



Bujagali Project: Prioritisation of Critical Habitat-qualifying species for monitoring and management actions

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Executive summary

This report details the species prioritisation process undertaken following Critical Habitat Assessment (CHA) of the Bujagali Hydropower Project (HPP) (the Project) (TBC 2018). The CHA identified a suite of Critical Habitat-qualifying species (priority biodiversity), all aquatic, within the operational area of the Project. To align with IFC PS6 (2012) and the requirements of the IFC Environmental and Social Action Plan ([ESAP](#)) carried out in support of Project refinancing, the Project is now required to prepare a Biodiversity Action Plan (BAP). The BAP should document actions that contribute toward net gain of priority biodiversity ([IFC project disclosure](#)).

There is variability in terms of ecology, threat level and level of scientific understanding of the Critical Habitat-qualifying species, many of which are haplochromine fish. This means the Project response for management and monitoring of risk (i.e. the BAP actions) for these species is also variable.

The prioritisation process described in this report identifies an appropriate level of management effort and future actions for priority biodiversity, providing a framework for BAP development. Each Project priority biodiversity feature has been allocated to an Action Category based on the likelihood and potential consequence of any operational impact to that feature. The outcome is summarised Figure 1. The species classed as highest priority for monitoring and management actions (Action Category 1) are riverine species¹ that are only likely to be present in the Upper Victoria Nile. Some of these species are known to still be present in the area of operational influence of the Project, others have not been recorded recently².

Targeted surveys are recommended as part of the BAP to assess whether these species are still present, and if they are present, to understand the extent of their distribution to inform further BAP mitigation measures. The regular NaFIRRI monitoring campaign (and potentially other work in the region) could be built upon for targeted surveys and for future long-term monitoring of CH species.

All species depend upon riverine habitat for their survival; the CHA identified sections of the river containing Natural and Modified Habitat, both of which contain Critical Habitat-qualifying species. Whilst the prioritisation detailed herein is species-focused, habitat management will be a key part of a BAP and recommendations for habitat management are given in [Section 4](#).

¹ Species that are only found in a river habitat, and are not found in lakes

² Lack of recent records does not necessarily mean the species is absent, it may also be due to the current monitoring approach. Details about when the species was last recorded by NaFIRRI are found in Appendix 1.

Figure 1: Action Categories: definitions and species

	Definition	Species list
1. Endemic to the Upper Victoria Nile: targeted monitoring and management	Riverine species only likely to be present in the Upper Victoria Nile	<p>Recently recorded (8 species): 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"</p> <p>Not recently recorded (3 species): 1. <i>Haplochromis niloticus</i>, 2. <i>Neochromis</i> "red simotes", 3. <i>Haplochromis</i> "cylindrical"</p>
2. Poorly known species: monitor to understand risk	<p>Riverine species recorded in the Project area but maybe present in lakes – surveys required to understand risk</p> <p>Predominantly lacustrine species 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</p>	<p>Riverine species (7 species): 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"</p> <p>Lacustrine species (13 species): 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)</p>
3. Lacustrine species but river maybe an important refuge: monitor for ongoing presence	<p>Predominantly lacustrine species not recently recorded in the Project area but known from multiple other lake and river locations</p>	<p>Lacustrine species (4 species): 1. <i>Labeo victorianus</i>, 2. <i>Brycinus jacksonii</i>, 3. <i>Mbipia</i> "blue", 4. <i>Xystichromis</i> "earthquake"</p>
4. Lacustrine species with widespread distribution: monitor for ongoing presence	<p>Predominantly lacustrine species recorded in the Project area and known from multiple other lake locations</p>	<p>Lacustrine species (5 species): 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)</p>

1 Introduction

This report details the species prioritisation process undertaken following Critical Habitat Assessment (CHA) of the Bujagali Hydropower Project (HPP) (the Project), on the Upper Victoria Nile in Uganda (Figure 2).



Figure 2: The Bujagali Project location and aquatic DMU (the operational area of influence of the Project)

CHA (TBC 2018) identified a suite of Critical Habitat-qualifying species, all aquatic. To align with IFC PS6 (2012) and the requirements of the IFC Environmental and Social Action Plan (ESAP) carried out in support of Project refinancing, the Project is now required to prepare a Biodiversity Action Plan (BAP). The BAP should document actions that contribute toward net gain of Critical Habitat-qualifying species ([IFC disclosure page](#)).

However, there is variability in terms of ecology, threat level and level of scientific understanding of the species, many of which are haplochromine fish. This means the Project response for management and monitoring of risk to these species is also variable.

Within the haplochromine group, there are species that require the flowing water of a riverine habitat to survive (whether that be fast flowing rapids or slow flowing clear water sections of the river) and therefore are more likely to be affected by developments that change the water flow regime than haplochromine species that prefer a still water, lake habitat. Likewise, the potential consequences of any particular pressure/threat for the population viability of a species are not equal: i.e. species known only from a few locations in the river are at potentially greater risk than a wider spread species.

Thus, not all Critical Habitat-qualifying species are equal priorities for further Project management/monitoring action. To help the Project identify the appropriate level of monitoring and management effort, a prioritisation process was applied to the list of Critical Habitat-qualifying species, providing a framework for BAP development.

2 Approach

The prioritisation process was based on:

1. A qualitative assessment of the sensitivity of a species to hydropower project impact: This took into account the sensitivity of a species to changes in water flow; species known to prefer fast flowing water (i.e. rapids) and/or that have not been recently recorded with the Project's Operational Area of Influence (known as the DMU in the CHA 2018) were considered to be the most sensitive to HPP impacts. The assessment was based on NaFIRRI records and knowledge of the haplochromine specialist (Vianny Natugonza who has access and knowledge of additional surveys to those undertaken by NaFIRRI). The descriptors found in Table 1 were applied.
2. A qualitative assessment of the consequence of any impact: This considered the number of locations³ a species was known from both within and outside the OAoI of the Project to assess the consequence for a species viability. For example, if the species is a riverine specialist only known from the OAoI any impact would potentially be significant for the viability of that species. Whereas if a species is known from multiple locations then an impact within the Projects OAoI may only affect local viability. The descriptors found in Table 2 were applied.

³ See the Critical Habitat Assessment (2018) for the definition of location for the Project

- Based on the outcome of steps 1 and 2, each species was placed into an appropriate 'Action Category' (AC) that defines the priority for monitoring (Figure 3).

It should be noted that although the Project has been undertaking bi-annual monitoring in the reservoir and immediately downstream of the reservoir, neither the locations selected to survey nor the survey methods have targeted haplochromine species. It is therefore possible that some species remain present and are more widely distributed than current records may indicate.

Table 1: Sensitivity of the species to hydropower project impacts (including changes in water flow, indirect impacts from fishing, increases in predation from species such as the Nile Perch and clearance of vegetation along the river banks resulting in increased sedimentation and loss of microhabitats)

Sensitivity of the species to HPP impacts	Definition
HIGH	Species is highly dependent on very fast flowing water habitat and degradation/loss of some/all of the species habitat has occurred in the past as a result of changes in water flow and movement from HPPs and/or the species has not been recently recorded in the OAol (in the last 5 years)
MEDIUM	Species lives in fast flowing water but also recorded in slower flowing sections, degradation/loss of some of the species habitat will have occurred in the past as a result of changes in water flow and movement from HPPs and/or species is susceptible to indirect impacts from fishing and/or predation
LOW	Species prefers slow flowing waters (lacustrine habitat) and is not targeted by fisheries or the preferred prey of the Nile Perch.

Table 2: Potential consequence of risk for species viability

Consequence	Definition
CRITICAL	Global viability/function may be significantly reduced or lost
MAJOR	Regional viability/function may be significantly reduced or lost
MODERATE	Local viability/function may be significantly reduced or lost and/or regional viability may be reduced
MINOR	Local viability/function may be reduced but regional viability is unlikely to be significantly affected

Project Action Categories		Sensitivity of the species to hydropower project impacts	
		High	Medium/Low
Consequence for species viability	Critical / Major	1. Endemic to the Upper Victoria Nile: Targeted monitoring and management	2. Poorly known species: Monitor to understand risk
	Moderate / Minor	3. Lacustrine species but river maybe an important refuge: Monitor for ongoing presence	4. Lacustrine species with widespread distribution: Monitor for ongoing presence

Figure 3: The four Action Categories that define the priority for monitoring and management

3 Results

CHA (TBC 2018) identified 40 species that qualify under Criteria 1 to 3: ten Tier 1 species, and 30 Tier 2 species. These were evaluated and categorised according the process described in [Section 2](#). This is summarised in Figure 4, with detailed justification and rationale for each species in [Appendix 1](#). A description of the recommended actions for each Action Category and next steps is found in [Section 4](#). In summary:

AC1 Endemic to the Upper Victoria Nile: Targeted monitoring and management: 11 species

Definition

- This is the highest priority AC, containing riverine species that are only found in the Upper Victoria Nile. Some species have not been recorded recently and may be close to extinction. Pressures on these species result from the multiple HPP projects on the Upper River Nile which have altered the river’s flow. Indirect

impacts are also likely to have affected these species such as the introduction of the Nile perch, fishing, water pollution in Lake Victoria and vegetation clearance along the banks of the river causing increased sedimentation and loss of niche habitats.

AC2 Poorly known species: Monitor to understand risk: 20 species

Definition

Clarification of the distribution of species in this category is required in order to understand risk. Species in AC2 includes:

1. Species that are currently only known from the Upper Victoria Nile but based on known information about the species ecology and habitat use, may also be found in a lake habitat;
2. Lacustrine species that have been recorded in the Project area and considered to be at risk elsewhere in their range or only have a narrow range of distribution. The area of operation of the Project therefore may provide an important refuge from on-going threats in the lakes.

AC3 Lacustrine species but river maybe an important refuge: Monitor for ongoing presence: four species

- This AC contains lacustrine species that have not been recently recorded in the operational area but are known from multiple other lake locations.

AC4 Lacustrine species with widespread distribution: Monitor for ongoing presence: five species

- This AC contains lacustrine species found in multiple lake locations and which have been recorded recently in the Project OAol. The Project OAol is unlikely to be an important refuge for these species.

	Definition	Species list
1. Endemic to the Upper Victoria Nile: targeted monitoring and management	Riverine species only likely to be present in the Upper Victoria Nile	<p>Recently recorded (8 species): 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"</p> <p>Not recently recorded (3 species): 1. <i>Haplochromis niloticus</i>, 2. <i>Neochromis</i> "red simotes", 3. <i>Haplochromis</i> "cylindrical"</p>
2. Poorly known species: monitor to understand risk	<p>Riverine species recorded in the Project area but maybe present in lakes – surveys required to understand risk</p> <p>Predominantly lacustrine species 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</p>	<p>Riverine species (7 species): 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"</p> <p>Lacustrine species (13 species): 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)</p>
3. Lacustrine species but river maybe an important refuge: monitor for ongoing presence	<p>Predominantly lacustrine species not recently recorded in the Project area but known from multiple other lake and river locations</p>	<p>Lacustrine species (4 species): 1. <i>Labeo victorianus</i>, 2. <i>Brycinus jacksonii</i>, 3. <i>Mbipia</i> "blue", 4. <i>Xystichromis</i> "earthquake"</p>
4. Lacustrine species with widespread distribution: monitor for ongoing presence	<p>Predominantly lacustrine species recorded in the Project area and known from multiple other lake locations</p>	<p>Lacustrine species (5 species): 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)</p>

Figure 4: Summary of species per Action Category, with category definitions

4 Recommend actions and next steps

The [IFC ESAP](#) identified that a Biodiversity Action Plan (BAP) would be required if the Critical Habitat Assessment confirms that the Project is operating in Critical Habitat (IFC ESAP item 13). As the Project is operating in Critical Habitat, this species prioritisation is intended to provide the basis for a Project BAP, providing an initial indication of the appropriate allocation of resources for management and monitoring action.

Recommendations are summarised in Table 3, and placed in order of priority. The highest priority actions are management actions that will support the conservation of riverine Natural and Modified Habitat. Habitat management is a priority action as it will benefit all riverine species. Some of the recommended actions overlap with ESAP actions; review and alignment between Project actions will be required as part of BAP development to ensure there is no duplication of actions or conflict between actions.

Table 3: Recommended BAP actions for habitats and species

Priority	Targeted biodiversity feature	Recommended action
1	Riverine Modified Habitat (and all CH species that this habitat supports), upriver of the Bujagali HPP	<ol style="list-style-type: none"> 1. In line with the Project Shoreline Management Plan, maintain and rehabilitate the 100 m vegetation buffer along the river margins in Project-controlled areas (overlap with IFC ESAP item 12). 2. Work with stakeholders to sustainably manage the Bujagali reservoir and fisheries to improve fishing techniques so that impacts to haplochromine species are minimized.
2	Action Category 1 species	Develop and implement the species-specific measures outlined in Figure 5 and Appendix 2
3	Action Category 2 species	Develop and implement the species-specific action outlined in Figure 5 and Appendix 2
4	All CH qualifying species	Review and improve the NaFIRRI monitoring approach in light of the findings of the CHA and species prioritisation to ensure it provides a feedback loop to understanding Project impacts and the outcomes of BAP mitigation actions (e.g. monitoring should cover the operational area of influence of the Project and target habitat known to support CH qualifying riverine species in particular).
5	All CH qualifying species	Input results of surveys into the shared species database that is currently under development (with GBIF⁴ support) to provide a wider understanding of the conservation status of threatened species.
6	AC1 and AC2 species	Provide funding to NaFIRRI to support the training and employment of staff curators to undertake genetic analysis and species descriptions/ assessments
7	Periodic review and update	Periodically review and update the NaFIRRI monitoring program to ensure it aligns with any new information obtained about a Critical Habitat-qualifying species or any new species that is discovered that may qualify for Critical Habitat.

⁴ Global Biodiversity Information Facility

	Definition	Actions	Species list
1. Endemic to the Upper Victoria Nile: Targeted monitoring and management	Riverine species only likely to be present in the Upper Victoria Nile	<ul style="list-style-type: none"> Undertake targeted surveys to assess the presence and distribution of species Undertake genetic analysis and publish descriptions of undescribed species Implement mitigation measures for indirect impacts Update monitoring programme to track changes in species presence and distribution across the area of operational influence of the Project 	<p>Recently recorded (8 species): 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"</p> <p>Not recently recorded (3 species): 1. <i>Haplochromis niloticus</i>, 2. <i>Neochromis</i> "red simotes", 3. <i>Haplochromis</i> "cylindrical"</p>
2. Poorly known species: Monitor to understand risk	<p>Riverine species recorded in the Project area but maybe present in lakes – surveys required to understand risk</p> <p>Lacustrine species 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</p>	<ul style="list-style-type: none"> Cross reference records from Lake Victoria to understand species distribution (undertake surveys in Lake Victoria if records not found); re-assess risk once completed Undertake genetic analysis and publish descriptions of undescribed riverine species when recorded 	<p>Riverine species (7 species): 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"</p> <p>Lacustrine species (13 species): 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)</p>
3. Lacustrine species but river maybe an important refuge: Monitor for ongoing presence	<p>Lacustrine species not recently recorded in the Project area but known from multiple other lake locations</p>	<ul style="list-style-type: none"> Evaluate ongoing presence/absence of these species based on future monitoring data 	<p>Lacustrine species (4 species): 1. <i>Labeo victorianus</i>, 2. <i>Brycinus jacksonii</i>, 3. <i>Mbipia</i> "blue", 4. <i>Xystichromis</i> "earthquake"</p>
4. Lacustrine species with widespread distribution: Monitor for ongoing presence	<p>Lacustrine species recorded in the Project area and known from multiple other lake locations</p>	<ul style="list-style-type: none"> Continue monitoring to understand their presence/ absence in the Project area 	<p>Lacustrine species (5 species): 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)</p>

Figure 5: Action Categories: definitions, potential actions and species

5 References

TBC (2018) Bujagali Project: Critical Habitat Assessment. Report prepared on behalf of BEL. The Biodiversity Consultancy Ltd, Cambridge, U.K.

Appendix 1 Detailed results of the species prioritisation

IUCN status: CR = Critically Endangered, EN = Endangered, NT = Near Threatened, VU = Vulnerable, LC = Least Concern, DD = Data Deficient, NE = Not Evaluated;
species not yet formally described

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
Haplochromine	<i>Haplochromis simotes</i>	DD	1	Sensitivity: High	Consequence: Major/Critical
				<p>The species prefers sections of the river with rapids and is therefore highly sensitive to changes in water flow. It has been observed before and after dam construction in the Projects OAol, (to date it has only been recorded below Kalagala/Itamba falls). Impacts from the construction of the Isimba dam will likely further impact the habitat this species depends on. The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts would support this species.</p>	<p>The species is only known from the Upper Victoria Nile and a reduction in habitat availability in the Projects operational area would significantly affect the regional viability of the species and may affect its global viability. Cumulative impacts from the Isimba project could reduce the species global viability.</p>
Haplochromine		NE	1	Sensitivity: High	Consequence: Critical

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
	<i>Paralabidochromis</i> sp. "red breast new"			The species was observed in the Project's OAol after dam construction, however it is species that prefers fast flowing waters/rapids and is therefore highly sensitive to changes in water flow. The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts would support this species.	The species is currently only known from one location in the OAol of the Project. Any impact to the population in this location would significantly reduce the global viability of the species.
Haplochromine	<i>Astatotilapia</i> "blue"	NE	1	Sensitivity: High	Consequence: Major (potentially critical)
				The species prefers riverine habitat (but not rapids), changes in water flow on the river are likely to have an impact on this species. It was observed in the Project area before the dam was built in 2007 (but it is unclear if lack of records is an indication the species is no longer present or due to the sampling approach used for monitoring). The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts would support this species.	This species has only been recorded in the OAol of the Project but is considered to be more widespread (according to the haplochromine specialist). As there are no recent records for this species information is needed to understand its presence/distribution. Any impacts to populations in the OAol of influence of the Project based on information available would significantly reduce the regional population and potentially reduce the global viability of the species.
Haplochromine		NE	1	Sensitivity: High	Consequence: Major

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
	<i>Neochromis</i> sp. "Labeo new"			This is a riverine species, preferring fast flowing waters and is therefore highly sensitive to changes in water flow resulting from HPPs. The species has not been recently recorded upstream of Bujagali but has been recorded downstream. Indirect impacts include incidental fishing and predation by the Nile perch; managing indirect impacts would support this species. Impacts from the Isimba dam are likely as this species prefers fast flowing waters.	The species is known to be found in the Kalagala/Isimba area. Any impact to the species in the OAol would significantly reduce the regional and potentially reduce the global viability of the species.
Haplochromine	<i>Pundamilia</i> "scarlet anal"	NE	1	Sensitivity: High	Consequence: Major
				This is a riverine species preferring fast flowing water and is therefore highly sensitive to changes in water flow. The haplochromine specialist indicates this species is still present in the Upper Victoria Nile, although rare (it has not been recorded by NaFIRRI since 2006). The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	The species has been recorded outside the OAol in the Upper Victoria Nile but any impact to the species in the OAol would significantly reduce the regional and potentially reduce the global viability of the species.
Haplochromine		NE	1	Sensitivity: High	Consequence: Major

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
	<i>Haplochromis</i> "silver arrow"			<p>This is a riverine species, preferring slow moving waters with a sandy substrate. This species is considered to be highly sensitive to HPP impacts as slow-moving water in reservoir areas is often associated with increases in Nile Perch and other predatory species which can affect haplochromine populations. According to the haplochromine specialist this species is still present in the river but it is rarely encountered (it has not been recorded by NaFIRRI since 2001). Managing indirect impacts in the reservoir would support this species.</p>	<p>The species has been recorded outside the OAol in the Upper Victoria Nile but any impact to the species in the OAol would significantly reduce the regional and potentially reduce the global viability of the species.</p>
Haplochromine	<i>Astatotilapia</i> "flameback"	NE	1	<p>Sensitivity: High</p>	<p>Consequence: Major (potentially critical)</p>
				<p>This species is considered to be a riverine species and will not be found in a lake environment (haplochromine specialist). It prefers a vegetated shoreline and a muddy substrate. This species is considered to be highly sensitive to HPP impacts as slow-moving water in reservoir areas is often associated with increases in Nile Perch and other predatory species which can affect haplochromine populations. Although not recorded by NaFIRRI since 2012, (possibly due to the sampling strategy), the specialist reports that this species is still observed in the river. The species is fished at</p>	<p>The haplochromine specialist reports that this species is still observed in the river (although it has not been recorded in recent NaFIRRI monitoring, possibly due to the sampling strategy). The species is only currently known from 2 locations in the OAol. Any impacts would potentially affect the global viability of the species but more information is need on the distribution of the species to fully understand the risks.</p>

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
				an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	
Haplochromine	<i>Neochromis</i> "yellow rufocaudalis"	NE	1	Sensitivity: High	Consequence: Major
				<p>This is a riverine species, preferring slow moving waters over a rocky substrate. This species is considered to be highly sensitive to HPP impacts as slow-moving water in reservoir areas is often associated with increases in Nile Perch and other predatory species which can affect haplochromine populations. This species was last recorded by NaFIRRI in 2001. However, the haplochromine specialist indicates it is still present but rare (gaps in records maybe due to the sampling approach used for monitoring). The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.</p>	<p>The species is only known from two locations, one in the OAol and one outside. An impact to the population within the OAol would significantly reduce the regional and potentially reduce the global viability of the species.</p>
Haplochromine		NE		Sensitivity: High	Consequence: Critical

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
	<i>Haplochromis</i> "cylindrical"		1 if still present	The species prefers riverine habitat (but slower moving waters, not rapids). It was last recorded in the Projects operational area in 2006. This species is considered to be highly sensitive to HPP impacts as slow-moving water in reservoir areas is often associated with increases in Nile Perch and other predatory species which can affect haplochromine populations. The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	This species is a riverine species and was only recorded in one location within the OAol (the section of river above where the dam is now located). Without further information about the distribution of this species any impacts to the population would mean that the global viability of the species may have been significantly reduced or lost.
Haplochromine	<i>Neochromis</i> "red simotes"	NE	1 if still present	Sensitivity: High	Consequence: Critical
				This species prefers a riverine habitat and fast flowing waters. It was last recorded in the Projects operational area but in 2001. As it prefers fast flowing waters/rapids it is highly sensitive to the changes in water flow associated with HPPs. Impacts from Isimba would affect this species if it is still present in the river. The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	This species is a riverine specialist and has only been recorded in the OAol. Without further information about the distribution of this species any impacts to the population would mean that the global viability of the species may have been significantly reduced or lost.

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
Haplochromine	<i>Haplochromis niloticus</i>	DD	1 if still present	Sensitivity: High	Consequence: Major
				<p>This species is described by the haplochromine specialist as a riverine species, preferring slow moving waters and a sandy substrate. It was last recorded in the Projects operational area in 2001. This species is considered to be highly sensitive to HPP impacts as slow-moving water in reservoir areas is often associated with increases in Nile Perch and other predatory species which can affect haplochromine populations. The species is also prey of the Nile perch; managing indirect impacts in the reservoir would support this species.</p>	<p>The species has been recorded in the Kalagala/Isimba area but any impact to the species in the OAol would significantly reduce the regional and potentially reduce the global viability of the species.</p>
Haplochromine	# <i>Paralabidochromis</i> "yellow"	NE	2	Sensitivity: Medium	Consequence: Major
				<p>This species is considered to be adaptable to both lake and river conditions and therefore likely to persist even if there are changes in flow within the river. It was last recorded in the area in 2006. Managing indirect impacts in the reservoir would support this species.</p>	<p>The species is known from above and below the HPP station, the record from Lake Victoria is currently unconfirmed. Until there is a better understanding of the species distribution any impact to the species in the OAol would significantly</p>

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
					reduce the regional and potentially reduce the global viability of the species
Gastropods	<i>Ceratophallus concavus</i>	CR	2	Sensitivity: Medium	Consequence: Major
				<p>This species was last recorded in 1954 in Bujagali area, it is therefore unclear what effect changes in flow or other associated HPP impacts may have on this species. The IUCN Red List assessment indicates that HPPs "could have altered the habitat of the species due to changes in wave action and water level fluctuations" (IUCN Red List assessment). It was also recorded in Lake Victoria (in 1954) and therefore is both a river and lake species of gastropod. Gastropod monitoring is not part of current Project monitoring but should be considered in the future to understand presence/absence and distribution of such species.</p>	<p>The species is only known from two locations (one inside the OAol of the Project and one in Lake Victoria), any impact to the population in the OAol would significantly reduce the regional and potentially reduce the global viability of the species</p>
Haplochromine	<i>Haplochromis aelocephalus</i>	CR	2	Sensitivity: Medium	Consequence: Major
				<p>This species was last recorded in 2010. It is primarily a lacustrine species and if still present in the Upper Victoria</p>	<p>The species is recorded by the IUCN as possibly extinct in Lake Victoria, any population left in the Upper Victoria Nile is</p>

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
				Nile will be affected by increases in Nile perch predation in the reservoir area, managing indirect impacts in the reservoir would support this species.	therefore very important for the species survival and any impacts would significantly reduce the regional and potentially reduce the global viability of the species.
Haplochromine	<i>Haplochromis microdon</i>	CR	2	Sensitivity: Medium	Consequence: Major
				This species was last recorded in 2009. It is primarily a lacustrine species and if still present in the Upper Victoria Nile will be affected by increases in Nile perch predation in the reservoir area, managing indirect impacts in the reservoir would support this species.	The species is recorded by the IUCN as possibly extinct in Lake Victoria, any population left in the Upper Victoria Nile is therefore very important for the species survival and any impact would significantly reduce the regional and potentially reduce the global viability of the species.
Haplochromine	<i>Haplochromis parvidens</i>	CR	2	Sensitivity: Medium	Consequence: Major
				This species is primarily a lacustrine species, last recorded in the Upper Victoria Nile in 2012. If still present in the Upper Victoria Nile will be affected by increases in Nile perch predation in the reservoir area; managing indirect impacts in the reservoir would support this species.	The species is recorded by the IUCN as possibly extinct in Lake Victoria, making any population left in the Upper Victoria Nile very important for the species survival and any impact would significantly reduce the regional and potentially reduce the global viability of the species.

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
Haplochromine	<i>Neochromis</i> "lemon britti"	NE	2	Sensitivity: Medium	Consequence: Critical (potentially)
				The species was only recorded in the Project area prior in 2001. As so little is known about the species it is unclear whether it is still present in the river and how sensitive it is to HPP associated impacts.	Currently the species is only known from one record at one location and therefore any impact would significantly affect the global viability of the population. However, this species may already be extinct.
Haplochromine	<i>Haplochromis</i> sp. cf. "red back scraper"	NE	2	Sensitivity: Medium	Consequence: Critical
				This species is currently considered to be riverine as it hasn't been recorded in a lake. However, the haplochromine specialist notes its similarity to fish assemblages from the wider Victoria-Nile-Kyoga system and therefore might also be found in lakes. It has been recently recorded but more information is required on the species distribution to understand risks. The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	The species has only been recorded within the OAoI, until the species is confirmed to be more widely distributed than currently known, any impact in the known location would be significant for the global viability of the species.

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
Haplochromine	<i>Lithochromis</i> sp	NE	2	Sensitivity: Medium	Consequence: Critical
				<p>This species is currently only known from the Upper Victoria Nile but the haplochromine specialist indicates that there are many undescribed <i>Lithochromis</i> species in Lake Victoria and therefore it is considered highly likely that this species is also lives in lakes. It has been recently recorded but it is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.</p>	<p>The species has only been recorded within the OAol, until the species is confirmed to be more widely distributed than currently known, any impact in the known location would be significant for the global viability of the species.</p>
Haplochromine	<i>Pundamilia</i> sp. "blue lip"	NE	2	Sensitivity: Medium	Consequence: Critical
				<p>This species is currently only known from the Upper Victoria Nile but the haplochromine specialist indicates it may also be present in Lake Victoria. The species has been recently recorded but is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.</p>	<p>The species is currently only known from the OAol of the Project and therefore any impact to this location would significantly affect the global viability of the species.</p>

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
Haplochromine	<i>Astatotilapia</i> "elongate"	NE	2	Sensitivity: Medium	Consequence: Major
				<p>This species is known from Lake Victoria and the Upper Victoria Nile and isn't considered to be a riverine specialist and therefore with a lower sensitivity to HPP impacts. It was last recorded in 2012 (but it is unclear if lack of records is an indication the species is no longer present or due to the sampling approach used for monitoring). The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species</p>	<p>Based on current information the species is only known from two locations (one in the OAol and one in Lake Victoria). Any impact to the population in the OAol would significantly reduce the regional and potentially reduce the global viability of the species. Further understanding of this species distribution would support assessment of risk.</p>
Haplochromine	<i>Astatotilapia</i> "red tail"	NE	2	Sensitivity: Medium	Consequence: Major
				<p>Based on information from the haplochromine specialist, this species is only likely to be found in the Upper Victoria Nile and is therefore a riverine fish, preferring very slow-moving water and is encountered on muddy and sandy substrates, near vegetated shoreline. It has recently been recorded (2017) and as a riverine species may be affected by HPPs. The species is fished at an artisanal scale and is prey of the</p>	<p>The species is currently only known from within the OAol (above and below the dam), until the species is confirmed to be more widely distributed than currently known, any impact to one of the two known locations would significantly reduce the regional and potentially reduce the global viability of the species.</p>

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
				Nile perch; managing indirect impacts in the reservoir would support this species	
Haplochromine	<i>Astatotilapia</i> "scarlet anal"	NE	2	Sensitivity: Medium	Consequence: Major
				Based on information from the haplochromine specialist, this species is only likely to be found in the Upper Victoria Nile and is therefore a riverine fish but prefers very slow-moving water and therefore only moderately affected by water flow changes as a result of HPP impacts. It is encountered on both muddy and sandy substrates, near a vegetated shoreline and was last recorded in 2015. The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species	The species is currently only known from within OAol (above and below the dam), until the species is confirmed to be more widely distributed than currently known, any impact to one of the two known locations would significantly reduce the regional and potentially reduce the global viability of the species.
Haplochromine	<i>Haplochromis brownae</i>	CR	2	Sensitivity: Medium	Consequence: Major
				This is a lacustrine species (possibly extinct in Lake Victoria but IUCN records require updating) and therefore only	As the species may already be extinct in Lake Victoria, any impact to the population in the Upper Victoria Nile would

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
				moderately affected by changes in flow conditions. It has recently been recently recorded in the Aol.	significantly reduce the regional and potentially reduce the global viability of the species.
Haplochromine	<i>Haplochromis crassilabris</i>	CR	2	Sensitivity: Medium	Consequence: Major
				This is a lacustrine species (possibly extinct in Lake Victoria but IUCN records require updating) and therefore only moderately affected by changes in flow conditions associated with HPP impacts. It has been recently recorded in the Aol. The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	As the species may already be extinct in Lake Victoria, any impact to the population in the Upper Victoria Nile would significantly reduce the regional and potentially reduce the global viability of the species.
Haplochromine	<i>Haplochromis guiarti</i>	CR	2	Sensitivity: Medium	Consequence: Major
				This is a lacustrine species (possibly extinct in Lake Victoria but IUCN records require updating) and therefore only moderately affected by changes in flow conditions associated with HPP impacts. It has been recently recorded in the Aol (last record from 2017). The species is fished at an	As the species may already be extinct in Lake Victoria, any impact to the population in the Upper Victoria Nile would significantly reduce the regional and potentially reduce the global viability of the species.

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
				artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	
Haplochromine	<i>Haplochromis</i> sp. "thick skin like"	NE	2	Sensitivity: Medium	Consequence: Major
				This species has been recorded in Lake Victoria and isn't therefore a river specialist and changes in water flow associated with HPP impacts are not likely to have a significant effect on the species. It has been recently recorded in the AoI (last record is from 2017). The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	Based on current information the species is only known from two locations (one in the OAoI and one in Lake Victoria). Any impact to the population in the area of the Project would significantly reduce the regional and potentially reduce the global viability of the species. Further understanding of this species distribution would support assessment of risk.
Haplochromine	<i>Neochromis</i> "elongate"	NE	2	Sensitivity: Medium	Consequence: Major
				This species has been recorded in Lake Victoria and isn't therefore a river specialist and changes in water flow associated with HPP impacts are not likely to have a significant effect on the species. The species was last recorded in 2012. The species is fished at an artisanal scale	The species is currently only known from two locations (one in the OAoI and one in Lake Victoria), until further surveys are undertaken to determine its distribution any impact to the population in the OAoI would significantly reduce the

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
				and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	regional and potentially reduce the global viability of the species.
Haplochromine	<i>Paralabidochromis</i> "scarlet anal"	NE	2	Sensitivity: Medium	Consequence: Major
				This species has been recorded in Lake Victoria and isn't therefore a river specialist and changes in water flow associated with HPP impacts are not likely to have a significant effect on the species. The species was last recorded in 2011. The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	The species is known from either side of the Bujagali dam (OAol) and from Lake Victoria. Any impact to the species within the OAol would significantly reduce the regional and potentially reduce the global viability of the species.
Haplochromine	<i>Paralabidochromis</i> sp 1	NE	2	Sensitivity: Medium	Consequence: Major
				This is a riverine species preferring moving water over a rocky substrate (but not rapids), the species may therefore be moderately affected by changes in water flow associated with HPPs. It has been recently recorded (in 2017). The species is fished at an artisanal scale and is prey of the Nile	The species is only known from two locations (one in the OAol and one in the mouth of Lake Victoria). An impact to the population within the OAol would significantly reduce the regional and potentially reduce the global viability of the species if it is not found elsewhere.

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
				perch; managing indirect impacts in the reservoir would support this species.	
Haplochromine	<i>Paralabidochromis</i> sp "Nile"	NE	2	Sensitivity: Medium	Consequence: Major
				This is a riverine species preferring moving water over a rocky substrate (but not rapids) the species may therefore be moderately affected by changes in water flow associated with HPPs. It has been recently recorded (in 2017). The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	OAol and one in the mouth of Lake Victoria). An impact to the population within the OAol would significantly reduce the regional and potentially reduce the global viability of the species if it is not found elsewhere.
Other fishes	<i>Labeo victorianus</i>	CR	3	Sensitivity: High	Consequence: Moderate
				This is a lacustrine and riverine species but is widely fished and its eggs are considered to be a delicacy; where permanent river populations exist, it is likely to be sensitive to indirect fishing impacts when intensive and unregulated	This species is known from multiple lakes and rivers within the Lake Victoria basin. The dams at Jinja would have prevented any migration of this fish species between Lake Victoria and Lake Kyoga but the Red List also reports this species as now non-migratory with sedentary populations living in lakes. Impacts would therefore significantly affect

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
				gills nets are used across rivers. It was last recorded in 2010 (i.e. 5 years or more ago).	the local river population and possibly reduce the regional viability.
Haplochromine	<i>Mbipia</i> "blue"	NE	3	Sensitivity: High	Consequence: Moderate
				This species isn't a riverine specialist and is known from at least two locations in Lake Victoria; changes in water flow associated with HPP impacts are unlikely to have a significant impact on this species. The species was last recorded in 2012 (i.e. 5 years or more ago), (although gaps in records may be due to the monitoring approach). The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	This species is not a riverine specialist and is known from at least two locations in Lake Victoria, impacts to the river population would significantly affect the local viability and possibly reduce the regional viability.
Haplochromine	<i>Xystichromis</i> "earthquake"	NE	3	Sensitivity: High	Consequence: Moderate
				This species isn't a riverine specialist and is known from several locations in Lake Kyoga (according to the haplochromine specialist). The species was last recorded in 2011 (5 years or more ago), (gaps in records may also be	This species is not a riverine specialist and is known from Lake Kyoga, impacts to the river population would affect the local viability and possibly reduce the regional viability.

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
				due to the monitoring approach). The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	
Other Fishes	<i>Brycinus jacksonii</i>	LC	3	Sensitivity: High	Consequence: Low
				This species is known from rivers and lakes throughout the Victoria basin and is considered migratory. It was last recorded in 2013 (i.e. 5 years of more ago); construction of the dams at Jinja will have cut off the migratory route into and out of Lake Victoria. Further HPPs will act as barriers and reduce the movement of this species.	The impact of the Bujagali dam is likely to have been to a remnant population, already cut off from Lake Victoria (the dams at Jinja cut off migratory routes and impacted this species). The species is also an LC species known throughout the Victoria basin; impacts in the OAol would reduce local viability but would not affect regional viability of the species.
Haplochromine	<i>Haplochromis orthostoma</i>	VU	4	Sensitivity: Medium	Consequence: Moderate
				This is a lacustrine species and therefore adaptable to changes in water flow associated with HPP impacts. It was last record in the OAol in 2001. The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species.	As the species is known from three locations outside of the operational area of the Project (downstream from Isimba, Lake Kyoga and Lake Nawampasa), and is primarily a lacustrine species, any impacts may affect the local

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
					population but would be unlikely to affect the regional or global population.
Haplochromine	<i>Haplochromis</i> sp. "flameback"	NE	4	Sensitivity: Low	Consequence: Moderate
				This is a lacustrine species known from Lake Kyoga and the Upper Victoria Nile and therefore adaptable to changes in water flow associated with HPP impacts. It has been recently recorded (in 2017). The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species	The species found in three locations within the Projects operational area and in Lake Kyoga and is not dependent on a riverine habitat. Any impacts to the population in the operational area of influence of the Project would affect local and possibly regional viability at most.
Haplochromine	<i>Xystichromis</i> sp. nov. 'Kyoga flameback'	CR	4	Sensitivity: Low	Consequence: Moderate
				This is a lacustrine species known from Lake Nawampasa and the Upper Victoria Nile and therefore adaptable to changes in water flow associated with HPP impacts. It has been recently recorded (in 2017).	As the species is primarily a lake species known from Lake Nawampasa (the Kyoga lake system), impacts to the river population would affect the local viability and potentially regional viability but not global viability.
Other fishes		CR	4	Sensitivity: Medium	Consequence: Minor

Group	Species	IUCN status	Action Category	Summary justification for categorisation	
	<i>Oreochromis variabilis</i>			This is primarily a lacustrine species, recorded at multiple sites in Lake Victoria and satellite lakes and therefore adaptable to changes in water flow associated with HPP impacts. It has been recently recorded in the OAol. The species is fished at an artisanal scale and is prey of the Nile perch; managing indirect impacts in the reservoir would support this species	The species is a lacustrine CR species but known from a number of locations in Lake Victoria, Lake Kyoga and other satellite lakes. Any impacts to this species would affect local viability but is unlikely to impact the regional viability of the species.
Bivalves	<i>Sphaerium regularis</i>	EN	4	Sensitivity: Medium	Consequence: Minor
				This bivalve species prefers a muddy substrate and lacustrine conditions, changes to the flow of the river are considered unlikely to affect this species but it may be sensitive to fluctuations in the height of the river or wave action. Bivalve monitoring is not part of current Project monitoring but should be considered in the future to understand presence/absence and distribution of species.	The northern section of Lake Victoria is the important area for populations of this species, where it is known from a number of sites. Any impact to the species in the Upper Victoria Nile would affect the local viability of the species but regional viability would not be affected.

Appendix 2 Recommended actions for each Action Category

Recommended actions AC1

- Implement mitigation measures to reduce threats to riverine species and habitat, for example work with stakeholders; to enforce the 100 m riverine vegetation buffer along the banks of the Upper Victoria Nile including measures to re-vegetate where required; sustainable fisheries management within the Bujagali reservoir to reduce impacts to haplochromines.
- Targeted surveys to: (i) assess whether species that have not been recently recorded are still present in the Upper River Nile; and (ii) map the distribution of each species within the Upper River Nile.
- Extend the monitoring program so it includes the entire operational area of the Project and targets the preferred habitat types of AC1 and AC2 species to enable evaluation of their presence/absence and distribution over time, and thus understand Project impacts and outcomes of BAP actions.
- Fund NaFIRRI curators to undertake genetic analysis and publish descriptions of undescribed species.

Recommended actions AC2

- Cross reference with unpublished species records from Lake Victoria⁵ to improve understanding of each species distribution (surveys may be required in the Ugandan sections of Lake Victoria if records not found); re-assess CH status and risk once completed.
- Undertake genetic analysis and publish descriptions of undescribed riverine species when recorded.

Recommended actions AC3

⁵ National fisheries institutions such as NaFIRRI and their Tanzania equivalent (TAFIRI) hold a wealth of records of species from Lake Victoria but much of it remains unpublished. Work has begun to create a publically accessible database but this is not yet finished.

- Evaluate ongoing presence/absence of these species based on future monitoring data to support understanding of Project impacts and BAP outcomes.

Recommended actions AC4

- Continue monitoring to understand their presence/ absence in the Project area and Project impacts and BAP outcomes.