CRITICAL ECOSYSTEM PARTNERSHIP FUND

Environmental Impact Assessment and Environmental Management Plan

Date
14 April 2021

CEPF Grant
IBIII-LG-2021-01

Grantee
Wildfowl & Wetland Trust

Project Title
Showcasing best practice for the Lower Mekong region in the restoration of feeding grounds for the sarus crane

Project Location
Boeung Prek Lapouv Protected Landscape Cambodia & Anlung Pring Protected Landscape

Grant Summary

1. Grantee organization. **Wildfowl & Wetlands Trust**
2. Grant title. **Showcasing best practice for the Lower Mekong region in the restoration of feeding grounds for the sarus crane**
3. Grant number. ***IBIII-LG-2021-01***
4. Grant amount (US dollars). **USD 240,000**
5. Proposed dates of grant. **1st January 2022 – 31st December 2024**
6. Countries or territories where project will be undertaken. **Cambodia**

Summary of the project

7. Building on a newly established research foundation and in-line with the agreed regional sarus crane Action Plan, this project will restore 255 hectares of primary feeding habitat for sarus crane, and continue existing conservation and protection efforts to preserve the 2,130 hectares of dry season feeding and roosting grounds inside the Anlung Pring Protected Landscape (AP) and Boeung Prek Lapouv Protected Landscape (BPL) used by over 50% of the regional population.

   The core focus will be seasonally inundated grassland, the main feeding habitat of sarus crane. Here, a more favourable hydrological regime will be created at AP and BPL to promote the recovery of grassland vegetation, in particular to increase the density and quality of *Eleocharis dulcis*, the favoured food source of the sarus crane. Hydrological improvements will include the construction of water retention bunds with spillways, lower ground levels to intercept groundwater, blocking of redundant channels and other hydrological outputs, and the suppression of non-native invasive species (e.g. *Mimosa pigra* and *Panicum repens*) by cutting, flooding, ploughing and prescribed burning treatments.

   A second habitat type, ephemeral pools will be targeted for creation. These pools support Nymphaea species, the tubers of which are also known to be an important food source for the sarus crane in the region. To promote the abundance of this species and provide foraging opportunities for sarus crane at the end of the flood season, ephemeral offline pools will be constructed by lowering ground levels and creating scrapes, or by enlarging existing pools. Nymphaea plants will be transplanted into newly created pools to promote establishment.

   Approaches to preserve the existing seasonally inundated grassland at AP and BPL (2,180ha) will focus on supporting community patrolling and law enforcement to prevent land encroachment, disturbance, fire, illegal unsustainable harvesting of natural resources and unregulated livestock grazing. To raise law enforcement standards, capacity building activities will be implemented.

   Through this project we will implement approaches such as workshops at local villages to raise awareness on protected area law, the importance of sarus crane and the importance of wetland ecosystem services. This is expected to reduce conflict between rangers and local communities while maintaining access to natural resources, and to support existing committees to promote the sustainable use of natural resources at the two sites.

   There is a need to engage local schools and raise awareness of AP and BPL among students in order to influence positive long-term behaviour change. The main approach will be to support teachers to integrate crane and wetland ecosystem knowledge into the local primary school curriculum through the provision of teaching materials and appropriate training to deliver the content. Furthermore, crane themed events will be organised to engage school children (also the local communities).

8. Date of preparation of this document. 14 April 2021

9. **<u>Status of area to be impacted</u>:** This section should describe the applicant's understanding of the site.

The physical impact of the project will largely be confined to land within the boundaries of AP and BPL, hence this EIA is focused on land within the Protected Landscapes.

Boeung Prek Lapouv Protected Landscape

The 8,305 ha BPL wetland is situated in Takeo Province, close to the border with Vietnam in the south of Cambodia (Figure 1). It is one of 40 globally Important Bird Areas (IBAs) identified as key sites for conservation in Cambodia and was designated as a Protected Landscape under the auspices of the Ministry of Environment in 2016. BPL it is a relatively flat area of land located in the western floodplain of the Bassac River, which is a distributary of the Mekong River. The grasslands are under threat from agricultural conversion throughout the region. At BPL, hydrological changes to facilitate rice-growing have negatively affected grassland habitats.

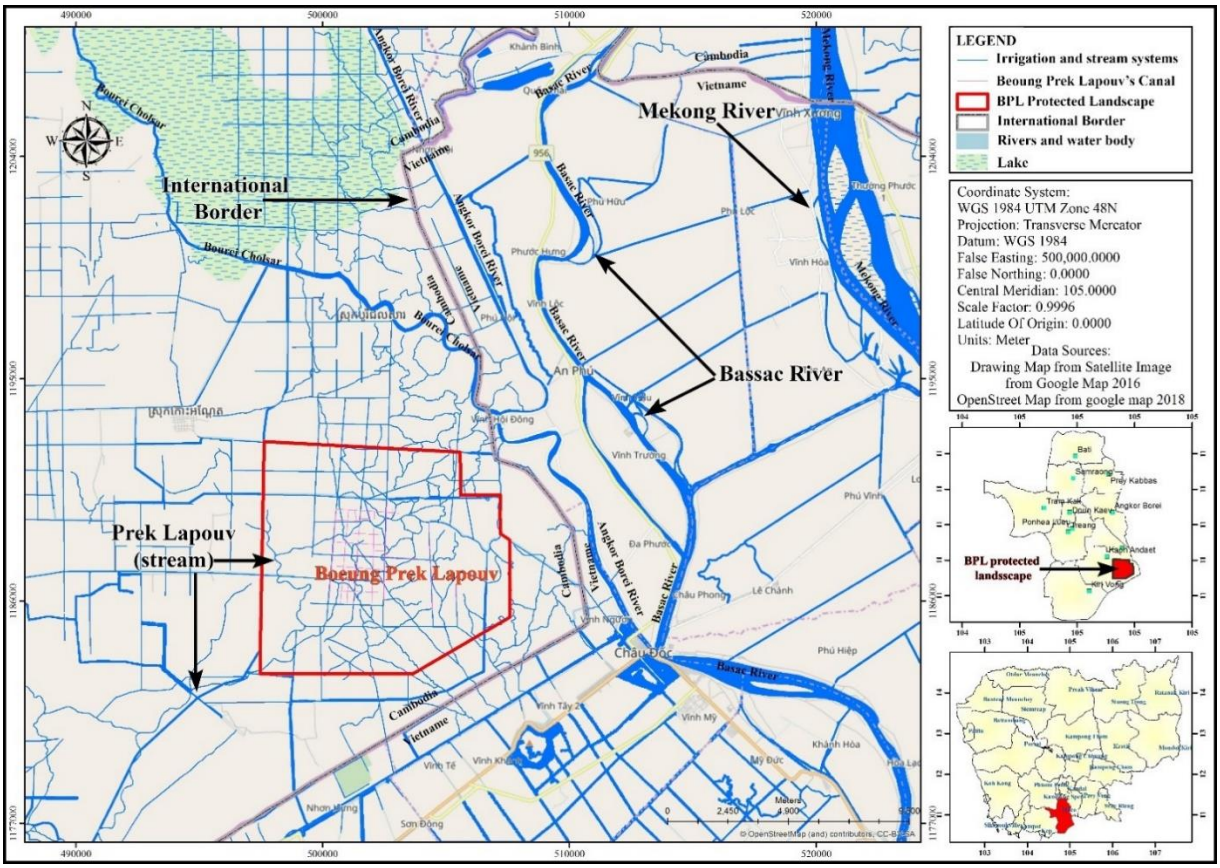


Figure 1: Location of BPL in relation to major rivers and streams.

The wetland harbours different ecosystems based on physical and hydrological characteristics and ecological processes. There are four main habitats that can be distinguished in BPL (Figure 2): seasonally inundated grasslands, flooded forests (and scrub), open water with aquatic plants, and rice fields.

- *Seasonally inundated grasslands.* The grasslands cover almost 2,000 hectares, 24.1% of BPL and large areas are found in the former core zone and southern parts of the Protected Landscape. The grasslands are dominated by *Panicum repens, Eleocharis dulcis, Ischaemum*

rogusum, Impomea aquatic, Youngia japonica, and *Imperata cylindrical.* The grasslands are a favoured feeding ground for many priority waterbird species including the sarus crane, painted stork, Asian openbill, greater adjutant and spot-billed duck. Sarus cranes also use the grasslands for roosting.

- *Flooded forests.* Flooded forests include shrubs and gallery forests and cover 108 hectares (1.3% of BPL). They are densely distributed in higher parts in the south of the Protected Landscape and along river banks and canals. Common scrub and tree species include *Morinda citrifolia L.*, *Phyllanthus reticulatus*, *Gmelina asiatica*, and *Barringtonia acutangula*, which depend on floods for regeneration. Common grasses beneath the scrub canopy are *Ruellia tuberosa*, *Cyperus difformis*, *Pluchea indica*, *Cynodon dactylon*, *Heliotropium indicum*, and climber species include *Ipomoea nil*, *Merremia umbellate*. The habitat supports many waterbird species including the painted stork, Asian openbill, greater adjutant, and spot-billed duck. The highly invasive non-native *Mimosa pigra* is scattered throughout the areas of shrub.
- *Open water with aquatic plants.* This is the general habitat of the canals, streams/channels and water bodies and is mainly located in the north and west of the former core zone. The total area covers around 1,150 hectares (13.8% of BPL), of which 926 hectares are aquatic vegetation and 230 hectares are canals and streams. Dominant plant species are lotus *Nelumbo nucifera*, water lily *Nymphaea sp.* (an important food source for many species including sarus crane) and the highly invasive, non-native water hyacinth *Eichhornia crassipes*. In areas where lotus is less dominant (eg, in a restored fish spawning canal), the habitat provides suitable conditions for many fish.
- *Rice fields.* Large areas in BPL are in use as rice fields, except the former core zone and the southernmost part of BPL, where agricultural activities are not favourable. Rice farming is the main livelihood in the area and farms cover almost 5,000 hectares (60.2%). Rice is cultivated 1-2 times per year, depending on field conditions and access to water. Rice fields provide foraging habitat for several large waterbird species. Some species play critical ecological roles in the rice fields, such as the nitrogen-fixing *Sesbania sesban*, and certain frog species that predate on rice crop pests.

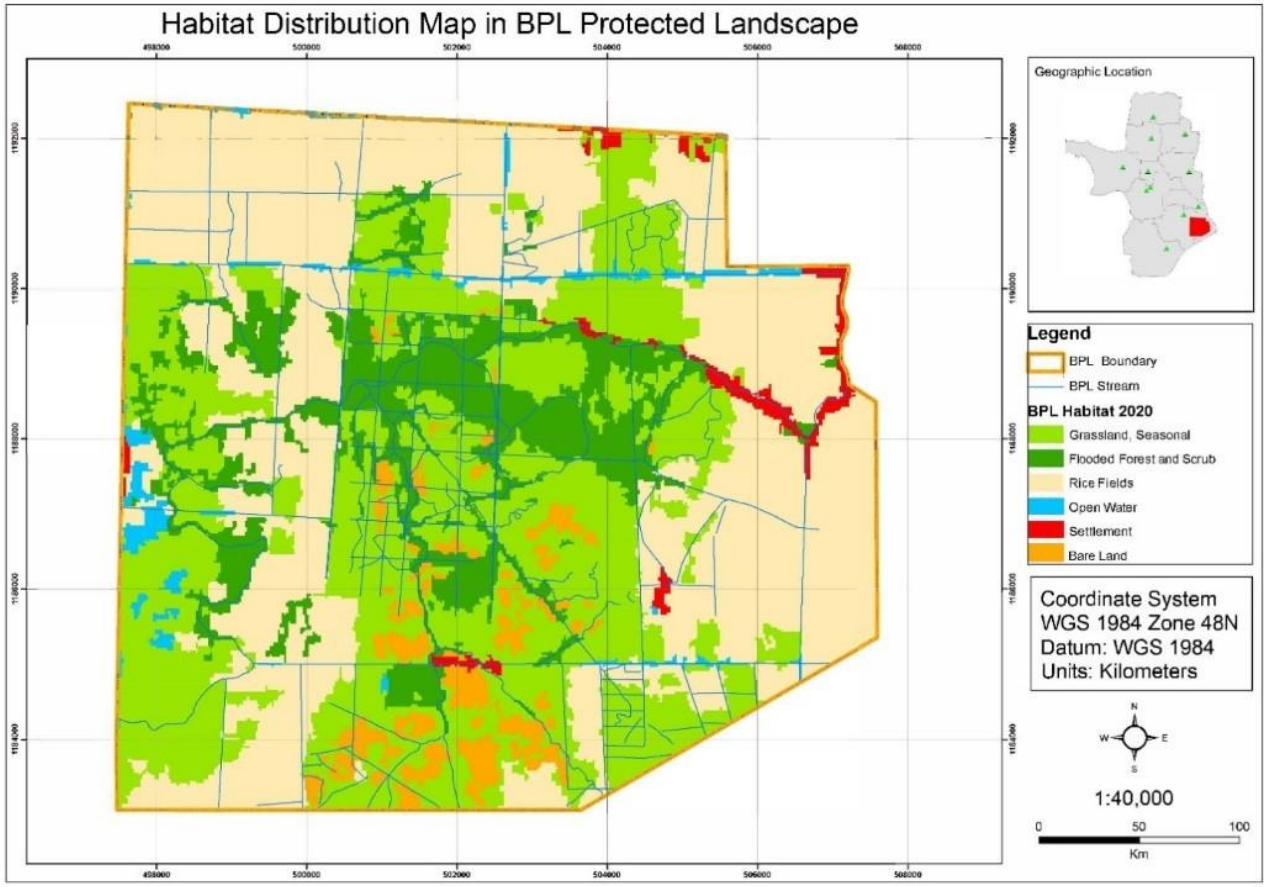


Figure 2: Habitat distribution in BPL (Source: WWT, 2021).

The proposed restoration works will be located inside the former core zone and conservation zone of BPL, see Figure 3. There are no settlements within these zones. The land is currently either 1) degraded seasonally inundated grassland, or 2) areas of former wetland habitat (currently scrub habitat dominated by the grass *Panicum repens* and the invasive non-native *Mimosa pigra*) identified for restoration.

The ecological and environmental conditions of the core zone and conservation zone are well understood. Biodiversity data, mostly avifauna, has been collected since 2001. Roosting and feeding locations of sarus crane are recorded and mapped each dry season (by NatureLife). Vegetation, soil, water quality and topography surveys have recently been undertaken, and surface water levels, groundwater levels, and meteorological variables are monitored continuously. Below is a summary of the known flora and fauna.

Flora at BPL

Sixty-six vascular plants have been recorded in the wetland. The largest family of plants are grasses (Poaceae) with 21 species identified, followed by sedges (Cyperaceae) with 13 species. No survey has been carried out for fungi. None of the recorded flora species within BPL are of nature conservation concern.

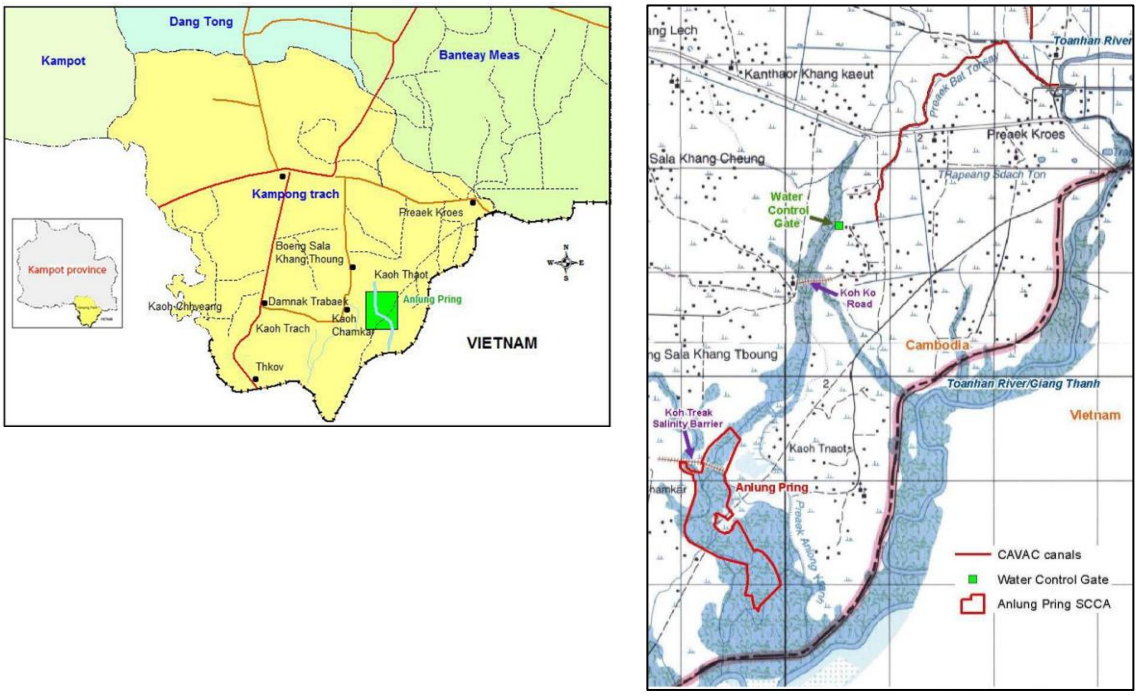
Fauna at BPL

Faunal records are mainly limited to birds and fish. No work has, as yet, been conducted on assessing or monitoring the status of reptiles, amphibians, mammals, aquatic and terrestrial invertebrates or soil organisms. To date 110 wild bird species have been recorded in the wetland including 60 waterbird species and 7 wetland-dependant species (NatureLife data). Eleven species are classified as of global

conservation concern. Both terrestrial and waterbirds nest inside BPL. In October 2020, 2,186 Asian openbill nests were found inside the wetland, the first confirmed nesting for 15 years. Eighty-four species of fish have been reported by local people at BPL. The more common species in 2015 were snakehead murrel *Channa striata*, bronze featherback *Notopterus notopterus*, snakeskin gourami *Trichohodus pectorallis* and moonlight gourami *Trichohodus microlepis*. Local people reported at least 51 species have either disappeared or are now low in very abundance. *Channa striata* is an economically important fish with a high protein content, high quality flesh and health benefits.

Anlung Pring Protected Landscape

The 217 ha AP wetland is situated in the seasonal floodplains of the Lower Mekong Basin within Kampong Trach district, Kampot province, in the south of Cambodia close to the border with Vietnam (Figure 3). The site is designated as a Flyway Network Site under the East Asian-Australasian Flyway Partnership and is the smallest of the three Sarus Crane Conservation Areas in Cambodia. AP is a flat site, no more than 1.35m above sea level dominated by semi-natural grasslands with smaller areas of Melaleuca / riverine scrub and open water. A road built through the site in 1984 modified the site's hydrology significantly, such that the northern section is no longer tide influenced.



a) Location within Kampot Province b) Location in relation to major rivers and streams

Figure 3: Location of AP

AP holds important areas of wet grassland with high densities of *Eleocharis* sp., and *Melaleuca* shrubs, also pools, which are common in floodplains of the Lower Mekong Basin. Five habitat types are present: Seasonally inundated grassland; *Melaleuca* scrub; Riverine scrub; Open water; and Bare ground, Figure 4.

- **Seasonally inundated grassland** extends across the entire site, covering over 180ha and is dominated by grass-like sedges from the *Eleocharis* sp. (Cyperaceae) family in either single species stands or multi-species communities. The grasslands are a favourable feeding ground for the Sarus crane. *Eleocharis spiralis* is more common in the area influenced by brackish water however its community is distributed in both sections of the conservation area. *Eleocharis*

dulcis and its communities are mainly distributed in relatively low-lying areas including depressions and along river channels. *Eleocharis philippinensis*, is only found in the southern section of AP covering about one third of the grassland area. This species is mostly found in association with *Cynodon dactylon.*

- **Open water with aquatic plants** (22.5ha) includes the freshwater pools north of the salinity barrier, and the inter-tidal channel network south of the barrier.
- ***Melaleuca* scrub** is found in the east of the south section. Covering an 8.8ha area it consists of two species, *Melaleuca leucadendron* and *Melaleuca cajuputi*. Stems of the latter species are used locally in construction and for firewood. The *Melaleuca* scrub inside the site forms part of a larger contiguous stand adjacent to eastern boundary of AP. Stands of *Melaleuca* shrubs are important roosting grounds for Sarus Crane.
- **Riverine scrub** (2.5ha) is present in the far south of the site, along the banks of the Song Giang Thanh River.

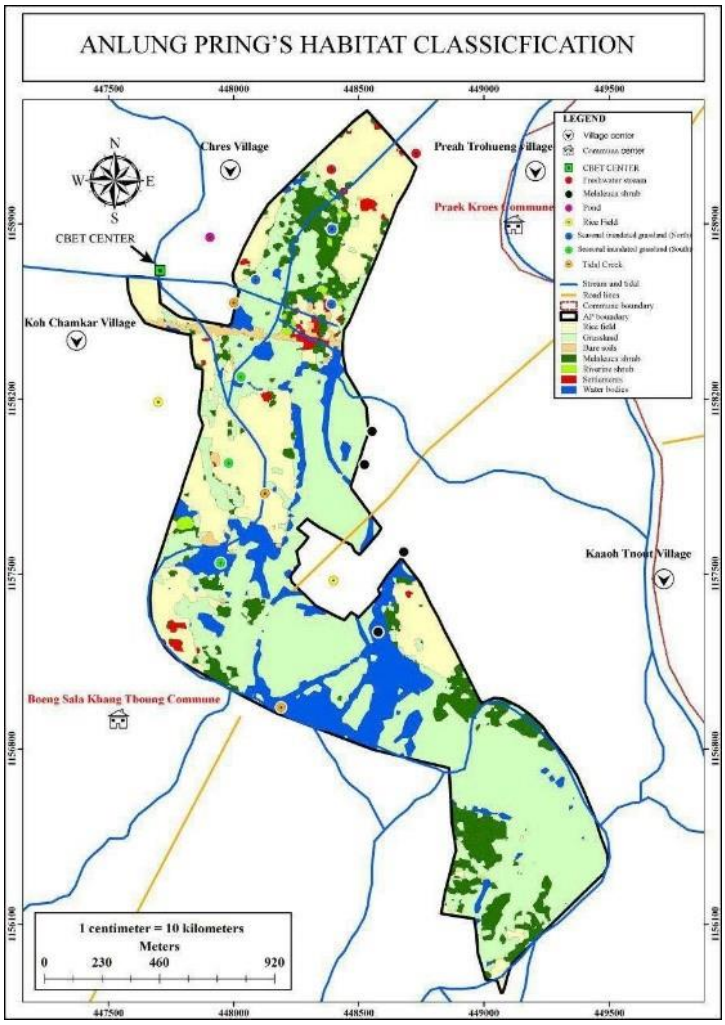


Figure 4: Habitat distribution in AP

The proposed restoration works will be located inside the protected landscape boundary. There are no settlements within the AP boundary.

Similar to BPL, there is a sound understanding of the ecological and environmental conditions of AP. Data is available for vegetation, soil, water quality and topography from recent surveys. Surface water levels, groundwater levels, and meteorological variables are monitored continuously. Avifauna data has been collected since 2001, including mapping of sarus crane roosting and feeding locations each dry season (by NatureLife). Below is a summary of the known flora and fauna at the wetland.

Flora at AP

A recent short survey of AP and surrounding areas recorded 22 species, belonging to 12 families. Cyperaceae is the largest family represented with eight species of which four belong to the genus *Eleocharis*. Around 80% of AP is covered by plant communities in which *Eleocharis* sp. dominate including (in order of abundance) *E. spiralis*, *E. dulcis*, *E. philippinensis* and *E. parvula*. *E. attropurpura* is present with individuals scattered across the wetland. These species are an important food source for wintering Sarus Crane. The southern section of AP, being inter-tidal, supports brackish plant species such as *Acanthus ilicifolius*, *Acrostichum aureum*, *Sonneratia caseolaris*, *Nypa fruticants* and *Fimbristylis sericea*.

Fauna at AP

Data on fauna is currently only available for birds. No work has as yet been conducted on assessing and monitoring the status of fish, reptiles, amphibians, mammals, or invertebrates. Ninety bird species have been recorded at the wetland, this includes five species of global conservation concern; sarus crane *Antigone antigone sharpii* (Indochinese subspecies), spotted greenshank *Tringa guttifer*, black-tailed godwit *Limosa limosa*, painted stork *Mycteria leucocephala*, and oriental darter *Anhinga melanogaster*. Three species are present in internationally important numbers. The site holds a significant proportion of the regional Sarus crane population during their non-breeding season.

10. **Approach**: This section will describe proposed actions during the project. Specifically, what do you intend to do and how will you do it?

The following activities will be employed to deliver the project. Restoration locations are shown in Figure 5.

1. Ranger patrols (AP and BPL);
2. Training workshops for rangers and Field Monitoring Team members (AP and BPL);
3. Education activities at schools (AP and BPL);
4. Vegetation surveys (AP and BPL);
5. Earthmoving; blocking ditches (AP and BPL), placing earth to make watertight bunds (BPL), lowering the ground surface (BPL) and extending/creating open water pools (AP and BPL);
6. Installing spillways in earth bunds (BPL); and
7. Cutting and removal of the non-native invasive *Mimosa pigra* (BPL).

Activities #1-#3 have been implemented at both sites before and are well established. The rangers use standard equipment such as a GPS, binoculars, communication devices and forms during their patrols; the patrol routes are predefined. Workshops will be held at the rangers' offices with occasional field training activities close to the office building. The majority of school activities will be delivered at the schools, however field trips into both sites will be undertaken to show wildlife (especially cranes).

Activity #4 will involve the setting up of fixed transect posts and then collecting vegetation data from the transects at regular intervals throughout the project.

Activity #5 involves the use of large machinery (dozer, backhoe, tractor and tipper truck).

- At BPL ditches will be blocked using site won material which will be transported to the desired locations using a tipper truck. A backhoe will then consolidate the material to ensure the block is effective. At AP, ditches will be blocked using material imported from outside the site boundary using a tipper truck and then consolidated using a backhoe.
- Similarly, bunds will be constructed using site won material. A tipper truck will transport the material to the bund locations and a backhoe will consolidate the material. The bunds will be approximately 2m (high) x 4m (wide) in order to retain flood water at the end of the wet season.
- A dozer will be used to lower the ground by ~10cm in restoration areas, and a backhoe to extend/create open water pools.

Activity #6. Concrete spillways will be installed along the bunds to allow excess water to drain from the impoundments without causing damage to the perimeter earth bunds. These will be prefabricated off-site and brought into the site using a truck. A backhoe will be used to complete the installation.

Activity #7. *Mimosa pigra* trees and shrubs will be cut to ground level and then flooded during the wet season. Fruits will also be collected and removed from the site to reduce *Mimosa pigra* spreading.

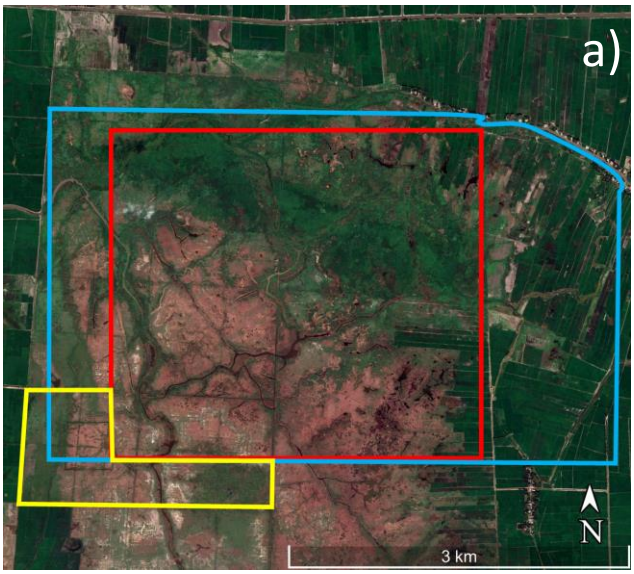


Figure 5a. Location of restoration activities within BPL. Earthmoving work within blue line (conservation zone). Yellow is the boundary of Mimosa pigra clearance. Red is the boundary of the former core zone.

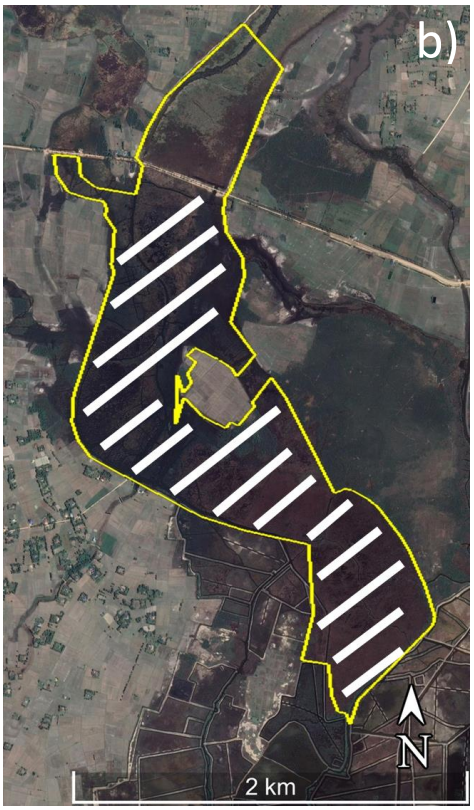


Figure 5b. Location of restoration activities within the AP boundary. Hatched area for ditch blocking and pools. Yellow line is AP boundary.

11. **Anticipated impact:** this section will describe the impact and how this impact has been determined.

No specific environmental / ecological impacts are expected from the implementation of Activities #1 to #4. However wildlife could be disturbed if the activities are inappropriately timed or near sensitive areas.

Activities #5. Temporary localised impacts are expected during earthmoving, and post-construction at the very start of the wet season.

a) Waterbirds are identified as a sensitive receiver and susceptible to disturbance during earthmoving operations;
b) Both sites contain many habitats of high conservation value which could be damaged by heavy machinery moving within them; and
c) Some soils contain minerals that can, when freshly exposed, oxidise, then release sulphates when wet (eg after the first rainfall of the wet season). This natural process can increase the acidity of nearby water.

Activity #6. Installation of the spillways is a short duration activity in the dry season, no significant impact is anticipated.

Activity #7. No significant impact is anticipated from cutting and removing *Mimosa pigra*. However wildlife could be disturbed if the activities are inappropriately timed or near sensitive areas.

At BPL, the core zone of the Protected Landscape is a no-take zone where access is prohibited except to government staff (eg rangers) and researchers with prior permission from the Ministry of Environment. Therefore no impact is anticipated on the overall provision of wild resources to the local community. The conservation zone is large and the activities will be concentrated in specific locations each year, therefore no significant impact to access or abundance of wild resources is expected. All of AP is a no-take zone, hence no impact is anticipated.

Long-term, the restoration is expected to result in improvements to the wider wetland ecosystem at both sites.

12. **Mitigation measures**: Describe measures that will be taken to mitigate negative impacts.

The following mitigation measures will be adopted:

a) As a general rule, activities will be timed to avoid creating disturbance to wildlife, and activity locations will be selected away from sensitive areas. Rangers are an exception as they need to patrol the sites year round. They will wear camouflaged uniforms and receive training on methods to avoid disturbing wildlife during their patrols.

b) To avoid causing disturbance to wildlife all earthmoving work will be undertaken in the dry season, following the departure of these species to their breeding grounds in February. Works will be completed in July, prior to the return of these species. The location of nesting birds at both sites is monitored every dry season. Should nesting activity be observed close to a proposed work location, the work will be postponed until nesting has finished.

c)

i) To avoid creating any unnecessary damage to natural habitats, heavy machinery will only access the sites in the dry season and use existing access points;
ii) Existing habitats or areas used by sarus crane to roost/feed will be identified using the available data set, then avoided during site operations;
iii) Regular site supervision by WWT staff and local rangers to oversee contractors and their work; and

iv) At BPL all site won material will be used for the bunds and ditch blocking meaning no material will be taken off-site, reducing vehicular movements inside the site.

d) According to a 2013 site-wide soil survey, the top 30-40cm of soils at BPL is predominantly organic material, with Iron Hydroxide minerals present in lower horizons. Therefore, the removal of the top 10cm of the soil layer is not expected to create conditions for acidic sulphate soils to form. Any existing areas of acidic sulphate soils within the restoration area will not be excavated.

13. **Actions to ensure health and safety**: Describe actions that will be taken to ensure the health and safety of workers as well as the site. Include a description of waste management and/or disposal.

Rangers patrol in pairs (sometimes a larger group), they will carry weapons, first aid kits, water, food and communication devices (walkie talkies).

Surveyors will also work in pairs (ie adopt the buddy system). Similarly they will carry a first aid kit, water, food and mobile phones. A risk assessment will be completed prior to any on-site activity.

Experienced local contractors will be employed to complete the earthmoving works. In BPL a similar project was previously undertaken southwest of the core area, and the same contractor will be approached.

Within each issued contract, there will be a statement informing contractors they must comply with national laws and regulations and follow WWT's risk assessment for the site and task.

Earthmoving works will only take place in the dry season when the ground is firm, thus reducing the risk of heavy machinery becoming unstable and/or unbalanced.

14. **Monitoring and Evaluation**: This section aims to outline what steps the proponent will take to monitor and evaluate the impact of the proposed intervention.

The most likely impact arising from the project is identified as disturbance to sensitive wildlife, particularly birds. Birds are monitored fairly intensively at both sites by a Field Monitoring Team (overseen by NatureLife, a Cambodian NGO) throughout the year. Therefore the impact to birds can be monitored and evaluated throughout the project by the Project Manager, and action taken promptly when required.

The grassland restoration areas will be monitored post construction using vegetation transects to record the establishment and recovery of grassland vegetation. *Eleocharis dulcis* and its tubers will be a focus. Bird usage will also be recorded, as well as surface water levels. Some groundwater levels and water quality data will be collected. The establishment of Nymphaea spp. will be monitored in the new or extended ephemeral pools using semi-quantitative methods.

The success of the restoration will be evaluated based on the above data and in consultation with MoE, community representatives, and NatureLife,

15. **Permission of the landowner**: Please verify permission of the landowner to undertake actions on the site, and verify that you have the required permits to undertake this work.

The proposed construction work will take place within the Ministry of Environment Protected Landscape. This is state owned land and there will be a requirement to receive permission from the General Department of Administration for Nature Conservation and Protection (GDANCP). A letter of support for this project has already been received from GDANCP.

WWT has an MoU in place with the Ministry of Environment to support the conservation of AP and BPL.

16. **Consultation**: This section aims to outline the range of informed consultations that the grantee has had both with experts to optimize the potential for success, and with stakeholders, particularly local communities, who are potentially affected by the proposed actions. Include dates of consultations.

The restoration activities are actions identified in the 2021-2025 BPL site management plan (WWT 2021) and the BPL Climate Change Vulnerability Assessment (Ly 2019). The process to draft these documents involved consultation with the local community, relevant government departments and delivery partners, including various workshops. The need to restore habitats was identified as a high priority.

Similarly, the need to restore habitats at AP has been raised by local people during the current process to prepare a Climate Change Vulnerability Assessment for AP.

NatureLife have and will continue to advise on the restoration plans, based on their lessons learnt from similar projects at BPL (construction of a water management control plot and *Mimosa pigra* control). As a delivery partner in this project, they have advised WWT on the ranger activities and school activities.

In preparation for this project, WWT liaised with the vice chief of office within the Department of Freshwater Wetland Conservation on the restoration scale and methods. WWT will continue to liaise with this contact throughout the delivery phase.

17. **Disclosure**: CEPF requires that safeguard documents are disclosed to affected local communities and stakeholders prior to project implementation. Please describe efforts to disclose this impact assessment and environmental management plan and provide dates.

This safeguarding document will be provided to NatureLife and the vice chief of office within the Department of Freshwater Wetland Conservation of Ministry of Environment at the start of the project.

Soon after confirmation of the contract for this grant, to communicate the content of this document, WWTs Technical Officer will prepare a summary in Khmer language and distribute leaflets to villages in the surrounding communes as well as the rangers in the wetland management office. The information will also be displayed on Community Information Points around AP and BPL.

18. **Grievance mechanism**: All projects that trigger a safeguard must provide local communities and other relevant stakeholders with a means to raise a grievance with the grantee, the relevant Regional Implementation Team or the CEPF Secretariat.

Details for raising any grievance will be explained in a local language leaflet to be distributed by the WWT Technical Officer, also posted on Community Information Boards.

This information will include:

- Email and telephone contact information for WWT in Cambodia.
- Email and telephone contact information for the CEPF Regional Implementation Team.
- The email of the CEPF Executive Director: cepfexecutive@conservation.org .

- A clear statement outlining the process to raise grievances, expected response time (15 days), procedure should the claimant not be satisfied with the response it can submit the grievance directly to the CEPF Executive Director, at cepfexecutive@conservation.org .

Should we receive any grievance, we will share it – and a proposed response – with the CEPF Regional Implementation Team within 15 days.

References

Ly. S., Hour. P, and T. Avent. 2019. *Climate Change Vulnerability Assessment for Boeung Prek Lapouv Protected Landscape, Cambodia*. Bangkok, Thailand: IUCN ARO. X + 32pp

WWT. 2021. *Management Plan for the Boeung Prek Lapouv Protected Landscape 2021-2025*. Wildfowl and Wetlands Trust, UK.