Final Report

ESSA 35 YEARS

Supplemental Environmental and Social Impact Assessment
Upper Trihsuli-1 Hydropower Project, Nepal

Prepared for Nepal Water & Energy Development Company Pvt., Ltd.
and the International Financial Corporation

NWEDC NEPAL WATER & ENERGY DEVELOPMENT COMPANY

IFC International Finance Corporation World Bank Group

Prepared for:
Nepal Water & Energy Development Company (NWEDC) and the International Finance Corporation (IFC)

Final Report:
Supplemental Environmental and Social Impact Assessment- Upper Trihsuli-1 Hydropower Project, Nepal

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Cover Photo:
Trishuli River downstream from the proposed powerhouse site, facing upstream. October, 2013. [Photo: P. de la Cueva]

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Organization of the Report

To facilitate the reader's ability to identify background and findings that are of most interest, this report is organized as follows:

Chapter 1: Introduction – This chapter describes the work done so far under this Independent Environmental and Social Consultant (IESC) assignment.

Chapter 2: Project Overview – This chapter describes the Upper Trishuli-1 Hydropower Project and the environmental and social context of the Trishuli Watershed. Current and future hydropower development in the watershed is also discussed.

Chapter 3: Summary of supplemental studies – This chapter provides an overview of the various additional studies that have been conducted in order to fill in the gaps in order to bring the Project in conformance with international standards (i.e. IFC Performance Standards on Environmental and Social Sustainability). In particular the scope and main findings of the different studies are discussed in this section:

- Complementary Environmental and Social Baseline
- GIS Mapping and Spatial Analysis
- Cumulative Impact Assessment
- Environmental Flows Assessment
- Construction Environmental and Social Management Plan

Chapter 4: **Environmental and Social Action Plan** – Based on the analysis discussed in Chapter 4, this section presents an ESAP describing a number of action items required to ensure the Project's conformance with international standards. This Action Plan was developed independently by ESSA for future consideration by Lenders to the Project.

Appendices A and B: Complementary Social and Environmental Baseline – Provides a summary of the supplemental environmental and social surveys conducted by Nepal Environmental & Scientific Services (NESS) to complement the original baseline of the Project. These supplemental studies have covered: (i) water quality and aquatic habitats; (ii) groundwater; (iii) ambient air quality; (iv) sound levels; (v) soil quality; (vi) vegetation; (vii) biodiversity; (viii) hazards; and (ix) socio-economic studies at the community and Project affected family (PAF) level.

Appendix C: GIS Mapping and Spatial Analysis – Provides a summary of the spatial information generated at three spatial scales: Project, Trishuli watershed, and Gandaki River System level. A number of thematic maps and a series of watershed pressure/risk indicators were developed as part of this study with the goal of understanding of the Upper

Trishuli-1 Hydropower and similar projects' effect on natural environments in the Trishuli watershed as well as the whole of the Gandaki basin.

Appendix D: Cumulative Impact Assessment – This document presents the results of the supplemental Cumulative Impact Assessment. The assessment followed international best practice, mainly IFC's *Good Practice Handbook Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets*, for the assessment and management of cumulative impacts from the UT-1 Project.

Appendix E: Environmental Flows Assessment – Provides the results and recommendations of the assessment conducted on the environmental flows that will be released into the diversion reach during the Project operations. The study also looks at upstream and downstream impacts on aquatic habitats, suggest mitigation options to these impacts, and sets up the terms of reference for the development of an *Environmental Flow Management Plan*.

Appendix F: Environmental and Social Management Plan for Construction - This CESMP has been developed to ensure that any negative environmental and social impacts of the UT-1 Project are minimized and that any possible environmental, safety and efficiency benefits are maximized during project construction.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

Abbreviations

CHAL	Chitwan Annapurna Landscape
CIA	Cumulative Impact Assessment
ESMP	Environmental Flow Management Plan
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESSA	ESSA Technologies Ltd
GIS	Geographic Information System
IEE	Initial Environmental Examination
IFC	International Finance Corporation
NEFIN	Nepal Federation of Indigenous Nationalities
NESS	Nepal Environmental & Scientific Services
Rs	Nepalese rupees
PAF	Project Affected Family
VDC	Village Development Committee

Executive Summary

The proposed Upper Trishuli-1 (UT-1) Hydropower Project is a 216 MW greenfield run-of-river facility located in the upper Trishuli Watershed, in the Rasuwa District in Central Nepal. It consists of a 77 m wide diversion dam located 275 m downstream of the confluence of the Trishuli with the Bhotekosi River. The weir, designed as a concrete gravity dam, stands 30 m from the ground and has a 26.3 m deep concrete foundation.

The project is designed to function as a run-of-river facility, working constantly up to a maximum diversion capacity of 76 m^3/s. The diverted water will be transported by a 9.82 km headrace tunnel to an underground power station where three 72 MW Francis turbines will be installed. At the normal operating level (1255 m), the reservoir area will occupy 2.1 ha.

The Project proponent, Nepal Water & Energy Development (NWEDC), retained ESSA Technologies Ltd. (ESSA) to act as Independent Environmental and Social Consultant (IESC) and provide assistance with upgrading the environmental and social management of the UT-1 Project according to international standards.

ESSA conducted an environmental and social gap analysis, mainly based on the approved EIA (Jade Consult 2011), to identify areas of non-conformance with IFC Performance Standards (PS) and related World Bank Group Environmental, Health and Safety (EHS) Guidelines. In order to satisfy international Lender requirements, a number of complementary studies were identified as required to be conducted in the short term in order to bring the project sufficiently into conformance with international standards.

This report presents a summary of the findings resulting from these supplemental studies, which are briefly described in the following sections.

Complementary environmental and social baseline

In order to address a number of priority information gaps that were identified in the original environmental and social baseline of the Project, Nepal Environmental & Scientific Services (NESS[1]) conducted a series of surveys to complement the existing information. At this stage, most of these environmental and social baseline studies have been completed but a number of on-going longer-term studies are required (e.g. aquatic surveys).

A **socioeconomic assessment** (Appendix A), both at the community and Project Affected Families (PAFs) level, was conducted in order to assess the socioeconomic impacts derived from the Project and to develop appropriate mitigation measures, including livelihood restoration plans. The Project area is predominantly inhabited by Tamangs; a marginalized

[1] NESS is an environmental and social consulting firm based in Kathmandu.

indigenous group (*Janajati*) recognized by the Nepal Federation of Indigenous Nationalities (NEFIN). The primary occupation of these communities is subsistence agriculture.

As of June 2014, the land requirements of the project are estimated in 99.89 ha, including 79.27 ha government-owned land (mostly community forests), 4.9 ha of private land, and 15.7 ha of Guthi/trust land. This land acquisition will result in the economic displacement of 40 households or project affected families (PAFs), all from Haku VDC. These PAFs are owners or tenants on agricultural land that will be occupied by the project. Additionally, three cases of physical displacement or resettlement have been reported to date.

Appendix A includes the terms of reference for a *Land Acquisition and Livelihood Restoration Management Plan* compliant with national regulations and international standards (i.e. IFC Performance Standard 5) that articulates a comprehensive assistance strategy that clearly identifies the impacts and the target groups, and integrates all the mitigation and compensation measures.

The monthly **aquatic habitat** surveys (Appendix B) conducted to date has identified limited diversity of fish species in the Project area. A species of snow trout (*Schizothorax richardsonii*), locally known as *Buche Asla*, is the predominant species and has been consistently sampled during the period August 2013-July 2014 along a 15 km river stretch including the diversion reach and the immediate upstream and downstream reach. This species is a mid-distance migratory and it has been classified as vulnerable by the IUCN Red List because, despite its wide geographic distribution across many watersheds in the Himalayan foothills, recent observations indicate drastic declines in many areas of its range due to introduction of exotics, damming and overfishing. *S. richardsonii* was selected as the key indicator species for the environmental flows assessment (Appendix E). Water quality and aquatic habitat characteristics (i.e. physical features, chlorophyll, periphyton, and macro-invertebrates) were also recorded monthly as part of the aquatic survey.

From a **biodiversity** perspective, the terrestrial wildlife and the vegetation surveys (Appendix B) have confirmed that the predominant habitat in the project area is forest managed by Community Forest Groups showing signs of significant degradation, compared to the more preserved Langtang National Park forest on the opposite side of the river. Various animal and plant species under international and national protection categories were identified during the surveys. The construction of the UT-1 Project and associated infrastructure, especially the 19-km road along the west bank of the river, will have an impact on terrestrial habitats in the form of loss of available habitat, fragmentation, and displacement of animals. A Biodiversity Management Plan is recommended to mitigate these impacts.

Hazard (**landslides**) assessment and **groundwater** and **spring** surveys were also conducted. Potential impacts on springs, mainly through physical damage during construction, constitute a major concern for local communities. Springs were inventoried

across the project area and those more vulnerable to impacts were identified. Provisions for monitoring and mitigation of potential impacts to springs are included in the Construction ESMP (Appendix F). Groundwater surveys identified two types of aquifers along the tunnel alignment: shallow and regional aquifers. These water bodies are not connected and only the deeper aquifer could be affected during the tunnel excavation but no permanent effect is expected. Landslides were inventoried in the project area. Although not active at present condition, they represent a risk to be monitored and mitigated as appropriate.

GIS Mapping and Spatial Analysis

A lack of spatial information prevented a thorough understanding of the Upper Trishuli-1 Hydropower and similar projects' effect on natural environments in the Trishuli watershed as well as the whole of the Gandaki basin. GIS Mapping and Spatial Analysis was completed to collect, review and generate relevant spatial information for the Project. The study (Appendix C) included the creation of a set of thematic maps for the Trishuli watershed and an assessment of watershed pressures across the sub-basins of the Gandaki system.

Cumulative Impact Assessment

In accordance with IFC Performance Standard 1, a Cumulative Impact Assessment (CIA) was conducted for the UT-1 Project following international best practice (Appendix C).

The approach taken for the CIA analysis focused on the identification and assessment of cumulative impacts on key Valued Environmental and Social Components (VECs), which were identified with the input of local stakeholders and included: water resources, fish and aquatic habitats, erosion and sedimentation processes, terrestrial habitats, natural resources use, and cultural and religious sites. Based on the results of this assessment, mitigation measures, both within NWEDC responsibility and requiring collaboration with other hydropower sponsors and relevant stakeholders, were recommended. These actions should be implemented within the framework of a Cumulative Impacts Management Plan.

Environmental Flow Assessment

Once in operation, the UT-1 Project will create a flow-reduced segment of about 11 km along the diversion reach; from the intake site to the tailrace. According to the currently proposed operational rules, a minimum of 10% of the mean monthly flow (consistent with Nepal regulatory requirements) will be released as environmental flow. Impacts on aquatic ecology and habitats are therefore expected to occur within the 11-km diversion reach as well as in the downstream and upstream portions of the Trishuli River near the project site.

In order to assess the potential impacts of the alteration of the natural hydrological regime, and evaluate the adequacy of the proposed flow operational rule, a hydrology-based assessment (Appendix E) was conducted focusing on the dominant fish species *Schizothorax richardsoni*.

Based on partial knowledge of the migratory patterns and habitat requirements of *S. richardsonii*, ***March-April is identified as the likely critical period when upstream***

migration and spawning occur and increased environmental flow levels will likely be required. This potential requirement is examined through the sensitivity analysis of impacts to power generation for increased environmental flow regimes (50% and 80% of unimpaired flow) within those two months, in addition to the original design of 10% of unimpaired flow during the other months. Annual power production would be reduced by about 5% for each month (March and April) if the most conservative (80%) environmental flow is maintained. This would have significant impacts on the power generation scheme.

Given the current knowledge gaps on aquatic habitats in the Trishuli River, especially regarding the biology and life-cycle of *S. richardsonii,* the recommended next steps to ensure the Project's conformance with IFC Performance Standards (i.e. no net loss of natural habitat) is to develop an Environmental Flows Management Plan (EFMP terms of reference are provided in Appendix E). The EFMP is also needed to better assess and implement adequate mitigation measures to minimize the impacts derived from the reduced flows in the diversion reach and the barrier effect and fish entrainment risk created by the dam and head works.

Construction Environmental and Social Management Plan

A Construction ESMP is presented in Appendix F. This plan sets up specific rules and guidance for addressing environmental and social issues during the construction of all project components. Responsibilities and monitoring protocols are also included in the plan.

Environmental and Social Action Plan

Section 4 presents an Environmental and Social Action Plan to ensure the Project is designed, constructed, and operated in conformance with Lenders and international standards. The priority activities include the following:

1. Project Environmental and Social Management System (ESMS)
2. Environmental Flows Management Plan (EFMP)
3. Land Acquisition and Livelihood Restoration Plan
4. Vulnerable Peoples Plan
5. Cumulative Impacts Management Plan
6. Biodiversity and Wildlife Conservation Management Plan
7. Reforestation Plan
8. Catchment Area Management and Treatment Plan
9. EIA for Transmission Line
10. Operations Environmental and Social Management Plan

1 Introduction

The Upper Trishuli-1 (UT-1) Hydropower Project (the 'project') is a 216 MW greenfield run-of-river hydropower facility to be located in the upper part of the Trishuli Watershed, in the Rasuwa District in Central Nepal. The Trishuli Watershed has been experiencing a rapid hydropower development in recent years; there 5 hydropower projects in operation, 9 under construction or with granted construction permits and another 19 in the planning phase which have obtained survey license. Once finished, the UT-1 project will be the hydropower facility with the highest generation capacity in the watershed.

The project is being developed by Nepal Water & Energy Development Company Pvt. (NWEDC), with the participation of the International Finance Corporation (IFC) through their *Infraventures*[2] investing vehicle. It is expected that other international Lenders will also provide financing.

As part of the Project's feasibility study, it was determined that the Environmental and Social Impact Assessment (ESIA) approved by the Nepali Government in 2011 (Jade Consult 2011) needed to be strengthened in order to bring the Project in compliance with international standards; most notably with IFC Performance Standards on Environmental and Social Sustainability[3] and related World Bank Group Environmental, Health and Safety (EHS) Guidelines..

It is in this context that ESSA Technologies Ltd. (ESSA) was retained by NWEDC to act as ***Independent Environmental and Social Consultant*** (IESC) and provide assistance with upgrading the environmental and social management of project to international standards. The local firm Nepalese Nepal Environmental & Scientific Services (NESS) Pvt. Ltd. was also retained by NWEDC to undertake additional environmental and social baseline studies.

ESSA initially conducted an environmental and social gap analysis to identify areas of non-conformance international standards, based primarily on a desk review of environmental and social project-related documentation and on a scoping field visit conducted in April 2013. This gap analysis identified the following issues:

- Incomplete environmental and social baseline.
- Insufficient analysis of ecological flows.

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2 http://www.ifc.org/wps/wcm/connect/Industry_EXT_Content/IFC_External_Corporate_Site/Industries/Infrastructure/IFC_InfraVentures/

3 http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/publications/publications_handbook_pps

- Limited scoping of the EIA (i.e. report did not include the transmission line which may be considered an associated facility).
- Limited land use and GIS mapping.
- Lack of a comprehensive Environmental and Social Management Plan and System (an immediate priority is for the construction phase).
- No assessment of the Project's contribution to potential cumulative impacts in the Trishuli watershed (including other hydropower projects in basin).

In order to address these issues, it was concluded that a number of additional studies were required to ensure adequate management of environmental and social issues and the project's compliance with applicable standards. The following studies were conducted:

- Complementary environmental and social baseline studies
- GIS Mapping and Spatial Analysis
- Cumulative Impacts Assessment
- Environmental Flows Assessment
- Construction Environmental and Social Management Plan

This report presents the main results and findings of these additional studies and recommends next steps required to continue aligning the Project environmental and social management in conformance with Lenders and international standards.

2 Project Overview

2.1 Project Description

The Upper Trishuli-1 Hydropower Project is a 216 MW run-of-river hydroelectric project located in the upper part of the Trishuli watershed, in the Rasuwa District in Central Nepal, 80 km northeast of Kathmandu (Figure 2-1). There are three village development committees (VDC) within the direct are of influence of the Project: Haku, Dhunche and Ramche.

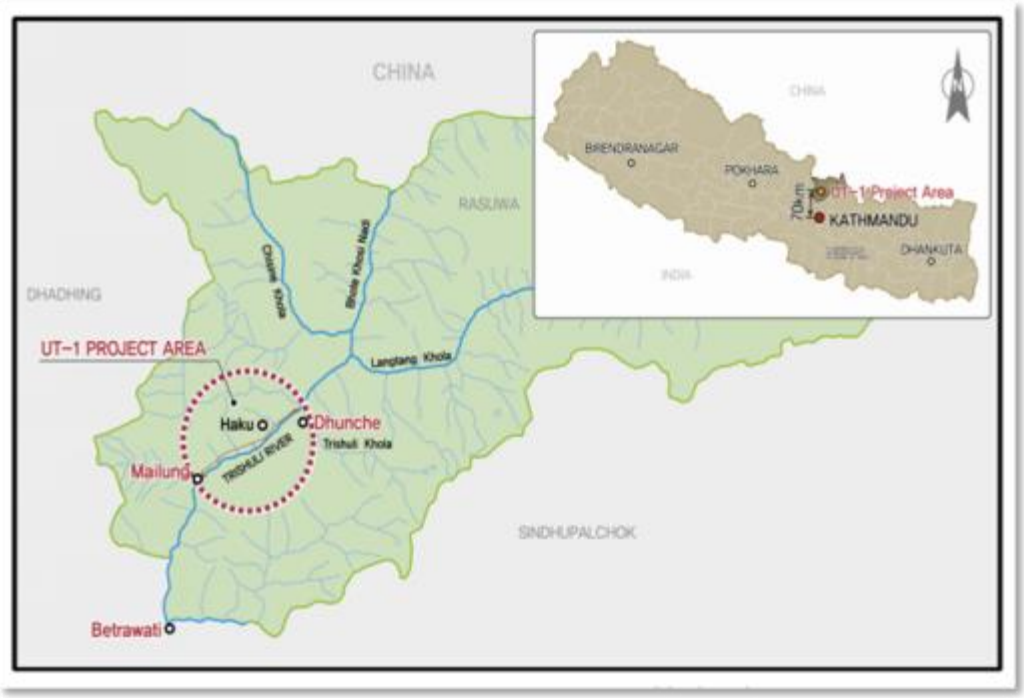

Figure 2-1: Location of the UT-1 Project

The UT-1 hydropower facility (see salient features of the project in Table 1-1) consists of a 77 m wide diversion dam located 275 m downstream of the confluence of the Trishuli with the Bhotekosi River. The weir, designed as a concrete gravity dam, stands 30 m from the ground and has a 26.3 m deep concrete foundation.

The project is designed to function as a run-of-river facility, constantly diverting water up to the maximum diversion capacity of 76 m^3/s. The diverted water will be transported by a 9.82 km headrace tunnel to an underground power station where three 72 MW Francis turbines will be installed.

Due to the remoteness and lack of infrastructure in the Project's area, a 19 km road will be built to connect the power station with the dam site. All intake, tunnel, access road and power station are located on the western bank of the Trishuli River. Langtang National Park extends along the opposite bank of the river.

Table 2-1: Salient features of the UT-1 Hydropower Project

Project component	Description
Installed capacity	216 MW
Net head	333.41m
Average annual energy	1440 GWH
Head race tunnel length	About 9.82 km, 6.5 m circular shape
Design discharge	Q_{50} = 74 m³/s
Maximum diversion flow	76 m³/s
Type of powerhouse	Underground
Turbine	3 Francis turbines of 72 MW capacity
Access road	19.3 km road from Mailung Dhovan (powerhouse) to the intake site

The diversion reach between the intake site and the tailrace extends for 10.7 km. The catchment area of the Trishuli watershed at the UT-1's intake site is 4350 km^2, with 71 % of this area located in the Tibet Autonomous Region in Chinese territory, where the Trishuli originates.

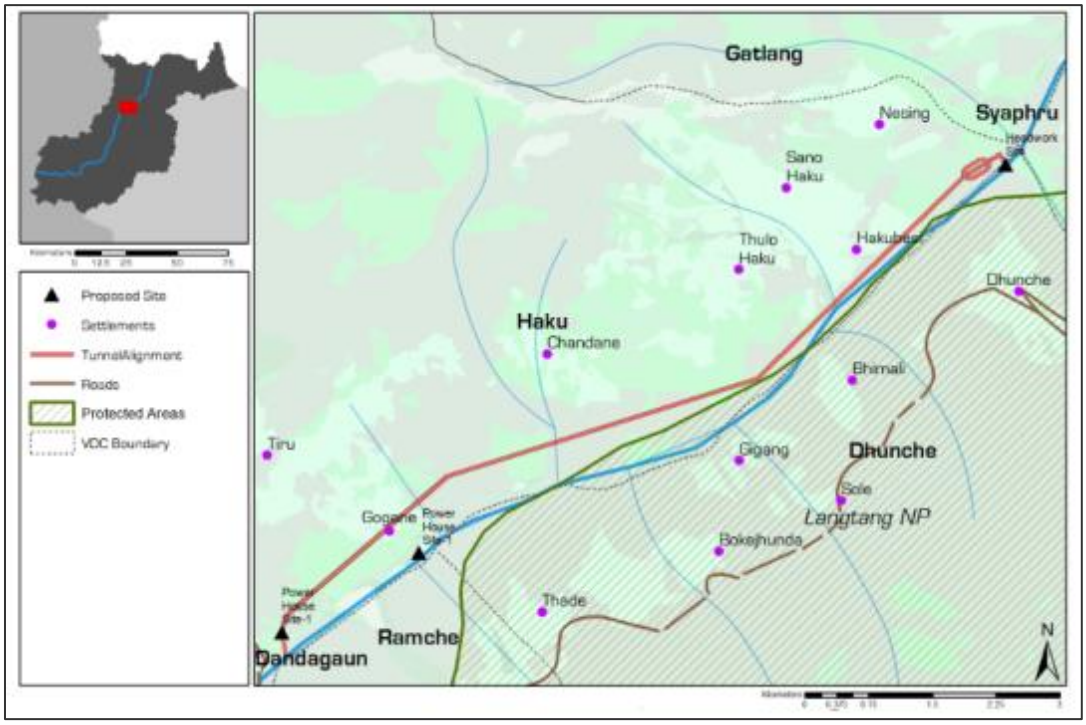

Figure 2-2: Location and main features of the UT-1 Project

It should be noted that at the time of this assessment the final design for the transmission line associated to the UT-1 Project had not been approved and, therefore, this project component was not included in the analysis. Recently, the Initial Environmental Examination (IEE) was completed and submitted to Nepal Government for approval.

2.2 Environmental and Social Setting

The Trishuli watershed is one of the eight sub-basins of the Gandaki River basin, which covers an area 32,000 km² in central Nepal (Figure 2-3). The Trishuli watershed occupies 13% of the total Gandaki area and it is the tributary located more to the East, within the physiographic Highland and Midland zones, characterized by average altitudes of 2000 m and high valley landscapes.

The Trishuli River originates in the Tibet Autonomous Region of the People's Republic of China, where it is known as Bhote Koshi. The catchment area of Bhote Koshi in Tibet is about 3,170 km^2 for a river length of 120 km. The approximate 106 km of Trishuli River within Nepal show a high gradient in the initial 40 km with. Rapids predominate all along the longitudinal profile although there are no impassable falls.

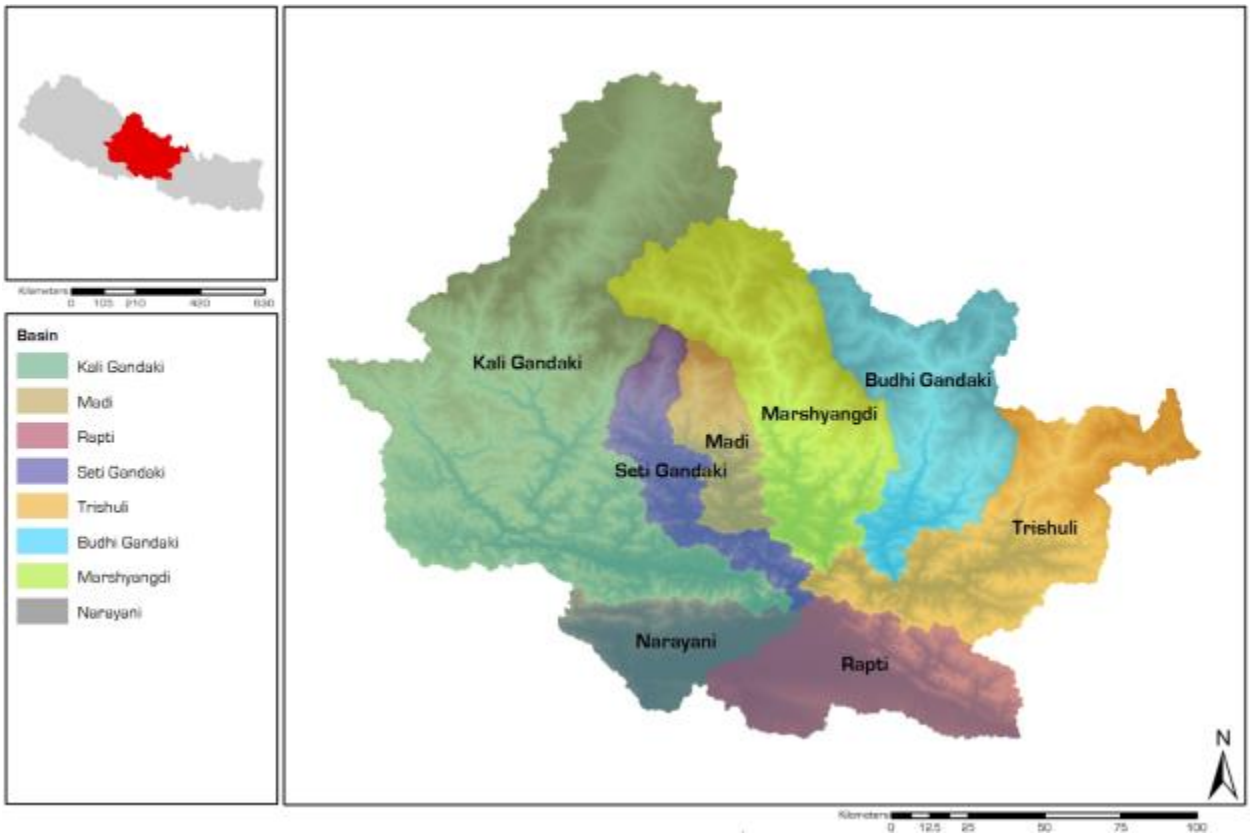

Figure 2-3: Gandaki basin and its eight constituent sub-basins

From an environmental perspective, the Trishuli basin has already been altered by anthropogenic activities, with five hydropower projects currently in operation, and existing cumulative impacts are evident not only in terms of aquatic habitat fragmentation but also in terms of overall degradation of the catchment area (e.g., deforestation, erosion, multiple access roads, and transmission lines).

At a regional level, it should be noted that the Trishuli River is considered a naturally occurring corridor that provides critical linkages north-south in the landscape. Common biodiversity conservation issues affecting the CHAL (Chitwan-Annapurna Landscape) region include: deforestation, overexploitation of community forests, illegal harvest of non-timber forest products, hydropower development affecting freshwater ecosystems connectivity, poaching, and forest fires and landslides as commonly occurring natural hazards.

Within the Trishuli Watershed, the main protected area is the Langtang National Park, located in the northeast part of the basin (Figure 2-4). This is a large conservation area that includes much of the forest cover in the Rasuwa District. The Trishuli River acts as the western border of Langtang Park. Project associated facilities (i.e. tunnel, access road) will be located on right bank of the river, outside of the Langtang Park.

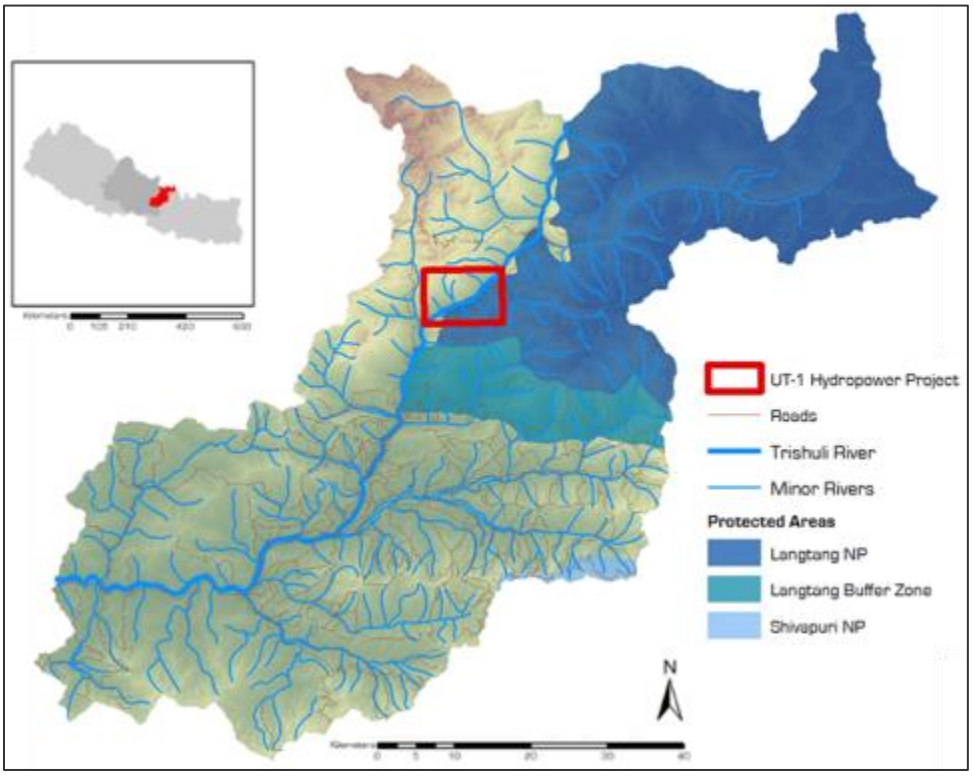

Figure 2-4: Protected areas within the Trishuli watershed

In terms of the socioeconomic conditions, the main economic activities are forestry and small scale agriculture in the upper part of the watershed, and agriculture in the lower part. Figure 2-5 shows the contrast in land uses between the upper and the lower part of the watershed. The upper part is characterized by steep, difficult access and the predominance of forest cover.

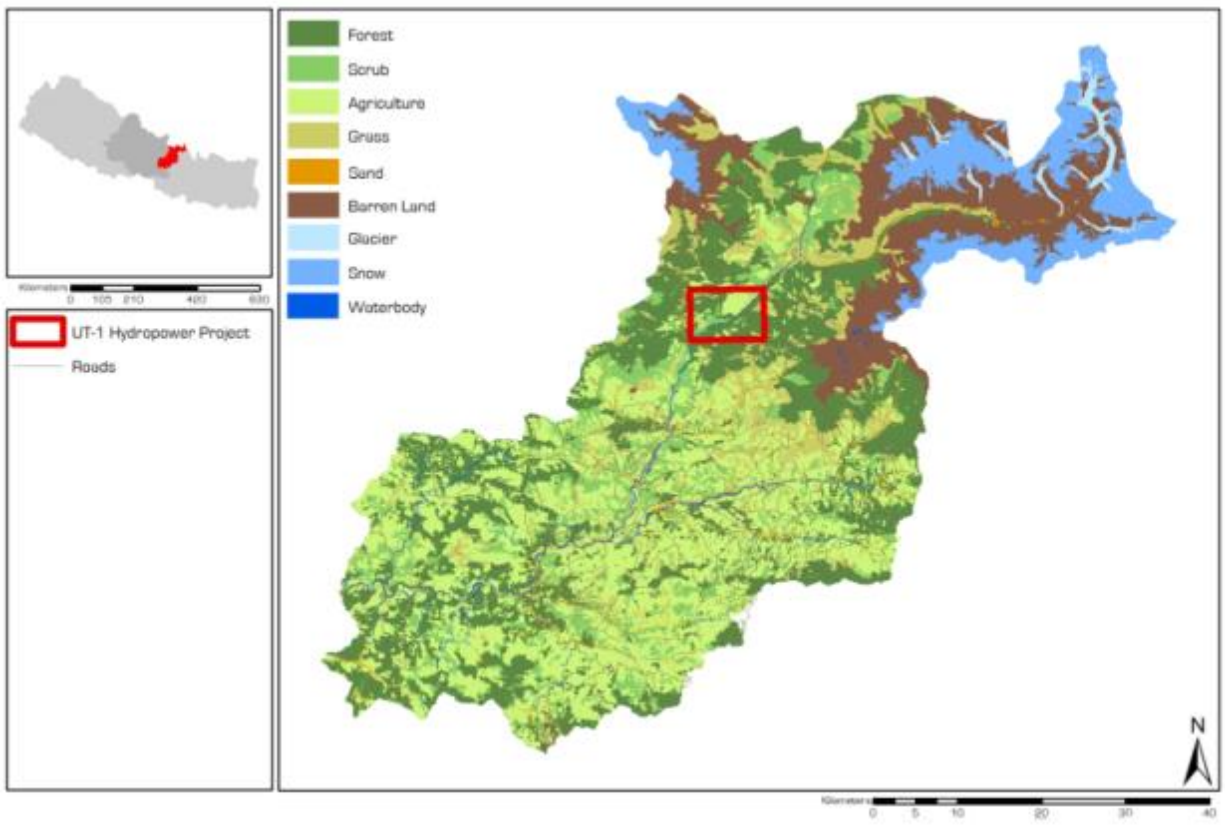

Figure 2-5: Land use (2010) in the Trishuli Watershed

In the upper part of the watershed, the predominant ethnic group is Tamang, and the Rasuwa District is popularly known as “Land of Tamangs”. The Tamangs, who live predominantly in the mountainous areas, are one of the 56 indigenous people legally recognized under the Nepal Federation of Indigenous Nationalities (NEFIN)[4]. They are classified as a marginalized group under NEFIN categories.

Health, water and sanitation and energy status is poor in the region. Communities rely on firewood as cooking fuel and access to water supply and sanitary facilities is limited, especially in Haku VDC.

[4] http://www.nefin.org.np/list/Categorization-of-Indigenous-People-based-on-development-/5/95/6

The inaccessibility of the area and the steepness of the terrain, which limits agricultural practice, result in a sparsely populated region where livelihoods are based on seasonal subsistence agriculture. Population is more concentrated in the lower part of the watershed (Figure 2-6). Out-migration rates are high in the region due to the lack of employment opportunities.

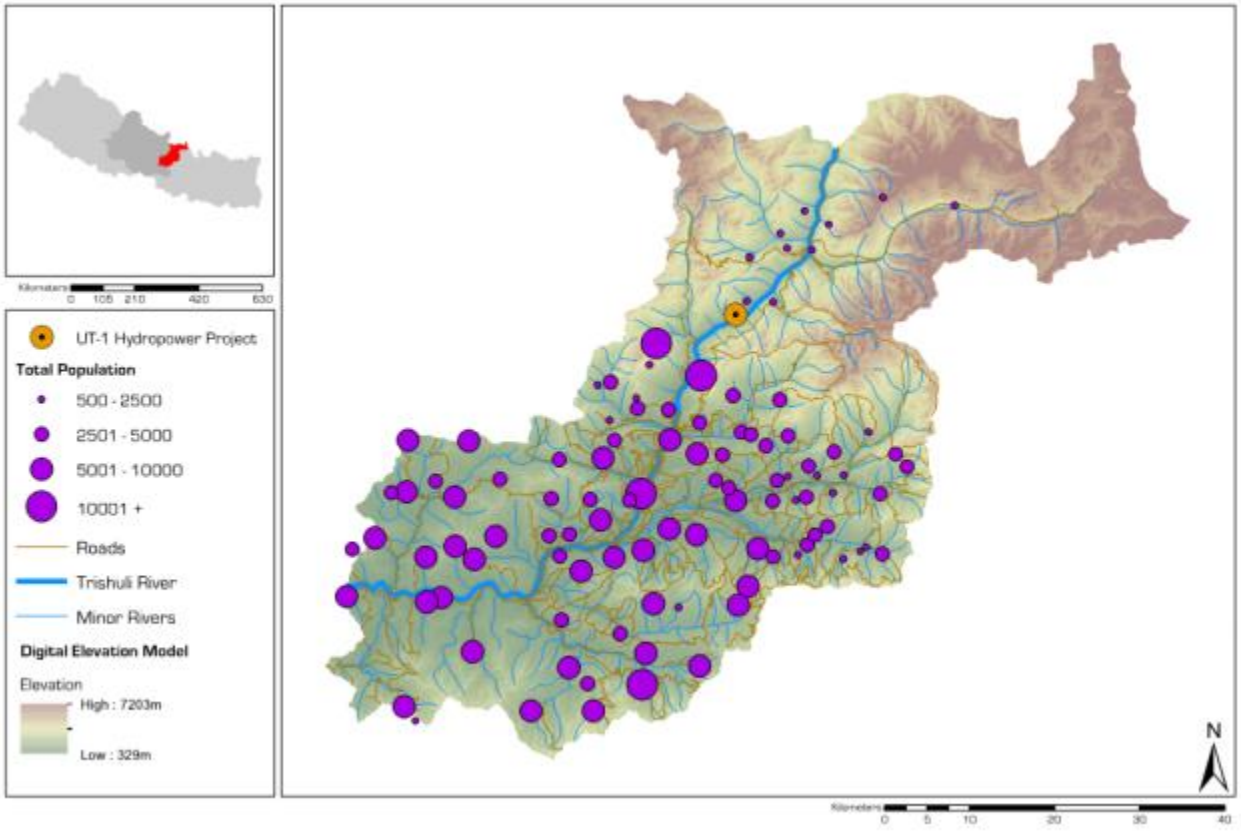

Figure 2-6: Population distribution in the Trishuli Watershed

As for hydropower development, it should be mentioned that the hydropower sector in Nepal opened formally to private sector developers in the late 1990's, with the enactment of new Hydropower Development Policy 1992, and has since then rapidly developed. The government body in charge of issuing hydropower licenses is the Department of Electricity Development, dependent of the Ministry of Energy. It is estimated that the total theoretical hydroelectricity potential of the country is 83,000 MW; 42,000 MW out of this potential capacity would be economically feasible (ADB and ICIMOD, 2006). Therefore, it is expected that the hydropower market in Nepal will grow significantly in the coming years to address both the growing domestic and the regional demand. There are nine major basins in Nepal (i.e. Seti, Karnali, Bheri, Rapti, Kali, Trishuli, Narayani, and Kosi) where most of the hydropower potential is concentrated.

The Trishuli (Figure 2-7) is the sub-basin of the Gandaki River with the highest intensity in hydropower development. There are currently 5 hydropower projects in operation, 9 under construction, including the UT-1 Project, and another 19 have a survey license. All of them are run-of-river facilities with generation capacities ranging between 1 and 216 MW.

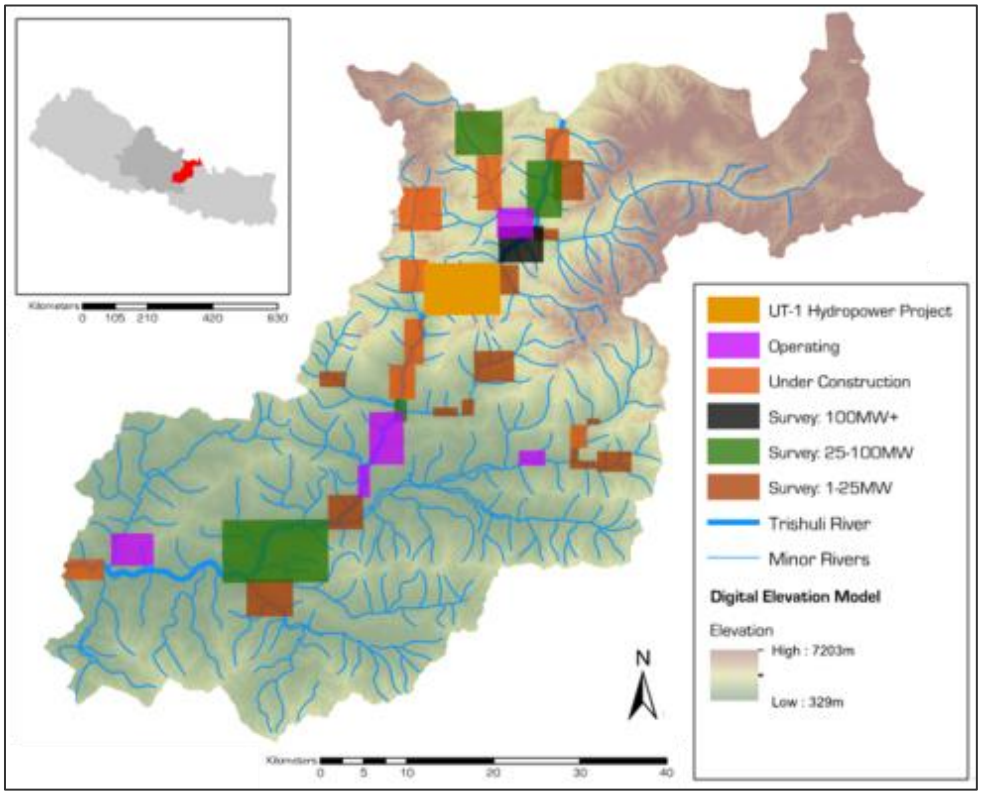

Figure 2-7: Hydropower development in the Trishuli Watershed

3 Summary of Supplemental Studies

3.1 Complementary Baseline Studies

In order to address environmental and social baseline gaps, and to provide input to the other supplemental studies that have been undertaken as part of Phase II (i.e. environmental flows, cumulative impacts assessment, and the environmental and social management plan for the construction phase), Nepal Environmental & Scientific Services (NESS) has led a series of surveys to upgrade the Project baseline in the following areas:

- Social Baseline
- Aquatic habitats
- Water quality and water users
- Groundwater
- Ambient air quality
- Soils
- Vegetation
- Biodiversity (terrestrial wildlife)
- Hazards

At this stage, most of these environmental and social baseline studies have been completed but there are still some surveys pending (i.e. air quality, soil quality, noise levels) and others are expected to continue until August 2014 (i.e. monthly aquatic survey). Appendixes A and B present a summary of the available results from the social and environmental complementary baselines, respectively. More detailed reports on the baseline studies have been provided by NESS to the proponent.

3.1.1 Complementary Social Baseline

The objectives of the supplemental social baseline study were: i) establish the current socio-economic and cultural environmental baseline condition of the Project area; ii) predict and evaluate the socio-economic and cultural impacts, and iii) identify required mitigation measures. Surveys were conducted at two levels:

- Community (VDC) level
- Project Affected Families (PAFs) level

A variety of methods were used to obtain the socioeconomic information, including: focus discussion groups, interviews with key stakeholders, structured households' surveys, and review of secondary sources (e.g. official statistics). The results of these surveys are presented in Appendix A.

Community (VDC) level

The VDCs in the project area (i.e. Haku, Dhunche and Ramche) account for 17% of the total population in the Rasuwa District. The Tamang community, recognized as a

marginalized indigenous group or Adivasi/Janajati by NEFIN, is the predominat group in the area, with 94% of the households. Other groups include, approximately: 4% of the Brahmin/Chhetri/Thakuri/Sanyasi (BCTS), who are integrated in the caste system, and 1.3% of Gurung, an Adivasi/Janjati community recognized as disadvantaged by NEFIN. The indigenous groups Magar (0.4%) and Newar (0.4%) are also reprsented in the project area, along with some Dalit households 0.4%). The Dalit community is at the bottom of the caste system and has been traditionally marginalized socially and economically in Nepal.

Farming is the main occupation in the Project's area of influence, with 41% of the active population working in agriculture. the majority (94%) own *Bari* land (rainfed upland) while only 15% of the households own *Khet* land (irrigated lowland) The most common crops grown in the area, mostly for self-consumption, are rice and maize.

Forests also play a key role in livelihoods of local communities, with 89% of the surveyed families use firewood as main source of energy. Other forest uses include: timber, forage, collection of herbs and medicinal plants, etc.

More than half of households (54%) reported food insufficiency for 3-6 months per year. The most common coping strategies adopted by a majority of the household are to work on daily wages basis (58%), foreign employment (29.1%), business (14%) and services (14%), sale of livestock (11%), and loans or selling household assets (6%).

Based on the results of the community surveys, and considering socioeconomic context and the ethnicity of the population groups in the project area, the following **vulnerable groups**, who might be differentially or disproportionally affected by the project, were identified:

- Indigenous (Adivasi/Janajati) groups: Tamangs (majority of the population), Gurungs, Magar and Newar.
- Women-headed households: 11% of the families in the project area are headed by women; a number that is increasing due to the trend for men migrating out of the area for work purposes.
- Poor households that fall below the poverty line according to the regional standard (i.e. Rs 19,859)

In terms of river/water users in the project area, NESS has recently (August 2013) conducted a river users inventory as along the 11 km diversion reach of the Upper Trishuli-1. Water uses concentrate in the lower part of the diversion reach and include: (i) two traditional watermills (*ghatta*) which are used throughout the year for grain grinding and are supplied with water from the Trishuli by earthen canals; (ii) an area of irrigated agricultural land of approximately 0.2 hectares where rice is grown during the monsoon season; (iii) a stretch of the river used by inhabitants of Gunchet settlement for domestic purposes (drinking, bathing, etc.) during the dry season; and (iv) non-commercial fishing practiced,

particularly during the fish migration periods of the monsoon season, by local fishermen in the lower part of the diversion reach and around the powerhouse area.

Project Affected Families (PAF) level

As of June 2014[5], the land requirements (Table 3-1) of the project are estimated in 99.89 ha, including 79.27 ha government-owned land (including land that belongs to 6 community forests), 4.9 ha of private land, and 15.7 ha of Guthi/trust land, which is the property of a Swayambhu (monastery).

Table 3-1: Summary of land requirements of the UT-1 Hydropower Project

Land Categories	Area of required land	
	m^2	Hectares
Government Land (Total)	**792,700.00**	**79.27**
a) 6 years leasing	330,500.00	33.05
b) 11 years leasing	251,000.00	25.1
c) 35 year leasing	171,100.00	17.1
d) Land purchase of District Forest Office	14,000.00	1.4
e) Land of Langtang National Park (lease)	26,100.00	2.61
Ghuthi Land (permanent purchase)	**156,911.39**	**15.69**
Private Land (permanent purchase)	**39,081.50**	**3.91**
Private Land (5 year leasing)	**10,173.75**	**1.02**
Total	**998,866.64**	**99.89**

Source: NWEDC, June 2014

The proponent has identified that these land acquisitions have affected, in the form of economic and/or physical displacement, 40 households, all from Haku VDC. Based on their property status, the identified PAFs fall into the two following categories:

- **Private land owners**: 3.8 hectares of agricultural land and 11 houses have been acquired from 21 private land owners, predominantly from the Tamang community.
- ***Guthi* tenants**: The project has also acquired 15.7 ha of *Guthi* (trust) land, including 26 agricultural plots held by 19 *guthi* tenants and four houses and other constructions (i.e. four cowsheds). Except for 3 Dalit families, the rest of the tenants belong to the Tamang community.

The households' survey revealed that 97% of the PAFs are Tamang and the 3% remaining belong to the Dalit community. As previously discussed, both groups are considered vulnerable due to their ethnicity (i.e. Tamang) and socio-economic status. The survey also

[5] Brief Note on Land Acquisition Practice and Process in UT-1, and its compliance with IFC Standards. NWEDC, June 2014

showed that the PAFs have a long history of settlement; 94% of the affected families have lived in the area for more than two generations.

The number of households potentially affected by the acquisition government-owned forest land (79.27), and who would be directly affected by the loss or restrictions of access to forest community forests, has not been determined.

Socioeconomic impacts

The 40 identified PAFs will experience economic and/or physical displacement as a consequence of the project. 21 private owners and 19 tenants will lose their agricultural land. To compensate for this loss, the proponent has negotiated with the affected families and government officials a compensation rate of NRs 0.5 million per *ropani* (508.72 m^2).

In terms of physical displacement, the resettlement of four families (3 of them from the Dalit community) from *Guthi* land has been confirmed. The proponent is now in the process of compensating for the lost houses according to the guidelines and recommendations of the Nepal Government's Department of Urban Development and Building Construction. It is unclear at this stage if the purchase of 11 houses in private land has also led to resettlement.

Besides the loss of property and assets, which can be compensated, the affected households are likely to experience disruption in their livelihoods due to the loss of agricultural production and access to community forests. The project will purchase 76.67 ha of government land which is currently under the management of 6 community forests (Table 3-2). This forest area includes 33 ha that will be used for the construction of the access road.

Table 3-2: Land requirements from community forests

#	Name of community forest	Area (ha)
1	Daksin Kalika Haku-8,9	17.25
2	Dharnasila Kanya Haku-9	24.57
3	Bratar Haku-7	0.99
4	Lumbudanda Haku-7	9.85
5	Labingpakha Tutudanda Haku-3	9.49
6	Labingpakha Haku-3	14.51
	Total	**76.66**

Source: NWEDC, June 2014

The loss of access (permanent or temporary) to forest resources (e.g. firewood, food and medicine, fodder, etc.) can have negative impacts on the livelihoods of these communities. The number of affected households and the degree to what their livelihoods depend on forest-derived products have not been evaluated.

Particularly during the construction phase, the local communities may also be affected by a series of impacts, including: noise, increased traffic, and the influx of workers into the area that would add pressure to natural resources (e.g. increase amount of solid waste and wastewater) and to social services (e.g. increase demand for health services) and utilities.

In order to mitigate these potential impacts and ensure that the Project does not cause a loss of standard of living and of livelihoods for the affected households and communities, a **Land Acquisition and Livelihood Restoration Management Plan** compliant with national regulations and international standards (i.e. IFC Performance Standard 5 on Land Acquisition and Involuntary Resettlement) is required (see Section 4). The terms of reference for this plan are provided in Appendix A. This plan should articulate a comprehensive assistance strategy that clearly identifies all the economic and/or physical displacement impacts, the target groups of PAFs, and that integrates all the measures implemented to mitigate and/or compensate for the adverse impacts on displaced persons and host communities.

Because the majority of households in the Project area are either indigenous *Adivasi/Janjati*, or marginalized groups (e.g. Dalit community), who might be disproportionally affected by the project, a **Vulnerable Peoples Plan** that specifically addresses the impacts and concerns of these vulnerable groups is also required (see Section 4).

Provisions to minimize impacts on local communities during the construction phase have been incorporated in the Construction ESMP (Appendix F).

3.1.2 Complementary Environmental Baseline Studies

Aquatic habitats and fish

NESS initiated a one-year monitoring program in August 2013 with the goal of establishing the baseline on fish resources and aquatic habitats in the project's area of influence. Aquatic habitat parameters (including fish samplings) and water quality have been monitored at five locations (Figure 3-1), representative of the conditions upstream of the intake site (F1), along the 11-km diversion reach (F2, F3, and F4) and downstream of the powerhouse (F5).

A total of 6 fish species were observed during the monitoring period, with the snow trout *Schizothorax richardsonii* as the dominant fish species which was consistently monitored in all monitoring sites through the year, accounting for 99% of the total fish catch.

Figure 3-1: Sampling locations for the monthly aquatic surveys

Of the observed species, *Schizothorax richardsoni*i (Buche Asala), *Euchiloglanis hodgarti* (Till Kabre), *Schitura savona* (Gadela), *Psedecheneis sulcatus* (Kabre) and *Noemacheilus Beavani* (Gadela) are all native fish species, while *Onchorhyncus mykiss* (Rainbow trout) is an exotic species probably introduced in the river system from the rainbow trout farms present in the catchment.

Higher numbers of fish were captured in the sampling locations in the lower part of the diversion reach and around the powerhouse site compared to upstream locations (i.e. headworks area). The peak in the number of snow trout specimens captured happened in the month of September (344 in total in the five sampling locations), coinciding with the end of the monsoon season and likely the downstream migration, and the lowest number was recorded in January (24 in total in the five sampling locations), during the dry period.

Field observation of female gonads of the captured specimens of *Schizothorax richardsoni* over the monitoring period showed presence of ovaries with mature eggs starting from July to February (Figure 4-11). No eggs were found during the months of March and April and immature ova were observed in the months of May and June. These observations indicate that spawning in the project area may occur from March to May, before the monsoon season.

Further surveys are required to characterize the population dynamics (temporal and spatial) of S. richarsonii in the Project's area of influence. Recommendations for further monitoring of aquatic habitats are provided as part of the terms of reference of the Environmental Flows Management Plan (Appendix E).

Terrestrial Habitats

In conformance with IFC Performance Standard 6 (*Biodiversity Conservation and Sustainable Management of Living Natural Resources*), terrestrial wildlife and vegetation surveys (see results in Appendix B) were conducted with the goal of determining the occurrence of critical natural terrestrial habitats in the project's area of influence, as well assessing the status of some of the species identified as threatened or endangered by international standards (IUCN). NESS conducted these additional vegetation and wildlife studies in two campaigns of studies; August 2013 (monsoon season) and February-April 2014 (dry season).

As previously mentioned, the project requires a total of approximately 100 hectares of land for its implementation. Out of this total area, 79.3 ha correspond to forest land. The majority (76.7 ha) of this forested area is located on the western slope of the Trishuli and only a small fraction (2.6 ha) is located on the eastern slope and will be leased from Langtang National Park.

Terrestrial habitats on the west bank of the Trishuli River, where most of the project components will be built, consist mostly of forest under management by local communities and agricultural or marginal lands. The forests are highly intervened and degraded by human activity (e.g. extraction of forests products, cattle grazing, etc.) and can be classified, following the premises of the IFC Performance Standard 6, as **modified habitat**. The forests on the eastern bank, part of the Langtang National Park, can be considered natural habitat.

Although these forests do not provide habitat for any critically endangered species, a number of species with conservation significance were identified during the field surveys. Valuable local plant species include: the tree Sal (*Bombax ceiba*), which is protected by Nepal Government for its economic interest, *Pinus roxburghii*, classified as LC by the IUCN and banned for exportation, and *Dioscorea deltoidea*, which is included in the Appendix II of CITES. Four species of mammals included in the IUCN red list were also identified, including: *Macaca assamensis (*Assamese monkey) and *Selenarctos thibetanus (*Himalayan Black Bear), both classified as vulnerable, and *Macaca mullata (*Rhesus Monkey) and *Nemorhedus goral (*Himalayan Goral), which are considered near threatened. Ten species of birds fall under CITES Appendix II and III and the Asiatic rat snake (*Ptyas mucosus*) is listed under CITES Appendix II.

Some of the vegetation in the areas to be occupied by the Project will be completely cleared (e.g. the 33 ha required for the construction of the access road) and other will be indirectly affected in other ways, such as added pressure and harvesting by increased population (i.e. influx of workers), increased sedimentation and erosion during construction, etc.

Local wildlife will be affected by the loss of terrestrial habitat and by the disturbance and displacement during the various construction activities. The area around Hakubeshi will be the most impacted since it is where the head works will be located and the influx of workers is likely to be more intense. During operations, the reduction of flow in the diversion reach can have negative impacts on riparian habitats, on which some bird species depend.

Indirectly, the project could have impacts on the overall habitat availability and connectivity for terrestrial fauna in the area by fragmenting the river corridor and by hindering altitudinal migration due to the construction of the access road at mid-slope on the western slope.

Taking into consideration the findings of the supplemental terrestrial habitats surveys and the identified potential impacts, the proponent needs to develop specific plans to minimize the loss of local biodiversity, compensate for the loss of forest and guarantee the continuation of ecosystem services for local communities, and manage the project in a sustainable way. The ESAP in Section 4 proposes as two main action items the development and implementation of a **Biodiversity and Wildlife Conservation Management Plan** and a **Reforestation Plan**. A set of specific indicators to track the evolution of local biodiversity in the project area, and which could be incorporated in these two plans, are suggested in Appendix B.

Groundwater Survey

Hydrological conditions in two representative locations along the tunnel alignment (Gogane and Haku Besi) were explored using a 2D-electrical resistivity tomography (2D-ERT) technology.

Two types of aquifers were identified in the Project area: shallow aquifers (some of them seasonal) that feed local springs, and a deeper regional aquifer which exhibits an effective porosity of 40% and is hydrologically connected to the Trishuli River. Since the proposed headrace tunnel in both areas passes below 175 m from the surface, the impact of the tunnel on the shallow groundwater body is not considered significant. However, it is possible that the deeper aquifer might be affected during the construction of the tunnel. These effects would be temporary and probably limited to the excavation phase since through the sealing of the tunnel, cracks or fractures in the aquifer would be filled.

The construction of the tunnel is therefore not expected to affect the regional deeper aquifer of the Project area. The Electrical Resistivity Tomography (ERT) study conducted as part of the environmental baseline contributes to the understanding of hydrological functioning of the region and the information generated is intended to be used as reference or baseline data.

Inventory of springs

Forty five (45) springs were identified on the western slope of Trishuli River during a field trip in December 2013; from the weir location to the powerhouse. This area will concentrate most of the construction activity (access road and tunnel). Location, discharge rate, water

uses and seasonality were recorded for each spring. The inventory of springs is presented in Appendix B.

Potential impacts on the identified springs, mainly through physical damage during construction, constitute a major concern for local communities. Estimations of changes in water yields have not been made but 16 out of the 45 identified springs of springs are considered more vulnerable to potential impacts given their status of main sources for water supply for the communities in their vicinity.

Monitoring and mitigation of these potential impacts on vulnerable springs, as identified in the spring's inventory (Appendix B), will need to be undertaken during the construction phase. To this effect, specific provisions have been included in the Construction Environmental and Social Management Plan (Appendix F, Section 5.6.8). The recommended mitigation measures include: (i) identify the location of these springs (coordinates provided in Appendix B); (ii) monitor water yield before, during and after construction; (iii) notify communities in advance if any restriction or impact to the access and use of springs will occur during construction works; (iv) enable a grievance mechanism that allows communities to express their concerns/claims in relation to local water supplies.

Hazard Study: Assessment of Landslides along the Tunnel Alignment

Landslides are one of the most pervasive natural hazards in the Project area and can affect hydropower facilities in several ways, including: removing support to the foundations of the projects infrastructure (e.g. dams, tunnels, etc.); increase of sediments load in the river; reduction of reservoir capacity; damage to turbines by sediments abrasion. A preliminary assessment of landslides along the tunnel alignment is included in Appendix B (Section 6).

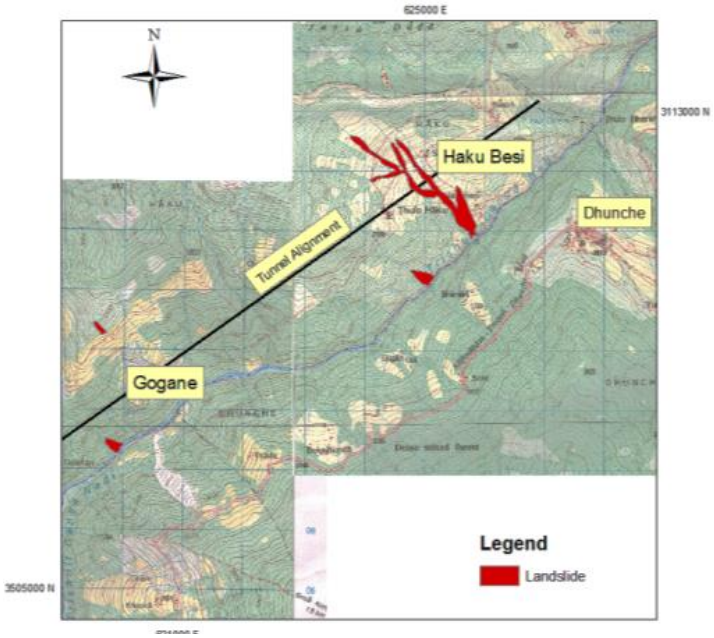

Figure 3-2: Landslide inventory along the tunnel

Landslides in the Project area were identified by previous studies and confirmed via a field inventory in in February 2014 (Figure 3-2). Unstable geology, combined with steep slopes and rainfall patterns (heavy rains during the monsoon), is the root cause of landslides in the area.

The identified landslides are currently inactive but they pose a risk in the face of construction works for the tunnel and the access road. The most critical area is located around Haku Besi, where a major landslide crosses the tunnel alignment.

Although currently inactive, the identified landslides, along with potential new areas of slope instability, should be monitored as part of the **Catchment Area Management and Treatment Plan** (see Section 4). Mitigation measures, including subsurface drainage and bio-engineering soil conservations actions, are highly recommended.

3.2 GIS Mapping and Spatial Analysis

Appendix C summarizes the GIS Mapping and Spatial Analysis work completed for the UT-1 Project. This mapping addresses the previous problem wherein large data and knowledge gaps pertaining to spatial information prevented a thorough understanding of the UT-1 area of influence and similar project's effect on natural environments in the Trishuli Watershed as well as the whole of the Gandaki basin.

A series of thematic maps on key environmental and social aspects of the watershed were produced. The spatial information generated through these activities has informed the other complementary studies.

The collection, review, and analysis of available spatial information at the watershed scale and the generation of multiple thematic maps looking at different environmental and social variables has contributed to creating a spatial knowledge base of the Trishuli Watershed that facilitates the understanding of the UT-1 and similar project's effect on natural environments in the Trishuli Watershed.

At the scale of the Gandaki river system, the exercise of comparing watershed pressure/risk indicators (e.g. roads, population density, hydropower development, etc.) across sub-basins provides valuable information that can support regional planning efforts, as these indicators show the different level of development, and therefore of associated impacts or environmental problems, across the region.

The Trishuli Watershed came as second, after the Madi basin, for the highest level of stress/pressure for the selected indicators. The Trishuli has the highest level of hydropower development of all the sub-basins in the Gandaki system. Road density, with its associated impacts on erosion rates and aquatic habitats, is also a significant pressure in the Trishuli in comparison with the other sub-basins.

3.3 Cumulative Impact Assessment

As per IFC Performance Standard 1 (PS1): Assessment and Management of Environmental and Social Risks and Impacts, clients are expected to ensure that their own assessment determines the degree to which the project under review is contributing to cumulative impacts, in association with other projects and activities. Since the UT-1 Project will be located in the Trishuli Watershed where other infrastructure projects are currently being built and planned, most notably multiple hydropower facilities, an evaluation of potential

cumulative impacts was required. This analysis of cumulative impacts was not included in the original ESIA (Jade Consult 2011).

In order to close this gap, a Cumulative Impacts Assessment (CIA) following international best practice, mainly IFC's *Good Practice Handbook Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Market* was produced. The results and findings of this CIA exercise are presented in Appendix C.

Using a Valued Environmental and Social Components (VEC)-centered approach, cumulative impacts and pressures on valued components of the Upper Trishuli environment were identified, including: water resources, fish and fish habitats, terrestrial ecosystems, erosion and sedimentation processes, use of natural resources by local communities and cultural and religious sites. Inputs from local stakeholders have been incorporated for the selection of the key VECs.

Spatial indicators were used to assess the cumulative impacts of hydropower development on the VECs across the Trishuli Watershed considering two potential scenarios: moderate and high intensity hydropower development. The cumulative impacts considered the most significant were: local reduction of water availability, impacts on aquatic habitats, and increased risk of landslides.

Based on the results of this assessment, mitigation measures for cumulative effects, both within NWEDC responsibility and those requiring collaboration with other hydropower sponsors and relevant stakeholders, were recommended. These mitigation measures, along with adequate monitoring protocols, will need to be integrated into a **Cumulative Impacts Management Plan** (Section 4). The proposed measures build on the existing environmental management framework for the UT-1. It is expected that internal capacity (i.e. staff and resources) on the part of NWEDC will be required to implement and follow up on the mitigation measures and coordinate as needed with other regional stakeholders (hydropower operators, NGOs, government, Community Forest Groups, etc.) to engage in and support regional initiatives.

3.4 Environmental Flows Assessment

Once in operation, the UT-1 Project will create a flow-reduced stretch of about 11 km along the diversion reach; from the intake site to the tailrace. According to the currently proposed operational rules, a minimum of 10% of the mean monthly flow will be released as environmental flow.

In order to assess the potential impacts of the alteration of the natural hydrological regime, and evaluate the adequacy of the proposed flow operational rule, a hydrology-based assessment was conducted (see Appendix E) taking into account the existing aquatic ecology baseline, including findings from NESS monthly aquatic surveys. Current and

previous fish surveys have identified the snow trout species *Schizothorax richardsonii* as the predominant fish in the Project area (see Appendix B and E). Given this predominance and its seasonal migrant behavior (i.e. it migrates upstream for spawning during the March-April period, at the start of the monsoon season, and downstream migration during October and November), which makes it vulnerable to barrier effect of the dam; *S. richardsonii* was selected as the key indicator species.

The analysis concludes that: (i) an environmental flow release of 10% of the mean monthly flow during May to February is likely sufficient for in-stream ecological needs; and (ii) maintenance of instream flow in the critical period of March-April (when flows are low and upstream migration and spawning of *S. richardsonii* takes place) greater than 10% of the historical range is recommended as an interim environmental flow regime. The final environmental flow regime (i.e. timing and quantity of flow to be released in the diversion reach) to be adopted during operations will have to be defined in an adaptive way once critical knowledge gaps on the ecology of *S. richardsonii* have been addressed by gathering additional aquatic baseline data.

Based on the existing knowledge gaps about aquatic habitats in the Trishuli River, especially in regards to the ecology and life-cycle of *S. richardsonii*, development of an **Environmental Flow Management Plan** (EFMP) is recommended. An EFMP would address the existing information gaps, implement the necessary measures to ensure viable fish populations during operations, and ensure the Project does not cause a loss of aquatic biodiversity in the affected part of the Trishuli River. The terms of reference for the EFMP are provided in Appendix E.

3.5 Construction Environmental and Social Management Plan

Appendix F provides a comprehensive Construction Environmental and Social Management (ESMP) compliant with international standards and establishes specific rules and guidance for addressing environmental and social issues during the construction of all project components. The specific objectives of the proposed Construction ESMP plan are:

- Provide contractors and supervisors practical specifications for the management of environmental and social impacts during construction.
- Provide the indicators and verifiable products to supervise compliance of environmental specifications during construction of the project.
- Identify the training needs of different actors involved (developer, contractor, supervisor) and private companies in the use and application of the ESMP.
- Propose a compliance framework for contractors, a definition of major, moderate, and minor non-compliances, and penalties for non-compliance.
- Propose a grievance mechanism for communities for addressing construction-related impacts, including decision-making process and conflict resolution alternatives.

4 Environmental and Social Action Plan

Based on the results of the complementary studies discussed in this document, a number of priority activities need to be completed to close the major outstanding gaps and ensure Project's conformance with Lenders requirements and international standards. Table 4-1 lists these recommended action items in an ESAP format consistent with international Lender requirements.

Table 4-1: Draft Environmental and Social Action Plan

DRAFT Environmental and Social Action Plan UT-1 Hydropower Project			
#	**Action description**	**Indicator of completion**	**Timeframe**
1	**Project ESMS** An updated Project-wide Environmental and Social Management System (ESMS) is required including: E&S Policy; organizational and competency structure; an Emergency Preparedness and Response System; and ongoing Stakeholders Engagement Plan.	ESMS documents reviewed and agreed with Lenders.	To be decided by Lenders but before commencement of construction.
2	**Environmental Flows Management Plan (EFMP)** An EFMP needs to be developed according to the terms of reference proposed in Appendix E of this report.	EFMP is provided and agreed with Lenders.	To be decided by Lenders but before commencement of operations.
3	**Land Acquisition and Livelihood Restoration Plan** An additional plan is required to clarify compensation standards used by the UT-1 Project and to identify any livelihood restoration that may be needed to ensure the UT-1 Project is in compliance with IFC Performance Standards.	Plan is provided and agreed with Lenders.	To be decided by Lenders but before commencement of actual displacement of economic activity.
4	**Vulnerable Peoples Plan** The Supplemental Social Baseline Studies recently completed by NESS (Appendix A of this report) identifies vulnerable peoples in the project's area of influence. A Vulnerable Peoples Plan is needed to ensure compliance with IFC Performance Standards (including IFC PS 7 requirements is applicable).	Plan is provided and agreed with Lenders.	To be decided by Lenders but before commencement of impacts to vulnerable peoples.
5	**Cumulative Impacts Management Plan** Considering that the Trishuli Watershed has already been impacted by hydropower development, upstream and downstream of the UT-1 Project, NWEDC should focus their efforts on mitigating those impacts for which a significant contribution from the UT-1 Project is expected. This should	Develop a Plan to implement the cumulative impact management recommendations as presented in Appendix D	To be decided by Lenders but before commencement of operations.

	include engaging and collaborating on regional coordinated actions to prevent further degradation of the Trishuli basin.	(Section 6). Plan is provided and agreed with Lenders.	
6	**Biodiversity and Wildlife Conservation Management Plan** The plan should be implemented during the life of the project and will occur outside the Langtang National Park boundary in the immediate catchment surroundings and integrate existing EIA mitigation measures.	Plan is provided and agreed with Lenders.	To be decided by Lenders but before commencement of construction.
7	**Reforestation Plan** Reforestation Plan should include compensatory plantation and/or protection of existing degraded forest land to compensate the forest area removed during the project implementation. The Plan should include a community forestry support program, including establishment of nurseries.	Reforestation Plan is provided and agreed with Lenders.	To be decided by Lenders but before commencement of land clearing activities.
8	**Catchment Area Management and Treatment Plan** Develop a Catchment Area Management and Treatment Plan to stabilize slopes. Engage and support soil conservation and erosion reduction initiatives in the Trishuli basin.	Plan is provided and agreed with Lenders.	To be decided by Lenders but before commencement of land clearing activities.
9	**EIA for Transmission Line** The Initial Environmental Examination (IEE) for the 8.4 km transmission line of the UT-1 was recently completed by Jade consultants and submitted to the Nepal Government for review. In order to meet IFC Performance Standards, it will need to be determined whether the transmission line is considered an *Associated Facility* and whether the potential environmental and social impacts associated to this infrastructure have been adequately assessed. The possibility exists for one transmission line to be shared by UT-1 and other hydropower projects in the river basin therefore the final decision on the transmission line location has not been decided.	EIA is provided and agreed with Lenders.	To be decided by Lenders but before commencement of construction of the transmission line.
10	**ESMP for Operations** Monitoring programs consistent with the EFMP and other identified social and environmental impacts will need to be developed. Operations ESMP should include performance indicators, acceptance criteria, and corrective actions for non-compliance occurrences.	Operations ESMP reviewed and agreed with Lenders.	To be decided by Lenders but before commencement of operations.

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Appendix A: Complementary Social Baseline

Appendix B: Complementary Environmental Baseline

Appendix C: GIS Mapping and Spatial Analysis

Appendix D: Cumulative Impact Assessment

Appendix E: Environmental Flows Assessment

Appendix F: Construction Environmental and Social Management Plan

Final Report