Black-faced Spoonbill (*Platalea minor*)

Species Action Plan

2024-2028

Latest version: Dec 2023

Compiled by the Agriculture, Fisheries and Conservation Department

Acronyms and Abbreviations

AFCD	Agriculture, Fisheries and Conservation Department
AI	Avian Influenza
BFS	Black-faced Spoonbill
CEPA	Communication, Education, Participation and Awareness
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
DSD	Drainage Services Department
EAAFP	East Asian-Australasian Flyway Partnership
EcoIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance (Cap. 499)
EPD	Environmental Protection Department
HKBWS	Hong Kong Bird Watching Society
HKWP	Hong Kong Wetland Park
IUCN	International Union for the Conservation of Nature
JIP	Deep Bay (Shenzhen Bay) Water Pollution Control Joint Implementation Programme
KFBG	Kadoorie Farm and Botanic Garden
LMCEEA	Lok Ma Chau Ecological Enhancement Area
MA	Management Agreement
MPNR	Mai Po Nature Reserve
MTR	MTR
NGO	Non-government Organisation
NNCP	New Nature Conservation Policy
SPCA	Society for the Prevention of Cruelty to Animals
TPO	Town Planning Ordinance (Cap. 131)
WCA	Wetland Conservation Area
WBA	Wetland Buffer Area
WAPO	Wild Animals Protection Ordinance (Cap. 170)
WWF-HK	World Wide Fund For Nature Hong Kong

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1 Introduction

The Black-faced Spoonbill (黑臉琵鷺, *Platalea minor* Temminck & Schlegel, 1849) (BFS) is a migratory waterbird endemic to East Asia. Its global population stood fewer than 300 individuals in the late 1980s. Thanks to concerted international efforts, the species was downlisted by the International Union for Conservation of Nature Red List of Threatened Species from "Critically Endangered (CR)" to "Endangered (EN)" in 2000, and its global population increased to more than 6,000 individuals in 2023.

In Hong Kong, it is a common winter visitor to the Deep Bay area and also regularly recorded in summer in small numbers. From 2018 to 2022, Deep Bay area (including the Mai Po Inner Deep Bay Ramsar Site and adjoining wetlands in Hong Kong and Futian National Nature Reserve in Shenzhen) held an average of 7.5% of the world population of the species in winter (Yu et al., 2022).

Local conservation measures for BFS and its habitat have been in place for over 20 years. BFS is protected by the Wild Animals Protection Ordinance (Cap. 170; WAPO). Its core over-wintering habitats in Hong Kong, the intertidal mudflat and Mai Po Nature Reserve (MPNR) are listed as Restricted Area under WAPO. Awareness of the conservation of BFS among public and government departments has been raised. The major local threats for the species are now considered to be habitat loss/degradation, pollution and botulism (BirdLife International, 2021).

The Action Plan for the Black-faced Spoonbill, which aims to conserve BFS throughout its range, was published by BirdLife International in 1995. The Action Plan was renewed by BirdLife International and the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals in 2010 (Chan et al., 2010). A conservation plan for BFS in Hong Kong was formulated in 2001 to identify, prioritise and promote the actions necessary to maintain the local BFS population and to contribute to its worldwide conservation. As the conservation authority of the territory, AFCD will continue the existing conservation measures and closely monitor the wintering BFS population in Hong Kong.

The species action plan, effective from 2024 to 2028, aims to maintain the Deep Bay BFS wintering population in a favourable condition, which is defined by a wintering population of BFS in Deep Bay with a stable or increasing population trend (with no decline of more than 20% compared to the previous year) through monitoring and research, continuous habitat protection and management, enforcement of related legislation, public education and other actions.

2 Background information

2.1 Taxonomy

The genus *Platalea* has six members which are distributed throughout the world, except the Arctic and Antarctic. The BFS is endemic to East Asia, and is the smallest spoonbill species.

The BFS is placed under the following taxonomic hierarchy:

Class AVES
Order PELECANIFORMES
Family THRESKIORNITHIDAE
Genus *Platalea*
Species *Platalea minor* Temminck & Schlegel, 1849

No subspecies was identified for this species.

2.2 General description

The BFS is a long-legged waterbird with dorso-ventrally flattened, spatulate bills (Swennen and Yu, 2005). Its total length measures 60-78.5 cm (del Hoyo et al., 1992) and it weighs about 1.5-1.9 kg (Melville et al., 1999). Adults are entirely white during winter but the plumage on the crest and the upper breast becomes yellow during the breeding season. Juveniles and immature birds have black wing tips until about the age of five and this feature fades as the birds reach adulthood. Juveniles have smooth bills while adults have ridges along the whole bill apart from the "spoon". Its face is featherless and black from the base of the bill to the throat, and extends to behind the eye. Some adults have yellow eyelids and a yellow patch in front of the eyes.


A BFS in breeding plumage.

2.3 Biology and ecology

The BFS breeds from March to August on uninhabited islands off the west coast of North Korea and South Korea, offshore islets in the eastern coast of Liaoning province

in China and in South Primorye in Russia (Birdlife International, 2001; Litvinenko and Shibaev, 2007; EAAFP, 2018). In October and November, BFS starts to migrate south mainly stopping over along the coast of China, e.g. Chongming Dongtan of Shanghai (del Hoyo et al., 1992; Jung et al., 2018; Son et al., 2020; So and Wong, 2023). Its most important wintering ground include Tsengwen estuary of Taiwan and the Deep Bay area of Hong Kong and Shenzhen and various sites in Mainland China (Yu et al., 2022). Some birds winter in South Korea, Japan, Vietnam, Philippines and Thailand (EAAFP, 2018; HKBWS, 2022). Northward migration generally occur from March to May (del Hoyo et la., 1992; Ueta et al., 2002; Ueta, 2005; HKBWS, 2014). Some immature individuals spend their summer in the wintering grounds or at stopover sites (Ueta, 2005). There are also regular summer records of BFSs in Hong Kong (Allcock et al., 2019).

The BFS is mainly a crepuscular feeder that inhabits tidal mudflats, salt marshes, lagoons, estuaries, mangroves, fishponds, wet rice fields and sometimes in inland lakes, and nests on small offshore islets (del Hoyo et al., 1992; Chan et al., 2010; Hancock et al., 1992; Zhao, 1995; Pedersen et al., 1998; Wells, 1999; Yu and Swennen, 2004b). The roosting and feeding sites are intertidal or located within 2 to 3 km from tidal areas (Yu and Swennen, 2004b). It generally requires open habitats and normally avoids dense vegetation for feeding or roosting, though it will feed in narrow channels within the mangroves in Deep Bay. It feeds by using lateral sweeps of the bill to locate fish and shrimp (Swennen and Yu, 2004; Swennen and Yu, 2005), in 5 to 20 cm deep waters. Due to its active feeding methods, such waterbodies must be clear of aquatic macrophytic vegetation.

Prey items of BFS include fish (e.g. *Gambusia affinis*, Tilapia *Oreochromis* sp., *Mullet* sp. *Mugil/Liza/Chelon* sp., *Acanthogobius hasta*, *Tridentiger obscurus*), shellfish, insects, shrimps (including *Metapenaeus ensis*, *Exopalaemon styliferus*, *Macrobrachium nipponense*), crabs (*Macrophthalmus japonicas*) and snails (del Hoyo et al., 1992; Hancock et al., 1992; Hseuh et al., 1993; Leader, 1998; Anon., 1999; BirdLife International, 2001; Swennen and Yu, 2005; Ueng et al., 2007; Kim et al., 2018; Sin and Sung 2019).

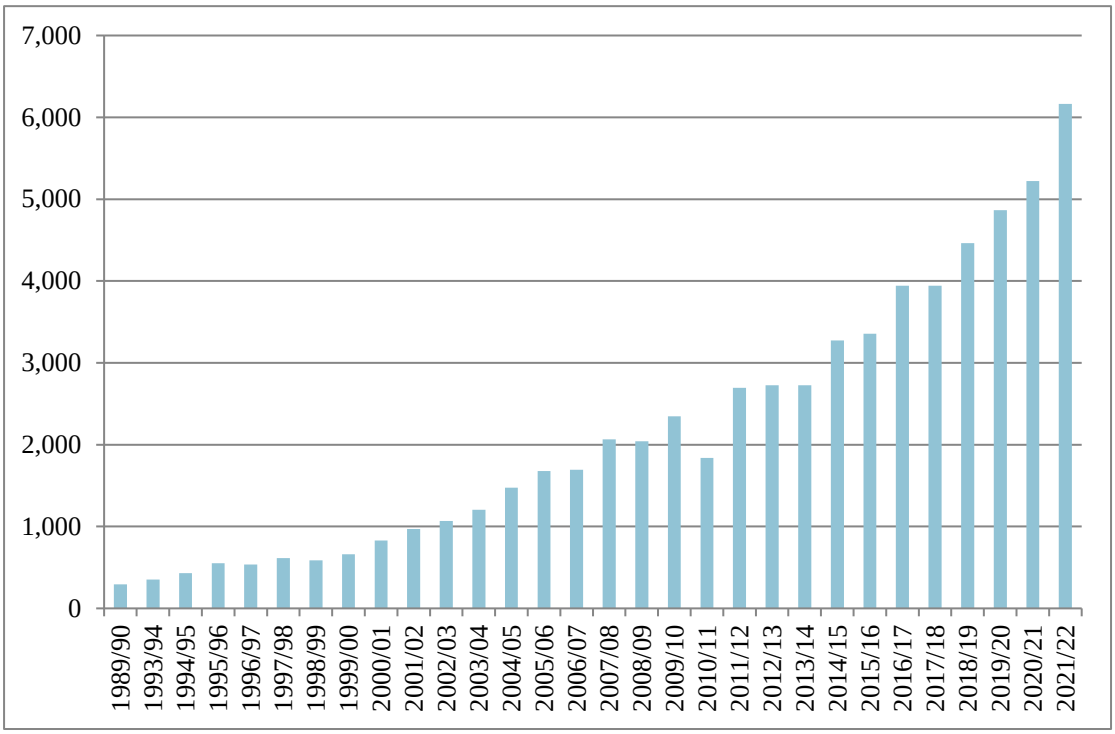
This species first breeds at the age of five (EAAFP, 2018). Re-sighting records of ringed BFS have indicated that the species can live for at least 20 years.

2.4 Population status

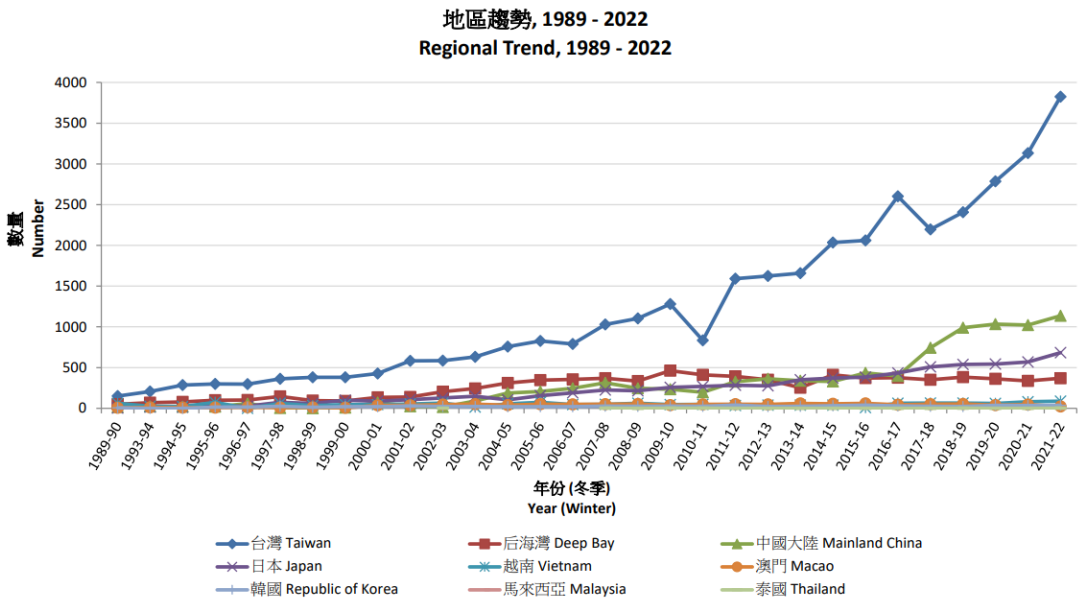
The first review of the population and distribution of BFS suggested the global population was only 288 birds between 1988 and 1990 (Kennerley, 1990). Since 1993/94 winter, an annual winter survey is being carried out to assess its population size. The first winter census in 1994 recorded a total of 341 individuals from nine sites (Dahmer and Felley, 1994) and the number rose to 6,633 individuals in 2023 (Yu et al., 2023). Based on the census data from 1997 to 2014, the annual population increase was estimated as 8.0% (Sung et al., 2018). While the population increase was regarded as a genuine increase reflecting successful conservation measures at a number of sites (BirdLife International, 2023), population viability analysis indicated that a population decline was apparent by 2050 in relation to continuous habitat loss and climate change (Pickett et al., 2018). Based on the resighting of ringed birds, mean adult survival rate was estimated at about 0.8 (Ueng et al., 2007; Pickett et al., 2018).

Deep Bay (including Futian National Nature Reserve, in the Shenzhen Special Economic Zone) and Kaohsiung in Taiwan holds the third largest known wintering populations (the largest and second largest being Tainan and Chiayi, Taiwan, respectively) (Yu et al., 2022). The Deep Bay population increased steadily from no more than 20 individuals before 1982 (Chalmers, 1986) to the highest record of 527 in 2022/23 winter (Anon., 2023). The average peak number between 2018/19 to 2022/23 winter was 433 individuals (Anon., 2019, 2020a, 2021, 2022, 2023). However, it is unclear whether Deep Bay population is at or below the carrying capacity of the habitat.

Annual monitoring of the age structure of wintering population in Hong Kong is being conducted to provide information on recruitment to assist in the interpretation of population trend. Since the commencement of the monitoring in 1998/99, the percentage adult ranged from 47-68%, average 58% (Anon., 2023). In line with the increasing global population, the relatively stable age structure recorded in Hong Kong might indicate a healthy population. However, there is limited information on immature proportion at each of the breeding grounds and wintering grounds in the region.



Global population trend of BFS from 1989-2022 (HKBWS, 2022)



Regional trend of BFS wintering population from 1989-2022 (from Yu et al., 2022)

Preliminary assessment of IUCN Green Status of Species in 2023 indicated that globally the BFS is currently Largely Depleted, with a Species Recovery Score of 35%; however, without past conservation actions, its estimated score would be only 15% (Critically Depleted), and that it is biologically possible for the species to fully recover (100%) in the next 100 years, if ambitious actions are taken (Cano-Alonso *et al.*, 2023).

2.5 Distribution

The BFS is endemic to East Asia and mainly breed around the Yellow Sea (Kennerly, 1990; del Hoyo *et al*., 1992; Hancock *et al*., 1992). It is known to breed on islets off the west coast of North Korea and South Korea, offshore islets in Liaoning province in NE China (Birdlife International, 2001) and in South Primorye in Russia (Litvinenko and Shibaev, 2007; EAAFP, 2018).

The annual international census of the wintering population of BFS, which was conducted since 1994, provides important data on the distribution of this species during winter. Wintering grounds of BFSs range from South Korea (e.g. Jeju Island and Gangwon) and Japan (e.g. Fukuoka, Kyushu and Okinawa), China (e.g. Shanghai, Fujian, Jiangsu, Guangdong, Hainan, Taiwan, Hong Kong), Vietnam, Thailand, Cambodia, the Philippines and Malaysia (BirdLife International, 2023; Yu et al., 2022). During the 2023 annual census, BFS was recorded 106 sites (Yu et al., 2023). Some individuals, especially the immature individuals, do not return to the breeding grounds during the summer but stay in the wintering grounds or at stopover sites (Ueta, 2005). The increased survey effort through the annual International Black-faced Spoonbill Census and the use of satellite telemetry in recent years (e.g. Wood et al., 2013, Jia et al., 2020, So and Wong, 2023) have provided more information on the migratory route and the distribution of BFS.

While wintering in Hong Kong, the principal daytime foraging areas are the wetlands around Deep Bay (Anon., 1999; Anon., 2020b). BFSs have been recorded feeding on

the mudflat from Mai Po to Pak Nai on the Hong Kong side of Deep Bay, across to the Futian National Nature Reserve on the mainland side (Shenzhen Special Economic Zone) of the Bay. The bird also feed opportunistically in the shallow waters of the Mai Po *gei wais* or the commercial fishponds in the Northwest New Territories when they are drained in winter. Gei wais in MPNR are drained regularly to provide suitable foraging habitats for wintering BFSs and other waterbirds under the Mai Po management practices.

Most BFSs are usually found loafing and roosting in MPNR and Hong Kong Wetland Park (HKWP). They generally loaf in shallow water away from reeds and other tall vegetation, on pond bunds or islands in *gei wais*. The Lok Ma Chau Ecological Enhancement Area (LMCEEA) also supports a considerable number of wintering BFSs. In the last five years (i.e. 2018/19 - 2022/23), the peak number of BFS recorded at these sites were 373 in MPNR, 109 in HKWP and 96 in LMCEEA (Anon., 2019, 2020a, 2021a, 2022, 2023). All three sites are managed for the conservation of birds.

Fishponds in the Mai Po Inner Deep Bay are also managed for the conservation of waterbirds and wetlands. Draining of fishponds is encouraged and subsidised as BFSs are also found feeding and loafing in fishponds. The peak number of BFS recorded in a fishpond at San Tin was 181 (Anon., 2023).

Range map of BFS (from BirdLife International, 2017)

Some important sites for the Deep Bay population of wintering BFS

2.6 Conservation

2.6.1 International and regional conservation status

The BFS was once classified as Critically Endangered in the IUCN Red List in 1994. In view of a population increase and reduced threats to the wintering grounds, the status has been revised to Endangered since 2000 (Chan et al., 2010). The listing was justified by the suspected very rapid decline in the near future owing primarily to habitat loss and pollution (BirdLife International, 2017). With the recent population increases confirmed to be genuine, the species may be downlisted in the future if the predicted very rapid decline does not occur (BirdLife International, 2023).

Convention on the Conservation of Migratory Species of Wild Animals (CMS) aims to conserve migratory species over whole of their range. Migratory species threatened with extinction are listed on Appendix I. BFS was listed in Appendix I of the Convention in September 2002. CMS Parties would strive towards strictly protecting species in Appendix I, conserving or restoring their habitat and controlling other factors that might endanger the species (CMS, n.d.).

Under the Wildlife Protection Law of the People's Republic of China (中華人民共和國野生動物保護法), List of Wildlife under Special State Protection (國家重點保護野生動物名錄) was drawn up. BFS is currently listed under Class 1 protection and shall not be hunted or killed without a special hunting licence.

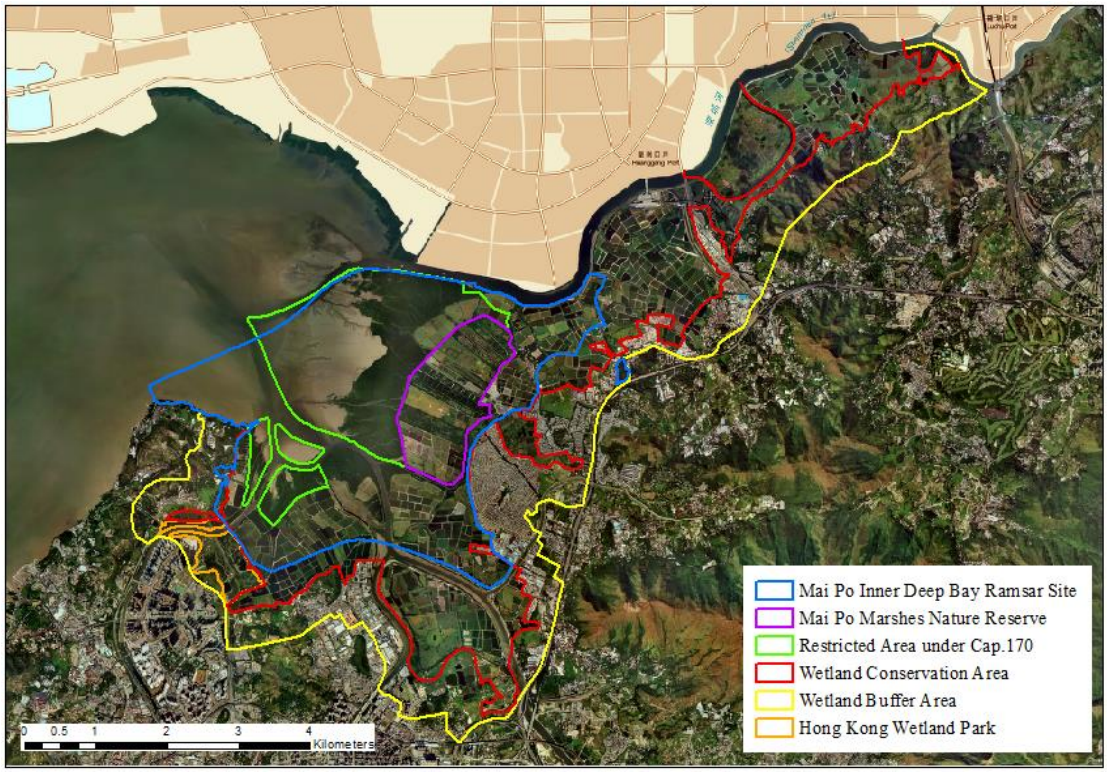
2.6.2 Local legislation and policies

The BFS is protected under the WAPO. Under the Ordinance, no person shall, without

permission, hunt or wilfully disturb, sell, export, or possess the BFS. The core area of the Ramsar Site (including MPNR) is designated as a Restricted Area under WAPO, where access is restricted to holders of permits issued by the AFCD. Meanwhile, HKWP is protected under Country Parks Ordinance (Cap. 208).

Environmental Impact Assessment Ordinance (Cap. 499; EIAO), Town Planning Ordinance (Cap. 131; TPO) and Country Parks Ordinance (Cap. 208) impose stringent control on land use and developments in Hong Kong and to ensure that any adverse impacts on the Deep Bay wetlands are properly addressed and mitigated. The 'no-net-loss in wetland' principle is set out in the Town Planning Board Guideline 12C (TPB PG-No. 12C) (TPB, 2014) for any development in the surrounding area of the Ramsar Site (i.e. Wetland Conservation Area (WCA) and Wetland Buffer Area (WBA)).

In 2004, the New Nature Conservation Policy (NNCP) was introduced and two schemes, namely the Public-Private Partnership and Management Agreement, were proposed with the aim to enhance conservation of ecologically important sites under private ownership. Twelve Priority Sites for Enhanced Conservation were identified under the NNCP. Two of which, i.e. Ramsar Site and Deep Bay Wetland outside Ramsar Site, provide important roosting and foraging habitats for the BFS.



Protected Areas in the Deep Bay area

2.6.3 Local Conservation Measures

Habitat protection and management

The 1,500 ha of wetland in the Mai Po Inner Deep Bay, the major loafing and foraging site for BFS in Hong Kong, was designated as Ramsar Site in 1995 under the Ramsar Convention. The site has a shallow bay with extensive intertidal mudflat backed by

mangal, tidal shrimp ponds (*gei wais*), fishponds and reedbeds. Core area of the Ramsar Site (including MPNR) is designated as restricted area under WAPO for additional protection. On the other hand, HKWP is protected under Country Parks Ordinance (Cap. 208).

Sites supporting high number of BFS, i.e. the Inner Deep Bay Ramsar Site (which includes MPNR), HKWP and LMCEEA, are all managed for the conservation of birds including BFS. In addition to the Ramsar Site Management Plans (Anon., 1997a, 2011) which lay out the management strategies of the Ramsar Site, Mai Po Management Plans (Young, 1999; WWF-HK, 2006, 2013 and 2019) were drawn up for the detailed management of MPNR. AFCD is responsible for the overall management of the Ramsar Site and HKWP while MPNR is managed by WWF-HK with the support of AFCD. LMCEEA is a mitigation wetland enhanced to provide like-for-like compensation in wetland function for the loss of wetland habitats due to the construction of Lok Ma Chau Spur Line and is managed by MTR. A management plan was also drawn up for LMCEEA (AEC Limited, 2019) and the plan is under review. Depending on the nature and requirement of each site, habitat management works include water level management, vegetation management (e.g. grass cutting, the removal of invasive exotic *Sonneratia* spp.), draining of ponds/*gei wais*/mudflat, visitor control, fish stocking, etc.

Fishpond, in particular during the drain down period, is one of the important feeding habitats of BFS. In order to maintain the availability of this habitat in and around the Ramsar Site, various measures to sustain pond fish farming have been conducted. These included measures to support the pond fish culture industry, e.g. voluntary Accredited Fish Farm Scheme (2005), Voluntary Registration Scheme (2007), trial of new fish species such as Jade Perch (2004) and organic fish farming (2009) (Anon., 2011). Management agreement projects are being conducted by the Hong Kong Bird Watching Society (HKBWS) with fishpond operators to enhance the ecological value of commercial fishponds and raise public awareness on nature conservation through educational activities since 2012 under the NNCP.

Monitoring and research

The Waterbird Monitoring Programme (WMP) commenced in 1998. It includes monthly waterbird counts to monitor waterbird population (including BFS) at the Mai Po Inner Deep Bay Ramsar Site and its vicinity. The programme is currently administered and executed by the HKBWS under a service contract of AFCD.

Since 2001, AFCD has been carrying out the Baseline Ecological Monitoring Programme (BEMP) to monitor the ecological condition of the Ramsar Site. The monitoring includes benthic fauna, water quality, sediment quality, and habitat conditions.

Annual coordinated monitoring and age structure assessment of the wintering BFS population in the Deep Bay area have been conducted since 2000/01 and 1998/99 respectively. Result of the studies provided reliable and detailed information of the species' status and population trends in Hong Kong.

The global census of BFS started in 1994 (Dahmer and Felley, 1994). HKBWS has been coordinating the annual census since 2003. The census cover a variety of wintering and staging sites of BFS including South Korea, Japan, Taiwan (China), Hong Kong

(China), Macau (China), provinces of coastal Mainland China, Vietnam, the Philippines, Thailand, Cambodia and Malaysia. This provides important information about annual BFS global population and distribution.

BFSs captured or rescued in Hong Kong are colour ringed according to a standardised banding protocol for the continuous research on this species. Resighting of ringed individuals are also recorded and reported.

To better understand the migratory route and the ecology of BFSs, satellite tracking and a number of specific research studies, e.g. habitat usage and diet of the species, were conducted in Hong Kong (e.g. Anon., 1999, 2020b; HKBWS, 2008; Melville et al., 1999; Sin and Sung, 2019; So and Wong 2023; Swennen and Yu, 2004, 2005; Ueta et al, 2002; Yu and Swennen, 2004a, 2004b).

Continuous monitoring of the water quality of Deep Bay is conducted by the Environmental Protection Department (EPD). Under the collaborative framework of the Deep Bay (Shenzhen Bay) Water Pollution Control Joint Implementation Programme (JIP), Hong Kong and Shenzhen have implemented pollution control measures by phase to protect and to improve the water quality of Deep Bay.

AFCD also commissioned series of studies on bird predation in fishponds and recommended bird deterring measures that would not pose harm to waterbirds, including BFS, to fishpond operators (e.g. AEC Limited, 2017, 2018).

Rescue and rehabilitation

Injured wild birds, including BFS, are rescued by AFCD or Society for the Prevention of Cruelty to Animals (SPCA), and rehabilitated by KFBG.

Since 1999, KFBG has received 40 rescued BFS. Of which, 14 were released after they made a full recovery, two were rehomed following rehabilitation. Amongst the 40 rescued individuals, 23 were suspected to be affected by the *Clostridium botulinum* toxin, six birds had injuries related to fish hooks and finish lines, one had injuries compatible with predator bites, two carried injuries of unknown nature and the rest (seven) carried musculoskeletal injuries (fractures, laceration and myopathy) of unknown origin.

All the birds released were fitted with external identifiers, generally in the form of rings, colour bands or both, while three were also fitted with GPS transmitters. As a result of the tagging, 10 of 14 birds were re-sighted either in Korea or Hong Kong.

Public awareness, education and training

As a globally endangered species with significant population found in Hong Kong every winter, BFS has been featured and incorporated in many awareness and education programmes run by different parties, e.g. AFCD, WWF-HK, HKBWS and KFBG.

With the establishment of HKWP in 2006, a Communication, Education, Participation and Awareness (CEPA) programme on wetland conservation is being implemented by AFCD. Information of BFS has been included in the CEPA programmes. A wide range of activities have been conducted including public and school guided tours, public and

teacher workshops, outreach programmes, talks and seminars and thematic publicity event. Besides, HKWP has launched a volunteer programme to provide training to the general public and encourage their continuous participation in wetland conservation. Leaflet and booklet on BFS were also produced by AFCD.

WWF-HK designed an education pack called "LoLo's Flying Journey" to provide students with hands-on activities that extend the knowledge and understanding about conservation of BFS. WWF-HK also organises training on wetland management and bird monitoring for wetland site managers in Mainland China and government officials in countries along the East Asian-Australasian Flyway. BFS is also featured in various activities organized by WWF-HK.

HKBWS coordinates and recruits volunteers for the international census of BFS every year. The species is also featured in various activities organized and publications produced by the society. The fishpond MA projects conducted by HKBWS also included education activities which raise public awareness on the conservation of fishponds, which provide foraging and roosting ground for BFS.

AFCD and HKBWS also maintain close communication with fishpond operators for the continuous "wise use" of the fish pond habitat and avoid any illegal use of hunting apparatus for deterring waterbirds from fishponds.

Regional co-operation

As the BFS is a migratory species, the concerted effort of various countries in East Asia is essential for its conservation. AFCD and various green groups (in particular WWF-HK and HKBWS) maintain close liaison with government officials, researchers and NGOs of mainland China and overseas for exchanging experience and knowledge in species conservation, wetland management and environmental education by attending international conferences, meetings and workshops or by other means of communication. An international symposium on BFS, which facilitated the preparation of the second international species action plan for BFS (Chan et al., 2010), was hosted by HKBWS in Hong Kong in 2006.

Mai Po - Inner Deep Bay (EAAF 003) is one of the Flyway Network Sites of the East Asian-Australasian Flyway Partnership (EAAFP). The goal of the Partnership is to protect migratory waterbirds, their habitat and the livelihoods of people dependent upon them (EAAFP, 2020a). AFCD, HKBWS and WWF-HK support and take part in the various initiatives of EAAFP for the conservation of BFS (i.e. biennial Meeting of Partners, and activities and meetings of Black-faced Spoonbill Working Group and Avian Disease Working Group).

In 2019, AFCD and the Environment Bureau of the Government of Incheon Metropolitan City of the Republic of Korea entered into Memorandum of Understanding (MoU) for the Conservation of Migratory Waterbirds to strengthen the conservation of migratory waterbirds especially the BFS, and establish the Sister Flyway Network Sites Arrangement between Mai Po Inner Deep Bay in Hong Kong and Songdo Tidal Flat in Incheon pursuant to the Sister Site Programme of the EAAFP. Under the Sister Site Arrangement, an International East Asian-Australasian Flyway Black-faced Spoonbill (BFS) Conservation Forum was conducted in 2020, 2021 and 2023 (EAAFP, 2020b, EAAFP, 2023) and a video "A Tale of Black-faced Spoonbill

Linking Two Cities, Incheon-Hong Kong Sister Site Agreement" was released in 2021 (EAAFP, 2021).

In 2023, AFCD and the Planning and Natural Resources Bureau of Shenzhen Municipality（深圳市規劃和自然資源局）signed a framework arrangement for the conservation of Shenzhen Bay (Deep Bay) wetlands to establish sister wetlands between the Mai Po Inner Deep Bay Ramsar Site and the Guangdong Neilingding Futian National Nature Reserve. The two wetlands are ecologically linked and are integral parts of the Shenzhen Bay (Deep Bay) wetland ecosystem, which serve as internationally important over-wintering sites and refuelling stations for waterbirds on the East Asian-Australasian Flyway, including the BFS. Areas of co-operation include information exchange on ecological baseline and waterbird monitoring, synchronised surveys of BFS and their habitats, protection of intertidal mudflat and native mangrove species, capacity building, and experience sharing on environmental education.

2.7 Threats

2.7.1 Pollution in Deep Bay

The water in Deep Bay was highly eutrophicated as a result of large amounts of organic input, including sewage, agriculture fertiliser and livestock effluent (EPD, 1997b; Huang et al., 2003; Xu et al., 2010; Young and Melville 1993). Its water and sediment was chronically polluted by toxic substances, polycyclic aromatic hydrocarbons, chlorinated compounds and endocrine disruptors (Centre for Coastal Pollution and Conservation, 2001; Liang and Wong, 2003; Man et al., 2004; Wong et al., 2004, 2005; Li et al., 2007; Qiu et al., 2009a, 2009b; Vane et al., 2009). Discharge from Pearl River and Shenzhen River are the major sources of pollution to the Ramsar Site (Lau and Chu, 2000). Nevertheless, with the joint efforts of the Hong Kong SAR and Shenzhen Government (e.g. provision and upgrading of sewage collection and treatment facilities), the water quality of Deep Bay has improved since 2000s. The overall Water Quality Objective compliance rate in Deep Bay was 67% in 2022 as compared with the ten-year average of 47% in 2009-2018 (EPD, 2023).

The long-term data of the BEMP (since 2001) showed a gradual reduction in biochemical oxygen demand, total Kjeldahl nitrogen and ammonical-nitrogen in recent years, while the levels of nitrite and nitrate remained stable. This indicates a general improvement of water quality in Mai Po Inner Deep Bay (Anon., 2013; AFCD and EPD, 2019).

2.7.2 Loss of foraging and roosting habitats

Though various legislations (i.e. Cap. 131, Cap. 499) are in place to control land use and development in the Deep Bay area, increasing human population and demand for land continue to pose pressure on land development in and or around fishpond area. Unauthorized developments of various scales in the Inner Deep Bay area were also recorded (WWF-HK, 2016).

Besides, there is concern that the changing fish farming practice and abandonment of fish farming would reduce foraging habitat of BFS. In mid-1990s, many fishpond operators intensified the management regime by harvesting throughout the year, without complete drain down of their ponds annually, or converted the coastal fishpond

to monoculture of brackish species such as giant grouper and scat. Some small-sized ponds were more densely stocked with predatory fish species, which feed on non-commercial species of fish such as *Gambusia affinis* and the shrimp *Macrobrachium nipponense*, thereby reducing the availability of the important food resources for BFS and other birds when ponds are drained. There were also many fishpond operators who have left the industry and abandoned their ponds as they suffered financial difficulties or they were too old to continue with their business (Cheung, 1999; Cheung, 2011; Anon., 2011). The abandonment of fishpond may reduce the opportunities of waterbirds including BFS to feed in drained fishponds in winter.

There are concerns that the sedimentation process may gradually increase the time of exposure of the mudflat between tides, resulting in the drying up of the mudflat and the encroachment of mangroves, grasses and sedges in the long run. This may reduce the size of the mudflat, hence the carrying capacity of Inner Deep Bay for foraging waterbirds and may have unforeseen and undesirable effects on its physio-chemical and hydrological properties. Based on the monitoring results of AFCD in the past years, some sites on the landward edge of the Mai Po mudflat have positive change in surface elevation but the change is not always significant. On the other hand, the seaward edge of the Mai Po mudflat experiences overall deficit in surface elevation but the change varies seasonally. AFCD will keep monitoring the baseline condition.

Fish and other aquatic animals are the major food source of the BFS. However, no detailed study has been conducted in the Mai Po and Deep Bay area to find out the abundance (total and specific areas such as MPNR and fishponds), diversity, distribution and seasonal variation of BFS food items. Wintering grounds in Taiwan also cover large areas of aquaculture area where the BFS can feed and loaf, thus food abundance and availability are closely related to the BFS wintering population.

Besides, the fast growing exotic *Sonneratia* spp. commonly found in the Inner Deep Bay may, together with the native species of mangrove, spread into the mudflat and reduce the area of open mudflat available to foraging BFSs. Since 2001, AFCD has been removing Sonneratia in Deep Bay every year.

The BFS population increased from 300 in 1990 to over 6000 individuals in 2022 and the annual percentage increase is 10% (Yu et. al. 2022). Many major wintering grounds recorded more BFS wintering in recent years. Mai Po and Deep Bay area is one of the best protected and managed areas for the BFS since the commencement of the BFS conservation activities. The wintering BFS in Hong Kong also increased from 1989/90 to 2006/07 but their numbers fluctuated between 350 and 450 individuals from 2017/18 to 2021/22.

2.7.3 Disturbance

Disturbance may result in reduced feeding success (through increased vigilance), higher energy expenditure (through reduced roosting and increased flight activity) and the equivalent of temporary or permanent habitat loss (Choi et al., 2014). Thus, where alternative feeding or roosting sites are not available, disturbance may reduce or limit carrying capacity. Sources of disturbance to BFS wintering in Hong Kong include human disturbance (e.g. illegal cross border fishermen on mudflat, visitors to MPNR, fishpond operators), bird deterring devices, feral animals, developments and low-flying aircraft and drones. There are existing measures to control these disturbance at and around the Ramsar Site including patrol and enforcement against illegal entry to the restricted area by AFCD, visitor management by AFCD and WWF-HK and statutory requirement in controlling development in Deep Bay area under TPO and EIAO.

2.7.4 Hunting, persecution and accidental deaths

There were occasional cases of BFSs caught by hooks or trapped by gin traps. These hooks and traps were likely used by fish farmers to scare or illegally hunt piscivorous birds (e.g. Great Cormorant, Little Egrets and Chinese Pond Herons) which take fish from fishponds. In 2018-2022, six BFSs were found to have gin traps on them and one BFS was found entangled by wires set up in fish pond for deterring Great Cormorants. All wild birds including BFS are protected under WAPO from being trapped, hunted or disturbed. AFCD conducts patrol in Deep Bay area and take enforcement actions against any illegal activities. Injured wild birds, including BFS, are rescued by AFCD or SPCA, and rehabilitated by KFBG.

2.7.5 Diseases

The significance of the impact of disease on the wintering population of BFS in Hong Kong is not clearly known. In Hong Kong, post mortem examination has identified foot injuries in some dead BFSs. In 2017 and 2022, several dead BFSs were confirmed to be infected by H5 subtype of Highly Pathogenic Avian Influenza viruses. Post mortem finding confirmed AI infection as the cause of death due to multiple organ necrosis. In addition, 23 rescued BFSs were suspected to be affected by the botulism. Since a single outbreak of botulism may affect considerable number of birds (e.g. 73 BFSs died in Tainan in 2002 due to avian botulism (Chuang et al., 2005)), its potential impact on the wintering BFSs in Hong Kong shall not be overlooked. After discovery of sick birds, they are rescued by AFCD or SPCA and then sent to KFBG for rehabilitation and appropriate treatment before return to the wild if suitable.

2.7.6 Threats outside Hong Kong

Given BFS is a migratory species, conservation of BFS cannot be achieved by the local authority alone and threats to one population will affect that of the other countries. Globally, the species is threatened by reclamation of intertidal flats, conversion of suitable habitats to aquaculture or industrial uses, increased disturbance, hunting and pollution, avian diseases, rapid dispersal of invasive species (e.g. *Spartina* spp.) (Collar et al., 1994; Chan et al., 2010; Sung et al., 2018; Jia et al., 2020; BirdLife International, 2023).

2.8 Climate change

Climate change may induce a change in the geographic range or timing of life-history events, e.g. timing of migratory. Though sea level rise due to climate change may reduce the availability of intertidal and shallow-water habitats, researcher anticipated that the current sedimentation rates in Deep Bay might offset the effect of the rising sea level (Corlett, 2009). Nevertheless, studies have also predicted that the distribution of BFS is likely to shift northward under the influence of climate change and the future of the wintering population of BFS in Hong Kong is highly uncertain and may even decline (Hu et al., 2010; Pickett et al., 2018).

2.9 Stakeholders

Various governmental and non-governmental bodies are involved in the local conservation of BFS. Major stakeholders include AFCD, EPD, WWF-HK, HKBWS, SPCA, KFBG and MTR.

2.10 Links to other action plans/strategies

The "Action Plan for the Black-faced Spoonbill *Platalea minor*" was produced by a Task Force through a workshop in Taipei in 1995 (Severinghaus et al., 1995). The Action Plan included general recommendations and country-specific recommendations for each range state. The general recommendations and those for Hong Kong are included in Annex 1.

The International Single Species Action Plan for BFS was adopted by CMS Scientific Council and subsequently by the CMS COP9 in 2008. It was published in 2010. The general recommendations and those for Hong Kong are included in Annex 2.

AFCD commissioned a consultancy study on the development of a Conservation Plan for the BFS in Hong Kong in 1998. The study objectives were to identify, prioritise and promote the actions necessary to maintain the population of the species in Hong Kong and to contribute to the conservation of its global population. A Conservation Plan for BFS was formulated in 2001 based on the recommendations of the study (Anon., 2001a; 2001b; 2001c). Actions identified in the plan are listed in Annex 3.

3 Action Plan

3.1 Aim

The primary goal of this plan is to provide a framework of conservation measures and actions that ensure long-term sustainability for the wintering population of the BFS in Deep Bay. These measures will be applied through collaboration among the government conservation authority, conservation organizations and tertiary institutions. These include protection and improvement of key foraging and roosting sites through proper habitat management, protection of species against illegal trapping through enforcement, rescue and rehabilitation, improvement of knowledge through scientific research studies, monitoring of population, as well as public awareness and education.

3.2 Objectives

The consolidated actions laid out in this plan are to be implemented through collaborations between the government conservation authority and other environmental organisations and institutes. The major objectives are:

(i) To safeguard the habitat for BFS for in situ conservation through habitat management and law enforcement.
(ii) To monitor the wintering BFS population and its habitat.
(iv) To maintain communication with local, mainland China and overseas authorities, researchers and NGOs for information exchange and collaboration.
(v) To raise public awareness about BFS and the importance of the conservation of its habitats.
(vi) To rescue and rehabilitate birds discovered sick or injured

3.3 Timeframe

This action plan covers a period of five years from 2024 to 2028. Review of the plan should be conducted towards the end of the five-year period.

3.4 Actions

3.4.1 Policy and legislation

Action (1): To scrutinize proposals for development, infrastructure projects or land use planning

Description: Scrutinise proposals for development, infrastructure projects or land use planning under EIAO and TPO in and around the Deep Bay wetlands, including the Ramsar Site, WCA and WBA to ensure that any adverse impact on Deep Bay wetlands/ BFS are properly addressed.
Agency(-ies): EPD, AFCD
Timeline: Ongoing

Action (2): To enforce the provisions of WAPO

Description: AFCD shall continue to carry out regular patrols at the Ramsar Site and take enforcement action against any illegal activities, such as hunting of wild birds and unauthorised entry into restricted area (e.g. visitors and fishermen), in accordance with WAPO. Any illegal shelters or traps discovered within the mangrove area shall also be removed. Relevant organizations shall inform their members the provisions of the Ordinance and encourage them to report illegal activities to AFCD.
Agency(-ies): AFCD, WWF-HK, HKBWS
Timeline: Ongoing

3.4.2 Habitat protection

Action (3): To conduct proper management on sites of conservation importance

Description: Ensure the continued proper management of the Mai Po Inner Deep Bay Ramsar Site including MPNR. Management for BFS in the Ramsar Site and MPNR should be implemented according to the Mai Po Inner Deep Bay Ramsar Site Management Plan (Anon., 2011) and the Mai Po Nature Reserve Management Plan 2019-2024 (WWF-HK, 2019). HKWP and LMCEEA shall also continue to be managed for the benefit of BFS. Depending on the nature of the site, management works shall include but not limited to water level management, vegetation management (including the removal of invasive exotic *Sonneratia* spp.), draining of ponds/ *gei wais*/ mudflat, channel desilting of *gei wai*s, visitor control etc.

Agency(-ies): AFCD, WWF-HK, MTR, DSD

Timeline: Ongoing

Action (4): To promote the sustainability of pond fish culture in Deep Bay

Description: Continue to support the pond fish culture in Deep Bay and encourage the management of fishponds to provide suitable foraging and roosting habitats for BFS. Demonstrate wise use of wetlands through Management Agreement (MA) between non-governmental organisations (NGOs) and fishpond operators. The two MA projects shall be continued subject to approval under the Countryside Conservation Funding Scheme.

Agency(-ies): AFCD, Countryside Conservation Office, HKBWS, other NGOs, fishpond operators

Timeline: Ongoing

Action (5): To improve the water quality of Deep Bay

Description: Continue the implementation of the Deep Bay (Shenzhen Bay) Water Pollution Control Joint Implementation Programme by EPD.

Agency(-ies): EPD, Ecology Environment Bureau of Shenzhen Municipality

Timeline: Ongoing

Action (6): To ensure works in Deep Bay area would not disturb wintering BFS or cause negative impact to BFS habitats

Description: Works in Deep Bay and its catchment (i.e. drainage and dredging) should be assessed to determine possible impacts on disturbance and on patterns of erosion and deposition of intertidal habitats which might adversely affect roosting and feeding behaviour of BFS. On the basis of the precautionary principle, works at roosting location of BFS during wintering period should be avoided, except under exceptional circumstances and with agreement of AFCD or relevant government departments.

Agency(-ies): AFCD, DSD

Timeline: Ongoing

Action (7): To avoid disturbance due to low level flight of manned and unmanned aircraft

Description: Issue a reminder to relevant government departments (i.e. Civil Aviation Department) and agencies to advise aircrews to avoid low level flights (e.g. at 500 feet for aircraft) in the Mai Po Inner Deep Bay Ramsar Site except in emergency and security situations, or on duty associated with the management of the Ramsar Site.

Require users (i.e. researchers) of small unmanned aircraft taking off from Mai Po Nature Reserve to avoid operating during the overwintering season (October to March) and, if it is unavoidable, precautionary measures should be taken (i.e. avoid the low level flights at 165 feet in all areas, avoid mudflats during low tide and *gei wai* during high tide).

Agency(-ies): AFCD

Timeline: Ongoing

3.4.3 Research and monitoring

Action (8): To monitor the wintering population of BFS

Description: Continue regular monitoring of the number of BFS in the Mai Po Inner Deep Bay Ramsar Site area and its vicinity. Monitoring shall also contribute to the coordinated annual global census of BFS.

Agency(-ies): AFCD

Timeline: Ongoing

Action (9): To monitor the age structure of wintering BFS

Description: Continue the monitoring of the age structure of the wintering BFS population to provide information on recruitment to assist in the interpretation of population trends.

Agency(-ies): AFCD

Timeline: Ongoing

Action (10): To conduct the Baseline Ecological Monitoring Programme

Description: Continue the Baseline Ecological Monitoring Programme and other monitoring activities for the inter-tidal mudflat including its elevation, distribution of mangroves, and benthic fauna or epi-fauna. The results of the monitoring programme should be made available for management purpose on a timely basis.

Agency(-ies): AFCD

Timeline: Ongoing

Action (11): To monitor the water quality, sediment quality and sedimentation of Deep Bay

Description: The water and sediment monitoring for the Deep Bay area should be continued, and the results made available on a timely basis.

Agency(-ies): EPD, AFCD

Timeline: Ongoing

Action (12): To monitor diseases affecting the BFS population by conducting pathological examination of sick or deceased BFSs

Description: Certain avian disease (i.e. highly pathogenic AI viruses and botulism) can cause mass die-off in wild birds including BFS. Therefore, surveillance is important in the foraging and roosting sites of BFS. All dead BFS discovered should be sent to AFCD. Post-mortem examination shall be conducted as far as practicable to identify the cause of death, especially during large-scale mortality event. KFBG shall also investigate the cause of death of any injured or sick BFSs under their care. If necessary, samples of live and dead birds with botulism symptoms will be collected by AFCD for testing. In case there is a suspected outbreak of avian botulism, WWF, MTR and KFBG shall alert AFCD, so AFCD can alert other stakeholders for rescue and rehabilitation preparation, and for the enhanced site management of MPNR and LMCEEA, e.g. removal of dead fishes and increase vigilance to any affected birds in their sites for timely rescue. Capacity building will be provided to relevant stakeholders

Agency(-ies): AFCD, SPCA, KFBG, HKBWS, WWF-HK, MTR

Timeline: Ongoing

Action (13): To monitor any change in the management of fishpond

Description: Changes in the fishpond management practices, especially the draining practice and abandonment of fishponds, may affect the use of fishpond as a foraging/roosting site for BFS. Hence, there is a need to monitor the management of the commercial fishponds around Deep Bay for the 'wise use' of wetlands.

Agency(-ies): AFCD

Timeline: Ongoing

Action (14): To encourage reporting of colour ringed BFSs

Description: Encourage birdwatchers, photographers and researchers to report sightings of BFS with colour rings. Such records will assist with elucidating local movement patterns, as well as contributing to long-term population studies.

Agency(-ies): AFCD, HKBWS, WWF-HK

Timeline: Ongoing

Action (15): To conduct scientific studies on BFS

Description: Research on BFS shall be conducted to inform further enhancement on management practices of wetland habitats favourable to BFS. More in-depth studies on its diet, habitat usage, activity pattern, characteristics of day/night roosting sites, food abundance of BFS and etc. may be conducted. Colour ringing of BFS shall continue.

Agency(-ies): AFCD, HKBWS, WWF-HK, Academics

Timeline: On-going/ when resources are available

3.4.4 Species protection

Action (16): To rescue injured/sick BFS

Description: Conduct prompt delivery of injured/sick BFSs found to the Wild Animal Rescue Centre of KFBG for timely medical treatment and rehabilitation. WWF-HK and MTR shall also report any injured/sick BFSs found at sites under their management to AFCD/ SPCA for rescue. Public shall be encouraged to report any injured or sick BFSs they encountered to AFCD or SPCA. In case there is a suspected outbreak of avian botulism, AFCD shall alert KFBG for rescue and rehabilitation preparation and WWF-HK and MTR for the enhanced site management of MPNR and LMCEEA, e.g. removal of dead fishes, if necessary, and increase vigilance to any affected birds in their sites for timely rescue.

Agency(-ies): AFCD, SPCA, KFBG, HKBWS, WWF-HK, MTR

Timeline: Ongoing

Action (17): To explore facilities for the long-term keeping of BFS that are rehabilitated but cannot be released into the wild

Description: Explore education or captive breeding facilities locally and overseas that can house rehabilitated BFS suffering from conditions that are unfavourable for them to be released into the wild.

Agency(-ies): AFCD, Ocean Park Corporation

Timeline: Ongoing

3.4.5 Communication and publicity

Action (18): To promote BFS conservation through awareness raising

Description: Continue public education and publicity on BFS and wetland conservation through the CEPA programmes of HKWP and WWF-HK, MA projects by HKBWS or other educational activities.

Agency(-ies): AFCD, WWF-HK, HKBWS, KFBG and interested parties

Timeline: Ongoing

3.4.6 Capacity building

Action (19): To maintain communication with mainland and overseas authorities, researchers and NGOs

Description:	Maintain regular communication with the relevant authorities, researchers and NGOs from mainland China and overseas (in particular Guangdong and Shenzhen and Incheon under MoU) on matters related to the conservation of BFS and wetland management. Participate in the international global census of BFS. Attend meetings of the Black-faced Spoonbill Working Group under the EAAFP or other relevant conferences or workshops. Should opportunities arises, conduct collaborative studies or programme can be initiated.
Agency(-ies):	AFCD, WWF-HK, HKBWS
Timeline:	Ongoing

3.5 Action timetable

Actions		Agency(-ies)	Timeframe
Policy and legislation			
(1)	To scrutinize EIAs and EcoIAs	EPD, AFCD	Ongoing
(2)	To enforce the provisions of WAPO	AFCD, WWF-HK, HKBWS	Ongoing
Habitat protection			
(3)	To conduct proper management on sites of conservation importance	AFCD, WWF-HK, MTR, DSD	Ongoing
(4)	To promote the sustainability of pond fish culture in Deep Bay	AFCD, Countryside Conservation Office, HKBWS , other NGOs, fishpond operators	Ongoing
(5)	To improve the water quality of Deep Bay	EPD, Ecology Environment Bureau of Shenzhen Municipality	Ongoing
(6)	To ensure works in Deep Bay area would not disturb wintering BFS or cause negative impact to BFS habitats	AFCD, DSD	Ongoing
(7)	To avoid disturbance due to low level flight of manned and unmanned aircrafts	AFCD	Ongoing
Research and Monitoring			
(8)	To monitor the wintering population of BFS	AFCD	Ongoing
(9)	To monitor the age structure of wintering BFS	AFCD	Ongoing
(10)	To conduct the Baseline Ecological Monitoring Programme	AFCD	Ongoing
(11)	To monitor the water quality, sediment quality and sedimentation of Deep Bay	EPD, AFCD	Ongoing
(12)	To monitor diseases affecting the BFS population by conducting pathological examination of sick or deceased BFSs	AFCD, SPCA, KFBG, HKBWS, WWF-HK, MTR	Ongoing
(13)	To monitor any change in the management of fishpond	AFCD	Ongoing
(14)	To encourage reporting of color ringed BFSs	AFCD, HKBWS, WWF-HK	Ongoing
(15)	To conduct scientific studies on BFS	AFCD, HKBWS, WWF-HK, Academics	Ongoing/ subject to availability of resources

Species protection			
(16)	To rescue injured/sick BFS	AFCD, SPCA, KFBG, HKBWS, WWF-HK, MTR	Ongoing
(17)	To explore facilities for the long-term keeping of BFS that are rehabilitated but cannot be released into the wild	AFCD	Ongoing
Communication and publicity			
(18)	To promote BFS conservation through awareness raising	AFCD, WWF-HK, HKBWS, KFBG, interested parties	Ongoing
Capacity building			
(19)	To maintain communication with mainland and overseas authorities, researchers and NGOs	AFCD, WWF-HK, HKBWS	Ongoing

4 Implementation and Reviews

Actions laid out in this action plan will be carried out by the corresponding agencies according to the set timelines, under the coordination of AFCD. Funding for the implementation of actions will be sought by the responsible agencies.

All actions will be reviewed in 2028. An interim review of the plan may also be undertaken if necessary. Set indicators will be used to evaluate the success and progress of this SAP.

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7 Annexes

Annex 1. Recommendations of the Action Plan for the Black-faced Spoonbill *Platalea minor* (Severinghaus et al., 1995).

Annex 2 Summary of the International Single Species Action Plan for the Conservation of Black-faced Spoonbill *Platalea minor* (Chan et al., 2010)

Annex 3 Summary of the Conservation Plan for Black-faced Spoonbill (Platalea minor) in Hong Kong (Anon., 2001a)

Annex 1. Recommendations of the Action Plan for the Black-faced Spoonbill *Platalea minor* (Severinghaus et al., 1995).

General recommendations

To ensure the continued survival of Black-faced Spoonbills in the wild, this Task Force urgently recommends the following actions to all the range states. Any information gathered will contribute to the conservation of this species. In these and other efforts, disturbance to Black-faced Spoonbills should be avoided and the welfare of the species should be considered the highest priority.

The Task Force considers the following to be urgent (l-*).

1-A That the Black-faced Spoonbill and sites that it uses be protected.

1-B That studies be conducted in range states to determine the following.

a) the availability of and threats to habitat used for breeding, migration and wintering. Known sites should be surveyed first, then potential sites second. Additional breeding sites on the Korean Peninsula should be located and protected.
b) the size of the total world population of the species, including the sizes of sub-populations which use each site, and
c) the migration routes of this species.

1-C That country and local task forces be established through national and local bird clubs, research institutions and/or management agencies. Each local task force should set action priorities for its respective country and identify limiting factors to the conservation of this species.

1-D That an international "Black-faced Spoonbill Center" be established or a liaison officer be appointed immediately under an existing Asian organisation to support organisations and people in each of the range states working toward the conservation of this species by assuming responsibility for:

a) disseminating information on the species to those involved in conservation of the species,
b) facilitating communication among researchers and conservationists involved with the species,
c) co-ordinating training of personnel working in range countries,
d) locating funding for Black-faced Spoonbill conservation and related research,
e) conducting an exhaustive literature search,
f) collecting all information on captive birds by contacting zoos and animal keepers,
g) tabulating all information on museum specimens,
h) establishing a Black-faced Spoonbill newsletter and network, and
i) co-ordinating a review on a regular basis (every one to two years) of this and future action plans, and revising and rewriting them to reflect the most current needs and knowledge/understanding of the species.

1-E That national and international campaigns be initiated to promote the public education and awareness of the conservation needs of the species and its habitats. Promotional and educational material for the conservation of Black-faced Spoonbills (e.g., TV documentaries, booklets and flyers, posters, T-shirts, calendars, logos, etc.) should be developed in national range-state languages. Conservation educational programmes targeted at children should also be developed.

1-F. That there be an increase in communication and co-operation among those working on Black-faced Spoonbills, as well as between experts on other species of spoonbills, wading birds and wetlands. Furthermore, the International Crane Foundation, the Asian Wetland Bureau and other international waterbird or wetland-related NGO's operating in Asia should be contacted to remain alert for possible breeding and wintering sites of Black-faced Spoonbills in Asia.

1-G. That funding sources, both in-country and international, be sought for research programmes, including the training of research and field personnel. International co-operation and co-ordination of training programmes should be encouraged.

The Task Force considers the following recommendations to have a high priority (2-*).

2-A. That international treaties and conventions reflect the endangered status of the Black-faced Spoonbill with appropriate protection, e.g., the Black-faced Spoonbill be included in Appendix I of the Bonn Convention;

and, that international treaties among range states protect the Black-faced Spoonbill along its migratory flyways.

2-B. That joint research and training sessions be set up among scientists and field personnel working in the range states.

2-C. That management plans for critical habitats should be developed by each range country reflecting the situations faced by the Black-faced Spoonbill in that country.

2-D. That banding and radio telemetry programmes and satellite tracking schemes be established ONLY after appropriate protocols have been established and personnel have been properly trained, and that such programmes are co-ordinated internationally.

2-E. That in situ conservation efforts described above be given priority for funding and manpower and that ex situ conservation efforts NOT be considered at this stage.

The Task Force considers the following recommendations to have medium priority (3-*)

3-A That reports and workshops on the conservation and scientific research of Black¬-faced Spoonbills be included as parts of Asian conservation and ornithological meetings.

3-B. That field data on this species be published in as timely a manner as possible to stimulate further studies and give feedback to all observers.

3-C- That each national task force evaluate its own country's relevant legislation (e.g. environmental impact legislation, pollution control legislation and zoning and land use legislation) to determine if it adequately supports wetland conservation. Each country's task force should lobby for effective enforcement of existing laws which support wetland conservation.

Country-specific recommendations

1.2.6 Hong Kong

A. The development of land adjacent to the inner Deep Bay and Mai Po Marshes in the northwest New Territories should be made compatible with the conservation of the wetland system; fishponds around the inner Deep Bay area should be conserved as buffer zones and reclamation of these ponds should be prohibited.

B. The Chinese Government (which will regain sovereignty over Hong Kong in 1997) should be encouraged to conserve the Inner Deep Bay wetlands, which include the Mai Po Marshes, Inner Deep Bay tidal mudflats and Futian Nature Reserve.

C. The Inner Deep Bay tidal mudflats should be incorporated into the Mai Po Marshes Nature Reserve, and it should be listed as a Ramsar Site as soon as possible. (The Hong Kong Government had sent the designation papers for Mai Po Marshes to the U.K. Government for onward transmission to the Ramsar Bureau as of June 1995)

D. Fishery practices compatible with conservation of Black-faced Spoonbills should be encouraged. Government programmes for compensation for losses to fisheries from conservation practices should be considered.

Annex 2 Summary of the International Single Species Action Plan for the Conservation of Black-faced Spoonbill *Platalea minor* (Chan et al., 2010)

4.1 International objectives, programme and activities

4.1.1 Improving legal protection status of the BFS

Programme	*Activity*
Agreements on conservation and joint project	- Range countries should formalize agreements for the conservation of FS following the CMS agreement model.
Prevent international and domestic trade	- Stop poaching and trade of eggs, chicks or adult birds for zoos, museum and private collectors.

4.1.2 Preventing habitat loss of the BFS

Programme	*Activity*
Establishing protected area	- The important sites specified in the national recommendations below and listed in the Appendix should be either legally designated as protected areas, or protected through appropriate land-use planning and management at the sties
Establishing additional breeding sites	- After studying the habitat requirement of breeding BFS, try to create suitable habitat at sites with good legal protection and low human disturbance (western Japan would be ideal) to attract nesting BFS
Recommendation of compatible land use at important sites	- Drafting land use guidelines for important sites, Organising workshops to discuss drafting appropriate land use plans for the buffer zones of protected areas or important sites that cannot be officially listed as protected areas.
Management plan for important sites	- Drafting management plans for important sites that have not got an existing plan, including through meetings of stakeholder through meetings of all stakeholders to discuss appropriate measures for conservation management of BFS and its habitat.
Site monitoring	- Drafting plan for regular monitoring and assessment of environmental factors at all important sites. National or local workshops should be held to draft the monitoring plans. - Monitor critical environment factors at important sites (water quality, food availability, development pressure etc.)

4.1.3 Improving Knowledge of the migration and distribution of the BFS

Programme	*Activity*
Satellite tracking	- Satellite tracking of birds from breeding grounds in South Korea to discover autumn migration route. - Track BFS for a one-year cycle. - Satellite tracking of birds from Mai Po marshes (Hong Kong) in early winter to study any movement further along the south China coast and to Vietnam
Summer survey for sites with immature birds in China	- Distribution of promotional materials at potential summer sites of immature birds (most likely in eastern and northern China) - Site surveys when information received
Continue colour banding of pulli (nestlings) at breeding grounds	- Dissemination of colour-banding protocols as pronted materials and on website. - Colour banding of BFS pulli.
Study changes in historic distribution	- Compare historical records of sightings and nesting with current distribution and status.

4.1.4 Biological studies

Programme	*Activity*
Age structure study	- Detailed study on the changes of morphology with age in captive birds. - Investigate the ratio of adult and immature birds in the populations at all important wintering sites to improve understanding of the breeding success and population trends of BFS.
Study on the sexing of birds by morphology	- Measurement of captive birds of known sex.
Study salt tolerance of newborn BFS chicks in captivity	- Study whether newborn BFS in captivity can take salty food to improve understanding of the foraging requirement of their parents.
DNA analysis	- Analysis of fallen feathers, captive birds and trapped birds
Intraspecific relationship with other birds	- Study whether gulls are beneficial as “watchdogs” or harmful as predators at the breeding grounds. - Study the intraspecific relationships of BFS with other birds in the wintering grounds.
Study the carrying capacity of BFS at their key sites	- Study the spatial and food requirement of BFS at important breeding, migration and wintering sites to determine the carrying capacity of these sites and factors that limit the BFS populations.

4.1.5 Reduce the risk of epidemic disease affecting the BFS populations

Programme	*Activity*
Establishing a disease alarming coordination system	- Establish an efficient system within the range of BFS to ensure rapid action and coordination in case of disease outbreak. - Contingency planning for epidemics such as avian influenza.
Collecting pathological and biological samples	- Establish a standardised sampling procedure
Training in the rescue of BFS	- Training on how to handle sick/injured birds and provide follow-up acare - Drafting of manual on bird rescue methods

4.1.6 Strengthen international network and coordination

Programme	*Activity*
Establishment of an international network and coordination system	- International coordinator nominated and funds secured. - Strengthen the existing international network, and consolidate the network at key sites and organisations. - Regular international meetings - Coordinator and working group identified.
Establish and international BFS website	- Focus on information sharing, site management and conservation issues.
Establish international mailing list	- Information to be distributed will focus on migration, reporting of banded birds, census results and urgent issues such as disease alerts.
Participation in the East Asia-Australasian Flyway Partnership (EAAF) network	- Participate in the EAAF Partnership and develop a BFS species working group to promote activities and projects under this Partnership.
Establish site-to-site relationships	- Develop and strengthen relationships between different BFS sites
Joint census of BFS	- Annual winter census - Annual breeding census
Regular meeting of site managers and specialists	- Meetings to update risk assessments and management recommendations
Coordination of reports on colour-banded birds	- Coordination of re-sighting reports

4.1.7 Strengthen local coordination

Programme	*Activity*
Establish BFS task force in each range state and region	- Organise national or local meetings to discuss the formation of local task forces.
Form local conservation groups at key sites for BFS	- Using the experience of the Red River Delta Local Conservation Group (and probably Tainan) to form similar local group at some important sites.
Involvement of local people in discussion on site management	- Organise regular meetings with local communities at important sites to explain the conservation management measures or provide education activities

4.1.8 Establishment of database

Programme	*Activity*
Establish one or more BFS database or libraries	- Identify the information that should be collected, including biometric data, DNA, parasite samples, etc. Ensure that standardised data are collected when a bird is examined in the hand.

4.1.9 Capacity building

Programme	*Activity*
Compile technical manuals	- Compile a technical manual on habitat creation and management, available in all languages in the flyway. - Compile a manual on best practice for ecotourism in different languages.
Training courses	- Training courses in the site management offered to management staff at important sites. - Training courses in education offered to management staff at important sites. - Training courses in site monitoring and basic research offered to management staff at important sites.

4.2 Regional/national objectives, programme and activities

Hong Kong

Programme	*Activity*
Study of BFS's feeding behaviour	- Investigate the basic biology and feeding ecology of BFS in Hong Kong
Fish-pond management	- Purchase and manage fishponds or promote the use of environmentally friendly management methods which provide additional feeding grounds for BFS

Annex 3 Summary of the Conservation Plan for Black-faced Spoonbill (*Platalea minor*) in Hong Kong (Anon., 2001a)

Policy and legislation

PL1. Scrutinise EIAs and, if necessary, ensure adequate mitigation measures are provided.

Site safeguard

SS1. Ensure strict protection of Mai Po Inner Deep Bay Ramsar Site and MNPR and implement Management Plans for these.

SS2. Hong Kong Guangdong Environmental Protection Liaison Group to recognise importance of inner Deep Bay mudflats to Black-faced Spoonbill.

SS3. Implement The Deep Bay Water Quality Regional Control Strategy.

SS4. Enforce the provisions of the Wild Animals Protection Ordinance.

SS5. Assess impacts of all drainage, dredging and other projects in Deep Bay.

SS6. Remind aircrews of the ecological importance of the Mai Po Inner Deep Bay Ramsar Site and the potential impact that low level flights have on birds, and that such flights should be avoided except in emergency and security situations.

SS7. Liaise with fish farmers to ensure that all bird scaring devices at fishponds are of a type which will not pose any threat to Black-faced Spoonbill.

SS8. Liaise with Lands Department and Squatters Control Section of the Housing Department to ensure that illegal structures in the mangroves off Mai Po are removed.

Species and habitat management

HM1. Drain one gei wai every two weeks throughout the winter to provide feeding opportunities for Black-faced Spoonbills.

HM2. Control vegetation encroachment into the open areas of water in the ponds which Black-faced Spoonbills use for roosting.

HM3. Maintain *gei wai* 3, 4 & 6 at suitable depths for Spoonbill roosting throughout the winter (i.e. 10 - 20 cm).

HM4. Ensure that commercial fishponds taken over for mitigation schemes provide feeding habitats for Black-faced Spoonbills.

HM5. Conduct trials on reducing prey loss from *gei wai* when the ponds are drained in winter.

HM6. Remove trees and manage vegetation on the bunds between Ponds 3/4, 4/6 and 6/7

HM7. Maintain uniform, flattened 'U'-shaped bottom profile in the channels to facilitate feeding by Black-faced Spoonbills.

Monitoring and research

MR1. Monitor the numbers and age structure of the Deep Bay population of Black-faced Spoonbill according to the methods described in Appendix IV.

MR2. Carry out post mortems using the standard forms provided in Appendix V on all recovered dead birds and monitor disease and parasite loads and annual known death rates

MR3. Develop and implement a programme for monitoring mudflat area and elevation, encroachment of mangroves, and abundance of benthic invertebrates, shrimps/prawns and fish.

MR4. Continue to monitor water quality in Deep Bay, and make sure that the results can be made available on a timely basis.

MR5. Monitor the management of the commercial fishponds with respect to the requirements of Black-faced Spoonbills.

MR6. Carry out research studies on the feeding ecology and behaviour of Black-faced Spoonbill

MR7. If required under MR4, develop and implement a strategy for monitoring levels of toxic substances in Black-faced Spoonbills and their prey.

MR8. Carry out a socio-economic study of fish farming within the Deep Bay area to assess economic viability and potential implications for Black-faced Spoonbills.

MR9. Establish the roosting requirements of Black-faced Spoonbills and identify areas for the creation of new roost sites.

MR10. Encourage birdwatchers to report birds with colour rings.

Public awareness, education and training

EA1. Establish an Education and Public Awareness Sub-committee of the Wetland Advisory Committee to promote and co-ordinate education

and public awareness activities.

EA2. Integrate wetland and Black-faced Spoonbill Conservation into current and future environmental education initiatives.

EA3. Generate media and public support for the conservation of wetlands and the Black-faced Spoonbill.

EA4. Generate support and action for the conservation of wetlands and Black-faced Spoonbills amongst decision makers.

EA5. Generate support and action amongst community groups that can contribute to the conservation of wetlands and the Black-faced Spoonbill.

EA6. Establish communication with fishermen and promote public understanding of the importance of fish farming for Black-faced Spoonbills and its role as a wise use of wetland.

Regional co-operation

RC1. AFCD should initiate dialogue regarding conservation efforts on mainland China that would ultimately benefit conservation work in Hong Kong.

RC2. Continue support and participation in current ongoing international initiatives

RC3. Hong Kong should host or co-sponsor an international workshop on Black-faced Spoonbill.