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Observations of migrants and other birds in Palau, April-May 2005, including the first Micronesian record of a Richard's Pipit

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Abstract—This paper reports on the occurrence and abundance of 48 migrant and resident bird species observed in the Palau Islands of western Micronesia from 22 April to 17 May 2005. Species accounts are presented for 41 migrants, including 23 shorebirds, eight land birds, seven egrets and herons, and three terns and gulls, and seven resident birds, including four waterbirds, two passerines, and one seabird. Noteworthy sightings include the first record of a Richard's Pipit *(Anthus richardi)* in Micronesia, the first confirmed record of a Gray Heron *(Ardea cinerea)* in Palau, and second published records of Great Egret *(Casmerodius alba),* Striated Heron *(Butorides striata),* Black Kite *(Milvus migrans),* Long-toed Stint *(Calidris subminuta),* Whiskered Tern *(Chlidonias hybrida),* and Gray Wagtail *(Motacilla cinerea)* in Palau. Although we did not observe large numbers of any migrant, four species (Greater Sand-Plover *[Charadrius leschenaultii],* Common Sandpiper *[Actitis hypoleucos],* Sharp-tailed Sandpiper *[Calidris acuminata],* and Eastern Yellow Wagtail *[Motacilla tschutschensis]*) were recorded in greater numbers than reported at other locations in Micronesia. Among resident species, we counted a total of 69 Common Moorhens *(Gallinula chloropus)* at three sites, which represents by far the highest number ever recorded in the archipelago. No Pacific Black Ducks *(Anas superciliosa)* were sighted, confirming the rarity of this species in Palau. Two popula-

tions of introduced Eurasian Tree Sparrows *(Passer montanus)* totaling 62 birds were found, indicating a rapid increase in abundance since this species was first discovered in Palau in 2000.

Introduction

The Palau Islands (6º54' to 8º12' N, 134º08' to 134º44' E) are the westernmost archipelago in Micronesia and consist of more than 350 volcanic and coralline islands, most of which are enclosed in a large barrier reef. Politically, the area is an independent nation known as the Republic of Palau, or Belau as it is called locally. Baker (1951) prepared the first detailed treatment of the avifauna of Palau. A handful of other reports, especially those by Marshall (1949), Owen (1977b), Pratt et al. (1980), Engbring (1983a, 1988, 1992), and Kepler (1993), have provided more information, particularly on the abundance of resident birds and the status of migratory and vagrant species. One hundred forty-eight species of birds have been documented in Palau, of which 50 are resident breeding species, 67 are migrants, and 31 are considered vagrants (Engbring 1988, Wiles 2005). Despite the previous work in Palau, much about the avifauna remains unknown and the status of most species has not been investigated since 1991, if not longer.

In April and May 2005, we participated in surveys sponsored by the Palau Conservation Society (PCS) to reassess the status and conservation needs of Palau's birds. Standardized surveys encompassed much of the land area in the island chain and were conducted using linear transects and variable circular plot methodology. Results of those surveys, including estimates of population size and density of most endemic and resident bird species, will be published elsewhere. Here, we report noteworthy incidental observations of other species, primarily water birds and migratory species, which the standardized transects were not designed to survey.

Methods

The observations reported here were made opportunistically from 22 April to 17 May throughout much of Palau, including Babeldaob, Koror, the Rock Islands, Peleliu, and Angaur. Several sites of special interest were visited more than once, including the municipal sewage ponds on Malakal on 22, 23, 27, and 28 April and 2, 3, 7, 10, 12, and 17 May; the Koror garbage dump on 23, 28, 29, 30 April and 9 and 11 May; Lake Ngardok in east-central Babeldaob on 2 and 7 May; and a mangrove-lined pond about 0.6 km southeast of Kloulklubed village in northern Peleliu on 3 and 5 May. Most other locations were visited only once. We photographed many unusual species to assist with identification and documentation. Nomenclature follows Wiles (2005).

Species Accounts

Pacific Black Duck *(Anas superciliosa pelewensis).* We did not observe any individuals of this rare resident during our study, but APM observed three birds at the northern end of Lake Ngardok on 4 and 7 June 2004. There have been several other recent reports in Palau, although possible confusion with migratory ducks and juvenile moorhens makes some of these records questionable. This species has been rare to very rare in the archipelago dating back to at least the early 1930s (Coultas 1931, Marshall 1949, Baker 1951, Pratt et al. 1980, Engbring 1988, 1992) and a full survey is needed. *Anas s. pelewensis* has become increasingly rare in some Pacific island groups (Engbring & Pratt 1985). Loss of limited wetland habitat, and possibly hunting and crocodile *(Crocodilus porosus)* predation are the primary threats in Palau (Engbring & Pratt 1985).

Red-tailed Tropicbird *(Phaethon rubricauda).* We saw a single adult Red-tailed Tropicbird on 25 April flying off the eastern shore of Babeldaob in Ngerchelong State near the stone monoliths at Badrulchau. This species is scarce throughout Palau, with the first report of breeding recently coming from the Southwest Islands (Bruyns 1964, Engbring & Owen 1981, Engbring 1983a, 1988, Kepler 1993, Wiles et al. 2004).

Gray Heron *(Ardea cinerea).* We observed a single adult Gray Heron at a mangrove-lined pond in northern Peleliu on 3 May. It was very large, had a whitish cap, a broad blackish line above the eye, a narrow black head plume, a light gray neck with thin black stripes on the throat, and light rather than rufous thighs (Fig. 1a). The legs were greenish yellow and the bill was yellow. This is the first verified sighting of *A. cinerea* for Palau, although two previous hypothetical records have been published (Owen 1977a, Wiles et al. 2000).

Great Egret *(Casmerodius alba).* We briefly observed a single Great Egret in flight at a mangrove-lined pond in northern Peleliu on 3 May. It was all white and very large, about the same size as a Gray Heron seen a few minutes earlier at the same location, with a very long neck, a long heavy yellow bill, and black legs and feet. This species has been reported only once previously in Palau, with one individual sighted at this same location in 2000 (Wiles et al. 2004).

Intermediate Egret *(Egretta intermedia).* One to four Intermediate Egrets were present at the Malakal sewage ponds on every visit from 22 April until 17 May. They foraged in the ponds and on nearby earthen banks, and roosted with Little Egrets *(E. garzetta)* in large trees adjacent to the ponds. We also observed one Intermediate Egret at a mangrove-lined pond in northern Peleliu on 3 May, one on the runway on Angaur on 5 and 6 May, three on sandflats south of Melekeok on 7 May, one at a shallow marshy pond in the center of Angaur on 7 May, and several single birds foraging in grassy areas at scattered locations on Babeldaob on various dates. This species is uncommon in Palau and very likely visits annually in small numbers (Baker 1951, Owen 1977b, Engbring 1983a, 1988, Kepler 1993).

Little Egret *(Egretta garzetta).* We counted five to 11 Little Egrets at the Malakal sewage ponds on every visit from 22 April to 17 May. They foraged in

the ponds and on nearby earthen banks, and roosted in large nearby trees with Intermediate Egrets. We also observed about 25 egrets, most of them *E. garzetta,* roosting at dusk in trees at a mangrove-lined pond in northern Peleliu on 3 May. This species is an uncommon migrant to Palau and probably occurs annually in small numbers (Owen 1977b, Engbring 1983a, 1988, Kepler 1993).

Cattle Egret *(Bubulcus ibis).* A large concentration of Cattle Egrets fed on insects and garbage at the Koror dump in association with 40-50 Rufous Night-Herons *(Nycticorax caledonicus)* during each of our visits, with a maximum of 137 egrets counted on 23 April. Some of these birds displayed varying amounts of breeding plumage. Five Cattle Egrets in various stages of breeding plumage were present at a small marshy pond on Angaur on 5 May, and one bird was observed at the Malakal sewage treatment ponds on 27 April. This species was also seen foraging in grassy areas along the compact road and other roads in many areas of Babeldaob. Most of these birds occurred in small groups of several individuals, but a flock of 14 was sighted on the lawn of the new capitol in Melekeok on 17 May. Cattle Egrets are a common migrant to Palau (Engbring 1988), with numerous published records (Hachisuka et al. 1932, Owen 1977b, Pratt & Bruner 1981, Engbring 1983a, 1992, Kepler 1993, Wiles et al. 2004). Some birds remain throughout the year, but breeding remains undocumented (Engbring 1988). Grassy roadsides created during the construction of the Compact Road appear to have expanded the amount of desirable foraging habitat for this species in Palau. The birds at the Koror dump represent the largest single flock ever documented in Micronesia. Records of other large flocks in the region appear in Pratt & Bruner (1981), Glass et al. (1990), Stinson et al. (1997b), and Wiles et al. (2004).

Striated Heron *(Butorides striata).* We saw an adult Striated Heron at the Malakal sewage ponds on 3 May. It was relatively small and had a black cap, yellowish-white eye-ring and cere, and white malar stripe (Fig. 1b). The upperparts were dark grayish-olive with some white edging on the wing feathers, and the underparts were dark with a white chin and a diffuse white streak down the center of the throat. The upper mandible was dark and the lower mandible was mostly yellowish. The legs were yellow and the feet were orange-yellow. Striated Herons are rare visitors to Palau (Engbring 1988). Only one previous record exists, of three birds seen in November and December 1931 (Coultas 1931, Baker 1951).

Black-crowned Night-Heron *(Nycticorax nycticorax).* We saw an adult and an immature Black-crowned Night-Heron at the Koror dump on 23 April (Fig. 1c, d), with the adult seen again on 11 May. The immature bird was distinguished from the many immature Rufous Night-Herons at this site by its paler and less rufous coloration, more numerous pale marks on the wings, less-distinct black cap, and more reddish iris. Only a few other observations have been documented of this rare visitor to Palau (Marshall 1949, Engbring 1988, Wiles et al. 2004).

Black Kite *(Milvus migrans).* We observed a Black Kite soaring over forest and secondary growth near the Ngardok Nature Reserve on 2 May. It was large, with long fairly narrow wings, a long slightly forked tail, and pale whitish "windows" at the base of the primaries (Fig. 1e). It was briefly mobbed by a pair of

White Terns *(Gygis alba)* and was molting the inner primaries. A kite seen in 1994 is the only prior record for Palau (Wiles et al. 2000).

White-browed Crake *(Porzana cinerea).* We observed three or four White-browed Crakes in a mangrove-lined pond in northern Peleliu on 3 May and two at Lake Ngardok on 7 May. White-browed Crakes also have been reported at the small Ngerkall Pond in Ngeraard State, but the pond was largely overgrown by the native wetland plant *Hanguana malayana* (Stemmermann 1981) on our visit to this site on 25 April and no crakes were seen. This shy, uncommon species prefers dense vegetation at wetland margins and occurs at wetlands and taro fields on Palau's main islands (Engbring 1988, 1992).

Common Moorhen *(Gallinula chloropus).* Early morning counts of this species were made at Lake Ngardok on 2 and 7 May, resulting in a maximum of 53 birds on 7 May, including at least 12 juveniles. The birds were shy and quickly took cover in dense marshy vegetation at the first approach of an observer, which suggests they are hunted. We observed an additional 16 moorhens in northern and central Angaur on 8 May, including five at a shallow marshy pond and 11 at the group of six deeper ponds 1 km to the northwest. Moorhens were considered quite rare in Palau during the 1970s and possibly extirpated from Babeldaob and Koror (Pratt et al. 1980, Engbring 1988), although at least one bird was seen at Lake Ngardok in 1991 (Engbring 1992). Most previous published sightings are from Angaur and Peleliu (Baker 1951, Pratt et al. 1980, Engbring 1988, 1992). Our combined counts for Lake Ngardok and Angaur are by far the highest number ever documented in the archipelago and indicate that both locations are critical to the conservation of this species in Palau.

Purple Swamphen *(Porphyrio porphyrio).* We observed Purple Swamphens at several sites, including one in a taro field at Ngetbong village in Ngerdmau State on 26 April, one eating bananas while perched in a banana tree next to a taro field in Ngesaol village in northeastern Koror on 28 April, and one in a small taro field on the side of a road in northern Aimeliik State on 30 April. We also heard the calls of this species in an overgrown agricultural area with remnant taro fields near Oikull in southern Airai State on 22 April and in an abandoned taro field near Mengalong village in northern Ngarchelong State on 25 April. All of our records were in or near active or abandoned taro fields, indicating the importance of taro farming to this species. All birds were shy and several fled at our approach. Although swamphens are widespread and appear fairly common at this time (A. Gupta, Palau Conservation Society, pers. comm. 2005), further declines in taro farming and wetland habitat could threaten the species. Farming of taro fields on a rotational basis and/or maintenance of some fields in an abandoned state would help ensure that suitable wetland habitat and food are consistently available for this species.

Black-bellied (Gray) Plover *(Pluvialis squatarola).* We observed a single Black-bellied Plover in non-breeding plumage on tidal mudflats off northern Peleliu on 5 May. It was larger and heavier-bodied than the numerous Pacific Golden-Plovers *(P. fulva)* in the area, and had a larger bill and black axillaries.

Pluvialis squatarola is an uncommon migrant to Palau (Engbring 1988). Other published records (Owen 1977b, Engbring 1983a) suggest that this species probably occurs annually.

Pacific Golden-Plover *(Pluvialis fulva).* This species is one of the two or three most common shorebirds to visit Micronesia, including Palau (Fisher 1950, Baker 1951, Anderson 1981, Schipper 1985, Hayes 1986, Engbring 1988, Clapp 1990, Stinson et al. 1997b). We observed it at many coastal locations. At the Malakal sewage ponds, the number of golden-plovers declined gradually over time from 20 birds on 22 and 23 April, to nine on 7 May, six on 10 and 12 May, and five on 17 May. Most birds remained in non-breeding plumage, but some were molting into breeding plumage. We also observed golden-plovers at the following locations: two on the old Japanese pier west of Ngetbong village in Ngerdmau State on 25 April, nine on sandflats south of Melekeok on 1 May, three resting on a coral causeway in Ngchesar State on 2 May, 39 on the Peleliu airstrip on 4 May, at least 50 on extensive mudflats off northeastern Peleliu on 5 May, five near the Angaur harbor on 5 May, seven and 14 on the Angaur airstrip on 5 and 6 May, six on sandflats south of Melekeok on 7 May, and single birds at other scattered locations on Babeldaob and Peleliu. Numerous older records exist for Palau (Hartlaub & Finsch 1868a, 1868b, 1872, Coultas 1931, Baker 1951, Engbring & Owen 1981, Engbring 1983a, 1992, Kepler 1993).

Lesser (Mongolian) Sand-Plover *(Charadrius mongolus).* We recorded this species at several sites, including a flock of 10 birds roosting on the pier in Mangelakl village in Ngerchelong State on 24 April, two on the old Japanese pier west of Ngetbong village in Ngerdmau State on 25 April, three roosting on a coral causeway south of Melekeok on 1 May, one on a coral causeway in Ngchesar on 1 May, three at the airstrip on Peleliu on 4 May, eight seen first at the southern sandy tip of Angaur and then again at the southern end of the island's airstrip on 6 May, and two on sandflats south of Melekeok on 7 May. Most Lesser Sand-Plovers flocked with larger numbers of Greater Sand-Plovers *(C. leschenaultii)* and were distinguished by their smaller size, shorter and thinner bill, shorter legs, and more rounded head shape. Lesser Sand-Plovers appeared to molt into breeding plumage somewhat earlier than Greater Sand-Plovers. Most Lessers displayed some breeding plumage and some were in complete breeding plumage, whereas most Greaters remained entirely in non-breeding plumage. Engbring (1988) described *C. mongolus* as an uncommon migrant to Palau. Records (Coultas 1931, Baker 1951, Engbring 1983a, Kepler 1993) suggest that it visits the archipelago each year.

Greater Sand-Plover *(Charadrius leschenaultii).* This species was encountered at a number of locations, including four birds on the old Japanese pier west of Ngetbong village in Ngerdmau State on 25 April, 11 on sandflats south of the pier in Melekeok on 1 May, four roosting on a coral causeway south of Melekeok on 1 May, five on a coral causeway in Ngchesar on 1 May, 12 on the Peleliu airfield on 4 May, two seen first at the southern sandy tip of Angaur and then again at the south end of the island's airstrip on 6 May, and 12 on sandflats south of Melekeok on 7 May. Both species of sand-plovers were often found in the same

flocks, with Greaters usually outnumbering Lessers. Engbring (1988) reported Greater Sand-Plovers as uncommon in the island group, with flocks of 10-30 birds noted during September by Baker (1951). Other records appear in Hartlaub & Finsch (1868b), Engbring (1983a), and Kepler (1993).

Little Ringed Plover *(Charadrius dubius).* We saw one Little Ringed Plover in breeding plumage on the Peleliu airstrip on 4 May in the company of sand-plovers, Pacific Golden-Plovers, Ruddy Turnstones *(Arenaria interpres),* and Red-necked Stints *(Calidris ruficollis).* It was smaller than C. mongolus, had pinkish-orange legs, a thin dark bill, a complete black breast band, a white collar, throat, and chin, a narrow black line through the eye, a white forehead, a black stripe across the forecrown, and a narrow yellowish eye-ring (Fig. 1f). In flight, there was no wing stripe, which separated the bird from Common Ringed Plover *(C. hiaticula).* Little Ringed Plover is an uncommon visitor to Palau (Engbring 1988), with Owen (1977b) describing it as a regular migrant in small numbers. Owen (1977b) and Engbring (1983a) give previous records.

Black-winged Stilt *(Himantopus himantopus).* We observed one stilt at a mangrove-lined pond on northern Peleliu on 3 and 5 May. It had white underparts, a black back and wings, and its head and neck were white with a black patch on the hind-crown and upper nape (Fig. 1h). Listed as scarce in Palau (Engbring 1988), the only previous records are of a bird on Koror in 1978 (Engbring & Owen 1981), three together at probably the same pond on Peleliu in 2002 (Wiles et al. 2004), and one seen on Ngeriungs islet, Kayangel Atoll, in November 2004 (A. Gupta, Palau Conservation Society, pers. comm. 2005). Stilts became nearly annual migrants to the southern Mariana Islands beginning in the mid-1980s (Stinson et al. 1997b, Wiles et al. 2000, 2004), perhaps signaling a broader pattern of increased visitation to other sites in western Micronesia.

Common Greenshank *(Tringa nebularia).* One to six Common Greenshanks were present at the Malakal sewage treatment ponds on most visits from 22 April to 17 May. The number of birds declined over time, with none seen on 7 and 10 May, and single birds present on 12 and 17 May. We also saw two greenshanks near the pier west of Ngetbong village in Ngerdmau State on 25 April, one on sandflats south of the pier in Melekeok on 1 May, one in a small pond in central Peleliu on 4 May, and one in grassy areas of the village on Angaur on 5 and 6 May. All were in breeding plumage. Engbring (1988) considered this species as an uncommon migrant in Palau (Engbring 1988). Baker (1951), Owen (1977b), and Engbring (1983a) give previous documentation for the archipelago.

Marsh Sandpiper *(Tringa stagnatilis).* One to six Marsh Sandpipers foraged at the Malakal sewage treatment ponds on each of our visits from 22 April to 17 May. Two birds were also sighted at a mangrove-lined pond on northern Peleliu on 3 and 5 May, another was at a small pond in central Peleliu on 4 May, and two were at the group of six ponds in northern Angaur on 7 May. All were in breeding plumage. *Tringa stagnatilis* is an uncommon migrant in Palau (Engbring 1988). Owen's (1977b) observations are the only other published account of the species, but indicate that it is probably an annual visitor.

Wood Sandpiper *(Tringa glareola).* We observed small numbers of this species, which is considered a common migrant to Palau (Engbring 1988). One to eight birds occurred at the Malakal sewage treatment ponds on most visits from 22 April to 12 May. Numbers at this location declined over time, with none present on 28 April and 2 and 17 May, and only single birds on other visits in May. Lone birds were also seen at the Koror dump on 23 April, on a coral causeway in Ngchesar on 1 May, at a rock quarry in Ngchesar on 2 May, and at the group of six ponds in northern Angaur on 7 May. A number of prior records exist for Palau (Kuroda 1922, Coultas 1931, Baker 1951, Engbring 1983a, 1988).

Wandering Tattler *(Heteroscelus incanus).* This species was regularly observed in association with Gray-tailed Tattlers *(H. brevipes),* but was usually less numerous. Wandering Tattlers were distinguished by the darker coloration of their back and breast, the coarser and darker ventral barring that extended to the undertail coverts on individuals with breeding plumage, and the less distinct white supercilia that usually failed to meet above the bill. About half the birds showed some breeding plumage, which aided identification. We observed a total of 10 individuals, including three on the old Japanese pier west of Ngetbong village in Ngerdmau State on 25 April, one on sandflats south of the pier in Melekeok on 1 May, five roosting on a coral causeway south of Melekeok on 2 May, and one on sandflats south of Melekeok on 7 May. Wandering Tattlers are an uncommon migrant in Palau (Engbring 1988); however, only Baker (1951) has provided specific records of past occurrence. Some older reports of *H. incanus* (e.g., Finsch 1875, Coultas 1931) were made before the two tattlers were separated into different species, making identity unclear. Palau appears to represent the westernmost site of regular occurrence for *H. incanus.* It has not been recorded in Philippines (Kennedy et al. 2000) or Wallacea (Coates & Bishop 1997), and is scarce in New Guinea (Beehler et al. 1986) and north-central Australia (Higgins & Davies 1996), although confusion with *H. brevipes* likely remains a problem in defining the limits of the wintering range.

Gray-tailed Tattler *(Heteroscelus brevipes).* We sighted a total of 23 individuals, including one bird on the old Japanese pier west of Ngetbong village in Ngerdmau State on 25 April, four along the shore in Ngeremetengel village in Ngeremlengui State on 30 April, four on sandflats south of the pier in Melekeok on 1 May, nine roosting on a dredged coral causeway south of Melekeok on 2 May, and five on sandflats south of Melekeok on 7 May. Engbring (1988) listed this species as a common migrant in Palau, with sightings documented in Baker (1951), Engbring (1983a), and Kepler (1993). Early records of tattler occurrence are equivocal because of taxonomic confusion with *H. incanus* (see Wandering Tattler).

Common Sandpiper *(Actitis hypoleucos).* Engbring (1988) reported this species as a common migrant in Palau. We observed 12 Common Sandpipers at the Malakal sewage ponds on 22 April, with numbers declining steadily to a single bird on 7 May and none thereafter. We also observed two at the Koror dump on 23 April, six on the pier west of Ngetbong village in Ngerdmau State on 25 April, two on a coral causeway in Ngchesar on 1 May, four near the Angaur har-

bor on 5 May, one on the Angaur airstrip on 5 May, three at the group of ponds in northern Angaur on 7 May, and single birds at numerous other locations on Babeldaob and Peleliu. Based on the frequency and wide distribution of our sightings, up to several hundred Common Sandpipers may have been present in Palau during our visit. These numbers are much higher than those reported elsewhere in Micronesia (Pratt & Bruner 1981, Hayes 1986, Stinson et al. 1997b) and suggest that Palau lies at the eastern edge of the migratory path of this species. A number of previous records exist for the island group (Hartlaub & Finsch 1868a, 1872, Coultas 1931, Baker 1951, Engbring 1983a, 1992, Wiles & Conry 1990).

Terek Sandpiper *(Xenus cinereus).* We observed one Terek Sandpiper at the Malakal sewage treatment ponds on 22 April, one on sandflats south of the pier in Melekeok on 1 May, four roosting on a coral causeway south of Melekeok on 2 May, and one on sandflats south of Melekeok on 7 May. This species is an uncommon migrant in Palau (Engbring 1988). Owen's (1977b) sightings of modest numbers in the mid-1970s represent the only other published reports for the island group.

Whimbrel *(Numenius phaeopus).* We observed Whimbrels at several locations on Babeldaob, including two on the old Japanese pier west of Ngetbong village in Ngerdmau State on 25 April, five on the shore at Ngeremetengel village in Ngeremlengui State on 30 April, one on the breakwater at the Angaur harbor on 5 May, nine on sandflats in Melekeok on 7 May, and two flocks totaling 19 birds flying along the coast in southern Aimeliik State at dusk on 10 May. This species is a common migrant to Palau (Engbring 1988), with records provided by a number of authors (Hartlaub & Finsch 1868a, 1872, Coultas 1931, Baker 1951, Engbring 1983a, 1992, Kepler 1993).

Black-tailed Godwit *(Limosa limosa).* One to five Black-tailed Godwits were present at the Malakal sewage treatment ponds from 27 April to 10 May, with numbers declining to one individual by 10 May. Another individual was seen at a mangrove-lined pond on northern Peleliu on 3 May. All birds were in breeding plumage. Those at Malakal were observed in flight and showed an obvious white rump, black tail, and white wing stripe, whereas the bird on Peleliu was identified by the black barring on its belly. Engbring (1988) described *L. limosa* as an uncommon migrant in Palau. Earlier reports (Owen 1977b, Engbring 1983a) indicate that the species perhaps occurs annually.

Bar-tailed Godwit *(Limosa lapponica).* We observed one bird at a mangrove-lined pond on northern Peleliu on 3 May, which was identified by its barred tail and upper tail coverts. This species is an uncommon migrant in Palau (Engbring 1988) and has been previously reported by Coultas (1931), Baker (1951), and Engbring (1983a).

Ruddy Turnstone *(Arenaria interpres).* We observed four turnstones at the Koror dump on 23 April and 11 May, 10 on the old Japanese pier west of Ngetbong village in Ngerdmau State on 25 April, one on a small rock seawall in the harbor in northern Peleliu on 3 May, one on the Peleliu airstrip on 4 May, three in grassy areas near the Angaur harbor on 5 May, and six on the sand spit at

the southern end of Angaur on 6 May. Ruddy Turnstones are a common migrant to Palau (Engbring 1988), with a number of prior records (Hartlaub 1867, Hartlaub & Finsch 1868a, 1872, Coultas 1931, Baker 1951, Engbring 1983a, Kepler 1993).

Red-necked Stint *(Calidris ruficollis).* One to four birds occurred at the Malakal sewage treatment ponds on all visits from 23 April to 7 May, but not thereafter. Other sightings included two stints roosting on the pier in Mangelakl village in Ngerchelong State on 24 April, two on the pier west of Ngetbong village in Ngerdmau State on 25 April, five at a mangrove-lined pond in northern Peleliu on 3 and 5 May, and four on the Peleliu airfield on 4 May. Most birds were in non-breeding plumage, but a few had some reddish feathers emerging on the face and throat. This species is a common migrant in Palau, with flocks of up to 300 birds noted (Engbring 1988). Other records from the island chain appear in Hartlaub & Finsch (1868a, 1872), Baker (1951), Engbring (1983a), and Kepler (1993).

Long-toed Stint *(Calidris subminuta).* We observed one to four Long-toed Stints at the Malakal sewage treatment ponds on each visit from 22 April to 3 May, with numbers decreasing over time. On Angaur, one was present in the village near the harbor on 5 May and another was seen at the northern end of the airstrip on 5 May. All birds were in breeding plumage (Fig. 1g). Hachisuka et al. (1932) is the only other author to report this species from Palau, where it is considered an uncommon migrant (Engbring 1988).

Pectoral Sandpiper *(Calidris melanotos).* We observed a Pectoral Sandpiper foraging on mudflats at low tide near the pier west of Ngetbong village in Ngerdmau State on 25 April. It had a heavily streaked breast with a sharply demarcated lower border. This sandpiper is an uncommon migrant in Palau (Engbring 1988). Owen's (1977b) multiple observations from 1974 to 1976 are the only other published records and suggest that the species visits Palau each year.

Sharp-tailed Sandpiper *(Calidris acuminata).* We observed from one to 10 Sharp-tailed Sandpipers at the Malakal sewage treatment ponds from 22 April to 3 May, one near the pier west of Ngetbong village in Ngerdmau State on 25 April, and 31 at a mangrove-lined pond on northern Peleliu on 3 May. Engbring (1988) listed *C. acuminata* as an uncommon migrant in Palau, but our observations suggest it is fairly common at times. Hartlaub & Finsch (1868a, 1872), Coultas (1931), and Baker (1951) have published earlier records.

Curlew Sandpiper *(Calidris ferruginea).* We observed one Curlew Sandpiper in partial breeding plumage at a mangrove-lined pond on northern Peleliu on 3 May. It was a little larger than a nearby Red-necked Stint, had a moderately-long bill with a distinct droop near the tip, a conspicuous white supercilium that extended behind the eye, and rufous feathers on the face, throat, and upper breast. This species is described as an uncommon migrant in Palau (Engbring 1988), but two records of single birds (Baker 1951, Engbring 1983a) are the only other published accounts.

Figure 1. (a) Gray Heron on Peleliu, with a Little Pied Cormorant for size comparison. (b) Striated Heron at the Malakal sewage treatment ponds. (c) Adult Black-crowned Night Heron at the Koror dump. (d) Immature Black-crowned Night Heron at the Koror dump. (e) Black Kite over Lake Ngardok. (f) Little Ringed Plover at the Peleliu airstrip. (g) Long-toed Stint at the Malakal sewage treatment ponds. (h) Black-winged Stilt on Peleliu. (i) Whiskered Tern in breeding plumage at Lake Ngardok. (j) Whiskered Tern in non-breeding plumage at Lake Ngardok. (k, l) White-winged Terns in immature plumage at Lake Ngardok. (m) Eastern Yellow Wagtail at the Koror dump. (n) Gray Wagtail at the Malakal sewage treatment ponds. (o, p) Richard's Pipit at the Malakal sewage treatment ponds.

Ruff *(Philomachus pugnax).* We observed a female Ruff in breeding plumage at a mangrove-lined pond on northern Peleliu on 3 May. Engbring (1988) reported this species as being an uncommon migrant in Palau. The only previous records are by Owen (1977b) and suggest that a few birds visit each year.

Common Black-headed Gull *(Larus ridibundus).* We observed single birds in non-breeding plumage at the Malakal sewage treatment ponds on 22 and 23 April and near the causeway between Koror and Malakal on 12 May, which may have been the same individual. Small numbers of *L. ridibundus* wintered annually in Palau in the 1970s (Owen 1977b, Engbring 1988), but the absence of documentation since then makes it difficult to know whether visitation has continued yearly.

Whiskered Tern *(Chlidonias hybrida).* We observed one to two Whiskered Terns at Lake Ngardok on 2 and 7 May. The birds were examined closely with a spotting scope and conclusively identified on May 7. On both visits, an individual in almost complete breeding plumage was present, with a black cap, dark underparts, contrasting white cheeks, and a gray rump of the same color as the back and tail (Fig. 1i). The second bird was in non-breeding plumage and was distinguished from a White-winged Tern *(C. leucopterus)* by its longer, thicker bill and the blackish color on the head that formed a patch across the nape and forward to the eye, but that did not extend below the eye or form a post-ocular spot or sideburn (Fig. 1j). Wiles et al. (2000) reported the only other sighting of *C. hybrida* from Palau, which occurred in 1993.

White-winged Tern *(Chlidonias leucopterus).* We observed one to two White-winged Terns at Lake Ngardok on 2 and 7 May. One bird was in immature plumage, with black bars on the leading edge of the primaries and trailing edge of the secondaries, and an extensive black "sideburn" that extended below the eye and onto the center of the nape (Fig. 1k). The rump on this bird appeared gray through binoculars, but photographs revealed that some rump feathers were whiter than the back and tail. When standing next to a Whiskered Tern, this bird had a noticeably shorter and thinner bill. The second bird was molting from immature to breeding plumage, and had a dark leading edge on the primaries, but lacked the dark trailing edge to the secondaries. The dark "sideburn" was less extensive and appeared more like a post-ocular spot at a distance (Fig. 1l). The rump was paler than the back and tail. White-winged Terns are an uncommon migrant to Palau (Engbring 1988), with previous reports by Coultas (1931) and Baker (1951).

Oriental/Common Cuckoo *(Cuculus saturatus/canorus).* We observed four cuckoos of this species pair, with one bird near the Ngetkib summer house in Airai State on 23 April, one in Aimeliik State on 24 April, one hepatic phase near the Malakal sewage ponds on 28 April, and one foraging on caterpillars in a tree in a neighborhood yard in Ngerchemai, Koror, on 4, 16, and 17 May. None were seen well enough to permit species identification. The birds were most likely Oriental Cuckoos, which are an uncommon annual visitor to Palau (Engbring 1988). A number of *Cuculus* records have been published for the island group (Hartlaub &

Finsch 1872, Coultas 1931, Marshall 1949, Baker 1951, Engbring 1983a, Kepler 1993), many of which were confirmed or suspected to be Oriental Cuckoos. By contrast, Common Cuckoos have only been identified once, during the mid-1800s, with a possible additional record in 1999 (Hartlaub & Finsch 1872, Wiles et al. 2004).

Oriental Dollarbird *(Eurystomus orientalis).* On three occasions, we sighted single dollarbirds that were readily identified by the pale blue-green wing patches visible in flight. One was seen on Angaur perched in a dead tree in the middle of an open area of mostly taro patches on 8 May, another was seen being mobbed by 10–12 swiftlets as it flew near the entrance to the Palau Pacific Resort on Ngerekebesang on 15 May, and a third was observed sitting atop a utility pole along a forested roadside in Ngechsar State, Babeldaob, on 17 May. Both birds seen while perched showed similar plumage and bill traits, including a gray head, upper back, and scapulars, dull blue-green wing coverts, lower back, lower breast, belly, and undertail coverts, and a blackish bill. These features are characteristic of immature birds of the Australian subspecies *E. o. pacificus* (Fry et al. 1992), which is probably the most common race visiting Micronesia (Engbring 1983b). Oriental Dollarbirds are considered an uncommon migrant to Palau (Engbring 1988). Engbring (1983b) summarized initial records for the island group, with additional observations presented by Kepler (1993) and Wiles et al. (2004).

Barn Swallow *(Hirundo rustica).* We saw one bird at the Malakal sewage treatment ponds on 23 April, two to four at the Koror dump from 28-30 April, and two at a mangrove-lined pond on northern Peleliu on 3 May. Modest numbers of this species are seen annually in Palau (Engbring 1988), with many previous records (Coultas 1931, Hachisuka et al. 1932, Marshall 1949, Baker 1951, Engbring 1983a, Kepler 1993).

Gray-streaked Flycatcher (Muscicapa griseisticta). We saw single individuals on three occasions, including one in forest edge habitat in southern Airai State on 23 April, one in a forest clearing and forest edge in Ngerchelong State on 25 April, and one in a small opening in secondary forest near Ulimang village in Ngeraard State on 26 April. This species is considered an uncommon migrant in Palau (Engbring 1988), with only a handful of previous records published, as reviewed by Wiles et al. (2000). The frequency of our observations indicates that it is indeed a regular visitor. Past sightings in December and February (Marshall 1949, Wiles et al. 2000, 2004), including one in February 2004 in Airai State (A. Gupta and G. Dutson, pers. comm.), suggest some individuals may overwinter in Palau. This flycatcher is a relatively inconspicuous bird that inhabits forest and forest openings, and is likely underdetected.

Eastern Yellow Wagtail *(Motacilla tschutschensis).* We observed yellow wagtails at numerous locations, including three birds at the Koror dump on 23 April, a flock of 21 on a grassy roadside in Airai State on 24 April, a flock of 24 on a grassy bank along the compact road in Ngatpang State on 24 April, two in Ollei village in Ngerchelong State on 25 April, three on grassy lawns in northern Peleliu on 4 May, two in grassy areas adjacent to the Angaur harbor on 5 May, and

single birds at other scattered locations extending through 6 May. About 25 individuals were viewed closely. All were similar in plumage, having a gray crown and nape, olive-green back and rump, yellow breast, belly, and undertail coverts, dark gray lores and auriculars, a long white supercilium, pale yellow tips on the median and greater wing coverts forming two wingbars, and pale edging on the secondaries (Fig. 1m). Some birds had a few faint grayish streaks on the breast. The throat was entirely yellow in some birds, but faded to white on the chin in others. These traits match those of the subspecies *M. t. simillima,* which is the predominate race found in the Philippines, Wallacea, New Guinea, and probably Australia (Coates & Bishop 1997, Kennedy et al. 2000, Pizzey and Knight 2003, Tyler 2004, T. Pratt pers. comm.). Engbring (1988) described yellow wagtails as uncommon migrants in Palau, but our observations suggest that *M. t. simillima* is fairly common at times. Wiles et al. (2000) reported at least 25–30 yellow wagtails in small groups of 3–12 birds and as scattered individuals between 23 April and an unknown date in May 1991. Other records from Palau appear in Owen (1977b), Engbring (1983a, 1992), and Kepler (1993). Our sightings represent the first confirmation that the subspecies *M. t. simillima* occurs in Palau and Micronesia (see Wiles 2005).

Gray Wagtail *(Motacilla cinerea).* We observed a single Gray Wagtail at the Malakal sewage treatment ponds on 27 April and 2 and 3 May. It had an unmarked gray crown and back, a yellow breast, belly, vent, and rump, pale yellow flanks, and a long tail with white outer tail feathers (Fig. 1n). Additional characters were a prominent white supercilium, dark gray auriculars, a white moustachial stripe, a white throat densely streaked with gray, faint double wingbars, secondaries edged with white, and pale legs. The bird bobbed its tail frequently while standing and walking. When flushed, it had a very undulating flight and gave a two-note "tseet-tseet" call. This species is a rare migrant in Palau (Engbring 1988), with Engbring & Owen's (1981) record of two to three birds in Koror in 1978 being the only previous report.

Richard's Pipit *(Anthus richardi).* We observed a single Richard's Pipit at the Malakal sewage treatment ponds on 23 and 28 April. The legs and toes were long and pink and, based on examination of photographs, the hind claw was slightly longer than the hind toe. The upper mandible was dark and the proximal three-fourths of the lower mandible was pale pinkish. The underparts were creamy-white, with a band of fine dark streaks on the upper breast and a buffy wash on the flanks (Fig. 1o, p). The crown and back were distinctly streaked black and buff. The primaries and secondaries had narrow buff edges, and the greater and median wing coverts had buff edges and tips, forming two wingbars. It had a long pale buff supercilium, a narrow dark line behind the eye, a narrow whitish eye-ring, brownish auriculars, a dark moustachial streak, and dark malar streaks framing the unstreaked chin and throat. The bird gave a soft "chirt" call in flight. It often gleaned insects from vegetation by stretching its neck up and standing high on its legs, sometimes jumping upward slightly. It bobbed the tail infrequently while walking.

Richard's Pipit is a long-distance migrant, with five recognized subspecies that variously breed in northeastern Asia and winter in southern Asia from India to Taiwan, the Philippines, and Borneo (Tyler 2004). The races are difficult to distinguish, but the moderate length of the hind claw, the distinct buff and black stripes on the back, and the creamy underparts with buff flanks suggest either the nominate race *A. r. richardi* or *A. r. ussuriensis,* with the latter more likely because it winters in southeastern rather than southwestern Asia (Tyler 2004). The very similar Paddyfield Pipit *(A. rufulus),* which formerly was considered conspecific with Richard's Pipit, is difficult to distinguish, but tends to have shorter legs, paler and less heavily streaked plumage, and narrower and paler tips on the secondary coverts (Alström & Mild 2003, Tyler 2004). The Paddyfield Pipit is non-migratory and resident in the Philippines and southern Asia (Alström & Mild 2003, Tyler 2004), and thus may be less likely to stray to Palau. This is the first record of any "Richard's-type" pipit from Micronesia.

Eurasian Tree Sparrow *(Passer montanus).* Wiles et al. (2004) reported two observations of several Eurasian Tree Sparrows from Peleliu in 2000 and 2002, which represented the first records for Palau. Here, we document rapid population growth of the species and colonization of a second site in the island chain. On 4 May, we surveyed specifically for tree sparrows on Peleliu by walking the main road through Kloulklubed village and searching one adjacent section of town for two hours. A total of 43 birds was counted, which included a flock of 12 in the yards of two homes. Additionally, 12 groups of one to five sparrows were detected elsewhere in town, with all but one bird found in close association with the utility poles lining the main street. Birds often perched on the poles and several entered the hollow metal cross arms near the tops of the poles. We strongly suspect that the sparrows nest inside the cross arms, but no actual evidence of nesting (e.g., protruding nest material) was noted. Sparrows were not seen elsewhere on Peleliu during our three-day visit.

On Malakal, we observed seven tree sparrows at the sewage ponds on 28 April and counted an additional 12 birds during a brief survey of urban areas on the remainder of the island and the adjacent north tip of Ngermalk Island on 7-8 May. Despite an abundance of appropriate habitat, sparrows were much less common than in Kloulklubed. Sightings on the latter dates included four groups totaling 10 birds between the port area and power plant on Malakal, and a pair on Ngermalk. Five of the sparrows were seen perched on utility poles. Unlike Peleliu, Malakal's utility poles feature solid wooden cross arms or hollow metal cross arms with slightly recessed inserts that prevent sparrow access to the inside of the arms. Lack of nesting opportunities in the cross arms may partially explain the smaller numbers of sparrows detected on Malakal and Ngermalk. We did not detect sparrows at urban sites on Koror or Ngerkebesang.

Passer montanus is native to Eurasia, but has been introduced to many parts of the world, including Yap, the southern Marianas, and the Marshalls (Wiles 2005). We recommend the eradication of both populations in Palau before they become too large and widespread. If this cannot be achieved immediately, block-

ing any holes on utility poles and other structures will reduce the availability of nesting sites and likely slow the population's rate of increase.

Blue-faced Parrotfinch *(Erythrura trichroa).* This species is resident in Palau, and is considered rare but widespread from Koror to Peleliu and very rare on Babeldaob (Engbring 1988, 1992, Wiles et al. 2004). We observed small groups at seven locations, including one and two birds in *Casuarina* trees at the north tip of Ngermalk Island between Koror and Malakal on 28 April and 10 May, three feeding in a large fruiting *Ficus* tree on the outskirts of Kloulklubed village, Peleliu, on 3 May, three feeding in *Casuarina* trees in southwestern Peleliu on 5 May, four feeding in *Casuarina* trees on Ngermeaus Island on 5 May, five including one begging juvenile feeding in a large fruiting *Ficus* tree on Ulong Island on 6 May, two in a large *Casuarina* tree on the grounds of the former Nikko Hotel in eastern Koror on 7 May, and three on Ulebsechel Island in Nikko Bay on 8 May. Our number of records is roughly similar to those of studies conducted in the late 1970s (Pratt et al. 1980, Engbring & Pratt 1985) and 1991 (Engbring 1992), suggesting that the species has remained stable in abundance during the past few decades. Analysis of our survey data collected on standardized transects will allow further evaluation of current status.

Discussion

Our study provides insight on the variety and abundance of migratory birds in Palau during late April and May, which coincides with the latter portion of the northward migration season. We documented 41 migrant species during a 26-day period, including 23 species of shorebirds, seven egrets and herons, seven small land birds, three terns and gulls, and one hawk. Based on Palau's closer proximity to the Philippines and New Guinea, Baker (1951) hypothesized that the archipelago was located along the eastern edge of the main body of the East Asian-Australasian Flyway, which accounted for its somewhat higher numbers and greater diversity of shorebirds in comparison to other Micronesian localities. Systematic surveys of shorebirds and other migrants have never been conducted in Palau, but observations made during this study and by Owen (1977b) and Engbring (1988) during the 1970s are supportive that abundance is higher in Palau than elsewhere in Micronesia (Baker 1951, Anderson 1981, Jenkins 1981, Hayes 1986, Clapp 1990, Stinson et al. 1997a, 1997b). Although absolute numbers were not large for any migrant, four species (Greater Sand-Plover, Common Sandpiper, Sharp-tailed Sandpiper, and Eastern Yellow Wagtail) were noticeably more common than reported elsewhere in Micronesia. Previous work has revealed that Red-necked Stints and Terek Sandpipers also visit Palau in somewhat greater numbers (Baker 1951, Owen 1977b, Engbring 1988). Total species diversity of migrants is roughly similar between Palau and the better-studied Mariana Islands (Wiles 2005), but our observations suggest that Palau probably receives greater species diversity on an annual basis. Additionally, our sightings indicate that diversity and abundance of migrant landbirds during April and May is substan-

tially greater in Palau than elsewhere in Micronesia (Baker 1951, Jenkins 1981, Hayes 1986, Garrett & Schreiber 1988, Stinson et al. 1997a, 1997b). Increased study of migrants at Palau and other Micronesian locations is needed to clarify overall patterns in regional occurrence.

Our migrant observations were considerably enhanced by making frequent visits to the Malakal sewage ponds, which were recently constructed in 2004. Like wastewater treatment sites elsewhere, the ponds provide rich foraging habitat for a variety of migratory and resident birds. This type of shallow, eutrophic, freshwater wetland habitat is rare in Palau, and the sewage ponds may entice migratory birds to stop longer to replenish their energy. Although this habitat is not natural, it provides a valuable window on the diversity and abundance of migratory species that pass through the island group.

This paper also provides records of four species of resident wetland birds occurring in Palau. Common Moorhens were detected in the highest numbers ever reported for the island group, but were found at just three locations. No sightings of Pacific Black Ducks were made, verifying the rarity of this species. With the exception of taro patches, freshwater wetlands are scarce throughout Palau (Engbring 1988, 1992), which undoubtedly limits the populations of these birds. The Ngardok Nature Reserve is an important site because it is one of the few freshwater wetlands in Palau, supports the largest population of moorhens, and harbors other wetland bird species (e.g., White-browed Crakes and perhaps Purple Swamphens) that are difficult to detect in the dense marshy vegetation surrounding the lake. The extreme shyness of moorhens at Lake Ngardok suggests they have had negative experiences with humans, and that greater enforcement is needed in the conservation area. We did not observe roosting or nesting activity by Little Pied Cormorants *(Phalacrocorax melanoleucos)* at the lake, which was considered an important rookery site into the 1990s (Engbring 1992). Human intrusion or ecological changes at the lake may be responsible for their recent absence.

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