

# The U.S. Shorebird Conservation Partnership – Past Accomplishments



Brad Winn

31 May 2022  
U. S. Shorebird Conservation Partnership Council

U. S. Shorebird Conservation Partnership Council. 2022. The U.S. Shorebird Conservation Partnership – Past Accomplishments. Available at <https://www.shorebirdplan.org/>.

## Table of Contents

PURPOSE.....	1
OVERVIEW AND ORGANIZATION.....	1
<b>Historical Background</b> .....	1
<b>The U.S. Shorebird Plan</b> .....	1
<b>Regional Shorebird Plans</b> .....	2
<b>Governance and Operation</b> .....	3
<i>Council Formation</i> .....	3
<i>Council Operating Principles</i> .....	3
<i>A Hemispheric Perspective</i> .....	4
<i>Identifying Implementation Needs</i> .....	4
<i>Performance Assessment</i> .....	4
ACCOMPLISHMENTS BY NABCI PRIORITIES .....	5
<b>Partnerships and Engagement (NABCI Priority Theme 3)</b> .....	6
<i>USSCP Representation</i> .....	6
<i>Alaska Shorebird Working Group</i> .....	8
<i>The Horseshoe Crab Recovery Coalition</i> .....	8
<i>American Oystercatcher Working Group</i> .....	8
<i>Education and Outreach</i> .....	9
<b>Addressing Threats (NABCI Priority Theme 4)</b> .....	10
<i>USSCP Conservation Assessment</i> .....	10
<i>State Species of Greatest Conservation Need</i> .....	11
<i>Flyway-scale Approaches</i> .....	12
<b>Land and Water Conservation (NABCI Priority Theme 1)</b> .....	14
<i>Migratory Bird Joint Ventures</i> .....	15
<i>North American Wetlands Conservation Act</i> .....	17
<i>Migratory Bird Hunting and Conservation Stamp</i> .....	20
<i>Partners for Fish and Wildlife and Coastal Program</i> .....	20
<i>National Wildlife Refuge System</i> .....	21
<i>Natural Resources Conservation Service</i> .....	21
<u>Regional Conservation Partnership Program</u> .....	21
<u>Working Lands for Wildlife</u> .....	22
<i>Western Hemisphere Shorebird Reserve Network</i> .....	23
<i>Shorebird Management Workshops</i> .....	23

<b>Monitoring, Research and Evaluation (NABCI Priority Theme 2)</b> .....	24
<i>Program for Regional and International Shorebird Monitoring</i> .....	25
<i>Arctic Shorebird Demographics Network</i> .....	26
<i>Western Hemisphere Shorebird Group</i> .....	26
<b>Policy and Funding (NABCI Priority Theme 5)</b> .....	27
<i>Advocacy Positions</i> .....	27
<i>Funding</i> .....	27
<u>Neotropical Migratory Bird Conservation Act</u> .....	27
<u>Southern Wings</u> .....	30
<u>State Wildlife Grants</u> .....	30
<u>Copper River International Migratory Bird Initiative</u> .....	31
<u>Celebra las Playeras (Celebrate Shorebirds)</u> .....	31
<u>Coastal Solutions Fellows Program</u> .....	32
CONTRIBUTORS .....	322
REFERENCES .....	322
<b>General</b> .....	322
<b>Regional Conservation Plans [Regional Plans]</b> .....	37

## PURPOSE

The purpose of this document is to provide the bird conservation community with a summary of the activities of the U.S. Shorebird Conservation Partnership (USSCP) over the last two decades and to chart a course for the next ten years. We highlight actions taken directly by partners or those influenced by the USSCP. All of the reports, action plans, minutes and position letters associated with the USSCP are available at <https://www.shorebirdplan.org>.

## OVERVIEW AND ORGANIZATION

### Historical Background

In 1995, staff at Manomet, Inc., and the Western Hemisphere Shorebird Reserve Network (WHSRN) drafted a proposal to develop a National Shorebird Conservation Plan, which was presented to and sponsored by the Migratory Shore and Upland Game Bird Committee of the (International) Association of Fish and Wildlife Agencies (AFWA). The proposal was endorsed by AFWA's Grants-in-Aid Committee in 1996 and was approved for funding by the U.S. Fish and Wildlife Service (USFWS) in 1997. The shorebird plan and partnership were envisioned as a complementary component to the existing North American Waterfowl Management Plan and Partners in Flight. By the end of 1997, a plan coordinator had been hired by Manomet, and the next two years were spent developing the *United States Shorebird Conservation Plan (U.S. Shorebird Plan)*. The original plan was published in 2000 and a slightly revised version in 2001 (Brown *et al.* 2001).

To assist development of the *U.S. Shorebird Plan*, three national working groups were proposed: Research and Monitoring, Outreach and Education, and Habitat Management. After initial discussions, the Habitat Management group decided to develop plans for 11 geographic regions within the jurisdictions of the USA (see below). Four technical task groups were formed within the Research and Monitoring Working Group to address monitoring, research, conservation assessment, and species prioritization. Technical Task Group and Outreach and Education reports were completed in 2000 and contributed to national plan development. A wide range of representatives from state agencies, federal agencies, non-governmental organizations, and private companies participated in national working and technical task groups. Chairs of all original working groups are listed in the *U.S. Shorebird Plan*, and working group participants are acknowledged in the technical plans. The overall vision and goals were drafted and reviewed by the coordinator and working group chairs.

### The U.S. Shorebird Plan

The *U.S. Shorebird Plan* provided 1) a vision of shorebird conservation and a set of hemispheric, national, and common regional goals and strategies; 2) shorebird conservation status, populations, and priorities, and 3) an approach for implementation

(Brown *et al.* 2001). Integration with other bird conservation initiatives, including Migratory Bird Joint Ventures (Joint Ventures), was recognized as being key for implementing the goals of the *U.S. Shorebird Plan*. Additionally, it acknowledged the importance of creating landscapes for shorebirds that also met other societal needs (e.g., flood control, human health). The initial *U.S. Shorebird Plan* has not been completely revised since its publication, but many components have been revised, updated and expanded. Although the *U.S. Shorebird Plan* has focused primarily on actions in the USA, it acknowledges the need to address conservation challenges of shorebirds across their entire annual cycle. The original goals and strategies described in the *U.S. Shorebird Plan*, presented below, remain relevant today. The “desired characteristics matrix” developed by Joint Ventures was modified in 2011 to assess the performance and identify improvements needed to increase performance of the *U.S. Shorebird Plan* partnership. The results were used subsequently to develop a strategic plan. All foundational documents are listed in the “References” section and are available under the “U.S. Plan and Council” tab at <https://www.shorebirdplan.org>.

*Original Vision* – The Vision of the U.S. Shorebird Conservation Plan is to ensure that stable and self-sustaining populations of all shorebirds are distributed throughout their range and diversity of habitats in the U.S. and across the Western Hemisphere, and species which have declined in distribution or abundance are restored to their former status to the extent possible at costs acceptable to society.

*Hemispheric Goal* – Restore and maintain stable and self-sustaining populations of all species of shorebirds in the Western Hemisphere.

*National Goal* – 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 stable populations are secure.

## **Regional Shorebird Plans**

The shorebird planning regions included combinations of Bird Conservation Regions (BCRs) in 1) Alaska, 2) U.S. Pacific Islands, 3) Northern Pacific Coast, 4) Southern Pacific, 5) Intermountain West, 6) Northern Plains/Prairie Potholes, 7) Central Plains/Playa Lakes, 8) Upper Mississippi Valley/Great Lakes, 9) Lower Mississippi Valley/Western Gulf Coast, 10) Southeastern Coastal Plains-Caribbean, and 11) Northern Atlantic. Regional plans were completed between 2000 and 2004, and a few were revised subsequently (e.g., Southern Pacific Coast/Central Valley, Upper Mississippi Valley/Great Lakes). A working group was established in Alaska in 1997 and has been active since its inauguration (see below). As with the *U.S. Shorebird Plan*, a wide range of representatives from state agencies, federal agencies, non-governmental organizations, and private companies participated in developing regional shorebird conservation plans. In general, the Council has viewed the incorporation of shorebird conservation objectives into Joint Venture implementation plans as second-generation revisions to the original regional plans (see below). Regional plans are listed separately

in the “References” section and are available under the “Regional Plans” tab at <https://www.shorebirdplan.org>.

*Common Regional Goal 1* – Provide sufficient high quality habitat to ensure that shorebirds in each region are not unduly limited by habitat availability or configuration.

*Common Regional Goal 2* – Ensure that efforts to provide habitat for shorebirds are integrated into multiple species habitat management initiatives where appropriate.

*Common Regional Goal 3* – Increase understanding of how local habitat conditions affect shorebird abundance and use of a region and, in turn, how conditions affect hemispheric shorebird populations.

## **Governance and Operation**

### *Council Formation*

Besides the working and technical task groups formed to help create the *U.S. Shorebird Plan*, a council was established to oversee the transition to implementation. The USSCP Council consisted of a Chair, Vice-Chair, chairs of regional and technical working groups, and representatives from participating agencies and organizations. The Council has existed, in various forms, since its inception in 1998. Over the years, terms of reference were created and revised to guide the operations of the Council, including its associated committees and working groups (e.g., USSCP 2009). Participation on the Council is open to any organization committed to achieving the goals of the *U.S. Shorebird Plan*. In 2001, the USFWS’s Division of Migratory Bird Management committed to supporting a position to coordinate implementation of the *U.S. Shorebird Plan*, facilitate operation of the Council, and serve as a national point-of-contact for shorebird biology and conservation within the USFWS. A central role of the coordinator is to increase awareness of shorebird conservation challenges and to encourage collaboration among shorebird conservation partners. The USFWS Migratory Bird Program currently supports the position within the Division of Bird Habitat Conservation.

### *Council Operating Principles*

Science – The Council believes effective shorebird conservation strategies must be based on science. The conservation goals of the *U.S. Shorebird Plan* cannot be achieved without the underlying foundation of scientific knowledge about shorebird species and the threats facing them. This scientific foundation forms the link between the broad goals laid out in this document, and the specific conservation projects that are necessary to conserve shorebird populations. Science provides the information necessary to identify critical conservation needs and to understand what to do about them.

Partnerships – The Council believes that the most effective way to advance the conservation goals of the plan is through cooperative partnership efforts. This approach

of cooperative action will guide all efforts related to implementation of the plan. Council members agree to work openly and cooperatively toward these common goals and to support the work of partner organizations whenever possible. Achieving the goals of the plan will require ongoing and committed action on the part of all state and federal agencies that protect birds, the many non-profit organizations involved with shorebird conservation, and a significantly increased understanding and involvement by the public.

### *A Hemispheric Perspective*

As described in the vision, the USSCP Council explicitly recognized the need to implement conservation actions across the entire annual cycle of migratory and resident shorebirds. In 2001, the Council adopted a set of actions that were needed to occur outside of the USA to promote a Western Hemisphere approach to shorebird conservation (USSCP 2001). Key action elements, which aligned with the *U.S. Shorebird Plan* goals and were reviewed by Latin American colleagues, included the need to 1) increase the scientific knowledge base, 2) enhance communications and outreach, 3) build organizational and technical capacity, and 4) supply adequate funding. These components continue to be key actions for WHSRN and flyway-scale shorebird conservation initiatives.

### *Identifying Implementation Needs*

In response to a request from the U.S. Committee of the North American Bird Conservation Initiative (NABCI-US; see below) to include shorebird needs in the development of an overall business plan in 2001, the Council identified high priority short-term staffing needs and major implementation needs. Staffing needs consisted of 1) stable funding for development of implementation activities within each region, in coordination with the Joint Ventures and BCR's, in the form of dedicated shorebird conservation biologists for each shorebird region; 2) development of a second position within the USFWS for coordination of USFWS activities related to shorebirds; and 3) development of a national shorebird research and monitoring coordinator position. Major implementation needs were identified, which aligned with major themes of the *U.S. Shorebird Plan*: 1) research and monitoring, 2) habitat protection, and 3) education (USSCP 2003). However, this effort achieved only very modest funding gains for *U.S. Shorebird Plan* implementation.

### *Performance Assessment*

The “desired characteristics matrix” developed by Joint Ventures was modified in 2011 to assess the current performance and identify improvements needed to increase performance of the USSCP (Table 1, USSCP 2011). Within evaluation elements, targets to be minimally and fully functional were described, progress on obtaining full functionality was reported, current performance was rated, and improvements needed to become fully functional were recommended. Twenty-two sub-elements within six main elements were evaluated as good or needing minor, moderate, or major

improvements. Results of the performance evaluation, in the context of the hemispheric and national goals and strategies, were used to develop a strategic plan for the Council and partners (USSCP 2012). Immediate tasks were those from the assessment that needed minor, moderate or major improvements; those elements rated as “good” were thought to likely continue under the current levels of effort from USSCP staff and partners. Overall, the Council believed the *U.S. Shorebird Plan* implementation was on track, with 18 of 22 elements scoring good to minor improvements needed. Specific actions for the next ten years will be discussed in the “Future Direction” section of this document.

Table 1. Summary of ratings for performance assessment sub-elements of the USSCP (2011).

Performance Element	Good	Improvements			Total
		Minor	Moderate	Major	
Organizational Performance	3			1	4
Biological Planning & Conservation Design	3	1	1	1	6
Conservation Delivery	1	1			2
Monitoring & Evaluation		3			3
Science & Research	1	3			4
Communications & Outreach	2			1	3
All Elements	10	8	1	3	22

## ACCOMPLISHMENTS BY NABCI PRIORITIES

The U.S. North American Bird Conservation Initiative (NABCI) Committee is a coalition of state and federal government agencies, private organizations, and bird initiatives in the United States working to ensure the long-term health of North America’s native bird populations. Formed in 1999, NABCI-US creates a unique forum for federal and state agencies and non-governmental organizations to address shared bird conservation challenges and priorities. Its strength lies in its ability to directly engage conservation leaders and to collaboratively develop and express a collective voice that promotes integrated all-bird conservation. Since formation the USSCP Council has furnished a representative to the U.S. NABCI Committee and associated subcommittees and working groups (see below).

The bird conservation community is complicated, with local, state, regional, national, and international partners representing many different interests across bird conservation. Priorities identified in national and flyway-scale plans were compiled to find areas of consensus across all bird conservation groups. These five broad priority themes were used to characterize the achievements of the USSCP over the last 20 years. No summation can present all the great work accomplished by USSCP, so we apologize in advance for any omissions. However, we believe the examples below illustrate the breadth of interaction of the USSCP with the conservation community.



Links to the *U.S. Shorebird Plan*'s original hemispheric, national and common regional strategies are identified under each NABCI-US priority. Clearly, some programs and projects address multiple NABCI-US priorities.

### Partnerships and Engagement (NABCI Priority Theme 3)

Hemispheric Strategy 3. Develop coordinated shorebird conservation efforts with Canada, Mexico, the Caribbean, Central America, South America, and Oceania/East Asia.

National Strategy 1. Integrate shorebird conservation as part of a regionally based, biologically driven, landscape-oriented, integrated migratory bird management program to deliver shorebird conservation in coordination with other migratory bird initiatives.

Common Regional Strategy 1.3. Coordinate management efforts for shorebirds among agencies and organizations within each region and flyway.

#### *USSCP Representation*

A major role for Council members, and other partners, is to represent shorebird conservation interests and perspectives on various bird conservation committees, working groups, and initiatives outside immediate USSCP operations. The Council ensures shorebird representation on the U.S. NABCI Committee and its associated subcommittees and working groups. The Council has also provided updates and representation on AFWA's Partners in Flight/Shorebird/ Waterbird working group and has a member on WHSRN's Hemispheric Council. Below is an USSCP Council assessment of current engagements and representation for shorebird conservation within national and regional organizations and the priority for continued engagement (Table 2). Future considerations should be given to groups outside of the traditional bird conservation partnerships. Much of the discussion that follows is built on partnerships across the spectrum of shorebird conservation.

Table 2. Hemispheric- and continental-scale activities for current USSCP Council and partner engagement. Priority level determined as high (H) or medium (M).

Scale/Group	Role	Level
<i>Hemispheric</i>		
Western Hemisphere Shorebird Reserve Network	Councilor, provide overall direction from USA perspective	H
Neotropical Migratory Bird Conservation Act	Review proposals; technical assistance; program direction	H
Western Hemisphere Shorebird Group	Help plan, fund and deliver meetings	H

Scale/Group	Role	Level
Atlantic Shorebird Flyway Initiative	Overall direction on steering committee; working group participants	H
Midcontinent Shorebird Conservation Initiative		
Pacific Shorebird Conservation Initiative		
East Asian Australasian Flyway Partnership		
Arctic Migratory Bird Initiative	Participate in working group	M
Convention on Migratory Species – Americas Flyway Task Force	Bring flyway-scale shorebird issues to table	M
<i>Continental</i>		
US NABCI Committee	Overall direction	H
State of the Birds Team	Shorebird technical assistance, report development	M
Monitoring Subcommittee	Shorebird technical assistance	M
Private and Working Lands Subcommittee	Shorebird technical assistance; Farm Bill guide development	H
Communications Subcommittee	Shorebird technical assistance	M
Human Dimensions Subcommittee	Shorebird technical assistance	H
AFWA PIF/Shorebird/Waterbird Working Group (and four regional FWAs)	Interaction with states on relevant shorebird conservation issues	H
<i>Joint Ventures</i>		
Technical Committees	Shorebird technical assistance	H
Unified Science Team	Shorebird technical assistance, develop integrated products	M
Avian Conservation Assessment Database	Shorebird technical assistance, develop integrated products	M
North American Wetlands Conservation Act	Proposal benefits review, shorebird technical assistance	H
Flyway Council Nongame Technical Committees	Interact with states on relevant shorebird issues	H
Executive Order 13186 Federal Agency Council	Develop conservation measures to meet EO	M
National Wildlife Refuge System Inventory and Monitoring National Bird Team	Shorebird technical assistance	M
National Wildlife Refuge System Acquisition Priority Team	Refine shorebird prioritization method for NWRS acquisition	H
Ramsar Convention – USA Committee	Recommend US shorebird sites; implement actions at US sites	M

### *Alaska Shorebird Working Group*

The Alaska Shorebird Group is a mix of academic and private researchers, federal and state agency staff, conservation organizations and shorebird enthusiasts dedicated to shorebirds in the state of Alaska. The group was founded in 1997 with the purposes to 1) raise the public's awareness of shorebirds; 2) promote research, monitoring, management, conservation, and education/outreach relevant to shorebirds; 3) integrate the goals and objectives of the Alaska Shorebird Group with regional, national, and international programs; 4) provide a structured forum to facilitate, coordinate, and enhance the exchange of shorebird information; and 5) promote range-wide management and conservation of shorebirds. The working group meets annually, publishes annual project summaries (<http://alaskashorebirdgroup.com/>) and has provided input into three Alaska Regional Shorebird Conservation Plan updates, of which the most recent was in 2019.

### *The Horseshoe Crab Recovery Coalition*

Shorebird biologists have long recognized the link between the importance of Horseshoe Crab eggs as food source for spring-migrant shorebirds passing through Delaware Bay and other sites along the Atlantic coast. Previous overharvest of crabs and lack of their recovery has negatively affected the ability of shorebirds to adequately gain weight during their stopover in Delaware Bay. After years of research, monitoring and conservation action, the Horseshoe Crab Recovery Coalition (HCRC) was formed to reverse the decline in horseshoe crab populations and fully restore them by 2030 (<https://hscrabrecovery.org/the-coalition/>). The goals of the coalition are to 1) manage horseshoe crab bait fisheries to ensure that populations are large enough to support the needs of other species like the red knot and weakfish that consume their eggs, 2) institute policies that reform the horseshoe crab bleeding industry to reduce mortality and other impacts, 3) encourage pharmaceutical companies to adopt the use of the synthetic LAL alternative (rFC) for use testing procedures, and 4) restore and protect horseshoe crab populations along Atlantic Coast. A broad effort is needed to address the conservation challenges of aquaculture, recreation and sea-level rise.

### *American Oystercatcher Working Group*

With the completion of the *U.S. Shorebird Plan*, the American Oystercatcher Working Group was formed to address priority research and conservation needs. Since its first meeting in 2001, the working group has met every year at locations across the birds' Atlantic and Gulf coast range. Membership is open to anyone interested in American Oystercatcher research and conservation. The working group has achieved a number of research, management, and conservation milestones, which included site-specific, regional and range-wide projects that have contributed significantly to the overall understanding of American Oystercatcher ecology. Accomplishments include 1) establishment of a standardized range-wide banding protocol; 2) initiation of re-sighting surveys throughout most of the species' range, the results of which have greatly clarified our understanding of oystercatcher migration; 3) completion of two range-wide

winter surveys (e.g., Brown *et al.* 2005); 4) development of an American Oystercatcher Conservation Plan; 5) establishment of an American Oystercatcher Working Group website (<http://amoywg.org/>); 6) development of a 10-year Business Plan for the conservation of the American Oystercatcher (American Oystercatcher Working Group 2008) supported by the National Fish and Wildlife Foundation; and 7) production of a revised species account for The Birds of North America. The working group remains active and is expanding to include all American Oystercatcher range in the Western Hemisphere.

### *Education and Outreach*

The Shorebird Sister Schools program was a major national education focus in the initial years of the USSCP (Education & Outreach Working Group 2002). The program originated with the Kachemak Bay Shorebird Festival with the idea of linking schools during migration along the Pacific Flyway from Chile to Alaska. Starting in 1994 with 17 schools from Alaska to California, the network grew to include schools all across the USA and beyond to many Latin American countries, Japan and Russia. The Shorebird Sisters Schools Educators Guide has been translated into Spanish, Russian, Japanese and Portuguese. Although the program still has local champions, the USFWS no longer provides national-level administration and promotion. Curricula are still available at <https://www.fws.gov/sssp/curriculum.html> and <https://digitalmedia.fws.gov/digital/collection/document/id/1598>.

Building on initial USSCP efforts, the AFSI has developed a searchable Shorebird Outreach Resource Directory that has lots of content in various media, from signs to brochures to videos, many in multiple languages (<https://atlanticflywayshorebirds.org/outreach-materials/>). At the state scale, the Florida Shorebird Alliance has a number of outreach and education materials directed at shorebirds and coastal habitats (<https://flshorebirdalliance.org/resources/outreach-materials/>). A number of other states and NGOs have developed various outreach and education materials pertaining to shorebirds. Specifically, American Bird Conservancy and Audubon have ramped up beach-bird stewardship efforts, including for Wilson's and Snowy Plovers, along the Gulf of Mexico since 2010, which was somewhat motivated by the Deepwater Horizon explosion and oil release and partially funded by restoration dollars.

Bird festivals focused on shorebirds have a long history of providing venues for shorebird education and conservation awareness to the public. The Cooper River Delta Shorebird Festival located in Cordova, Alaska, has operated consistently for 30 years and the Kachemak Bay Shorebird Festival in Homer, Alaska, has been held for 28 years. Other festivals provide great shorebird experiences for the public and involve USSCP organizations, such as Grays Harbor, Washington; the Oregon Coast; Jamaica Bay, New York; and Wings and Wetlands, Kansas. *BirdWatcher's Digest* has an online directory of domestic and international bird festivals (see <https://www.birdwatchersdigest.com/bwdsite/explore/festivals/finder.php>) and WHSRN provides festival resources at <https://whsrn.org/outreach-resources/festival-resources/>.

## Addressing Threats (NABCI Priority Theme 4)

### *USSCP Conservation Assessment*

A compilation of information on population sizes of all shorebirds in North America (Morrison *et al.* 2000, 2001) was motivated by the development of the *U.S. Shorebird Plan* and the Canadian Shorebird Conservation Plan (Donaldson *et al.* 2000). Assessments of shorebird abundance and trend in North America were also provided to Wetlands International for their periodic summaries of global waterbird abundance (e.g., Wetlands International 2012). Population sizes were updated and information on trend was added to the assessments in 2006 (Morrison *et al.* 2006) and 2012 (Andres *et al.* 2012a). Because shorebird populations are constantly changing, survey and analytical methods continue to improve, and new data are acquired, a regular revision of population sizes and trends is needed to keep information current and relevant to shorebird conservation practitioners (revision planned for 2022). Recent analysis of long-term population change (>40 years) indicate that most shorebird populations are declining or data are too sparse to assess change; only 28% are stable to increasing (Table 3).

Table 3. Number of USA shorebird populations ( $n = 72$ ) that were stable to increasing, decreasing or unknown between 2012 and 2019 (Rosenberg *et al.* 2019).

Long-term population trend	2012	2021
Stable to significant large increase	27	20
Unknown	13	15
Possible small to significant large decrease	32	37

Population size and trend are two of six elements used to assess the conservation status of shorebirds, along with breeding and nonbreeding distribution size and threats to breeding and nonbreeding populations (Panjabi *et al.* 2020). The first conservation assessment was completed as part of the *U.S. Shorebird Plan* (Brown *et al.* 2000) and was updated twice since (USSCP 2004, 2016). Beginning in 2014, shorebird assessment criteria were fully aligned with those used by Partners in Flight (Rosenberg *et al.* 2014), with the acknowledgement that data quantity and quality vary among taxonomic groups. Incorporating recent updates to the analyses of population trend (Rosenberg *et al.* 2019) into the conservation assessment framework (Panjabi *et al.* 2020), results in most (57%) of 75 assessed shorebird populations being on the Watch List (Table 4). Since 2014, climate change was considered in the assessment of threats to breeding and nonbreeding shorebird populations.

Table 4. Conservation concern level of shorebird populations ( $n = 75$ ) occurring in the USA.

<b>Conservation Concern Level</b>	<b>Number</b>	<b>%</b>
ESA-listed	7	9.3
Red Watch List	6	8.0
Yellow Watch List due to high threats or decline	12	16.0
Yellow Watch List due to small population size or range	18	24.0
Least Conservation Concern	32	42.7

#### *State Species of Greatest Conservation Need*

Development of State Wildlife Action Plans (SWAPs; see below) included the identification of Species of Greatest Conservation Need (SGCN). Most of the SWAPs were revised and updated in 2015. In addition to identifying species at the state level, the Southeast and Northeast Associations of Fish and Wildlife Agencies designated regional species of greatest conservation concern. States varied widely in their approaches to designating shorebirds of high conservation need, with some states focused only breeding species and others considering the full complement of breeding, passage and wintering species in the state. As a result, designated shorebird species ranged from 0 to 32 on state SGCN lists. Compared to the USSCP list of species of high conservation concern or higher, 19 states had  $\geq 50\%$  of USSCP populations on their lists, and six states had  $\geq 70\%$  of the appropriate shorebird populations designated as SGCNs (AK, DE, HI, IA, NJ, SC). Four populations were designated as regional priorities in the Northeast and nine in the Southeast. Central Flyway states tended to focus on breeding shorebird populations and had the fewest number of shorebirds designated as SGCNs (Table 5). Alaska and coastal states/territories in the Atlantic Flyway and along the Gulf of Mexico had the highest number of shorebird SGCNs (Table 5). Differences in designations of shorebirds as SGCNs among states may hamper collaborative, population-level action for the conservation of shorebirds, particularly with new state-focused funding opportunities. The designated regional model of the Atlantic Flyway states might be valuable for other flyways in advancing shorebird conservation.

Table 5. Species of Greatest Conservation Need (SGCN) identified in State Wildlife Action Plans by flyways/regions.

Flyway/Region	No. of States/ Terr.	% of All Flyway/ Regional Taxa		taxa	% USSCP Taxa ≥ High Conservation Concern		taxa
		median	range		median	range	
Alaska	1	78.0	–	41	100	–	18
Pacific Coastal	3	21.9	15.6 – 31.3	32	33.3	25.0 – 50.0	13
Pacific Interior	4	4.00	0.00 – 28.0	25	5.00	0.00 – 10.0	10
Pacific Islands	4	16.7	0.00 – 100	6	0.00	0.00 – 100	4
Central	9	13.5	8.11 – 59.5	37	11.8	11.8 – 64.7	17
Mississippi	11	30.3	3.03 – 63.6	33	40.0	0.00 – 86.7	15
Atlantic/Gulf Coastal	18	32.6	11.6 – 72.1	43	50.0	22.7 – 77.3	22
Atlantic Interior	4	31.9	27.3 – 54.5	11	33.3	0.00 – 66.7	3
Caribbean	2	34.1	27.3 – 40.9	22	53.9	46.2 – 61.5	13

### *Flyway-scale Approaches*

The next generation of conservation plans for shorebirds have focused on identifying conservation actions within a flyway-scale framework. Flyway-scale plans facilitate cooperation at the scales necessary to conserve migratory shorebirds and their habitats and enhance partner and stakeholder abilities to collaborate. These efforts can place local action in a flyway context that complements regional, national and international plans and can help leverage corresponding funding and support. Flyway-scale initiatives consist of 1) building a strategic framework through a logical process and practitioner engagement, 2) forming an engaged steering committee to guide development and promote implementation, and 3) developing new and leveraging existing revenue streams to accomplish implementation. Within the Americas, flyway-scale shorebird conservation frameworks have been developed as part of the Atlantic Flyway Shorebird Initiative (AFSI 2015) and Pacific Shorebird Conservation Initiative (PSCI; Senner *et al.* 2016) and a framework is in development as part of the Midcontinent Shorebird Conservation Initiative (MSCI). Alaska is involved in a similar effort within the East Asian Australasian Flyway Partnership. Funding through the National Fish and Wildlife Foundation and U.S. Agency for International Development/USFWS have been instrumental in advancing the implementation of the AFSI Business Plan. The David and Lucile Packard Foundation played a pivotal role in funding the development and implementation of the Pacific Americas Shorebird Conservation Strategy.

The Western Hemisphere initiatives have all identified focal species (Table 6), critical threats and the most effective actions (Table 7) to maintain and restore shorebird populations and their habitats in their respective flyways. In general, there is significant overlap with the threats and actions identified in the *U.S. Shorebird Plan*, with a stronger emphasis on filling knowledge gaps in the *U.S. Shorebird Plan*. As with the USSCP, working groups to tackle specific threats and implement more detailed actions have been established in both Atlantic and Pacific initiatives. Some results of these efforts are

provided in Table 8. As the flyway frameworks are completed with the development of the MSCl, the USSCP Council could serve as the implementing body for flyway actions in the USA.

Table 6. North American focal species for flyway-scale shorebird conservation plans in the Americas.

Species	AFSI	MCSI	PSCI	Species	AFSI	MCSI	PSCI
American Oystercatcher	X		X	Stilt Sandpiper		X	
Black Oystercatcher			X	Sanderling	X		X
American Golden-Plover	X	X		Dunlin			X
Piping Plover	X	X		Rock Sandpiper			X
Wilson's Plover	X	X	X	Purple Sandpiper	X		
Mountain Plover		X		Baird's Sandpiper		X	
Snowy Plover	X	X	X	Buff-breasted Sandpiper		X	
Upland Sandpiper		X		Pectoral Sandpiper		X	
Whimbrel	X		X	Semipalmated Sandpiper	X		X
Long-billed Curlew		X	X	Western Sandpiper		X	X
Hudsonian Godwit		X	X	Short-billed Dowitcher			X
Marbled Godwit	X	X	X	Lesser Yellowlegs	X	X	
Ruddy Turnstone	X			Willet			X
Black Turnstone			X	Greater Yellowlegs	X		
Red Knot	X	X	X	Wilson's Phalarope		X	
Surfbird			X	Red-necked Phalarope	X		

Table 7. Critical threats and the most effective strategies in the Atlantic and Pacific Americas Flyways.

<b>Critical Threats</b>
Climate change
Development
Shoreline and wetland modification, including coastal engineering
Water use and management, including incompatible natural resource management
Aquaculture
Disturbance from recreational activities
Invasive and problematic native species, including predation
Hunting
<b>Most Effective Broad Strategies</b>
Manage and protect critical shorebird habitats
Cultivate and empower conservation constituencies
Create conservation initiatives w/ natural resource industries
Strengthen compliance and enforcement
Develop environmental and wildlife protection policies
Improve knowledge of present and future habitats and shorebird response
Increase partner and stakeholder capacity



Table 8. Examples of working group and partner products addressing key strategies identified in the AFSI and PSCI.

<b>Key Strategy/Product</b>
<p><i>Manage and protect critical shorebird habitats – Disturbance and Predation</i></p> <p>Guidance and best practices for evaluating and managing human disturbances to migrating shorebirds on coastal lands in the northeastern United States (Mengak <i>et al.</i> 2019)</p> <p>Defining human disturbance to shorebirds using manager and scientist input (Mengak &amp; Dayer 2020).</p> <p>Guidance and best practices for coordinated predation management to benefit temperate breeding shorebirds in the Atlantic Flyway (Hunt <i>et al.</i> 2019).</p> <p><i>Achieve sustainable hunting of shorebirds</i></p> <p>A plan to address the sustainability of shorebird harvest in the Western Atlantic Flyway (AFSI Harvest Working Group. 2016).</p> <p>Changes in shorebird harvest policy and management actions for the Western Atlantic Flyway, 2012–2017 (Andres 2017)</p> <p>Achieving a sustainable shorebird harvest in the Caribbean and northern South America, progress report, 2011–2017 (AFSI Harvest Working Group 2017).</p> <p>Actions for the Atlantic Flyway Shorebird Initiative’s Shorebird Harvest Working Group 2020–2025 (AFSI Harvest Working Group 2020).</p> <p><i>Create conservation initiatives with natural resource industries – shrimp aquaculture</i></p> <p>Shorebirds and shrimp farming: Assessment of shrimp farming activities on shorebirds in Central America (Morales <i>et al.</i> 2019)</p> <p><i>Increase partner and stakeholder capacity</i></p> <p>International policy initiatives and multilateral funding mechanisms: Alignment with the Pacific Americas Shorebird Conservation Strategy (Greenwald and Gates 2020).</p>

## **Land and Water Conservation (NABCI Priority Theme 1)**

National Strategy 3. Identify management actions that can ameliorate factors limiting shorebird populations in the U.S., and implement regional conservation programs to ensure that populations of shorebird species are not limited by any environmental factors within the U.S.

Common Regional Strategy 1.4. Establish a specific habitat budget for the region, including amounts of specific habitat types that should be acquired, managed, or restored for shorebirds.

Common Regional Strategy 2. Promote management of wetland habitats as dynamic natural systems to provide habitat for the entire range of wetland-dependent species, including shorebirds, at appropriate points in natural wetland cycles.

Common Regional Strategy 3. Encourage management strategies and/or modeling exercises that will help clarify the most important determinants of shorebird use of particular habitat types.

## *Migratory Bird Joint Ventures*

In 2002, the U.S. Fish and Wildlife Service Director's Order No. 146 stated that a Joint Venture should accept the responsibility for delivery of national or international bird conservation plans and work to develop the capacity to become the delivery agents for all migratory bird-habitat conservation priorities in their geographic areas. The Joint Venture community subsequently assumed the responsibility of defining population objectives as a fundamental role and core competency of their partnerships (Andres *et al.* 2012b). Within the previously discussed *Desired Characteristics for Habitat Joint Venture Partnerships* matrix, the development, description, and application of explicit bird population objectives are critical aspects of meeting the technical expectations associated with the comprehensive content for numerous other elements and sub-elements within the matrix, including identifying limiting factors, modeling species-habitat relationships, assessing landscape condition, developing decision support tools, and establishing habitat objectives. Thus, there is a clear need to integrate population objectives, habitat models, landscape assessment, habitat objectives, and habitat delivery within the Joint Venture conservation approach.

In 2019, the USSCP National Coordinator, in collaboration with Joint Venture Science Coordinators, reviewed the status of shorebird conservation planning and objective setting within the Joint Ventures. Information was compiled from current Joint Venture implementation plans and follow-up correspondence with Science Coordinators. Of 22 habitat Joint Ventures, five implementation plans did not address shorebirds at all; six plans developed in the 2000s and 11 plans completed or updated after 2010 included shorebirds. Of 69 potential taxa regularly occurring in the USA and Canada (excluding taxa wintering in Asia or Europe and American Woodcock), 53 taxa (77%) were mentioned in implementation plans or other supporting documents ( $n = 17$ ). Nine species were mentioned in more than seven implementation plans, and six of these species breed within the Joint Venture where they were mentioned. Eight of the nine species were designated as high conservation concern (Table 9). Shorebird taxa listed under the U.S. Endangered Species Act or are USSCP taxa of greatest conservation concern were well represented in JV implementation plans where they occurred (Table 10).

Table 9. Number of Joint Venture implementation plans where shorebirds were indicated as species of high conservation concern or as a focal species.

	High Concern	Focal		High Concern
American Avocet		11	Marbled Godwit	8
Long-billed Curlew	11		Short-billed Dowitcher	8
Snowy Plover	10		Mountain Plover	7
Piping Plover	9		Whimbrel	7
Wilson's Phalarope		9		

Table 10. Fraction of Joint Venture implementation plans addressing shorebird taxa, where they occur, listed under Endangered Species Act or as a USSCP Species of Greatest Conservation Concern.

<b>Taxa</b>	<b>Fraction of Plans</b>	<b>Taxa</b>	<b>Fraction of Plans</b>
Hawaiian Stilt	0/1	Piping Plover	9/11
American Oystercatcher	4/5	Mountain Plover	7/8
Snowy Plover	10/10	Red Knot	5/7
Wilson's Plover	5/5		

Beyond just describing habitat needs for shorebirds, 50% of the Joint Ventures ( $n = 22$ ) set specific population objectives for shorebirds; seven in the breeding season by species, six in the nonbreeding season by species, and two in the nonbreeding season by guild. Eight Joint Ventures provided shorebird-specific habitat objectives and another six Joint Ventures considered shorebirds habitat objectives as captured in objectives set for waterfowl (Table 11).

Habitat objectives for breeding shorebirds were derived from density models, whereas nonbreeding habitat objectives were generated mainly from energetics/daily ration models. Variability and impediments for addressing shorebirds included that 1) the Joint Venture was of only minor importance to shorebirds any time during their annual cycle, 2) there was no dedicated funding for shorebirds, 3) staff relied on other documents to inform actions about shorebirds, 4) planning was only at a specific BCR level and not Joint Venture-wide, and 5) shorebirds were not a current management board priority.

Table 11. Joint Ventures that address shorebirds in implementation plans ( $n = 17$ ) and have specific habitat objectives for breeding or nonbreeding shorebirds or considered adequately covered by waterfowl, where shorebirds are mentioned.

<b>Joint Venture</b>	<b>Breeding</b>	<b>Nonbreeding</b>	<b>Waterfowl</b>
Atlantic Coast			X
Canadian Intermountain			X
Central Valley	X	X	
Gulf Coast		X	
Lower Mississippi Valley		X	
Oaks and Prairies	X		
Playa Lakes	X		
Prairie Habitat/Western Boreal Forest			X
Prairie Pothole			X
Rainwater Basin	X	X	
San Francisco Bay		X	
Upper Mississippi/Great Lakes	X	X	

Besides the setting of specific habitat objectives, many Joint Ventures have used shorebird abundance and habitat information to develop decision-support tools to guide shorebird conservation investments. Perhaps the most recognized of these tools are the “thunderstorm” abundance maps developed for breeding waterfowl, and later shorebirds, in the Prairie Potholes by the USFWS’s Habitat and Population Evaluation Team. Private lands biologists and other partners use these maps to prioritize landowner engagement for easements and other habitat conservation programs and projects.

While the Joint Ventures have made significant progress, the USSCP should continue to work with Joint Venture Science Coordinators to develop species- or guild-specific objectives for breeding and nonbreeding shorebird and support increased capacity within Joint Ventures to plan and deliver shorebird conservation actions (USSCP 2015).

### *North American Wetlands Conservation Act*

The federal North American Wetlands Conservation Act (NAWCA) was passed by Congress in December 1989, with the purpose of encouraging partnerships among public agencies and other interests to 1) protect, enhance, restore, and manage an appropriate distribution and diversity of wetland ecosystems and other habitats for migratory birds and other fish and wildlife in North America; 2) maintain current or improved distributions of migratory bird populations; and 3) sustain an abundance of waterfowl and other migratory birds consistent with the goals of the North American Waterfowl Management Plan and the international obligations contained in the migratory bird treaties and conventions and other agreements with Canada, Mexico, and other countries. The general idea was to provide newly established Migratory Bird Joint Venture partners with a source of funding to increase and improve wetland habitat for waterfowl and other wetland birds. NAWCA also required the establishment of a Council to recommend projects for funding approval by the joint Federal agency-Congress Migratory Bird Conservation Commission.

Projects funded through NAWCA consist of standard grants in Canada (no maximums), the USA (generally \$1,000,000 maximum), and Mexico (generally <\$500,000) and small grants in the USA (\$100,000 maximum). Submitted proposals are evaluated through a series of seven technical questions that are scored by Council staff. After the development of other bird conservation plans, the Council revised two technical questions on US Standard Grant applications to better address all wetland birds — 1) how does the proposal contribute to the conservation of other wetland-associated migratory birds, and 2) how does the proposal location relate to the geographic priority wetlands described by the North American Waterfowl Management Plan, Partners in Flight, the U.S. Shorebird Conservation Plan, and/or the North American Waterbird Conservation Plan? The first question draws mainly on the BCR lists of the USFWS’s Birds of Conservation Concern. To answer the latter question, the USSCP generated a map of Nationally Important Shorebird Areas in 2005, which was based primarily on important waterfowl wetland areas. Using Level III ecoregions of the U.S. Environmental Protection Agency, as a starting point, the USSCP worked with Joint Venture, state,

federal and other partners to significantly revise and improve the map between 2011 and 2012.

Beginning in 2007, the USSCP National Coordinator has provided Council staff with input on the above two technical questions relative to shorebirds. To answer the first question, potential conservation benefits of a proposal to shorebirds were scored from low (1) to high (7) during breeding, passage and wintering phases of the annual cycle, with the default being the passage phase. For the second question, inclusion of the proposal project sites was designated as in, partially in or outside of a Nationally Important Shorebird (wetland) Area.

Since 2007, \$653.8 million has been awarded to US Standard Grant recipients at a  $\geq 1:1$  partner match ratio. The majority (53.3%) of funded projects provided high benefits to shorebirds; unfunded proposals were the exact opposite, with the majority (51.5%) of projects providing low benefits to shorebirds (Figure 1). Relatively few (15.3%) funded projects provided low benefits to shorebirds. Most (72.3%) funded projects provided moderate or high benefits to shorebirds across multiple phases of the annual cycle (Table 12). Because many Arctic and boreal species migrate through the lower 48 states of the USA, NAWCA projects generally provide benefits to shorebirds during the passage phase. Most (73.4%) funded projects that provided moderate to high conservation benefits to shorebirds were located within Nationally Important Shorebird Areas, whereas projects providing low conservation benefits were not (Figure 2).

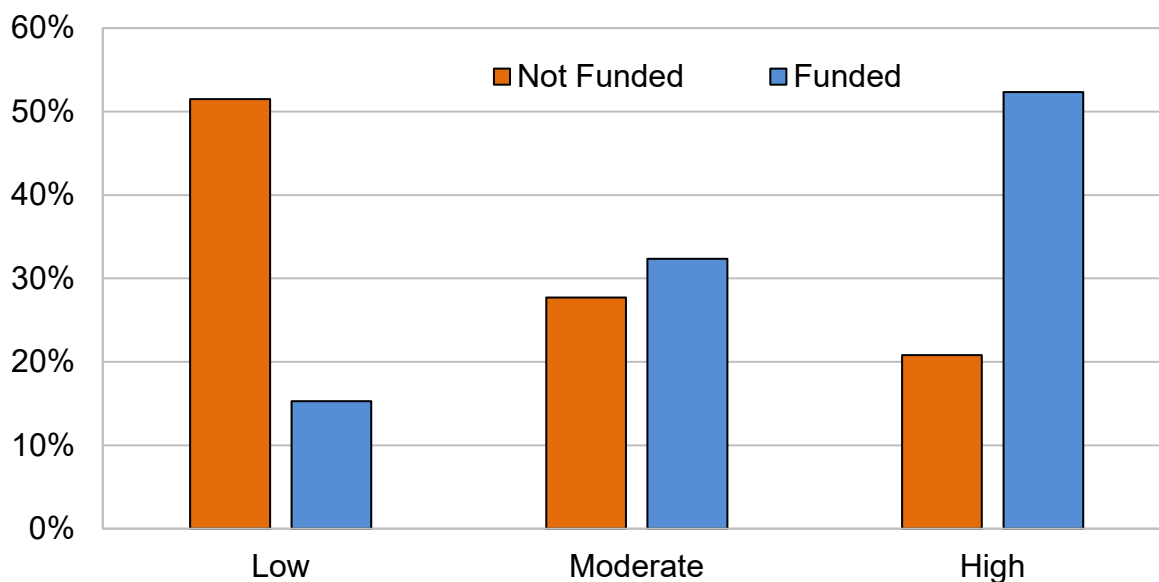


Figure 1. Percentage of funded NAWCA projects ( $n = 621$ ) and unfunded proposals ( $n = 101$ ) providing low, moderate, and high conservation benefits to shorebirds, 2007–2020.

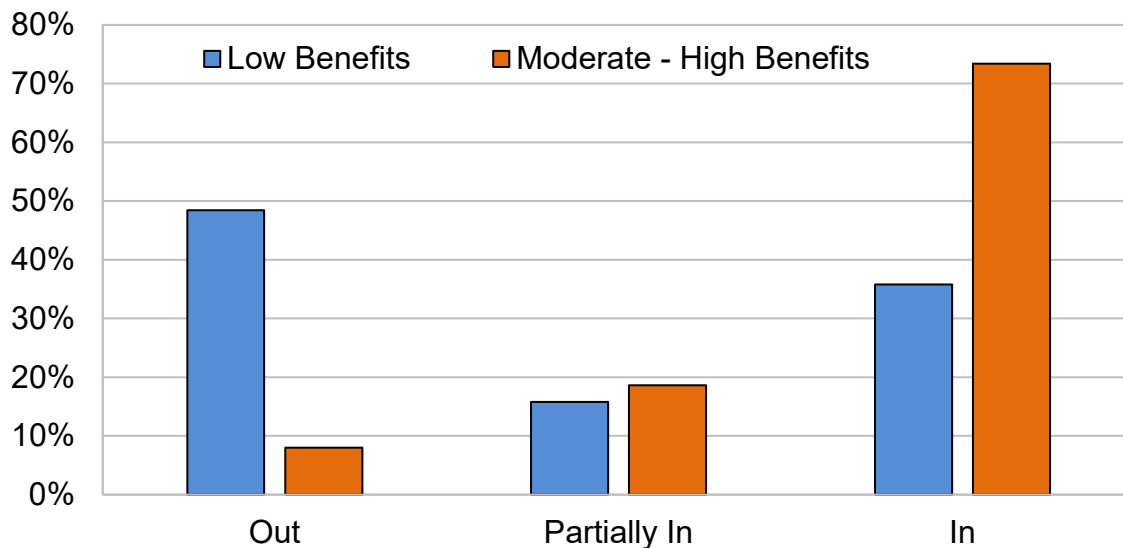


Figure 2. Location of funded NAWCA projects that provided low ( $n = 95$ ) and moderate to high ( $n = 526$ ) conservation benefits to shorebirds relative to being located in a designated Nationally Important Shorebird Area, 2007–2020.

Table 12. Percentage of funded NAWCA projects ( $n = 621$ ) with moderate or high conservation benefits to shorebirds among annual cycle periods, 2007–2020.

Annual Cycle Period	% Projects	Annual Cycle Period	% Projects
Passage/Breeding	37.3	Passage/Wintering/Breeding	9.7
Passage/Wintering	25.3	Breeding only	3.0
Passage only	24.7		

Proposals indicated the BCRs where project sites were located (including sites in multiple BCRs), which were combined into regions that generally matched the original 2000 shorebird planning regions for comparisons among regions. Every planning region had at least one project, and the highest of numbers of projects were funded in the Prairie Potholes/Northern Great Plains, Southern Atlantic Coast, and Gulf Coastal Prairie (Table 13). Regions west of the Mississippi had higher percentages of projects that provided moderate to high conservation benefits to shorebirds, and, with the exception of the Intermountain West, had higher percentages of projects located within or partially in Nationally Important Shorebird Areas (Table 13).

Overall, NAWCA USA Standard Grant projects have likely provided major conservation benefits for passage, wintering and breeding shorebirds; however, no evaluations of project implementation were made to assess realized conservation benefits. Because the Atlantic Flyway is the most threatened flyway in the Americas and supports a number of ESA-listed populations and species of high conservation concern, increasing projects there that provide high conservation benefits could contribute to flyway conservation goals for shorebirds. An additional \$430.5 million has been awarded to Canada, Mexico, and US Small Grant recipients. Although Canada and Mexico projects

were not assessed, NAWCA projects funded outside the USA most likely provide substantial conservation benefits to shorebirds.

Table 13. Funded NAWCA projects within shorebird planning regions of the USA, 2007–2020, and percentages of projects providing moderate to high conservation benefits to shorebirds and those located within a Nationally Important Shorebird Area.

Shorebird Planning Region	All Projects (n = 621)		Moderate to High Shorebird Conservation Benefits	
	number	%	% projects	% in a nationally important area
Northern Atlantic Coast	60.5	9.7	52.1	50.4
Southern Atlantic Coast	88.8	14.3	62.3	62.0
Upper Miss/Great Lakes	59.8	9.6	70.5	45.4
Lower Miss/West Gulf Plain	45.0	7.2	87.8	87.2
Gulf Coastal Prairie	78.5	12.6	96.2	96.2
Central Plains	34.2	5.5	97.1	78.8
Prairie Potholes/North Plains	123.0	19.8	98.9	96.7
Intermountain West	52.3	8.4	96.2	66.5
Northern Pacific	18.5	3.0	100.0	100.0
Southern Pacific	59.5	9.6	96.6	96.6
Hawaii	1.0	0.2	100	0.00

### *Migratory Bird Hunting and Conservation Stamp*

In 1934, President Franklin D. Roosevelt signed the Migratory Bird Hunting Stamp Act (or Duck Stamp Act), which allowed the purchase and leasing of wetlands that were vital to the survival of migratory waterfowl. Under the act, all waterfowl hunters 16 years of age and over must annually buy and carry a Federal Duck Stamp. Ninety-eight percent of the revenue from sales of the Duck Stamp are used to expand the National Wildlife Refuge System and to increase Waterfowl Production Areas through fee-title acquisition or easements. Since 1934, \$800 million has been generated to protect 5.7 million acres of wetlands. More than 300 national wildlife refuges were created or expanded using Federal Duck Stamp dollars. Examples of refuges important to shorebirds that have been expanded through this program are Monomoy, MA; Cape Romain, SC; Ottawa, OH; Catahoula, LA; Union Slough, IA; Quivira, KS; Anahuac, TX; Bear River, UT; Willapa, WA; and Sacramento, CA. About 10 states issue their own waterfowl stamps.

### *Partners for Fish and Wildlife and Coastal Program*

The Partners for Fish and Wildlife Program (PFW) in the USFWS provides technical and financial assistance to landowners interested in restoring and enhancing wildlife habitat on their land. Projects are custom-designed to meet landowners' needs. The program

originated in 1987 to help implement the North American Waterfowl Management Plan on private lands. Since that start, some 50,000 private landowners have worked with Partners staff to complete 60,000 habitat restoration projects on 6 million acres. PFW biologists assist with private lands portions of NAWCA grants. Although there are programmatic and legal differences among USFWS administrative regions, several have established specific focal areas and used the *U.S. Shorebird Plan* to identify focal species. In the Mountain Prairie Region, breeding shorebirds are prominent in the focal area where they occur. The USFWS Coastal Program provides funding to restore and protect fish and wildlife habitat on public and privately-owned lands. Funding targeted to 24 priority coastal areas along the Atlantic and Pacific Oceans, Gulf of Mexico, Great Lakes and in the Caribbean; many of these include important shorebird stopover and wintering sites. Increased communication between the USSCP and private lands biologists in the PFW and Coastal Program could bring increased benefits to breeding, passage and wintering shorebirds.

### *National Wildlife Refuge System*

In the Strategic Growth Policy for the National Wildlife Refuge System, conserving migratory birds of conservation concern is one of the three priority conservation targets that will guide the growth of the NWRS. The National Coordinator and other USFWS partners worked with NWRS staff to develop a tool to assess potential land acquisitions relative to high priority breeding and nonbreeding shorebirds, which were thought to be habitat limited. Location of the potential acquisition in a nationally important shorebird area or targeted ecoregion were included in a decision tree along with the threshold values for several tiers of use. Since the development in 2012, shorebirds of high conservation concern have been considered when ranking NWRS acquisitions. The shorebird tool will likely be revised in 2021. By including shorebirds in acquisition decisions, shorebirds will benefit from increased funding through the Land and Water Conservation Fund.

### *Natural Resources Conservation Service*

#### Regional Conservation Partnership Program

The Regional Conservation Partnership Program (RCPP) promotes coordination of Natural Resources Conservation Service (NRCS) conservation activities with partners to expand a collective ability to address natural resource concerns at the property, watershed and regional scales. Through RCPPs, NRCS seeks to co-invest with partners to implement projects that demonstrate innovative solutions to conservation challenges and provide measurable improvements and outcomes that are tied to the specific resource concerns. The RCPP has annual funding of \$300 million in two funding pools: Critical Conservation Areas and a State/Multistate pool. Eligible activities include land management, improvement or restoration practices; land rentals; easements; or public works/watersheds. In California, the California Rice Commission has received \$5,488,033 in funding, matched by \$11,040,384, for the California Bay Delta Critical Conservation Area. The purpose of the project is to engage rice producers



in implementing a mix of proven and innovative wildlife practices on their farms to substantially increase foraging, roosting and nesting value of ricelands for wetland-dependent birds. Audubon California, The Nature Conservancy and Point Blue Conservation Science formed the Migratory Bird Conservation Partnership with the primary goal to protect the wetlands and agricultural lands that support shorebirds and other migratory wetland populations in California. The Nature Conservancy has developed a unique reverse auction marketplace to incentivize qualifying landowners to create temporary wetlands on their properties (Reynolds *et al.* 2018).

### Working Lands for Wildlife

The Working Lands for Wildlife (WLFW) program systematically targets conservation efforts to improve agricultural and forest productivity and enhance wildlife habitat in working landscapes. NRCS provides technical and financial assistance to participants who voluntarily make improvements to their working lands, while the US Fish and Wildlife Service provides participants with regulatory predictability for species covered by the Endangered Species Act. Through 2019, WLFW has helped producers conserve more than 7.1 million acres of wildlife habitat and has helped many species, including shorebirds. Beginning in 2017, NRCS expanded this model that now includes 19 landscapes covering 48 States. Breeding Long-billed Curlews benefit from WLFW project areas in the Northern Plains Grassland and Sandhills (Nebraska) as do Willets through the American Black Duck project along the Atlantic coast. A new WLFW landscape is being developed for the central grasslands, which would benefit several breeding shorebirds. Other WLFW landscapes could be established to benefit shorebirds, which was discussed during the development of the strategic framework for Midcontinent Shorebird Conservation Initiative (e.g., Mississippi Valley wetlands).

Farmers in parts of Louisiana are providing habitat for passage and wintering shorebirds by temporarily creating shallow wetland habitats on agricultural lands. As wetland habitats degrade, agricultural lands are increasingly important for shorebirds and other waterbirds. Holding water on cropland fields and pastures can benefit waterbirds while providing other ecosystem services such as recharging groundwater, minimizing soil erosion, and reducing sedimentation and nutrient runoff. Assistance offered by NRCS helps farmers plan and implement a variety of conservation practices that benefit shorebirds

This shorebird project builds on NRCS's former Migratory Bird Habitat Initiative (MBHI), which was launched following the 2010 Deepwater Horizon oil spill to enable farmers to create habitat for migratory birds that provided alternative habitat to impacted coastal ecosystems. The MBHI provided \$40 million in cost-share assistance to private landowners in eight states (Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Missouri and Texas) to manage habitats through 1- to 3-year contracts. Over 470,000 acres were enrolled through MBHI within a few short months following the oil spill. The project has continued since the oil spill, albeit at a reduced scale.

## *Western Hemisphere Shorebird Reserve Network*

The Western Hemisphere Shorebird Reserve Network (WHSRN) was established in 1985 and today serves as a voluntary, non-regulatory network of public and private partners working to protect the most important breeding and nonbreeding habitats for shorebirds throughout the Americas. WHSRN is managed by an Executive Office (EO) that is administratively housed at Manomet (1998 - present). Overall direction for WHSRN and oversight of its progress in achieving its mission and vision is provided by an advisory body, the Hemispheric Council.

With the development of the USSCP and governing Council in 2001, the first WHSRN-USA Committee was formed in 2004 under the auspices of the USSCP Council. Since 2001, the USSCP has furnished a representative to the Hemispheric WHSRN Council and has been consistent in reviewing USA site nominations. However, the WHSRN-USA Committee has had variable amounts of activity and participation. One accomplishment was the development of a survey of USA WHSRN sites to 1) determine the current knowledge of WHSRN and shorebirds at designated sites in the USA, 2) assess the perceived value of being a WHSRN site, and 3) determine how sites can be assisted by WHSRN and the USSCP Council in regards to technical assistance for various components of shorebird conservation (USSCP 2014). In 2017, the WHSRN-USA Committee was re-invigorated with the purposes of supporting current activities of WHSRN site partners, identifying and assisting nomination of new WHSRN sites and modifications to existing sites, and promoting the Network among site-based and other conservation partners (WHSRN-USA Committee 2018). As of 2020, there 48 designated WHSRN sites in the USA.

## *Shorebird Management Workshops*

After the publication of the Shorebird Management Manual (Helmert 1992), Manomet initiated a series of workshops aimed at increasing the awareness of and capacity for management of wetlands and other habitats. In recent years, Manomet's *Habitats for Shorebirds Project* works with diverse partners to implement habitat management in the most important shorebird areas. Through immersive educational workshops, local stakeholders (including land managers, wildlife biologists and community leaders) learn about shorebirds and the role their local sites play in the full annual-cycle needs of migrant shorebirds. Guidance is provided on methods to improve habitat conditions and help implement strategies that benefit shorebird species.

Since 2015, Manomet has held six collaborative shorebird ecology, conservation, and management workshops within the United States, which were attended by 198 participants (Table 14). Through these workshops, Manomet staff and engaged partners supported implementation of habitat management efforts that benefit shorebirds with the following impacts: 1) engaged on 941,800 acres under purview of workshop attendees by direct management, program administration or permitting; 2) advised on 232,390 acres managed by workshop participants or colleagues and partners that indicate they plan to incorporate management enhancement strategies learned at workshops and/or

for which site specific recommendations for habitat management is requested and provided by program staff; and 3) implemented actions on 50,082 acres, where a change in policy, practice, or on-the-ground management recommended by Manomet staff resulted in commitments to or action taken to improve conditions to benefit shorebirds. Additional evaluations of the on-the-ground outcomes of the management workshops would be useful. A major revision to the Management Manual is now available (Iglecia & Winn 2021). Continuation and expansion of shorebird management workshops was identified as a need in the development of the MCSI strategic framework.

Table 14. Location and participation in Manomet's Habitats for Shorebirds Project workshops since 2015. Additional Partners include BirdsCaribbean, Delta WindBirds, South Carolina Department of Natural Resources, The Nature Conservancy and U.S. Fish and Wildlife Service.

<b>Location</b>	<b>Associated WHSRN Sites</b>	<b>Date</b>	<b>No. of Attendees</b>
Tom Yawkey Wildlife Center, SC	Cape Romain - Santee Delta Region	May 2015	41
Bulls Island, SC	Cape Romain - Santee Delta Region	May 2015	27
Mississippi Alluvial Valley, Clarksdale, MS	NA	Sep 2015	41
Mississippi Alluvial Valley, Isola, MS	NA	Oct 2015	18
Cheyenne Bottoms, KS	Cheyenne Bottoms	May 2018	33
Cabo Rojo Salta Flats, PR	Cabo Rojo Salt Flats	Feb 2019	57

## **Monitoring, Research and Evaluation (NABCI Priority Theme 2)**

Hemispheric Strategy 1. Develop monitoring programs to determine whether shorebird populations are declining.

Hemispheric/National Strategy 2. Focus research efforts on determining factors limiting populations of declining shorebird species, and focus international and national conservation efforts on reducing the effects of these limiting factors.

Common Regional Strategy 1. Identify and monitor key ecosystem and landscape variables that may affect shorebird use of the region (e.g., prey density, availability of roost sites, and distance between high quality sites).

Common Regional Strategy 2. Monitor shorebird use of available habitats to determine contributions of important sites to support of local populations of shorebirds.

## *Program for Regional and International Shorebird Monitoring*

In conjunction with the development of the *U.S. Shorebird Plan*, the Research and Monitoring Working Group developed a comprehensive monitoring plan for North American shorebirds (Howe *et al.* 2000). The report included 1) a history of shorebird monitoring in North America, 2) a discussion of important considerations for survey design and methodology, 3) an assessment of coverage of shorebird species in current and proposed monitoring programs, 4) an implementation strategy, and 5) a library of monitoring protocols developed for individual species or assemblages. The document built on previous analyses and recommendations of Harrington & Page (1991) and Bart (1999). Monitoring efforts in Canada, the USA and Latin America were combined into the formation of the multi-national Program for Regional and International Shorebird Monitoring (PRISM) committee. The current goals of PRISM are to 1) identify species at risk, 2) determine causes of population changes, and 3) guide (and evaluate) effective shorebird management and conservation actions. Specific objectives are to 1) estimate distribution, abundance, and habitat relationships of North American-breeding shorebirds throughout their annual cycle; 2) quantify changes and trends in distribution, abundance, and habitat relationships of North American-breeding shorebirds throughout their annual cycle; and 3) integrate shorebird monitoring data into a process of iterative learning and adaptive management (PRISM 2012).

To achieve these goals and objectives, a four-part approach was initially recommended to include surveys in arctic and boreal breeding areas, north-temperate breeding areas, north-temperate nonbreeding areas and neotropical and south-temperate nonbreeding areas (Bart *et al.* 2002). The PRISM committee (2002) developed estimates of the funding needed to accomplish the goals and objectives indicated above. A standardized approach to breeding surveys in arctic Canada and Alaska is now well established (see Bart & Johnston 2012) and has undergone a programmatic peer review (Arctic PRISM Peer Review Committee 2010). Species- or region-specific surveys have been conducted for some temperate breeding species (e.g., Stanley & Skagen 2007, Jones *et al.* 2008, Lyons *et al.* 2012, Thomas *et al.* 2012). Surveys of Snowy Plovers and Piping Plovers, which are listed under the ESA, are conducted annually on the Atlantic and Pacific Coasts and in the Great Lakes.

There are several existing and emerging multinational monitoring programs for nonbreeding shorebirds and other waterbirds in the Western Hemisphere, such as the Neotropical Waterbird Census, International Shorebird Survey, Caribbean Waterbird Census, Migratory Shorebird Project and Central American Waterbird Census. These existing monitoring programs vary somewhat in objectives, protocol, timing, geographic extent and focal species but frequently rely on the same organizations and volunteers to complete field surveys and provide some common data types. Recently, the PRISM Committee, and partners associated with the programs mentioned above, developed a unified set of standards to design and implement nonbreeding (migration or boreal winter) shorebird monitoring programs and projects throughout the Western Hemisphere (PRISM 2018). Although the focus is on programs developed in the Western Hemisphere, ideas in the document will be applicable to nonbreeding shorebird

surveys across the globe. The recommendations acknowledged the history, individuality and integrity of long-standing monitoring programs but also recognized the need to improve consistency and rigor to maximize the value of shorebird monitoring efforts throughout the hemisphere. To produce data that allow for rigorous analyses of shorebird patterns and trends at large spatial scales, implementation of consistent and standardized methods at the field level is critical (e.g., Reiter et al. 2020). The overall goal of the standards is to increase the utility of shorebird monitoring data to inform conservation and management decisions. PRISM Committee members and partners have recently been working with eBird staff to add additional environmental fields to their mobile app for the shorebird survey protocol.

### *Arctic Shorebird Demographics Network*

The goal of the Arctic Shorebird Demographics Network (ASDN) was to conduct demographic analyses for several target species that help to determine factors limiting their populations. The ASDN measures demographic rates like adult survival and productivity and other demographic parameters at various life history stages. The project was designed to substantially increase our ability to address a wide variety of other science and conservation goals that can only be approached at a regional or global level, such as migratory connectivity studies that require work across the entire range of a species. The existing large-scale monitoring efforts developed under PRISM provide critical information on population size and trend, along with accompanying environmental data to interpret the estimates. However, the existing programs cannot provide information on the mechanisms behind declines and when shorebird populations are likely to be limited during the annual cycle. Determining when and where shorebird populations are limited will have significant impacts on future conservation actions to address population declines. The ASDN, coordinated by USFWS, Manomet and Kansas State University, included 17 international partners working in 16 camps across Alaska, the Canadian Arctic and Russia (see <https://www.manomet.org/project/arctic-shorebird-demographics-network-asdn/>). A number of protocols were developed, and data are now being analyzed and reported (e.g., Weiser *et al.* 2018, Weiser *et al.* 2020). A major conclusion was that survival of Arctic-breeding shorebirds was primarily influenced by factors away from the breeding grounds.

### *Western Hemisphere Shorebird Group*

The Western Hemisphere Shorebird Group formed in 2006 as a collection of shorebird researchers, conservationists, students and enthusiasts. The goal from the outset has been to promote pan-hemispheric discussions and actions for the science and conservation of shorebirds and their habitats. One of the main efforts of the group has been to hold a meeting every two years to provide a structured forum to facilitate, coordinate and enhance the exchange of shorebird information among the group's members. Since 2006, seven multi-day meetings have been held that attracted an average of about 170 participants. Besides scientific presentations, the meetings provide a venue for hemispheric workshops on marking techniques, species of

conservation concern and flyway-scale conservation initiatives. Since 2006, meeting organizations have endeavored to raise travel funding to support students and international partners. The meeting location rotates among South, Central and North American locations. This endeavor has been crucial in developing flyway-scale collaborations to address the annual-cycle conservation of shorebirds. Information and summaries of past meetings can be found at <https://westernshorebirdgroup.org/>.

## **Policy and Funding (NABCI Priority Theme 5)**

### *Advocacy Positions*

Unlike some governing committees of bird conservation plans, the USSCP Council decided that they would play a role in advocating for shorebird conservation and outlined a process for advocating for shorebird conservation with respect to public and private policy and legislative actions (USSCP 2004). The Council decided to advocate only for conservation issues that affect broad shorebird landscapes, high priority shorebird populations, important stopover sites (following WHSRN criteria) or other issues deemed of major significance. Since 2006, the Council has drafted and submitted 32 advocacy letters.

### *Funding*

#### Neotropical Migratory Bird Conservation Act

The purpose of the Neotropical Migratory Bird Conservation Act (NMBCA) is to provide financial support and foster international cooperation for initiatives and projects that will sustain bird populations throughout their annual cycles. Since 2002, the NMBCA program has provided matching grants to Neotropical migratory bird conservation projects throughout the Western Hemisphere, with at least 75 percent of funding going to projects outside the United States. The competitive grants require that grant requests be matched by partner contributions at no less than a 3-to-1 ratio. Over this period, the NMBCA program has awarded \$74.6 million in grants. Since its inception, the USSCP National Coordinator has served as a proposal reviewer and has assisted NMBCA staff in other aspects of the program's development. From 2002 to 2020, projects that benefit shorebirds have received \$25.9 million of this funding (35%) and have generated \$91.6 million in matching funds (total = \$117.5 million). Of the 202 funded grants that benefited shorebirds, the majority (67%) went to projects in the Midcontinent Flyway (Figure 3); most of these projects have targeted wintering grassland shorebirds, in conjunction with landbirds, in the desert grassland ecosystem of the southwestern USA and northern Mexico (Figure 4). Projects in South America received most of the funding in the Atlantic and Pacific Flyways and within the Midcontinent, after discounting projects in the desert grasslands (Figures F5, F6). Projects ranged from land acquisition, community outreach and involvement, research and monitoring. Recently, NMBCA staff and the Advisory Council have promoted the development of large-scale strategies, such as the Atlantic and Pacific Flyway plans, to guide their conservation

investments. Clearly, the NMBCA has been a key partner in stimulating shorebird conservation action outside the USA.

Figure 3.  
Distribution of  
NMBCA funding to  
benefit shorebirds  
among flyways  
(*n* = 202 projects).

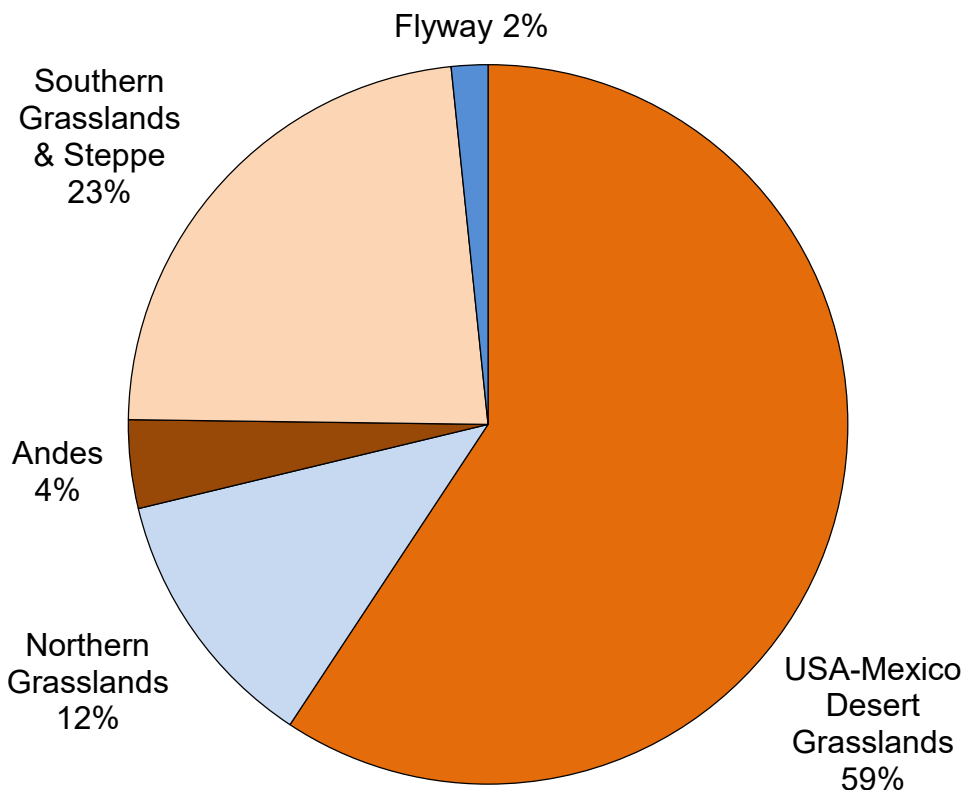
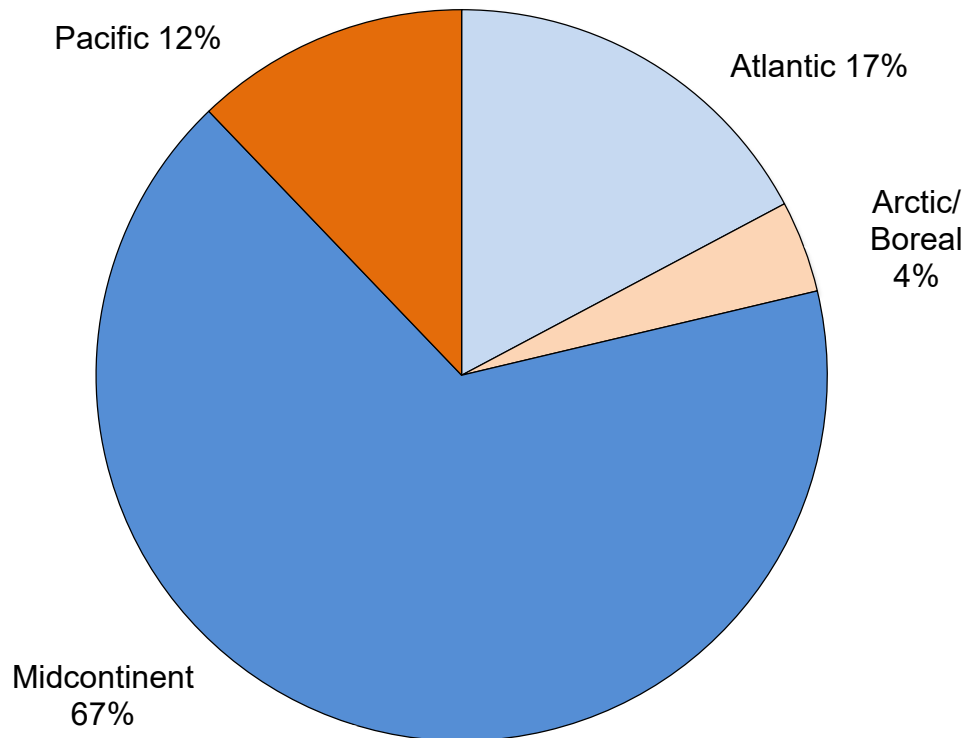


Figure 4.  
Distribution of  
NMBCA funding  
among regions  
to benefit  
shorebirds in  
the Mid-  
continent  
Flyway (*n* = 118  
projects).

Figure 5.  
Distribution of  
NMBCA funding  
to benefit  
shorebirds  
among regions  
in the Atlantic  
Flyway  
(*n* = 43 projects).

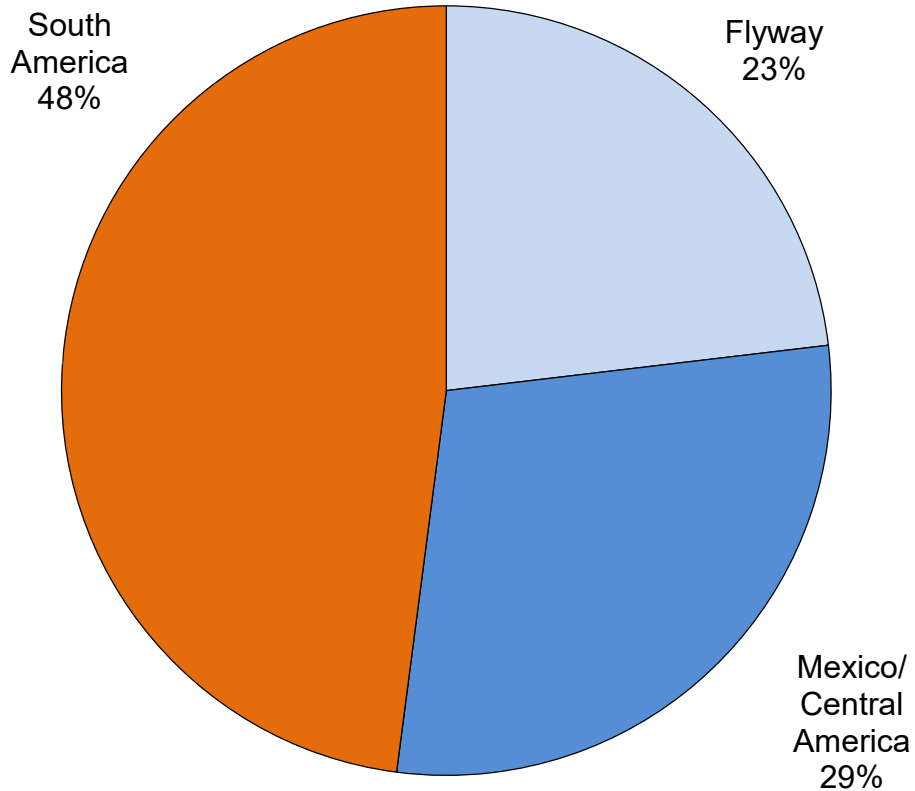
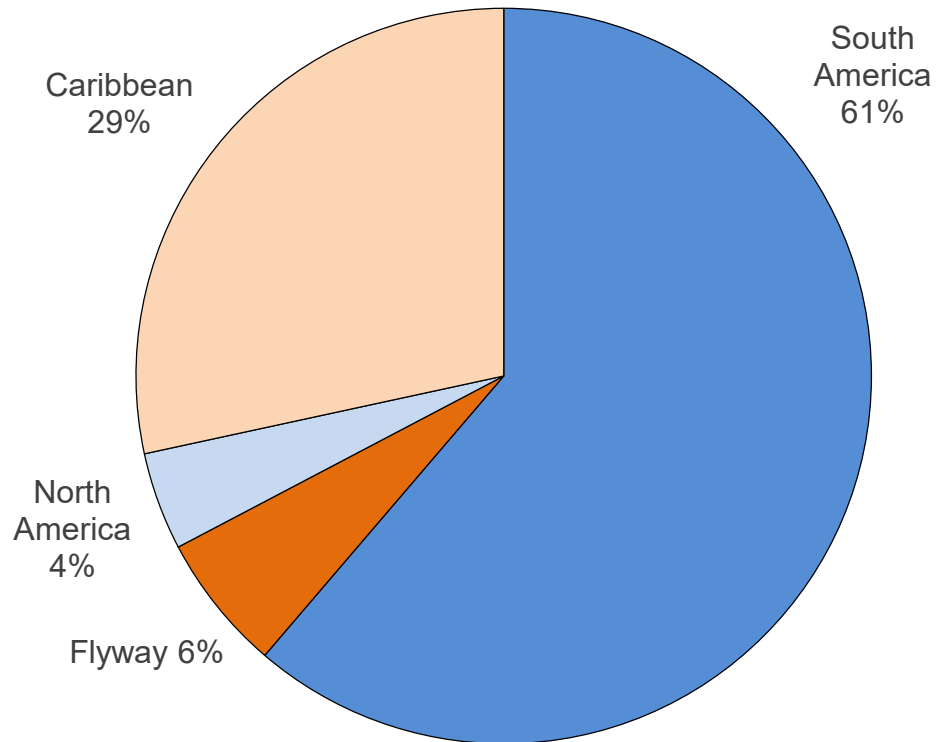


Figure 6.  
Distribution of  
NMBCA  
funding to  
benefit  
shorebirds  
among regions  
in the Pacific  
Flyway  
(*n* = 32  
projects).



## Southern Wings

Southern Wings was created in 2009 by the Bird Conservation Committee of the Association of Fish and Wildlife Agencies (AFWA) to provide a mechanism for state wildlife agencies to partner with conservation projects for shared priority species with partners in Mexico, Central America, South America and the Caribbean. Since 2009, >\$2.9 million has been contributed by 32 states for 24 projects outside of the USA to positively affect state Species of Greatest Conservation Need. A number of projects have addressed shorebird conservation needs (Table 15). In 2012, AFWA endorsed a 10-year vision that encouraged states to maximize their voluntary funding for annual life-cycle conservation and achieve a \$2 million annual goal for the conservation of shared species. Shorebird conservation partners should work with state staff to help achieve this vision and include more projects for shorebirds.

Table 15. Southern Wings project examples addressing the conservation of shorebirds outside the USA.

---

Protection of wintering and stop-over sites in the Conservation Coast Birdscape, Guatemala.

Protection of desert grasslands migratory bird habitat in the El Tokio Grassland Priority Conservation Area (in the Saltillo BirdScape, Long-billed Curlew).

Protecting stopover and wintering habitat for key priority species of shorebirds and waterbirds in Laguna Madre, Mexico.

Conserving critical Piping Plover and other shorebird wintering sites in the Bahamas.

The Pacific Flyway Shorebird Survey: Identifying threats and conservation hotspots in northwest Mexico.

Shorebird surveys in high Andean wetlands.

Implementation of monitoring of Buff-breasted Sandpiper (*Calidris subruficollis*) populations in the Orinoco Basin of Colombia during northern migration.

---

## State Wildlife Grants

The Fish and Wildlife Conservation Act of 1980 stated that “each State should be encouraged to develop, revise, and implement, in consultation with appropriate Federal, State, and local and regional agencies, a plan for the conservation of fish and wildlife, particularly those species which are indigenous to the State”. Although authorized, the Act was never appropriated. In 2000, however, the State Wildlife Grant Program (SWG) was created and the Tribal Wildlife Grant Program (TWG) was added a year later. The grant program has focused on implementing conservation actions aimed at preventing

new federal listings of threatened and endangered species, recovering those species already listed, and ensuring that tribal communities are able to maintain traditional subsistence-based lifestyles reliant on healthy populations of fish and wildlife (USFWS 2020). State Wildlife Action Plans (SWAPs), originally drafted in 2005 and revised in 2015, guide funding for species and specific conservation actions. The 2015 revised SWAPs identified >12,000 rare, declining, and imperiled fish and wildlife species and a set of conservation actions needed for their recovery (USFWS 2020). Between 2002 and 2019, annual funding for SWGs was \$54,093,306 and TWGs was \$5,263,044. In 2008, a competitive grant program was added to encourage multi-State, multi-partner projects; in 2014 the program was extended to the four Regional Associations of Fish and Wildlife Agencies. Since 2008, this program has received an average of \$5,522,922. In general, projects have focused on ESA-listed shorebird taxa (e.g., Piping Plover, Red Knot), although some projects have addressed species not listed under the ESA (e.g., American Oystercatcher, Lesser Yellowlegs). Because of the many non-shorebird taxa identified as SGCNs and the variability among states in identifying shorebirds as SGCNs, State Wildlife Grants will likely not provide a significant funding source for shorebird conservation across a broad scale. However, some regions and individual states have included work on shorebirds since the inception of the SWG program (e.g., New Jersey, South Carolina), and some states have used Pittman-Robertson funds for shorebird-related projects that are not captured in reports on SWG-funded projects.

#### Copper River International Migratory Bird Initiative

The U.S. Forest Service International Programs along with the Pacific Northwest Research Station, the Chugach National Forest, Ducks Unlimited and Ducks Unlimited of Canada established the Copper River International Migratory Bird Initiative (CRIMBI). The initiative is named for the Copper River Delta, one of the “jewels in the crown” of the Pacific Americas Flyway, because of its crucial role in the survival of coastal migrant shorebirds and other waterbirds; the Copper River Delta has been designated a Western Hemisphere Shorebird Reserve Hemispheric Site. The CRIMBI provides project funding to partners across the Pacific Americas Flyway and works to build capacity and collaboration among partners.

#### Celebra las Playeras (Celebrate Shorebirds)

Through the America’s Great Outdoors Initiative, Environment for the Americas collaborated with the U.S. Forest Service and Bureau of Land Management to create the *Celebra las Playeras* (Celebrate Shorebirds). Between 2013 and 2017, the program provided a comprehensive approach to engaging Latinos in natural resource careers and conservation action through internships at important shorebird sites in the Pacific Americas Flyway. It was designed to encourage Latinx youth to explore careers in natural resource management, environmental conservation, and scientific research. Interns work side-by-side with managers, educators, and biologists, gaining invaluable experience and mentoring, at sites chosen for their importance to migratory shorebirds and waterfowl in California, Oregon, Colorado and Alaska.

## Coastal Solutions Fellows Program

After the completion of the Pacific Americas Shorebird Conservation Strategy, the David and Lucile Packard Foundation and the Cornell Lab of Ornithology partnered to create the Coastal Solutions Fellows Program. To tackle the complex challenges surrounding coastal development, solutions will need to combine knowledge, expertise and ideas from multiple disciplines and sectors. For the next decade, the Coastal Solutions Fellows Program will support early-career planners, developers, and scientists from Latin America to collaboratively design and implement new solutions to tackle current challenges facing shorebirds, coastal ecosystems and communities. The program will support six young professionals per year to implement a project at a priority shorebird site in Latin America along the Pacific Americas Flyway. Fellows will be provided two years of funding, mentoring support and professional development opportunities, including annual retreats that combine peer-to-peer learning and strategic trainings. To date, the program has supported 18 fellows from eight countries and is a critical component of engaging multiple sectors in shorebird conservation and implementation of the Pacific Americas Shorebird Conservation Strategy. Information on the program and current and past projects and fellows can be found at <https://www.solucionescosteras.org/en/>.

## CONTRIBUTORS

Brad Andres, U.S. Fish and Wildlife Service; Susana Mateos, Judith Scarl, Association of Fish and Wildlife; Bill Vermillion, Gulf Coast Joint Venture; Stephen Brown, Shiloh Shulte, Manomet; River Gates, National Audubon; Sara Schweitzer, North Carolina Wildlife Resources Commission; Monica Iglesia, Pacific Birds Habitat Joint Venture; Matt Reiter, Point Blue Conservation Science; Agencies; Brian Smith, U.S. Fish and Wildlife Service.

## REFERENCES

Citations of unpublished reports are abbreviated; [brackets] indicate the tabs at <https://www.shorebirdplan.org> where they are available.

### **General**

American Oystercatcher Working Group. 2008. Business plan for the conservation of the American Oystercatcher — A 10-year plan to secure a coastal keystone species. National Fish and Wildlife Foundation, Washington, D.C., USA.

Andres, B.A. 2017. Changes in shorebird harvest policy and management actions for the Western Atlantic Flyway, 2012–2017. U.S. Fish and Wildlife Service, Falls Church, Virginia, USA. [Hunting]

- Andres, B.A., B.L. Altman, A.M. Bartuszevige, C.J. Beardmore, R. Dettmers, D.T. Jones-Farrand, E.J. Laurent, R.S. Mordecai, J.M. Tirpak, W. Vermillion & J.A. Wheeler. 2012. Considerations for establishing bird population and habitat objectives to further conservation within habitat Joint Ventures. Partners in Flight Technical Series No. 6. <https://partnersinflight.org/resources/pif-tech-series/>.
- Andres, B.A., Smith, P.A., Morrison, R.I.G., Gratto-Trevor, C.L., Brown, S.C. & Friis, C.A. 2012. Population estimates of North American shorebirds, 2012. Wader Study Group Bulletin 119: 178–194. [Science]
- Atlantic Flyway Shorebird Initiative (AFSI) Business Plan. 2015. Available at <https://atlanticflywayshorebirds.org/about/>.
- AFSI Harvest Working Group. 2016. A plan to address the sustainability of shorebird harvest in the Western Atlantic Flyway. U.S. Fish and Wildlife Service, Migratory Bird Program, Falls Church, Virginia, USA. [Hunting]
- AFSI Harvest Working Group. 2017. Achieving a sustainable shorebird harvest in the Caribbean and northern South America, progress report, 2011-2017. Unpublished report, U.S. Fish and Wildlife Service, Migratory Bird Program, Falls Church, Virginia, USA. [Hunting]
- AFSI Harvest Working Group. 2020. Actions for the Atlantic Flyway Shorebird Initiative's Shorebird Harvest Working Group 2020–2025. Unpublished report, U.S. Fish and Wildlife Service, Migratory Bird Program, Falls Church, Virginia, USA. [Hunting]
- Arctic PRISM Peer Review Committee. 2010. A Peer Review of the Arctic PRISM Program. [Science]
- Bart, J. 1999. A Quantitative Analysis of Shorebird Monitoring Programs. U.S. Fish and Wildlife Service. [Science]
- Bart, J., B. Andres, S. Brown, G. Donaldson, B. Harrington, H. Johnson, V. Johnston, S. Jones, R.I.G. Morrison, M. Sallaberry, S.K. Skagen & N. Warnock. 2002. Program for Regional and International Shorebird Monitoring (PRISM), version 0.7. [Science]
- Brown, S., C. Hickey, B. Gill, L. Gorman, C. Gratto-Trevor, S. Haig, B. Harrington, C. Hunter, G. Morrison, G. Page, P. Sanzenbacher, S. Skagen & N. Warnock. 2000. National Shorebird Conservation Assessment: Shorebird Conservation Status, Conservation Units, Population Estimates, Population Targets, and Species Prioritization. [Science]
- Brown, S., C. Hickey, B. Harrington & R. Gill, eds. 2001. The U.S. Shorebird Conservation Plan, 2nd ed. [U.S. Plan & Council]

- Brown, S. C., S. Schulte, B. Harrington, B. Winn, J. Bart & M. Howe. 2005. Population size and winter distribution of eastern American Oystercatchers. *Journal of Wildlife Management* 69:1538-1545.
- Donaldson, G.M., C. Hyslop, R.I.G. Morrison, H.L. Dickson & I. Davidson. 2000. Canadian Shorebird Conservation Plan. Canadian Wildlife Service Special Publication. Environment Canada, Ottawa, Ontario, Canada.
- Education & Outreach Working Group. 2002. Directory of Shorebird Education Materials. [Education & Outreach]
- Greenwald, S. & H.R. Gates. 2020. International policy initiatives and multilateral funding mechanisms: Alignment with the Pacific Americas Shorebird Conservation Strategy, Version 2. National Audubon Society and Pacific Shorebird Conservation Initiative, Washington, D.C.  
<https://pacificflywayshorebirds.org/resources/> [resources]
- Harrington, B.A. & G.W. Page. 1991. Development of a North American survey for monitoring shorebird populations. U.S. Fish and Wildlife Service [Science].
- Helmers, D. 1992. Shorebird Management Manual. Western Hemisphere Shorebird Reserve Network, Manomet, Massachusetts, USA.
- Howe, M., J. Bart, S. Brown, C. Elphick, R. Gill, B. Harrington, C. Hickey, G. Morrison, S. Skagen & N. Warnock, eds. 2000. A Comprehensive Monitoring Program for North American Shorebirds. [Science]
- Hunt, K.L., S.M. Karpanty, K.L. Davis, A. Wilke, N. Myers, C. Spiegel, S. Schulte, D.H. Catlin & J.D. Fraser. 2019. Guidance and best practices for coordinated predation management to benefit temperate breeding shorebirds in the Atlantic Flyway. U.S. Fish and Wildlife Service and National Fish and Wildlife Foundation, Hadley, Massachusetts. <https://atlanticflywayshorebirds.org/> [resources].
- Iglecia, M. & B. Winn. 2021. A shorebird management manual. Manomet, Inc., Manomet, Massachusetts, USA. Available at [https://www.manomet.org/wp-content/uploads/2021/01/Iglecia\\_and\\_Winn\\_2021\\_AShorebirdManagementManual-012021-web.pdf](https://www.manomet.org/wp-content/uploads/2021/01/Iglecia_and_Winn_2021_AShorebirdManagementManual-012021-web.pdf).
- Johnson-Shultz, H., J. Burton, N. Cirillo & S. Brown, eds. 2000. National Shorebird Education and Outreach Plan. [Education & Outreach]
- Jones, S.L., C. Nations, S.D. Fellows & L.L. McDonald. 2008. Breeding abundance and distribution of Long-billed Curlews (*Numenius americanus*) in North America. *Waterbirds* 31: 1–14.

- Lyons, J.E., J.A. Royle, S.M. Thomas, E. Elliott-Smith, J.R. Evenson, E.G. Kelly, R.L. Milner, D.R. Nysewander & B.A. Andres. 2012. Large-scale monitoring of shorebird populations using count data and n-mixture models: Black Oystercatcher surveys by land and sea. *Auk* 129: 645–652.
- Mengak, L. & A.A. Dayer. 2020. Defining human disturbance to shorebirds using manager and scientist input. *Environmental Management* 65:62–73.
- Mengak, L., A.A. Dayer, R. Longenecker & C.S. Spiegel. 2019. Guidance and Best Practices for Evaluating and Managing Human Disturbances to Migrating Shorebirds on Coastal Lands in the Northeastern United States. U.S. Fish and Wildlife Service, Hadley, Massachusetts. <https://atlanticflywayshorebirds.org/resources>
- Morales, S., O. Jarquín, E. Reyes & G.J. Navedo. 2019. Shorebirds and shrimp farming: Assessment of shrimp farming activities on shorebirds in Central America. Western Hemisphere Shorebird Reserve Network, Manomet, Massachusetts, USA. <https://pacificflywayshorebirds.org/resources/> [resources]
- Morrison, R.I.G., R.E. Gill, Jr., B.A. Harrington, S. Skagen, G.W. Page, C.L. Gratto-Trevor & S.M. Haig. 2000. Population estimates of Nearctic shorebirds. *Waterbirds* 23: 337–352.
- Morrison, R.I.G., R.E. Gill, Jr., B.A. Harrington, S. Skagen, G.W. Page, C.L. Gratto-Trevor & S.M. Haig. 2001. Estimates of shorebird populations in North America. Canadian Wildlife Service Occasional Paper No. 104, Ottawa, Ontario, Canada.
- Morrison, R.I.G., B.J. McCaffery, R.E. Gill, S.K. Skagen, S.L. Jones, G.W. Page, C.L. Gratto-Trevor & B.A. Andres. 2006. Population estimates of North American shorebirds, 2006. *Wader Study Group Bulletin* 111: 67–85.
- Panjabi, A.O., W.E. Easton, P.J. Blancher, A.E. Shaw, B.A. Andres, C.J. Beardmore, A.F. Camfield, D.W. Demarest, R. Dettmers, R.H. Keller, K.V. Rosenberg, T. Will, and M.A. Gahbauer. 2020. Avian Conservation Assessment Database Handbook, Version 2020. Partners in Flight Technical Series No. 8.1. <http://pif.birdconservancy.org/acad.handbook.pdf>.
- Program for Regional and International Monitoring (PRISM) Committee. 2002. Funding Needs for Implementation of the Program for Regional and International Shorebird Monitoring (PRISM). [Science]
- PRISM Committee. 2012. Revisiting our role after a decade of work. [Science]
- PRISM Committee. 2018. Standards for Monitoring Nonbreeding Shorebirds in the Western Hemisphere. [Science]

- Reiter, M.E., E. Palacios, D. Eusse-Gonzalez, R. Johnston, P. Davidson, D.W. Bradley, R. Clay, K.M. Strum, J. Chu, B.A. Barbaree, C.M. Hickey, D.B. Lank, M. Drever, R.C. Ydenberg & R. Butler. 2020. A monitoring framework for assessing threats to nonbreeding shorebirds on the Pacific Coast of the Americas. *Avian Conservation and Ecology* 15(2):7.
- Reynolds, M., B.L. Sullivan, E. Hallstein, S. Matsumoto, S. Kelling, M. Merrifield, D. Fink, A. Johnston, W.M. Hochachka, N.E. Bruns, M.E. Reiter, S. Veloz, C. Hickey, N. Elliot, L. Martin, J.W. Fitzpatrick, P. Spraycar, G.H. Golet, C. McColl, C. Low & S.A. Morrison. 2017. Dynamic conservation for migratory species. *Science Advances* 3(8) e1700707.
- Rosenberg, K.V., D. Pashley, B. Andres, P.J. Blancher, G.S. Butcher, W.C. Hunter, D. Mehlman, A.O. Panjabi, M. Parr, G. Wallace & D. Wiedenfeld. 2014. The State of the Birds 2014 Watch List. North American Bird Conservation Initiative, U.S. Committee. Washington, D.C.
- Rosenberg, K.V., A.M. Dokter, P.J. Blancher, J.R. Sauer, A.C. Smith, P.A. Smith, J.C. Stanton, A. Panjabi, L. Helft, M. Parr & P.P. Mara. 2019. Decline of the North American avifauna. *Science* 10.1126/science.aaw1313.
- Senner, S.E., B.A. Andres & H.R. Gates (eds). 2016. Pacific Americas shorebird conservation strategy. National Audubon Society, New York, New York, USA. Available at <https://www.shorebirdplan.org/international-shorebird-conservation/>.
- Stanley, T.R. & S.K. Skagen. 2007. Estimating the breeding population of Long-billed Curlew in the United States. *Journal of Wildlife Management* 71: 2556–2564.
- Thomas, S., J.E. Lyons, B.A. Andres, E. Elliott-Smith, E. Palacios, J.F. Cavitt, J.A. Royle, S.D. Fellows, K. Maty, W.H. Howe, E. Mellink, S. Melvin & T. Zimmerman. 2012. Population size of Snowy Plovers breeding in North America. *Waterbirds* 35: 1–14.
- U.S. Fish and Wildlife Service (USFWS). 2020. The State and Tribal Wildlife Grant Programs: 20 Years of Conservation Success. U.S. Department of the Interior (Van Ryzin, P.J., ed.).
- U.S. Shorebird Conservation (Plan) Partnership (USSCP). 2001. Promoting a Western Hemisphere Perspective — A Report to the U.S. Shorebird Conservation Plan Council, November 2001. [U.S. Plan & Council]
- USSCP. 2003. Building Capacity to Achieve Objectives of the U. S. Shorebird Conservation Plan - Operational and Staffing Needs. [U.S. Plan & Council]
- USSCP. 2004. High Priority Shorebirds — 2004. [Science]

USSCP. 2004. Advocating for Shorebird Conservation – The Role of the U.S. Shorebird Conservation Plan Council. [U.S. Plan & Council]

USSCP. 2009. U. S. Shorebird Conservation Plan Council Terms of Reference. [U.S. Plan & Council]

USSCP. 2011. Desired Characteristics for the U.S. Shorebird Conservation Plan (USSCP) Partnership. [U.S. Plan & Council]

USSCP. 2012. Strategy for Implementing the U.S. Shorebird Conservation Plan (2012–2016). [U.S. Plan & Council]

USSCP. 2014. Survey of Western Hemisphere Shorebird Reserve Network Sites in the USA. [Habitat]

USSCP. 2015. U.S. Shorebird Conservation Partnership Comments and Tasks from the January NABCI/Bird Plan/JV meeting. [U.S. Plan & Council]

USSCP. 2016. U.S. Shorebirds of Conservation Concern – 2016. [Science]

Weiser, E.L., R.B. Lanctot, S.C. Brown, H.R. Gates, J. Bêty, M.L. Boldenow, R.W. Brook, G.S. Brown, W.B. English, S.A. Flemming, S.E. Franks, H.G. Gilchrist, M-A. Giroux, A. Johnson, S. Kendall, L.V. Kennedy, L. Koloski, E. Kwon, J-F. Lamarre, D.B. Lank, C.J. Latty, N. Lecomte, J.R. Liebezeit, R.L. McGuire, L. McKinnon, E. Nol, D. Payer, J. Perz, J. Rausch, M. Robards, S.T. Saalfeld, N.R. Senner, P.A. Smith, M. Soloviev, D. Solovyeva, D.H. Ward, P.F. Woodard & B.K. Sandercock. 2020. Annual adult survival drives trends in Arctic-breeding shorebirds but knowledge gaps in other vital rates remain. *Condor* 122, duaa026.

Weiser, E.L., R.B. Lanctot, S.C. Brown, H.R. Gates, R.L. Bentzen, J. Bêty, M.L. Boldenow, W.B. English, S.E. Franks, L. Koloski, E. Kwon, J.-F. Lamarre, D.B. Lank, J.R. Liebezeit, L. McKinnon, E. Nol, J. Rausch, S.T. Saalfeld, N.R. Senner, D.H. Ward, P.F. Woodard & B.K. Sandercock, 2018. Environmental and ecological conditions at Arctic breeding sites have limited effects on true survival rates of adult shorebirds. *Auk* 135: 29–43.

Wetlands International. 2012. Waterbird population estimates, 5th ed. Wetlands International, Summary Report. Wetlands International, Wageningen, The Netherlands.

WHSRN-USA Committee. 2018. Implementation Plan. [Habitat]

### **Regional Conservation Plans [Regional Plans]**

Alaska Shorebird Group. 2019. Alaska Shorebird Conservation Plan. Version III.



- Clark, K.E. & L.J. Niles. 2000. Northern Atlantic Regional Shorebird Plan, Version 1.0.
- Drut, M.S. & J.B. Buchanan. 2000. Northern Pacific Coast Regional Shorebird Management Plan.
- Elliott, L & K. McKnight. 2000. Lower Mississippi/Western Gulf Coast Shorebird Planning Region.
- Engilis, Jr., A. & M. Naughton. 2004. U.S. Pacific Islands Regional Shorebird Conservation Plan.
- Fellows, S., K. Stone, S. Jones, N. Damude & S. Brown. 2000. Central Plains/Playa Lakes Regional Shorebird Conservation Plan, Version 1.0.
- Hickey, C., W.D. Shuford, G.W. Page & S. Warnock. 2003. Version 1.1. The Southern Pacific Shorebird Conservation Plan: A strategy for supporting California's Central Valley and coastal shorebird populations.
- Hunter, W.C. 2002. Southeastern Coastal Plains-Caribbean Region Report.
- Oring, L.W., L. Neel & K. Oring. 2000. Intermountain West Regional Shorebird Plan, Version 1.0.
- Russell, R.P., K.E. Koch & S.J. Lewis. 2016. Upper Mississippi Valley/Great Lakes Regional Shorebird Conservation Plan. Version 2.0.
- Skagen, S.K. & G. Thompson. 2000. Northern Plains/Prairie Potholes Regional Shorebird Conservation Plan, Version 1.0.