

14.1

INTRODUCTION

This Chapter presents an assessment of potential impacts to terrestrial and marine biodiversity and identifies whether any additional mitigation or management procedures are needed to manage residual impacts to an environmentally or socially acceptable level. Such measures are presented where appropriate and elaborated further within the ESMP (**Chapter 17**).

In accordance with the ADB sourcebook (Section V) the objectives of biodiversity impact assessment are to identify and quantify the potential project impacts; design measures to avoid, minimise or mitigate potential adverse impacts; and identify likely residual impacts. To achieve this; a five step process was undertaken. This included:

- Screening to determine the biodiversity features that require studying;
- Scoping to determine which direct and indirect biological impacts are likely to be significant in order to determine the focus issues of the impact assessment (**Section 14.3**);
- Baseline Studies to define the values of the habitats that will be affected on the Project area and in the area of influence (**Section 14.5**);
- Impact Analysis to assess impacts identified during scoping and baseline studies to determine the significance of the impacts (**Section 14.7**);
- Mitigation Measures are developed to avoid or reduce adverse impacts to biodiversity with a priority given to impacts on features with significant biodiversity values (**Section 14.7.2** and **Section 14.7.3**); and
- Biodiversity Offsets are determined to compensate for unavoidable residual harm caused to biodiversity (if required).

The vegetation within the Project area and surrounds is described in terms of modified and natural habitats in accordance with the ADB sourcebook.

14.2

ASSUMPTIONS AND LIMITATIONS

The assessment of potential impacts related to terrestrial and aquatic biodiversity in this Chapter is based on the environmental baseline data collected by ERM and the information available from the Sponsor at the time of writing; judgements have been made based on available data, professional knowledge and previous experience of ERM.

14.3

SCOPE OF ASSESSMENT

14.3.1

Project and Associated Activities

Impacts are evaluated in the context of the Project Facilities fully described in **Chapter 2**, including details of planned construction and operation activities.

This assessment refers to the land development, construction and operation of the Power Plant including the main facilities and supporting facilities as described in **Chapter 2**. The construction and operation of the Project are also considered.

Table 14.1 summarises the nature of impacts to biodiversity values related to these activities. These terms are used in the scoping of Project impacts on biodiversity values and relate to the identified threats from the activities.

Table 14.1 Nature of impacts on biodiversity values

Term	Description
Direct Impacts	Means direct physical displacement or impact from the Project on a species' habitat or lifecycle.
Indirect Impacts	Means a secondary impact resulting from a direct impact from the Project on a species' habitat or lifecycle.
Spatial Impacts	Means impacts on species' habitats or lifecycle including: isolation of populations or individuals; impacts on species endemism; impacts on the heterogeneity of species; environmental gradients; edaphic interfaces (derived from soil toils); connectivity between habitats and climate change adaptation importance.
Temporal Impacts	Means: <ul style="list-style-type: none"> • Temporary Impact means a reversible impact on a species' habitat or lifecycle; and • Permanent Impact means an irreversible impact on a species' habitat or lifecycle.

Source: ERM, 2015.

14.3.2 Resources and Receptors

For this assessment of impacts on terrestrial and aquatic biodiversity, the key resources and receptors identified are:

- Habitats and flora identified in the baseline assessment (See **Chapter 5**);
- Terrestrial wildlife/fauna identified in the baseline including avifauna, mammals and herpetofauna; and
- Aquatic fauna.

Note **Chapter 15** assesses Project impacts on socio-economic receptors and is the main chapter to consider provisioning ecosystem services such as social implications of Project impacts on wild capture fisheries, aquaculture, productive land (e.g. rice fields), and standing crops (e.g. Acacia spp. and fruit trees).

14.3.3 Project Study Area

The Project Study Area for Terrestrial and Aquatic Biodiversity is within a 500 m buffer area from the Complex and water pipeline described in **Chapter 5**. This area was determined based on the likelihood of impacts to species by the Project Facilities, based on the construction and operational activities that are described in the project description. Likely impacts within this area could include: permanent loss of habitat from clearing activities; disturbance/displacement of species from construction and operation; light and noise impacts from construction and operation; alteration of surface flow regimes; and air and water pollution discharges. Based on the species determined likely to be present (noting that no highly mobile, sensitive or conservation significant species were identified) it was determined that the 500 metres would be sufficient to characterize the likelihood of impacts.

The Project Area of Influence was determined based on the proximity of sensitive biodiversity receptors and relevant geographic boundaries that influence the movement of species within the landscape.

14.4

LEGISLATION REQUIREMENTS

1. **IFC Performance Standard 6** – Biodiversity Conservation and Sustainable Management of Living Natural Resources
2. **ADB Safeguard Policy Statement 8**— Biodiversity Conservation and Sustainable Natural Resource Management

14.5

SUMMARY OF RELEVANT BASELINE CONDITIONS

Chapter 6 provides further details on the baseline conditions for the terrestrial and aquatic biodiversity in the Project Study Area and makes an evaluation as to whether each habitat is natural or modified as well as specifically assessing whether they should be considered 'Critical Habitat' (CH). This section provides a summary of the information in **Chapter 5, Section 5.10** Terrestrial and Aquatic Biodiversity.

The Project site resides within the dry zone of central Myanmar located in the Irrawaddy Dry Forests Ecoregion. It is predominately comprised of disused cultivated land used for informal grazing, supporting grassland, low shrubs and minimal tree cover, therefore the area is a highly modified habitat.

In recent years the larger mammal fauna have been hunted to the brink of extinction. The conversion of forests to agricultural land and illegal cutting of timber causes loss and fragmentation of the habitat, while intense poaching of protected animals and the lack of political will to conserve this and other ecoregions in Myanmar leaves the remaining forests devoid of wildlife.

Myanmar currently has a total of 57 Protected Areas, which account for only 4% of the country's total surface area. Only three are within 60km from the Project site, the closest being 43km away. There are also few species of conservation significance. Only four critically endangered species are known to the ecoregion, which include the Long-billed Vulture and White-bellied Heron.

Table 14.2 below summarises the biodiversity value/sensitivity given to each habitat type.

Table 14.2 *Area of Habitats found in the Study Area*

	Habitat	Area (hectares)
Power Station	Modified Habitat	9
230 kV Overhead Transmission Line	Modified Habitat	5
Water Supply Pipeline and Wastewater Discharge Pipeline	Modified Habitat	2
	Total	16

No species that are considered of conservation interest were recorded during the baseline surveys.

14.6

ASSESSMENT METHODOLOGY

The impact assessment is based on the baseline terrestrial and aquatic biodiversity conditions and sensitivities as detailed in **Chapter 5** and summarised below. **Chapter 4** describes the overall approach used for the assessment of impacts and the

identification of mitigation options. Similar to the other biophysical topics, evaluation of the significance of impacts on terrestrial and aquatic biodiversity, including direct, indirect and induced impacts, takes the following two factors into consideration.

14.6.1 Sensitivities of Terrestrial and Aquatic Biodiversity Resources/ Receptors

Chapter 5 provides an overall evaluation of baseline resources (habitats) and receptors (species). Data for this evaluation was collected during surveys to the Project Study Area and included mapping of habitat types.

14.6.2 Assessment Criteria

The impact magnitude is a function of a range of considerations including extent (e.g. local, regional or national), impact duration (e.g. temporary, short-term, long-term or permanent), scale (i.e. size of the impact), frequency (i.e. constancy or periodicity of the impact), and likelihood (for unplanned events only, e.g. unlikely, possible, or likely).

By considering all of the above characteristics, magnitudes of impacts to terrestrial and aquatic biodiversity are defined into the following qualitative scales as outlined in **Figure 14.1** for habitats and **Figure 14.2** for species.

Figure 14.1 Magnitude Criteria for Effect on Baseline Habitats

Habitat Sensitivity/Value		Magnitude of Effect			
		Negligible	Small	Medium	Large
Low	Habitats with no or local designation/recognition; habitats of significance for species of Least Concern; habitats which are common and widespread within the region.	Negligible	Negligible	Minor	Moderate
Medium	Habitats within nationally designated or recognised areas; habitats of significant importance to globally Vulnerable, Near Threatened or Data Deficient species; habitats of significant importance for nationally restricted range species; habitats supporting nationally significant concentrations of migratory species and/or congregatory species; nationally threatened or unique ecosystems.	Negligible	Minor	Moderate	Major
High	Habitats within internationally designated or recognised areas; habitats of importance to globally Critically Endangered or Endangered species; habitats of importance to endemic and/or globally restricted-range species; habitats supporting globally significant concentrations of migratory species and/or congregatory species; highly threatened and/or unique ecosystems, areas associated with key evolutionary species (In accordance with ADB Critical Habitat definition)	Negligible	Moderate	Major	Critical
Magnitude of Effect Definition					
<i>Negligible</i>	<i>Effect is within the normal range of variation</i>				
<i>Small</i>	<i>Affects a small area of habitat, but without the loss of viability/function of the habitat</i>				
<i>Medium</i>	<i>Affects a sufficient proportion of the habitat that the viability/function of part of the habitat or the entire habitat is reduced, but does not threaten the long-term viability of the habitat or species dependent on it.</i>				
<i>Large</i>	<i>Affects the entire habitat or a significant proportion of the habitat to the extent that the viability/function of the entire habitat is reduced and the long-term viability of the habitat and the species dependent on it are threatened.</i>				

Figure 14.2 Magnitude Criteria for Effect on Baseline Species

Species Sensitivity/Value		Magnitude of Effect			
		Negligible	Small	Medium	Large
Low	Species which are included on the IUCN Red List of Threatened Species as Least Concern (LC) (IUCN 2011).	Not significant	Not significant	Minor	Moderate
Medium	Species included on the IUCN Red List of Threatened Species as Vulnerable (VU), Near Threatened (NT) or Data Deficient (DD) (IUCN 2011). Species protected under national legislation. Nationally restricted range species. Nationally important number of migratory or congregatory species.	Not significant	Minor	Moderate	Major
High	Species included on the IUCN Red List of Threatened Species as Critically Endangered (CR) or Endangered (EN) (IUCN 2011). Species having a globally Restricted Range (i.e. plants endemic to a site or found globally at fewer than 10 sites, fauna having a distribution range (or globally breeding range for bird species) less than 50,000 km ² . Internationally important numbers of migratory or congregatory species. Key evolutionary species.	Not significant	Moderate	Major	Critical
Magnitude of Effect Definition					
<i>Negligible</i>	<i>Effect is within the normal range of variation.</i>				
<i>Small</i>	<i>Affects a small proportion of a population, but does not substantially affect other species dependent on it, or the populations of the species itself</i>				
<i>Medium</i>	<i>Affects a sufficient proportion of a species population that it may bring about a substantial change in abundance and /or reduction in distribution over one or more generations, but does not threaten the long term viability of that population or any population dependent on it.</i>				
<i>Large</i>	<i>Affects an entire population or species at sufficient scale to cause a substantial decline in abundance and/or change in distribution beyond with natural recruitment (reproduction, immigration from unaffected areas) may not return that population or species, or any population or species dependent upon it, to its former level within several generations, or when there is no possibility of recovery.</i>				

Table 14.3 summarises the threats to biodiversity values related to the activities during construction. These threats to biodiversity are derived from IFC 6 and relate to the activities that are likely to occur during Project construction. **Table 14.4** provides an assessment of significance for the modified habitats within the Project area. A number of the threats relate to both construction and operation activities and as such an assessment of significance has been undertaken in this section.

Table 14.3 *Threats to biodiversity values during Construction*

Term	Description
Permanent Loss of Habitat	Permanent loss of habitat or species due to permanent or temporary site activities for the Project
Disturbance and Displacement of Species	Disturbance to, or displacement/exclusion of a species from foraging habitat due to construction activities, de-commissioning activities, and operational and maintenance activities.
Edge Effects on Habitats	Disturbance or damage to adjacent habitat and species caused by movement of vehicles and personnel, potential mobilisation of sediment, artificial lighting, dust, spillage of fuels and chemicals, emissions and noise, and subsidence.
Alteration of Water Flow Regimes	Effects on downstream habitats caused by alterations to natural flow regime.
Light/Noise Impacts	Effects on species caused by permanent alterations in night time light conditions;
Alien Species (Plants and Animals)	Introduction or spreading of alien species during the construction works.
Air/Water Pollution	Contamination of the environment that has a direct or indirect impact on a species either through exposure to harmful substances.
Mortality	Mortality of individual fauna species as a result of vehicle or machinery strike or falling debris during clearing activities.

Table 14.4 Assessment of Impacts to Habitats during Construction

Impact	Description	Comment	Sensitivity	Magnitude	Significance
Temporary loss of habitat	Temporary disturbance of terrestrial and aquatic habitat in areas required to facilitate construction. Temporary disturbance will mainly be associated with access roads to construction areas, laydown areas and construction camps as well as waterway crossings and in-stream infrastructure construction (bridges).	Construction activities will require clearing of modified vegetation to facilitate the construction process which will remove habitat. The habitats are common and widespread within the region (low sensitivity) and the loss will be limited to that necessary for construction. The areas to be temporarily disturbed are considered unlikely to impact the viability or functioning of adjacent ecosystems (small magnitude). Where possible topsoil will be managed locally and natural regeneration or rehabilitation using native species will be undertaken in areas not required for the operation of the Project. For waterway crossings, water exclusion dams may be required during construction leading to a loss of habitat locally and restriction of movement by aquatic species.	Low	Small	Negligible
Permanent loss of habitat	Permanent loss of 16 ha of habitat within the infrastructure footprint and inundation areas. Habitat loss includes 16 ha of modified habitat. These areas will be cleared or inundated during construction.	The construction activities will result in the loss of 16 hectares of habitat. The habitats are common and widespread within the region (low sensitivity) and the loss will be limited to that necessary for construction. The areas to be disturbed are considered unlikely to impact the viability or functioning of adjacent ecosystems (small magnitude). Where possible topsoil will be managed locally and natural regeneration or rehabilitation using native species will be undertaken in areas not required for the operation of the Project. For waterway crossings, water exclusion dams may be required during construction leading to a loss of habitat locally and restriction of movement by aquatic species.	Low	Small	Negligible
Temporary disturbance to fauna behaviors	Disturbance and displacement of resident fauna due to noise, light and/or vibration as a result of construction activities (excavation, blasting, clearing, spoil disposal, camps, plant and vehicle movement).	Noise and light disturbances have the potential to influence fauna breeding, roosting or foraging behaviour of native fauna. The consequences of these influences are dependent on the extent of disturbance but in extreme cases these factors can influence local populations if breeding and communication is inhibited. Excessive noise can impede fauna communication and deter the use of habitats nearby. Similarly, introducing light sources has the potential to deter foraging and dispersal activities of nocturnal species. The impact is likely to be small and localised (low sensitivity) and unlikely to impact significantly on fauna (small magnitude).	Low	Small	Negligible

Impact	Description	Comment	Sensitivity	Magnitude	Significance
Edge effects degrading habitat	The construction and inundation associated with the Project will generate newly disturbed forest edges around the margins of the reservoir, along access roads, the transmission line and at the infrastructure locations.	Edge effects are an indirect impact of land clearing. Where vegetation clearing occurs, adjacent vegetation and habitats are exposed to increased noise, light, dust and wind environment as well as increased competition from predators and invasive species. In extreme cases some of these effects have potential to alter the habitat characteristics of the ecotone and influence suitability for native flora and fauna. 'New' habitat edges will be created where infrastructure is located in natural habitat areas, not previously disturbed. In general, the habitats that may be impacted are common and widespread within the region (Low sensitivity) and the impact is not likely to impact the viability/function of adjacent habitats (Small magnitude).	Low	Small	Negligible
Degradation of habitat	Introduction of alien species and competition with native communities	Invasive or alien species have the potential to be introduced or spread throughout the Project area through increased movement of people, vehicles, machinery, vegetation and soil. An increase in the prevalence of weeds or other pests has the potential to reduce the quality of habitat for some native flora and fauna, including threatened species (Sensitivity medium). Invasive flora species can rapidly germinate in disturbed areas whereby affecting the ability of native vegetation communities to re-establish. Alien animals also have the potential to be introduced or increased in abundance. These animals may adversely impact native fauna as a result of increased competition for resources, predation or habitat degradation. Two invasive plant species have identified in the project area including <i>Acacia catechu</i> and <i>Leucaena glauca</i> . Vehicle movement and activities which introduce a risk of invasion will be focussed along the access track and construction areas (Magnitude small).	Medium	Small	Minor
	Accidental release of hazardous substances stored or used during construction phases.	The Project components include the storage and handling of hazardous materials, including refuelling. Accidental release or spill of these materials can be toxic to flora and fauna locally and downstream if substances are released into the aquatic environment. Such that impacts are likely to be localised (magnitude small) and the Area of Influence does not contain habitats or species of significance (Sensitivity medium).	Medium	Small	Minor

Impact	Description	Comment	Sensitivity	Magnitude	Significance
Water Quality Impacts	Erosion and runoff at waterways crossings leading to downstream degradation of water quality, and aquatic habitats.	<p>A range of Project activities have the potential to lead to indirect dust and runoff impacts to native flora, fauna and habitat during the construction phase as well as longer term edge effects and noise impacts.</p> <p>During construction, land preparation has the potential to generate dust which may settle on vegetation adjacent to the construction area. Excessive dust deposition on flora may act to suppress growth through limiting photosynthesis and the dusted foliage may also become unpalatable to foraging fauna. The construction activities will be temporary and short lived, and dust generation is likely to be localised to active work areas. Rainfall will generally remove dust from foliage.</p> <p>Land preparation will create exposed bare earth areas that are vulnerable to erosion (wind and/or runoff) until infrastructure construction or replanting is completed to stabilise the surface. Erosive processes transport and deposit sediment to downstream habitats (both aquatic and terrestrial). The indirect impact has potential to degrade downstream habitat areas or change habitat characteristics, and as such influencing suitability for native flora and fauna communities.</p> <p>Impacts are likely to be localised (magnitude small) and no species of conservation significance were detected (Sensitivity medium).</p>	Medium	Small	Minor
Fauna mortality		<p>Fauna mortality can occur during vegetation clearing activities in the event individuals are struck by vehicles and machinery. Animals that are unable to disperse during clearing activities are vulnerable to being injured or destroyed through interaction with machinery or falling debris.</p> <p>It is likely that most individuals will disperse (Sensitivity low) from clearing locations into adjacent habitats however some less mobile species may experience a localized reduction (Magnitude small) in abundance during this period, such as amphibians, reptiles and small mammals.</p>	Low	Small	Negligible

14.7.1 *Avoidance/ Minimisation of Impacts*

The mitigation hierarchy aims to achieve the best possible outcome to minimise effects on biodiversity and should be applied sequentially to: avoid or minimise; mitigate; rehabilitate/ restore and finally to compensate/ offset if required.

14.7.2 *Construction Phase*

Disturbance to habitat in modified and natural habitat areas during construction has the potential to impact the local and downstream biodiversity as well as impacts to priority biodiversity values. Mitigation measures can be implemented to manage the disturbance during construction such that biodiversity values are not significantly impacted or impacts are reduced by the application of the mitigation hierarchy (avoid, minimise, mitigate and compensate through offsets).

To further mitigate potential impacts to biodiversity values, the remainder of the mitigation hierarchy principle was applied. The impact assessment (**Table 14.4**) identified potential impacts to both modified habitats. Modified habitat types were not identified to play a significant role in habitat suitability for priority biodiversity values.

Management measures specific to managing the natural environment will be incorporated into the Project Construction Management Plans and these will include (but not be limited to) those identified in **Table 14.5**. These general environmental management measures will assist in reducing the potential for degradation of habitat, behaviour disturbance, fauna mortality and habitat fragmentation for native species.

In addition to the general measures for the management of potential impacts to the natural environment, measures specific to managing potential impacts to conservation significant values are also considered. Throughout the baseline assessment, no priority biodiversity values have been identified and hence it is not necessary to assess candidates for critical habitat in accordance with ADB SPS.

Table 14.5 Mitigation and Management Measures, Construction Phase

Nature of Impact	Overview of Measures
Loss of habitat	<ul style="list-style-type: none"> • The design and layout plan will be prepared to minimise tree cutting and protected area disturbance where possible. The Project owner shall be directly responsible for dissemination to its staff and workers of all rules, regulations and information concerning these restrictions, as well as the punishment that can expected if any staff or worker or other person associated with the Project violate rules and regulations; • The planned clearance area for the construction works shall be clearly identified and marked to avoid accidental clearing; and • Project will utilize or upgrade existing roads where possible to minimize unnecessary clearing requirements.
Disturbance to fauna behaviour	<ul style="list-style-type: none"> • Construction vehicles and machinery will be maintained in accordance with industry standard to minimise unnecessary noise generation; • Arrangement of transportation schedules will aim to avoid peak hours of road usage to minimise heavy traffic through habitat areas; • Traffic signs will be installed on all roads throughout construction areas depicting speed limits;

Nature of Impact	Overview of Measures
	<ul style="list-style-type: none"> • For construction areas requiring night-time lighting, lights will be used only where necessary and will be directed toward the subject area and away from habitat areas where possible; and • Commitment will be made to raise awareness of the construction work force and make arrangements for restriction of poaching.
Barrier to movement and habitat fragmentation	<ul style="list-style-type: none"> • The Project shall implement landscaping and re-vegetation after completion of construction in suitable areas to establish a suitable riparian corridor; • In-stream works will be carried out in low-flow conditions where possible; and • The transmission line will not be fenced.
Edge effects	<ul style="list-style-type: none"> • Dust suppression techniques will be utilised during construction, to control the dispersion of dust created by clearing lands at the construction sites; • The Project shall implement landscaping and re-vegetation after completion of construction using native species where possible; • To avoid/minimize releasing sediment load into the river, erosion control measures will be implemented and maintained e.g. using silt fence and temporary re-vegetation to minimize sediment transport from steep slope releasing to the river and smaller waterways; and • Weed and pest management measures should be implemented in accordance with a Project weed and pest management plan to avoid introduction of weeds to natural and modified habitat areas.
Degradation of habitat	<ul style="list-style-type: none"> • Construction and domestic waste will be appropriately stored and disposed of to avoid attracting native and alien species to the construction areas; • For areas in direct runoff path to a watercourse, sediment and erosion control devices will be installed and maintained until vegetation replanting can occur to stabilise disturbed surfaces; • Oil, chemical and solid waste will be stored, and handled and disposed of by appropriately licenced waste management contractors; • Weed and pest management measures should be implemented in accordance with a Project weed and pest management plan to avoid introduction of weeds to natural and modified habitat areas; • Speed limits to maximum of 20 km/hr for construction vehicles will be enforced to limit noise and dust generation; • Construction materials and chemicals will be appropriately secured and locked down during flood season to avoid accidental release to the natural environment; • Engineering works will be designed to comply with the agreed water quality standards; • Water quality monitoring will begin as soon as possible after the Project begins, in order to control the quality of discharge water; and • Emergency response plan and procedures will be prepared and implemented for the construction activities of the Project. This will include emergency drills and education of Project workers.
Fauna mortality	<ul style="list-style-type: none"> • Speed limits to maximum of 20 km/hr for construction vehicles will be enforced to minimise potential for fauna strike; • Commitment will be made to raise awareness of values of natural habitat areas to construction work force and arrangements will be made for restriction of poaching and forest product collection; • Hunting wild animals will be strictly prohibited to apply for all staff; and • Fishing and using of illegal fishing gear anywhere along the river will be prohibited;

Table 14.6 Summary of the Significance of Site Development Activities

Impact	Site Development and Construction of Power Station, Transmission and Water Pipelines				
Impact Nature	Negative	Positive	Neutral		
	The impact on the terrestrial and aquatic biodiversity is negative				
Impact Type	Direct	Indirect	Induced		
	Direct terrestrial habitat loss in the Project Footprint in areas to be developed. Indirect effects on remnant/ isolated habitats.				
Impact Duration	Temporary	Short-term	Long-term	Permanent	
	Although construction is estimated to take 22.5 months, the loss/ conversion of habitats will be permanent.				
Impact Extent	Local	Regional	International		
	The impact is expected to be local for habitats.				
Impact Scale	It is anticipated that the Project will cover a land area of approximately 16 ha.				
Frequency	Construction occurs only once.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Considering the magnitude of impacts to each habitat discussed above, the overall magnitude of this impact is Negligible to Small .				
Receptor Sensitivity	Low	Medium	High		
	Given the large proportion of the area affected is covered by habitats with medium sensitivity, the overall sensitivity is considered Low .				
Impact Significance	Negligible	Minor	Moderate	Major	Critical
	The significance of this impact is Negligible to Minor .				

14.7.3 Operation Phase

Approach to Assessment of Impacts

The approach for the assessment of impacts used for this section is the same as that used in “6.2.3 Construction Impacts on Biological Environment”.

Impacts to Biodiversity Values

Table 14.7 summarises the threats to biodiversity values related to the activities during operation. These threats to biodiversity are derived from IFC 6 and relate to the activities that are likely to occur during Project operation. **Table 14.8** provides an assessment of significance for modified habitats within the Project area.

Table 14.7 Assessment of Impacts to Habitats during Operation

Impact	Description	Comment	Sensitivity	Magnitude	Significance
Disturbance	Disturbance to, or displacement/exclusion of a species from foraging habitat due to operational and maintenance activities.	Operational activities that have potential to disturb native fauna include the use of night lighting at infrastructure and facility locations. Lighting required for operation and safety at the facilities can influence nocturnal foraging behaviours as well as disrupt sleep patterns of crepuscular species.	Low	Small	Negligible
Fauna mortality	Mortality of individual fauna species as a result of vehicle or machinery strike or falling debris during transmission line maintenance vegetation clearing activities.	Fauna mortality can occur during vegetation clearing activities in the event individuals are struck by vehicles and machinery. Vegetation clearing or lopping will be required to maintain the safe vegetation height beneath the transmission line. Animals that are unable to disperse during clearing activities are vulnerable to being injured or destroyed through interaction with machinery or falling debris. It is likely that most individuals will disperse (Sensitivity low) from clearing locations into adjacent habitats however some less mobile species may experience a localized reduction (Magnitude small) in abundance during this period, such as amphibians, reptiles and small mammals.	Low	Small	Negligible

Table 14.8 Mitigation and Management Measures, Operation Phase

Nature of Impact	Overview of Measures
Disturbance to fauna behaviour	<ul style="list-style-type: none"> Vehicles and machinery will be maintained in accordance with industry standard to minimise unnecessary noise generation; For areas requiring night-time lighting, lights will be used only where necessary and will be directed toward the subject area and away from habitat areas where possible; and Speed limits to maximum of 20 km/hr for vehicles will be enforced to minimise potential for fauna strike.
Fauna mortality	<ul style="list-style-type: none"> Commitment will be made to raise awareness of values of natural habitat areas and arrangements will be made for restriction of poaching and forest product collection; Hunting wild animals will be strictly prohibited to apply for all staff; and Fishing and using of illegal fishing gear anywhere along the river will be prohibited.

Source: ERM, 2015.

Table 14.9 Summary of the Significance of Site Development Activities

Impact	Site Development and Construction of Power Station, Transmission and Water Pipelines.				
Impact Nature	Negative	Positive	Neutral		
	The impact on the terrestrial and aquatic biodiversity is negative				
Impact Type	Direct	Indirect	Induced		
	Direct terrestrial habitat loss in the Project Footprint in areas to be developed. Indirect effects on remnant/ isolated habitats. Direct aquatic habitat loss through and road and river crossings.				
Impact Duration	Temporary	Short-term	Long-term	Permanent	
	The loss/ conversion of habitats will be permanent.				
Impact Extent	Local	Regional	International		
	The impact is expected to be local for habitats. (Further discussion of impacts on the wildlife/ fauna that may utilize the habitats are found in the following sections)				
Impact Scale	It is anticipated that the Project will cover a land area of approximately 16 ha.				
Frequency	Operation is continuous.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Considering the magnitude of impacts to each habitat discussed above, the overall magnitude of this impact is Negligible to Small.				
Receptor Sensitivity	Low	Medium	High		
	Given the small proportion of the area affected and the area is modified habitats, the overall sensitivity is considered Low.				
Impact Significance	Negligible	Minor	Moderate	Major	Critical
	The significance of this impact is Negligible .				

14.7.4 Residual Impacts on Biodiversity Values

There are no residual impacts to biodiversity values identified that require offsetting or compensating following mitigation.