Regional Flyway Initiative · Site Study

January 2026

RFI Priority Site · Boeung Prek Lapouv (Sarus Crane Reserve)

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Asian Development Bank

General Site Information

Country	Cambodia			
RFI Site Name	Boeung Prek Lapouv			ID011
City/ Municipality, Province, Region	Borey Chulsar and Koh Andet district, Takeo Province			
Geographical coordinates	10.72º N, 105.03º E		Area (has)	8,312 ha
Key species	Sarus Crane, Greater Adjutant, Black-tailed Godwit			
Key habitats (biomes)	Seasonally-flooded grassland and swamp forest			
Key ecosystem services	Provisioning services (e.g. fisheries, freshwater for rice cultivation) and regulating services (flood hazard protection)			
Key drivers of change	Agricultural and fishing activities. Infrastructural development near site			
Conservation status (mark all that applies)	■	Protected Area		Flyway Network Site
		Ramsar Site		Others _____
IBA/ KBA name (and number) and other designations	Boeung Prek Lapouv			
Management Stakeholders	Ministry of Environment, Fisheries Administration, Provincial and district agricultural office, Takeo Provincial Government (including Provincial Department of Environment), Borey Chulsar and Koh Andeth district government			
With management plan?	Yes			
Project concept themes	Site management, agriculture and small-scale fisheries			
Length of project	Up to 10 years (but at least 5 years)			
Sector/s	Agriculture (rice) and fisheries			
No. of potential beneficiaries	approximately 12,000 people depend on BPL for their livelihoods			
Indigenous Peoples	■	No		Yes _____
Anticipated Implementation Risks	Increase in tourism activities at the site may impact freshwater ecosystems and potentially result in disturbances to biodiversity.			
Estimated Project Budget (US$)	17,950,000			
Potential Source/s of Financing	■	Loan (to be identified)		Private Sector
	■	Grant (to be identified)		Public-Private Partnership

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Acronyms

ADB	Asian Development Bank
AWC	Asian Waterbird Census
BPL	Bueng Prek Lpov
CSR	Conservation Status Review
DoFWC	Department of Freshwater Wetlands Conservation
DoF	Department of Fisheries
DMC	Developing Member Country
EAAFP	East Asian-Australasian Flyway Partnership
FiA	Fisheries Administration
GDANCP	General Directorate of Administration for Nature Conservation and Protection
IBA	Important Bird and Biodiversity Area
IUCN	International Union for the Conservation of Nature
LCG	Local conservation group
MAFF	Ministry of Agriculture, Forestry and Fisheries
MOE	Ministry of Environment
NLC	NatureLife Cambodia
NGO	Non-governmental Organisation
PDoE	Provincial Department of Environment
RFI	Regional Flyway Initiative
TPA	Takeo Provincial Administration
TESSA	Toolkit for Ecosystem Services Assessment
USD	United States Dollars
WCS	Wildlife Conservation Society
WWT	Wetlands and Wildfowl Trust

Executive summary

Cambodia's middle and lower floodplains along the Mekong River are home to some of very few untouched floodplain wetlands remaining in continental Southeast Asia. Spanning an area of nearly 8,000 ha, Boeung Prek Lapouv hosts important areas of seasonally flooded grassland and flooded forests and supports globally significant congregations of both migratory and resident waterbirds, the best known being the Sarus Crane, of which more than 10% of the regional population uses the site during the dry season. In recent years, surveys have also documented regular congregations of Greater Adjutant (NT), Spot-billed Pelican (NT), and very large congregations of the Black-tailed Godwit (NT) and Yellow-breasted Bunting (CR). BPL is designated as a Protected Landscape with the Ministry of Environment as its management authority. There are at least 12 villages across the two districts, Borey Chulsar and Koh Andeth, that BPL falls under. Thousands of people rely on BPL for their livelihoods; an ecosystem services survey in 2012 found that almost 3,000 households (68% of the total) use the site for resources such as fish, edible plants, firewood, and for farming land, demonstrating the importance of the site for key provisioning services and regulating services from flood hazard control.

Local communities in and around BPL are dependent on small-scale fishing and dry-season rice farming as a major source of livelihood, together with nature-based tourism activities from mostly domestic visitors. Rice is also cultivated in the buffer zone, and experimental zones of BPL although the core conservation area (<2,200 ha) is relatively undisturbed. Major threats faced by BPL are land encroachment, illegal fishing, illegal (bird) trapping, pollution, and the overuse of water for growing rice during the dry season. Invasive plants such as the giant mimosa affect the site's wetland ecosystem but changing the plant composition within the wetland. Water pollution, especially from household waste and agro chemicals used in rice cultivation, may also have long-term impact on BPL's important fisheries.

To strengthen management and conservation of BPL there is a clear need for: improving legal protection and the overall management of the wetlands. This includes better zonation of key sites for livelihood and conservation activities, while addressing dry-season fires and invasive species. Although nature-based tourism activities at BPL at best limited, studies show that this is anticipated to grow over time, which will increase pressures on the site. This needs to be supported by a commensurate investment into sustainable nature-based tourism, including improvement of ecotourism infrastructure at BPL including signages, jetties and viewing structures. This then needs to be supported by targeted work to build the capacity of local communities and tourism businesses (e.g. skills-based training, hospitality training) to scale up tourism operations in an environmentally friendly manner. There are also major opportunities for rice agriculture transition with a focus on biodiversity-friendly rice farming approaches that has been piloted elsewhere in Cambodia, most famously through the 'Crane Rice' initiative in Kampot and 'Ibis Rice' at other inland sites.

1. Background of the Regional Flyway Initiative

In July 2021, the Asian Development Bank made a commitment to develop a long-term Regional Flyway Initiative (RFI) in the East-Asian Australasian Flyway (EAAF) (Sovereign Project 55056-001) to protect and restore priority wetland ecosystems and the associated ecosystem services they provide in the EAAF, the most threatened migratory bird flyway globally. The Initiative is slated for implementation in nine ADB developing member countries (DMCs) in East, South and Southeast Asia: Mongolia, People's Republic of China (PRC), Bangladesh, Viet Nam, Cambodia, Philippines, Thailand, Malaysia and Indonesia. In 2023, the geographic scope of the RFI was further extended to two DMCs in Southeast Asia and the Pacific respectively, Lao PDR and Papua New Guinea.

The primary aim of the RFI is to enhance and expand the existing efforts in conserving and managing wetlands of the highest priority for migratory birds within the EAAF through innovative loan and grant financing, and at scale. Consultations and analyses over the development period help identify key interventions to strengthen the management of wetlands, enabling the implementation of nature-based solutions while strengthening biodiversity protection. Over time, the RFI seeks to leverage collaborative opportunities by developing partnerships among important stakeholders including national governments, civil society organizations, communities, regional organizations like the East Asian-Australasian Flyway Partnership (EAAFP), development agencies, the private sector, and other relevant entities.

Through the RFI Technical Assistance (TA) implemented over the RFI's development phase from 2021 to 2024, BirdLife International takes the lead in providing and coordinating technical support for development of the RFI. This is carried out in collaboration with the EAAFP and a consortium of international non-governmental organizations including Wetlands International and the Paulson Institute, as well as two universities, namely the University of Southampton, UK and the National University of Singapore. Over the development phase, the TA team undertook a site selection analysis to identify priority wetland sites in all 10 countries based on recent bird data benchmarked against internationally accepted criteria under the Convention on Wetlands of International Importance (or Ramsar Convention), EAAFP Flyway Network Sites and Important Bird and Biodiversity Areas (IBAs). The team further developed ecosystem services profiles for prioritised wetlands using a multi-pronged approach used the TESSA ecosystem services assessment tool, and data-driven modelling of water-based ecosystem services and stored carbon.

In Cambodia, a total of 15 wetland sites, including several Asian Waterbird Census (AWC) count sites, were initially assessed through data analysis and expert consultation, of which 12 were short-listed for assessment based on the available (recent) data. Of this pool of sites, nine (9) were defined and identified to be RFI priority sites on the basis that they support more than 1% the flyway population of at least one EAAF migratory waterbird species. Eight (8) of the RFI sites identified are inland wetlands, most notably a cluster of sites around the Tonle Sap Great Lake, such as Prek Toal, Ang Tropeang Thmar and Boeng Tonle Chmmar. A single coastal site was identified, i.e. Koh Kapik Ramsar Site where there have been extensive surveys of its biodiversity to date, including surveys led by NatureLife Cambodia. 11 EAAF species exceeded the 1% threshold at the site level in Cambodia, with species such as the Masked Finfoot, Greater

Adjutant and Sarus Crane (ssp. *sharpii*) at their highest congregations in Southeast Asia. Other species with important populations and/or congregations in Cambodia includes Spotted Greenshank, Black-headed Ibis and Painted Stork.

2. Site profile of Boeung Prek Lapouv (Sarus Crane Reserve)

Location: Boeung Prek Lapouv is part of one of the largest areas of contiguous natural wetland (e.g. seasonally flooded grassland and mosaics of *Barringtonia*-dominated swamp forest) remaining in the Mekong Delta. The site is located in Koh Andeth and Borey Chulsar districts of Takeo Province in the western floodplain of the Bassac River, a distributary of the Mekong River. It borders Viet Nam to the south and east, where the natural habitat has been almost entirely converted to rice agriculture.

Area: The Boeung Prek Lapouv RFI site has an area of 8,312 ha

Altitude: 4-5 metres asl.

Geographical coordinates: 10.72º N, 105.03º E

Description of site: The Boeung Prek Lapouv (BPL) Protected Landscape is one of few remaining areas of seasonally inundated floodplain grasslands in the Cambodian part of the Lower Mekong Delta. The site is inundated for 3-4 months each year during the monsoon season, during which time a mat of floating vegetation forms on the surface of the water. Sophanna et al. (2019) identified four habitat types within BPL; they include seasonally inundated grasslands (24% of total area), shrubs and gallery forests (<1%), open water with aquatic plants (13.7%), and rice fields (61%). Grassland habitats throughout the region are under threat from agricultural conversion, with their hydrology significantly altered to facilitate rice growing, which poses a risk to flagship species, including Sarus Crane *Antigone antigone* and Painted Stork *Mycteria leucocephala*. These wetlands of Boeng Prek Lapouv provide critical ecosystem services that are estimated to support the livelihoods of 12,000 people from 19 villages.

Site administration, management and land tenure: Boeung Prek Lapouv was established as a Conservation Area for Sarus Cranes in 2007, authorised under the Ministry of Agriculture, Forestry and Fisheries (MAFF), with a core conservation zone that included two community fisheries. The protected area was officially transferred to the Ministry of Environment (MoE) and re-designated as Protected Landscape in May 2016. Despite being established as a conservation area since 2007, Boeung Prek Lapouv has yet to be clearly demarcated, leading to uncertainty around land tenure and zonation and continuing encroachment. A governance structure has been developed for the protected area: within MoE, the institution responsible for taking the lead management role is the Department of Freshwater Wetlands Conservation (DoFWC) of the General Directorate of Administration for Nature Conservation and Protection (GDANCP) and the Provincial Department of Environment (PDoE). These organisations cooperate with Takeo provincial administration (TPA) and the District Administrative Authority of Takeo Province, and WWT and BirdLife are the international NGO partners. A management plan for Boeung Prek Lapouv from 2014-2018 was

published by WWT (2014). According to interviews with commune chiefs, most land in Boeung Prek Lapouv is presumed to be owned by local people, although few hold official land titles.

Social and economic values: About 22 villages (~5,000 households) use the wetlands at Boeung Prek Lapouv for rice farming and the collection of natural resources including fish, edible plants, firewood and grass. Sophanna (2017) found that most people there (97%) are involved in the cultivation of rice, raising cattle for sale (56%) and fishing (51%). There are tensions between the local population and transient Vietnamese farmers and fishers who cross the border to use the land. The widespread conversion of wetlands for rice cultivation is likely to result in a reduction in ecosystem values to local people because of a reduction in the availability of natural resources.

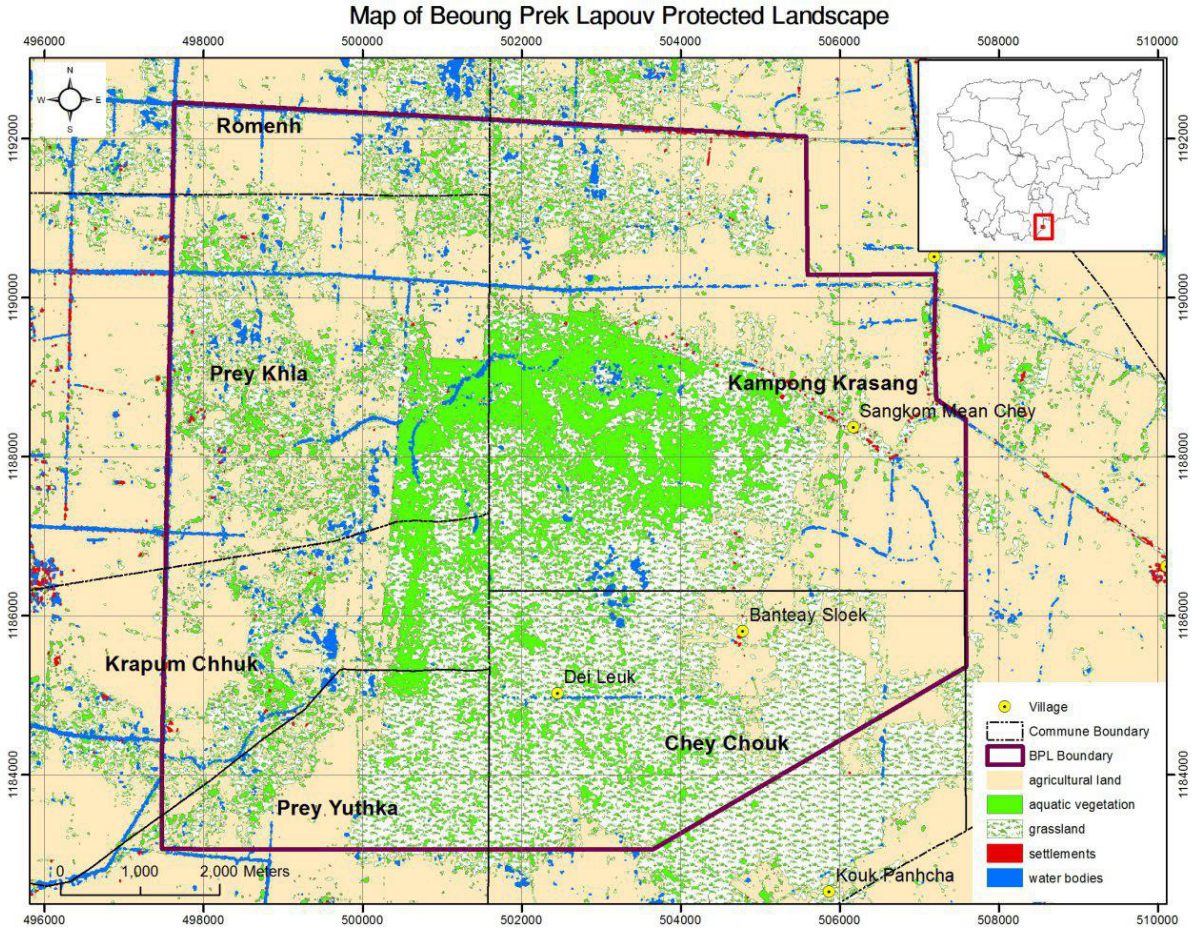

Figure 1. Map of the Boeng Prek Lpov Protected Landscape, showing its location in Cambodia (Map: NatureLife Cambodia)

3. Biodiversity value of Boeung Prek Lapouv (Sarus Crane Reserve)

3.1 Key habitats

The Boeung Prek Lapouv (BPL) Protected Landscape is one of few remaining areas of seasonally inundated floodplain grasslands in the Cambodian part of the Lower Mekong Delta. Sophanna et al. (2019) identified four habitat types within BPL; they include seasonally inundated grasslands (24% of total area), shrubs and gallery forests (<1%), open water with aquatic plants (13.7%), and rice fields (61%).

3.2. Importance of Boeung Prek Lapouv for migratory waterbird species

During the dry season, from December until May, Boeung Prek Lapouv supports an important non-breeding population of Sarus Crane *Grus antigone*, although their numbers there (and at other non-breeding sites for the species in Cambodia) have declined in recent years. Boeung Prek Lapouv also supports small numbers of several other globally threatened and near-threatened waterbird species, including Black-headed ibis *Threskiornis melanocephalus*, Greater adjutant *Leptoptilos dubius* (NT) and Lesser adjutant *Leptoptilos javanicus* (NT).

Count data from the 2017, 2019 and 2022 Asian Waterbird Census (AWC) was used in the RFI analysis for Boeung Prek Lapouv. The results of these counts were averaged for these three years and then compared to the Conservation Status Review (CSR1) 1% population estimates to calculate a score for each species. The two migratory waterbird species were found to regularly exceed the 1% population estimates during these three years (Table 1), and the CSR1 scores for these species were summed to produce the overall site score.

Table 1. List of migratory species (based on the EAAFP list of species) with globally significant congregations in Boeung Prek Lapov wetlands.

Species name	IUCN	Average count	CSR1	CSR1 score
Sarus Crane *Antigone antigone sharpii*	VU	58.7	2	29.3
Painted Stork *Mycteria leucocephala*	LC	73.5	70	1.05

3.3. Other notable biodiversity

In addition to the waterbirds, Boeung Prek Lapouv supports small numbers of the globally threatened Bengal Florican *Houbaropsis bengalensis* (CR) which successful bred there in 2015 and there remains a small population as of 2025 (Vorsak, B. in litt.). The site is particularly notable for the large non-breeding population of the Yellow-breasted Bunting *Emberiza aureola* (CR), potentially the largest roost of the species in Cambodia, with more than 5,000 individuals counted there in 2022 (Ly et al. 2022).

4. Ecosystem services

4.1. Ecosystem services provided by Boeung Prek Lapouv (Sarus Crane Reserve)

The Boeung Prek Lapouv contains diverse wetland habitats, providing essential provisioning, regulating and cultural ecosystem services (Figure 2). The results from the RFI workshop[1] highlight the top ecosystem services provided by the site, emphasising their essential and non-substitutable nature (Table 2). Provisioning services, particularly fresh water and food, benefit communities both within, adjacent to, and distant from the site. Regulating services, such as flood hazard regulation, water purification and waste treatment, and pollination, play a crucial role. Flood hazard regulation benefits communities within and adjacent to the site whereas water purification benefit communities within the site only. Pollination benefits communities at all distances.

[1] Asian Development Bank. (2023, September 13-14). Cambodia: Wetland Ecosystem Services Workshop [Workshop]. Phnom Pehn, Cambodia. https://events.development.asia/learning-events/cambodia-wetland-ecosystem-services-workshop

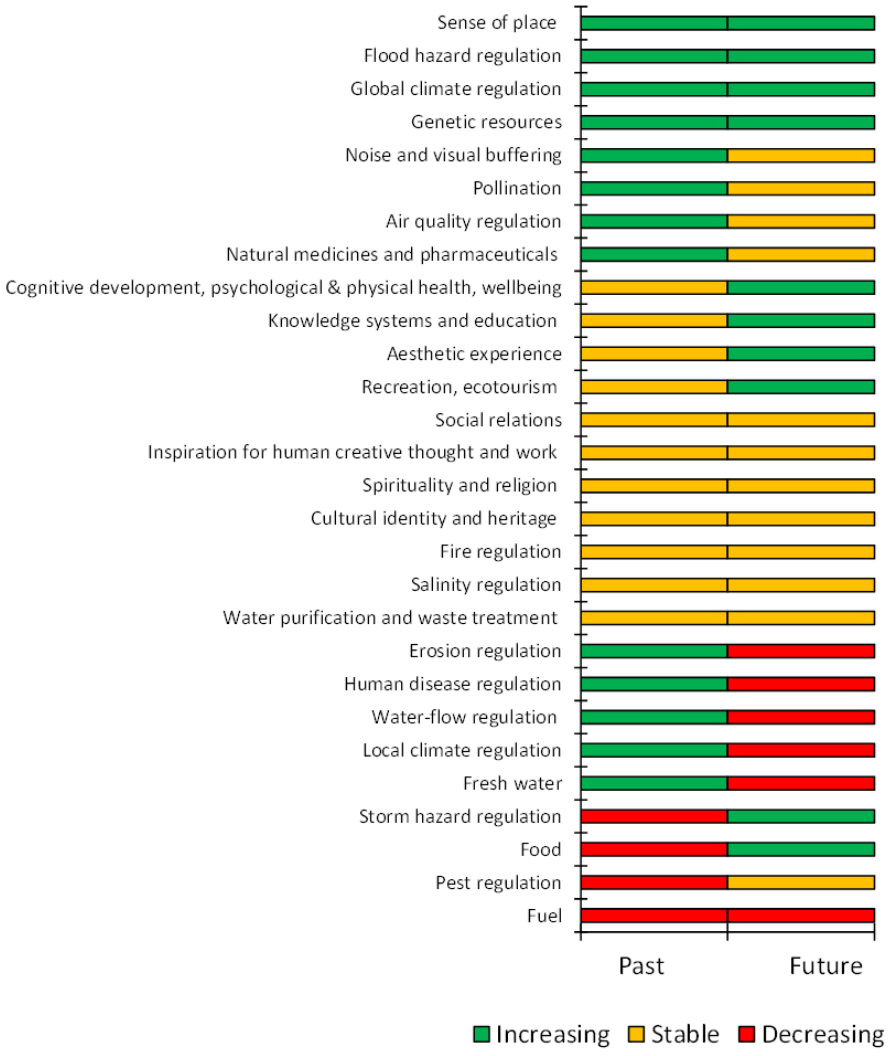

Figure 2. List of ecosystem services provided by Boeung Prek Lapouv (Sarus Crane Reserve), as identified through stakeholder consultation at the Regional Flyway Initiative workshop.

Table 2. List of top ecosystem services provided by Boeung Prek Lapouv (Sarus Crane Reserve

Ecosystem services	Essential or non-substitutable	Benefits to communities			Change	
		Within the site	Adjacent to the site	Distant to the site	Past	Future
Provisioning services						
Fresh water	Yes	✓	✓	✓	Increase	Decrease
Food	Yes	✓	✓	✓	Decrease	Increase
Regulating services						
Flood hazard regulation	Yes	✓	✓		Increase	Increase

Ecosystem services	Essential or non-substitutable	Benefits to communities			Change	
		Within the site	Adjacent to the site	Distant to the site	Past	Future
Water purification and waste treatment	Yes	✓			No change	No change
Pollination	Yes	✓	✓	✓	Increase	No change

4.2. Global climate regulating services

Based on the look-up values from a FAO report (Dondini et al. 2023) and IPCC (2006), the amount of carbon stored in Boeung Prek Lapouv is estimated to range from 61,500 to 65,600 tonnes, while the annual carbon sequestration rate is estimated at 1,130 tonnes per year.

4.3. Flood mitigating services

The flood mitigation services provided by Boeung Prek Lapouv were assessed using biophysical values only (see Table A1 and Annex 1 for details). When compared to both the average of the eight RFI inland sites and the average of all other inland wetlands in Cambodia (Table A2 in Annex 1), Boeung Prek Lapouv shows some mostly consistent results in terms of benefits and beneficiaries:

(1) for the average green storage capacity per sq. km of wetland, Boeung Prek Lapouv is above average compared to RFI inland sites (448 Giga Litres or GL of water per km^2 vs. 382 GL/km^2) but below average for all other inland wetlands (448 GL/km^2 vs. 458 GL/km^2);

(2) for the average population uniquely benefitting from influential green storage upstream per sq. km of wetland, Boeung Prek Lapouv is also above average (139 vs. 80 people/km^2 RFI inland sites and 110 people/km^2 for all other inland wetlands); and

(3) for the average built-up area uniquely benefitting from influential green storage upstream per sq. km of wetland, Boeung Prek Lapouv is again well above average (8.40 ha/km^2 vs. 4.89 ha/km^2 for RFI inland sites and 3.92 ha/km^2 for all other inland wetlands).

5. Drivers of change and their potential impacts on Boeung Prek Lapouv (Sarus Crane Reserve)

5.1. Current drivers of change and their level of impact

Stakeholders at the RFI workshop[2] identified 31 drivers of change impacting Boeung Prek Lapouv, and their corresponding levels of impact on the wetland site (Table 3). High-impact drivers include the collection of terrestrial plants (non-timber), which significantly affects the natural vegetation and biodiversity. Drought conditions and prolonged droughts also pose substantial threats to the wetland's ecological balance, reducing water availability and affecting habitat quality. Fishing, killing, and harvesting of aquatic resources further exacerbate the impact on the site's biodiversity.

Medium-impact drivers consist of agricultural and forestry effluents, which degrade water quality and impact aquatic life. Annual and perennial non-timber crop production, dams and hydrological modifications, and habitat clearing contribute to changes in land use and habitat loss. Other medium-impact factors include invasive plant species, livestock farming, recreational activities and tourism, and research and education activities. Restoration for conservation has moderately modified the site, while water extraction, shipping lanes, canals, and air-borne pollutants add to the cumulative stress on the wetland's ecosystem.

[2] Asian Development Bank. (2023, September 13-14). Cambodia: Wetland Ecosystem Services Workshop [Workshop]. Phnom Pehn, Cambodia. https://events.development.asia/learning-events/cambodia-wetland-ecosystem-services-workshop

Table 3. Drivers of change and their potential impact on the integrity of Boeung Prek Lapouv (Sarus Crane Reserve) based on consultations with stakeholders.

Driver of change	Impact
Collecting terrestrial plants or plant products (non-timber)	High
Drought conditions	
Droughts	
Fishing, killing and harvesting of aquatic resources	
Agricultural and forestry effluents	Medium
Annual and perennial non-timber crop production	
Dams within or upstream of the wetland site, which alter the hydrological regime	
Dams, hydrological modification and water management/use	
Habitat clearing	
Invasive plant species	
Livestock farming and grazing	
Recreational activities and tourism	
Research, education and other work-related activities	
Restoration for conservation	
Shipping lanes and canals	
Water extraction/diversion within the wetland site or catchment	
Air-borne pollutants	Low
Fire and fire suppression	
Garbage and solid waste	
Habitat shifting and alteration	
Household sewage and urban wastewater from outside the wetland site	
Housing and settlement	
Hunting, killing and collecting of terrestrial animals	
Invasive animal species	
Loss of keystone species	
Pathogens	
Sewage and wastewater from wetland site facilities	
Storm and flooding	
Temperature extremes	
Vandalism, destructive activities or threats to staff and visitors	
Wood pulp and plantations	

5.2. Potential alternative state of Boeung Prek Lapouv (Sarus Crane Reserve) under current drivers of change

Stakeholders at the RFI workshop[3] defined the most plausible future alternative state (to 2035), and how this will translate to a net change in the cover of different types of wetland habitat types within this site (current habitat cover vs future alternative cover; Figure 3). The alternative state of the site assumes there will be no changes in the current drivers of change impacting the site, and the current management regime.

[3] Asian Development Bank. (2023, September 13-14). Cambodia: Wetland Ecosystem Services Workshop [Workshop]. Phnom Pehn, Cambodia. https://events.development.asia/learning-events/cambodia-wetland-ecosystem-services-workshop

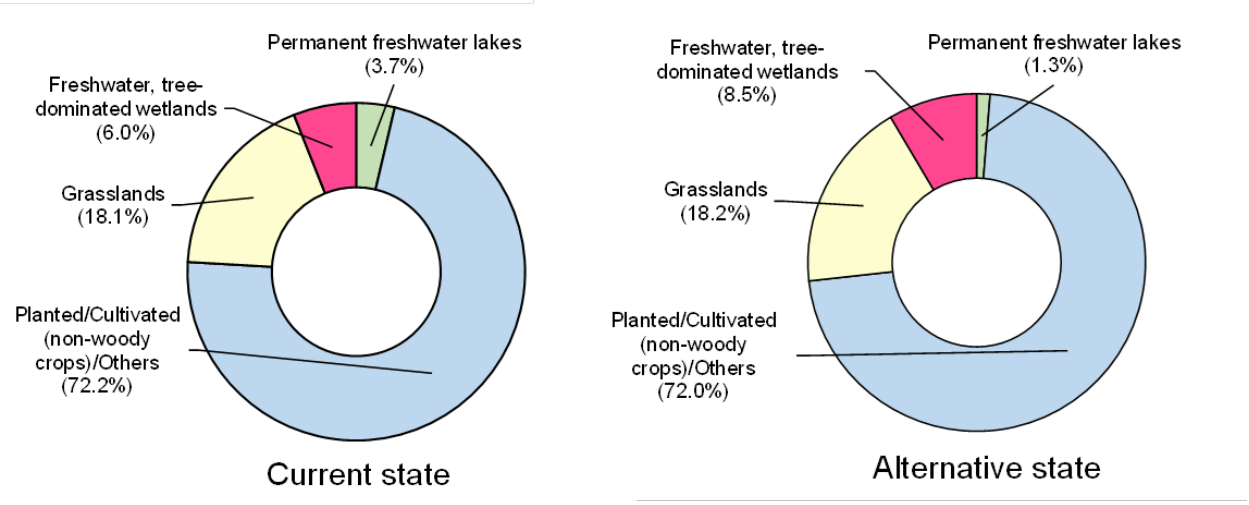

Figure 3. The proportional change in the extent of different habitat types between the current and alternative states of Boeung Prek Lapouv (Sarus Crane Reserve).

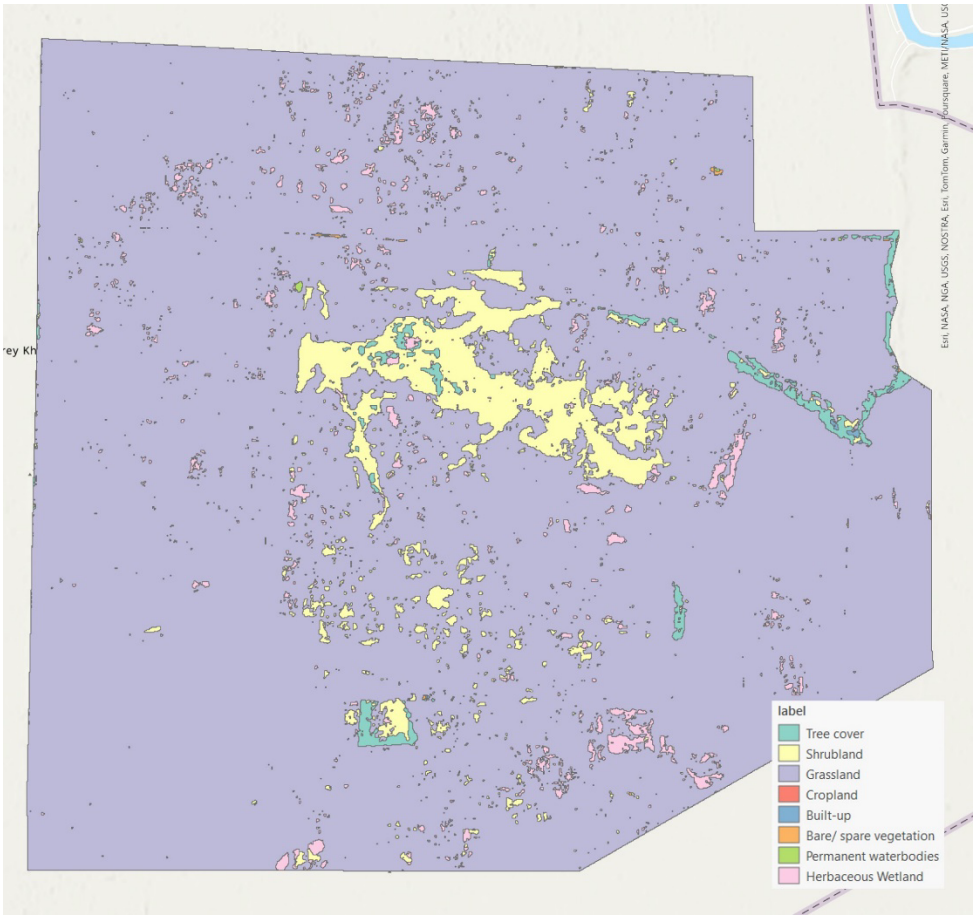

Figure 4. Major land cover types in BPL wetlands based on remotely sensed data (Map: Radhika Bhargava)

5.3. Expected changes in the ecosystem services of Boeung Prek Lapouv (Sarus Crane Reserve)

Stakeholders at the RFI workshop[4] documented the future trends in the provision of ecosystem services in Boeung Prek Lapouv, indicating if the ecosystem services provided by this site (to 2035) will increase, decrease, or will remain stable if the current drivers of change impacting this site will continue in their present condition, with the intervention remains unchanged.

Figure 2 and Table 2 highlight that provisioning service for fresh water has seen an increase in the past, but a decrease is anticipated in the future. Cultivated good provision has increased in the past and this trend will continue in the future. Wild food provision has experienced a decline previously but is expected to increase moving forward. Flood hazard regulation has increased in the past, with further increases expected. Water purification has remained stable, showing no change in both the past and future. Pollination has increased in the past but is projected to remain unchanged in the future.

In the alternative state, the 40% gain wetland will result in a gain of stored carbon, estimated to be between 3,600 and 5,210 tonnes, and an increase in carbon sequestration rate (carbon accumulation) by approximately 253 tonnes per year.

As presented in Table A5, a net gain of 120.1 hectares of green water habitats as presented in Table A5, including planted/cultivated areas, grasslands, and freshwater tree-dominated wetlands, is expected to result in an effective increase of 1.5% or 6.7 Giga Litres in green storage capacity per km². This may amount to nearly 2.1 people and 0.13 hectares of built-up areas gaining enhanced flood mitigation benefits per km² of wetland.

6. Capacity needs in Boeung Prek Lapouv (Sarus Crane Reserve)

The stakeholder consultation and analyses with government and civil society stakeholders identified at least 5 stakeholder groups with clear roles in the long-term sustainable management of the Boeung Prek Lapouv (Sarus Crane Reserve). Table 4 summarizes the current and potential roles of these stakeholder groups in relation to the management of Boeung Prek Lapouv. There are opportunities to strengthen patrolling and law enforcement, tourism, site management, and biodiversity monitoring.

[4] Asian Development Bank. (2023, September 13-14). Cambodia: Wetland Ecosystem Services Workshop [Workshop]. Phnom Pehn, Cambodia. https://events.development.asia/learning-events/cambodia-wetland-ecosystem-services-workshop

Table 4. Capacity needs for key stakeholders involved in the management of the BPL wetlands.

Stakeholder Group	Current role in the wetland management	Current capacity for sustainable wetland management	Capacity Development support needed to improve wetland management	Form of capacity development
Ministry of Environment	Oversee site management and policymaking.	N/A	N/A	N/A
Provincial Department of Environment		N/A	N/A	N/A
Site management and rangers	Management of site, undertake patrols and enforcement. Engage local communities	• GPS utilization • Documentation of illegal cases • Proficiency in law enforcement procedures • Report writing skills • Boat driving expertise • Laptop operation • Bird photography and identification • Tour guiding capacity	• GPS and GIS approaches • SMART Patrol approaches • Illegal case documentation • Biodiversity monitoring • First Aid • Tourism management • Site management • Law enforcement	• Training (online + In person) • Site visit (local and oversea) • Internship • Equipment and tools (laptop, camera, GPS, Drone)
Local authorities	Support with enforcement against illegal activities. Support site management	• Awareness-raising • Coordination skills • Intervention in law enforcement • Administrative proficiency • Action plan development	• Guidelines for wetland management • Strengthen grievance mechanism • Law enforcement	• Training • Site visit • Internship
Other relevant ministries	N/A	N/A	N/A	N/A
Local communities	Direct beneficiaries of site	N/A	Support site management activities, enforcement and biodiversity monitoring.	• Training programmes • Site visit

7. Opportunities for RFI interventions

7.1. Recommended Interventions

Bueng Prek Lapouv is one of very few large, floodplain wetland on the lower Mekong of Cambodia and supports globally significant congregations of both migratory and resident waterbirds, the best known being the Sarus Crane. BPL is designated as a Protected Landscape with the Ministry of Environment as its management authority. There are at least 12 villages across two districts at the site, and local communities are dependent on small-scale fishing and dry-season rice farming as a major source of livelihood, together with nature-based tourism activities from mostly domestic visitors. Rice is also cultivated in the buffer zone, and experimental zones of BPL although the core conservation area (<2,200 ha) is relatively undisturbed. Encroachment activities such as illegal land clearance (and land grab activities) have damaged or resulted in the loss of a significant part of BPL while fishing and agricultural activities is expected to contribute to water and solid waste pollution, which in turn may have long-term impact on BPL's important fisheries. To strengthen management and conservation of BPL there is a clear need for: (1) strengthening legal protection and management of the wetlands, including better zonation of key sites for livelihood and conservation activities, while addressing dry-season fires and invasive species such as giant mimosa which is now established across much of the region.

Although nature-based tourism activities at BPL is limited at present, studies show that this is anticipated to grow over time, which will benefit local communities but also increase pressures on the site. This needs to be supported by a commensurate investment into tourism, including (1) Improvement of ecotourism infrastructure at BPL including signages, jetties and viewing structures. This then needs to be supported by targeted work to build the capacity of local communities and tourism businesses (e.g. skills-based training, hospitality training) to scale up tourism operations in an environmentally friendly manner. There are also major opportunities for rice agriculture transition with a focus on biodiversity-friendly rice farming using approaches that has been trialled in Anlung Pring, Kampot. Existing consultations with local people has identified 'Crane Rice' as a potential intervention, in contributing to improved site management, while addressing broader livelihood issues for several local communities.

Table 5. Summary of key RFI interventions proposed for Boeung Prek Lapouv wetlands (Sarus Crane Reserve)

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
Component 1. Strengthening site management and protection of BPL.					
Conduct a scoping study of existing interventions and threats and disturbance at BPL, including	Best practices, guidelines, and standards for proposed RFI interventions	Assessment report with key threats identified and recommendations for improved management	50,000	1 year	MOE BPL management board

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
targeted work on long-term threats (from climate change, encroachment and invasive species management).		published and disseminated to key stakeholders.			Consultancy companies Conservation organisations ADB
Strengthen and expand site management and BPL protected landscape, including designation of a buffer.	Strengthened management of the BPL, through co-management with key stakeholders BPL site management plan over short to medium-term updated and revised, in consultation with key stakeholders Establishment of a co-management framework, with stronger involvement of local stakeholders. Improved management of BPL wetlands through increased enforcement patrols focused on illegal bird hunting and land clearance.	Site management plan, with zonations, over short to medium-term for BPL developed, presented to key stakeholders and endorsed MOE Number of consultations conducted to strengthen engagement of local stakeholders for participatory processes, understand local needs, and engage national stakeholders for mandates on zonation. Number of implemented activities in the developed site management plan. Co-management framework developed and piloted. Number of stakeholder groups engaged in the development	100,000	2 years	MOE BPL management board Takeo provincial government Borey Chulsar and Koh Andeth district government Conservation organisations Community groups (including LCGs)

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
		of site management plan. Number of patrol and enforcement activities focused on illegal bird hunting and land clearance, using SMART approach, implemented in BPL wetlands.			
Improve water management infrastructure to ensure water supply to BPL during the dry season to minimise the risk of fires.	Mitigation measures for fire risk during dry seasons are in place through better water management system	Number of water management infrastructure (including drainage canals and ditches) repaired and improved. Number of facilitated localized dredging works for addressing siltation and vegetation. Recorded bush fires reduced substantially over baselines Number of consultations organized with all villages on water regime concerns on rice farming.	1,500,000	2-3 years	MAFF BPL management board
Assess the extent of water, plastic, and solid waste pollution in BPL	Improved management of BPL, through assessment of the extent of	Comprehensive study published and circulated to key stakeholders	100,000	2 years	MOE BPL management board

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
(e.g. agro chemicals from rice agriculture, fishing equipment such as nets)	water pollution and potential approaches to address it.	on water and solid waste pollution. Number of stakeholder groups engaged in the assessment.			Conservation and academic organisations (including bird and community-focused NGOs Research institutions
Strengthen the invasive species management with a focus on Giant Mimosa in BPL and surrounding rice farming land	Invasive species, such as the Giant Mimosa, at BPL are effectively controlled and no longer affecting sections of the BPL Core Zone identified to be important to biodiversity.	Invasive species management plan developed, with a focus on Giant Mimosa, and aligned with the site management and zonation plans. Number of activities implemented in the invasive species management plan. Area (target of at least 20 ha) of the wetlands with controlled number of invasive species including Giant Mimosa At least one experimental plot for Giant Mimosa removal established. Number of stakeholder groups involved in the implementation of the invasive species	100,000	5 years	MOE BPL management board Conservation and academic organisations (including bird and community-focused NGOs Research institutions Community groups

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
		management plan.			
Component 2. Wildlife protection and monitoring, with a focus on the Sarus Crane and other flagship species					
Strengthen the legal protection of BPL	Increased wildlife protection and management of BPL, through precise zone delineation for various usage, co-management with local stakeholders, and increased patrolling and enforcement efforts.	Number of facilitated legal protection (target to have Huai Chorakhe Mak and Huai Talad a higher legal protected status). Number of patrol activities, using SMART approach, implemented in BPL Co-management framework with representative from villages and conservation organisations. Capacity program on enforcement and monitoring developed and implemented. Number of capacity-building activities implemented Number of trained people on enforcement and monitoring.	100,000	3 years	MOE BPL management board Borey Chulsar and Koh Andeth district government Conservation and academic organisations (including bird and community-focused NGOs)

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
Strengthen biodiversity monitoring, with a focus on the Sarus Crane population.	Increased awareness for Sarus Crane and support for waterbird conservation amongst local people and tourists Improved large waterbird and shorebird conservation through biodiversity monitoring	Number of awareness-raising activities implemented to preserve cranes and wetlands. Number of stakeholder groups engaged in the awareness-raising activities Biodiversity monitoring program developed, synergized with the management plans and frameworks, and implemented. Number of biodiversity monitoring activities implemented.	100,000	3 years	
Component 3. Strengthen the management of artisanal fisheries in BPL					

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
Strengthen management of site fisheries, with a focus on small-scale artisanal fishers.	Management system strengthened, through regulation of fishing activities in BPL and protection of fish breeding areas. Fishery resources are better managed and conserved.	Number of consultations on fisheries management Licensing framework for fishers established and in place. Number of stakeholders engaged in sustainable fishing practices. Number of patrol activities, using SMART approach against illegal fishing Fishery monitoring framework in place. Number of community-led agreements on sustainable fishing practices, supported with improved storage and processing capability to increase market access.	500,000	5 years	MAFF Fisheries Administration (FiA) BPL management board Takeo provincial government Borey Chulsar and Koh Andeth district governments Fishing operators
Strengthen the capacity and resilience of small-scale artisanal fishers	Fishery resources are conserved due increased awareness of fishers (from	At least 100 small-scale fishing operators and fishers engaged across two districts.	200,000	5 years	MAFF Borey Chulsar and Koh Andeth district governments

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
	the local communities of 12 villages) on wetland impacts, and their adoption of good fishing practices. Fishery resources are conserved through improved access to microfinance for small scale fishing communities based around sustainable practices. Increased stakeholder participation with the improved engagement of women in the workforce.	A capacity-building program for local fishing communities in cooperatives and sustainable fishery management developed. Number of trained fisherfolk (with a representative % of women) on sustainable fishing practices. Small loan scheme in place for small-scale fishers. Number of fishing cooperatives established and supported. Number of people who benefitted from the microfinance for small scale fishing communities			Fishing operators Community groups Conservation organisations
Component 4. Upscaling tourism infrastructure and strengthening sustainable ecotourism					
Improve and expand tourism infrastructure at Boeng Prek Lapouv, including signages and viewing structures	Improved protection and management of BPL, through ecotourism benefits and increased	Number of tourism infrastructure (including signage and viewing structures) improved and installed.	500,000	2 years	MOE BPL management board Takeo provincial government

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
	appreciation of Sarus Cranes, Yellow-breasted Bunting, and wetland habitats.	Number of households benefiting from ecotourism (target of at least 100 households)			Borey Chulsar and Koh Andeth district government Conservation and academic organisations (including bird and community-focused NGOs) Tourism operators
Strengthen the capacity of local communities and businesses for nature-based tourism. Establish a development plan for nature-based tourism in BPL	Improved protection and management of BPL, through nature-based tourism benefits and increased capacity of local stakeholders to support domestic and international tourists.	An ecotourism strategy and plan, focused on Sarus Crane and migratory waterbirds, developed and tested with tourism operators. Number of stakeholder groups engaged in the development of the ecotourism strategy and plan. A training program for ecotourism developed. Number of trained people from target communes Number of people benefitting from ecotourism activities.	200,000	3 years	
Component 5. *Strengthening sustainable and organic rice farming (on Jasmine rice, or other native rice varieties) in BPL*					

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
Pilot sustainable, regenerative rice-farming in Koh Andet and Borey Chulsar, and in BPL experimental zone ('Ibis Rice' and 'Crane Rice'	Improved management of BPL, through sustainable and regenerative rice production in selected communities in BPL	A capacity building (and training) program for organic and biodiversity-friendly rice farming developed and implemented. Number of capacity-building activities implemented. Number of trained rice farmers on biodiversity-friendly and/or organic farming At least XX% of rice farmers in and around ATT cultivating sustainable farming. Number of successful rice-planting trials and experiments (on fertilizer use, soil management) in selected plots in BPL experimental zone.	100,000	3 years	Ministry of Agriculture Takeo provincial government Koh Andet and Borey Chulsar district government Conservation organisations (including bird and community-focused NGOs) Agricultural banks
Scale up sustainable, regenerative rice-farming in the existing landscapes in BPL, using organic and/or	Organic and biodiversity-friendly rice farming expanded and upscaled in landscapes around BPL.	Number of small loans granted for marginalized communities Number of people who benefitted from the local	500,000	10 years	Ministry of Agriculture Takeo provincial government

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
wildlife-friendly approaches. Exchange visits to Anlung Pring wetlands to meet local communities and 'Crane Rice' representatives.	Financing mechanism (for local loans and grants) created for local communities and supported by key lending institutions for farmers. Improved management of ATT, through the practice of biodiversity-friendly farming.	financing mechanism. At least 50% increased on the adoption of biodiversity-friendly rice-farming using 'Crane Rice' At least 30% of rice fields around BPL under organic/ biodiversity-friendly cultivation.			Koh Andet and Borey Chulsar district government Representatives from households 'Crane Rice' community groups Conservation organisations Rural development organisations Fertilizer companies
Improve the management of agro-chemical waste in the rice paddies in BPL experimental zone and surrounding areas in Koh Andet and Borey Chulsar.	Improved management of BPL, through the reduction of agrochemical inflow into the wetlands Increased biodiversity in rice fields in BPL.	Agro-chemical management and disposal protocols established and communicated to relevant villages. Metrics for agrochemical inflow established and monitored. Reduced inflow of agro-chemicals into BPL wetlands against baselines and based on set metrics. Number of biodiversity monitoring activities	500,000	3 years	

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
		Number of people involved in monitoring the agro-chemical inflow and biodiversity survey			
Total investment for 5-10 years			**17,950,000 USD**		

7.2. Potential Financing

The estimated project cost is USD 17,950,000 over 5-10 years. This budget supports the development of a site management plan that addresses zonation, fire risk during the dry season, and invasive species, implementation of enforcement and patrolling activities, biodiversity monitoring, establishment of a microfinancing mechanism, improvement of nature-based tourism infrastructure, capacity-building activities on sustainable agriculture, and piloting the transition to sustainable rice farms. Table 5 summarizes the projected budget distribution across the proposed project components.

7.3. Proposed Institutional Arrangements

The proposed project is expected to be implemented over a period of at least five (5) years, with main project components focusing on improved site management for BPL (led by the Ministry of Environment) and expanding organic and/or biodiversity-friendly rice agriculture (with the Ministry of Agriculture, Forestry and Fisheries). Conservation organisations are expected to play a major role in the project by supporting project activities focused on biodiversity monitoring, stakeholder engagement and capacity building for better management of fisheries and rice agriculture.

7.4. Project Beneficiaries

These wetlands of Boeng Prek Lapouv provide critical ecosystem services, estimated to support the livelihoods of 12,000 people from 19 villages. Another estimate indicates that about 22 villages (~5,000 households) use the wetlands at Boeung Prek Lapouv for rice farming and the collection of natural resources, including fish, edible plants, firewood, and grass.

This proposed project is expected to undertake activities promoting gender inclusion and participation in livelihood activities, through capacity building activities for organic rice farming, small-scale fisheries, and nature-based tourism.

There are no indigenous communities in the project landscape.

7.5. Anticipated Implementation Risks

Stakeholder engagement: Proposed interventions rely on support from local communities, particularly in adopting biodiversity-friendly and organic farming, patrolling, and co-management. Establishing strong stakeholder buy-in from local leaders and community engagement will facilitate better implementation of the proposed interventions.

Environment: Most proposed interventions are relatively soft and have a low environmental impact, but it may be necessary to consider the effects of expanding tourism on Boeung Prek Lapouv, which could increase anthropogenic pressures on the wetlands and lead to increased disturbance to wildlife. Planning with stakeholders to reduce noise pollution during the construction of ecotourism facilities and ongoing ecotourism activities, as well as managing waste pollution from increased tourist traffic, is essential.

It is also important to assess how major infrastructural developments in Takeo, such as canals and roads, may potentially impact the site in the long term.

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Annex 1. Supplementary information on flood mitigation services

To further validate the identification of the top ecosystem services by means of stakeholder consultation, an expectedly essential or non-substitutable regulating service across all RFI sites, namely coastal protection and flood mitigation (i.e., storm and flood hazard regulation), was assessed based on a combination of globally available datasets supplemented by web-based tool Co$tingNature (Mulligan, 2022). Estimates for flood mitigation were spatially inferred in QGIS from a selection of metrics expressing different biophysical values modelled online by the Water World component of this tool. Equivalent data to assess monetary values similarly to coastal protection were not available for the RFI region.

The key metrics selected for biophysical values (Table A1) were the average green storage capacity, which is the volume of water stored by each square kilometre of wetland itself as well as its soil and vegetation, and the direct influence of this storage capacity on beneficiaries found downstream of the wetland, both as the average number of people and the average built-up area that are uniquely benefitting from the resulting flood mitigation (and not from other green storage found upstream).

Table A1. Contribution of the wetland habitats to flood mitigation in Boeung Prek Lapouv based on site-level (biophysical) values inferred from Mulligan (2022) and expressed as ranges to represent the resulting uncertainty.

Influence of the wetland on flood mitigation (metrics)	**Benefit/Beneficiaries**
Average green storage capacity per sq. km of wetland in million cubic metres (GigaLitres/km^2)	410 – 485
Average population uniquely benefitting from influential green storage upstream per sq. km of wetland (n/km^2)	127 – 150
Average built-up area uniquely benefitting from influential green storage upstream per sq. km of wetland (ha/km^2)	7.69 – 9.11

Table A2. Biophysical benefits from and beneficiaries of RFI inland wetland sites (expressed as ranges to represent the resulting uncertainty) and at the national level.

Site name	**Green storage capacity (GigaLitres/km^2)**	**Downstream population (n /km^2)**	**Downstream built-up area (ha /km^2)**
Prek Toal Core Area	486 (±29)	112 (±7)	7.19 (±0.42)
Ang Tropeang Thmor	411 (±38)	73 (±7)	3.84 (±0.36)
Boeung Prek Lapouv	448 (±37)	139 (±12)	8.40 (±0.71)
Anlung Pring	264 (±63)	0 (±0)	1.22 (±0.29)

Site name	Green storage capacity (GigaLitres/km^2)	Downstream population (n /km^2)	Downstream built-up area (ha /km^2)
Boeng Tonle Chhmar	406 (±27)	102 (±7)	6.57 (±0.43)
Chikraeng and Stoung	206 (±23)	45 (±5)	2.84 (±0.32)
Kulen Promtep Wildlife Sanctuary	456 (±6)	87 (±1)	4.20 (±0.05)
Cambodia RFI average	382	80	4.89
Cambodia national average	458	110	3.92

Table A5. Key habitat types in Boeung Prek Lapouv (Sarus Crane Reserve) based on stakeholder-based assessment at the Regional Flyway Initiative workshop in September 2023.

Habitat type	Current state		Alternative state (2035)	
	Area (ha)	Cover (%)	Area (ha)	Cover (%)
Permanent freshwater lakes	305.2	3.7	105.1	1.3
Planted/Cultivated (non-woody crops)/Others	6004.9	72.2	5924.8	71.3
Grasslands	1501.2	18.1	1501.2	18.1
Freshwater, tree-dominated wetlands	500.4	6.0	700.6	8.4
Low Intensity Residential	0.0	0.0	80.1	1.0
Total	8311.8	100.0	8311.8	100.0