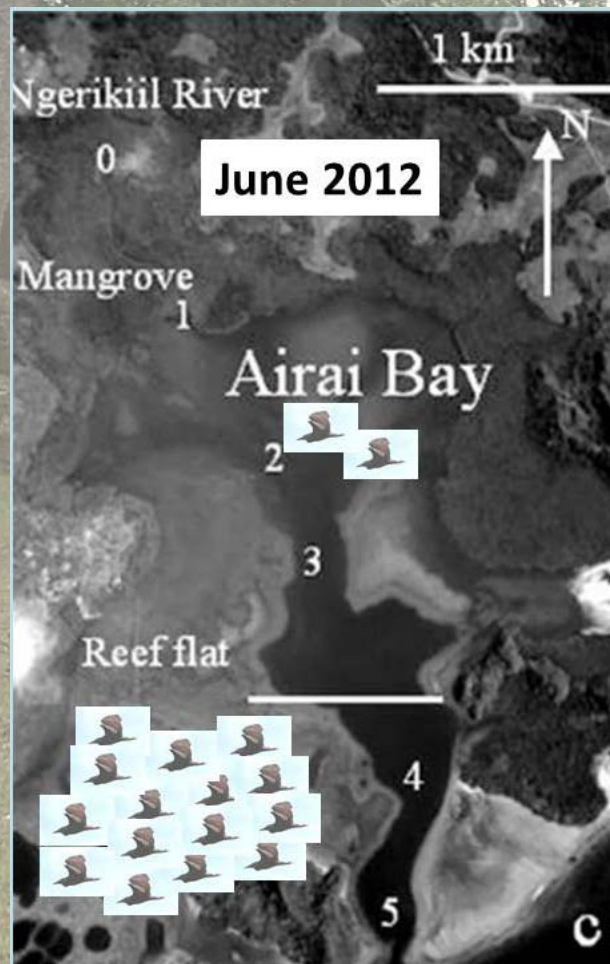
Palau's Rufous Night-Heron (below) is a resident (non-migratory) subspecies found in Palau and Chuuk. It is important to know the size of the Rufous Night-Heron population in Palau because the night-heron is a primary indicator for monitoring the health and biodiversity of coastal marine ecosystems. A recent survey of the night-heron population found that an estimated 1,200 adult Rufous Night-Herons live in Palau. The map on the right shows the sample locations for the population survey.



Introduction: The Importance of Palau's Birds and Biodiversity

Case Study – Integrated Water Resource Management (IWRM) Ngerikiil Watershed Project

The IWRM project provides an example of the value of the Rufous Night-Heron as an indicator species. The maps below illustrate changes in heron counts at the Ngerikiil River estuary in Airai Bay and adjacent reef flats over a one-year period. In late 2012, a typhoon tidal surge damaged the reef flat and subsequently the number of herons in the reef flat declined from 15 to 8 birds. Airai Bay was protected from typhoon damage. During the same year an upriver reforestation project reduced sedimentation in the bay, resulting in improved water quality and an increase in the number of herons from two to 8 birds. As the water quality in the bay continues to improve and the reef flats begin to recover from the typhoon, more night-herons could be attracted to the increasingly healthy ecosystems at both locations.



State of Palau's Birds: Migratory Visitors

Black-winged Stilt, *Himantopus himantopus*

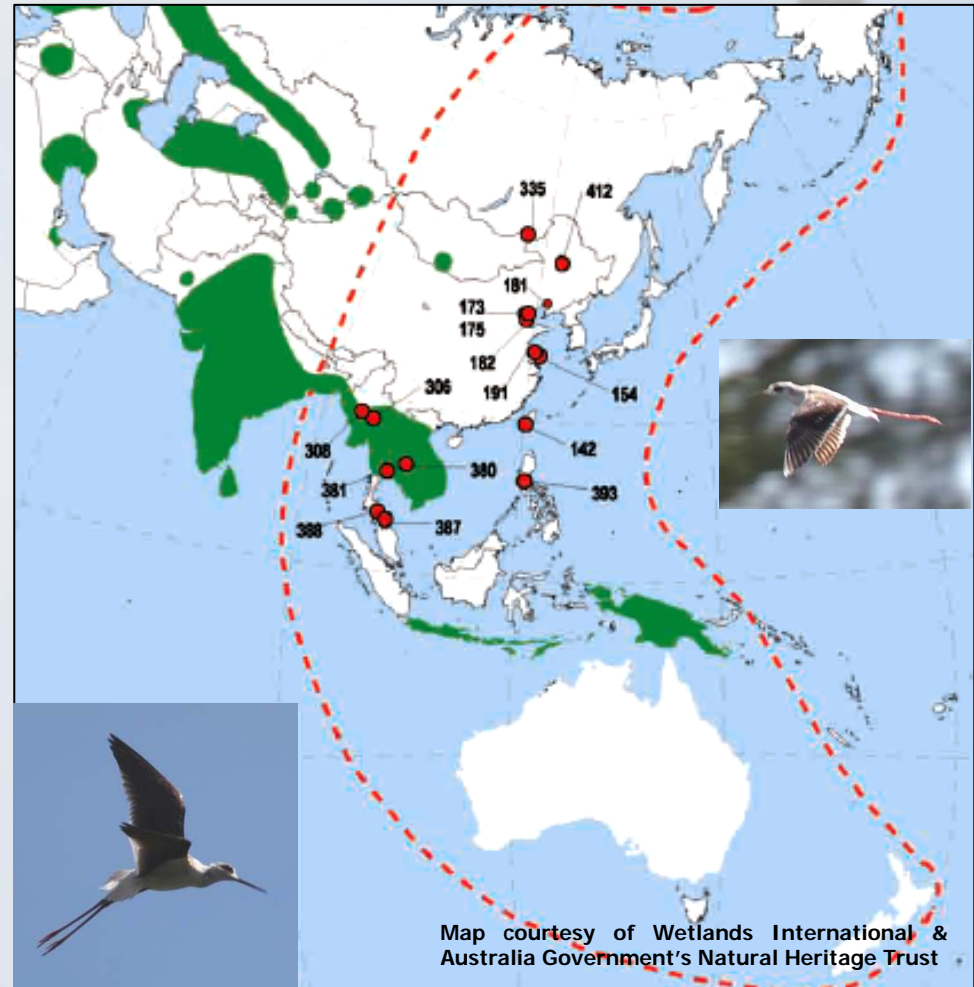
The migratory bird season began with an unusually large number (approximately 20) of Black-winged Stilts that arrived as a single flock at the settling ponds of the Koror sewage treatment plant in mid-September 2013. After arriving in Koror, the stilts dispersed to other parts of Palau to spend the winter. Once rare in Palau, the number of stilts has steadily increased every season since 2010. Many experts believe that this species is expanding its range. Perhaps Palau is part of that expansion.



State of Palau's Birds: Migratory Visitors



Black-winged Stilts migrate to Palau each season from India, Southeast Asia or other localities in Eurasia. They follow an unusual migration route, flying east-southeast from Eurasia to Palau, Papua New Guinea or Indonesia in the autumn and returning by a west-northwest route to their Eurasian breeding grounds in the spring. The migration route may require birds to travel in and out of the standard north-south flyway that is used by other migratory birds. There is also an Australian species, the Pied Stilt, which rarely migrates outside of Australia and a western species, the Black-necked Stilt, which is found in the Americas, Europe and Africa but is very rarely seen in Oceania.



Map of the Asian-Australasian Migratory Bird Flyway (outlined in red), showing the range of the Black-winged Stilt (green areas) inside and outside the flyway. Red dots represent major staging areas for Black-winged Stilt migration.

State of Palau's Birds: Migratory Visitors



Stilts are attracted to ponds where they probe the pond bottom with their long, thin beaks to feed on insects, worms, snails and other invertebrates that live in the soil. Although they are often found at fish farms, they do not harm the fish stocks because fish are not a part of their diet. All of the migratory birds that come to Palau, stilts included, are protected by national law and most are protected by international law as well. It is against the law in Palau to harm or capture any migratory bird, even those that are attracted to fish farms or other aquaculture facilities.

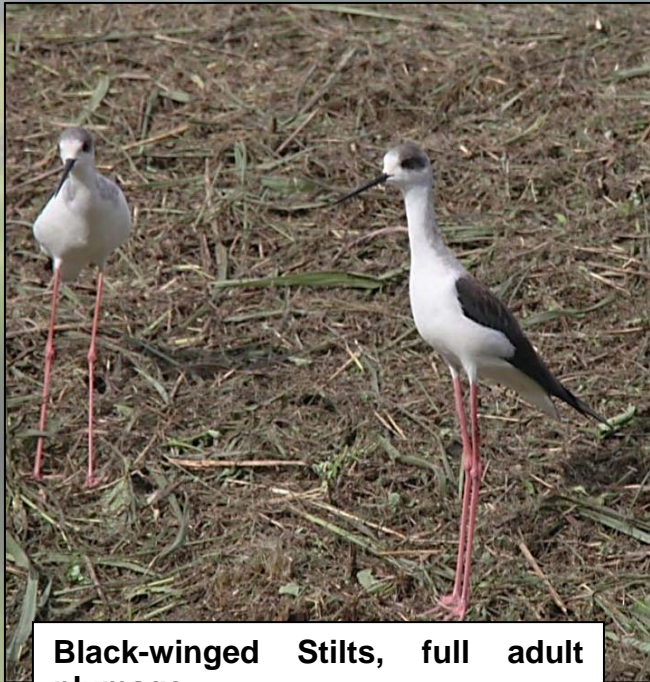


Black-winged Stilts at various locations: clockwise from top left: Koror, Ngaremlengui, Melekeok, Ngatpang, Koror



State of Palau's Birds: Migratory Visitors

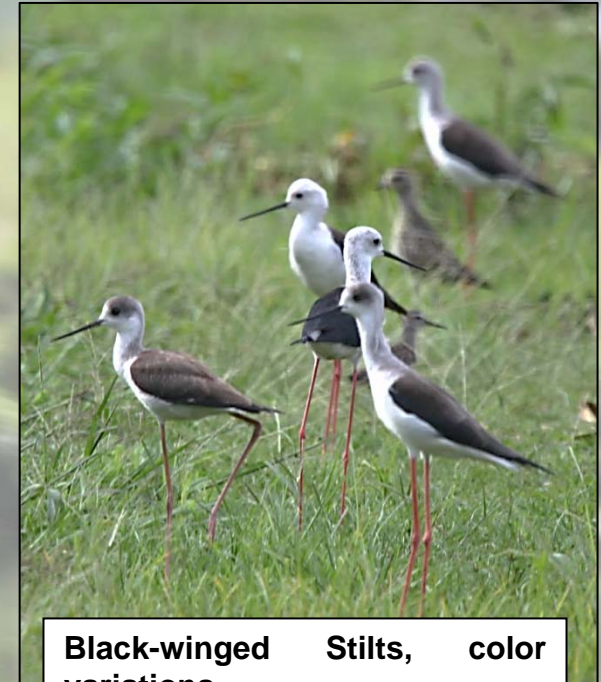
The color patterns of Black-winged Stilts vary for each individual bird. Although adults always have black wings with white breast and belly, the head and neck may vary from pure white to a white face with various amounts of dark coloration on the crown and nape. Legs are bright pink. Immature birds resemble adults except the wings are lighter in color and the legs are gray.



Black-winged Stilts, full adult plumage



Black-winged Stilts, adult (left) immature (right)



Black-winged Stilts, color variations

State of Palau's Birds: Migratory Visitors

The Egrets

The arrival of the flock of Black-winged Stilts was followed by the arrival of a flock of more than 20 egrets at the Koror sewage treatment facility in early November 2013. The egrets arrived in a mixed group of Little Egrets (*Egretta garzetta*) and Intermediate Egrets (*E. intermedia*) with one Great Egret (*Ardea alba*) and a few Cattle Egrets (*Bubulcus ibis*). The Cattle Egrets dispersed to other parts of Palau within a day or two but the remaining egrets stayed at the sewage treatment facility through December 2013 and beyond. Interestingly, the mixed group took flight as a single cohesive flock when disturbed.



Left: Mixed flock of egrets

Bottom: Egrets and friends

Left: Little Egret

Center: Intermediate Egret

Right: Cattle Egret



Pressure: Megapodes and Climate Change

Climate Change Threatens Bekai, the Palau Megapode

Currently, there are two recognized subspecies of the endangered Micronesian Megapode, one in the Northern Marianas Islands and one in Palau however; recent scientific studies indicate that the Palau Megapode may rank as a separate species. Although an IUCN plan has been developed that addresses many issues that are shared by both subspecies, field work in Palau has identified major threats from climate change and tourism that are unique to the Palau Megapode. This update describes the threats to the Palau Megapode from climate change and the conservation actions that are planned to mitigate those threats.



Palau Megapode, *Megapodius laperouse senex*
Left, Carp Island: right, Ulong Island

Pressure: Megapodes and Climate Change

After a lengthy hiatus of typhoon activity, Palau was struck by two supertyphoons within the space of one year. Both typhoons inflicted serious damage on the nesting grounds of the endangered Palau Megapode. It is estimated that over 20% of the active megapode nesting mounds were affected by the typhoons. In addition, an unusually high “king” tide (June 2013) inundated several nesting mounds in the rock islands. The increased frequency and severity of typhoons and king tides are both attributable to climate change.



The tidal surge from Typhoon Bopha (December 2012) damaged nesting grounds in the Rock Islands/Southern Lagoon. Aerial views of Ngeruchebtang Island (left), before and after Typhoon Bopha, show the damage from Bopha's tidal surge, which split the island in two and washed away several megapode nesting mounds. Many other megapode nesting grounds in the southern lagoon were impacted by Typhoon Bopha.

In November 2013, Typhoon Haiyan devastated Kayangel Atoll, which accounts for one-third of the breeding population of megapodes. An aerial photograph of Ngeriungs Island (right) shows the complete destruction of the megapodes' forest habitat by typhoon winds and waves.



Pressure: Megapodes and Climate Change

The Palau Megapode builds permanent nesting mounds to incubate its eggs. Over 90% of these nesting mounds are located on the floors of coastal forests near beaches. Rising sea levels due to climate change expose these nesting grounds to coastal erosion, "King Tides" and increasingly frequent and destructive typhoons.

Climate Change – Rising Sea Levels

Left: A megapode nesting mound surrounded by sea water from a King Tide
Right: Coastal erosion of a megapode nesting mound.

Ngerduwais Island, nest mound #1 surrounded by King Tide waters, June 2013



Ngerechong Island, nest mound #27, August 2012
Landward side. Eroded seaward side



Climate Change – Increasingly Frequent and Destructive Typhoons
Below: Megapode nesting mounds before and after Typhoon Bopha (December 2012).
The mounds were inundated and destroyed by the typhoon's tidal surge.

Ngeanges Island, nest mound #6
August 2012 January 2013



Ulong Island, nest mound #1
August 2012 January 2013



Response: Megapode Conservation Action Plan

A Megapode Conservation Action Plan Working Group was convened in September 2013 by the Palau Conservation Society to develop a conservation action plan for the survival of the Palau Megapode. The group developed the following framework for a conservation action plan to address climate change and other threats.

Objective	Activity
Scientific knowledge of the natural history and taxonomy of the Palau Megapode is increased	Study the population dynamics of the Palau Megapode
	Review the taxonomic status and IUCN status of the Palau Megapode
Advances in scientific knowledge are shared and exchanged	Share scientific information with site support groups and managers of local protected areas through periodic reports and seminars
	Coordinate exchanges of information with the IUCN Megapode Specialist Group, US Fish and Wildlife Service and other megapode conservation organizations
	Publish novel results in peer review journals
Resilience of the Palau Megapode to impacts from climate change is enhanced	Implement priority projects for enhancing resilience <ul style="list-style-type: none"> ❖ Monitor nesting grounds for impacts and recoveries from climate change events ❖ Spatial distribution model of nesting mounds in relation to predicted impact of climate change
	Encourage Protected Area status for megapode nesting refuges that are naturally protected from rising sea levels and typhoon tidal surges
Community awareness of the vulnerability of the Palau megapode is increased	Develop an active community campaign to support ongoing awareness <ul style="list-style-type: none"> ❖ Emphasis on threats from climate change
	Develop awareness literature, posters, media presentations, events, etc. <ul style="list-style-type: none"> ❖ RISL kiosks at BNM, PICRC
Decisions/policies are informed by status reports on the Palau Megapode	Provide periodic briefings on megapode status and trends to site support groups, PAN officials, legislators and other policy and decision makers
	Include a megapode status report in the annual State of Palau's Birds report that is issued through the National Program for Monitoring Forest and Coastal Birds and circulated to policy-makers

Response: Megapode Conservation Action Plan

Objective	Activity
Awareness is enhanced through intramural collaboration	Encourage collaborative support of existing awareness activities that are contained in the management plans for the RISL World Heritage Site, Kayangel Protected Area and other protected areas with megapodes
	Develop eco-tourism awareness materials to encourage tourism activities that maintain or improve the status of Palau Megapode populations
Capabilities to protect and conserve the Palau Megapode are enhanced	Develop and implement a program to train conservation officers to monitor megapode habitats and enforce conservation regulations
	Provide technical support for site support groups
	Establish guidelines that ensure sustainable use of megapode/sea turtle habitats by following best management practices
A new capability to collect and apply field data is created through participation in the eBird website	Encourage participation in the crowdsourcing of bird diversity observations on the eBird database
	Familiarize protected area managers and policy-makers with the use of crowdsourced data for informed policy and decision-making ❖ Emphasis on megapode data
Coordination of activities for megapodes and sea turtles enables the pooling of resources for the sustainable protection of both species	Establish a reserve at Kmekumer Islands for the joint protection of nesting grounds shared by Palau Megapodes and Hawksbill Turtles
	Coordinate the monitoring of megapodes with the monitoring of sea turtles
Coordinated conservation of megapodes and sea turtles provides an umbrella for improving the overall sustainability of conservation programs	Survey megapode/sea turtle sites for shared overall biodiversity ❖ Prioritize sites to maximize overall biodiversity coverage ❖ Emphasis on megapodes, sea turtles and other species of concern
	Promote megapodes and sea turtles as a partnership of flagship species for ridge-to-reef conservation
The conservation action plan is internationally recognized as a framework for protecting the Palau Megapode	Coordinate with BirdLife International and the Megapode Specialist Group to append the Conservation Action Plan and priority projects to the IUCN/SSC Megapode Conservation Action Plan

Response: Megapode Conservation Action Plan

"Bekai" - Palau's most endangered bird



A Distinguished Visitor

The process of developing a Megapode Conservation Action Plan benefited from the guidance and expertise of René WRJ Dekker, Chairman of the IUCN/SSC Megapode Specialist Group, who visited Palau in 2013 to experience the Palau Megapode. Dr. Dekker is pictured (left) beside a megapode nesting mound on Ngerbelas Island, Kayangel Atoll.

Megapode Conservation Campaign

The Palau Megapode faces possible extinction due to climate change and habitat disruption. A major component of the Megapode Conservation Action Plan is the "Bekai Tribe" outreach campaign (right) for building awareness of the vulnerability of the Palau Megapode to climate change and encouraging public support for megapode conservation.



Acknowledgements

This report was made possible through the support of:

Board of Trustees of the Belau National Museum

Palau Conservation Society: *Umai Basilius, Heather Ketebengang*

Koror State Department of Conservation and Law Enforcement, and the Koror State Rangers

Palau Environmental Quality Protection Board

Carp Island Resort

BirdLife International: *Mark O'Brien*

The Nature Conservancy: *Mike Aulerio*

Photographers: *Milang Eberdong, Mandy T. Etpison, Heather Ketebengang, Alan R. Olsen*

Birdwatchers: *Itu Bells, Michener Besebes, Princess Blailles, Mark Defley, Charlotte Dekker, René Dekker, Stallone Etiwii, Emerald Keraskes, Perkins Ace Kikuo, Andrea Klindworth, Darold Klindworth, Megan Laut, R. Maech, Lazarus Meyar, Godines Ngiltii, Jennifer Ngual, Raynor R., Rondy Ronny, Blelas Sakurai, Angelina Smaserui-Olsen, Tekau Teriong, Techur Timulch, Omkal Tmetuchi, Debra Williams, Hilary Ubedei, Earvin Wong, Yalap Yalap, Asailee Yamada*

In memoriam: *Karen Semey † January 17, 2014*

Editors: Alan R. Olsen and Milang Eberdong

Generous financial support was provided by the Marisla Foundation via the Global Greengrants Fund. Additional support provided by Canada Fund and Palau Integrated Water Resource Management Project (UNDP). Thank you.



MARISLA
FOUNDATION



GLOBAL
GREENGRANTS
FUND



The Nature
Conservancy 
Protecting nature. Preserving life.™

Consider the birds of the air
Matt. 6:26

