



Biodiversity Action Plan for the Mpatamanga Hydro Power Project, (MHPP), Malawi.

Version 3.0

March 2025

This version is for public disclosure and emits detailed budgeting, but includes a summary budget for the BAP

Citation: TBC (2025). Biodiversity Action Plan for the Mpatamanga Hydro Power Project. Report for Mpatamanga Hydro Power Limited (for public disclosure). Version 3.0. Cambridge, UK: The Biodiversity Consultancy. March 2025.

This report was prepared for MHPL (Mpatamanga Hydro Power Limited).

This document is copyright-protected by The Biodiversity Consultancy Ltd (TBC). The reproduction and distribution of this document for information is permitted without prior permission from TBC. However, neither this document nor any extract from it may be reproduced, stored, translated, or transferred in any form or by any means (electronic, mechanical, photocopied, recorded, or otherwise) for any other purpose without prior written permission from TBC.

| Document information | |
|----------------------|---|
| Document title | Biodiversity Action Plan for the Mpatamanga Hydro Power Project (for public disclosure) |
| Document subtitle | |
| Project No. | MHP1 |
| Date | 13 March 2025 |
| Version | V3.0 |
| Author | Suzanne Livingstone, Dave Wilson, Simon Furnell |
| Client name | MHPL |

| Document history | | | | | | |
|------------------|---|------------|------------|-------------------|----------|-------------|
| Revision no. | Author/s | Reviewer 1 | Reviewer 2 | Date | Comments | Final/draft |
| V1 | Suzanne Livingstone, Dave Wilson, Simon Furnell | Emma Hume | | 06 June 2024 | | Draft |
| V2 | Suzanne Livingstone, Dave Wilson, Simon Furnell, Nadia Sheikh | Emma Hume | | 19 September 2024 | | Final draft |
| V3 | Suzanne Livingstone, Dave Wilson, Simon Furnell, Nadia Sheikh | Emma Hume | | 13 March 2025 | | Final |

Signature of Strategic Director

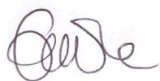


Table of contents

| | |
|--|-----------|
| Table of contents | 4 |
| Acronyms and Abbreviations | 6 |
| Executive summary | 9 |
| 1. Introduction | 11 |
| 1.1 Project description | 11 |
| 2 Purpose and scope | 13 |
| 2.1 Purpose | 13 |
| 2.2 Scope | 13 |
| 2.2.1 Temporal scope | 13 |
| 2.2.2 Project scope | 14 |
| 2.2.3 Biodiversity scope | 14 |
| 3 Biodiversity management | 14 |
| 3.1 Documents supporting the BAP | 14 |
| 3.2 Biodiversity management within MHPL | 15 |
| 3.3 Stakeholder engagement during the BAP development | 17 |
| 4 Biodiversity context | 24 |
| 4.1 Priority biodiversity features | 26 |
| 5 Summary of potential impacts and mitigations | 31 |
| 5.1 Prioritisation of priority biodiversity features for mitigation and monitoring | 31 |
| 5.2 Project impacts | 32 |
| 5.3 Technical rationale for mitigation actions | 35 |
| 5.3.1 Avoidance and minimisation | 35 |
| 5.3.2 Rehabilitation | 37 |
| 5.3.3 Offset | 37 |

| | | |
|-----------|---|-----------|
| 5.4 | General mitigation actions..... | 37 |
| 5.5 | Specific mitigation actions..... | 46 |
| 5.5.1 | Species specific actions | 46 |
| 5.5.2 | Site-specific actions..... | 48 |
| 6 | Residual impact assessment and offset targets..... | 58 |
| 6.1 | Approach to assess impacts..... | 58 |
| 6.2 | Results and significance..... | 59 |
| 7 | Offset strategy..... | 61 |
| 7.1 | Terrestrial natural habitat..... | 65 |
| 7.1.1 | Biodiversity Conservancy in Neno District..... | 65 |
| 7.2 | Aquatic natural (degraded) habitat..... | 71 |
| 7.2.1 | Elephant Marsh..... | 71 |
| 7.3 | Offset contingency plans..... | 75 |
| 7.4 | Supporting conservation actions | 77 |
| 7.5 | Next steps..... | 81 |
| 8 | Monitoring and evaluation strategy..... | 83 |
| 9 | BAP implementation..... | 87 |
| 10 | References..... | 89 |

Acronyms and Abbreviations

Table 1 List of acronyms and abbreviations

| Acronym | Full name |
|--------------|---|
| AP | African Parks |
| BAP | Biodiversity Action Plan |
| BOIMP | Biodiversity Offset Implementation and Management Plan |
| BFDs | Bird Flight Diverters |
| CBO | Community Based Organisation |
| CCA | Community Conservation Area |
| CHA | Critical Habitat Assessment |
| DEO | District Environment Officer |
| DNPW | Department of National Parks and Wildlife |
| EDF | Electricite de France |
| ESCOM | Electricity Supply Corporation of Malawi |
| ESMMP | Environmental and Social Management and Monitoring Plan |
| EWT | Endangered Wildlife Trust |
| GMA | General Mitigation Action |
| GOM | Government of Malawi |
| IAS | Invasive Alien Species |
| IFC | International Finance Corporation |
| LWT | Lilongwe Wildlife Trust |
| LNP | Liwonde National Park |
| MGDS | Malawi Growth and Development Strategy |
| MHPL | Mpatamanga Hydro Power Limited |

| Acronym | Full name |
|---------------|--|
| MoU | Memorandum of Understanding |
| MWASIP | Malawi Watershed Services Improvement Project |
| MWR | Majete Wildlife Reserve |
| MWRA | Majete Wildlife Reserve Association |
| NG | Net Gain |
| NBSAP | National Biodiversity Strategy and Action Plan |
| NFLRS | National Forest Landscape Restoration Strategy |
| NNL | No Net Loss |
| NTFP | Non-Timber Forest Product |
| PES | Payment for Ecosystem Services |
| PPA | Project Preparatory Assistance |
| PPA | Power Purchase Agreement |
| PS6 | Performance Standard 6 |
| QKm | Quality kilometre |
| QH | Quality hectare |
| PRRAP | Preliminary Restoration and Resettlement Action Plan |
| RIA | Residual Impact Assessment |
| SSA | Species Specific Action |
| SCA | Supporting Conservation Action |
| SDG | Sustainable Development Goals |
| SIA | Social Impact Assessment |
| SoP | Series of Projects |
| SC | Stakeholder Concern |

| Acronym | Full name |
|-------------|--|
| SVTP | Shire Valley Transformation Programme |
| SWOT | Strengths, Weaknesses, Opportunities and Threats |
| TBC | The Biodiversity Consultancy |
| TCFA | Trans-Frontier Conservation Areas |
| VFA | Village Forest Area |
| WB | World Bank |
| WBG | World Bank Group |
| WESM | Wildlife and Environmental Society of Malawi |

Executive summary

This document is the Biodiversity Action Plan (BAP) for the Mpatamanga Hydropower Project (the Project). The Project is being developed by four co-developers: the Government of Malawi (GoM), the International Finance Corporation (IFC), Electricité de France (EDF) and SCATEC JV, through a Public Private Partnership (PPP) and Mpatamanga Hydro Power Limited (MHPL) has been set up to lead Project development. The Project is located on the Middle Shire River in the Southern Region of Malawi and consists of a 301 MW peaking plant at the main dam at the Mpatamanga gorge and a 57 MW baseload downstream plant at the regulating dam located approximately 7 km downstream of the main dam.

The BAP presents the Project strategy to mitigate and manage biodiversity impacts during construction and operations to achieve no net loss for natural habitat and net gain for critical habitat-qualifying features. A risk-based prioritisation process identified focal priority features for management actions which also act as a proxy for wider biodiversity. The BAP outlines:

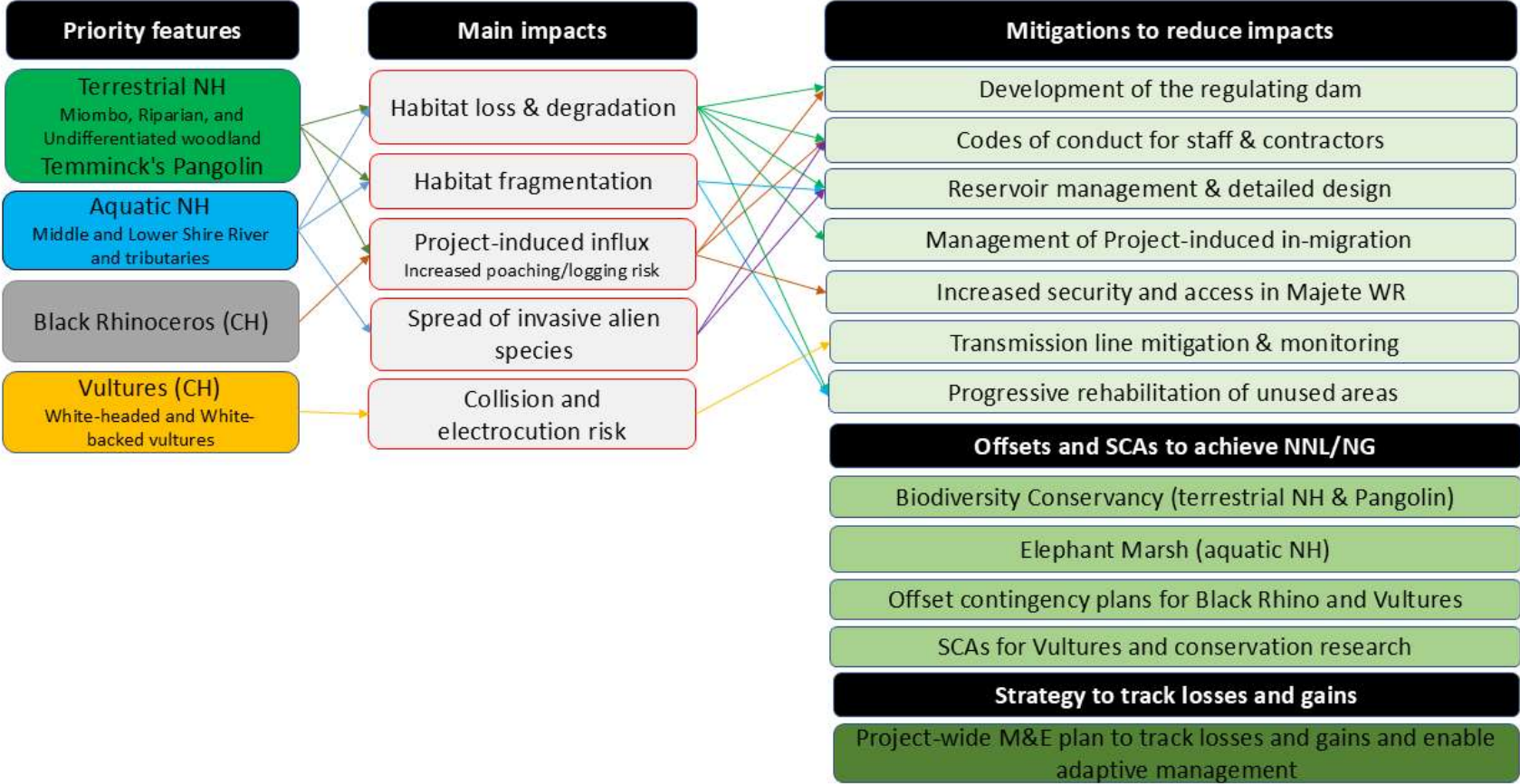
- Mitigation actions to address the loss, degradation and fragmentation of natural habitat (aquatic and terrestrial), introduction of invasive species, overexploitation of fauna and flora in and around Majete Wildlife Reserve and reduce collision and electrocution risks for vulture species;
- Actions to implement offsets for terrestrial and aquatic natural habitat;
- Actions to develop offset contingency plans for Black Rhinoceros (*Diceros bicornis*) and White-backed and White-headed Vultures (*Gyps africanus* and *Trigonoceps occipitalis*);
- Actions to implement Supporting Conservation Actions (SCAs) to achieve positive outcomes for vultures in Malawi as well as support conservation research in Malawi; and
- A framework to monitor biodiversity losses and gains over time and adaptively manage Project actions to achieve no net loss and net gain objectives.

The BAP is a living document that will be reviewed regularly and updated as appropriate. Implementation of the above actions will require proactive and transparent stakeholder engagement and partnerships.

To operationalise the actions from this BAP, the Project will develop and implement:

1. Biodiversity mitigation measures in the project-level Environmental and Social Management and Monitoring Plan (ESMMP) (SLR Consulting 2024a) which operationalises biodiversity mitigation in Project controlled areas;
2. Other biodiversity-specific plans, including an overarching Biodiversity Offset Management and Implementation Plan (BOMIP) and a Biodiversity Monitoring and Evaluation Plan (BMEP) (TBC 2024a); and
3. Other plans with relevance to biodiversity, which are included in the ESMMP including measures to manage project-induced influx, reservoir management and invasive species.

Figure 1: Overview of priority biodiversity features, main impacts, and mitigation and offset actions



1. Introduction

1.1 Project description

This document is the Biodiversity Action Plan (BAP) for the Mpatamanga Hydropower Project (the Project) on the Middle Shire River in Southern Malawi. The Project is being developed by four co-developers: the Government of Malawi (GoM), the International Finance Corporation (IFC), Electricité de France (EDF) and SCATEC JV, through a Public Private Partnership (PPP). Mpatamanga Hydro Power Limited (MPHL) leads the Project's development, working in close coordination with the GoM. The World Bank (WB) is involved in the Project through its provision of a Project Preparatory Assistance (PPA) grant to the GoM to support its involvement in the Project development.

The Project is in the Southern Region of Malawi, within the Blantyre and Neno Districts, on the Middle Shire River, approximately 50 kilometres (km) from the city of Blantyre. It will be situated between the existing Tedzani and Kapichira hydropower schemes, have a generation capacity of 358 megawatts (MW) and comprise two hydropower plants:

- A 301 MW peaking plant at a main dam at the Mpatamanga gorge and;
- A regulating dam with 57 MW installed capacity with the main purpose of which is to re-regulate the peaking water flow before further releasing downstream in the Shire River located approximately 7 km downstream of the main dam, c. 300 m from the northeast corner of the Majete Wildlife Reserve boundary.

Two transmission lines will be installed to deliver electricity generated through the Project to the Malawian national grid. These are:

- A 64 km long 400 kilovolt (kV) transmission line (TL) from the main powerhouse to the existing Phombeya sub-station in Balaka District; and
- A 11.4 km long 132 kV TL from the regulating dam powerhouse to the existing Tedzani-Kapichira TL.

Other infrastructure will also be developed to support the Project, including construction and operation villages for staff and contractors, a new access road between the main dam and the regulating dam, widening of existing roads and creation of new roads in both Neno and Blantyre Districts, quarries and two proposed resettlement sites (Figure 2). Detailed descriptions of all Project infrastructure are in the Project ESIA (SLR Consulting 2024).

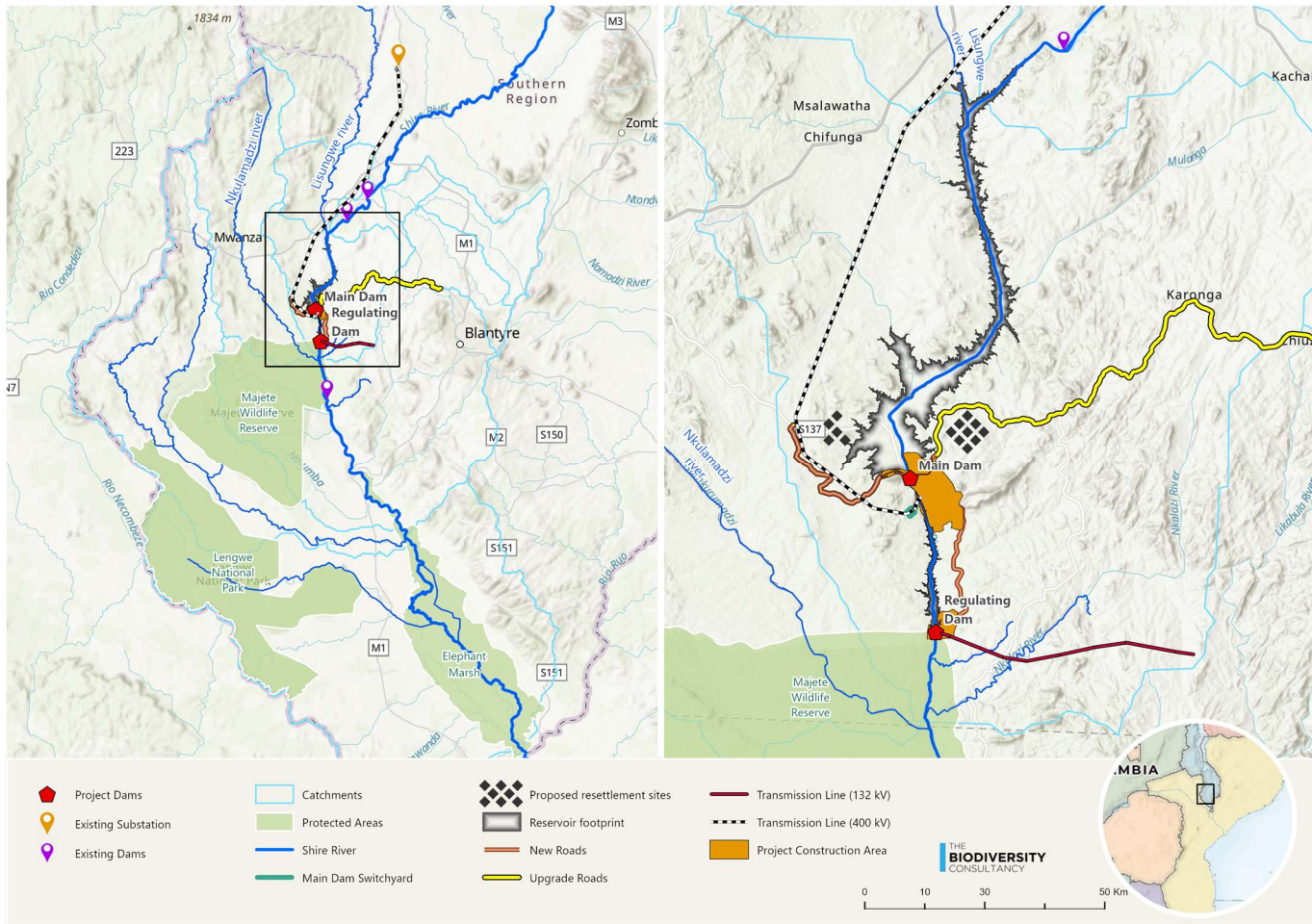


Figure 2: Location of the Project with Project infrastructure placement. The Project design shown in the map is from April 2024.

2 Purpose and scope

2.1 Purpose

The Project is being developed in compliance with national legislation; World Bank (WB) Environmental and Social Framework (ESF), International Finance Corporation (IFC) Performance Standards (PS) and good international industry practice (GIIP). Potential negative impacts of the Project have been identified and environmental and social management plans (ESMPs) are being put in place to avoid and/or mitigate these. The Project is operating in an area of largely degraded natural habitat with six critical habitat-qualifying species (TBC 2024b). It is therefore aligning with the no net loss (NNL) and net gain (NG) requirements of WB ESS6 (World Bank 2016) and IFC PS6¹ (IFC 2012, 2019).

The purpose of this Biodiversity Action Plan (BAP) is to set out the Project strategy to mitigate and manage biodiversity impacts to identified priority biodiversity features during construction and operations to demonstrate how the objectives of NNL for natural habitat and NG for critical habitat-qualifying biodiversity will be achieved. The BAP sets out the approach for how the mitigation hierarchy will be followed including the roles and responsibilities for implementation for internal staff and external partners and provides the basis for developing more detailed biodiversity management, monitoring and offset plans.

The objectives of this BAP are to:

- Identify the priority biodiversity features impacted by the Project
- Summarise the biodiversity mitigation measures for the construction and operation phases
- Summarise the residual impacts to priority biodiversity features, post mitigation
- Set out the offset strategy to demonstrate achievement of NNL/NG targets
- Present a monitoring and evaluation framework, and
- Set out the next steps to implement the BAP.

2.2 Scope

2.2.1 Temporal scope

Construction of the Project is expected to last approximately 4.5 years (54 months) (MHPL 2023). Once the Project is constructed, it will be operated by MHPL for 30 years under a Power Purchase Agreement (PPA) before it is transferred back to the Government of Malawi (EGENCO).

¹ Biodiversity Conservation and Sustainable Management of Living Natural Resources: To protect and conserve biodiversity; maintain benefits from ecosystem services; and promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

The temporal scope of the BAP is the construction and operational phases of the Project for the period it is operated by MHPL. It does not cover any later operational phases (once transferred to the Government) or the decommissioning phase.

The Residual Impact Assessment (RIA) (TBC 2024c) identified NNL and NG targets based on a 2023 baseline (SLR Consulting 2024b), and the Offset Strategy covers the same timeframe as the BAP (with offset targets to be achieved within the 30 years of MHPL led operations) (TBC 2024d). The BAP is a living document that will be updated as the Project progresses, based on data from monitoring and evaluation of impacts and the effectiveness of mitigation and offset actions.

2.2.2 Project scope

The BAP includes actions to mitigate the impacts of the Projects' infrastructure footprint (Project Construction Area, one upgraded road and new road sections constructed, two transmission lines, quarries, the main dam and regulating dam and the full supply water level of the two reservoirs) and two proposed physical resettlement areas outlined in the Project description (Figure 2). It also includes mitigation for disturbance impacts associated with the Project such as noise and dust, labour-induced influx and physical and economic resettlement of affected communities.

2.2.3 Biodiversity scope

The BAP focuses on a suite of *priority biodiversity features* identified through the Critical Habitat Assessment (TBC 2024b) (Section 4.1). Ecosystem services are not explicitly included within the BAP. However, the mitigation and offset actions proposed in the BAP will support the conservation of biodiversity that underpins the functionality of ecosystems and the services they provide to people. The Project's social management plans will address issues of affected communities' access to, and use of, ecosystem services which have been identified through baseline studies and the Resettlement Policy Framework (SLR Consulting 2024c, 2024d).

3 Biodiversity management

3.1 Documents supporting the BAP

Through extensive biodiversity surveys and stakeholder engagement, the Project has developed a suite of documents to inform the BAP and develop mitigation, offset actions and supporting conservation actions (SCAs) for impacted priority biodiversity. The BAP brings these documents together to summarise their findings and sets out specific actions for the Project to implement to manage biodiversity and biodiversity-related risk. This BAP should therefore be read in conjunction with these documents as key references (Table 2.)

Table 2: Key biodiversity studies supporting the BAP

| Document | Purpose of document | Reference |
|---|---|-------------------------------|
| Critical Habitat Assessment | Identifies natural habitat and critical habitat-qualifying biodiversity associated with the Project as per the guidance notes of the IFC Performance Standard 6 from 2012 (IFC 2012). | (TBC 2024b) |
| Risk-Based Prioritisation report | Identifies the biodiversity features to focus mitigation and monitoring actions for the Project. | (TBC 2024e) |
| Ecological Baseline (chapter 5) and Impacts and mitigations (chapter 8) (ESIA) | Presents the ecological baseline that provides a basis for the qualitative assessment of impacts and mitigation actions for biodiversity. | (SLR Consulting 2024b, 2024e) |
| Residual Impact Assessment | Quantifies the residual impacts of the Project, after the application of mitigation hierarchy, and set NNL/NG targets to enable offset planning. | (TBC 2024c) |
| Offset Feasibility Study | Assesses the feasibility of possible offset options in the landscape to deliver the gains required to achieve NNL/NG and select the feasible options to achieve the Project outcome. | (TBC 2024f) |
| Offset Strategy | Develops the selected feasible offset sites and supporting conservation actions that will enable the Project to achieve NNL/NG net gain goals, with an estimated budget. | (TBC 2024d) |

To operationalise the actions from this BAP, the Project will develop and implement:

- Biodiversity mitigation measures in the project-level Environmental and Social Management and Monitoring Plan (ESMMP) (SLR Consulting 2024a) which operationalises biodiversity mitigation in Project controlled areas;
- Other biodiversity-specific plans, including an overarching Biodiversity Offset Management and Implementation Plan (BOMIP) and a Biodiversity Monitoring and Evaluation Plan (BMEP) (TBC 2024a); and
- Other plans with relevance to biodiversity are included in the ESMMP, which include measures to manage project-induced influx, reservoir management and invasive species.

3.2 Biodiversity management within MHPL

MHPL is developing an overarching ESMMP to cover the implementation of all components of the Project, including biodiversity. This BAP forms part of the suite of documents under the ESMMP. The principal roles and responsibilities for the implementation of the BAP are outlined in Table 3. As the Project develops through construction and into operations, additional roles will be created within the environment team to provide technical support, especially for co-ordinating the implementation of the offsets programme.

Table 3. MHPL roles and responsibilities for implementation of this Biodiversity Action Plan

| Role | Responsibility |
|--|---|
| General Manager | <ul style="list-style-type: none"> ▶ Compliance with Malawi laws and regulations and support for liaison and negotiation with GoM stakeholders |
| Project Director | <ul style="list-style-type: none"> ▶ Overall management responsibility to ensure construction and operations are aligned with IFC PS6 and that the BAP is effectively implemented |
| E&S Manager | <ul style="list-style-type: none"> ▶ Overall responsibility for BAP implementation, including ensuring that adequate and timely resources are available |
| Environment Unit Lead | <ul style="list-style-type: none"> ▶ Work with MHPL managers to ensure all BAP mitigation actions are embedded into the relevant construction and operations Management Plans, and contractual requirements and monitoring systems are in place to check compliance ▶ Ensure environmental and social Management Plans (including the Resettlement Action Plan) address the biodiversity requirements outlined in the BAP, and oversee the communications between the Environmental & Social teams ▶ Ensure the BAP and associated Plans are available to all MHPL employees and contractors ▶ Provide leadership and strategic advice on biodiversity matters to departmental managers and within the biodiversity team ▶ Develop and communicate on a regular basis with relevant department managers progress with targets related to biodiversity ▶ Engage contractors to obtain specialist advice and support to achieve the objectives of the BAP |
| Biodiversity Offsets Manager | <ul style="list-style-type: none"> ▶ Develop the Biodiversity Offsets Management and Implementation Plan (BOMIP) ▶ Manage and implement the day-to-day management of the BOMIP ▶ Liaise with relevant government, non-government and community stakeholders, to coordinate offset activities (in co-ordination with the Stakeholder Engagement Coordinator) ▶ Engage contractors to obtain specialist advice and support to achieve the objectives of the BOMIP |
| Biodiversity Specialist ² | <ul style="list-style-type: none"> ▶ Support the implementation of the BOMIP working closely with the Biodiversity Offsets Manager. |
| Forest and Conservation Management Coordinator (non-offsets) (Terrestrial) | <ul style="list-style-type: none"> ▶ Implement the day-to-day management of the actions necessary to meet the requirements of the BAP ▶ Work with contracted specialists to complete the actions in the BAP |
| Environmental Coordinator and Watershed Management Specialist | <ul style="list-style-type: none"> ▶ Monitor and report on compliance with MHPL biodiversity commitments and legal obligations ▶ Provide training and guidance to MHPL staff and contractors on the requirements of this BAP |

² Two positions of the Biodiversity Specialist may be required: one for terrestrial offsets and one for aquatic offsets.

| Role | Responsibility |
|---|---|
| | <ul style="list-style-type: none"> ▶ Liaise with relevant government, non-government and community stakeholders, to coordinate offset activities for biodiversity conservation, in particular the establishment of offsets |
| E&S Operations Coordinator | <ul style="list-style-type: none"> ▶ Ensure appropriate checks and balances are in place to verify that subcontractors are abiding by BAP actions and control measures of associated Management Plans ▶ Provide necessary implementation and monitoring support to meet the requirements of this BAP ▶ Work with Social staff to implement the requirements of this BAP. Liaison with the following members of the social team: Consultation and Stakeholder Management Coordinator, Land Acquisition and Compensation Coordinator, Resettlement Infrastructure Coordinator and Livelihoods Social Development Coordinator |
| Data Management Coordinator and Geographical Information Systems (GIS) Specialist | <ul style="list-style-type: none"> ▶ Maintain the systems necessary to support the implementation and monitoring of this BAP ▶ Manage all BAP documents and databases (and co-ordinate with social team). |
| All employees and contractors | <ul style="list-style-type: none"> ▶ Comply with the requirements of this BAP |

Effective biodiversity management will require coordination of the Environment team with the Social team, EPC contractors and external stakeholders. To facilitate effective cross-team working, MHPL will establish direct lines of communication between key Environment and Social team members. The lines of communication will be maintained throughout construction and operations. Activities to connect the Social and Environment team will include development and maintenance of a joint spatially-referenced database of information relevant to the monitoring and adaptive management of biodiversity and social impacts and mitigation measures; coordination and planning of joint activities, and identification of activities which may pose conflicting outcomes for environmental and social objectives. The development of an environmental and social working group is recommended (specifically for biodiversity issues) in addition to the existing E&S Coordination unit, with monthly meetings to discuss overlapping issues.

3.3 Stakeholder engagement during the BAP development

A summary of organisations and experts consulted during the development of this BAP is provided in Table 4. This was informed by the BAP stakeholder mapping engagement plan (TBC 2023).

Table 4: Organisations and experts consulted during the development of the BAP

| Organisation/expert | Description | Topics discussed and outcome |
|---|---|---|
| DNPW (national and regional level) | The Department of National Parks and Wildlife (DNPW) is one of the departments under the Ministry of Natural Resources and Climate Change (MoNRCC) and is responsible for the management and conservation of wildlife resources in Malawi. | <p>Topics: Conservation priorities in Southern Malawi. Status of protected areas: Lengwe National Park, Majete Wildlife Reserve and Elephant Marsh. Potential offset options and supporting conservation actions within the Project landscape. Risks associated with mitigation measures in Majete Wildlife Reserve. Legal designation of the Biodiversity Conservancy offset.</p> <p>Outcome: Information gathered has been used to develop the Critical Habitat Assessment (CHA) and develop the Offset Feasibility Study and refine the Offset Strategy.</p> |
| Malawi Watershed Services Improvement Project: MWASIP | MWASIP is the first in a 'Series of Projects' (SoP) aimed at supporting the implementation of the National Forest Landscape Restoration Strategy (NFLRS). The NFLRS estimates that nearly 7.7 million ha of degraded land requires restoration intervention. The NFLRS target is to restore 4.5 million ha of the degraded landscape by 2030. The overarching Program Development Objective (PDO) is to restore degraded landscapes in priority river basins and improve water security, agricultural productivity and livelihoods. | <p>Topics: Potential offset actions in the Shire Valley catchment area. MWASIP activities.</p> <p>Outcome: Information gathered used to assess aquatic offset options in the Offset Feasibility Study.</p> |
| Environmental Affairs Department | The Environment Affairs Department (EAD) is a government agency established to exercise general supervision and coordination over all matters relating to the environment, natural resources and climate change management. | <p>Topics: Scope of mitigations for priority biodiversity features and proposed offset options.</p> <p>Outcome: Information gathered has been used to develop mitigations and offset options in the Offset Feasibility Study and refine the Offset Strategy.</p> |
| Forestry Department | The Department of Forestry was established in 1942, as the lead agency in the administration of the National Forest Policy and the Forestry Act in Malawi. | <p>Topics: Scope of mitigations for priority biodiversity features and proposed offset options.</p> <p>Outcome: Information gathered has been used to develop mitigations and offset options in the Offset Feasibility Study and refine the Offset Strategy.</p> |

| Organisation/expert | Description | Topics discussed and outcome |
|-------------------------|---|---|
| Department of Fisheries | The Department of Fisheries (DoF) under the Ministry of Agriculture was established in 1966. Its vision is “a nation that enjoys food security through sustainable fisheries and aquaculture production” and this is achieved through the provision of a framework for the promotion of sustainable Capture Fisheries and Aquaculture to achieve food security, poverty alleviation and economic growth. | <p>Topics: The CHA and threatened fish species in the Shire River. Proposed offset actions in the Shire tributaries.</p> <p>Outcome: Information gathered has been used to develop the CHA and refine information on threatened fish species and develop aquatic offset options in the Offset Feasibility Study and refine the Offset Strategy.</p> |
| USAID | USAID partners with the Government of Malawi (GOM) and local and international organizations focusing on three development objectives: (1) strengthening the accountability and effectiveness of the public sector; (2) helping Malawi’s youth lead healthy, informed, and productive lives; and (3) invigorating the private sector to increase inclusive and sustainable wealth generation. USAID is currently active in the lower Shire with the Forest Landscape Restoration Initiative (FLRI). | <p>Topics: Potential offset options in the Project landscape.</p> <p>Outcome: Information gathered considered in the development of offset options in the Offset Feasibility Study.</p> |
| SVTP | The Shire Valley Transformation Programme (SVTP). The Government of Malawi (GoM) through the Ministry of Agriculture, with support from the World Bank, the African Development Bank and the Global Environment Facility (GEF), is implementing the Shire Valley Transformation Programme. The programme aims to boost agricultural production and increase productivity by helping farmers get a better harvest and healthier livestock and grow more high value cash crops to sell at both domestic and international markets through a network of irrigation canals. | <p>Topics: SVTP activities and impact assessment. Potential offset options in Lengwe National Park. Offsets in Elephant Marsh Ramsar site.</p> <p>Outcome: Information gathered considered in the development of offset options in the Offset Feasibility Study and Offset Strategy.</p> |
| Concern Worldwide | Concern Worldwide have been operating in Malawi for over 20 years and has a global mission of eliminating extreme poverty (Concern Worldwide 2021). | <p>Topics: Concern Worldwide activities in Malawi. Potential offset options in the Project landscape.</p> <p>Outcome: Information gathered considered in the development of offset options in the Offset Feasibility Study and Offset Strategy.</p> |

| Organisation/expert | Description | Topics discussed and outcome |
|---|---|--|
| United Purpose | United Purpose has been operating in Malawi since 1988, working in partnership with local government and communities across fourteen districts mainly in central and southern Malawi. Much of their expertise surrounds development programs related to health, nutrition, sanitation and disaster response. United Purpose have also been involved in the creation and management of Village Forest Areas. | <p>Topics: United Purpose activities in Malawi. Potential offset options in the Project landscape. The use of Village Forest Areas in Malawi.</p> <p>Outcome: Information gathered considered in the assessment of aquatic offset options in the Offset Feasibility Study.</p> |
| African Parks | African Parks is a non-profit conservation organisation that takes on direct responsibility for the rehabilitation and long-term management of protected areas in partnership with governments and local communities. In Malawi specifically, African Parks has delegated management authority for four protected areas: Liwonde National Park, Majete Wildlife Reserve, Mangochi Forest Reserve and Nkhotakota Wildlife Reserve. | <p>Topics: Majete Wildlife Reserve 5-year plan and activities within the reserve and with communities in surrounding areas. Potential Project impacts on Majete WR and the Shire River including influx of people to the area. Potential impacts to CH-qualifying Vultures and other priority birds. The status of pangolins and hippos in and around Majete Wildlife Reserve. Development of key mitigation measures within Majete to avoid influx impacts. Assessment of potential offset actions around Majete Reserve (community protection area). Potential supporting conservation actions (SCAs) in and around Majete Wildlife Reserve and Liwonde National Park. Potential risks associated with commitments made to mitigation measures within Majete. Potential for offset in Lengwe National Park.</p> <p>Outcome: Development of site-specific mitigations for influx impacts in Majete Wildlife Reserve. Development of proposed offset options for the Offset Feasibility Study.</p> |
| Robin Pope Safaris (RPS) / Mkulumadzi concession within MWR | | <p>Topics: Potential Project impacts on Majete WR and the Mkulumadzi concession.</p> <p>Outcome: Information gathered considered in the development of mitigations.</p> |
| WESM | WESM (Wildlife and Environment Society of Malawi) is a national NGO in promoting and advocating for conservation and sustainable management of wildlife and the natural environment in Malawi. WESM play an active role in the annual wildlife counts which take place in Lengwe National Park. | <p>Topics: WESM activities in Malawi. Potential Project impact on biodiversity in southern Malawi. Potential offset options for aquatic and terrestrial offset options. Potential to be an offset implementing partner for the Biodiversity Conservancy.</p> <p>Outcome: Information gathered considered in the development of mitigations and offset options in the Offset Feasibility Study and Offset Strategy.</p> |

| Organisation/expert | Description | Topics discussed and outcome |
|---------------------------|--|---|
| CICOD | Centre for Integrated Community Development (CICOD) was set up in 2002 by community development activists to empower local communities. CICOD have been performing various activities in the communities surrounding Lengwe National Park which includes: Watershed management, tree planting and sustainable livelihood support. | <p>Topic: CICOD activities around Lengwe National Park. Offset feasibility in Lengwe National Park.</p> <p>Outcome: Information gathered considered in the assessment of offset options in Lengwe National Park in the Offset Feasibility Study.</p> |
| Endangered Wildlife Trust | The Endangered Wildlife Trust (EWT) is a registered Non-profit, Non-governmental, and Public Benefit Organisation. Since its establishment in 1973, they are committed to conserving threatened species and ecosystems in southern Africa focusing on three main strategic imperatives: Saving Species, Conserving Habitats, and Benefitting People. They partner with Lilongwe Wildlife Trust in Malawi. | <p>Topic: EWT activities in Malawi. Potential Project impacts on vultures and other priority bird species. Offset options and SCA for CH-qualifying Vultures.</p> <p>Outcome: Information gathered considered in the development of mitigations and offset options for the CH-qualifying vultures in the Offset Feasibility Study and Offset Strategy. Development of SCAs for vultures and other priority birds.</p> |
| Lilongwe Wildlife Trust | The Lilongwe Wildlife Trust (LWT) is a registered Non-profit charity in Malawi. They are committed to conserving threatened species and ecosystems in Malawi focusing on five main key areas: Wildlife rescue and welfare, biodiversity research, conservation justice, environmental education and campaigning and advocacy. | <p>Topic: LWT activities in Malawi. Potential Project impacts on vultures and other priority bird species. Offset options and SCA for CH-qualifying Vultures. Status of pangolins in Malawi and the Malawi Pangolin Action Plan.</p> <p>Outcome: Information gathered considered in the development of mitigations and offset options for the CH-qualifying vultures in the Offset Feasibility Study and Offset Strategy. Development of SCAs for vultures and other priority birds and for Pangolins.</p> |
| MUST | The Malawi University of Science and Technology (MUST) is Malawi's fourth public university established by an Act of Parliament Number 31 of 2012. The main aim is to promote development, adaptation, transfer and application of science, technology and innovation for macro- and microeconomic development of Malawi. Engagement was specifically with the Ndata School of Climate and Earth Sciences (NSCES). Specifically talked to Tiwonge Gawa (university professor in biodiversity). | <p>Topic: MUST activities and biodiversity-focused MSc Programmes. Potential Project impacts on vultures and other priority bird species. Offset options and SCA for CH-qualifying Vultures. The national Malawi national Red List Working Group and progress. Development of an MSc grant to support students building capacity in biodiversity conservation research (SCA).</p> <p>Outcome: Information gathered considered in the development of offset options for the CH-qualifying vultures in the Offset Feasibility Study and Offset Strategy. Development of SCAs for vultures and other priority birds. Development of MSc SCA.</p> |

| Organisation/expert | Description | Topics discussed and outcome |
|--|--|---|
| District Environmental Officers (Blantyre, Neno, Chikwawa) | District Environment Officers (DEO). | <p>Topic: Environment priorities within the districts. Potential terrestrial and aquatic offset options.</p> <p>Outcome: Information gathered considered in the development of mitigations and offset options in the Offset Feasibility Study and Offset Strategy.</p> |
| World Bank | The World Bank is an international financial institution that provides loans and grants. In Malawi the relevant projects which receive financing from the World Bank are SVTP, MWASIP, MOMA and Kapichira HPP. | <p>Topic: Scope of the CHA (development of priority biodiversity features), the RIA (extent of residual impacts), BAP mitigations and proposed offset options. Discussed and gathered information on other World Bank Projects in the region: MOMA, Kapichira dam, SVTP and MWASIP.</p> <p>Outcome: Information gathered considered in the development of the CHA, RIA, mitigations and offset options in the Offset Feasibility Study and revision of the Offset Strategy.</p> |
| International Finance Corporation (IFC) | IFC is the largest global development institution focused on the private sector in developing countries. By encouraging growth, IFC advances economic development, creates jobs and improves the lives of people. The IFC is a lender to MHPP. | <p>Topic: Scope of the CHA (development of priority biodiversity features), the RIA (extent of residual impacts), BAP mitigations and proposed offset options.</p> <p>Outcome: Information gathered considered in the development of the CHA, RIA, mitigations and offset options in the Offset Feasibility Study and revision of the Offset Strategy.</p> |
| ESCOM | The Electricity Supply Corporation of Malawi (ESCOM) is a state-owned entity with the responsibility for transmission and distribution of electric power throughout the country. | <p>Topic: Retrofitting existing transmission lines with anti-collision and anti- electrocution devices. Data sharing on the MOMA transmission line.</p> <p>Outcome: Information gathered considered in the consideration of an offset option for Vultures in the vulture contingency plan.</p> |
| Communities around the Lisungwe and Mkulumadzi tributaries | In total 16 communities were engaged along the two tributaries during a field mission in May 2023. These would be some of the engaged communities if offset sites are developed the tributary catchments. | <p>Topic: Interviews to inform the Mkulumadzi and Lisungwe tributary offset options. Questionaries were developed on how they currently used the land, interest in being part of a biodiversity conservation programme and previous experience of other Shire Valley watershed initiatives.</p> <p>Outcome: Information gathered informed the development of the aquatic offset options, informing the offset feasibility Study.</p> |

| Organisation/expert | Description | Topics discussed and outcome |
|--|---|---|
| Agricane: Kaombe Estate | Kaombe Estate is a sugarcane plantation managed by Agricane, located within the Nsanje District of Malawi, situated at the edge of Elephant Marsh. The Estate is a 2,300-hectare farm, of which 830 ha is under cultivation. Of the 830 hectares, 500 ha are run commercially and 330 ha are run under the charitable Kaombe Community Development trust. The estate also contains an approximately 800 ha nature reserve, the Thangadza River Conservancy. | <p>Topic: Agricane's activities for nature in the region. Discussed the status of the Elephant Marsh and the Elephant Marsh Management Plan with Community Conservation Areas.</p> <p>Outcome: Information gathered informed the development of an offset option in Elephant Marsh, informing the offset feasibility Study and the Offset Strategy.</p> |
| Denis Tweddle, Research Associate at South African Institute for Aquatic | Biodiversity and renowned expert on the Shire River ichthyology. | <p>Topic: Consulted on the ecology and presence of fish species in the Shire River and its tributaries, and the condition of the River.</p> <p>Outcome: Information gathered supported the development of the CHA regarding fish species, and mitigations and offset options in the Offset Feasibility Study and revision of the Offset Strategy.</p> |
| Rob Palmer, Nepid consultants. | Freshwater Ecologist, specialist in African river systems and wetlands. | <p>Topic: Consulted on results of Index of Habitat Integrity studies (IHI) and Middle Shire River condition. Contracted to do field studies to support the ecological baseline of the ESIA.</p> <p>Outcome: Information gathered supported the development of the CHA regarding condition of Middle Shire River and tributaries, and mitigations and offset options in the Offset Feasibility Study.</p> |
| Warren McClelland, SLR Consulting. | Terrestrial Ecologist, specialist in African landscapes at SLR Consulting. | <p>Topic: Consulted on condition of terrestrial habitats within the ecologically appropriate area of analysis (EAAA) for the CHA and areas of natural habitat where pangolins could be present. Status of vultures and other threatened birds of prey in Southern Malawi.</p> <p>Outcome: Information gathered supported the development of the CHA and RIA regarding condition of quality of terrestrial natural habitat, and mitigations for vultures and offset options in the Offset Feasibility Study and revision of the Offset Strategy.</p> |

4 Biodiversity context

The Project is located on the Middle Shire River, between Tedzani HPP and Majete Wildlife Reserve (Figure 2). The Middle Shire is characterised by a series of rapids and falls which have been harnessed to provide energy for various hydropower projects (e.g. Nkula HPP, Tedzani HPP, Kapichira HPP). The Middle Shire lies between the Upper Shire, which flows between Lake Malawi to the Kamuzu Barrage along a very shallow gradient, and the Lower Shire, which emerges below the Kapichira falls across a wide floodplain, in which the Elephant Marsh Ramsar Site is located (Niras 2016) (Figure 3). The stretch of the Middle Shire between Tedzani and Kapichira HPPs, where the Project is located, is the last remaining fast-flowing portion of the Middle Shire. The Middle Shire is biogeographically separate from the Lower Shire due to Kapichira falls acting as a natural barrier. The Middle Shire is ecologically distinct to the Upper Shire, but it shares certain elements of the Upper Shire assemblage and does not have endemic species.

Terrestrial ecosystems vary throughout the Project area, based on a range of edaphic features including topography, soils and altitude. The Shire valley is in the Zambebian biome where the natural vegetation is a range of savannah woodland mosaics. Throughout the area, natural ecosystems have been heavily degraded through conversion to agriculture, and through firewood and charcoal collection (SLR Consulting 2024f), and high levels of hunting have affected wildlife populations. Levels of degradation are lower in the protected areas, but even these areas have seen encroachment, wood collection, and hunting, e.g. in Lengwe National Park (BRL 2017).

A number of protected areas / internationally recognised areas (PA/IRA) are located around the Project area (Figure 3), the most relevant being the ones located downstream of Mpatamanga along the Shire River: Majete Wildlife Reserve (MWR), c. 7 km downstream of the Main Mpatamanga dam, and Elephant Marsh Ramsar Site, c. 30 km downstream of Mpatamanga dam (Figure 2). The regulating dam is planned to be located c. 300 m upstream of MWR's north-eastern boundary.

A detailed description of the terrestrial and aquatic ecological context is provided in the ESIA ecological baseline (SLR Consulting 2024b).

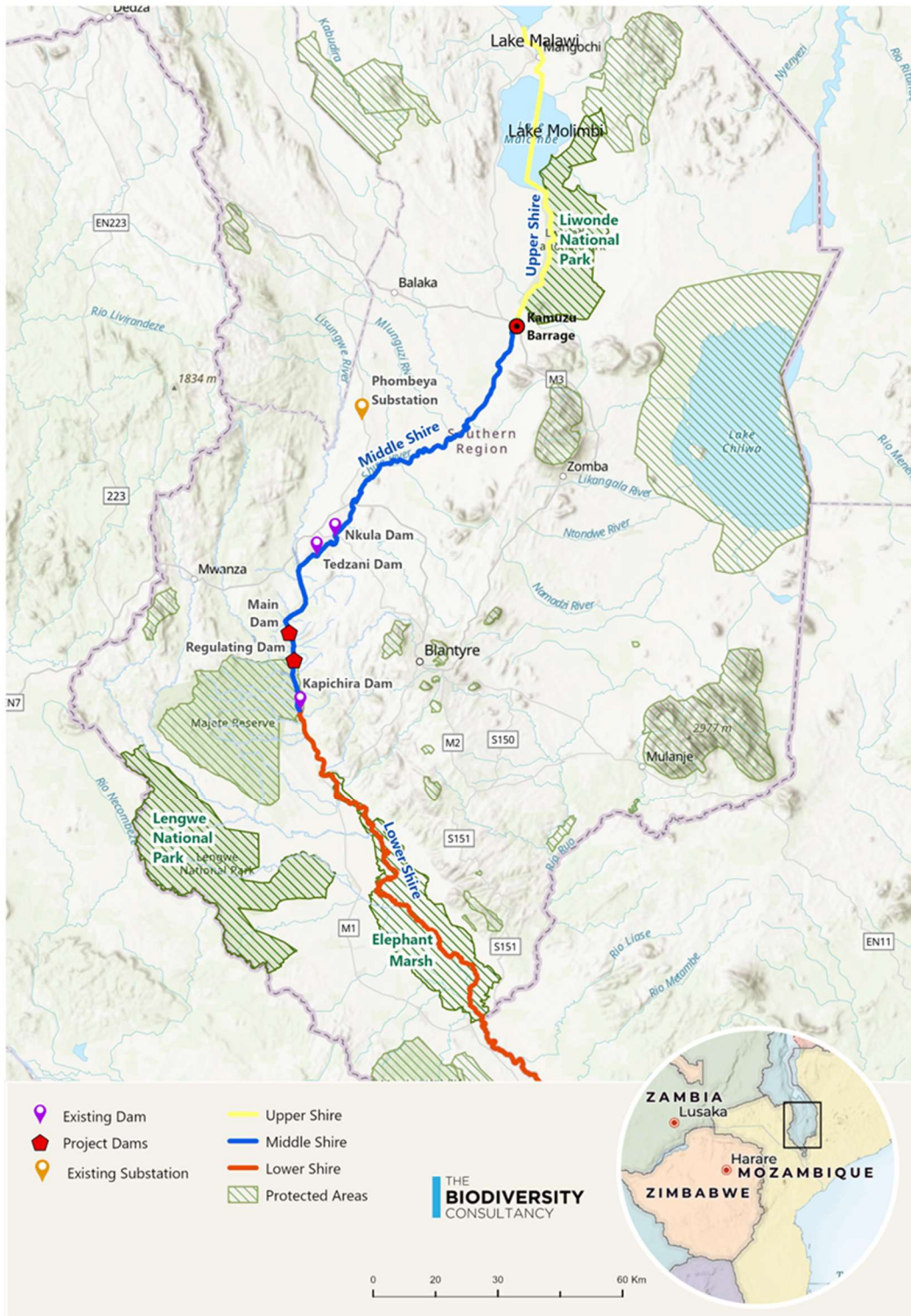


Figure 3: Context of the zonation of the Shire River (Upper, Middle and Lower) showing the existing hydropower projects and the planned main dam and regulating dam. The protected areas in the landscape are also shown.

4.1 Priority biodiversity features

The Critical Habitat Assessment (TBC 2024b) determined the Project's priority biodiversity features which are defined as:

1. Species that qualify for critical habitat (Table 5);
2. Species of stakeholder/conservation concern;
3. Natural habitat

For the species that qualified for critical habitat, the Project is required to demonstrate (IFC 2012, paragraph 17):

- No other viable alternatives within the region exist for development of the Project on modified or natural habitats that are not critical;
- The Project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;
- The Project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; and,
- A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.

Where these can be demonstrated, a BAP (this document) will describe the Project's mitigation strategy to achieve net gain for these species (IFC 2012, paragraph 18).

Table 5: Critical habitat-qualifying species

| Biome | Feature | CH qualifying feature | Presence in EAAAs | Criteria |
|-------------|------------|---|---|----------|
| Terrestrial | Mammals | Black Rhinoceros (CR) (<i>Diceros bicornis</i>) | Confined to Majete WR | 1c |
| | Birds | White-backed Vulture (CR) (<i>Gyps africanus</i>) | Move between Majete WR, Lengwe NP and Liwonde NP | 1c |
| | | White-headed Vulture (CR) (<i>Trigonoceps occipitalis</i>) | Move between Majete WR, Lengwe NP and Liwonde NP | 1c |
| Aquatic | Waterbirds | African Openbill (LC) (<i>Anastomus lamelligerus</i>) | Primarily associated with Elephant Marsh | 3a |
| | | African Skimmer (LC) (<i>Rynchops flavirostris</i>) | Primarily associated with Elephant Marsh | 3a |
| | Reptiles | Zambezi Flapshell Turtle (EN) (<i>Cycloderma Frenatum</i>) | Primarily associated with Upper and Lower Shire River, and Elephant Marsh | 1a |

Twelve species of conservation and/or stakeholder concern were identified through stakeholder consultation by the BAP, ESIA and CIA workstreams (Table 6). International good practice is to treat such biodiversity in the same way as natural habitat, achieving a no net loss where possible.

Table 6: Species of stakeholder/conservation concern

| Biome | Feature | SC species | Presence in EAAAs |
|-------------|---------|---|---|
| Terrestrial | Mammals | Temminck's Pangolin (<i>Smutsia temminckii</i>) (VU) | Majete WR and the surrounding area |
| | | Cheetah (<i>Acinonyx jubatus</i>) (EN), Giraffe (<i>Giraffa camelopardalis</i>) (VU), African Savannah Elephant (<i>Loxodonta africana</i>) (EN), African Wild Dog (<i>Lycan pictus</i>) (EN), Lion (<i>Panthera leo</i>) (VU), Leopard (<i>Panthera pardus</i>) (VU) | (largely) Confined to Majete WR |
| | Birds | Hooded Vulture (<i>Necrosyrtes monachus</i>) (CR) and the Lappet-faced Vulture (<i>Torgos tracheliotos</i>) (EN) | Move between Majete WR, Lengwe NP and Liwonde NP |
| | | Martial Eagle (<i>Polemaetus bellicosus</i>) (EN) Bateleur (<i>Terathopius ecaudatus</i>) (EN) | Majete WR and surrounding area |
| Aquatic | Mammals | Hippopotamus (<i>Hippopotamus amphibius</i>) (VU) | Majete WR, throughout the Middle Shire River and Elephant Marsh |

The CHA determined that the Project is in a mosaic of natural and modified habitat, with natural habitat (of varying degrees of quality) consisting of:

- Terrestrial areas of Miombo, Riparian and Undifferentiated woodlands, primarily within Protected Areas adjacent to the Project but with some patches remaining on privately owned lands and ranches; and
- Aquatic habitats (largely degraded) along stretches of the Middle Shire River, Lower Shire River and in Elephant Marsh.

Modified and natural habitats were mapped in the Project landscape for both the terrestrial habitats (Figure 4) and the aquatic habitats (Figure 5).

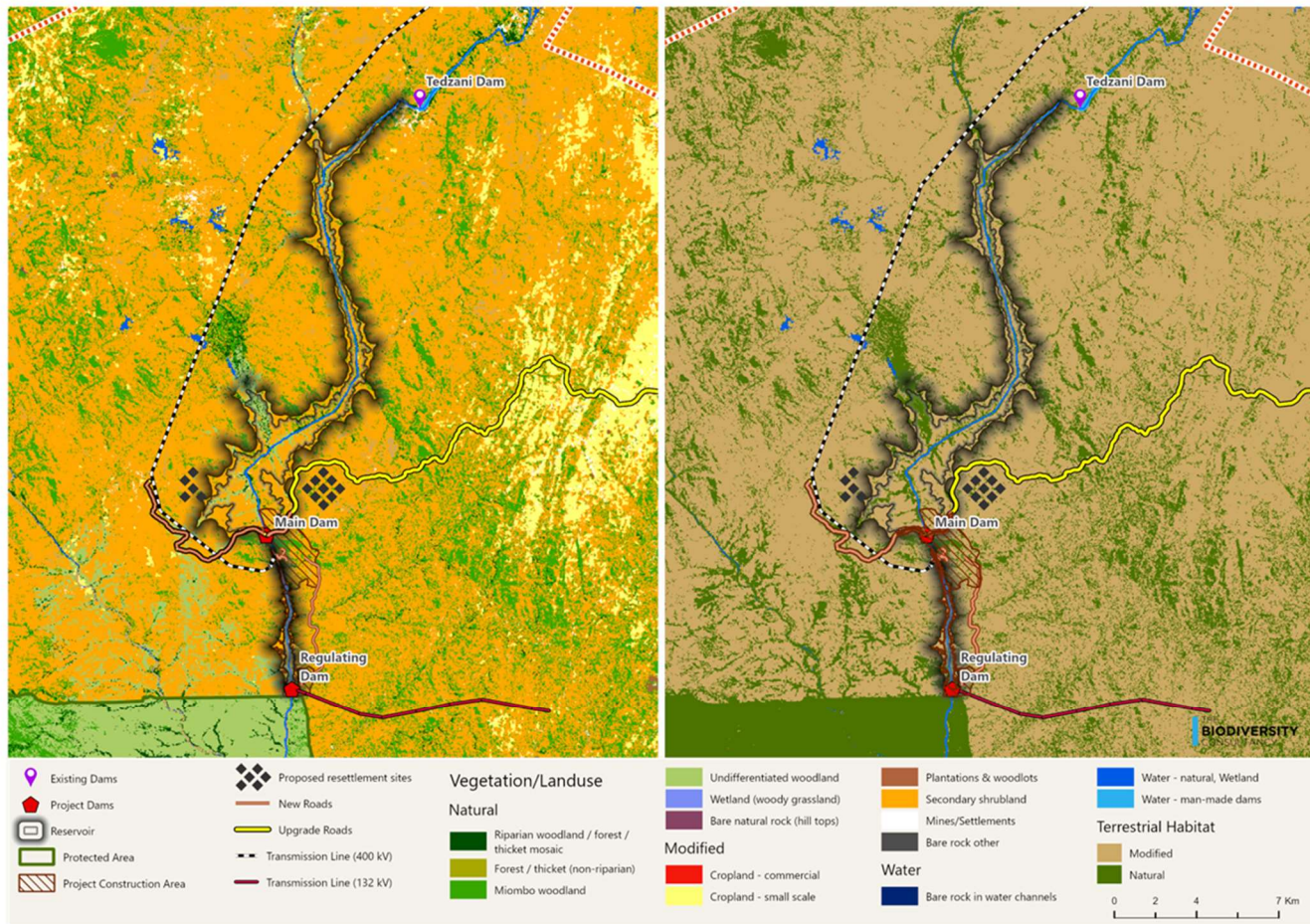


Figure 4: Left: GTI terrestrial habitat map created for the Project (GTI 2023). Right: Map of terrestrial natural habitat (NH) and modified habitat (MH) in the terrestrial EAAA (Terrestrial habitat map source: GTI 2023).

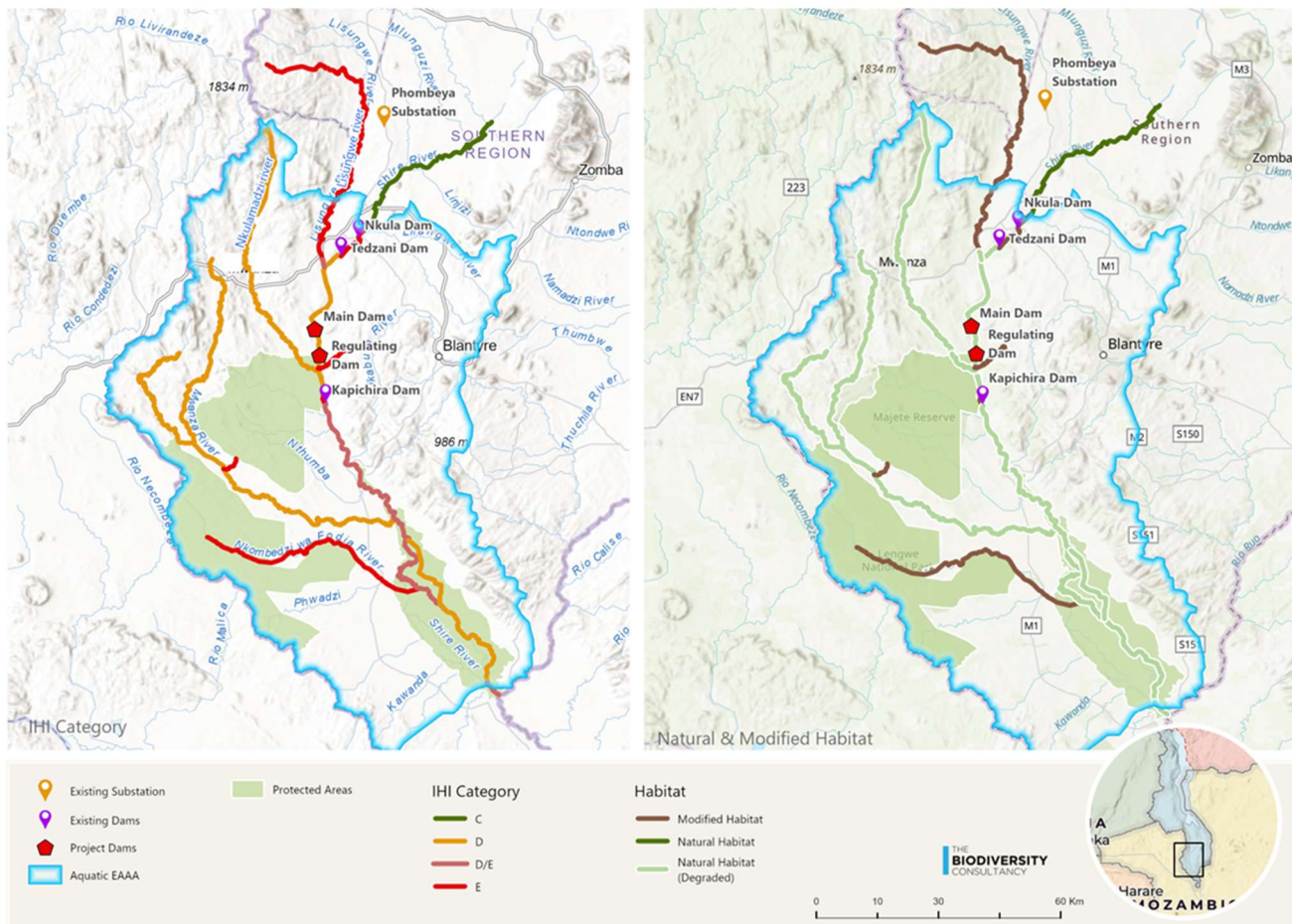


Figure 5: Index of Habitat Integrity data (IHI) (Kleyhans 1999) (a measure of habitat quality, D/E – E being the limit between natural and modified habitat used in the CHA) and NH/MH PS6 aquatic habitat classification for stretches of the Shire River and tributaries.

In areas of natural habitat, PS6 requires that mitigation measures area designed to achieve no net loss of biodiversity where feasible (IFC 2012: paragraph 15), where no net loss is defined 'as the point at which project-related impacts on biodiversity are balanced by measures taken to avoid and minimize the project's impacts, to undertake on-site restoration and finally to offset significant residual impacts, if any, on an appropriate geographic scale' (IFC 2012: footnote 9).

The protected areas within the Project landscape are not priority biodiversity features but are highlighted as important areas for biodiversity.

- Majete Wildlife Reserve is wholly natural habitat and critical habitat due to the presence of the Black Rhinoceros and the two CH vulture species.
- Elephant Marsh (Ramsar site) is a mosaic of natural (albeit degraded) and modified habitat and is also critical habitat due to the presence of two critical habitat-qualifying waterbirds and the Flapshell Turtle.
- Lengwe National Park and Liwonde National Park were included in the CHAs ecologically appropriate areas of analysis (EAAAs) for vultures as the CH vulture species are known to migrate between these areas and Majete Wildlife Reserve. Both national parks are critical habitat due to the presence of the two CH vulture species.

Areas of modified, natural and critical habitat were mapped based on the results of the CHA (Figure 6).

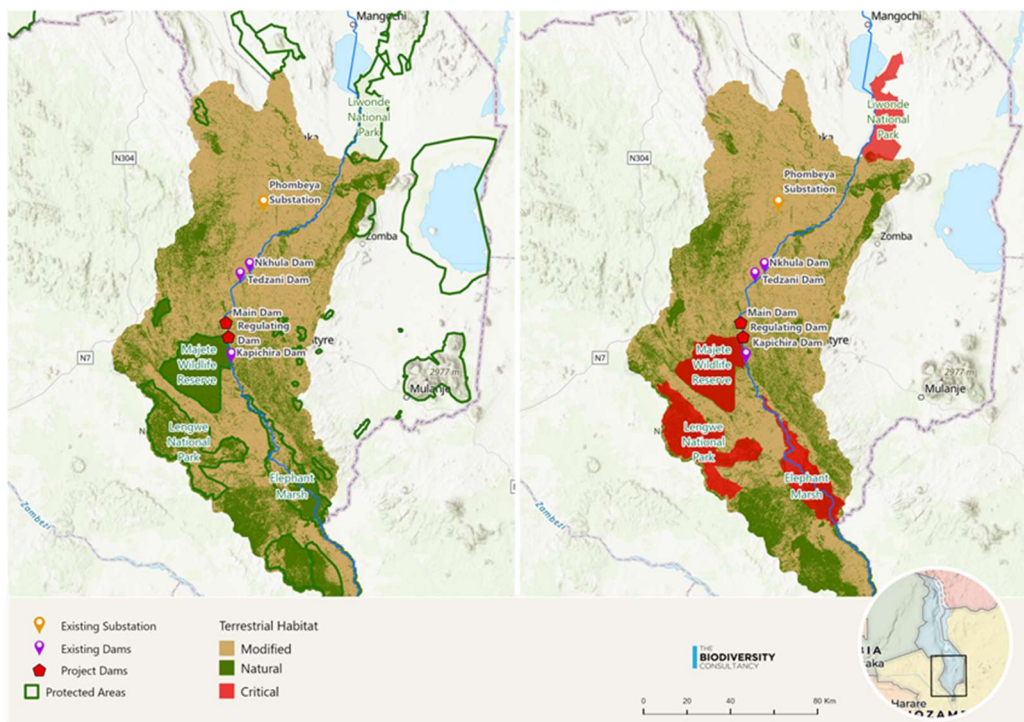


Figure 6: Map showing the areas of critical habitat within the Project landscape restricted to Majete Wildlife Reserve, Lengwe National Park, Liwonde National Park and the Elephant Marsh Ramsar Site.

5 Summary of potential impacts and mitigations

This section summarises the main potential impact pathways on priority biodiversity features (Table 8), and the main actions that will be undertaken to mitigate (avoid, minimise, restore) and offset impacts, and to monitor losses and gains. The rationale for the proposed actions is provided in Section 5.3.

5.1 Prioritisation of priority biodiversity features for mitigation and monitoring

Within the suite of identified priority biodiversity features, there is variation in terms of the conservation status, quality (habitats), amount of available information, Project and non-project influences, and cumulative impacts. In order to identify the biodiversity that is a focus for BAP actions and monitoring (and for the RIA, TBC 2024c), a prioritisation process was undertaken based on the likelihood of a Project impact and the potential consequence of that impact (TBC 2024e). This type of risk-based approach enables a Project to appropriately focus effort and resources on priority biodiversity features at highest risk.

The results of the risk-based prioritisation are summarised in (Table 7). The biodiversity classed as highest priority for BAP actions (Action Category 1) comprises aquatic natural (degraded) habitat (Shire River) and three terrestrial natural habitats (Miombo woodland, Riparian woodland and Undifferentiated woodland). These priority features also act as a proxy for the features in other Action Categories and wider biodiversity.

Table 7: Risk-based prioritisation results for priority biodiversity features (TBC 2024e).

| Action Category (AC) | Biodiversity features | Mitigation and monitoring approach |
|--|---|--|
| <p>AC1 High priority for habitat and/or species mitigation</p> <p><i>Definition:</i> High risk that the feature will be impacted, and the consequence of the risk is considered to be significant. These features are therefore a mitigation and monitoring priority.</p> | <ul style="list-style-type: none"> Aquatic Natural (degraded) Habitat (Shire River) (NH) Terrestrial Natural Habitat (Riparian woodland, Miombo woodland, Undifferentiated woodland) (NH) | <ul style="list-style-type: none"> Mitigation: specific mitigation actions to reduce likelihood and consequences of impacts Residual impacts: quantification of residual impacts once all possible avoidance/minimization measures have been considered Offsets required: implement offset actions to achieve a no net loss, where possible, (natural habitat) or net gain (critical habitat) Monitoring: robust monitoring to assess losses and gains in response to impacts and mitigation, in collaboration with stakeholders |
| <p>AC2 Contingency planning</p> <p><i>Definition:</i> There is a low risk that the feature will be impacted but if it occurs, the consequence of the impact will be</p> | <ul style="list-style-type: none"> Black Rhinoceros (CH) White-headed Vulture (CH) White-backed Vulture (CH) African Wild Dog Giraffe | <ul style="list-style-type: none"> Mitigation: specific mitigation actions to reduce likelihood and consequences of impacts Residual impacts: residual impacts are not predicted post mitigation for the mammals, so quantification is not necessary. Residual impact for vultures to be quantified using available data from South Africa to assess significance of impacts (expected to be low). SCAs: offsets are not needed, but supporting conservation actions can provide gains (that can be qualitative). |

| Action Category (AC) | Biodiversity features | Mitigation and monitoring approach |
|---|---|--|
| significant. These features therefore require contingency planning in case an impact occurs. | | <ul style="list-style-type: none"> • Monitoring: monitoring to assess if a significant impact occurs, in collaboration with stakeholders (throughout the project cycle) • Prepare an offset contingency plan, that would be activated if an impact occurs. • If impacts are considered to become significant, change to AC1. |
| <p>AC3 General mitigation measures</p> <p><i>Definition:</i> Likely that an impact will occur but the consequences for the feature are not significant. Habitat mitigation and monitoring.</p> | <ul style="list-style-type: none"> • Hippopotamus • Temminck's Pangolin • Lappet-faced Vulture • Hooded Vulture • Martial Eagle • Bateleur Eagle | <ul style="list-style-type: none"> • Mitigation: general mitigation measures to reduce likelihood of impacts (within the ESIA). • Residual impacts: qualitative assessment (within the ESIA). • Monitoring: to assess response to impacts, in collaboration with stakeholders (throughout Project). |
| <p>AC4 Remain aware</p> <p><i>Definition:</i> Low likelihood and consequence of an impact.</p> | <ul style="list-style-type: none"> • African Openbill (CH) • African Skimmer (CH) • Zambezi Flapshell Turtle (CH) • African Savannah Elephant • Cheetah • Leopard • Lion | <ul style="list-style-type: none"> • Monitoring: to ensure no impacts occur. • If impacts considered significant, consider changing the Action Category and develop appropriate mitigation actions. |

5.2 Project impacts

The main Project impacts to priority biodiversity features are summarised in Table 8, these are drawn from the Environmental and Social Impact Assessment (ESIA), which provides additional detail of these impacts (SLR Consulting 2024e).

Table 8: Main potential impacts on priority biodiversity associated with the Project during the construction and operations phases.

| Main potential impacts | Main project components creating impact | CH species, Stakeholder Concern (SC) Species and Natural Habitats potentially impacted | Construction/ Operation |
|--|---|---|--------------------------|
| Habitat loss and degradation due to Project footprint (Figure 2) | <ul style="list-style-type: none"> • Main dam and regulating dam infrastructure • Main dam reservoir • Regulating dam reservoir • Project construction area (including Project village areas for workers) • Two transmission lines (132kV and 400Kv) | <p>Natural terrestrial habitats (Miombo woodland, Riparian woodland and Undifferentiated woodland)</p> <p>Aquatic natural (degraded) habitat (Middle Shire River and Lisungwe tributary)</p> <p>Hippopotamus (SC species)</p> <p>Temminck's Pangolin (SC species)</p> | Construction & Operation |

| Main potential impacts | Main project components creating impact | CH species, Stakeholder Concern (SC) Species and Natural Habitats potentially impacted | Construction/ Operation |
|--|--|---|---|
| | <ul style="list-style-type: none"> • Construction and upgrade of roads • Quarries • Proposed physical resettlement sites for affected communities | | |
| Light and noise pollution at night | <ul style="list-style-type: none"> • Regulating dam construction and operations | <p>Black Rhinoceros CH species)</p> <p>Other priority mammals and birds in Majete Wildlife Reserve (SC species)</p> | <p>Construction</p> <p>Operation (lower level)</p> |
| Habitat loss and degradation | <ul style="list-style-type: none"> • Economic resettlement of affected communities and associated farming • Induced economic influx to project area | Natural terrestrial habitats (Miombo woodland, Riparian woodland and Undifferentiated woodland). | Construction & Operation |
| Habitat fragmentation (ecological connectivity) | <p>Physical barriers to ecological connectivity created by the construction and operation of the:</p> <ul style="list-style-type: none"> • Main dam and regulating dam infrastructure • Main dam reservoir • Regulating dam reservoir | <p>Aquatic natural (degraded) habitat (Middle Shire River and Lisungwe tributary).</p> <p>Hippopotamus (SC species)</p> | <p>Construction (to a lesser degree)</p> <p>Operation</p> |
| Modification of river flows (reservoirs, hydropeaking at the main powerhouse) and interruption of EFlow in between the two dams) | <ul style="list-style-type: none"> • Main dam reservoir • Shire River between the main dam and the regulating dam reservoir • Regulating dam reservoir | Aquatic natural (degraded) habitat (Middle Shire River and Lisungwe tributary). | Operation |
| Riverbed incision and related consequences (e.g., lowering of the groundwater) | Main dam resulting in downstream impacts due to the retention of sediments in the reservoir | Aquatic natural (degraded) habitat (Middle Shire River and Lower Shire River and associated flood plains). | Operation |

| Main potential impacts | Main project components creating impact | CH species, Stakeholder Concern (SC) Species and Natural Habitats potentially impacted | Construction/ Operation |
|---|--|--|--|
| table) and riverbank erosion | | African Openbill and African Skimmer (CH species) Zambezi Flapshell Turtle (CH species) | |
| Poaching and illegal logging in Majete Wildlife Reserve (including increase of poisoning events of water holes) | Increase in pressure resulting from induced economic influx to the Project area (particularly around the regulating dam) | Black Rhino (and other priority mammals in Majete WR including pangolins) CH-qualifying vultures (and other priority vultures (SC species)) Natural terrestrial habitats (Miombo woodland, Riparian woodland and Undifferentiated woodland). | Construction & first 10 years of Operation |
| Overexploitation of fauna and flora (in customary lands) | Hunting, poaching and collection of wild animals and plants by staff and contractors | Temminck's Pangolin (SC species) | Construction & Operation |
| | Hunting, poaching and collection of wild animals and plants as a result of induced economic influx to Project area | | |
| Accidental mortality (collision and electrocution) | Two transmission lines (132kV and 400Kv) | CH-qualifying vultures (and other priority birds of prey) | Operation |
| Introduction of invasive species | Movement of staff and contractor vehicles and equipment (terrestrial and aquatic alien invasive plants) | Natural terrestrial habitats (Miombo woodland, Riparian woodland and Undifferentiated woodland). Aquatic natural (degraded) habitat (Middle Shire River and Lisungwe tributary). | Construction & Operation |
| | Potential for intentional introduction in the reservoirs of aquatic species – Tigerfish (<i>Hydrocynus vittatus</i>) and Redclaw crayfish (<i>Cherax quadricarinatus</i>). | Aquatic natural (degraded) habitat (Middle Shire River (impacting species composition) | Operation |

5.3 Technical rationale for mitigation actions

The Project will apply the mitigation hierarchy to avoid, minimise and rehabilitate impacts to biodiversity. Actions to address residual impacts will include terrestrial and aquatic offsets and supporting conservation actions. The rationale for the main general mitigation actions (GMAs) are summarised below. All the GMAs relevant to priority biodiversity are presented in more detail in section 5.4 and Table 8.

5.3.1 Avoidance and minimisation

The key measure avoid impacts to the Middle Shire River that the Project will implement is the construction of the regulation dam approximately 7 km downstream of the main dam, c. 300 m from the northeast corner of the Majete Wildlife Reserve boundary. This avoidance measure is the culmination of multiple years of studies, rounds of stakeholder engagement and discussion and will ensure that the hydropeaking power impacts of the main powerhouse do not extend downstream of the regulating dam, thereby avoiding significant impacts to the remaining section of the Middle Shire River which flows through Majete Wildlife Reserve.

Procedures to avoid and minimise staff/contractor impacts (GMA1)

- Biodiversity focused procedures will be developed to ensure staff and contractors are aware of the species and habitats that are a priority for the Project and the actions they must undertake to avoid and minimise impacts to them. Compliance with procedures will be monitored and any breaches dealt with through strong penalty measures.

Detailed planning, micro-siting and protocols to avoid and minimise construction and operational impacts (GMA2)

- Detailed planning will ensure the Project is fully appraised of impact risks and, as appropriate, develops further measures to avoid and minimise impacts prior to construction activities for Alien Invasive Species and at quarry sites. A suite of protocols will be developed and implemented to guide construction and operational activities to minimise direct Project impacts to habitats and species surrounding construction sites. A Reservoir Management Plan will be developed and implemented in coordination with stakeholders to minimise operational impacts and structure community activities within the main reservoir.

Negotiated and agreed actions with stakeholders (GMA3)

- Influx of economic migrants during the construction period is potentially a significant impact to priority biodiversity features through uncontrolled land clearance and poaching in customary lands and increases in poaching and illegal logging in Majete Wildlife Reserve. The Project will therefore work with local authorities and communities to establish appropriate mechanisms to avoid and minimise influx prior to the commencement of construction activities (e.g. through radio campaigns to state the preference for only employing local people already registered in the area) and to

minimize the consequences related to in-migration (e.g. to ensure that influx is directed as much as possible to areas where appropriate infrastructure can be provided). These actions are further described in the ESMMP.

- Impacts to the main reservoir will be managed through the implementation of the reservoir management actions in the ESMMP. From a biodiversity perspective, management actions will focus on avoiding the introduction of and managing invasive species, developing sustainable fisheries management and ensuring wider catchment activities do not lead to contamination or sedimentation of the reservoir or feeder streams. Vegetation clearance prior to flooding of the reservoir may be undertaken by local communities where there is an economic incentive (facilitated by the Project). Farming will be restricted within the full supply level of the reservoir (MHPP-acquired land). Communities will be allowed to farm in the shoreline zone beyond the full supply level area, but farming activities will be monitored and where required interventions made to minimise erosion and sedimentation of the reservoir.

Species-specific actions for Vultures (SSA1)

- Mitigation to avoid and minimise accidental mortality of vultures and other large-bodied birds has been considered in the design of the transmission lines and pylons connecting the main dam and the regulating dam to the national grid. This includes routing of the transmission lines to avoid sensitive habitats, and the minimisation of collision risk and avoidance of electrocution risk by the integration of appropriate devices in the design.

Site-specific actions for Black Rhinoceros (and other priority mammals) in Majete Wildlife Reserve (MAJ01-04)

- Project-induced influx is predicted to increase pressure on natural resources in customary land around the Project and in Majete Wildlife Reserve which is 300m south of the regulating dam. Mitigation measures have been developed to minimise this impact, particularly focused on increased security and monitoring actions and creation of infrastructure to support access to challenging-to-reach areas of the reserve e.g., improved roads and river crossings and agreed use of the regulating dam to cross the river. If these mitigation actions are effectively implemented, the risk of residual impacts is considered reduced to negligible. These mitigations are described in more detail in Section 5.5.2.1.

Site-specific actions for larger remaining patches of terrestrial natural habitat (BCA01-03)

- Project-induced influx is predicted to put additional pressure on non-protected areas of natural habitat in the landscape. 58% of the Project landscape (within the terrestrial EAAA developed in the CHA (TBC 2024b)) is modified habitat and the 42% assessed to be natural habitat is mostly within areas of land that are privately owned and protected or in Majete Wildlife Reserve. Areas of remaining natural woodland habitat in privately owned/managed areas are at risk from being logged for charcoal production. The larger areas of higher quality natural habitat potentially impacted by Project influx have been identified and impacts will be avoided through the acquisition and protection of

land through the Project RAP process and secured as a Biodiversity Conservancy (section 5.5.2.2) (Table 13).

5.3.2 Rehabilitation

Rehabilitation actions agreed actions with EPC contractors (GMA4)

- The Project will apply a progressive rehabilitation approach to return areas no longer required by Project activities to a natural state (where possible), such as a large portion of the construction areas near the main dam.

5.3.3 Offset

Offset actions (GMA5)

The Project will have a large, unavoidable footprint that will result in residual impacts from habitat loss and fragmentation to aquatic natural (degraded) habitat and of habitat loss and degradation of terrestrial natural habitat. Estimates of the residual impacts to priority biodiversity features has been used to guide the offset site selection process. Two offset sites, one for terrestrial and one for aquatic habitat, have been selected and are predicted to enable the Project to meet NNL and NG requirements (actions BCA4-6 (Table 13), EMA1-6 Table 14)) contingency planning (actions CP1-2 Table 15) and supporting conservation actions (SCA1-6 Table 16).

5.4 General mitigation actions

This section summarises the main mitigation actions (Table 9) (presented in the ESMMP) that the Project will implement to address impacts to priority biodiversity (Figure 7 and 8), the rationales for which are presented in Section 5.3. General mitigation measures address the introduction and spread of invasive alien species (IAS), habitat loss and degradation and impacts from overexploitation of fauna and flora. These mitigation actions are fully integrated in the ESMMP and the information provided below does not add additional mitigation requirements.

Species and site-specific mitigation actions required for Action Category 1 species are discussed in Section 5.5 and offset actions to achieve NNL and NG gain in Section 7.

Figure 7: Overview of priority biodiversity (with significant residual impacts or risks), main impacts, mitigation and offset actions

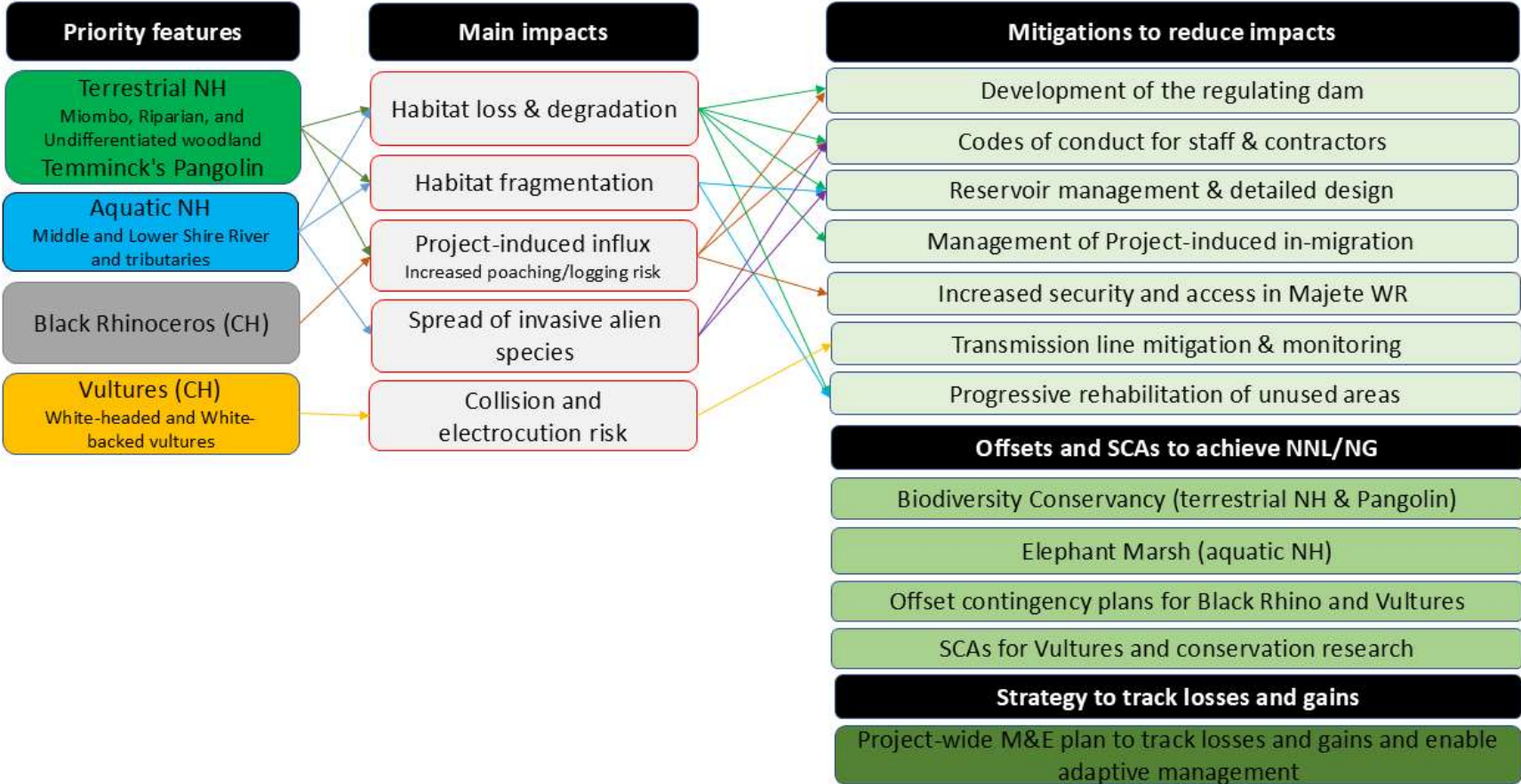


Table 9: General mitigation actions for biodiversity

| Mitigation: ID, measure and outline of required actions | Applicability (Construction / Operations) | Timing | Frequency | Responsibility for ensuring action is implemented | Means of verification | |
|--|--|---|--|---|-----------------------|--|
| Procedures to avoid and minimise staff/contractor impacts | | | | | | |
| GMA1 | <p><u>Avoidance through staff and contractor awareness</u></p> <p>Ensure staff and contractors abide by procedures to prevent biodiversity impacts</p> | Pre-construction, Construction and Operations | Prior to commencement of ground works to end of operations | Monthly reporting by MHPL and contractors once codes of conduct are operationalised | MHPL | <p>Codes of conduct that align with this BAP</p> <p>Induction records of contractors and staff</p> <p>Breaches of conduct by staff and contractors</p> <p>Contractor reports</p> <p>Records of spot checks by MHPL of contractors</p> <p>Development of Disciplinary Procedure</p> |
| | <ol style="list-style-type: none"> 1. Develop biodiversity procedures for contractors, employees to outline the rules, codes of conduct and prohibitions relevant to the mitigation of impacts on biodiversity, to include: restriction of personnel movements to designated roads and paths to minimize habitat degradation and interaction with wildlife; prohibition of hunting and fishing and purchase of bushmeat; prohibition of collection of timber and non-timber forest products (NTFPs); prohibition of transporting of bushmeat or NTFPs in Project and contractor vehicles; prohibition of introduction of alien/exotic plants or animals including domestic pets; sanitation and hygiene measures; waste disposal; smoking area restrictions (to avoid fire); and vehicle speed limits. 2. Ensure there are sufficiently strong penalties for staff and contractors who disregard the procedures. 3. Ensure compliance with biodiversity mitigation procedures is explicitly included in the Terms of Reference for contractors and subcontractors. 4. Develop an induction program to train new staff, contractors and visitors upon their arrival in the procedures and communicate the penalties for non-compliance. | | | | | |

| Mitigation: ID, measure and outline of required actions | Applicability (Construction / Operations) | Timing | Frequency | Responsibility for ensuring action is implemented | Means of verification | |
|--|---|---|---|---|-----------------------|---|
| <p>5. Develop specific training for roles that may impact priority biodiversity, e.g. training of vehicle operators to adhere to speed restrictions and avoid collisions with wildlife, training of security guards to check for bushmeat or other prohibited products on personnel and vehicles leaving/entering site, training for the social team on the synergies and potential conflicts of community and biodiversity work.</p> <p>6. Enforce the procedures with regular checks and balances to ensure compliance, e.g. verify that security teams undertake routine inspections of vehicles and staff bags entering and leaving site to check for prohibited products, verify records of journey times or Global Positioning System (GPS) recorders to check speed limits on roads are respected, verify that new staff and contractors are familiar with the codes of conduct.</p> <p>7. Engage with wildlife sanctuaries or relevant NGOs that provide rehabilitation services for wildlife recovered from employees attempting to smuggle animals. This action is important because recovered wildlife may often be in poor condition and require rehabilitation before being released back into the wild. The Lilongwe Wildlife Trust operates a rehabilitation center in Lilongwe and could be a suitable partner for this initiative. https://lilongwewildlife.org/.</p> <p>8. Coordinate with national wildlife authorities or law enforcement to address cases involving perpetrators of wildlife crime.</p> | | | | | | |
| Detailed planning, micro-siting, and operational protocols to avoid and minimise impacts | | | | | | |
| GMA2 | <p><u>Avoidance and minimisation through implementation of construction and operational protocols, detailed planning and micro-siting</u></p> <p>Ensure staff and contractors comply with construction and operational protocols to avoid and minimise biodiversity impacts</p> | Pre-construction, Construction and Operations | Prior to and during ground works to end of operations | Monthly reporting by contractor(s) once protocols are operationalised | MHPL | <p>Protocols that align with Project biodiversity requirements of this BAP</p> <p>Monitoring of breaches in protocols</p> <p>Spot checks by MHPL of contractor work</p> <p>Reporting by contractors</p> |

| Mitigation: ID, measure and outline of required actions | Applicability (Construction / Operations) | Timing | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|---|---|--------|-----------|--|--|
| | | | | | <ol style="list-style-type: none"> 1. Establish which species or pathogens are at risk of being brought to the Project area via imported equipment or vehicles or movement of equipment and vehicles in-country. Develop and implement appropriate construction and operational protocols to clean vehicles and equipment: (i) prior to export (ii) on arrival in country; and (iii) on arrival to site; to identify and monitor high risk invasive species; and to control/eradicate any invasive species that do inadvertently become established. 2. Ensure only minimal infrastructure is built at the regulatory dam and worker facilities e.g. accommodation is only constructed at the main dam construction area to minimize indirect impacts to Majete Wildlife Reserve. 3. Where possible, locate quarry site(s) within the future reservoir footprint to avoid additional impacts. 4. Ensure contractors develop pre-clearance work protocols to: <ol style="list-style-type: none"> i. Demarcate a buffer of 50 m either side of any streams that are within the Project construction area but outside of the footprint of the reservoirs to protect and restore riparian habitat. ii. Remove and store topsoil in a suitable area for progressive rehabilitation activities (GMA4). iii. Where possible along the transmission line corridors avoid impacts to baobab trees and other trees (e.g. nationally protected species). 5. For infrastructure located outside of the project construction area, establish a pre-disturbance protocol to assess whether any of the projects priority biodiversity values are present or using the area prior to any clearance activities. Where possible avoid construction in areas with priority biodiversity features (e.g. natural terrestrial habitats). Where impacts cannot be avoided or minimized, record the type of habitat impacted, the condition of the habitat, and the area of land that will be impacted to inform rehabilitation activities (GMA4). 6. Ensure contractors develop construction and operational protocols to minimise light, dust, noise and contamination impacts, including: only essential lighting is used in the construction areas and directional lighting near rivers and streams; dust suppression techniques are regularly used along unsurfaced roads and in construction and quarry areas; and minimizing noise disturbance blasting at night (and doing the noisy but necessary activities during the day time). 7. Develop operational protocols to maintain the recommended minimum hydrological flows at all times during construction and operation from the regulating dam, maintain a minimum environmental flow (see ESIA EFlow chapter). 8. Develop and implement a reservoir management actions (in the ESMMP) for the main reservoir and regulating reservoir that includes the following actions (NB the actions within the management plan that require community engagement are covered in GMA3.2): <ol style="list-style-type: none"> i. Operational protocols to remove floating debris, including any invasive plant species from the dam intake grills for appropriate disposal to avoid downstream contamination. |

| Mitigation: ID, measure and outline of required actions | Applicability (Construction / Operations) | Timing | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|---|---|---|---|---|--|
| <ul style="list-style-type: none"> ii. Water quality monitoring protocols to monitor water quality at different depths in main and regulating reservoirs and water quality of discharge. If problems are detected, adaptive management measures should be undertaken. iii. Minimize greenhouse gases emissions via implementing measures adequate for Mpatamanga reservoir characteristics. Monitor greenhouse gas emissions from the reservoir and respond using adaptive management measures to reduce anoxic conditions if required. iv. Implement sediment management. Adaptive management measures should be implemented for sediment impacts noted during monitoring. v. Assess the need for mitigations to manage potential impacts to Hippopotamus (and people) due to human-wildlife interactions around the main dam reservoir. <p>9. Ensure during construction and operations that infrastructure provides a barrier to the upstream migration of invasive species, in particular the Tigerfish (<i>Hydrocynus vittatus</i> and Redclaw crayfish (<i>Cherax quadricarinatus</i>).</p> | | | | | |
| Engagement with authorities to reduce indirect impacts | | | | | |
| <p>GMA3 <u>Minimisation through negotiated and agreed actions with stakeholders including communities, local and regional Government authorities</u></p> <p>Ensure impact risks to biodiversity are addressed in social management plans and third-party management plans</p> | <p>Pre-construction, Construction, Operations</p> | <p>Prior to commencement of ground works to end of operations</p> | <p>Monthly reporting through project lifetime</p> | <p>MHPL</p> | <p>Existence of Management Plans for influx and reservoir management</p> <p>Tracking of implementation of activities in Management Plans</p> |
| <p>1. Evaluate the potential scale and location of human influx that may occur during the construction period (currently estimated at between 4,000 – 7,500 people (SLR Consulting 2024e) and into operations as people may choose to stay in the area) and establish with local government authorities and communities an appropriate response to manage influx prior to the commencement of construction activities to minimise social and environmental impacts (such as uncontrolled land clearance, increased hunting pressure, increased poaching and illegal logging in Majete Wildlife Reserve and introduction of invasive/alien species into reservoirs). Measures to deter people from speculatively moving to the area should be included in the Influx Management Strategy (e.g. radio campaigns to state preference for only employing local people already registered in the area) as well as measures to concentrate influx into specific towns where appropriate infrastructure can be put in place. Particularly key is to ensure that no influx of people occurs around the regulatory dam which is very close to Majete Wildlife Reserve. Embed</p> | | | | | |

| Mitigation: ID, measure and outline of required actions | Applicability (Construction / Operations) | Timing | Frequency | Responsibility for ensuring action is implemented | Means of verification | |
|---|--|-----------------------------|---------------------------------------|--|-----------------------|-------------|
| | <p>agreed measures into the relevant management plans (as indicated in the ESMMP) and work with relevant authorities and organisations to ensure effective implementation and joint monitoring.</p> <ul style="list-style-type: none"> i. The use of existing or creation of new tracks on the west bank (Neno side) to construct the regulating dam by the EPC contractor will be prohibited (to discourage influx to these areas). ii. The Project will allow access across the Shire River via the coffer dam and/or the regulating dam to the Majete Wildlife Reserve security staff and managers to improve security patrols around Majete WR, as long as it does not interfere or conflict with the safety of construction activities. <p>2. Work with appropriate specialists and local authorities and stakeholders to evaluate the most appropriate approach to managing the main reservoir and catchment area around (NB access will be given to communities to use the shoreline and reservoir margins of the regulating reservoir but boating and fishing will not be allowed due to safety issues) key actions to be developed involving external stakeholders include:</p> <ul style="list-style-type: none"> i. Work with social, safety and biodiversity specialists to define any areas of the reservoir for fishing activities and no-go areas from a health and safety perspective and from a biological perspective (e.g. fish spawning grounds). ii. Controls on fishing activities to limit offtake (e.g. through provision of fishing permits that are monitored), prevent the introduction of invasive species into the reservoir and prevent fishing in no-go areas. iii. A clear mechanism should be established to enable communities to report conflicts with wildlife, such as incidents involving hippos raiding crops or other animals posing risks to human safety. This mechanism should allow communities to notify MHPL promptly (for example, via the GRM). The objective is to prevent retaliatory actions against wildlife from the communities by ensuring that the Project team can implement appropriate measures to manage human-wildlife conflicts effectively. iv. Agreement on wider catchment activities to ensure they do not lead to contamination or sedimentation of the reservoir or feeder streams. v. Agree with stakeholders how the implementation and outcomes of the management plan will be tracked and monitored and results shared. | | | | | |
| Progressive rehabilitation of unused areas | | | | | | |
| GMA4 | <u>Rehabilitate areas disturbed during construction</u> | Construction and Operations | Trial approaches during first year of | As disturbed areas are no longer | MHPL | Site visits |

| Mitigation: ID, measure and outline of required actions | Applicability (Construction / Operations) | Timing | Frequency | Responsibility for ensuring action is implemented | Means of verification | |
|--|--|---|---|---|-----------------------|--|
| Undertake technical and biological rehabilitation to enable the natural restoration process based on effective techniques | | construction and scale up thereafter | required are available | | | |
| <ol style="list-style-type: none"> 1. Develop a rehabilitation plan to enable progressive rehabilitation of disturbed areas that are no longer used by the Project. The plan should include technical protocols to remove debris and contaminated soils and re-contour surfaces to achieve a gentle gradient with an even spread of topsoil. Trials may be required to assess the most appropriate approach to biological rehabilitation; in some circumstances the area could be left to passively rehabilitate (for example if the disturbed area is small and surrounded by native vegetation); in other circumstances (where larger areas have been disturbed) biological rehabilitation using seeder and/or direct planting of native plants, may be required. The aim of rehabilitation is to achieve a return of vegetation type similar to or ideally better than pre-disturbance, the condition of the vegetation is expected to naturally improve over time. Protocols should include checks of rehabilitated areas to remove invasive species and monitor the progress of biological rehabilitation. If monitoring detects native vegetation is not growing in rehabilitated areas, further technical and biological rehabilitation may be required. | | | | | | |
| Adaptive management of mitigation and offset actions | | | | | | |
| GMA5 | <u>Track and adaptively manage progress towards no net loss and net gain targets</u> Develop and implement an overarching Biodiversity Monitoring and Evaluation Plan (BMEP) to track losses and gains and enable adaptive management | Pre-construction, Construction and Operations | Implement monitoring approach during Construction period, adapt and finalise for Operations | As per the requirements of the plan | MHPL | Biodiversity monitoring and evaluation plan Biannual and annual reports on monitoring results |
| | | | | | | <ol style="list-style-type: none"> 1. Develop an overarching Biodiversity Monitoring and Evaluation Plan (BMEP) to develop the methods for monitoring pressure, state and response indicators within both the Project area (to measure impacts/ biodiversity losses) and at offset sites (to measure biodiversity gains). Adaptive management thresholds will be provisionally developed to be tested during the construction period. The same state indicators will be used at offset sites to ensure losses and gains can be compared. However, the monitoring method for state indicators, and the indicators and methods for pressure and response indicators at offset sites, will be site-specific and therefore developed as part of offset development actions. |

| Mitigation: ID, measure and outline of required actions | Applicability (Construction / Operations) | Timing | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|---|---|--------|-----------|--|-----------------------|
| | <ol style="list-style-type: none"> <li data-bbox="286 421 2132 448">2. Begin implementation of the monitoring plan within the Project area early in the construction period (year 1) to ensure all "monitoring baseline" data is complete for the identified method. <li data-bbox="286 472 2132 563">3. Review data collected during each of the first two years of the construction period and adapt methods and thresholds as required to ensure the data collected can usefully inform adaptive management. Continue implementation of the adapted BMEP, including periodic evaluation of methods and thresholds to enable the Project to demonstrate progress towards no net loss and net gain targets. <li data-bbox="286 587 1800 614">4. Develop a NNL/NG tracker which integrates the results of monitoring and tracks progress towards NNL/NG goals for impacted priority biodiversity features. | | | | |

5.5 Specific mitigation actions

5.5.1 Species specific actions

The only species requiring species-specific mitigation actions (see Table 7) are the two species of vulture that qualify for critical habitat (White-headed and White-backed Vultures) (Table 10). The mitigation actions that will be implemented for these species will also benefit other species of raptor and large bodied soaring bird including species of stakeholder concern (e.g. the Martial Eagle and Bateleur, Table 6).

Table 10: Specific mitigation actions for Vultures

| Mitigation: ID, measure and outline of required actions | | Applicability (Construction / Operations) | Timing | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|--|--|---|---|---|--|--|
| Detailed planning and design to avoid and minimise impacts | | | | | | |
| SSA1 | <p><u>Avoidance and minimisation through implementation of transmission line mitigation and monitoring</u></p> <p>Ensure mitigation is designed into transmission line infrastructure and monitoring is undertaken to understand impacts</p> | Pre-construction, Construction and Operations | Prior to and during ground works to end of operations | Monthly reporting by contractor(s) once protocols are operationalised | MHPL | <p>Transmission line design</p> <p>Visual inspection</p> <p>Monitoring reports</p> |
| <ol style="list-style-type: none"> 1. Work with Project engineers on the design of transmission lines to ensure the biodiversity risks of the 132 kV and 400 kV transmission lines are mitigated to minimise collision and electrocutions. Wildlife-friendly pylons and bird flight diverters should be used along the defined lengths of each line and regular monitoring should be undertaken to assess bird mortality. 2. Bird flight diverters and anti-perching devices will be installed along the entire 132 kV transmission line and in selected locations of the 400 kV lines (the southern 30km) (see ESMP for details). 3. Post-construction bird carcass monitoring will be undertaken monthly for the first two years of operation along selected priority areas in the southern portion of the 400 kV line and along the entire length of the 132 kV line. A robust post-construction monitoring protocol to assess bird mortality will be developed and undertaken by trained consultants. The protocol will include detailed guidelines on the following aspects: frequency of monitoring, areas to be surveyed, detection bias, and scavenging bias (see the BMEP (TBC 2024a)). Community members resident along the line will be notified and requested to provide information on any carcass sightings. Community members will be trained by an avian expert and compensated for their participation, ensuring high-quality and reliable monitoring. The location of all mortalities will be recorded, and photographs taken so that species can be confirmed later. | | | | | | |

5.5.2 Site-specific actions

Site-specific mitigation actions are designed to avoid and minimise impacts to priority biodiversity features from Project-induced influx. The two proposed sites for specific mitigation action are Majete Wildlife Reserve and an area of land between the northern boundary of Majete, running alongside the regulating reservoir up to the main dam on the Neno district (Biodiversity Conservancy). The sections here describe the mitigation actions for each area.

Justification for mitigation measures for Project-induced influx

Project induced influx has the potential to have impacts from both a social and ecological perspective (Chinugwo 2023; SLR Consulting 2024e). The ESIA assessed the risk and magnitude of Project-induced influx and its potential impacts using the IFC handbook on project-induced in-migration (IFC 2009) and the World Bank Guidance Note on Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx (World Bank Group 2016). Overall, the magnitude of Project-induced influx of unskilled workers was assessed to be medium to high, and between 4,000 to 7,500 people (depending on the selected scenario). The predicted migration hotspots were mapped in the ESIA and include an area around the regulating dam, on the Blantyre side of the reservoir near the main dam (which is connected by a private road to the regulating dam), and in Feremu and Andivuta on the Neno District, which could put additional pressure near the northern boundary of Majete Wildlife Reserve (Figure 8), as well as on the proposed Biodiversity Conservancy in Neno District (Figure 11).

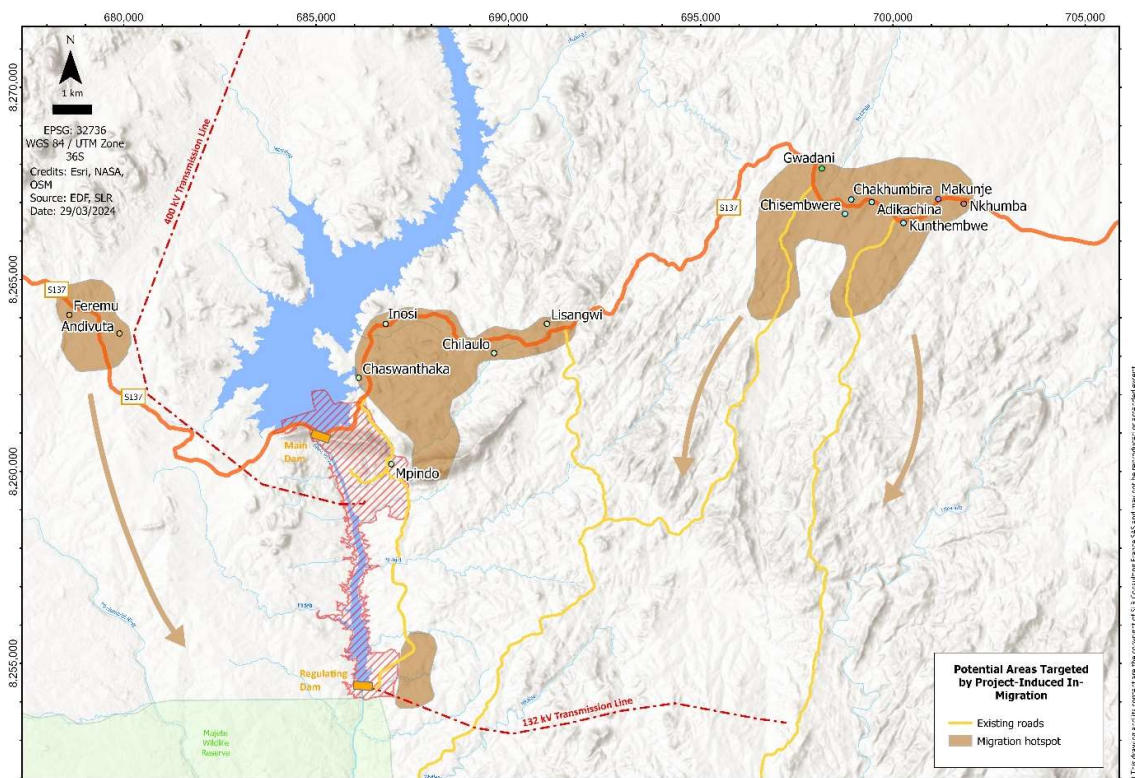


Figure 8: Predicted influx hotspots. Brown arrows show potential movements of people in the hotspot areas in search of natural resources (SLR Consulting 2024e).

Habitats at higher risk from influx-related pressures are the remaining more intact woodlands on the west (Neno) side of the regulating reservoir, in the unfenced cattle ranches. Owners or staff at these ranches may be unable to prevent illegal activities, notably for charcoal production. Similarly, increased human in-migration into the Project Area initiated during the construction phase is predicted to pose increased risks of harvesting and poaching pressure, particularly along the northeastern boundary of Majete WR. In the absence of mitigation, the combined indirect impacts of construction staff and jobseekers on natural habitats would be of high significance. Construction staff and jobseekers may result in increased hunting and poaching of wildlife species such as Temminck's pangolin, possibly hippopotamus, crocodiles and some antelope species in communal land and ranches around the reservoirs. There is likely to be an increase in setting of snares to catch fauna for bushmeat or trade. Of particular concern is the risk of increased poaching pressure resulting from human influx into the Project Area on Majete WR, particularly along the northeastern boundaries closest to the Project infrastructure. This could potentially result in an increased risk of poaching of target species such as Black Rhinoceros and other priority species. Additional threats include an increased risk of poisoning of critical habitat vultures.

General mitigations to minimise influx have been designed and are presented in detail in the ESMMP (e.g. control measures such as developing and implementing a code of conduct for workers, control measures to restrict risk of in-migration of jobseekers particularly close to the regulating dam and proximity to Majete WR) along with several actions for minimising influx-related impacts to biodiversity in the sensitive areas (GM3, Table 9). These mitigations and the residual impacts assessed (see section 6) have taken into account experiences from other large infrastructure projects (Kapichira HPP, SVTP), as presented in Appendix 4.

However, despite the effectiveness of the mitigation measures, the residual impacts regarding in-migration and its consequences, particularly on biodiversity, are predicted to remain moderate (SLR Consulting 2024e).

5.5.2.1 Majete Wildlife Reserve

The only significant anticipated impact to Majete WR and its wildlife is from Project-induced influx of people. This is predicted to increase pressure on natural resources in and around Majete WR resulting in increased poaching pressure and illegal logging for charcoal. The impacts from in-migration on Majete WR are most likely to occur in the areas close to the regulating dam, i.e. the northeastern corner of the Reserve (Figure 9) where Project activities are focused. Mitigation measures will be designed to specifically avoid and/or minimise these anticipated impacts and will be implemented by the Majete management. The actions have been designed in collaboration with the Reserve management to ensure that they are feasible (technically and financially) and will directly mitigate the potential impacts of influx. The focal species of mitigation is the Black Rhinoceros, but the planned actions will also support other priority features and wildlife and prevent illegal logging for charcoal (terrestrial natural habitat).

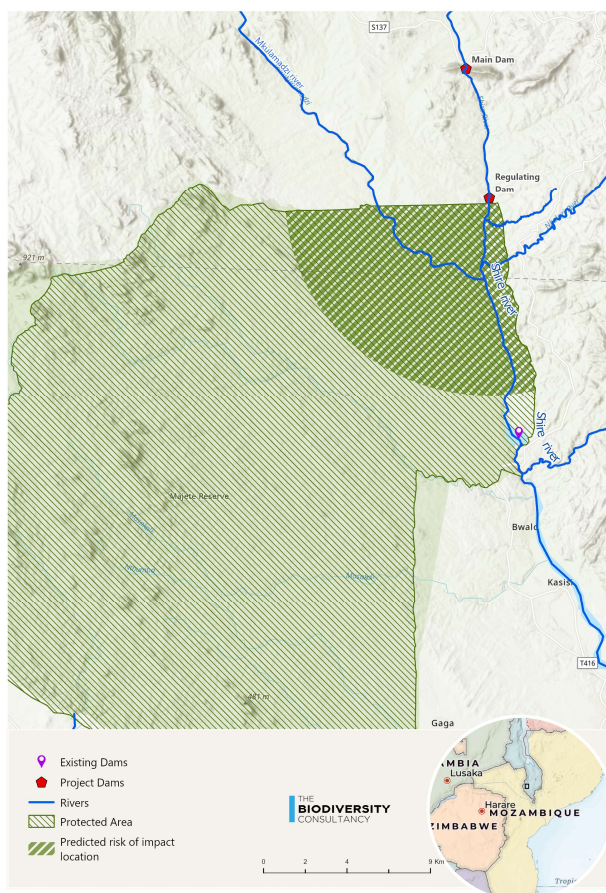


Figure 9: Area of MWR with a higher risk of impacts from Project-induced influx.

The overall approach is to provide funding directly to the Majete Reserve managers to implement mitigation measures in Majete Wildlife Reserve. The Majete Wildlife Reserve is currently managed by African Parks as per partnership agreements with the GoM. All proposed activities will be implemented by the managers and have been formulated to integrate and expand on existing activities within the current 5-year business plan (African Parks 2022).

1. Support to security (anti-poaching) patrol activities in the northeastern sector of the reserve

Potential impacts from in-migration are anticipated to occur in the northeastern sector of the reserve. One of the most effective means of protecting wildlife in protected areas from anthropogenic threats is to implement effective patrolling and road blocks (Kablan *et al.* 2017).

Currently there are three patrol outposts which host ranger teams within MWR. There is no patrol outpost or paved road network in the northeastern boundary sector (Figure 10). The action is to construct, staff and equip (equipment and logistical support) a fourth outpost in this sector to provide a permanent presence in area where the highest pressure is predicted.

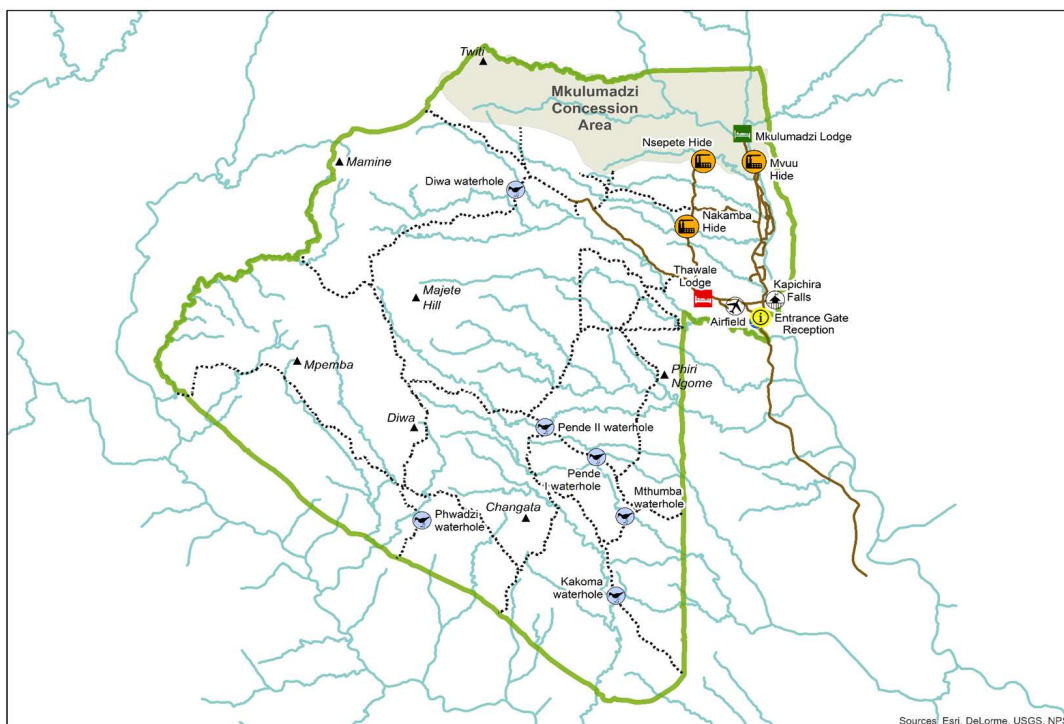


Figure 10: Existing road network in Majete Wildlife Reserve (the existing patrol outposts are not shown on the map for maintaining security).

Current outposts within MWR are manned by a team of eight rangers who are coordinated by a camp leader and a deputy camp leader (African Parks 2022). The following actions will be essential to ensure that effective patrolling can be implemented:

- **Construction and equipping of an outpost and related buildings:** Majete WR is patrolled via various means (foot patrols, quadbike patrols and car patrols) from the outposts around the reserve. Constructing and equipping a new outpost will provide a base for permanent patrolling activities in the northeastern sector. Necessary infrastructure include:
 - Four houses, solar power, solar water pump, boreholes, water tanks, office, strong room.

An engineering design, budget and construction process must be developed for the construction on an outpost building and then be signed off by registered civil engineers, which is approved by DNPW, Project PIU and Lenders before proceeding.

- **Transport vehicles and track maintenance:** To effectively patrol the targeted sector, the patrol team will require vehicles to transport them around the northeastern sector and to and from the new outpost. The road network in the sector is largely dirt tracks with no paved roads. The tracks will need to be maintained regularly to ensure effective movement of patrol staff around the sector. A key aspect of effective patrolling is being able to get around quickly, therefore motorbikes and maintained tracks are important.
- **Bridge building:** Construction of a concrete low water bridge across the Mkulumadzi River for rapid reaction to northern triangle between the Mkulumadzi and the Shire River. It currently takes 5 to 6 hours to get to this area by vehicle as they need to go around the river. The bridge would reduce this time considerably allowing faster access to respond to people entering the Reserve illegally. Two pedestrian suspension bridges are also required, one across the Mkulumadzi to access critical areas along the northern boundary fence for extended patrols on foot, and the other across the Shire River to access the east bank area.

Drones were discussed during developing mitigations for influx impacts in Majete. Drones are good for surveillance of fires etc. and potentially animal monitoring. However, they are not enough of a deterrent for people entering the park and poaching. It is important for the rangers to be able to access the areas by foot and motorbike, and this can only be done by a bridge over the Mkulumadzi River. Patrols will be able access the area more quickly and safely, and man the new ranger post in the northern area. Mitigation provided by the bridge infrastructure needs to last throughout construction and into operations. Therefore, bridge maintenance will be required to ensure that the mitigation is effective. This is good practice when it comes to conservation actions involving infrastructure and items like vehicles and machinery. Maintenance is included in the mitigation budget.

It is noted that the construction of a bridge is likely to be technically challenging and need to be done properly with the assurance that an appropriate structure will be constructed with longevity, safety and minimising impacts to biodiversity (i.e. an appropriate impact assessment). An engineering design, budget and construction process must be developed, signed off by registered civil engineers, which is approved by DNPW, Project PIU and Lenders before proceeding.

- **Equipment, staffing and training:** MWR will require additional staff (eight people) who are properly equipped and trained to man the new outpost. It is anticipated that the new ranger post will feed information into the existing EarthRanger³ management software which is used throughout the reserve. The new patrol team will require training to align them with the existing rangers (training will ensure compliance with

³ See: <https://www.earthranger.com/>

Human Rights security requirements).

- **Fence maintenance:** The MWR boundary is fenced around the entire perimeter of the Reserve. Ensuring that the fence in the northeastern sector of MWR is maintained will provide a deterrent to people in the surrounding communities who may wish to enter the Reserve and will prevent instances of human-wildlife conflict. The construction of the bridge across the Mkulumadzi will also facilitate the improved maintenance of the fence in the northeastern part of the reserve.

Additional fencing along both banks of the Shire River between the regulating dam wall and the existing reserve fence is also proposed to prevent wildlife from leaving the reserve via the river, and to protect staff and communities. This part of the reserve has had cases of wildlife escaping which could exacerbate human wildlife conflict, and be dangerous for staff at the regulating dam (this action is detailed in the ESIA (SLR Consulting 2024e).

The estimated budget to implement these activities is in Appendix 2.

While people that come to the area for opportunities during the construction phase of the Project, may return to their homes after construction (as they largely did for the Kapichira Project, *in litt.* Archibald Kandoje, Sept 2024), it is not certain that this will happen for Mpatamanga and monitoring will be needed to track this. With this knowledge, ongoing site-specific mitigation measures within Majete are planned for the construction phase (4.5 years), and then 10 years into operations (and not for the whole 30 year length of the PPA). Impacts from influx to Majete will be monitored through specific indicators in the BMEP (TBC 2024a). Depending on monitoring results, the duration of mitigation measures in Majete can be reviewed and adapted after 5 years of operations.

2. Develop roadblocks in areas outside of Majete Wildlife Reserve

A key part of mitigating the impacts of population influx will be preventing the illegal transport of charcoal and bushmeat (this action is detailed in the ESIA (SLR Consulting 2024e). The Project will liaise with police and Forestry Department to assess the feasibility/legality of the Project implementing roadblocks.

- **Roadblocks / search points:** Two strategic placements for roadblocks to mitigate impacts to Majete Wildlife Reserve and its wildlife have been identified as:
 - The road from Kapichira to Blantyre on the eastern bank of the Shire River; and
 - The regulating dam wall road (access to crossing will be restricted to only Project staff and the Majete managers and staff to aid patrolling on the area of Majete on the east bank).

The cost of these actions is not included in BAP budget as is it not possible to estimate the costs at this time, and these actions will not necessarily be funded by MHPL.

Table 11: Site-specific mitigation for Majete Wildlife Reserve

| Offset: ID, measure and outline of action required | Applicability | Timeframe | Frequency | Responsibility for ensuring action is implemented | Means of verification | |
|--|--|---|--|---|--|--|
| Actions to avoid and minimize impacts to priority biodiversity in Majete Wildlife Reserve | | | | | | |
| MAJ1 | <p><u>Support to patrolling activities in Majete Wildlife Reserve and roadblock development</u></p> <p>Support to the northwestern sector of the reserve where impacts from in-migration are anticipated</p> | Pre-construction, construction and operations | Prior to commencement of ground works to end of operations | Ongoing throughout the life of the Project | Majete WR managers, Department of Forestry and Police (overseen by MHPL) | <p>Monthly reports from African Parks including:</p> <ul style="list-style-type: none"> a) km of patrols walked; b) number of patrol days; c) Observations of illegal activity per km walked <p>Photographic evidence of infrastructure created (or verified by a visit)</p> <p>Annual reporting including:</p> <ul style="list-style-type: none"> 1. Total number of patrols and kms walked. 2. Number, type and location of signs of illegal activity per km walked 3. Number and location of people apprehended per day |
| | <ol style="list-style-type: none"> 1. MHPL to engage with Majete managers to agree the activities, develop a workplan and key performance indicators (KPIs) and refine the budget estimate. Within the agreement, it will need to be stipulated that monthly monitoring reports, any yearly workplans, budgets and KPIs are presented to ensure the timely release of funds. Remaining activities are led by Majete managers: 2. Support the development of necessary infrastructure that will support the patrol team in the northwest sector of the reserve. This includes staff housing, an office, strongroom and related solar and water infrastructure. 3. Bridge building: Construction of a concrete low water bridge across the Mkulumadzi River for rapid reaction to northern triangle between the Mkulumadzi and the Shire River. Construction of two pedestrian bridges. One across the Mkulumadzi, and one across the Shire to access the east bank section of the reserve. 4. Fence maintenance: Ensuring that the fence in the northeastern sector of MWR is maintained will provide a deterrent to people in the surrounding community who may wish to enter the Reserve and will prevent instances of human wildlife conflict 5. Recruit, train and equip staff who will be deployed at the outpost in the northwestern sector of the park. Each outpost requires eight rangers, one camp leader and one deputy. All staff will be trained in patrol techniques and the use of relevant software packages (e.g. Earthranger). 6. Perform regular patrols in the northwestern sector of the reserve | | | | | |

| Offset: ID, measure and outline of action required | | Applicability | Timeframe | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|--|--|-----------------------------|--|-----------|---|---|
| MAJ2 | <p><u>Roadblocks outside Majete Wildlife Reserve</u></p> <p>To prevent illegal transport of charcoal and bushmeat</p> | Construction and operations | During ground works to end of operations | Ongoing | MHPL | <p>1. Number of vehicles checked per day</p> <p>2. Number, type and location of signs of illegal activity per day</p> |
| | <p>1. Engage with Forestry Department and Police to discuss the feasibility of implementing roadblocks in identified key positions around MWR.</p> <p>2. As agreed with the Forestry Department implement strategic roadblocks</p> | | | | | |
| MAJ3 | Monitoring and adaptive management to achieve offset targets | Construction and operations | From year the start of groundworks until the end of operations | Ongoing | MHPL | Annual monitoring reports |
| | <p>1. An overarching Biodiversity Monitoring and Evaluation Plan (BMEP) will be developed to track effectiveness of mitigation measures. Site-specific monitoring and evaluation indicators that align with the overarching BMEP will be developed for the Majete mitigation measures (i) the number and intensity of patrols (response indicators); (ii) Number of anthropogenic events within the northwestern sector of the reserve (pressure indicators), and (iii) Increases/decreases in the number of anthropogenic events in the reserve (status state indicators). Key response and pressure (and if appropriate state) indicators will have thresholds associated with them to trigger an adaptive management response if targets are not met.</p> <p>2. Monitoring and evaluation will be undertaken in accordance with the BMEP. Annual monitoring reports will be produced and provide results for each indicator. If monitoring detects that any threshold has been crossed without appropriate adaptive management being put in place, it will be raised immediately with the implementing partner to undertake an assessment and appropriate adaptive management action.</p> | | | | | |

5.5.2.2 Biodiversity Conservancy (Neno District)

This is the key mitigation to avoid predicted impacts to significant areas of terrestrial natural habitat remaining in the landscape from Project-induced influx. The approach is to create a Biodiversity Conservancy in a parcel of land adjacent to the regulating dam reservoir from the Regulating Dam (and the northern boundary of Majete) up to the Main Dam totalling an area of c. 2,000 hectares (Figure 11).

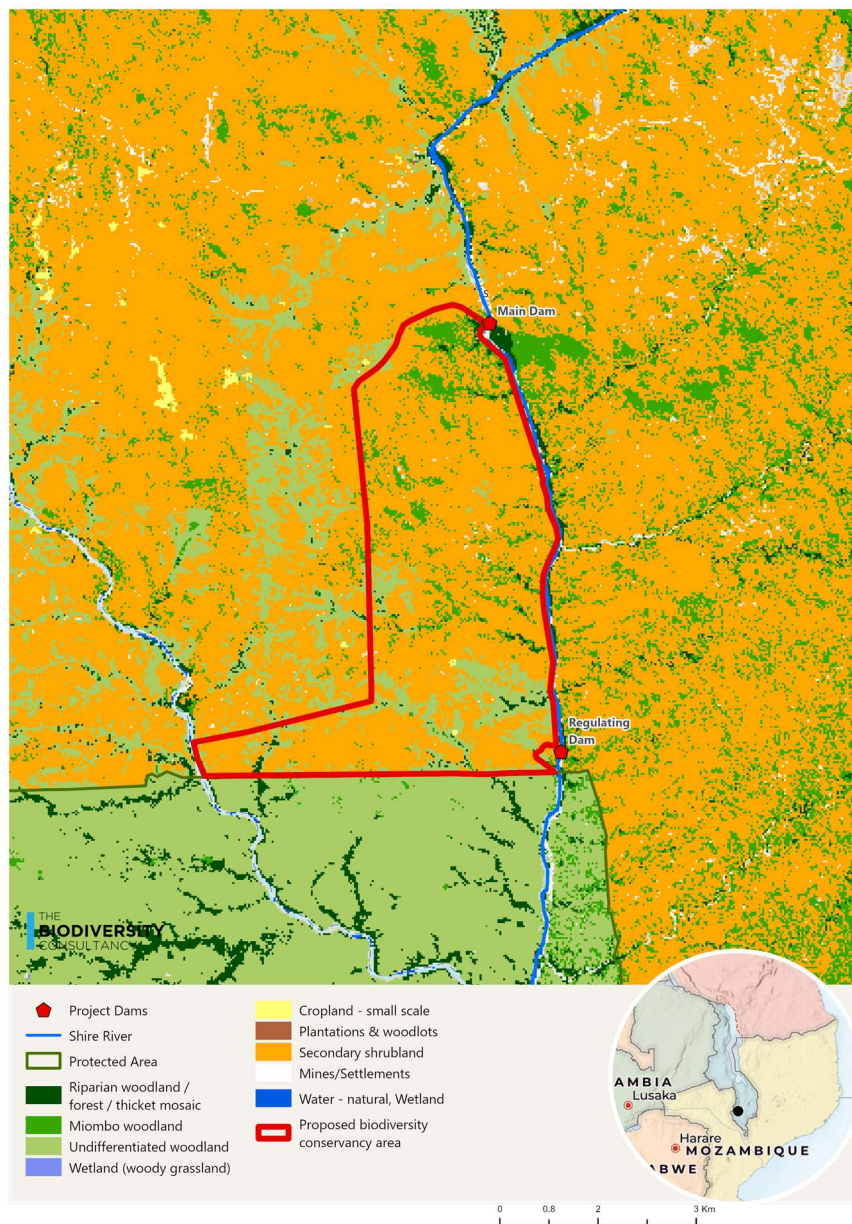


Figure 11: Area of proposed Biodiversity Conservancy for protection (mitigation – avoidance) and restoration (offset).

The Biodiversity Conservancy is proposed as both a site to avoid impacts to natural habitats and as an offset site to generate gains to compensate for residual impacts to terrestrial habitat via restoration (see more detail in the offsets section 7.1.1). Impacts from influx resulting in increased pressure on natural resources for firewood and increased illegal logging will be addressed by through a combination of community engagement and management of the Conservancy, and protection measures. The overall approach is to protect and improve the condition of the existing terrestrial habitat and restore degraded areas (largely area of shrubland assessed as modified habitat) (Figure 11). The creation of the Conservancy will also contribute to enhancing protection of a portion of the northeastern border of MWR.

The Resettlement Action Plan team (RAP) have undertaken engagement activities (SLR Consulting 2025) culminating in a land acquisition and compensation plan which is then used to guide land acquisition and secure the Conservancy. The average land purchase price per hectare has been costed for the full c. 2,000 hectares (as per estimates land costs per hectare (SLR Consulting 2024d) and is included in the RAP budget. As the area will need to be protected from human encroachment, fencing of the entire Conservancy boundary is required as soon as possible after the Main Works RAP is completed, prior to construction starting. This fencing will be the same type of fencing as in Majete Wildlife Reserve.

The actions to acquire, protect and manage the Biodiversity Conservancy are detailed in the offset section in Section 7.1.1.

6 Residual impact assessment and offset targets

A quantified residual impact assessment (RIA) of priority biodiversity was carried out to assess the significance of residual impacts from Project activities after avoidance, minimisation and rehabilitation measures have been put in place (TBC 2024c). The RIA identified offset targets to compensate for significant residual impacts on natural habitats. Residual impacts to priority species were not found to be significant and therefore no targets were set. It is not practical to quantify residual impacts for all biodiversity, so the Project carried out a risk-based prioritisation exercise ((TBC 2024e) Table 7) to identify priority biodiversity features with a high likelihood and consequence of Project impacts; these features were the focus of the RIA⁴.

Based on the findings, a habitat-based approach was used to assess impacts on the three terrestrial natural habitats i.e. Miombo woodland, Riparian woodland and Undifferentiated woodland and aquatic natural habitat (Middle and Lower Shire River and tributaries). For RIA focal species (White-backed Vulture and White-headed Vulture), the habitat-based approach was not appropriate as these species are impacted by threats other than habitat degradation and loss (e.g. collisions with powerlines). A species-specific approach was therefore applied to these species.

The Project residual impacts (post mitigation) identified and included in the RIA were:

- Habitat loss and degradation from the Project footprint, i.e. project infrastructure including the main and regulating dam, roads, the two reservoirs at full supply level, quarries, two transmission lines and resettlement areas;
- River fragmentation
- Hydropeaking and interruption of Environmental Flow between the main powerhouse and the regulating reservoir;
- Riverbed incision and erosion downstream of Kapichira;
- Bird collisions with transmission lines; and
- Increased hunting from Project induced influx (in customary lands).

The other impacts to priority biodiversity identified (Table 8) were assessed to be not significant post mitigation.

6.1 Approach to assess impacts

To quantify the residual impacts for natural habitats the Project adopted a 'Quality Hectare' (QH) approach for terrestrial habitats and a 'Quality Kilometre' (QKm) approach for aquatic habitat (the Shire River and tributaries). The QH/QKm approach combines a measure of area/length and a

⁴ Natural habitat: Miombo woodland, Riparian woodland and Undifferentiated woodland and aquatic natural habitat (Middle and Lower Shire River and tributaries). Species: White-backed Vulture and White-headed Vulture

measure of condition of the habitat to obtain an overall measure of loss (ICMM & IUCN 2013). For the White-headed Vulture and White-backed Vulture, number of individuals was used to quantify losses, using extrapolated data from South Africa, as no information on fatalities of vultures from collision and electrocution is available for Malawi. Static baselines were used to assess residual impacts which is the most precautionary approach to ensure that Project impacts are not likely to exceed estimates.

6.2 Results and significance

Table 12 presents a summary of residual impacts for the RIA focal features and their no net loss (NNL) or net gain (NG) target. No areas of critical habitat have residual impacts (critical habitat is restricted to protected areas in the landscape). It is estimated that the Project will impact 3,495 ha of land, 74% of which is modified habitat. The remaining 26% of natural habitat has variable quality, from degraded to highly degraded, but as only small patches of habitat remain outside of protected areas across the landscape, impacts to them are considered significant from a local perspective.

The impacts to the Middle Shire River are significant as the Project will alter the flow of the last remaining stretch into lacustrine conditions. Residual impacts to the Lower Shire River have the potential to be significant, but the impacts from erosion of the riverbed (due to sediments being held back at the main dam) are still being investigated, therefore impacts to the Lower Shire have not been quantified at the time of writing this report.

The number of vultures predicted to be impacted is very low (0.3 birds per year). While any impact to a Critically Endangered species is considered significant, especially where threats (such as habitat destruction and poisoning and use by traditional medicine) are still prevalent, the Project has opted to carry out fatality monitoring to understand the real impacts of the transmission lines and develop a vulture offset contingency plan to be activated, if significant impacts are detected (based on the thresholds set in the BMEP). A specific offset target has not been set at this time, but scenarios of required targets will be included in the contingency plan.

Table 12: Summary of estimated residual impacts for focal RIA features and no net loss/ net gain targets

| Biodiversity feature | Impact | | | | NNL/NG target |
|------------------------------------|-----------------|-----------|-------------------|------------------------------------|-----------------|
| | Footprint | Collision | Influx | Riverbed Incision and bank erosion | |
| Terrestrial natural habitat | 391 QH (910 ha) | - | Negligible | - | ≥ 391 QH |
| <i>Miombo woodland</i> | <i>160 QH</i> | - | <i>Negligible</i> | - | <i>≥160 QH</i> |
| <i>Riparian woodland</i> | <i>95 QH</i> | - | <i>Negligible</i> | - | <i>≥95 QH</i> |

| | | | | | |
|--|-------------------|-----------------------------|-------------------|---|------------------|
| <i>Undifferentiated woodland</i> | 136 QH | - | <i>Negligible</i> | - | ≥ 136 QH |
| Aquatic natural (degraded) habitat (Middle Shire River) | 9.3 QKm (41.8 Km) | - | - | Negligible | ≥ 9.3 QKm |
| <i>Middle Shire main stem</i> | 8.4 QKm | - | - | <i>Negligible</i> | ≥ 8.4 QKm |
| <i>Lisungwe tributary</i> | 0.9 QKm | - | - | <i>None</i> | ≥ 0.9 QKm |
| Aquatic natural (degraded) habitat (Lower Shire River and floodplain lakes) | - | - | - | Un quantified but considered of likely low significance (in ESIA) | N/A |
| White-backed Vulture and White-headed Vulture | None | c. 0.3 individuals per year | Negligible | - | Not set |

Residual impacts on Black Rhinoceros (or other priority mammals in Majete) are not expected as the Project has developed comprehensive mitigation measures in Majete Wildlife Reserve (section 5.5.2.1) and influx management measures in the ESMMP. However, a Black Rhino offset contingency plan will be developed to be implemented in the unlikely event of a fatality, and Supporting Conservation Actions (SCA) to achieve net gain for Black Rhinoceros are being investigated.

The two waterbird species African Openbill and African Skimmer, and the Zambezi Flapshell Turtle, are also not predicted to be impacted by the Project as they are not present in significant numbers within the Project impacted area.

Residual impacts are predicted to Temminck's Pangolins from habitat loss (from the Project footprint) and increased hunting pressure for wildlife trade from Project-induced influx. However, no data is available (population size or range) to provide a species-specific estimate of residual impacts. Therefore, terrestrial natural habitat is used as a proxy for loss.

Impacts to Hippopotamus have not been quantified as the qualitative assessment predicts an overall negligible impact (TBC 2024c). Hippos are not considered to require specific offset actions or SCAs.

In summary, the biodiversity features that require offsets are:

- three natural terrestrial woodland habitats (Miombo, Riparian and Undifferentiated woodland) and Temminck's Pangolin; and
- aquatic natural (degraded) habitat (the Middle Shire River and tributaries).

7 Offset strategy

The Offset Strategy sets out how the Project will develop and implement biodiversity offsets to achieve a net gain for critical habitat-qualifying biodiversity and no net loss for natural habitats and other priority species. The Offset Strategy is detailed in a separate document (TBC 2024d) and summarised here.

The residual impact assessment results show that offsets are required for: (i) terrestrial natural habitat (ii) aquatic habitat. The selection of offset sites and activities is therefore focused on this biodiversity.

Offset site selection was informed by previous phases of work (TBC 2019; Mott MacDonald 2021) and by engagement with key stakeholders (Table 4). An Offset Feasibility Study was undertaken to help understand the actions that would be required to create biodiversity gains and to estimate the scale of gains possible at each site (TBC 2024f). Two feasible offset sites have been selected, along with two offset contingency plans and Supporting Conservation Actions (SCAs) (Figure 12) (TBC 2024d).

The two offset sites that have been identified are one for terrestrial natural habitat and associated species, and one for aquatic natural habitat. The terrestrial habitat offset is the establishment and management of a protected Biodiversity Conservancy in the Neno District connected to the northern boundary of Majete Wildlife Reserve running alongside the Shire River between the regulating dam and the main dam (Figure 11). This is a like-for-like offset and the gains for the natural woodland habitats will be delivered by enhancing remaining patches of natural habitat and allowing woodland habitat to restore where it has previously been cleared. Gains for Temminck's Pangolin will be achieved through protection and restoration of suitable habitat in the Conservancy and gains will be monitored using habitat as a proxy, as well as Pangolin specific monitoring outlined in the Biodiversity Monitoring and Evaluation Plan (BMEP). The Conservancy is planned to have an education centre to raise awareness about biodiversity conservation (to the public and within schools) and have a significant community engagement and activity programme to ensure benefit-sharing and employment opportunities to the surrounding communities, which will help create a sustainable Conservancy in the long term.

The aquatic offset focuses on the Elephant Marsh Ramsar site, supporting the development of a Community Conservation Area (CCA) (within the framework of the Elephant Marsh Integrated Management Plan (Government of Malawi 2024)) to deliver protection and gains to wetland habitat. Gains for species including the Hippopotamus, African Skimmer, African Openbill and Zambezi Flapshell Turtle will be achieved through the conservation activities in the Elephant Marsh, with habitat acting as a proxy, alongside species specific monitoring outlined in the BMEP. Due the lack of feasible offset options for like-for-like river habitat in the wider Project

landscape, the aquatic offset in the Elephant Marsh uses the “like for like or better” principle⁵. The Elephant Marsh is a known area of high biodiversity, is a national priority and has an existing Management Plan (Government of Malawi 2024) (currently in draft to be finalised September 2024). Key stakeholders (e.g. relevant government agencies, lenders and NGOs) have voiced support for the “like for better” aspect of this offset during additional feasibility consultation in July and August 2024.

Through a series of stakeholder meetings and consultation in 2023 and 2024 the components of this Offset Strategy have received preliminary endorsement from key government departments, Project partners, lenders and NGOs in Malawi. Further engagement is required, particularly with communities in the Elephant Marsh and around the Biodiversity Conservancy area, to ensure transparency and input into detailed offset design.

Establishing conservation programmes is challenging in any environment and biodiversity offsets are no different. The two offsets planned for MHPP are complex and involve multiple conservation actions with numerous stakeholders over a long period of time. The Offset Strategy draws on years of experience (including from previous phases of Project design) to mitigate risks during the finalisation of offset design and implementation. Key risk mitigation components to the strategy include:

- Establishment of clear governance and management mechanisms to oversee final offset design and implementation;
- Institutional capacity building to enable offset oversight and implementation; and
- Realistic estimates of offset costs and long-term funding approaches.

⁵ GN23 (IFC 2019) The principle of “like-for-like or better” indicates that biodiversity offsets must be designed to conserve the same biodiversity values that are being impacted by the project (an “in-kind” offset). In certain situations, however, areas of biodiversity to be impacted by the project may be neither a national nor a local priority, and there may be other areas of biodiversity with like values that are a higher priority for conservation and sustainable use and under imminent threat or need of protection or effective management. In these situations, it may be appropriate to consider an “out-of-kind” offset that involves “trading up” (i.e., where the offset targets biodiversity of higher priority than that affected by the project) that will, for critical habitats, meet the requirements of paragraph 17 of this Performance Standard.

| Type | Aquatic | Terrestrial | | |
|--------------------------------|---|--|--|--|
| Impacted feature | Aquatic natural (degraded) habitat (Shire River and tributaries) | Terrestrial natural habitat (Miombo, Riparian and Undifferentiated woodland) | Birds CH species: White-backed and White-headed Vultures SC species: Hooded and Lappet-faced Vulture, Martial Eagle, Bateleur | Mammals CH species: Black Rhinoceros SC species: Cheetah, Giraffe, Elephant, Wild Dog, Lion, Leopard |
| No significant residual impact | CH Species: African Skimmer, African Openbill, Zambezi Flapshell Turtle SC species: Hippopotamus | SC Species: Temminck's Pangolin | | |
| Target | NNL for NH NG for CH & NNL for SC (if possible) | NNL for NH and SC species | NG for CH vultures (if needed) NNL for SC species (if possible) | NG for Black Rhino (if needed) NNL for SC species (if possible) |
| Approach | Offset: Community-based conservation management in-line with existing national Management Plan | Offset: Site-based conservation management and restoration, with education focus and community involvement | Fatality monitoring to establish significance of impacts & offset contingency planning SCAs to support vulture conservation activities in Malawi | Monitoring to ascertain if impacts occur & offset contingency planning |
| Location | Elephant Marsh Ramsar site | Biodiversity Conservancy in Neno District north of Majete Wildlife Reserve (2,000 Ha) | SCAs: National support; nest monitoring in Liwonde NP and Majete WR; anti-poisoning education around Project area | Monitoring in Majete WR; If impacts occur, actions in Majete WR and Liwonde NP |
| Gain method | Support a Community Conservation Area (CCA) to zone, manage, protect and restore wetland habitat | Acquire land through Project acquisition approach and protect via fencing. Enhance existing natural habitat and restore degraded habitat | If monitoring reveals an impact: Retrofit existing ESCOM transmission lines across flight path of vultures with equipment to reduce collision and electrocution risk | If monitoring reveals an impact: Rhino specific activities in Majete WR and Liwonde NP |

Figure 12: Overview of the Project's Offset Strategy

The actions necessary to further develop and implement the Offset Strategy are listed in Table 13 for terrestrial habitat offset actions in the Biodiversity Conservancy in the Neno District, Table 14 for aquatic offset actions in the Elephant Marsh. Actions for contingency planning are in Table 15 and SCAs are in Table 16.

Governance structures for each offset option have been proposed in the Offset Strategy, setting out how MHPL could interact with implementing partners, communities and government (TBC 2024d). Oversight of the overall Offset Programme (which includes all offset sites and activities) will be carried out by MHPL (with support by the PIU). The programme will involve multiple partners and stakeholders, and multiple land use classifications. Therefore, it is essential that the roles and responsibilities of each stakeholder are clearly established, and that all operational, logistical and financial responsibilities are clear to all. Figure 13 provides an overview of the proposed oversight structure of the Offset Programme. The oversight role includes authorizing/approving annual work plans and budgets, ensuring the quality of activities undertaken in the field, maintaining relations between the various stakeholders and the guarantee of transparent financial management. The structure includes independent offset expertise, MHPL and the PIU, and the implementing partners for each offset option. The roles and responsibilities of each stakeholder are detailed in the Offset Strategy.

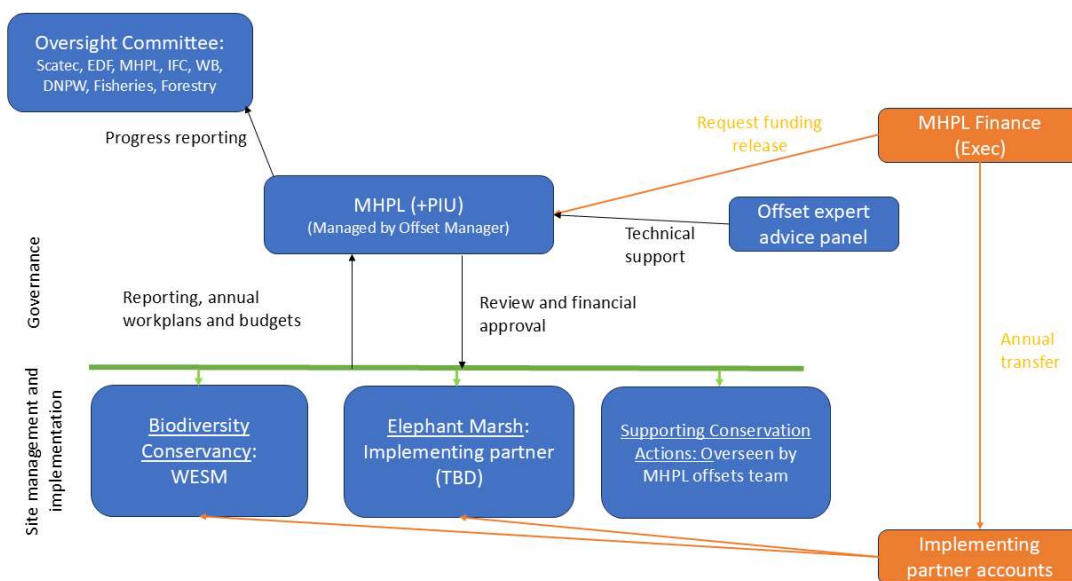


Figure 13 Offset programme oversight structure.

It is currently estimated that the offset programmes and supporting conservation action costs over the lifespan of the Project are \$14,000,000⁶ USD (24,038,280,000 MWK) and are detailed in

⁶ When reporting overall offset costs, the figure is rounded up to the nearest reasonable round number. This is because offset costs are estimates and likely to change based on better knowledge over the lifetime of the Project.

the Offset Strategy (TBC 2024d). This equates to an average annual cost of around \$400,000 USD (686,808,000 MWK). Cost estimates for the Biodiversity Conservancy are based on costs from the Majete Wildlife Reserve 5-year Management Plan, known protected area management costs and offset costs elsewhere, and estimates of the levels and costs of external technical support necessary to deliver not just a functioning protected area but also an offset delivering net gains in biodiversity. Cost Estimates for the Elephant Marsh are based on the most recent draft of the Elephant Marsh Management Plan (Government of Malawi 2024) and discussions with SVTP (Shire Valley Transformation Project) on the costs of setting up the first CCA in Elephant Marsh. These are guideline figures only that will be re-assessed with implementing partners during the set-up period.

7.1 Terrestrial natural habitat

7.1.1 Biodiversity Conservancy in Neno District

This offset is to protect, manage and restore a parcel of land as a Biodiversity Conservancy. The land is adjacent to the regulating dam reservoir from the Regulating Dam (and the northern boundary of Majete) up to the Main Dam (Figure 11) in the Neno District. This area will be acquired by the Project (through the RAP process) and protected with a fence, therefore acting as a mitigation measure to avoid impacts of Project-induced influx as described in section 5.5.2.2. The area will serve as part mitigation (avoidance of impacts from influx) and part offset (generating gains from being protected and managed in the long term).. The Conservancy will provide an additional layer of protection to Majete Wildlife Reserve along the northeastern boundary from potential impacts from Project-induced influx such as illegal logging and poaching. The Conservancy boundary is designed to minimise impacts to communities , to avoid physical displacement where possible, while integrating some areas of identified contiguous remaining natural woodland and tributaries.

Gains for terrestrial natural habitat will be made via the enhancement of existing areas of natural habitat and passive restoration of modified habitat. The Resettlement Action Plan (RAP) team have undertaken initial engagement with land owners in the draft Conservancy boundary. Project disclosure meetings with district authorities, village leaders and community members in July 2024 presented the concept for the Conservancy. Initial consultation with landowners and communities in the Conservancy area was undertaken in September 2024, and no objections were raised at that time. Since portions of the Conservancy area are required for the regulating dam, the process of land acquisition will be done as part of the Main Works RAP, currently scheduled to commence in Q2 of 2025. More detailed landowner engagement was not undertaken in advance of the RAP to avoid raising expectations and land speculation. Additional work to assess social feasibility of the Conservancy was undertaken by MHPL and the RAP consultant (SLR Consulting) in December 2024 and Q1 of 2025 (SLR Consulting 2025). Meetings were conducted with local traditional authorities and the Nkhwali community potentially affected by the creation of the Conservancy area. A total of 6 meetings were conducted, with 37 respondents made up of 68% men and 32% women. The study found that the Nkhwali community and local governments (District, TA, GVH and VH) are supportive of the Neno Conservancy, and the offset is feasible from a social perspective. The stakeholders were clear

that they will require to benefit from the Conservancy and requested regular and continued engagement from MHPL on the development of the offset. The acquisition of the land for the Neno Conservancy is a Project land requirement, as such its' impacts on communities will be addressed, compensated and mitigated as part of main works Resettlement Action Plan.

The land needed for the Project will be acquired by the Government and they will retain the ownership of the lands and grant the land rights to MHPL. The Project's Resettlement Policy Framework (RPF) (SLR Consulting 2024d) describes the approach for land acquisition for the entire Mpatamanga Project, which includes the land required to create the Biodiversity Conservancy. For the Conservancy, the principles will be the same as for the Main Works: exclusive rights to access and use for the term of the Power Purchase Agreement (PPA) (in the case of this Project, 30 years). The exclusive rights to access and use of the land are important for MHPL to have full control and management over the Conservancy to achieve the biodiversity gains required. At the end of the PPA, the MHPL land rights are dissolved, and ownership of the land is retained by the Government. It is unclear at this time how the Conservancy will be managed at the end of the PPA. This will need careful consideration in the offset exit strategy which will be developed as part of the Conservancy Management Plan with the offset partners and agreements from the relevant Government departments. Possibilities (non-exhaustive list) for the land management post PPA include:

- Responsibility of the Conservancy be transferred to the DNPW, with gazettelement as a separate Wildlife Reserve or National Park;
- Retention of management by MHPL;
- Incorporation of the area into the Majete Wildlife Reserve boundary;
- EGENCO retain the area with management responsibilities remaining with the implementing partner.

The main goal for the ongoing land management is to support long-term sustainability of the area for biodiversity protection and an important education resource in Malawi.

It is recommended that the Conservancy obtain the legal status of a private wildlife ranch⁷, as this seems to be most relevant to this particular situation. The requirements for such a designation are set out in the National Park and Wildlife (Wildlife Ranching) Regulations, 2018, in the National Parks and Wildlife Act, 2020 (CAP.66:07). A permit to manage an area of land as a wildlife ranch is required, purchased from the Government (DNPW). This legal designation is considered to be the preferred option but will need to be agreed with stakeholders and the relevant authorisations obtained.

Local community participation in protected areas is essential for the sustainability of biodiversity conservation and should be part of any newly created area in Malawi. Although it is currently recommended that the legal status of the Conservancy is a wildlife ranch rather than a legally

⁷ A "wildlife ranch" is described as a managed area of land harbouring wildlife roaming freely in such an area but does not include a zoo" in the National Parks and Wildlife Act, 2020.

protected area, the Conservancy will be developed to have a strong community element with local communities actively involved in conservation efforts. This will include investigation into a benefits-sharing mechanism to ensure benefits derived from wildlife conservation (e.g. tourism) are shared with local communities, which in turn incentivizes community involvement. Capacity-building initiatives including training in wildlife management and sustainable practices will be developed to support effective participation and employment opportunities, including involvement in biodiversity monitoring programs.

Three phases are set out with actions to deliver; 1. feasibility confirmation, 2. offset set up and 3. implementation, that align with key milestones in the Project timeline. Project construction is expected to extend over 54 months. Early Works (for the upgrade of the S137 road) and the Main Works, which includes the land acquisition and fencing of the Conservancy, are planned to start post financial close in March 2026. To be included in the Resettlement Action Plan (RAP) for the Main Works (set to begin in April 2025), the creation of the Biodiversity Conservancy will need to be approved by the relevant stakeholders, and the boundary of the area needs to be defined and agreed. The Main Works RAP will begin with desk top analysis, and then the on-the-ground census will start shortly after; therefore, the Project requires the approval and defined boundary of the Conservancy prior to the start of the Main Works RAP. The feasibility confirmation phase sets out to achieve this. The set-up phase actions are planned to be undertaken in Q2 2025– June 2026 prior to the Main Works construction (starting in Q3 2026). This includes completing the RAP, fencing the Conservancy area (once the RAP is completed), and developing the detailed 5-year Conservancy Management Plan. The Implementation Phase is planned start around the same time as the Main Works construction, once the set-up phase tasks are completed (currently planned for post July 2026). The Implementation Phase will last for approximately 35 years (4.5 months of construction and 30 years of the PPA).

Table 13: Offset actions for the Biodiversity Conservancy (Neno District)

| Offset: ID, measure and outline of action required | | Applicability | Timeframe | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|---|---|---------------|---|-----------|---|--|
| Actions to avoid and minimize impacts to terrestrial natural habitat | | | | | | |
| BCA1 | Feasibility confirmation phase | Construction | Development Phase | One-off | MHPL (with support from specialist consultant) | Minutes of meetings with gov to understand legal designation process Complete registration for Conservancy Signed agreements with relevant parties Confirmed Conservancy boundary shapefile |
| | <p>1. Agree legal designation of Conservancy with relevant stakeholders – MHPL to understand what is required to gain approval for the Biodiversity Conservancy by all relevant stakeholders.</p> <p>2. Finalise the boundary of the Conservancy area (requires ground truthing of topography and community engagement on important social boundaries):</p> <ul style="list-style-type: none"> • Ground truth the topography of the boundary to ensure it is possible to fence the entire area. (This was undertaken in December 2024 by MHPL using satellite imagery and no topographic obstacle was identified). • Investigate any social/community barriers along the proposed boundary of the Conservancy. (This was undertaken in December 2024 by MHPL and SLR Consulting. No social/community barriers along the boundary were identified (SLR Consulting 2025). • Finalise and confirm the Conservancy boundary based on engagement with communities and physical ground truthing. <p>3. Engage with local government and communities to seek opinion and support (carry out an initial assessment of community involvement and livelihoods resulting from the Conservancy with the Village of Nkhwali and other surrounding communities) . This action was carried out by the RAP team/MHPL social and environment team in December 2024 and Q1 of 2025. The main finding was that the Nkhwali community and local governments (District, TA, GVH and VH) are supportive of the development of the Conservancy with the condition they benefit from the Conservancy and MHPL continues to conduct regular engagements with the community. The Conservancy offset is feasible from a social perspective (SLR Consulting 2025). MHPL will ensure transparent and regular engagement with this community to maintain that feasibility.</p> <p>4. Agree on roles and responsibilities with Conservancy stakeholders: (e.g. MHPL, Forestry Dept, DNPW, WESM, Majete Reserve management).</p> <p>5. Identify and confirm the implementing partners’ role and involvement (e.g. further engagement with WESM on their potential role as the implementing partner).</p> <p>6. Agree Conservancy designation post PPA (to support exit strategy):</p> <ul style="list-style-type: none"> • Understand and agree the legal designation of the Conservancy for the duration of the PPA with DNPW (e.g. a wildlife ranch or other). • Investigate and agree what will happen to the Conservancy at the end of the PPA – how it will be managed and by whom. A recommendation is made in the Offset Strategy (TBC 2024d) but this needs to be verified with EGENCO and other stakeholders. This is important for the development of the exit strategy. | | | | | |
| BCA2 | Set up phase: Land acquisition | Construction | Completed prior to start of Main Works construction | One-off | RAP team and MHPL | Completed RAP and livelihoods restoration plan for affected peoples with the Conservancy area |

| | Offset: ID, measure and outline of action required | Applicability | Timeframe | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|------|---|-----------------------------|--|-----------|---|---|
| | 1. Develop Resettlement Action Plan (RAP) and livelihood restoration plan for Main Works (RAP workstream). | | | | | |
| BCA3 | Set up phase: Fence conservancy area | Construction | Completed after the Main Works RAP and financial close but prior to the start of Main Works Construction | One-off | MHPL | Invoices for fence purchase Visual inspections of fence once constructed |
| | 1. Complete purchase and importation of fencing 2. Install fencing along the terrestrial boundaries of the concession 3. Monitor functioning of electric fencing and repair when necessary | | | | | |
| BCA4 | Set up phase: management | Construction | Year 1 of construction | One-off | MHPL and implementing partner | A final Conservancy Management and implementation Plan Field reports and mapping Data from field studies Minutes of engagement A constructed education centre |
| | 1. Development of 5-year management plan and 1 year implementation plan (with refined budgets) 2. Ground truthing and inventory of natural habitat and species (refinement of achievable gains) 3. Establishment of a baseline for natural habitat quality and Pangolin 4. Establishment of community involvement 5. Recruit conservancy staff and train them: patrol staff, environmental education staff and camp support. 6. Construct an education centre, camping facilities, staff housing and perimeter fencing alongside the purchase of vehicles and equipment. | | | | | |
| BCA5 | Implementation phase: Biodiversity Conservancy implementation | Construction and Operations | To begin once Set-up Phase tasks are completed | Ongoing | MHPL and implementing partner | Various means through management plan |

| Offset: ID, measure and outline of action required | Applicability | Timeframe | Frequency | Responsibility for ensuring action is implemented | Means of verification | |
|--|--|-----------------------------|---|---|---------------------------------------|---------------------------|
| | <ol style="list-style-type: none"> 1. Implement the Biodiversity Conservancy management plan. 2. Implementing partner to provide bi-annual progress reports and annual reports to the Executive Committee to track implementation progress. 3. Engage an expert offset advisor/s will be engaged on an annual basis (and ad-hoc if required) to review implementation progress and monitoring outcomes of the Biodiversity Conservancy and make recommendations to MHPL on how to improve offset outcomes for terrestrial habitat. 4. Periodic (e.g. every 5 years) of the Management Plan should be undertaken and updates made to reflect changing objectives and activities which may be required to deliver the necessary gains for the project. | | | | | |
| BCA6 | Monitoring and adaptive management to achieve offset targets | Construction and operations | From year three until end of operations | Ongoing | Implementing partner overseen by MHPL | Annual monitoring reports |
| | <ol style="list-style-type: none"> 1. Develop site-specific monitoring and evaluation indicators that align with the overarching BMEP for the Biodiversity Conservancy to track (i) the implementation of management actions (response indicators); (ii) instances of anthropogenic pressure in the conservancy (pressure indicators), and (iii) a. changes in terrestrial habitat quality b. social outcomes (status state indicators). Key response and pressure (and if appropriate state) indicators will have thresholds associated with them to trigger an adaptive management response if targets are not met. 2. Undertake monitoring and evaluation in accordance with the BMEP and site-specific indicators and provide annual monitoring reports to the oversight committee, with the results for each indicator. If monitoring detects that any threshold has been crossed without appropriate adaptive management being put in place, it will be raised immediately with the proposed Implementing partner to undertake an assessment and appropriate adaptive management action. | | | | | |

7.2 Aquatic natural (degraded) habitat

7.2.1 Elephant Marsh

The Elephant Marsh is a wetland that lies on the flood plains of the Lower Shire Valley, water levels in the Elephant Marsh are dependent on the hydrology of the upstream Shire Valley and its source, Lake Malawi. The proposed approach to deliver gains for aquatic habitat within the Elephant Marsh is to support the development and management of a Community Conservation Area (CCA) within the marsh. There is a current draft management plan for Elephant Marsh which is planned to be validated and operational in July 2024 (Government of Malawi 2024). This management plan sets out the approach of creating CCAs within the Marsh which overlap with sites of high biodiversity, and which will be managed with a focus on conservation. For the offset, a CCA would be created which overlaps with an identified biodiversity hotspot. This CCA would then be managed for conservation purposes (in alignment with the general Elephant Marsh management plan) and would generate restoration gains for aquatic habitat via activities such as clearing of invasive species, reducing harmful human practices and promoting sustainable land use planning to prevent further degradation of aquatic habitat. Details of this offset are set out in the Offset Strategy (TBC 2024d).

Three phases are set out with actions to support 1. feasibility confirmation, 2. offset set up and 3. implementation, that align with key milestones in the Project timeline. The feasibility confirmation phase is estimated to take around a year and is focused on identifying an appropriate CCA within the Elephant Marsh, engagement with relevant communities and finding the right implementing partner to manage the offset activities, with signed agreements in place. Once the confirmation study goals are achieved, the set-up phase will be focused on the creation of the CCA using the guidance developed by the GoM (Government of Malawi 2021), developing the Elephant Marsh Offset Management Plan and creating the ecological baseline. The implementation phase will then begin with implementation of the CCA activities and monitoring of habitats and species to track the biodiversity gains. The milestones for the Elephant Marsh offset are not specifically linked to the Project schedule (as for the Biodiversity Conservancy). They are more an indication of duration in order to progress with the offset in a timely fashion.

Although the Offset Feasibility Study (TBC 2024f) found the Elephant Marsh to be feasible, it is not without potential challenges (e.g. finding an appropriate implementing partners and the complexity of the governance of the Elephant Marsh) (for more details see the Offset Strategy (TBC 2024d). There is the potential for an offset to be deemed to be unfeasible later in the development process, for example during the confirmation phase. If this happens, then other

offset options will be revisited. In the case that there are no feasible options for offsetting aquatic natural habitat⁸, an appropriate procedure will need to be defined.

⁸ For areas of natural habitat, Paragraph 8 of the IFC PS6 Guidance Note states: "Mitigation measures will be designed to achieve no net loss of biodiversity where feasible...". No guidance is provided on the course of action when there is no feasible option.

Table 14: Offset actions for the Elephant Marsh.

| | Offset: ID, measure and outline of action required | Applicability | Timeframe | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|------|--|---------------|-----------------------------------|-----------|---|---|
| EMA1 | Confirm offset option with stakeholders | Construction | November 2024 | One-off | MHPL (via specialist consultant) | Minutes of meeting |
| | 1. Present the proposed offset to stakeholders (e.g. Project lenders) to gain buy-in that: 1. the gain contributions arising from the Elephant Marsh constitute a “like for better” exchange as the Elephant Marsh is part of a Ramsar site and therefore of higher conservation value than the Shire River habitat impacted. 2. The gains created would equal or exceed the offset target for aquatic habitat. | | | | | |
| EMA2 | Feasibility confirmation study | Construction | Construction period (year 1) | One-off | MHPL (via specialist consultant) | Feasibility confirmation study report |
| | 1. Undertake a feasibility confirmation study to: <ul style="list-style-type: none"> • Mapping of potential CCA locations and sizes (with DNPW and SVTP) • Selection of a potential CCA to support • Engagement with community members to assess willingness to participate. • Assessment of threats within the potential CCA • Clarification on land-tenure in the potential CCA • Proposal of a process for negotiation with communities and the need for independent mediators during community engagement/negotiation. 2. Assessment of gains from the selected CCA (to confirm size of CCA needed) | | | | | |
| EMA3 | Identify a suitable Implementing partner and build capacity | Construction | Construction period (years 1 & 2) | One-off | MHPL | Minutes of meetings Signed MoU |
| | 1. Identify a suitable implementing partner to deliver the offset in the Elephant Marsh. (Efforts to find a partner by MHPL are ongoing and an initial list of potential partners has been drafted – see the Offset Strategy). 2. Develop an MoU between MHPL and Implementing partner to outline the agreement between to the two organisations (including roles and responsibilities) and how they will engage to implement the Elephant Marsh offset. 3. Assess the implementing partner capacity gaps and develop and implement a recruitment plan to ensure that there is sufficient capacity to implement and monitor the offset in the Elephant Marsh. (At least a Project Manager, and field technicians likely need to be recruited.) | | | | | |
| EMA4 | Set-up phase: Create Community Conservation Area | Construction | Construction period (years 2 & 3) | One-off | Implementing partner | Management plan GIS shapefiles of demarcated CCA |

| | Offset: ID, measure and outline of action required | Applicability | Timeframe | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|------|---|-----------------------------|--|-----------|---|--------------------------------|
| | <p>1. Based on results of the feasibility confirmation study, follow the process for creating a community conservation area as defined by the Department of National Parks and Wildlife, as follows:</p> <ul style="list-style-type: none"> • Stakeholder mapping, awareness raising and engagement • Definition of the CCA boundary (mapping and zonation) • Management plan development: 5-year management plan including development of an exit strategy • Registration and declaration of the CCA <p>2. Ground-truthing and inventory of natural habitat and species</p> <p>3. Establishment of a baseline for habitat quality and species</p> | | | | | |
| EMA5 | Elephant Marsh Offset implementation | Operations | Year 4 onwards | Ongoing | Implementing partner overseen by MHPL | Annual and semi-annual reports |
| | <p>1. The CCA management plan will be implemented by local communities with significant technical support and oversight provided by Implementing partner. Bi-annual progress reports and annual reports will be provided to the Executive Committee to track implementation progress. The expert offset advisor/s will be engaged on an annual basis (and ad-hoc if required) to review implementation progress and monitoring outcomes of the Biodiversity Conservancy. They will make recommendations to MHPL on how to improve offset outcomes for aquatic natural habitat.</p> | | | | | |
| EMA6 | Monitoring and adaptive management to achieve offset targets | Construction and operations | From year four until end of operations | Ongoing | Implementing partner overseen by MHPL | Annual monitoring reports |
| | <p>1. An overarching Biodiversity Monitoring and Evaluation Plan (BMEP) will be developed to track losses (impacts) and gains (offsets) (TBC 2024a). Site-specific monitoring and evaluation indicators that align with the overarching BMEP will be developed for the Elephant Marsh CCA (i) the implementation of management actions (response indicators); (ii) Number of anthropogenic actions in the integrally protected zone (pressure indicators), and (iii) changes in quality of aquatic and riparian habitat (status state indicators). Key response and pressure (and if appropriate state) indicators will have thresholds associated with them to trigger an adaptive management response if targets are not met.</p> <p>2. Monitoring and evaluation will be undertaken in accordance with the BMEP and site-specific indicators. Annual monitoring reports will be provided to the executive committee, with the results for each indicator. If monitoring detects that any threshold has been crossed without appropriate adaptive management being put in place, it will be raised immediately with the implementing partner to undertake an assessment and appropriate adaptive management action.</p> | | | | | |

7.3 Offset contingency plans

An offset contingency plan for both the Black Rhinoceros and the two critical habitat-qualifying vultures (White-Backed Vulture and White-headed Vulture) is required to manage biodiversity risk around these species.

The residual impacts for the vultures are predicted to be very low (TBC 2024c), therefore the Project as opted to focus on detailed fatality monitoring along the two Project transmission lines (TBC 2024a), and develop a contingency plan for offsets in the event of monitoring showing significant levels of mortality to either species. The offset contingency plan for vultures will present potential offset options if the vulture fatality monitoring planned for the Project transmission lines show a significant impact to the either of the CH vultures. Specific thresholds to trigger the contingency plan will be developed in the BMEP (TBC 2024a). Scenarios of net gain targets will be included in the contingency plan. Potential offset actions for vultures include retrofitting existing ESCOM transmission lines located within the known flight path of White-backed vultures with anti-collision and/or anti-electrocution devices. Development of this plan will include consultation with vulture experts and key stakeholders in Malawi (e.g. DNPW, LWT, EWT and ESCOM) to ensure that recommended offsets are both technically and institutionally feasible. The contingency plan will contain a set of actions to implement proposed offsets with an estimated budget.

The offset contingency plan for Black Rhinoceros will present potential offset options if the monitoring within Majete WR shows a significant impact and can be directly attributed to the Project⁹. Specific thresholds from monitoring data to trigger the contingency plan have been developed in the BMEP¹⁰ (TBC 2024e). Potential offsets for Black Rhinoceros include actions within Majete Wildlife Reserve and Liwonde National Park (which also contains a population of Black Rhinos). Development of this plan will include consultation with Black Rhino experts and key stakeholders in Malawi (e.g. DNPW and Majete and Liwonde management) to ensure that recommended offsets are both technically and socially feasible. The contingency plan will contain a set of actions to implement proposed offsets with an estimated budget and scenarios of net gain targets will be included.

In the event of a Black Rhino fatality, there may be significant reputational consequences for MHPL, project partners and lenders. The plan will include steps to investigate the circumstances of the event and whether the Project is liable for the impact, and to minimise negative reputational impacts from such an event.

⁹ For a contingency plan to be initiated in the event of a poaching incident of a Black rhino, an independent investigation would need to demonstrate the Project is liable. From a legal perspective, it cannot be assumed the Project will take liability.

¹⁰ Note that Majete Management will not directly share actual population figures for Black Rhino due to security risks, but information on populations trends will be used to inform the evaluation indicators, and the Project will be alerted if there is a fatality.

Table 15: Contingency plan actions for Vulture and Black Rhinoceros

| Offset: ID, measure and outline of action required | | Applicability | Timeframe | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|---|----------------------------------|-----------------------------|--|-----------|---|--|
| CP1 | Contingency plan for Vultures | Operations | To be in place for when transmission lines are constructed | One off | MHPL | Offset contingency plan for Vultures is available |
| <p>Develop an offset contingency plan for White-headed and White-backed Vultures. Key actions are:</p> <ol style="list-style-type: none"> 1. Identify a specialist consultant to develop the plan and ensure input from African vulture experts and relevant Malawi stakeholders (e.g. DNPW, LWT, EWT and ESCOM). The plan should be developed in the construction phase and in place prior to the completion of the constructed transmission lines. 2. Include potential offset options (including a feasibility study) and scenarios of net gain targets, a set of actions to implement proposed offsets and an estimated budget. 3. Regularly check the vulture fatality monitoring results (monthly) from the transmission lines to know if specific thresholds to trigger the contingency plan developed in the BMEP (TBC 2024a) are met. | | | | | | |
| Offset: ID, measure and outline of action required | | Applicability | Timeframe | Frequency | Responsibility for ensuring action is implemented | Means of verification |
| CP2 | Contingency plan for Black Rhino | Construction and Operations | To be in place prior to construction of Main Works | One off | MHPL | Offset contingency plan for Black Rhino is available |
| <p>Develop an offset contingency plan for Black Rhino. Key actions are:</p> <ol style="list-style-type: none"> 1. Identify a specialist consultant to develop the plan and ensure input from Black Rhinoceros experts and relevant Malawi stakeholders (e.g. DNPW, Majete and Liwonde management). The plan should be developed prior to the Main Works construction commencing. 2. Include potential offset options (actions within Majete Wildlife Reserve and Liwonde National Park) and a set of actions to implement proposed offsets and an estimated budget. 3. Regularly check the Black Rhino specific monitoring results in Majete Wildlife Reserve (monthly) to know if specific thresholds to trigger the contingency plan developed in the BMEP (TBC 2024a) are met (detail of information shared on Black Rhino at the discretion of the Majete management). | | | | | | |

7.4 Supporting conservation actions

A suite of SCAs has been designed to provide contribution to a net gain outcome and support ongoing vulture conservation efforts in Malawi. Five SCAs are proposed, all of which are considered cost effective options that maximise conservation outcomes and the Project's profile with stakeholders. The actions have been developed with engagement with MEPA, DNPW, MUST, the National Red List Working Group, the Lilongwe Wildlife Trust (LWT), Endangered Wildlife Trust (EWT), and African Parks, who are all involved in vulture conservation and research in Malawi. These groups are currently developing a Malawi Vulture Action Plan, and these actions are in alignment with the draft document. SCA6 is a conservation action to support capacity building and research in biodiversity conservation within Malawi. These SCAs are detailed in the Project's Offset Strategy (TBC 2024d).

Table 16: SCAs for vultures and biodiversity conservation research

| Offset: ID, measure and outline of action required | | Applicability | Timeframe | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|--|--|---------------|---|-----------|---|---|
| SCA1 | Red List workshop for Malawi Vultures | Construction | Post financial close (within year 1 of construction) | One off | MHPL | Output reports on the national Red List Assessments for at least 4 vulture species (also potentially the pangolin and other birds of prey). |
| | <p>Complete a national Red List assessment for Malawi Vultures (and potentially several other species important to the Project) through a focused Red List Workshop with relevant stakeholders and experts present. Key actions are:</p> <ol style="list-style-type: none"> 1. Agree the species which will be included in the workshop with the National Red List Working Group (key contact: Tiwonge Gawa). The Working Group have a set of priority species to assess for the National Red List – so ensure timely communication with the group so they know when this specific workshop is likely to take place (e.g. when there will be funds available). Species include White-backed, White-headed, Hooded and Lappet-faced Vulture, and potentially additional threatened raptor species and the Temminck's Pangolin. 2. Engage with stakeholders/identified experts to organise the logistics of the workshop in a timely manner: date, time, accommodations, travel arrangements, no. of days, agenda. The offset strategy (TBC 2024d) lists recommended stakeholders to be included in the workshop. 3. Arrange for the draft assessments for each species to be compiled with available information in advance of the workshop: This work is to be carried out by an MSc student from Malawi University of Science and Technology (MUST) supporting the National Red List Working Group. Lilongwe Wildlife Trust (LWT) has agreed in principle to provide a three-month internship for the student to undertake this work (data gathering and inputting in into draft species assessments in Word documents). 4. The species will then be collectively assessed under national IUCN Red List Criteria at the workshop. Once finalised, the Red List Assessments will be sent to the IUCN Red List Unit for verification. 5. Consider the opportunity to share results of the Red List workshop on social media. | | | | | |
| SCA2 | Support to developing the Malawi Vulture Action Plan | Construction | Post financial close (within year 1 of construction) | One off | MHPL | A published Vulture Action Plan with specific actions to conserve vultures in Malawi (Word document) |
| | <p>Contribute to the MVAP development. Actions include:</p> <ol style="list-style-type: none"> 1. MHPL to provide funding to EWT and LWT to hold a workshop to progress the MVAP. 2. MHPL to follow up post workshop with minutes and progress in finalising and publishing the action plan. | | | | | |

| Offset: ID, measure and outline of action required | | Applicability | Timeframe | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|--|---|-----------------------------|--|--|--|---|
| SCA3 | Monitoring vulture nests across Lengwe, Liwonde and Majete by helicopter | Construction and Operations | 20 years | Once every five years (starting in year 1 of construction) | MHPL | Monitoring reports |
| <p>1. Identify the costs and logistics of hiring a helicopter and pilot for the planned surveys and the necessary permits needed.</p> <p>2. Engage with LWT, EWT and African Parks to establish who will conduct the surveys, and how the data will be stored and managed.</p> <p>3. Facilitate data sharing amongst all relevant stakeholders with potential to conduct research using the data that will have conservation benefits for the vultures in the region.</p> <p>4. Ensure data is fed into Project monitoring plan (see BMEP for state indicator monitoring of vultures).</p> | | | | | | |
| SCA4 | Support for tagging and tracking vultures between Majete/Liwonde and Lengwe NP | Construction and Operations | Throughout project life span | Contribute tags every x years | MHPL | Number of tags purchased for LWT Reports generated from tagging data |
| <p>1. Engage with LWT to identify suitable tagging technology purchases and definitively set a budget and timeline for when and how many tags will be purchased (see budget for estimated costs in Offset Strategy).</p> <p>2. MHPL will facilitate communication and data sharing between stakeholders who could make positive use of the data acquired (such as MUST, NGO's, the Government).</p> | | | | | | |
| SCA5 | Anti-poisoning workshops around Majete WR with communities (in collaboration with DNPW) | Construction and Operations | Throughout offset lifespan | 6 workshops total, every 5 years | MHPL, DNPW | Number of workshops successfully conducted |
| <p>1. MHPL will engage with workshop provider (recommended EWT and DNPW) to design the workshop content and format.</p> <p>2. MHPL will communicate with relevant community groups (schools, village chiefs etc) around the Project area to support the delivery of the workshops. MHPL employees will also receive the training.</p> <p>3. Workshops will be organised every 5 years.</p> | | | | | | |
| SCA6 | Funded biodiversity MSc Research Programme | Construction and Operations | First ten years starting in year 1 of construction | Every year for ten years | MHPL and Malawi University of Science and Technology | Publications/manuscripts from student recipients |
| <p>The Project will fund an MSc research grant programme to support two biodiversity students a year doing the MSc in Biodiversity Informatics course at the Malawi University of Science and Technology (MUST), with a conservation-focused research project as part of their degree. Actions include:</p> <p>1. Develop an MoU between MHPL and MUST to outline the agreed activities between to the two organisations (including roles and responsibilities) and how they will engage to support the MSc research programme.</p> <p>2. MUST to identify and oversee students who are recipients of the grant received from the Project (there is an existing mechanism within MUST to identify the recipient students).</p> | | | | | | |

| Offset: ID, measure and outline of action required | Applicability | Timeframe | Frequency | Responsibility for ensuring action is implemented | Means of verification |
|--|--|-----------|-----------|---|-----------------------|
| | <p>3. MHPL and MUST will agree on research project topics from which the students can choose (example project topics included in the Offset Strategy).</p> <p>4. MUST to provide the Project with manuscripts and publications produced by students who were recipients of financing from the Project.</p> | | | | |

7.5 Next steps

Through a series of meetings with project partners and stakeholders, the components of the Offset Strategy have received preliminary endorsement from key government and NGO stakeholders in Malawi. The next steps will be to undertake the feasibility confirmation studies to further understand the willingness of communities to engage with the terrestrial offsets and refine the scale of potential gains. Relationships will then need to be developed with potential implementing partners who will be responsible for offset implementation under the oversight of MHPL.

The following actions are recommended to progress develop the Offset Programme:

- **MHPL to hire an experienced Biodiversity Offset Manager:** To oversee development and implementation of the offsets and SCAs. MHPL will require adequate staffing to oversee and manage the Offset Programme. Ideally this position will be hired within Q2 2025.
 - **Responsibility:** MHPL to develop job description and hire the Offset Manager.
- **Establish offset oversight structure:** MHPL should start identifying individuals who can play the different roles in the proposed offset oversight structure and enter into discussions and agreements with them. Frequency of meetings and site visits should also be decided so that experts can familiarise themselves with the local biodiversity context and the Offset Strategy.
 - **Responsibility:** MHPL to identify individuals and establish the governance structures (Offset Manager position).
- **Establish agreements with relevant government departments:** The Project will require specific agreements with different government agencies for offset implementation. For example, legally binding agreements will be required with Department of National Parks and Wildlife (DNPW) and the Forestry Department for the Neno Biodiversity Conservancy and with DNPW and the Fisheries Department for the Elephant Marsh offset. Agreements will need to outline the roles and responsibilities between the parties for establishment and management of the offsets during MHPL's ownership of the Project and the planned exit strategy (see below).
 - **Responsibility:** MHPL to identify where agreements are needed for the offsets and SCAs and get them in place (Offset Manager position).
- **Complete feasibility confirmation actions (within the recommended timeframes):** The confirmation actions are required to clarify how each offset will be established and ensure that the required approvals and information is attained in line with key Project milestones.
 - **Responsibility:** MHPL (with the support of external consultants if needed).
- **Development of offset management and implementation plans with refined budgets:** An overarching offset management and implementation plan (managed by MHPL) will provide a logical framework of the actions required to manage each offset area and the SCAs. There will need to be a separate "on the ground" management and implementation

plan and budget for each offset site, and these plans should be developed in close collaboration with (or if possible, by) the identified implementing partners, with input and review from communities and government partners. Approval of final development plans and budgets by Project lenders will be required.

- **Responsibility:** MHPL and the identified implementing partners for each offset site (with the support of external consultants if needed).

- **Development of impact-triggered contingency plans for Black Rhinoceros and CH vultures:** In case of the event of a Black Rhino fatality caused by the Project-induced influx, a clear contingency plan is required. If such an event did occur, it would likely have an impact on MHPL's reputation (and Project partners and lenders) and a full investigation of the causes should be launched to ensure it isn't repeated and to assuage stakeholders' concerns. A contingency plan for offsets is also required for White-backed and White-headed Vultures to be implemented if fatality monitoring surpasses risk thresholds.
 - **Responsibility:** MHPL (with the support of external consultants if needed).

- **Develop an offset exit strategy:** The MHPP (including all associated land acquired for the Project) will be handed back to the Government of Malawi (EGENCO) after 30 years of MHPL management. This includes the Offset Programme, and the land acquired for the Biodiversity Conservancy. A clear exit strategy will be needed for both offset sites to maintain the biodiversity gains. For the Elephant Marsh, the aim would be for the Community Conservation Area (CCA) to be sustainable without requiring funding from the Project (either by securing funding from elsewhere and/or the development of sustainable livelihood activities outside of the wetland area such as fishponds or tourism). For the Biodiversity Conservancy, the exit strategy would involve the responsibility of the land going back to the government to be under the care of (most likely) DNPW. Financial security would aim to be achieved through Conservancy activities. Building capacity of Offset Programme partners and implementing partners will be essential to the success of the exit strategies, therefore the Project will incorporate capacity-building objectives into offset management plans from the beginning. It will be necessary to establish a set of decision-making criteria for the timing of handover that is driven principally by the requirement to deliver on the Project's biodiversity objectives. The exit strategies for each offset will be developed in the Management Plans in collaboration with all the relevant parties, and the exit strategy will start to be implemented in year 20 of the offset to allow significant time to have the exit plans in place prior to the Government hand over.
 - **Responsibility:** MHPL and implementing partners for each offset (with the support of external consultants if needed).

8 Monitoring and evaluation strategy

The Project will use a Pressure-State-Response framework (Figure 14) to develop indicators and approaches to track losses and gains and adaptively manage mitigations and offset actions. An overarching Project monitoring approach will be developed in the Biodiversity Monitoring and Evaluation Plan (BMEP) prior to the construction phase of the Project (GMA5). A BMEP enables a project to determine the actual scale of impacts, the effectiveness of mitigation actions, and the gains generated from offsetting actions. The BMEP will include measurable metrics for each biodiversity mitigation action and ecological indicator, and will support adaptive management of mitigation and offset actions in order to achieve the overall>NNL / NG outcomes.

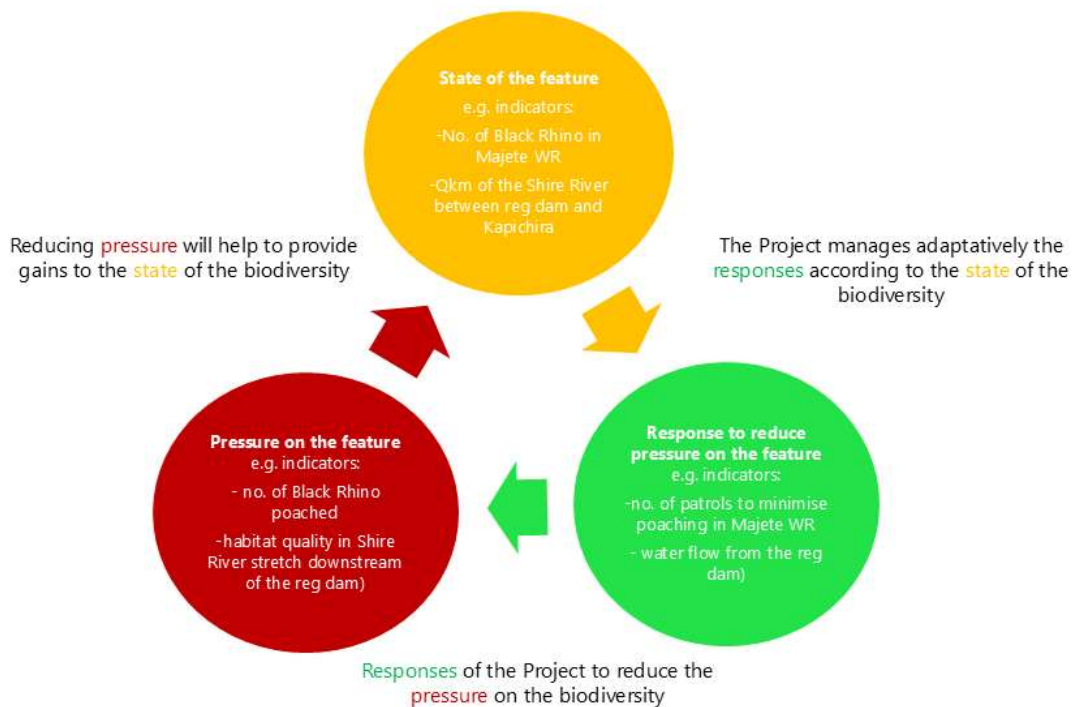


Figure 14: Pressure-State-Response framework diagram

The BMEP will capture the approach for monitoring pressure, state and response indicators within the Project area (losses) and biodiversity gains at offset sites. Specific monitoring plans will be developed as part of the BOIMP for the Biodiversity Conservancy and Elephant Marsh offset actions and will share common state indicators with the BMEP to ensure that losses and gains for priority biodiversity features can be compared.

Thresholds will be developed for key pressure and response indicators e.g. area and quality of woodland cover to trigger an adaptive management response and enable the Project to change the level of mitigation or offset effort. For example, if remote sensing data indicates that the areas of natural habitat are not regenerating at the predicted rate in the Biodiversity Conservancy, this would trigger an investigation into the causes of and, where required, increase or alter conservation actions. The potential indicators and approaches outlined in Table 17 will be elaborated in the BMEP (TBC 2024a).

Table 17: Overview of key indicators and approaches for the Biodiversity Monitoring and Evaluation Plan (BMEP)

| Priority biodiversity | Response Indicator | Pressure Indicator | Pressure Approach | State indicator | State Approach |
|---|--|--|---|---|--|
| Terrestrial natural habitat: Miombo, Riparian and Undifferentiated woodland | <p>Area of Conservancy under conservation agreements</p> <p>Fenced area of the Conservancy</p> | <p>Illegal timber harvesting in Majete WR</p> <p>Encounter rate of signs of wood harvesting in the Conservancy</p> | <p>Patrols to detect human activities</p> | <p>Area and quality of habitat restored and protected in the Biodiversity Conservancy</p> | <p>Remote sensing</p> <p>Ground surveys (in the Biodiversity Conservancy)</p> |
| Aquatic natural (degraded) habitat: Middle Shire River and Lower Middle River (excluding reservoirs) | <p>eFlow variation</p> <p>Area of Elephant Marsh under CCA agreement</p> | <p>Number of new invasive species (catch per unit effort (CPUE))</p> | <p>During fish surveys as part of ESMMP data collection</p> | <p>Habitat extent and condition</p> <p>Presence/absence of flow dependent species</p> <p>Fish and macroinvertebrate community composition</p> | <p>IHI assessment (impact areas and CCA in the Elephant Marsh)</p> <p>eDNA, periodic surveys for fish and macroinvertebrate diversity as per the ESMMP data collection</p> |
| White-backed Vulture, White-headed Vulture | <p>A contingency plan will be developed and implemented if a fatality threshold is passed</p> | <p>Number of vulture fatalities under Project transmission lines</p> | <p>Surveys for fatalities 1. along two Project transmission lines (as part of ESMMP data collection); 2. along existing ESCOM transmission lines (to support development of vulture contingency plan)</p> | <p>Number of active vultures nests in Majete WR and Liwonde NP</p> | <p>Nest surveys by helicopter in Protected areas (Majete and Liwonde)</p> |

| | | | | | |
|---|---|---|---|--|---|
| Black Rhinoceros (and other priority species in Majete Wildlife Reserve) | A contingency plan will be developed and implemented if a Black Rhino is poached as a result of the Project | Level of poaching evidence per km patrolled | Security patrols collecting data on human activities e.g. number of snares found, trees removed, animals poached. | Black Rhino population in Majete WR (and other priority mammals in Majete as possible) | Monitoring of Black Rhino numbers in Majete WR (all animals radio tracked on a daily basis) ¹¹ |
|---|---|---|---|--|---|

¹¹ As previously mentioned, exact figures of Black Rhino in Majete will not be shared, but population trend data and the event of a fatality will be.

The Project has collected extensive biodiversity data to inform mitigation actions, but ongoing monitoring will likely adopt approaches that are more efficient and effective for tracking long-term change. Monitoring priority biodiversity will align with ESMMP monitoring to avoid duplication of effort.

The indicators and approaches in the BMEP will be trialled early in the construction period to identify any gaps or other issues and as the result the BMEP will be updated. Subsequently there will be a periodic review of the biodiversity data collected, to ensure that the BMEP indicators and methods continue to provide the Project with the required data to demonstrate progress towards no net loss and net gain targets.

Evaluation of monitoring data compared to expected trends is an essential step in implementing adaptive management. An important part of evaluation is to establish thresholds that, if crossed, trigger further review and – where necessary – corrective action. Two types of thresholds will be established:

- Early warning or “orange” thresholds that suggest that mitigations/offset actions may be deviating from expected trends such that corrective action may be necessary;
- Alert or “red” thresholds that suggest significant deviation from expected trends and a comprehensive review and urgent and extensive corrective action may be required.

The budget for biodiversity specific actions in the BMEP which are not covered by the ESMMP budget (for monitoring in the Project-impacted areas) or either of the two offset budgets (for monitoring in the Conservancy or the Elephant Marsh) is an estimated cost of US\$417,500. This includes monitoring for remote sensing in the Conservancy to track gains in natural terrestrial habitat, surveys for the two critical habitat waterbirds in the Elephant Marsh, and bird fatality monitoring in existing ESCOM transmission lines to support the Vulture offset contingency plan. This budget is detailed in the BMEP (TBC 2024a).

9 BAP implementation

To implement this Biodiversity Action Plan, these next steps are required. These are set out in Table 18. An overall estimated budget for the BAP specific actions is presented in Appendix 3.

Table 18: Actions required to implement this BAP

| No. | Action | Timeline to begin activity | KPI |
|------------------------------------|---|----------------------------|---|
| 1. Management and resources | | | |
| 1.1 | Recruit Offset Manager position into the E&S team | ASAP (within Q1-Q2 2025) | Offset Manager is hired |
| 1.2 | Recruit other biodiversity specific staff positions into the E&S team | Start of early works | Biodiversity team is in place |
| 1.3 | Finalise estimated BAP budget including Offsets Programme and biodiversity specific mitigations (Majete WR actions) planning and monitoring costs | Q4 2024 | Final estimated BAP budget approved |
| 2. Offset Programme | | | |
| 2.1 | Initiate feasibility confirmation phase actions for the two offset sites which will require engagement with government and communities to clarify final feasibility of offsets (see section 7.5 for detailed actions) | Q1 2025 | To obtain agreements and approvals required to progress with offset options |
| 2.2 | Establish offset oversight committee structure | Q2 2025 | Offset oversight committee set up with individuals in place |
| 2.3 | Develop Black Rhino Offset Contingency Plan | Q4 2025 | Final plan drafted |
| 2.4 | Develop Vulture Offset Contingency Plan | Q2 2026 | Final plan drafted |
| 2.5 | Biodiversity Offset Management and Implementation Plan (overarching for MHPL) including an exit strategy for each offset site (Biodiversity Conservancy and Elephant Marsh) | Q3 2025 | Final plan drafted |
| 2.6 | Initiate implementation of Supporting Conservation Actions (post financial close) | Q2 2026 | SCAs implemented with partners |
| 2.7 | Initiate set up phase actions for the two offset sites as per detailed implementation plans in Offset Strategy (note – the Elephant Marsh feasibility phase may take longer to complete) | Q3 2025 | - |
| 2.8 | Initiate implementation phase actions for two offset sites as per detailed implementation plans in Offset Strategy | Q2 2026 | - |

| No. | Action | Timeline to begin activity | KPI |
|--|---|----------------------------|---|
| 3. Develop biodiversity management plans (including other plans with relevance to biodiversity) | | | |
| 3.1 | Biodiversity Monitoring and Evaluation Plan (finalised March 2025) | Dec 2024 | Final plans drafted. |
| 3.2 | ESMMP – Biodiversity measures for on-site ¹² (EPC contractor’s own management plan) | Q1 2026 | |
| 3.5 | ESMMP - Influx measures (MHPL) | Q1 2025 | |
| 3.6 | ESMMP - Reservoir Management measures (MHPL) | Q3 2027 | |
| 3.7 | ESMMP - Alien Invasive Species management measures (EPC contractor) | Q1 2026 | |
| 4. Biodiversity management | | | |
| 4.1 | Initiate the implementation of the mitigation measures presented in this document. | Start of early works | Tracking actions and progress with an action tracker (recommended in Excel format). Ensure the EPC contractor is aware of biodiversity measures in the ESMMP and that they will be responsible for implementing many of the actions. |
| 5. Monitoring and evaluation (and adaptive management) | | | |
| 4.1 | Initiate BMEP to enable tracking of progress towards NNL/NG targets. Collect baseline data where required If evaluation shows risk thresholds are met for any priority features, adaptive management will be triggered. | Start of early works | Annual and bi-annual reports on results of monitoring Reporting on effectiveness of mitigation measures and offset actions. An NNL/NG tracking framework |

Prior to the Project becoming operational, this BAP will be updated to incorporate the final agreed Offset Programme, pending results of the remaining confirmation studies. The BAP is a living document that will be reviewed regularly and updated as appropriate.

¹² The ESMMP will contain biodiversity mitigation measures to create an operational plan for the EPC Contractor for onsite biodiversity management and will not contain any actions to do with offsets.

10 References

- African Parks (2022) Majete Wildlife Reserve - Five Year Business Plan - 2023-2027. African Parks.
- BRL (2017) Updated Environmental and Social Impact Assessment (ESIA) for the Shire Valley Irrigation Project (SVIP), Impact Assessment Report, Shire Valley Transformation Program.
- Chinugwo, P. (2023) Mpatamanga Hydropower Project. Labour Influx Assessment. Final Report Contract No. MW-DOEA-272920-CS-INDV. 9th October 2023. Ministry of Energy, The Republic of Malawi.
- Concern Worldwide (2021) Concern Worldwide Strategic Plan 2021 - 2025. Concern Worldwide. <https://admin.concern.net/sites/default/files/documents/2021-07/Concern%20Worldwide%20Strategic%20Plan%202021%20-%202025.pdf>
- Government of Malawi (2021) Guidelines for the development of the Elephant Marsh Community Conservation Area in Malawi. Lilongwe, Malawi.
- Government of Malawi (2024) DRAFT - The Elephant Marsh General Integrated Management Plan 2024 - 2029. Lilongwe, Malawi.
- ICMM & IUCN (2013) Independent report on biodiversity offsets. Prepared by The Biodiversity Consultancy, available at: www.icmm.com/biodiversity-offsets.
- IFC (2009) Projects and People: A Handbook for Addressing Project-Induced In-Migration. International Finance Corporation, Washington DC, USA.
- IFC (2012) Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. International Finance Corporation (IFC), Washington DC, USA.
- IFC (2019) Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. International Finance Corporation (IFC), Washington DC, USA.
- Kablan, Y.A., Diarrassouba, A., Mundry, R., Campbell, G., Normand, E., Kühl, H.S., Koné, I. & Boesch, C. (2017) Effects of anti-poaching patrols on the distribution of large mammals in Tai National Park, Côte d'Ivoire. *Oryx* 1–10.
- Kleynhans, C. (1999) The development of a fish index to assess the biological integrity of South African rivers. *Water S.A.* 25: 265–278.
- MHPL (2023) Mpatamanga Hydropower Project Design Freeze (Feasibility Study Optimization). February 2023 - Rev A.
- Mott MacDonald (2021) Biodiversity Action Plan - Offset Strategy and Preliminary Feasibility Study. Brighton, UK.
- Niras (2016) Shire River Basin Atlas. Ministry of Agriculture, Irrigation and Water Development, Malawi.
- SLR Consulting (2024a) Mpatamanga Hydropower Project: Environmental and Social Impact Assessment, ESMMP, Revision D, July 2024.
- SLR Consulting (2024b) Malawi Mpatamanga Hydropower Project: ESIA, Ecology Baseline, Revision B. January 2024. SLR Consulting.

- SLR Consulting (2024c) Mpatamanga Hydropower Project: Environmental and Social Impact Assessment, Chapter 5 – Environmental and Social Baseline, Revision A, February 2024.
- SLR Consulting (2024d) Mpatamanga Hydropower Project Resettlement Policy Framework (Revision B.3 -10th Sept 2024). Prepared for MHPL.
- SLR Consulting (2024e) Mpatamanga Hydropower Project: Environmental and Social Impact Assessment, Chapter 8 – Impact Assessment & Mitigation Measures, Revision B, July 2024.
- SLR Consulting (2024f) Mpatamanga Hydropower Project Environmental and Social Impact Assessment Charcoal Value Chain Study (Draft).
- SLR Consulting (2025) Mpatamanga Hydro Power Project: Social feasibility of Neno Conservancy, Revision B, February 2025.
- TBC (2019) Mpatamanga Hydropower Project, Malawi; Biodiversity Action Plan – Phase 1. Prepared for the World Bank Group and Government of Malawi. The Biodiversity Consultancy Ltd. Cambridge, UK. 60 pp.
- TBC (2023) Stakeholder Mapping and Engagement Plan, Mpatamanga Hydro Power Project. July 2023. The Biodiversity Consultancy Ltd., Cambridge, UK.
- TBC (2024a) Biodiversity Monitoring and Evaluation Plan (BMEP) for the Mpatamanga Hydropower Project, Malawi. October 2024. Version 2.0. The Biodiversity Consultancy Ltd, Cambridge, UK.
- TBC (2024b) Critical Habitat Assessment, Mpatamanga Hydro Power Project (MHPP), Malawi - version 4.1 August 2024. The Biodiversity Consultancy Ltd, Cambridge, UK.
- TBC (2024c) Residual Impact Assessment, Mpatamanga Hydropower Project (MHPP), Malawi. August 2024. Version 2.1. The Biodiversity Consultancy Ltd, Cambridge, UK.
- TBC (2024d) Biodiversity Offset Strategy, Mpatamanga Hydro Power Project (MHPP), Malawi. September 2024. Version 2.1. The Biodiversity Consultancy Ltd., Cambridge, UK.
- TBC (2024e) Risk-based Biodiversity Prioritisation, Mpatamanga Hydro Power Project (MHPP), Malawi. August 2024. The Biodiversity Consultancy Ltd., Cambridge, UK.
- TBC (2024f) Biodiversity Offset Feasibility Study for the Mpatamanga Hydro Power Project (MHPP), Malawi. Version 2.1. September 2024. The Biodiversity Consultancy Ltd, Cambridge, UK.
- World Bank (2016) ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. Guidance note for borrowers.
- World Bank Group (2016) Guidance Note on Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx. December 1, 2016.

Appendix 1 Risk-based prioritisation

Appendix 2 Estimated budget for mitigations within Majete Wildlife Reserve

A proposed budget for implementing the mitigation measures related to impacts of in-migration on Majete Wildlife Reserve can be found in Table 19. A breakdown based on the construction and operations periods of the Project can be found in Table 20.

Table 19: Summary budget for mitigation measures in Majete Wildlife Reserve split into the construction and operations phases of the Project.

| Mitigation | Required budget for mitigation implementation | | Total |
|-------------------------|---|--|--------------------|
| | During construction phase (years 1-5) | During first 10 years of operations (years 6-15) | |
| Majete Wildlife Reserve | \$708,619 | \$1,301,881 | \$2,010,500 |

Table 20: Estimated budget for implementing mitigation measures in and around Majete Wildlife Reserve.

Budget will be included in the final version of this document

Appendix 3 Estimated budget for the Biodiversity Action Plan

Table 21: Estimated budget for the overall Biodiversity Action Plan including site specific mitigations in Majete, offset actions, development of offset management and implementation plan and BMEP monitoring.

| Type | Action | Development Phase (approx. 1.5 years) | Construction phase (years 1-5) | Operations (years 6-35) | Total | |
|--|---|--|-----------------------------------|----------------------------|-------------|----------|
| Mitigation | | | | | | |
| Mitigation | Influx mitigation in Majete WR | \$0 | \$708,619 | \$1,301,880 | \$2,010,500 | |
| Offsets | | | | | | |
| Offset | Biodiversity Conservancy | \$270,000 | \$1 923 357 | \$5,547,143 | \$7,740,500 | |
| Offset | Elephant Marsh | \$100,000 | \$827,000 | \$4,378,000 | \$5,305,000 | |
| Offset | Overarching Management and Implementation Plan for Offset Programme | \$250,000 | \$0 | \$0 | \$250,000 | |
| Contingency and Supporting Conservation Actions | | | | | | |
| Contingency plans | Vulture offset contingency plan | \$0 | \$25,000 | \$0 | \$25,000 | |
| | Black Rhino offset contingency plan | \$0 | \$25,000 | \$0 | \$25,000 | |
| SCAs | SCA1: Vulture Red List Workshop | \$0 | \$25,000 | \$0 | \$25,000 | |
| | SCA2: Malawi Vulture Action Plan | \$0 | \$20,000 | \$0 | \$20,000 | |
| | SCA3: Vulture presence monitoring | \$29,000 | \$29,000 | \$58,000 | \$116,000 | |
| | SCA4: Vulture movement tracking | | \$0 | \$18,000 | \$9,000 | \$27,000 |
| | | | \$0 | \$24,000 | \$24,000 | \$48,000 |
| SCA5: Anti-poisoning workshops | \$0 | \$7,200 | \$28,800 | \$36,000 | | |

| Type | Action | Development Phase (approx. 1.5 years) | Construction phase (years 1-5) | Operations (years 6-35) | Total |
|-------------------|---|--|-----------------------------------|----------------------------|---------------------|
| | SCA6: Funded biodiversity MSc Research Grant Programme | \$0 | \$70,000 | \$70,000 | \$140,000 |
| Monitoring | | | | | |
| BMEP | BMEP implementation and ongoing monitoring | \$0 | \$162,500 | \$255,000 | \$417,500 |
| TOTAL | | \$649,000 | \$3,864,676 | \$11,671,823 | \$16,185,500 |

Appendix 4 Influx experiences from other infrastructure projects in the Shire Valley

To further understand what the impacts of Project-induced influx might be, MHPL investigated other infrastructure projects in the Shire Valley, close to Majete Wildlife Reserve. The Kapichira Dam was built in the year 2000. The number of workers brought in for the project during construction was approximately 3,000 people (skilled, semiskilled and unskilled labour) (*in litt.* Archibald Kandoje, Sept 2024). Negative impacts from influx were perceived to be largely social issues such as theft and prostitution. Positive impacts were seen as increased tourism opportunities for Majete and enhanced restoration within the Reserve (funded through a partnership between the project and the Reserve which was being newly protected under new management at the time). Mitigation measures were put in place for influx (focused on social impacts) and were effective at keeping impacts low (*in litt.* Archibald Kandoje, Sept 2024). The people that came to the area for jobs for the Kapichira Project, largely returned to their home areas after construction on the Kapichira dam project (*in litt.* Archibald Kandoje, Sept 2024). This is an interesting case study of the potential impacts of a hydro dam on the Middle Shire River close to Majete. However, the context is different from the Mpatamanga Project in that Kapichira was built 25 years ago, at a time when there were more natural resources available for communities within customary land (animals to hunt and trees for charcoal making), the population in Malawi was smaller, and Majete Wildlife Reserve was in a degraded state (just having been fenced and protected) with limited biodiversity to be impacted by any influx of people. This is different to the Mpatamanga Project where the influx is estimated to be larger (4,000 – 7,500 people), in addition to the 2500 workers estimated to be employed (non-locals will be housed in the workers' camp). In addition, road infrastructure will be upgraded and/or built, which will increase opportunities to move natural resources by road, there is a general context of higher pressures on natural resources, and Majete Wildlife Reserve now harbours high quality biodiversity with a large number of species, many of them threatened with extinction. The potential impacts for natural terrestrial habitat and priority biodiversity species close to the Project, including Majete Wildlife Reserve is assessed as medium to high, and specific mitigations are required to reduce that as much as possible.

The Shire Valley Transformation Project (SVTP) is another infrastructure Project which was been constructed in the vicinity of Majete Wildlife Reserve, more recently. Approximately 600 people moved to the area, mostly without their families. The negative impacts from the influx were similar to that of Kapichira and most mitigations were focused around minimised the social impacts (*in litt.* Aurther Kambombe, Sept 2024). However, there was also the suggestion that Majete WR was at risk from increased poaching, interfering with the security fence, and taking trees for making curios or charcoal production. There was also a concern raised about trafficking of pangolins by foreign workers with rumours that they were employed by the SVTP (*in litt.* Aurther Kambombe, Sept 2024). Impacts from SVTP influx are likely to have been much smaller than what will happen with Mpatamanga due to the much lower number of workers and associated influx as well as the shorter construction period. However – the concerns raised due to the SVTP Project impacting biodiversity are important to consider. When asked about potential impacts to biodiversity from SVTP, Chikwawa District Council stated that poaching and

cutting of trees is a constant occurrence in the district but were not sure if this would be exacerbated by influx (*in litt.* Dumisani Maona & Andrew Khonjera, Sept 2024). Such impacts were more likely to be a result of actions by people familiar with the area, and by unskilled workers rather than skilled workers. Suggestions to reduce impacts to biodiversity were to prioritise hiring locally for unskilled jobs and to have road control and barricades to deter poachers and illegal trading.

The SVTP Environment and Social Management Plan (Phase 1) did not include specific mitigations for Project-induced influx, but significant support was provided to Majete Wildlife Reserve for compensation for impacts which was budgeted at between US\$ 1,350,000 – US\$ 2,610,000 (as part of the wider E&S plan budgeted at c. US\$ 6,000,000), which is akin to the budget developed for mitigations measures for Mpatamanga (Table 18). This included measures such as additional rangers with housing, tree planting, monitoring of wildlife, infrastructure to protect animals from the open canal and to compensate for loss of business. Phase 2 includes a total budget of c. US\$8,000,000, with c.US\$ 2,500,000 put aside for compensation in Lengwe National Park.