Bhutan for Life
Environmental and Social Management Plan for
Jigme Singye Wangchuck National Park
(2022).

1. Introduction

(A) Project Background

The Bhutan for Life (BFL) project aims to ensure a robust network of protected areas and biological corridors that secures human well-being, biodiversity conservation and increase climate resilience in Bhutan. The project provides a 14-year financial bridge that allows for immediate improvement in the management of Bhutan's protected areas for climate resilience, and the prompt delivery of mitigation, adaptation and biodiversity gains, while the country gradually ratchets up its own financing resources.

BFL seeks to achieve the following objectives:

- Help Bhutan remain carbon neutral by increasing forest and vegetative cover within the Protected Area System;
- Enhance the socio-economic wellbeing of communities in and in the vicinity of the PAS through climate-informed natural resources management;
- Maintain stable, thriving and diverse populations of key species contributing toward national and global biodiversity goals;
- Strengthen organizational, institutional, and financial capacity for effective management of PAS.

BFL includes five components that reflect these goals, divided into 16 milestones (or outputs) and over 80 detailed activities.

(B) Scope of ESMP

The preparation of this Environmental and Social Management Plan (ESMP) was required in order to manage the environmental and social impacts through and specific mitigation actions required to implement the project in accordance with the requirements of WWF's SIPP, the

project's Environmental and Social Management Framework (ESMF), and applicable national legislation and regulations.

The ESMP provides an overview of the environmental and social baseline conditions on the routes of the proposed second segment of the project, summarizes the potential impacts associated with the proposed activities and sets out the management measures required to mitigate any potential negative impacts.

This ESMP will be implemented by BFL focal person in each park authority (PA) and biological corridor (BC), and by the contractor to be commissioned by each PA/BC for the project.

(C) Purpose of ESMP

This Site-Specific ESMP is a project-specific source document detailing the environmental and social protection requirements to mitigate and minimize the adverse impacts. The ESMP's primary purpose is to ensure that the environmental requirements and social commitments associated with the project are carried forward into implementation and operational phases of the project and are effectively managed. The specific objectives of this ESMP are as hereunder:

- Minimizing any adverse environmental, social and health impacts resulting from the project activities;
- Conducting all project activities in accordance with the relevant RGoB Laws and WWF's safeguard operational policies and guidelines;
- Preventing environmental degradation as a result of either individual subprojects or their cumulative effects;
- Enhancing the positive environmental and social outcomes of project activities;
- Ensuring that the proposed mitigation measures are feasible and cost-efficient;
- Providing an Action Plan to ensure that the project impact mitigation measures are properly implemented and monitored;
- Ensuring that all stakeholders are engaged in the project activities' preparation and implementation, and their concerns are fully addressed.

2. Environmental and Socio-Economic Conditions:

(A). Geological and topographical conditions

JSWNP is located between the latitudes of 27.0224° to 27.4872° North and longitudes of 90.0682° to 90.6887° East, covering an area of 1730 Km^2. JSWNP covers 10 geogs, wholly or partly, from within the political boundaries of five Dzongkhags (districts) of Trongsa, Sarpang, Tsirang, Wangdue Phodrang and Zhemgang. From Trongsa, Korphu geog entirely falls inside the park and Langthel and Tangsibji geogs fall partly inside the park. From Sarpang, about half of Jigmechholing geog falls inside the park and Chhudzom (Dovan) geog just touches the park at one point. From Tsirang, Sergithang and Phuntenchu geogs have small parts of them falling inside the park. From Wangdue Phodrang, around half of Athang and Phobji geogs fall inside the park and from Zhemgang, part of Trong geog falls inside JSWNP.

Topographically, the north-central part of the national park has rugged landforms, with peaks rising to almost 5000 masl at the highest point, while the southern parts are relatively less steep and rugged.

Geologically, the mountains are recent and steep-sided, consisting largely of Pre-Cambrian and early Paleozoic quartzite and gneiss, with some areas with sedimentary limestone, dolomite, sandstone and shales. The soils are generally clay loam, with good permeability and moderate moisture retention.

(B). Climatic conditions

JSWNP is one of the few PAs that represents large altitudinal variation. The wide elevation range and mountainous terrain create complex climatic conditions; however, the park can be broadly categorized into four climatic zones; wet-subtropical, temperate, sub-alpine and alpine zones. The wet-subtropical climatic conditions prevail along the southern regions of the national park with altitude as low as 150 masl. The temperate conditions prevail along the mid-altitude areas all around the national park, and the sub alpine and alpine conditions occur mainly in the north-central part of the park where the Black Mountain range rises to form permanent ice cap. The south-west monsoon contributes most of the annual rainfall from June to September. The rain shadows imposed by the high mountain ranges result in localized rainfall gradients during this period.

(C). Hydrological conditions

The national park is surrounded by three major rivers: the Mangdechu defines the eastern boundary starting from its confluence with Nikka Chhu below Tangsibji in Trongsa to

Tingtibi, Nikachu drains the Chendebji valley in the northern part of the park till its confluence with Mangdechu, whereas Punatshangchu touches the mid-western part of the park in Taksha. There are many glacial lakes in the Black Mountain region. The most distinct ones are the Jeadhha Tsho, Mendey Tsho, Buxa Tsho, Tsho Zhao, Yue Tsho and Ser Tsho.

Numerous streams originate from these snow-fed alpine lakes which form smaller rivers like the Hara-chu, Nabji-chu, Berti-chu, Phrumzur-chu, and the Waichhen-chu. This network of small perennial and annual tributaries flow down the steep slopes, often as waterfalls and along valleys to become tributaries of the larger rivers. The distinct rainy and dry seasons results into a wide seasonal variation in the river flows, with large volumes of sediment-laden water flowing during the monsoon and low volume during the dry, winter season. The local communities also rely on the water from these rivers for domestic consumption and for irrigation.

(D). Flora and fauna

Flora: The Park has three major eco-floristic zones with different vegetation types and they are: 1. Subtropical zone, 2. Temperate zone, and 3. Alpine zone (NBSAP, 2014). Due to the wide-range of altitude and variation in climatic conditions, the park supports a wide range of forest types and habitat types within the different land-use types. Forest constitutes the dominant ecosystem with 95% per cent under forest cover and 17 land-use types classified inside the park (LCMP, 2016). The presence of 10 forest types including meadow, wetland, rocky outcrop, cave, limestone formation etc., signifies the presence of all habitat types for successful conservation of fauna and flora inside the park. The Park is home to so many species of threatened flora and the conservation of those species will be of utmost importance for achievement of overall conservation goals and also in providing ecosystems goods and services to the communities residing inside the park. The Species *Paphiopedilum fairrieanum* was found under Taksha range and the assessment on population status, habitat characteristics and threat level to the species was fairly understood for management. However other threatened floral species recorded inside the park such as *Cypripedium himalaicum, Gastrochilus calceolaris, Primula chasmophila, Nardostachys jatamansi, Paris polyphylla, Panax pseudo-genseng, Taxus baccata etc.* require further assessment for sustainable management. The direct and indirect threat observed were mainly illegal collections, forest fires, human disturbance, browsing and climate change.

Fauna: Owing to the great altitudinal variation and diverse habitat types, JSWNP holds a wide array of wild faunal biodiversity. A recent biodiversity survey conducted in the park found that the park is home to 55 species of mammals including some of the endangered species such as Royal Bengal Tiger, Musk deer, Red Panda, Himalayan Black bear, Golden Langur, Gaur and Snow Leopard. The park also has rich diversity of bird whereby the recent survey confirmed the presence of 324 species of birds including the critically endangered White-bellied Heron, Rufous-necked Hornbill, Great Hornbill and Palla's Fish Eagle. The park is also home to 42 species of herpeto-fauna, 16 species of fishes, 376 species of butterflies and 42 species of dragonflies and damselflies.

(E). Socio-economic conditions

Of the ten gewogs falling inside JSWNP, seven gewogs have communities residing inside the park's jurisdiction. Three gewogs i.e., Phobji, Chudzom (Dovan) and Phuntenchu have no communities inside the park. Although Phobji gewog does not have permanent settler inside the national park, there are at least eight households who lead semi nomadic lifestyle, migrating with their yak, cattle and sheep herds along the Black Mountain trails of JSWNP, with their transit huts located in Wangjela, Maniting, Jari Busa, Yakchu, Khephu, Boekha, Nyishula, Jeddah tsho, Gubjila and Broksa. Overall, there are 601 households and a total population of 5538 (2601 female and 2937 male) inside Jigme Singye Wangchuck National Park. Sergithang gewog under Tsirang has only seven households falling inside the park's jurisdiction.

Agriculture is the main source of livelihood for the people living in JSWNP. Most of the agricultural lands are in lower elevation areas of the park. The most common types of land holding are *Chhuzhing* (wetlands), *Kamzhing* (dry lands), Orchard and *Tsesha* (vegetable garden). People grow various cereals, vegetables, fruits and cash crops. Common cereals grown are paddy, wheat, barley, maize, buckwheat and millet. Mustard is grown as a source of oil in certain parts such as Chendebji village, Samthang and Rukha communities. In hotter areas such as Athang, Langthel and Trong gewogs people grow some fruits such as mandarin, mango, jack fruit, plum, peach and walnut as source of income. Cardamom is cultivated by most of the communities as cash crop. Chendebji village also grows potato as cash crop. Livestock rearing is the second most important income source and livelihood option. Common livestock reared in the park are cattle, yak, horse, poultry, pig, goat and sheep. While cattle are reared across the communities in all gewogs, yak herding is not a common practice among the permanent settlers of the park. Some yak herding families of Phobjikha

and Gogona herd their yaks along the trails leading from Phobjikha valley towards the Black Mountain range. This is an ancient trail used for yak herding since ancient times. The people transit from one location to another depending upon the season, herding the yaks in the park's area for over 8 months every year. Though most of the communities in the park are connected with farm roads, people still keep horses in communities such as Korphu, Tangsibji, Athang and Langthel.

The Park has human settlements in the multiple use zone, who are primarily dependent on agriculture and livestock rearing. Since these settlements are surrounded by forests, constant interaction between wildlife and the human communities become inevitable, leading to various conflicts between human and wildlife. The main types of conflicts faced in the national park are: 1. Crop damage, 2. Livestock depredation and, 3. Human-human conflict due to wildlife (this is another dimension of HWC where two or more group of people clash in the varying interest of wildlife, such as conflict between conservationists and poachers).

3.Planned Activities in Year 2022

Activity 1. Construction of landslide protection wall and drains in JSWNP headquarter, Tshangkha.

- *Budget:* **Nu. 12,82,145.99/-**
- *Timeline: Q1, 2022 (January to March, 2022).*
- *Location: JSWNP Headquarter, Tshangkha*
- *Activity description:*

The activity will involve construction of over 25 m long retention wall (stone and concrete) and 70 m long U-drain below the staff quarter at the park's headquarter in Tshangkha. During the monsoon of 2021 a landslide occurred below the staff quarter in the park's headquarter which has posed threat to the staff quarters including the residence of Chief Forestry Officer. If not mitigated, the upcoming monsoon season would see more disaster at the site. Therefore, the construction of the retention wall and drains is felt necessary. The activity will be implemented in the first quarter of 2022 and completed by end of March 2022. The site is located on government land, within JSWNP headquarter compound, in a moderate slope. The wastewater of national highway above the headquarter is drained through the JSWNP headquarter compound and exits the area from the activity site; this wastewater is the main cause of the landslide. Although the wastewater is channelised through a concrete drainage system, the drains have withered in multiple locations; especially a stretch of about 70 m meters towards the end of the channel has been completely spoiled. Therefore, the drain has to be renovated in this stretch to channelise the wastewater until its exit from the park's compound. The site is located on the government reserve land, that is under the user right certification of JSWNP. The land is an empty government land below the park's staff quarter,

with no physical structures; however, Staff quarters housing 9 families and one office building (JSWNP hq.) are located within the vicinity of the site and are at risk of being washed away in the upcoming monsoon seasons if the site is not strengthened. Three trees (*Alnus nepalensis*) were present at the site, but all of them are uprooted by the landslide. The construction works will be outsourced to a local contractor. Number of workers will depend upon the contractor's decision; however, it can be estimated that around 10 to 15 workers would be involved. Cement, Sand and boulders will be used for the construction; cement will be procured from the distributor in Trongsa (expected quantity: 100 bags) sand and boulder will procured from the locality as marketed by NRDCL (expected quantity: 7 TL of stones and 3 TL of sand). The waste water running through the drain can be used for all construction purposes. For drinking (workers) the existing water supply of the park will be used. Electricity requirement, especially for workers cooking and lighting, will be met from the nearby source (office building). Workers will live in existing housing facility which has toilet and kitchen facilities. No significant amount of wastes will be generated. The kitchen wastes generated by workers will be disposed in waste collection truck that collects waste of the park every Wednesday and Saturday.

Potential social and environmental impacts of the activity are:

- Generation of waste from the construction.
- Risk of Disturbance to the soil (which is already eroding).
- Noise pollution
- Worker's health and safety.

Activity 2: Improvement of Sub-alpine meadow in Yakchu

- Budget: Nu. 3,50,000/-
- Timeline: Q3 2022 (October – December, 2022)
- Location: Yakchu, JSWNP
- Activity description as per above format.

The activity is to carry out de-branching of juniper in alpine grasslands as per the habitat management guideline of Bhutan in Yakchu (4000 masl). The main activities are to de-branch the extensive growth of Juniper bushes in the meadow areas, whereby all the lateral branches will be removed up to breast height of all the Juniper trees and the main stem singled out. This will open up ground space for growth of grasses for yaks and wild ungulates. Other species such as Rosa sp. Will also be removed as these are invasive in the region and degrade the meadow. The removed materials will be disposed off properly; will be collected in one location and burnt.

The alpine grasslands of JSWNP, starting from Wangjela to Yakchu have degraded over the years due to encroachment of such grasslands by Juniper recurva trees and other associated species such as Rosa seresea and Berberis sp. This has led to significant reduction in grazing areas for wildlife and domestic yaks alike. Since these areas are core tiger habitat, maintaining a viable population of wild herbivores such as sambar deer, barking deer, wild pigs, Himalayan serow, and musk deer is important as these species are the main tiger prey in

the region. Therefore, JSWNP began the habitat restoration works to revive these grasslands from 2019 (first year of BFL). De-branching of juniper trees that have encroached into the grasslands was carried out in Wangjela region, covering over 18 hectares of degraded grasslands in 2019, 2020 and 2021. Also, a long-term study of the site development under such intervention has been started in Wangjela from 2021 in order to determine the benefits of Juniper de-branching interventions. This year, we intend to carry out the similar Juniper de-branching activity in Yakchu region, which has similar habitat degradation trend. Yakchu lies along the ancient Black Mountain trail at an altitude of 3900 masl. the area has one transit hut of yak herders in which the herders live for two months every year.

The activity is intended to open up more areas to enable growth of more grasses for wildlife and domestic yaks. The activity has a budget of Nu. 3,50,000/- and will be implemented in August to September, 2022. Power chain saw will be used for de-branching activity; however, expert and licensed operators will be hired and proper safety gears will be used to minimize the risks. Around 8 local herders will engage for the work and they will be accommodated in the existing herders transit hut at Yakchu. They will use the existing water resources for cooking and will collect their food waste after completion of the work.

Potential social and environmental impacts of the activity are:

- Removal of vegetation
- Accidental Forest fire during burning of debris
- Accidental introduction of invasive alien species
- Growth of non-palatable species
- Air quality change & Noise disturbance
- Waste generation
- Worker's health and safety including COVID.

Activity 3: Riverbank protection wall construction in Reeti

- *Budget:* Nu. 10,36,769.34/-
- *Timeline:* Q1, 2022 (January – March, 2022)
- *Location: Reeti village, JSWNP*

Reeti village is a remote community in Jigmechholing gewog of Sarpang district, and falls inside JSWNP. The community with about 30 households depends upon agriculture and livestock rearing for livelihood. The community has a primary school, an outreach clinic (ORC) and a Lhakhang as community centre. Gongchhu (Gongkhola) is the main river that flows through the village and a smaller river, Rongchhu flows from near the school and joins the main river below the school. Both of these rivers increase in their volume during monsoon season and become small during winter. This habit of the rivers pose threat to the school and agricultural fields during the monsoon as the swollen rivers easily gets into agriculture fields and village. Therefore, riverbank protection measures, especially gabion

wall construction was felt necessary and the gewog administration requested the park to provide support and BFL came to fulfil this need.

The main activity is to construct gabion wall (about 100 meters long) along a stretch of Gongchhu, above Zhompagang village of Reeti and protect the agriculture fields from flooding. Stone wall will be laid inside iron wire net. The whole work will be outsourced to a local contractor who will execute the works as per agreed standards. The number of workers will depend upon the contractor's discretion. Approximately, there would be around 10 workers who would be mainly local residents and commute from the nearest community which is around 100 meters-500 meters. There will be no machinery used as well as no concrete will be used. However, the workers will have to get inside the river causing disturbance. The work would take around 1 month to complete. The work will be carried out in fourth quarter of 2021 (October to December, 2021).

Potential social and environmental impacts of the activity are:

- Water quality change
- Noise disturbance
- Waste generation
- Worker's health and safety including COVID

3. Mitigation Measures for Environmental and Social Impacts

Potential impact	Impact scale	Proposed mitigation measures	Responsible Party	Costs (million)
Activity 1: **Construction of landslide protection wall and drains in JSWNP headquarter, Tshangkha**				**Nu.**
Generation of waste from the construction.	Short term minor	• Proper disposal of mud and debris • Identification of the different waste types at the project site (soil, concrete, etc.); • Ensure that the kitchen waste generated by workers is properly disposed. • Proper containers/waste bins shall be provided at the project site; • Dumping waste shall be prohibited on fragile slopes, forests, and other sensitive areas or areas. • Collection, transportation and final disposal of all waste will be undertaken regularly (weekly). • Burning of construction waste shall be prohibited. • All waste shall be removed from the project site at the end of the activity.	-Contractor -BFL focal of JSWNP	Cost will be included in the activity budget.
Risk of Disturbance to the soil (which is already eroding).	Short term minor	• Foundation digging shall be done manually and carefully to avoid excessive soil disturbance. • Waste-water will be carefully drained using pipe towards safe location during construction. • Plantation of fast-growing species shall be done after construction.	-Contractor -BFL focal of JSWNP	Cost will be included in the activity budget.
Noise pollution	Short term minor	• Requirements to limit emissions shall be included in the bidding documents. • The construction work shall not be permitted during the nights, the operations on site shall be restricted to the hours 7am—7pm;	-Contractor -BFL focal of JSWNP	Cost will be included in the activity budget.

		• Vehicles that are excessively noisy shall not be operated until corrective measures have been taken; • Earplugs and protecting devices shall be provided to workers on site.		
Worker's health and safety including Covid related precautions	Short term minor	• Strictly follow workers' safety protocol attached as annexure • Ensure safety kits and first aid kits. • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged. • Decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers. • Use safety gears (helmet, gumboots, gloves). • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.) • Implement workers' GRM.	-Contractor -BFL focal of JSWNP	Cost will be included in the activity budget.
Activity 2: **Improvement of Sub-alpine meadow in Yakchu**				**Nu.**
Removal of vegetation	Short term minor	• Only de-branching should be done; no complete felling of trees shall be permitted. • Precautions should be taken to ensure that no accidental damage is caused to local vegetation • The removed branches shall be disposed properly	-BFL focal of JSWNP	Cost will be included in the activity budget.
Accidental Forest fire during burning of debris	Short term minor	• Prescribed burning shall be done strictly adhering to existing guideline and protocols related to fire prevention. • The residual debris shall be piled in one location and burnt under strict monitoring.	BFL Focal of JSWNP	Cost will be included in the activity budget.
Accidental introduction of	Short term minor	• No plantation shall be carried out. • Preliminary assessment of species composition shall be carried out before	BFL Focal of JSWNP	Cost will be included in the

invasive alien or non-palatable species.		the activity. • Regular assessment of the site shall be carried out after the activity implementation to monitor growth of any undesirable species.		activity budget.
Air quality change	Short term minor	Pre-construction: • Requirements to limit emissions shall be included in workplan approval note-sheet, as pre-requisite for the power-chain hiring. During Activity implementation; • Construction materials should be stored in appropriate and covered places to minimize dust; • Before approving the machine for the activity, fitness and emission test of the machine shall be performed; • Workers should wear protective masks to protect against dust and emissions, • Regular maintenance of the machines should be performed in order to reduce any leakages of oils, emissions and dispersion of pollution; • Burning of debris shall be prohibited.	-Machine operator/owner -BFL focal of JSWNP	Cost will be included in the activity budget.
Noise disturbance	Short term minor	• Requirements to limit noise shall be included in the workplan approval note-sheet and strictly followed during implementation. • The work shall not be permitted during the nights, the operations on site shall be restricted to the hours 8 am—5 pm; • Machines (power-chain saw) that are excessively noisy shall not be operated until corrective measures have been taken; • Earplugs and protecting devices shall be provided to workers on site.	-Machine operator/owner -BFL focal of JSWNP	Cost will be included in the activity budget.
Waste generation	Short term minor	• Proper disposal of mud and debris • Identification of the different waste types at the project site (soil, concrete, etc.); • Ensure that the kitchen waste generated by workers is properly disposed.	-Machine operator/owner -BFL focal of JSWNP	Cost will be included in the activity budget.

		• Proper containers/waste bins shall be provided at the project site; • Dumping waste shall be prohibited on fragile slopes, forests, and other sensitive areas or areas. • Collection, transportation and final disposal of all waste will be undertaken regularly (weekly). • Burning of construction waste shall be prohibited. • All waste shall be removed from the project site at the end of the activity.		
Worker's health and safety	Short term minor	• Strictly follow workers' safety protocol attached as annexure • Ensure safety kits and first aid kits. • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged. • Decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers. • Use safety gears (helmet, gumboots, gloves). • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.) • Implement workers' GRM.	-Machine operator/owner -BFL focal of JSWNP	Cost will be included in the activity budget.
Activity 3: **Riverbank protection wall construction in Reeti**				**Nu.**
Water quality change and disturbance of natural habitats.	Short term minor	• Water disturbance shall be minimized during the construction. • Throwing of construction materials in the water shall be avoided. • Use of heavy machinery shall be avoided during construction. • Construction will be done during the winter season when the water volume is at the minimum. • The area shall be cleaned after the activity completion.	-BFL focal in JSWNP -Nabji ranger -Contractor	Cost will be included in the activity budget.

		• The downstream communities shall be consulted and well informed about the activity		
Noise disturbance	Short term minor	• Requirements to limit noise emissions shall be included in the bidding documents. • The construction work shall not be permitted during the nights, the operations on site shall be restricted to the hours 7am—7pm; • Vehicles that are excessively noisy shall not be operated until corrective measures have been taken; • Earplugs and protecting devices shall be provided to workers on site.	-BFL focal in JSWNP -Nabji ranger -Contractor	Cost will be included in the activity budget.
Waste generation	Short term minor	• Proper disposal of mud and debris • Identification of the different waste types at the project site (soil, concrete, etc.); • Ensure that the kitchen waste generated by workers is properly disposed. • Proper containers/waste bins shall be provided at the project site; • Dumping waste shall be prohibited on fragile slopes, forests, and other sensitive areas or areas. • Collection, transportation and final disposal of all waste will be undertaken regularly (weekly). • Burning of construction waste shall be prohibited. • All waste shall be removed from the project site at the end of the activity.	-BFL focal of JSWNP -Nabji ranger -Contractor	Cost will be included in the activity budget.
Worker's health and safety including COVID	Short term minor	• Strictly follow workers' safety protocols attached as annexure. • Ensure safety kits and first aid kits. • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged. • Decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers.	-BFL focal of JSWNP -Nabji ranger -Contractor	Cost will be included in the activity budget.

		• Use safety gears (helmet, gumboots, gloves). • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.)		

4. ESMP Implementation Arrangements

The implementation of project activities will be carried out by the BFL focal person in JSWNP. The focal person will be responsible for compliance with all procedures outlined in this ESMP, as well as compliance with any requirements to obtain clearances, permits, approvals, or consent documents from relevant authorities and stakeholders. This ESMP should be part of the contract that the PA will sign with the Contractor(s) (including community contractors) for implementation of the planned activities in JSWNP in 2022. The Contractor is obligated to perform all proposed preventive or mitigation environmental and social measures in this plan and to keep the evidence of any documents related to applying these measures (e.g., letter asking the municipality for disposal of inert waste, records on OHS information session performed for all workers before start of activities, all developed EHS plans, etc.).

An OHS information session should be organized by the Contractor for all workers prior start the project activities and prior any specific tasks with high health risks. The JSWNP's Supervising Engineer needs to monitor the implementation of proposed measures by the Contractor and Contractor's subcontractors with visual checking, reviewing the records of evidence that the measures have been applied and ask the Contractor to apply the measures as soon as possible. Non-compliances should be recorded and the Report on any non-compliances should be reported to the ESS officer immediately, and the ESS officer will report it to the PCU (M&E Officer). Each non-compliance should be closed with appropriate measure/s and the evidence should be kept. Disbursement of project funds to the PA will be contingent upon their full compliance with the safeguard's requirements.

5. ESMP Monitoring Arrangements

Protocol for monitoring of activities under this ESMP will be carried out as follow;

Sl#	Activities	Monitoring team	Timeline		Location	Means of Verification
			Start	Complete		
1	*Construction of landslide protection wall and drains in JSWNP headquarter, Tshangkha.*	Field Focal	Jan. 2022	March, 2022	Tshangkha	Monitoring reports/ photos
		ESS focal	March 2022	March 2022		
2	*Improvement of Sub-alpine meadow in Yakchu.*	Field Focal	Sept. 2022	Sept. 2022	Yakchu	Monitoring reports
		ESS focal	Sept. 2022	Sept. 2022		
3	*Riverbank protection wall construction in Reeti.*	Field Focal	Feb. 2022	March 2022	Reeti	Monitoring reports
		ESS focal	March 2022	March 2022		

Activity 1: Construction of landslide protection wall and drains in JSWNP headquarter, Tshangkha.

Monitoring by implementing entities:

- The BFL focal and CFO of JSWNP will be available on daily basis to monitor the activity implementation by the contractor.

Monitoring by ESS consultants:

- Field visits by ESS consultants – at least once during the intervention (March 2022);
- Reports by ESS consultants to the PCU (M&E officer) – within two weeks after the field visit and for semi-annual reporting

Quarterly reports by PCU (M&E officer) to Secretariat

Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final APRs)

Activity 2: Improvement of Sub-alpine meadow in Yakchu.

Monitoring by implementing entities:

- The BFL focal of JSWNP will be available on daily basis to monitor the activity implementation.

Monitoring by ESS consultants:

- Field visits by ESS consultants – at least once during the intervention (September 2022);
- Reports by ESS consultants to the PCU (M&E officer) – within two weeks after the field visit and for semi-annual reporting

Quarterly reports by PCU (M&E officer) to Secretariat

Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final APRs)

Activity 3: Riverbank protection wall construction in Reeti.

Monitoring by implementing entities:

- The BFL focal/ Nabji Ranger will monitor the works at least twice during the activity implementation.

Monitoring by ESS consultants:

- Field visits by ESS consultants – at least once during the intervention (March 2022).

Quarterly reports by PCU (M&E officer) to Secretariat

Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final APRs)

6. Capacity Need and Budget

Activities under this ESMP will be implemented by the BFL focal person, supervising engineer/staff, and a contractor that will employ workers as mentioned in the contract agreement.

- *The budget for each of the activities is: (last section)*

Sl#	Activity	Amount (Nu.)	Budget for ESS mitigation
1	*Construction of landslide protection wall and drains in JSWNP headquarter, Tshangkha*	**Nu. 12,82,145.99/-**	Budget included in the activity budget
2	*Improvement of Sub-alpine meadow in Yakchu.*	**Nu. 3,50,000/-**	Budget included in the activity budget

3	*Riverbank protection wall construction in Reeti.*	**Nu. 10,36,769.34/-**	Budget included in the activity budget
Total		**Nu. 2668915.33/-**	

7. Consultation and Disclosure Mechanisms

This ESMP has been prepared in a participatory manner, and a community consultation will be carried out before implementing the activity to consult the local communities regarding the planned project activities, solicit their opinions, and enable them to question proposed mitigation measures.

For the *Improvement of Sub-alpine meadow in Yakchu. the* consultation will be carried out in August, 2022.The 5 yak herding families who use the alpine grasslands in Yakchu region will be the participants. The meeting will mainly discuss the objectives of the Juniper de-branching interventions, and its benefits for them and the wildlife. BFL's ESS, and GRM mechanisms will also be communicated.

For the *Riverbank protection wall construction in Reeti.* the consultation will be carried out in January, 2022. The communities of Reetey and Zhompagang will be the participants of the meeting. The meeting will mainly discuss the objectives of the intervention, timeline of the activity and the possible impacts of the activity and their mitigation measures. BFL's ESS, and GRM mechanisms will also be communicated.

Official minutes of consultation meetings (along with a list of participants, disaggregated by gender and age) will be maintained and submitted to the ESS officer at PCU for further records and disclosure.

The full English version of this ESMP, as well as an executive summary in Dzongkha, shall be disclosed on the website of MoAF, BFL and WWF, Bhutan Program. Hard copies of the ESMP should also be available at the PA Management Office and at the PCU Office.

8. Stakeholder Engagement Plan

The stakeholders involved in the activity will be engaged during the process of implementation of the activity in following manner:

- For the alpine grassland improvement activity, the local yak herding communities will be engaged during the activity implementation as helpers, mainly to dispose the branches.
- For the riverbank protection wall construction, the local contractor and its local members would be involved in the construction works.

- For the alpine grassland improvement activity, the meeting will be carried out during the consultation meeting with the communities in August, 2022, and for the riverbank protection activity, the meeting will be carried out in January, 2022.

Annexure

BFL: OCCUPATIONAL HEALTH AND SAFETY STANDARDS

Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. Implementing entities should hire contractors that have the technical capability to manage the occupational health and safety issues of their workers, extending the application of the hazard management activities through formal procurement agreements.

This section provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety. It is based on the IFC's Environmental, Health, and Safety Guidelines (April 30, 2007)[1] and the Occupational Health and Safety Guidelines of Bhutan's Construction Development Corporation Ltd., which relies on the national Regulation on Occupational Health, Safety and Welfare 2012, Regulation on Working Conditions 2012 and Labour Act 2007, and in compliance to Sl. No. 21 of Regulation on Occupational Health, Safety and Welfare 2012.

1. General Facility Design and Operation

Integrity of Workplace Structures

Permanent and recurrent places of work should be designed and equipped to protect occupational health and safety:

- Surfaces, structures and installations should be easy to clean and maintain, and not allow for accumulation of hazardous compounds.
- Buildings should be structurally safe, provide appropriate protection against the climatic conditions, and have acceptable light and noise conditions.
- Fire resistant, noise-absorbing materials should, to the extent feasible, be used for cladding on ceilings and walls.
- Floors should be level, even, and non-skid.
- Heavy oscillating, rotating or alternating equipment should be located in dedicated buildings or structurally isolated sections.

Severe Weather and Facility Shutdown

- Workplace structures should be designed and constructed to withstand the expected elements for the region and have an area designated for safe refuge (e.g., in case of earthquake).

Workspace and Exit

- The space provided for each worker, and in total, should be adequate for safe execution of all activities, including transport and interim storage of materials and products.

Fire Precautions

The workplace should be designed to prevent the start of fires. Other essential measures include:

- The workplace shall be provided with adequate means of protection and escape in case of fire.
- The workplace shall be provided with adequate number of relevant fire extinguishers.

[1] https://www.ifc.org/wps/wcm/connect/1d19c1ab-3ef8-42d4-bd6b-cb79648af3fe/2%2BOccupational%2BHealth%2Band%2BSafety.pdf?MOD=AJPERES&CVID=ls62x8l.

- Workers shall wear shoes without iron or steel nails or any other exposed ferrous materials which is likely to cause sparks by friction.
- Smoking, lightening, or carrying of matches, lighters or smoking materials shall be prohibited within and around the construction sites.
- All other precautions, as are reasonably practicable, shall be taken to prevent initiation of ignition from all other possible sources such as open flames, frictional sparks, overheated surfaces of machinery or plant, chemical or physical, chemical reaction and radiant heat.
- At every workplace adequate provision of water supply for firefighting shall be provided and maintained.
- Facilities shall be equipped with firefighting equipment (e.g., fire extinguishing bottle). The equipment should be maintained in good working order and be readily accessible. It should be adequate for the dimensions and use of the premises, equipment installed, physical and chemical properties of substances present, and the maximum number of people present.
- Manual firefighting equipment shall be easily accessible and simple to use.
- Fire extinguishers and emergency alarm systems that are both audible and visible should be in place.
- Fire exits should be identified and marked in Dzongkha and English- all workers should be made aware of the fire exits.

Lavatories and Showers

- Adequate lavatory facilities (toilets and washing areas) should be provided for the number of people expected to work in the facility (one for at least one for every 20 workers). Toilet facilities should also be provided with adequate supplies of water and soap and also be connected to sewerage system.

Potable Water Supply

- Adequate supplies of clean drinking water should be provided to workers at the work site.

Clean Eating Area

- Where there is potential for exposure to substances poisonous by ingestion, suitable arrangements are to be made for provision of clean eating areas where workers are not exposed to the hazardous or noxious substances.

Lighting

- Workplace should receive adequate natural light and if required supplemented with artificial illumination to promote worker's safety and enable safe equipment operation.
- Emergency lighting of adequate intensity should be provided in case of failure of the powerline.

Safe Access

- Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe, and appropriate access.
- Equipment and installations requiring servicing, inspection, and/or cleaning should have unobstructed, unrestricted, and ready access.
- Covers need to be provided where ever necessary, if there is risk of falling of overhead object.
- Measures to prevent unauthorized access to dangerous areas should be in place.

First Aid

- The employer should ensure that qualified first-aid can be provided at all times. A sufficient number of first aid boxes or cupboards shall be provided and maintained so as to be readily available during all working hours, provided that the distance of the nearest first aid box or a cupboard stall be not more than 200m from any working place.
- First aid kits include all equipment outlined in Annex 1 to these Guidelines.
- Each first aid box or a cupboard shall be distinctly marked "FIRST AID"

Air Supply

- Workplace should have adequate ventilation for fresh air

2.Information Provision on Occupational Health and Safety (OHS)

2. The Contractor is responsible to hold an information session to familiarize all workers with the OHS procedures specified in these guidelines, in order to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow workers.
3. The information session should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-specific hazard or color coding in use should be thoroughly reviewed as part of orientation training.

3. Physical Hazards

Physical hazards represent potential for accident or injury or illness due to repetitive exposure to mechanical action or work activity.

Rotating and Moving Equipment

Injury or death can occur from being trapped, entangled, or struck by machinery parts due to unexpected starting of equipment or unobvious movement during operations. Recommended protective measures include:

- Designing machines to eliminate trap hazards and ensuring that extremities are kept out of harm's way under normal operating conditions. Examples of proper design considerations include two-hand operated machines to prevent amputations or the availability of emergency stops dedicated to the machine and placed in strategic locations.

- Where a machine or equipment has an exposed moving part or exposed pinch point that may endanger the safety of any worker, the machine or equipment should be equipped with, and protected by, a guard or other device that prevents access to the moving part or pinch point. Guards should be designed and installed in conformance with appropriate machine safety standards.

Noise

- No worker should be exposed to a noise level greater than 90 dB(A) for a duration of more than 8 hours per day without wearing ear plugs/ear muffs.
- Exposures to impulsive or impact noise shall not exceed 140dB(A).
- For every 3 dB(A) increase in sound levels from the permissible limit of noise, the 'allowed' exposure period or duration should be reduced by 50 percent.
- Where it is not practicable to reduce the noise, the employer must limit the duration of time persons employed or working in the workplace are exposed to the noise so that such persons are not exposed to excessive noise.
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.
- Periodic medical hearing checks should be performed on workers exposed to high noise levels.

Vibration

In any workplace where persons are at work in any process or operation which involves exposure to vibration which may constitute a risk to their health, it shall be the duty of the employer to provide, so far as is reasonably practicable, effective means to reduce the vibration.

Electrical

Exposed or faulty electrical devices, such as circuit breakers, panels, cables, cords and hand tools, can pose a serious risk to workers. Overhead wires can be struck by metal devices, such as poles or ladders, and by vehicles with metal booms. Vehicles or grounded metal objects brought into close proximity with overhead wires can result in arcing between the wires and the object, without actual contact. Recommended actions include:

- Marking all energized electrical devices and lines with warning signs
- Locking out (de-charging and leaving open with a controlled locking device) and tagging-out (warning sign placed on the lock) devices during service or maintenance
- Checking all electrical cords, cables, and hand power tools for frayed or exposed cords and following manufacturer recommendations for maximum permitted operating voltage of the portable hand tools
- Double insulating / grounding all electrical equipment used in environments that are, or may become, wet; using equipment with ground fault interrupter (GFI) protected circuits

- Protecting power cords and extension cords against damage from traffic by shielding or suspending above traffic areas
- Appropriate labeling of service rooms housing high voltage equipment ('electrical hazard') and where entry is controlled or prohibited
- Establishing "No Approach" zones around or under high voltage power lines
- Conducting detailed identification and marking of all buried electrical wiring prior to any excavation work
- Every person who is working on an electric supply line or apparatus or both shall be provided with tools and devices such as gloves, rubber shoes, and safety belts, ladders, earthing devices, helmets, line testers, hand lines whichever is relevant for protecting him/her from mechanical and electrical injury.

Eye Hazards

Solid particles from a wide variety of industrial operations, and/or a liquid chemical spray may strike a worker in the eye causing an eye injury or permanent blindness. Recommended measures include:

- Use of machine guards or splash shields and/or face and eye protection devices, such as safety glasses with side shields, goggles, and/or a full-face shield. Frequent checks of these types of equipment prior to use to ensure mechanical integrity is also good practice.
- Where machine or work fragments could present a hazard to transient workers or passers-by, extra area guarding or proximity restricting systems should be implemented, or PPE required for transients and visitors.

Welding / Hot Work

Welding creates an extremely bright and intense light that may seriously injure a worker's eyesight. In extreme cases, blindness may result. Additionally, welding may produce noxious fumes to which prolonged exposure can cause serious chronic diseases. Recommended measures include:

- Provision of proper eye protection such as welder goggles and/or a full-face eye shield for all personnel involved in, or assisting, welding operations. Additional methods may include the use of welding barrier screens around the specific work station.

Working Environment Temperature

Exposure to hot or cold working conditions in indoor or outdoor environments can result temperature stress-related injury or death. Use of personal protective equipment (PPE) to protect against other occupational hazards can accentuate and aggravate heat-related illnesses. Extreme temperatures in permanent work environments should be avoided through implementation of engineering controls and ventilation. Where this is not possible, such as during short-term outdoor work, temperature-related stress management procedures should be implemented which include:

- Monitoring weather forecasts for outdoor work to provide advance warning of extreme weather and scheduling work accordingly
- Providing temporary shelters to protect against the elements during working activities or for use as rest areas
- Use of protective clothing
- Providing easy access to adequate hydration such as drinking water or electrolyte drinks.

Ergonomics, Repetitive Motion, Manual Handling

Injuries due to ergonomic factors, such as repetitive motion, overexertion, and manual handling, take prolonged and repeated exposures to develop, and typically require periods of weeks to months for recovery. These OHS problems should be minimized or eliminated to maintain a productive workplace. Controls may include:

- Use of mechanical assists to eliminate or reduce exertions required to lift materials, hold tools and work objects, and requiring multi-person lifts if weights exceed thresholds (adult man- 50kg, adult female-25kg)
- Selecting and designing tools that reduce force requirements and holding times, and improve postures
- Incorporating rest and stretch breaks into work processes, and conducting job rotation
- Implementing quality control and maintenance programs that reduce unnecessary forces and exertions

Working at Heights

Fall prevention and protection measures should be implemented whenever a worker is exposed to the hazard of falling more than two meters; into operating machinery; into water or other liquid; into hazardous substances; or through an opening in a work surface. Fall prevention / protection measures may also be warranted on a case-specific basis when there are risks of falling from lesser heights. Fall prevention may include:

- Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area
- Proper use of ladders and scaffolds by trained workers
- Use of fall prevention devices, including safety belt and lanyard travel limiting devices to prevent access to fall hazard area, or fall protection devices such as full body harnesses used in conjunction with shock absorbing lanyards or self-retracting inertial fall arrest devices attached to fixed anchor point or horizontal life-lines
- Appropriate training in use, serviceability, and integrity of the necessary PPE
- Inclusion of rescue and/or recovery plans, and equipment to respond to workers after an arrested fall

Illumination

Work area light intensity should be adequate for the general purpose of the location and type of activity, and should be supplemented with dedicated work station illumination, as needed. Controls should include:

- Use of energy efficient light sources with minimum heat emission
- Undertaking measures to eliminate glare / reflections and flickering of lights
- Taking precautions to minimize and control optical radiation including direct sunlight.
- Exposure to high intensity UV and IR radiation and high intensity visible light should also be controlled
- Controlling laser hazards in accordance with equipment specifications, certifications, and recognized safety standards. The lowest feasible class Laser should be applied to minimize risks.

4. Personal safety equipment for workers

All workers are equipped with the following personal safety equipment: helmet, gloves, ordinary boots and reflective vest.

Workers that are exposed to dust should also be provided with eye protection glasses and face mask. Workers that are exposed to noise should be provided with ear plugs. Workers that need to work in the dark should be provided with hand and cap lamps.

Workers are instructed regarding safety equipment as follows:

- Always wear complete set of protective wear.
- Do not wear loose clothing, such as overhang shirt, jackets, mufflers etc.
- Tuck shirt and jacket well.
- Secure helmet with belt under the chin.
- Tuck the bottom sleeves of trouser inside safety boot.
- Dress with reflector

5. Standards for workers' accommodation[2]

1. General living facilities

- The location of the facilities is designed to avoid flooding or other natural hazards
- The living facilities are located within a reasonable distance from the worksite.
- Transport is provided to worksite safe and free if the accommodation is reasonably far from the worksite.

[2] Based on Workers' accommodation: processes and standards—A guidance note by IFC and the EBRD (August 2009): https://www.ifc.org/wps/wcm/connect/60593977-91c6-4140-84d3-737d0e203475/workers_accomodation.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-60593977-91c6-4140-84d3-737d0e203475-jqetNIh

- The living facilities are built using adequate materials, kept in good repair and kept clean and free from waste and refuse.

2. Drainage

- The site is adequately drained.

3. Heating, air conditioning, ventilation and light

- Living facilities are provided with adequate heating, ventilation, and light systems including emergency lighting.

4. Water

- Workers have easy access to a supply of clean/ potable water in adequate quantities.
- The quality of the water complies with national/local requirements and is regularly monitored.
- Tanks used for the storage of drinking water are constructed and covered to prevent water stored therein from becoming polluted or contaminated.
- The quality of the drinking water

5. Wastewater and solid waste

- Wastewater, sewage, food and any other waste materials are adequately discharged in compliance with national and/or international standards and without causing any significant impacts on camp residents, the environment or surrounding communities.
- Specific containers for waste collection are provided and emptied on a regular basis.

6. Rooms/dormitories facilities

- Rooms/dormitories are kept in good condition. They are aired and cleaned at regular intervals.
- Rooms/dormitories are built with easily cleanable flooring material.
- Rooms/dormitories and sanitary facilities are located in the same buildings.
- Residents are provided with enough space.
- The number of workers sharing the same room/dormitory is minimized.
- Doors and windows are lockable and provided with mosquito screens when necessary.
- Separate sleeping areas are provided for men and women.
- A separate bed is provided for every worker and use of double deck bunks is minimized.
- Workers are provided with comfortable mattresses. Workers may be expected to use their own pillows and bed linens.
- Adequate facilities for the storage of personal belongings are provided.
- Separate storages for work clothes and PPE and depending on condition, drying/airing areas are provided.

8. Sanitary and toilet facilities

- Sanitary and toilet facilities are constructed from materials that are easily cleanable.
- Sanitary and toilet facilities are cleaned frequently and kept in working condition.
- Toilets, showers/bathrooms and other sanitary facilities are designed to provide workers with adequate privacy including ceiling to floor partitions and lockable doors.
- Separate sanitary and toilet facilities are provided for men and women.
- Toilet and shower facilities are conveniently located and easily accessible.
- Toilet facilities are environmentally friendly (e.g., pit toilet) and sewage is not disposed into the worksite.
- Open defecation in the vicinity of project sites should be prohibited.
- An adequate number of hand wash basins and showers/bathrooms facilities are provided.

9. Cooking and laundry facilities

Cooking and laundry facilities should available for workers at the worksite or in close vicinity to it. These facilities should be kept in clean and sanitary conditions.

Annex 1. Contents of first aid box or cup-boards

The first aid boxes or cup-boards shall be distinctively marked with white cross on a green background and shall contain the following equipment:

1. Small sterilized dressings (12)
2. Medium size sterilized dressings (6)
3. Large size sterilized dressings (6)
4. Large size sterilized burn dressings (6)
5. (1/2 oz.) Sterilized cotton wool (6 packets)
6. (2oz.) Bottle containing a two per cent alcoholic solution of iodine (1)
7. (2oz.) Bottle containing Betadine (antiseptic solution) having the dose and mode of administration indicated on the label (1)
8. Roll of adhesive plaster (1)
9. A snake bite lancet (1)
10. Torch light (1)
11. Pair of scissors (1)
12. Tablets Aspirin (5gms) 2 dozen
13. Burn Ointment (2 tubes)
14. Dettol (2 phial, about 2 ozs)
15. Bandages 4 inches wide
16. Bandages 2 inches wide
17. Triangular bandages (2)
18. Packets of safety pins (1)
19. A supply of suitable splint