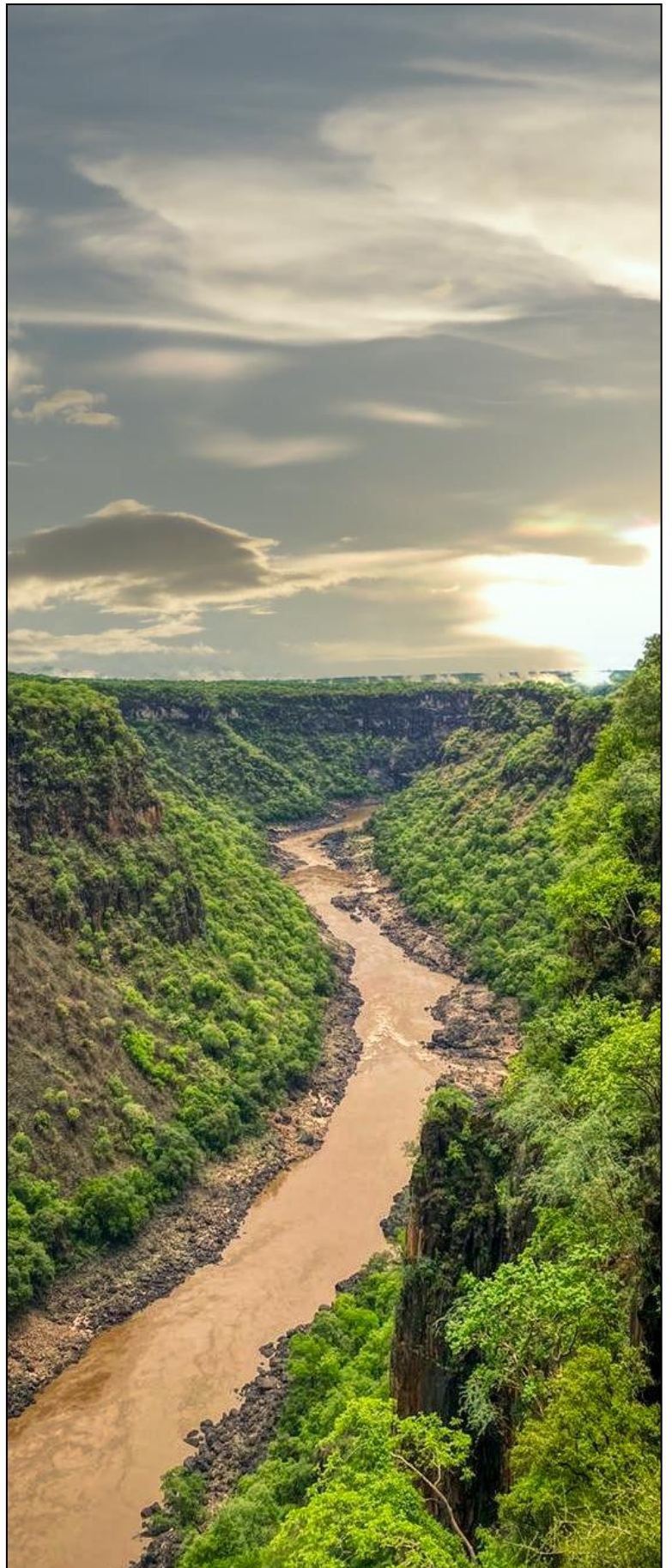


BIRDLIFE ZIMBABWE

BIRDWATCH ZAMBIA

POSITION PAPER ON PROPOSED BATOKA GORGE HYDRO-ELECTRIC SCHEME

DATE: 24 January 2021



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Summary

As organizations that are focused on the conservation of avian biodiversity and the preservation of the environment it occupies, BirdLife Zimbabwe and BirdWatch Zambia are highly opposed to the construction of an impoundment and hydropower scheme on the Batoka Gorge. The project will result in the permanent and un-mitigated submergence of a very rare, restricted and unique habitat that is globally recognised as a site of scenic and world heritage value. Potentially the continued recognition of Victoria Falls/Mosi-oa-Tunya as a UNESCO World Heritage Site will be in jeopardy until such time as a review of the impact of the Batoka Gorge Hydroelectric Scheme and all of its associated infrastructures on the Outstanding Universal Value (OUV) property is ascertained. There are no indications that this review has been undertaken, especially since the World Heritage Committee has published a position that is incompatible with dams with large reservoirs, and furthermore the draft ESIA does not address the impacts of all associated infrastructures. The environmental impact of extensive transmission infrastructure, specifically powerlines and pylons linking hydropower generators to the national grids of affected countries, and development of two large townships at the dam wall site have not been assessed. This deficiency in assessing the impacts of transmission infrastructure on avian biodiversity raises both local and global concern as it potentially affects known and important populations of vulture species, amongst other bird species, that are now categorized as Endangered or Critically Endangered, in terms of conservation status. In this respect, we consider the ESIA to be out-dated as it fails to accurately assess the overall impact of the project in the context

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of updated conservation priorities, such as re-categorizations of species conservation status as well as commitments towards multi-lateral environmental agreements (eg. Zimbabwe is signatory to the Convention on Biological Diversity, Ramsar Convention and AWEA). Within the protracted period that has elapsed in completing the ESIA there have been improved alternative sources of energy and energy generation. The Batoka Gorge Hydro-Electric Scheme (BGHES) is not the only significant power generation scheme in the sub-region and the predicted expanded generation capacity of other projects suggests that use of transmission connectors offers a more cost effective and environmentally friendly solution to hydropower, with a quicker turn around. At best the BGHES will only supply power in 9 years, assuming it ever reaches completion. Both Zambia and Zimbabwe have encountered difficulties in financing other hydropower and large dam construction projects which has led to significant delays in completion of these projects. The perceived increased vulnerability of hydropower to the effects of climate change amongst global financial institutions does not improve either Zimbabwe or Zambia's ability to access finance for this scheme, especially if there are feasible alternatives in repurposing existing power generation facilities or adopting new generation technologies, such as solar. The cumulative downstream effect of construction of another impoundment above Kariba is also not addressed in the ESIA, despite the possible threat it represents to function and productivity of the Kariba fishing industry. In particular, that based on commercial Kapenta (*Limnothrissa miodon*) catch.

In addition to the inadequate assessment of environmental impact of transmission infrastructure, a number of previously identified deficiencies in assessed biological impacts have still not been addressed in the ESIA or public disclosure. Despite a commitment made two years ago to survey the entire length of the Batoka Gorge for Taita Falcon (*Falco fasciinucha*) presence and nesting, this has yet to be initiated. Only the top 27 Km has been surveyed for this species and although much emphasis has been placed on the impact of the project on the Taita Falcon, a promised workshop dedicated to exploring mitigation for the species has also not materialized. The potential environmental impacts of the Batoka Gorge Impoundment on the habitat, ecology and biodiversity of the river and rapids of the upper gorges, closest to the Victoria Falls are classified as having a Major Negative (Red) Impact with no scope for downgrading this categorization through mitigation. Although previously recognized as being an area of exceptional species diversity and biomass, still no effort has been made to identify or quantify the species assemblage that will be affected. The indications are that at least two species of fish, new to science, will be rendered extinct before they are even described. Failure to address these long recognized deficiencies casts doubt over the sincerity and thoroughness of the biological assessment of potential impacts of the B.G.H.E.S. and only serves to further the resolve to ensure that other key aspects, in particular impact of associated transmission infrastructure is assessed in this draft ESIA. We reject the suggestion that this aspect will be the subject of a separate EIA and insist that publically announced commitments be honoured before construction of the dam commences.

Abbreviations and Acronyms

BGHES	Batoka Gorge Hydro Electric Scheme
CESMP	Construction Environmental and Social Management Plan
ESIA	Environmental and Social Impact Assessment
FSL	Full Supply Level
HEP	Hydro Electric Power
IBA	Important Bird and Biodiversity Area
IPP	Independent Power Producer
KBA	Key Biodiversity Area
m asl	Metres above sea level
NP	National Park
NGO	Non-Governmental Organisation
OESMP	Operational Environmental and Social Management Plan
RAM	RAMSAR Advisory Mission
RAMSAR	Convention on Wetlands (named after Ramsar, Iran)
SADC	Southern African Development Community
SAPP	Southern African Power Pool
T&D	Transmission & Distribution
ZRA	Zambezi River Authority

Our Understanding of the Project

This first section outlines our understanding of the project, as a prelude to defining our concerns.

Aspects	Summary
Project Rationale	<p>The objective of the proposed BGHES is stated as being:</p> <ul style="list-style-type: none"> • To increase power generation capacity in both Zambia and Zimbabwe and subsequently mitigate the current power deficits currently experienced in both countries; • To reduce the overall power tariffs in both Zambia and Zimbabwe • Conjunctive operation of both the proposed BGHES and Kariba Complex; • To reduce power outages; and • Contribute to the sustainable and renewable energy Agenda in the two countries thereby reducing reliance on coal fired power stations.
History	<ul style="list-style-type: none"> • Investigated since 1904 • In 1972 Batoka Gorge was identified as the most suitable site below the falls • Full feasibility in 1993 of current site • 2014 current site feasibility subject to further engineering studies and EISA • Scoping report in 2015 • Amended EISA 2019-2021
Dam, Site and Works	<ul style="list-style-type: none"> • Dam site at South -17.926464° and East 26.110928°, • 175 m high arch gravity dam wall • Two powerhouses (Zambia and Zimbabwe). Installed capacity of 1,200 MW each - Total 2,400 MW. 6 Turbines per side. • Project townships in both countries. Between 25 and 30 km² set aside in each country. In Zimbabwe excision from communal land to urban land. • Full Supply Level (FSL) is 757 m asl. • Area of the dam when full will be 23 km² • The reservoir will be 51 km long at FSL of 757 m asl and 45 km long at 730 m asl • Twelve km of the reservoir will be in the World Heritage Site at 757 m asl • Spillway in Zimbabwe through a separate canal that needs to be constructed
Construction	<ul style="list-style-type: none"> • Expected to take nine years. • First two will require more staff - Approximately 8,000 people employed during construction, dropping to 6,000 after two years
Operation	<ul style="list-style-type: none"> • Variable operational approach split into two six month periods • February to July operating as normal at 757 m asl. • August to January operating at 730 m asl, almost run of river • The lower operating level will allow a half day rafting experience • 1,500 operational staff required

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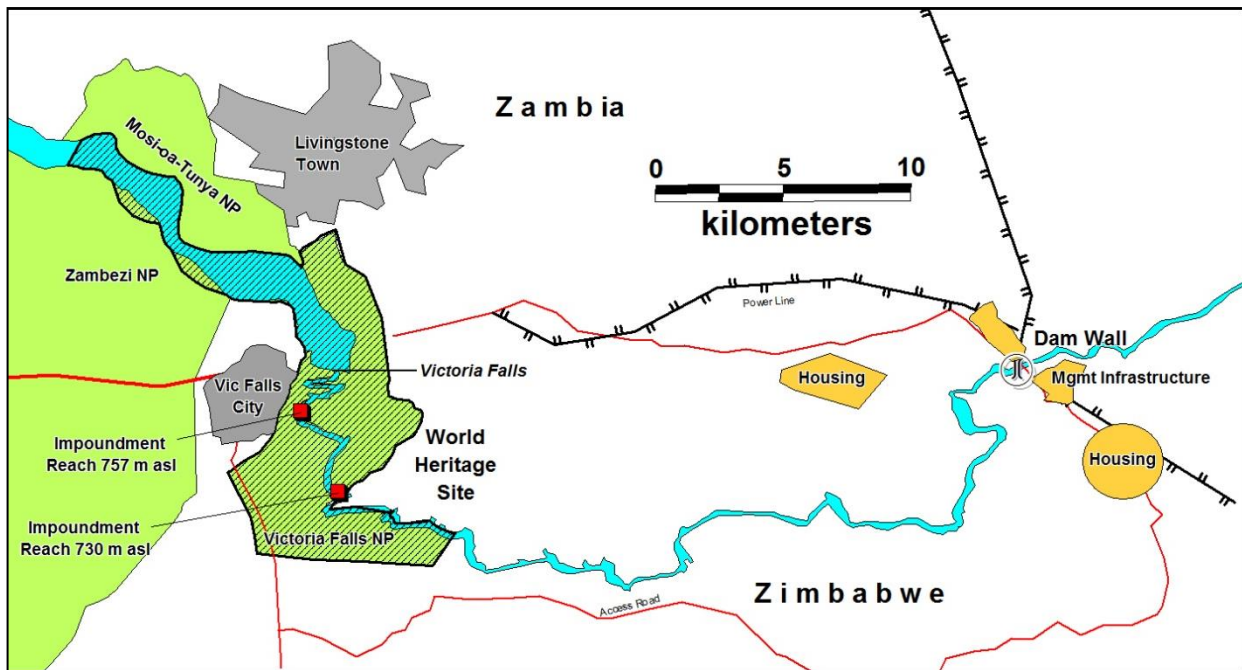
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Aspects	Summary
Transmission	<p>Zambia</p> <ul style="list-style-type: none"> • Mukuni 300 kV transmission line-approximately 22 km to Livingstone • Muzuma 300 kV transmission line-approximately 152 km to Choma <p>Zimbabwe</p> <ul style="list-style-type: none"> • Hwange 2 by 400 kV transmission line-approximately 67 km to Hwange
EIA Study	<p>Three separate draft studies. Initially to be completed by 2015. Significant set of meetings held in 2014/2015 during the scoping phase. More meetings held in late 2018 as part of a stakeholder engagement phase. A final round of disclosure and focus group meeting held on-line in late 2020.</p> <p>Specialist studies</p> <ul style="list-style-type: none"> • Biodiversity (terrestrial and aquatic) • Climate Change (risk review) • Cultural Heritage and Archaeology • Economic Cost-benefit Analysis • Greenhouse Gas Emissions Assessment • Livelihood Restoration • Socio-economic and Health Assessment • Tourism • Water Resource Studies (water quality and environmental flows)

There are sections of the Zambezi that are deemed to be World Heritage Sites. The figure below illustrates the boundaries of the Heritage Sites (black shaded area).



Issues and Concerns

The ESIA carried out by ERM is fully aware and primarily focuses on the main impact of this project which will permanently submerge a very rare, restricted and unique habitat and a site of scenic and world heritage value. There is no scope for substantial mitigation of the environmental and aesthetic impacts of the project and are defined as such in the ESIA. Once the gorges are flooded the habitat and natural ecological function is irretrievably lost. The ESIA report advises that the Governments of Zimbabwe and Zambia need to weigh up and balance the environmental losses as well as other impacts with the perceived gains from the project before making a decision on physical implementation of the project. However, in referring to project documentation (ESIA, CESMP and OESMP), attending of the project public disclosure meetings, and investigating other sources, we believe there are a number of issues, concerns and deficiencies that need to be addressed, or at least require further explanation, in order for the respective governments to reach an appropriately considered and justified decision in terms of national interest, civil society, global heritage and biological conservation.

In the first instance, we believe this ESIA to be incomplete and consequently deficient as it does not address the impact of this proposed project in its entirety. None of the potential environmental impacts of transmission infrastructure connecting the dam to the national grids of the respective countries have been adequately assessed. This transmission infrastructure potentially has serious consequences for avian biodiversity, specifically a number of Critically Endangered and Endangered Vulture species. The ESIA mentions three powerlines, two in Zambia and one in Zimbabwe, that will connect the dam to substations in Hwange (Zimbabwe), Livingstone (Zambia) and Choma (Zambia), however in other reports there is also a suggestion of a further 2 x 400kV lines are to be developed in

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Zimbabwe to feed energy intensive platinum operations in the centre of the country. While it was indicated in the technical Public Disclosure meeting that there are intentions to conduct separate ESIA's of the impact of transmission infrastructure, these assessments (for power transmission lines and roads etc.) must be developed in conjunction with the main ESIA and shared for public scrutiny at the same time. Very simply; these ESIA's cannot be separated from the main ESIA. If there is no dam then there is no need for significant transmission infrastructure. The same argument holds true for the superficial treatment of the environmental impact of the townships that will be built to accommodate the estimated 8000 workers to be employed in construction of the dam. The effects of social impacts, such as immigration and subsequent laying off of construction workers on completion of the dam, or changed urbanisation along the margins of the Batoka Gorge as a result of substantial road infrastructure developed for access to these townships, have not received adequate consideration.

While this initial response is registered, the following text addresses the issues and concerns related to the project from our perspectives as national conservation NGO's based in Zambia and Zimbabwe, that are both additionally aligned and partnered to global conservation initiatives.

Scope and Rationale of the Project in a Global context

We question the rationale and perceived benefits of the project in context of global trends and opinion in respect of the greatly increased and prioritised value placed upon environmental resource and biodiversity equity, versus potential value and benefit of generated power and unquantifiable environmental damage.

Protected Areas of Global significance

In the face of development and degradation protected areas have become one of the key instruments for protecting and safeguarding biodiversity and the physical parameters that sustain it, especially water. They are critical for safeguarding species and habitats and act as buffers against climate change and they bring cultural, ecological, spiritual, and scientific benefits to society. The Victoria Falls and the gorges below the falls are a site of global importance and they fall into several categories of protected area that are globally significant.

World Heritage Site

There are three protected areas in the vicinity of the project of which two, Victoria Falls and Mosi-oa-Tunya National Parks are directly impacted through construction of the dam. Victoria Falls/Mosi-oa-Tunya was proclaimed a UNESCO World Heritage Site on the basis that it contains superlative natural phenomena, areas of exceptional natural beauty and aesthetic importance and an outstanding example representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features.

The World Heritage Committee has previously requested that the ESIA for the Batoka Gorge Hydroelectric Scheme include “a specific assessment of the impacts of the dam and all of its associated infrastructures, on the Outstanding Universal Value (OUV) of the property, in line with the IUCN’s World Heritage Advice Note on Environmental Assessment” (Decision 41 COM 7B.22). The Zimbabwean and Zambian governments’ response was to provide assurances that the relevant agencies would review the ESIA to ensure that the impact of the Scheme was ascertained, and any possible detrimental impact on OUV mitigated (2019 State of Conservation Report).

However, the draft ESIA contains no explicit assessment of the impact of the dam and associated infrastructure on OUV. Moreover, the World Heritage Committee has repeatedly requested that the draft ESIA be submitted to the World Heritage Centre for review by the IUCN (Decisions 41 COM 7B.22 and 43 COM 7B.34). This must be done *before* any final decision on this project is taken. The dam will inundate 14 km of the World Heritage Site. Has the draft ESIA been submitted to the World Heritage Centre and reviewed by the IUCN and, if so, what was the outcome of this review and has there been any response from the World Heritage Committee to this document? We note further in this regard that, in addition to the above-mentioned decisions, which are directed specifically towards this project, the World Heritage Committee, in Decision 40 COM 7 (State of Conservation of World Heritage properties), states that “construction of dams with large reservoirs within the boundaries of World Heritage properties is incompatible with their World Heritage status, and urges State Parties to ensure that the impacts from dams that could affect properties located upstream or downstream within the same river basin are rigorously assessed in order to avoid impacts on the Outstanding

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Universal Value (OUV)". Any un-mitigatable negative impacts on OUV should be considered a fatal flaw in this project and should result in the applications for authorisation being rejected.. We believe any response from UNESCO to be a matter of public record.

Ramsar Site

Part of the project area affected by the dam is a wetland of international importance, designated under the Ramsar Convention, although the official description seems to be limited to the southern part of the Victoria Falls National Park. Parties to the Ramsar Convention are required to promote the conservation of Ramsar sites and the wise use of all wetlands in their territories (Article 3.1). 'Conservation' in this context has been defined to mean maintenance of a site's ecological character (COP Recommendation 4.2). It is therefore important that the ESIA consider any potential impacts on the ecological character of the Ramsar site concerned. Per Article 3.2 of the Convention, any likely change in the site's ecological character must be reported to the Ramsar Convention's Secretariat.

The Ramsar Advisory Mission (RAM) is one of the most valuable tools available to Contracting Parties to the Ramsar Convention on Wetlands. A RAM is a technical assistance mechanism through which a Contracting Party may request expert advice about how to respond to threats to the ecological character of a Ramsar Site and associated wetland issues. To our knowledge no such RAM has been requested by either Zimbabwe or Zambia and this represents an oversight in the assessment.

Key Biodiversity Area (KBA)/ Important Bird Area (IBA)

There are two Key Biodiversity Areas (KBAs) and Important Bird Areas (IBAs), each located on either side of the Zambian-Zimbabwean border - Mosi-oa-Tunya National Park and Batoka Gorge (Zambia) and Batoka Gorge (Zimbabwe).

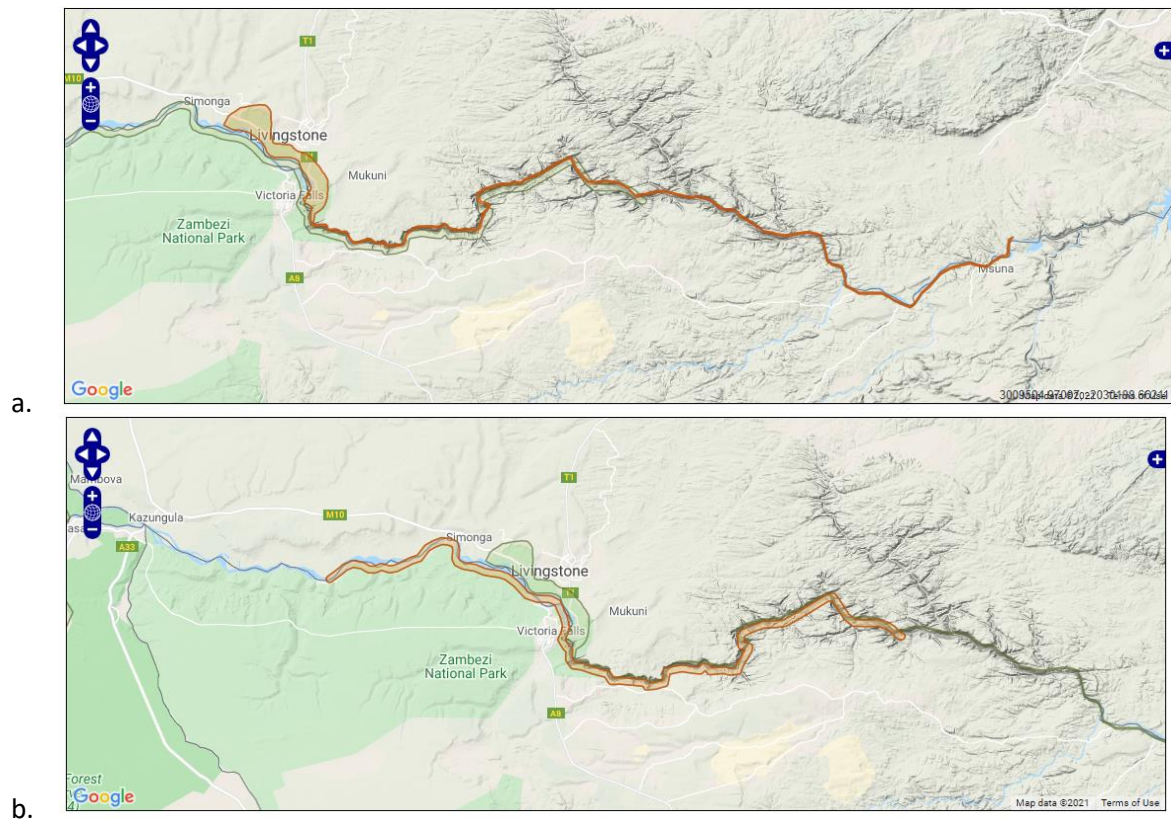
On the Zambian side, the site comprises the Mosi-oa-Tunya National Park and the adjacent Batoka Gorge which extends downstream as far as the confluence of the Zambezi with the Kalomo River. At 6,600 ha, the park is Zambia's smallest, but it is the most popular as it flanks a stretch of the Zambezi river just south of Livingstone that includes the Victoria Falls. As well as riparian habitats such as sandbars and fringing forest, there is woodland (mainly mopane) and the immense basalt gorge below the falls (much of which is over 100 m deep). The site is most important for the species occurring in and around the gorge. The Taita Falcon (*F. fasciinucha*) has been recorded with some regularity and is known to nest here—Hartley (1993) estimated that 8–10 pairs occurred in the gorge along 60 km of its length—but it is perhaps not as common as some local tour operators might suggest, possibly due to confusion with other species such as Peregrine (*Falco peregrinus*). Other breeding species of interest include Black Stork (*Ciconia nigra*), Verreaux's Eagle (*Aquila verreauxii*) and African Black Swift (*Apus barbatus*) and, along the river above the falls, White-Backed Night-Heron (*Gorsachius leuconotus*), African Finfoot (*Podica senegalensis*) and Rock Pratincole (*Glareola nuchalis*).

On the Zimbabwean side, the Batoka Gorge is recognised as an Important Bird and Biodiversity Area (for the presence of bird species of global conservation concern, for supporting significant congregations of one or more bird species and for holding a good selection of bird species of that are characteristic of that particular biome). The Batoka Gorge is a major breeding site for cliff-nesting raptors, in particular Taita Falcon. Eighteen pairs of Peregrine Falcon have been recorded nesting there. The gorge also holds 35 other raptor species, Black Storks and large numbers of Rock Pratincole,

nesting Hooded Vulture (*Necrosyrtes monachus*) and White-backed Vulture (*Gyps africanus*) which use the gorge as a flyway.

The lake produced by the proposed dam would severely constrain the breeding opportunities for cliff-nesting raptors and given the reduced space (upstream) and the competitive dominance shown by *Falco peregrinus*, it is debatable whether *F. fachiinucha* would survive there. In addition, if Batoka Gorge held a lake rather than a rushing river, then increased access to the lake would be bound to increase, with the consequence of greater disturbance (upstream) to the remaining raptors.

As party to the Convention on Migratory Species and the Agreement on the Conservation of African-Eurasian Migratory Waterbirds, Zimbabwe has international obligations in respect of several of these species. In terms of the southern African population of Black Stork, parties are obliged to take measures to restore this population to a favourable conservation status – including through habitat conservation.



Maps of (a) Mosi-Oa-Tunya National Park and Batoka Gorge KBA and IBA (Zambia) and (b) Batoka Gorge KBA and IBA (Zimbabwe).

Year of most recent IBA criteria assessment: 2001

Populations of IBA trigger species

Species	Current IUCN Red List Category	Season	Year(s) of estimate	Population estimate	IBA Criteria Triggered
Taita Falcon <i>Falco fasciinucha</i>	VU	resident	-	present	A1
Coppery-tailed Coucal <i>Centropus cupreicaudus</i>	LC	resident	1998	present	A3
Racquet-tailed Roller <i>Coracias spatulatus</i>	LC	resident	1998	present	A3
Kurrichane Thrush <i>Turdus libonyana</i>	LC	resident	1998	present	A3
Miombo Rock-thrush <i>Monticola angolensis</i>	LC	resident	1998	present	A3
Arnot's Chat <i>Myrmecocichla arnotti</i>	LC	resident	1998	present	A3
White-breasted Sunbird <i>Cinnyris talatala</i>	LC	resident	1998	present	A3
Brown Firefinch <i>Lagonosticta nitidula</i>	LC	resident	1998	present	A3
Broad-tailed Paradise-whydah <i>Vidua obtusa</i>	LC	resident	1998	present	A3
Black Stork <i>Ciconia nigra</i>	LC	resident	-	7 breeding pairs	A4i
Black Stork <i>Ciconia nigra</i>	LC	non-breeding	-	20 individuals	A4i
Rock Pratincole <i>Glareola nuchalis</i>	LC	non-breeding	-	300 individuals	A4i

Note: This table presents the IBA criteria triggered and the species that triggered then at the time of assessment, the current IUCN Red List category may vary from that which was in place at that time.

Big Dam Projects

Hesitant Implementation. Aside from the established negative environmental impacts, Big Dam projects have a number of associated draw-backs and problems. In developing countries many proposed projects have gone through cycles of proposal, assessment, shelving, re-proposal and re-assessment. While many sites in Africa were proposed in the early 1900s and then again in the 70s, 80s and 90s, few of these have been constructed.

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Others, such as Batoka Gorge in Zimbabwe/Zambia are still being reassessed over 100 years after first investigation. The protracted period between conception and commitment to physical development still speaks to ongoing concerns for the cost/benefit of this project, particularly in the light of progress made toward alternative power generation technologies and the scope for improved efficiencies in existing power generation infrastructure (see section on Alternative Energy Sourcing).

A comparative ranking of the environmental impacts of hydroelectric generation of power involving use of large dams or reservoirs is controversial, although considered by some to be amongst the most environmentally damaging forms of power generation. This is assuming they even reach completion!

Funding and Disinvestment. Funding for construction and operation of large dams is often unclear and the BGHES is no exception. These projects represent significant risk and due to their size and long lead times ahead of commissioning. Consequently they are often subject to cost overruns. Long term financial planning can be fickle and difficult to guarantee, but it is the national governments (in this case Zambia and Zimbabwe) that will ultimately pay for the dam. Recently, the Zambian Government has encountered difficulties in the financing of the Lower Kafue Gorge Power Station.

As recognised on pages 10 -69 of the draft ESIA, not all of the criteria in IFC performance Stand 6 can be satisfied by this project. This could present a hurdle to securing additional funding.

Similarly construction of the Tokwe-Mukosi Dam in south-eastern Zimbabwe was halted and almost abandoned due to non-payment, resulting in a delay in completion of over 15 years. So conceivably the worst case scenario is for the B.G.H.E.S. financing to also become problematic leading to delays in completion and possibly abandonment after the gorge had been impacted. Clarity on the financing plan for the B.G.H.E.S., including the nature of the investors is needed, and explicitly; what is the contingency for disinvestment?

The Mphanda Nkuwa Dam (MND) Project in Mozambique, which would have been built on the Lower Zambezi River, has been placed on hold as this Dam Project did not meet any of the seven criteria laid down by the World Commission of Dams (WCD). As with the MND Project, one of the needs assessments indicate a clear need for rural electrification, a necessity the project does not mention at all. Affected communities were not involved in the decision-making process and have unacceptably low levels of information. The options assessment does not present any alternative options such as solar, wind, or natural gas. The project does not address the problems caused by existing dams and further exacerbates these problems. In the case of sustaining rivers and livelihoods the project will further damage the already ecologically fragile lower Zambezi River system and delta.

Long-term Lifespans of dams

While it is argued that hydroelectric projects provide sustainable power generation, the limited lifespans of dams are ignored. Most dams designed and built in the last 100 years have projected lifespans of 50-100 years. Kariba Dam, completed in the 1960's, has a projected lifespan of 140 years and has recently already undergone extensive repairs to meet this lifespan. The lifespan is also dependent on experience and workmanship of the construction contractor. This has been questioned in other ESIA's, such as the Egyptian company being used in construction of the Stiegler's Gorge Project.

Climate change

A 2011 World Bank report states: "Heavy reliance on hydropower creates significant vulnerability to climate change and is a feature that many low and middle-income countries have in common". The Batoka Gorge project is no exception to this. The issue of climate change is addressed in Annex Hof the ESIA, however by its own admission this is a broad, short-term study.

For such a large project, and several others that are also proposed for the Zambezi River, it would be prudent to undertake a comprehensive climate change study, especially since climate change has begun to change precipitation patterns significantly and unpredictably. On the one hand, more frequent droughts will make many hydropower projects uneconomic, while on the other, more extreme rainfall will increase siltation of dams (reducing their useful lifetimes) and increase the risk of dam failures and catastrophic flood releases. River flows are becoming increasingly unpredictable with reduced flows resulting in reduced power outputs, thereby making projects unsatisfactory. Kariba Dam immediately downstream of the proposed dam site, and mainly reliant on Zambezi River flow, has been exactly in that position for the last few years in that water levels have been critically low resulting in severely limited generating capacity. Building a second large dam on the Zambezi increases the risks of over-relying on one river catchment for both Zimbabwe and Zambia.

In any case, the long-term prognosis is that dams are not forever and this will be the case for Batoka as well. Does it really make sense to use expensive and damaging large hydropower schemes as our main power supply systems in the long-term?

Alternative energy sourcing

The main justification for the BGHES is potential output of 2,400 MW, and it is rationalized that alternative energy generation cannot match this output. Notwithstanding previously mentioned drawbacks, at best this output may be achieved only in 9 years and in the interim contributes zero energy to increasing and immediate demand.

The proposed development of the BGHES is not the only significant power generation initiative under consideration in the sub-region. Based on a World Bank study from 2015, the Government of Mozambique estimates to have expanded generation capacity to 3,138 MW by 2022 and 4,163 MW by 2030. A least cost and easily implementable solution for access to energy is that of transmission Interconnectors. Their overall impact on the environment is substantially less than a hydropower plant, with lower capital and operating costs and a noticeably short turn around in terms of implementation. Entering into commercial agreements with their neighbours such as Mozambique, such as those that already exist, to purchase power from them would enable all parties to access excess energy, which is a SADAC strategy, and in this particular scenario, IPPs become the largest group of generators.

Consequently, on the above points alone, we question whether all alternative power generation schemes to offset the need for HEP have been considered and further offer the following for consideration?

Gas-fired generation. With the large gas fields in the Rovuma Basin, Mozambique/Tanzania, the option of channeling gas from these fields to Zimbabwe or Zambia via existing infrastructures should be investigated. The potential for gas to power projects is certainly considerable. In addition, the benefits to industrialise the countries by importing gas forms a strong motivation to consider this option. Furthermore, there are four coal fired power stations in Zimbabwe that could potentially be repurposed. These power plants are already established and supporting infrastructure is already in place. For example, the Hwange coal fired station has been beset by problems related to aging infrastructure and lack of maintenance over the last few decades and repurposing to gas generation is potentially a logical and viable option to improve efficiency and output of this obsolete existing power generation facility. From a T&D perspective and land allocation to the site, repurposing makes sense as well as addressing arising environmental concerns over planned expansion of Hwange coal fields.

Roof-top solar installation. Since much of the high demand resides in the built-up areas of city centres and urban developments, the opportunity to develop and implement wide scale roof top solar power generation schemes is available. Currently this is a practice followed in-country, mostly due to load shedding rather than as a coordinated and systematic approach. Medium to large power users could be incentivized to install sizable installations through a REFIT tariff regime.

Floating solar farms. While still in its infancy, the potential for floating solar farms is evident and the technology is fast growing to suit these environments. Have studies been run to determine the potential of floating PV farms? Surely there is potential for this technology to augment energy generation on sites, such as Kariba, which already has the necessary transmission infrastructure and vast surface area?

Wind generation. While the wind potential may not be huge, there are some areas where some potential could be leveraged. If no wind studies have been performed, then the actual potential is unknown. These should be factored in when considering power generation options.

Upgrade of existing facilities. Hwange power station has long been associated with poor maintenance leading to power outages. Upgrade of this facility would greatly alleviate short-term power shortages in Zimbabwe and would also allow the development and investigation of some of the options discussed above before deciding that a large dam is the only option.

Beneficiation of generated power

Although the ESIA documentation stresses that the project is for the benefit of the host countries, it appears that an agreement has been reached between GE (General Electric) and PowerChina to construct and run the dam on behalf of the Zambezi River Authority (ZRA). The details of this agreement are not clear, in this respect there needs to be transparency to ensure that the beneficiaries are indeed the citizens of the host countries and not the business of exporting power for the benefit of the developers.

Cumulative effects

Secondary benefits, such water storage or development of fisheries are often included in the rationales for construction of Big Dam projects. In the case of BGHES perceived benefits are limited

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to only generation of electricity as there is no justification for increased water storage and no mention of possible fisheries development. Presumably for the latter there is none, as the characteristics of the impounded gorge offer little scope for a productive fishery. However the cumulative effect of altered nutrient flows, the Batoka Gorge impoundment is effectively a nutrient trap due to its proposed position, and flow regimes could conceivably have a profound effect on the productivity of the Lake Kariba fisheries, which is Zimbabwe's largest and significant commercial fishery. Inflow regimes and consequent nutrient cycling are well known to affect recruitment and productivity of Kapenta (*Limnothrissa miodon*), a principal species of the commercial catch from the Kariba fishery. In the technical disclosure meeting a question was raised to the assessment of downstream cumulative effect, however this point was quickly discounted on the grounds that Kariba absorbs any cumulative effect. The potential effect of the BHGES on a major fishing industry, and source of livelihood for many, appears to be unconsidered in the ESIA?

Precedent for other Big Dam projects

Zambezi River Authority documentation reveals several other proposed dam sites along the Zambezi (e.g. Devil's Gorge and Mupata Gorge). If the Devil's Gorge proposal should become a reality then the entire system of gorges below the Victoria Falls will be altered forever. Gorges and their unique ecology represent a very minor part of the world's ecosystems and have already been heavily impacted through construction of impoundments despite their outstanding environmental value. Care should be taken before destroying them.

Specific concerns relating to the project ESIA

Effects on Wildlife

Considerable effort has been made towards assessing the potential environmental impacts of the Batoka Gorge Impoundment on the habitat, ecology and biodiversity of this unique system. In some aspects these are classified as having a Major Negative (Red) Impact with no scope for downgrading this categorization through mitigation. Despite the severity of this categorization and acknowledgement in the ESIA that there are still critical information gaps in terms of biological impacts, commitments to address these deficiencies have yet to be undertaken. Specific cases are detailed below. Furthermore, since assessment in the ESIA the conservation status of a number of bird species, including most vulture species and the Black Stork have been reviewed resulting in their re-categorization to Endangered and Critically Endangered. In the light of this observation, it is conceivable that the ESIA is already out of date in its assessment of impacts on such species, particularly in respect of potential impacts on global populations. As previously indicated, further gaps have been identified in terms of the potential risks to avian biodiversity from transmission infrastructure that is not even addressed in the current ESIA.

Moreover, several residual impacts have been assigned lower significance ratings, despite the draft ESIA acknowledging a myriad of uncertainties regarding both the impacts of the project and the effectiveness of mitigation measures. If predictions regarding the effectiveness of mitigation measures cannot be supported by evidence, the precautionary principle should be applied when assessing residual impacts and the significance ratings should not be lowered.

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Transmission Infrastructure

If not designed safely, transmission or electricity distribution lines can result in devastating impacts on birds, especially those that are medium and large-bodied, such as raptors and storks. Surprisingly, some “modernized” lines in certain countries (e.g., Mongolia or Morocco) are having a higher negative impact, due to dangerous configurations of pylons, especially those of metal or concrete with metal cross-arms, which are in some cases more dangerous than some older traditional distribution power lines constructed with wood. It is calculated that there are over 65 million km of medium- and high voltage power lines across the world, with this figure rising at a rate of 5% each year (Jenkins et al., 2010). The impact of these linear infrastructures includes the death by collision and electrocution of millions of birds and other animals, such as monkeys and bats, as well as habitat degradation and fragmentation. The environmental risks posed by transmission infrastructure is additionally exacerbated depending on the landscape and location of intended distribution. Probability of negative impact is increased where birds may use transmission infrastructure to perch and nest upon or where there are natural concentrations of flying birds, such as paths of migration and topographic features that influence air currents and consequently flight patterns of birds.

In terms of the B.G.H.E.S., the victims of electrocutions or collisions with transmission infrastructures are potentially an important factor of mortality, threatening endangered species at a regional level or larger scale. Upon these grounds we insist that detailed track, location and technical specifications (including technical drawings) of all transmission infrastructure relating to the project is included within the ESIA, and that these are assessed in terms of their environmental impact. Implications of these potential impacts need to be interpreted in respect of all endangered species, including all vulture species, certain eagles, and other large bird species, such as storks. The superficial and dismissive assessment of “important birds” in this draft of the ESIA relates to only a small portion of the total envisaged transmission infrastructure relating to the project and critically understates potential environmental impact on a suite of endangered bird species.

Taita Falcon

The ESIA places much emphasis on the impact of the project on the Taita Falcon (*Falco fasciinucha*) population that resides in the Batoka Gorge. There has been considerable historical and recent survey effort towards monitoring this population, including one dedicated to a survey of the species commissioned by the principal, however this effort has mostly concentrated on the upper 25-27Km of the Gorge with little in the remainder of the system down to the proposed dam wall site. The principal recognized this deficiency in 2018 and proposed further survey of the lower section of the Gorge at that time. Furthermore the principal also proposed a workshop focusing on the issue of Taita Falcon conservation and detailed discussion of potential mitigation for the species. These commitments were further confirmed in the 2nd technical disclosure meeting (4 December 2020). Two years have elapsed since these proposals were made and no progress has been made in these undertakings and in the face of imminent commencement of construction, is there actually any intention to honour these undertakings, or is it just discourse to pacify detractors? It is reiterated that there is historical record of Taita Falcon nesting sites on the Zambezi River within the lower section of the Gorge. There are also suitable secondary cliff faces away from the main river course that have never been surveyed that may host Taita Falcon nesting sites, as well as other cliff-dwelling raptor species.

The eroded valleys of the lower reaches of the Batoka Gorge also host riparian vegetation that supports at least 1 pair of the recently up-listed Martial Eagle (*Polemaetus belicosus*), but could

support nesting activity of the Critically Endangered Hooded Vulture (*Necrosyrtes monachus*) amongst other species. These areas will be directly and permanently affected by the project as will be inundated by the water level. In this respect, the absence of survey of these areas is a serious deficiency in the ESIA, especially since even the principal has recognized the importance of this aspect of the biological assessment.

It is noted that survey of the lower Batoka Gorge allows the principal to address another deficiency of the ESIA, which is preliminary assessment of potential impact of inundation on sites of archaeological significance and cultural heritage. There is causal relationship between topographical features, specifically cliffs, required by Taita Falcons and distribution of caves that potentially could have been occupied by prehistoric man.

Hydrological Impacts of the Impoundment

The ESIA dedicates a section to the effect of the impoundment on changed river flow regime on aquatic invertebrate macrofauna and fish. Sites were identified and sampled for these aspects of species biodiversity. All of the sample sites were downstream of the location of the proposed dam wall location and none positioned to assess the upstream effect of altered water flow regimes on the ecology of the upper gorges, even though this represents highly unique habitat in terms of location, below an impassible natural barrier (the Victoria Falls), and comprising rapids and riffles of a magnitude and frequency found nowhere else. Efforts to preserve an estimated 9Km of this unique and highly productive habitat by reducing the proposed maximum wall height by 4m are both recognized and commended, but also demonstrate the importance of this section of the river from an environmental impact perspective. However, there has been no assessment of potentially affected biodiversity and biomass, especially aquatic invertebrate macrofauna and fish species, of this apparently unique habitat which will to a large extent be inundated and altered permanently. Has any survey of aquatic invertebrate macrofauna of the Batoka Gorge ever been undertaken? The ESIA report records the finding of a potentially new and undescribed Mormyrid fish species, and the contracted expert, Mr Denis Tweddle, also mentioned in the disclosure meeting the possible existence of yet another undescribed fish species, also of the Family *Mormyridae*, in the river downstream of the proposed dam wall site which host smaller and less dramatic rapids and riffles. In his opinion it seemed that both species may be lost as a result of construction of the impoundment. In light of these findings of unique and probably endemic ichthyofauna there is an obligation to at least describe what species biodiversity, specifically aquatic macrofauna, invertebrate and vertebrate, stands to be lost/exterminated by progressing this project.

Besides, this baseline data on natural function of this ecosystem offers the opportunity to demonstrate mitigation of this 'Category Red' environmental impact if favourable comparison can be made post construction. It is understood that that the 730 m operating level will be 10 km below the falls and the 757m operating level will be 4.5 km below the falls. This still leaves 5-6 km that will be submerged to a depth 25 m for six months of the year at its lowest end.

Recommendations

Thus, from our inputs provided in this document, BirdLife Zimbabwe and BirdWatch Zambia propose the following measures and processes to enhance the protection of the Batoka Gorge OUV as the draft ESIA does not address the impact of the project in its entirety:

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1. That clarity on the financing plan for the B.G.H.E.S be provided including the nature of the investors.
2. That the contingency plan for disinvestment be shared with stakeholders
3. That the potential environmental impacts of transmission infrastructure connecting the dams to the national grids of the respective countries be adequately assessed and reported
4. That the ESIA assessing the impact of townships and roads that are proposed to be built be prepared in conjunction with the main ESIA and shared with stakeholders and Government ahead of any approvals made in terms of the development
5. That the draft ESIA be submitted to the World Heritage Centre and reviewed by the IUCN and that the outcome of this review be shared with stakeholders *before* any final decision on this project is taken
6. That the BHGES development be reported to and the ESIA be shared with the Ramsar Convention and that the Governments of Zimbabwe and Zambia request a Ramsar Advisory Mission to assess the threats to the ecological character of the Victoria Falls Ramsar Site and submit their report to be shared with stakeholders before any final decision on this project is taken
7. That the draft ESIA include a full investigation to determine whether commitments made in respect of Multi-lateral Environmental Agreements (MEAs) eg. Convention on Migratory Species, Convention of Biological Diversity and Convention on Africa-Eurasian Migratory Waterbirds (AEWA), Ramsar Convention are being adhered to by Zimbabwe and Zambia (where they are signatories to these MEAs) for key species eg: Black Stork, Hooded Vulture, White-backed Vulture
8. That a comprehensive climate change study be undertaken, especially since climate change has begun to change precipitation patterns significantly and unpredictably
9. That all alternative power generation schemes to offset the need for Hydro Electric Plant be comprehensively investigated
10. That ESIA's be developed for the several other proposed dam sites along the Zambezi (e.g. Devil's Gorge and Mupata Gorge) to understand the cumulative impact before any decision is made for BGHES
11. That the draft ESIA include assessments of vulture species (White-backed Vulture and Hooded Vulture), the Black Stork and Martial Eagle due to their re-categorization to Endangered and Critically Endangered in particular relation to potential impacts on global populations.
12. That the potential risks to avian biodiversity from transmission infrastructure be investigated and addressed in the draft ESIA
13. That the commitment by the ESIA team to facilitate a further Taita Falcon survey of the lower section of the Gorge and that the proposed workshop focusing on the issue of Taita Falcon conservation and detailed discussion of potential mitigation for the species honoured before decision is made for BGHES
14. That the ESIA investigate the effect of altered water flow regimes on the ecology of the upper gorges upstream from the impoundment

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15. That a survey of aquatic invertebrate macrofauna of the Batoka Gorge be undertaken. There is an obligation to at least describe what species biodiversity, specifically aquatic macrofauna, invertebrate and vertebrate, stands to be lost/exterminated by progressing this project.
16. That the potential cumulative effect of altered nutrient flows by the BHGES on the major fishing industry in Kariba be investigated and reported before any decision is made on BGHES
17. That the potentially new and probably endemic ichthyofauna Mormyrid fish species in the river downstream of the proposed dam wall site be investigated and be described before a decision is made on the BGHES
18. That SEAs be performed to determine best the energy mix – considering social, economic and environmental factors - to power development in Zimbabwe and Zambia for the twenty-first century.
19. That the ESIA should assess the entire assemblage of raptors (including Critically Endangered vultures) in considering the impacts of the inundation of the gorge.
20. That the feasibility of offsets, and the costs associated with securing and managing these areas be investigated in more detail before a decision is made.

No decision should be made until such steps have been taken, and that any authorisations granted should not allow construction to commence until offset sites have been secured (ideally through legal designation as protected areas) and sufficient funding set aside for their continued management.

Submitted by BirdLife Zimbabwe and BirdWatch Zambia to ERM on 24 January 2021

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