9 Critical Habitat Assessment

Contents

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List of Tables

PUBLIC DISCLOSURE AUTHORIZED

List of Figures

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9.1 Introduction

9.1.1 Approach and Relevant Lender Standards

The approach to this CHA followed the requirements of the World Bank and the International Finance Corporation (IFC), as set out in their Environmental and Social Safeguards (ESS 2018) and IFC guidance notes: (IFC GN6, 2019): Biodiversity Conservation and Sustainable Management of Living Natural Resources. The IFC PS6 / GN6 (2019) thresholds for determination of critical habitat were applied. The approach followed is also aligned with African Development Bank (AfDB) requirements as set out in their Operational Safeguard 3 (OS3) - Biodiversity, Renewable Resources and Ecosystem Services.

9.1.1.1 World Bank Standard for Biodiversity

The World Bank's ESS6 requires a differentiated risk management approach to habitats based on their sensitivity and values and address all habitats, categorized as 'Modified Habitat', 'Natural Habitat', and 'Critical Habitat', (as defined in Section 9.1.2) along with 'legally protected and internationally and regionally recognized areas of biodiversity value' which may encompass habitat in any or all of these categories.

Categorising habitats as Natural or Modified based on their condition needs to recognise that in practice, Natural and Modified Habitats exist on a continuum ranging from largely untouched, 'pristine' Natural Habitats to intensively managed Modified Habitats. It is important to note that land which has been or is used for shifting agriculture, hunting, grazing or selective timber harvesting may still be classified as Natural Habitat depending on the degree of transformation or degradation, or the degree of restoration if the drivers of degradation are no longer active (e.g. abandoned cultivated lands). Critical Habitats can be represented by Modified or Natural habitats depending on whether biodiversity features are present that meet the relevant criteria and the thresholds for Critical Habitat. This categorisation of habitats provides an indication of the level of risk a project poses to biodiversity and then provides a basis for determining the level of mitigation required to compensate for impacts on habitats of different conservation value e.g. loss or fragmentation. Both ESS6 and the IFC's PS6 requires an ultimate outcome of no net loss of biodiversity for Natural Habitat and net gain for Critical Habitat.

Projects with significant risks and adverse impacts on biodiversity require a Biodiversity Management Plan. Where there is a lack of scientific certainty or where impacts on biodiversity are uncertain, a precautionary approach is required, including implementation of the mitigation hierarchy, application of cost-effective mitigation measures and adaptive management.

ESS6 (in summary) states that projects can only be undertaken in Critical Habitat if a number of criteria are satisfied e.g. there are no other viable alternatives for the project in habitats of lesser biodiversity value; all national laws and international obligations of the host country's approval for the project in or adjacent to the Critical Habitat has been complied with; there is no likelihood of measurable adverse impacts on the biodiversity values for which the Critical Habitat was designated; there is no anticipated net reduction in a population of any Critically Endangered, Endangered or restricted range species over a reasonable time period; the project will be designed to achieve a net gain of those biodiversity values for which the Critical Habitat was designated, and that a robust appropriately designed long term biodiversity monitoring and evaluation program is integrated in to the Borrower's management program.

9.1.1.2 African Development Bank (AfDB)

The AfDB adopted an Integrated Safeguards System in 2013 with supporting guidance materials produced in 2015. Operational Safeguard 3 (OS3) - Biodiversity, Renewable Resources and Ecosystem Services adopts similar language to that of IFC PS6. Specific objectives of OS3 are to "endeavour to reinstate or restore biodiversity, including, where some impacts are

unavoidable, through implementing biodiversity offsets to achieve 'no net loss but net gain' of biodiversity" (AfDB 2013). In addition, OS3 states that '*for projects that are being developed in natural habitats, modified habitats with significant conservation value, critical habitats or legally protected areas, the borrower or client incorporates the best available science and engages internationally recognised biodiversity experts in conducting the impact assessment and in developing and implementing mitigation and management strategies*' (ADB 2013).

The AfDB requirements of projects in Critical Habitat (AfDB 2015) are aligned with IFC requirements and also require a net gain of biodiversity for projects impacting biodiversity values that contribute to Critical Habitat. The AfDB safeguard for biodiversity specifically states the following:

'Projects may be permitted within Natural or Critical Habitats, with implementation of appropriate biodiversity offsets, if the borrower or client can demonstrate that:

- All other elements of the mitigation hierarchy have been implemented to the extent feasible before an offset program was developed.
- The project-related activities will not have adverse effects on the criteria for which the Critical Habitat was designated.
- The borrower or client can demonstrate that the project will not have negative effects on Critically Endangered or Endangered species.

A biodiversity monitoring program has been established, with results feeding into adaptive management of biodiversity impacts, and into the offsets program.

Under circumstances where development of biodiversity offsets is permitted by the Bank, this should be done in accordance with the principles of the Business and Biodiversity Offsets Program (BBOP) and with reference to offset design guidance which should be used by borrowers or clients to inform the design of biodiversity offsets' (ADB, 2015).

The AfDB recognises that projects impacting on Critical Habitat may require an extended process of identifying an offset and developing and implementing an offset programme. It specifies that such process requires engagement of partners, lenders and implementers.

9.1.2 Definitions of Habitat Status and Requirements

9.1.2.1 Natural Habitat

Natural Habitats are defined by ESS6 as "areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition". ESS6 indicates that habitats affected by human activities are still considered Natural Habitats if they: "(a) have limited impact on the species composition or ecological function of the habitat; (b) form part of a long-term pattern of traditional use, to which native species assemblages have adapted; (c) are no longer prevalent, and the habitat supports a mature and diverse community of predominantly native species; or (d) have not profoundly affected the habitats ability to recover its former ecological characteristics". It recognises that expert inputs may be required to determine whether the character and functions of the habitat remain essentially natural.

Under ESS6, if Natural Habitats are identified as part of the assessment, the Project will seek to avoid adverse impacts, in accordance with the mitigation hierarchy. Where Natural Habitats have the potential to be adversely affected by the project, the Project will not implement any project related activities unless:

a) There are no technically and financially feasible alternatives; and
b) Appropriate mitigation measures are put in place, in accordance with the mitigation hierarchy, to achieve no net loss and, where feasible, preferably a net gain of biodiversity over the long term. When residual impacts remain despite best efforts to avoid, minimize and mitigate impacts, and where appropriate and supported by relevant stakeholders,

mitigation measures may include biodiversity offsets adhering to the principle of "like-for-like or better."

9.1.2.2 Modified Habitat

Modified Habitats are "areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition"[1]. Modified Habitats may include areas managed for agriculture, forest plantations, reclaimed[2] coastal zones, and reclaimed wetlands. Examples of modified aquatic habitats include dams, river diversions, canals and dramatically altered flow regimes (World Bank 2021)[3].

ESS6 applies to those areas of Modified Habitat that include significant biodiversity value, as determined by the risks and impacts identification process required in ESS1. The Project should minimize impacts on such biodiversity and implement mitigation measures as appropriate.

9.1.2.3 Critical Habitat

A Criteria

Critical Habitat is a description of the most significant and highest priority areas for biodiversity conservation. It considers both global and national priority setting systems and builds on the conservation biology principles of 'vulnerability' (degree of threat) and 'irreplaceability' (rarity or uniqueness). Determination of Critical Habitat is based on quantitative thresholds of biodiversity priority, which are largely based on globally accepted precedents such as the International Union for Conservation of Nature (IUCN) Red List criteria and Key Biodiversity Area (KBA) thresholds.

As per ESS6, Critical Habitats are areas with high biodiversity importance or value, and include the following categories:

a) Habitat of significant importance to Critically Endangered and/or Endangered[4] species,
b) Habitat of significant importance to Endemic and/or Restricted-Range species,
c) Habitat supporting globally significant concentrations of migratory species and/or congregatory species,
d) Highly threatened and/or unique ecosystems, and/or
e) Ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d)5.

The AfDB's OS3, follows the five criteria specified by the IFC PS6 (as above but where Criterion 5 is "*Areas that are associated with key evolutionary processes*" rather than that specified by ESS6 (as per (e) above): "*Ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d).* AfDB OS3 criteria for Critical

[1] This excludes habitat that has been converted in anticipation of the project.

[2] Reclamation as used in this context is the process of creating new land from sea or other aquatic areas for productive use.

[3] World Bank 2021. ESS6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources: Technical Support Manual. Version 5.1 (April 2021).

[4] As listed on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species. The determination of Critical Habitat based on other listings is as follows: (i) If the species is listed nationally / regionally as critically endangered or endangered, in countries that have adhered to IUCN guidance, the Critical Habitat determination will be made on a project by project basis in consultation with competent professionals; and (ii) in instances where nationally or regionally listed species' categorizations do not correspond well to those of the IUCN (e.g., some countries more generally list species as "protected" or "restricted"), an assessment will be conducted to determine the rationale and purpose of the listing. In this case, the Critical Habitat determination will be based on such an assessment.

[5] Note: The IFC PS6/GN6 and the AFD's fifth criterion for determining critical habitats refers to Key Evolutionary Processes rather than Key Ecological Processes.

Habitat also includes i) *Areas that are important to species that are vital to ecosystems, such as keystone species*; and ii) *Areas that supply ecological networks.*

The World Bank's ESS6 and the African Development Bank OS3 does not provide specific guidance or thresholds for the determination of Critical Habitats. Therefore, Critical Habitats were assessed using the thresholds specified in the IFC Guidance Note 6 (IFC, 2019) which underpins the IFC PS6 (IFC, 2012) for the first four criteria.

ESS6 (in summary) states that projects can only be undertaken in Critical Habitat if a number of criteria are satisfied e.g. there are no other viable alternatives for the project in habitats of lesser biodiversity value; all national laws and international obligations of the host country's approval for the project in or adjacent to the Critical Habitat has been complied with; there is no likelihood of measurable adverse impacts on the biodiversity values for which the Critical Habitat was designated; there is no anticipated net reduction in a population of any Critically Endangered, Endangered or restricted range species over a reasonable time period; the project will be designed to achieve a net gain of those biodiversity values for which the Critical Habitat was designated, and that a robust appropriately designed long term biodiversity monitoring and evaluation program is integrated in to the Borrower's management program.

See Section 9.3 for further details on the Critical Habitat thresholds, approach used, and results of the CHA.

B Critical Habitat Thresholds

Thresholds used in this CHA are described and defined based on the IFC Guidance Note 6 (IFC 2019) (see Table 9-1) except for Criterion 5 (Key Ecological Processes) which is the fifth criterion of ESS6 and which replaces the IFC's fifth criterion: Key Evolutionary Processes.

Table 9-1 Critical Habitat Criteria (ESS6 & IFC PS6) and Thresholds (as per IFC PS6/GN6)

ESS6 Criteria (2018; clause 23)	IFC PS6 Criteria	Description	IFC PS6 Threshold(s)
(a) Habitat of significant importance to Critically Endangered or Endangered species, as listed in the IUCN Red List of threatened species or equivalent national approaches	**Criterion 1** (a) Critically Endangered and/or Endangered Species	Species threatened with global extinction and listed as CR and EN on the IUCN Red List of Threatened Species or on national or regional Red Lists shall be considered under Criterion 1. Critically Endangered species face an extremely high risk of extinction in the wild. Endangered species face a very high risk of extinction in the wild. The inclusion of species in Criterion 1 that are listed nationally/regionally as CR or EN in countries that have adhered to IUCN guidance, shall be determined on a project-by-project basis in consultation with competent professionals. This criterion may also apply to Vulnerable (VU) species where they are borderline and could be up-listed to EN or CR with further loss. Subspecies can be included in this criterion where such subspecies are formally recognised and assessed by IUCN.	(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (> 0.5% of the global population AND > 5 reproductive units of a CR or EN species). (b) Areas that support globally-important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in Criterion 1. (c) As appropriate, areas containing important concentrations of a nationally or regionally-listed EN or CR species.
(b) Habitat of significant importance to endemic or restricted-range species	**Criterion 2** (b) Endemic and/or restricted-range species	The term endemic is defined as restricted-range. In terms of IFC GN6, restricted range refers to a limited extent of occurrence (EOO). For terrestrial vertebrates and plants, a restricted-range species is defined as those species that have an EOO less than 50,000 square kilometres (km^2). For coastal, riverine, and other aquatic species in habitats that do not exceed 200 km width at any point (for example, rivers), restricted range is defined as having a global range of less than or equal to 500 km linear geographic span (i.e., the	Areas that regularly hold ≥10% of the global population size AND ≥10 reproductive units of a species.

ESS6 Criteria (2018; clause 23)	IFC PS6 Criteria	Description	IFC PS6 Threshold(s)
		distance between occupied locations furthest apart).	
(c) Habitat supporting globally or nationally significant concentrations of migratory or congregatory species	**Criterion 3** (c) Migratory and congregatory species	Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem). Congregatory species are defined as species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis.	(a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle. (b) Areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress.
(d) Highly threatened or unique ecosystems	**Criterion 4** (d) Highly-threatened and/or unique ecosystems	The IUCN is developing a Red List of Ecosystems, following an approach similar to the Red List for Threatened Species. The client should use the Red List of Ecosystems where formal IUCN assessments have been performed. Where formal IUCN assessments have not been performed, the client may use assessments using systematic methods at the national/regional level, carried out by governmental bodies, recognized academic institutions and/or other relevant qualified organizations (including internationally-recognized NGOs).	a) Areas representing ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN. b) Other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.
(e) Ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d).	**Criterion 5** (e) Key evolutionary processes	This criterion is linked to any of the four criteria above and is therefore not a standalone criterion for assessing critical habitat. In essence, it requires the assessment to consider the wider context of species or habitat distribution to ensure that the ecological processes that maintain such species or habitats are included. For example, this could refer to specific pollinators, food sources or movement corridors for CH-qualifying species. Such areas should therefore be considered when defining the Ecologically Appropriate Area of Analysis (EAAA) for the CHA.	There is no quantitative threshold for this criterion. Criterion 5 is reliant on scientific knowledge and understanding of the ecology of species and habitats. A qualitative / descriptive approach should be taken to identifying and assessing the applicability of this criterion.

Source: ESS6 (2018) and IFC Guidance Note,(IFC 2019).

For projects in protected areas or regionally or internationally recognised areas (e.g. KBAs), both ESS6 and IFC PS6 requires borrowers to ensure activities are consistent with the legal protection status and management objectives, consult relevant stakeholders and implement additional actions to enhance the conservation area aims and effective management. Further, ESS6 specifically states that borrowers are also required to "identify and assess potential project related adverse impacts and apply the mitigation hierarchy to prevent or mitigate impacts from projects that could compromise the integrity, conservation objectives or biodiversity importance of such an area".

The IFC PS6 guidance also requires that where projects are located within or adjacent to internationally and/or nationally recognised areas of high biodiversity values, such as Key Biodiversity Areas (KBAs), which encompass Important Bird and Biodiversity Areas (IBAs), these should be mapped and also taken into account during the CHA.

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9.1.3 Definition of Terms

Ruzizi Basin covers 6059 km^2 and is the spatial area within which species have been initially screened for potential critical habitat. This boundary has been used as context to show the species that may qualify for critical habitat at a basin scale.

The Ecologically Appropriate Area of Analysis (EAAA) is the geographic area considered during the CHA and is specific to each feature or group of similar features considered within the assessment. The approximate location of a project and its Area of Influence (AOI) are considered when establishing an EAAA. The project type, its impacts and its mitigation strategy are irrelevant when determining if Critical Habitat is present within the EAAA. The EAAA boundaries used in this CHA are described and mapped in Section 0 and are applicable only to selected fish species.

The Project Area of Influence (AOI) is the spatial geographic area within which the majority of direct and indirect project impacts are anticipated to occur and takes into account impacts such as habitat loss (temporary and permanent), and hydrological changes and disturbance, including edge effects.

The Study Area – this is the extent of the field survey area which has been studied during the 2022 surveys for terrestrial and aquatic ecology and which includes areas inside and outside of the AoI. The study area for this ESIA was focussed on the AoI upstream of Burundi. However, fish data for the downstream reaches to Lake Tanganyika have also been reviewed and referenced in this CHA where relevant.

9.1.4 Methodology

The field survey methodology is detailed in Volume III (Annexures) of the ESIA report with a detailed baseline description in Chapter 7. A short summary is listed below.

9.1.4.1 Data Sources

Key sources of available information for biodiversity were sourced from the following:

- Baseline study for the basin of Lake Kivu and the Ruzizi River (Sher Consult 2020)
- Draft ESIA for proposed Ruzizi III HPP (SOFRECO 2021a)
- Ruzizi III Fish Survey (SOFRECO 2021b)
- Ruzizi III Limnological Survey (Mulungula 2020)
- Rwanda Dragonfly Biotic Index (Uyizeye *et al.* 2021)
- Checklist of fishes of Rwanda (de Vos *et al*. 2001)
- IUCN Red list of threatened species (www.iucnredlist.org)
- Global Biodiversity Information Facility (www.gbif.org)
- Global information system on fishes (www.fishbase.org)
- African Dragonflies and Damselflies Online (http://addo.adu.org.za/)
- Published data on key species (various sources)
- Biodiversity of the Albertine Rift (Plumptre *et al.* 2003)
- Terrestrial Ecoregions of Africa (Burgess *et al.* 2004)
- Potential Natural Vegetation of East Africa project (Lillesø *et al*., 2011) (https://vegetationmap4africa.org)
- Various volumes of the Flore d'Afrique centrale (Meise Botanic Garden, Belgium)
- Birds in Rwanda – an atlas and handbook (Vande weghe & Vande weghe, 2011)
- Rwanda chapter of the Important Bird Areas of Africa (Kanyamibwa, 2001)
- Field guide to the Mammals of Africa (Kingdon, 2015)
- Field guide to the reptiles of East Africa (Spawls, 2002)

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Distribution maps in IUCN Online Assessments.

Unpublished and summarised fish survey data collected between 2015 and 2022 for the upper, middle and lower Ruzizi River was kindly made available from fish researchers at the Centre of Research in Biodiversity, Ecology, Evolution and Conservation (CRBEC) in DRC in collaboration with the Research Centre in Natural Sciences and Environment (CRSNE) at the University of Burundi [6]. In addition, fish location records for the potentially CH-qualifying species from the Royal Museum of Central Africa in Belgium was kindly provided by Jos Snoeks at the Royal Museum for Central Africa who supplied museum records on five potential CH-qualifying fish species.

Fish species identifications were supported and verified by fish taxonomist Denis Tweddle at the Southern African Institute for Aquatic Biodiversity (SAIAB) with input from Emmanuel Vreven and Kisekelwa Kisse (from CRBEC) on *Labeobarbus* species.

A Field Surveys

To supplement the available ecology data for the region, including that collected previously in the Ruzizi River by ecologists for SOFRECO (2020a), a five-day field survey was undertaken by Dr Robert Palmer (aquatic ecologist) and Warren McCleland (terrestrial ecologist) between 19 and 24 January 2022. An additional low flow fish survey was also undertaken on 27 February 2022 coinciding with non-peaking by upstream hydropower plants. A follow up bird and flora survey was also undertaken from 13 to 17 May 2024 to confirm the potential presence of target plant and bird species. Survey sites undertaken by SLR are shown in Figure 9-3 to Figure 9-2 while fish sampling sites conducted by CRBEC/CRSNE are shown in Figure 9-4.

Sampling activities included:

- Crab sampling using a baited crab net
- Sweep netting for macroinvertebrates
- Fish sampling using electrofisher and seine net, and
- Botanical, bird and mammal walked transect surveys.

B Sampling Sites

Terrestrial Biodiversity: A total of 18.87 km of walked transects were performed and 75 points sampled for flora in the Ruzizi III HPP area, including reservoir and dam wall, downstream reaches, transmission line, access road and proposed quarry sites. The supplementary flora and bird survey in May 2024 covered 18 km focussed in the construction areas along the Ruzizi River and 15 km of habitats along the transmission line corridor.

Aquatic Biodiversity: A total of 21 sites were sampled for aquatic biodiversity including 12 sites on the main Ruzizi River and nine on tributaries: eight on the Rubyiro River (including upstream tributaries, the Ntondwe, and Katabavuga and Njambwe streams); and one on the Ruhwa River. Only fish were sampled in the Rubyiro and Ruhwa tributaries.

[66] Note: access to the fish data was conditional on not publishing the detailed fish catch data at sampled sites. Only a fish list for each site was provided for use in this CHA. Future planned publication is expected to make more survey data available.

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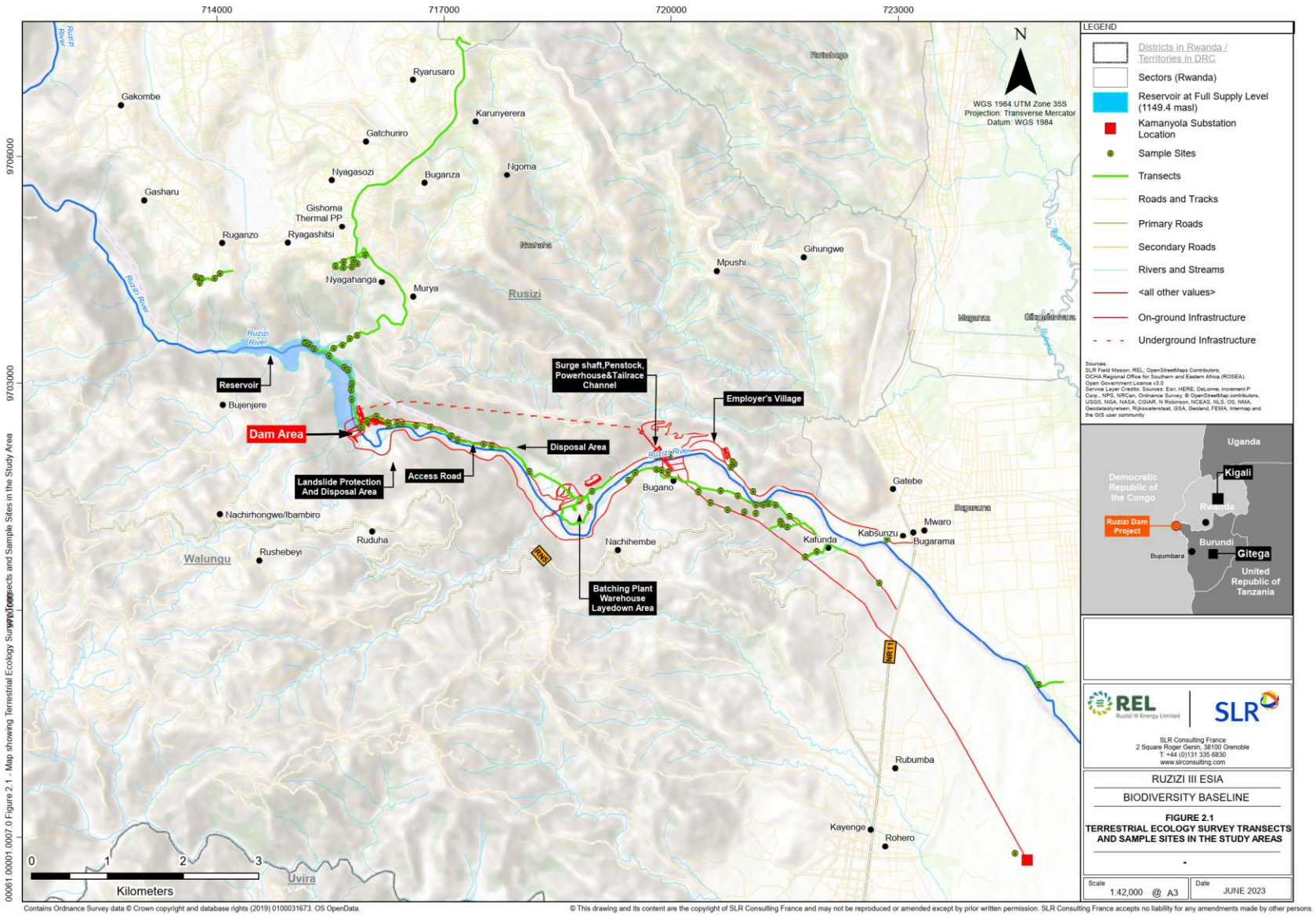

Figure 9-1 SLR 2022 Terrestrial Survey Sites Near Ruzizi III HPP within Rwanda and DRC Portion of Ruzizi Basin

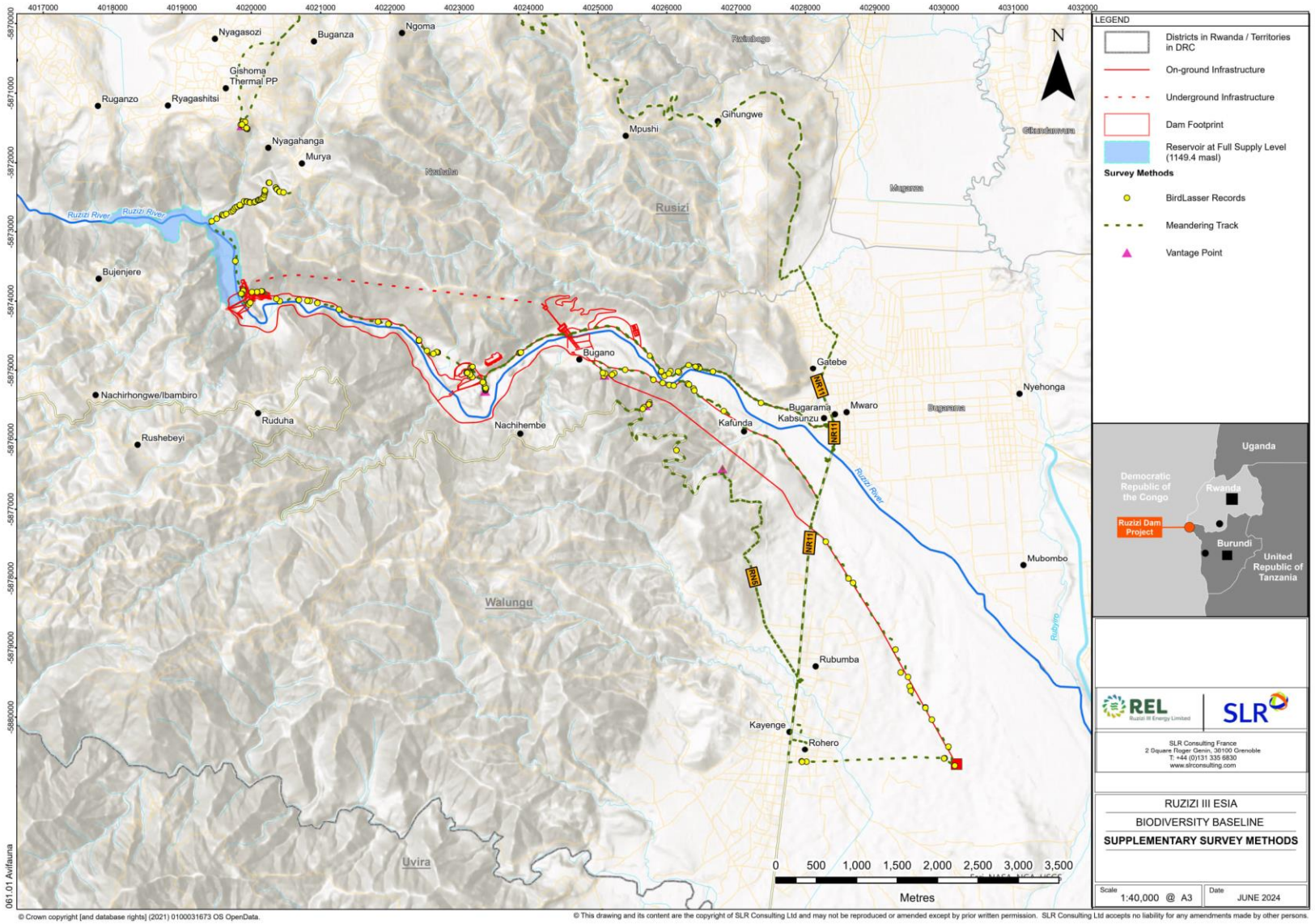

Figure 9-2 SLR May 2024 Terrestrial Survey Sites Near Ruzizi III HPP within Rwanda and DRC

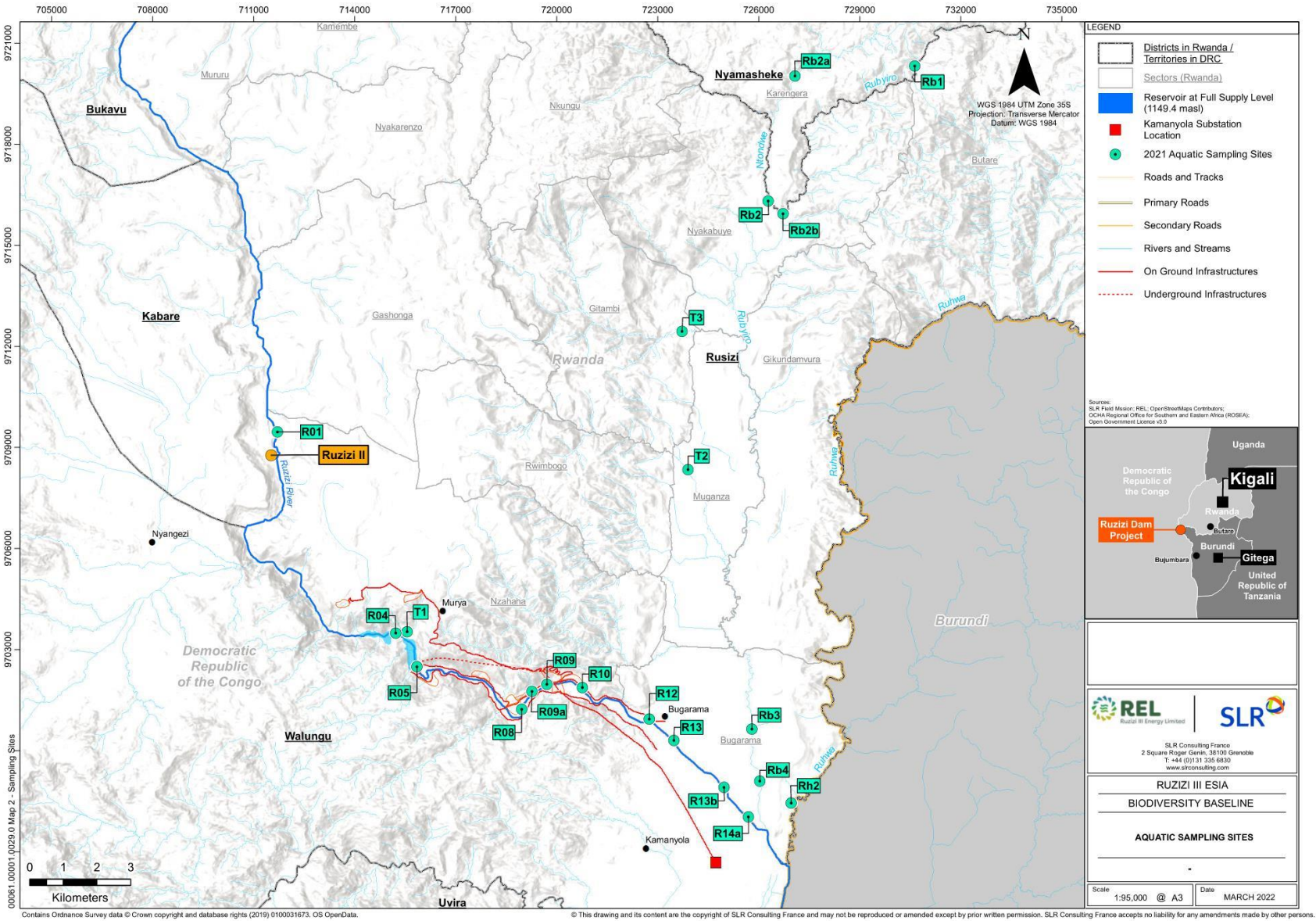

Figure 9-3 SLR 2022 Aquatic Survey Sites Near Ruzizi III HPP within Ruzizi Basin

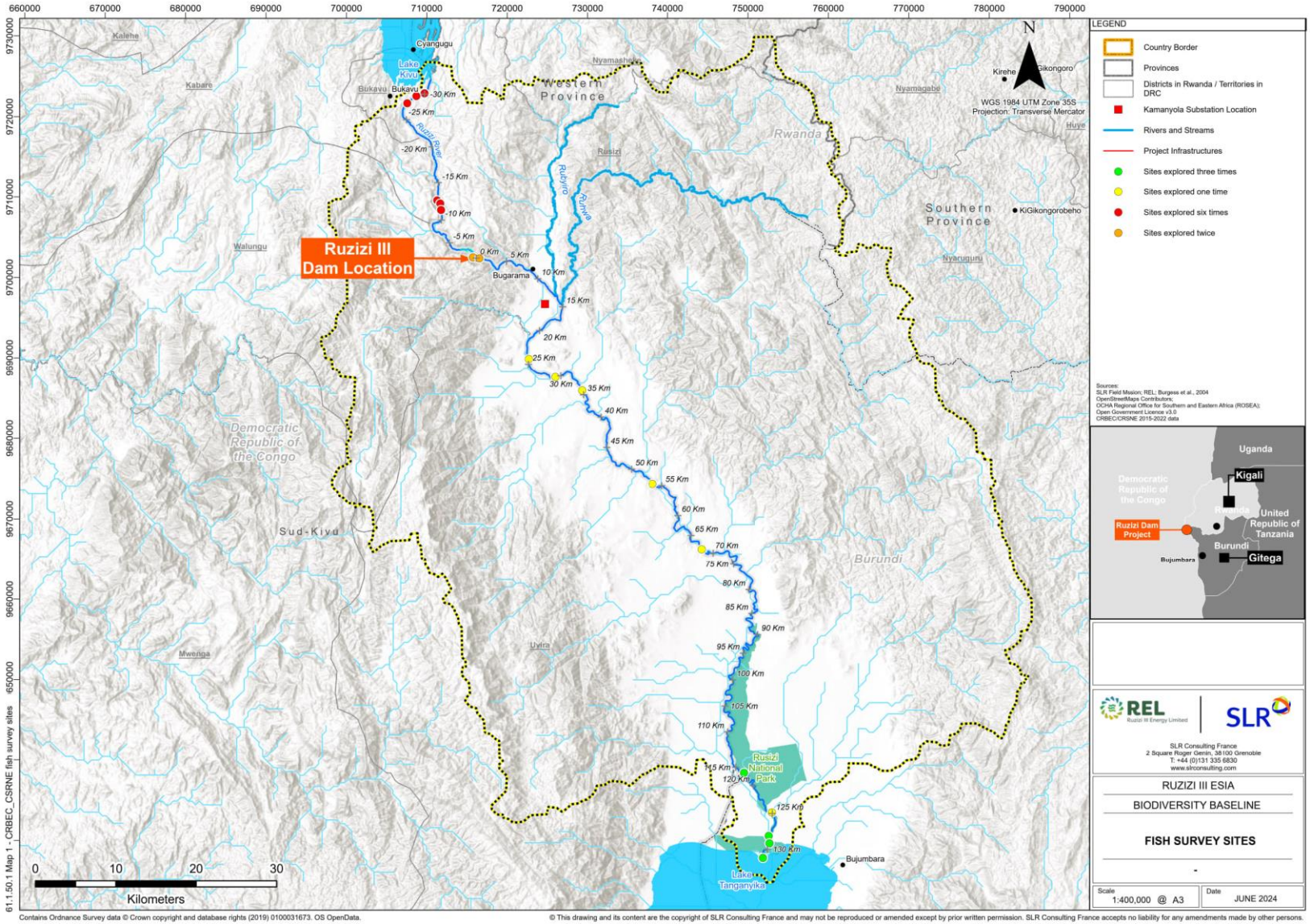

Figure 9-4 CRBEC/CRSNE 2015-2022 Fish Survey Sites in Ruzizi Basin

9.1.5 Approach to Critical Habitat Assessment

The key steps undertaken to identify Critical Habitat and assess impacts on it and its qualifying biodiversity features, are as follows:

1. Assembly and review of available information, including field survey results.
2. Screening of potential Critical Habitat qualifying species in the Ruzizi Basin.
3. Defining the Ecologically Appropriate Area of Analysis (EAAA) for screened in fish species groups.
4. Confirming which biodiversity features qualify as Critical Habitat using IFC PS6 / GN6 thresholds.

9.1.6 Assumptions and Limitations

The assumptions and limitations applicable to the field activities and findings of this report are detailed in Table 9-2. The majority of limitations are focussed on fish as this is the biodiversity feature that is of most relevance to the determination of Critical Habitat in this CHA.

Table 9-2 Assumptions and Limitations

Item	Heading	Description
1	Available biodiversity data	Available biodiversity information in the Ruzizi Basin is limited. This assessment was conducted using the best available information on presence and distribution of the biodiversity of the region and informed by additional field surveys and observations of the status of habitats in the project study area. However, it is acknowledged that some potentially threatened or restricted range species could have been missed.
2	Survey coverage	The 2022 survey covered representative habitats in the proposed reservoir area and along the proposed powerline as well as two proposed quarry areas in Rwanda. The survey did not cover the full extent of the project footprint, including the entire 7 km transmission line, and 46 ha reservoir area. A supplementary flora and bird survey in May 2024 covered 15 km focussed on grassland portions of the transmission line and 18 km of the Ruzizi River area in the area earmarked for project construction infrastructure. Additional quarry sites are expected to be identified during detailed design which have not yet been surveyed. In addition, some infrastructure footprints within the project boundary have not been defined or may be modified during more detailed design. Therefore, it is possible that some priority species that could be present may have been overlooked. However, given the degraded status of the majority of habitats it is unlikely that any important biodiversity features are present that are not covered by this CHA. In terms of fish data, since the surveys conducted for this ESIA did not extend into Burundi down to the Rusizi Ramsar Site, the additional fish data obtained for 2015 to 2022 from researchers at CRBEC/CRSNE (and affiliated to the Royal Museum of Central Africa) contributed valuable supplementary data to support the findings of this CHA.
3	Fish data and species identification	Publicly available fish data for the Ruzizi River and its affluent tributaries, and the region in general, is sparse and much of the reliable information is old, pre-dating the construction and operation of the two upstream hydropower projects (Ruzizi-I and -II) and which may no longer reflect the current fish distribution and status. Additional unpublished fish data collected from CRBEC/CRSNE from 2016-2022 in the Ruzizi catchment has provided further inputs and confidence to support revision of the initial CHA findings. Given concerns on potential Critical Habitat status of the Ruzizi River, the SLR team has made considerable effort to engage with local and international fish consultants and obtain more recent site-specific data to support the CHA in order to provide more certainty on fish presence than is available in public or online documents. This additional information was considered sufficient to conclude on the CH status of the Ruzizi River as provided in this report. In many cases available fish data does not identify fish to species level - particularly in the taxonomically difficult *Labeo/Labeobarbus* genus -making interpretation of some of the species data and their status difficult. Considerable effort has been spent in validating fish identifications using taxonomic experts to view high quality photographs to provide a robust as possible analysis of critical habitat. Further work is ongoing by CRBEC/CRSNE on the taxonomy of the *Labeo/Labeobarbus* records (with several unidentified specimens considered morphotypes (see point 7 below).

Item	Heading	Description
4	Spatial datasets	The spatial datasets on species distributions used for the purposes of this study were obtained from their EOO published by the IUCN (2021) and modified to include additional hydrobasins and IUCN designated 'possibly extant' areas where fish data has confirmed the presence of potential critical habitat qualifying species. These EOOs are determined based on known historical museum or published distributions, as well as by consulting experts. In all but instances of restricted-range species, sampling for fishes is impossible throughout their distribution ranges. Thus, many of the distributions are inferred based on expert knowledge and limited survey data and may therefore be inaccurate. This is particularly problematic where a species range may have contracted due to anthropogenic factors and may be misrepresented or excluded from the CHA.
5	Population size and extent of occurrence (Critical Habitat Assessment)	While the known and predicted spatial distribution of priority fish species is available on IUCN databases, there is no information on the population size in specific locations within each species' EOO. Therefore, a key assumption used in the Critical Habitat Assessment was that a species' EOO is a proxy for its population size which therefore assumes that a species population is evenly distributed across its EOO. This is unlikely to be the case as certain fish species will concentrate in different habitats on a seasonal basis depending on their feeding and breeding/spawning requirements. However, the approach of using a species EOO as a proxy for population size was used by Sayer *et al.* 2018 to identify Key Biodiversity Areas (KBAs) in the Lake Victoria Basin and therefore provides a precedent for this approach. Nonetheless it is important to infer potential variation in population distribution where habitats are not preferential for a species or where there is significant threat in certain areas of a species distribution.
6	Fish migration	Knowledge of cyclically predictable migrations of African freshwater fishes is incomplete and evidence is often anecdotal – relying largely on visual observations of large aggregations of juvenile or adult fish. While there is strong evidence to suggest that a large proportion of African tropical and subtropical fish depend on migration, the distances and functions of such migrations (e.g. dispersal, spawning, recolonization), is less clear. In the absence of a clearer understanding of the importance of the movement of priority fish species in the Ruzizi River including *Labeobarbus altianalis, L. caudovittatus, L. leleupanus, L. somereni* and *L. tropidolepis* a precautionary approach will have to be adopted to assess project impacts. Evidence for migration has therefore been obtained from the literature and based on inferences regarding habitat requirements. Freshwater fish movement can be inferred from repeated seasonal surveys, from radio telemetry studies, or mark recapture experiments. However, all these methods require lengthy multi-year studies which are not within the scope of the current assessment.
7	Fish taxonomy	Much of the freshwater fish research in the region is focussed on Lake Kivu and Lake Tanganyika both because of the importance of commercial fish catches and for the diversity of the endemic haplochromine cichlids that occur in both lakes. Taxonomic guides or keys for fish species in the Ruzizi River are not available and many anatomical features that distinguish species – particularly among the haplochromine species – require preserved specimens to be dissected by specialist taxonomists. Some of the fish species identities collected in this study are therefore types, or denoted "c.f." between the genus and species name, indicating that the specimen most strongly resembles the species indicated.

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9.2 Assessment of Natural and Modified Habitats

9.2.1 Habitat Types, Status and Extent

9.2.1.1 Habitat Types and Status

A full description of the habitats and species confirmed to occur in the Project AoI is described and mapped in Chapter 7. The habitat types present in the Project AoI and their assigned habitat status with rationale are described in Table 9-3.

Table 9-3 Habitat Status of Vegetation Communities/Faunal Habitats Represented in the Study Area

Vegetation Community/ Habitat	Habitat Status	Rationale
Hillslope Grassland / Savanna	Natural	Plant species composition is almost entirely indigenous species and typical ecological processes and functions are largely intact. However, landslides and soil erosion have reduced the integrity of certain functions of the vegetation, such as slope stabilisation; grassland patches are well connected, and important processes such as pollination and seed dispersal are likely to be largely intact.
Bare Rock	Largely Natural	Although this habitat is often associated with landslides, there are also areas of natural exposed sheetrock, particularly on steep slopes. These habitats have mostly been colonised by indigenous plant species and are likely to be moderately important habitat for the herpetofaunal assemblage (although these are likely exposed to human threat).
Riparian Thicket	Modified	The plant species composition of this community comprises mostly indigenous species, although certain thickets have been invaded by alien shrubs such as *Lantana camara* and *Tithonia diversifolia*. While most of the typical ecological processes and functions are largely intact, the thickets are fragmented and disconnected, which has likely impacted the integrity of some processes such as connectivity and dispersal for thicket fauna. Accordingly, the loss of connectivity and ecological functioning in areas of dense alien plant growth, denotes that the habitat has been modified
Riparian Wetland	Modified	The plant species composition of this community comprises mostly indigenous species, although some drier wetlands have been invaded by alien species such as *Parthenium hysterophorus, Ageratum conyzoides* and *Mimosa pigra.* Typical ecological processes and functions are intact in areas of indigenous vegetation, although some may be compromised by the unnatural daily flow modifications from upstream hydropower plants. The majority of the alluvium has been cleared for cultivation of cassava (*Manihot esculenta*). Due to the interspersed distribution of indigenous patches and their minimal size, the habitat was categorised as 'Modified'
Hillslope Thicket / Forest	Modified	While the plant species composition of this community comprises mostly indigenous species, many thickets remaining in the landscape are small and fragmented and have been invaded by alien shrubs such as *Lantana camara* and *Tithonia diversifolia*. Typical ecological processes and functions have been impacted due to the fragmented and disconnected nature of the thicket patches, which have reduced habitat connectivity and dispersal for thicket fauna.

Vegetation Community/ Habitat	Habitat Status	Rationale
Open Water (Middle Ruzizi River)	Modified	The Middle Ruzizi River habitat has been assessed as Modified Habitat largely due to the alteration of riverine ecological processes and level of degradation exhibited by aquatic biota, largely caused by sub-daily hydropeaking from Ruzizi I and II upstream, and level of catchment degradation. The aquatic study was focussed on the middle reach of the Ruzizi River and assessed the Present Ecological State (PES) of aquatic macroinvertebrates as *Seriously Modified* (Category E). This was based on low diversity and abundance of macroinvertebrates mostly dominated by species tolerant of poor water quality with a high proportion of air breathers and predators, and indicator species typical of modified habitats. In addition, the aquatic plant community was dominated by a filamentous algae that are typical of polluted conditions and diatom composition also indicated elevated concentrations of nutrients and suspended sediments. While the fish community was dominated by indigenous species with a few alien species, the species complement and assemblage structure has changed from historic natural conditions due to the operation of upstream hydropower plants and inundation of lotic habitats. This is reflected by the low diversity and abundance of fish-eating waterbirds and lack of common species that would be expected along a large river. With increasing distance downstream, the effects of hydropeaking diminish – also with additional tributary inputs - and the river downstream of Bugarama still contains populations of hippopotamus and Nile crocodiles. Note: further downstream, as the river enters the Ruzizi floodplain and Ramsar site (approximately 88 km from Ruzizi III) the lower Ruzizi River can be considered Natural Habitat.
Cultivation / Secondary Shrubland	Modified	This vegetation mosaic comprises habitat that is entirely Modified (cultivated lands, tree plantations) and largely Modified (Secondary Shrubland on fallow / abandoned fields). The Secondary Shrubland habitat has been classified as Modified even though it has regained some indigenous species and has regained some of the original functions of the habitat that was cleared for cultivation (e.g. slope stabilisation, carbon sequestration). However, it still has a high proportion of alien species and has severely impaired functionality compared to the woodland / thicket habitat that would originally have been cleared for cultivation.
Settlements (Towns & Villages)	Modified	Parts of the project area which comprise towns and villages, especially in the vicinity of Bugarama, Kamanyola and the numerous villages on the plateau near the quarry sites, are entirely Modified Habitat with very little evidence of the original plant species composition of the area; typical ecological process and functions are disrupted or severely impaired and human impact is evident throughout this habitat.

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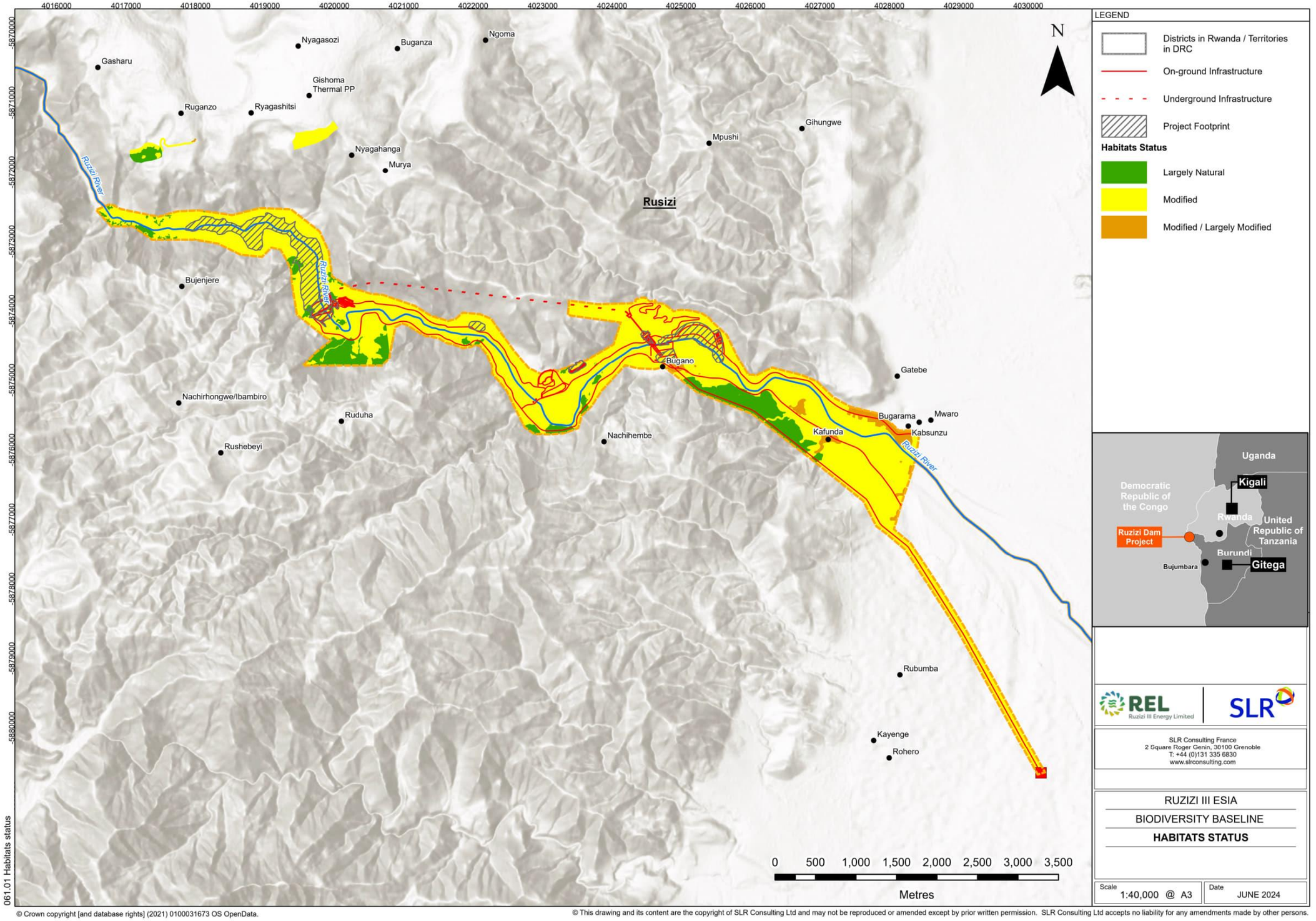

Figure 9-5 Habitat Status of the Ruzizi III HPP Project Area: Entire Terrestrial Area of Influence

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9.2.1.2 Quantification of Habitat Extents in the Project AoI

The extent of the various mapped habitat types and their habitat status (i.e. modified / natural) in the Project AoI are quantified in the below (Table 9-4). A detailed breakdown of the habitat type losses for different components is provided in Chapter 7.

In summary, the Ruzizi III Project will directly impact approximately 244 ha of terrestrial and aquatic habitats. The majority of land affected by the Project comprises a mosaic of cultivated land and degraded shrubland (approximately 154 ha or 63%). Included within the 244 ha of mapped units is 43 ha of open water which is assessed as Modified Habitat (as a result of the operation of upstream hydropeaking power projects and water pollution from upstream towns).

This quantification is based on broad areas identified for project infrastructure near the dam wall and powerhouse. Since no detailed design is available the actual project footprint within the infrastructure polygons is not confirmed and final residual habitat losses may be slightly different from estimated. The quantification should be refined once detailed layout and design footprints are available to quantify the net residual habitat losses.

Table 9-4 Summary Quantification of Spatial Extent of Habitat Status in the Project Area of Influence

Habitat Status	Direct AoI	
	Hectares	%
Largely Natural	18	7.5
Modified*	226	92.5
Total	**244**	**100**

* Includes 43 ha of open water

9.2.2 Protected Area and Internationally Recognised Areas

No protected areas and internationally recognised areas (Key Biodiversity Areas/Important Bird Areas) are located in close proximity to or within the project area of influence. Protected areas overlapping partially or entirely within the Ruzizi River Basin are described in Chapter 7 (Section 7.8.1) and shown in Figure 9-6.

The only conservation area of potential relevance to the evaluation of Project impacts is the Rusizi National Park located approximately 88 km downstream of the powerhouse which extends a further 40 km to Lake Tanganyika. This area is also a Wetland of International Importance (Ramsar Site) and a designated IBA, important for water birds and fish. Potential Critical Habitat-qualifying features of this area that may be relevant to the Ruzizi III HPP – migratory fish - are considered in the Critical Habitat Assessment, described in Section 9.3.

Upstream of the Rubyiro River (that joins the Ruzizi River just downstream of Ruzizi III) is the Nyungwe National Park, which is also an IBA and KBA mainly for forest biodiversity, located approximately 20 km from the Project. While this park is outside the Project AoI, it plays an important role in protecting the upper catchment of the Rubyiro River which contains important fish such as the Endangered *Chiloglanis asymetricaudalis* and possibly the Critically Endangered *Chiloglanis ruziziensis* which would qualify this river for Critical Habitat.

Table 9-5 provides a summary of potential CH-qualifying landscape features such as Protected Areas, Key Biodiversity Areas and Ramsar Sites (see Environmental Baseline for additional information).

Table 9-5 Potential Critical Habitat Qualifying Protected Areas in the Project Area of Influence

Protected Area	Description
Nyungwe National Park (Rwanda) - 1019 km^2	Nyungwe forest is situated in south-west Rwanda between Lake Kivu and the international border with Burundi, where it is contiguous with Kibira National Park. These parks overlap with the western portion of the Ruzizi Basin covering an area of approximately 100,000 ha and located approximately 20 km to the east and north-east of the PAOI. CH-qualifying species include chimpanzee (EN), L'Hoest's monkey (VU), Angolan colobus (VU) and owl-faced monkey (VU), and birds such as Shelley's crimsonwing (EN), red-collared mountain-babbler (EN) and Congo Bay owl (EN). These parks are the source of the major tributaries of the Ruzizi River, namely the Rubyiro and Ruhwa Rivers. Rubyiro River which contains important fish such as the Endangered *Chiloglanis asymetricaudalis* and possibly the Critically Endangered *Chiloglanis ruziziensis* which would qualify this river for Critical Habitat.
Cyamudongo Forest Reserve (Rwanda) – 415 ha	Cyamudongo forest is a small relict forest that is an outlier of the much larger Nyungwe Forest with its entirety located within the Ruzizi Basin. It is located approximately 14 km from the PAOI. CH-qualifying species includes a small population of chimpanzee (EN) is present in the forest. Numerous Albertine Rift bird endemics are present, although none of the highly threatened species occurring in Nyungwe are present due to the lower altitude. Furthermore, there have been no reports of chimpanzees from the reserve foraging within the PAOI.
Rusizi National Park (Burundi) – 6.2 km^2	Rusizi National Park is located north-west of Bujumbura along the border with the DRC at the southern end of the Ruzizi Basin. It comprises a floodplain of about 2 km wide and 35 km long along the east bank of the Ruzizi River and a smaller area of delta where the Ruzizi enters Lake Tanganyika, with the main Bujumbura – Uwinka road separating these two areas. The delta is a mixture of islands and channels covered with *Phragmites* and papyrus swamps, while the northern floodplain comprises *Hyphaene* palm savannah. The delta section of the park is an important area for migratory waterbirds, such as Madagascar pond heron (EN), great snipe (NT), lesser flamingo (NT) and Eurasian curlew (NT) as well as other threatened species such as hippopotamus (VU) and Nile crocodile (VU).

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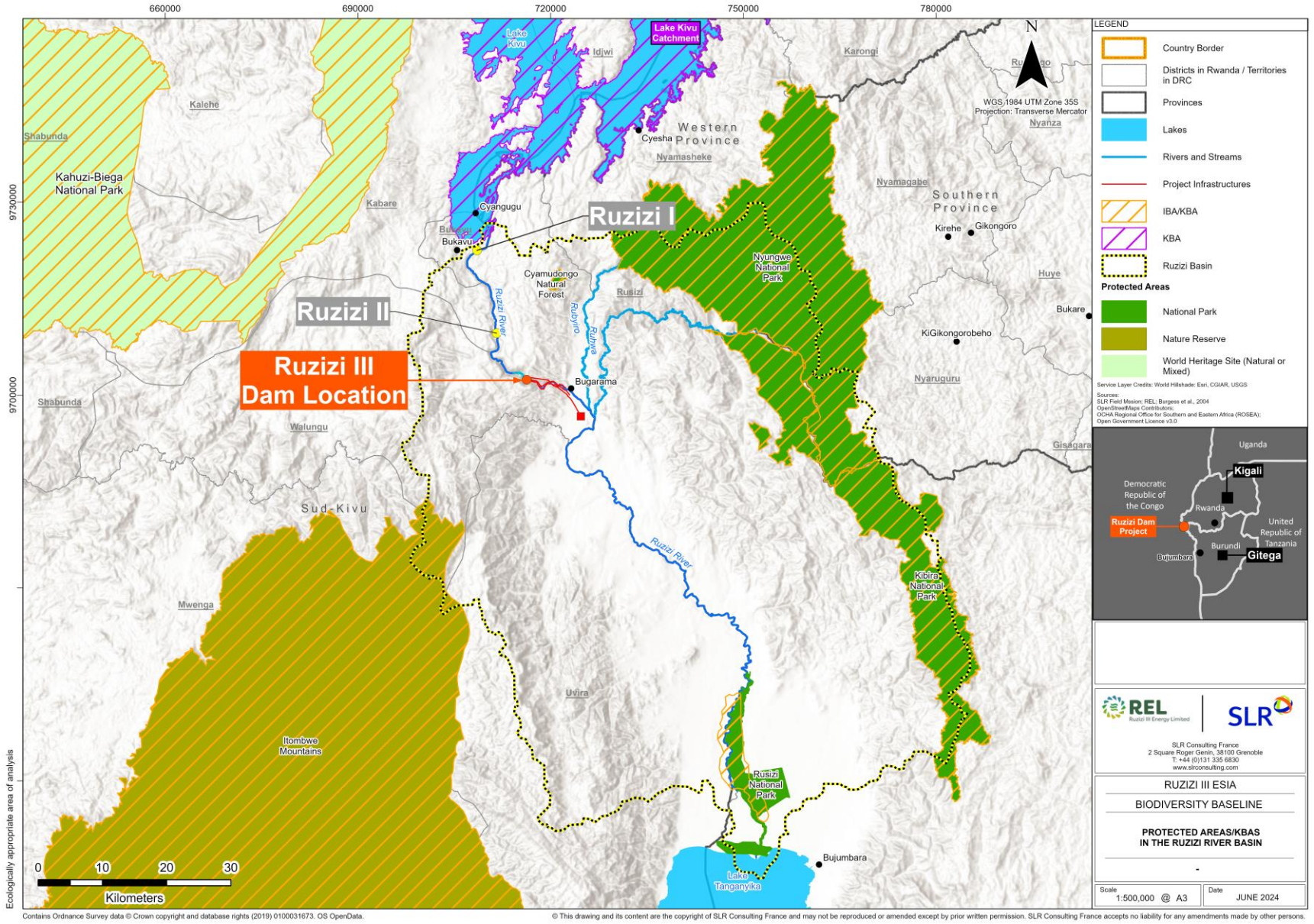

Figure 9-6 Protected Areas in Proximity to the Ruzizi River Basin

9.3 Critical Habitat Assessment

9.3.1 Objectives and Approach

The aim of this chapter is to determine if Critical Habitat is present within the Ruzizi III HPP Project Area of Influence as a basis for determining impacts and mitigation and the need for any compensation requirements.

This was done by the following steps:

- Screen the biodiversity features that may be present or have been confirmed in the Ruzizi Basin that may trigger Critical Habitat and select those that potentially qualify for further evaluation using IFC PS6 thresholds.
- Determine an appropriate spatial scope for the CHA and define the Ecologically Appropriate Area of Analysis (EAAA) for species or groups of species (with similar or identical ecological requirements). For this CHA this was only relevant for fish and was done separate for migratory and non-migratory fish as and described in Section 0.
- Evaluate each screened in biodiversity feature against the criteria and thresholds for determining Critical Habitat based on the International Finance Corporation GN6 (IFC, 2019).

The identification of Critical Habitat using IFC PS6 is based on five criteria, for which four criteria have quantitative thresholds, as summarised in Table 9-1 in Section 9.1.2.3.

9.3.2 Screening of Potential CH-Qualifying Species

9.3.2.1 Initial Screening of CR/EN, Restricted-Range and Migratory/Congregatory Species

Species known to occur in the Ruzizi Basin, and which may occur in the Ruzizi Project Area based on habitat suitability, and which could qualify for Critical Habitat are identified and screened in Table 9-6. These include the following types of species:

- Threatened species that are listed as CR or EN at global or national level. Note: there are no regional or country-specific species red lists applicable to DRC, Rwanda or Burundi.
- Threatened species listed by IUCN as VU where these are confirmed or highly likely to occur and where they are close to the threshold for being listed as endangered or which are of potential stakeholder concern.
- Restricted range species that have a confirmed or likely Extent of Occurrence of <50,000 km^2 or where aquatic species have a distribution of 500 km linear geographic span.
- Migratory / congregatory species.
- Keystone Species (AfDB Criterion).
- Ecological Networks (AfDB Criterion).

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Table 9-6. Initial Screening of CH-qualifying Species Confirmed or Likely to Occur in the Ruzizi Basin and Project Area

Scientific Name	IUCN Status	Restricted range	Migratory/ Congregatory	Habitat and Distribution	Likelihood of Occurrence	Rationale for Critical Habitat Screening	Screened In or Out
Flora							
Emilia subscaposa	EN	Yes (EOO: 706 km^2)	N/A	Prefers swamps, but has also been reported from sandy fallows, cassava fields, and dry grassland, at 775–1,030 masl.	Low	While much suitable habitat is present downstream of the project, this poorly known species has not been collected since 1971 and is only known from six specimens from the southern reaches of the Ruzizi River and is therefore unlikely to occur in the project AoI.	**Out**
Chlorophytum hirsutum	EN	No (EOO: 12,155 km^2)	N/A	Grows in open forest, Loudetia grassland, forest margins among boulders, gallery forest, ravine with Euphorbia; at 675-1,200 masl.	Moderate	Globally EN, but while there is some suitable habitat present in the project AoI it is only known from a few locations and has a low likelihood of being present	**Out**
Bulbostylis longiradiata	EN	No (EOO: 111,949 km^2)	N/A	Grows in grassland and open woodland at 800-1,250 masl.	Moderate	Some suitable present in the project area.	**Out**
Vernonia melanocoma	NT	Yes (EOO: 40,813 km^2)	N/A	An annual herb of roadsides in wooded grassland and grassland.	Moderate	Some suitable present in the project area.	**Out**
Birds							
Hooded Vulture *Necrosyrtes monachus*	CR	No (EOO: 22,500,000 km^2)	No	Occurs in open grassland, forest edge, wooded savanna and desert, often associated with human settlements north of the Equator.	Low	Although CR, it has a wide distribution and is generally absent from western Rwanda.	**Out**
White-backed vulture *Gyps africanus*	CR	No (EOO: 23,400,000 km^2)	No	Occurs in open wooded savanna, particularly areas of *Acacia.*	Low	Although CR, it is absent from western Rwanda and occurs in less degraded habitats than those present in the project area.	**Out**
Rüppell's vulture *Gyps rueppelli*	CR	No (EOO: 14,200,000 km^2)	No	Prefers open landscapes such as open Acacia woodland, grassland and montane regions.	Low	Although CR, it is absent from western Rwanda and occurs in less degraded habitats than those present in the project area.	**Out**
Congo bay-owl *Phodilus prigoginei*	EN	Yes (EOO: 4,900 km^2)	No	Occurs in a mosaic of grassland and either montane or bamboo forest, above 1,800 masl.	Very Low	Extremely unlikely to be present in the project area since no suitable habitat present and occurs at higher altitudes than those in the project area.	**Out**
Lappet-faced vulture *Torgos tracheliotos*	EN	No (EOO: 34,200,000 km^2)	No	Found in dry savanna, arid plains, deserts and open mountain slopes, up to 3,500 masl.	Low	Absent from western Rwanda and occurs in less degraded habitats than those present in the project area.	**Out**

Scientific Name	IUCN Status	Restricted range	Migratory/ Congregatory	Habitat and Distribution	Likelihood of Occurrence	Rationale for Critical Habitat Screening	Screened In or Out
Secretarybird *Sagittarius serpentarius*	EN	No (EOO: 23,200,000 km²)	No	Prefers open landscapes, ranging from open plains and grasslands to lightly wooded savanna, but is also found in agricultural areas and semi-desert.	Low	Very rare in Rwanda and not recorded in the west. Also prefers less degraded habitats than those in the project area.	**Out**
Steppe eagle *Aquila nipalensis*	EN	No (EOO: 12,600,000 km²)	Yes Migratory	Occurs in open habitats such as grasslands, lightly wooded savannah and semi-desert shrublands during passage and when overwintering.	Low	A very rare non-breeding migrant in Rwanda, which has not been recorded in the west. Also prefers less degraded habitats than those in project area.	**Out**
Madagascar pond-heron *Ardeola idae*	EN	No (EOO: 1,050,000 km²)	Yes Migratory	Prefers freshwater wetlands, particularly shallow waterbodies fringed with vegetation and adjacent trees.	Low	Absent from western Rwanda and there is limited suitable habitat in the project area.	**Out**
Grey parrot *Psittacus erithacus*	EN	No (EOO: 4,460,000 km²)	No	Occurs in dense forest, including forest edges and clearings; also in gallery forest, mangroves, wooded savannah and cultivated areas close to forest.	Low	Although this species can tolerate moderate habitat modification and some disturbance, the level of habitat fragmentation and human disturbance in the project area is much higher than areas where this species usually occurs. The project area is also at the edge of its known distribution.	**Out**
Grey crowned crane *Balearica regulorum*	EN	No (EOO: 6,070,000 km²)	No	Occurs in shallow wetlands such as marshes, pans and dams with tall emergent vegetation, as well as riverbanks, shallowly flooded plains and temporary pools, sometimes foraging in adjacent grasslands, open savannas and croplands. Nearest known locality is the large Butambamo wetland to the north of the project area at 1,600 masl.	Low	No suitable breeding habitat present within the reservoir and downstream reaches of the Ruzizi River (at least until the Burundi border). Possible it may occasionally forage in cultivated lands downstream of Bugurama. Given its wide distribution it would not meet thresholds for critical habitat.	**Out**
Shelley's crimsonwing *Cryptospiza shelleyi*	EN	No (EOO: 123,000 km²)	No	Prefers the understorey of closed-canopy moist forest, often in valleys near water; also in low secondary growth at forest edges, forest clearings and glades; above 1,900 masl.	Very Low	No suitable habitat present and occurs at higher altitudes than the project area.	**Out**
Red-collared mountain-babbler *Kupeornis rufocinctus*	EN	No (EOO: 89,100 km²)	No	Confined to montane forest and bamboo at altitudes of 1,500-3,200 masl.	Very Low	No suitable habitat present and occurs at higher altitudes than the project area.	**Out**

Scientific Name	IUCN Status	Restricted range	Migratory/ Congregatory	Habitat and Distribution	Likelihood of Occurrence	Rationale for Critical Habitat Screening	Screened In or Out
Bateleur *Terathopius ecaudatus*	EN	No (EOO: 23,500,000 km^2)	No	Frequents open country, including grasslands, savanna and semi-desert, often foraging over secondary vegetation near towns. This species can tolerate significant disturbance and some habitat modification.	Moderate	Suitable foraging habitat present, but no extensive areas of natural habitat which would be important for breeding habitat. May only occur as a foraging non-breeding visitor. Given its wide distribution it would not meet thresholds for critical habitat.	**Out**
Martial eagle *Polemaetus bellicosus*	EN	No (EOO: 26,000,000 km^2)	No	Occurs in open woodland, wooded savanna, grassland and open thornbush; avoids densely populated areas.	Low	Absent from western Rwanda and occurs in less degraded habitats than those present in the project area. Given its wide distribution it would not meet thresholds for critical habitat.	**Out**
Lesser flamingo *Phoeniconaias minor*	NT	No (EOO:27,700,000 km^2)	Yes Congregatory	Occurs on large undisturbed alkaline and saline lakes and salt pans, occasionally occurring at other shallow open-water wetlands when on passage.	Low	Absent from western Rwanda; limited suitable open-water habitat present. Has a wide distribution.	**Out**
Black-winged pratincole *Glareola nordmanni*	NT	No (EOO: 5,560,000 km^2)	Yes Migratory	Occurs in open landscapes such as grasslands or large salt pans in its overwintering grounds in southern Africa.	Low	Very rare in Rwanda and not recorded in the west.	**Out**
Eurasian curlew *Numenius arquata*	NT	No (EOO: 20,700,000 km^2)	Yes Migratory	Mostly coastal habitats during the austral winter, rarely occurring inland at lakes and rivers.	Low	Very rare in Rwanda and not recorded in the west, although known to occur in the lower Ruzizi floodplain in Burundi.	**Out**
Pallid harrier *Circus macrourus*	NT	No (EOO: 10,900,000 km^2)	Yes Migratory	Occurs in open landscapes such as grasslands or lightly wooded savannah in its overwintering grounds in southern Africa.	Moderate	Scattered records from western Rwanda; known to forage over cultivated lands, so suitable habitat present.	**Out**
Black-tailed godwit *Limosa limosa*	NT	No (EOO: 30,300,000 km^2)	Yes Migratory	Occurs in freshwater habitats during the austral winter, such as swampy lake shores, pools, flooded grassland and irrigated rice fields.	Low	Very rare in Rwanda and not recorded in the west.	**Out**
Great snipe *Gallinago media*	NT	No (EOO: 9,730,000 km^2)	Yes Migratory	Occurs in marshlands and short grass or sedges on lake edges or in flooded fields.	Low	Absent from western Rwanda; limited suitable habitat present.	**Out**
Red-footed falcon *Falco vespertinus*	VU	No (EOO: 2,280,000 km^2)	Yes Migratory	Occurs in open landscapes such as grasslands or lightly wooded savannah in its overwintering grounds in southern Africa.	Low	Occurs on passage over the project area, usually flying at great height, so unlikely to forage within the project area.	**Out**
Rockefeller's sunbird *Cinnyris rockefelleri*	VU	Yes (EOO: 16,000 km^2)	No	Prefers thickets along streams in bamboo forest, as well as montane forest and afro-alpine moorland.	Very Low	No suitable habitat present and does not occur at similar altitudes as project area	**Out**

Scientific Name	IUCN Status	Restricted range	Migratory/ Congregatory	Habitat and Distribution	Likelihood of Occurrence	Rationale for Critical Habitat Screening	Screened In or Out
Grauer's broadbill *Pseudocalyptomena graueri*	VU	Yes (EOO: 45,600 km²)	No	Inhabits interior of primary rainforest, occasionally at edges or clearings.	Very Low	Not yet recorded in Rwanda; no suitable habitat present.	**Out**
Chapin's flycatcher *Fraseria lendu*	VU	Yes (EOO: 31,900 km²)	No	Occurs in dense montane forest between 1,470 and 1,820 masl.	Very Low	Not yet recorded in Rwanda; no suitable habitat present.	**Out**
Mammals							
African forest elephant *Loxodonta cyclotis*	CR	No (EOO: >50,000 km²)	No	Occurs in a variety of forest habitats including lowland humid forest, swamp forests, lower reaches of Afromontane forests, dry forests and forest-savanna mosaics.	Very Low	No suitable habitat present and high disturbance levels in project AoI.	**Out**
Chimpanzee *Pan troglodytes*	EN	No (EOO: >50,000 km²)	No	Occurs in primary and secondary moist lowland forest, swamp forest, submontane and montane forest, dry forest, forest galleries in savanna woodland, and farmland.	Low	Limited suitable habitat present, habitat degradation is severe and human density is high.	**Out**
Foa's red colobus *Piliocolobus foai*	EN	Yes (EOO: 6,700 km²)	No	Occurs in primary montane and submontane forest from 800 to 2,270 masl.	Very Low	No suitable habitat present and high disturbance levels.	**Out**
White-bellied pangolin *Phataginus tricuspis*	EN	No (EOO: >50,000 km²)	No	Occurs in moist tropical lowland forests and secondary growth, but also occurs in dense woodlands, especially along water courses; associated with abandoned oil palm plantations in some areas.	Low	Limited suitable habitat present, habitat degradation is severe and human density is high.	**Out**
Ulindi River red colobus *Piliocolobus lulindicus*	EN	No (EOO: 104,800 km²)	No	Poorly known; recorded from primary lowland forest and along rivers.	Very Low	No suitable habitat present and high human density in project AoI.	**Out**
Giant ground pangolin *Smutsia gigantea*	EN	No (EOO: >50,000 km²)	No	Occurs in primary and secondary rainforest forest formations, gallery forests, swamp forests, forest-savannah mosaic habitats and wooded savannah.	Very Low	No suitable habitat present and high human density in project AoI.	**Out**
Rahm's brush-furred rat *Lophuromys rahmi*	NT	Yes (EOO: 25,832 km²)	No	Inhabits dense primary montane forest; has been recorded in secondary forest and sparse bamboo stands covered with grass.	Very Low	No suitable habitat present.	**Out**
Moon forest shrew *Sylvisorex lunaris*	NT	Yes (EOO: 46,659 km²)	No	Occurs in primary and secondary montane tropical moist forest and swamps above 1,700 masl.	Very Low	No suitable habitat present.	**Out**

Scientific Name	IUCN Status	Restricted range	Migratory/ Congregatory	Habitat and Distribution	Likelihood of Occurrence	Rationale for Critical Habitat Screening	Screened In or Out
African straw-coloured fruit-bat *Eidolon helvum*	NT	No (EOO: >50,000 km^2)	Yes Migratory	Occurs in a very wide range of habitats; can also inhabit wooded areas in large urban areas, often roosting in cities and towns	High (not confirmed)	Suitable habitat present and can persist in degraded habitats and densely settled areas. However, even if it is present, it is highly unlikely to occur in numbers high enough to trigger the criterion for migratory species, i.e. over 100 000 individuals[7]	**Out**
Hippopotamus *Hippopotamus amphibius*	VU	No (EOO: >50,000 km^2)	No	Occurs along rivers and lakes throughout the savanna zone of Africa, and in the main rivers of the forest zone in Central Africa.	Confirmed	This species has been included as a species of potential stakeholder concern. However, as a widespread VU species it does not trigger any of the CH criteria since it is not close to the threshold for being upgraded to EN or CR and does not occur in sufficient numbers to trigger Criterion 1 even if it was listed as EN.	**Out**
Ruwenzori shrew *Ruwenzorisorex suncoides*	NT	Yes (EOO: 54,551 km^2)	No	Associated with damp and dense mossy vegetation in montane primary tropical moist forest.	Very Low	Has been included based on its EOO being very close to the threshold of 50,000 km^2. However, there is no suitable habitat present in the project area and the species also occurs at higher altitudes than the project AoI.	**Out**
Delany's swamp mouse *Delanymys brooksi*	VU	Yes (EOO: 16,941 km^2)	No	Confined to high altitude marshes within bamboo and montane forest.	Very Low	There is no suitable habitat present in the project area and the species also occurs at higher altitudes than those in the project AoI.	**Out**
Lemara shrew *Crocidura lanosa*	VU	Yes (EOO: 8,548 km^2)	No	Prefers primary montane forest, Cyperus swamps, and bamboo forests; has been recorded from secondary montane forest and in disturbed areas above 1,850 masl.	Very Low	No suitable habitat present.	**Out**
Medium-tailed brush-furred rat *Lophuromys medicaudatus*	VU	Yes (EOO: 14,204 km^2)	No	Inhabits montane forests and swamps, avoiding modified habitats.	Very Low	No suitable habitat present.	**Out**
Kemp's thicket rat *Thamnomys kempi*	VU	Yes (EOO: 18,935 km^2)	No	Occurs in thickets in open areas of montane secondary forests (and occasionally in primary forests).	Very Low	Project area well below the altitudinal limit for this species.	**Out**

[7] Based on a conservative global estimate of 10 000 000 individuals (Cooper-Bohannon et al. 2020)

Scientific Name	IUCN Status	Restricted range	Migratory/ Congregatory	Habitat and Distribution	Likelihood of Occurrence	Rationale for Critical Habitat Screening	Screened In or Out
Herpetofauna							
Kivu screeching frog *Arthroleptis pyrrhoscelis*	LC	Yes (EOO: 34,662 km²)	No	Occurs primarily in montane grasslands, although it has also been observed in disturbed areas such as road ditches and banana plantations; 1,000 to 2,100 masl.	High	Although there might be some suitable to support this species in the project area, the low proportion of natural habitat makes it unlikely that sufficiently large populations would be present to trigger CH status	**Out**
Bururi long-fingered frog *Cardioglossa cyaneospila*	NT	Yes (EOO 24,458 km²)	No	A species of montane forests, presumably breeding along streams; 1,467 to 2,000 masl.	Moderate	Although there might be some suitable habitat to support this species in the project area, the low proportion of forest habitat makes it unlikely that it is present or in sufficiently large populations to trigger CH status. Most of the project area is below its typical elevation range.	**Out**
Kivu banana frog *Afrixalus orophilus*	LC	Yes (EOO 46,537 km²)	No	Poorly known species, but has been found in montane grassland, montane bamboo forests, and in wetland areas in reeds and papyrus. Recorded at 1,500 masl.	High	Although there might be some suitable habitat to support this species in the project area, the low proportion of suitable habitat makes it unlikely that sufficiently large populations would be present to trigger CH status. Most of the project area is below its typical elevation range.	**Out**
Hyperolius discodactylus	LC	Yes (EOO 12,383 km²)	No	Known to occur mostly in montane forests, usually near rivers, streams and swamps; 1,600 to 2,700 masl.	Moderate	Although there might be some suitable habitat to support this species in the project area, the low proportion of suitable habitat makes it unlikely that sufficiently large populations would be present to trigger CH status. Most of the project area is below its typical elevation range.	**Out**
Bushoho reed frog *Hyperolius frontalis*	LC	Yes (EOO 26,818 km²)	No	Occurs across a wide altitudinal range (700 to 2,000 masl) and has been recorded in lowland and montane forest; also occurs in dense secondary vegetation overhanging streams and in small marshes in forest.	Moderate	Although there might be some suitable habitat to support this species in the project area, the low proportion of suitable habitat makes it unlikely that sufficiently large populations would be present to trigger CH status.	**Out**

Scientific Name	IUCN Status	Restricted range	Migratory/ Congregatory	Habitat and Distribution	Likelihood of Occurrence	Rationale for Critical Habitat Screening	Screened In or Out
De Saeger's river frog *Amietia desaegeri*	LC	Yes (EOO 37,203 km²)	No	Occurs in streams in submontane and montane rainforest; known to tolerate significant habitat disturbance; 1,000 to 3,000 masl.	High	Although there might be some suitable to support this species in the project area, the low proportion of natural habitat makes it unlikely that sufficiently large populations would be present to trigger CH status and much of the project area is below its typical elevation range.	**Out**
Schoutenden's Montane Dwarf Chameleon *Trioceros schoutedeni*	DD	Yes (EOO 14,000 km²)	No	Habitat poorly known but has been collected in montane forest; 1,000 to 3,000 masl.	Moderate	Although there might be some suitable to support this species in the project area, the low proportion of natural habitat makes it unlikely that sufficiently large populations would be present to trigger CH status	**Out**
Uvira thread snake *Leptotyphlops latirostris*	NT	Yes (EOO 14,000 km²)	No	Occurs in savanna, evergreen bushland and secondary Acacia grassland below 1,000 masl.	High	Although there might be some suitable to support this species in the project area (along the transmission line route), the low proportion of natural habitat makes it unlikely that sufficiently large populations would be present to trigger CH status.	**Out**
Rwanda five-toed skink *Leptosiaphos graueri*	EN	Yes (EOO <50,000 km²)	No	Has been recorded in various microhabitats in wet montane forest and upland wetlands; 1,500 to 3,000 masl.	Moderate	Although there might be some suitable to support this species in the project area, the low proportion of natural habitat makes it unlikely that sufficiently large populations would be present to trigger CH status and most of the project area is below its typical elevation range.	**Out**
Macroinvertebrates							
Potamonautes semilunaris (crab)	DD	Yes EOO unknown	No	Known from two sites in the DRC near Lake Kivu, neither of which are protected (Cumberlidge 2008).	Uncertain	Not expected to occur in the Project AoI and none were found during surveys in 2022.	**Out**
Agriocnemis palaeforma (damselfly)	VU	Yes EOO 127,552 km² AOO = 200 km²	No	Typically associated with Papyrus swamps	Low	IUCN listed as VU but not range restricted. Unlikely to occur in the Project AoI because there are no Papyrus swamps.	**Out**
Platycypha pinheyi (damselfly)	NT	Yes EOO = 15,931 km²	No	Known only from five locations in the DRC, Tanzania and Zambia, including the northern shores of Lake Tanganyika where it is typically associated on lake shores.	Low	IUCN listed as NT and although restricted range it is unlikely to occur in the Project AoI, but may occur in the Burundi portion of the project AoI, in the Rusizi National Park.	**Out**

Scientific Name	IUCN Status	Restricted range	Migratory/ Congregatory	Habitat and Distribution	Likelihood of Occurrence	Rationale for Critical Habitat Screening	Screened In or Out
Stenocypha molindica (damselfly)	NT	Yes EOO = <5,000 km^2	No	Typically associated with shaded forested streams.	Low	IUCN listed as NT and although restricted range it is unlikely to occur in Project AoI because there are no forested streams.	**Out**
Stenocypha jacksoni (damselfly)	NT	Yes EOO = 20,000 km^2	No	Typically associated with shaded forested streams.	Low	IUCN listed as NT and although restricted range it is unlikely to occur in Project AoI because there are no forested streams.	**Out**
Tropodiaptomus burundensis (copepod)	VU	Yes EOO unknown	No	Endemic to the Ruzizi River in Burundi (Reid 1996). Associated with standing or slow-moving water.	Low	IUCN listed as VU and although restricted range to Ruzizi River in Burundi, it is unlikely to occur in the Project AoI because of limited standing or slow-moving water.	**Out**
Fish							
Amphilius ruziziensis	NE	Yes (EOO: 7,790 km^2)	No	Range-restricted and endemic to the Ruzizi River and west bank Tanganyikan affluent tributaries. *Amphilius* species are adapted to fast-flowing rocky streams at high elevation, feeding on benthic aquatic macroinvertebrates.	Possible. Similar species confirmed in Rubyiro River in 2022	Range-restricted species to Ruzizi River (<500 km geographic span), listed by the IUCN as Not-Evaluated and therefore its conservation status is currently unknown. Likely to qualify Ruzizi Basin as CH under Criterion 2 threshold.	**In**
Astatoreochromis straeleni Bluelip haplo	LC	Yes (EOO: 15,335 km^2)	No	Range-restricted species with its global extant distribution including Lake Kivu and the northern shores of Lake Tanganyika, including the Ruzizi and Malagarazi Rivers. Primarily a lacustrine (lake-dwelling) fish.	Not confirmed in 2021/22	Restricted range (<500 km geographic span), non-migratory species listed by IUCN as LC. Likely to qualify Ruzizi Basin as CH under Criterion 2 threshold.	**In**
Astatoreochromis vanderhorsti	LC	No (EOO: 52,790 km^2)	No	This is a junior synonym of *A. straeleni* and therefore equivalent to the above species.	-	-	**Out**
Astatotilapia burtoni Burton's haplo	LC	No (EOO 155,792 km^2)	No	*H. burtoni* is common in Lake Tanganyika lagoons associated with inflowing rivers. Primarily a lacustrine (lake-dwelling) species in the early phases of adaptive divergence between river and lake populations.	Confirmed in 2021/22 fish surveys. Likely present in low abundance.	IUCN listed as LC and although it is a localised endemic it does not qualify as restricted-range and does not meet the Criterion 2 threshold for the Ruzizi Basin.	**Out**
Astatotilapia stappersii	LC	No (EOO: 88,162 km^2)	No	Present in Lake Tanganyika and affluent rivers. Mouth-brooding haplohromine cichlid. Primarily a lacustrine (lake-dwelling) fish.	Not confirmed in 2021/22 fish surveys. Likely present in low abundance.	IUCN listed as LC and is a localised endemic.	**Out**

Scientific Name	IUCN Status	Restricted range	Migratory/ Congregatory	Habitat and Distribution	Likelihood of Occurrence	Rationale for Critical Habitat Screening	Screened In or Out
Ctenochromis horei Hore's haplo	LC	Yes (EOO 55,535 km^2)	No	*C. horei* is a Lake Tanganyika endemic but is common in rivers including the Lukuga River draining into the Congo Basin and the Ruzizi. It is piscivorous occurring on sand bottoms in the lake. Primarily a lacustrine (lake-dwelling) fish.	Confirmed in Ruzizi River in 2021/22	IUCN listed as LC and is a localised endemic (<500 km geographic span). Likely to qualify the Ruzizi Basin as CH under Criterion 2 threshold.	**In**
Gnathochromis pfefferi	LC	Yes (EOO 55,535 km^2)	No	Endemic to Lake Tanganyika, Adults inhabit lakes, often solitary. Feed mainly on shrimps. Females brood their young in the mouth. Primarily a lacustrine (lake-dwelling) fish.	Not confirmed in 2021/22 fish surveys.	IUCN listed as LC and is a localised endemic (<500 km geographic span). Likely to qualify the Ruzizi Basin as CH under Criterion 2 threshold.	**In**
Oreochromis tanganicae Tanganyika tilapia	LC	No (EOO: 34,377 km^2)	No	Primarily a lacustrine (lake-dwelling) fish and not usually found in rivers.	Not confirmed in 2021/22 fish surveys.	IUCN listed as LC and although it is a restricted-range species mainly found in lake habitat it does not qualify the Ruzizi Basin under the Criterion 2 threshold.	**Out**
Chrysichthys sianenna Kanimba	LC	Yes (EOO:34,465 km^2)	No	Present in Lake Tanganyika and affluent rivers including Lower Malagarazi River. Common in deep water with a sandy bed. Upstream spawning migrations have been reported.	Not confirmed in 2021/22 fish surveys.	IUCN listed as LC and although it is a restricted-range species it is found mainly around Lake Tanganyika and therefore it has been screened out.	**Out**
Limnothrissa miodon Lake Tanganyika sardine	LC	No (34,377 km^2)	Yes Migratory	Endemic to Lake Tanganyika. Introduced into Lake Kivu. Primarily a lacustrine (lake-dwelling) fish.	Not confirmed in 2021/22 fish surveys.	IUCN listed as LC and although it is a restricted-range species endemic to Lake Tanganyika and migratory, it does not meet the Criterion 2 threshold for Ruzizi Basin and has been screened out.	**Out**
Acapoeta tanganicae Mbaraga	LC	No (EOO: 42,403 km^2)	Yes Migratory	Recorded from Lake Tanganyika and Lake Rukwa area of Western Tanzania. Occurs in rocky areas of lake and rivers in rapids. Migratory and common in rivers where it frequents rapids.	Not confirmed in 2021/22 fish surveys but IUCN report non-dated records exist of it occurring in Ruzizi River	IUCN listed as LC but is a migratory species recorded previously in the Ruzizi River with high conservation priority due its Evolutionary Distinctiveness (ED). Likely to qualify Ruzizi Basin as CH under Criterion 3 thresholds.	**In**

Scientific Name	IUCN Status	Restricted range	Migratory/ Congregatory	Habitat and Distribution	Likelihood of Occurrence	Rationale for Critical Habitat Screening	Screened In or Out
Enteromius lufukiensis	NT	Yes (EOO: 40,597 km²)	No	Known from rivers draining the western shores of Lake Tanganyika and the Ruzizi, and also reported from the Luama River, Congo River Basin, DRC. Its extent of occurrence is less than 41,000 km² and area of occupancy less than 2,000 km².	Not confirmed in 202122 fish surveys	IUCN listed as NT and is a restricted-range species (<500 km geographic span). Likely to qualify Ruzizi Basin as CH under Criterion 2 threshold.	**In**
Enteromius taeniopleura	LC	No (EOO: 168,180 km²)	No	*E. taeniopleura* is associated more strongly with the Tanganyikan-Congo basin and with rivers draining into Lake Tanganyika as well as the Lukuga River from the lake into the Congo system.	Not confirmed in 2021/22 surveys. Likely present in Ruzizi tributaries.	IUCN listed as LC but not a restricted-range species and does not meet the Criterion 2 threshold for Ruzizi Basin.	**Out**
Labeo cylindricus Redeye labeo	LC	No, although EOO: 19,851 km² (based on IUCN red list) is not accurate)	Yes Migratory	*L. cylindricus*, widespread throughout southern, central and eastern Africa. It is considered part of the "forskalii" group of species which are closely related and difficult to distinguish morphologically.	Confirmed in Ruzizi River in 2022	IUCN listed as LC which although appears to be restricted range based on IUCN red list has a wide distribution based on related morphological types. Although it is migratory it does not meet the Criterion 3 thresholds for Ruzizi Basin.	**In**
Labeobarbus altianalis Ripon barbel	LC	No (EOO 244,889 km²)	Yes Migratory	Widely distributed species. *L. altianalis* are rheophilic gravel-bed spawners and migrate upstream to spawn during the wet season. They are considered long-distance migrators (over 80 km), potentially migrating from as far downstream as the Ruzizi River mouth at Lake Tanganyika.	Confirmed in 2021/2022 surveys	Listed by IUCN as LC with wide distribution and migratory. Likely to qualify Ruzizi Basin as CH under Criterion 3 threshold.	**In**
Labeobarbus caudovittatus	LC	No (EOO: 70,198 km²)	Yes Migratory	Widely distributed mainstem migratory species recorded from the Congo River system DRC, as well as Angola and Zambia as well as the Ruzizi.	Not confirmed in 2021/2022 surveys but known to occur here	Listed by IUCN as LC, is not a restricted range species but is migratory. Likely to qualify Ruzizi Basin as CH under Criterion 3 threshold.	**In**

Scientific Name	IUCN Status	Restricted range	Migratory/ Congregatory	Habitat and Distribution	Likelihood of Occurrence	Rationale for Critical Habitat Screening	Screened In or Out
Labeobarbus leleupanus Leleup's carp	VU	Yes (EOO: 42,403 km^2)	Yes Migratory	Range-restricted species with its global extant distribution including Lake Kivu and the northern shores of Lake Tanganyika including the Ruzizi and Malagarazi Rivers.	Not confirmed in 2021/2022 surveys, but was present in the 1950s and 1960s.	Listed by IUCN as VU, is a range-restricted species (<500 km geographic span) and migratory. Qualifies the Ruzizi Basin as CH under Criterion 2 and 3 thresholds.	**In**
Labeobarbus somereni Someren's barb	LC	No (EOO: 51,339 km^2)	Yes Migratory	Occurs in the Ruzizi, Malagarazi and the middle and upper Kagera Rivers, and known from fast-flowing rivers in the Ruwenzoris. It is considered migratory of medium to long distances. It is mainly located in mountain stream ecosystems and is found in fast-flowing reaches in the Ruwenzori area.	Confirmed in October 2021 survey but not in 2022 surveys. Suggesting seasonality may be an important factor	Listed by IUCN as LC and migratory. Qualifies the Ruzizi Basin as CH under Criterion 3 threshold.	**In**
Labeobarbus tropidolepis	LC	No (EOO: 127,546 km^2)	Yes Migratory	Endemic to the Lake Tanganyika Basin where it is common in inshore catches. It is considered migratory of medium to long distances.	Not confirmed during the 2021/2022 surveys.	Listed by IUCN as LC, is a restricted-range and migratory species. Likely to qualify the Ruzizi Basin as CH under Criterion 3 threshold.	**In**
Raiamas moorii Lake Rukwa minnow	LC	No (EOO: 119,133 km^2)	No	Present in Lakes Tanganyika and Rukwa. Inhabits rivers and lakes where it is found in sandy bays.	Confirmed in Ruzizi River in 2022	IUCN listed as LC and although it is a near restricted-range species (mainly in lakes but confirmed in the Ruzizi River) it does not meet the Criterion 2 thresholds for Ruzizi Basin.	**Out**
Chiloglanis asymetricaudalis Longtail suckermouth	**EN**	Yes (EOO: 9,545 km^2)	No	Known from Ruzizi Basin but is also more widely distributed in the south to the Luiche River, an affluent river into Lake Tanganyika. The species is well adapted for inhabiting fast-flowing riffle-rapid habitats in rivers. With a sucker mouth that enables it to feed on algae and invertebrates in fast currents.	Possible. Confirmed in Rubyiro River in 2022. Unconfirmed recently in Ruzizi River.	IUCN listed as EN and is restricted range (<500 km geographic span) with historical records from Ruzizi River Basin, mainly in tributaries. Confirmed in Rubyiro River and likely to occur in Ruzizi River in low numbers. Qualifies Ruzizi Basin as CH under Criterion 1 and 2.	**In**
Chiloglanis ruziziensis Ruzizi suckermouth	**CR**	Yes (EOO: 10,347 km^2)	No	This species is known only from the Ruzizi River and tributaries. Inhabits rapids where it feeds on macro-invertebrates.	Possible. Not recorded in 2021/2022 Last official recording was in 1950s and mid-1980s	IUCN listed as CR and restricted range (<500 km geographic span), and there are historical records from Ruzizi River and its tributaries. Current abundance and distribution not known but may occur in Ruzizi River in low numbers. Qualifies Ruzizi Basin as CH under Criterion 1 and 2.	**In**

Scientific Name	IUCN Status	Restricted range	Migratory/ Congregatory	Habitat and Distribution	Likelihood of Occurrence	Rationale for Critical Habitat Screening	Screened In or Out
Lamprichthys tanganicanus Tanganyika killifish	LC	Yes (EOO: 34,377 km^2)	No	A native of Lake Tanganyika, it is primarily a lacustrine (lake-dwelling) species and its presence in the Ruzizi River may be incidental as recorded as introduced to Lake Kivu.	Confirmed in Ruzizi River in 2022	IUCN listed as LC and is a restricted-range species (<500 km geographic span).	**In**

9.3.2.2 Screening of Keystone Species and Ecological Networks

Keystone species and Ecological Networks are two additional criteria required by AfDB OS3.

A keystone species is a species that has a disproportionately large effect on its environment relative to its abundance (Paine,1995). There are no keystone species present in the Project Area. While hippopotamus is present in the Ruzizi River and will under normal circumstances play a significant ecological role in recycling nutrients and managing riparian vegetation density, they are not present in sufficient numbers in the Project AoI to be considered a keystone species in this predominantly modified environment. Further, no elephants or Nile crocodiles are present in the Ruzizi River reach (where the project is located) which would likely qualify as a keystone species.

In terms of ecological networks, the Project area would not qualify as Critical Habitat due to the extent of habitat modification and fragmentation across most of the area resulting in compromised ecological networks. It is not located within any corridor that serves as an important connection between discrete areas of natural biodiversity or protected areas where animal movement or plant pollinators or gene flow is critical to the survival of important species.

While the Ruzizi River serves as an important corridor for migratory fish species to reach upstream spawning grounds, the functionality of this corridor has been significantly compromised by other hydropower projects upstream that form barriers to fish connecting between Lake Tanganyika and Lake Kivu. For these reasons, the Project AoI is not considered to be located within an Ecological Network that could qualify as Critical Habitat, although the ecological processes that maintain migratory fish need to be recognised and managed to optimise their survival.

In summary, there are no keystone species or ecological networks in the Ruzizi River mainstem or the project area of influence that would qualify for Critical Habitat under these two AfDB criteria and they are not considered further.

9.3.2.3 Summary of Initial Critical Habitat Screening Results at Ruzizi Basin Scale

In summary, after an initial screening assessment using online data sources, 23 species were evaluated, 17 fish species were screened in (Figure 9-11**Error! Reference source not found.**). Of these, 15 were assessed to qualify for Critical Habitat at Ruzizi Basin scale. These include:

- 2 which qualify as threatened species (EN/CR) under criterion 1 with >1% of their IUCN distribution in the Ruzizi Basin (*Chiloglanis ruziziensis* and *C. asymetricaudalis*);
- 9 (including the 2 threatened species above) which qualify as restricted range; and
- 7 of these qualify as migratory species under Criterion 3, of which one species (*Labeobarbus leleupanus*) also qualifies for Criterion 2, restricted range.

These 15 species were screened once more in greater detail using historical and other available data and information obtained from recent surveys of the Ruzizi River (e.g. from CRBEC/CRSNE) and for a defined Ecological Area of Analyses in Section 9.3.3.1.

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9.3.3 Critical Habitat Assessment for Fish

9.3.3.1 Defining the EAAA for Fish

A Introduction

The CHA was based on IFC GN6 (2019; GN59). The assessment requires an Ecologically Appropriate Area of Analysis (EAAA) to be determined for each species with regular occurrence in the Project's Area of Influence (AoI) (or groups of species with overlapping distribution and ecosystem requirements) or at an ecosystem level. These are defined considering the distribution of species or ecosystems and ecological patterns, processes, features or functions necessary to maintain them. For wide-ranging (or migratory/congregatory) species, these need to include consideration of areas of aggregation and recruitment (e.g. for feeding or spawning). Where appropriate and to maintain connectivity, these boundaries may extend to a catchment level of analysis. Typically, the EAAA will be larger than the area of influence of the project, especially where species such as fish rely on fluvial systems for movement between breeding and feeding areas and for other ecological processes (e.g. food supply) to sustain them.

The IFC GN6 stresses that delineating the EAAA for a Critical Habitat Assessment (CHA) should be informed by the AoI of the Project but that the definition of Critical Habitat is done irrespective of the impact of a project. In other words, when defining the spatial boundary for the CHA it is necessary to understand the potential zone of project influence before identifying the biodiversity values (e.g. priority species or habitats) that occur within this zone and the spatial extent of their ecological requirements needed to sustain these identified values. In cases of uncertainty about a species' distribution or ecological requirements to complete its lifecycle, delineations should ensure the EAAA is sufficient to encompass the possible or likely habitat or connectivity needs of a species. The size of the Critical Habitat can be amended after closer examination and collection of additional information.

However, the larger the spatial extent of the EAAA the more likely that Critical Habitat will be determined, irrespective of whether the project may impact on the biodiversity values that trigger Critical Habitat. For instance, the length of river reach or catchment extent that sustains a migratory species may provide the basis for the CHA on a precautionary basis, which is often a good basis for screening potential CH species. However, one or more revised EAAAs may be more appropriate in situations where i) IUCN distribution data is outdated and more recent field data is available that can provide more reliable species distribution, and ii) where the extent of influence of the Project is better understood to support a more refined and smaller EAAA. This is the case for the Ruzizi III project where sub-basin level EAAAs have been defined (see below) for the more detailed CHA analysis. These are deemed appropriate for a more precise determination of the fish species that may qualify in the area of influence of the project.

Regardless of the EAAA used for the CHA, once a Critical Habitat has been defined, it is important to link the potential impacts of the Project on the biodiversity triggers as a basis for informed decision-making. When using a large EAAA, it is useful to link species requirements to specific zones or river reaches as a basis for determining potential project impacts. This may help to avoid raising a 'red flag' without contextualising the project impacts and to determine whether mitigation can effectively minimise the project risks on Critical Habitat-qualifying features.

B EAAAs for Migratory and Non-Migratory Fish

The EAAAs used in this CHA are defined only for fish that were screened in and may qualify as Critical Habitat (Table 9-6). Separate EAAAs were defined for migratory and non-migratory fish rather than individual species as the distribution of these two categories of fish largely overlap. There is insufficient data to map EAAAs separately for individual fish species or their habitat types.

The EAAA in this assessment has been delineated using a global standardised hydrological framework that delineates basins and sub-basins at 12 resolutions i.e. the global digital drainage

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networks (HydroBASINS) Level 10 (Lehner and Grill 2013) in QGIS Version 2.20.2. These HydroBASINs are used by the IUCN to define a species Extent of Occurrence (EOO) and are widely used for numerous other freshwater species conservation assessments where the river basin is generally accepted as the most appropriate unit of assessment.

EOOs defined by the IUCN are produced from existing distribution and museum records with expert input but are not always up to date. Figure 9-7 shows the spatial extent of EAAAs for migratory and non-migratory fish species which are further elaborated on as follows:

- **Migratory Species**: the EAAA is defined by Level 10 HydroBASINS within the Ruzizi Basin between an area 4.5 km downstream of the Ruzizi II hydropower plant[8] (representing the uppermost barrier for migratory species) down to the Ruzizi floodplain where the river enters the Lake Tanganyika (an area important for breeding/spawning of migratory and other fish endemic to the lake). Only those HydroBASINS that intersected with the Ruzizi River main channel were selected as the this is the reach which falls within the project area of influence, where impacts on fish migrating between Lake Tanganyika and the Middle Ruzizi could be affected. This EAAA stretches ~105 km from just downstream of the Ruzizi II hydropower plant to Lake Tanganyika and includes the HydroBASINS that intersect with the river over this distance. The migratory species EAAA covers an area of 1,059 km^2.
- **Non-migratory Species**: the EAAA for non-migratory species is defined as the HydroBASIN that include the uppermost reach of the Ruzizi III reservoir (extending 4.5 km downstream of Ruzizi II HPP) down to 6 km past the expected furthest reach where peaking flow releases may impact the river near Bugurama. This EAAA for non-migratory species stretches 23 km and the relevant HydroBASINS cover an area of 113 km^2.

Note: For the purposes of this assessment the HydroBASIN layers are considered the most appropriate unit of assessment rather than river length for which no comparable distribution data are available.

[8] The nearest HydroBASIN boundary extends to 4.5 km downstream of the Ruzizi II HPP. The next upstream Hydroshed boundary would have included the entire reach up to Lake Kivu and including Ruzizi I HPP and Bukavu. Hence, it was decided that since only a small portion of the reach to Ruzizi II HPP was excluded from the EAAA that it would be appropriate to exclude the 4.5 km section rather than including the full reach to the lake which is not accessible to migratory species moving upstream from the Ruzizi III HPP AoI.

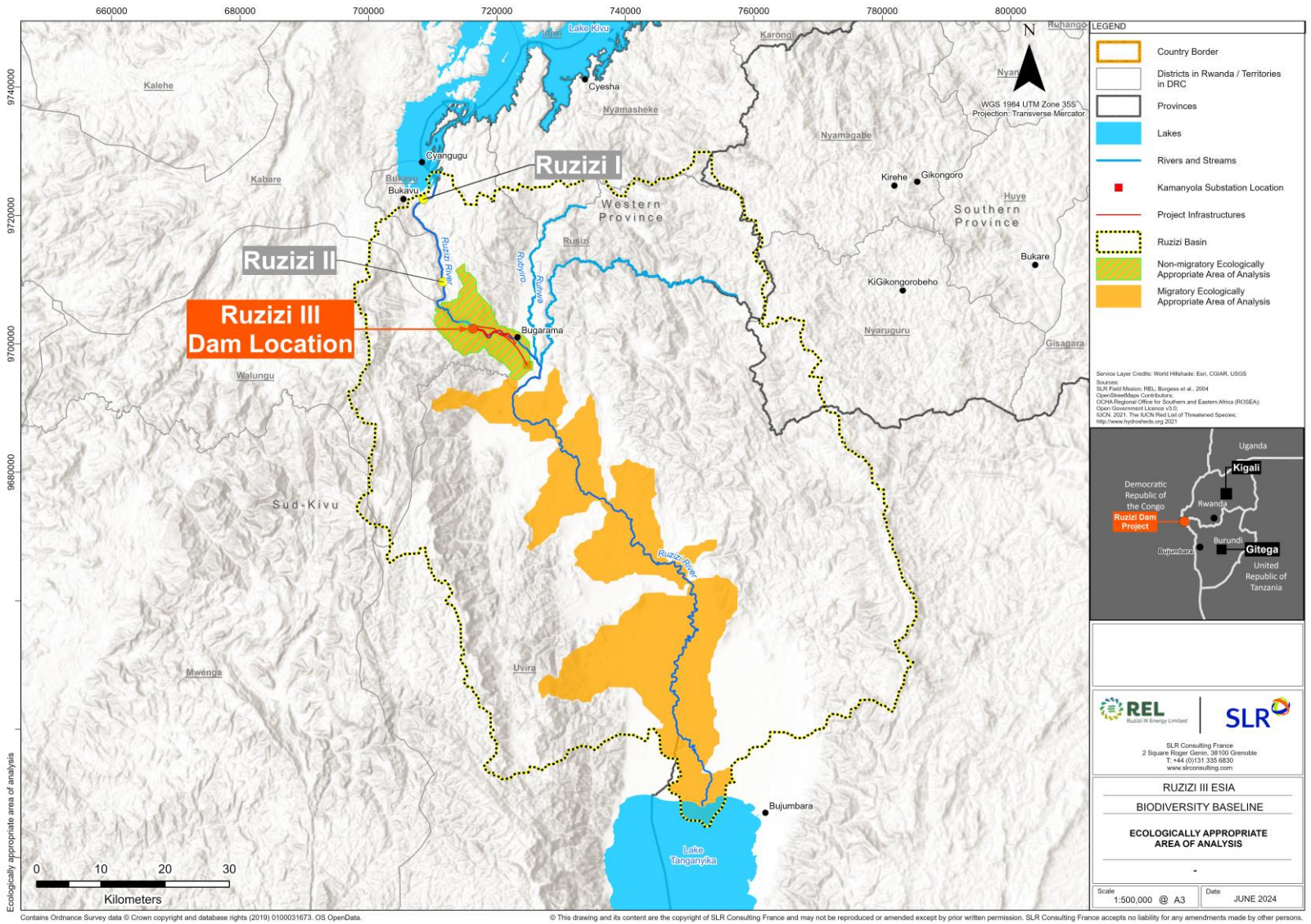

Figure 9-7 Project EAAA for Migratory Fish (1,059 km^2) and Non-Migratory Fish (113 km^2) in Ruzizi Basin (6,078 km^2)

9.3.3.2 Application of IFC PS6 Thresholds to the Detailed CHA for Fish

The thresholds for each criterion and their application in this CHA for the Ruzizi River are indicated in Section 9.1. Note: IFC GN6 (2018) includes thresholds for criteria 1-4 only. Criterion 5 is an ESS6 criterion and does not have specific thresholds. The approach to applying each criterion and their thresholds is summarised in Table 9-7.

A Note on Calculating Species Spatial Extent in the EAAA for Criteria 1-3

Where population data is limited, which is largely the case for freshwater biota in remote areas, the global spatial extent of a species distribution (i.e. EOO) based on IUCN data are typically used as a surrogate for population size (Sayer et al., 2018). Sayer et al.'s (2018) approach was followed for the aquatic CHA which used 'extant' (i.e. known) distributions to determine the extent to which the EAAA intersected with a species global EOO.

This approach assumes species are equally abundant across all planning units although this is likely an incorrect assumption as some habitats will be favoured by certain species over others. This is a precautionary approach and is necessitated as population abundance data are lacking for most freshwater species in African rivers. It is also a conservative approach because the Ruzizi River has been significantly modified over the last 50 years by the hydropeaking mode of operation of the Ruzizi-I and -II hydroelectric schemes.

The proportion of a species' extant EOO was used to calculate the threshold percentage and determine if it met the threshold percentage for each IFC criterion The global EOO for each species in this CHA that triggered one or more of the Critical Habitat criteria was obtained from the IUCN spatial datasets (IUCN, 2018). These datasets consist of polygons delineating the 'extant' (resident) and 'possibly extant' distributions. The EOO is determined based on known historical museum or published distributions and by consulting experts. Areas that are likely to support a species, but for which there are no known records are considered 'possibly extant'. In most instances, the original IUCN EOOs were used to define EAAAs. However, where additional data on species distributions became available, the EOO was revised to include these data. Further discussion on the known habitat preferences and records of the species was then applied to determine if a species qualifies for CH.

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Table 9-7 Application of ESS6 Criteria 1, 2 and 3 and IFC PS6 Thresholds for Critical Habitat to the Ruzizi III HPP CHA

ESS6 Criteria & Thresholds (IFC GN6)	**Notes on approach for Ruzizi HPP CHA**
Criterion (a): Habitat of Significant Importance to Critically Endangered or Endangered species, as listed in the IUCN Red List of threatened species or equivalent national approaches [9]	
Areas that support globally important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥ 5 reproductive units[10] of a CR or EN species).	Insufficient data is available to determine the global population size or reproductive units of EN or CR fish in the EAAA. Therefore, as described above, the proportion of a species' Extent of Occurrence (EOO) within an EAAA is used as a proxy for percentage of population, following a similar approach used by Sayer (2018)
Areas that support globally important concentrations of an IUCN Red-listed VU species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in GN72(a).	As above. Note: one Vulnerable species of fish - *Labeobarbus leleupanus* Leleup's carp (previously *Varicorhinus leleupanus*)- is endemic to the Ruzizi River and other streams flowing into the northern end of Lake Tanganyika where it is inferred to have a small population and is very rare in fisheries catches, and only recorded from less than five locations. It is threatened by sedimentation and water turbidity from watershed erosion. It was last assessed by IUCN in 2006 and needs updating. It is possible that its reassessment could result in an upgrade to EN.
As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.	No national or regional red list of aquatic species exists for Rwanda, DRC or Burundi. Only IUCN globally red-listed species are used for Criterion 1.
Criterion (b): Habitat of significant importance to endemic or restricted-range species [11]	
Areas that regularly hold ≥10% of the global population size AND ≥10 reproductive units of a species	Insufficient data is available to determine the global population size or reproductive units of endemic or restricted range fish in the EAAA. As for Criterion 1a, the proportion of the defined EAAA catchment area within the confirmed EOO of each species is used as a proxy for percentage of a fish population within the EAA zones following Sayer *et al* ., 2018[12].
Criterion (c): Habitat supporting globally or nationally significant concentrations of migratory or congregatory species [13]	
Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle.	This criterion has been applied to migratory fish confirmed to occur in the Ruzizi River based on the proportion of a migratory species' EOO that falls within the EAAA. Insufficient data is available to determine whether certain parts of the Ruzizi catchment are more important than others for sustaining the global population of migratory or congregatory species.

[9] Where subspecies and sub-populations have been separately assessed for inclusion in the IUCN Red List, they may be considered under Criteria 1, as appropriate (GN68)

[10] The IUCN Biodiversity Areas standard uses the following definition for reproductive unit: "the minimum number and combination of mature individuals necessary to trigger a successful reproductive event at a site Examples of five reproductive units include five pairs, five reproducing females in one harem, and five reproductive individuals of a plant species." Eisenberg, 1977. The Evolution of the Reproductive Unit in the Class Mammalia (footnote GN16 under GN72)

[11] Restricted range species are those with limited Extent of Occurrence (EOO) (GN74): (i) For terrestrial vertebrates and plants, a restricted-range species is defined as those species that have an EOO less than 50,000 square kilometers (km^2). (ii) For marine systems, restricted-range species are provisionally being considered those with an EOO of less than 100,000 km^2. (iii) For coastal, riverine, and other aquatic species in habitats that do not exceed 200km width at any point (for example, rivers), restricted range is defined as having a global range of less than or equal to 500 km linear geographic span (i.e., the distance between occupied locations furthest apart).

[12] Sayer, C.A., Máiz-Tomé, L. and Darwall, W.R.T. (2018). Freshwater biodiversity in the Lake Victoria Basin: Guidance for species conservation, site protection, climate resilience and sustainable livelihoods. Cambridge, UK and Gland, Switzerland: IUCN. xiv +226pp.

[13] Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem) (GN76). Congregatory species are defined as species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis (GN77).

ESS6 Criteria & Thresholds (IFC GN6)	Notes on approach for Ruzizi HPP CHA
Areas that predictably support ≥10% of the global population of a species during periods of environmental stress.	There is insufficient data to apply this criterion. One could only assume that the larger rivers draining into Lake Tanganyika such as the Ruzizi River would be of greater importance in times of environmental stress, especially if other tributaries (e.g. Ruhwa and Rubyiro River) are impacted by further irrigation development.
Criterion (d): Highly threatened or unique ecosystems	
Areas representing ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN. Note: This requires use of the IUCN Red List of Ecosystems where formal IUCN assessments have been performed or "assessments using systematic methods at the national/regional level, carried out by governmental bodies, recognized academic institutions and/or other relevant qualified organizations (including internationally recognized NGOs)".	No formal Red List process has been done for ecosystems in the Project Area and therefore this threshold has not been applied in this CHA.
Other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.	No regional or national conservation plan or identification of KBAs has been conducted covering the Ruzizi Basin. However, the Rusizi National Park is a Ramsar site and KBA located 88 km downstream of the Ruzizi III HPP powerhouse and would likely qualify for Critical Habitat. While the Ruzizi River is important for fish migration between the lower and upper river reaches, it does not qualify as a Highly Threatened or Unique Ecosystem under this criterion.
Criterion (e): Ecological Processes or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d)	
No thresholds are defined.	Considerations are given to aspects such as landscape connectivity to support and maintain migratory species and facilitate gene flow.

9.3.3.3 Critical Habitat Assessment of Screened in Fish Species

A ***IFC PS6 Criterion 1 to 3: CR/EN; Restricted Range and Migratory/Congregatory Species***

The initial screening described in Section 9.3.2 identified 23 fish species in the Ruzizi Basin that potentially qualify for critical habitat of which 15 species potentially qualify as Critical Habitat at the basin scale (Table 9-6).

These 15 screened-in fish species were shortlisted for more detailed analysis by assessing them against IFC PS6 thresholds for the migratory and non-migratory EAAAs (described in Section 9.3.3.1).

Distribution records of these species in the Ruzizi Basin were obtained in early 2023 from the Royal Museum for Central Africa, Belgium, and CRBEC / CRSNE and the Global Biodiversity Information Facility (GBIF). Experts at these institutions were also consulted on their understanding of current species distributions. This information was used to inform the critical habitat assessment.

The results of the more detailed assessment for the 15 five fish species are summarised in Table 9-8.

In summary, threshold analysis for five of the 15 species indicate that they may qualify for Critical Habitat based on the spatial extent of their known distribution that overlaps within the migratory or non-migratory species EAAA. It should be noted that this approach does not take into account differences in their distribution range where these species are more likely to have a higher population as insufficient data is available. However, there are some inferences that can be draw on their habitat preference and likely areas of higher abundance that can be used to infer whether they can be considered to qualify for Critical Habitat.

Information on each species is described below with a concluding statement on their status as CH qualifying species.

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Table 9-8 Fish Species Screened in for CHA in Table 9-6

(A)						(B) Ruzizi Basin applied to Migratory and Non-migratory species				(C) EAAAs for Non-migratory and Migratory species			
Family	Species	Status	Migratory	Range-restricted	Global EOO (km^2)	Intersection of EOO with Area of Analysis (km^2)	% of EOO in Ruzizi Basin	Criterion	Triggered (Criterion)	Intersection of EOO with Area of Analysis (km^2)	% of EOO in EAAA	Criterion	Triggered (Criterion)
Amphiliidae	*Amphilius ruziziensis*	NE	No	**< 500 km**	7,790	6,078	**78.0%**	1(a)&2	**Y (2)**	113	1.5%	1(a)&2	N
Cichlidae	*Astatoreochromis straeleni* Bluelip haplo	LC	No	**< 500 km**	15,335	6,078	**39.6%**	2	**Y (2)**	113	0.7%	2	N
	Ctenochromis horei Hore's haplo	LC	No	**< 500 km**	55,535	6,078	**10.9%**	2	**Y (2)**	113	0.2%	2	N
	Gnathochromis pfefferi	LC	No	**< 500 km**	55,535	6,078	**10.9%**	2	**Y (2)**	113	0.2%	2	N
Cyprinidae	*Enteromius lufukiensis*	NT	No	**< 500 km**	40,597	6,078	**15.0%**	2	**Y (2)**	113	0.3%	2	N
	Acapoeta tanganicae Mbaraga*	LC	**Yes**	> 500 km	75,279	6,078	**8.1%**	2&3	**Y (3)**	1059	**1.4%**	3	**Y (3)**
	Labeo cylindricus Redeye labeo	LC	**Yes**	> 500 km	4,831,479	6,078	0.1%	3	N	1059	0.0%	3	N
	Labeobarbus altianalis Ripon barbel	LC	**Yes**	> 500 km	244,889	6,078	**2.5%**	3	**Y (3)**	1059	0.4%	3	N
	Labeobarbus caudovittatus	LC (global) NT (E.Africa)	**Yes**	> 500 km	70,198	6,078	**8.7%**	3	**Y (3)**	1059	**1.5%**	3	**Y (3)**
	Labeobarbus leleupanus Leleup's carp*	VU	**Yes**	**< 500 km**	42,403	6,078	**14.3%**	2&3	**Y (2&3)**	1059	**2.5%**	3	**Y (3)**
	Labeobarbus somereni Someren's barb*	LC	**Yes**	> 500 km	127,265	4,383	**3.4%**	3	**Y (3)**	1059	0.8%	3	N
	Labeobarbus tropidolepis	LC	**Yes**	> 500 km	127,546	6,078	**4.8%**	3	**Y (3)**	1059	0.8%	3	N
Mochokidae	*Chiloglanis asymetricaudalis* Longtail suckermouth*	**EN**	No	**< 500 km**	13,090	6,078	**46.4%**	1(a)&2	**Y (1a)&2**	113	**0.9%**	1(a)	**Y (1a)**
	Chiloglanis ruziziensis Ruzizi suckermouth*	**CR**	No	**< 500 km**	10,347	6,078	**58.7%**	1(a)&2	**Y (1a)&2**	113	**1.1%**	1(a)	**Y (1a)**
Poeciliidae	*Lamprichthys tanganicanus* Tanganyika killifish	LC	No	> 500 km	34,377	28	0.1%	2	N	28	0.1%	2	N

(NE = Not Evaluated, LC = Least Concern, VU = Vulnerable, EN = Endangered, CR = Critically Endangered); Y = yes / N = no

Fish species screened in for CHA in Table 9-6 are listed in Table (A) with their conservation status, migratory status, extant distribution based on IUCN records, range restricted species (<500 km) and global Extent of Occurrence (EOO); Table (B) assesses the extent of overlap of their EOO with the Ruzizi Basin (1) in Figure 9-7 and (C) the extent of overlap with their EOO with separate and smaller EAAAs for migratory and non-migratory species. The IFP criterion and whether it is triggered or not is listed in adjacent columns.

* Indicates a revised EOO based on additional records obtained from additional sources including the Royal Museum for Central Africa, Belgium, and CRBEC / CRSNE and the Global Biodiversity Information Facility (GBIF). Experts at these institutions were also consulted on their understanding of current species distributions.

***Acapoeta tanganyicae* (Boulenger 1900) Mbaraga**

Acapoeta tanganicae is reportedly a migratory species that occurs predominantly in Lake Tanganyika and is considered a common species around rocky shorelines and the rapids of influent tributaries (Eccles 1992). Once considered endemic to Lake Tanganyika, a population outside the species' expected geographic range was recently recorded in an influent tributary of Lake Rukwa, an endorheic system in eastern Tanzania which supports a historical connection to Lake Tanganyika (Genner *et al.* 2015). This population has been added to the extant area of this species (Figure 9-8). With the addition of the Lake Rukwa locality, the proportion of this species' EOO overlapping with the EAAA for migratory species comprises 1.4% and therefore would potentially qualify for Critical Habitat under Criterion 3 (migratory species) (Figure 9-8). However, as with *L. leleupanus*, *A. tanganicae* was last recorded in the Ruzizi Basin in the 1950s (based on available data) and it has not been recorded in recent surveys either by the CRBEC/CRSNE, SOFRECO or by SLR. This includes the surveys in the lower Ruzizi River and Ramsar site done between 2018 and 2020 by CRBC/CRSNE researchers who confirmed that they had not encountered it. Based on these results, *A. tanganicae* has been reassessed and screened out of the CHA on the basis of lack of evidence for its continued occurrence in the Ruzizi River.

In summary, since there are no records of Acapoeta tanganicae in the Ruzizi River since the 1950's (despite more recent surveys in the middle and lower reaches) plus the fact records suggest it is mainly a lake-dwelling species, it is not considered to qualify for critical habitat.

***Labeobarbus caudovittatus* (Boulenger 1902)**

Specimens of *Labeobarbus caudovittatus* have been recorded from a number of Central and West African countries, including the Democratic Republic of the Congo, Gabon, Burundi, Angola and Zambia including the Ruzizi River (De Vos and Thys van den Audenaerde 1990). The Royal Museum for Central Africa houses several specimens collected from the Ruzizi in 1994 (De Vos 1994) and it is considered to occur in a number of other river systems affluent to Lake Tanganyika including the Malagarisi and Lukuga Rivers (Figure 9-9). The global status of its populations is largely unknown, but it is not considered threatened at global level (Moelants 2010). However, it is assessed as Near Threatened in East Africa where it is threatened by fishing pressures and regression of habitat due to farming (Ntakimazi; IUCN redlist).

It was collected by the CRBEC in unpublished surveys conducted between 2018-2022 at a site in the middle reach of the Ruzizi River downstream of the proposed Ruzizi III HPP (Figure 9-9). Occurrences from 1973 museum records also confirm its occurrence here (GBIF 2024). As with many of the larger *Labeobarbus* species, it is considered migratory.

In summary, although this species has been confirmed in the Middle Ruzizi River and the analysis indicates that 1.5% of its global EOO occurs in the migratory EAAA, Labeo caudovittatus is a widespread species occurring in several rivers of central Africa and the Ruzizi River is not considered Critical Habitat for this species.

***Labeobarbus leleupanus* (Matthes 1959) Leleup's carp**

There are only four records of the species in the GBIF database dating from 1952 to 1960 and three occurrence records from 2016-2018 in three affluent rivers of the lower Ruzizi in Burundi, all located >34 km downstream of the Ruzizi III HPP according to (as yet) unpublished data of the CRBEC/CRSNE. In addition, Bayona (1991) recorded *L. leleupanus* from beach seine catches on the shores of Lake Tanganyika. Its distribution is shown in Figure 9-10. The original holotype comes from the Ruzizi River Basin (Vreven *et al.* 2016). It is listed by the IUCN as Vulnerable (VU) due to increased sedimentation as a result of poor land management practices and erosion in the catchments (Ntakimazi 2006) and likely impacted by existing hydropower developments. It is considered rare and endemic to the Ruzizi Basin (Eccles 1992, Banyankimbona *et al.* 2012, De Vos *et al.* 2001) and the rivers flowing into the northern end of Lake Tanganyika. Since no additional distribution records for this species could be found, the proportion of the EAAA overlapping the EOO of *L. leleupanus* remains the same.

In summary, given the lack of evidence for the continued presence of Labeobarbus leleupanus in the middle or upper Ruzizi River (with only four historic records prior to 1960) and its reported

occurrence in tributaries of the lower Ruzizi River (2016-2018) (from 34 km downstream of the Ruzizi III project), the upper and middle Ruzizi River mainstem is not assessed to be Critical Habitat for this species. However, the lower Ruzizi River and its affluent rivers may qualify for Critical Habitat.

***Chiloglanis asymetricaudalis* (De Vos 1993) Longtail suckermouth**

Chiloglanis asymetricaudalis was initially considered endemic to the Ruzizi River Basin when it was described by de Vos (1993). It is currently considered rare and endangered (EN) as a consequence of erosion and sedimentation. Subsequently, in 2011, a population was discovered in the Luiche River, a small tributary draining the east bank of Lake Tanganyika north of the Malagarisi catchment confirming its presence outside of the Ruzizi Basin (Friel & Vigliotta 2011). This population has been added to the known extant population for this species (Figure 9-11) This additional Level 06 HydroBASIN was therefore included in the extant EOO for this revised CH assessment. With the addition of this catchment, the threshold for triggering Criterion 1 (a) for CR/EN species is still exceeded (0.9 %) (Table 9-8). *C. asymetricaudalis* was caught in SLR surveys from the Rubyiro River in 2022 and in other tributaries by CRBEC/CRSNE. All the historical records and records from CRBEC/CRSNE of this species are from tributaries and at the confluence of tributaries with the Ruzizi River. Ad hoc interviews with fishermen (in May 2024) indicated that they occasionally catch *Chiloglanis* spp. in the Middle Ruzizi River. While it does appear to be more common in tributaries such as the Rubyiro, it is also possible that available fish catch results do not reflect its presence in the Ruzizi River mainstem. While its numbers may be reduced from hydropeaking effects of Ruzizi I and II, it is also likely less recorded in the mainstem river because of the difficult fishing conditions (deep water and high flow) and because this fish occurs on the river bottom amongst rocks, where it is difficult to access.

On a precautionary basis, given its Endangered threat status and confirmed recent records, Chiloglanis asymetricaudalis is screened in as a potential CH qualifying species for the Middle Ruzizi River non-migratory EAAA.

***Chiloglanis ruziziensis* (Boulenger 1900) Mbaraga**

Chiloglanis ruziziensis was described with *C. asymetricaudalis* by De Vos (1993). It is considered endemic to the Ruzizi Basin and the rivers draining the western shoreline of Lake Kivu and is listed by the IUCN as Critically Endangered (CR). It is considered rare in fish catches and threatened by sedimentation in the catchment (Ntakimazi 2006). It has been historically recorded in the Ribyiro River near Bugarama.

The threshold for triggering Criterion 1 (a) for CR/EN species is exceeded (the EAAA for non-migratory fishes exceeds 0.5% of the EOO) (Table 9-8). Although, it has not been caught in recent surveys (the last records date to 1986) (Figure 9-12) it is assessed as qualifying for Critical Habitat for the Middle Ruzizi River on a precautionary basis. As for *C. asymetricaudalis*, it may occur in the mainstem river where it is difficult to catch but if so, it is likely to be rare.

On a precautionary basis, given its Critically Endangered threat status, Chiloglanis ruziziensis is screened in as a potential CH qualifying species for the Middle Ruzizi River non-migratory EAAA.

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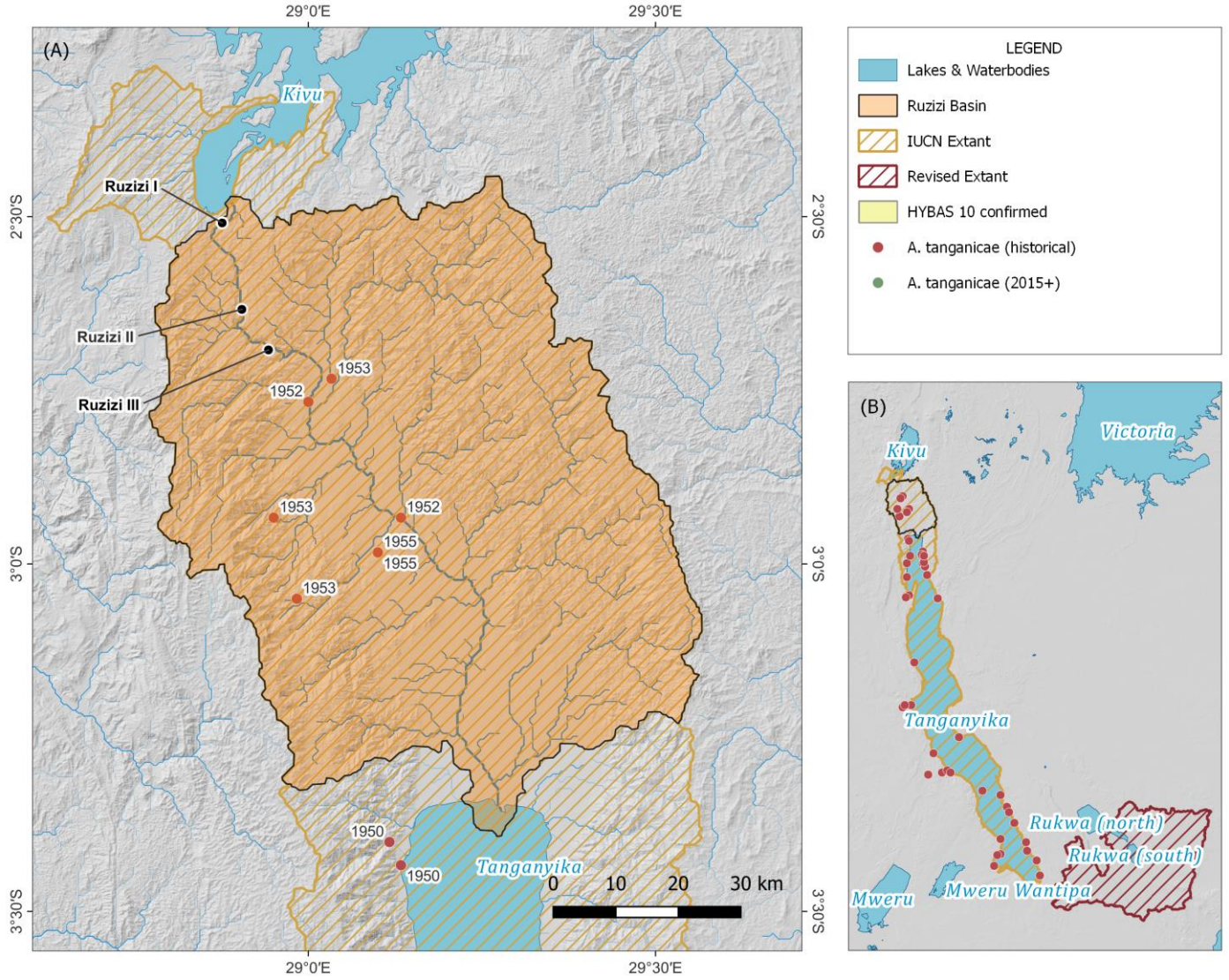

Figure 9-8 Distribution of *Acapoeta tanganicae* in the Ruzizi Basin

(A) historical and recent (2015+) records with overlapping HydroBASINS level 10 (HYBAS 1) of confirmed records and (B) revised EOO showing (1) IUCN Extant (resident) – regions in which resident populations were confirmed by the IUCN (2) IUCN Possibly Extant (revised) – regions in which populations were thought to occur, but which are here considered confirmed, (3) Revised Extant – new regions identified by a review of distribution records undertaken in this report.

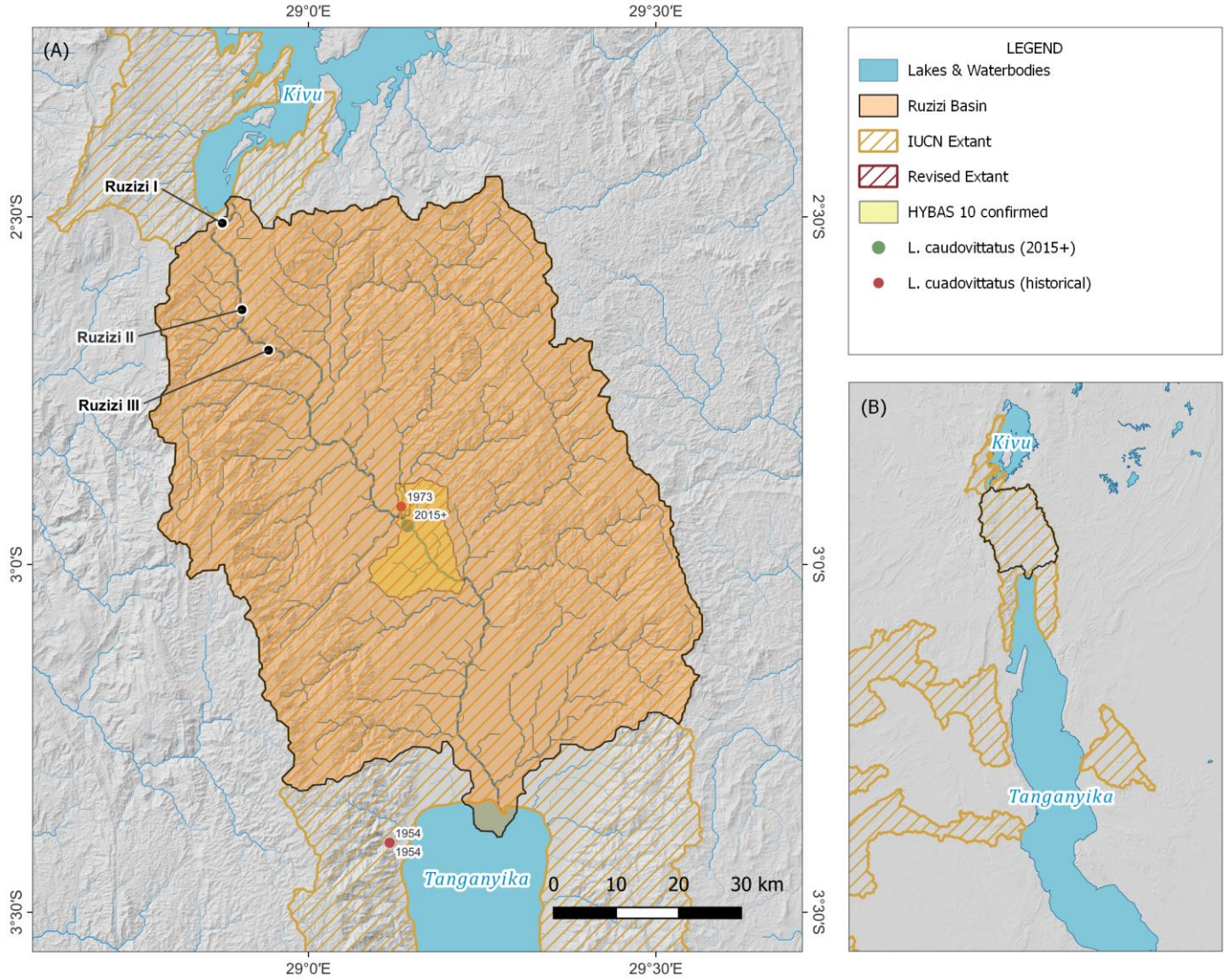

Figure 9-9 Distribution of *Labeobarbus caudovittatus* in the Ruzizi Basin

(A) historical and recent (2015+) records with overlapping HydroBASINS level 10 (HYBAS 1) of confirmed records and (B) revised EOO showing (1) IUCN Extant (resident) – regions in which resident populations were confirmed by the IUCN (2) IUCN Possibly Extant (revised) – regions in which populations were thought to occur, but which are here considered confirmed, (3) Revised Extant – new regions identified by a review of distribution records undertaken in this report.

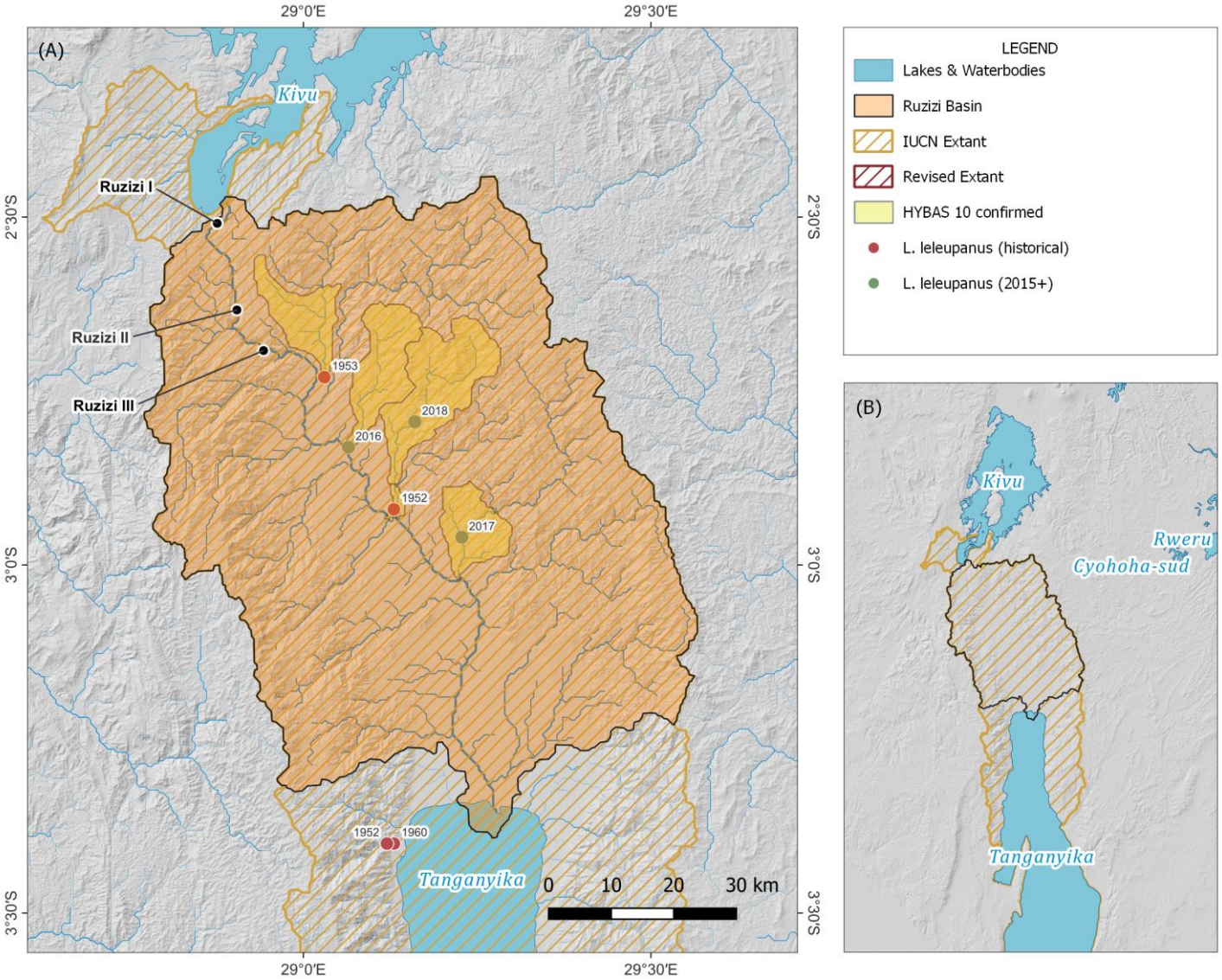

Figure 9-10 Distribution of *Labeobarbus leleupanus* in the Ruzizi Basin

(A) historical and recent (2015+) records with overlapping HydroBASINS level 10 (HYBAS 1) of confirmed records and (B) revised EOO showing (1) IUCN Extant (resident) – regions in which resident populations were confirmed by the IUCN (2) IUCN Possibly Extant (revised) – regions in which populations were thought to occur, but which are here considered confirmed, and (3) Revised Extant – new regions identified by a review of distribution records undertaken in this report.

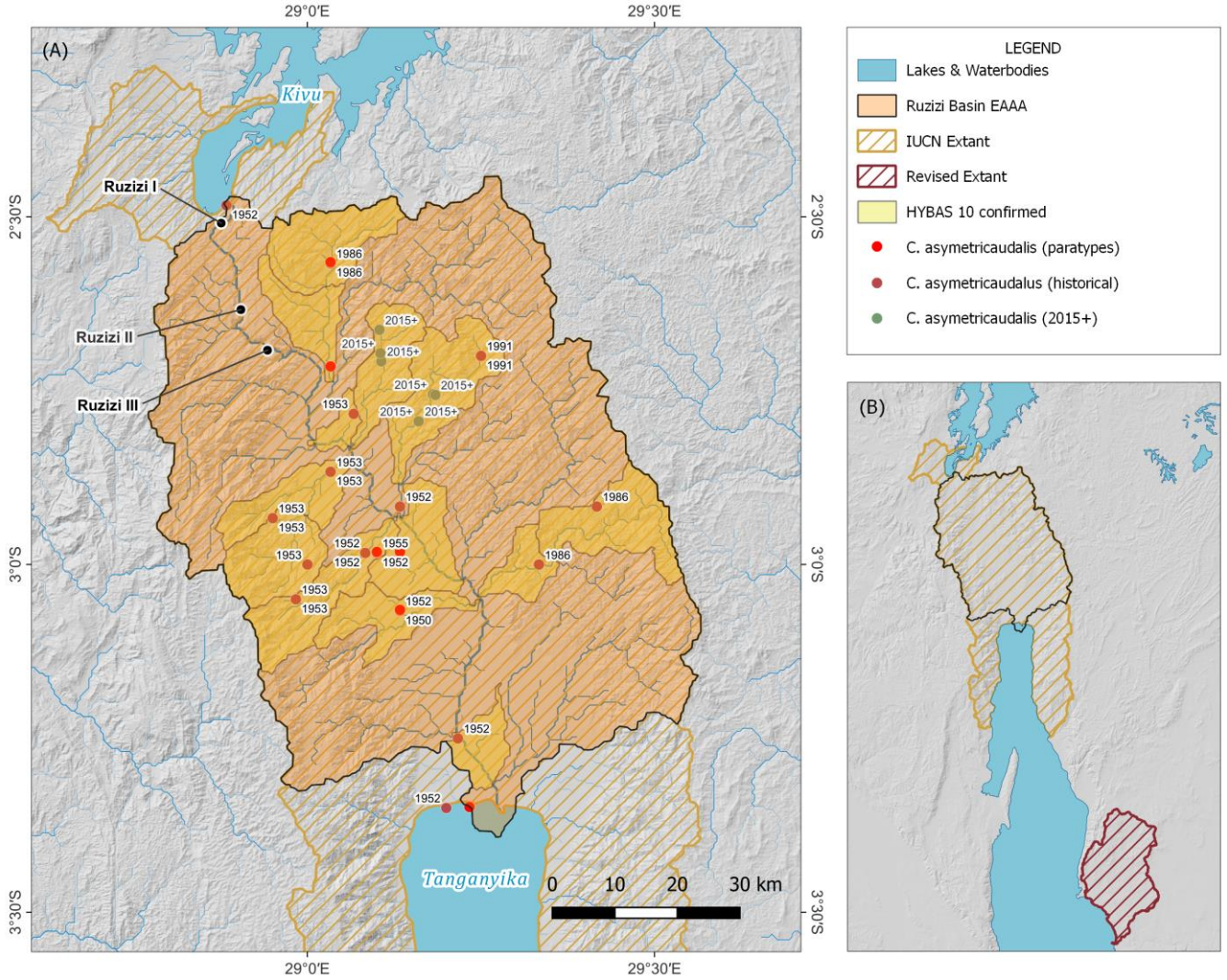

Figure 9-11 Distribution of *Chiloglanis asymetricaudalis* (Endangered) in the Ruzizi Basin

(A) historical and recent (2015+) records with overlapping HydroBASINS level 10 (HYBAS 1) of confirmed records and (B) revised EOO showing (1) IUCN Extant (resident) – regions in which resident populations were confirmed by the IUCN (2) IUCN Possibly Extant (revised) – regions in which populations were thought to occur, but which are here considered confirmed, (3) Revised Extant – new regions identified by a review of distribution records undertaken in this report.

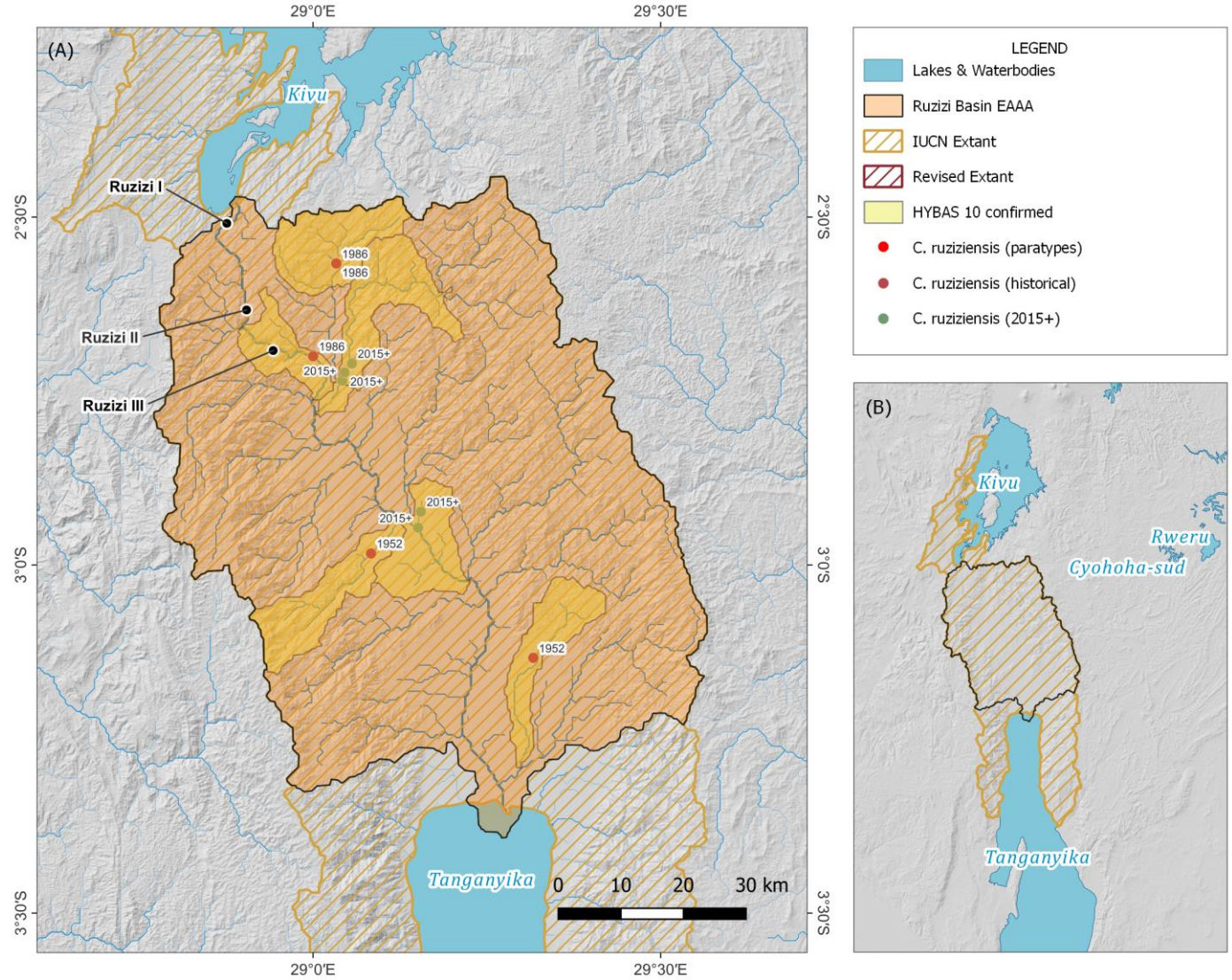

Figure 9-12 Distribution of *Chiloglanis ruziziensis* (Critically Endangered) in the Ruzizi Basin

(A) historical and recent (2015+) records with overlapping HydroBASINS level 10 (HYBAS 1) of confirmed records and (B) revised EOO showing (1) IUCN Extant (resident) – regions in which resident populations were confirmed by the IUCN (2) IUCN Possibly Extant (revised) – regions in which populations were thought to occur, but which are here considered confirmed, (3) Revised Extant – new regions identified by a review of distribution records undertaken in this report.

B ***IFC PS6 Criterion 4: Highly Threatened and/or Unique Ecosystem***

No red listing of ecosystems or systematic conservation prioritisation process has been done that identifies the Ruzizi Basin as an area that would qualify under this criterion.

C ***ESS6 Criterion 5: Ecological Processes***

Two species of *Chiloglanis* (rock catlets) qualify the non-migratory EAAA for Critical Habitat under Criterion 1 and possibly Criterion 2. They are non-migratory species that inhabit rocky river bottoms where they graze on benthic algae. The Project will need to assess impacts to these species and identify measures to achieve Net Gain for any residual impacts.

Three migratory species qualify the migratory EAAA for Critical Habitat based on threshold analysis but are not considered CH-qualifying species for the mainstem of the Middle Ruzizi River in the Project AoI. Whether they qualify for CH or not, the Project needs to assess impacts to migratory fish and identify suitable mitigation to minimise impacts. Ecological processes required to support CH-qualifying species are summarised below.

Table 9-9 Ecological Processes Required to Sustain CH-Qualifying Fish Species

Critical Habitat trigger species	EAAA	Ecological Processes
Chiloglanis asymetricaudalis *Chiloglanis ruziziensis*	Non-migratory EAAA	• River flow rate sufficient to maintain rapid habitats year round • Water quality (including sediment loads) of an acceptable standard
Labeobarbus leleupanus Leleup's carp* *Labeobarbus caudovittatus* *Acapoeta tanganicae*	Ruzizi Basin	• River connectivity - absence of barriers or presence of fish passages to maintain migratory species movements for breeding and gene flow. • River flow rates or flood pulses as cues as well as habitats for migration and reproduction • Water quality (including sediment loads) of an acceptable standard

9.3.4 Summary of Critical Habitat Assessment

No terrestrial species qualify for Critical Habitat. A summary of the CHA for fish is provided below.

9.3.4.1 Criterion 1: Critically Endangered or Endangered Species.

Two fish species in the Non-Migratory EAAA qualify for Critical Habitat: *Chiloglanis ruziziensis* (CR) and *Chiloglanis asymetricaudalis* (EN). Records of these species from fish surveys are primarily from tributaries of the Ruzizi River, including close to the confluence of the Rubyiro and Ruhwa Rivers. Only *C. asymetricaudalis* has been confirmed in recent surveys to occur in the Rubyiro River and Nyamagana Rivers where they typically occur as bottom dwellers in riffle and rapid habitats. Given that they are both restricted range species with over 0.5% of their EOO in the Ruzizi catchment, these two species would qualify the affluent rivers in which they are found as Critical Habitat. It is however possible that individuals may occur in low numbers in the main Ruzizi River (as reported by fishermen) where they occur at the bottom of the deep and fast flowing river and are difficult to catch. It is uncertain if they qualify as having "regular occurrence" in the Ruzizi River but are included on a precautionary basis as CH qualifying species for the Project Area of Influence.

9.3.4.2 Criterion 2: Restricted-Range Species

While there are several restricted-range species in the Ruzizi River Basin only the two *Chiloglanis* species referred to under Criterion I potentially qualify for CH under Criterion 2, although the

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small size of the non-migratory EAAA does not meet the >10% threshold. They would definitely qualify as CH – qualifying species if a larger EAAA was applied.

9.3.4.3 Criterion 3: Migratory Species

The Ruzizi River is known to contain several migratory fish species, mostly *Labeobarbus* species.

Three species are potential Critical Habitat qualifying species potentially with over >1% of their known 'extant' population (i.e. based on IUCN spatial distribution) in the Ruzizi River based on the migratory EAAA. However, based on more recently acquired fish data for the Lower and Middle Ruzizi River, none of the three species are assessed to qualify the Ruzizi River mainstem in the area of influence as Critical Habitat based on the following:

A ***Acapoeta tanganicae***

This is a Least Concern, restricted-range, migratory species to Lake Tanganyika and Lake Rukwa area of Western Tanzania, and the Ruzizi River, where it is recorded from rocky substrate areas of lakes and in rapids in rivers. Most records are from Lake Tanganyika. Based on available data, it has not been confirmed in surveys conducted along the Lower to Middle Ruzizi River between 2015-2022 (CRSNE/CRBEC data), or in SOFRECO surveys in 2021 and 2022, or in SLR surveys in 2022 in the project area of influence or downstream reaches. Since there is no reliable evidence of recent or regular occurrence of this species in the Ruzizi River it does not qualify for Critical Habitat.

B ***Labeobarbus leleupanus***

This is a Vulnerable and range-restricted species with a global extant distribution including Lake Kivu and the northern shores of Lake Tanganyika including the Ruzizi and Malagarasi Rivers. It was not confirmed in recent surveys by SOFRECO in 2021 and 2022 or SLR in 2022 in the project area of influence in the Middle Ruzizi River, but was confirmed by CRSNE/CRBEC over 34 km downstream of Ruzizi III HPP in the Nyakagunda, Nyamagarana and the Kaburantwa Rivers. Since there is no evidence for regular occurrence of this species in the Upper and Middle Ruzizi River mainstem it is not assessed to be Critical Habitat for this species. However, it is possible that the Lower Ruzizi River and its affluent rivers may qualify for Critical Habitat but further surveys and assessment would need to confirm this.

C ***Labeobarbus caudovittatus***

This migratory species is Near Threatened in East Africa and Least Concern at global level with a global extant distribution in a number of Central and West African countries, including the Democratic Republic of the Congo, Gabon, Burundi, Angola and Zambia. In East Africa it occurs in the Ruzizi River, and in a number of other river systems affluent to Lake Tanganyika including the Malagarisi and Lukuga Rivers. However, it is assessed as Near Threatened in East Africa where it is threatened by fishing pressures and regression of habitat due to farming. It was confirmed at a site in the Middle Ruzizi River downstream of the proposed Ruzizi III HPP by CRSNE/CRBEC. Given its wide distribution and low number of records in the Ruzizi River, the Middle Ruzizi is not assessed to be Critical Habitat for this species.

In summary, based on available data, none of the three species above appear to qualify the Middle Ruzizi River for Critical Habitat under Criterion 3, although they qualify for Critical Habitat at Ruzizi Basin level. Nonetheless, migratory fish are important fish species in the Ruzizi River and measures to mitigate project impact on these species are required.

9.3.4.4 Criterion 4: Highly Threatened and/or Unique Ecosystems

No red listing of ecosystems or systematic conservation prioritisation process has been done that identifies the Ruzizi River as an area that would qualify under this criterion.

Two protected and internationally recognised areas that would qualify Critical Habitat in the wider Project Area outside the Project Area of Influence are:

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- **Rusizi National Park and KBA**: Located 88 km downstream of the Ruzizi III Project it is a protected area and internationally recognised biodiversity area primarily for its floodplain wetlands and birds and fish, and may qualify under this criterion. This area is threatened by pollution from upstream and expanding human settlement and associated fishing, harvesting and agricultural expansion pressures in the floodplains. However, while there is limited information to assess this area under Criterion 4, there is no evidence to suggest the Ruzizi River would qualify under this criterion.
- **Nyungwe National Park and KBA**: Located approximately 20 km to the east of Ruzizi River in the upper catchment of the Rubyiro River it is of conservation importance for forest biodiversity, including chimpanzees. While this park is outside the Project AoI, it plays an important role in protecting the upper catchment of the Rubyiro River which contains important fish such as the Endangered *Chiloglanis asymetricaudalis* and possibly the Critically Endangered *Chiloglanis ruziziensis.*

9.3.4.5 Criterion 5: Ecological Functions or Characteristics

This criterion relates to the ecological processes or characteristics that are needed to maintain the viability of the biodiversity values described in the above four Critical Habitat criteria, and is the fifth criterion of the World Bank ESS6, for which there are no defined thresholds.

This criterion only applies to the ecological processes required to sustain the presence of *Chiloglanis* rock catlets in the rapids of tributaries of the Ruzizi River, and possibly the mainstem river itself. These processes include maintenance of flowing water and rocky river bottom habitat on the riverbed and acceptable water quality (including turbidity levels).

Criterion 5 under the IFC PS6 applies to Key Evolutionary Processes. There are no areas along the Ruzizi River that are believed to qualify under this criterion. The fish community in the Ruzizi Basin are not evolutionarily distinct and exhibits a high degree of species transitional between Lake Kivu and Lake Tanganyika.

9.3.4.6 Criterion: Keystone Species (AfDB OS3 Criterion)

There are no confirmed keystone species such as African elephants or vulture colonies in the Project AoI. Crocodile and hippopotamus (Vulnerable) are present in the Lower and Middle reaches of the Ruzizi River and may play a role in nutrient cycling but are not of such key importance that they would qualify the Ruzizi River as Critical Habitat.

9.3.4.7 Criterion: Ecological Networks (AfDB OS3 Criterion)

The Project area is dominated by modified habitats comprising a mosaic of agriculture with small, fragmented portions of degraded but largely natural habitat such as riparian and hillslope thickets. The Ruzizi River does serve as an important corridor for migratory fish to access upstream spawning habitats from Lake Tanganyika to the upper catchment. However, the Project is not located within an area that could be considered an important ecological network linking priority areas of conservation areas.

9.3.4.8 Concluding Summary

In summary, the Middle Ruzizi River Basin has been degraded through a long period of hydropeaking from two upstream hydropower projects and water pollution, and is assessed as Modified Habitat. Nevertheless, the Ruzizi III HPP AoI appears to qualify for Critical Habitat for two species of fish (*Chiloglanis asymetricaudalis* and *C. ruziziensis*) under Criterion 1 (CR/EN species) and possibly under Criterion 2 (Restricted-Range species). Three other fish species were considered to potentially qualify the Middle Ruzizi River as CH under Criterion 3 (Migratory species) but this is unlikely due to lack of evidence for their presence in the Middle to Upper Ruzizi River reach.

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Implications for the Project to achieve a no net loss or net gain are summarised in Table 9-10.

Table 9-10 Implications of CHA Findings for Project

Biodiversity Feature	Residual Impact			NNL/NG Requirement
	Footprint	Barrier	Flow Alteration	
Natural Habitat				
Hillslope Grassland / Savanna	Loss of ~18.3 ha in project footprint (transmission line & construction infrastructure) - likely to be lower in final design footprint)	-		No Net Loss (Design avoidance / restoration measures)
Critical Habitat				
Chiloglanis asymetricaudalis (EN)	Possibly through flooding & dewatering of 10 km of river. Note: most species records in tributaries of Ruzizi River.	-	-	Possible Net Gain (based on pre-construction fish surveys)
Chiloglanis ruziziensis (CR)		-	-	
Priority Biodiversity				
Migratory fish species (*Labeobarbus* species) (River is Modified Habitat but some migratory fish are Critical Habitat for Ruzizi Basin)	-	Barrier to fish migration - reduced to 18 km of Middle Ruzizi River		No Net Loss (fishing restrictions & reduction of fishing pressures)
Rusizi National Park (88-130 km downstream in Burundi)	No direct or indirect impacts expected	-	No significant residual impact	No intervention
Nyungwe National Park (20 km upstream Rubyiro River, in Rwanda)	No direct or indirect impacts expected	-	-	No intervention

The Project is required to confirm residual impacts on the priority biodiversity features and to implement additional mitigation and compensation measures to achieve a no net loss and net gain for confirmed impacts. Mitigation measures are specified in Vol. IV – ESMP, outlined in the framework Biodiversity Action Plan.

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