# Pacific Golden Plovers *Pluvialis fulva* and other waders on the Samoan Islands: Wintering in a changing Polynesian landscape

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Counts and observations of waders wintering on the Samoan Islands, Oceania, in February and March 1999 and March and April 2000 are reported. The most abundant waders were Pacific Golden Plovers *Pluvialis fulva*. This species benefits from the rapidly changing landscape, as primary rain forest is turned into cultivated land. 2000 individuals of *P. fulva* are making use of these tropical islands as their non-breeding area. The majority, 800–1000, is concentrated on the island of Upolu, especially within the urban environs of Apia. Pacific Golden Plovers have shown a considerable change in behaviour during the last few years by making use of small garden lawns. Other species wintering in or migrating through the Samoan islands are Wandering Tattler *Heteroscelus incanus*, Ruddy Turnstone *Arenaria interpres*, and Pectoral Sandpiper *Calidris melanotos*. During earlier years (1975–1998), Bristle-thighed Curlew *Numenius tahitiensis* and Lesser Yellowlegs *Tringa flavipes* were also recorded.

## INTRODUCTION

The Polynesian islands are known as non-breeding areas for arctic waders (Mayr 1945, Watling 1982, Pratt *et al.* 1987). Despite its remote location (e.g. about 9,000 km from wader breeding grounds in west Alaska and northeast Siberia), several species migrate annually to this region (Williams & Williams 1988, Johnson & Connors 1996, Johnson *et al.* 2001). This is why this type of migratory bird was called a "globe-spanner" (Chapman 1924).

This study is the first to report on numbers, distribution and habitats of waders in the Samoan Islands, part of the Polynesian archipelago (Figure 1). Previously, population estimates have been made only for the comparatively small eastern islands of American Samoa (Amerson *et al.* 1982).

The Samoan islands are of volcanic origin with mountains reaching to 1,858 m. A few decades ago, primary forest covered the islands and was virtually untouched. Villages and plantations were confined mainly to the coastal areas. Today, vast areas of native forest have disappeared and rain forest birds have suffered severe loss of habitat. Several migratory species, however, have benefited by making use of the areas that have been cleared and turned into cultivated land. The purpose of this study is to document the present status of migratory shorebirds in Samoa as well as their habitat selection. This baseline information will mean that future trends that may result from the rapidly changing landscape can be accurately assessed.

## MATERIAL AND METHODS

When the author's studies on Samoan birds began in 1975, migratory waders were observed only sporadically. Species and habitats used were recorded qualitatively. The author spent more than four years in Samoa, three years continuously. Other visits were made in a variety of seasons. Therefore data were collected in a wide range of locations covering all major habitats and for every time of the year.

From 2 to 21 March 1999 and from 22 March to 9 April 2000, the numbers of migratory shorebirds were counted on the islands of Upolu, Savai'i and Nu'utele (Figure 2). This time of year was chosen because the adults have not yet started to return to their breeding grounds. Moreover it is generally too early for the arrival of new individuals from further south (although spring migration of waders wintering in the Southern Hemisphere does start in about the middle of March (Byrkjedal & Thompson 1998)).

Counts were carried out along all the coastlines by car or on foot. In the hinterland, potentially suitable habitat was checked on foot wherever access was difficult.

For Pacific Golden Plover, maps were prepared showing the distribution of flocks according to the following size-classes: 5–10, 11–50 and >50 individuals.

The size of territories used by Pacific Golden Plovers was determined by observing individual birds regularly for 5–9 days and by measuring the areas used and defended by each.

## RESULTS

### Pacific Golden Plover *Pluvialis fulva*

#### *Numbers*

The majority of Pacific Golden Plovers – 1,000–1,200 – were found on the western islands of Savai'i, Upolu, Apolima, Manono and the Aleipata islands off Upolu (Nu'utele, Nu'ulua, Fanuatapu, Namu'a). About 800 of these were on Upolu and 200–300 on Savai'i. On Upolu, only a few places were suitable for large numbers. The majority were in small groups and individuals scattered widely over the island. The relatively small islands off Upolu and Savai'i were suitable

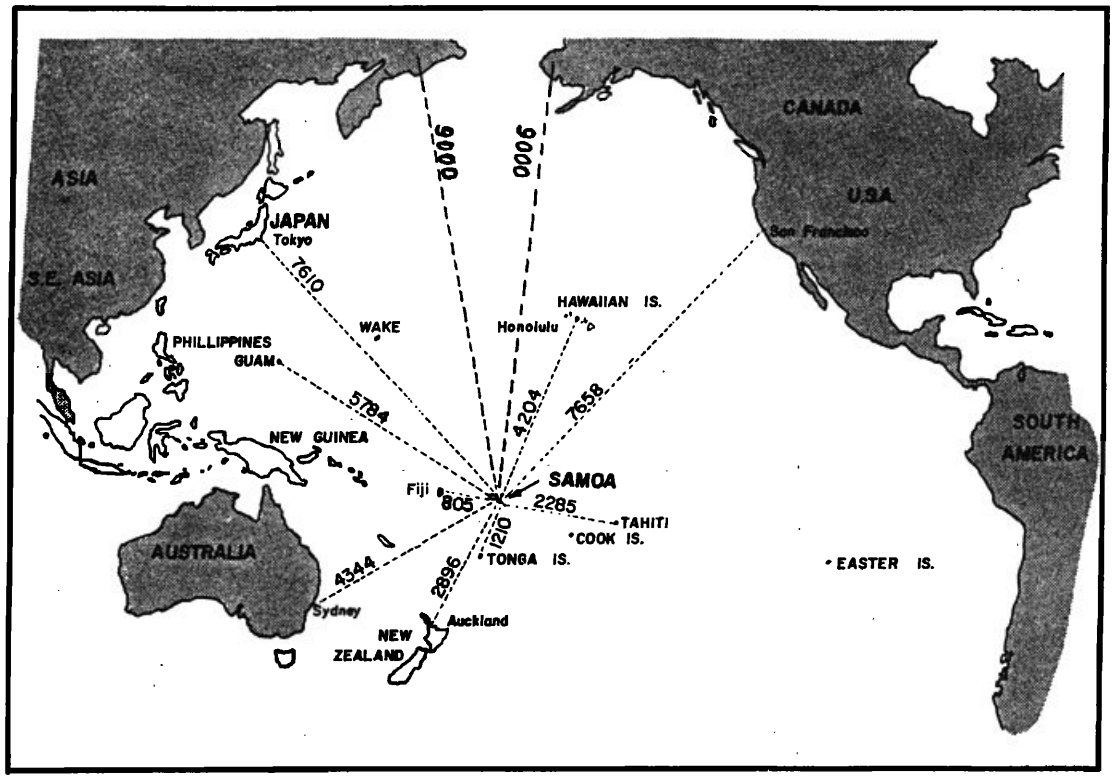


**Figure 1.** Waders visiting the Samoan Archipelago have to cover a distance of more than 9000 km from their breeding areas, mainly flying over the Pacific Ocean. (Map, slightly modified, after Amerson *et al.* (1982). Distances are in kilometres.)

for only a few individuals. It seems likely that these birds fly to the larger islands to feed or roost.

The population of the eastern islands of the chain (American Samoa) is 500–600, comprising 200–300 on Tutuila and an estimated 200–300 on the Manu'a-Group (author's unpublished observations). Therefore the total population of all the islands of the Samoan group is about 2,000 individuals.

### *Distribution*

Pacific Golden Plovers were concentrated in the western part of the Samoan island chain with the majority concentrated on the north coast of Upolu (Figure 3). Numbers were greatest throughout the year in the vicinity of the City of Apia and on the International airport at Faleolo. The lawns of Samatau church and school at the westernmost end of Upolu are also attractive to a smaller group of this species.

In the vicinity of Apia, Pacific Golden Plovers concentrate on Mulinu'u Peninsula (Plate 3), on the golf course at Fagali'i village and on Fagali'i airstrip. Other important places are a reclaimed area in the City of Apia, various sportsfields including those at Matafagatele, University of Samoa and Apia Park, the L.D.S. compound in Lepea and several lawns at Alafua and Moamoa.

A relatively new site for waders is the Catholic church centre recently set up in Tuana'i-Leauva'a. This quiet compound seems ideal for Pacific Golden Plovers, as it borders on a mangrove swamp with muddy substrate.

Important wintering and summering grounds on Upolu (see Figure 3) are: Faleolo International Airport (1), Catholic church centre Tuana'i-Leauva'a (2), the city of Apia and its vicinity (3), Fagali'i golf course and airstrip (4), Lufilufi church lawn (5), Solaua cattle farm (6), Falefá inland cattle farms west of Mafa Pass (7), Richardson track, roadsides and

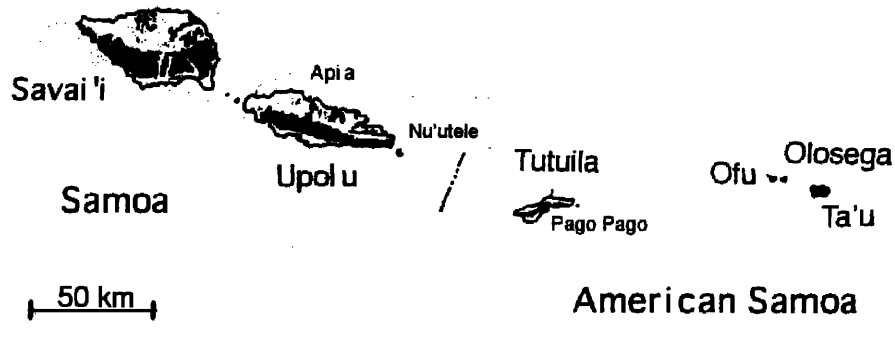


**Figure 2.** Within the Samoan island chain, the main land masses are the larger islands in the west of Savai'i and Upolu. Waders are found mainly on Upolu, where cultivation of land is most advanced.

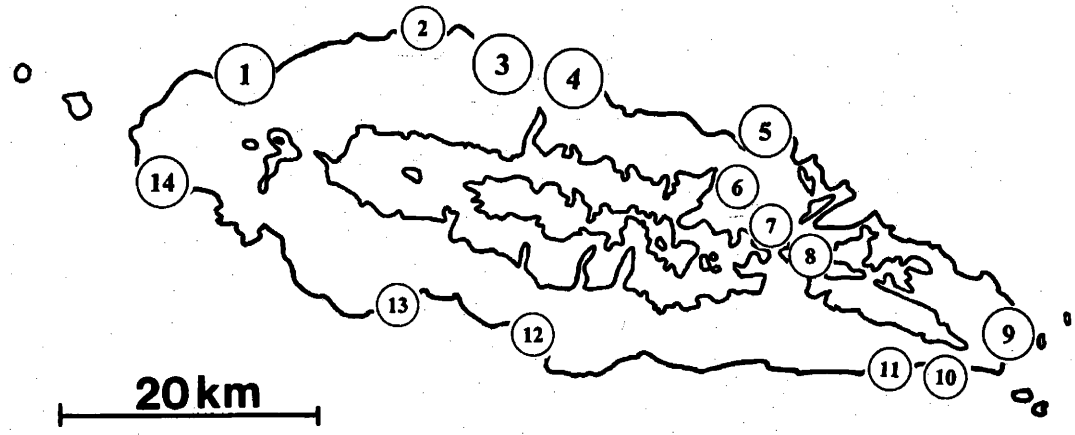


**Figure 3.** Concentrations of Pacific Golden Plovers on Upolu in 1999 and 2000. Small squares indicate 5–10 birds, medium squares 11–50 and large squares >50. Numbers identify each site as follows: Faleolo International Airport (1), Catholic church centre, Tuana'i-Leauva'a (2), the City of Apia and its vicinity (3), Fagali'i golf course and airstrip (4), Lufilufi church lawn (5), Solaua cattle farm (6), Falefá inland cattle farms west of Mafa Pass(7), Richardson Track, roadsides and cattle farms (8), Aleipata beach and Aleipata islands (9), Cape Tuiolemú beach (10), Lotofaga area (11), Siumu inland lawns (12), Safata Bay beach (13), Samatau church and school lawn (14).

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### *Size of territories*

The two largest territories – 1,925 $m^2$ and 1,200 $m^2$ – were both held by adult males (Plate 1). The smallest territory covered only 184 $m^2$. The average size of territories (n = 22) was 876 $m^2$. Adult males were more aggressive than females or immatures.

### *Feeding behaviour*

Food of Pacific Golden Plovers in Samoa consists of invertebrates. Berries and other small fruit on the ground are not available. Therefore foraging behaviour is adapted to small fast-moving prey items. Birds walk slowly, taking only a few steps, then wait motionless before rushing towards their prey, pecking it with a fast movement of the neck (Plate 2). Similarly small crabs of about 1 cm carapace size are caught on the sandy or muddy mangrove areas and beaches.

## Wandering Tattler *Heteroscelus incanus*

Wandering Tattlers are much less common in Samoa than Pacific Golden Plovers. Counts along the coastline varied from 200 to 300 individuals for Upolu, Savai'i and Nu'utele together.

This species prefers rocky shores, formed either through volcanic activity or by corals. Also, especially during low water, they will often forage on coral reefs. They search for invertebrates hidden in rock crevices or in tidal pools. On the reclaimed area in Apia, Tattlers frequently forage on man-made structures, such as stone walls or concrete walls by the sea. On 4 April 2000, for the first time since 1975, one individual was observed in Apia's fishing harbour next to the old market building.

On Nu'utele, the size of two Wandering Tattler territories was measured. Each bird used 350 m of the 700 m coral beach. Depending on tide, the area of coral reef varied considerably. During high tide, when the corals were covered by water, both birds defended their territories vigorously (Plate 7).

## Ruddy Turnstone *Arenaria interpres*

During the two census periods, Ruddy Turnstones were only found once. This was on 4 April 2000 when 16 were seen feeding on a lawn west of the old market building in Apia. When disturbed, they would fly to rest on a nearby stone wall. In view of the date, these may have been migrants. In previous years, 5–10 Turnstones were sometimes observed on the reclaimed area in Apia and on freshly cut lawns in front of the parliament building on Mulinu'u Peninsula.

In Samoa, Turnstones always seem to be nervous and easily disturbed. Nevertheless they do not avoid the presence of humans. They are usually found in and around the city of Apia.

## Pectoral Sandpiper *Calidris melanotos*

Two Pectoral Sandpipers were observed behind the Government building on the reclaimed area in the City of Apia on 6 and 7 April 2000 (Plate 8). This is the first time that this species has been reported from the Samoan island group (Pratt *et al.* 1987). In view of the date, these birds were presumably passage migrants. They were very inconspicuous and the colour of their plumage resembled very much that of the juvenile Pacific Golden Plovers foraging or roosting nearby. Their small size, however, attracted attention.

On both days, the two birds remained almost all the time within the same area, 50 m across. In this particular part of the reclaimed area, water was lying in a wheel-track. Elsewhere, water usually seeps away quickly into the porous lava rock. The two Pectoral Sandpipers looked for food by probing in the muddy substrate with their long bills, unlike Golden Plovers, Wandering Tattlers and Turnstones that peck prey from the surface.

## Bristle-thighed Curlew *Numenius tahitiensis*

The Bristle-thighed Curlew is a rare visitor to the Samoan

**Plate 1.** A male Pacific Golden Plover on a lawn in front of the Government Building. This bird defended the largest territory within this study (City of Apia, Upolu, 6 May 2000).

**Plate 2.** Typical hunting behaviour of Pacific Golden Plover on the Samoan islands: invertebrates are snatched from the short-cut grass of lawns.

**Plate 3.** Mulinu'u Peninsula in Apia offers suitable habitat for wintering and summering waders. Pacific Golden Plovers prefer lawns like the one in front of the Parliament Building (*above left*) or the Observatory (*far right*). Wandering Tattlers can be found on the beach of Vaiusu Bay (*above right*). Both species use the mangrove belt (*top*).

**Plate 4.** Pacific Golden Plover in front of a traditional Samoan house. No waders make use of shady places in Samoa. They often keep their bills open to cool down body temperature.

**Plate 5.** Hand-held lawn-mowers replace the bush-knives. Golden Plovers benefit from this new technique, as lawns are kept shorter.

**Plate 6.** Freshly mown lawns are preferred by Pacific Golden Plovers, as they dry up quickly and invertebrates are easier to detect. This male Golden Plover is not disturbed by the dog running by.

**Plate 7.** Wandering Tattler roosting on coral debris in its heavily defended territory on Nu'utele Island, 27 March 2000.

**Plate 8.** This Pectoral Sandpiper, on the reclaimed area in the city of Apia, is one of the two that were seen on 6 and 7 April 2000. This is the first time that the species has been recorded on the Samoan Islands.

islands. It was not found at all during the studies of 1999 and 2000. The last observation was in 1996 when one was seen on the northeast coast of Upolu. From 1975 to 1995, only single birds were noted.

The main areas where this species has been recorded are the mangrove and mud flats at Mulinu'u and the sandy beaches of Lufilufi and Solosolo, all on Upolu.

### Lesser Yellowlegs *Tringa flavipes*

Since 1975, the author has only recorded this species once in Samoa. In September 1997, a single Lesser Yellowlegs was observed near the village of Sa'anapu on the south coast of Upolu. It was searching for food during low tide in the mud between the roots of old mangrove trees.

## DISCUSSION

Conditions for waders wintering or summering in Samoa vary considerably from species to species. Birds like Bristle-thighed Curlew and Lesser Yellowlegs suffer from an increasing pressure of human population along the coastline, especially on the beaches (Amerson *et al.* 1982). Bristle-thighed Curlews, in particular, are very sensitive to human disturbance. Moreover many of the sites they used in the past have been lost as a result of the destruction of mangrove areas, dredging of sand and the pollution of Mulinu'u Bay through the dumping of garbage from the City of Apia. Pacific Golden Plovers, on the other hand, have benefited from the changing landscape. Suitable areas are generated on a large scale, such as lawns, sports fields and cattle farms. New techniques like motor-driven hand-lawnmowers permit easy cutting of grass instead of the back-breaking use of the bush-knife. Therefore lawns are mown more often than before offering easy access to invertebrate food without the birds having to walk through long, wet grass (Plates 4, 5 and 6).

The census results suggest that the total number of Pacific Golden Plovers wintering in the whole Samoan island chain during 1999 and 2000 was about 2,000 individuals. This

figure differs from a study carried out in 1975 and 1976 in the eastern part (American Samoa) by Amerson *et al.* (1982). At that time, the population of American Samoa alone was estimated at 4,500. There are no data to show whether numbers have decreased since then. However, it would seem possible that Amerson *et al.* over-estimated the population in the 1970s through extrapolation from small study plots.

To understand current and likely future trends in the Pacific Golden Plover population of Samoa, it is informative to compare the results of recent studies on Hawai'i (Johnson *et al.* 2001). There, territoriality has been studied intensely, giving further insight into territory size, proportion of territorial and non-territorial birds as well as survival rate and longevity. The fact that Pacific Golden Plovers establish territories in their wintering grounds was originally reported for Hawai'i by Johnson *et al.* (1981). This study shows that they behave in much the same way on Samoa. Moreover they defend their territories in the same manner as described for Hawai'ian birds by Johnson & Connors (1996). For Samoa, more detailed information is needed on the daily movements of inland-feeding birds. They certainly spend time at other places, not only to roost at night, but also to make use of coastal areas accessible during low tide.

In Samoa, Wandering Tattlers also seem to establish territories. Future studies might show whether this applies to all or only a part of the population.

Population trends might be directly influenced by a change in human attitudes towards nature and conservation. In Samoa, this change is already apparent. When the author started his bird studies in 1975, the favourite pastime of children was to kill birds around their houses and plantations using slings. Probably this is the reason why Pacific Golden Plovers never used to use shady areas because shade-providing structures like trees, shrubs or houses might harbour such hunters. Recently, killing birds with slings has become very rare and people are more tolerant of sharing their lawns and gardens with wildlife. Waders will thus benefit from this increasing tolerance, leading to what is described for Hawai'i as "the remarkable ability of wintering Pacific Golden-Plovers to coexist with people" (Johnson *et al.* 2001).

Despite the increasing awareness of nature conservation needs, wildlife in Samoa is under increasing pressure along much of the coastlines as well as in the mountains. Transformation of primary rain forest into cattle-farms, construction of roads across the islands and to the hinterland plantations has opened up the dense forest that used to cover the Samoan islands almost completely.

On the Hawaiian Islands, this change of landscape happened decades earlier (Johnson *et al.* 1981, 2001). Pacific Golden Plovers have adapted to this situation, using man-made habitats like parks, roadsides and sports fields next to skyscrapers. During the author's numerous visits to Oahu Island, Hawai'i, it has become clear that this species can adapt quickly to the presence of humans. Golden Plovers are using the roofs of one-storey buildings and even expect food from people driving to the upper-floor parking area at the Ala Moana Shopping centre in Honolulu.

On the Samoan islands, this transformation is more recent and Pacific Golden Plovers have only just started to move into this newly created landscape. It is possible that, as a result, their numbers will increase in the next few years. After over-wintering under favourable conditions, they may have a better chance of reaching their breeding grounds in Alaska and eastern Siberia, breeding successfully and returning. After long over-sea flights – twice flying more than 9,000 km – they will come back to a wintering area that is continuously improving, offering more and better opportunities for feeding and roosting in safety.

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