

## Part 5: Regional Shorebird Conservation Goals and Strategies

### Overview

The eleven regional working groups formed in this planning process are the core of the U.S. Shorebird Conservation Plan. Other parts of this document assess the status of shorebird species in North America, set population targets, and propose methods for effectively monitoring changes in population size. These are extremely important endeavors, but the ultimate responsibility for ensuring that shorebirds breeding in, wintering in, or migrating through the U.S. have adequate quality, quantity, and distribution of habitat falls on the organizations working in each region of the country. This is no simple undertaking. But individuals and organizations from across the country have pooled their expertise and resources to collectively rise to the occasion. Individuals involved in the regional planning process range from lifetime shorebird conservation advocates and scientists to those with a newly growing interest and responsibility for shorebird habitat provision. Whatever the motivation, everyone involved brought an important perspective to the table.



Red Knots in the sunset. Photo by David Twitchell.

Each region is unique in its make-up of habitat types, management issues, and collection of individuals and agencies involved in wildlife research and management. These differences are reflected in the compositions of the regional groups, in the processes of regional goal development and in the strategies for shorebird conservation that they have generated. Below are executive summaries from the regional groups' efforts. Note that no regional plan was developed for the Appalachian region, where the mountainous terrain results in very small populations of shorebirds. The regional summaries each give a general description of pressing habitat management issues, list species of primary importance, and outline each group's broad goals and future direction. As with all of the

other documents associated with this Plan, specific reports should be consulted for more detail. The main components of each full regional report include: 1) a description of the region, including geographic boundaries, major habitat types and management issues of highest concern; 2) a summary of species occurrences and regional species priorities; 3) habitat goals, objectives, and management needs; 4) management coordination and monitoring needs; 5) critical research goals; and 6) education and outreach objectives. The reports vary in the level of detail included for each of the above components and some include additional information, such as specific funding needs and very specific habitat management recommendations.

Each regional group has identified important next steps and considered ways to formalize their group's structure, composition, and integration with other bird conservation initiatives. Most of the regions envision maintenance of a core shorebird working group with regular meetings and clear responsibilities for further planning and implementation of regional goals. Many groups feel strongly that coordination and effective implementation of report goals will be facilitated greatly by a designated position for these responsibilities. The organization responsible for the position will depend on resources and interest in each region. Also, most of the regional groups embrace the need to integrate achievement of their goals with those of other bird conservation initiatives. This makes sense from a very practical stand point and most groups recognize the clear advantages of working within existing frameworks established for on-the-ground habitat conservation. Different models have been proposed to formalize the

relationship between the regional shorebird working groups and Joint Ventures of the North American Waterfowl Management Plan. The relationships have begun to be established to date by the generous involvement of Joint Venture Coordinators in the shorebird planning process and by the more formal inclusion of shorebird representatives on many of the Joint Venture management boards and technical committees.

## *Pacific-Asiatic Flyway*

### *Alaska*

Because of its size and northerly position, Alaska provides breeding habitat for more shorebird species than any other state in the U.S. Seventy-one species of shorebirds have occurred in Alaska; 37 of them, including several unique Beringian species and Old World subspecies, regularly breed in the region. Most of these species migrate south of the U.S.-Mexico border and a third migrate to South America or Oceania. Concentrations of shorebirds at several coastal staging and migratory stopover sites exceed one million birds; on the Copper River Delta alone, five to eight million shorebirds stop to forage and rest each spring.

Using the species prioritization process developed for the U.S. Shorebird Plan, 14 taxa were identified as species of high concern in Alaska. All species of concern tend to have small global population sizes and/or limited breeding distributions. Seasonal occurrence of priority species was examined within the geographic context of Alaska's six Bird Conservation Regions, (BCRs). Most priority species, particularly breeding species, occur in the Western Alaska BCR. Southern regions (Cook Inlet and the Northern Pacific Rainforest BCRs) are primarily used by shorebirds during migration and winter. The Aleutian/Bering Sea Islands BCR is also an important wintering area for shorebirds.

Alaska's overall size and the size of its BCRs dictate that conservation considerations for shorebirds generally be framed within a landscape context. Except for the Arctic Plains/Mountains and Cook Inlet, where habitat for breeding shorebirds is being lost, most other shorebird habitats in Alaska remain relatively intact. The main threats to shorebirds in Alaska come from drilling, transport, and refining of oil and natural gas, especially in the Cook Inlet, Northern Pacific Rainforest, and Arctic Plains/Mountains BCRs.

It is unlikely that at anytime in the near future habitat will be deliberately manipulated to manage shorebirds in Alaska as it is elsewhere in the U.S. and Canada. Thus, an overall conservation goal for shorebirds in Alaska is to keep species and their habitats well distributed across not only the Alaska landscape, but also regions used by these same populations during other phases of their annual cycles. This will be achieved through a subset of goals and objectives specific to several major components of the Alaska Shorebird Conservation Plan that focus on population and habitat, research, and education/outreach. Specific actions for each component will be formulated during the first year following adoption of the plan. Biological elements of the plan will be based on well-designed, cost-effective, and well-coordinated efforts.

### *Northern Pacific*

The purpose of the Northern Pacific Region (NPR) management Plan is to address shorebird management needs on a regional basis while considering Pacific Flyway and national levels of need. Within the NPR, the important shorebird habitats are coastal estuaries and beaches, rocky shorelines, open ocean/bay areas, and freshwater systems (natural and managed wetlands, flooded agricultural areas, and riverine systems). The group identified numerous sites across these habitat types within the region that supported at least 1,000 birds at a time. Many of the coastal estuaries within the region, such as Grays Harbor, Willapa Bay, and the Columbia River estuary, support large numbers of shorebirds during migration (i.e., >100,000 birds). Other locations, such as the Willamette Valley, are a mixture of wetlands and agricultural lands that, overall, support a wide diversity of species and large numbers of individuals.



Of the 50 shorebird species breeding within the United States, 40 occur regularly within the NPR, although several species occur in very low abundance. All species were given regional prioritization scores based on abundance in the region, potential threats and several other important variables. Only one species, the Snowy Plover, was considered to be highly imperiled at the regional scale. Nineteen species were identified regionally as species of high concern (e.g., Black Oystercatcher, Common Snipe, Dunlin, Greater Yellowlegs, and Sanderling) and the remaining species were considered as moderate concern, low concern, or no risk.

The primary NPR goals are to: 1) stabilize and maintain current levels of breeding, wintering, and migrating populations of shorebirds within the region/flyway; and 2) measurably increase populations, over the next 10 years, of species affected by current or recent declines at population or flyway levels. In support of these broad population goals, specific goals were also developed for monitoring, management, habitat protection, research, and outreach. Specific strategies to meet each of these goals were developed.

Key features of the monitoring strategy include development and implementation of a flyway-wide survey to monitor shorebird species across four primary habitat strata (estuarine, rocky shoreline, pelagic, and freshwater). Research and monitoring recommendations cover a broad spectrum and include: 1) examination of shorebird response to introduced species and their control; 2) effects on shorebirds of various contaminants; 3) assessment of spatial and temporal aspects of shorebird habitat use; 4) in-depth studies of the life history of species of concern; and 5) evaluation of shorebird response to integrated waterbird management efforts and other enhancement or restoration efforts. Outreach strategies were developed to improve communication among public and private land managers regarding shorebird needs, to facilitate effective Plan implementation at the regional scale, and to support public enjoyment of shorebirds.

The loss of wetland habitat is a primary concern for shorebird conservation in the region. To meet critical habitat goals, the regional group focused on protection, restoration, and enhancement activities, recognizing the importance of the Pacific Coast Joint Venture (PCJV). The PCJV has identified and facilitated acquisition of many sites known to be important for shorebirds. The NPR Working Group will continue to work with the PCJV to implement habitat strategies, including identification and protection of additional important sites and implementation of restoration/enhancement activities. Restoration and protection would focus on three of the broad habitat types: rocky shoreline, estuarine, and freshwater. Restoration and protection activities include the protection of nesting areas for Black Oystercatchers on rocky shorelines, restoration of tidal regimes to diked wetlands in estuaries, water level and moist soil management in freshwater environments lost to agriculture and development, and removing exotic species and planting native vegetation in both estuarine and freshwater areas. Numerous sites from throughout the region were identified for implementation of these protection and restoration activities.



*Black Turnstones breed only in a narrow coastal zone of western Alaska. Individuals typically return to the same locations each year. One male with colored bands was tracked for 5 years using the same 5-mile section of California beach each winter, and nesting in the same hectare in the Alaskan breeding zone. Photo by Tim Bowman.*

### **Southern Pacific**

Shorebird habitat in the Southern Pacific Region is concentrated along the coast and in the Central Valley of California. Tidal flats, tidal marshes, salt ponds, seasonal wetlands, beaches, and rocky shoreline are the principal shorebird habitats on the coast. In the Central Valley managed wetlands, flooded agricultural lands, hypersaline agricultural evaporation ponds, municipal sewage ponds, and vernal pool rangeland are the main habitats.

The region is used by millions of shorebirds annually, with internationally or nationally significant numbers of many species (e.g., Western Sandpiper, Snowy Plover and Mountain Plover).

Extensive habitat alteration has occurred over the past two centuries, resulting in the loss of over 90% of the region's historic wetlands. Urban development is likely to cause further habitat loss, especially in the Central Valley. Changes in cropping patterns may reduce the value of agricultural land to shorebirds and urbanization may reduce the water supply available for wetlands and agriculture. In many places, habitat quality has been reduced due to altered hydrology, increased sedimentation, and contamination. Mosquito abatement programs, oyster culture practices, salt pond management, and many other human land use activities may also affect shorebird management and conservation.

Interactions with other species are a further concern. The spread of exotic plants has reduced the extent of shorebird habitat. The introduction of non-native invertebrates into coastal wetlands has unpredictable effects on the shorebird food base. Introduced mammalian predators and expanding populations of native predators have caused decreases in shorebird breeding success.

Shorebird conservation in the Southern Pacific Region will require substantial effort just to maintain current populations. Nonetheless, regional priorities must include increasing populations of breeding species such as Snowy Plover, Killdeer, Black Oystercatcher, Black-necked Stilt, and American Avocet. Migratory and wintering populations of all key shorebird species in the region should be increased through habitat protection, management and restoration.

Critical management activities should be conducted in each habitat type, including increasing the area and quality of tidal wetlands along the coast and managed wetlands in the Central Valley, protecting coastal wetlands from development, limiting disturbance on coastal beaches and promoting the management and conservation of agricultural lands for shorebirds. Specific topics where research would facilitate effective shorebird conservation include improving our understanding of the extent and reasons for shorebird movements at large spatial scales, the factors that limit populations of species for which the region is especially important, and the effects of human disturbance. Focus also should be put on experimentation with management of human-built habitats such as salt ponds and rice fields. A framework for monitoring local and regional shorebird populations and their habitats and predators needs to be provided and new programs to educate the public about shorebird conservation need to be developed.

A working group should be formed to guide implementation of the U.S. Shorebird Conservation Plan in the Southern Pacific Region. The working group's efforts should be coordinated through the Joint Ventures currently active in the region. In addition, a coordinator should be hired to oversee Plan implementation, especially along the southern California coast, where currently there is no active Joint Venture.

### *Hawaii and the Pacific Islands*

Because of the vast geography, isolation, and small land base, the U.S. Pacific Islands are often overlooked as habitat for shorebirds. The region stretches 5,000 miles from east to west across the Pacific Ocean and 3,000 miles from north to south, including: the Hawaiian Islands; Guam and the Northern Marianas Islands; Wake Is.; Johnston Is.; Baker and Howland Islands (in the Phoenix Islands); Jarvis, Kingman and Palmyra Islands (in the Line Islands); and the islands of American Samoa. A full regional plan is in development and should be completed by 2001.

The Pacific Islands are of critical importance for two species of arctic breeders, Bristle-thighed Curlew and Pacific Golden-Plover. The majority of both species' populations winter in the Pacific Islands, several of which are critical to the maintenance of these birds. The Islands are also of importance for several other migratory species including, in order of abundance: Ruddy Turnstone, Wandering Tattler, Gray-tailed Tattler, and Sanderling. All of these species are common in winter and widespread across the Pacific. Other species occur in lower numbers, but are regular winter visitors. These include Black-bellied Plover, Long-billed Dowitcher, Dunlin, Pectoral and Sharp-tailed sandpipers, and Lesser Yellowlegs. The U.S. Pacific Islands are also home to one endemic shorebird, the endangered Hawaiian Stilt or Ae'o (*Himantopus mexicanus knudseni*).

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, grayer 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.

Managing for shorebirds in the NP/PPR is challenging because of the dynamic nature of wetland conditions in time and space and because of the need to provide diverse wetland habitats for waterfowl and other wetland-dependent birds. An identified management and monitoring need is to enhance the landscape perspective of shorebird use of the plains, to acquire critical information on when and where 'ecological hurdles' may exist, such as the lack of suitable stopover habitat across large regions, and to create avenues for focused, coordinated management activities. To fill this need, an internet-based regional communication network apprising land managers and biologists of habitat availability and generalized shorebird movements within the U.S. interior is proposed.

### *Central Plains/Playa Lakes*

Forty species of migrating shorebirds forage and rest within the interior of North America to replenish diminished fat reserves necessary to complete migration and enhance reproductive success when arriving on the breeding grounds. Thirteen of those species breed within the area. The interior is also a migrating, breeding, and wintering site for the federally listed endangered Piping Plover.

The Central Plains/Playa Lakes Region extends from Texas (excluding the coast) through eastern New Mexico and Colorado, western Oklahoma, Kansas, Nebraska and the south-eastern corner of Wyoming. Shorebird habitat types within the region include ephemeral wetlands such as playa lakes, semi-permanent wetlands, seasonally flooded wetlands (moist-soil type habitats), mud and alkali flats, wet meadows, short-grass prairie, agriculture fields, reservoirs, rivers, and a myriad of other water sources such as ditches and farm ponds.

Shorebirds of primary concern in the region include Piping Plover, Mountain Plover, Snowy Plover, American Golden-Plover, Long-billed Curlew, Upland Sandpiper, and Buff-breasted Sandpiper. Many of these species rely upon regional grassland and upland habitat. The region also is important to several species that depend heavily upon the Central Plains due to specialized migratory routes or other life history requirements, including White-rumped Sandpipers, Baird's Sandpipers, and Pectoral Sandpipers.

There are three Western Hemisphere Shorebird Reserve Network Sites in the region, Cheyenne Bottoms Wildlife Management Area and Quivira National Wildlife Refuge in south-central Kansas and the Salt Plains National Wildlife Refuge in north-central Oklahoma. In addition to these and other key migratory stopover sites in the region, shorebirds rely heavily upon chains of small wetlands that dot the landscape. Collectively, the sites in the region support a large percentage of the hemisphere's long-distance migrants, such as Stilt Sandpipers and White-rumped Sandpipers. These mosaics of ephemeral wetlands are critical to shorebird survival but are extremely dynamic and unpredictable, making management, monitoring and planning efforts very challenging. The hydrology of most of the wetlands within the region has been negatively altered by wetland drainage, agriculture practices, and urbanization.

Major shorebird issues in the region include the lack of baseline shorebird data and the lack of monitoring of federally and state listed species such as Piping Plover and Snowy Plover as well as other nesting species. Additionally, privately owned land is a major component (>85%) of the land base in this region. Shorebird conservation cannot be achieved with just the habitats set aside for wildlife purposes.

Many of the major challenges in conserving shorebirds in the Central Plains revolve around the complicated issues of the draining of aquifers and lowering of water tables due to over-pumping and water development projects. Other challenges include unpredictable rainfall, water quality, increased salinization of wetlands, and lack of funding to support shorebird habitat management activities. Recommended management efforts include securing and maintaining water rights; managing water levels to benefit invertebrates and to create dynamic hydroperiods; controlling the encroachment of undesired plant species; and meeting other waterbird habitat needs.



The Central Plains/Playa Lakes region can best contribute to hemispheric populations of shorebirds by concentrating on identifying, restoring, and protecting key shorebird staging and breeding areas in the region, improving the quality of habitat presently managed for shorebirds, maintaining an appropriate configuration of wetland and grassland habitats, working with private landowners to create a network of habitat, protecting water quality and availability, increasing and improving monitoring of shorebirds and shorebird habitat, and increasing the awareness and understanding of grasslands and wetlands within the region and their importance to shorebird populations. The cooperation of the Playa Lakes and Rainwater Basin Joint Ventures is essential to achieving these goals.

## Mississippi Flyway

### Upper Mississippi Valley/Great Lakes

The Upper Mississippi Valley/Great Lakes (UMVGL) region is a diverse area that includes five Bird Conservation Regions and provides important habitat for shorebirds, especially migrants. Thirty-two shorebird species occur in the region, with 25 being common or abundant. Twenty-three species are of moderate or higher concern in the region. High-priority species include: Greater Yellowlegs, Whimbrel, Buff-breasted Sandpiper, Short-billed Dowitcher, Marbled Godwit, Wilson's Phalarope, Upland Sandpiper, American Woodcock, and the Federally-listed Piping Plover; the latter five species breed in the region. Various habitats within the region, including natural and managed wetlands, river floodplains, lake shoreline, sand and gravel bars, reservoirs, and flooded agricultural fields, provide the shallow water and sparsely-vegetated conditions required by foraging shorebirds. However, interior areas like the UMVGL region experience dynamic climatic conditions, making habitat conditions for shorebirds unpredictable compared to coastal regions. Furthermore, loss of wetlands from urban development, river dredging and diking, and agriculture has reduced the amount of habitat in the region. A primary goal of the UMVGL Plan is to ensure the availability of shorebird foraging and nesting sites over a range of climatic conditions by protecting, restoring, and managing a variety of habitat types throughout the UMVGL region. At many intensively managed sites, water level manipulation and other management activities (e. g., burning or discing) can be used to provide habitat for shorebirds, usually without compromising other wildlife objectives. Ultimately, an integrated management approach should be adopted that combines region-specific information on wetland dynamics and life history strategies of a variety of wildlife species. The North American Waterfowl Management Plan's Upper Mississippi River and Great Lakes Region Joint Venture established waterfowl habitat conservation objectives that focus on providing complexes of ephemeral and permanent wetlands and associated upland habitats. Objectives include providing 3.6 million hectares (9.1 million acres) of wetlands and associated uplands in Joint Venture waterfowl production counties (northern latitudes), and 213,000 hectares (533,000 acres) of wetlands in waterfowl migration counties (mid-latitudes). Since most of these areas will also provide good shorebird habitat, the Joint Venture's habitat objectives have been adopted for the UMVGL Plan. The infrastructure and partnerships in place to implement the Joint Venture will be expanded to address shorebird habitat needs, although the type of habitat provided for shorebirds (especially shallow water) may at times differ from what is optimal for some waterfowl species. Information is needed on the following to accomplish the UMVGL Plan: regional abundance, distribution, chronology, and population trends of shorebirds; responses of shorebirds and their invertebrate food base to management activities; wetland distribution and habitat conditions during a variety of climatic patterns; and effects of human disturbance on shorebirds. Providing this and other information to land managers and private landowners will help ensure the conservation of shorebirds throughout the region. Regional needs for shorebird population monitoring, research, and education and outreach activities in the UMVGL region are identified in its full.

### Lower Mississippi/Western Gulf Coast

The Lower Mississippi/Western Gulf Coast Region is rich with a variety of shorebird habitats. Shorebird habitats and patterns of use are divided rather distinctly between truly coastal (Gulf Coastal Prairies: GCP) and non-coastal habitats (Mississippi Alluvial Valley/West Gulf Coastal Plain: MAVGCP). Hence, these regions are treated separately throughout the Plan.

### *Mississippi Alluvial Valley/West Gulf Coastal Plain*

Thirty-one of the 43 species found in the MAVGCP occur regularly. Species of high conservation concern span a variety of habitats and foraging guilds, ranging from terrestrial gleaners (e.g., American Golden-Plover) to aquatic probers (e.g., Least Sandpiper).

While a few shorebird species winter and breed in the MAVGCP, most of the shorebirds found in this region utilize the area as migratory stopover habitat. Clearing of much of the Mississippi Alluvial Valley, with resulting open agricultural fields, has resulted in tremendous potential for providing shorebird habitat. Supplying the necessary mix of water depth and vegetative structure at the appropriate times is the most important management issue in this region.

Habitats in the region that possess the greatest potential for shorebirds include agricultural fields, moist soil impoundments, semi-permanent impoundments, and aquaculture ponds. Recommended management practices for each of these habitat types are described in the regional plan. Because of the abundance of agricultural and aquacultural land with water control capabilities, and the prevalence of water management for waterfowl in the region, opportunities for shorebird habitat management are substantial. Perhaps the factor most important to maintaining and increasing habitat for shorebirds in the MAVGCP is outreach and education. Providing land managers and supervisors with specific management information (migration chronology, water depth, and vegetation density tolerances, etc.) should facilitate an increase in the quality and quantity of shorebird habitat in the region.

Regional habitat objectives previously were set for the Lower Mississippi Valley by the Lower Mississippi Valley Migratory Bird Initiative based on fall population estimates. Two general aspects of these objectives are in particular need of attention: 1) testing assumptions of the model upon which habitat objectives are based; and 2) inclusion of the West Gulf Coastal Plain BCR in the model. Because the habitat objectives model is based on untested assumptions regarding population size, obtaining a better estimate of shorebird population abundance and chronology are the highest research priorities. Of the two assumptions that have been tested, one (food density) appears to be valid and one (habitat carrying capacity: birds per hectare) may not be accurate and needs further testing and revision.

Coordination of continued planning, implementation, and evaluation of the MAVGCP Plan will be provided by the Lower Mississippi Valley Joint Venture Office. Interested members of the regional working group will serve as a technical advisory team, providing input to the LMV Joint Venture on the biological foundation and evaluation of shorebird habitat management objectives.

### *Gulf Coastal Prairie*

Because of the geographic location of the Gulf Coastal Prairies (GCP) region, and the diversity of habitats provided by rice fields, beaches, coastal marshes and lagoons, large numbers of shorebirds migrate, winter, and breed on the Gulf Coast, making this one of the most important regions in the United States for this group of birds. In particular, of the 34 regularly occurring species in the GCP, five are considered Highly Imperiled (Snowy Plover, Piping Plover, Mountain Plover, Eskimo Curlew, and Long-billed Curlew), while 13 are of High Concern. Six of the 17 species with the highest priority scores are found predominately in beach habitats (Piping Plover, Snowy Plover, Wilson's Plover, Ruddy Turnstone, Sanderling, American Oystercatcher), with an additional far favoring wet meadow/prairie habitats (American Golden-Plover, Mountain Plover, Long-billed Curlew, Buff-breasted Sandpiper. In addition, Eskimo Curlew is in this category- if not already extinct).

A number of habitat management issues exist in this region, including encroachment of urban and industrial development in coastal areas, disturbance of beach and mudflat habitats, potential for chemical spills and other types of discharges, sea-level rise, decreasing freshwater inflows to coastal wetlands, invasive plant species, and



declining rice culture. This Plan outlines specific goals, objectives, and biological assumptions associated with each of these issues. Shorebird habitat goals for the region are to: 1) ensure at least stable populations of beach-nesting shorebird species (Wilson's Plover, Snowy Plover, American Oystercatcher); 2) ensure that habitat is not limiting to non-breeding shorebird species that utilize beach habitats; 3) ensure that habitat is sufficient for non-breeding maritime shorebird species that utilize non-beach habitats; and 4) ensure that habitat is not limiting to populations of shorebird species that utilize non-maritime habitats, especially during southward migration.

Attainment of these goals will require effective and much-increased implementation, monitoring, and evaluation. Coordination of these activities will be accomplished best through the Gulf Coast Joint Venture, with technical guidance provided by a shorebird technical advisory team.

## Atlantic Flyway

### Northern Atlantic

The North Atlantic planning region is one of the most heavily populated areas in the U.S. Many wetland habitats have been affected by development, causing wetlands loss, pollution, and increased human access leading to disturbance. The Atlantic coast beaches and bays, however, still have high quality habitats that have become more essential to shorebirds than ever before. The region is critical to the survival of hemispheric populations of some species (e.g., Red Knots, Piping Plovers, Whimbrels), which would be decimated by continued habitat degradation or catastrophic chemical or petroleum spills. Delaware Bay was the first Western Hemisphere Shorebird Reserve Network site, and provides critical habitat for huge concentrations of migrating shorebirds that use historically abundant supplies of horseshoe crab eggs to fuel their northward migrations.



*Mixed species feeding flocks are common among shorebirds, such as these sandpipers, turnstones, and knots. Photo by David Twitchell.*

The North Atlantic region has a number of inherent strengths supporting effective shorebird protection: 1) a huge constituency with reasonably good access to shorebird viewing opportunities; 2) large portions of publicly-owned coastal shorebird habitats; and 3) strong state land use regulations that affect actions on private land. However, the potent threats in the region are almost the flip side of the strengths. Large human population centers create a substantial threat from development and disturbance. They also cause a significant potential for resource conflicts. Further, the northeast Atlantic Coast is always under the threat of catastrophic oil spills and consequent damage to shorebird habitat or shorebirds themselves. The major weaknesses in existing protection center on inadequate funding for management and surveys, thus leading to an insufficient database on population, distribution, and habitats.

Combining these strengths, weaknesses and threats, our group developed a number of opportunities that may be unique to the North Atlantic region: first, strong state agencies create the potential for creative intra- and inter-state shorebird projects; second, the large human population and easy access to important shorebird sites creates a significant opportunity for improving recreational use of shorebirds with small increases in funding for developing access; and third, strong agency interest exists for developing interspecies management and protection.

The group considered the regional strengths and threats, and suggested the following high priority projects:

- Begin region-wide coastal surveys conducted by individual state agencies and coordinated by the USFWS throughout the region.
- Work on-site at known important areas to reduce disturbance, identify and protect critical food resources, and control predation.
- Significantly improve impoundment management, and coordinate habitat availability throughout the region.
- Create a strong emphasis on volunteer banding and wardening, as methods to increase awareness.
- Develop coordinated state and federal satellite habitat mapping, delineating all important shorebird habitats.
- Establish a number of "all bird" Joint Venture projects.
- Improve spill prevention and emergency response.



*Slumbering Sanderlings. Photo by David Twitchell.*

### *Southeastern Coastal Plain/Caribbean*

The Southeastern Coastal Plains-Caribbean Regional Plan (SCPCR) articulates what is needed in this area to advance shorebird conservation. The Plan identifies priority species, outlines potential and present threats to shorebirds and their habitats, reports gaps in knowledge relevant to shorebird conservation, and makes recommendations for addressing identified problems. The SCPCR Plan should serve as a template for a regional strategic management plan, with step-down objectives, local allocations and priority needs outlined. Development of a separate Caribbean Shorebird Plan is underway and will be based in part on principles outlined in the SCPCR Plan.

The SCPCR is important for breeding shorebirds as well as for supporting transient species during both northbound and southbound migrations. Breeding species of highest regional priority include American Oystercatcher, Snowy Plover, Wilson's Plover, and Piping Plover. Shorebirds in the planning region face potential impacts primarily from: 1) chronic human-caused disturbance to roosting and nesting birds and possibly to foraging birds; 2) oil spills at strategic migration staging areas; 3) transfer of water rights that may directly or indirectly affect prey availability by reducing freshwater input into important estuarine habitats; 4) barrier beach stabilization; 5) contaminants; and 6) inadequate management capability on public lands. Also, there has been a well-documented loss of wetland habitats in the SCPCR during the last 200 years.

Three general habitat goals for the SCPCR are: 1) to provide optimal breeding habitat to maintain and increase populations of priority species; 2) to provide high quality managed habitat to support species migrating through or wintering in the region; and 3) to restrain human disturbance to tolerable levels for shorebirds throughout the year.

In the SCPCR, the challenge for directly providing habitat for migrating shorebirds can be partly met by public land managers fostering appropriate management, including disturbance management along with more traditional habitat management particularly of impounded wetlands. Over 5 million shorebirds are estimated to

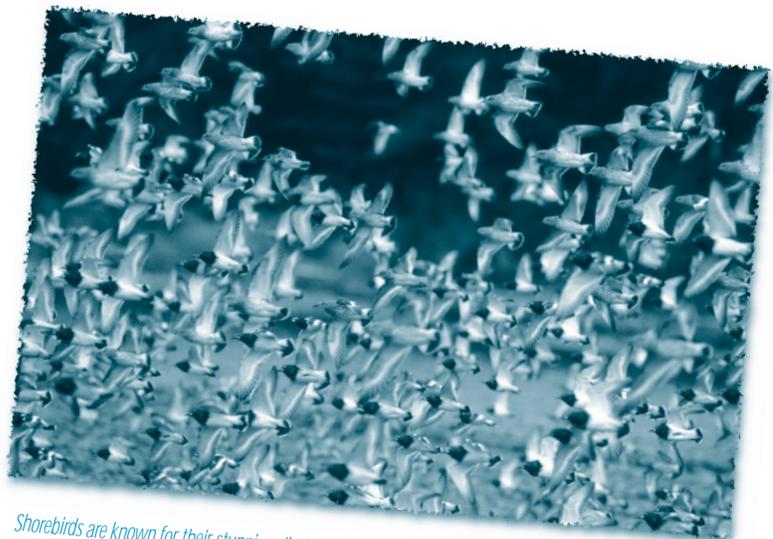
occur within the region during peak migration periods and about 2.5 million shorebirds are estimated to use inland and managed wetland habitats. Presently, about 50,000 acres of publicly managed wetlands are potentially available, with about 30,500 acres on National Wildlife Refuges alone. Collaborative interagency management efforts need to better target shorebirds throughout the region, starting with the provision of 4,000 acres in the year 2000. The SCPCR Plan calls for increasing habitat availability to 15,200 acres by 2002. If monitoring and research shows that more managed wetland habitat is needed to support upwards to 50% of all shorebirds using inland and managed habitats, then the Plan calls for providing 30,400 acres by 2005.

Meeting habitat objectives for nesting shorebirds will depend upon actions taken on lands managed cooperatively through public/private partnerships, especially along beach fronts, dredge spoil and oyster rake sites, and other near-shore habitats. Presently, the SCPCR Plan calls for the region to support a minimum 550 pairs of American Oystercatchers, 300 pairs of Snowy Plovers, 1500 pairs of Wilson's Plovers, and 55 pairs of Piping Plovers and to attempt to at least double these numbers during the next 50 years. These numbers will be subject to change as better demographic and habitat capacity information becomes available. Monitoring and assessment of management efforts should become a high priority for evaluating the success of nesting habitat protection measures.

Setting management objectives for roosting habitat should focus on areas where known concentrations of shorebirds occur and should concentrate on controlling sources of chronic human disturbance.



*Beach-nesting populations of shorebirds such as Snowy Plovers have declined precipitously in the United States, providing a special management challenge in a habitat popularly enjoyed for human recreation.  
Photo from Western Hemisphere Shorebird Reserve Network.*



*Shorebirds are known for their stunning displays of aerial acrobatics. Flocks like these Surtbirds and Black Turnstones wheel and turn in impressively tight formations, which helps them avoid predation.  
Photo by Philip Martin.*