



# Bujagali Project: Biodiversity Action Plan

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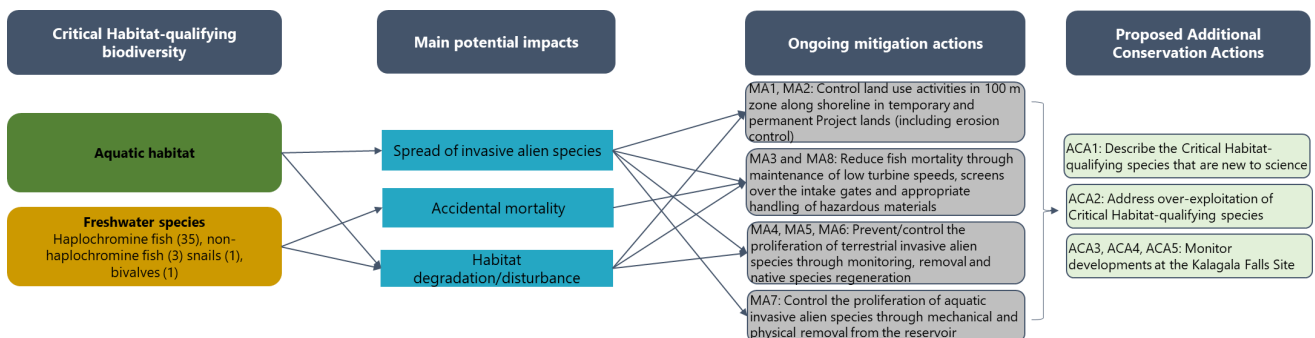
## Executive summary

This document is the Biodiversity Action Plan (BAP) for the Bujagali Hydropower Project ('the Project'), owned and operated by Bujagali Energy Limited (BEL). The 250 MW Project, operational since 2012, is located on the Upper Victoria Nile, Uganda (between Lake Victoria and Lake Kyoga), approximately 8 km north-west of the town of Jinja.

This BAP is the Project strategy for mitigating and managing potential biodiversity impacts during the on-going operational phase of the Project from 2017 onwards. This document details (Figure 1):

- Existing on-going mitigation actions that address habitat degradation, accidental mortality, the spread of invasive alien species (IAS), and contamination risk; and
- Additional Conservation Actions (ACAs) with the potential to contribute towards Net Gain for Critical Habitat-qualifying biodiversity: 40 aquatic species, including 35 haplochromine cichlid fishes.

Implementing ACAs that are technically and politically feasible will require additional scoping.



*Figure 1: Overview of Critical Habitat-qualifying biodiversity, main potential impacts, on-going mitigation actions, and objectives of proposed Additional Conservation Actions*

This BAP is a living document that will be reviewed regularly, and updated as appropriate. The first review will be undertaken in 2021, once information is available to evaluate the viability of the ACAs. It links closely with the Biodiversity Monitoring and Evaluation (M&E) Plan, focuses on Critical Habitat-qualifying biodiversity (TBC 2018a). The M&E Plan will be reviewed every three years, and updated as needed. Next steps and a high-level timeline are suggested for the implementation of the BAP, noting that strong stakeholder engagement and partnerships will be required.

## 1 Introduction

This document is the Biodiversity Action Plan (BAP) for the Bujagali Hydropower Project ('the Project'), owned and operated by Bujagali Energy Limited (BEL). The BAP is the Project strategy for mitigating and managing potential biodiversity impacts during the on-going operational phase from 2018 onwards.

Project construction began in 2007, and the Project has been operational since 2012. Social and Environmental Assessment (SEA) of the Project was carried out in 2006 (Burnside International Ltd 2006) according to the 2006 version of the International Finance Corporation (IFC) Performance Standard 6 (PS6) on Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC 2006). The SEA concluded that the Project was not operating in Critical Habitat and mitigation actions were captured and implemented via a suite of documents including the Project's Environmental Mitigation and Monitoring Plan (Bujagali 2007).

The Project underwent re-financing in 2017. In support of the re-financing process, Environmental and Social Due Diligence (ESDD) was undertaken of past Project mitigation. The Project and lenders are confident that effective implementation of previous and existing mitigation measures are sufficient to reduce all past and on-going residual impacts to levels predicted in the SEA and other assessments agreed with the lenders to be acceptable<sup>1</sup>.

As part of the Environmental and Social Action Plan ([ESAP](#)) re-financing requirements, a Critical Habitat Assessment (CHA) (TBC 2018a) was carried out according to the current IFC PS6 (IFC 2012), which contains clarification on the approach to identifying Critical Habitat. The 2018 CHA concluded that the Project is operating in Critical Habitat (CH), primarily due to the presence of threatened and endemic species of fish from the haplochromine family (TBC 2018a). The Project is therefore now required to develop a BAP that contributes toward Net Gain in the protection of the species that triggered Critical Habitat via reasonable actions within BEL's control<sup>2</sup>.

This BAP therefore summarises the on-going mitigation actions the project is implementing and outlines Additional Conservation Actions (ACAs) that together can contribute towards the Project's goal of a Net Gain for Critical Habitat-qualifying biodiversity. Project actions focus on the sections of the river where the Project has a level of control over actions. Furthermore, the BAP outlines the Project's monitoring program to ensure a robust ability to monitor and evaluate assumptions of no additional residual impacts over time for Critical Habitat-qualifying biodiversity.

This BAP is a living document that will be reviewed regularly and updated as appropriate, as the Project better understands the status and ecology of Critical Habitat-qualifying biodiversity, Project impacts on biodiversity and the effectiveness of mitigation actions.

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<sup>1</sup> All past impacts were assessed through the original Environmental and Social Impact Assessment (ESIA) and are considered to have been addressed by the management actions implemented by the Project (see the Environmental and Social Review Summary (ESRS) on the IFC website: <https://disclosures.ifc.org/#/projectDetail/ESRS/24408>).

<sup>2</sup> As agreed in the ESAP, item 13 (Section 3.2.1)

## 1.1 Project description and ecological setting

### 1.1.1 Project description

The 250 MW Project, operational since 2012, is located on the Upper Victoria Nile, Uganda (between Lake Victoria and Lake Kyoga), approximately 8 km north-west of the town of Jinja. BEL (owner-operator) sub-contracts Project operations and maintenance to O&M Energy Uganda Limited (O&ME).

Key features of the Project include:

- A 28 m high dam;
- A 388 ha reservoir that extends to the tailrace areas of the Nalubaale and Kiira hydro power plants (HPPs) at Jinja (previously known as Owen Falls and Owen Falls Extension, respectively);
- A spillway and intake system, and a powerhouse containing five 50 MW Kaplan turbines; and
- A substation, service, storage, office and workshop areas and operator facilities.

Upstream of the Project, water is released through the Nalubaale and Kiira HPPs at Jinja. This discharge is then used by the Project to generate power. The Project does not have any control over the rate of discharge from these upstream HPPs and therefore effectively operates as a run-of-river scheme, but with an associated reservoir (Reeman Consulting 2017).

Although the Project does not have any control over discharge rates from projects upstream, the Project's existence alters water flow rates in the Bujagali reservoir and downstream of the dam. The Project's Operational Area of Influence (OAoI) is therefore defined as the maximum length of river in which the Project exerts an effect over water flow rates (Figure 2).

This OAoI extends 8 km upstream from the dam to the tailrace of the Nalubaale and Kiira HPPs (i.e. the top of the Bujagali reservoir) and c. 17.5 km downstream to the top of the reservoir of the Isimba HPP<sup>3</sup>. Within the OAoI, the level of Project influence over flow rates is variable; there is a stronger influence and effect in the reservoir (the area labelled as Modified Habitat in Figure 2).

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<sup>3</sup> The upstream limit of the Isimba reservoir is not yet known as the HPP is not yet operational, hence this is an estimate only.

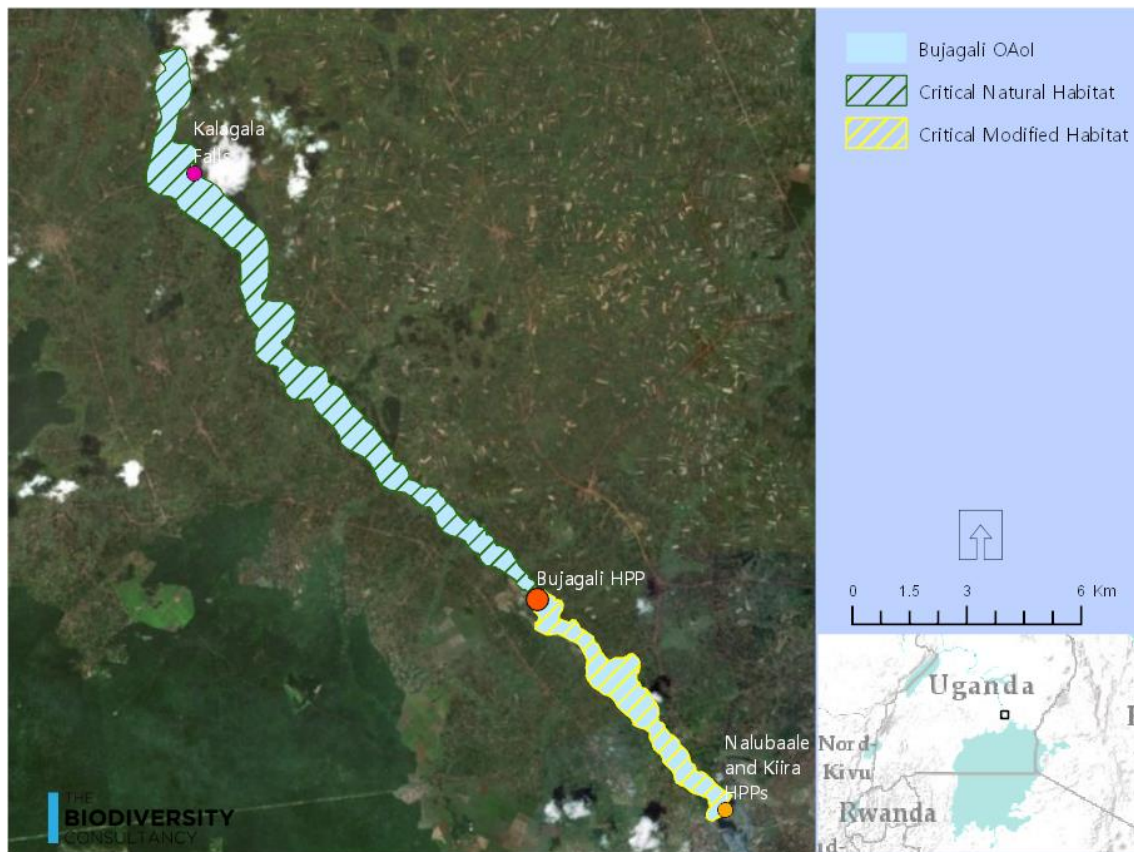


Figure 2: Project Operational Area of Influence (OAoI), and Critical (Natural and Modified) Habitats identified in the CHA (TBC 2018a)

### 1.1.2 Ecological setting

The Upper Victoria Nile connects Lakes Victoria and Kyoga. This lakes-river system is inhabited by haplochromine cichlids, one of the most abundant and species-rich tribes of freshwater fish in the world. The majority of haplochromine cichlids are found in the East African Great Lakes, which have a total of c. 2,000 species. Most are endemic to specific water bodies (Danley *et al.* 2012), with at least 500 species in Lake Victoria (Witte *et al.* 2007).

An estimated 200 species of haplochromines living in Lake Victoria (40% of Lake Victoria's known haplochromine species) have disappeared or are threatened with extinction (Witte *et al.* 2007) due to environmental degradation, predation by the introduced Nile Perch, and climatic change. The Upper Victoria Nile flows over diverse habitats including rocky areas, falls and rapids from an altitude of 1,134 metres above sea level (m.a.s.l.) on Lake Victoria to 615 m.a.s.l. on Lake Albert. The river may provide a refuge for some species that are under threat in Lake Victoria and also provides habitat for species that are endemic to the Upper Victoria Nile.

The development of hydropower schemes along the Upper Victoria Nile has modified water flow in the river, in particular slowing natural water flow speeds in reservoir areas and likely resulted in a manifestation of secondary threats to haplochromine species. These include;

1. Targeted fishing. Fishing of haplochromines as bait for the Lake Victoria Nile Perch industry has been undertaken since the Nile Perch was introduced to Lake Victoria in 1954 to boost the fishing industry after the decline of major food fishes (Downing *et al.*

2013). In the Upper Victoria Nile, impacts on haplochromines as a result of targeted fishing have become more significant following the development of HPPs, which modify haplochromine habitats and open up more areas to fishermen for fishing. Near to the Project, fishermen use different fishing methods depending on the target species (Burnside International Ltd 2006)<sup>4</sup>.

2. Accidental by-catch. The use of intensive gill netting (especially small mesh net gills that catch immature fish) and basket trapping, especially during fish migration, can have an impact on some haplochromine species (Burnside International Ltd 2006). In Uganda, over-fishing and the use of illegal and harmful fishing gears and methods is widespread (World Bank 2012). Over-fishing and the use of illegal equipment (e.g. smaller sized mesh and smaller hooks) is threatening stock regeneration (World Bank 2012) in native species and may be increasing (Frame Survey National Working Group 2010).
3. Predation by Nile Perch. Haplochromines are the preferred and main prey of larger-sized Nile Perch (over 20 cm total length; Kische-Machumu et al. 2012). They prefer slow moving water habitats, including those created by HPP reservoirs. High densities of Nile Perch lead to a collapse in haplochromine populations while the resurgence of haplochromines leads to competition and predation of Nile Perch juveniles by haplochromine piscivores and larger Nile Perch, which decrease Nile Perch recruitment (Walters & Kitchell 2011).

### 1.1.3 Summary of potential Project-related impacts

The Project is fully operational. Impacts associated with construction and early years of operation were assessed and mitigated through the original Project documents and management plans (Reeman Consulting 2017) and, as such, are not considered in this BAP (Bujagali Energy Limited 2007)<sup>5</sup>.

The main potential operational impacts on biodiversity associated with on-going Project operations are outlined in Table 1. On-going Mitigation Actions that address these impacts are described in [Section 4](#). There are no plans for further construction or changes to operational management and therefore on-going Project operations are not expected to result in additional habitat loss, habitat fragmentation or barrier effects. These impacts are therefore not address in Table 1.

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<sup>4</sup> In the river near the Project, fishermen use gill nets ranging from 2" to 8" in stretch mesh size, although yield data indicate that long-lines are more effective. Gill nets are used in shallow marginal waters or left to drift. Long lines are used to target *Lates niloticus*, *Protopterus spp.*, and *Clarias spp.*, while traps and basket fishing are exclusively used in shallow water to catch *Protopterus*, *Clarias*, and other slow-water fish species (Burnside International Ltd 2006).

<sup>5</sup> More information can be found in the Environmental and Social Review Summary (ESRS) on the IFC website: <https://disclosures.ifc.org/#/projectDetail/ESRS/24408>

*Table 1: Main impacts on biodiversity potentially associated with the operational Project.*

Potential impact	Operational Project activity associated with the potential impact	Biodiversity potentially affected
Habitat degradation	Conversion of natural habitat along the river banks in the fenced and/or temporary fenced area by local people  Unplanned changes in the hydrological regime (e.g. due to changes in flow from upstream HPPs) and water quality in the reservoir and downstream	Aquatic habitat and species
Accidental mortality	Intake of HPP turbines	All aquatic species
Spread of invasive alien species (IAS)	Spread of existing invasive species in the reservoir and surroundings	Aquatic habitat and associated species in the Bujagali reservoir
Contamination risk	Oil spills or other hazardous materials from routine maintenance of the HPP	Aquatic habitat and species downstream of the HPP

#### 1.1.4 Cumulative impacts

The Project is one of four HPPs on the Upper Victoria Nile (two are upstream and have started operations; a third is downstream and began construction in 2015). The combination of multiple HPPs reduces habitat diversity and availability for many species endemic to the river. In addition, the transformation of the river by multiple HPPs into a slower-flowing river could further increase the threat of predation to haplochromines by Nile Perch. Finally, the HPPs may act as physical barriers within species ranges: more HPPs mean it is increasingly unlikely that species can regularly cross all the barriers within their range.

The need to account for cumulative impacts was considered prior to Project construction in 2007 (Burnside International Ltd 2006) and is incorporated in the Project's on-going mitigation actions<sup>6</sup>. Project monitoring of the Project OAoI is designed to detect cumulative impacts on Critical Habitat-qualifying biodiversity ([Section 6](#)) as multiple monitoring locations included that extend over approximately 14.5 km of the Upper Victoria Nile.

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<sup>6</sup> All past impacts were assessed through the 2006 SEA (Burnside International Ltd 2006) and are considered to have been addressed via the management actions implemented by the Project (more information can be found in the online [Environmental and Social Review Summary](#)). Although the addition of the downstream Isimba HPP may further reduce the significance threshold for impact, that Project has yet to come online and impacts associated with it are not within Project control.

## 1.2 Biodiversity values

Biodiversity values for this Project are defined as the species and habitats that qualify for Critical Habitat.

### 1.2.1 Critical Habitat-qualifying biodiversity

#### **Species**

The CHA (TBC 2018a) identified 40 aquatic species that are likely to be Critical Habitat-qualifying, of which most (35) are haplochromine cichlid fishes. Of these 35 species (Table 2), 25 are currently undescribed<sup>7</sup>. No terrestrial Critical Habitat-qualifying species were identified.

*Table 2: Summary of Project Critical Habitat-qualifying species (TBC 2018a)*

Group	Scientific name	IUCN status
Haplochromines	<i>Haplochromis aelocephalus</i> , <i>H. brownae</i> , <i>H. crassilabris</i> , <i>H. guiarti</i> , <i>H. microdon</i> , <i>H. parvidens</i>	CR
	<i>Xystichromis</i> sp. nov. 'Kyoga flameback'	
	<i>H. orthostoma</i>	VU
	<i>H. niloticus</i> , <i>H. simotes</i>	DD
	<i>Astatotilapia</i> "flameback", A. "blue", A. "elongate", A. "red tail", A. "scarlet anal"	NE
	<i>Haplochromis</i> "cylindrical", H. "silver arrow". H. sp. cf. "red back scraper", H. sp. "flameback", H. sp. "thick skin like"	
	<i>Lithochromis</i> sp.	
	<i>Mbipia</i> "blue"	
	<i>Neochromis</i> "elongate", N. "lemon britti", N. "red simotes", N. "yellow rufocaudalis", N. sp. Labeo new	
	<i>Paralabidochromis</i> "scarlet anal", P. "yellow", P. sp 1, P. sp "Nile", P. sp. "red breast new"	
	<i>Pundamilia</i> "scarlet anal". P. sp. "blue lip"	
	<i>Xystichromis</i> "earthquake"	

<sup>7</sup> Many haplochromine species are classed as Data Deficient on the IUCN Red List or have not yet been evaluated (NE). NaFIRRI has given the NE species working names based on morphological characteristics (e.g. sp. red tail). The BAP refers to these names using double quotes. Species names using single quotes (i.e., *Xystichromis* sp. nov. 'Kyoga flameback') is a described species and the name follows the IUCN Red List.

Other fishes	<i>Labeo victorinus</i>	CR
	<i>Oreochromis variabilis</i>	CR
	<i>Brycinus jacksonii</i>	LC
Gastropods	<i>Ceratophallus concavus</i>	CR
Bivalves	<i>Sphaerium regularis</i>	EN

IUCN status: CR = Critically Endangered; EN = Endangered; VU = Vulnerable; LC = Least Concern; DD = Data Deficient; NE = Not Evaluated.

Within the suite of 40 Critical Habitat-qualifying species, there is variation in terms of each species conservation status, ecology, level of scientific understanding of the species, Project and non-Project influences and cumulative impacts. Therefore, to highlight which species are a priority for monitoring and management actions, a prioritisation process was undertaken based on the sensitivity of each species to hydropower impacts and the potential consequence of any impact on that feature (TBC 2018c)<sup>8</sup>.

The results are summarised in Figure 3. The species classed as highest priority for targeted monitoring and management effort (Action Category 1) are riverine species<sup>9</sup> that are only likely to be present in the Upper Victoria Nile. Some of these species are known to still be present in the OAol, while others have not been recorded recently.

The species classed as highest priority for monitoring and management (Action Category 1) are riverine species<sup>10</sup> that are only likely to be present in the Upper Victoria Nile. Some of these species are known to still be present in the OAol, others have not been recorded recently<sup>11</sup>. The M&E sampling design includes sections of the river with a variety of micro-habitat types likely to ensure that all habitat types that are likely to support Critical Habitat-qualifying species are included. Specifically, the M&E Plan targets fast-flowing sections of the river as fast-flowing sections are likely to be the preferred habitat for Action Category 1 species. Fast-flowing sections of the river have not been a focus for EMMP monitoring.

<sup>8</sup> The standalone report will be provided to lenders for review.

<sup>9</sup> Species that are only found in a river habitat, and are not found in lakes.

<sup>10</sup> Species that are only found in a river habitat and are not found in lakes

<sup>11</sup> Lack of recent records does not necessarily mean the species is absent, it may also be due to the fact that the species is rare, and as the EMMP monitoring approach did not focus on haplochromine species. Details on when the species was last recorded by NaFIRRI can be found in the species prioritisation report (TBC 2018b).

Priority level and monitoring action	Definition	Species list	Mitigation and monitoring approach
<b>1. Endemic to the Upper Victoria Nile:</b> targeted monitoring and management	<b>Riverine species</b> only likely to be present in the Upper Victoria Nile	<b>Recently recorded (8 species):</b> 1. <i>Haplochromis simotes</i> , 2. <i>Astatotilapia</i> "flameback", 3. <i>Astatotilapia</i> "blue", 4. <i>Haplochromis</i> "silver arrow", 5. <i>Neochromis</i> "yellow rufocaudalis", 6. <i>Neochromis</i> sp. Labeo new, 7. <i>Paralabidochromis</i> sp. "red breast new", 8. <i>Pundamilia</i> "scarlet anal"  <b>Not recently recorded (3 species):</b> 1. <i>Haplochromis niloticus</i> , 2. <i>Neochromis</i> "red simotes", 3. <i>Haplochromis</i> "cylindrical"	<ul style="list-style-type: none"> <li>• Continue to implement operational mitigation measures (Section 4.1)</li> <li>• Implement targeted Additional Conservation Actions (Section 4.2: ACA1, ACA2)</li> <li>• Implement targeted monitoring in fast flowing sections of the river with (TBC2018b)</li> </ul>
<b>2. Poorly known species:</b> monitor to understand risk	<b>Riverine species</b> recorded in the Project area but maybe present in lakes – surveys required to understand risk  <b>Predominantly lacustrine species</b> recorded in the Project area and believed to be at risk elsewhere in their range or have may have a narrow range – verification of distribution required to understand risk	<b>Riverine species (7 species):</b> 1. <i>Astatotilapia</i> "red tail", 2. <i>Astatotilapia</i> "scarlet anal", 3. <i>Haplochromis</i> sp. cf. "red back scraper", 4. <i>Paralabidochromis</i> sp 1, 5. <i>Paralabidochromis</i> sp "Nile", 6. <i>Pundamilia</i> sp. "blue lip", 7. <i>Neochromis</i> "lemon britti"  <b>Lacustrine species (13 species):</b> 1. <i>Haplochromis aelocephalus</i> , 2. <i>Haplochromis brownae</i> , 3. <i>Haplochromis crassilabris</i> , 4. <i>Haplochromis guiarti</i> , 5. <i>Haplochromis microdon</i> , 6. <i>Haplochromis parvidens</i> , 7. <i>Astatotilapia</i> "elongate", 8. <i>Haplochromis</i> sp. "thick skin like", 9. <i>Lithochromis</i> sp, 10. <i>Neochromis</i> "elongate", 11. <i>Paralabidochromis</i> "scarlet anal", 12. <i>Paralabidochromis</i> "yellow", 13. <i>Ceratophallus concavus</i> (Gastropod)	<ul style="list-style-type: none"> <li>• Continue to implement operational mitigation measures (Section 4.1)</li> <li>• Implement targeted Additional Conservation Actions (Section 4.2: ACA1, ACA2)</li> <li>• Continue EMMP monitoring and implement additional targeted monitoring (TBC 2018b)</li> </ul>
<b>3. Lacustrine species but river maybe an important refuge:</b> monitor for ongoing presence	<b>Predominantly lacustrine species</b> not recently recorded in the Project area but known from multiple other lake and river locations	<b>Lacustrine species (4 species):</b> 1. <i>Labeo victorianus</i> , 2. <i>Brycinus jacksonii</i> , 3. <i>Mbipia</i> "blue", 4. <i>Xystichromis</i> "earthquake"	<ul style="list-style-type: none"> <li>• Continue EMMP monitoring; report findings on presence and distribution of these species</li> </ul>
<b>4. Lacustrine species with widespread distribution:</b> monitor for ongoing presence	<b>Predominantly lacustrine species</b> recorded in the Project area and known from multiple other lake locations	<b>Lacustrine species (5 species):</b> 1. <i>Oreochromis variabilis</i> , 2. <i>Xystichromis</i> sp. nov. "Kyoga flameback", 3. <i>Haplochromis orthostoma</i> , 4. <i>Haplochromis</i> sp. "flameback", 5. <i>Sphaerium regularis</i> (Bivalve)	<ul style="list-style-type: none"> <li>• Continue EMMP monitoring; report findings on presence and distribution of these species</li> </ul>

Figure 3: Results of the species prioritisation exercise (TBC 2018c)

**Other Critical Habitat-qualifying biodiversity**

The CHA identified the Lake Victoria-Upper Victoria Nile ecosystem as likely to be Critical Habitat-qualifying under Criterion 4 and identified an overlap of the Project footprint with the Jinja Wildlife Sanctuary ([IUCN Management Category VI site](#)), (TBC 2018a). However, Project impacts on the broad ecosystem and the Wildlife Sanctuary were addressed via management actions in the Environmental Mitigation and Monitoring Plan (Bujagali Energy Limited 2007) and therefore no additional actions are proposed in this BAP.

1.2.2 Natural and Modified Habitat

The Project OAol comprises both Modified and Natural Habitats (as defined in IFC 2012a). The aquatic areas upstream of the dam are considered Modified, and the aquatic areas downstream are considered Natural. Both Natural and Modified Habitats contain Critical Habitat-qualifying species and are therefore also Critical Habitat (TBC 2018a).

Upstream of the dam (Figure 2), seven rapids in a 4 km section of river were impacted by the creation of the reservoir. The change in water flow velocity and quality, modified the primary ecological function of the river (converting it from a fast-flowing river into more lacustrine conditions)<sup>12</sup>.

Downstream of the dam (Figure 2), water level fluctuations due to Project operations may affect shallow inshore areas where fish species feed and spawn in areas immediately downstream of the dam (NaFIRRI 2017). However, hydrology has not been altered to the extent that the primary ecological functions and species composition of downstream fast water and rapids have been significantly modified.

*Table 3: Critical Natural and Critical Modified Habitat in the OAol*

Habitat	Length of river	% of OAol
Critical Natural Habitat	18 km	71 %
Critical Modified Habitat	7.5 km	29 %

The total length of the Upper Victoria Nile to Lake Kyoga is approximately 115 km, the OAol therefore encompasses around 22% of the river’s length.

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<sup>12</sup> Impacts that occurred during construction and early operations are considered to have been addressed through the Project’s original mitigation and offset actions (Reeman Consulting 2017)

### 1.2.3 Species of stakeholder concern

Through stakeholder discussions ([Section 2](#)), the National Fisheries Resources Research Institute (NaFIRRI) identified that species such as *Mormyrus kannume*, *Enteromius paludinosus* and *Labeobarbus altianalis* are declining in the OAoI and elsewhere as well. Although these species do not qualify for Critical Habitat, information will continue to be gathered on these species as part of the Project's monitoring program ([Section 6](#)).

## 1.3 Biodiversity goals

In summary, and as noted in the IFC ESAP<sup>13</sup>, the Project aims to:

- Contribute towards Net Gain for Critical Habitat-qualifying species, via reasonable actions within the Project's control; and
- Develop mechanisms that demonstrate progress towards Net Gain.

The Project will also contribute, where feasible, to maintaining riverine Natural Habitat and minimising indirect impacts to Modified Habitat via reasonable actions within Project control, through continued avoidance and minimisation of any on-going risks to aquatic ecology.

## 1.4 Technical rationale

The Project has been operational since 2012, and this BAP is focused on the operational phase from Project refinancing in 2017 onwards. The BAP is not concerned with prior operational, construction or pre-construction impacts, which were assessed in the Project's 2006 SEA (Burnside International Ltd 2006) and mitigated through original Project actions. The due diligence process associated with Project refinancing found that environmental risks associated with the Project "are considered to be limited, and the environmental monitoring and mitigation and management aspects are sufficient to address the potential risks from the operation of the power station" (Reeman Consulting 2017).

There will be no new construction activities or changes to Project operations (Section 1.1.3) and therefore effective implementation of the existing mitigation measures will ensure that there are no significant residual impacts associated with on-going operations. The monitoring baseline for demonstrating that there are no significant residual impacts to Critical Habitat-qualifying species from on-going operations will be established during data collection in 2019. Monitoring prior to re-financing did not focus on haplochromine species (i.e. Critical Habitat-qualifying species) and therefore a new monitoring baseline is required (TBC 2018b).

In addition to these existing mitigation measures, the Project has identified a series of Additional Conservation Actions. These actions aim to address the risk to Critical Habitat-qualifying species of over-exploitation of fisheries and to contribute towards achieving a Net Gain for Critical Habitat-qualifying species, via reasonable actions within the Project's control (Section 4.2). An overview of Critical Habitat-qualifying biodiversity, main potential impacts, on-going mitigation actions and Additional Conservation Actions to deliver the goals of the Project is found in Figure 4.

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<sup>13</sup> [IFC Bujagali Refinancing ESAP item 13](#)

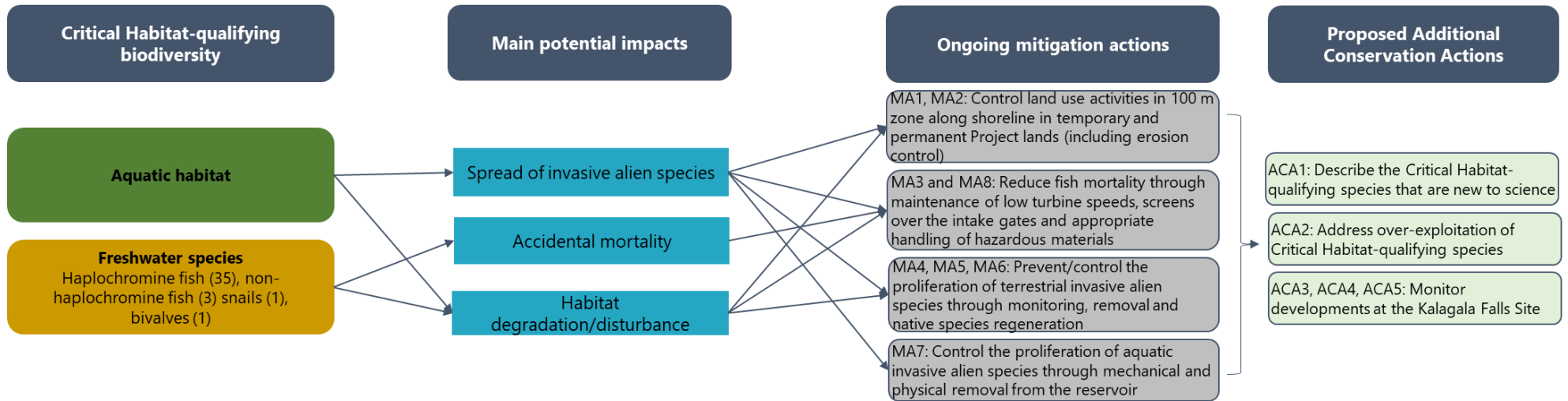


Figure 4: Overview of Critical Habitat-qualifying biodiversity, main potential impacts, on-going mitigation actions, and objectives of Additional Conservation Actions.

## 2 Stakeholder engagement

A summary of organisations and specialists consulted during the development of the BAP is provided in Table 4.

*Table 4: Organisations and specialists consulted during the development of the BAP*

Organization	Name and title	Topics discussed and key information used to inform the BAP
NaFIRRI	Anthony Taabu Munyaho, Director of Research Richard Ogutu-Ohwayo, Principal Research Officer Herbert Nakiyende, Research Officer Monic Nsega, Research Technician Philip Rwezawula, Fish technician and taxonomist Laban, Research Officer	Approaches to monitoring and evaluation for Critical Habitat qualifying species; recommendations from NaFIRRI and their input have been used to develop the CH focused M&E plan (TBC 2018b).  Potential additional actions to support a Net Gain for Critical Habitat-qualifying biodiversity
Vianny Natugonza	Independent consultant and haplochromine specialist	Monitoring and Evaluation and Additional Conservation Actions; Vianny's specialist knowledge informed the monitoring approaches and methods in the M&E Plan (TBC 2018b) and selection of Additional Conservation Actions.
Naturemetrics	Catherine Bruce, Director	Potential for using eDNA approaches for monitoring via eDNA trials; as a result of eDNA trial sampling it was concluded that this is not a useful approach for monitoring haplochromines as the species are genetically very similar.
S.O.U.L. (NGO)	Brooke Stern Okoth	Fish farming; lessons learnt from Project support to two fish farms established by S.O.U.L. are used as a basis for the Additional Conservation Actions of the BAP.

## 3 Project policies and commitments

### 3.1 Institutional framework

This section provides a summary of biodiversity-related national laws, policies and conventions most relevant to the BAP. Additional national and international laws, policies, and conventions

relevant to the Project have been detailed extensively in other Project documentation (e.g. Burnside International Ltd 2006).

*Table 5: Summary of the most relevant laws, policies, and conventions.*

Law/Regulation	Implications for the BAP
National Environment Act (NEA)	<p>Legislation that deals with environment impact assessments (EIA) including for HPPs, water quality standards, and control of noise. It includes regulations that provide protection for all river banks and lake shores for the common good, including against soil erosion, siltation, and water pollution. Restoration activities undertaken by the Project require approval.</p> <p>The National Environment Regulations (2000) for Wetlands, Riverbanks and Lakeshores Management of the NEA provides guidance to districts in the implementation of environmental laws pertaining to aquatic ecosystems and resources.</p>
The Water Act, Cap. 152	It provides for the management of water in Uganda, with various regulations put in place to operationalize the Act to minimize water pollution.
The Fish Act (1964) Cap 197; Fish (Fishing) Rules 2010; the National Fisheries Policy, 2004; the Fish (Beach Management) Rules, 2003; and the Fish (Aquaculture) Rules, 2003	<p>The Fish Act provides for the control of fishing, conservation of fish, and purchase/sale/marketing/processing of fish. Activities stipulated under the Act are carried out by the Directorate of Fisheries Resources (DFR) within the Ministry of Agriculture, Animal Industry, &amp; Fisheries<sup>14</sup>. The new Fish (Fishing) Rules 2010 introduced harsher penalties to address illegal catch and trade of immature fish (though district Fisheries officials indicate the penalties are not a deterrent for illegal activities) (World Bank 2012).</p> <p>The National Fisheries Policy 2003 provides for decentralization and community involvement in fisheries management. The policy states that stakeholders will be involved in the management of fisheries by devolving some decision-making responsibilities from central to local governments/communities. The Fisheries Sector Strategic Plan (FSSP) derived from the policy includes the creation of national network of Beach Management Units (BMUs – see below). BMUs are intended to be supported through training programs to serve as an efficient engine of growth of the fisheries sector through improved management of fisheries resources.</p> <p>The Fish (Beach Management) Rules No. 35, 2003 delegates local authority to local people for fisheries planning and</p>

<sup>14</sup> More information can be found on the Ministry website: <http://agriculture.go.ug/fisheries-resources/>

Law/Regulation	Implications for the BAP
	management. Fisheries stakeholders may form legally empowered groups known as BMUs <sup>15</sup> .  The Fish (Aquaculture) Rules 2003 regulate aquaculture practices, particularly at the commercial level.
The Uganda Wildlife Act, Cap 200	This Act established the Uganda Wildlife Authority (UWA). The Act authorizes UWA to assume responsibility for wildlife management in Uganda, both inside and outside its protected areas.
National Biodiversity Strategy and Action Plan (NBSAP)	The NBSAP provides requirements for projects to document and demonstrate alignment with requirements regarding invasive alien species. HPP operations were found to align with the requirement to avoid intentional or accidental introduction on alien or non-native species (Reeman Consulting 2017).
National Strategy on Invasive Species	This Strategy provides requirements for projects to manage invasive alien species. HPP operations were found to align with the requirement to avoid intentional or accidental introduction of alien or non-native species (Reeman Consulting 2017).

## 3.2 Lender requirements

The Project aims to align with IFC PS6 (2012).

### 3.2.1 ESAP actions

Table 6 shows Project progress against the biodiversity requirements of the IFC ESAP<sup>16</sup>, developed in 2017 as part of Project refinancing.

*Table 6: Lender ESAP requirements and Project progress towards meeting the requirement*

ESAP item number <sup>17</sup>	IFC requirement	Project progress
N/A	The company will provide a CHA. The assessment should focus, but not exclusively, on the haplochromine species of fish.	Completed in 2018 (TBC 2018a)
13	Should the critical habitat assessment confirm that the Bujagali HPP is in critical habitat, the company will prepare a biodiversity action plan (BAP) that contributes toward Net Gain in the	This document

<sup>15</sup> BMUs were suspended by presidential order in 2015 and have been replaced by landing site committees although landing site committees are not legally empowered. BMUs however, have not been dissolved and therefore are still legal on paper.

<sup>16</sup> More information online: <https://disclosures.ifc.org/#/projectDetail/ESRS/39102>

<sup>17</sup> More information online: <https://disclosures.ifc.org/#/projectDetail/ESRS/39102>

	protection of the species that triggered critical habitat via reasonable actions within BEL’s control.	
14	The company will monitor the Kalagala Falls Site (KFS)/Kalagala Offset Area (KOA) process between Government of Uganda and World Bank regarding the original 2006 PS6 requirements. BEL will not be responsible for KFS/KOA implementation as agreed by all parties under the original investment. Annual monitoring reports on this process, based on the public information received by BEL from the Government of Uganda and the World Bank, will be provided to IFC.	BAP Additional Conservation Action (ACA3; <a href="#">Table 8</a> )
15	Should the Kalagala Falls Site (KFS) cease to exist (in the current or modified form), BEL will review 2006 requirements and develop an alternative offset approach that will address the original compliance requirements agreed between IFC and BEL at the time of the original investment via reasonable actions within BEL’s control.	BAP Additional Action (ACA4; <a href="#">Table 8</a> )

### 3.3 Corporate framework and policies

#### 3.3.1 Overview

The Project’s Environmental, Social and Health & Safety Management System (ESHS MS) comprises both the BEL and the O&ME ESHS MS. The O&ME MS covers all actions within the Project controlled lands (within the Project’s fence line) and the BEL ESHS MS covers all actions beyond the fence line<sup>18</sup>. The responsibility for the implementation of each on-going mitigation action is outlined in [Section 4](#). BEL is responsible for implementing all Additional Conservation Actions ([Section 4.2](#)).

The BEL General Manager has oversight of the BAP, whilst the BEL Social and Environmental Liaison Officer is responsible for ensuring that actions are appropriately implemented. An overview of how the BAP and M&E Plan will be integrated into the existing BEL ESMS is provide below.

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<sup>18</sup> As per the ESDD report (Reeman Consulting 2017) O&ME has control of all operations within the fence around the ‘permanent lands’, which encompasses the land housing the dam and all the associated facilities, and includes managing access to the site. BEL’s ESHS MS is subservient to O&MEs within the fence line. BEL activities outside of the fence line fall under BEL’s ESHS MS.

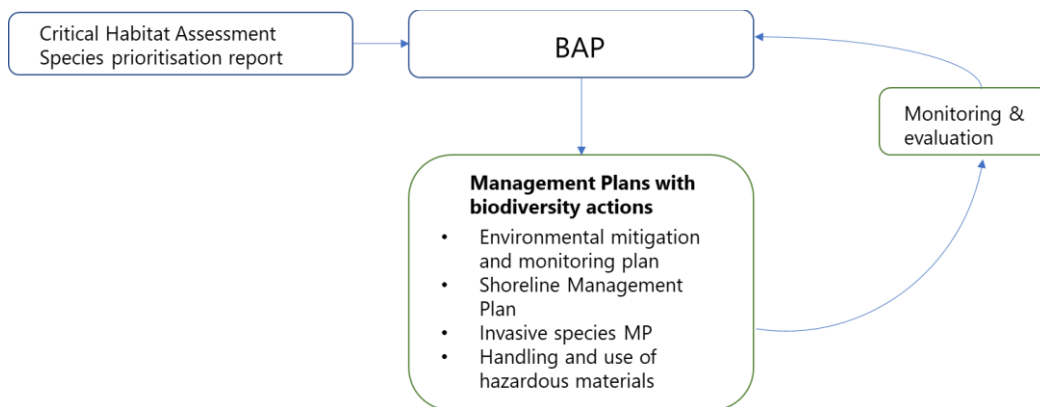


Figure 5: Integration of the BAP and M&E Plan within BEL's ESMS

### 3.3.2 Corporate policies

BEL and O&ME are committed to implementing an effective mitigation program to protect and enhance the Upper Victoria Nile River system<sup>19</sup>. The mitigation actions identified in the 2006 SEAP were designed to align with IFC PS6 (2006). The mitigation actions outlined in this BAP aim to contribute toward Net Gain for Critical Habitat-qualifying species, as per lender ESAP requirements (Section 3.2.1).

## 4 Project mitigation actions

This section summarises mitigation actions that the Project is already implementing to align with PS6 to address the potential impacts that on-going operations are most likely to cause (Table 1). Specifically, mitigation measures address: habitat degradation; accidental mortality; the spread of invasive alien species (IAS); and contamination risk (Table 7). Measures are summarised from the following existing Project documents:

- Shoreline Management Plan (Bujagali Energy Limited 2017a);
- Invasive Species Management Plan (Bujagali Energy Limited 2017b); and
- 2007 and 2010 Environmental Mitigation and Monitoring Plans (Bujagali Energy Limited 2007; Bujagali Energy Limited 2010).

In addition to these existing and on-going mitigation measures, the Project has identified a series of Additional Conservation Actions. These actions aim to address the risk to Critical Habitat-qualifying species of over-exploitation of fisheries and to contribute towards achieving a Net Gain for Critical Habitat-qualifying species, via reasonable actions within the Project's control. These are discussed in Section 4.2.

<sup>19</sup> The wider ecosystem is referred to as the Lake Victoria-Upper Victoria Nile ecosystem for the purposes of the CHA (TBC 2018a).

Table 7: Summary of existing, on-going mitigation actions

ID	Mitigation measure and outline of the action	Timing	Frequency	Relevant Management Plan	Responsibility for action (and implementation)	Means of verification
Minimisation measures to address habitat degradation						
MA1	<p><b>Work with the local community to control land use in the 100 m zone along the shoreline in temporary Project lands<sup>20</sup></b> (agriculture and construction are prohibited but general access for day use, fishing, and livestock grazing are allowed)</p> <p>If any signs of shoreline slides or unexpected erosion are noted during inspections, the cause will be investigated and remedial action taken. Stabilisation actions may include re-grading of the shoreline, placement of riprap, or addition of non-invasive river vegetation.</p>	Operational life of the Project	Monthly	Shoreline management plan	BEL (working with Local Chairperson 1s (LC1s))	<p>Monthly property inspections by Local Chairman compiled in monthly written reports</p> <p>Random, monthly inspections by BEL, the police and army; compiled in written reports</p> <p>Annual shoreline monitoring by BEL</p>
MA2	<p><b>Control of activities in the 100 m zone along the shoreline in permanent Project lands<sup>21</sup></b> (only Project activities are allowed within the controlled fence line)</p>	Operational life of the Project	Continuous	Shoreline management plan	O&ME	<p>Permanent patrol by Project security</p> <p>Annual shoreline monitoring by BEL</p>

<sup>20</sup> The Project does not have management control over the shoreline in temporary Project lands and works with adjacent communities to monitor and enforce agreed land use activities. Within temporary and permanent Project lands there is no ongoing restoration work but the Project monitors land-use in the 100 m shoreline zone in temporary Project lands in coordination with the Local Chairmen of the communities as part of the Projects Shoreline Management Plan to prevent prohibited activities following the National Environmental Management Authority (NEMA) guidelines. Actions to stabilise the shoreline to control erosion are undertaken if a problem is identified.

<sup>21</sup> The Project has management control over permanent Project land that lies within the Projects fence line

ID	Mitigation measure and outline of the action	Timing	Frequency	Relevant Management Plan	Responsibility for action (and implementation)	Means of verification
	If any signs of shoreline slides or unexpected erosion are noted during annual monitoring, the cause will be investigated and remedial action taken. Stabilization actions may include re-grading of the shoreline, placement of riprap, or addition of non-invasive river vegetation.					
Minimisation measures to address accidental mortality						
MA3	<b>Reduce the mortality of aquatic species into the HPP turbines by using screens in front of the intake gates<sup>22</sup>.</b> Remove waste for appropriate disposal to prevent downstream contamination.	Operational life of the Project	Weekly	EMMP (2007) and EMMP (2010)	BEL	Cleaning records (BEL reporting system)
Minimisation measures to address the spread of IAS						
MA4	<b>Prevent the proliferation of terrestrial IAS on Project lands</b> through security checks when fill is delivered to site, with actions including prohibiting delivery of any possibly contaminated soil and monitoring source of soil/fill.	Operational life of the Project	Continuous	Invasive Species Management Plan	O&ME	Monitoring of fill delivered to the site
MA5	<b>Control the proliferation of terrestrial IAS on Project lands</b> through a continual monitoring and removal of IAS and encouragement of native species regeneration.	Since construction	Continuous	Invasive Species Management Plan; Shoreline	O&ME	Monitoring of restored construction areas

<sup>22</sup> Given the 6-inch screen size, Critical Habitat qualifying-species will not be prevented from passing through the screen. On the basis of available information, it is not possible to quantify the potential numbers of individuals passing through the turbine, nor the likely survival rates

ID	Mitigation measure and outline of the action	Timing	Frequency	Relevant Management Plan	Responsibility for action (and implementation)	Means of verification
				Management Plan		Visual inspections of Project lands
MA6	<b>Control the proliferation of terrestrial IAS on Project lands</b> through a planting program of indigenous and/or naturalized species.	Since construction	Annually	Invasive Species Management Plan; Shoreline Management Plan	BEL	Visual inspections of Project lands
MA7	<b>Control the proliferation of aquatic IAS in Project-controlled areas</b> through the continuous removal of invasive plants from the water stream, by mechanical and/or physical removal from the reservoir (for subsequent removal by a registered waster collector) <sup>23</sup>	Since construction	Continuous	Invasive Species Management Plan	O&ME	Records of IAS removed from the HPP Periodic monitoring of invasive water species by NaFIRRI
Minimisation measures to address contamination risk						
MA8	<b>Control contamination risk</b> through appropriate employee training and best practice handling, storage and disposal of hazardous materials by employees and contractors	Operational life of the Project	Continuous	Handling and use of Hazardous Chemicals	O&ME	Number of reported contamination incidents to the Safety, Health, Environment and Quality (SHEQ) Engineer

<sup>23</sup> Note: During storm conditions there can be an overload of aquatic IAS and physical removal is not safe or possible. In these circumstances aquatic IAS are 'flushed' over the HPP.

## 4.1 Summary of impact significance

With the effective implementation of the mitigation measures identified above (Table 7), and because there will be no new construction activities or changes to Project operations, no significant residual impacts are anticipated in association with the Project and the Project thus anticipates achieving No Net Loss with existing mitigation measures.

## 4.2 Offsets and Additional Conservation Actions

As no significant residual impacts are associated with on-going Project operations, offsetting is not required. However, because the Project is operating in Critical Habitat for a number of species ([Section 1.2](#); TBC 2018a), the Project has identified a series of Additional Conservation Actions (ACAs) that are within its control, designed to contribute towards achieving Net Gain for those species. The objective of each ACA is as follows (Table 8):

- Support NaFIRRI to publish descriptions of Critical Habitat-qualifying species that are new to science (ACA1)<sup>24</sup>;
- Address over-exploitation of fisheries (ACA2); and
- Monitor developments at the Kalagala Falls Site (KFS) (ACA3, ACA4, ACA5).

Further detail on the ACAs and the actions required to implement them, (that the Project will undertake), is provided in Section 5.

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<sup>24</sup> Note: this action aligns with an ESDD recommendation to modify monitoring and reporting by NaFIRRI in order to better track progress towards the SEA (Reeman Consulting 2017).

Table 8: Additional Conservation Actions (ACAs) identified by the Project to contribute to achieving Net Gain for Critical Habitat-qualifying species

ID	Additional Conservation Action and outline of the action	Timing	Frequency	Responsibility for action	Means of verification
<b>Objective: Support NaFIRRI to publish ecological and taxonomic descriptions of Critical Habitat-qualifying species that are new to science</b>					
ACA1	Describe the ecology, and publish species descriptions, of Critical Habitat-qualifying species that are new to science, including collecting and preserving voucher specimens, collecting habitat and ecological data, genetic barcoding, visiting international collections for comparison with other specimens, and publishing species descriptions.	On-going, from 2019	On-going (when sufficient data are collected)	NaFIRRI, with BEL support	Publication of species descriptions in peer-reviewed journals  Deposition of type/voucher specimens in museum collections
<b>Objective: Address over-exploitation of Critical Habitat-qualifying species</b>					
ACA2	Develop and implement an effective system to reduce haplochromine over-exploitation.  Implement supporting actions to ensure that efforts aiming to reduce haplochromine over-exploitation have an overall positive effect on livelihoods.	From 2019	On-going	BEL in collaboration with partners; partners with support from BEL	Implementation of over-exploitation control measures
<b>Objective: Monitor developments at the Kalagala Falls Site (KFS)</b>					
ACA3	As agreed under the original investment, the Government of Uganda (and not BEL) is responsible for the implementation of the Kalagala Offset Sustainable Management Plan (Ministry of Water and Environment 2009). The Project will maintain a watching brief over the process and provide information to the	On-going	Yearly	BEL	Annual monitoring reports provided to the IFC ( <a href="#">see ESAP item 14</a> )

ID	Additional Conservation Action and outline of the action	Timing	Frequency	Responsibility for action	Means of verification
	lenders based on public information received from the Government of Uganda and the World Bank.				
ACA4	If the KFS ceases to exist (in the current or modified form), the Project will review 2006 requirements and develop an alternative offset approach that will address the original lender requirements agreed between IFC and BEL at the time of the original investment via reasonable actions within BEL's control.	Dependent on on-going monitoring of the KFS	N/A	BEL	Alternative offset approach (only required if KFS ceases to exist in the current or modified form; <a href="#">see ESAP item 15</a> )
ACA5	As appropriate, provide monitoring information to the Kalagala management authorities on the species present in the Busowoko monitoring location to support management activities.	On-going, once NaFIRRI reports are available	Yearly	BEL/NaFIRRI	Reports/communication with the Kalagala management authority

## 5 Technical rationale for ACAs

This section contains background information to provide the rationale for each ACA and the detailed actions (tasks) that the Project will undertake to achieve the overarching objective of the ACA.

### 5.1 Support NaFIRRI to publish ecological and taxonomic descriptions of Critical Habitat-qualifying species that are new to science

*Table 9: ACA1: Publication of species descriptions*

Additional Conservation Action	ACA1 <b>Objective: Support NaFIRRI to publish ecological and taxonomic descriptions of Critical Habitat-qualifying species that are new to science (Table 8)</b>
Background and rationale	<p>Very little published information is available on haplochromine species from the Upper Victoria Nile. Twenty-five (25) of the 35 Critical Habitat-qualifying haplochromine species are currently undescribed and a further two species are classified by IUCN as Data Deficient. Little is known about the taxonomy, ecology, habitat preference, distribution and conservation status of these 27 species.</p> <p>The benefits of publishing species descriptions include:</p> <ul style="list-style-type: none"> <li>• Ensuring that the appropriate species are listed as Critical Habitat-qualifying species for the Project; more information about these 27 species will result in a more accurate assessment of their status, and may result in their removal from the list of Critical Habitat-qualifying species. This is because undescribed and Data Deficient species are, in the absence of other information, typically treated as if they were threatened species (IUCN Red List 2018). Greater knowledge may confirm these species are threatened, or may reveal they are not threatened or even restricted-range, and thus not priorities for Project monitoring and management.</li> <li>• Improving monitoring, because ecology, habitat preference, and distribution influence the types of monitoring tools that can/should be used.</li> <li>• Contributing to understanding of how to manage Project and cumulative impacts.</li> </ul> <p>The publication of robust species descriptions requires multiple steps, but much of this effort can be built into NaFIRRI's on-going monitoring work. The Action Categories (Figure 3) should guide which species are of highest priority to the Project to be formally described if and when they</p>

<p><b>Additional Conservation Action</b></p>	<p><b>ACA1</b></p> <p><b>Objective: Support NaFIRRI to publish ecological and taxonomic descriptions of Critical Habitat-qualifying species that are new to science (Table 8)</b></p>
	<p>are recorded; undescribed species in Action Categories 1 and 2 are highest priority for this action.</p>
<p><b>BEL Tasks</b></p>	<p>Following a scoping<sup>25</sup>, BEL will provide additional funds to enable NaFIRRI to undertake this work. With these additional resources, NaFIRRI should undertake the following:</p> <ul style="list-style-type: none"> <li>• Collecting several individual/voucher specimens (at least three, but preferably ten or more from various localities) of undescribed species for preservation in ethanol or formalin with fin clippings preserved in ethanol for sequencing of genetic material. For each individual, notes and observation on the biology and ecology are important. This should include for example, geographic locality, river system, basin, general description of the habitat where the fish was sampled, and in situ water quality data (including photographs).</li> <li>• Comparison of voucher specimens with specimens from international museum collections. Support to NaFIRRI to travel and spend time with these collections would need to be provided.</li> <li>• Genetic barcoding of individual specimens, is highly recommended when publishing new species descriptions and will serve to support improved understanding of the haplochromine tribe. The costs associated with genetic analysis range from 20-40 USD for private labs in South Africa or the UK per fin clip.</li> <li>• Publication of findings in a peer-reviewed journal, preferably open access. Publication fees associated with open-access publication can range up to USD\$2,000, though multiple species descriptions can be published in the same article (or publication is free in journals such as ZooTaxa and Zookeys which are not open access).</li> </ul> <p>As it can take several years to compile the information needed for new species descriptions, it is suggested that attempts are not made to publish species descriptions on any specific timetable, but whenever enough data are collected to merit a research trip to a museum collection and publication. Up to five species descriptions are the target for 2020.</p>

<sup>25</sup> A scoping and budgeting exercise would be useful in estimating costs of this ACA. It may also be beneficial for NaFIRRI to submit a proposal to BEL outlining how the work would be undertaken, alongside an assessment of whether this would require a new sub-contracting mechanism or if this could be included as part of NaFIRRI's on-going monitoring work.

## 5.2 Measures to address over-exploitation of Critical Habitat-qualifying species

*Table 10: ACA2: Conservation Agreements to address over-exploitation of Critical Habitat-qualifying species*

Additional Conservation Action	ACA2 Objective: Address over-exploitation of Critical Habitat-qualifying species ( <a href="#">Table 8</a> )
Background and rationale	<p>Critical Habitat-qualifying species are threatened by unsustainable fishing methods in the Project reservoir and downstream (pers. Comms. NaFIRRI staff). The Project will work with partners to develop and implement an effective system that aims to reduce exploitation of haplochromines and other non-haplochromine Critical Habitat-qualifying species. The Project, together with partners, will also implement supporting actions to help ensure that efforts to reduce haplochromine over-exploitation are overall livelihood-positive.</p> <p>Fisheries are important in Uganda's economy, providing &gt;50% of consumed animal protein, and are a major source of income, especially for the rural poor. Commercial fisheries developed in major lakes across the country serve domestic and international markets. The Project is located in a region providing some of the highest fish catch in the country. During the period from 1990 to 1997, Lakes Victoria and Kyoga provided 87% of the total Ugandan fish catch, while the River Nile System contributed to 1.2% of the Ugandan fish catch (Burnside International Ltd 2006). A 1999 baseline socio-economic survey of the local economy, found that 4% of the population selected fishing as their primary economic activity while 46% selected farming. Although farmers also undertake fishing in the Nile River to supplement income; Burnside International Ltd 2006)<sup>26</sup>. In 2006, the upper 65 km of the Victoria Nile supported 50-90 fishing boats and c. 150-200 full-time fishing jobs; the number of fishers and fish traders had increased from 89 to 128 and 12 to 47 between 2000 and 2006, respectively (Burnside International Ltd 2006). Across the Lake Victoria region, the number of fishers and fishing boats is increasing (Frame Survey National Working Group 2010).</p> <p>Within the local population, fishing generates only low levels of income compared to formal employment (Burnside International Ltd 2006) and is often undertaken by men with low levels of formal education. Fish are sold locally, used for household consumption, and sold as bait to the Lake Victoria Nile Perch industry.</p>

<sup>26</sup> Other economic activities include running a business (16%), working as a taxi and bicycle driver (4%), and being a student (15%).

Additional Conservation Action	ACA2 Objective: Address over-exploitation of Critical Habitat-qualifying species (Table 8)
	<p>In Uganda, stakeholders at the local level can form fisheries co-management structures called Beach Management Units (BMUs)<sup>27</sup>. BMUs provide a mechanism for establishing community control of fisheries with a degree of legal protection and links to local government<sup>28</sup>. Though they are effective in ensuring better representation from fishers, BMUs often lack funding, are unable to enforce regulations, and often lack human capacity, among other challenges (World Bank 2012).</p> <p>Changes in water flow as a result of multiple HPPs in the Upper Victoria Nile have created conditions which have caused increases in secondary threats such as targeted fishing, accidental bycatch and predation by Nile Perch (see Section 1.1.2 for further detail).</p> <p>Existing national fishing regulations provide a definition for minimum mesh net sizes in fishing gear only<sup>29</sup>. The minimum size of mesh net will vary between a lake and river context as fish tend to be smaller on rivers and larger in lakes. The agency responsible for the Fish Act is resource-constrained, limiting its ability to define appropriate sizes of mesh for river and lake contexts and regulate implementation of the existing law (World Bank 2012).</p>
Feasibility assessment to assess the scope of potential actions	<p>BEL, together with partners, will develop and implement voluntary activities to directly address over-exploitation of Critical Habitat-qualifying fish species. The specific scopes and management of these activities will need to be built on updated baseline data regarding local fisher households<sup>30</sup>, modified monitoring for Critical Habitat-qualifying species by NaFIRRI, and stakeholder engagement<sup>31</sup>. The action will require further scoping, feasibility assessment, and planning, building on existing Project documentation and experience.</p>

<sup>27</sup> As noted in Section 3.1, BMUs have been suspended and are replaced by landing site committees, however this change does not have a legal standing and therefore this BAP uses the term BMU.

<sup>28</sup> BMUs enable communities to define and register an assembly with the authorities and establish bylaws for the management of their fishery unit. These bylaws can include the restriction or banning of certain fishing gear and the implementation of licences for fishing as well as designations of no fish areas. Implemented effectively, and with sound planning, these institutions could protect key fisheries resources (Odongkara 2009) while safeguarding fishing livelihoods.

<sup>29</sup> The law states only that fish mesh size should be defined based on fish size at first maturity (i.e. the length at which 50% of individuals in a population have attained maturity) and, therefore, it varies depending by species.

<sup>30</sup> A survey would be required to clarify, for example: the number of fishing households in the area along with socio-economic information (e.g. are the fishers local? Is the fishing community changing, and how?); trends in fishing gear use; and stakeholder acceptance of different mechanisms for managing over-exploitation of Critical Habitat-qualifying species.

<sup>31</sup> This will need to align with the Project Stakeholder Engagement Plan (SEP). In recommending a SEP, Reeman Consulting (2017) notes that this should include fishers as people affected by the Project. In particular, BMUs and LC1s would need to be consulted. Communities may, for example, not feel that fish farming is an activity that would yield many benefits and might suggest alternative activities.

Additional Conservation Action	ACA2 Objective: Address over-exploitation of Critical Habitat-qualifying species ( <a href="#">Table 8</a> )
	<p><b><i>Voluntary changes in fishing gear and norms</i></b></p> <p>Existing BMUs (landing site committees), with the assistance of LC1s, can provide a platform/mechanism to develop and implement voluntary actions to address the over-exploitation of haplochromines. This could, for example, promote a voluntary change in fishing gear (e.g. moving to larger mesh sizes). If implemented correctly, this can lead to a reduction in haplochromine by-catch and, secondarily, can support the sustainability of fishing.</p> <p>Various frameworks and mechanisms exist to support the development and implementation of voluntary conservation actions. For example, Conservation Agreements offer communities negotiated incentives in return for agreed conservation incentives (which are conditional upon verified performance of the conservation action)<sup>32</sup>. The negotiated incentives may take various forms e.g. a small direct payment, bursaries for education or an alternative livelihood option (see below). Conservation Agreements have been used successfully to work with communities in both freshwater (Mora <i>et al.</i> 2017) and marine areas. Agreements can involve conservation commitments ranging from direct behaviour/gear change, to spatial/temporal restraints (e.g. shifting fishing to avoid 'no-go' zones, delineating a fishing season), and actions to reduce external pressures (e.g. patrolling). A staggered approach can be used whereby voluntary agreements go into partial effect for some period of time, before they are fully implemented. BMUs could be used to assist the monitoring of the implementation of the conservation commitment and check if agreed commitments are being applied by the fishermen. This could be done through the provision of small monthly stipends to the BMUs (to fund checks of the area for example). Monitoring of the outcome of this action would be captured via the Project's M&amp;E Plan.</p> <p><b><i>Negotiated incentives</i></b></p> <p>The conservation commitment(s) chosen (e.g. changes in the size and/or use of fishing gear, delineating a fishing season etc.) may have short-term impacts on the livelihoods and incomes of fishermen (with negative, indirect impacts on their households, e.g. childhood education enrollment). Therefore, an appropriate incentive will need to be negotiated which may take the form of a small payment, or education bursaries, or an alternative livelihood option such as fish farming. BEL is already providing education bursaries, these could be expanded to target fisher families for example. Or, BEL has also already supported fish farming activities in community lands near the reservoir, through a collaboration with S.O.U.L. NGO. Approximately 15,000 fish were provided per site; these farms were managed by women. One of the two sites supported by BEL has been successful and lessons learned can be</p>

<sup>32</sup> See, for example, this case study on sustainability in the Rwandan coffee sector ([Gaborone Declaration for Sustainability in Africa 2017](#)).

<b>Additional Conservation Action</b>	<b>ACA2</b> <b>Objective: Address over-exploitation of Critical Habitat-qualifying species (Table 8)</b>
	applied to similar projects with BMUs and/or communities living around the reservoir and immediately downstream of the HPP. Fish farms should be developed in community lands away from the river and not in the river/reservoir itself to avoid impacts to the river system. The development and operation of fish farms should also follow good practice guidelines to minimize negative environmental impacts; NaFIRRI has for example developed guidance based on their experience. Fish farming could provide food for household consumption in the short term and, in the long-term, may provide an additional source of household income. An additional indirect benefit of introducing women to fish farming is an increased likelihood for household profits to be invested in child education.
<b>BEL Tasks</b>	BEL, together with partners, will: <ul style="list-style-type: none"> <li>• Undertake stakeholder engagement regarding the issue of haplochromine over-exploitation in the reservoir and immediately downstream;</li> <li>• Supplement NaFIRRI monitoring of haplochromines to undertake a survey of fisher families in the local area;</li> <li>• Scope and develop a Conservation Agreement approach using an iterative stakeholder engagement process, that helps to address the issue of over-exploitation of haplochromines in the area.</li> </ul>

### 5.3 Monitor developments at the Kalagala Falls site

*Table 11: ACA3, ACA4, ACA5: Monitor developments at the Kalagala Falls site*

<b>Additional Conservation Action</b>	<b>ACA3, ACA4, ACA5</b> <b>Objective: Monitor developments at the Kalagala Falls site (Table 8)</b>
<b>Background and rationale</b>	The KFS together with Mabira Forest Reserve and the reserves on both banks of Kalagala Falls comprise the Kalagala Offset Area (KOA). In 2007, the Government of Uganda (GoU) and World Bank signed an Indemnity Agreement in which the GoU committed to set aside and manage the KFS for its natural habitat and tourism and not to develop power generation that could adversely affect the ability to maintain Kalagala Falls. In 2010, the Ministry of Water and Environment (MWE) developed the Kalagala Offset Sustainable Management Plan (KOSMP) under the auspices of this agreement. The plan recognises the contribution of BEL's mitigation actions as they pertain to the Project (Ministry of Water and Environment 2009). In

	<p>the future, the KOA will be impacted by the Isimba HPP (IHPP; ERM 2017)<sup>33</sup>. It has been proposed that the impacts on the KFS by the IHPP can be mitigated by modifying the KFS geographical area so that it continues to protect the natural habitats and environmental value of the KFS as originally envisioned (ERM 2017). A more detailed overview of the KOA history and development can be found in Reeman Consulting (2017).</p>
BEL tasks	<p>The Government of Uganda (and not BEL) is responsible for the implementation of the KOSMP. There is no outstanding requirement for BEL's contribution to the KOA. Thus, BEL will:</p> <ul style="list-style-type: none"> <li>• Inform lenders through an annual memo to lenders on progress of/at the KOA, based on publicly available information received from the Government of Uganda and the World Bank (ACA3);</li> <li>• As requested, provide species information from Project monitoring at the Busowoko monitoring location to the KOA management authorities, to support their management activities (ACA5).</li> <li>• If the KOA ceases to exist (in the current or modified form), the Project will review the 2006 requirements and develop an alternative offset approach that will address the original requirements agreed between IFC and BEL at the time of the original investment, via reasonable actions within BEL's control (to be defined at such time as the KOA may cease to exist). (ACA4)</li> </ul>

## 6 Monitoring and Evaluation

The Project's Environmental Mitigation and Monitoring Plan (EMMP; Bujagali Energy Limited 2010) was written in 2010 to fulfil the monitoring requirements of the 2006 SEA (Burnside International Ltd 2006) and associated documentation. The EMMP has formed the basis for the bi-annual aquatic monitoring that NaFIRRI undertakes on behalf of the Project.

Building on the EMMP as well as the Critical Habitat-qualifying species prioritisation (TBC 2018c), a Biodiversity Monitoring and Evaluation (M&E) Plan has recently been developed to focus on Critical Habitat-qualifying species (TBC 2018b). The M&E Plan:

- Builds on the prioritisation results (Figure 3) to focus monitoring efforts given the high number of Data Deficient and undescribed species, and can in turn refine the prioritisation over time as more information becomes available on the Critical Habitat-qualifying species ([Section 4.2](#));
- Identifies new monitoring locations and methods to target Critical Habitat-qualifying species;
- Facilitates the monitoring of operational activities during the lifetime of the Project, to ensure that they do not lead to measurable adverse impacts on Critical Habitat-qualifying biodiversity, or a net reduction for Critical Habitat-qualifying species; and

<sup>33</sup> As noted in the ERM (2017), impacts are estimated to include an anticipated loss of 22.62% of the area of the Kalagala Falls Site (KFS; 288.89 ha).

- Addresses the need for modified monitoring and reporting by NaFIRRI for Critical Habitat-qualifying species in order to better track progress towards the SEA (Reeman Consulting 2017).

The M&E Plan sets out the framework, indicators and approaches that the Project will use to track any changes in Critical Habitat-qualifying species and evaluate whether Project objectives, including the requirements of PS6, have been fulfilled. The M&E Plan is based on a state-pressure-response framework (Figure 6) and identifies thresholds for key pressure indicators to enable the Project to adaptively manage responses if significant changes are detected in key characteristics of the Upper Victoria Nile and Critical Habitat-qualifying species. Further detail can be found in the M&E Plan (TBC 2018b).

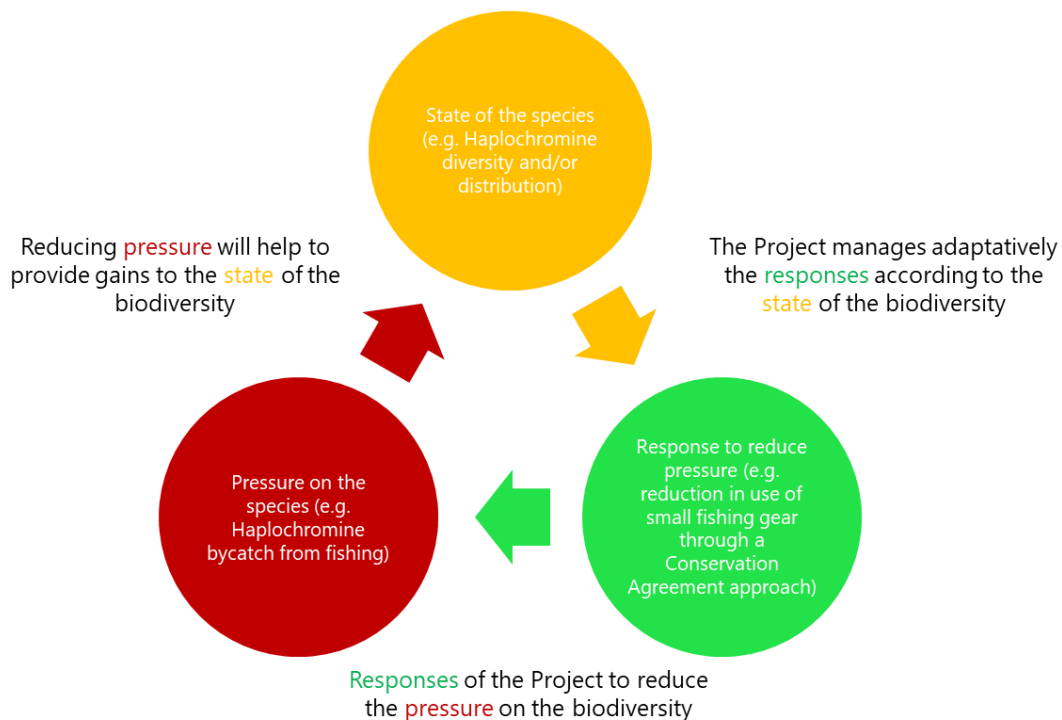


Figure 6: Concept of the State-Pressure-Response Framework (TBC 2018b)

## 7 BAP implementation

### 7.1 Timeline for Additional Conservation Actions

Below are the key tasks required to enable the implementation of BAP actions.

Table 12: Actions and tasks required to enable implementation

Actions and tasks	Responsibility	Timing
<b>ACA1: Support NaFIRRI to publish ecological and taxonomic descriptions of Critical Habitat-qualifying species that are new to science</b>		
1. Review and amend the NaFIRRI scope of work, and allocate new budget as necessary.	BEL	Q1 2019

Actions and tasks	Responsibility	Timing
2. Collection of voucher specimens, with associated notes and observations on status and ecology.	NaFIRRI	Starting 2019
3. Comparison of voucher specimens with specimens from international museum collections.	NaFIRRI	Starting 2019
4. Genetic barcoding of individual specimens.	Private laboratory (contracted by NaFIRRI)	Starting 2019
5. Publication of findings in a peer-reviewed journal.	NaFIRRI	Starting 2020
<b>ACA2: Measures to address over-exploitation of Critical Habitat-qualifying species</b>		
1. Feasibility and scoping study for establishing voluntary Conservation Agreements (to ensure contribution to Net Gain for Critical Habitat-qualifying species in Project operational lifetime, in a manner that is technically and politically feasible). To include a socio-economic survey of fisher families (and families that use fishing as a secondary income) around the reservoir and immediately downstream and stakeholder analysis to capture all groups that will be engaged in the establishment and implementation of Conservation Agreements and what their role will be. The outputs would include: <ul style="list-style-type: none"> <li>A. A baseline report on fishing families<sup>34</sup>;</li> <li>B. Roles and responsibilities of each identified stakeholder group in the development and implementation of Conservation Agreements;</li> <li>C. Input into negotiations with communities and BMUs on voluntary conservation commitments within the Conservation Agreements.</li> </ul>	BEL	2019
2. Use NaFIRRI fishing data to understand the trend in size of fish caught, size of mesh and gear used, since bi-annual collection began.	NaFIRRI	Q1 2019
3. Input into the SEP to ensure that programming with a strong social component is embedded appropriately within the Project.	BEL	2019 – 2020

<sup>34</sup> Could use a semi-structured interview format, and should include for example: Number of families reporting fishing as main income versus families reporting it as a secondary or supplemental income, number of people in household, number of children, ages, in school/not in school, number completed primary/secondary/further education, number of days per week fishing is undertaken, number of hours spent fishing per event, type of fish that are targeted, fishing gear used, average amount caught, where sold to, income earned, problems they have as fishermen (request clarifications where necessary; e.g. if it is stated that they do not catch enough fish, ask why they believe that might be and what could be done). This report would provide an update on the 2006 SEA baseline information.

Actions and tasks	Responsibility	Timing
4. Development and implementation of voluntary Conservation Agreements informed by the stakeholder engagement and through a participatory process [steps to be determined in the assessment and subsequent scoping].	BEL, together with partners and local stakeholders	2020-2021
<b>ACA3, ACA4, ACA5: Observe progress at the Kalagala Falls Site (KFS)</b>		
ACA3: The Project will: A. Provide an annual memo to lenders on the progress of/at the KOA based on publicly available information received from the Government of Uganda and the World Bank.	BEL	On-going
ACA4: If the KFS ceases to exist (in the current or modified form), the Project will review 2006 requirements and develop an alternative offset approach that will address the original lender requirements agreed between IFC and BEL at the time of the original investment via reasonable actions within BEL's control.	BEL	If/when required
ACA5: As requested, provide monitoring information to the Kalagala management authorities on the species present in the Busowoko monitoring location to support management activities.	BEL/NaFIRRI	On-going

## 7.2 Partnerships and stakeholder engagement for BAP implementation

There are a number of existing and potential partnerships that can support implementation of mitigation actions (Table 7) and Additional Conservation Actions (Table 8). For example:

- LC1s in the community already work together with BEL to support monitoring activities on Project lands (Table 7);
- NaFIRRI already works together with BEL to support monitoring activities. The data collected by NaFIRRI will be important in developing several of the Additional Conservation Actions (Table 8); and
- BEL has recent experience implementing a community fish farm with the S.O.U.L. NGO.

Stakeholder engagement, and new or modified partnerships and relationships, will be defined in the detailed scoping exercises that will precede the development of each ACA.

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