U.S. Shorebird Conservation Plan

U.S. Pacific Islands Regional Shorebird Conservation Plan

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Pacific Golden-Plover © Jack Jeffrey

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U. S. Pacific Islands Executive Summary

The U.S. Pacific Islands (USPI) often are overlooked as an important region for shorebirds largely due to their isolation, the vast expanse of ocean they occupy, and their small land base. However, the USPI support a surprising number of birds and are important in maintenance of global shorebird populations. The USPI occur in an area that stretches 5,000 mi (9,265 km) from east to west across the Pacific Ocean and 3,000 mi (5,559 km) from north to south. The U.S. islands in this area include the Hawaiian Islands, Guam and the Commonwealth of the Northern Mariana Islands, Wake Island, Johnston Atoll, Baker and Howland islands (in the Phoenix Island group), Jarvis Island, Kingman Reef, and Palmyra Atoll (in the Line Island group), and the islands of American Samoa.

The USPI are home to one endemic shorebird, the endangered Hawaiian Stilt, and are important wintering areas for three species of Holarctic-Nearctic breeders: the Bristle-thighed Curlew, Pacific Golden-Plover, and Wandering Tattler. The majority of these species' populations overwinter in the Pacific Islands, and these islands are critical to the maintenance of these birds. The USPI also are important, though to a lesser degree, for the Ruddy Turnstone. These four species are common in winter and widespread across the Pacific. Other species occur in lower numbers, but are regular winter visitors. These include the Black-bellied Plover, Sanderling, Long-billed Dowitcher, Dunlin, Pectoral Sandpiper, Lesser Yellowlegs, Sharp-tailed Sandpiper, and Bar-tailed Godwit. The Mariana Islands support these and several Asian breeders including: Asiatic Whimbrel, Grey-tailed Tattler, Mongolian Plover, Wood Sandpiper, Common Sandpiper, and Red-necked Stint.

This plan also addresses another Pacific endemic species, the Tuamotu Sandpiper. This diminutive, non-migratory sandpiper, listed as endangered by the IUCN – The World Conservation Union, was once widespread throughout the central Pacific, but has been extirpated from much of its former breeding range and now is restricted to five small atolls in the Tuamotu Archipelago. Although it does not currently occur on any USPI, predator-free islands under U.S. jurisdiction could be important to recovery efforts.

Modern threats to shorebirds in the region include: urban, industrial, military, agricultural, and recreational development (loss of habitat); introduction of invasive, non-native plants (degradation of habitat) and non-native animals (predation, disease, competition); human disturbance; and contaminants (sewage discharge, oil spills, radioactive wastes, pesticides). Conservation and restoration of shorebird habitats in the USPI is a growing effort and essential for the protection of endangered and declining shorebird populations. Wetlands, beach strand, coastal forests, and mangrove habitats are particularly vulnerable on Pacific islands due to increasing development pressures and already limited acreage. Modified habitats, such as pastures, urban grass parks, and golf courses provide habitat for wintering shorebird species across the Pacific Islands.

There is little published literature on the status, trends, and ecology of wintering shorebirds in the Pacific. Basic information such as seasonal status, distribution, abundance, important migration stopover locations, and habitat requirements is lacking.

Monitoring and research needs include: assessment of population sizes and trends; assessment of the timing and abundance of birds at key wintering and migration stopover sites; assessment of habitat use and requirements at wintering and migration areas; exploration of the geographic linkages between wintering, stopover and breeding areas; and evaluation of habitat restoration and management techniques to meet the needs of resident and migratory species.

Education and public outreach are critical components of this plan. Expanding public understanding of the importance of migratory shorebirds as a component of the USPI avifauna and the need to protect these species, is a primary challenge.

The logistics of a coordinated effort across the Pacific are complex. Coordination must be undertaken within the political framework of each island group. Resource management agencies of Federal, Territorial, Commonwealth, and State governments will need to work together with military agencies, non-governmental organizations, and the scientific community. Implementation must be coordinated with ongoing recovery efforts for species listed under the Endangered Species Act (ESA), such as the Hawaiian Stilt and other Pacific Island waterbirds. The USPI plan is closely linked to the Alaskan Shorebird Conservation Plan and coordinating activities will ensure mutually beneficial and complementary efforts. On a larger scale, coordination at the international level will be key to the conservation of vulnerable species, both migratory and resident.

Introduction

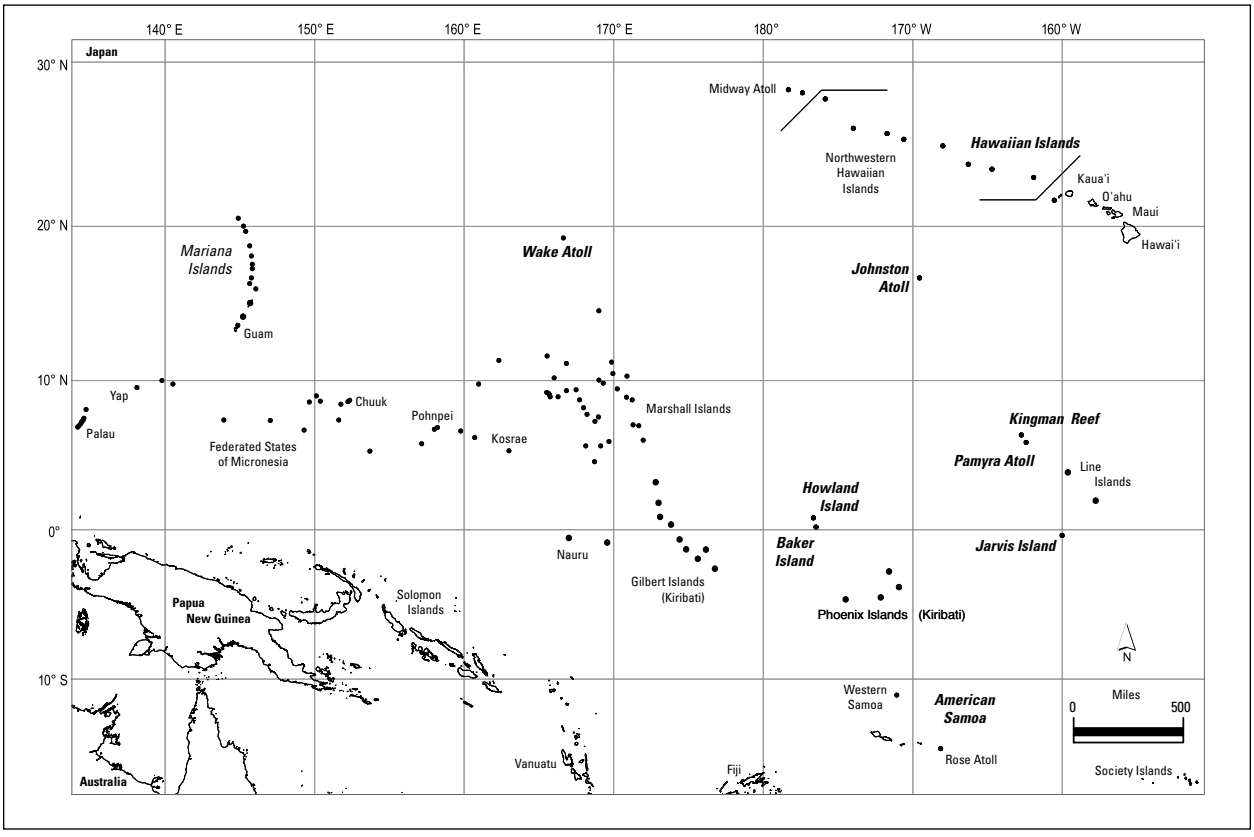
The U.S. Pacific Islands Regional Shorebird Conservation Plan is one of eleven regional plans developed as part of the U.S. Shorebird Conservation Plan (Brown et al. 2001, Appendix 1). Total landmass of the USPI is approximately 7,000 mi^2 (18,200 km^2) spread across millions of square miles of ocean. These islands provide essential habitat for four species of shorebirds. Pacific Golden-Plover (see Appendix 2 for scientific names), Bristle-thighed Curlew, and Wandering Tattler migrate thousands of miles, non-stop over open ocean, from breeding grounds in Alaska and Siberia to wintering grounds in Hawai`i and islands farther south. Hawaiian Stilt, endemic to the main islands of Hawai`i, is the only breeding shorebird in the Region.

Shorebirds face increasing threats to their existence, such as habitat loss and degradation, contaminants, invasive species, and introduced predators. In this plan we:

- Describe habitats that shorebirds utilize,
- Describe the shorebird community and focus on the species of greatest importance and conservation need,
- Identify the threats to shorebirds and their habitats, and
- Outline conservation goals for management, monitoring, research, and outreach.

The USPI are divided into four subregions. Following a general overview of the Region as a whole, each of the subregions is covered in greater detail.

FIGURE 1. U.S. Pacific Islands



Description of the U.S. Pacific Islands

This plan covers only those Pacific islands under the jurisdiction of the United States (Figure 1, Appendix 3). These islands, which include Hawai`i, American Samoa, the Marianas, and seven islands/ atolls in the central Pacific, are scattered over a vast region. With the possible exception of the Hawaiian Islands, our knowledge of shorebirds in this region is poor, and this plan draws heavily on unpublished information regarding the status and populations of shorebirds in the region. For the purposes of this plan, the USPI are divided into four subregions: Hawaiian Islands, Mariana Islands, American Samoa, and Central Pacific Islands. Shorebird habitats vary within each subregion and are mostly dependent on the size and type of island and the history of human occupation.

There are three basic types of islands in the USPI:

1. Volcanic basalt islands, built from the seafloor, often are large and high enough to support a variety of habitats along gradients of elevation, temperature, and precipitation. The high islands of Hawai`i and American Samoa are examples of volcanic islands.

2. Low coralline islands are the product of coral reef growth on ancient, submerged volcanic platforms, and typically are small, sandy islands or atolls with one or more emergent islets (motus). These islands typically have limited habitat diversity, little or no fresh water, and may have lagoons or saline lakes. The northwestern or leeward Hawaiian Islands and the islands of the central Pacific subregion are examples of low coralline islands.

3. Raised limestone islands are ancient coral reefs lifted above sea level by tectonic activity. These islands typically are composed of generally flat terraces separated by steep cliffs. Coastal areas may harbor wetlands. The southern Mariana Islands are examples of raised limestone islands.

One common component of all islands is that land area, and thus suitable habitats for shorebirds, is limited. Volcanic islands make up over 99 percent of the land area in the USPI, and human populations are concentrated on volcanic or raised limestone islands because of their relatively large size and fresh water sources, and strategic position. Many of the low coralline islands are uninhabited, though none have escaped human alterations.

Shorebird Habitats in the USPI

In the USPI, shorebirds utilize a variety of habitats, many of which differ from those frequented by continental wintering populations. For example, Wandering Tattler uses rocky shorelines almost exclusively during winter along the Pacific Coast of North America. In the USPI, tattlers can be found in a variety of habitats including grassy areas, forests, mudflats, coral reefs, and rocky coast (HAS 1997). In the USPI, four habitats are predominately used: estuaries, other wetlands, beaches, and grasslands. More specifically, tidal flats, estuaries, exposed reefs, freshwater and salt marshes, ephemeral wetlands, ephemeral playas, and aquaculture wetlands (taro, shrimp, and rice) support the highest diversity of shorebirds. Grasslands such as grazed pastures, lowland grasslands, golf courses, edges of runways, and urban parks are important for Pacific Golden-Plovers in particular. Beaches include coral and volcanic sands, and associated dune systems. Beaches provide important habitat for curlews, turnstones, Sanderlings, and to a lesser degree, golden-plovers. Unique to American Samoa and Palmyra are littoral forests that support a surprising number of curlews, golden-plovers and tattlers. This latter habitat is more fully addressed in the American Samoa subregion discussion. Shorebirds have been documented to use mangrove forests, but to what degree remains unclear.

Wetland Habitats

The USPI wetlands (that support shorebirds) can be categorized into the following types (follows Polhemus et al. 1992).

Seasonal Lowland Wetlands & Ephemeral Playas. Large basins that flood from winter rains and dry through evapotranspiration. They behave similarly to playas of the Intermountain West of North America and exhibit alkali soils. Common on the islands of Hawai`i, Ni`ihau, Maui, Moloka`i, and O`ahu. Important habitat for Hawaiian Stilt and all migratory species.

Seasonal Lowland Wetlands (Ephemeral Freshwater Marshes). Freshwater vegetated wetlands that flood during the winter rainy season and dry in summer (or after monsoon rains). They are common in coastal areas of the main Hawaiian Islands, American Samoa, and Guam. Used by stilt (Hawai`i only), and to a lesser degree by golden-plover and turnstone.

Lowland Freshwater Marshes. Permanent freshwater wetlands characterized by emergent vegetation and permanent water. Many are badly degraded by non-native, invasive plant species and altered hydrology. These wetlands occur primarily in coastal springs and river valleys. Associated with the high islands of Hawai`i, Marianas and American Samoa. Kawainui Marsh and Punamano Pond, O`ahu, are examples. If in a hemi-marsh state (50 percent interspersion of vegetation to open water) or more open, can be important for several species including stilt, golden-plover, and turnstone.

Lowland Saline Marshes. Saline wetlands dominated by emergent vegetation including pickleweed (*Batis maritima*) and various sedges. Examples include Kealia and Kanaha ponds, Maui and Agana Marsh, Guam. Saline marshes are among the most important habitat in the islands for migrant shorebirds and are critical for Hawaiian Stilt.

Estuaries. Nearshore waters in natural basins at the ocean interface, fed by water from perennial stream runoff. Characterized by brackish-water species of plants such as pickleweeds and mangroves. Vegetated areas often higher in elevation and provide roost sites for migrant shorebirds. Associated mudflats are important shorebird habitat throughout USPI. Examples include Pearl Harbor and Kaneohe Bay, O`ahu; Pago Pago Harbor and Nu`uuli Pala, American Samoa; and coves on Guam. Most have been seriously degraded by development, contaminants, and introduced plant species. Historically widely used by large numbers of migrant shorebirds and stilts; less use now due to habitat loss and degradation and, in the Hawaiian Islands, introduction of mangroves.

Coastal Mudflats. Exposed at low tide usually on older islands with runoff that deposits silt. Examples include the south shores of Moloka`i and O`ahu. Golden-plovers, tattlers, Sanderlings, and turnstones are common on these flats at low tide.

Artificial Freshwater Habitats. Manmade wetlands, not managed for waterbirds specifically, provide perennial or seasonal water and sometimes harbor emergent vegetation similar to natural wetlands (*e.g.*, reservoirs, ponds used for aquaculture, mariculture, and wastewater treatment). All common shorebirds can be found on these wetlands in varying diversity and abundance. On some islands, these are the only wetlands available.

Kailua Beach Park, O`ahu, Hawai`i, typical main island beach habitat. Photo by A. Engilis, Jr.

Lagoons. Saline lagoons, ponds, and lakes of Pacific islands and atolls. Vary in depth from a few feet to several hundred feet. Shallow margins can support emergent vegetation, sandy beaches, and prolific invertebrate blooms. Examples of closed lagoons include the lake on Laysan, in the Northwestern Hawaiian Islands and Swains Lagoon, American Samoa. Important for golden plovers, turnstones, and tattlers. The open lagoons typical of atolls provide less habitat for shorebirds, except along sandy margins.

Beaches. Coral beaches are typical of atolls, small islets, and the eroded shorelines of main islands. Typically they are sparsely vegetated and exposed to surf action. Some beaches on younger islands are comprised of basalt sands (*e.g.*, Island of Hawai`i). This is a widespread habitat that is important for curlews and turnstones, as well as other species of shorebirds throughout the USPI.

Other wetlands of less importance to shorebirds include: upland marshes, upland bogs, riverine systems, lowland saline swamps, anchialine pools, and lacustrine ecosystems (lakes and ponds).

Upland Habitats

Upland habitats important for shorebirds in the USPI can be categorized into the following types (follows Wagner et al. 1990).

Coastal Dry Grasslands. Found mostly on low, eroded islands and atolls, also some high islands. Comprised of several species of bunch and rhizominous grasses, intermixed with sandy soils. Important for numerous species of wintering shorebirds, including turnstone and Bristle-thighed Curlew.

Lowland Mesic Grasslands. Moderately wet grasslands, managed as pasture. Widespread throughout the Pacific Islands in association with ranching and other agricultural practices. Widely used by golden-plover in winter.

Montane Mesic/Wet Grasslands. Wet to very wet (dominated by hydric species of emergents) found on high, windward sides of islands above 2,000 feet (610 m). Most common on Maui and Hawai`i. Important for golden-plover and to lesser degree turnstone.

Coastal Dry Herblands. Associated with leeward coastal habitats found on dune systems and associated uplands. Characterized by sparse shrubs mixed with grasses. Found predominately on larger islands with older, more eroded coastal plains. Examples include Kahuku Plain, O`ahu and Mo`omomi Dunes, Moloka`i. Important for golden-plovers and curlews. Many offshore islets (particularly off of O`ahu) are characterized by this habitat and provide important overnight roost sites for shorebirds.

Urban Grasses and Parks. Large grass parks, golf courses, recreational fields, cemeteries, military antenna fields, mowed grass along runways, and urban lawns. These lawns are all generally maintained at a low height and provide excellent foraging habitat for golden-plovers. During rainy periods, other species often forage or roost, including turnstones, tattlers, and Hawaiian Stilt.

Littoral Forests. Littoral forests are coastal habitats dominated by *Pandanus* spp., *Pisonia grandis*, and *Barrintonia* spp. The dominant tree is determined by soils and climate. The understory is relatively open and is a favored habitat for golden-plovers, tattlers, and turnstones. At one time a common habitat in the Pacific, but human alteration of island landscapes has limited this forest type. Still present in small patches in American Samoa and Palmyra Atoll.

TABLE 1. Shorebirds of Primary Conservation Importance in the U.S. Pacific Islands.

Species	Population Trend	Area Importance[2]	Conservation Category
Pacific Golden-Plover	Unknown	5	High Concern
Hawaiian Stilt	Stable	5	Highly Imperiled
Bristle-thighed Curlew	Unknown	5	High Concern
Wandering Tattler	Unknown	4	Moderate Concern
Ruddy Turnstone	Unknown	3	Low Concern

[1]Ranking Criteria follows the U.S. Shorebird Conservation Plan (Brown et al. 2001) (Appendix 5).

[2] Importance of the region to U. S. shorebird populations: Area of high importance, supporting hemispheric populations (5); Area of high importance especially within the flyway (4); Area is within the primary range of the species but birds present in low abundance relative to other areas (3). (Appendix 5)

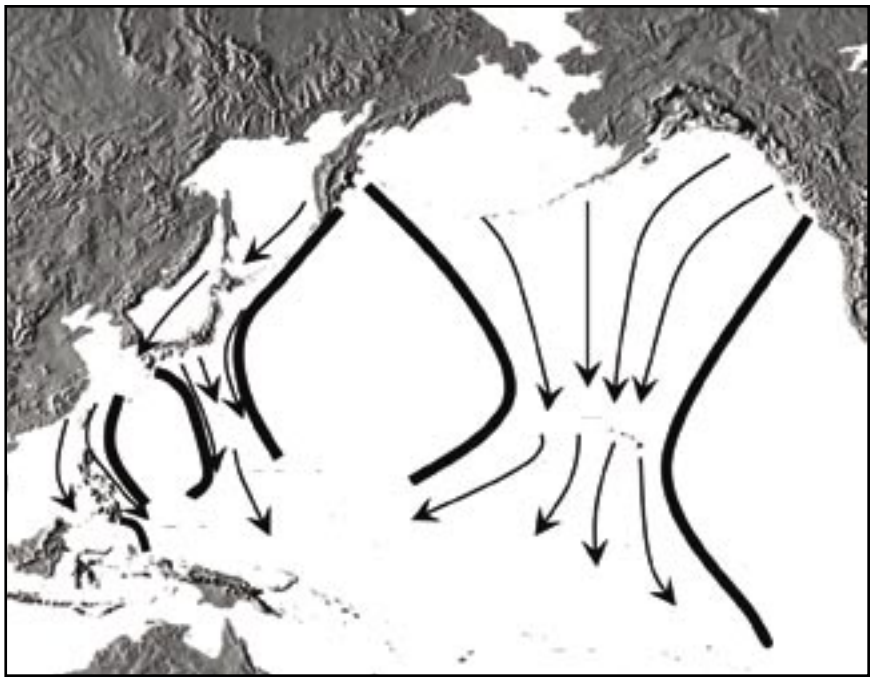
Occurrence Patterns and Regional Species Priorities

Sixty-eight species of shorebirds have been recorded in the USPI (Appendix 4). Most occur as vagrants or annually in very small numbers. However, the region does support hemispherically significant populations of three migrants: Pacific Golden-Plover, Bristle-thighed Curlew, and Wandering Tattler. In addition, the USPI supports relatively large populations of Ruddy Turnstone. The endemic Hawaiian Stilt is the only shorebird currently breeding in the USPI. Table 1 summarizes the conservation status of these five species, based on criteria established by the U.S. Shorebird Conservation Plan (criteria definitions are attached as Appendix 5). The Tuamotu Sandpiper has not been documented from the USPI, but the type specimen was collected from nearby Kiritimati (Christmas) Island, in the Line Islands (Pratt et al. 1987). Further investigation might yield additional historical records from Palmyra and Jarvis (also in the Line Islands) or other Central Pacific islands.

The specific breeding origin of winter shorebirds in each of the island groups is largely unknown for most species and most island groups. However, banding, radio telemetry, and morphometric studies have helped to elucidate breeding origins of golden-plovers, turnstones, and curlews that overwinter in the USPI (Woodward 1972, Ely and Clapp 1973, Johnson and Connors 1996, Marks et al. 2002, Gill et al. 2002). In general, islands of the western Pacific support more Palearctic nesting species, whereas the Hawaiian Islands support more Nearctic species. South of the equator, species diversity declines and Asian and North American nesting species are more homogeneously represented. The distribution of Bristle-thighed Curlew exemplifies this pattern. Its winter distribution is predominately in the islands of Hawai`i, Polynesia, and west to the Marshall Islands (Marks et al. 2002); *i.e.*, they are accidental in the Carolines and Marianas. Similarly, Gray-tailed Tattler becomes more abundant and Wandering Tattler less abundant in the western Pacific. Rare species, occurring in Hawai`i are mostly of North American origin whereas the Marianas typically hosts Asian forms. The species composition for each of the USPI groups is listed in Appendix 4.

The migratory paths taken by shorebirds to the Pacific Islands are poorly known, but their long over-water flights are among the most spectacular of any migratory species. Bristle-thighed Curlews fly at least 4,000 kilometers non-stop between Alaska and Hawai`i. Wandering Tattlers can migrate more than 12,000 kilometers over mostly open ocean. Three flyways have been postulated and are supported by banding studies (Johnson and Conners 1996, Marks and Redmond 1994, Kuroda 1961). Baker (1953) summarized these flyways as follows: Asiatic – Palauan Flyway (birds move from Asia to Western Pacific and Philippine Sea Islands), Japanese – Marianan Flyway (mostly Asian birds move through Japan into the Mariana Islands and Caroline Islands), Nearctic – Hawaiian Flyway (birds breeding in Alaska and Eastern Siberia [Beringia] move through Hawai`i to Marshalls and Polynesia) (Figure 2). Band recoveries, patterns of distribution, and species assemblages lend support to the existence of these flyways.

FIGURE 2. Routes of migration used by shorebirds in the Pacific Ocean (reprinted from Baker 1953)



Species of Primary Importance in the Region

Hawaiian Stilt. The Hawaiian Stilt is non-migratory and endemic to the main Hawaiian Islands, breeding on Ni`ihau, Kaua`i, O`ahu, Moloka`i, Lāna`i, Maui, and Hawai`i. It is the only breeding shorebird in the USPI. Estimates based on biannual waterbird surveys reveal that the population fluctuated between 1,200 and 1,600 birds from 1998 – 2003 (average 1,350) (Engilis and Pratt 1993, Reed and Oring 1993, Reed et al. 1994, USFWS in prep.). Although this population has been stable for several decades, it remains at very low levels. The Hawaiian Stilt is currently listed as endangered by Federal and State endangered species acts. Populations are limited by declining habitat, poor quality of existing habitat, and predation by introduced vertebrates. Large coastal wetlands and ephemeral playas are important habitat for this species (USFWS 1999, Ducks Unlimited 1998). Recovery objectives are to maintain a stable population above 2,000 birds for 10 years and to have viable breeding populations on Kaua`i, O`ahu, Moloka`i, Maui, and Hawai`i. The Hawaiian Stilt is part of a superspecies complex that includes Black-necked, Black-winged, White-headed, Black-backed, and Black Stilts. Recent genetic evidence suggests that it is most closely related to North American Black-necked Stilt (Fleischer and Macintosh 2001).

Hawaiian Stilt (Himantopus mexicanus knudseni). Photo: © Jack Jeffrey

Pacific Golden-Plover. The Pacific Golden-Plover breeds in western Alaska and Siberia and winters throughout the Pacific Islands. Other wintering areas include the southern Pacific coast of the U.S. (small numbers), and the coasts of Southeast Asia, India, New Zealand, Australia, and northern Africa (Hayman et al. 1986, Johnson and Connors 1996). The Pacific Golden-Plover is the most abundant and ubiquitous shorebird throughout the USPI. The Alaskan breeding population (approximately 16,000 birds [Morrison et al. 2001]) winters in the Hawaiian Islands, Marshall Islands, American Samoa, and some as far south as Victoria, Australia (Johnson and Connors 1996). Golden-plovers that breed in eastern Asia may overwinter in the Hawaiian Islands as well. Birds wintering in the Mariana Islands are assumed to breed in Siberia but the breeding origin of plovers wintering in American Samoa and the Central Pacific is still poorly understood. Turnover rates (number of individuals moving through a given region during a specific period of time) during migration are unknown, and radar studies suggest large movements of golden-plovers as they fly over Hawai`i and Guam (Williams and Williams 1988, Johnson and Conners 1996).

Kealia Pond NWR in fall, with ideal flooding conditions, provides critical coastal wetlands for migrant shorebirds. USFWS Photo

Pacific Golden-Plover (Pluvialis fulva). Photo: © P. LaTourrette

Few attempts have been made to estimate the total wintering population in the USPI, even in the Hawaiian Islands where this species has received considerable attention. In the Hawaiian Islands, a conservative estimate ranges from 15,000 – 20,000. This estimate is based on Christmas bird counts (year 2000), and pastoral surveys on Maui and Hawai`i, extrapolated to suitable land base (Engilis, Jr. and K. A. Uyehara, unpublished data). Past estimates of 74,000 birds on the main Hawaiian Islands (Schwartz and Schwartz 1949) and 15,173 on the island of O`ahu (Giffin and Medeiros upubl data) have been reported. Approximately 1,900 birds have been estimated to winter on O`ahu golf courses (Johnson and Johnson 1993). Even at the lower estimate of 15,000 golden-plovers, Hawai`i supports a significant proportion of the Alaskan breeding population (Johnson and Connors 1996). Amerson et al. (1982) estimated 4,500 golden-plovers in American Samoa. Stinson et al. (1997b) estimated 5,000 – 20,000 birds migrating through the Mariana Islands, with only a few thousand over-wintering. Scattered populations occur throughout the remainder of the USPI.

Pacific Golden-Plovers are widespread across the region in any open habitat from beach strands to upland pastures. They prefer the large expanses of grasslands managed for grazing, residential, or even ornamental purposes, and these habitats are most abundant on large islands with established human populations. Golden-plovers are common on golf courses, parks, cemeteries, residential lawns, and grazed pastures. They also occur in good numbers on remote islands and atolls. This species supported a sport-hunting program in the Hawaiian Islands from before the turn of the 19th Century until hunting was banned in 1941 (Schwartz and Schwartz 1949). We are unaware of golden-plovers currently being hunted in the USPI.

Bristle-thighed Curlew. The Bristle-thighed Curlew is the only migratory species whose entire wintering population is restricted to the islands of the Pacific (Hayman et al. 1986; Marks et al. 1990). The Northwestern Hawaiian Islands (NWHI) support roughly 800 birds. This represents 8 percent of the estimated world population of 10,000 birds (Brown et al. 2001; Morrison et al. 2001). Micronesia (not entirely surveyed) supports another 1,200 birds (Marks and Redmond 1994). Further south the Tuamotu Islands are suspected to support the remaining bulk of the birds, with a few birds in the Cook and Marqueses islands (Marks and Redmond 1994, Marks et al. 2002) and low hundreds at Palmyra (B. Flint, USFWS, pers. comm.). In Micronesia, this species is widespread in the Marshall Islands but is only accidental in the eastern Caroline Islands and Mariana Islands. On the wintering grounds, maintenance of habitat and eradication/control of non-native mammals are essential actions required to protect this globally rare species. In addition, monitoring and interdiction are needed to ensure that mammals do not become established on remote islands used by curlews. This species is especially susceptible to human disturbance, and their molt-induced flightlessness on the wintering grounds (unique in shorebirds) makes them especially vulnerable to mammalian predators (Marks and Redmond 1994). Up to 50 percent of the population is flightless during prebasic molt (Marks et al. 1990). This species is identified as a Bird of Conservation Concern by the U.S. Fish and Wildlife Service (USFWS 2002), and is ranked Vulnerable by the IUCN (BirdLife International 2000). The South Pacific Regional Environmental Programme (SPREP) highlights the Bristle-thighed Curlew as a globally threatened species in need of regional action. Work in the USPI should be coordinated with efforts throughout Oceania.

Bristle-thighed Curlew (Numenius tahitiensis). Photo: © Jack Jeffrey

Tuamotu Sandpiper: The lone survivor of an endemic genus of shorebirds, Tuamotu Sandpiper is among the world's rarest birds with a total population of approximately 2,000 birds restricted to a few atolls of the Tuamotu Islands (Hayman et al. 1986, E. VanderWerf pers. comm.). Surveys in 2003 documented two previously unknown populations on Tuamotu atolls (E. VanderWerf pers. comm.), but the overall population size for this species still is perilously small. Although its current range places the Tuamotu Sandpiper outside the scope of this plan, this species is mentioned here because of its greater historical range, including a population (extirpated) on Kiritimati in the Line Islands. To date, there is no evidence that this species occurred at Jarvis or Palmyra (also in the Line Islands) but strategies for its recovery include the identification of suitable, predator-free islands for translocation (BirdLife International 2000). USFWS has been very active over the past two decades removing introduced predators from isolated islands under its management. Eradication of mammalian predators from Jarvis Island recently has been completed, and efforts on Palmyra Atoll are planned. The U.S. should work with SPREP and other international organizations to include USPI in the evaluation of suitable translocation islands for the Tuamotu Sandpiper.

Species of Importance in the Region

Wandering Tattler: The Wandering Tattler is nowhere common but is ubiquitous throughout the USPI. The population is estimated at 10,000 – 25,000 birds (Gill et al. 2002). Predominantly a nearctic breeder, Wandering Tattlers breed in Alaska, northwest Canada, and less than 10 percent in the Russian Far East (Gill et al. 2002). During winter, they are solitary or occur in small groups of two to three birds throughout the Pacific Basin (Gill et al. 2002). The birds migrate and winter along continental coasts on both sides of the Pacific Basin but the main non-breeding area is Oceania, from Hawai`i south (Gill et al. 2002). In 2000, the Hawai`i Christmas Bird Counts yielded 163 birds in just a portion of the available habitat and it is estimated that the Hawaiian Islands support more than 1,000 wintering birds (Engilis, Jr. unpublished data). Amerson et al. (1982) estimated 900 Wandering Tattlers wintering in American Samoa. Hawai`i and American Samoa combined account for 8 – 19 percent of the wintering population. The Wandering Tattler is a regular component of the avifauna in the Central Pacific Islands but is uncommon in the Mariana Islands, being replaced in the western Pacific by the Gray-tailed Tattler (Stinson et al. 1997b). On their wintering grounds in the Pacific, Wandering Tattlers use a broader array of habitats than they do in coastal North America. The species is found on rocky coasts, exposed reefs, sandy beaches, and mudflats (Gill et al. 2002).

Wandering Tattler (Heteroscelus incanus). Photo: © P. LaTourrette

Species of Secondary Importance in the Region

Ruddy Turnstone. The Ruddy Turnstone is a common shorebird throughout the Pacific Islands, yet its wintering numbers in the USPI are small relative to the global population. Band recoveries indicate a linkage between the USPI (Hawai`i and Johnston) and Alaska (Pribilof Islands) but the breeding origins of these birds, captured during migration, are unknown and may include birds from both Siberia and Alaska. (Amerson, 1971, Woodward 1972, Ely and Clapp 1973, Amerson, and Shelton 1976). Remote sandy islands appear to support the largest numbers of turnstones in the USPI. In spite of their small size, the Northwestern Hawaiian Islands harbor relatively large numbers of turnstones. In 2000, 11 Christmas Bird Counts in Hawai`i, yielded 4,035 turnstones; 2,936 of these were at Laysan Island's hypersaline lagoon. (Table 2). From these available surveys, we estimate the wintering population in the Hawaiian Islands at between 5,000 and 7,000 birds. Amerson, et al. (1982) estimated 550 birds wintering in American Samoa. Stinson et al. (1997b) estimated several hundred birds wintering in the Mariana Islands. There are no estimates for other island groups. Similar to tattlers, Ruddy Turnstones use a variety of habitats while on their Pacific Islands wintering grounds, including sandy and rocky beaches, coral reefs, and mudflats. Turnstones are relatively common in pastures up to 7,000 ft (2,100 m) on Maui and Hawai`i (A. Engilis, Jr., pers. obs.).

TABLE 2. Migratory Shorebird Totals from the Hawaiian Island Christmas Counts Conducted in 2000 (Source: NAS 2000, 2001)

Count Name	Pacific Golden-Plover	Sanderling	Ruddy Turnstone	Wandering Tattler	TOTALS
Honolulu, O' ahu	894	40	256	24	1214
North Kona, Hawai'i	25	29	59	19	132
Pu'u Okaka'e, Maui	32	0	0	1	33
I'ao Valley, Maui	218	129	174	13	534
Kualapul'u, Moloka'i	127	10	23	6	166
Waipi'o, O'ahu	227	16	36	17	296
Waimea, Kaua'i	89	5	9	4	107
Kapa'a, Kaua'i	50	0	0	2	52
French Frigate Shoals, Tern Island	65	3	286	3	357
Laysan Island	1033	6	2936	110	4085
Midway, Sand Island	894	40	256	24	1214
TOTALS	3654	278	4035	223	8190

Species of Limited Importance in the Region

Seven species of North American breeding shorebirds were ranked with limited importance because their abundance in the USPI is low relative to wintering regions in North America (or Asia). However, these species are annual migrants to the USPI, albeit in very small numbers, and are thus an important part of the region's avifaunal diversity.

The Sanderling is widespread and locally common throughout the Pacific Islands. In the USPI, the Sanderling is more numerous than tattler and curlew. But the vast majority of Sanderling over-winter in other regions of the globe. Sharp-tailed Sandpiper and Bar-tailed Godwit are found in small numbers across the Pacific Islands, and both are regular fall migrants as they pass through the region to the Southern Hemisphere (Pyle 1997, Stinson et al. 1997b). In the Hawaiian Islands, Sharp-tailed Sandpiper numbers have exceeded 100 birds on occasion in coastal wetlands (*e.g.*, Kealia Pond, Maui) (SIGHTINGS Database). Black-bellied Plover, Semipalmated Plover, Dunlin, Least Sandpiper, Lesser Yellowlegs, and Long-billed Dowitcher are examples of species that occur annually, in Hawai`i, but in very small numbers. In the Mariana Islands, the Whimbrel, Ruddy Turnstone, Wandering Tattler, and Grey-tailed Tattler are common to uncommon. Another four species, all Asian breeders, are regular in very small numbers in the Marianas (10 – 50 birds per year), and are accidental elsewhere in the USPI: Mongolian Plover, Wood Sandpiper, Common Sandpiper, and Red-necked Stint (Refer to Appendix 4 for full listing of species in each region of the USPI).

Importance of the USPI to Asian Shorebird Populations

Although most of the other U. S. regional shorebird plans assess their region's importance based on North American shorebird population estimates, this method is not appropriate for assessment of wintering species in the USPI. A unique aspect of this regional plan is the abundance of over-wintering and migrant Asian shorebirds, particularly in the Western Pacific. These populations are not covered by the U. S. Shorebird Conservation Plan, but they are a significant component of the USPI shorebird community. We have chosen to include Asian breeding species in this plan, although little is known about their status on the breeding grounds or about the extent of their winter ranges. The genera involved occur both in Asia and North America, and the habitat requirements of Asian species are similar to their North American congeners, although we have little knowledge of which populations winter in which islands. Are the Ruddy Turnstones and golden-plovers wintering in the Mariana Islands from one or both continents? Are Sanderlings that over-winter in Hawai`i of North American origin? Where do the Sharp-tailed Sandpipers over-winter that pass through Hawai`i in late summer? The goals of this conservation plan have the potential to influence the conservation of many Holarctic shorebird species, not only those that breed in North America.

Conservation Priorities for the U. S. Pacific Islands

Summarized below are the highest and shared priorities for the USPI. These priorities and those unique to each island group are further detailed in the subregion sections that follow.

Species Objectives

- Document the distribution and accurately assess abundance of wintering and transient shorebirds in the Pacific Islands

- Coordinate with the Alaskan Shorebird Conservation Plan to develop and support population goals for Pacific Golden-Plover, Bristle-thighed Curlew, Ruddy Turnstone, and Wandering Tattler

- Increase population size and distribution of the Hawaiian Stilt to meet the delisting criteria in the Hawaiian Waterbird Recovery Plan (USFWS in prep.)

- Determine trends in wintering populations of shorebird species of primary and secondary importance

- Work with international partners (*e.g.*, SPREP) to evaluate the potential for reestablishing Tuamotu Sandpiper within their historic range

Monitoring Priorities

- Maintain monitoring of the endangered Hawaiian Stilt and examine trends to evaluate progress towards recovery goals

- Develop standardized, statistically rigorous, GIS based protocols to monitor population size and trends of USPI migratory shorebirds with emphasis on Pacific Golden-Plover, Bristle-thighed Curlew, and Wandering Tattler. This will assist in establishing population level objectives for the USPI

- Coordinate monitoring activities with the Program for Regional and International Shorebird Monitoring (PRISM) and Hawai`i biannual waterbird survey

- Monitor for introductions and spread of invasive species *e.g.*, predatory vertebrates, invasive plants

- Monitor response of shorebirds to predator removal programs

- Monitor islands for oil spills, other environmental contaminants, and human generated waste and debris on remote beaches

Research Priorities

- Coordinate with the international community (*e.g.*, SPREP) to document habitat requirements for Tuamotu Sandpipers and evaluate the suitability of USPI to support translocated populations

- Initiate long-term studies of wintering shorebird ecology

- Evaluate the effects of contaminants, including pesticides on shorebirds (*e.g.*, golden-plovers utilizing managed grass lands: golf courses, lawns, pastures, etc.)

- Determine the breeding locations, migration routes, and key wintering/migration stopover sites for Pacific Island migrant curlews, golden-plovers, and tattlers

- Document USPI habitat requirements for priority species

- Assess limiting ecological factors in lagoon systems in relation to wintering shorebird needs

- Investigate the control of invasive plants and animals and develop eradication methods for key species threatening shorebirds and their habitats

Management Priorities

- Develop a balanced approach to managing wetlands to benefit shorebirds and native waterbirds. Coordinate with management goals established for endangered species recovery plans

- Identify, protect, restore, and enhance important habitats for priority shorebird species (*i.e.,* Pacific Golden-Plover, Bristle-thighed Curlew, Wandering Tattler, and Hawaiian Stilt) with a focus on estuarine habitats, wetlands, beaches, lagoons, and uplands where suitable

- Develop best management practices for wetlands and grasslands under agency and private ownership

- Eradicate or control introduced predators at important shorebird sites

- Eradicate or control invasive plant and animal species that degrade wetland habitats

- Prepare plans to minimize the potential for "predator spills" and outline actions so that introductions can be eliminated immediately. Focus on cats, rats, mongooses, treesnakes, but do not exclude others that may pose threats

- Assess the use of easements to protect and enhance shorebird habitats on private lands

- Create suitable habitats, *e.g.*, wetlands, in order to diversify island resources for migrant and resident shorebirds and waterbirds

- Assess suitability of RAMSAR (the Convention on Wetlands) or Western Hemisphere Shorebird Reserve Network (WHSRN) designations and seek nominations for key shorebird habitats in the USPI

Outreach and Education

- Increase public understanding of the process of migration, shorebirds as part of island biota, threats, and the importance of protection and restoration of habitats for migrant shorebirds. Coordinate actions through education departments, non-profit groups, and community based activities

- Create education packets for priority shorebird species and integrate the USPI shorebird community into the Shorebird Sister Schools Program

- Investigate the expansion of monitoring programs established in Hawai`i through Kolea Watch to other island groups. Using Pacific Golden-Plover as a keystone species for education

Implementaion and Coordination

Key to successful implementation of this plan will be coordination at international, national and local scales. Federal agencies such as USFWS, Natural Resource Conservation Service (NRCS), Department of Defense (USDOD), U.S. Environmental Protection Agency (USEPA), National Park Service (NPS), and U.S. Geological Survey (USGS) need to coordinate with local equivalent agencies and non-governmental organizations. In addition, coordination with agencies responsible for the recovery of endangered species in Guam, CNMI, and Hawaiian Islands, or rare species in American Samoa and the Central Pacific, must be employed to ensure that mutually beneficial objectives of this and existing recovery plans can be achieved. Education and outreach should be undertaken at all levels including non-profit organizations and local education departments. The Shorebird Sister Schools Program can play an important role in local, national, and international outreach and education efforts. Key conservation groups working in the region include The Nature Conservancy (TNC), Ducks Unlimited, Inc., (DU), and National Audubon Society (NAS). These groups could coordinate with agencies and local non-governmental organizations to help facilitate the implementation of this plan. Coordination and cooperation with private landowners will be essential for the implementation of this plan throughout the USPI.

Aside from Hawaiian Stilt, all of the other shorebird species of primary importance are migratory and widespread throughout the Pacific, or reside on other islands (Tuamotu Sandpiper) and thus conservation actions must include international efforts. The Asia-Pacific Migratory Waterbird Conservation Strategy and its Shorebird Working Group, and the recently formed Pacific Bird Conservation Working Group, South Pacific Regional Environmental Programme (SPREP), BirdLife International, Wetlands International, and the International Shorebird Network are examples of such efforts in the Pacific Islands.

The USPI host many shorebirds that breed in Alaska and serve as important wintering habitat for three species of primary importance, the Bristle-thighed Curlew, Pacific Golden-Plover, and Wandering Tattler. For this reason, the Alaska and USPI plans should be coordinated to foster cooperative conservation and research efforts in both the breeding and wintering ranges of these species. Specific tasks include research, monitoring, and identifying links between specific populations of shorebirds breeding in Alaska and wintering in the USPI. These two regions should work together to determine the best methods to monitor populations and habitats used throughout the annual cycle.