

United States Shorebird Conservation Plan

MANOMET CENTER FOR CONSERVATION SCIENCES
MANOMET, MASSACHUSETTS 02345

MAY 2001

SECOND EDITION

BY STEPHEN BROWN, CATHERINE HICKEY,
BRIAN HARRINGTON, AND ROBERT GILL, EDITORS

The United States Shorebird Conservation Plan is a partnership effort of state and federal agencies, non-governmental conservation organizations, academic institutions, and individuals from across the country committed to restoring and maintaining stable and self-sustaining populations of shorebirds in the U.S. and throughout the Western Hemisphere.

Cover: Short-billed Dowitchers congregate before fall migration at Cook Inlet, Alaska. Photo by Robert Gill.

Executive Summary

The U.S. Shorebird Conservation Plan is a partnership involving organizations throughout the United States committed to the conservation of shorebirds. This document summarizes all of the major technical reports and recommendations produced by the various working groups that participated in developing the Plan. The organizations and individuals working on the Plan have developed conservation goals for each region of the country, identified critical habitat conservation needs and key research needs, and proposed education and outreach programs to increase awareness of shorebirds and the threats they face. The shorebird partnership created during the development of the Plan will remain active and will work to improve and implement the Plan's recommendations.

Natural landscapes in the United States have been altered significantly, and the wetlands, shoreline habitats, and grasslands used by shorebirds have been particularly disturbed. For many shorebird species, existing information is insufficient to determine how these alterations have affected populations. Many shorebird species face significant threats from habitat loss, human disturbance, and from different forms of habitat degradation such as pollution, prey resource depletion, and increasing threats from predators. Despite ongoing conservation efforts, many shorebird populations are declining, in some cases at alarming rates. Because development pressure will continue, critical conservation actions must be identified, integrated management practices must be developed, and ongoing changes in habitat configuration, quality, and availability must be controlled. Focused conservation action is needed now to protect and restore necessary habitats and address other threats to prevent additional shorebird species from becoming threatened or endangered.

The Plan has three major goals at different scales. At a regional scale, the goal of the Plan is to ensure that adequate quantity and quality of habitat is identified and maintained to support the different shorebirds that breed in, winter in, and migrate through each region. At a national scale, the goal is to stabilize populations of all shorebird species known or suspected of being in decline due to limiting factors occurring within the U.S., while ensuring that common species are also protected from future threats. At a hemispheric scale, the goal is to restore and maintain the populations of all shorebird species in the Western Hemisphere through cooperative international efforts.

The Plan was developed by a wide array of state and federal agencies, non-governmental conservation organizations, and individual researchers throughout the country. Major partners include all 50 States, the U.S. Fish and Wildlife Service, the North American Waterfowl and Wetlands Office, most of the Joint Ventures established through the North American Waterfowl Management Plan, the Bureau of Land Management, the U.S. Geological Survey, the USDA Forest Service, the International Association of Fish and Wildlife Agencies, The Nature Conservancy, National Audubon Society, Ducks Unlimited, the Canadian Wildlife Service, the Western Hemisphere Shorebird Reserve Network, Point Reyes Bird Observatory, and many other regional organizations. Manomet Center for Conservation Sciences initiated the project, obtained the funding to develop the Plan, and hired the coordinators who oversaw all aspects of the project to date as well as publication of these reports.

Three major working groups were formed at a national level. The research and monitoring group developed scientifically sound approaches for tracking populations of shorebirds, identified the critical research questions that must be answered to guide conservation efforts, and determined funding requirements to meet these needs. The habitat management group worked with the regional groups to assemble specific regional habitat management goals into a national program. The education and outreach group focused on development of materials for schools and public education programs to help build awareness of shorebirds and the risks facing them throughout the country, and identified areas where increased funding for education and outreach are needed.

Eleven regional groups were formed during the development of the Plan. The major focus of these groups was to determine what habitats need to be protected and managed to meet the requirements of the shorebirds in each region. Each group set its own regional goals and objectives, and collected information about ongoing management efforts and how they can be improved. In addition, the regional groups provided input to the development of the research and monitoring programs, and helped identify education and outreach needs.

The loss of wetland habitat in the U.S. has motivated federal, state, and private agencies to increase conservation and management of wetlands to preserve the public values of these critical habitats. Wetland management and restoration have developed rapidly in recent years, and the North American Waterfowl Management Plan has stimulated significant increases in funding for wetland conservation activities. There is growing recognition among land managers of the opportunity to integrate management practices beneficial to shorebirds and other waterbirds into current management practices focused predominantly on game species. This changing orientation reflects the rapidly growing number of people who engage in bird watching, wildlife photography, and eco-tourism in addition to traditional activities such as fishing and hunting. This growing constituency brings substantial economic benefits to wetlands and waterfowl areas, and has broadened public support for wetland conservation. We need management practices to focus on entire landscapes, but this requires an unprecedented level of coordination among multiple partners. No single conservation initiative can be effective alone. Wetland conservation for wildlife across entire landscapes requires the coordination of multiple efforts. The Shorebird Conservation Plan represents a significant contribution to the development of landscape-level wildlife conservation, and can contribute significantly to these larger goals as part of a broad partnership for wetland conservation.

The Shorebird Plan is designed to complement the existing landscape-scale conservation efforts of the North American Waterfowl Management Plan, Partners in Flight, and the North American Colonial Waterbird Conservation Plan. Each of these initiatives addresses different groups of birds, but all share many common conservation challenges. One major task is to integrate these efforts to ensure coordinated delivery of bird conservation on the ground in the form of specific habitat management, restoration, and protection programs. The newly developing North American Bird Conservation Initiative addresses conservation needs for all birds in North America, and the Shorebird Plan partnership will work closely with this initiative toward common goals.

Each partner organization involved in the Shorebird Plan will take on implementation roles suited to its focus and skills. The U.S. Shorebird Plan Council, which includes representatives of all partners in the Plan, will coordinate implementation. Major implementation partnerships are being set up with interested Joint Ventures organized under the North American Waterfowl Management Plan and with Partners in Flight. International coordination is also underway between the U.S. Shorebird Plan and the Canadian Shorebird Conservation Plan, which share responsibility for many of the same species at different points in their annual cycles. These partnerships will work to ensure that all of the recommendations provided in this document and the accompanying technical reports are addressed, and to ensure that stable and self-sustaining shorebird populations are maintained into the distant future.

An Agenda for Shorebirds

Developing a Shorebird Conservation Plan for the United States was a daunting task for a variety of biological and political reasons. Each species has different geographic breeding and non-breeding distributions, population size, and dispersion patterns. Shorebirds occur in all 50 states, and use a wide variety of habitat types. In addition, the biology and ecology of most species are poorly understood. Comprehensive planning is made even more difficult by the fact that shorebirds are highly migratory. The Shorebird Plan must take into account all situations where lands of the U.S. play critical roles for populations of shorebirds. Some species breed or winter in the U.S., while others do neither but depend upon key habitats in the U.S. for completing their migrations. Clearly, understanding basic biological characteristics of shorebirds is essential to developing sound conservation plans for their protection. Part 1 of the Plan reviews some of the biological characteristics of shorebirds that play important roles in shaping a conservation plan. To successfully address these complex conservation issues the Plan must:

- include all shorebirds that occur in the United States during breeding, non-breeding, or migration seasons;
- identify those species and populations most in need of focused national conservation efforts;
- identify those species most in need of regional conservation efforts;
- prioritize conservation objectives;
- identify mechanisms for delivery of conservation programs;
- identify mechanisms for tracking success of conservation programs;
- propose programs that can be integrated into a larger, international framework because most of the shorebirds in the United States are international migrants; and
- work within the context of the existing, successful framework of other migratory bird conservation initiatives.



Black-bellied Plovers, shown here at a migration stopover site, readily use both marine and non-marine habitats. Photo by David Twitchell.

Shorebird Biology and Conservation Planning

This section provides background on the group of species known as shorebirds, including their distribution in the U.S., and the major conservation challenges that result from their unusual biology.

Shorebird Distribution in the United States

The term shorebird is applied in North America to a large group of birds commonly called sandpipers and plovers, but also including oystercatchers, avocets, and stilts. There are 214 kinds of shorebirds world-wide, 53 of which regularly occur in the U.S. Three of these species are relatively scarce in the U.S. and breed outside of North America (Curlew Sandpiper, Sharp-tailed Sandpiper, and Ruff), and one (Purple Sandpiper) winters but does not breed in the U.S. The Shorebird Plan primarily addresses the 50 species that regularly breed or occur in the U.S. A list of additional species recorded in the U.S. is included in Appendix 4.

Thirty-seven shorebird species breed in Alaska (29 of these breed only in Alaska and not in the lower 48 states); 25 of the 37 do not breed outside of North America (three of these breed only in Alaska, while the remainder also breed in Canada). Eight species (Whimbrel, Bar-tailed Godwit, Black-bellied Plover, Red Phalarope, Red-necked Phalarope, Red Knot, Sanderling, and Ruddy Turnstone) are circumpolar breeders (Holarctic) and six (Pectoral Sandpiper, Rock Sandpiper, Long-billed Dowitcher, Western Sandpiper, Baird's Sandpiper, and Pacific Golden-Plover) breed in Alaska and eastern Siberia. There are 12 species that breed in the lower 48 but not in Alaska; six of these (Piping Plover, American Avocet, Willet, Long-billed Curlew, American Woodcock, and Wilson's Phalarope) also

breed in Canada, four breed in the U.S. and Mexico (Wilson's Plover, Snowy Plover, American Oystercatcher, and Black-necked Stilt), and one (Mountain Plover) is essentially restricted to breeding only in the U.S. A single species breeds in Hawaii, the endangered Hawaiian Stilt, but a variety of species spend the non-breeding season there.

Shorebird Conservation Challenges

This section reviews the aspects of shorebird biology that result in conservation challenges which must be addressed successfully to protect this diverse group of birds.

Long Distance Migration

Because many shorebirds have extremely long migrations, protection efforts for critical sites must be coordinated over vast distances often involving many different countries. As a group, shorebirds undertake some of the longest-distance migrations of all animals. Pacific Golden-Plovers, Bar-tailed Godwits, and Ruddy Turnstones, for example, routinely travel more than 7,000 miles between Alaskan breeding and Australian non-breeding areas. A few species, including Snowy Plovers from Oklahoma or Rock Sandpipers from Alaska, may migrate just a few hundred miles between breeding and non-breeding habitats. However, many of the most highly migratory shorebirds use a 'long-hop' strategy, meaning that some sections of their journeys will be completed in long, non-stop flights. For example, Bar-tailed Godwits fly more than 7,000 miles across the Pacific to New Zealand without stopping for food, rest, or water. Other species may cover long migration journeys in a series of short flights. Some of the relatively short- and moderate-distance migrants also employ non-stop flights spanning from a few hundred to one or two thousand miles without stops, whereas others may have short-hop migrations.



Red knots, Ruddy Turnstones, Sanderlings, and Semipalmated Sandpipers "refueling" on horseshoe crab eggs, whose energy will be transformed to forward feathered motion to the Canadian Arctic. Photo by David Twitchell.

Shorebirds have a diversity of migration routes. Although each species is different, there are three general patterns in the United States, including: migrations between Alaska and Pacific islands and continents as distant as Australia; migrations along the Pacific coast and western mountain cordilleras of North and South America, some to as far as Tierra del Fuego; and migrations to the Caribbean Basin and northeastern South America, some of which pass through central regions of the lower 48 states, and others of which are more concentrated in Atlantic coastal regions. In general - but with exceptions - the more northern-breeding species of shorebirds have longer migrations, some extending to southernmost South America. Species that breed principally in the lower 48 states generally spend the non-breeding season in the southern U.S. and Mexico, but again, there are exceptions.

Low Reproductive Potential

Shorebirds generally have low rates of reproduction, so it is difficult to reverse past declines and recover populations rapidly. Clutch sizes of almost all species are four or fewer eggs, and very few species will re-nest after a successful first nesting attempt. Predation rates of young can also be high, especially in the Arctic when lemming populations are low and food for predators is scarce, or during years when there is late snow covering breeding habitats. Shorebird populations have proven unable to withstand an improperly regulated hunting harvest. Populations of many species crashed due to excessive market and sport hunting during the late 1800's and early 1900's; some species, such as American Golden-Plover, have never recovered their historic numbers, and Eskimo Curlews may already be extinct. Only two species, the Common Snipe and the American Woodcock are still legally hunted.

Concentration

Another element of shorebird biology that raises conservation challenges is the extraordinary degree to which some species depend upon one or a small number of strategic migration stopover sites; concentration makes them extraordinarily vulnerable to environmental disruption because much of the population is in the same place at the same time. Recognition of this special aspect of shorebird biology, and the need to devise novel conservation strategies, were the major factors driving the creation of the Western Hemisphere Shorebird Reserve Network. Documentation of concentration is costly to develop, but several examples are available. A case study of Red Knots shows that between 50 and 80 percent of the North American population stages at Delaware Bay during the spring. The population evidently depends on this stopover site for completion of northward migration into the Arctic. Survey data suggest that a number of other species also are highly dependent on small numbers of migration stopover sites. For example, during spring, most of the Buff-breasted Sandpipers recorded across the United States were at only 10 sites between the Appalachians and the Rocky Mountains. An example from the Pacific Flyway is the Western Sandpiper, where 2-4 million birds (60-80% of the population) may concentrate at the Copper River Delta in Alaska in any given year. National conservation priorities must consider the patterns of concentration at strategic migration areas in the U.S., identify which species are most at risk, and recommend appropriate regional priorities for protecting and managing strategic migration staging sites.

Dispersed and Ephemeral Habitat

Many shorebirds use habitat types, such as seasonal wetlands, that are widely dispersed across the landscape, and may be available in the same place only once every several years. Several regions within the United States where these habitat types are critical to shorebirds present special problems for efforts to monitor their numbers. The value of habitat for shorebirds in areas such as the Prairie Pothole region of the upper Midwest or the Playa Lakes region tends to be underestimated since wetlands are typically small, dispersed, and numbers of birds using any particular wetland may be small. However, when the complex of wetlands or the region is considered as a whole, numbers of birds using the area may be quite large. Additionally, these pothole wetlands, some managed wetlands, and larger alkali lakes, particularly in the Great Basin, may hold water one year and be dry the next. This causes great variance in the numbers of shorebirds using these wetlands in any particular year. Turnover rates of birds at these sites tend to be rapid. The overall effect on monitoring studies in these areas is that they need to be longer term and cover a wider area than some of the monitoring efforts at sites with predictable water resources (largely coastal) that attract large numbers of shorebirds.

Loss of Habitat

Shorebirds, like all other wildlife, need appropriate habitats to live in, including habitats for breeding, for the non-breeding season, and for migration. In many cases, strikingly different habitats are used in different seasons (e.g., many tundra-breeding species also depend on coastal habitats during migration and non-breeding seasons). Populations of almost all kinds of shorebirds have been affected by loss of essential habitat. For some species, losses of habitat have been severe in migration or non-breeding areas, whereas for others losses have been severe in breeding habitat. Some species have suffered severe habitat loss during two or more seasons.

In general, habitat loss has been very high for temperate-zone breeders, especially coastal-nesting species such as Snowy Plover and Piping Plover. Prairie-breeding shorebirds also have been affected substantially by breeding habitat loss, as prairie pothole habitat has been converted to agricultural uses. On the other hand, populations of some species such as Killdeer and Upland Sandpiper probably have increased due to human activities in some areas. In general, breeding habitat loss has been minimal in boreal- and arctic-breeding shorebirds, but there is growing concern that global warming may change this.

Loss of migration habitat also has been extensive. Coastal development and human activities in coastal zones of the U.S. have grown enormously since European settlement, reducing intertidal habitats and/or prey base used for foraging, and perhaps more importantly, usurping high tide resting areas used by shorebirds when feeding grounds



are inundated. For many kinds of shorebirds, migration stopover areas play a vital role in their ability to accumulate fat reserves, which are then spent to fuel the next leg of migration. Shorebirds unsuccessful in gaining necessary fat apparently have very low survival rates. Even where suitable habitats remain intact, they may be degraded by a wide variety of factors that limit their value for shorebirds, such as increased salinity, toxicants, or disturbance. Because the majority of shorebirds migrate southward throughout the United States during July and August, they frequently are competing with humans for coastal space during the peak of the human summer outdoor recreation season. In other situations, they are directly competing with humans for food and/or habitat resources (e.g., Red Knots and horseshoe crab harvest).

Population Change in Shorebirds

There have been no broad-scale projects designed to identify shorebird population sizes or to monitor changes in shorebird populations of North American species. Nevertheless, large habitat losses and existing data indicate that many shorebird species are likely to be experiencing significant declines. Evaluations of information from projects operated for other purposes are possible, but precision is low. Population changes need to exceed 50% before they are detectable using databases such as the International Shorebird Surveys. Nevertheless, evaluations of existing databases indicate declines in many of the species that have been examined, declines that in some cases have been large and rapid. A 1995 summary showed that more than half of the shorebird species evaluated were declining, while only one species was increasing nationally.

The U.S. Shorebird Conservation Plan provides population estimates based on a synthesis of existing information from the Western Hemisphere. While these numbers are sure to be revised, they provide a solid basis for beginning the shorebird conservation planning and monitoring processes. The Plan proposes monitoring protocols that will increase our ability to detect changes in shorebird populations. The protocols also should increase opportunities for identifying causes of population change, which heretofore have largely been elusive. Finally, improved monitoring will be essential for tracking effectiveness of the Plan itself.

Planning Across International Boundaries

Forty-nine species of shorebirds regularly breed in the United States. Table 1 summarizes their principal non-breeding distribution patterns and Figure 1 shows some of the major migratory pathways. The species that breed in the U.S. spend their non-breeding seasons or migrate through no less than 41 nations (13 in South America, 7 in Central America, 3 in North America, 11 in Oceania, and Australia, New Zealand, Japan, New Guinea, Philippines, China, and Russia). An additional four species from Russia and Canada do not breed in the U.S. but use U.S. lands during non-breeding seasons. Meeting the goals of the U.S. Plan will require cooperative conservation planning and implementation with similar efforts in many other nations. Clearly, what happens to shorebirds in one part of the world may dramatically affect their status in another part.



The Western Hemisphere Shorebird Reserve Network, Partners in Flight, and the North American Waterfowl Management Plan have pioneered the development of international networks for migratory bird conservation. Shorebird planning efforts have benefited from those successful models. The U.S. Shorebird Plan has been developed in close coordination with the Canadian Shorebird Conservation Plan, and also has included input from Mexico and Australia. In this process, we have formed new alliances and have provided impetus for our countries to reconfirm their commitment to migratory bird conservation.

Young shorebirds like this Semipalmated Sandpiper often migrate south on later dates than their parents, and, like other young shorebirds, will frequently use different habitats from adults. Having adequate habitat available when young migrate is an important management and conservation consideration. Photo by Dennis Paulson.



Some North American shorebirds, such as the Wandering Tattler, winter on hundreds of oceanic islands, including dozens of different commonwealths and nations of the Pacific Ocean. Photo by Dennis Paulson.

significant declines. Because appropriate data is often lacking, the classifications produced by this system are considered estimates of the actual conservation status of each species. Further study is needed for most species with respect to most of these variables. The classifications presented here will be revised within one year of the completion of the Shorebird Plan, and at regular intervals as appropriate, and should not be considered final. The specific variables used in the system, and the rules for classifying species, are described in detail in the National Shorebird Conservation Assessment report.

To develop regional species priorities, an additional variable called Area Importance is used to reflect the relative importance of each Planning Region to each species.

Considering area importance at the regional scale ensures that conservation effort will be directed at species that are relatively important in each region. The relative importance of each Planning Region for each shorebird species during the breeding, migration, and wintering seasons is shown in Appendix 2. An additional table showing the relative importance of each NABCI Bird Conservation Region is included in the National Shorebird Conservation Assessment. Area Importance scores are based on knowledge of distributions, expert opinion, and data on distributions for species' where it is available. Because management decisions based on species priorities must often be conducted at appropriate seasons, the scores for these variables are reported using a system that reflects both the relative area importance and the season or seasons during which the area is important, including breeding, wintering, and migration.

Shorebird Prioritization Categories

The prioritization system classifies each species in one of the following categories:

5) Highly Imperiled

All species listed as threatened or endangered nationally, plus all species with significant population declines and either low populations or some other high risk factor.

4) Species of High Concern

Populations of these species are known or thought to be declining, and have some other known or potential threat as well.

3) Species of Moderate Concern

Populations of these species are either: a) declining with moderate threats or distributions; b) stable with known or potential threats and moderate to restricted distributions; c) relatively small; d) relatively restricted; or e) declining but with no other known threats.

2) Species of Low Concern

Populations of these species are either: a) stable with moderate threats and distributions; b) increasing but with known or potential threats and moderate to restricted distributions; or c) of moderate size.

1) Species Not at Risk

All other species where there is apparently no current risk of population decline.

The prioritization scores for each species and subspecies are provided in Appendix 3.



Some species, like this Whimbrel, survived an intense era of market gunning, while similar species like the Eskimo Curlew apparently did not, probably because of the Curlew's more limited distribution and more specific habitat needs. Photo by Elizabeth P. Mallory.

Threats to shorebirds in the region include: loss of habitat to urban, industrial, agricultural, and recreational development, non-native plants (degradation of habitat), non-native animals (predation, disease, competition, etc.), disturbance, and contaminants. Conservation of shorebird habitats in the Pacific Islands is of paramount importance in order to maintain healthy wintering and resident populations. In the Hawaiian Islands, habitats are being restored and managed to support both endemic and migratory species. Wetlands and beach strand habitats are particularly vulnerable on Pacific islands due to the limited acreage of these habitat types. The coastal areas of all main Pacific islands have been impacted by humans for well over 2000 years resulting in a mass extinction of native endemic birds and ground nesting seabirds. Some trends from Hawaii waterbird survey data show that shorebird numbers have declined during the past twenty years.

Islands of the western Pacific support more Asian, 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 equally represented. Unfortunately, there is little published literature on the status, trends, and ecology of migratory shorebirds in this region. Basic concepts such as seasonal status, distribution and abundance, important migration stopover locations, and habitat requirements are often poorly understood.

Monitoring and research needs include better assessment of timing and abundance at key wintering and migration stopover sites; assessment of habitat use and needs at wintering and migration areas; better understanding of the linkages between wintering, stopover, and breeding areas; and refinement of habitat restoration and management techniques (adaptive management strategy) to meet the needs of resident and migratory species.

Intermountain West Flyway

Intermountain West

The Intermountain West (IMW) is a huge region, stretching from Canada to Mexico and from the Rocky Mountains to the Sierras Nevadas and Cascades. The six Bird Conservation Regions, (BCRs) of the IMW include an array of wetland habitats from saline sinks to alpine streams. Eleven species of shorebirds regularly breed in the IMW, and 23 additional species are annual migrants. Two IMW sites (Great Salt Lake, UT, and Lahontan Valley, NV) are recognized by WHSRN as Hemispheric Sites, and two other IMW sites (Mono Lake and Salton Sea, CA) are classified as International Sites. A number of additional IMW sites surpass WHSRN International site requirements, including Lake Abert and Summer Lake, OR.

The IMW region is North America's most important area for breeding Snowy Plover, American Avocet, Black-necked Stilt, and Long-billed Curlew. Up to 90% of the world's adult Wilson's Phalaropes molt/stage in the IMW's hypersaline lakes prior to migrating to South America. The IMW also hosts very large numbers of migrant Red-necked Phalarope, Long-billed Dowitcher, Western Sandpiper, and Marbled Godwit. The region, too, is the nation's most important for wintering Mountain Plover.

The Great Basin, one of the six BCRs in the IMW, stands out as enormously important for both breeding and migrant shorebirds. Of particular importance are the large hypersaline lakes, e.g. Great Salt Lake, UT; Lake Abert, OR; and Mono Lake, CA, and the salt lake/playa associated marshes of Utah, Oregon and Nevada.

The most important issue facing shorebird conservation in the IMW is the enormous human-driven competition for water. Finding ample, high quality fresh water will be the greatest challenge faced by future shorebird conservation interests. The IMW Plan addresses this and other issues through five goals and associated objectives and strategies.

- These goals are: 1) *Habitat Management*. The regional group will work to maintain and enhance diverse landscapes that sustain thriving shorebird populations by working to protect, restore, and manage shorebird habitat.
- 2) *Monitoring and Assessment*. The group will work to acquire information on shorebird distribution and abundance needed for shorebird conservation by developing monitoring and assessment programs responsive to local, regional, and national needs.
- 3) *Research*. In addition, new information will be collected to facilitate



shorebird conservation. This information will deal with the ecology of salt lakes and playas, major shorebird predators, and shorebird species of special conservation concern. 4) *Outreach*. The group will develop an informed and supportive constituency for long-term shorebird conservation through implementation of region-wide outreach programs. 5) *Planning*. We will achieve regional cooperation for shorebird conservation by developing a process to facilitate planning among states and agencies, and working toward integration of shorebird concerns with land management plans.

Perhaps a million shorebirds breed in the IMW, and millions of additional shorebirds migrate annually through the area. No inland region of North America is more important to maintenance of the continent's shorebird populations than the IMW. The hiring of a full time shorebird biologist/coordinator to work with the IMW shorebird group, and the IMW Joint Venture in implementing the IMW Shorebird Plan is the region's most urgent priority.

Central Flyway

Northern Plains/Prairie Potholes

The Northern Plains/Prairie Pothole Region (NP/PPR) encompasses two Bird Conservation Regions, the Prairie Potholes and the Badlands and Prairies, and all or parts of seven states, including eastern Montana, northeastern Wyoming, North Dakota, South Dakota, western Minnesota, north-central Iowa, and northeastern Nebraska. The landscape is characterized by rolling hills of prairie grasses, millions of depressional wetlands ranging in size from shallow temporary or seasonal wetlands to deeper semi-permanent wetlands, and agriculture.



To many people all five species of small sandpipers—collectively known as peeps—look alike. The two kinds shown here are Semipalmated (speckled upper breast, grayish backs) and Least sandpipers ('bibbed' upper breast, browner backs). Photo by Western Hemisphere Shorebird Reserve Network.

Thirteen species of shorebirds breed within the NP/PPR and require a landscape of grassland and wetland habitats for nesting and brood rearing. One of the major migration routes for western hemispheric shorebirds, especially long-distance migrants, traverses the Northern Plains/Prairie Pothole Region. Because long-distance migrations are energetically expensive, the availability of abundant habitat and food resources at migration stopovers within the NP/PPR is critical. Shorebirds use a wide range of habitat types within the NP/PPR, including dry grasslands, sand and gravel beaches, natural freshwater and alkaline wetlands, lake margins, and shallowly-flooded agricultural fields. During migration the unvegetated shallow waters and moist mudflats of freshwater or alkaline wetlands are

especially important. Dramatic fluctuations in water levels are commonplace in the NP/PPR, and shallow water and mudflat habitats are highly unpredictable in space and time. Due to the dynamic nature of wetlands in this region, shorebird habitat use is opportunistic and dispersed across the changing landscape.

Three major shorebird issues have been identified for the NP/PPR. These are: 1) endangered and threatened species, declining species, and species of special concern; 2) habitat loss, including fragmentation and degradation; and 3) the need for additional information to evaluate potential threats, such as contaminants, predation, and invasion of exotic plants, to migrating and breeding shorebirds.

Regional goals are: 1) to maintain biotic integrity and persistence of breeding shorebird populations in the NP/PPR; 2) to ensure that adequate stopover resources exist to support populations of migrating shorebirds; 3) to identify and fill information gaps, including the development of tools to use within the context of dynamic ecosystem processes; and 4) to coordinate with other conservation efforts in a cross-border landscape. A series of habitat goals and objectives and research goals aligning with the regional goals have been delineated.

Appendix 3. National Shorebird Prioritization Scores

| SPECIES | PT | RA | TB | TN | BD | ND | CONSERVATION CATEGORY |
|-------------------------|----|----|----|----|----|----|--------------------------|
| Black-bellied Plover | 5 | 3 | 2 | 2 | 2 | 1 | 1 |
| American Golden-Plover | 5 | 3 | 2 | 4 | 2 | 3 | 2 |
| Pacific Golden-Plover | 3 | 5 | 2 | 2 | 5 | 4 | 4 |
| Snowy Plover | 5 | 5 | 4 | 4 | 3 | 4 | 2 |
| Wilson's Plover | 3 | 5 | 4 | 4 | 4 | 3 | 4 |
| Semipalmated Plover | 3 | 3 | 2 | 2 | 1 | 1 | 1 |
| Piping Plover | 5 | 5 | 5 | 4 | 5 | 4 | 5 |
| Killdeer | 5 | 1 | 3 | 3 | 1 | 2 | 1 |
| Mountain Plover | 5 | 5 | 4 | 4 | 5 | 4 | 5 |
| American Oystercatcher | 3 | 5 | 4 | 4 | 3 | 4 | 4 |
| Black Oystercatcher | 3 | 5 | 4 | 3 | 3 | 4 | 4 |
| Black-necked Stilt | 3 | 3 | 3 | 2 | 1 | 2 | 2 |
| American Avocet | 3 | 2 | 3 | 4 | 2 | 3 | 3 |
| Greater Yellowlegs | 3 | 4 | 2 | 2 | 2 | 1 | 3 |
| Lesser Yellowlegs | 5 | 2 | 2 | 3 | 2 | 1 | 3 |
| Solitary Sandpiper | 3 | 4 | 4 | 2 | 3 | 2 | 4 |
| Willet | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Wandering Tattler | 3 | 5 | 2 | 2 | 3 | 2 | 3 |
| Spotted Sandpiper | 3 | 3 | 2 | 2 | 1 | 1 | 2 |
| Upland Sandpiper | 5 | 2 | 2 | 4 | 2 | 3 | 4 |
| Eskimo Curlew | 5 | 5 | 3 | 4 | 5 | 5 | 5 |
| Whimbrel | 5 | 4 | 2 | 2 | 3 | 2 | 4 |
| Bristle-thighed Curlew | 3 | 5 | 2 | 4 | 5 | 3 | 4 |
| Long-billed Curlew | 5 | 5 | 4 | 4 | 3 | 3 | 5 |
| Hudsonian Godwit | 3 | 4 | 3 | 4 | 4 | 4 | 4 |
| Bar-tailed Godwit | 3 | 4 | 2 | 4 | 4 | 3 | 4 |
| Marbled Godwit | 4 | 3 | 4 | 4 | 3 | 3 | 4 |
| Ruddy Turnstone | 4 | 3 | 2 | 4 | 2 | 2 | 4 |
| Black Turnstone | 3 | 4 | 4 | 4 | 5 | 3 | 4 |
| Surfbird | 4 | 4 | 2 | 4 | 4 | 3 | 4 |
| Red Knot | 5 | 2 | 2 | 4 | 3 | 3 | 4 |
| Sanderling | 5 | 2 | 2 | 4 | 2 | 1 | 4 |
| Semipalmated Sandpiper | 5 | 1 | 2 | 3 | 3 | 3 | 3 |
| Western Sandpiper | 5 | 1 | 2 | 4 | 4 | 2 | 4 |
| Least Sandpiper | 5 | 2 | 2 | 2 | 2 | 2 | 3 |
| White-rumped Sandpiper | 3 | 2 | 2 | 2 | 3 | 3 | 2 |
| Baird's Sandpiper | 3 | 2 | 2 | 2 | 3 | 3 | 2 |
| Pectoral Sandpiper | 3 | 2 | 2 | 3 | 2 | 3 | 2 |
| Purple Sandpiper | 2 | 5 | 2 | 3 | 3 | 3 | 2 |
| Rock Sandpiper | 3 | 3 | 3 | 4 | 5 | 4 | 3 |
| Dunlin | 5 | 2 | 2 | 3 | 2 | 3 | 3 |
| Stilt Sandpiper | 3 | 3 | 3 | 4 | 3 | 3 | 3 |
| Buff-breasted Sandpiper | 4 | 5 | 3 | 4 | 3 | 4 | 4 |
| Short-billed Dowitcher | 5 | 2 | 2 | 4 | 3 | 2 | 4 |



Appendix 3. National Shorebird Prioritization Scores, con't.

| SPECIES | PT | RA | TB | TN | BD | ND | CONSERVATION CATEGORY |
|-----------------------|----|----|----|----|----|----|-----------------------|
| Long-billed Dowitcher | 2 | 2 | 2 | 3 | 4 | 3 | 2 |
| Common Snipe | 5 | 1 | 3 | 2 | 1 | 2 | |
| American Woodcock | 5 | 1 | 4 | 4 | 2 | 3 | 4 |
| Wilson's Phalarope | 5 | 1 | 3 | 4 | 2 | 5 | |
| Red-necked Phalarope | 4 | 1 | 2 | 3 | 2 | 1 | 3 |
| Red Phalarope | 5 | 1 | 2 | 3 | 2 | 1 | |

| SPECIES with SUBSPECIES SCORE | PT | RA | TB | TN | BD | ND | CONSERVATION CATEGORY |
|---|-------|----|----|----|----|----|-----------------------|
| Black-bellied Plover | 5 | 3 | 2 | 2 | 2 | 1 | 3 |
| <i>Pluvialis squatarola squatarola</i> | 5 | 4 | 2 | 2 | 3 | 4 | |
| <i>P.s. cynosurae</i> | U (3) | 3 | 2 | 4 | 4 | 2 | 3 |
| Snowy Plover | 5 | 5 | 4 | 4 | 3 | 4 | |
| <i>Charadrius alexandrinus nivosus</i> (Pacific Coast) | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| <i>C.a. nivosus</i> | 4 | 5 | 4 | 4 | 3 | 3 | |
| <i>C.a. tenuirostris</i> | 5 | 5 | 4 | 4 | 5 | 5 | 5 |
| Piping Plover | 5 | 5 | 5 | 4 | 4 | 4 | |
| <i>Charadrius melodus melodus</i> | 5 | 5 | 5 | 4 | 5 | 4 | 5 |
| <i>C.m. circumcinctus?</i> (Great Lakes) | 5 | 5 | 5 | 4 | 5 | 5 | |
| <i>C.m. circumcinctus</i> (Great Plains) | 5 | 5 | 5 | 4 | 4 | 4 | 5 |
| Black-necked Stilt | 3 | 3 | 3 | 2 | 1 | 2 | |
| <i>Himantopus mexicanus</i> | 3 | 4 | 4 | 3 | 2 | 2 | 3 |
| <i>H.m. knudseni</i> | 3 | 5 | 5 | 5 | 5 | 5 | |
| Solitary Sandpiper | 3 | 5 | 2 | 2 | 3 | 2 | 3 |
| <i>Tringa solitaria solitaria</i> | U (3) | 5 | 2 | 2 | 2 | 1 | |
| <i>T.s. cinnamomea</i> | U (3) | 5 | 2 | 2 | 3 | 2 | 3 |
| Willet | 3 | 3 | 3 | 3 | 3 | 3 | |
| <i>Catoptrophorus semipalmatus semipalmatus</i> | 3 | 4 | 3 | 3 | 4 | 2 | 3 |
| <i>C.s. inornatus</i> | U (3) | 3 | 4 | 3 | 3 | 2 | |
| Whimbrel | 5 | 4 | 2 | 2 | 3 | 2 | 4 |
| <i>Numenius phaeopus hudsonicus</i> | 5 | 5 | 2 | 3 | 4 | 3 | |
| <i>N.p. rufiventris</i> | U (3) | 4 | 2 | 3 | 3 | 3 | 3 |
| Hudsonian Godwit | 3 | 4 | 3 | 4 | 4 | 4 | |
| <i>Limosa haemastica</i> (Alaska) | U (3) | 5 | 2 | 4 | 5 | 5 | 4 |
| <i>Limosa haemastica</i> (Hudson Bay) | 3 | 4 | 3 | 4 | 5 | 5 | |
| Marbled Godwit | 4 | 3 | 4 | 4 | 3 | 3 | 4 |
| <i>Limosa fedoa fedoa</i> (Great Plains) | 4 | 3 | 4 | 4 | 3 | 3 | |
| <i>L.f. fedoa</i> (Hudson Bay) | 4 | 5 | 3 | 3 | 5 | 3 | 4 |
| <i>L.f. beringiae</i> | 3 | 5 | 2 | 4 | 5 | 4 | |
| Ruddy Turnstone | 4 | 3 | 2 | 4 | 2 | 2 | 4 |
| <i>Arenaria interpres interpres</i> (Alaska) | U (3) | 5 | 2 | 4 | 4 | 1 | |
| <i>A.i. interpres</i> (Canada to Europe) | U (3) | 4 | 2 | 2 | 2 | 2 | 3 |
| <i>A.i. morinella</i> | 4 | 3 | 2 | 4 | 4 | 2 | |

Appendix 3. National Shorebird Prioritization Scores, con't.

| SPECIES with SUBSPECIES SCORES | PT | RA | TB | TN | BD | ND | CONSERVATION CATEGORY |
|--|------|----|----|----|----|----|-----------------------|
| Red Knot | 5 | 2 | 2 | 4 | 3 | 3 | 4 |
| <i>Calidris canutus rufa</i> | 5 | 3 | 2 | 4 | 4 | 2 | |
| <i>C. c. islandica</i> | U(3) | 4 | 2 | 4 | 4 | 3 | 3 |
| <i>C. c. rosellarri</i> | U(3) | 3 | 2 | 4 | 4 | 3 | |
| Purple Sandpiper | 2 | 5 | 2 | 3 | 3 | 3 | 2 |
| <i>Calidris maritima maritima</i> | U(3) | 5 | 2 | 2 | 4 | 3 | 4 |
| <i>C. m. belcheri</i> | 3 | 5 | 2 | 2 | 4 | 4 | |
| Rock Sandpiper | 3 | 3 | 3 | 4 | 5 | 4 | 3 |
| <i>Calidris ptilocnemis tschuktschorum</i> | 3 | 4 | 3 | 3 | 5 | 4 | |
| <i>C. p. ptilocnemis</i> | 4 | 5 | 4 | 5 | 5 | 5 | 4 |
| <i>C. p. cousei</i> | 3 | 4 | 3 | 3 | 5 | 4 | |
| Dunlin | 5 | 2 | 2 | 3 | 2 | 3 | 3 |
| <i>Calidris alpina pacifica</i> | 4 | 2 | 2 | 4 | 4 | 3 | |
| <i>C. a. arctica</i> | 5 | 4 | 2 | 5 | 5 | 3 | 5 |
| <i>C. a. hudsonia</i> | 4 | 3 | 2 | 3 | 3 | 3 | |
| Short-billed Dowitcher | 5 | 2 | 2 | 3 | 3 | 2 | 3 |
| <i>Limnodromus griseus griseus</i> | 5 | 4 | 2 | 3 | 4 | 3 | |
| <i>L. g. hendersoni</i> | 4 | 4 | 2 | 3 | 3 | 3 | 4 |
| <i>L. g. caurinus</i> | U(3) | 3 | 2 | 4 | 4 | 3 | |

NOTES:

- PT** Population Trend
RA Relative Abundance
TB Threats during the Breeding Season
TN Threats during the Non-breeding Season
BD Breeding Distribution
ND Non-breeding Distribution

CONSERVATION CATEGORIES:

- Category 5** Highly Imperiled
Category 4 Species of High Concern
Category 3 Species of Moderate Concern
Category 2 Species of Low Concern
Category 1 Species Not at Risk

Conservation categories are explained in the text. Conservation scores will be revised as new information becomes available. Updated information will be posted at the U.S. Shorebird Conservation Plan website at: <http://www.manomet.org/USSCP/files.htm>