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DRAFT INTERNATIONAL SINGLE SPECIES ACTION PLAN

FOR THE CONSERVATION OF THE SPOON-BILLED SANDPIPER *CALIDRIS PYGMAEA*

2025–2035

(Submitted by the Government of Bangladesh)

Summary:

This information document was submitted by the Government of Bangladesh in relation to agenda item 9.4.1. The International Single Species Action Plan for the Conservation of the Spoon-billed Sandpiper *Calidris pygmea* 2025-2032 was adopted on 14 November 2025 by the 12th Meeting of Partners of the East Asian Australasian Flyway Partnership, held in Cebu, the Philippines.

D R A F T

International Single Species Action Plan for the Conservation of the Spoon-billed Sandpiper *Calidris pygmaea* 2025–2035

[*Proposed to be adopted by the East Asian-Australasian Flyway Partnership*]

International Single Species Action Plan for the Conservation of the Spoon-billed Sandpiper *Calidris pygmaea* 2025–2035

Editors: Christoph Zöckler, Paul Insua-Cao and Sayam U. Chowdhury

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[Proposed to be adopted by the East Asian-Australasian Flyway Partnership on XX November 2025]

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Milestones in developing this Action Plan

1. 29 March 2022 – online meeting of the Spoon-billed Sandpiper Task Force to outline objectives and main themes of the Action Plan.
2. 27–28 January 2023 – hybrid in-person/online workshop held in Yangon, Myanmar to discuss outline, communication, capacity building, education, participation, and awareness (CEPA) and draft table of important sites (Task Force Bulletin 28, May 2023).
3. Sept 2023 – a strategy on CEPA finalised based on consultation with Task Force national focal points
4. 2023 into early 2024 – thematic working groups prepared and submitted designated text to Action Plan editors.
5. 25–27January 2024 – in-person meeting of the Task Force in Shenzhen, Guangdong Province, China, which compiled a comprehensive list of all sites with Spoon-billed Sandpiper records (Task Force Bulletin 30, May 2024). A summary of that list is shown in Annex 6.
6. July to September 2024 – first draft circulated among Task Force members for feedback.
7. 18 October 2024 – draft action plan presented and discussed at the EAAF Shorebird Conservation Forum & Shorebird Work Group meeting in Beijing.
8. 5 July 2025 Action Plan circulated to EAAFP Partners, Technical Sub-Committee, Working Groups and other key members for comment.

[This Action Plan was presented and endorsed at the 12th Meeting of Partners of the EAAFP in November 2025 in Cebu, Philippines.]

Contributors

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Executive Summary

The Spoon-billed Sandpiper (*Calidris pygmaea*) is an evolutionarily distinctive and Critically Endangered migratory shorebird of the East Asian-Australasian Flyway (EAAF). A continuing decline and very small global population necessitate an updated conservation action plan. The causes for the decline of the Spoon-billed Sandpiper are multi-faceted, with hunting and habitat loss being most important. Other issues also threaten the species' survival within the context of a small population that is sensitive to unpredictable demographic impacts. This Action Plan outlines the issues and actions required over the next ten years to reverse the population decline and prevent its extinction in the wild.

Since the first Spoon-billed Sandpiper Action Plan in 2008, numerous conservation issues faced by this species and other shorebirds have been successfully addressed including hunting and trapping in critical areas. Over 830,000 ha of important habitat in Bangladesh, Myanmar, China, the Republic of Korea and Thailand have received protected status. In Russia key breeding areas have been regularly monitored and guarded by joint national-international research teams and local communities. The Spoon-billed Sandpiper Recovery Team was established in 2004, became a Task Force under the East Asian–Australasian Flyway Partnership in 2010, and has since served as a model for conserving threatened species along the flyway, uniting a network of like-minded individuals and organisations across political, cultural and spiritual boundaries, fostering a global conservation community. The Task Force helped advocate for a shift of coastal management to more sustainable solutions and an end to coastal reclamation along China's coast. Capacity building and awareness raising across the flyway and beyond have elevated the species' global status, highlighting its extinction risk and flagship role in coastal wetlands and migratory species conservation. Although conservation breeding has not yet succeeded, important advances were made and head-starting at a key breeding site has made an important contribution to reducing the population decline.

Research and monitoring capacity has expanded significantly across most range states, aided by advanced techniques and increased manpower. The use of remote sensing and the application of small satellite transmitters have enhanced our knowledge on the distribution, movements, habitat use and threats to this species. However, population surveys show a continued annual decline of ~5%, with the population now estimated at 350–550 individuals, although the rate of decline is much lower than before 2010. This continued decline, the fact that many new collaborators have joined the Task Force, and the availability of new technologies demand a new Action Plan.

The overall goal of this Action Plan for the period 2025 to 2035 is "***the long-term survival of the Spoon-billed Sandpiper***". To achieve this goal, the Spoon-billed Sandpiper Action Plan recognises 9 objectives, 18 results and 75 priority actions. Of these objectives, 5 are recognised as **high priority and essential** for achieving the goal of the action plan and the remaining 4 as supporting delivery of the action plan and long-term conservation needs (Further details are given in Table 1: Framework of Results and Actions).

The priority objectives, results and actions are:

Objective 1. Direct human threats to Spoon-billed Sandpiper are significantly reduced

Result 1.1. Ensure no hunting in key passage and wintering grounds – through; **identifying and monitoring hunting hotspots, government enforcement, supporting local communities with alternative livelihoods and engaging local stakeholders to address hunting**.

Result 1.2. Ensure no by-catch in key passage and wintering grounds – through; **surveys to understand extent of the issue and identify key sites for intervention,**

identifying and trialling solutions, engaging with authorities and communities to roll-out solutions.

Objective 2. Key breeding and non-breeding sites are under stronger protection and management

Result 2.1. All major breeding and non-breeding sites are under protection – through; **establishing the key known breeding area as a protected area "Land of the Spoon-billed Sandpiper" and establishing protection mechanisms for other key sites throughout its range**.

Result 2.2. Improved site management supporting conservation of the Spoon-billed Sandpiper at all key sites – through; **supporting site managers and other local stakeholders at key sites, including through the EAAFP Sister Sites Program, enabling knowledge exchange, capacity building and joint conservation actions.**

Result 2.3. No key sites are significantly impacted by new development pressures through; **engaging in development planning processes**.

Objective 3. Key intertidal mudflats and high-tide roosting habitats are restored and developed

Result 3.1. Previously reclaimed and degraded intertidal mudflats restored and high tide roosts are improved and developed – through; **restoring intertidal habitats and improving both artificial and natural high tide roosts.**

Result 3.2. The area of key intertidal mudflats covered by invasive vegetation is significantly reduced – through **long-term removal and eradication of *Spartina* from key sites**.

Objective 4. Improved reproductive success through *in-situ* measures on the breeding grounds and *ex-situ* conservation breeding

Result 4.1. A headstarting programme is operational on the breeding grounds – through; **reviewing effectiveness of headstarting and restarting the headstarting programme at Meinypil'gyno.**

Result 4.2. A Spoon-billed Sandpiper conservation breeding programme has been established in at least two institutions – through; **advancing protocols for conservation breeding, identifying appropriate hosting institutions to re-establishing conservation breeding and establishing a training programme on conservation breeding of small waders.**

Objective 5. Improved understanding of migration patterns and population trends of the Spoon-billed Sandpiper to inform conservation action

Result 5.1. Improved knowledge of the Spoon-billed Sandpiper population and migratory patterns – through; **continued use of numbered leg-flags, continued and expanded surveying and monitoring of key sites**.

Result 5.2. Identification of new breeding sites, passage sites, and wintering grounds – through; **further tracking of Spoon-billed Sandpiper using satellite-based technologies, habitat modelling and ground surveys of new potential sites.**

The following 4 objectives with associated actions will support effective implementation of the action plan and a basis for its long-term vision:

Objective 6. Improved understanding of the ecology and genetics of the Spoon-billed Sandpiper to inform long-term conservation needs

Objective 7. Engagement in understanding and addressing longer-term threats that impact the Spoon-billed Sandpiper and other shorebirds

Objective 8. Greater awareness and support for conservation of the Spoon-billed Sandpiper at all levels of society across the flyway

Objective 9. The Spoon-billed Sandpiper Task Force is building and coordinating an international community of committed conservationists and researchers

1. Introduction

Globally, the Spoon-billed Sandpiper (*Calidris pygmaea*) is one of the shorebird species most threatened with extinction. It has been listed as Critically Endangered on the IUCN Red List of Threatened Species since 2008, based on its extremely small population and a rapid continuing decline (BirdLife International, 2024a). This species breeds on the coastal tundra of Chukotka Province, in the far north east of Russia, and migrates down the coast of East Asia to spend the boreal winter on the inter-tidal mudflats of southern China and South East Asia (Figure 1), along what is known as the East Asian-Australasian Flyway (EAAF). The global population of mature Spoon-billed Sandpipers is currently estimated to be between 330 and 550 individuals and declining by about 5% per year (Green et al., 2024; Zöckler et al., 2020), hence its Critically Endangered status. The ecology and population of the Spoon-billed Sandpiper is described in more detail in Annex 1.

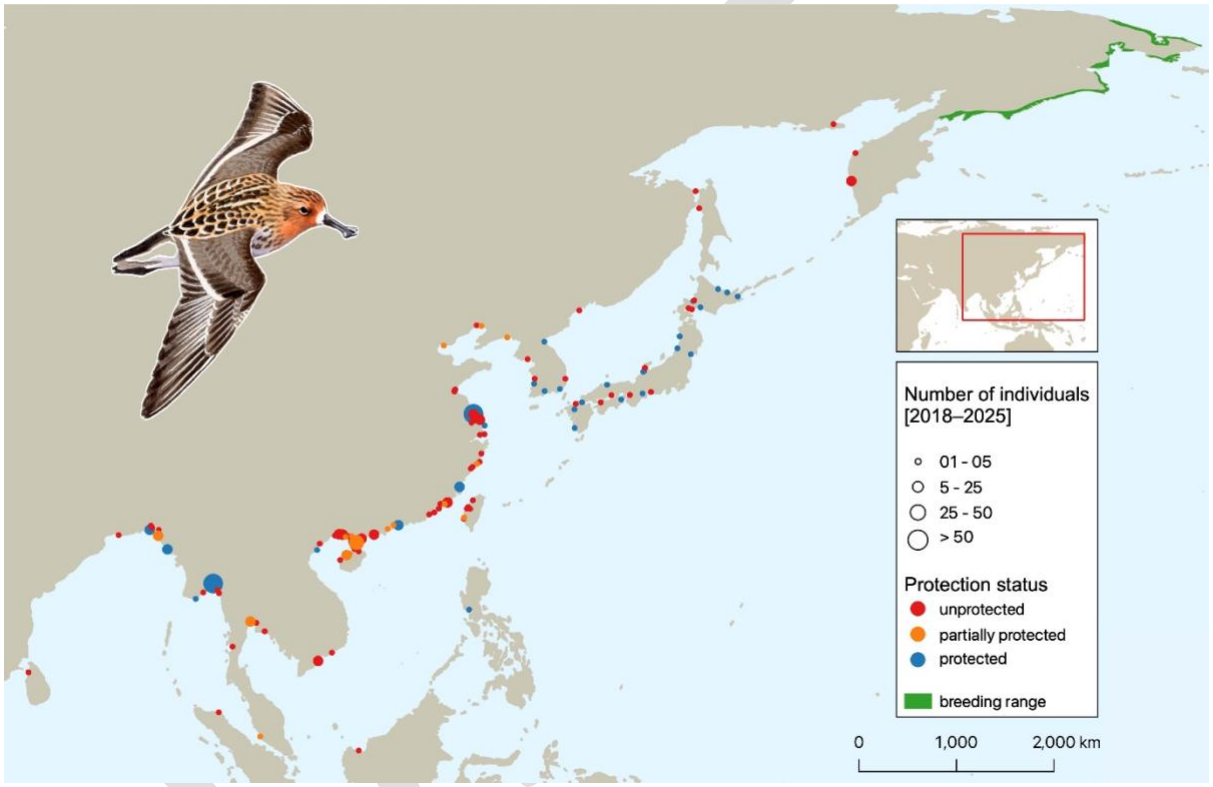

Figure 1. Flyway distribution of the Spoon-billed Sandpiper showing its breeding range and sites where it was recorded between 2018 and 2025 (see Annex 6). Circle size indicates the number of individuals and colours denote protection status (red: unprotected, orange: partially protected and blue: protected). *Illustration of Spoon-billed Sandpiper by Szabolcs Kókay.*

The precipitous decline of the population of the Spoon-billed Sandpiper has been well recognised since the early 2000s and growing international concern led to the 2008 International Single Species Action Plan for the Conservation of the Spoon-billed Sandpiper to be adopted by the Convention of Migratory Species (CMS) and BirdLife International (Zöckler et al., 2010a). The Spoon-billed Sandpiper Task Force was established soon after under the East Asian-Australasian Flyway Partnership. A great deal has been achieved since 2008 (see Annex 1) and the rate of decline of the Spoon-billed Sandpiper now appears to be much lower than the 26% decline estimated at the time. Nevertheless, with an on-going decline and such a small global population, the need for an updated Spoon-billed Sandpiper Action Plan is as pertinent as it was in the 2000s. Substantial knowledge has been gained to

build upon and while some threats are being addressed and that work needs to continue, new threats are emerging and significant knowledge gaps remain. It is very important to recognise that actions to conserve the Spoon-billed Sandpiper are also benefitting numerous other migratory shorebird species that use the same sites along the EAAF and potentially supporting livelihoods of the coastal communities which depend upon those sites.

Inevitably, for a migratory bird that travels a long distance through some of the world's most densely populated and rapidly developing regions on the planet, the causes for the decline of the Spoon-billed Sandpiper are multi-faceted and dispersed. This Action Plan has identified hunting and habitat loss as the most important threats to the species. Hunting occurs for different reasons in different parts of its range; subsistence needs resulting from poverty, demand for wildlife consumption and cultural practices, although the species is not normally target directly, but as part of general take of waterbirds. Intertidal mudflats are being lost to development throughout the flyway, and other forms of habitat degradation and loss include invasive vegetation, changing patterns of sedimentation and erosion. High-tide roosts are also often overlooked as important temporal habitats. Other issues persist, not least the small population that is sensitive to stochastic demographic impacts. The issues and challenges facing conservation of the Spoon-billed Sandpiper are analysed in more detail in Annex 2.

A network of protected sites along the flyway will be essential for the survival of the Spoon-billed Sandpiper and its sympatric shorebird allies. Out of 156 sites with recent records of Spoon-billed Sandpiper (see Annex 6), 110 (71%) have no level of protection, and only 26 (17%) are fully protected, and there are important gaps in our knowledge of major sites for this species, which will also likely need protecting. Establishing either formal protected areas or other forms of protection (which can formally be recognised as OECMs, i.e. Other Effective area-based Conservation Measures), such as community-managed conservation areas, is a high priority for this Action Plan. Formal designation of a protected area doesn't always mean the necessary protection measures are in place so strengthening site-based management and conservation action is also a high priority to address issues such as habitat loss and hunting.

This Action Plan has been developed by the Spoon-billed Sandpiper Task Force, under the umbrella of the EAAFP. In doing so it aligns with the EAAFP Strategic Plan 2019–2028 (see Annex 5). Funding to develop this Action Plan has been generously provided by the Mangrove Conservation Fund (MCF), the Manfred-Hermsen-Stiftung, Royal Society for the Protection of Birds (RSPB), the Lao Niu Foundation through the Paulson Institute, and in addition the in-kind support of a broad spectrum of individuals and organisations, largely from the countries within the EAAF, but also from other parts of the world. As such, this Action Plan brings together the best available experience and scientific input. This Action Plan is supplemented with more detailed actions for in a strategy for "Communication, capacity building, education, participation, and awareness" (CEPA) (Fu. & Aung, 2023), with abridged actions included within this Plan

2. Goal and Objectives for Conservation of the Spoon-billed Sandpiper

Our aspiration is that – in an age of species and habitat loss, increasing societal fragmentation and global conflict – we continue to build and foster a community that transcends national and cultural boundaries, contributing to the protection of birds, the enhancement of nature and greater peace and mutual understanding between peoples.

The **goal of this Action Plan** is:

The long-term survival of the Spoon-billed Sandpiper

*The **purpose of this Action Plan** is*

To stabilise or increase the global population of the Spoon-billed Sandpiper by 2035

Through developing this Action Plan, we have identified a set of **9 objectives to meet this purpose and goal**:

Priority objectives

1. Direct human threats to Spoon-billed Sandpiper are significantly reduced.
2. Key breeding and non-breeding sites have stronger protection and management.
3. Key intertidal mudflats and high-tide roosting habitats are restored (and developed in the case of high-tide roosts).
4. Improved reproductivity success through *in-situ* measures on the breeding grounds and *ex-situ* conservation breeding.
5. Improved understanding of migration patterns and population trends of the Spoon-billed Sandpiper to inform conservation action.

Supporting objectives

6. Improved understanding of the ecology and genetics of the Spoon-billed Sandpiper to inform long-term conservation needs.
7. Engagement in understanding and addressing longer-term threats that impact the Spoon-billed Sandpiper and other shorebirds.
8. Greater awareness and support for conservation of the Spoon-billed Sandpiper at all levels of society across the flyway.
9. The Spoon-billed Sandpiper Task Force is building and coordinating an international
10. community of committed conservationists and researchers.

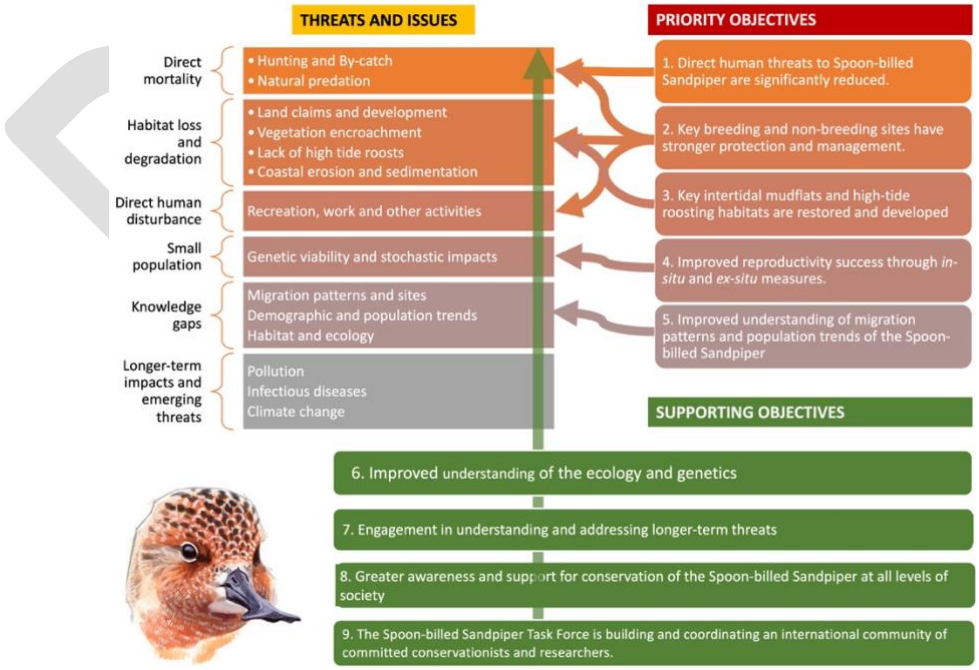

Figure 2. Relationship between the nine strategic conservation objectives of the Spoon-billed Sandpiper Action Plan and the corresponding challenges they aim to address. Illustration of Spoon-billed Sandpiper by Szabolcs Kókay

3. Framework of Results and Actions

To meet these nine objectives, a set of 18 results and a total of 75 actions to be achieved by 2035 have been identified in table 1.

Table 1. Framework of Actions for Conservation of the Spoon-billed Sandpiper (2025–2035).
The table is divided into two sections; high priority actions and supporting actions.

PRIORITY OBJECTIVES, RESULTS AND ACTIONS				
Threat /issue	**Action**	**Timescale**	**Countries**	**Organisations involved and responsible**
Objective 1. Direct human threats to Spoon-billed Sandpiper are significantly reduced				
Result 1.1. Ensure no hunting in key passage and wintering grounds				
Hunting	1.1.1 Identify major hunting hotspots and monitor known hotspots for shorebird hunting, where the Spoon-billed Sandpiper is known to or could likely frequent. *(See Table 2 for key areas where hunting is currently known to be a major issue).*	Short	Russia, China, Vietnam, Thailand, Myanmar	National NGO partners and other interested parties
Hunting	1.1.2 Advocate relevant government authorities to strengthen (where necessary) and enforce laws to prevent shorebird hunting, especially through removal of illegal nets set for hunting.	Short	China, Vietnam, Thailand, Myanmar, Bangladesh	Governments, national NGO partners, BirdLife, EAAFP/CMS (ITTEA)
Hunting	1.1.3 Where shorebird hunting is driven by livelihoods and subsistence needs, engage local communities and support ex-hunters with alternative livelihoods to displace hunting activities.	Medium	Bangladesh, Myanmar	Local government authorities, NGO partners
Hunting	1.1.4 Establish and build capacity of local Community Conservation Groups (CCGs) to address illegal hunting and engage local communities to support protect sites.	Medium	China, Vietnam, Thailand, Myanmar	National NGO partners
Hunting	1.1.5 Engage with hunting associations in the Russian Far East to increase their awareness of the Spoon-billed Sandpiper (and protected shorebird species in general) and designate no-hunting areas during key migration periods.	Medium	Russia	Birds Russia in collaboration with local hunting associations

PRIORITY OBJECTIVES, RESULTS AND ACTIONS				
Threat /issue	**Action**	**Timescale**	**Countries**	**Organisations involved and responsible**
Hunting	1.1.6 Contribute to a situational analysis on production, sale, use and regulation of nets used for bird trapping and take steps to implement recommendations.	Medium	Flyway	BirdLife International, CMS Scientific Council and ITTEA, national governments of range states, national NGO partners
Result 1.2. Ensure no by-catch in key passage and wintering grounds				
By-catch	1.2.1 Conduct surveys to understand the extent and severity of by-catch and identify priority areas for intervention.	Short	China, Vietnam, Thailand, Myanmar	National NGO partners
By-catch	1.2.2. Identify and trial solutions with local communities to prevent accidental by-catch of shorebirds and find win-win solutions for local people and birds.	Medium	China, Vietnam, Thailand, Myanmar	Researchers, relevant authorities, national NGO partners
By-catch	1.2.3 Engage authorities and those putting up nets to roll-out and implement policies and technical solutions to prevent accidental by-catch of shorebirds.	Medium	China, Vietnam, Thailand, Myanmar	Relevant authorities, national NGO partners
Objective 2. Key breeding and non-breeding sites are under stronger protection and management				
Result 2.1. All major breeding and non-breeding sites are under protection				
Site Protection	2.1.1 Formally establish the “Land of the Spoon-billed Sandpiper” in Chukotka to protect Meinypil’gyno, Okeanskoie and neighbouring breeding sites (including nominating the area nationally or as part of serial transnational World Heritage Sites).	Medium	Russia	Russian Ministry of Nature protection and Natural Resources, Chukotka Administration, BirdsRussia,
Habitat loss and degradation	2.1.2 Establish formal protected areas for key unprotected sites throughout the flyway. *(See Table 3 and Figure 3 for the list of key sites and areas which currently need protection measures).*	Ongoing	Russia, DPRK, China, Vietnam, Thailand, Myanmar, Bangladesh	National governments, national NGO partners

PRIORITY OBJECTIVES, RESULTS AND ACTIONS				
Threat /issue	**Action**	**Timescale**	**Countries**	**Organisations involved and responsible**
Habitat loss and degradation	2.1.3 Established other effective area-based conservation measures (OECMs), such as community conservation areas, for key unprotected sites (Figure 3) throughout the flyway where establishing formal protected areas is less feasible or less appropriate. *(See Table 3).*	Ongoing	Vietnam, Thailand, Myanmar, Bangladesh	National NGO partners
Habitat loss and degradation	2.1.4 Initiate programmes of conservation action at key sites for Spoon-billed Sandpiper where no such programme currently exists.	Short	Russia, Vietnam, Myanmar	National NGO partners,
Habitat loss and degradation	2.1.5 Pursue protection via World Heritage listing of key sites where this is likely to benefit their protection, management and restoration, either nationally or as serial transnational sites (building on the Chinese and ROK Yellow Sea World Heritage Sites).	Long	All range states with key sites	Range State national Natural World Heritage Authorities, relevant local governments, EAAFP, BirdLife International
Result 2.2. Improved site management supporting conservation of the Spoon-billed Sandpiper at all key sites				
Site Protection, habitat loss and degradation	2.2.1 Engage with key stakeholders and provide support at key sites to develop their skills and capacity for site management, including the establishment of local community conservation groups where appropriate.	Ongoing	China, Vietnam, Thailand, Myanmar, Bangladesh	National NGO partners, EAAFP, Ramsar Regional Centre East Asia, IUCN Asia Regional Office, BirdLife, RSPB, WWT
Monitoring	2.2.2 Monitor the status and threats at all key sites for Spoon-billed Sandpiper.	Ongoing	Flyway	Protected areas, national NGO partners, government counterparts
Site protection	2.2.3 Promote the model of EAAF Sister Sites among current and potential Flyway Network Sites to enhance collaboration and exchange on site protection and management, capacity building and scientific research under the common goal of Spoon-billed Sandpiper conservation.	Medium	Flyway	EAAFP, national governments, protected area managers, MCF, BirdsRussia, SBS TF
Improving site management	2.2.4 Establish a network of conservation stations that coordinate management activities, monitor population levels and threats as well as awareness campaigns at key sites to coordinate action for Spoon-billed Sandpiper.	Long	China, Vietnam, Myanmar, Bangladesh	MCF
Site disturbance	2.2.5 Engage with reindeer herders and other stakeholders to avoid nesting areas and negotiate alternative reindeer migration routes during the Spoon-billed Sandpiper breeding season.	Short	Russia	BirdsRussia
Result 2.3. No key sites are significantly impacted by new development pressures				

PRIORITY OBJECTIVES, RESULTS AND ACTIONS				
Threat /issue	**Action**	**Timescale**	**Countries**	**Organisations involved and responsible**
Habitat loss, renewable energy	2.3.1 Engage in development planning processes to mitigate potential adverse impacts of key sites.	Ongoing	Flyway	National government and NGO partners
Habitat loss, renewable energy	2.3.2 Policy advocacy to respond to development plans which would adversely impact important sites for Spoon-billed Sandpiper.	Ongoing	Flyway	EAAFP, SBS TF, BirdLife, RSPB, National partners
Objective 3. Key intertidal mudflats and high-tide roosting habitats are restored and developed				
Result 3.1. Previously reclaimed and degraded intertidal mudflats restored and high tide roosts are improved and developed				
Habitat loss and degradation	3.1.1 Identify both short-term and long-term coastal restoration opportunities at priority locations along the flyway.	Medium	Flyway	Government, NGO partners, researchers
Habitat loss	3.1.2. Develop and establish coastal re-alignment programmes to restore intertidal mudflats, where suitable.	Long	China, Japan, Korea, Vietnam	Government, NGO partners, INGOs
Habitat loss and degradation	3.1.3 Restore or create intertidal habitats on a large scale and according to best available knowledge of Spoon-billed Sandpiper requirements, drawing from international and regional experience.	Long	China, DPRK, ROK, Japan Vietnam Thailand	Government, NGO partners, researchers
Loss of high tide roosts	3.1.4 Trial, restore and improve artificial and natural high tide roosts including appropriate feeding and roosting conditions for the Spoon-billed Sandpiper.	Medium	China, ROK Thailand	Government, NGO partners, researchers
Result 3.2. The area of key intertidal mudflats covered by invasive vegetation is significantly reduced				
Vegetation encroachment	3.2.1 Conduct long-term removal and eradication of *Spartina* from key sites (Table 4) and collate and promote experiences in the management of *Spartina*.	Medium	China, ROK	Government, NGO partners, researchers
Vegetation encroachment	3.2.2 Engage with local authorities and avoid mangrove plantations at key shorebird feeding habitats. Only where it is essential, partially remove and subsequently control mangrove where it causes local loss of intertidal mudflat feeding habitat for the Spoon-billed Sandpiper.	Long	Thailand, China (Guangdong, Guangxi, Hainan), Bangladesh, Myanmar	Government, NGO partners, researchers

PRIORITY OBJECTIVES, RESULTS AND ACTIONS				
Threat /issue	**Action**	**Timescale**	**Countries**	**Organisations involved and responsible**
Loss of high tide roosts	3.1.3 Trial, restore and improve artificial and natural high tide roosts including appropriate feeding and roosting conditions for the Spoon-billed Sandpiper.	Medium	China, Thailand	Government, NGO partners, researchers
Objective 4. Improved reproductive success through *in-situ* measures on the breeding grounds and *ex-situ* conservation breeding				
Result 4.1. A headstarting programme is operational on the breeding grounds (while it is shown to support reduce the rate of decline of the Spoon-billed Sandpiper population)				
Small population	4.1.1 Conduct a full review to assess effectiveness of headstarting within the context of population estimates and other planned conservation measures.	Immediate	N/A	SBS TF Headstarting Sub-group
Small population	4.1.2 Maintain headstarting capacity and restart headstarting programme at Meinypil'gyno and if possible, at another breeding ground.	Short	Russia	BirdsRussia, MCF
Small population	4.1.3 Analyse survival and life cycle of headstarted birds and revise headstarting protocols accordingly.	Ongoing	Russia	BirdsRussia, SBS TF Headstarting Sub-group
Small population	4.1.4 Provide training for further headstarting in Russia.	Ongoing	Russia, China,	BirdsRussia, Durrel Institute, OIST Japan, Yancheng NR, NNU
Result 4.2. Spoon-billed Sandpiper conservation breeding programmes have been established in at least two institutions				
Small population	4.2.1 Finalise guidelines on available best practice to date, drawing from experiences so far on breeding Spoon-billed Sandpiper.	Immediate	UK	WWT
Small population	4.2.2 Progress experience with breeding small shorebirds through a breeding programme of a closely related species.	Medium	China, Sweden, Germany and other potential countries	BirdsRussia, MCF, BFU
Small population	4.2.3 Identify suitable hosting institutions for Spoon-billed Sandpiper breeding programmes.	Medium	China, Sweden, Germany and other potential countries	SBS TF Conservation Breeding Sub-group, BirdsRussia, MCF, BFU

PRIORITY OBJECTIVES, RESULTS AND ACTIONS				
Threat /issue	**Action**	**Timescale**	**Countries**	**Organisations involved and responsible**
Small population	4.2.4 Establish decision-making framework for no-regrets collection of eggs or birds for a captive conservation breeding population of Spoon-billed Sandpiper.	Short	N/A	SBS TF Conservation Breeding Sub-group
Small population	4.2.5 Establish a training centre for conservation breeding of shorebirds (*potentially in Yancheng, China*).	Medium	China	SBS TF Conservation Breeding Sub-group
Small population	4.2.6 Establish and maintain captive populations of Spoon-billed Sandpiper in at least two institutions.	Long	China, Russia, Sweden, Germany and other potential countries	Chinese and Russia governments, SBS TF Conservation Breeding Sub-group, BirdsRussia, MCF
Small population	4.2.7 Sign an MoU between Chinese and Russian governments to re-establish a captive breeding population.	Medium	Russia, China	Chinese and Russia governments, MCF, NNU, SBS TF
Objective 5. Improved understanding of migration patterns and population trends of the Spoon-billed Sandpiper to inform conservation action				
Result 5.1. Improved knowledge of the Spoon-billed Sandpiper population and migratory patterns				
Population dynamics	5.1.1 Appropriately trained researchers continue to fit numbered leg-flags to Spoon-billed Sandpipers following standard EAAFP leg-flag colour protocols.	Ongoing	Russia, China, Thailand and new sites	SBS TF Science Sub-group, national NGO partners, researchers
Population dynamics	5.1.2 Survey and monitor local Spoon-billed Sandpiper populations at currently monitored breeding, passage and wintering sites and expand monitoring to more sites. (*On breeding sites, following protocols to ensure minimal disturbance to the breeding population*).	Annually	Russia, passage and wintering countries	National NGO partners, researchers
Population dynamics	5.1.3 Conduct simultaneous mid-January surveys of Spoon-billed Sandpiper on wintering grounds.	Annually	China, Vietnam Thailand, Myanmar, Bangladesh	National NGO partners, researchers
Result 5.2. Identification of new breeding sites, passage sites, and wintering grounds				
Population distribution	5.2.1 Continue satellite tracking Spoon-billed Sandpipers sites to identify new wintering, passage and breeding sites.	Ongoing	Flyway	SBS TF Science Sub-group, national NGO partners, researchers

PRIORITY OBJECTIVES, RESULTS AND ACTIONS				
Threat /issue	**Action**	**Timescale**	**Countries**	**Organisations involved and responsible**
Population distribution	5.2.2 Model potential habitat using remote sensing data to identify potential breeding grounds (once sufficient data is available), passage and wintering grounds.	Ongoing	Flyway	SBS TF Science Sub-group, BirdsRussia, RSPB
Population distribution	5.2.3 Survey locations identified through satellite tracking and habitat modelling to assess local populations of Spoon-billed Sandpipers, threats and conservation actions needed.	Ongoing	Flyway	National NGO partners, researchers

SUPPORTING OBJECTIVES, RESULTS AND ACTIONS				
Threat /issue	**Action**	**Timescale**	**Countries**	**Organisations involved and responsible**
Objective 6. Improved understanding of the ecology and genetics of the Spoon-billed Sandpiper to inform long-term conservation needs				
Result 6.1. Understanding of habitat and ecological requirements, diet and breeding behaviour at breeding, passage and wintering sites of Spoon-billed Sandpipers.				
Ecology	6.1.1 Field studies on habitat characteristics and use, and feeding ecology.	Ongoing	Flyway	Researchers
Natural predation	6.1.2 Monitor and research the rate and trends of nest predation with camera traps at Meinypil'gyno and new breeding grounds to identify measures for predator control where required.	Medium	Russia	BirdsRussia
Human disturbance	6.1.3 Update and share best practice monitoring protocols of Spoon-billed Sandpipers on the breeding grounds, including confidentiality of newly identified breeding site.	Short	Russia	BirdsRussia
Result 5.2. Improved understanding of the genetic structure of the global population of Spoon-billed Sandpiper to understand demographic risks				
Small population	6.2.1 Establish a genome group under the SBS TF to coordinate collaboration on genetic studies that support conservation of this species.	Short	N/A	OIST and other researchers
Small population	6.2.2 Establish protocols, provide training and collect DNA samples from the wild through feather collection when birds are handled for marking.	Medium	N/A	OIST and other researchers

SUPPORTING OBJECTIVES, RESULTS AND ACTIONS				
Threat /issue	**Action**	**Timescale**	**Countries**	**Organisations involved and responsible**
Small population	6.2.3 Collect samples from museum skins and conduct analyses to help identify changes over time in genetic structure and genetic diversity.	Medium	globally	OIST and other researchers
Small population	6.2.4 Identify potential genetic bottlenecks for the Spoon-billed Sandpiper population and identify measures to improve genetic diversity.	Medium	N/A	OIST and other researchers
Objective 7. Engagement in understanding and addressing longer-term threats that impact the Spoon-billed Sandpiper and other shorebirds				
Result 7.1 Measures are in place to respond to threats from infectious diseases, especially avian influenza.				
Infectious diseases	7.1.1 Liaise closely with the EAAFP Avian Disease Working Group, in particular, and other organisations that are engaged in global surveillance of avian influenza and other infectious diseases.	Ongoing	Flyway	EAAFP, SBS TF, national NGO partners, relevant national health authorities
Infectious diseases	7.1.2 Monitor the health of shorebirds by collecting and testing carcasses for infectious diseases and sampling live shorebirds to assess pathogen presence and gut health.	Ongoing	Flyway	Researchers, relevant national health authorities
Result 7.2. Understand the exposure and impacts of pollutants on the health and demography of the Spoon-billed Sandpiper along the flyway				
Pollution	7.2.1 Assess pollutant exposure and risks by measuring pollutants on key sites, focusing on their foraging habitats in coastal wetlands and monitoring sympatric species.	Long	Flyway	Researchers
Pollution	7.2.2 Investigate the impact of pharmaceuticals, plastic debris (including microplastics), and antibiotic residuals to understand their effects on shorebirds.	Long	Flyway	Researchers
Pollution	7.2.3 Develop protocols for non-invasive monitoring to track pollutant exposure and its ecological consequences over time.	Medium	Flyway	Researchers
Result 7.3. Improved understanding of the impact of climate change on the Spoon-billed Sandpiper				
Climate change	7.3.1 Conduct ecological studies to monitor changing habitat of the Spoon-billed Sandpiper on the breeding grounds, including correlation of Normalised Deviation of Vegetation Index (NDVI), snow melt, temperature, precipitation data and changes in vegetation cover with breeding performance.	Long	Russia	BirdsRussia, SBS TF, researchers

SUPPORTING OBJECTIVES, RESULTS AND ACTIONS				
Threat /issue	**Action**	**Timescale**	**Countries**	**Organisations involved and responsible**
Climate change	7.3.2 Conduct a regional assessment of the potential impact of climate change on key passage and wintering sites of the Spoon-billed Sandpiper.	Medium	Flyway	SBS TF, researchers
Objective 8. Greater awareness and support for conservation of the Spoon-billed Sandpiper at all levels of society across the flyway				
Result 8.1. National and international policy support for conservation of Spoon-billed Sandpiper and its habitats				
International policy	8.1.1 Engage with EAAFP, CBD, Ramsar Convention, CMS, ADB and other relevant multinational and intergovernmental agencies to ensure alignment with the priorities of this Action Plan.	Ongoing	N/A	BirdLife, SBS TF, EAAFP
National Policy	8.1.2 Engage and support government and local authorities for effective conservation action to protect the Spoon-billed Sandpiper and habitats, and secure the highest level of national legal protection.	Ongoing	Flyway	EAAFP Sec, National NGO partners
Result 8.2. Communication, capacity building, education, participation and awareness (CEPA) actions address major stakeholder groups from international to national and to local levels.				
CEPA	8.2.1 Raise awareness from national to local levels of the conservation needs of the Spoon-billed Sandpiper, drawing from local to national and international events and campaigns, such as World Wetlands Day and World Migratory Bird Day; working creatively in collaboration with different groups and through various channels and media.	Ongoing	Flyway	National NGO partners, EAAFP, SBS TF CEPA Sub-group
CEPA	8.2.2 Engage local communities and other local stakeholders in conservation action for conservation of the Spoon-billed Sandpiper to prevent hunting and protect its habitat (including reactivating the “Friends of the Spoon-billed Sandpiper” at Meinypil’gyno and Anadyr-based local NGO ‘Kulik’).	Ongoing	Flyway	BirdsRussia, Local government authorities, protected areas, national NGO partners
CEPA	8.2.3 Support and promote the development and implementation of CEPA Programmes within site management plans.	Ongoing	Flyway	Local government authorities, protected areas, national NGO partners

SUPPORTING OBJECTIVES, RESULTS AND ACTIONS				
Threat /issue	**Action**	**Timescale**	**Countries**	**Organisations involved and responsible**
CEPA	8.2.4 Establish Local Community Conservation Groups (CCGs) to act as advocates and support monitor and protect the Spoon-billed Sandpiper locally.	Ongoing	Bangladesh, Thailand, Myanmar, Vietnam, China, Russia	National NGO partners
CEPA, Population dynamics	8.2.5 Develop and promote citizen science for the submission of records (ideally with photographs) of Spoon-billed Sandpipers, especially those with leg- flags.	Ongoing	Flyway	National NGO partners, researchers
Objective 9. The Spoon-billed Sandpiper Task Force is building and coordinating an international community of committed conservationists and researchers				
Coordination	9.1. Monitoring implementation of this Action Plan and reporting to the EAAFP.	Bi-annually	N/A	SBS TF
Coordination	9.2 Establish Sub-groups of the Task Force to meet regularly focussed on management and implementation of specific actions; Headstarting, Conservation Breeding, Science, CEPA, Genetics and others where a need is identified.	Immediate	N/A	SBS TF
Population dynamics	9.3 Maintain a database of site surveying and monitoring records and leg-flag records across the range of Spoon-billed Sandpiper.	Ongoing	N/A	SBS TF Science Sub-group
Population dynamics	9.4 Analyse survey data to estimate global population, including population trends and reproductive success of Spoon-billed Sandpiper.	Every 3 years	N/A	SBS TF Science Sub-group, RSPB
Population dynamics	9.5 Continue developing and updating standardised guidelines for surveying Spoon-billed Sandpiper and train local survey teams on passage and wintering grounds to follow protocols. (*Liaising closely with the EAAFP Shorebird Working Group and EAAFP Waterbird and Wetland Monitoring Task Force.)*	Ongoing	Passage and wintering countries	SBS TF Science Sub-group, national NGO partners, researchers, EAAFP

SUPPORTING OBJECTIVES, RESULTS AND ACTIONS				
Threat /issue	**Action**	**Timescale**	**Countries**	**Organisations involved and responsible**
Coordination	9.6 Annual Task Force meetings (either online, in-person or hybrid) to share information, promote collaborate and coordinate implementation of this Action Plan.	Annually	N/A	SBS TF
Coordination	9.7 Updated information and findings on Spoon-billed Sandpipers, their habitats and conservation issues and measures shared/communicated, especially among relevant scientists, NGOs and birdwatching communities, through regular bulletins, emails, social media and an updated website.	Ongoing	N/A	SBS TF
Coordination	9.8 Identify funding sources and opportunities to support implementation of this Action Plan and establish a Fundraising Sub-group of the Task Force.	Ongoing	N/A	EAAFP, BirdLife, SBS TF, national governments, National NGO partners
Coordination	9.9 Outreach to potential partners at new sites with records of Spoon-billed Sandpiper and promote engagement with the Task Force and collaboration on conservation actions.	Ongoing	N/A	SBS TF

The below tables (Table 2, 3 and 4) present the key sites and areas (Figure 3) for conservation action, based upon current knowledge. These lists of key sites are expected to evolve through implementation of the Action Plan. We currently know where only about 50% of the Spoon-billed Sandpiper population spends the boreal winter and where only 25-40% of the population breeds. The tables are based on sites or areas with counts of more than five Spoon-billed Sandpipers between January 2018 and May 2025, or areas where satellite-tagged birds indicate high potential importance. The full list of 156 sites where the Spoon-billed Sandpiper has been recorded is shown in Annex 6 and includes summaries of conservation actions identified for those sites.

Table 2. Key areas to address waterbird hunting that may impact Spoon-billed Sandpiper.

Country	Site / Area
Russia	Kamchatka Peninsula
Russia	Primorskyi Krai
Russia	Magadan Region
Russia	Sakhalin Island
China	Leizhou Peninsula
China	Guangxi coast
Vietnam	Northern Vietnam coast around Red River Delta to Quang Ninh Province
Vietnam	Mekong Delta coast
Myanmar	Gulf of Mottama
Myanmar	Ayeyarwady Delta
Myanmar	Nan Thar Island

Table 3. Current key sites and areas for establishing and strengthening protection where there are more than five Spoon-billed Sandpiper recorded between 2018 and 2025.

	Country	Site / Area	Max. no.	Protection status
	Breeding			
1.	Russia	Meinypil'gyno, Chukotka	40+	Unprotected
2.	Russia	Okeanskoie, Chukotka	15+	Unprotected
	Passage			
3.	Russia	Tyk Bay, Sakhalin	Sat. tag	Unprotected
4.	Russia	Sobolevo, Kamchatka	10	Unprotected
5.	DPRK	Ryongmae Island, Yonan	Sat. tag	Unprotected
6.	ROK	Yubudo tidal flat including Seocheon tidal flat of Geumgang estuary	5	Protected
7.	China	Jiangsu Yancheng Tiaozini; Yancheng Wetland National Nature Reserve	60	Protected
8.	China	Jiangsu Yancheng Fangtang Estuary	9	Unprotected
9.	China	Jiangsu Nantong Yangkou to Fengli	10	Unprotected
10.	China	Jiangsu Nantong Dongling	21	Unprotected
11.	China	Jiangsu Nantong Tongzhou Bay	11	Unprotected
	Wintering			
12.	China	Fujian Quanzhou Weitou Bay	8	Unprotected
13.	China	Fujian Fuzhou Minjiang River Estuary	8	Protected
14.	China	Guangdong Coast (Yangjiang, Zhanjiang, Leizhou Peninsula)	63	Partially protected
15.	China	Guangxi coast (Beihai, Qinzhou, Fangchengang)	33	Unprotected
16.	China	Hainan Danzhou Bay	6	Partially protected

17.	Vietnam	Red River Delta coast (including Xuan Thuy, Cat Hai)	8	Partially protected
18.	Vietnam	Mekong Delta coast (Binh Dai, Con Ngang, Tan Thanh)	6	Partially protected
19.	Thailand	Inner Gulf of Thailand (Pak Thale-Laem Phak Bia, Khok Kham, Khlong Phi Khut)	13	Partially protected
20.	Myanmar	Nan Thar, Rakhina	15	Protected
21.	Myanmar	Gulf of Mottama, Yangon, Bago and Mon State	105	Protected
22.	Bangladesh	Sonadia Island, Chattogram	18	Partially protected
23.	Bangladesh	Nijhum Dwip, Chattogram	6	Protected

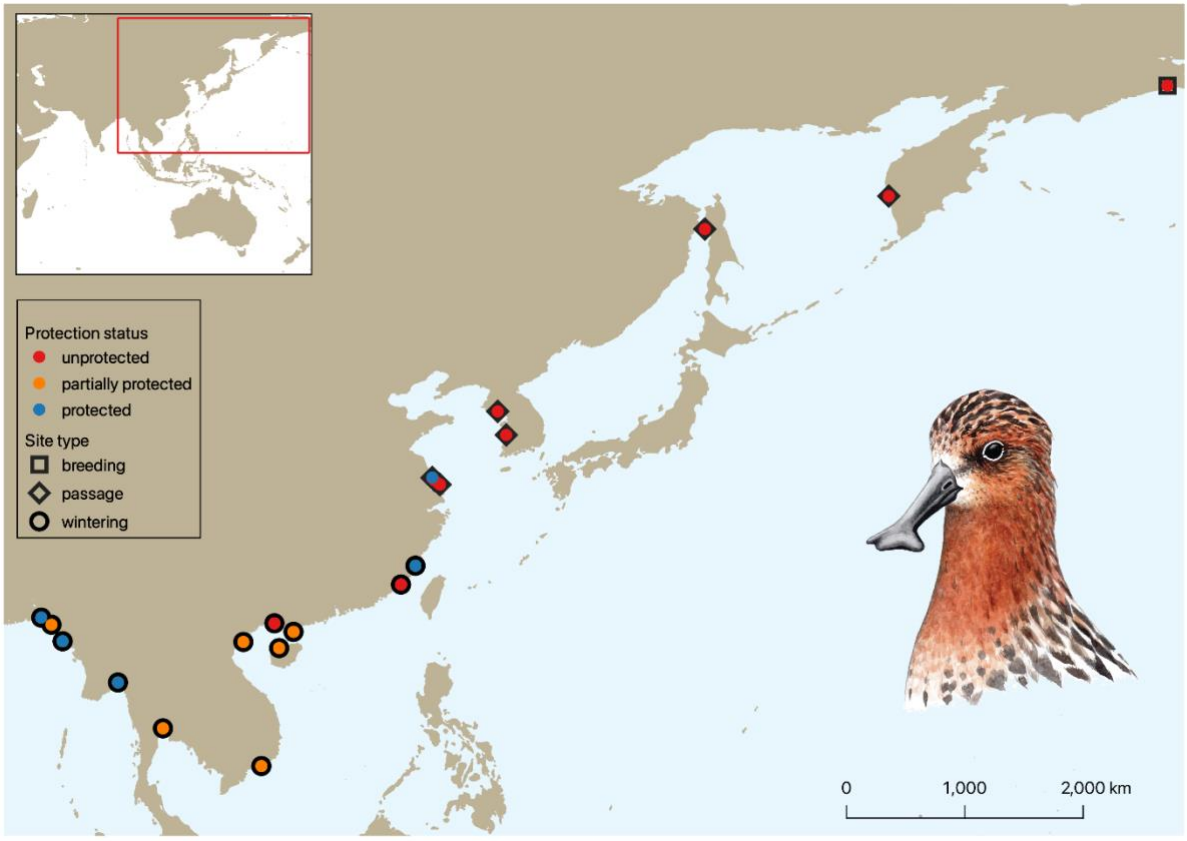

Figure 3. Key Spoon-billed Sandpiper breeding, passage, and wintering sites recorded between 2018 and 2025, categorised by protection status. Squares, diamonds and circles denote breeding, passage and wintering sites, respectively; red, orange and blue indicate unprotected, partially protected, and protected sites. Illustration of Spoon-billed Sandpiper by Ayuwat Jearwattanakanok.

Invasive Cord Grass *Spartina* has been identified as an important issue at 49 sites in China where Spoon-billed Sandpiper has been recorded. The following table lists those sites with *Spartina* with records of more than 5 Spoon-billed Sandpipers since 2018 ordered by highest to lowest counts.

Table 4. Key sites and areas in China to remove invasive Spartina and restore intertidal habitat.

Province	Site / Area	Max. no. (2018–2025)
Jiangsu	Yancheng Tiaozini (Yancheng Wetland National Nature Reserve)	60
Guangdong	Zhanjiang Leizhou Fucheng	29
Guangdong	Zhanjiang Wuchuan Shaerjiao	22
Jiangsu	Nantong Dongling	21
Guangxi	Beihai Xichang Damushen	16
Jiangsu	Nantong Tongzhou Bay	11
Jiangsu	Nantong Yangkou to Fengli	10
Jiangsu	Yancheng Fangtang Estuary	9
Fujian	Quanzhou Weitou Bay	8
Fujian	Fuzhou Minjiang River Estuary	8
Guangxi	Fangchenggang Shaluoliao	7
Guangdong	Yangxi Xitou Santouzui Beach	7
Guangxi	Qinzhou Sanniang Bay Yangwucun	6
Hainan	Danzhou Bay	6
Guangxi	Fangchenggang Shanxin sandbar	5
Guangdong	Yangjiang Pinggang	5

Illustration of Spoon-billed Sandpiper by Szabolcs Kókay.

Annex 1. Evaluation of actions taken to implement the 2008 Action Plan for Spoon-billed Sandpiper

The 2008 International Single Species Action Plan for the Spoon-billed Sandpiper (Zöckler et al., 2010a) recognised the dire status of the species and the urgent need to take action to save it from extinction. Most of the recommendations in that Action Plan have been implemented and built upon, largely as a result of the commitment and effort of the Spoon-billed Sandpiper Task Force.

The Task Force was first established as the Spoon-billed Sandpiper Recovery Team during the *Waterbirds around the World* Conference in Edinburgh in 2004 and then officially as a Task Force (SBS TF) under the EAAFP in 2010. It has been engaged in coordinated conservation efforts, research and surveys, and leveraged funding across the entire range of the species. Since 2008, many of the direct threats to the species were addressed and continue to be mitigated. Hunting has been significantly reduced at key locations. Over 800,000 ha of important Spoon-billed Sandpiper habitat has since been brought under formal protection across its range, which also benefits a great number of other waterbirds. At several sites there have been direct benefits to local communities through improved livelihoods. There is now much greater awareness of the plight of the Spoon-billed Sandpiper and it has been taken up as a flagship species for shorebird conservation in the flyway by governments, multi-national and non-governmental organisations and the wider global community. Scientific studies have led to a much better understanding of migration patterns, demography and threats, especially through advances in technology such as colour-marked flagging and satellite tagging and advances in analysis. The Task Force and the community of conservationists addressing the plight of the Spoon-billed Sandpiper has been growing and getting stronger since 2008, especially among researchers and conservationists from range states. Some of the important conservation actions undertaken were not originally identified under the 2008 Action Plan, but arose out of improved understanding from the field, as a result there is now a strong body of experience in captive breeding and headstarting, from which to build upon.

The 2008 Action Plan identified 24 recommendations for conservation of the Spoon-billed Sandpiper under seven categories; species protection, habitat protection, site management, awareness raising and education, capacity building, research and monitoring, and, fundraising. A summary of the achievements made those recommendations are presented here based upon an online consultation with Task Force members.

Species Protection

1. Publish an assessment of the potential change of status of the species from Endangered to Critical and upgrade in the Red Data Book, globally and in all range countries.
    - The Spoon-billed Sandpiper was listed as Critically Endangered in 2008 on the IUCN Red List (BirdLife International, 2024a).
2. Stop and actively prevent species persecution and collection for museums and private collections through public awareness campaigns and local self-guarding systems. List the species on Appendix 1 on the CITES Convention.
    - The Spoon-billed Sandpiper has not been recorded as being collected for museums or private collection since 2008. The only known breeding site at Meinypil'gyno has been well protected during the breeding season by annual research teams and support from a local group. The Spoon-billed Sandpiper is not listed on Appendix 1 of CITES.
3. Upgrade the legal protection status of the species in all range states and prevent persecution by local hunters.

- The Spoon-billed Sandpiper is now legally protected in 12 range countries (including being classified as a Class 1 National Key Protected Wild Animal in China in 2021), up from 10 range countries in 2008.
- Hunting remains an issue across the range of the Spoon-billed Sandpiper. Hunting was curtailed or substantially reduced in some priority wintering grounds, namely in Bangladesh, Myanmar and parts of southern China. Livelihood support and engagement with poor coastal communities have been very successful in Myanmar and Bangladesh, especially through setting-up local conservation groups, which include former hunters to monitor against hunting. However, in Myanmar, since the start of the current conflict, occurrences of hunting are again being recorded. In parts of China, strict enforcement by government authorities to take down illegal mist-nets has been very effective.

Habitat Protection

4. Identify key areas for the species and improve its legal site protection and management using national legal mechanisms and collaborative international mechanisms (e.g. Ramsar sites and Flyway Network Sites).
    - Key sites in Bangladesh, Myanmar, China, ROK and Thailand have received protected status covering over 830,000 ha altogether (Figure 3). Other sites, including Meinypil'gyno, a critical breeding area in Russia, have benefitted from the regular presence of conservationists. The percentage of important sites being protected rose from 4% at the start of the Action Plan to 17% in 2025. Among the most notable sites receiving protection since the 2008 Action Plan have been the following:
        - Parts of the eastern Ayeyarwady Delta in 2016 as Myanmar's third Ramsar and Flyway Network Site covering 50,000 ha;
        - Gulf of Mottama Ramsar Site in Myanmar established in 2017 and then extended in 2019 and 2020 to 161,030 ha;
        - Ganguirar Char (6,971 ha) in Bangladesh declared as a Flyway Network Site in 2018;
        - At Pak Thale in Thailand, an eight ha privately-owned nature reserve of salt pans was purchased for shorebird conservation in 2019;
        - Yancheng mudflats in China inscribed as a UNESCO World Heritage Site in 2019 covering 453,000 ha;
        - Getbol Tidal Flats in the Republic of Korea inscribed as a UNESCO World Heritage Site in 2021 covering 128,400 ha; and,
        - Nan Thar Island and Mayyu Estuary in Myanmar established as a Marine National Park and Flyway Network Site in 2022 covering 40,000 ha.
5. Endorse the Action Plan and integrate the activities with the East Asian – Australasian Flyway Partnership.
    - The Spoon-billed Sandpiper Task Force was the first species task force under the EAAFP and has become a model for conservation of other species within the EAAFP, most recently for the Nordmann's Greenshank (*Tringa guttifer*) Conservation Sub-group formed under the Shorebird Working Group. It has been very active within the EAAFP with cross-communication with other working groups and tasks forces as well as the EAAFP Secretariat.
    - The Task Force has brought together a network of like-minded individuals and organisations that strive for a common goal beyond political, cultural and spiritual boundaries, fostering an active global community. The number of participants has grown considerably and has met on a regular basis, both in-person and online.

- Since 2009, a biannual newsletter has been issued updating Task Force members and the global conservation community on the progress and challenges in conserving the species https://eaaflyway.net/spoon-billed-sandpiper-task-force/.
- National Spoon-billed Sandpiper Action Plans have been produced for Myanmar, Thailand, and China.

Site Management

- Projects on habitat management and restoration have been implemented or are underway, especially in China (Yancheng (Jiangsu) and Chong Ming-Dong Tan (Shanghai), ROK and Thailand (Pak Thale), developing skills in creating new habitat, managing invasive species and managing salt pans, often with cross learning from European partners and their sites.

6. Implement and improve the Integrated Coastal Zone Management (ICZM) of important stopover and wintering sites of the species.
   - The Gulf of Mottama in Myanmar was established as a Flyway Network Site and Ramsar Site (see 4 above) and supported to integrate wetland management with livelihood support for local communities, by Swiss Development Corporation from 2016–2024.
   - At the key stop-over site on the Jiangsu coast, a spectacular policy reversal by the Chinese government meant that a planned large development project on the tidal mudflats was halted and instead much of the area has been designated as part of a World Heritage Site (see 4 above).
7. Develop model projects in three countries to showcase the integration of saltpans management and shorebird conservation.
   - Saltpans at Pak Thale, Thailand, were purchased by the Bird Conservation Society of Thailand and are being managed for shorebirds, especially the Spoon-billed Sandpiper in collaboration with the local salt collectors.
8. Study the feasibility of coastal habitat restoration in technical and political terms.
   - Shanghai Chongming Dongtan National Nature Reserve in China signed an MoU with the RSPB and received technical support for restoring and managing habitat for shorebirds and has since become a site with regular records of the Spoon-billed Sandpiper.
   - MCF in collaboration with local authorities improved 75 ha of high tide roost in Tiaozini, China.
9. Revise and modify existing policies on the reclamation of inter-tidal areas to promote Spoon-billed Sandpiper conservation.
   - In China there has been dramatic change of national policy for coastal areas which has led to a moratorium in 2018 on coastal developments and aims to restore coastal wetland habitats. Together with the new Ecological Conservation Redline policy, these have led to the protection of the most important passage sites (Choi et al., 2022a). Additionally in 2016, the government of ROK ordered a halt to major land claims (MacKinnon et al., 2023).
10. Identify potential restoration sites and arrange study tours to learn about coastal restoration methods and learn from European pilots of managed coastal retreat.
    - An MoU has been signed between the RSPB and the Ministry of Fisheries of ROK that includes technical support from RSPB staff on coastal restoration and management for shorebirds.
    - Study tours to RSPB sites in the UK and to the German and Dutch Wadden Sea have been conducted for coastal site managers from China and ROK.

Awareness Raising and Education

11. Increase the awareness of the Spoon-billed Sandpiper's conservation needs through targeted campaigns at educational and federal institutions, local communities, through national and international media as well as among visiting birdwatchers and the general public.
    - CEPA activities have been implemented in nearly all range states. See Fu & Aung (2023).

Capacity Building

12. Facilitate and develop programmes to assist individuals and NGOs to have access to conservation awareness material, binoculars and telescopes for fieldwork.
    - Binoculars and telescopes have been provided to local NGOs and groups in Russia, Indonesia, Bangladesh, Myanmar, Thailand and Vietnam.
    - Local groups have been given continuous support in Bangladesh, Myanmar, Thailand, Vietnam, China with training and the provision of equipment.
13. Provide training in wader bird identification and techniques in field surveys in the inter-tidal areas, with special focus on Spoon-billed Sandpiper habitats.
    - Training has been provided across the flyway for monitoring of the Spoon-billed Sandpiper in Bangladesh, Myanmar (Gulf of Mottama, Nan Thar, Thanintharyi), Thailand (Inner Gulf), Vietnam (Mekong Delta) and China.
14. Implement national activities for coastal managers and communities to increase awareness of Spoon-billed Sandpiper and coastal management options.
    - There are many more groups and individuals actively involved in protecting and monitoring this species at important coastal sites throughout the range. Local conservation groups in Myanmar, Bangladesh, Thailand and Russia have been established and act as species guardians.
    - The Spoon-billed Sandpiper has now been adopted as a flagship species by conservation organisations and programmes and local and national governments through its range. Its cause is now becoming mainstreamed, and it is often well known outside specialist birdwatching and conservation milieux. Most importantly there is raised awareness of the plight of the species among local communities at many key flyway sites including the known breeding areas.

Research and Monitoring

15. Continue to identify further key sites in the breeding, stopover and wintering grounds through inventory work, remote sensing techniques and data logger technology to identify missing key breeding and stop over sites. (Russia, China, Bangladesh, Vietnam, Myanmar and Cambodia)
    - Satellite tagging technologies have dramatically improved and, combined with ever improving analysis of remote sensing data, have led to identification of important sites for Spoon-billed Sandpiper (Chang et al., 2020 and 2021, Chowdhury et al., 2018), which has been followed-up by surveys on the ground. So far 15 Spoon-billed Sandpiper have been fitted with satellite tags at various sites along the Flyway.
16. Continue research in the breeding areas with focus on breeding success and climate variability and changes over the last 20 years.
    - Annual monitoring of breeding success has been carried out at the current known breeding site at Meinypilg'yno in Russia.
17. Implement research in the non-breeding grounds for the identification of key coastal habitats and ecological requirements.

- Models have been developed to identify potential intertidal habitats from remote-sensing data (Bradfer-Lawrence et al., 2021) and research has been conducted on the ecology of the Spoon-billed Sandpiper in Myanmar, China and Thailand.

18. Coordinate existing conservation activities of different international organisations to avoid duplication of effort and ensure most effective cooperation.
    - The Spoon-billed Sandpiper Task Force has been coordinating actions for this species, such as through regular Task Force meetings, annual site counts, maintaining a database of records (see 21) and develop the partnership for conservation of this species.
19. Complete DNA population differentiation analyses and stable isotope analyses for the needs of conservation planning.
    - Genetic analysis has led to a better understanding of the genome and evolutionary history of the Spoon-billed Sandpiper and relationships with sister species and potential subspecies. This may help inform strategies for future captive breeding and head-starting.
20. Develop and agree on a code of conduct for researchers to minimise impact on the threatened population.
    - Protocols for working on the breeding grounds have been developed and are regularly revised.
21. Establish and enhance regular monitoring at key sites on the breeding grounds and on the non-breeding grounds.
    - Annual monitoring is occurring at many key sites, often led by local groups, and with careful recording of leg-flags, and is helping to refine estimates of the global population size and trend. A database of Spoon-billed Sandpiper records, including leg-flags has been established (Bunting & Zöckler, 2006) and it is planned to be developed into an online version to inform conservationists, with over 2,000 records to date (Katherine Leung, in litt., 2024).
22. Apply remote sensing and GIS techniques to mapping of remaining suitable habitats and their monitoring.
    - See 15.
23. Promote and populate the GIS based species database as a vital monitoring tool
    - See 21.

Fund raising

24. Raise funding from international and national sources to support the implementation of the Action Plan.
    - Fundraising activities have generated on average annual funds of 100,000 to 400,000 US dollars for conservation of the Spoon-billed Sandpiper across the flyway through implementation by national partners. This is a very conservative estimate as it does not take into account projects for which protection of the Spoon-billed Sandpiper is secondary to the goal of the project, e.g. reducing poverty among coastal communities in Myanmar, which removes reliance on shorebird hunting. Nor does this estimate include the in-kind contribution of the many individuals and organisations that have provided their precious resources to supporting the Action Plan.

The need and possibility to take urgent action on headstarting and conservation breeding were not foreseen at the time of the first Action Plan. Nevertheless, these have become important components of work on the Spoon-billed Sandpiper and will need to be developed further in the next Action Plan.

- Headstarting has been trialled and applied successfully on the breeding grounds as a result of international collaboration that has built the skills of Russian scientists to manage this pioneering approach (Loktionov et al., 2023). It has led to 236 birds being released, contributed to an increase in the global population compared to a scenario without headstarting (see Annex 3.d).
- Despite best efforts and global experience and cutting-edge breeding techniques, a captive breeding population could not be established, but an immense amount of experience and understanding about breeding Spoon-billed Sandpipers has been generated as a result (see Annex 3.d). Early experiences led directly to assisting the establishment of the headstarting intervention.

Annex 2. Spoon-billed Sandpiper ecology and population

The Spoon-billed Sandpiper is a small calidrid shorebird that breeds on the coastal tundra of Chukotka Province, in the far north east of Russia. Unusually for shorebirds, it is only known to breed within about 12 km of the coast, mainly on lagoon spits with moss-sedge tundra and dwarf bush vegetation (Tomkovich, 1995, Syroechkovskiy, 2005, Zöckler et al., 2010b, Lappo et al., 2012). One satellite-tagged individual was recorded far in-land and at higher elevation during the breeding season in 2024 (K. Leung, in litt., 2024). Although this doesn't indicate a new breeding ground per se it is indicative of how much we still can learn about this species. Breeding birds arrive at breeding sites by the end of May/early June and clutches of usually four eggs are laid in mid-June on the ground among the crowberry *Empetrum nigrum* and moss-sedge tundra. Chicks usually hatch during the first half of July and by mid-August nearly all the Spoon-billed Sandpipers have left their breeding grounds and are heading south. They may fly as much as 8,000 km, through Kamchatka and Sakhalin in Russia and Japan, stopping over at critical sites in DPRK and China (Tong et al., 2012, Peng et al., 2017, Green et al., 2018) to spend the boreal winter on the mudflats of South China, South and South East Asia Zöckler et al., 2016). En route, both north and south, they congregate on the mudflats of the Yellow Sea coasts, where they refuel and undergo body moult and primary moult (Tong et al., 2012, Yang et al., 2020). The Yellow Sea has critical bottlenecks, such as at Tiaozini, Yangkou and Dongling in southern Jiangsu Province, China, where about 40% of the global population is estimated to stop on passage during southward migration (Chang et al., 2019). The annual migration cycle is completed when they arrive back on the breeding grounds in late May / early June.

Due to its highly threatened status and charismatic appearance, the Spoon-billed Sandpiper is often considered as a flagship species for conservation of shorebirds on the EAAF (Zöckler et al. 2010b, Pain et al., 2018). This flyway is home to over 50 million migratory waterbirds, including 34 globally threatened species (Mundkur & Langendoen, 2022 and BirdLife International, 2024b); the highest proportion of threatened species among the world's flyways, thus qualifying the EAAF as the flyway of highest conservation priority for migratory birds globally (BirdLife International, 2020). Therefore, conservation measures which enable the recovery of the Spoon-billed Sandpiper population will undoubtedly benefit many other migratory shorebird species using the same sites along the EAAF. Protection of coastal wetland sites used by the Spoon-billed Sandpiper can also benefit millions of people who depend on these wetlands either directly or indirectly for the ecosystem services that they bring.

The global population of mature Spoon-billed Sandpipers is currently estimated to be between 330 and 550 individuals (Zöckler et al., 2020, Green et al., 2024, Chowdhury & C. Zöckler, 2025). Before 2010, the rate of decline of the population was estimated to be at 26% (Zöckler et al., 2010b). A decline continues to be observed, but at a slower rate. The breeding

population monitored at Meinypil'gyno in Chukotka, Russia, over the past 23 years has steadily declined but at a slower rate, especially after including head-starting as a key conservation measure (Loktionov et al., 2023, see also Figure 4).

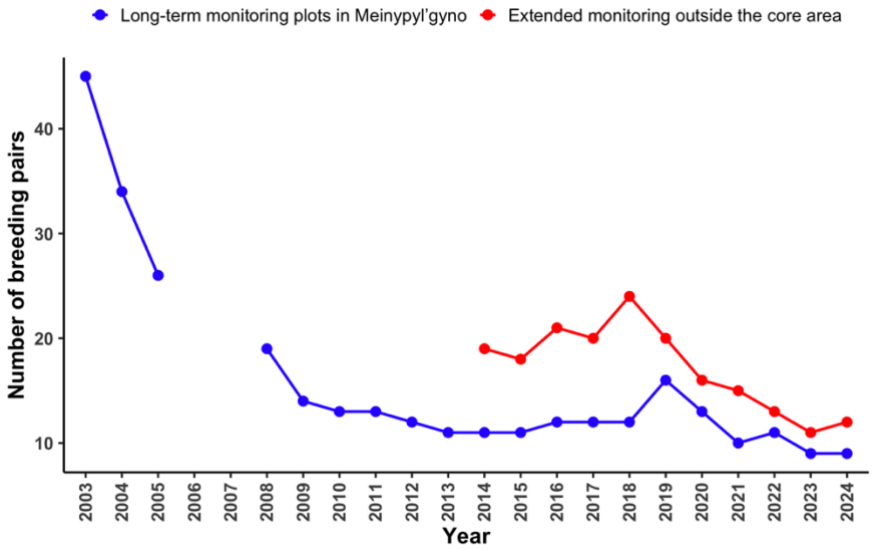

Figure 4. Spoon-billed Sandpiper population estimates on the breeding grounds at Meinypil'gyno between 2003 and 2024, showing the main monitoring area (dark blue line) and total population within a larger area around the site (red line). Source: Lappo et al., 2024.

Table 5 shows key non-breeding sites where the Spoon-billed Sandpiper is monitored through simultaneous counts and which also indicates an on-going decline (see Table 5). An improved dataset from years of monitoring at five major sites over the past 17 years has enabled a more precise estimate of the rate of decline to be calculated at about 5% per year (Green et al., 2024 and Figure 4) and highlights the urgency to further scale-up conservation efforts.

Table 5. Sites and records of recent mid-winter Spoon-billed Sandpiper counts (conducted around mid-January each year)

Site	Country	2020			2021			2022	2023	2024	2025
		Total	Flagged	% flagged	Total	Flagged	% flagged	Total	Total	Total	Total
Southern China	China	49	13	27%	61	16	26%	67	70	54	62
Mekong Delta	Vietnam	6	1	17%	5	0	0%	4	4	5	4
Red River Delta	Vietnam				8	0	0%	2	0	1	1
S Central Vietnam	Vietnam								1	0	0
Gulf of Mottama	Myanmar	105	24	23%	42	2	12%	80	19	34	61
Ayeyarwaddy Delta	Myanmar				1	1	0	1	1		0
Bokpyin	Myanmar				1	0	0	1	0		0
Nan Thar	Myanmar	18	2	11%	5	2	40%	7	7	5	
Inner Gulf of Thailand	Thailand	11	4	36%	7	2	29%	8	11		
Sonadia Island	Bangladesh	12	3	25%	4	2	50%	4	4	5	2
Nijhum Dwip	Bangladesh	6	2	33%	2			0	0	0	0
Chattogram	Bangladesh	4	1	25%	3	1	33%			0	0
Ganguirar Char	Bangladesh							2		1	1
Selangor	Malaysia									1	1
Total		**211**	**50**		**137**	**25**		**176**	**117**	**118**	**142**

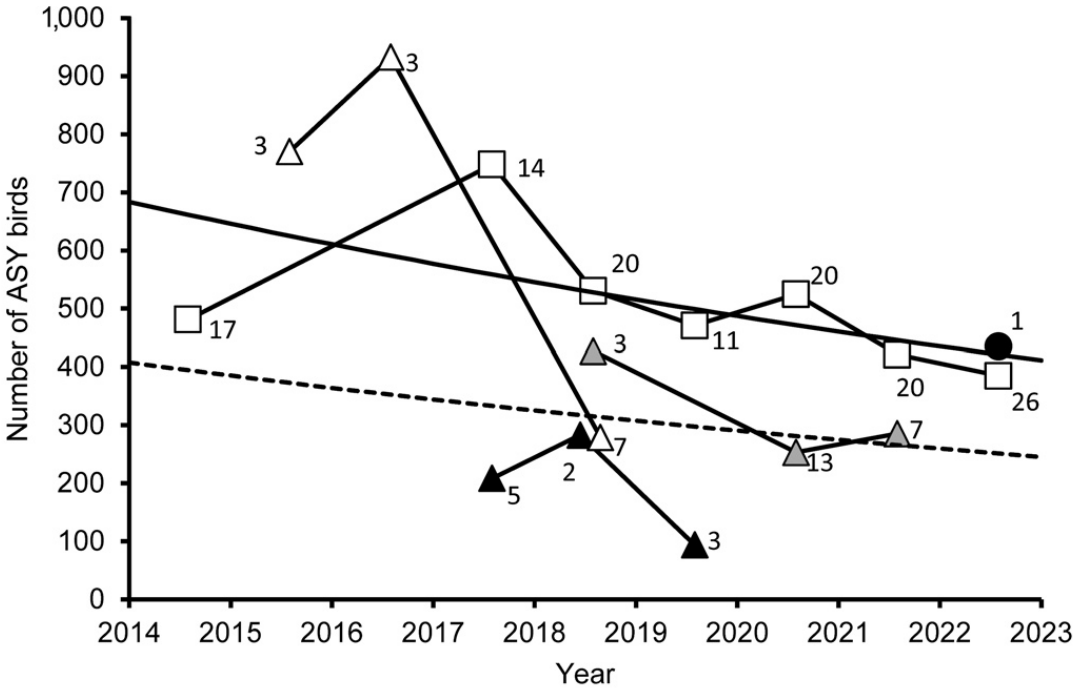

Figure 5. Estimates of the world population of adult (ASY = after second year) Spoon-billed Sandpipers, based upon 17 scan surveys at five sites. (Jiangsu, China = open square; Leizhou, China = upward grey filled triangle; Gulf of Thailand, Thailand = filled circle; Gulf of Mottama, Myanmar = upward open triangle; Sonadia, Bangladesh = upward filled triangle). Surveys were carried out in the post-breeding period (1 August–15 October) at Jiangsu and during the boreal winter in November–March at the other four sites. Numerals adjacent to each symbol show the minimum number of individually marked birds recorded during each scan survey. The curves show results in which the natural logarithm of the population estimate was a linear function of year with the same slope, but different intercepts, for surveys conducted in the post-breeding (solid line) and boreal winter (dashed line) periods. Extracted from Green et al., 2024.

Annex 3. Issues and threats

Despite focused conservation efforts over the past 15 years, the population of the Spoon-billed Sandpiper continues to decline albeit at a lower rate than pre-2010 (Green et al., 2024). The primary drivers behind this ongoing decline have shifted in location, intensity, and nature since 2010. While some uncertainty remains, especially due to challenges to access parts of the migration route, key threats have been identified as having important impacts on the Spoon-billed Sandpiper population and other issues which may have longer-term impact are also recognised. Many of the key issues were already identified in 2008 and while progress has been made to address most of them, they remain pertinent to this Action Plan. In the intervening years, our understanding of their scope, causes and impacts, and the means to address them have improved.

A database of 156 non-breeding sites (see Annex 6) where the Spoon-billed Sandpiper has been recorded was compiled by contributors to this Action Plan, mainly during 2023 with further records added up to May 2025. Contributors were also asked to identified key threats to the Spoon-billed Sandpiper and conservation actions needed at the respective sites.

Figure 6 below presents a summary of site threats and the number of sites where they were recorded to show threat frequency across the range. Annex 6 shows the full list of sites with actions required, where they could be defined.

Figure 6. Threats identified across 156 passage and wintering sites where Spoon-billed Sandpiper has been recorded. Priorities defined by; Red (high) occurs at more than 60% of sites, Yellow (medium) occurs at between 20 and 60% of sites, Green (low) occurs at less than 20% of sites.

Threat		Total sites identified with threat (out of 156)	Priority
Direct mortality from people	Hunting	53	
	By-catch	10	
Habitat loss and degradation	General	5	
	Aqua/agric-culture	14	
	Lack of high tide roost	49	
	Sandmining	1	
	Mangrove encroachment	16	
	Spartina	49	
	Coastal erosion & sedimentation	7	
Development	Residential & commercial development	40	
	Upstream water management	1	
	Transport & service corridors	8	
	Land claim	6	
	Renewable energy	11	
Pollution	General	3	
	Domestic & Industrial	2	
	From aqua/agri-culture	6	
	Plastic	2	
	Ocean waste	3	
Human disturbance	Recreation	15	
	Work & other activities	18	

By 2023, only 46 (30%) of all sites where the Spoon-billed Sandpiper have been recorded are protected in any way (including national protected areas, Ramsar sites and non-governmental protection) and only 26 (17%) are fully-protected. Figure 1 (page 10) shows these sites along the Flyway and their level of protection. For the 10 sites with records of 10 or more individual Spoon-billed Sandpipers, the level of protection is not much higher with 60% having no form of protection.

The high priority threats to address on migratory passage and wintering grounds have been identified as direct mortality due to human actions, either intentional (hunting) or unintentional (by-catch), and habitat loss and degradation (including high-tide roosts which are often overlooked) from development pressures (Zöckler et al., 2016, Peng et al., 2017, Yang et al., 2022). Figure 6 shows that encroachment by the cord grass, *Spartina* on mudflats is a priority issue around the Yellow Sea and southern China, which is a major part of the Spoon-billed Sandpiper's range. The low Spoon-billed Sandpiper population itself is another concern which could lead to genetic fragility in the population and exposure to devastating one-off natural events.

Other important site-based threats which are widespread throughout the passage and wintering range (Figure 1) include various sources of pollution and incidental human disturbances from various activities both work-based and for leisure (Figure 6). At the key breeding site at Meinypil'gyno, threats come from natural predators and human-based disturbance. Changes in habitat due to climate change have also been noticed at several sites along the breeding range (Syroechkovskyi & Zöckler, 2009), which may present a long-term

issue for breeding success. There are also longer-term issues that need addressing such as the impact of climate change, pollution and avian diseases (Chowdhury & C. Zöckler, 2025).

Despite regular surveying of potential coastal breeding sites (which has logistical challenges due to remoteness of the region) our knowledge of current breeding sites remains incomplete. Likewise, we still don't know where about 50% of the global population spends the boreal winter, nor where are some of the key stopover sites, especially on migration along the coasts of Russia and North Korea. Therefore, continued monitoring and research is a high priority and should need to be expanded to list of key sites.

The following sections describe these issues in more detail.

a. Direct mortality from hunting and by-catch on staging and wintering grounds

Hunting is known to be a significant threat and driver for the decline of migratory shorebirds on the stopover sites and wintering grounds of the EAAF (Lobkov, 1980; Melville, 1997; Chowdhury 2010, Zöckler et al 2010c; Turrin & Watts, 2016, Eberhardt 2016; Gallo-Cajiao et al., 2020, Matsyna et al., 2023a and 2023b). Our review of sites and a 2023 survey of Task Force members recognises hunting as the most widespread direct threat to the Spoon-billed Sandpiper and one of the most common issues across non-breeding range (Figure 6). Hunting is thus a high priority immediate threat for this Action Plan to address. The motivations behind the shorebird hunting which threatens the Spoon-billed Sandpiper vary across the flyway, but as a species it is usually not targeted directly. Direct hunting is not the only threat; Spoon-billed Sandpipers are also known to be caught in species-indiscriminate shootings (Matsyna et al 2023a,b) and as by-catch in traps intended for other species such as fish, or in nets and other devices set up as deterrents to protect aquatic resources, such as molluscs, prawns and fish, from birds (Liang et al., 2023; Angkaew et al., 2022).

Recreational hunting during the migration in Russia

Hunting birds, especially waterfowl and large waders, is deeply rooted in the culture of the Russian Far East. Questionnaire surveys and interviews in 2019 in Kamchatka, 2020 in Sakhalin and 2022 in Magadan Oblast, led to a first approximation of the magnitude of shorebird hunting in this region (Matsyna et al., 2023a). About 30,000 people receive annual permits to hunt birds, mainly waterfowl, but also potentially shorebirds. Whimbrel (*Numenius phaeopus*) is usually the species targeted, although sometimes also Far Eastern Curlew (*Numenius madagascariensis)*. Other shorebirds are hunted by teenagers, gourmet hunters, fur trappers or opportunistically by casual hunters. Shorebird species which form mass aggregations at stopover sites when waterbird hunting is in the open season are most strongly affected. Hunters usually shoot at dense flocks targeting small and medium shorebirds, which may result in killing of Spoon-billed Sandpipers. The hotspots for hunting are concentrated along the coast of the Sea of Okhotsk; the western and southern coasts of the Kamchatka Peninsula, northern Sakhalin Island, the coastal districts of Khabarovsk Krai and around the city of Magadan and Olsky district of the Magadan Oblast. The total number of small shorebirds hunted was estimated as 20,500 in Sakhalin, 6,000 in Kamchatka, 5,000 in Khabarovsk Krai, and 1,200 in Magadan Oblast and estimated to kill up to 30 individual Spoon-billed Sandpipers annually (Matsyna et al., 2023a). Of the five Spoon-billed Sandpipers satellite-tagged on a northward migration in 2018, two stopped transmitting in Kamchatka, suggesting mortality. The current level of hunting in the Russian Far East and its potential impact on the mortality of Spoon-billed Sandpipers needs much better understanding.

Hunting for consumption in the wintering areas

Targeted trapping of waterbirds continues to remain ubiquitous at the southern end of the Spoon-billed Sandpiper's range. It occurs in many wetland habitats, such as paddy fields,

marshland, intertidal flats and at major roost sites such as aquaculture ponds, which are largely either unpoliced or not legally protected (Martinez & Lewthwaite, 2013; Angkaew et al., 2022; Yong et al., 2022).

The Spoon-billed Sandpiper is not specifically targeted by hunters on the wintering grounds, but they can get caught opportunistically when larger waterbirds are being targeted. Motivations to trap and hunt waterbirds vary. In the coastal areas of Myanmar and Bangladesh, local fisher people trap wild birds for sale to supplement livelihoods, often due to declining fish stocks or lack of necessary fishing equipment forcing a shift of their source of livelihood (Zöckler et al., 2010c, Chowdhury, 2010, Aung et al., 2023). This hunting is often opportunistic and supply driven as there is not usually a culture of eating shorebirds. They employ improvised fishing nets and mist-nets to trap shorebirds in a non-targeted way. Hunting has been substantially reduced rate in Myanmar and Bangladesh where there have been intensive conservation measures to provide alternative livelihoods to ex-hunters, while conducting awareness raising among local communities and targeted shorebird protection activities. Former hunters are now also involved in local conservation groups and even support bird surveys in the Gulf of Mottama and other places in Myanmar (Aung et al., 2024). In Vietnam's Red River and Mekong Delta regions and the southern and south-eastern coasts of China, many species of migratory shorebirds are trapped in large numbers for the restaurant and wild meat trade, often using mist-nets and improvised nets set up in aquaculture ponds, salt pans and intertidal flats (Martinez, 2016, Nguyen et al., 2022; Yong et al., 2022, Yang et al., 2022). These nets can be at very high densities in southern China (Martinez & Lewthwaite 2013), but positive support from Chinese authorities has resulted in a major crackdown on such illegal hunting (Chowdhury et al., 2020).

While hunting has been substantially reduced in Bangladesh, Myanmar and parts of southern China, it remains an issue that needs to be monitored, as downturns in economic opportunities may force a return to hunting. Sadly, this is being seen in Myanmar as the civil war has led to some resumption of hunting replacing other lost opportunities for livelihoods (Aung et al., 2024).

Accidental by-catch

Less well known as a threat to the Spoon-billed Sandpiper are standing nets and other trapping devices which are set up in coastal areas for purposes other than trapping shorebirds. Nets and devices may be placed for fishing and become exposed at low tide or may be set-up to protect aquatic resources, such as clam seedlings, from waterbirds. The coasts of Zhejiang and Fujian provinces in China are hotspots, with high densities of nets put out on mudflats in order to protect razor clam (*Sinonovacula* spp.) fisheries. In April and May 2021, Liang et al., (2023) conservatively estimated that two sites in Zhejiang and Fujian entangled approximately 13,676 shorebirds within 8 to 9 km^2 of intertidal foraging habitat. Out of another 32 razor clam sites visited, 17 were found with similar levels of netting, indicating that this is a major threat to shorebirds, the scale of which is just beginning to emerge. A proposed solution to this issue is to remove netting immediately after the razor clam harvest before April/May, which would prevent most mortality of migratory birds during the spring northward migration. Implementation of such as solution will require political buy-in, engagement of fishermen and additional resources, but can be seen as a win-win. Fishing nets are often put up on intertidal mudflats, such as in the Gulf of Mottama where they have been known to trap shorebirds including the Spoon-billed Sandpiper (Aung et al., 2024). By-catch from deterrent netting for fish and clams has also been documented as a problem in China and Thailand (Angkaew, 2022).

b. Habitat loss on staging and wintering grounds

Like many migratory waterbird species, a large portion of the Spoon-billed Sandpiper population congregates in a small number of intertidal staging (also known as stopover) and wintering grounds. Such sites can have an importance disproportionate to their area and the amount of time they are used. Habitat modelling has shown that a limited number of staging sites are suitable for Spoon-billed Sandpiper, with the Yellow Sea being particularly important (Bradfer-Lawrence et al., 2021). A network of sites supporting appropriate tidal wetlands and high tide roosts across the flyway is essential for a Spoon-billed Sandpiper to survive its arduous migration. Currently only about a third of the sites identified for Spoon-billed Sandpipers have some level of formal protection.

Along the EAAF, shorebird population declines have been largely attributed to the loss of critical staging habitats, especially tidal mudflats on which Spoon-billed Sandpipers depend (MacKinnon et al., 2023; Piersma et al., 2017; Studds et al., 2017). Globally, there has been a net loss of 4,000 km^2 of tidal wetlands from 1999 to 2019, three-quarters of which has occurred in Asia (74.1%), with 68.6% concentrated in just three countries: Indonesia (36%), China (20.6%) and Myanmar (12%) (Murray et al., 2022). Asian wetland loss has been attributed primarily to human activity, such as land claims and coastal development (Bunting et al., 2022; Goldberg et al., 2020; Murray et al., 2014 & 2022; Wang et al., 2021). In the Yellow Sea (including Bohai Bay), 65% of intertidal wetlands were reported lost in the five decades up to 2014, leading to steep shorebird population declines (Studds et al., 2017; Murray et al., 2014).

Our review of threats to sites identifies the loss of habitat as a major issue for the Spoon-billed Sandpiper across the range of staging and wintering areas. Infrastructure and industrial developments in coastal areas are widespread issues, as well as the conversion of important areas, especially high tide roosts, to supratidal aquaculture and agriculture areas and solar farms. Tidal mudflat loss also results from developments far from the coastal sites as infrastructure, such as dams, change the patterns of flow of sediments into estuarine and coastal areas (Glover et al., 2021). Encroachment of mudflats by Smooth Cordgrass *Spartina alterniflora* is a major issue for the coastlines of China and ROK, and potentially DPRK and Vietnam and mangrove encroachment a potential issue in Bangladesh and Myanmar. These drivers of habitat loss are described in more detail here.

Coastal land claim

Land claims in the Yellow Sea have had a dramatic impact on shorebird populations in the EAAF and been described as being the biggest component of intertidal habitat loss (MacKinnon et al., 2023). China was considered a hotspot for land claim, with over 3,000 km^2 of mudflats having been claimed during the past 30 years along the coast of the Yellow Sea and further south in Zhejiang Province (MacKinnon et al., 2012, Martinez, 2016). In an abrupt turn for the better, on 25 July 2018, China's State Council published a circular to cease further coastal land claims and where necessary carry out ecological restoration. This has largely stopped land claims, although with some notable exceptions (MacKinnon et al., 2023). Importantly, this circular led to the cancelation of plans to establish one of the largest potential land claims in China at Tiaozini, Dongtai County, Jiangsu Province. This huge site has one of the largest annual gatherings of Spoon-billed Sandpipers during the southward migration and is where individual birds may spend a month moulting and refuelling (Tong et al., 2012, Peng et al., 2017, Chang et al., 2019, Yang et al., 2020). The area is now listed as a natural World Heritage Site as a critical site for many other migratory waterbird species.

China is not the only country to have lost vast swathes of intertidal habitat. In ROK, shorebird abundance was shown to decline by approximately 95% and 97.3% during the northward and

southward migrations, respectively, as a result of the Saemangeum reclamation which led to the loss of 27,000 ha of tidal flats (MacKinnon et al., 2012) and more than 200 Spoon-billed Sandpipers no longer use the site (Lee et al., 2017). Nevertheless, in 2016, the ROK government suspended large-scale coastal land claim projects, but small-sized land claims still exist at certain sites (MacKinnon et al., 2023).

Analysis using satellite imagery indicates an increase in the pace of land claims for coastal wetlands in the Democratic People's Republic of Korea (DPRK) with about 500km^2 having being added since 2008 and a plan for 3,000 km^2 (M. Fanck in lit, MacKinnon et al., 2023). One of the likely affected sites is the unprotected Ryongmae Island mudflats in Gyeonggi Bay, Yonan – a critically important staging site for Spoon-billed Sandpipers where 38.5% of tagged Spoon-billed Sandpipers from the Meinypil'gyno breeding ground have stopped during migration (Green et al., 2018; Chang et al., 2020).

Mudflat loss from vegetation encroachment

Smooth Cordgrass, *Spartina alterniflora*, is a north American grass often used to stabilise coastlines. It was introduced into China in 1979 for ecological coastal engineering (Wang et al., 2006) and has continued to spread in coastal areas forming dense monocultures with its coverage increasing to 54,580 ha by 2015 (Mao et al., 2019). *Spartina* is now recognized by the Chinese government as a priority invasive exotic species for control due to its negative ecological impact; reducing the availability of foraging and roosting habitat for waterbirds (Stralberg et al., 2004; Gan et al., 2010; Lyu et al., 2023), reducing the density and biomass of macrobenthos in unvegetated shoals (Chen et al., 2018; Okoye et al., 2020), and altering the structure of macrobenthic invertebrate communities (Chen et al., 2009; S. Wang et al., 2021). In China, at 14 sites where Spoon-billed Sandpiper occurs in internationally important numbers, *Spartina* now takes up 61% of the area (Jackson et al., 2021a). In 2023, the Chinese government has issued a policy for over 90% of *Spartina* to be removed by 2025 and large-scale removal is now being carried out along the coast. However, it is currently uncertain if the restored areas will return to their "natural state" as mudflat feeding habitat, and if resources are allocated to effectively tackle any further regrowth of *Spartina* after 2025. While it remains a major issue in China, *Spartina* has also been detected spreading into the Korean Peninsula and Japan (Maebara et al., 2020), and being known from Guangxi could spread to Vietnam.

Mangroves are a critical coastal habitat for biodiversity and communities, but globally mangrove extent has decreased dramatically since the 1950s (Giri et al., 2011; FAO, 2020). Nevertheless, during the past two decades the rate of decline has decreased, with about half of the total loss being offset by the expansion of mangroves into areas where they were not present in 2000 (Leal & Spalding, 2024). This represents a dilemma as mangrove restoration, which is recognised as an important ecological need, often occurs on important tidal mudflats for foraging shorebirds (Choi et al., 2022). Mangroves are usually first lost from upper tidal flats where development prevents mangrove reforestation, thus driving restoration and afforestation efforts to middle tidal mudflats where mangroves may not have originally occurred. Some important sites for Spoon-billed Sandpipers have become potential areas for mangrove afforestation, including Shanwei and Leizhou peninsula in Guangdong province and Danzhou Bay, Hainan province in China, the southern Gulf of Mottama, Nanthar Island and the Myeik Archipelago in Myanmar, and the Meghna Estuary (especially Nijhum Dwip National Park) in Bangladesh. Mangroves have also naturally encroached onto important high-tide salt pan roost and feeding areas at Pak Thale, Phetchaburi province, in Thailand.

Loss of high-tide roosts

High-tide roosts for shorebirds are often overlooked, as they are frequently located in coastal areas with high human population density within the EAAF and often perceived as lesser

importance for biodiversity. Nevertheless, man-made habitats often play key roles as roosts for shorebirds at high tide when the mudflats are covered (Jackson et al., 2020) and could be a more important limiting factor for coastal shorebirds than availability of feeding areas at some sites. The key sites for Spoon-billed Sandpiper in the Inner Gulf of Thailand are prime examples of this, as shorebirds use less saline saltpans for foraging as well as roosting. These saltpans are threatened by conversion to other purposes such as aquaculture or solar farms, even as they have now become a major draw for birdwatchers and bird photographers (Green et al., 2015). In China, many areas on the landward side of concrete seawalls that were part of land claims have inadvertently become important high tide roots. That is until they are developed for industry, urban areas, deep water aquaculture, agriculture or solar farms. High-tide roosts are often inadvertently overlooked when planning for wetlands and reserves, as their functional link to the tidal flat ecosystems may not be fully realised. The potential lack and loss of safe high-tide roosts has been identified by Task Force members as a major cause for concern at many of the sites in China. International guidelines have been produced to support their management (Jackson et al., 2021b).

c. Pressures on the breeding grounds

The Spoon-billed Sandpiper was previously known to be breeding at many locations across a range from the Chukchi Sea in the north to Northern Kamchatka in Russia, but by 2012 the number of known breeding areas was reduced to only a few on the southern Chukotka coast, with Meinypil'gyno being only known with any significance. In 2011 and 2016, two new breeding sites were discovered on the southern Chukotka coast with the help of Heritage Expeditions (Lappo & Syroechkovskaya, 2016) and in 2015 a new breeding area was discovered at Okeanskoie relatively close to Meinypil'gyno (Syroechkovskiy, 2015). Other sites in southern Chukotka show promise for more surveys (Lappo et al. 2023). The reasons for the disappearance of Spoon-billed Sandpipers from so much of its breeding range is not well understood.

Natural predators

Camera traps used between 2012 and 2024 on the nests of Spoon-billed Sandpipers and other shorebirds at Meinypil'gyno, showed predation from Red Fox *Vulpes vulpes*, Arctic Fox *Alopex lagopus*, Arctic Ground Squirrel *Urocitellus parryii*, Brown Bear *Ursus arctos*, Arctic Skua *Pomarinus stercorarius* and Raven *Corvus corax*. Because of the high rate of nest predation at Meinypil'gyno and its high risk for Spoon-billed Sandpiper breeding success it is important to continue the monitoring of nest survival using other wader nests and to identify ways to manage predation within the area (Lappo et al., 2024). Although, natural predation would be compensated by the relatively long lifespan of the Spoon-billed Sandpiper of about 14–16 years (P. Tomkovich pers. comm.).

Human-related disturbance

Although Chukotka is very thinly populated, 90% of the human population lives along the coast. In 2004, there were known to be 20 settlements and over 50 fishing camps in the vicinity of breeding Spoon-billed Sandpipers (Syroechkovskiy, 2005). Considering the high site fidelity of the species the constant presence of human habitation so close to the breeding sites does have an impact. At Meinypil'gyno, trampling by reindeer herding, hunting, fishing, off-road vehicles and recreational activities by local people as well as roaming village dogs are all known to disturb the Spoon-billed Sandpipers. However, there is now greater awareness of the Spoon-billed Sandpiper among local people and disturbance is observed to be relatively low, following years of engagement by BirdsRussia, and the establishment of the 'Friends of the Spoon-billed Sandpiper' local conservation group.

Research and monitoring activities can cause disturbance to this species, but may be vital for its conservation. Capturing adult breeding birds on the nest, searching for nests and leaving traces may attract predators, such as foxes (Tomkovich et al 2018). Two out of 76 nests found by researchers were abandoned after being monitored, potentially due to the observer influence. Therefore, only experienced and well-trained researchers should be allowed to search for nests, catch and ring these birds and all such research should follow a voluntary code of conduct.

Hunting for skins on breeding grounds

Being a rare and charismatic bird, the Spoon-billed Sandpiper has always been a target for museums and private collectors, especially for its breeding plumage. As with many other species (Courchamp et al., 2006), the rarer the species becomes, the more attractive it is for collectors. It is no longer possible to get an official permit for collecting the species in Russia, and the practice has been driven underground so is difficult to document. Local people were often paid handsomely by collectors to take them to Spoon-billed Sandpiper breeding sites or for specimens (one report of several thousand USD for a specimen). There has been no evidence of collecting at any known breeding sites since the preparation of the previous Action Plan, but it should not be overlooked as a potential further threat.

d. Conservation interventions for a very small global population

The global population of the Spoon-billed Sandpiper is by far the smallest of any migratory shorebird and we know that the population is still in decline (Green et al., 2024). The survival of the Spoon-billed Sandpiper is also intrinsically threatened by the fact of its small global population spread and moving across a large range. Despite the best conservation efforts to address the threats outlined above, the Spoon-billed Sandpiper is vulnerable to stochastic impacts and ad hoc threats along the flyway. In addition, inbreeding threatens the genetic viability of the population and has already been observed between related individuals in Meinypil'gyno in 2023 and 2024 where breeding behaviours have been closely followed for over two decades (Ivanov et al., in prep). Two innovative approaches have already been carried out to address this issue with varying degrees of success: *in-situ* headstarting and *ex-situ* conservation breeding. Both approaches remain crucial to the success of this Action Plan and need further development.

Headstarting

Headstarting is a novel conservation approach designed to improve reproductive success whereby eggs are collected and incubated and the chicks raised in captivity prior to immediate release when they mature enough; thus avoiding predation and other threats at these very vulnerable stages (Loktionov et al, 2023). It can also stimulate production of a replacement clutch by the parents, further increasing egg productivity per pair of birds. Since 2012, headstarting at Meinypil'gyno has led to the release of 236 headstarted juveniles (Loktionov et al., 2023) and indicates a remarkable operational success. Despite considerable logistical challenges and the novelty of the technique, it has proved possible to release large numbers of captive-reared Spoon-billed Sandpipers into the wild, and these birds have been fit enough to contribute to the global breeding population.

However, analysis also shows that the quantitative contribution to the improvement to the global population size and trend has been less than originally expected. This is partly because the global population is now estimated to be larger than at the time that headstarting was devised (Green at al., 2021; Zöckler et al., 2010b). Additionally, it now understood that the survival of wild-bred chicks from fledgling (typically at about two days old) to two years old is higher than survival of headstarted birds from release to two years old (Loktionov et al., 2023) and some headstarted birds started breeding a year later than wild-bred birds (Tomkovich et

al., 2021; Loktionov et al., 2023). There is anecdotal evidence that headstarted individuals may be tamer that wild ones away from the breeding areas. Such tameness could potentially lead them into situations where they are more likely to be caught in nets or predated. Nevertheless, while the recruitment of headstarted birds to the breeding population at Meinypil'gyno is lower than for wild-bred chicks, the positive difference in fledging success means that headstarting has helped to sustain the local Spoon-billed Sandpiper population. It can also be said to have lowered the rate of decline (Loktionov et al., 2023).

New analyses (Clements et al., 2022; WWT, unpublished) indicate that there is some potential to increase the impact of headstarting through refinements in collection, incubation, rearing and release techniques.

Protocols need to be developed for future headstarting to improve the rate of juvenile return, such as reducing contact time with chicks to avoid them being accustomed to seeing humans. Genetic analysis can be integrated into the future headstarting program to increase the genetic diversity amongst the headstarted individuals and to avoid inbreeding. Any changes need to be recorded and the subsequent survival of headstarted cohorts analysed to see if they have any positive effect on survival (Loktionov et al., 2023). As a result of global political tensions, headstarting has ceased since 2022, but it is important that it resumes as soon as possible. Finally, beyond its demographic significance, headstarting has also played an important role in engaging the local people at Meinypil'gyno in conservation of Spoon-billed Sandpiper.

Conservation breeding

The rapid decline of the species in 2011 required a quick decision to attempt to establish a conservation breeding programme, which was hosted by the WWT in the UK. WWT is recognised as a world leader in husbandry of waterbirds for the purpose of their conservation. 13 chicks were collected in 2011 and 20 eggs in 2012 (resulting in 17 chicks) from the main known breeding site of the species at Meinypil'gyno, Russia and transferred to WWT Slimbridge. The plan was to establish an *ex-situ* population from the collected eggs and supplement the wild population in Meinypil'gyno and/or reintroduce the species to former breeding sites in the future. In four out of nine possible breeding years, 19 eggs were laid in six clutches by four 2012 cohort females. Of these, seven chicks hatched and three survived to fledge. Conservation breeding efforts were suspended following the death of the last female in 2021 and the last two males (aged 12 and 5 years) in 2024.

This was the first attempt to breed this species in captivity and much had to be learnt along the way in terms of developing best husbandry practices and creating ideal conditions for breeding in a latitude and climate vastly different from the Spoon-billed Sandpiper's natural breeding and wintering grounds. Annual reviews and regular meetings with stakeholders and experts were held throughout the conservation breeding programme (2010–2021) to identify and address factors that might hinder or contribute to breeding success. The complexities of establishing a self-sustaining population have been enormous and interlinked, and a detailed review of the conservation breeding efforts is currently underway. Given the continuing decline of the Spoon-billed Sandpiper population, establishment of a breeding programme and stable *ex-situ* assurance (also known as "ark") population remains necessary as part of a long-term strategy to prevent the complete extinction of this species.

However, there are significant constraints to re-establishing a breeding programme, which need to be recognised. It is vital not to lose the experiences learnt from WWT Slimbridge in order to be able to continue developing and improving husbandry practices. Migratory shorebirds are rarely bred in captivity and compared to many other bird families, less is known about their husbandry and propagation. Experience in breeding other closely related small shorebirds is at an early stage and more experience should be gained with other such waders,

prior to attempting conservation breeding again with Spoon-billed Sandpiper. A successful breeding programme requires long-term commitment, sufficient resources and husbandry experience to support it. Ideally, as a biosecurity measure, the breeding programme should be housed between at least two, ideally three, physically separate institutions.

e. Important knowledge gaps

In addition to the research needs and supporting actions listed above the following section outlines areas for critical scientific research.

Identifying new breeding grounds

Currently, the Spoon-billed Sandpiper is known to breed in only very few locations within the entire breeding range in the Russian Far East; at Meinypil'gyno and Okeanskoie, which are both relatively close to each other in Chukotka (although travel between the two sites is difficult). Some relict populations might still exist along the coast, south of Khatyrka, north of Beringovski, at Russkyi Koshka, Kresta Bay and Belyaka Spit with a solitary male seen last in 2017. The breeding pairs at Meinypil'gyno are monitored annually, but Okeanskoie has only been visited in 2016, 2023 and 2024, and only for short periods because access is difficult. The Spoon-billed Sandpiper has abandoned many breeding sites where it was previously recorded. Many sites though could not be revisited, and it is unclear if breeding is still occurring. So currently it is only known where approximately 25-40% of the global population is breeding. Just four of the 73 Spoon-billed Sandpipers leg-flagged as fully-grown birds outside the breeding range during the non-breeding season have subsequently been recorded at the two known breeding sites, which highlights the potential of identifying further breeding grounds. It is crucial to identify the unknown breeding areas holding important populations of the Spoon-billed Sandpiper to ensure monitoring and protection are in place at those sites. Implementation of important management approaches, such as headstarting and predation control, at a larger scale than has been attempted so far will only be possible if a higher proportion of breeding sites are located. The vast expanse of the potential breeding grounds throughout Chukotka and probably also in Kamchatka, and huge logistical difficulties in travelling to and through this remote region present significant challenges which can best be resolved by tracking birds to their breeding grounds.

Satellite tagging of Spoon-billed Sandpipers on their northward migration in the boreal spring is proving to be a valuable tool to identify potential new areas where they breed and possibly improve our knowledge about the characteristics of their breeding habitats. One of two adult Spoon-billed Sandpipers tagged in spring 2024 with light-weight Platform Transmitter Terminals (PTT) travelled north to subarctic Russia and spent time at inland sites in northern Kamchatka which had very different habitat characteristics from the coastal sites at Meinypil'gyno and Okeanskoie. However, the sites have not been visited and it is not known whether the bird visited a breeding area, even though the individual was present for the usual duration of successful breeding. It is important to note that the weight of transmitters available at present (combined weight of the tag and attachment: 1.9–2.0 g) are close to the upper tolerance limit of the Spoon-billed Sandpipers, so great care must be taken to tag more birds.

Sampling of genetic variability from birds on wintering and passage grounds may help to establish the existence of unknown breeding sites. If the Spoon-billed Sandpiper population has detectible population structure across different breeding sites, genome sequencing can help to identify breeding site-specific genetic variability. Birds that can be sampled on the wintering and passage grounds from unknown breeding locations can then be analysed to detect new patterns of variability. With enough sampling, if the population is not completely panmictic, the number of existing breeding grounds can be estimated using this approach.

Identifying new boreal wintering and passage grounds

Despite great advances in identifying new wintering areas for the Spoon-billed Sandpiper since the previous Action Plan, we still only know where about 50% of the global population winters of a species that almost exclusively has been recorded at coastal habitats. Nor do we know where many birds stage on passage, especially north of the Yellow & Bohai Sea in China. Identifying all the important wintering grounds and passage hotspots is crucial to ensure sufficient habitat is being monitored and protected. Another major knowledge gap concerns the passage sites used by juveniles between August and October. Juveniles are often photographed on passage in autumn, tending to migrate later than the adults and being much more widely dispersed, and are seen especially in Japan and ROK. The number of records and leg-flag resightings of juveniles during this period is very sparse relative to the representation of this age class in the global population. There are indications from analyses of the few leg-flag sightings available that juveniles are either widely spread along the parts of the flyway north of China or that they are concentrated at sites in the DPRK, where no counting or leg-flag recording is conducted.

Satellite tagging has so far only been used on adults and has proved to be invaluable in understanding their migration paths and movements to and on wintering grounds. Of 28 clusters of sites identified by following tagged Spoon-billed Sandpipers, eight were newly identified including a first record for Indonesia (Chang et al., 2020; Putra et al 2019).

Monitoring global population size and trends

Population monitoring in the breeding season is typically done by counting breeding territories and, where possible, locating nests and broods to confirm breeding. In the non-breeding season, usually high-tide roosts or foraging areas are located and birds are counted individually. Spoon-billed Sandpipers do not occur in single-species flocks at high-tide roosts or intertidal foraging sites in non-breeding areas. They are often mixed in with other small shorebirds such as stints and can easily be missed or misidentified (Chowdhury & C. Zöckler, 2025).

For surveys at non-breeding sites, the most robust method is to conduct closed-population Lincoln-Petersen mark-resighting and scan surveys (Green et al., 2021). This method comprises two elements (1) repeated reading of leg flags over a period of days or a few weeks to obtain an estimate of the total number of leg-flagged birds present and (2) scan surveys to estimate the proportion of birds carrying leg flags. Population size can be estimated from these two parameters. An essential feature of this approach is that it allows for incomplete detection: i.e. that some of the birds actually present in the population are not detected and recorded. For the method to be accurate, it is important that the population is closed during the survey (no immigration or emigration and minimal mortality) and that the study area is well defined and covered evenly by survey effort. This approach cannot always be guaranteed but has been adopted successfully at a number of non-breeding sites and across the range from Bangladesh to China (e.g. Jiangsu, Leizhou in Guangdong Province, Gulf of Mottama, Inner Gulf of Thailand and Sonadia Island; Green et al., 2021; Chowdhury et al., 2021; Leung et al., 2022; Green et al., 2024) and generally produces larger local population estimates than those from co-ordinated winter counts (Zöckler et al., 2020). Significant advantages over direct counts are that confidence limits for the estimates can be obtained and the method should have similar accuracy when repeated by different observers as long as the protocols are followed. The disadvantage is that it cannot be applied for all monitoring sites and especially as the species has become scarcer over the years, scan surveys do not always reveal birds in numbers statistically relevant for analysis.

For over a decade or more local Spoon-billed Sandpiper populations have been monitored at many key sites across its range. Not only does monitoring provide an indication of the conditions and threats at a site, it can also give clues at a more refined scale to global population dynamics. Often, these surveys were conducted as international teams, fostering a sense of caring jointly for a flyway species that belongs to all. Year-on-year population declines of 9.5% were observed at Sonadia in Bangladesh during 2012–2018, followed by a more rapid decline of 49.1% per year during 2018–2021 (Chowdhury et al., 2022). Similarly, a drop of about half between 2009 and 2016 in the Gulf of Mottama in Myanmar (Aung et al., 2018) and even further by 2024 (Aung et al., 2024). Bangladesh and Myanmar had been estimated to account for about 80% of the winter population and these two sites had the highest concentrations of Spoon-billed Sandpipers identified in the two countries (Zöckler et al., 2016). The population decline in Tiaozini, Jiangsu province, China, was thought to be associated with recent changes in the intertidal mudflat (Chang et al., 2021). Recent counts and population estimates at key wintering sites in South China revealed the importance of this region for the wintering population (Zöckler et al., 2020; Leung et al., 2022).

Regularly assessing the global population trend of the Spoon-billed Sandpiper is essential to judge the success of this Action Plan. Estimating the global population from summing local populations is only accurate if the locations of all breeding or non-breeding sites are known, which they aren't. While valid as a first approach for assessing the status of the population, it needs to be complemented by scan surveys (see above) and other methods, which have stronger statistical rigour (Green et al., 2024).

Monitoring demographic rates

In determining the demographic mechanisms underlying an observed population decline, it is useful to have estimates of demographic rates: survival and breeding productivity. A study conducted at Meinypil'gyno found that annual survival of marked breeding adults there was quite high at 75% relative to that of other calidrids of similar body size (Loktionov et al., 2023). However, per capita recruitment of young adults to the site was low and breeding productivity was also substantially low. The estimate of adult survival was reliable, but breeding productivity and per capita recruitment (the product of productivity per adult and pre-reproductive survival to breeding age) are difficult parameters to estimate in shorebirds. Mark-resighting analysis of data derived from the leg-flagging of large numbers of wild chicks at Meinypil'gyno has recently allowed reliable estimates of pre-reproductive survival to be made, but breeding productivity estimates from monitoring the outcomes of nesting attempts may be biased because it is difficult to follow the fate of broods of chicks which may move a long distance from the nest before fledging. In any case, demographic rates determined at Meinypil'gyno might not be representative of those for the whole global range. One approach is to use an Integrated Population Model (IPM), which would use repeated estimates of the global population size of breeding age birds (see above) combined with annual estimates of annual survival of leg-flagged adults to estimate the mean value and trend of per capita recruitment. This analysis still has the potential weakness that survival of adults marked at a few sites (principally Meinypil'gyno and Jiangsu) may not be typical of those for all adults. This IPM is currently under development.

A complementary approach is to investigate global distribution of genetic variability across the species' range. Tracking the prevalence of rare genetic variance across the species can provide independent estimates of changes in the effective population size over time. However, this approach would require a substantial number of complete genomes from samples obtained across several years.

Ecological research

Studies of the habitat characteristics, feeding ecology, habitat use and moult strategy of Spoon-billed Sandpipers during the non-breeding season may help identify changes underlying the deterioration of important sites; help understand site selection (Aung et al. 2022), and provide insight for habitat restoration projects. A recent example identified trends in the topography of the intertidal mudflats at Tiaozini (Jiangsu Province) which correlated with a decline in the number of adults using the site for their post-breeding moult (Chang et al., 2021).

Improved understanding of genetics

A survey of the genetic composition of the small Spoon-billed Sandpiper population has the potential to reveal important information about the species and provide a useful set of tools for broader conservation goals for this species. Genome-wide data can provide insights about the genetic structure of the global population, and if the species is not panmictic to reveal any undiscovered subpopulations. This could be done by sampling breeding adults at a wide range of breeding sites distributed throughout the global range. However, at present this approach is precluded because so few breeding sites are currently known and all in close proximity. Adults sampled at Meinypil'gyno and those sampled at other sites during the non-breeding season could be compared; the latter almost certainly consisting of a mixture of birds from a range of mostly unknown breeding sites. The same data can be used to describe historical changes in demographic history of the species. Genome sequence data can be used to track the extent of inbreeding in the wild and help reduce inbreeding in any captive populations. Finally, sequence data, including simpler microsatellite analyses, can be used to determine the extent of relatedness of new individuals, leading to a global genealogy of the species.

f. Longer-term and emerging threats

Infectious diseases such as avian influenza among wild populations

Major outbreaks of H5N1 High Pathogenicity Avian Influenza (HPAI) in waterbirds and seabirds have been reported across the world in the last few years (Shi et al., 2022). The impact of HPAI on migratory waterbirds is significant, as the virus has caused widespread mortality among wild bird populations globally. The ability of the H5N1 variant to infect various species, including migratory waterbirds, has contributed to its rapid spread across continents. Migratory birds may be key contributors to the virus's dissemination across long distances (Charodstad et al., 2023). Birds such as Spoon-billed Sandpipers and shorebirds that congregate in part of their annual cycle are at greater risk, especially at high-tide roosts where densities are higher. For the Spoon-billed Sandpiper this issue should be addressed by working through the EAAFP Working Group on Avian Diseases to liaise with established on-going global, flyway-level and national frameworks and following established guidelines such as those of the World Organisation for Animal Health (WOAH) and the IUCN on disease surveillance to protect wildlife (WOAH & IUCN, 2024) and with techniques provided by Food and Agriculture Organisation (e.g. Whitworth et al., 2008).

Climate change leading to sea-level rise and loss and changes in habitats

Breeding grounds: Climate change is strongly impacting the Arctic region. The surface air temperature of the Arctic region is warming approximately 3 times faster than the rest of the planet (Moon et al., 2024), impacting the breeding grounds of many high latitude breeding shorebird species, including Spoon-billed Sandpiper. Milder winters and warmer summers are accelerating plant growth and changing vegetation structure from crowberry tundra to a richer, multi-layered bushy vegetation, which is less suitable as breeding habitat. This has been observed at previous Spoon-billed Sandpiper breeding grounds in coastal Kamchatka near Ossora and to the south of Oliutorskiy cape (Syroechkovskiy & Zöckler 2009). Although, in some parts of southern Chukotka, the cold Bering Sea waters appear to have slowed the rate

of warming coastal vegetation and there appears to have been a slower change in the growth in vegetation in the Meinypil'gyno breeding grounds (Syroechkovskiy in litt., 2021) compared to other regions. Due to the Spoon-billed Sandpiper population decline, plenty of good breeding habitat remains unoccupied by the species, so availability of breeding habitat is currently not considered a major problem, but may be more significant in the future. Along the Bering and Chukchi Sea coasts of Chukotka a decrease in sea ice cover in June-July has been observed to lead to more flooding and coastal erosion of breeding grounds. Other impacts on Arctic-breeding shorebirds associated with climate change include: increased nest predation of shorebirds (Kubelka et al., 2018); increased tundra fires due to less precipitation (as observed around Anadyr in Chukotka), vulnerability to changing temporal availability of arthropod food species (Lameris et al., 2021); and population structures affected by changes in the timings of migration (Bom et al., 2023). So far, few comprehensive studies have been undertaken to determine the impact of climate change on the breeding grounds of Chukotka, and this is becoming an increasingly urgent need to be able to plan long-term conservation interventions.

Stop-over sites and wintering grounds: Climate change will undoubtably have significant long-term impacts on lower latitude coastal habitats for Spoon-billed Sandpiper, especially through sea-level rise affecting intertidal mudflats. Nevertheless, for the critical Yellow Sea coasts, the relative impacts of human impacts from reduced sediment discharge and subsidence from resource extraction may be far greater than global sea-level rise (Murray et al. 2014). Currently only a few river deltas accrete sufficient volumes of sediments to keep level with the losses by increasing sea level rise, e.g. Ayeyarwady Delta in Myanmar and Red River in Vietnam, while Mekong and Yellow Rivers report huge losses in sediment load (Glover et al., 2021). An overall assessment of the sedimentation load in all major river deltas relevant for staging and wintering Spoon-billed Sandpiper is needed. The high level of urbanisation, industrial development and the spread of cordgrass *Spartina* along much of the southern part of the Spoon-billed Sandpiper's range means that the issues facing tidal mudflats are compounded by a coastal squeeze with no opportunity to migrate inland as sea levels rise (Wong et al., 2014). Higher levels of coastal erosion are also associated globally with sea level rise (Wong et al., 2014) and has been observed to impact important high tide roosts and feeding grounds on salt pans at Pak Thale in Thailand. Overall, like with the breeding grounds, the impacts of climate change on Spoon-billed Sandpiper habitats at lower latitudes have yet to be well studied, and is an important long-term research need.

Pollution

The potential effects of environmental pollution on the demographic rates of shorebirds, are not well documented. In the Yellow Sea, in general, four sources of pollution are recognised – plastic waste, eutrophication leading to algal blooms, oil discharge and toxic chemicals (MacKinnon et al., 2023). Chemical pollutants are suspected as being contributors to the global decline of shorebirds (Ma et al., 2022 and 2024). Negative health effects have been demonstrated to include embryotoxicity and post-hatch development impairment caused by persistent industrial chemicals (Lunny et al., 2020); reduced reproduction performance caused by Mercury Hg and Lead Pb (Hargreaves et al., 2011); and impaired refuelling and/or migration performance related to oil contamination (Maggini et al., 2017; Bianchini & Morrissey, 2018a, 2018b; Bianchini et al., 2021). Along the EAAF, migratory shorebirds primarily use estuarine habitats, which can be heavily impacted by pollutant runoff from human activities like aquaculture and industry. The impact of pollution on the Spoon-billed Sandpiper is a long-term research need and should be addressed as part of studies of impacts on shorebirds in general, especially for closely related species and those using similar habitats.

Solar and wind energy

Solar and wind power offer cleaner alternative to fossil fuels and are vital to combat global warming. However, a potentially significant threat for some Spoon-billed Sandpiper sites is the loss of intertidal habitat and high tide roosts due to wind or solar farms constructed on mudflats used for feeding or aquaculture ponds and salt pans used as high tide roosts, This is occurring in Tiaozini, Xiaoyangkou and Dongling, southern Jiangsu Province in China (K. Leung in litt., 2024) and occurred on salt pans at Khok Kham, Samut Sakhon Province in Thailand in 2016. China and Vietnam, two key range states for Spoon-billed Sandpiper, rank among the fastest growing markets for wind power. In addition, when poorly planned, wind farms can lead to direct mortality of migratory shorebirds from collisions, disruption and disturbance to migration paths and habitat loss (Chamberlain et al., 2006; Desholm & Kahlert, 2005, Larsen & Guillemette, 2007; Dierschke et al., 2016; Marques et al., 2021, Drewitt & Langston, 2006). Different birds respond differently to wind turbines (Bai et al., 2021; Li et al., 2020; Zhao et al., 2020), e.g. a Black-faced Spoonbills (*Platalea minor*) were found to give up their southward migration after encountering the offshore wind farm in the southern Jiangsu coast and returned back to ROK (Lai et al., 2025). Spoon-billed Sandpiper responses to wind farms remain poorly understood and it is critically important to understand how such projects which may impact its feeding and roosting habitats so that mitigation actions can be identified at the early stage of any planning process.

Annex 4. Communication, capacity building, education, participation, and awareness (CEPA)

Conservation cannot be achieved by a few committed individuals; collaboration across all levels of society and across all range countries is needed. The Ramsar Convention on Wetlands promotes the use of communication, capacity building, education, participation, and awareness (CEPA) as essential for long-term wetland conservation in all areas and at all levels (Ramsar Convention, 2022). In the past decade, CEPA activities for the Spoon-billed Sandpiper have been carried out in most range countries to increase public awareness, particularly among local communities and hunters and conduct outreach with different stakeholders, including national governments. Capacity building has been implemented, leading to local conservation groups and more local NGOs involved in various conservation activities such as bird surveys, patrolling against hunting or illegal mist-netting, awareness raising and education. A survey of Task Force national focal points identified the following gaps and challenges (Fu & Aung, 2023):

1. Limited awareness: Some partners reported a lack of awareness among local stakeholders including local or national governments, and thus a lack of interest in and limited engagement in conservation actions.
2. Limited stakeholder communication: Building trust with the local community, government officers and other local stakeholders takes time (which wasn't helped by the COVID-19 pandemic, which led to a loss of conservation momentum in engagement with various stakeholders). In addition, restricted access to and a high turnover rate of government staff impedes development of working relationships.
3. Limited information sharing: Although the Task Force has been active in information sharing, communication mainly relies on country representatives and, partly due to the language barrier, cross-country communication among researchers, local conservation groups and relevant stakeholders remains limited.
4. Lack of funding: Despite increasing funding sources and support for conservation actions – funding usually remains small-scale and short-term, implemented mainly by local NGOs and conservationists, and budgeting for CEPA activities may be lower if funding is limited. Long-term, sustainable funding for conservation activities and capacity building to enhance human resources remains essential.

The Spoon-billed Sandpiper Task Force has developed detailed actions for CEPA (Fu & Aung, 2023) which is summarised as follows*:*

- Engage and support government and local authorities for effective conservation action to protect the Spoon-billed Sandpiper and habitats, especially through development of National Biodiversity Strategies and Action Plans (NBSAPs), the Ramsar Convention, the Convention on Migratory Species (CMS), the EAAFP and similar networks.
- Raise awareness from national to local levels of the conservation needs of the Spoon-billed Sandpiper, drawing from local to national and international events and campaigns such as World Wetlands Day and World Migratory Bird Day; working creatively in collaboration with different groups and through various channels and different media.
- Support relevant site managers develop and implement CEPA programmes (aligned with Ramsar, CMS and EAAFP CEPA Programme and Action Plan) and build their capacity for CEPA, including by sharing experiences with other Spoon-billed Sandpiper sites.
- Continue to share updated information and findings on Spoon-billed Sandpipers and their habitats, especially among relevant scientists, NGOs and birdwatching communities.
- Engage local communities and other local stakeholders in capacity building and planning for action on conservation of the Spoon-billed Sandpiper and its habitat.
- Enhance communication and collaboration with the Spoon-billed Sandpiper conservation community.
- Strengthen the coordination of fundraising to sustain long-term conservation activities at local and international levels, and to motivate continuous support.

Annex 5. National and international policy frameworks

a. Key national legislation providing protection to the Spoon-billed Sandpiper

Country	Protection status in national legislation including the title of the legislation
Russia	Red Data Book
Japan	National Red List
China, mainland	Class 1 National Key Protected Wild Animal under the Wildlife Protection Law (since 2021)
China, Hong Kong	All wild birds are fully protected - Wild Animals Protection Ordinance (Cap 170), National Species Action Plan adopted
China, Taiwan	Fully protected - Act on Wildlife Conservation
DPRK	-
ROK	Endangered Wildlife Class I
Vietnam	Protected under Directive 04/CT-TTg, 2022, on urgent tasks and solutions to protect wild and migratory birds in Vietnam
Thailand	
Myanmar	Shorebirds as a group are fully-protected, National Species Action Plan adopted
India	All wild birds are fully protected
Malaysia	Protected under Wildlife Conservation Act 2010 (amended in 2022)
The Philippines	Protected under the Wildlife Resources Conservation and Protection Act of 2001
Bangladesh	All wild bids are protected under Wildlife (Conservation and Security) Act 2012

b. International Policy framework

East Asian-Australasian Flyway Partnership (EAAFP)

The Spoon-billed Sandpiper Task Force was endorsed by the East Asian-Australasian Flyway Partnership in 2008 and is one of several Task Forces and Working Groups within the EAAFP, of which the most directly related to this Action Plan are the Yellow Sea Ecoregion Task Force, Task Force on Illegal Hunting, Taking and Trade of Migratory Waterbirds, CEPA Working Group, Shorebird Working Group and Waterbird and Wetland Monitoring Task Force. The EAAFP includes government partners from all range states as far west as Bangladesh. [This Action Plan was adopted by EAAFP MOP12 in November 2025.] It contributes to implementation of the Kunming-Montreal Global Biodiversity Framework, [the CMS Strategic Plan 2024–2032] and especially the **EAAFP Strategic Plan 2019–2028**, addressing all five of its objectives:

1. Development of the Network of sites of international importance for the conservation of migratory waterbirds along the EAAF, building on the achievements of the Asia-Pacific Migratory Waterbird Conservation Strategy networks.
   Supported through actions under Objective 2 of this Action Plan.
2. Enhance communication, education, and public awareness of the values of migratory waterbirds and their habitats.
   Supported through actions under Objective 7 of this Action Plan.
3. Enhance flyway research and monitoring activities, build knowledge, and promote the exchange of information on waterbirds and their habitats.
   Supported through actions under Objectives 1, 4, 5 and 7 of this Action Plan.
4. Build the habitat and waterbird management capacity of natural resource managers, decision makers and local stakeholders.
   Supported through actions under Objectives 1, 2 and 7 of this Action Plan.
5. Develop, especially for priority species and habitats, flyway-wide approaches to enhance the conservation status of migratory waterbirds.
   Supported through actions under Objective 8 of this Action Plan.

EAAFP Sister Sites

Under Objective 1 of its Strategic Plan the EAAFP encourages a closer network and cooperation between sites by connecting Flyway Network Sites across different countries that share migratory species, such as Spoon-billed Sandpiper. These are known as EAAFP Sister Sites Program and was developed to foster collaborative conservation activities, information exchange, capacity building and mutual support in manpower and resources.

The most suitable Sister Sites to include are the three main or key sites along the flyway: Meinypil'gyno in Russia, Tiaozini in China and Gulf of Mottama in Myanmar (Figure 3). These are all large areas and two of them already established as Ramsar like Gulf of Mottama in Myanmar and World Heritage (China) Sites and other Flyway Network Sites. Earlier initiatives in the late 2010s aimed to establish a regional nature park (Zakaznik) in Chukotka in around the area of Meinypil'gyno to protect most of the known breeding sites. The idea of sister sites is to establish at least three 'Lands of the Spoon-billed Sandpiper' across the flyway including one each in China and Myanmar and so encourage the progress in establishing the 'Land of Spoon-billed Sandpiper' in Russia as the third sister site along the EAAF.

Additionally, smaller sites could be connected through association with known individual Spoon-billed Sandpipers (Figure 1), which are identified through satellite tags or leg-flags, thus developing an even stronger attachment. The satellite-tagged bird 'Orange K9' from Thailand stopped at several sites in China, DPRK, and Sakhalin and Kamchatka in Russia before hinting at a potential new breeding area. None of these sites apart from Tiaozini in

China is designated as a protected area. Some of the sites like Tyk Bay in Sakhalin (Figure 3) seem to be very significant for the species and certainly would benefit from increased public attention to deliver level of conservation action, especially in mitigating hunting.

UN Convention on the Conservation of Migratory Species of Wild Animals (CMS)

The Spoon-billed Sandpiper was listed in the CMS Appendix I at the CMS MOP7. Of the range states of the Spoon-billed Sandpiper, only the Philippines, Bangladesh, India and Sri Lanka are parties to the CMS. Nevertheless, CMS is a partner of EAAFP and the 2008 Spoon-billed Sandpiper Action Plan was endorsed under CMS. Decision 14.123 of CMS directs the CMS Scientific Council to contribute to a global situation analysis on production, sale, use and regulation of the use of mist nets and other sorts of nets used for bird trapping, which would have direct relevance for protection of the Spoon-billed Sandpiper. The Asia Pacific Illegal Taking of Migratory Birds Intergovernmental Task Force (ITTEA) was established under the CMS to ensure that no illegal hunting, taking and trade of migratory birds takes place in the EAAF by facilitating initiatives in close cooperation with the EAAFP. This Action Plan therefore includes an action to support preparation of that situation analysis and actions that might follow-up.

Convention on Wetlands

All range states are Parties to the Ramsar Convention on Wetlands. The identification and designation of internationally important sites for Spoon-billed Sandpiper as Ramsar Sites can be an important policy tool for site protection and restoration, as the designation affords international recognition, national government commitment to protection and involvement of local communities dependent upon the wetland. Currently only 21 of 156 sites identified for Spoon-billed Sandpipers are designated as Ramsar Sites, highlighting the need for Parties to designate additional sites.

UNESCO World Heritage Sites

A UNESCO World Heritage Site (WHS) is one of the highest levels of international recognition and protection a site can attain for biodiversity conservation. A chain of World Heritage Sites along the coasts of the Yellow Sea (and Bohai Sea) appears to be an increasing possibility, and would be of great importance for protecting habitat of the Spoon-billed Sandpiper. To date a first phase of WHS designations for the “Migratory Bird Sanctuaries along the Coast of the Yellow Sea-Bohai Gulf of China” saw Yancheng-Tiaozini in Jiangsu listed in 2019. In RoK, the Getbol, Korean Tidal Flats were listed in July 2021. In 2024, a further five sites were added in China including Shanghai Chongming-Dongtan and Liaoning Yalujiang Estuary under a second phase. Further support and advocacy to national WHS authorities is a key action to list more sites around the Yellow Sea. With the DPRK a signatory to UNESCO, there is a further opportunity for greater protection of critical sites with highest priority being Ryongmae Island mudflats in Gyeonggi Bay. Other key sites for further WHS listing around the Yellow Sea are in Jiangsu (including Nantong-Dongling, Nantong Yangkou to Fengli and Lianyungang).

Bilateral Agreements

Russia and China have a long history of bilateral environmental agreements, including on migratory birds. Currently a new 5-year cycle is coinciding with the planning period of both countries. The Spoon-billed Sandpiper will feature strongly and collaboration on monitoring, scientific research and joint conservation activities are planned. This includes the exchange of expertise and experts of both countries and could built the basis for resuming headstarting on the breeding grounds and conservation breeding activities in China.

Russia and the DPRK have an existing bilateral on migratory birds. While this does not explicitly include the Spoon-billed Sandpiper, there are currently plans between Russia and

the DPRK to address the conservation of the species and exchange of scientists between the two countries. It could also be an important basis for the surveying of crucial stopover sites in DPRK.

While other bilateral agreements exist between EAAF countries, like the China-Japan bilateral agreement on migratory bird protection, few include relevant actions for Spoon-billed Sandpiper conservation.

Regional Flyway Initiative

Launched in 2021 by the Asian Development Bank (ADB) in partnership with EAAFP and BirdLife International, the Regional Flyway Initiative (RFI) will mobilise large-scale financing to support the protection, maintenance, and restoration of wetlands in East and Southeast Asia, focusing on coastal wetlands. The RFI has developed a list of priority sites of international importance for migratory waterbirds based on an analysis of the latest information. Currently 56 sites for Spoon-billed Sandpiper have been identified as RFI sites and many may be eligible for future financing.

Arctic Migratory Birds Initiative (AMBI) / Conservation of Arctic Flora and Fauna (CAFF)

The Arctic Migratory Birds Initiative (AMBI) under the Conservation of Arctic Flora and Fauna (CAFF) is an Arctic Council initiative that conducts activities to help conserve populations of priority Arctic-breeding migratory birds in decline. AMBI addresses knowledge gaps and conservation challenges to support healthy populations of migratory birds and to connect Arctic and non-Arctic actors to prioritize conservation activities for those birds. Priority conservation issues for AMBI in the EAAF include: identifying and securing habitats along the flyway; preventing illegal hunting; improving the quality and quantity of species population data; and addressing other threats including environmental contaminants. The Spoon-billed Sandpiper is a priority species for AMBI and targeted within its workplan.

Key Biodiversity Areas (KBAs)

The Key Biodiversity Area (KBA) standard identifies the most important places in the world for species and their habitats through a process that is quantitative and objective and has local consultation. Protection and monitoring KBAs can support national commitments to the post-2020 Global Biodiversity Framework of the Convention on Biological Diversity. In addition, identification of a site as a KBA can support major development investors to avoid sites of importance for biodiversity. KBAs are recognised by the Equator Principles, whereby major global financial institutions commit to avoiding investments which adversely impact KBAs.

Annex 6. Table of sites

The following table is the result of a consultation within the Spoon-billed Task Force to identify all sites where there have been records of Spoon-billed Sandpipers between January 2010 and May 2025 along with the actions already identified. Sites with records of five or more Spoon-billed Sandpipers at one time since 2018 are marked in bold. Protected (yes = protected, no = unprotected and part = partially protected) indicates it is listed as a protected area under national or local protection laws, or designated as a Ramsar Site, or World Heritage Site.

Site name	Max. count (2018–2025)	Satellite-tag record	Protected	Flyway Network Site code	Actions						
					Mitigate hunting	Protect sites	Strengthen management	Restore habitat	Monitoring & research	Government advocacy	CEPA
Sri Lanka											
Vankalai Sanctuary, Mannar	1		yes								
India											
Frazergunj, West Bengal	1		no								
Bangladesh											
Sonadia Island	**18**		**yes**	**103**	**x**					**x**	**x**
Ganguirar Char	2		no	141			x			x	x
Jaijjar Char	1		no							x	
Nijhum Dwip	**6**		**yes**	**102**						**x**	
Chattogram	4		no		x						x
Char Shahjalal/ Nizam	0		no							x	
Myanmar											
Nan Thar	**15**		**yes**	**139**	**x**		**x**				**x**
Ayeyarwady Delta (West)	?		no		x				x		
Ayeyarwady Delta (East)	2		yes	140							
Gulf of Mottama	**105**		**yes**	**117**	**x**				**x**	**x**	**x**
Bilyun Island	1		no		x	x					
The Than Beach (Myeik)	0		no			x			x		x
Bokpyin	3		no			x					
Thailand											
Pak Thale - Laem Phak Bia	**6**		**part**	**121**				**x**	**x**	**x**	**x**
Khok Kham	3		no	122					x	x	x
Gleua café and Khlong Phi Khut salt pans	4		no								
Klong Tamru salt pans	1		no								
Prasae Rivermouth	1		no								
Vietnam											
Binh Dai, Ben Tre Province	2		no								
Con Ngang Island	2		no								
Tan Thanh mudflats, Tien Giang Province	2		no		x						
Can Gio Biosphere Reserve	0		no								
La Gi, Binh Thuan	1		no		x						
Day River Mouth	0		no								

Site name	Max. count (2018–2025)	Satellite-tag record	Protected	Flyway Network Site code	Actions						
					Mitigate hunting	Protect sites	Strengthen management	Restore habitat	Monitoring & research	Government advocacy	CEPA
Xuan Thuy National Park	4		yes								
Cat Hai mudflats (An Hai IBA)	4		no		x						
Do Son, Hai Phong	1	x	no								
Malaysia											
Teluk Air Tawar – Kuala Muda	0		part							x	x
North-Central Selangor Coast (including Selangor Kapar Power Station ash ponds)	1		part			x			x	x	x
Bako Buntal Bay	1		no	112		x			x		
Indonesia											
Seunodon Sub-district, Aceh Province, Sumatra	1	x	no								
Philippines											
Balanga Nature and Wetland Park	1		yes								
China											
Guangxi Fangchenggang Shaluoliao	**7**		**no**		**x**				**x**		
Guangxi Fangchenggang Shanxin sandbar	**5**		**no**		**x**				**x**		
Guangxi Fangchenggang Bailangtan	4		no		x				x		
Guangxi Fangchenggang Wanweijintan	1		no		x	x			x		
Guangxi Qinzhou Sanniang Bay Yangwucun	**6**		**no**		**x**	**x**			**x**		
Guangxi Beihai Xichang Damushen	**16**		**no**		**x**	**x**			**x**		
Guangxi Beihai Hepu Sankou Mangrove Ecological National Nature Reserve	2		yes		x	x			x		
Guangxi Beihai Binhai Wetland	1		part		x	x			x		
Guangxi Beihai Tieshangang Henei	**5**		**no**								
Hainan Danzhou Bay	**6**		**part**		**x**	**x**	**x**	**x**	**x**		**x**
Hainan Xinying Guancunyintan and Xinying Mangrove National Wetland Park	1		part		x	x		x	x		x
Hainan Dongfang Chang River Estuary	2		no						x		
Hainan Haikou Xinbu Island	1		no								
Guangdong Zhanjiang Leizhou Xuwen Tigu	0		no		x						
Guangdong Zhanjiang Leizhou Wushi	1		no		x						
Guangdong Zhanjiang Leizhou Qishui	1		yes			x	x	x	x		x

Site name	Max. count (2018–2025)	Satellite-tag record	Protected	Flyway Network Site code	Actions						
					Mitigate hunting	Protect sites	Strengthen management	Restore habitat	Monitoring & research	Government advocacy	CEPA
Guangdong Zhanjiang Leizhou Dongli	1		part			x	x	x	x		x
Guangdong Zhanjiang Leizhou Fucheng	**29**		**part**		**x**	**x**	**x**	**x**	**x**		**x**
Guangdong Zhanjiang Leizhou Donghai Island Xiwan	2		no		x				x		x
Guangdong Zhanjiang Leizhou Jijia Danchang	1		no	x	x						x
Guangdong Zhanjiang Leizhou Lemingang	1	x	no		x						x
Guangdong Zhanjiang Wuchuan Shaerjiao	**22**		**no**		**x**	**x**			**x**		**x**
Guangdong Zhanjiang Nansan Island Dasha	**5**		**no**								
Guangdong Yangxi Xitou Santouzui Beach	**7**		**no**		**x**	**x**		**x**	**x**		
Guangdong Yangjiang Pinggang	**5**		**no**		**x**						
Guangdong Yangjiang Shanwaixi Sandbar	3		no		x				x		
Guangdong Xinhui Yinhuwan Wetland Park	1	x	part								
Guangdong Zhongshan Nanlong	1		part								
Hong Kong Mai Po Inner Deep Bay	2		yes	3			x	x	x		x
Guangdong Shantou Han River Estuary	1		no						x		
Taiwan Hsinchu Xiangshan Wetland	1		no						x		
Taiwan Kinmen Cihu	2		part						x		
Taiwan Kinmen Wujiang River Estuary	1		part						x		
Taiwan Taichung-Changhwa Dadu River estuary	1		no						x		
Taiwan Changhwa Fubao	0		no								
Taiwan Changhwa Hanbao	1		no						x		
Taiwan Nantou Caotun	1		no								
Taiwan Tainan Jiangjun	1		part						x		
Taiwan Tainan Dingshsan Qiqu	1		part						x		
Taiwan Tainan Qiqu Zengwen River Estuary	1		no						x		
Fujian Zhangzhou Zhaoan	1	x	no								
Fujian Zhangpu Juyu salt pan	1	x	no								
Fujian Xiamen Ganwen	1		no								
Fujian Xiamen Dadeng	1		no						x		
Fujian Quanzhou Weitou Bay	**8**		**no**			**x**			**x**		
Fujian Quanzhou Bay	2		no						x		

Site name	Max. count (2018–2025)	Satellite-tag record	Protected	Flyway Network Site code	Actions						
					Mitigate hunting	Protect sites	Strengthen management	Restore habitat	Monitoring & research	Government advocacy	CEPA
Fujian Fuzhou Minjiang River Estuary	8		yes					x	x		x
Zhejiang Wenzhou Ruian Coast	1	x	no						x		
Zhejiang Wenzhou Yongqiang Coast	1		no						x		
Zhejiang Taizhou Xuanmen Bay Wetland Park	2		part						x		
Zhejiang Taizhou Dongpu Farm	1		no						x		
Zhejiang Taizhou Sanmen Bay	1	x	no								
Zhejiang Hangzhou Bay Wetlands	0	x	part						x		
Zhejiang Hangzhou Shangyu Coast	0		no								
Shanghai Fengxian Coastal Wetlands	1		no								
Shanghai Nanhui Dongtan	1		no						x		x
Shanghai Hengsha Island	0		no						x		
Shanghai Chongming Dongtan	1	x	yes			x		x	x		x
Jiangsu Suzhou Zhangjiagang	1		no								
Jiangsu Nantong Tongzhou Bay	**11**		**no**			**x**			**x**		
Jiangsu Nantong Dongling	**21**		**no**			**x**			**x**		
Jiangsu Nantong Yangkou to Fengli	**10**		**no**			**x**		**x**	**x**		
Jiangsu Yancheng Fangtang Estuary	**9**		**no**			**x**		**x**	**x**		
Jiangsu Yancheng Tiaozini; Yancheng Wetland National Nature Reserve	**60**	**x**	**yes**	**5**				**x**	**x**		**x**
Jiangsu Lianyungang Linhong Estuary	0		part			x			x		
Jiangsu Lianyungang Qingkou Estuary	1		no			x			x		
Jiangsu Lianyungang Xingzhuang Estuary	2		no			x			x		
Jiangsu Lianyungang Xiuzhen Estuary	2		no			x			x		
Shandong Jiaozhou Bay	1		no						x		
Hebei Luannan Wetland	2		part						x		
Liaoning Xiaoling River Estuary	1		no						x		
Liaoning Liao River Estuary	2		part	4					x		
Liaoning Yalujiang Estuary	1		part						x		
Republic of Korea											
Yubudo tidal flat including Seocheon tidal flat of Geumgang estuary	**5**		**yes**				**x**	**x**			**x**
Nakdonggang estuary	2		yes			x	x	x			x
Saemangeum Reclamation area	0		no				x	x			x

Site name	Max. count (2018–2025)	Satellite-tag record	Protected	Flyway Network Site code	Actions						
					Mitigate hunting	Protect sites	Strengthen management	Restore habitat	Monitoring & research	Government advocacy	CEPA
Namyang Bay	0		yes				x	x			x
Gomsobay	2		yes				x				x
Beach near Pohang city of East Coast	1		no				x	x	x		x
Suncheon Bay	1		yes				x				x
Beach near Ulsan city of East Coast	0		no				x	x	x		x
Democratic People's Republic of Korea											
Kumya Bay	1	x	yes	44							
Ryongmae Mudflat	2	x	no								
Japan											
Lake Komuke-ko	2		yes								
Lake Tofutsu-ko	1		yes								
Notsukezaki	1		yes	116		x					
Mukawa	1		no								
Noboribetsu	1		no								
Kimonbetsu-gawa	1		no								
Shin-kawa Estuary	1		no								
Ishikari Coast	1		no								
Tennou-ishiguchi, Katagami	1		yes	88	x						
Gamo Tidal Flat/Torinoumi	1		no						x		
Sakata Ohama Coast	1		no								
Coast of ShigaTown	1		no								
Takamatsu Kahoku Coast	1		no								
Uchinada Coast	1		no								
Toyokawa Estuary	1		no								
Kumode-gawa, Gonushi Coast	1		no								
Shiomi Park, Izumi-Otsu	1		no								
Yoshino-gawa Estuary	1		no	61						x	
Yonago Wild Bird Park	1		yes	60							
Tamashima Landfill, Kurashiki	1		no							x	x
Shigenobu-gawa Estuary	1		no								
Sone Tidal Flat	1		no								
East Coast, Hakata Bay	1		no								
Daiju-garami Tidal Flat	3		Yes	124						x	x
Fukiage Coast, Minami-Satsuma	1		no								
Wakkanai	1		no								
Russia											
Kamchatka: Pakhachi River mouth	1		no		x						x
Kamchatka: Anapka bay	2		no		x						x
Kamchatka: Palana	0	x	no		x						x
Kamchatka: Perevalochni Bay	2		no		x						x

Site name	Max. count (2018–2025)	Satellite-tag record	Protected	Flyway Network Site code	Actions						
					Mitigate hunting	Protect sites	Strengthen management	Restore habitat	Monitoring & research	Government advocacy	CEPA
Kamchatka: Ust Khairuzovo	1		no		x						x
Kamchatka: Moroshechnaya River	3		no		x						x
Kamchatka: Sobolevo	**10**		**no**		**x**						**x**
Khabarovsk region: Schastya Bay, Okhotsk sea	4		no		x						x
Northeast Sakhalin Lagoons	0		no		x						x
Sakhalin: Tyk Bay	2	x	no		x				x		
Sakhalin: Aniva Bay	0		no		x						
Primorie: Islands in Peter the Great Bay	0		no		x						x
Primorie: Lower Tumen River	1		no		x						x

Annex 7. Acronyms

ADB	Asian Development Bank
BFU	Beijing Forestry University, China
CEPA	Communication, capacity building, education, participation, and awareness
CMS	UN Convention on the Conservation of Migratory Species of Wild Animals
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DPRK	Democratic People's Republic of Korea
EAAF	East Asian-Australasian Flyway
EAAFP	East Asian-Australasian Flyway Partnership
FNS	Flyway Network Sites
HPAI	High Pathogenicity Avian Influenza
GIS	Geographic Information Systems
KBA	Key Biodiversity Area
ITTEA	Asia Pacific Illegal Taking of Migratory Birds Intergovernmental Task Force
IUCN	International Union for the Conservation of Nature
MCF	Mangrove Conservation Foundation
NABU	The Nature And Biodiversity Conservation Union (BirdLife Germany)
NCS	Nature Conservation Society – Myanmar

NGO	Non-governmental organisation
NNU	Nanjing Normal University, China
OECM	Other Area-based Effective Conservation Measure
OIST	Okinawa Institute of Science and Technology, Japan
RFI	Regional Flyway Initiative
ROK	Republic of Korea
RSPB	Royal Society for the Protection of Birds (BirdLife UK)
SBS	Spoon-billed Sandpiper
SBS TF	Spoon-billed Sandpiper Task Force
UNESCO	United Nations Educational, Scientific and Cultural Organization
WHS	World Heritage Site
WWT	Wildfowl and Wetlands Trust

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