



# Regional Flyway Initiative · Site Study

January 2026

## **RFI Priority Site · Koh Kapik (Peam Krasop Wildlife Sanctuary)**

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## General Site Information

Country	Cambodia		
RFI Site Name	Koh Kapik (Peam Krasop Wildlife Sanctuary)	ID016	
City/ Municipality, Province, Region	Koh Kapik commune, Koh Kong district, Koh Kong Province		
Geographical coordinates	11.54° N, 102.97° E	Area (has)	13,478 has
Key species	Spotted Greenshank, Great Knot, Fishing Cat, Dugong		
Key habitats (biomes)	Mangrove forests, intertidal mudflats, and coastal (beach) forests.		
Key ecosystem services	Provisioning services (for fisheries) and regulating services (coastal hazard protection, carbon storage)		
Key drivers of change	Unsustainable fishing practices, forest clearance		
Conservation status (mark all that applies)	<input type="checkbox"/>	Protected Area	<input type="checkbox"/>
	<input type="checkbox"/>	Ramsar Site	<input type="checkbox"/>
IBA/ KBA name (and number) and other designations	Koh Kapik		
Management Stakeholders	Ministry of Environment, Ministry of Agriculture, Forestry and Fisheries, Provincial Department of Fisheries		
With management plan?			
Project concept themes	Wetland (mangrove) restoration and site management, sustainable fisheries		
Length of project	5-6 years		
Sector/s	Fisheries, forestry		
No. of potential beneficiaries	731 households and a population of slightly more than 3,200 people.		
Indigenous Peoples	<input type="checkbox"/>	No	<input type="checkbox"/>
Anticipated Implementation Risks	Potentially reduction of benefits from fishing/shell fisheries, with increased enforcement on fisheries, wildlife disturbance with tourism facilities		
Estimated Project Budget (US\$)	12,775,000		
Potential Source/s of Financing	<input type="checkbox"/>	Loan (to be identified)	<input type="checkbox"/>
	<input type="checkbox"/>	Grant (to be identified)	<input type="checkbox"/>

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## Acronyms

ADB	Asian Development Bank
AWC	Asian Waterbird Census
CPA	Community Protected Area
CSR	Conservation Status Review
Danida	Danish International Development Agency.
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
IDRC	International Development Research Council
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

The Koh Kapik Ramsar Site (15,000 ha), which forms a part of the Peam Krasop Wildlife Sanctuary, is one of the largest areas of mangrove forests on the Cambodian coastline and is located on the western fringe of Koh Kong province on the international border with Thailand. Koh Kapik comprises extensive areas of mangrove forests (nearly 10,000 ha, or c. 60% of the site), coastal beach forests, intertidal mudflats and sand flats, as are over 150 ha of seagrass beds in its inshore waters. Recent and historical surveys have shown the site to provide important feeding and roosting habitat for large congregations of migratory waterbirds including the largest flocks of Spotted Greenshank (EN) in Cambodia. A further 10 species are globally Near Threatened or globally threatened, such as Great Knot (EN), Chinese Egret (VU), and Asian Dowitcher (NT). Survey data also demonstrates the importance of the Koh Kapik wetlands for a well-documented population of the Fishing Cat (EN). Peam Krasop Wildlife Sanctuary was designated in 1993 with the Ministry of Environment as the Management Authority, and Koh Kapik Ramsar site was designated in 2012, with Koh Kong's Department of Environment as its Management Authority. There is partial overlap between the two designated areas, with 60% of the Ramsar site located within the wildlife sanctuary and 40% outside (see Figure 1). There are three villages within Koh Kapik, with 731 households and a population of slightly more than 3,200 people.

Koh Kapik's coastal ecosystems offer important provisioning services through its coastal (fish) and crab fisheries and which benefit communities living along the Koh Kong coastline. Koh Kong provides key regulating services in the form of coastal protection, and carbon storage. The estuary-mangrove system at Koh Kapik plays a key role as a nursery ground for coastal fish populations which support valuable fisheries, a major source of livelihoods for many households. Local people in Koh Kapik harvest shellfish such as crabs, mussels and snails nearshore.

Koh Kapik Ramsar Site faces major challenges in its management due to its low management capacity, while local communities living in and around the wetlands have limited access to livelihood opportunities besides fishing and shellfish harvesting. There is a strong need for a robust site management plan and biodiversity monitoring framework in place, alongside capacity building activities to improve enforcement capabilities of its rangers, which in turn can be complemented co-management mechanisms. Local communities in each of the villages can play a bigger role in supporting conservation through the creation and management of new community-protected area (CPA). There are significant scope and opportunity to gradually expand low-impact nature-based tourism activities at the site through the installation of infrastructure to enhance tourist access to mangroves such as jetties, boardwalks and shelters, and strengthening the capacity of local communities to support tourism. More importantly, the site's rich marine resources also demand targeted interventions for sustainable management, notwithstanding that many of Cambodia's coastal fisheries have seen fish stocks depleted. This may include capacity building and training to establish cooperatives for fishers, local shrimp farmers and crab fishers, improving access to financing (microcredit), while ensuring that sustainable fishing and harvest practices are promoted and incentivised.

# 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.

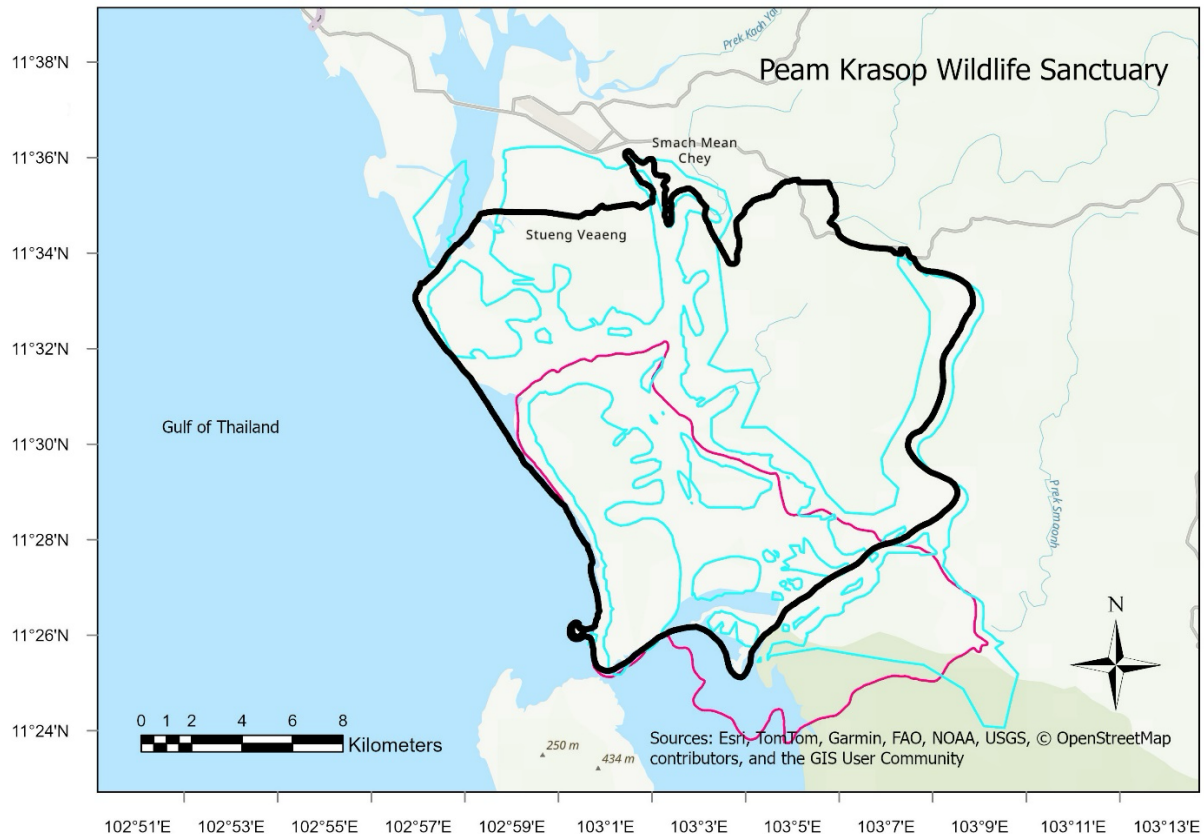
Through the RFI Technical Assistance (TA) implemented over the RFI's development phase from 2021 to 2024, BirdLife International takes the lead in providing and coordinating technical support for development of the RFI. This is carried out in collaboration with the EAAFP and a consortium of international 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 Koh Kapik Ramsar Site (Peam Krasop Wildlife Sanctuary)

*Location:* Koh Kapik Ramsar Site (and Peam Krasop Wildlife Sanctuary) is located approximately 15km southeast of Koh Kong town, the main administrative centre of Koh Kong Province, in southwest Cambodia, near the border with Thailand. It lies in the catchment of the forested central Cardamom Mountains, which provide freshwater to the wetlands through two major rivers. A small part of the site lies within the boundaries of Botum Sakor National Park.



**Figure 1. Boundary of Peam Krasop Wildlife Sanctuary (in black) and the Koh Kapik Ramsar Site (in red). (Map: Yong Ding Li)**

*Area:* The Koh Kapik RFI site has an area of 13,478 ha

*Altitude:* 0-2 m asl.

*Geographical coordinates:* 11.54° N, 102.97° E

*Description of site:* The Koh Kapik RFI site is made up of numerous alluvial islands separated by a maze of bays and channels, immediately off the mainland of Koh Kong Province. Most of the land is inundated during the spring tides, and the area is characterised by substantial tracts of relatively undisturbed mangrove forest (60% of the site) (Sorn & Veth 2019). The freshwater inflow from two rivers (Prek Koh Pao in the north, and Prek Khlang Yai/ Stung Kep in the south) into the estuary-mangrove system is important for the maintenance of the brackish-water character of the wetlands, supporting an assemblage of brackish-water plankton and fish populations which are the food base for the majority of the waterbirds that use of the site, and a nursery ground and source of nutrients for the fisheries utilised by coastal communities. Much of the material carried to the sea by the rivers is sandy in nature and there are sand flats in many places, but the only well-developed mudflats are found along the western side of Koh Kapik. The site supports 100-150 ha of seagrass beds, mostly around Koh Sralao (Sorn & Veth 2019)

*Site administration, management and land tenure:* Peam Krasop Wildlife Sanctuary was designated in 1993, with the Ministry of Environment as the Management Authority, and Koh Kapik Ramsar site was designated in 2012, with the Environmental Department of Koh Kong Province as the Management Authority. A small part of the Ramsar site lies within the Botum Sakor National Park. There is partial overlap between the two designated areas, with 60% of the Ramsar site located within the wildlife sanctuary and 40% outside (see Figure 1). In 2011, the Government of Cambodia issued a sub-decree to zone the wildlife sanctuary (and hence the Ramsar site), which resulted in a 1,024-ha core zone and a 912-ha conservation use-zone, with the remaining area declared as a community zone and a sustainable use zone. To date, no specific plan has been compiled for the protection and management of Koh Kapik, but donors (including Danida, IDRC, and IUCN) have supported projects and programmes to strengthen management of the site, including through the establishment of community protected areas (CPA). All of the land within the Ramsar site and wildlife sanctuary is owned by the Government of Cambodia. These areas are under the territorial/ administrative jurisdiction of Koh Kong Province, and functional jurisdiction of the Ministry of Environment (as with all protected areas and Ramsar Sites), although the Fisheries Administration (FA) oversees the management of the resources within the area, including fishing, aquaculture, and exploitation of mangrove resources, and projects on fisheries.

*Social and economic values:* The mangroves in Koh Kapik are relatively intact (even though degradation has increased over time), and local people utilise them for fuelwood, charcoal, and construction material for housing. There are three villages within Koh Kapik Ramsar Site with a total of 731 households and 3,200 individuals (San et al. 2024). The estuary-mangrove system at Koh Kapik plays a critical role as a nursery ground and source of nutrients for the coastal fish populations, which support valuable fisheries in coastal Cambodia, a major source of livelihoods for many households. Local people in Koh Kapik harvest shellfish, such as shrimp, crabs, and green mussels, nearshore (in the mudflats and mangroves), while most fishing is conducted offshore. Shrimp harvesting is a major source of livelihoods, and villages can collect up to 100 kg of shrimp daily during the peak harvest in April-June. Mangroves and seagrasses in

Koh Kapik provide habitat for economically important seafood, including shrimp, mud crabs, vinegar crabs, swimming crabs, and molluscs (e.g., green mussels, blood cockles), which are all harvested by local people (San et al. 2024). Some local people are involved in supporting tourists through the provision of boat services.

### 3. Biodiversity value of Koh Kapik (Peam Krasop Wildlife Sanctuary)

#### 3.1 Key habitats

The Koh Kapik RFI site is made up of numerous alluvial islands separated by a maze of bays and channels, immediately off the mainland of Koh Kong Province. Most of the land is inundated during the spring tides, and the area is characterised by substantial tracts of relatively undisturbed mangrove forest (60% of the site) (Sorn & Veth 2019).

#### 3.2. Importance of Koh Kapik for migratory waterbird species

Count data from two recent waterbird surveys was used in the RFI analysis for this site, (i) the Koh Kapik shorebird survey project (Taing et al. 2018) and (ii) an unpublished report on ongoing threatened shorebird surveys at Koh Kapik. The results of these two surveys were averaged and then compared to the Conservation Status Review (CSR1) 1% population estimates to calculate a score for each species. Two migratory waterbird species were found to exceed the 1% population estimates during both studies, and the CSR1 scores for these species were summed to produce the overall site score (Table 1).

*Table 1. List of migratory species (based on the EAAFP list of species) with globally significant congregations in the Koh Kapik coast.*

Species name	IUCN	Average count	CSR1	CSR1 score
Lesser Sandplover <i>Charadrius mongolus</i>	LC	570	300	1.9
Spotted Greenshank <i>Tringa guttifer</i>	EN	13	10	1.3

In addition to Spotted Greenshank, several globally threatened and near threatened migratory waterbird species have been recorded at Koh Kapik, including Spot-billed Pelican *Pelecanus philippensis* (NT), Chinese Egret *Egretta eulophotes* (VU), Malaysian Plover *Charadrius peronii* (NT), Eurasian Curlew *Numenius arquata* (NT), Bar-tailed Godwit *Limosa lapponica* (NT), Black-tailed Godwit *Limosa limosa* (NT),

Great Knot *Calidris tenuirostris* (EN), Curlew Sandpiper *Calidris ferruginea* (NT), Red-necked Stint *Calidris ruficollis* (NT), Asian Dowitcher *Limnodromus semipalmatus* (NT) and Grey-tailed Tattler *Tringa brevipes* (NT) (see also Taing et al. 2018).

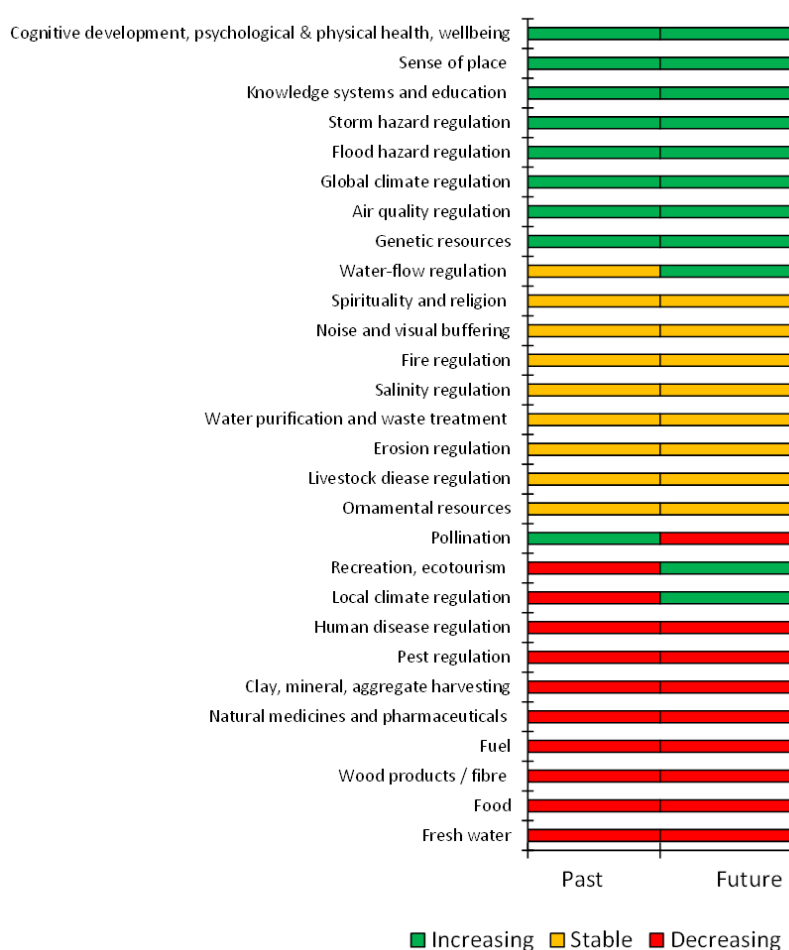
### 3.3. Other notable biodiversity

Several globally threatened mammal and reptile species occur at Koh Kapik, most notably Fishing Cat *Prionailurus viverrinus* (EN), of which an important population persist and the focus of much conservation work by the Fishing Cat Ecological Enterprise (Munoz et al. 2024). Other species of conservation concern at Koh Kapik includes Greater Hog Badger *Arctonyx collaris* (VU), Fishing Cat *Prionailurus viverrinus* (EN), Black Marsh Turtle *Siebenrockiella crassicollis* (EN) and Yellow-headed Temple Turtle *Heosemys annandalii* (CR). Koh Kapik is also notable for its rich mangrove assemblage, seagrasses and corals, with a local expert having identified 56 species of hard and soft corals in the wetlands in the sanctuary.

## 4. Ecosystem services

### 4.1. Ecosystem services provided by Koh Kapik (Peam Krasop Wildlife Sanctuary)

Koh Kapik overlaps with diverse coastal habitats, providing essential provisioning, regulating and cultural ecosystem services (Figure 2). The results from the RFI workshop<sup>1</sup> highlight the top ecosystem services provided by the site, emphasising their essential and non-substitutable nature (Table 2). Provisioning services, such as fresh water and food, benefit communities within the site. Regulating services, including storm hazard regulation, erosion regulation, and salinity regulation, are crucial for the local communities within the site. Storm hazard regulation benefits both local and adjacent communities.



**Figure 2. List of ecosystem services provided by Koh Kapik (Peam Krasop Wildlife Sanctuary), as identified through stakeholder consultation at the Regional Flyway Initiative workshop.**

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

**Table 2. List of top ecosystem services provided by Koh Kapik (Peam Krasop Wildlife Sanctuary).**

Ecosystem services	Essential or non-substitutable	Benefits to communities			Change	
		Within the site	Adjacent to the site	Distant to the site	Past	Future
<i>Provisioning services</i>						
Fresh water	Yes	✓			Decrease	Decrease
Food	Yes	✓			Decrease	Decrease
<i>Regulating services</i>						
Storm hazard regulation	Yes	✓	✓		Increase	Increase
Erosion regulation	Yes	✓			No change	No change
Salinity regulation	Yes	✓			No change	No change

## 4.2. Global climate regulating services

Based on systematic reviews (Chen & Lee, 2022; Stankovic et al., 2023), the amount of carbon stored in Koh Kapik (Peam Krasop Wildlife Sanctuary) is estimated to range from 805,000 to 11,000,000 tonnes, while the annual carbon sequestration rate is estimated to be between 9,650 and 86,900 tonnes per year.

## 4.3. Coastal protection services

The coastal protection services provided by Koh Kapik were assessed using both biophysical indices and monetary values (see Tables A1 and A2, and Annex 1 for details). When compared to the average of all other coastal (RFI) sites in Cambodia (Table A3 in Annex 1), Koh Kapik shows some only partly mixed results in terms of risk level:

1. for the potential exposure to coastal hazards, Koh Kapik is below average (index: 2.47 vs. 2.74 for all other coastal areas);
2. for the contribution to reducing coastal risk as a proportion of population density with 2.5 km of the coast, Koh Kapik is also below average (6 vs. 18 people/ha for all other coastal areas); but
3. for the contribution to reducing coastal risk as a percentage of the maximum potential exposure, Koh Kapik is above average (6.35% vs. 4.83% for all other coastal areas).

In monetary terms (Table A4 in Annex 1), Koh Kapik ranks well below the national RFI average (1.62 vs. 1,195 USD/ha) in terms of total annual benefits per ha of mangroves. Similarly, these benefits for the total area of Koh Kapik are also below average (21 thousand vs. 3.9 million USD for all other coastal areas in Cambodia).

## 5. Drivers of change and their potential impacts on Koh Kapik (Peam Krasop Wildlife Sanctuary)

### 5.1. Current drivers of change and their level of impact

Stakeholders at the RFI workshop<sup>2</sup> identified 38 drivers of change impacting Koh Kapik, and their corresponding levels of impact on the wetland site (Table 3). High-impact drivers include the destruction of cultural heritage sites, which significantly affects the cultural and ecological value of the wetland. Fishing, and unsustainable harvesting of aquatic resources (including electro-fishing, crab harvesting) pose substantial threats to biodiversity. The accumulation of garbage and solid waste degrades the environment, while the loss of cultural links, traditional knowledge, and keystone species further diminishes the wetland's ecological integrity. Natural deterioration of cultural wetland values and restoration for conservation activities also contribute to the high impact. Additionally, sewage and wastewater from wetland facilities substantially reduced water quality.

Medium-impact drivers consist of dams upstream or within the wetland, altering the hydrological regime and affecting water flow. Erosion and siltation (in large part driven by sand mining and dredging), habitat clearing, and other edge effects moderately degrade the wetland's ecological values. Pathogens, storm and flooding events, and agricultural and forestry effluents add to the medium-level stress on the wetland's ecosystem.

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<sup>2</sup> 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>

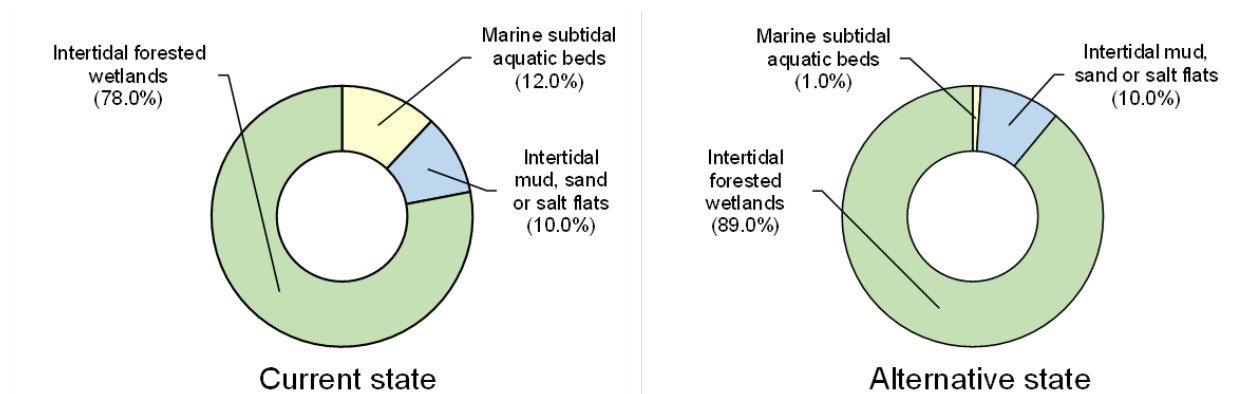
**Table 3. Drivers of change and their potential impact on the integrity of Koh Kapik (Peam Krasop Wildlife Sanctuary) based on consultations with stakeholders.**

Driver of change	Impact
Destruction of cultural heritage buildings, gardens, sites, etc.	High
Fishing, killing and harvesting of aquatic resources	
Garbage and solid waste	
Loss of cultural links, traditional knowledge and/or management practices	
Loss of keystone species	
Natural deterioration of important cultural wetland site values	
Restoration for conservation	
Sewage and wastewater from wetland site facilities	Medium
Dams within or upstream of the wetland site, which alter the hydrological regime	
Erosion and siltation/deposition	
Habitat clearing	
Other 'edge effects' that degrade the wetland site values	
Pathogens	Low
Storm and flooding	
Agricultural and forestry effluents	
Air-borne pollutants	
Annual and perennial non-timber crop production	
Collecting terrestrial plants or plant products (non-timber)	
Drug cultivation	
Energy generation, including from hydropower dams, wind farms and solar panels	
Excess energy	
Fire and fire suppression	
Habitat shifting and alteration	
Household sewage and urban wastewater from outside the wetland site	
Housing and settlement	
Hunting, killing and collecting of terrestrial animals	
Increased fragmentation within the wetland site	
Invasive animal species	
Invasive plant species	
Logging and timber harvesting	
Marine and freshwater aquaculture	
Oil and gas drilling; extraction of sand	
Ports with large scale loading and unloading of goods	
Recreational activities and tourism	
Roads and railroads	
Shipping lanes and canals	
Temperature extremes	
Tourism and recreation infrastructure	

## 5.2. Potential alternative state of Koh Kapik (Peam Krasop Wildlife Sanctuary) under current drivers of change

Stakeholders at the RFI workshop<sup>3</sup> 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.

<sup>3</sup> 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 Koh Kapik (Peam Krasop Wildlife Sanctuary).**

### 5.3. Expected changes in the ecosystem services of Koh Kapik (Peam Krasop Wildlife Sanctuary)

Stakeholders at the RFI workshop<sup>4</sup> documented the future trends in the provision of ecosystem services in Koh Kapik (Peam Krasop Wildlife Sanctuary), 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 services, such as fresh water and food, have experienced a decline in the past and are projected to continue decreasing in the future. Storm hazard regulation has experienced an increase in the past and a continued rise is expected in the future. Erosion and salinity regulation have remained stable, with no change observed in both the past and future.

In the alternative state, the gain of 14% of mangrove and the loss of 92% of intertidal mudflat will result in a gain of stored carbon, estimated to be between 82,800 and 125,000 and an increase in carbon sequestration rate (carbon accumulation) by approximately 1,060 to 12,000tonnes per year.

A gain of 1,482.5 ha of mangroves as presented in Table A5, which is equivalent to 11.0% of the total land use for the site, is expected to result in roughly a 11.5% increase in coastal protection. This may amount to approximately 2,400 USD in gained total benefits per year (based on 1.62 USD per hectare of mangroves).

<sup>4</sup> 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>

## 6. Capacity needs in Koh Kapik (Peam Krasop Wildlife Sanctuary)

The stakeholder consultation and analyses with government and civil society stakeholders identified at least three stakeholder groups with clear roles in the long-term sustainable management of the Koh Kapik (Peam Krasop Wildlife Sanctuary). Table 4 summarizes the current and potential roles of these stakeholder groups in relation to the management of Koh Kapik. There are opportunities to strengthen site management and leadership, patrolling, and law enforcement.

*Table 4. Proposed interventions for Koh Kapik Ramsar Site for strengthened management and conservation.*

Stakeholder group	Current role in wetland management	Possible future role in wetland management	Current capacity for sustainable wetland management	Capacity development needed to improve wetland management	Form of capacity development
Local communities around protected area	Participate and collaborate with stakeholders to protect site, highlight enforcement  Cooperate with partner organizations (livelihood development, mangrove restoration and protection)	Stronger leadership role in nature resources management.  Share local knowledge  Participate in community planning	Implementation of activities according to plan  Strengthen collaboration with other stakeholders	Improve leadership planning and management	Provide training courses in financial management  Provide training courses in leadership  Training courses on recycling and sustainable use of resources
Ministry of Environment (Ministry, Park Rangers)	Legal and regulatory support  Technical support in the environmental sector	Adjusted in accordance with the Ministry of Environment's policies	Conducting patrols in the area  Preparing patrol plans for law enforcement  Preparing village and commune	Technical skills (SMART patrol for enforcement)  Environmental skills and knowledge  Strengthen the implementation of laws	Provide leadership skills training  Provide modern technology skills training  Provide training courses in document and

Stakeholder group	Current role in wetland management	Possible future role in wetland management	Current capacity for sustainable wetland management	Capacity development needed to improve wetland management	Form of capacity development
			development plans  Participating in promoting environmental education		data management skills  Provide skills training courses, coordinated with local communities.
Ministry of Agriculture (Provincial Fisheries Administration, Provincial Agriculture Office)	-	-	-	-	-
Non-governmental organization	-	-	-	-	-
Local government and authorities (village, commune, province)	Implement the principles and policies of the Ministry of Environment in the region.  Participate in law enforcement and planning, disseminate information	Lead the implementation of projects	Legal support  Participate in crime prevention and support	Leadership skills  Administrative management skills	Provide support to site management and conservation activities

## 7. Opportunities for RFI interventions

### 7.1. Recommended Interventions

Peam Krasop Wildlife Sanctuary (and Koh Kapik Ramsar Site) protects the largest remaining area of mangrove forests along the Cambodian coastline, and is a significant site for coastal biodiversity, including some of the most important congregations of migratory shorebirds in Cambodia. Koh Kapik support major inshore fisheries which directly provide a major source of livelihoods for many of the site's 1,300 households. Tourism, however, is poorly developed and there are at present limited facilities for tourism (e.g. 1-2 access jetties) although access is convenient from the provincial capital of Koh Kong. There are significant scope and opportunity to gradually expand tourism at the site through the installation of (low impact) infrastructure to enhance tourism access to mangroves such as boardwalks and signages and strengthening the capacity of local communities to support tourism. More importantly, the site's rich marine resources also require targeted interventions for sustainable management. This may include capacity building and training to strengthen and establish cooperatives for local shrimp farmers and crab fishers, improving access to financing (microcredit), while sustainable fishing and harvest practices are promoted and incentivised.

Koh Kapik Ramsar Site faces major gaps and challenges in management due to its low management capacity (only three rangers to oversee Koh Kapik and Peam Krasop Wildlife Sanctuary) and therefore there is a strong need for a robust site management plan and biodiversity monitoring framework in place, alongside capacity building to improve enforcement capabilities. Local communities in each of the villages can play a role in supporting conservation of the site through the creation and management of new community-protected area (CPA).

Table 5. Summary of key RFI interventions proposed for Peam Krasop Wildlife Sanctuary and Koh Kapik Ramsar Site

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
<i>Component 1. Restoration of degraded mangrove forest in the Peam Krasop Wildlife Sanctuary and Koh Kapik Ramsar Site</i>					
Undertake environmental and social impact assessments (including local needs, due to remoteness of villages in Koh Kapik)  Hydrological and climate change impact assessment.	Improved management of the Peam Krasop Wildlife Sanctuary and Koh Kapik Ramsar Site through increased understanding of the local hydrological and climatic conditions of the wetlands.	Environmental and social impact assessment (see Sorn & Veth 2019; San et al. 2024), including climate change and hydrological impacts, updated and shared with key stakeholders.  Guidelines on the impacts of project components developed and adopted to redesign proposed projects.  Number of consultation meetings implemented with key stakeholders.  Number of stakeholder groups involved in the local situational assessment.	100,000	Up to 1.5 years.	MOE/ Department of Coastal Wetlands  Koh Kapik management board  Consultancy companies  Conservation organisations  IUCN  ADB
Strengthen the capacity of the Peam Keasop WS Protected Area management board	Improved management of the Peam Krasop Wildlife Sanctuary and Koh Kapik Ramsar Site through increased capacity for patrol and enforcement at PKWS (at least	A training program developed for protected area management, focused on SMART patrol.  Number of people involved in patrolling.	120,000	5 years	MOE/Department of Coastal Wetlands  Koh Kapik management board

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
	50% increase over 5 years against baseline)	<p>Number of people trained on patrol and enforcement</p> <p>A patrolling group organized at PKWS.</p>			<p>Botum Sakor management board</p> <p>Conservation organisations</p>
Restore degraded mangrove forests and habitat across Koh Kapik Ramsar Site to improve climate resilience.	Improved climatic condition and resilience through restoration of degraded mangroves and illegally cleared areas in Koh Kapik Ramsar Site, and the enforcement of sustainable harvest of mangroves for firewood by site management.	<p>Area (target of up to 100 ha) of degraded coastal habitat restored with suitable mangrove species.</p> <p>Number of stakeholder groups engaged in sustainable mangrove harvesting practices, against baselines.</p> <p>Number of people involved in the mangrove restoration activities.</p> <p>Number of consultation meetings related to enforcing sustainable mangrove harvesting practices.</p>	500,000	5 years	<p>MOE/Department of Coastal Wetlands</p> <p>Peam Krasop management board</p> <p>Conservation organisations</p>

<b>Intervention</b>	<b>Outcome</b>	<b>Indicators</b>	<b>Cost (USD)</b>	<b>Timeframe</b>	<b>Potential Stakeholders</b>
<p>Establish new community conservation areas (CCAs) around Peam Krasop including a medium to long term site management plan.</p> <p>Establish community-led site management organisations and committee</p> <p>Strengthen site mitigation against the impacts of climate change.</p>	Improved management and climate resilience of PKWS through co-management measures with local communities	<p>Wetland management plan addressing threats, disturbance, climate resilience, and site conditions developed and endorsed by key government agencies and local stakeholders.</p> <p>Number of community conservation areas (CCAs) established and supported.</p> <p>Number of agreements established for a coordinated management approach for the site among relevant stakeholders</p> <p>Number of multi-stakeholder management committee established, with regular meetings.</p>	200,000	3 years	<p>Koh Kong Provincial Government</p> <p>MOE/Department of Coastal Wetlands</p> <p>Peam Krasop management board</p> <p>Botum Sakor management board</p>
Develop a long term community-led biodiversity monitoring programme.	Improved biodiversity conservation in PKWS through increased local capacity on key species indicators (e.g. Spotted Greenshank, Fishing Cat) and	A biodiversity monitoring framework with clearly identified indicator species, established and implemented with key stakeholders through active field work and passive methods.	50,000	3 years	<p>MOE</p> <p>Peam Krasop management board</p> <p>Conservation organisations (including NatureLife, FFI, FCE)</p>

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
	biodiversity monitoring.	<p>Number of people trained on biodiversity monitoring.</p> <p>A multi-sector biodiversity monitoring group organized.</p> <p>Number of biodiversity monitoring activities implemented.</p>			Local community groups
<i>Component 2. Strengthening local livelihoods for small-scales fishers and aquaculture businesses</i>					
<p>Develop a co-management system for small-scale artisanal fisheries and shell-fisheries (to strengthen value chains).</p> <p>Improve livelihood and income-generating activities for local communities with a focus on small-scale fisheries and shellfisheries (e.g. shrimp, green mussel, cockle harvesters)</p>	<p>Improved management of PKWS through improved local livelihood, shifting to sustainable fishing practices and finance/ credit mechanism for fisherfolk and small-scale aquaculture businesses</p> <p>Fishery resources are better managed and conserved, ensuring its provisioning services (for food resources, e.g. fish)</p>	<p>A co-management framework and plan for small-scale fishers developed and approved by Fisheries Administration and Provincial Fisheries Office.</p> <p>Number of identified activities in the co-management plan implemented.</p> <p>Number of fishing households (target of at least 200 households) benefitting from activities to promote sustainable fishing practices and co-management.</p>	500,000	5 years	<p>Protected Area management board</p> <p>Fisheries Administration</p> <p>Koh Kong Provincial Fisheries Department</p> <p>Conservation organisations</p> <p>Local community groups and cooperatives</p>

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
		<p>Number of community-led agreements on sustainable fishing and shellfish harvest practices facilitated.</p> <p>Number of local fishing and shellfishery cooperatives and communities supported (e.g., improved storage and processing capability to increase market access and reduce wastage/spoilage of seafood products).</p> <p>A finance/ credit mechanism for fishers and small-scale aquaculture businesses established.</p> <p>Number of local fishing and shellfishery cooperatives and communities established and supported through the finance mechanism.</p>			
Strengthen and promote sustainable management and production processes for	Improved management of PKWS through sustainable shellfish harvesting and	Standards for sustainable fishing practices, with focus on shellfish harvesting and processing)	500,000	6 years	Fisheries Administration  Koh Kong Provincial

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
<p>crab and shellfish aquaculture.</p>	<p>processing practices, and microfinance.</p> <p>Fishery resources are better managed and conserved, ensuring its provisioning services (for food resources, e.g. fish)</p>	<p>developed, consulted with key stakeholders, and approved.</p> <p>Number of local certifications on sustainable fishing practices facilitated</p> <p>Compliance mechanism with penalties and incentives developed, consulted with key stakeholders and established.</p> <p>A skill training and financial training program for fishery workers developed and implemented.</p> <p>Number of trained fisherfolk on sustainable fishing practices.</p> <p>A microfinance facility established (or strengthened), with governance structures in place, and involving key stakeholders.</p> <p>Number of households (target of up to 200 households) involved in aquaculture and fisheries benefiting</p>			<p>Fisheries Department</p> <p>Local community groups and cooperatives</p> <p>Fishery cooperatives and fishermen</p> <p>Aquaculture operators</p>

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
		from grants and loans.			
<i>Develop and conduct initiatives to promote gender inclusion, better working conditions, skills-based training and finance management for women.</i>	Improved management of PKWS through uplifting social working conditions for vulnerable groups including fisherfolk, women, and other disadvantaged workers.	<p>An assessment study to identify barriers and opportunities for job market entry, better working conditions for fishery workers, and to determine next steps for inclusive practices completed and validated with key stakeholders.</p> <p>A training program, based on the assessment report, developed and piloted.</p> <p>Number of people trained (target of up to 200 women from all villages).</p>	100,000	2 years	<p>Koh Kong Provincial Government</p> <p>Local community groups and cooperatives</p> <p>Conservation organisations</p>
<b>Component 3. Upscaling tourism infrastructure and strengthening sustainable ecotourism</b>					
Improve and expand tourism infrastructure at Koh Kapik, including signages, jetties, shelters, and viewing structures.	Improved management of PKWS through ecotourism benefits and increased appreciation of local wildlife, mangrove forests, and wetland habitats	Number of tourism infrastructure (including signage, jetties, shelters, and viewing structures) improved and installed.	500,000	2 years	<p>MOE</p> <p>Koh Kapik management board</p> <p>Koh Kong provincial government</p> <p>Conservation organisations</p>

<b>Intervention</b>	<b>Outcome</b>	<b>Indicators</b>	<b>Cost (USD)</b>	<b>Timeframe</b>	<b>Potential Stakeholders</b>
<p>Strengthen the capacity of local communities and businesses for nature-based tourism.</p> <p>Establish a development plan for nature-based tourism in Koh Kapik.</p>	<p>Improved management of PKWS through nature-based tourism benefit – sharing and increased capacity of local stakeholders to support domestic and international tourists.</p>	<p>A nature-based tourism strategy and business plans and packages with mangrove tours (and visit to villages) developed and tested with tourism operators.</p> <p>Number of households benefitting from ecotourism (target of at least 50 households)</p> <p>Number of stakeholder groups engaged in the development of the ecotourism strategy and plan.</p> <p>A training program for ecotourism developed.</p> <p>Number of trained people from target communes</p>	200,000	5 years	Tourism operators
<i>Component 4. Improving local communities' access to freshwater sources.</i>					
<p>Assess local people's freshwater needs</p>	<p>Local access to freshwater sources improved.</p>	<p>A local community vulnerability (water access) assessment completed and disseminated with local stakeholders</p> <p>Number of consultation meetings conducted</p>	50,000	1-1.5 year	<p>Ministry of Water Resources</p> <p>Koh Kong Provincial Government</p> <p>Community groups</p>

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
		for the local assessment.  Number of stakeholder groups engaged in the local assessment.			
Develop and construct new water infrastructure to enhance access to freshwater.		Number of water infrastructure, such as well and distillation devices, installed for all target villages.  Number of people benefiting from the new water infrastructure.	500,000	2 years	
<b>Total investment for 5-6 years</b>			<b>12,775,000 USD</b>		

## 7.2. Potential Financing

The estimated project cost is USD 12,775,000 over 5-6 years. This budget supports the development of the wetland management plan, restoration of mangroves in degraded areas, capacity-building of local stakeholders on patrolling, enforcement, biodiversity monitoring, sustainable fisheries, and tourism, establishment of a microfinancing mechanism, and the improvement of freshwater and tourism infrastructure. Table 5 summarizes the projected budget distribution across the proposed project components.

The ADB sustainable coastal and marine fisheries project, currently being implemented in Koh Kong with the Fisheries Administration, would offer several opportunities for co-financing project activities.

If the proposed USD 500,000 investment over five years is allocated to restoring degraded mangrove forests and habitats across Koh Kapik Ramsar Site, it could support the rehabilitation of up to 100 hectares of degraded or illegally cleared coastal areas using suitable mangrove species. With estimated coastal protection benefits of USD 1.62 per hectare annually (see Section 5.3), this intervention could yield approximately USD 162 in annual benefits – amounting to only USD 810 over five years. This results in a benefit–cost ratio well below 1:1 when considering coastal protection alone, highlighting limited direct financial returns in this context. However, the intervention’s value lies beyond immediate protection benefits: by reducing destructive harvesting practices and promoting sustainable firewood collection, it

supports long-term ecosystem health, helps secure carbon sequestration, and safeguards biodiversity in a designated Ramsar site. Neglecting restoration and management improvements would risk further habitat degradation, loss of ecosystem services, and declining resilience of one of Cambodia's most important coastal wetlands.

### 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 Koh Kapik Ramsar Site (led by the Ministry of Environment) and scaling up sustainable fisheries and shellfisheries (with the Ministry of Agriculture, Forestry and Fisheries; Koh Kong Provincial Department of Fisheries). Conservation organisations are expected to play a major role in supporting project activities focused on biodiversity monitoring, mangrove restoration, stakeholder engagement and capacity building for better management of fisheries and shellfisheries.

### 7.4. Project Beneficiaries

There are three villages within Koh Kapik, with 731 households and a population of slightly more than 3,200 people, which can directly and indirectly benefit from the proposed interventions.

This proposed project is expected to undertake activities promoting gender inclusion and participation in livelihood activities, through capacity building activities for small-scale fisheries/shellfisheries 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 sustainable fishing practices, patrolling, and co-management. Establishing strong stakeholder buy-in from local leaders and engagement from local communities 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 in PKWS, which could increase anthropogenic pressures and lead to greater disturbance of 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.

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## Annex 1. Supplementary information on coastal protection 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 coastal protection by mangroves (after the effects of coral reefs) were spatially inferred in QGIS from a selection of metrics expressing different biophysical and monetary values modelled by Chaplin-Kramer et al. (2023) and Menéndez et al. (2020), respectively.

The key metrics selected for biophysical values (Table A1) were current maximum potential exposure to coastal hazards, which is a vulnerability risk index calculated in InVEST<sup>41</sup> for several hazard variables (i.e., wind, waves, sea level rise, geomorphology, and bathymetry) in the hypothetical absence of current mangrove extent, and nature's (i.e., the mangroves') contribution to reducing this coastal risk, both as an absolute value multiplied by the local population affected and a percentage of the maximum potential exposure.

**Table A1.** Contribution of mangroves to coastal protection as a critical natural asset in Koh Kapik based on site-level (biophysical) values inferred from Chaplin-Kramer et al. (2023) and expressed as ranges to represent the resulting uncertainty. Key metrics are in italics.

<b>Critical contribution of mangroves to coastal protection (metrics)</b>	<b>Risk levels</b>
Current population density within 2.5 km of the coast (number of people per hectare)	20 – 60
<i>Current maximum coastal risk to be mitigated, or potential exposure to coastal hazards (unitless index)</i>	<i>2.29 - 2.64</i>
Maximum coastal risk to be mitigated, or potential exposure to coastal hazards in 2050 according to IPCC's Shared Socioeconomic Pathway #1 'Sustainability' (unitless index)	2.57 - 2.97
Maximum coastal risk to be mitigated, or potential exposure to coastal hazards in 2050 according to IPCC's Shared Socioeconomic Pathway #3 'Regional Rivalry' (unitless index)	2.75- 3.17
Maximum coastal risk to be mitigated, or potential exposure to coastal hazards in 2050 according to IPCC's Shared Socioeconomic Pathway #5 'Fossil-fueled Development' (unitless index)	3.00 - 3.45
Current proportional risk reduction, nature's contribution to reducing coastal risk as a proportion of maximum coastal risk (unitless index)	0.15 - 0.17
<i>Nature's contribution to reducing coastal risk as a proportion of population density within 2.5 km of the coast (# of people per hectare)</i>	<i>3 - 9</i>
<i>Nature's contribution to reducing coastal risk as a percentage of the maximum potential exposure (%)</i>	<i>0.06 - 0.07</i>

The key metrics selected for economic values (Table A2) were the annual expected flood protection benefits to total stock, which is the monetary value of the averted damages to the industrial and residential stocks (i.e., property) in

2015 US\$, the same total annual benefits expressed per hectare of mangroves, and the total benefits in the event of a 100-year return period storm, which are the rarest of cyclonic conditions but cause the most flood damages to property (i.e., maximum level of coastal protection by mangroves).

**Table A2.** Coastal protection benefits offered by mangroves in Koh Kapik based on site-level (monetary) values inferred from Menéndez et al. (2020) and expressed as ranges to represent the resulting uncertainty. Key metrics are in italics.

<b>Benefits of mangroves in terms of coastal protection (metrics)</b>	<b>Avoided costs (US\$)</b>
Mangrove extent (hectares) <sup>[2]</sup>	4,444 – 9,584
Annual expected flood protection benefits to people (number of people)	(11) – 41
Annual expected flood protection benefits to Industrial Stock (US\$)	(6,190) – 23,886
Annual expected flood protection benefits to Residential Stock (US\$)	(8,961) – 34,579
<i>Annual expected flood protection benefits to Total Stock (US\$)</i>	<i>(14,648) – 56,525</i>
<i>Annual expected flood protection benefits to Industrial Stock per hectare of mangroves (US\$ per hectare)</i>	<i>(1) – 4</i>
1-in-100-year return period damage in terms of area flooded (number of hectares)	(9,302) - 16,631
<i>Total expected flood protection benefits of mangroves per 100-year return period storms (US\$)</i>	<i>122,276 – 218,636</i>

**Table A3.** Biophysical benefits from RFI coastal wetland sites (expressed as ranges to represent the resulting uncertainty) and at the national level.

<b>Site name</b>	<b>Max pot exp (index)</b>	<b>Risk reduction (index * pop)</b>	<b>Risk reduction (% max pot exp)</b>
Koh Kapik	2.47	6	6.35
Cambodia RFI average	2.47	6	6.35
Cambodia national average	2,74	18	4.83

**Table A4.** Monetary benefits from RFI coastal wetland sites (expressed as ranges to represent the resulting uncertainty) and at the national level.

<b>Site name</b>	<b>Total annual benefits (US\$)</b>	<b>Per mangrove area (US\$/ha)</b>	<b>For 100-yr return period storms (US\$)</b>
Koh Kapik	20,939 (±35,587)	1.62 (±2.76)	48,180 (±170,456)
Cambodia RFI average	20,939	1.62	48,180
Cambodia RFI total	20,939	Not Applicable	48,180
Cambodia national average	3,862,621	1,195	8,667,077

Cambodia national total	69,527,171	Not Applicable	130,006,152
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**Table A5.** Key habitat types in Koh Kapik (Peam Krasop Wildlife Sanctuary) 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 (%)
Marine subtidal aquatic beds	1617.3	12.0	134.8	1.0
Intertidal mud, sand or salt flats	1347.8	10.0	1347.8	10.0
Intertidal forested wetlands	10512.5	78.0	11995.0	89.0
Total	13477.5	100.0	13477.5	100.0