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Review

Reversing the Decline in a Threatened Species: The Black-Faced Spoonbill *Platalea minor*

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Abstract: The black-faced spoonbill *Platalea minor* is a species endemic to the coastal fringes and archipelagos of East Asia. The global population was fewer than 300 individuals in the late 1980s. Since then, two international action plans (1995 and 2010–2020) have been implemented, and the global population has increased to more than 6000 individuals in 2021–2022; the species was downlisted from "Critically Endangered (CR)" to "Endangered (EN)" in 2000. To examine the basis for this success, we reviewed the implementation of the action plans in light of the IUCN Species Conservation Cycle (Assess–Plan–Act–Network–Communicate) framework, using publicly available information documenting the planned activity or policy outcome. Additionally, we used the IUCN Green Status of Species framework to assess the impact of this conservation effort on the black-faced spoonbill's recovery to date and recovery potential. We found that the action plans for the black-faced spoonbill contain activities across all SCC framework components, though the number of activities implemented differed among countries. Our preliminary Green Status assessment indicates that the black-faced spoonbill is currently Largely Depleted, with a Species Recovery Score of 35%; however, without past conservation actions, we estimate that its score would be only 15% today (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. This provides further evidence that premeditated, evidence-based conservation interventions can reverse biodiversity loss.

Keywords: *Platalea minor*; Species Conservation Cycle of Assess–Plan–Act–Network–Communicate; Green Status of Species; species action plan

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1. Introduction

The black-faced spoonbill *Platalea minor* is a species endemic to the coastal fringes and archipelagos of East Asia (Figure 1) that shows a remarkable conservation history; probably no other bird species in Asia has such an interesting conservation account [1]. The species went from being a little-known waterbird with a global population of fewer than 300 individuals in the late 1980s, to one of the best-known threatened waterbirds, for which concerted conservation efforts have helped the population rebound to more than 6000 individuals in 2021–2022 [1,2]; the species was downlisted from "Critically Endangered (CR)" in 1994 to "Endangered (EN)" in the 2000s [3]. Currently, the species breeds only in four areas: primarily in two areas on the west coast of the Korean Peninsula, with small numbers breeding in Liaoning Province, China and far east Russia. The species winters in Vietnam, South China (including Hong Kong, Macao, Hainan, and Taiwan), Korea (Jeju), and Japan, with sparse records from Thailand, the Philippines, Malaysia, and inland China [2,4] (Figure 1).

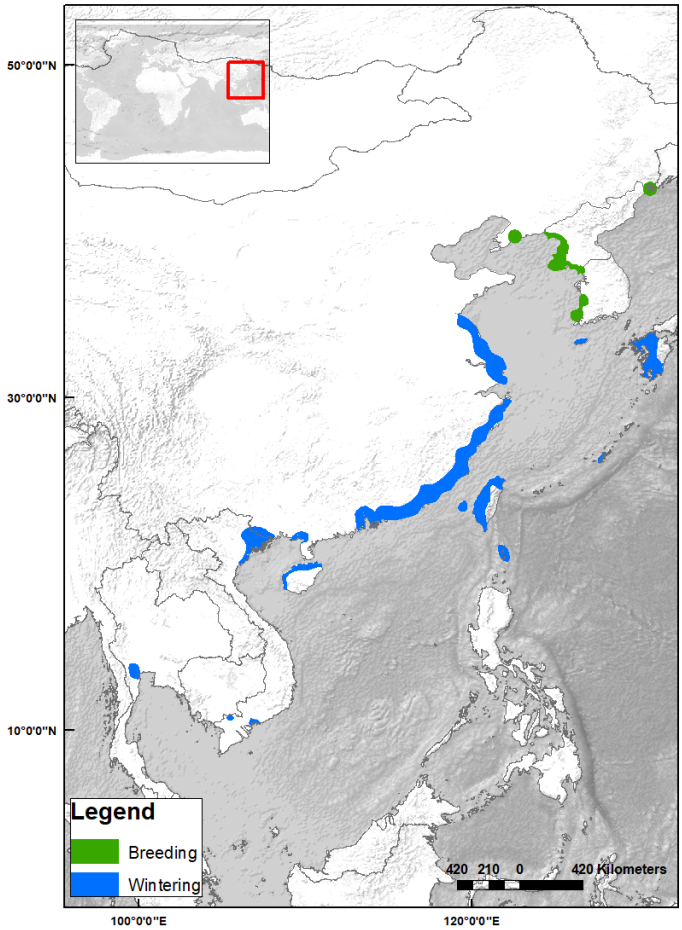

Figure 1. Map showing current breeding areas and regular wintering areas based on BirdLife International [5] and Chen et al. [6].

The species' conservation history started at the 21st BirdLife International World Conference held in 1994, where the Asian partners agreed on joint actions to conserve the black-faced spoonbill. As a result of this conference, the first species action plan was published in 1995 [7]. Workshops were held in Beijing (1996) and Tokyo (1997) on the implementation of the action plan. This first plan initiated international cooperation projects for the black-faced spoonbill in all parts of its range and contributed to the achievement of important aims, such as increased scientific research (i.e., satellite tracking), legal protection of the species, and a series of workshops and meetings held in most range countries. The success of the first action plan resulted in the compilation of the Second International Action Plan under the auspice of the Convention of Migratory Species from 2005—a series of workshops aimed to prepare an international single-species action plan for the conservation of the black-faced spoonbill between 2005 and 2007. This plan was adopted in 2008 by the Convention on Migratory Species (CMS) Scientific Council, and subsequently the CMS COP9, and the plan was published in 2010 [1]. The action plan had a lifespan of 10 years (2010–2020). Finally, a black-faced spoonbill working group in the East Asian–Australasian Flyway Partnership (EAAFP) was set up in October 2013 to coordinate conservation efforts using the international single-species action plan as the basis of their on-going work. The working group members included representatives from all of the principal range states (except Vietnam). More than a decade later, this action plan and its coordinated implementation are regarded as one of the most successful action conservation programs for a threatened bird in Asia.

While this coordination and cooperation must be celebrated as a conservation success, it is also important to reflect on the implementation of these actions and which actions

have been the most effective for species recovery. Such reflections will be critical for maintaining the upward trajectory of the species. Two recent frameworks facilitate this reflection process. Recently, the International Union for Conservation of Nature (IUCN) Species Survival Commission adopted the Species Conservation Cycle (hereafter SCC) as its primary strategic framework [8]. The SCC categorizes species conservation activities as belonging to one of five components: Assess, Plan, Act, Network, or Communicate. Categorizing activities in this way helps clarify the planning and action landscape for a species [9]. The next step in reflection is to assess the effectiveness of these actions, and IUCN introduced a novel method for assessing species recovery and conservation impact in 2021: the IUCN Green Status of Species [10,11]. The draft methods for the Green Status assessment were tested with nearly 200 species [12], with the black-faced spoonbill being one of them, but its Green Status assessment has not been formally published yet.

Here, we (1) review the implementation of the action plans and their preparation process under the light of the SCC Assess–Plan–Act–Network–Communicate framework; (2) use the Green Status of Species framework to assess the recovery of and conservation impact on the black-faced spoonbill; and (3) reflect on lessons learned for future planning and conservation efforts.

2. Materials and Methods

2.1. The Species Conservation Cycle: Assess–Plan–Act–Network–Communicate

We reviewed the two action plans (1995 and 2010) and their preparation processes to categorize their implemented activities into the five components of the SCC: (1) Assess, (2) Plan, (3) Act, (4) Network, or (5) Communicate (Figure 2).

Figure 2. The Species Conservation Cycle has three components that follow each other—Assess, Plan, and Act—and two components that span across the others—Network and Communicate [8].

The first three components flow sequentially, while the other two are transverse [8]. The Assess component is about understanding and documenting the status and trends of the black-faced spoonbill, including both species and ecosystem assessments. The Plan component addresses the development of collaborative, inclusive, and science-based conservation. The Act component refers to mobilizing conservation actions to improve the status of the species, including ecosystem-level conservation. The Network component enhances and supports collaboration and capacity building among experts. Finally, the Communicate component aims to drive strategic and targeted communications to enhance the impact of species conservation initiatives.

The two action plans of this species included different conservation activities. We reviewed all activities proposed in the action plans. We considered that a plan's activity had been implemented when there was a published paper or information publicly available documenting the activity or a policy outcome (e.g., a protected site declared) during the lifespan of the action plans. Therefore, to assess whether the activities given in the action plans from 1995 onwards (e.g., satellite-tracking research, protected areas) were

implemented, we used the key words "*Platalea minor*" to search published articles and databases (https://scholar.google.com/ (accessed on 10 October 2022), https://www.ramsar.org/ (accessed on 10 October 2022)). We assumed a bias in the published articles between lower- and higher-income nations [8,13] within the species range and expected that there were some conservation activities implemented in lower-income nations without any reflection or support of a published paper; however, we considered this bias acceptable for the purpose of this review. Additionally, we also gathered information from the EAAFP black-faced spoonbill Working Group. We assigned an SCC component category (Table S1), date (year/s) of implementation, and the implemented geographic range according to the Red List [3] to each registered activity. In the case of a wide/international activity, we attributed that activity to all countries involved in it. Finally, we recorded available documentation (e.g., published reports/resources and papers) for activities listed under the objectives defined in the single-species action plan 2010–2020 to tentatively recognize those activities that have been carried out, those that have not, and where (Tables S2 and S3). This showed the degree of implementation of the current action plan at global and national levels and may provide some lessons learned and directions for future plans for the species.

2.2. Green Status Assessment of Black-Faced Spoonbill

While the Red List categories can capture changes in species status due to conservation action (e.g., the downlisting of the black-faced spoonbill from "Critically Endangered" to "Endangered"), they do not fully capture the impact of conservation actions [12,14]. The Green Status of Species [10] was created, in part, to evaluate the impact of, and by doing so incentivize, conservation actions. Therefore, in addition to categorizing the conservation actions for the black-faced spoonbill according to the Assess–Plan–Act–Network–Communicate framework, we have completed a preliminary Green Status assessment for the species to inquire about how the planned actions may have contributed to the species' recovery and help us identify possible directions for a future action plan.

2.2.1. Overview of the IUCN Green Status of Species

The Green Status of Species introduces, and its metrics of conservation impact are based upon, a standardized definition of species recovery. This recovery definition goes beyond risk of extinction to assess differences in a species' status across different parts of its range (***spatial units***), accounting for areas where the species has been extirpated, and considers whether the species exists in populations able to perform its ecological functions. Recovery is judged by assessing the ***state*** of the species (***Absent, Present, Viable***, or ***Functional***) in each spatial unit. If a species is ecologically functional AND viable (i.e., not threatened with extinction) in all spatial units of its ***indigenous range***, it is considered Fully Recovered (or Non-Depleted). A numeric ***Green Score*** reports a species' status relative to this definition, where 100% represents a ***Fully Recovered*** (or ***Non-Depleted***) species (state = Functional and Viable in all spatial units), while 0% represents a species that is Extinct or Extinct in the Wild (state = Absent in all spatial units); these percentages are calculated based on the different values (***weights***) assigned to the four possible states in each spatial unit. For full methods for the Green Status of Species and definitions of bolded terms, see IUCN [15,16] and Grace et al. [12]; in this paper we present a summary of the method only. Nonetheless, the full preliminary assessment for this species, with justifications and supporting documentation, is included as a Supplementary File (File S4).

The Green Score at the time of assessment, based on observed or inferred information, is called the ***Species Recovery Score***. However, the power of the Green Status to evaluate conservation impact is realized by estimating the Green Score under scenarios including or excluding past and expected future conservation actions [16]. This generates four ***conservation impact metrics***: ***Conservation Legacy*** (impact of past conservation), ***Conservation Dependence*** (expected impact of halting all conservation in the short term), ***Conservation Gain*** (expected impact of continuing conservation in the short term), and ***Recovery Potential*** (maximum possible recovery within 100 years) [12,15].

2.2.2. Basis for the Black-Faced Spoonbill Green Status Assessment

To conduct a preliminary Green Status assessment for the black-faced spoonbill and generate its Species Recovery Score and conservation impact metrics, we had to (1) establish the species' indigenous range (i.e., its distribution prior to the start of major human impacts, plus any areas it currently occupies in which it is considered wild); (2) consider whether the range should be divided into spatial units; and (3) establish a definition of functionality for the species.

To assess indigenous range, we first established the benchmark year in which human impacts started causing noticeable shifts in the spoonbill's abundance and/or distribution. The first evidence of major human impacts is the dramatic decline in population numbers that began in 1950. We were unable to find evidence of earlier declines, and the species had been described as common [17]; indeed, genetic evidence [17] suggests that there may have been more than 10,000 individuals prior to the decline. The species' distribution in 1950 is not expected to be much different from the current distribution (Figure 1); it seems the black-faced spoonbill would have historically been endemic to the coastal fringes of East Asia and archipelagos of the Yellow Sea [18–25]. Since 1950, the distribution has expanded slightly to the north in Russia [26,27] and to the south [2,6]; these areas also form part of the indigenous range.

Once the indigenous range was established, we needed to decide whether to subdivide the range into spatial units. The purpose of spatial units in a Green Status assessment is to account for differences in status across the species' range, which may be the result of biological or ecological divisions within the species or the presence of specific threats in some parts of the range but not others [10,14]. However, the range does not need to be divided into more than one spatial unit if there are no clear divisions within the species [10,15]. Because the black-faced spoonbill is considered a single population globally, which breeds in only 11 sites [28], we considered the entire global population to be part of one spatial unit. Because we used a single spatial unit, we used fine-resolution states (i.e., the four basic states subdivided further into ten fine-resolution states to allow for finer-scale assessment of changes in status: Absent, Present [Present–Critically Endangered, Present–Endangered, Present–Vulnerable, Present–Near Threatened, and Declining], Viable [Viable–Near Threatened and Not Declining, Viable–Least Concern], and Functional [Functional in <40% of the spatial unit, Functional in <70% of the spatial unit, Functional in >70% of the spatial unit]) [15].

Finally, because the Green Status assessment requires evaluation of whether the species is ecologically functional within its spatial units, we defined functionality for the black-faced spoonbill. The species performs a number of trophic- and ecosystem-level functions (predation, nutrient cycling) and also has notable intraspecific functions (migration and colony formation) [29]. However, although even a single individual performs some level of function, in the Green Status assessment, functionality must be defined in such a way that a population can be judged as functional or not; there must be defining characteristics or thresholds. Because the relationship between the number of individuals and output of a particular function (e.g., nutrient cycling) is usually difficult to measure, proxies for functionality can be used [10]. We assumed that at the pre-impact population size (approximately 10,000 individuals [17]), the species was performing its ecological functions across its range. Therefore, functionality would be represented by recovery to this population size. However, given the uncertainty in this estimate (95% CI: 1976–37,254 individuals [17]), we could not assume 10,000 individuals as a hard cutoff for functionality. Rather, if the species was Viable in a spatial unit, the ability to record uncertainty built into the Green Status assessment allowed us to also indicate that the species could be Functional at some level in that scenario (see File S4). The species must also remain migratory across its flyways to be considered Functional, as this is a defining characteristic of the species.

The preliminary Green Status assessment (i.e., the estimation of spatial-unit states under different scenarios with and without conservation) was conducted using the assessment materials made available by the IUCN Species Survival Commission, and the draft

document is included as a Supplementary File. However, the assessment of the species is not final until it has been published on the Red List website.

3. Results

3.1. Action Plan Implementation within the SCC Framework

Although the SCC framework was only recently developed, the action plans for the black-faced spoonbill contain activities across all SCC framework components (Table S1). All countries, excluding the DPRK, have developed the "*communicate*" and "*network*" components to some degree, and this is reflected in the other framework components. Regarding the "*assess*" component, the plans were designed through consultative processes, with at least some of the design process taking place in situ (e.g., regional consultation workshops were held for both action plans) and included follow-up workshops to evaluate the implementation of the plans and to assess further interventions.

However, in spite of the effort to cover the species' entire distribution regarding planned actions, there is a disparity in the number of activities implemented among countries (Figure 3). For instance, in the "*act*" component, we found 18 documented main activities in the Republic of Korea, but only 2 in Vietnam and the Democratic People's Republic of Korea (DPRK).

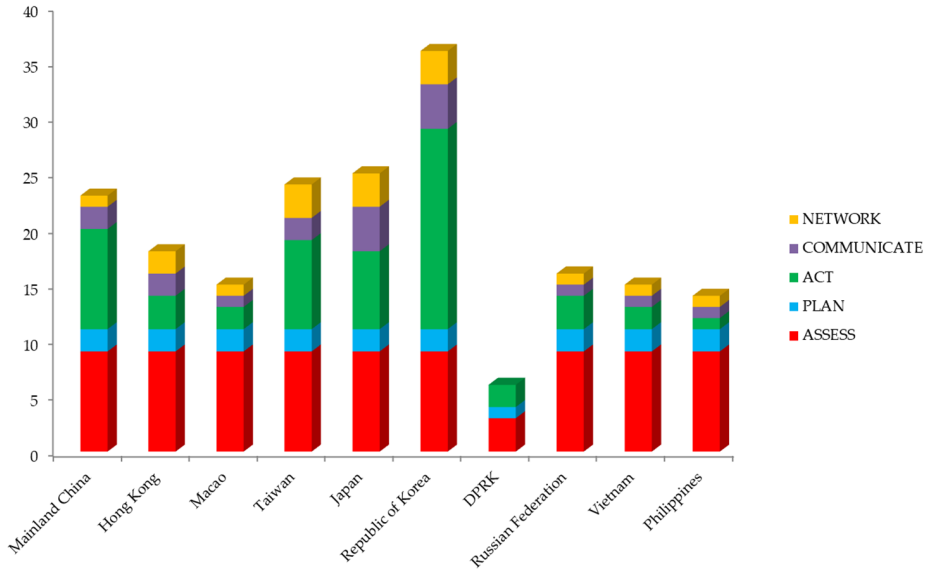

Figure 3. Number of documented activities founded within a SCC framework by countries (including international activities attributed to more than one country; see Table S1).

This disparity is partially explained by the fact that the action plans did not consider the same number of activities in each part of the species' distribution. Focusing on the action plan in 2010–2020, we found published papers and publicly available information that document the initiation of 56% (n = 28) of the total activities (n = 50) proposed under the international objectives (Tables 1 and S2). At the national level, we found papers and publicly available information that document the initiation of 43 out of 77 proposed activities (55.84%) (Tables 1 and S3).

These figures likely underestimate the degree of implementation of the action plan. Expected biases include the lack of capacity to produce public information in some countries, especially if the activities are done at local levels; the lack of opportunities to publish papers in indexed journals; and language barriers. Even so, our results demonstrate the effort taken to develop conservation interventions, including policies, in the lifespan of the action plan.

Table 1. Number of activities planned in the black-faced spoonbill single-action plan 2010–2020 compared to those documented by published papers and publicly available information as being implemented. The details of all planned activities are given in Tables S2 and S3.

Objectives in Action Plan (2010–2020)	Total Activities Planned	Activities Documented by Published Papers and Publicly Available Information	Percentage of Plan Activities Covered
International Objectives (attributed to more than one county)	50	28	56%
	Regional/national Objectives		
Russian Federation	5	3	60%
Mainland China	29	21	84%
Taiwan	5	2	40%
Macao	10	3	30%
Hong Kong	2	2	100%
South Korea	9	8	89%
Japan	3	2	66%
Vietnam	9	1	11%
Others	5	1	20%

3.2. Green Status

Preliminary Species Recovery Score for the Black-Faced Spoonbill

The black-faced spoonbill has a preliminary Species Recovery Score of 35% (uncertainty: 25–45%), categorizing it as a Largely Depleted species within the Green Status framework [10]. This is because within the global spatial unit, there is currently a total population of about 5000–6000 individuals (and at least 3000 mature individuals based on the age structure reported in An [30]). The number of mature individuals has not declined since the last Red List assessment in 2017 [3], but there is a continuous decline in habitat quality mainly due to human activities along the East Asian coast (habitat loss, noise pollution, climate change, urban development, etc.). The population is experiencing global threats such as diseases, the pressure of human disturbance, habitat loss, and climate change, especially in the southern part of the range [6,31–34]. The ongoing still small population and decline in habitat quality mean that the species is only Present (as opposed to Viable or Functional). However, the extent of the ongoing decline in habitat quality [33] is not expected to exceed 50% in three generations (i.e., by 2045) because there is room to prevent habitat loss, so it might be feasible to increase the environmental carrying capacity for this endangered bird [17,35]. Therefore, the species can be considered Vulnerable under Red List criterion A3c. This is different from the 2017 Red List assessment of the global population as Endangered under A3c, but this apparent contradiction aligns with the text of the 2017 assessment, "If the predicted very rapid declines do not materialize, the species will warrant downlisting in the near future" [3]. This result, as with the other results reported in this section, is preliminary and should not be cited as final until the assessment is published on the Red List website.

The preliminary Green Score for the current-without-conservation scenario is 15%, which means that in the absence of past conservation action, the black-faced spoonbill would be considered Critically Depleted today. This gives the species a high Conservation Legacy (impact of past conservation) of 20%. This is because conservation efforts focused on reversing the species' decline. Between 1950 and 1980, the species declined so steeply that there were only around 300 individuals remaining. There is controversy over the main reason for this decline among experts. Some suggest the main cause was disruption accompanying the Korean war [36], while others support other causes, e.g., the use of DDT [17]. Whatever the main cause, the species experienced a dramatic decline from the 1950s until the 1980s. The current state without conservation (counterfactual) would be Present-CR, which is the listing of the species during the 1990s prior to the establishment of

the first action plan. Given that there were so few individuals remaining prior to concerted conservation, there is a chance that the species could have gone extinct entirely (reflected in the lower bound).

The future-with-conservation scenario (10 years from now) reflects planned conservation measures to protect and guarantee the quality of spoonbill habitats. This scenario is harder to predict, with a most likely scenario being that the species would remain Vulnerable with some degree of ongoing decline over that time period, which would result in a static Green Score of 35% and a Conservation Gain of 0% over the next 10 years. Habitat quality has been repeatedly shown to be vital for the recovery of the species [6,33,34]. However, the success of these measures is hard to determine. In the 2010–2020 plan, preventing further habitat loss was given as the most pressing conservation action, and "establishing protected areas" was a high priority action that was "imminent and ongoing". However, in 2021–2022, we see that despite that commitment, the extent of habitat quality loss continues to grow. Therefore, the lower bound of this scenario reflects the lower bound of the "current" state, as does the best estimate of Present–Vulnerable, reflecting an ongoing decline in habitat quality (Red List criteria A3c) but at levels of <50%. It is possible within 10 years to stop the ongoing decline in habitat quality, especially given ongoing negotiations around the Convention on Biological Diversity, so the upper bound (Viable–Near Threatened) reflects that.

The future-without-conservation scenario reflects the expected changes over 10 years if all protections and conservation actions were taken away. In this scenario, we expect the ongoing decline to accelerate, losing the gains made over the last decades. However, it is unlikely that the species would go entirely extinct within this relatively short time frame. Therefore, the best estimate is that the species would once again become Critically Endangered, resulting in a Green Score of 15% and a high Conservation Dependence of 20%.

The long-term aspiration scenario reflects what is possible for the species in the next 100 years. Even though some former habitats may be lost to development, it is possible to protect enough area so that the species can return to a functional population size and number of breeding pairs over that time; therefore, within 100 years, the species can become Fully Recovered with a Green Score of 100%, meaning that the Recovery Potential is high (65%).

4. Discussion

Globally, there is a serious decline in waterbird populations in East Asia, with 64% of these populations showing a decreasing trend [37]. However, the black-faced spoonbill, an endemic species in the region, shows a remarkable conservation history [1]. Since the first action plan was launched in 1995 [7], the species was downlisted from "Critically Endangered (CR)" in 1994 to "Endangered (EN)" in the 2000s [3], with a population increase from about 400 birds at the time of the first action plan [7] to over 6000 individuals in 2022 [2]. In this review, we have assessed that the black-faced spoonbill is currently Largely Depleted, with a Species Recovery Score of 35%; however, without past conservation actions, we estimate that its score would be only 15% today (Critically Depleted). This supports the evidence that premeditated, evidence-based conservation interventions can reverse biodiversity loss [8]. We have documented a number of planned activities in the two action plans that have been implemented [Tables S1–S3]. Focusing only on the second action plan (2010–2020), we found documentation for at least 28 and 42 activities at the international and national levels, respectively, that tackle more than 50% of the objectives of the action plan (Table 1). In all likelihood, the number of implemented activities is higher since publicly available information is lacking in some countries (e.g., Vietnam and DPRK). The combination of these conservation interventions has contributed to the species' recovery to this point (e.g., 16 Ramsar sites have been declared since 1995 where the black-faced spoonbill is a target species; Table S1). The Green Status' comparison to pre-human impact levels is important; even if all threats to the species ceased and enough time passed for the species to become Least Concern, the species is currently far from pre-

impact levels, which has implications for restoring function (i.e., loss of so much spoonbill biomass from breeding and wintering areas since the pre-impact period has probably changed nutrient cycling and food webs). Moreover, the species seems to still be far from the pre-human impact baseline, considering other parameters. The pre-impact population has been estimated to be between 7500 [35] and 10,320 birds (CI = 1976–37,254) [17], so the population has not reached the pre-impact size yet. There is evidence of genetic consequences of the recent bottleneck of the black-faced spoonbill population, so recovery of population numbers alone may not be sufficient [35]. For instance, the species is exposed to diseases and outbreaks, such as botulism and a highly pathogenic avian influenza virus (HPAIV) [31,32], which may quickly reverse the positive trend of the population size due to the current risky genetic health of the population after a bottleneck. On the other hand, a number of hybridization cases with the European spoonbill *Platalea leucorodia* have been reported [27,38]; thus, long-term genetic monitoring is especially necessary for this species. In spite of the efforts over the last decades (see Table S1), there has been insufficient protection of its most important habitats; there are still many unprotected sites [6]. Even if the habitat is protected, long-term monitoring programs of habitat quality are needed, not only in breeding areas but also in wintering sites (e.g., Mainland China sites, Xuan Thuy National Park, Vietnam; Cotai ecological zones, Macao, China; Tainan, Taiwan, China; Mai Po Nature Reserve and the Inner Deep Bay mudflat, Hong Kong, China). Finally, climate change and ongoing habitat loss are predicted to have adverse impacts upon this species, causing ultimate reductions in the size of their global population before 2050 [6,33]. Special attention should be paid to the development of wind farms along the EAAF on the eastern coast of Asia and their impact on waterbirds and their habitat quality [39].

But there is room to be positive. The Green Status assessment also shows the expected benefits and potential of future conservation efforts (high Recovery Potential if threats are eliminated). The two action plans were developed well before the SCC framework was formalized, but nonetheless, all framework components were taken into account (see Table S1). There is a disparity in the number of conservation activities among countries; probably partially due to long-term political, economic, and social challenges inherent in all conservation issues [8], but the plans have covered the distribution of the species and aimed to strengthen regional, national, and local efforts and enhance the local capacities, as is desirable in any action plan [8]. In this way, the role played by the EAAFP Black-faced Spoonbill Working Group in coordinating wintering censuses ("*Act*" component), networking (partnership), and communicating, among other initiatives, is especially remarkable. A formal alignment with the SCC framework could help the conservation community plan and act at appropriate geopolitical scales and particularly at the national level, such that we might ameliorate the current disparity among countries. Our knowledge of this species has improved greatly since the development of the action plans; the black-faced spoonbill has gone from a little-known species to one of the best-known threatened waterbirds [1]. We need to still increase the knowledge of the species for scientific-based planning. For instance, field surveys and tracking studies are needed to provide further information about the distribution and abundance of the black-faced spoonbill [6]. We need to improve understanding of the interspecific relationships between the black-faced spoonbill and other species [27,38] and the ecological function of this species in estuaries and intertidal mudflats [37]. New needs have arisen, including the necessity of developing standardized guidance for dealing with emergency situations (i.e., disease outbreaks) (see Table S2). Finally, it seems that local efforts for this species and its habitat protection have positive impacts on the population size [4]. We show a sharp increase in the number of individuals in those countries that have implemented a higher number of planned activities, but we do not know exactly the direct correlation and the impact degree of these activities with the recovery of the species. For example, focusing on those countries with wintering populations of the black-faced spoonbill, Taiwan has increased the population from 300 individuals in 1995–1996 to 3824 birds in January 2022 [2] (+1174.67%), with 24 implemented activities between 1995 and 2022 (Figure 3); Japan has increased it from 31 birds to 683 (+2103.23%)

in the same period [2], with 25 implemented activities (Figure 3); mainland China increased the population from 21 to 1136 birds (+5309.52%) [2], with 23 implemented activities (Figure 3); Vietnam has increased it from 75 to 88 (+17.33%) in the same period of time, with only 15 activities (most of them are global activities) (Figure 3); and the Philippines does not show any increase [2] (14 global activities in this country, Figure 3). All of these issues should be taken into consideration in a new plan.

The active period of the second international single-species action plan for the conservation of the black-faced spoonbill 2010–2020 has formally expired. More than a decade since its initiation, the situation of the species has changed dramatically. A new plan should be developed in light of these changes, taking into account the following items: (1) the current population size and advances in knowledge of ecology, genetics, and threats; (2) the Green Status of the species; (3) the lessons learned from the previous actions plans [1,7]; and (4) the explicit use of the SCC framework in developing the plan, as well as principles, steps, and tools to use for species conservation planning [9].

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/d15020217/s1, Table S1: All implemented activities (for which we could find evidence) of the two Black-faced Spoonbill action plans, classified within the Species Conservation Cycle (SCC) framework (Assess-Plan-Act-Network-Communicate). See the References section of the paper for full citation information (citation number in brackets). Table S2: International objectives recorded in the International Single Species Action Plan for the Conservation of the black-faced spoonbill (2010–2020) (pp. 12–26). This information has been reproduced verbatim from the action plan. Activities for which we could find evidence of implementation are highlighted in grey. See the References section of the paper for full citation information (citation number in brackets). Table S3: Regional/National objectives recorded in the International Single Species Action Plan for the Conservation of the black-faced spoonbill (2010–2020) (pp. 27–40). This information has been reproduced verbatim from the action plan. Activities for which we could find evidence of implementation are highlighted in grey. See the References section of the paper for full citation information (citation number in brackets). File S4: Excel file showing the full data of the preliminary Green Status assessment of the black-faced spoonbill.

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