



Biodiversity Action Plan

Adjaristsqali Hydropower Cascade Project

July 2013

Adjaristsqali Georgia LLC



Adjaristsqali
Georgia
LLC



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Content

Chapter	Title	Page
1.	Introduction	1
1.1	Adjaristsqali Hydropower Project _____	1
1.1.1	Overview _____	1
1.1.2	Project Description _____	2
1.2	Why is the Adjaristsqali Hydropower Project BAP Needed? _____	5
1.3	Structure of this report _____	5
2.	Scope of the Adjaristsqali Hydropower BAP	6
2.1	Aims and Objectives of the BAP _____	6
2.2	Formulation of the Project BAP _____	7
2.3	Consultation with Stakeholders and Biodiversity Experts _____	8
2.3.1	Overview _____	8
2.3.2	Stakeholder Categorisation _____	8
2.3.3	Stakeholder Influence/Interest Analysis _____	10
2.4	Study Area _____	11
3.	Legal, Regulatory, Planning and Third Party Requirements	13
3.1	Legal and Regulatory Requirements _____	13
3.1.1	International Legislation and Policy _____	13
3.1.2	European Union (EU) Legislation and Policy _____	13
3.1.3	National Legislative and Policy Framework _____	14
3.2	Planning and Permitting Requirements _____	17
3.2.1	Environmental and Social Impact Assessment _____	17
3.3	AGL's Environmental and Social Sustainability Policy _____	20
3.4	Third Party Requirements _____	20
3.4.1	Overview _____	20
3.4.2	International Finance Corporation (IFC) Standards and Guidance _____	20
3.4.3	European Bank for Reconstruction and Development (EBRD) Standards _____	21
3.4.4	Asian Development Bank (ADB) Standards _____	22
4.	Biodiversity Baseline	23
4.1	General Approach and Methodology _____	23
4.1.1	Desktop Study _____	23
4.1.2	Field surveys _____	24
4.1.2.1	Overview _____	24
4.1.2.2	Vegetation and Floristic Surveys _____	24
4.1.2.3	Bird Surveys _____	25
4.1.2.4	Mammal Surveys _____	25
4.1.2.5	Reptile & Amphibian Surveys _____	25
4.1.2.6	Fish and Zoo-benthos Surveys and Interviews _____	25
4.1.2.7	River Habitat Surveys _____	26
4.2	Ecoregions and Biodiversity Hotspots _____	26
4.3	Protected and Nature Conservation Areas _____	27
4.3.1	Kintrishi Nature Reserve and Important Bird Area _____	27
4.3.2	Machakhela National Park _____	28

4.3.3	Mtiral National Park	28
4.3.4	Batumi Important Bird Area	29
4.3.5	Adjara-Imereti Ridge Important Bird Area	29
4.3.6	Shavsheti Ridge Important Bird Area	29
4.3.7	Key Biodiversity Areas	29
4.4	Habitats	29
4.4.1	Overview	29
4.4.2	Main Habitats	31
4.4.2.1	Shuakhevi Scheme	31
4.4.2.2	Koromkheti Scheme	32
4.4.2.3	Western Part of Study Area	32
4.5	Flora	33
4.6	Birds	38
4.7	Mammals	40
4.8	Reptiles and Amphibians	43
4.9	Fish	44
4.10	Invertebrates and Algae	46
5.	Critical Habitat Assessment	47
5.1	Background Information	47
5.2	Determination of Critical Habitat	47
5.2.1	Introduction	47
5.2.2	Critically endangered and/or endangered species at global and/or national level	48
5.2.3	Endemic and/or restricted-range species	52
5.2.4	Migratory and/or congregatory species	54
5.2.5	Legally protected and internationally recognised areas	54
5.2.6	Critical habitat trigger features	55
5.3	Critical habitat impacts and project requirements	56
5.3.1	Overview	56
5.3.2	Critically endangered and/or endangered species at global and national level	57
5.3.3	Endemic and/or restricted range species	58
5.3.4	Migratory and/or congregatory species	59
5.3.5	Legally protected and internationally recognised areas	59
6.	Priorities for Biodiversity Conservation	60
6.1	Selection criteria	60
6.2	Priorities	60
6.2.1	Habitats	60
6.2.2	Species	61
6.2.2.1	Plant species of conservation importance in Adjara, Georgia and Caucasus	61
6.2.2.2	Mammal species of Georgian and/or global conservation importance	61
6.2.2.3	Bird species of global and national importance	62
6.2.2.4	Globally and nationally threatened species of reptiles and amphibians	62
6.2.2.5	Fish species of national conservation importance	62
7.	BAP Actions	63
7.1	Overview	63
7.2	Action Plan for Forest Habitat and Notable Plant Species	64
7.2.1	Current Status	64

7.2.2	Current Factors Affecting the Forest Habitats in the Study Area	65
7.2.3	Current Actions	66
7.2.4	Action Plan Objectives and Actions	66
7.3	Action Plan for Rivers and Associated Species	76
7.3.1	Current Status	76
7.3.2	Current Factors Affecting Rivers and Associated Species	76
7.3.3	Current Actions	76
7.3.4	Action Plan Objectives and Actions	77
7.4	Action Plan for Protected and Threatened Terrestrial Mammal and Reptile Species	84
7.4.1	Current Status	84
7.4.2	Current Factors affecting the Protected and Threatened Mammals and Reptiles	84
7.4.3	Current Actions in Georgia	84
7.4.4	Action Plan Objectives and Actions	85
7.5	Action Plan for Protected and Threatened Bird Species	92
7.5.1	Current Status	92
7.5.2	Current Factors Affecting the Birds of Conservation Concern in the Study Area	92
7.5.3	Current Actions	92
7.5.4	Action Plan Objectives and Actions	93
8.	BAP Implementation, Monitoring and Reporting	98
8.1	Mitigation Ranking	98
8.2	Implementation of the Adjaristsqali BAP	99
8.3	Monitoring, Evaluation and Reporting	100
8.3.1	Overview	100
8.3.2	Monitoring during Construction	100
8.3.3	Post-construction Monitoring	101
8.3.4	Reporting	101
9.	Draft Biodiversity Monitoring and Evaluation Programme	102
9.1	Aim and Objectives	102
9.2	Monitoring Indicators	103
9.2.1	Regional/Landscape Level	103
9.2.2	Community/Ecosystem Level	103
9.2.3	Species/Population Level	103
9.2.4	Socio-Economic Factors	103
9.3	Monitoring Methodology	104
9.3.1	Interpretation of Satellite Imagery and Habitat Classification	104
9.3.2	Habitat Ground Truthing	104
9.3.3	Habitat Quality	105
9.3.4	Monitoring of populations size for threatened species of mammals and reptiles	106
9.3.5	Monitoring of Socio-economic Factors	106
9.4	Monitoring Timescale and Reporting	106
9.5	Evaluation	106
9.6	Dissemination	107
9.7	Resources	107
9.8	Training and Capacity Building	108
10.	References	109

Appendices	113
Appendix A. Baseline Species Data _____	114
A.1. Bird Data _____	114
A.2. Fish Data _____	121
Appendix B. Consultation with Stakeholders and Experts _____	124
B.1. Biodiversity Action Plan Workshop _____	124
B.2. Consultation with Biodiversity Experts _____	131

Abbreviations

AGL	Adjaristsqali Georgia LLC
ADB	Asian Development Bank
BAP	Biodiversity Action Plan
BMP	Biodiversity Management Plan
CEMP	Construction Environmental Management Plan
CHA	Critical Habitat Assessment
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DMU	Discrete Management Unit
EBA	Endemic Bird Area
EBRD	European Bank for Reconstruction and Development
EPE	European Principles for the Environment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FFI	Fauna and Flora International
GoG	Government of Georgia
AIS	Alien Invasive Species
IBA	Important Bird Area
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature and Nature Resources

KBA	Key Biodiversity Area
PR6	EBRD's Performance Requirement 6
PS6	IFC's Performance Standard 6
RBMP	River Basin Management Plan
RDB	Red Data Book
spp.	Several species within the same genus
ssp.	Sub-species
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
WWF	World Wildlife Fund
Zol	Zone of Influence

1. Introduction

1.1 Adjaristsqali Hydropower Project

1.1.1 Overview

Adjaristsqali Georgia LLC (hereafter referred to as AGL) is undertaking the development of the Adjaristsqali Hydropower Cascade Project (the 'Project') in the Autonomous Republic of Adjara, Georgia (Figure 1.1).

The Project is part of the Government of Georgia's (GoG) energy policy to achieve economic independence and sustainability in the energy sector as well as the provision of energy security through domestic sources. In addition Georgia considers electric power to be an export commodity and is aiming to develop this potential.

In May 2010 AGL was successful in receiving concessions for three potential hydropower schemes on the Adjaristsqali River. The concessions received were for the Shuakhevi, Koromkheti and Khertvisi sections of the Adjaristsqali River and specific tributaries, and collectively these comprised the Adjaristsqali Hydropower Cascade Project (the Project).

An international Environmental and Social Impact Assessment (ESIA) was prepared for the Project in accordance with International Finance Corporation (IFC) Performance Standards and European Bank for Reconstruction and Development (EBRD) Guidelines in order to assess whether the Project met relevant international environmental and social standards. The ESIA has been subsequently reviewed by the Asian Development Bank (ADB) and found to be in accordance with their requirements. The ESIA was undertaken during the Feasibility Study stage (July 2011-August 2012), with the final version issued in October 2012. The ESIA, at the time of its finalisation, was prepared including consideration of all three scheme concessions (Shuakhevi, Koromkheti and Khertvisi).

Detailed engineering design was undertaken subsequent to issue of the ESIA. During this process it was identified that significant economic and environmental risks were present with the Khertvisi scheme, including the potential for construction activities to fall within the boundaries of the planned Machakhela National Park. Due to these considerations AGL has confirmed that although it retains the concession at present, the Khertvisi scheme will not be pursued as part of the third and final phase of the Project. The Project to be developed will therefore constitute the Shuakhevi and Koromkheti schemes only.

The Project therefore now comprises two separate hydropower schemes operating in cascade along the Adjaristsqali River (Figure 1.2). Each scheme consists of a combination of dams and weirs, reservoirs, headrace and transfer tunnels, powerhouse, power evacuation, and access roads. The two cascade schemes are Shuakhevi (185 MW installed capacity) and Koromkheti (150 MW installed capacity), which will provide an annual average production of 930 GWh of renewable electricity (465 GWh for each scheme). The Project is expected to supply the Georgian and Turkish power markets. The Project will also enable Georgia to use more of its energy resources to meet electricity demand during the winter months of December, January and February.

The Project will require transmissions lines for transmitting the generated electricity to substations for eventual use by consumers¹. It is proposed that a new 220 kV transmission line will be constructed

¹ Transmission lines will be subject to separate technical, environmental and social studies. Broadly it has been identified that a new

connecting into existing national grid at Batumi and Akhaltsikhe substations. The construction of the transmission line is a separate project and will be undertaken in accordance with the national permitting requirements (this includes requirement to develop a stand alone ESIA). The development of the transmission line is not included as part of the activities for which AGL are seeking finance. However, as this will be an associated facility, high level comment has been made to the extent possible in accordance with IFC requirements (IFC, 2012c).

Figure 1.1: Project location within Georgia



1.1.2 Project Description

The project includes construction and operation of two-step HPPs cascade (Figure 1.2), with total installed capacity of 335 MW. The estimated power output (annual average production) will be 930 GWh. The generated electricity will be primarily sold on the Turkish energy market and supplied to the Georgian energy system during the winter (December, January, February).

The project includes the Shuakhevi and Koromkheti Schemes). A brief summary of the two schemes is provided below:

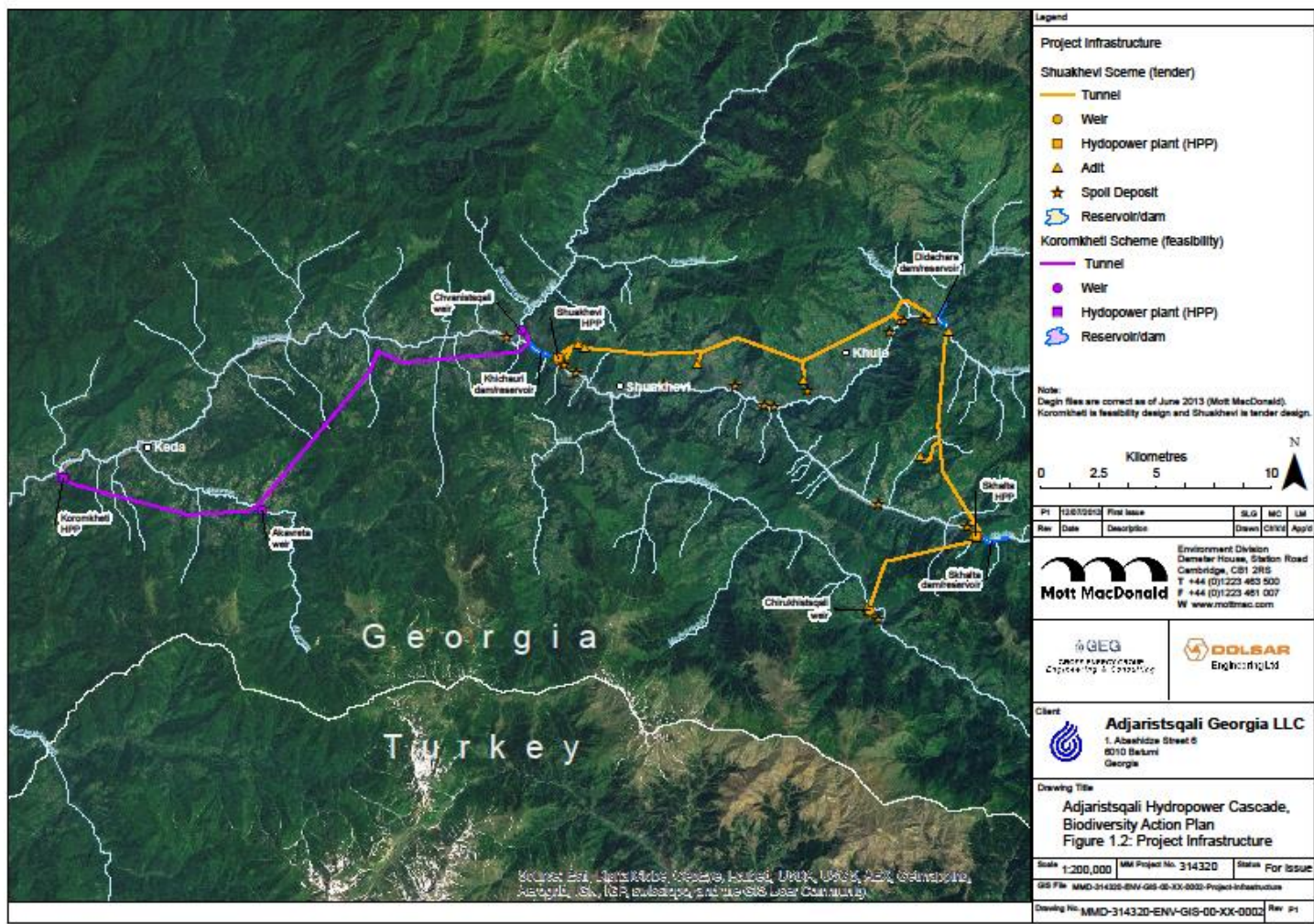
- Shuakhevi Scheme:** The total installed capacity of the Shuakhevi scheme will be 185 MW. The project envisages arrangement of two dams with reservoirs on the Adjaristsqali and Skhalta Rivers and one weir on the Chirukhistsqali River. River water will be diverted through tunnels from the abstraction points on the Skhalta and Chirukhistsqali rivers into the Didachara reservoir on the Adjaristsqali River from here it will be sent through headrace tunnel to the Shuakhevi HPP. A small-capacity HPP (10MW) will be arranged at Skhalta utilizing the water being transferred from the river Chirukhistsqali, while the main power unit (Shuakhevi HPP) will be arranged on the right bank of the Adjaristsqali River near Shuakhevi village and the confluence of the Adjaristsqali and Chirukhistsqali rivers.

220kV transmission line will be constructed following the existing transmission line corridor running through the valley from Batumi.

- **Koromkheti Scheme:** installed capacity of the HPP will be 150 MW, which will include one dam and reservoir on the river Adjaristsqali (below the Shuakhevi HPP), one low-threshold dam on the river Chvanistsqali and weir on the river Akavreta. The water transportation is considered by the diversion tunnels. An underground HPP arrangement is planned on the left bank of the Adjaristsqali River near Koromkheti village.

The Project is envisaged to be operated as a peaking plant, whereby the cascade will aim to operate at maximum capacity during the periods of high electricity demand, when there are high prices in Turkey (electricity prices vary depending on the time of day). Each scheme has small reservoirs to enable daily storage of water which allows the schemes to operate to full capacity at chosen times of the day to meet peak demand.

Figure 1.2: Adjariatsqali Hydropower Project Infrastructure



1.2 Why is the Adjaristsqali Hydropower Project BAP Needed?

A Biodiversity Action Plan (BAP) is a plan which includes a set of actions that lead to the conservation or enhancement of biodiversity for a specific site or project.

The Adjaristsqali Hydropower BAP is needed to ensure that the Project:

- Implements the mitigation, compensation and biodiversity offsetting measures within the Adjaristsqali Hydropower ESIA (Mott MacDonald, 2012a, 2012b, 2012c);
- Complies with AGL's Environmental and Social Sustainability Policy (Clean Energy Group, 2012);
- Complies with national legislation/policy requirements; and
- Complies with international environmental requirements and best practice, including European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy, International Finance Corporation (IFC) Performance Standard 6 (PS6), and the Equator Principles.

1.3 Structure of this report

This report is structured as follows:

- Chapter 2 presents the aim and general objectives of the Adjaristsqali BAP, along with the steps followed in the formulation of the BAP, the stakeholder consultation, and the study area for the BAP;
- Chapter 3 summarises the legislative and policy frameworks at international and national levels together with the Adjaristsqali ESIA process and its key findings with regard to biodiversity;
- Chapter 4 describes the biodiversity baseline and includes information on ecoregions, nature conservation areas, habitats, flora and fauna within the study area;
- Chapter 5 includes a Critical Habitat Assessment to establish which IFC PS6 requirements are applicable to this project;
- Chapter 6 lists the priorities for conservation and the selection criteria;
- Chapter 7 includes four action plans, each with objectives, targets and actions;
- Chapter 8 presents information on the mitigation ranking, BAP implementation, monitoring and reporting;
- Chapter 9 included a draft Biodiversity Monitoring and Evaluation Programme (BMEP) for the long-term monitoring of habitat change in the Adjaristsqali River Basin.

Only the Shuakhevi and Koromkheti schemes are being progressed, but reference to a third scheme called Khertvisi has been retained in the introductory and baseline sections of the BAP to reflect that AGL holds the concession for this area and that it technically could be developed as part of a further stage of development. AGL however has no plans to develop the Khertvisi scheme at this time. Chapter 5 onwards of this BAP therefore focus solely on the Shuakhevi and Koromkheti schemes.

2. Scope of the Adjaristsqali Hydropower BAP

2.1 Aims and Objectives of the BAP

The aim of the Adjaristsqali Hydropower BAP is to achieve no net biodiversity loss as a result of the Project by ensuring that the biodiversity is protected and enhanced where possible. The BAP has been developed in consultation with the stakeholders and biodiversity experts and confirms that appropriate measures are in place to be successfully implemented.

The objectives of the Adjaristsqali Hydropower BAP are to:

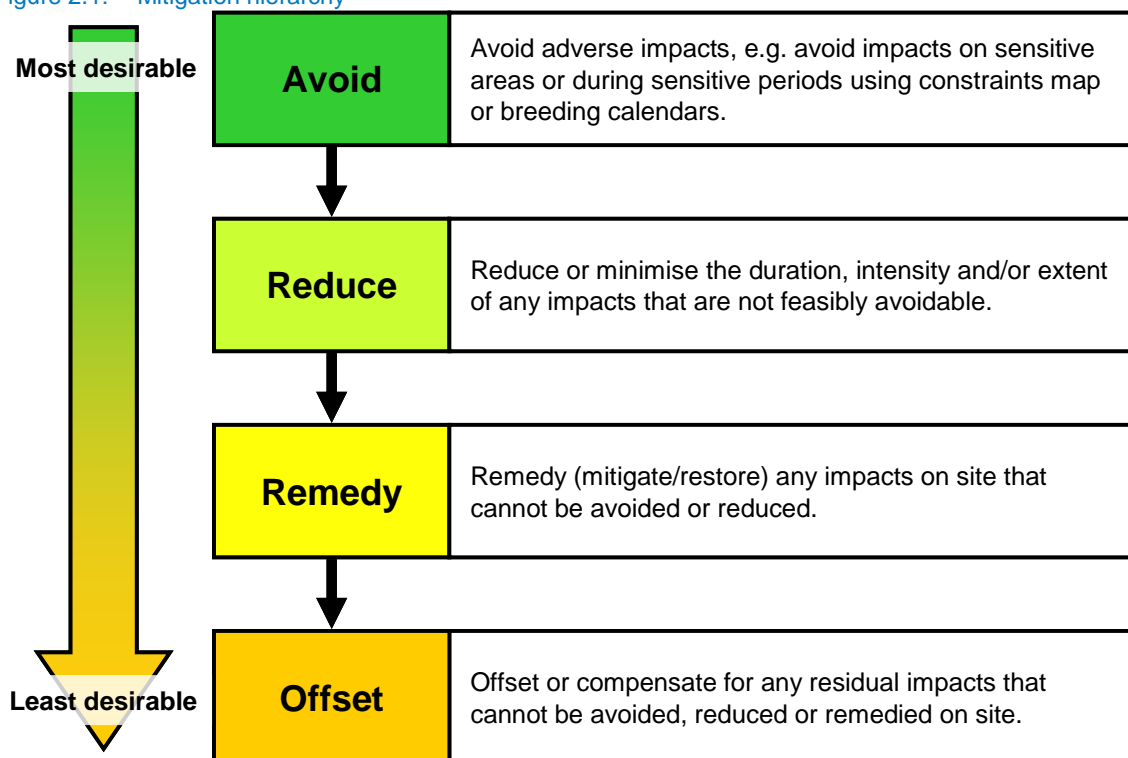
- Review existing biodiversity baseline information and legislative/policy frameworks for the Study Area (see section 2.4) and identify gaps;
- Implement a consultation process with relevant stakeholders and biodiversity experts to inform priorities and actions for biodiversity conservation;
- Undertake a Critical Habitat Assessment to determine the IFC PS6 requirements for the Project;
- Identify priorities and actions for biodiversity conservation, in consultation with stakeholders and biodiversity experts; and
- Establish a monitoring and evaluation programme for biodiversity allowing for the success of the BAP interventions to be assessed.

This BAP includes both long-term biodiversity conservation actions and on-site mitigation measures linked to the construction and operation activities of the Project. The on-site mitigation measures can be incorporated into a separate Biodiversity Management Plan (IFC, 2012b), but an integrated approach is considered to be more appropriate and efficient as the two sets of actions are strongly linked.

The biodiversity baseline, conservation actions and mitigation in this BAP supplement the information in the Adjaristsqali Hydropower ESIA, ESMP and CEMP (Mott MacDonald, 2012a, 2012b, 2012c, 2012d). Additional conservation opportunities/actions have been identified during the BAP process, following a comprehensive desktop review and consultation with stakeholders and biodiversity experts.

The conservation objectives and actions in this BAP have been developed to ensure the systematic implementation of the mitigation hierarchy i.e. avoid, reduce (minimise), remedy (restore) and offset. The concept of the mitigation hierarchy is outlined in Figure 2.1. This will allow for the careful management of risk and the best possible outcomes for the project and local communities, without compromising the health, function and integrity of the ecological system. In addition to the actions linked to the mitigation hierarchy, this BAP includes Additional Conservation Actions (ACA), which are actions to enhance the biodiversity of the Study Area, irrespective of the developments taking place there.

Figure 2.1: Mitigation hierarchy



The conservation actions have been established with the aim of achieving 'no net loss' to biodiversity in accordance with IFC PS6 (IFC, 2012a, 2012b). IFC PS6 requires evidence that the mitigation hierarchy has been applied, that avoidance is prioritised, and that offsets are measurable and only applied as a last resort where residual impacts are unavoidable.

2.2 Formulation of the Project BAP

The development of the Adjaristsqali Hydropower BAP follows the IFC Guidance Note 6 (IFC, 2012b) and the guidance published by the International Petroleum Industry Environmental Conservation Association (IPIECA, 2005). The IPIECA guidance is for the oil and gas industry, but it is the only detailed BAP guidance available and is relevant to many other project types, including hydropower projects.

It is important to recognise that a BAP is not just the production of a single document which details what actions are needed for the conservation and management of biodiversity. A BAP is a process from which a BAP document is formulated through the review of previous studies and from consultation with local stakeholders. The ESIA is part of this process in that the ecological assessments of the ESIA provide the baseline upon which the BAP objectives and conservation priorities are based. In accordance with IPIECA guidance (2005) best practice, A BAP should include eight specific tasks:

- Task 1: Determination of the legal, regulatory, planning, permitting & third party requirements
- Task 2: Desktop assessment of the project
- Task 3: Baseline survey of the biodiversity
- Task 4: Biodiversity impact assessment
- Task 5: Preparation of the BAP

- Task 5.1 Establishment of priorities for conservation
- Task 5.2 Identification of conservation actions
- Task 6: Implementation of the BAP
- Task 7: Monitoring, evaluation and improvement
- Task 8: Reporting, communication and verification of BAP performance

Tasks 1 to 4 were dealt with as part of the Adjaristsqali Hydropower ESIA (Mott MacDonald, 2012a, 2012b, 2012c). However, Tasks 1 to 4 have been reviewed in more detail and updated in line with the requirements of the Adjaristsqali Hydropower BAP and IFC PS6 (IFC, 2012a, 2012b).

2.3 Consultation with Stakeholders and Biodiversity Experts

2.3.1 Overview

Stakeholder consultation is an integral component in the formulation of a BAP. It is essential to engage with stakeholders to gather opinions on how to complement and coordinate actions. A number of stakeholders were consulted as part of the Adjaristsqali Hydropower ESIA (Mott MacDonald, 2012a). However, additional stakeholder consultation was required for the Adjaristsqali Hydropower BAP to:

- Update the biodiversity baseline and likely impacts;
- Identify the priorities for biodiversity conservation and develop the conservation actions; and
- Disseminate the draft BAP to stakeholders and receive feedback from them.

In addition, a number of national and international experts on biodiversity have been consulted with regard to the species that may trigger the critical habitat, in accordance with IFC PS6 (IFC, 2012a, 2012b). The responses of the experts are included in Appendix B of this report. In addition, consultation with the IFC has been undertaken and their advice has been incorporated in this document.

2.3.2 Stakeholder Categorisation

There are two types of stakeholders for the Adjaristsqali Hydropower BAP work:

- Stakeholder who need to know about the Adjaristsqali Hydropower BAP project
- Stakeholders that the Adjaristsqali Hydropower BAP project needs information from

Table 2.1 below provides a summary of the stakeholders consulted as part of the Adjaristsqali Hydropower ESIA and BAP and the method of stakeholder engagement. A stakeholders' workshop was organised in Batumi on 14th September 2012 as part of the Adjaristsqali Hydropower BAP. It has to be noted that a number of additional stakeholders were invited to the workshop, but not all were able to attend. The minutes of the Batumi workshop can be found in Appendix B of this report.

The feedback provided by stakeholders during the workshop in September 2012 has been incorporated into the baseline conditions, priorities for conservation, and BAP actions included in this document. A second workshop is planned for August 2013 in Batumi to discuss in more detail the priorities for conservation, further develop the BAP actions and establish long-term partnerships with the organisations who will implement the actions. An information meeting for the general public and the media will follow the completion of the final BAP report.

The draft BAP report will be circulated to a number of key stakeholders and their comments will be incorporated into the final version of the BAP report. Stakeholders who need to know about the

Adjaristsqali Hydropower BAP will be sent a formal letter summarising the information in the BAP document.

Table 2.1: List of stakeholders consulted for the Adjaristsqali Hydropower ESIA and BAP

Stakeholders	Method of engagement for the BAP	Consulted for ESIA?
Local communities and villages		
Residents of the local villages and surrounding areas within the Khulo, Shuakhevi and Keda Municipalities: <ul style="list-style-type: none"> • Didachara Village (Khulo Municipality) • Kvatia Village (Khulo Municipality) • Chvana Community (Shuakhevi) Municipality • Zamleti Community (Shuakhevi Municipality) • Oladauri Community (Shuakhevi Municipality) • Merisi Community (Keda Municipality) 	Not needed	Yes
Local government departments		
Directorate of Environmental and Natural Resources of Adjara	Workshop and review of draft BAP report	Yes
Autonomous Republic of Adjara Ministry of Agriculture	Workshop	Yes
Forestry Agency of Adjara and counterparts within each municipality	Workshop and review of draft BAP report	Yes
Urban Development Department of the Ministry of Finance and Economics of the Autonomous Republic of Adjara	Workshop	No
National government departments and ministries		
Ministry of Environment Protection and Natural Resources	Workshop and review of draft BAP report	Yes
Agency of Protected Areas of Georgia	Expert advice	No
International and national NGOs		
International Union for Conservation of Nature (IUCN) – Dr B. Tuniyev, reptile expert	Expert advice	No
Fauna and Flora International (FFI)	Consultation Letter	No
Birdlife International	Consultation Letter	No
Regional Environment Centre for the Caucasus http://rec-caucasus.org	Consultation Letter	No
Greens Movement Georgia/Friends of the Earth	Review of draft BAP report	Yes
World Wide Fund for Nature (WWF) Caucasus – Dr Nugzar Zazanashvili	Expert advice	No
Green Alternative	Review of draft BAP report	Yes
Local NGOs and conservation groups		
Association “Flora and Fauna”	Consultation Letter	No
Wild nature Protection Society “Chaobi”	Consultation Letter	No
Environmental Organization “PSOVI” – Dr Z. Javakhishvili, expert ornithologist	Expert advice and review of draft BAP report	No
Union on development of civil society “Borjgalo”	Consultation Letter	No
Association for Nature Protection and Sustainable Development “Mta-Bari” – Dr Z. Manvelidze and Dr N. Memiadze	Expert advice and review of draft BAP	Yes
Batumi Raptor Count	Workshop	No
LELP Adjara Sustainable Development Association	Workshop	Yes
Adjara Greens	Consultation Letter	Yes
Civil society organisations and research bodies		

Stakeholders	Method of engagement for the BAP	Consulted for ESIA?
Batumi Botanical Gardens (Dr N. Memiadze)	Workshop and expert advice	Yes
Black Sea Monitoring Agency	Workshop and review of draft BAP	Yes
Black Sea Eco Academy	Consultation Letter	No
Centre for Biodiversity Conservation and Research (NACRES) – Dr. B. Lortkipanidze	Expert advice	No
Georgian Centre for the Conservation of Wildlife – Birdlife partner	Consultation letter	No
Ilia State University Tbilisi - Dr D. Tarkhnishvili, reptile expert	Expert advice	No
Batumi State University	Consultation Letter	Yes
Industry and business		
Local and international companies operating in and around the BAP area, including Asti Hydropower Project.	Information letter	Yes
Media and press		
National and regional newspapers and radio stations	Information meeting	No

2.3.3 Stakeholder Influence/Interest Analysis

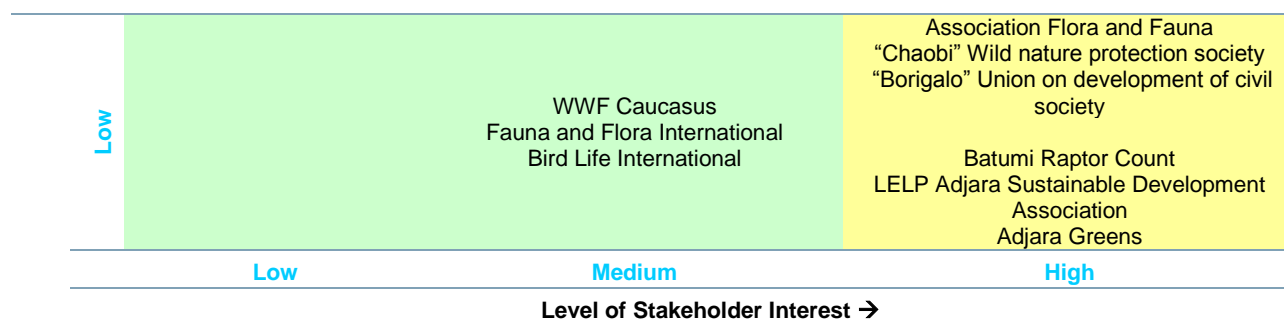
At the start of the Adjaristsqali Hydropower BAP, a stakeholder influence/interest analysis was carried out to identify the most important stakeholders who can potentially be partners for or influence the BAP actions, or stakeholders who have a strong interest in these actions (Table 2.2). The placement of the stakeholders in the different categories in the matrix below was discussed during the Batumi workshop, and comments from the stakeholders have been incorporated.

For the purpose of the interest/influence analysis, the following definitions apply:

- Interested parties are those who will be interested in the development of the BAP and whose background, past or current work may mean that they can contribute knowledge to it or should be made aware of the contents of the BAP; and
- Influential parties are those who can either positively or negatively affect the BAP and its planned outcomes. Stakeholders are placed in the high influence category if they may be directly affected by the outcomes of the BAP or the works undertaken in the development of the BAP.

Table 2.2: Stakeholder influence/interest analysis for the Adjaristsqali Hydropower BAP

Level of Stakeholder Influence →	High	Autonomous Republic of Adjara Ministry of Agriculture Urban Development Department of the Ministry of Finance and Economics of the Autonomous Republic of Adjara Agency of Protected Areas of Georgia Asti Hydropower Project	Ministry of Environment Protection and Natural Resources Directorate of Environmental and Natural Resources of Adjara Forestry Agency of Adjara
	Medium	Green Alternative Green Movement Regional Environment Centre for the Caucasus Black Sea Eco Academy Batumi State University Ilia State University Tbilisi IUCN NACRES	Botanical Gardens Batumi Black Sea Monitoring Agency “PSOVI” Environmental Organisation Association for nature protection and sustainable development “Mta-Bari”



2.4 Study Area

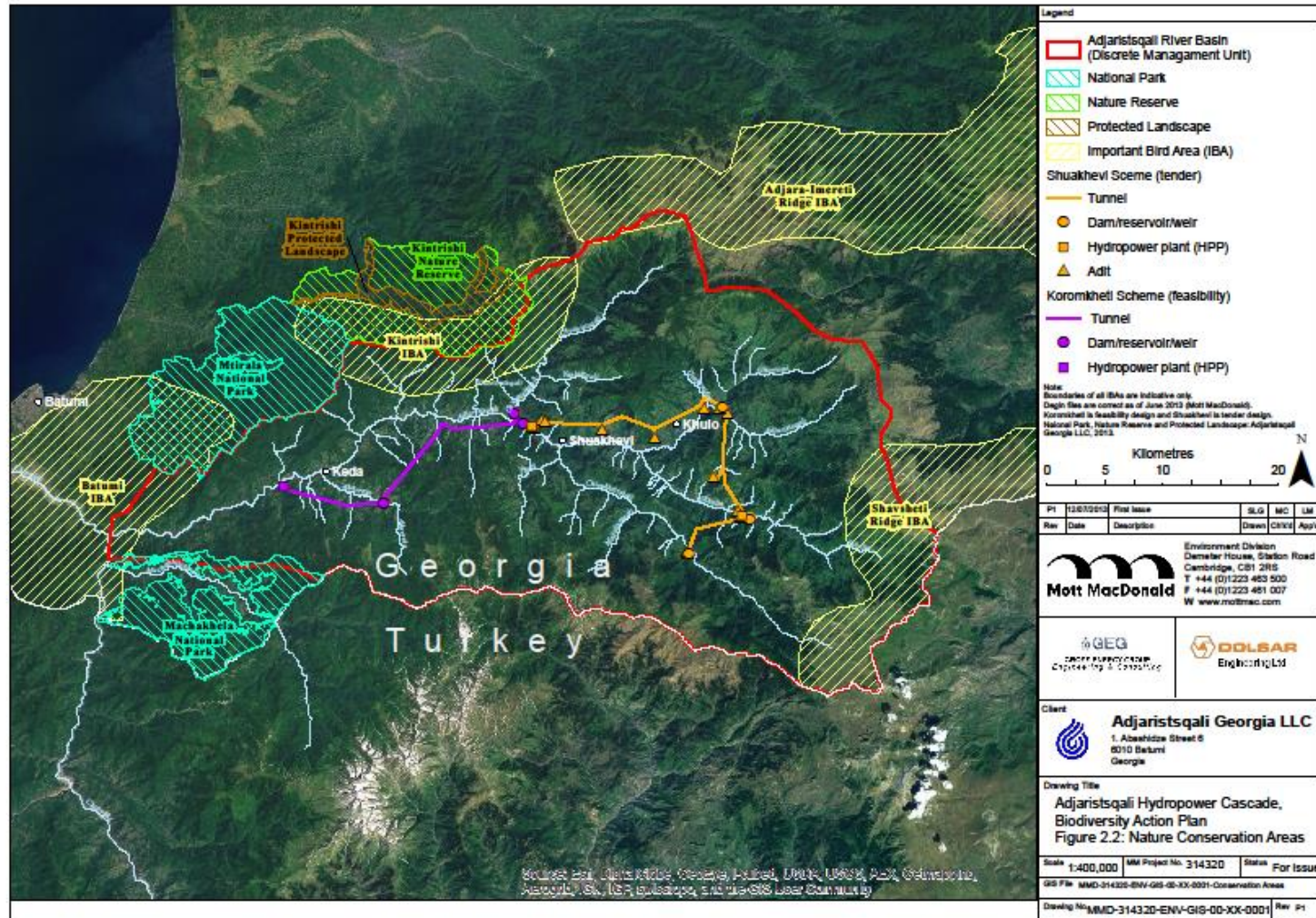
The Project is being implemented in the territory of the Autonomous Republic Adjara, which is situated in the south-west part of Georgia, on the Black Sea coast. Five administrative units (municipalities) are included in Adjara, namely: Kobuleti, Keda, Shuakhevi, Khulo and Khelvachauri. The HPPs cascade infrastructure units will be deployed on the territories of Khulo, Keda and Shuakhevi municipalities and consequently the environmental and social impacts are expected on the territories of these municipalities.

The general location of the Project area within Georgia is shown on Figure 1.1. The components of the Project are shown on Figure 1.2.

The Study Area for this BAP is the Adjaristsqali River Basin, which is considered to represent a Discrete Management Unit, in line with IFC Guidance Note 6 (IFC, 2012b). The Adjaristsqali River Basin (1565 km²) is shown on Figure 2.2 together with the project components and nature conservation areas within and adjacent to the Study Area.

In order to comply with the IFC PS6 requirements (IFC, 2012b), the BAP Study Area is larger than the Zone of Influence (Zol) investigated as part of the Adjaristsqali ESIA (Mott MacDonald, 2012a).

Figure 2.2: Adjariistsqali Hydropower BAP - Nature Conservation Areas



3. Legal, Regulatory, Planning and Third Party Requirements

3.1 Legal and Regulatory Requirements

3.1.1 International Legislation and Policy

The following international laws and conventions have been ratified by Georgia and are of relevance to this Project:

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1971)
- United Nations Framework Convention on Climate Change
- Convention on the Conservation of Migratory Species of Wild Animals (1979)
- Agreement on the Conservation of Bats in Europe (EUROBATS) (2001)
- Agreement on the Conservation of African-Eurasian Migratory Waterbirds (2001)
- UN (Rio) Convention on Biological Diversity (1992)
- Paris Convention on the Protection of the World Cultural and Natural Heritage (1972)
- The Black Sea Biodiversity and Landscape Conservation Protocol to the Convention on the Protection of the Black Sea against Pollution
- Convention on the Protection of the Black Sea Against Pollution (1992)
- International Plant Protection Convention

3.1.2 European Union (EU) Legislation and Policy

Georgia is a non-EU country but is a potential EU candidate country. Georgia's relations with the European Union are shaped via the European Neighbourhood Policy (ENP).

The Environmental Acquis comprises approximately 300 legal instruments, mostly in the form of Directives. The Acquis covers environmental protection, polluting and other activities, production processes, procedures and procedural rights as well as products. The key EU environmental directives making up the Acquis that are considered to be applicable to the Adjaristsqali BAP are listed in Table 3.1 and are shown alongside the directly equivalent transposed Georgian legislation.

Table 3.1: EU Legislation Applicable to the Project

EU Legislation	Georgian Legislation
Council Directive 85/337/EEC (amended by 97/11/EC) on Environmental Impact Assessment (EIA)	Regulation on Environmental Impact Assessment was approved by the Order No. 59 of the Minister of Environment Law on Ecological Examination 2007 Law on Service of Environmental Protection 2007 Law on Environmental Impact Permit 2007 other laws, by-laws, statutory acts and regulations
Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna (Natura 2000) – The Habitats Directive	Law on Protection of Environment (1996, amend 2000, 2003, 2007) Law on Wildlife (1997, amend. 2001, 2003, 2004)
Council Directive 78/659/EEC on the quality of fresh waters needing protection or improvement in order to support fish life	Law on System of Protected Areas (1996, amend.2003, 2004, 2005, 2006, 2007)

EU Legislation	Georgian Legislation
Council Directive 79/409/EEC on conservation of wild birds	Law on Red List and Red Book of Georgia 2006 Law on Status of Protected Areas, 2007 Biodiversity Protection Strategy and Action Plan, 2005 Red List, 2005 other laws, by-laws, statutory acts and regulations Georgia is a party to Convention on International Trade in Endangered Species (CITES), Ramsar and CBD.
Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy" or, in short, the EU Water Framework Directive	Law on Water 1997 Law on Environment Protection 1996 Law on Public Health 2007 Standard acts of the Ministry of Environment Protection and Natural Resources

3.1.3 National Legislative and Policy Framework

In Georgia, The Ministry of Environmental Protection (MoE) is responsible for regulating the natural environment. The MoE participates in the development environmental state policy and implements all policies designed for the protection and conservation of the environment and for the sustainable use and management of Georgia's natural resources. This includes controlling activities that have a potential adverse impact on the environment and natural resources and issuing environmental licences and permits.

Georgian legislation comprises the Constitution, environmental laws, international agreements, subordinate legislation, normative acts, presidential orders and governmental decrees, ministerial orders, instructions and regulations. Along with the national regulations, Georgia is signatory to a number of international conventions, including those related to environmental protection (see Section 3.1.1).

The National Biodiversity Strategy and Action Plan (NBSAP) for Georgia (2005) sets out the goals, objectives and policies for the protection and conservation of biodiversity in Georgia. The NBSAP sets nine strategic goals with the vision that Georgia *"will be a country where biological diversity is sustained and rehabilitated within a political, social and economic context that favours the wise use of natural resources and adequate benefit sharing"*. The strategic goals of the NBSAP are the following:

- A. To develop a protected areas system to ensure conservation and sustainable use of biological resources.
- B. To maintain and restore Georgia's habitats, species and genetic diversity through in-situ, exsitu and inter-situ conservation measures, and through sustainable use of biological resources.
- C. To conserve Georgian agrobiodiversity through ensuring its sustainable use and by promoting of ex-situ and in-situ conservation measures
- D. To promote sustainable hunting and fishing through adequate planning, restoration and protection of key biological resource
- E. To develop a biodiversity monitoring system and an active and integrated biodiversity database to ensure sustainable use and conservation of biological resources.
- F. To protect both the human population and biodiversity from potential threats from genetically modified organisms (biotechnology), through the strengthening the law and through increasing public involvement in decision making.
- G. To raise public awareness of biodiversity issues and to encourage public participation in the decision making process.

- H. To ensure appropriate financial and economic programmes are in place in order to support effective conservation of biodiversity, and to ensure the delivery of the BSAP.
- I. To further improve national legislation (and associated institutions) relating to biodiversity conservation, through the creation of new, and elaboration of existing laws and regulations, and through ensuring harmonisation to international legal responsibilities

The Project has considered these strategic goals and will help achieve the following goals: B, D, E and G. The other goals are either not relevant to this project or AGL has no control or influence to achieve these.

Georgian environmental legislation is based on existing international concepts and criteria. The key pieces of legislation regarding biodiversity are:

- Law of Georgia on Protection of the Environment (framework law)
- Law of the General Rules for the Protection of Wild Plants and Animals
- Law of Georgia on Protected Areas
- Law of Georgia on Wildlife
- Law of Georgia on Red List and Red Book
- Forest Code of Georgia.

The **Law of Georgia on Protection of the Environment** regulates legal relationship between the bodies of the state authority and physical persons/legal entities in the scope of environmental protection and consumption of natural resources on all Georgian territory including its territorial waters, airspace, continental shelf and special economic zones.

The law concerns environmental education, environmental management, economic sanctions, licensing, standards, environmental impact assessment and related issues. The law considers various aspects of ecosystem protection, protected areas, global and regional environmental management, protection of the ozone layer, biodiversity and the Black Sea, as well as discussing international cooperation aspects.

The main goals of the law are promotion of biological diversity, conservation of the country-specific, rare, endemic and endangered species of flora and fauna, marine environmental protection and provision of ecological balance. Law defines "*biological diversity conservation principle*", meaning that an activity should not lead to irreversible degradation of biodiversity.

The **Law of the General Rules for the Protection of Wild Plants and Animals** defines general rules for wildlife and plant protection:

- To maintain self-reproduction of wild plant and animal resources and biodiversity conservation, their extraction from the environment is strictly limited and is a subject to licensing;
- Any activities that could damage wildlife, plants, habitats, reproduction areas and migration routes are prohibited;
- Endangered wild animals and plants are registered in the "Red List" and "Red Book" of Georgia; and
- Any kind of activity regarding wild animals and plants, registered in the "Red List" and "Red Book" of Georgia are prohibited, including: hunting, trade, catching, cutting, mowing, except in special cases, which decreases the plants and animals number, deteriorates their habitats and living conditions.

The **Law of Georgia on Protected Areas** gives a definition of protected areas (including national parks, reserves, State Preserves and multiple use areas) and sets frameworks of activities, permitted in those areas. Eligible activities are determined according to the area designation, territory legislation, specific provisions and protected area management plans, as well as in accordance with the requirements of

international agreements and conventions signed by Georgia. It defines limits of the natural resource use within national parks and other protected areas. Generally, following activities are prohibited in the protected areas:

- To damage or modify natural ecosystems
- To destroy natural resources due to use or other purposes
- To seize, damage or disturb natural ecosystems and species
- To pollute the environment
- To introduce and multiply alien and exotic species of living organisms
- To import into the territory explosive or poisonous materials.

The **Law of Georgia on Wildlife** provides protection and restoration of the wildlife and its habitats, conservation of species diversity and genetic resources, sustainability and creating conditions for sustainable development, taking into account interests of future generations; legislative provision of the state regulation, regarding animal protection and animal wildlife use.

The **Law of Georgia on Red List and Red Book** (2003) regulates the Red List of Georgia and Red Book of Georgia, in relation to endangered species protection and their use, with the exception of issues related to aspects of international trade in endangered animals and plants. There are 137 species protected under the Laws in Georgia. Together with species protected by international conventions, the number increases to 200. Most of these are listed in the International Red List (Red Data List of IUCN), Red List of Georgia and in the Conventions' appendices.

The **Forest Code of Georgia** regulations relate to functions and use of forest, including protection, management of water catchment basin, wood production, etc. It allows for private ownership of forest and commercial woodcutting. According to the law, the Forest Department of Georgia does not undertake commercial woodcutting itself, but controls and manages these operations by granting this function to private enterprises. However, the Forest Department carries responsibility for maintenance woodcutting and forest management. According to the Code, the Ministry of Environment Protection and Natural Resources delegated to the Department a right to issue woodcutting licenses. The Forest Code sets categories of protected forests, including those regulating soil and catchment basins, riparian and sub-alpine forest zones, floristic species of the Red List, etc. The Forest Code is a framework law and requires execution of detailed regulations.

At present Georgia has no fisheries law. Recently the Ministry of Agriculture (MoA) started to prepare a new law on fisheries for Georgia. Governmental approval of this law is expected to take place in coming years, after which a number of regulations under the law will still need to be produced.

In addition to these, the **Law of Georgia on Environmental Impact Permit 2007** gives a complete list of activities subject to ecological examination (Article 4, Chapter II) and defines environmental examination through the EIA process as an obligatory step for obtaining authorisation for implementation of the planned development. This includes development of a hydroelectric power station with 2 MW or higher installed capacity. The legislation sets out the legal basis for issuance of environmental permits, including implementation of an ecological examination, public consultations and community involvement in the processes. According to the Law, the environmental permit is the key procedure for implementation of an activity on the territory of Georgia. The permit takes ecological, social and economic interests of the public and the state into consideration in order to protect human health and natural and cultural assets and heritage.

3.2 Planning and Permitting Requirements

3.2.1 Environmental and Social Impact Assessment

A detailed ecological impact assessment was completed for the Project as part of the ESIA (Mott MacDonald, 2012a, 2012b, 2012c). The ESIA identified a number of mitigation and compensation measures which were necessary to ensure that there would be no significant loss in biodiversity. It has been agreed that a BAP is needed to ensure that mitigation and compensation measures are fully and properly implemented, with stakeholder consultation, to meet conservation goals and objectives. This BAP supplements and updates the information included in the Adjaristsqali Hydropower ESIA to reflect the refinement and development of the Project design, the additional biodiversity baseline information collected since October 2012, and to include further assessment (including a Critical Habitat Assessment), mitigation and conservation actions which are required to comply with IFC PS6 (IFC, 2012a, 2012b).

A review of the likely impacts presented in the Adjaristsqali Hydropower ESIA has been undertaken and used to:

- Determine whether the BAP is necessary and which features it should be applied to;
- Determine the level of impact and risk associated with the impacts;
- Determine the associated mitigation, monitoring and evaluation activities needed to address those impacts; and
- Determine the conservation actions.

Table 3.2 below includes a summary of the likely significant impacts of the Project (Shuakhevi and Koromkheti Schemes only) as identified in the Adjaristsqali Hydropower ESIA (Mott MacDonald, 2012a). The table presents sensitive habitats and protected species that have been identified to occur within the wider Project Area, which may be affected by the project and the types of impacts that may occur. Additional surveys to be undertaken prior to site clearance of each construction site and during the construction period will provide further details on whether these impacts will occur as well as quantification of impact. The construction management measures as well as mitigation measures that will be implemented throughout the project to avoid and minimise these impacts are summarised within Chapter 7 BAP Actions, further details on construction management measures are detailed within the ESMP (Mott MacDonald, 2012c) and the Construction Environmental Management Plans (CEMP). Details of impact magnitude and significance are provided in the Ecology and Biodiversity chapter of the ESIA (Mott MacDonald, 2012a).

Table 3.2: Summary of key significant impacts on ecological features during construction (C) and operation (O) activities

Features	Key Impacts (c=construction impact, o=operational impact)	Shuakhevi Scheme	Koromkheti Scheme
Valuable habitats			
Oak forest – <i>Quercus petraea ssp. dschorochensis</i>	C= Habitat loss and felling for road access, work compounds.	X	X
	O= Permanent habitat loss from inundation and infrastructure	X	X
Oak-hornbeam forest - <i>Carpinus caucasica, Quercus petraea ssp. dschorochensis or Quercus hartwissiana</i>	C= Habitat loss and felling for road access, work compounds.		X
	O= Permanent habitat loss from inundation and infrastructure		X

Features	Key Impacts (c=construction impact, o=operational impact)	Shuakhevi Scheme	Koromkheti Scheme
Chestnut forest with cherry-laurel – <i>Castanea sativa</i> , <i>Acer campestre</i> , <i>Alnus barbata</i>	C= Habitat loss and felling for road access, work compounds. O= Permanent habitat loss from inundation and infrastructure		X X
Mixed, species-rich deciduous forest with Colchic understorey- <i>Castanea sativa</i> , <i>Aristolochia pontica</i> , <i>Alnus barbata</i> , <i>Tamus communis</i>	C= Habitat loss and felling for road access, work compounds. O= Permanent habitat loss from inundation and infrastructure		X X
Liana-rich mixed deciduous forest with mixed spruce – <i>Picea orientalis</i> , <i>Carpinus caucasica</i> , <i>Alnus barbata</i> , <i>Salix caprea</i>	C= Habitat loss and felling for road access, work compounds. O= Permanent habitat loss from inundation and infrastructure	X X	
Degraded spruce (<i>Picea orientalis</i>) forest with deciduous species – <i>Quercus petraea</i> ssp. <i>dshorochensis</i> , <i>Fagus orientalis</i> , <i>Ulmus glabra</i> , <i>Carpinus caucasica</i>	C= Habitat loss and felling for road access, work compounds. O= Permanent habitat loss from inundation and infrastructure	X X	
Riparian forest with <i>Alnus barbata</i> dominant	C= Habitat loss and felling for road access, work compounds O= Permanent habitat loss from inundation and infrastructure. Changes in hydrological conditions may increase as river recedes	X X	X X
Walnut plantation – <i>Juglans regia</i> , <i>Alnus barbata</i> , <i>Picea orientalis</i>	C= Habitat loss and felling for road access, work compounds. O= Permanent habitat loss from inundation and infrastructure	X X	
Pontic rhododendron (<i>Rhododendron ponticum</i>) scrub	C= Habitat loss and felling for road access, work compounds. O= Permanent habitat loss from inundation and infrastructure	X X	
Riverside grassland	C= Habitat loss for construction activities O= Permanent habitat loss from inundation and infrastructure.	X	X X
Aquatic/riverine habitats of the Adjaristsqali River and its tributaries	C= Sediment release, changes in water quality.		X
Bare rock, cervices and riverside deposits	C= Deposition of tunnelling waste, drilling activities, habitat loss O= Permanent habitat loss from inundation and infrastructure	X X	X X
Protected and notable plant species			
Chestnut (<i>Castanea sativa</i>) and Walnut (<i>Juglans regia</i>)	C= Habitat loss and felling for road access, work compounds. O= Permanent habitat loss from inundation and infrastructure		X X
European hop hornbeam (<i>Ostrya carpinifolia</i>) and Colchic bladdernut (<i>Staphylea colchica</i>)	C= Habitat loss and felling for road access, work compounds. O= Permanent habitat loss from inundation and infrastructure		X X
Hartvisian oak (<i>Quercus</i>	C= Habitat loss and felling for road access, work	X	X

Features	Key Impacts (c=construction impact, o=operational impact)	Shuakhevi Scheme	Koromkheti Scheme
<i>harwissiana</i>)	compounds. O= Permanent habitat loss from inundation and infrastructure	X	X
Elm (<i>Ulmus glabra</i>)	C= Habitat loss and felling for road access, work compounds. O= Permanent habitat loss from inundation and infrastructure		X X
Cyclamen (<i>Cyclamen adzharicum</i> syn. <i>C. coum</i> ssp. <i>caucasicum</i> , <i>C. vernum</i>) and assemblage of notable plant species	C= Habitat loss and felling for road access, work compounds. O= Permanent habitat loss from inundation and infrastructure	X X	X X
Protected and notable animal species			
European otter (<i>Lutra lutra</i>)	C= Barriers during construction, noise disturbance, food shortage, sediment release, habitat loss O= Physical barriers preventing movement of species, reduced riverine habitat, reduce food availability along rivers, changes in water quality, increase disturbance	X X	X X
Brown bear (<i>Ursus arctos</i>)	C= Habitat loss, noise disturbance, hunting O= Habitat loss, noise disturbance, hunting	X X	X X
European lynx (<i>Lynx lynx</i>)	C= Habitat loss, noise disturbance, hunting O= Habitat loss, noise disturbance, hunting	X X	
Caucasian squirrel (<i>Sciurus anomalus</i>)	C= Habitat loss & noise disturbance O= Habitat loss, noise disturbance, hunting	X X	X X
Golden jackal (<i>Canis aureus</i>) and common wild boar (<i>Sus scrofa</i>)	C= Habitat loss, noise disturbance, hunting O= Habitat loss, noise disturbance, hunting	X X	X X
Bats (all species)	C= Habitat loss, light and noise disturbance. O= Habitat loss, reduced area for roosting, increased disturbance and light pollution. But open water habitats creating new foraging areas	X X	X X
Caucasian grouse (<i>Tetrao mlokosiewiczii</i>)	C= Habitat loss and hunting	X	
Long-legged buzzard (<i>Buteo rufinus</i>)	C= Noise disturbance and hunting		X
Boreal owl (<i>Aegolius funereus</i>)	C= Habitat loss, light and noise disturbance O= Habitat loss, light and noise disturbance	X	X X
Common rosefinch (<i>Carpodacus erythrinus</i>)	C= Habitat loss and noise disturbance O= Habitat loss	X	X
Golden eagle (<i>Aquila chrysaetos</i>)	C= Noise disturbance and hunting	X	
Red-footed falcon (<i>Falco vespertinus</i>)	C= Hunting		X
Eastern imperial eagle (<i>Aquila heliaca</i>)	C= Noise disturbance and hunting		X
Levant sparrowhawk (<i>Accipiter brevipes</i>)	C= Hunting		X
Lesser kestrel (<i>Falco naumanni</i>)	C= Noise disturbance and hunting		X
Bird assemblages	C= Habitat loss, light and noise disturbance	X	X

Features	Key Impacts (c=construction impact, o=operational impact)	Shuakhevi Scheme	Koromkheti Scheme
Clark's lizard (<i>Darevskia clarkorum</i>) and Caucasus viper (<i>Vipera kaznakovi</i>)	C= Habitat loss, accidental killing and injury O= Habitat loss, accidental killing and injury	X X	X X
Caucasian toad (<i>Bufo verrucosissimus</i>)	C= Habitat loss O= Habitat loss along river margins		X X
Caucasian salamander (<i>Mertensiella caucasica</i>)	C= Habitat loss, accidental killing and injury, degradation of habitats O= Habitat loss, accidental killing and injury	X X	X

3.3 AGL's Environmental and Social Sustainability Policy

This policy sets out AGL's commitments and responsibilities as a developer to achieve environmental and social sustainability in their projects. AGL prioritises environmental and social issues including biodiversity conservation, climate change mitigation and adaptation, and energy and resource efficiency (Clean Energy Group, 2012).

AGL and the contractors hired by AGL to construct the project will:

- Meet or exceed all applicable national laws and regulations;
- Minimise environmental and social impacts and continually improve the environmental and social performance as an integral part of AGL's operating strategy;
- Respect the stakeholders, the environment and cultural heritage;
- Constructively engage with affected communities and other stakeholders and address complaints about any breach of this policy promptly;
- Ensure that AGL's employees and contractors understand this Policy and conform to the high standards it requires; and
- Intervene promptly in unsafe or non-compliant situations.

In addition, AGL will actively seek to:

- Ensure its activities adhere to good international industry practices in environmental, social and human resource management, including the IFC's Performance Standards and EHS Guidelines.
- Contribute to effective implementation of relevant principles and codes of practice related to environment, labour, corporate responsibility and access to information;

3.4 Third Party Requirements

3.4.1 Overview

The Project is required to meet the international standards of the IFC, which is part of the World Bank Group, and potentially those of the EBRD. The international environmental and social safeguard policies of these organisations are outlined below.

3.4.2 International Finance Corporation (IFC) Standards and Guidance

The IFC PS6 (IFC, 2012a) and Guidance Note 6 (IFC, 2012b) has been used on the Project as best practice and international standard. In accordance with IFC PS6, habitats are divided into modified, natural

and critical habitats. Critical habitats can be either modified or natural habitats supporting high biodiversity value, including:

- habitat of significant importance to critically endangered and/or endangered species (IUCN Red List);
- habitat of significant importance to endemic and/or restricted-range species;
- habitat supporting globally significant concentrations of migratory species and/or congregatory species;
- highly threatened and/or unique ecosystems; and/or
- areas associated with key evolutionary processes.

A BAP is required for all projects located in critical habitat (IFC, 2012a) and is recommended for projects that have the potential to significantly impact natural habitat (IFC, 2012b). The Adjaristsqali Hydropower ESIA has highlighted the potential presence of critical habitats within the zone of influence of the Project (Mott MacDonald, 2012a). A Critical Habitat Assessment is included in Section 5 of this document.

Specific reference has been made to the following IFC environmental standards and guidance:

- IFC General Environmental, Health and Safety (EHS) Guidelines (2007)
- IFC EHS Guidelines for Electric Power Transmission and Distribution (2007)

3.4.3 European Bank for Reconstruction and Development (EBRD) Standards

Under the EBRD Environmental and Social Policy (ESP) (EBRD, 2008), projects are categorised as A / B / C / FI, based on environmental and social criteria to: (i) reflect the level of potential environmental and social impacts and issues associated with the proposed Project; and (ii) determine the nature and level of environmental and social investigations, information disclosure and stakeholder engagement required for each project, taking into account the nature, location, sensitivity and scale of the Project, and the nature and magnitude of its possible environmental and social impacts and issues.

The categorisation of each project depends on the nature and extent of any actual or potential adverse environmental or social impacts, as determined by the specifics of its design, operation and location. EBRD lists the criteria by which a project is classified as a Category A project. This includes projects which involve large dams and other impoundments designed for the holding back or permanent storage of water and the construction of high-voltage overhead electrical power lines, both of which are features of this Project and consequently it is classified as Category A.

EBRD has adopted a comprehensive set of specific Performance Requirements (“PRs”) that projects are expected to meet. Furthermore, EBRD is committed to promoting EU environmental standards as well as the European Principles for the Environment (EPE), which are reflected in the PRs.

The PR6 “Biodiversity Conservation and Sustainable Management of Living Natural Resource” is the relevant requirement for this BAP. PR6 applies to projects in all types of habitats, irrespective of whether they have been disturbed or degraded previously, or whether or not they are protected or subject to management plans.

The objectives of PR6 are:

- to protect and conserve biodiversity
- to avoid, minimise and mitigate impacts on biodiversity and offset significant residual impacts, where appropriate, with the aim of achieving no net loss or a net gain of biodiversity
- to promote the sustainable management and use of natural resources
- to ensure that Indigenous Peoples and local communities participate appropriately in decision-making

- to provide for fair and equitable sharing of the benefits from project development and arising out of the utilisation of genetic resources
- to strengthen companies' license to operate, reputation and competitive advantage through best practice management of biodiversity as a business risk and opportunity
- to foster the development of pro-biodiversity business that offers alternative livelihoods in place of unsustainable exploitation of the natural environment.

3.4.4 Asian Development Bank (ADB) Standards

The ADB Safeguards Policy Statement (SPS) 2009 sets out policy principles and outlines the delivery process for ADBs safeguard policy in relation to environmental safeguards. The ADB has adopted a set of specific safeguard requirements that borrowers/clients are required to meet in addressing environmental and social impacts and risks. ADB staff will ensure that borrowers/clients comply with these requirements during project preparation and implementation.

The safeguard policies are operational policies that seek to avoid, minimise or mitigate the adverse environmental and social impacts of projects including protecting the rights of those likely to be affected or marginalised by the development process. ADBs safeguard policy framework in the SPS consists of three operational policies on the environment, indigenous people and involuntary resettlement. ADB has developed Operational Procedures to be followed in relation to the SPS policies and these are included in the ADB Operations Manual.

Requirements for assessing and addressing biodiversity effects of projects are set out within ADB Safeguard Requirements 1: Environment, Section D8 'Biodiversity Conservation and Sustainable Natural Resource Management'. This document is included as an appendix to the SPS.

Section D8 requires the environmental assessment process to focus on the major threats to biodiversity and for the borrower/client to identify measures to avoid, minimize, or mitigate potentially adverse impacts and risks and, as a last resort, propose compensatory measures, such as biodiversity offsets, to achieve no net loss or a net gain of the affected biodiversity.

Obligations on the borrower/client differ depending on whether the habitat is classified as modified, natural or critical. For areas of critical habitat the requirements state that no project activity will be implemented in areas of critical habitat unless:

- There are no measurable adverse impacts, or likelihood of such, on the critical habitat which could impair its high biodiversity value or the ability to function;
- The project is not anticipated to lead to a reduction in the population of any recognized endangered or critically endangered species or a loss in area of the habitat concerned such that the persistence of a viable and representative host ecosystem be compromised;
- For any lesser impacts, mitigation measures will be designed to achieve at least no net loss of biodiversity. They may include a combination of actions, such as post-project restoration of habitats, offset of losses through the creation or effective conservation of ecologically comparable areas that are managed for biodiversity while respecting the ongoing use of such biodiversity by Indigenous Peoples or traditional communities, and compensation to direct users of biodiversity.

When the project involves activities in a critical habitat, ADB requires the borrower/client to retain qualified and experienced external experts to assist in conducting the assessment.

4. Biodiversity Baseline

4.1 General Approach and Methodology

4.1.1 Desktop Study

A detailed desk-based review of available information from national and international sources was undertaken. This included information from international databases and information held by various international NGOs, and by individual Ministerial departments in Georgia:

- The Adjaristsqali Hydropower ESIA;
- Published research available, as identified by Mott MacDonald, AGL and stakeholders;
- International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species (<http://www.iucnredlist.org>);
- The Red List of Georgia ([#](http://chm.moe.gov.ge/index.php?page=red_list&lng=en));
- The Red List of Endemic Plants of the Caucasus Region and Adjara Plant Red List;
- Critical Ecosystem Partnership Fund (CEPF) – conservation programmes on the Caucasus Biodiversity Hotspot (www.cepf.net);
- Fauna and Flora International (FFI) conservation programmes- Georgian carnivore conservation (www.fauna-flora.org);
- USAID – Support for the National Parks Programme (<http://map.usaid.gov/ProjectDetail?id=a0cd0000012aSaAAI>);
- UNDP/GEF – Catalyzing Financial Sustainability of Georgia’s Protected Areas (<http://undp.org/ge/>);
- World Wildlife Fund (WWF) Caucasus – Various programmes including ‘Greening the Black Sea Synergy’ and ‘Programme of Work on Protected Areas across the Caucasus’ (<http://wwf.panda.org>);
- Fishbase (<http://www.fishbase.org/search.php>);
- Batumi Raptor Count (www.batimiraptorcount.org);
- Centre for Biodiversity Conservation and Research (www.nacres.org);
- Georgian Centre for the Conservation of Wildlife (<http://gccw.bunebaprint.ge>);
- BirdLife International Data Zone (<http://www.birdlife.org/datazone/home>); and
- Terrestrial and freshwater ecoregions within the Study Area (http://wwf.panda.org/about_our_earth/ecoregions).

Information on the following nature conservation areas (existing or proposed) within or near the Study Area has also been collected and reviewed:

- Ramsar Sites
- Key Biodiversity Areas (KBA)
- Important Bird Areas (IBA)
- Endemic Bird Areas (EBA)
- Important Plant Areas (IPA)
- Nationally protected areas in Georgia:
 - Strict Nature Reserves;
 - National Parks;
 - Managed Nature Reserves;
 - Natural Monuments;
 - Protected Landscapes; and
 - Multiple Use Area.

4.1.2 Field surveys

4.1.2.1 Overview

A field reconnaissance survey was carried out in May 2011 by Mott MacDonald, Gamma and Gross Energy Group to inform the Adjaristsqali Hydropower ESIA. Ecological surveys of areas of specific interest and areas sensitive to potential disturbance within the Study Area were undertaken between May and September 2011 (Gamma, 2011, 2012) and included:

- Flora and vegetation surveys;
- Birds surveys;
- Mammal surveys (including bats);
- Reptile and amphibian surveys; and
- Fish surveys.

The following additional surveys were carried out in 2012:

- Autumn and spring bird migration surveys as part of the electricity transmission line routing study (Batumi Raptor Count – September/October 2012 and April/May 2013);
- Botanical and habitat walkover surveys and ground truthing as part of the electricity transmission line routing study (Mott MacDonald – September, 2012 and June 2013);
- Fish surveys (Black Sea Monitoring Agency - August 2012); and
- River meso-habitat surveys (Mott MacDonald and CEDREN (SINTEF) - August 2012).

A routing study has been undertaken to inform the new 220 kV transmission line which is to be developed as a separate project (Mott MacDonald, 2013) but reference to it here has been included because it is associated with the Adjaristsqali Hydropower Project. The proposed electricity transmission line is 125 km long, but only the western most 75 km fall within the Adjaristsqali basin. As mentioned previously in this document, the Transmission Line works are not part of this BAP or construction program, but may be considered in full at a different time.

A brief summary of the methodology for each ecological feature is provided below. A full account of the methodologies and results of these surveys can be found in the Adjaristsqali Hydropower ESIA (Mott MacDonald, 2012a, 2012b) and Adjaristsqali Transmission Line Routing Study (Mott MacDonald, 2013).

4.1.2.2 Vegetation and Floristic Surveys

Description of the habitats and an inventory of the floristic diversity within the areas around each component of the Project were undertaken in May-June 2011 (Gamma, 2011). This included the identification of plant species listed in the Red Data Book of Georgia. Lists of protected, threatened, rare and endemic plant species were recorded by qualified botanists during the walkover for the electricity transmission line undertaken in September 2012 and June 2013. In addition, a botanical walkover survey of the proposed construction sites on the Shuakhevi Scheme was undertaken in mid September 2012 to inform the BAP.

Through interpretation of satellite imagery (Rapid Eye and Landsat), a preliminary land-use and habitat classification was prepared in 2012 for the areas under the footprint of the Project and for the entire route corridor (1 km wide) of the associated electricity transmission line project. Habitat ground truthing from 2011, 2012 and 2013 was used to refine the preliminary habitat classification. The habitat areas to be

affected by the Project have been calculated and this information has been used in the assessment of impacts on critical habitat features (see Section 5.3).

4.1.2.3 Bird Surveys

Birds were recorded in 2011 by observation and detection of bird calls during transect surveys of lowland and mountainous landscapes. Legally protected species were noted, and nesting areas were identified.

Autumn bird migration surveys along the proposed electricity transmission line were carried out by Batumi Raptor Count between 18th September and 4th October 2012. Birds were counted at 16 vantage points along the proposed route and each point was visited between one and five times. A total of 106.4 hours of survey effort were undertaken. Counts lasted for 1-3 hours and whenever possible, different starting hours were used. When a bird was found, an estimation of the height at which the bird was flying was made.

An additional bird migration survey was carried out in spring 2013 between 20th April and 26th May. The proposed transmission line route was split into three sections:

- Eastern section (Akhalsikhe to Goderdzi Pass) - 13 survey points surveyed four times for 2.5 hours each (119.5 survey hours);
- Central section (Goderdzi Pass to Adjaristsqali-Chorokhi confluence) – five survey points surveyed twice for 2 hours each (20 survey hours); and
- Western section (Adjaristsqali-Chorokhi confluence to Batumi substation) – four survey points surveyed five times for 4 hours each (80 survey hours).

More survey effort (survey points and/or hours) was put in the eastern and western sections due to a higher risk of bird collisions with power lines there. The survey recorded number of migratory birds in each species; height of flight; direction of migration; foraging; and perching or roosting.

4.1.2.4 Mammal Surveys

Large and medium-sized mammals were recorded visually and by field signs, e.g. footprints findings, along 1-5 km transect routes both during the daytime and at night. Species composition and number counts were further determined by standard trap-line methods (by means of live traps). This approach allowed determination of a percent of species that were caught in the traps per 100 trap-days. Ground digging was also recorded to determine the status of moles.

Bats were also recorded by transect surveys of known routes, forests, lanes, trees, underground roosts, buildings and reservoir banks within the Study Area.

4.1.2.5 Reptile & Amphibian Surveys

Hand searches of key habitats including ponds, river edges and riparian vegetation was undertaken for reptiles and amphibians, including searches under natural hibernacula. Visual sightings of individuals of these animal groups while undertaking surveys were also taken into account.

4.1.2.6 Fish and Zoo-benthos Surveys and Interviews

A series of surveys were undertaken in August and September 2011; these included a walkover within the Study Area and subsequent field surveys for fish, zoo-benthos and interviews with fishermen. Based on the

preliminary project layout options, the main rivers and tributaries were divided into separate sampling reaches, with each reach encompassing one dam or one weir. A walkover survey was then undertaken to identify suitable survey sites which encompassed a range of different habitats available for fish as well as the identification of sensitive sections. A total of 11 sites were selected with a range of different morphological conditions so as to detect as many fish species as possible.

Fish and zoo-benthos (prey for fish) samples were taken using gill nets, landing nets, throwing nets, fishing rods and dragnets for fingerlings. Fish were sorted according to species and counted. Zoo-benthos samples were obtained using established techniques with approximately two to three samples collected within each river section and within a 0.25 m² area.

Local fishermen were interviewed to obtain further information on the fish present (e.g. general species including any rare, protected and/or migratory species), preferred areas, as well as identification of any known sensitive areas (e.g. spawning sites). These interviews would also provide information on how socio-economically important fishing is to the local community.

As part of the mitigation measures included in the Adjaristsqali Hydropower ESIA, fish surveys will be carried out every year starting with 2012 (first survey was conducted in August 2012), during construction and for ten years during operation. The surveys are being undertaken by the Black Sea Monitoring Agency. The 2012 surveys included the Shuakhevi Scheme only and no interviews were conducted this year.

4.1.2.7 River Habitat Surveys

A two-phased approach to assess the most appropriate environmental flows along the length of the affected river reaches has been used in the Adjaristsqali Hydropower ESIA (Mott MacDonald, 2012a). As part of this approach, river meso-habitat mapping has been used to collect ecological and physical information to inform the environmental flows assessment (Borsányi et al., 2004). The first set of river habitat data as well as physical data was collected in August 2012 from the Adjaristsqali, Chirukhistsqali and Skhalta Rivers.

This method classifies the river sections into meso-scale morphological (meso-habitat) classes by visual observation. Details on this method can be found in the Adjaristsqali Hydropower ESIA (Mott MacDonald, 2012a).

4.2 Ecoregions and Biodiversity Hotspots

The Caucasus is one of WWF's Global 200 ecoregions, identified as globally outstanding for biodiversity. Global ecoregions are large areas of land or water that contain geographically distinct assemblages of natural communities that share a large majority of their species and ecological dynamics, share similar environmental conditions, and, interact ecologically in ways that are critical for their long-term persistence (http://wwf.panda.org/about_our_earth/ecoregions).

Georgia is located within the Caucasus-Anatolian-Hyrcanian Temperate Forests Global ecoregion, made up of six terrestrial ecoregions: Kopet Dag woodlands and forest steppe; Caucasus mixed forests; Euxine-Colchic deciduous forests; Northern Anatolian conifer and deciduous forests; Caspian Hyrcanian mixed forests; and Elburz Range forest steppe. This global ecoregion comprises some of the most diverse and distinctive temperate forests in Eurasia, where endemism is very high – in the Caucasus alone, up to 20% of the flora is considered endemic. More than 10000 plants, 700 vertebrate animals, and 20000

invertebrate animals have been catalogued in the Caucasus mixed forests. The Euxine-Colchic deciduous forests together with the swampy broadleaf forests of the Colchic lowland, boast 130 endemic species of plants and animals (http://wwf.panda.org/about_our_earth/ecoregions/caucasus_temperate_forests.cfm).

The Caucasus region has also been identified by the WWF as one 35 Priority Places identified as focal among globally outstanding ecoregions (called Global 200 ecoregions) (WWF, 2010).

The Caucasus is one of the 25 most diverse and endangered biodiversity hotspots in the world, as defined by Conservation International and World Wide Fund for Nature (WWF). The Caucasus biodiversity hotspot supports a large number of endemic plant species, and the unique biodiversity of this area is threatened by forest clearing, illegal hunting and plant collecting (CEPF, 2004).

At least 153 mammal species inhabit the Caucasus hotspot, one-fifth of which are endemic, and the coasts of the Black and the Caspian Seas within this region are important stopover sites for migratory birds flying over the isthmus. More than a third of the marine and freshwater fish species found in the hotspot are found nowhere else in the world. WWF's Programme of Work on Protected Areas Programme (PoWPA) have promoted an increase for government funding in the Caucasus area, an increase in protected areas in the region since 2004, sustainable financing mechanisms in the region and supported the Caucasus Biodiversity Monitoring Network as the first biodiversity monitoring tool at regional level. The Caucasus has been named as a large herbivore hotspot by WWF's Large Herbivore Initiative (CEPF, 2004). Eleven species of large herbivore as well as five large carnivores are found over a relatively small area. In 2002, the IUCN Red List identified 50 globally threatened animal species and one plant species in the Caucasus, of which 18 were restricted range or endemic species. The region is also of particular importance for agrobiodiversity, with Georgia regarded as one of the centres of origin of domestic plant species (Mott MacDonald, 2012a). This rich diversity in this area is explained by its juncture between the Black Sea and the Caspian Sea, the high levels of landscape diversity due to the temporal-spatial variability in the region, and the diversity in climatic conditions with precipitation ranging from more than 4,000 mm per year in south western Caucasus to less than 200 mm a year in the deserts in the east. The region as a whole is therefore considered to be of very high conservation value (CEPF, 2004).

There are no specific requirements for developments being undertaken within biodiversity hotspots. However, some of the biodiversity features within hotspots are included in internationally recognised or legally protected areas, and critical habitat may be triggered by endangered/critically endangered, endemic/restricted-range and/or migratory/congregatory species. These aspects are dealt with in Section 5.

4.3 Protected and Nature Conservation Areas

There are several nature conservation areas within or adjacent to the Study Area: Kintrishi Nature Reserve and Important Bird Area (IBA), Machakhela National Park, Mtirala National Park, Shavsheti Ridge IBA, Adjara-Imereti Ridge IBA and Batumi IBA (Figure 2.2). Brief descriptions of these sites are provided below. Further information and an assessment of the likely impacts are provided in the Critical Habitat chapter below (Sections 5.2.4 and 5.3.4).

4.3.1 Kintrishi Nature Reserve and Important Bird Area

The Kintrishi Nature Reserve (IUCN category Ia) was established in 1959, has an area of 13,893 ha and is located approximately 5 km north-west from the Project (Koromkheti Scheme). Areas that meet the criteria of the IUCN's Protected Area Management Category Ia are likely to qualify as critical habitat (IFC, 2012b).

Kintrishi IBA overlaps with the nature reserve but is slightly larger (15,725 ha) (Birdlife International, 2012a). The nature reserve and IBA are protected for important habitats (broad-leaved deciduous forests, alpine/subalpine/boreal grasslands, rocky areas and wetlands) and bird species, notably the Caucasian grouse (*Tetrao mlokosiewiczii*), listed as 'near threatened/decreasing' on the IUCN Red List, and Caspian snowcock (*Tetraogallus caspius*), listed as 'least concern/decreasing' on the IUCN Red List.

The Kintrishi IBA site supports at least two of the 10 species in Europe that are restricted (when breeding) to the Eurasian high-montane biome. Other notable species that do not meet IBA criteria and are present in the Kintrishi IBA include: lesser kestrel (*Falco naumanni*), bearded vulture (*Gypaetus barbatus*), golden eagle (*Aquila chrysaetos*) and peregrine falcon (*Falco peregrinus*); all these species are listed as being of 'least concern' on the IUCN Red List (IUCN, 2012a).

4.3.2 Machakhela National Park

Approximately 2 km south of the Adjaristsqali River is the Machakhela National Park (IUCN category II), which was designated in May 2012. The goal of the park is to conserve the natural and cultural landscape (including the unique south Colchi ecosystems), to function as an ecological corridor between protected areas in south-west Georgia and north-east Turkey, and to promote tourism development in the Machakhela valley.

An USAID funded project has facilitated the transboundary cooperation and the development of an action plan for Machakhela-Jamili transboundary park between Georgia and Turkey (<http://map.usaid.gov/ProjectDetail?id=a0cd00000012aSaAAI>).

Machakhlistsqali River feeds into the Chorokhi River and is upstream of the confluence with the Adjaristsqali River. The Machakhlistsqali valley is characterized by a unique variety of relict and endemic plants. Approximately 10,868 ha of the Machakhlistsqali valley is covered by forests, and 75% of the territory is represented by virgin forests. Most of the territory of the valley is occupied by the Colchic type mixed forests with domination of beech.

Areas that meet the criteria of the IUCN's Protected Area Management Category II are likely to qualify as critical habitat (IFC, 2012b). Nevertheless, the Shuakhevi and Koromkheti schemes are unlikely to affect this national park.

4.3.3 Mtirala National Park

This park is located approximately 4.5 km to the northwest of the Adjaristsqali River (Koromkheti scheme). Mtirala National Park (IUCN category II) was established in 2006 through initiative of the Government of Adjara Autonomous Republic and the Agency of Protected Areas of the Ministry of Environment Protection and Natural Resources, with WWF's assistance and financial support provided by the Norwegian Government. This park is within the Adjara-Imereti Range, which is characterised by a humid climate and is covered with relict Colchic forests. As stated in the Law of Georgia on Mtirala National Park, the goal of the park is to conserve the the unique biological and landscape diversity, protect the Colchic forests in long-term, and provide development of eco-tourism and recreational activities.

Areas that meet the criteria of the IUCN's Protected Area Management Category II are likely to qualify as critical habitat (IFC, 2012b). However, it is unlikely that the Project will have any adverse impacts onto Mtirala National Park.

4.3.4 Batumi Important Bird Area

This IBA overlaps with the western end of the Adjaristsqali River basin and includes the Chorokhi-Adjaristsqali confluence and part of the Chorokhi River, excluding the Chorokhi Delta. The IBA has an area of 41,938 ha and is designated for passage soaring birds/cranes.

No adverse impacts on this IBA from the Project are likely.

4.3.5 Adjara-Imereti Ridge Important Bird Area

This IBA is located approximately 12 km to the north of Didachara on the Shuakhevi scheme. Adjara-Imereti Ridge IBA is very large (173,279 ha) and is designated for the following trigger species: Caucasian grouse, Caspian snowcock, Eastern Imperial eagle (*Aquila heliaca*), listed as 'vulnerable' on the IUCN Red List, corncrake (*Crex crex*) and great snipe (*Gallinago media*).

This IBA is very unlikely to be affected by the Project.

4.3.6 Shavsheti Ridge Important Bird Area

This IBA is located approximately 8 km to the east of the Shuakhevi scheme (Skhalta dam) and is unlikely to be affected by the project. The IBA trigger species are Caucasian grouse (20 breeding pairs recorded in the period 2000-2002) and Caspian snowcock.

4.3.7 Key Biodiversity Areas

A number of Key Biodiversity Areas (KBAs) were identified in the Caucasus region by WWF-Caucasus and the Georgian Centre for the Conservation of Wildlife (Langhammer et al., 2007). This includes Adjara-Imereti Ridge IBA and Mtirala National Park (Agency of Protected Areas, pers. comm. – see Appendix B.2).

Nevertheless, at the national level, it is understood that the KBA evaluation process has not started in Georgia and is not likely to start in the near future (N. Zazanashvili, pers. comm. - see Appendix B.2). The above KBAs are treated as proposed in this BAP, but the IFC PS6 requirements are the same for established and proposed designations.

4.4 Habitats

4.4.1 Overview

A detailed description of the habitats in the study area is provided in the Flora and Vegetation Report in Volume 3 of the Adjaristsqali Hydropower ESIA (Mott MacDonald, 2012b). A summary of the main habitats within the Project Study Area is provided below.

The fast flowing rivers, riverine deposits, riverbeds, bare rock and modified riverside grasslands along the corridor of the river system are prominent habitats throughout the Study Area (Figures 4.2 to 4.4). The 2012 river meso-habitat surveys (low flows) indicate that although different types of meso-habitats are present in the Adjaristsqali, Chirukhistsqali and Skhalta Rivers, meso-habitat type F (i.e. broken/unbroken standing waves, steep, fast and shallow habitat) is the most representative (Mott MacDonald, 2012a). A description of the river meso-habitat categories is presented in Borsányi et al. (2004).

In accessible areas, small agricultural and pasture occur on the river terrace (Figure 4.7), which has lead to some soil erosion and localised landslips.

Forests and rivers within the Study Area are the most important habitat for biodiversity. The conservation value of the forest habitats varies and depends on the species composition, presence of threatened species, and degree of disturbance. Forest habitats in the western part of the Study Area are typically patchy, dominated by deciduous trees, partly modified and of low to medium conservation value. Within the areas of the Koromkheti Scheme there are patches of natural, medium to high conservation value forest types, typically mixed-species deciduous forests, including oak, hornbeam and chestnut forest types. At higher elevations (Shuakhevi Scheme) the forest habitats change with a gradual increase in the abundance of conifer tree species. Immediately along the river and road access areas, these forests are typically natural, mixed deciduous and coniferous forests of medium to high conservation value (Figures 4.4 and 4.5). Narrow strips of riparian woodland dominated by *Alnus barbata* are present alongside the smaller rivers and streams (Figure 4.6).

Figure 4.1: River habitats at the confluence of Adjaristsqali and Ghorjamistsqali (Shuakhevi Scheme)



Figure 4.2: Adjaristsqali River and mixed coniferous-deciduous forest near Didachara Reservoir (Shuakhevi Scheme)



Figure 4.3: Skhalta River and mixed forest near Skhalta dam (Shuakhevi Scheme)



Figure 4.4: Mixed coniferous-deciduous forest near Pachka adit (Shuakhevi Scheme)



Figure 4.5: Narrow strip of riparian woodland with *Alnus barbata* near Chirukhistsqali weir

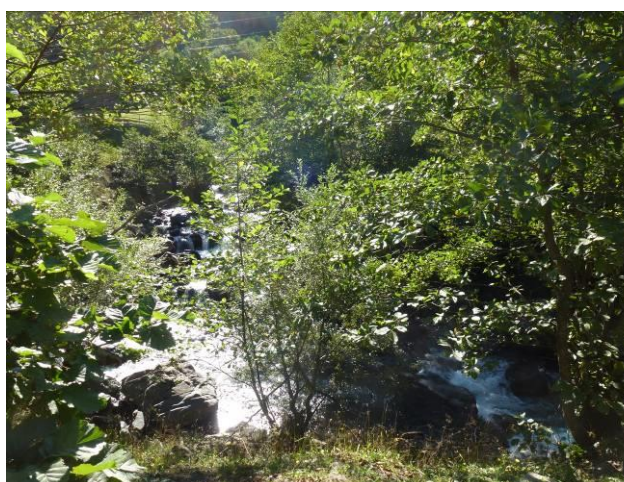


Figure 4.6: Small agricultural and pasture areas on the Chirukhistsqali River (Shuakhevi Scheme)



4.4.2 Main Habitats

The main habitats on the Project schemes and the western part of the Study Area (not being developed at this stage) are briefly presented below. Table 4.1 includes the main habitats along with the conservation value and IFC classification (modified, natural and critical habitat).

4.4.2.1 Shuakhevi Scheme

The key habitats of the Shuakhevi Scheme area are as follows:

- On the Chikhuristsqali River, downstream of village of Karapeti, walnut (*Juglans regia*) plantation are scattered across the gorge. Canopy is represented by the following tree species: *Juglans regia*, *Alnus barbata*, *Picea orientalis*, *Carpinus caucasica*. Shrubs include the following species: *Crataegus*

microphylla, *Rubus sanguineus*, *Hedera colchica*. Herbaceous species include: *Fragaria vesca*, *Sanicula europaea*, *Bellis perennis*, *Poa* sp., *Cyclamen vernalis*, *Salvia glutinosa*, *Cynoglossum officinale*, *Tamus communis*, *Phyllitis scolopendrium*, *Asplenium trichomanes*;

- Patches of degraded spruce forest (due to felling activities) are also present by the Chirukhistsqali River. The following tree species are represented: *Picea orientalis*, *Carpinus caucasica*, *Alnus barbata*, *Salix caprea*. Herbaceous plants include *Pteridium tauricum*;
- Along the tributaries of the Adjaristsqali River, areas of Pontic rhododendron scrub (*Rhododendron ponticum*) occur together with degraded spruce forest composed of *Picea orientalis*, *Populus tremula*, *Alnus barbata*, *Corylus avellana*, and *Thelycrania australis*;
- At the confluence of the Didadjaristsqali and Adjaristsqali Rivers, downstream of Didadjar village, the riverside terrace consists of *Salix alba*, *Robinia pseudocacia* and *Alnus barbata*; and
- Along the gorge of the Adjaristsqali River, natural oak forest (*Quercus petraea* ssp. *dschorochensis*) occur with patches of pine and spruce forest (*Pinus kochiana*, *Picea orientalis*) which are of high conservation value. Slightly further downstream, there are degraded (due to felling) spruce forest with *Quercus petraea* ssp. *dschorochensis*, *Fagus orientalis*, *Ulmus glabra*, *Carpinus caucasica*.

4.4.2.2 Koromkheti Scheme

The key habitats around the Koromkheti Scheme are as follows:

- At the confluence of Akavreta and Medzibnis Gele Rivers, natural mixed deciduous forest of high floristic diversity occur, with *Castanea sativa*, *Alnus barbata*, *Acer campestre*, *Rhododendron ponticum*, *Prunus laurocerasus* (*Laurocerasus officinalis*), *Hedera colchica*, *Aristolochia pontica*, *Tamus communis*, *Arum albispathum*, *Oxalis acetosella*, *Phyllitis scolopendrium*, *Dryopteris filix-mas*, and *Pteris cretica*;
- On the Adjaristsqali River, at Phurtio Bridge, natural oak and hornbeam forest occur above the riverside, with *Carpinus caucasica*, *Acer campestre*, *Fraxinus oxycarpa*, *Crataegus* sp., *Mespilus germanica*, *Robinia pseudoacacia*, *Prunus divaricata*, *Pteridium tauricum*, *Eupatorium cannabinum*, *Sambucus ebulus*, *Arctium lappa*, *Helleborus caucasicus*, *Fragaria vesca*, *Cicerbita macrophylla*, *Digitalis ferruginea* ssp. *schischkinii*, and *Campanula cordifolia*;
- Along the edges of the Adjaristsqali River, on the rocky riverside terrace, the habitats are dominated by riparian woodland composed of *Alnus barbata*;
- Patches of hop-hornbeam (*Ostrya carpinifolia*) and elm-leaved sumach (*Rhus coriaria*) forest type; and
- Downstream of the Village of Khokhona and its surroundings natural chestnut forest can be found with mixed cherry-laurel forest, with canopy composed of *Castanea sativa*, *Acer campestre*, *Alnus barbata*, *Acer campestre*, and shrub species including *Prunus laurocerasus* (*Laurocerasus officinalis*), *Rhododendron ponticum*, *Ilex colchica*, *Staphylea colchica*. Herbaceous species and lianas include *Smilax excelsa*, *Hedera colchica*, *Phyllitis scolopendrium* and *Asplenium trichomanes*.

4.4.2.3 Western Part of Study Area

The key habitats in the western part of the Study Area are as follows:

- At the confluence of Chorokhi and Adjaristsqali Rivers, the riverside terraces act as a floodplain during high flow and are inundated, supposedly, with water level rising over the slope up to 3 m height. The main riparian species are *Alnus barbata* and *Salix alba*;
- The areas along the Machakhlistsqali River largely consist of treeless riverside terrace and adjoined agricultural landscape, as well as degraded (due to felling) alder forest mixed with cherry-laurel, lime-tree, hornbeam and maple. Herbaceous cover is formed by the following species: *Vinca herbacea*, *Phyllitis scolopendrium*, *Sanicula europaea*, *Pteridium tauricum*, *Ranunculus* sp., *Urtica dioica*,

Dyiopteris filix-mas etc. Shrub species noted include *Rubus sanguineus*, *Corylus avellana* and *Lonicera caucasica*; and

- On the Chorokhi River, a fragment of hornbeam-chestnut forest occurs downstream of the alignment, on the right riverbank, with *Castanea sativa*, *Carpinus caucasica*, *Hedera colchica*, *Pteridium tauricum*, *Phyllitis scolopendrium* and *Polypodium vulgare*. The riverside rocky terrace on the left riverbank supports *Alnus barbata*, *Robinia pseudoacacia* and *Salix alba*.

Table 4.1: Main habitats within the Study Area

Habitat Type	IFC Category	Conservation value	Shuakhevi	Koromkheti	Western Part of Study Area
Oak forest – <i>Quercus petraea</i> ssp. <i>dschorochensis</i>	Natural	High	X	X	
Hornbeam-chestnut forest – <i>Castanea sativa</i> , <i>Carpinus caucasica</i>	Natural	High		X	X
Oak-hornbeam forest - <i>Carpinus caucasica</i> , <i>Quercus petraea</i> ssp. <i>dschorochensis</i> or <i>Quercus hartwissiana</i>	Natural	High		X	
Mixed, species-rich deciduous forest with <i>Castanea sativa</i> , <i>Alnus barbata</i> , <i>Aristolochia pontica</i> , <i>Tamus communis</i>	Natural	High		X	
Liana-rich mixed deciduous forest with spruce – <i>Picea orientalis</i> , <i>Carpinus caucasica</i> , <i>Alnus barbata</i> , <i>Salix caprea</i>	Natural	Medium	X		
Chestnut forest with cherry-laurel – <i>Castanea sativa</i> , <i>Acer campestre</i> , <i>Alnus barbata</i>	Natural	Medium		X	
Degraded spruce (<i>Picea orientalis</i>) forest with deciduous species – <i>Quercus petraea</i> ssp. <i>dschorochensis</i> , <i>Fagus orientalis</i> , <i>Ulmus glabra</i> , <i>Carpinus caucasica</i>	Natural	Medium	X		
Riparian woodland – <i>Alnus barbata</i> dominant	Natural	Medium	X	X	X
Walnut plantation – <i>Juglans regia</i> , <i>Alnus barbata</i> , <i>Picea orientalis</i>	Modified	Low	X		
Pontic rhododendron (<i>Rhododendron ponticum</i>) scrub	Natural	High	X		
Riverside grassland- river terrace typically used for agricultural/grazing purposes	Modified	Negligible	X	X	X
Bare rock, crevices and riverside deposits	Natural	Low	X	X	X
Rivers and streams	Natural	High	X	X	X

4.5 Flora

The region, including the Study Area, is well known as being of significant botanical interest with high floristic diversity and refugia for genetic diversity of domestic cultivars. Hence, detailed floristic surveys were undertaken as part of the ESIA in 2011 (Gamma, 2011; Mott MacDonald, 2012b). Additional botanical surveys were carried out in September 2012 and June 2012 to support the Adjaristsqali Hydropower BAP and the electricity transmission line routing (Mott MacDonald, 2013) (see Section 4.1.2.2). Eleven plant species included in the Red Data Book for Georgia and Adjara Plant Red List have been recorded in the Study Area: *Ostrya carpinifolia*, *Astragalus sommierii* (Figure 4.8), *Arbutus andrachne*, *Castanea sativa*, *Juglans regia*, *Quercus hartwissiana*, *Staphylea colchica*, *Ulmus glabra*, *Osmanthus decorus* (Figure 4.9),

Taxus baccata and *Buxus colchica* (Table 4.2). Of these, *Staphylea colchica* and *Osmanthus decorus* are also listed as 'vulnerable' on the Red List of Endemic Plants of the Caucasus Region.

The study area supports three species that are listed as 'endangered' on the red list of Georgia and Adjara. These species have been assessed against the Critical Habitat criteria and details are provided in Section 5.2.1 below.

- A small patch of *Astragalus sommieri*, a species listed as 'endangered' on the Georgia and Adjara red lists, has been recorded near Zamleti village (Mott MacDonald, 2013). It is understood that this area is part of a known and small population of this species, which is the only population of this species in Georgia (Manvelidze et al., 2009). However, this area is very unlikely to be affected by the Project.
- *Ostrya carpinifolia* ('endangered' in Georgia and Adjara) has been recorded near Zamleti (Gamma, 2011), near Nenia, at the confluence of the Diditzkali and Skhalta rivers, near Purtio Bridge and at the confluence of the Skhalta and Adjaristsqali rivers (Mott MacDonald, 2013).

This species is rare in Georgia and in Adjara it is present in the Shuakhevi and Khulo municipalities (Eristavi et al., 2013; Z. Manvelidze, pers. comm.).

- *Arbutus andrachne* ('endangered' in Georgia and Adjara) is only known from one location in Adjara, 5 km west of Shuakhevi (Z. Manvelidze, pers. comm.) and the species is rare in Georgia (Melia et al., 2012; Eristavi et al., 2013).

Staphylea colchica is listed as 'unresolved' in the Plant List (www.theplantlist.org) and is not recognised by the Catalogue of Life (www.catalogueoflife.org).

Buxus colchica is a synonym of *B. sempervirens* in the Plant List, but it is not recognised by the Catalogue of Life. *B. colchica* and *Juglans regia* are the only species recorded in the Study Area and which are on the IUCN red list as 'near threatened' or a higher threat category. *Rhus coriaria* is listed as 'vulnerable' on the IUCN red list and was recorded near Keda and Baladzeebi (Koromkheti Scheme) in September 2012. However, this species is planted and even invasive in Georgia and is native in Tajikistan and Uzbekistan only (IUCN, 2012).

Swida koenigii is listed as vulnerable on the Caucasus Endemic Plant List and is thought to be a Colchic endemic, but is not listed on the Georgia or Adjara red lists. This species is a synonym of *Cornus sanguinea* ssp. *australis*, which is in the Plant List but is not recognised by the Catalogue of Life. *Sedum caucasicum* and *Helleborus caucasicus* are on the Caucasus red list, but have not been evaluated.

Twenty three endemic species have been recorded in the Study Area, including Colchic, Caucasian, Georgia, Adjara and Adjara-Lazetian species (Table 4.2). Example of endemic species which have been recorded in the Study Area include: *Hedera colchica*, *Digitalis ferruginea* ssp. *schischkinii* (*D. schischkinii*), *Cirsium imereticum*, *Erysimum contractum*, *Helleborus caucasicus*, *Quercus petraea* ssp. *dschorochensis* (*Q. dschorochensis*), *Pyrus caucasica*, *Origanum (Amaracus) rotundifolium* (Figure 4.11), *Ficus carica* (including *F. colchica*), *Linaria adzharica* (Figure 4.14), *Cyclamen adzharicum* (*C. coum* ssp. *caucasicum*, *C. vernum*). Endemic plant species are discussed in more detail in the Critical Habitat Assessment section below (Section 5.2.2). *Cyclamen adzharicum* (along with most *Cyclamen* species) is protected by the Convention on International Trade in Endangered Species (CITES).

Of the endemic species listed above, *Lonicera caucasica* is not recognised by the Catalogue of Life (www.catalogueoflife.org) and is listed as 'unresolved' in the Plant List (www.theplantlist.org) - it has not been established whether these are accepted names or synonyms of another taxon. All of the species mentioned above are rare or scarce in Adjara and Georgia, and are not restricted to the Project area.

Table 4.2: Protected, threatened and endemic plant species within the Study Area

Latin name	Common name	Endemic	Georgia Red Data Book	Adjara Plant Red List	Caucasus Endemic Plant List	IUCN Red Data Book	Shuakhevi	Koromkheti	Western Part of Study Area
<i>Castanea sativa</i>	Chestnut	-	VU	VU	-	-	X	X	X
<i>Juglans regia</i>	Walnut	-	VU	VU	-	NT	X	X	X
<i>Ostrya carpinifolia</i>	Hop hornbeam	-	EN	EN	-	-	X	X	
<i>Quercus hartwissiana</i>	Hartvisian oak	-	VU	VU	-	-	X	X	
<i>Staphylea colchica</i>	Colchic bladdernut	Colchic endemic	VU	VU	VU	-		X	
<i>Ulmus glabra</i>	Elm	-	VU	VU	-	-	X	X	X
<i>Osmanthus decorus</i>	Caucasian osmanthus (Oil tree)	Adjara-Lazetian endemic	VU	VU	VU	-		X	X
<i>Taxus baccata</i>	Yew	-	VU	VU	-	LC		X	X
<i>Buxus colchica</i> (<i>B. sempervirens?</i>)		Colchic endemic?	VU	VU	-	NT		X	X
<i>Arbutus andrachne</i>	Greek strawberry tree	-	EN	EN	-	-	X		
<i>Astragalus sommieri</i>		Adjara-Lazetian Endemic	EN	EN	-	-	X		
<i>Cornus sanguinea ssp. australis</i> (<i>Swida koenigii</i>)	Dog wood	Colchic endemic?	-	-	VU	-	X	X	X
<i>Erysimum contractum</i>		Adjara	-	-	VU	-	X	X	
<i>Centaurea adzharica</i>		Adjara	-	-	-	-	X	X	
<i>Galanthus woronowii</i>		Georgia	-	NE	NE	-	X	X	
<i>Cirsium caput-medusae</i>		Georgia	-	-	NE	-	X	X	
<i>Cirsium imereticum</i>		Georgia	-	LC	LC	-	X	X	
<i>Alcea transcucasica</i>		Georgia	-	NT	NT	-	X	X	
<i>Rubus woronowii</i>		Georgia	-	-	DD	-	X	X	
<i>Hedera colchica</i>	Ivy	Colchic endemic	-	-	-	-	X	X	X
<i>Digitalis ferruginea ssp. schischkinii</i> (<i>D. schischkinii</i>)	Foxglove	Caucasian endemic	-	-	NE	-	X	X	
<i>Helleborus caucasicus</i>	Helleborine	Caucasian endemic	-	-	NE	-	X	X	X
<i>Tilia rubra ssp. caucasica</i> (<i>T. caucasica</i>)	Caucasian lime	Caucasian endemic	-	-	-	-	X	X	X
<i>Quercus petraea ssp. dschorochensis</i> (<i>Q. dschorochensis</i>)	Sessile oak	Adjara-Lazetian endemic	-	-	-	-	X	X	X
<i>Pyrus caucasica</i>	Pear	Caucasian	-	-	-	-	X	X	

Latin name	Common name	Endemic	Georgia Red Data Book	Adjara Plant Red List	Caucasus Endemic Plant List	IUCN Red Data Book	Shuakhevi	Koromkheti	Western Part of Study Area
		endemic							
<i>Lonicera caucasica</i> (<i>L. orientalis</i>)	Caucasian honeysuckle	Caucasian endemic?	-	-	-	-	X	X	X
<i>Origanum</i> (<i>Amaracus</i>) <i>rotundifolium</i>	Round-leaved oregano	Adjara-Lazetian endemic	-	-	NE	-	X	X	
<i>Linaria adzharica</i>		Adjara-Lazetian endemic	-	-	-	-	X		
<i>Ficus carica</i> (<i>F. colchica</i>)	Common fig	Colchic endemic	-	-	-	LC	X	X	
<i>Cyclamen adzharicum</i> (<i>C. coum</i> ssp. <i>caucasicum</i> , <i>C. vernum</i>)	Cyclamen	Adjara-Lazetian endemic	-	-	NE	-	X	X	X

Figure 4.7: *Astragalus sommieri* near Zamleti (Shuakhevi Scheme)



Figure 4.8: *Osmanthus decorus* (oil tree) near Zeda Makhuntseti (Koromkheti Scheme)



Figure 4.9: *Juglans regia* (Walnut tree) at Kantauri (Koromkheti Scheme)



Figure 4.10: *Origanum rotundifolium* (*Amaracus rotundifolius*)



Figure 4.11: *Quercus petraea* ssp. *dschorochensis* (Shuakhevi Scheme)

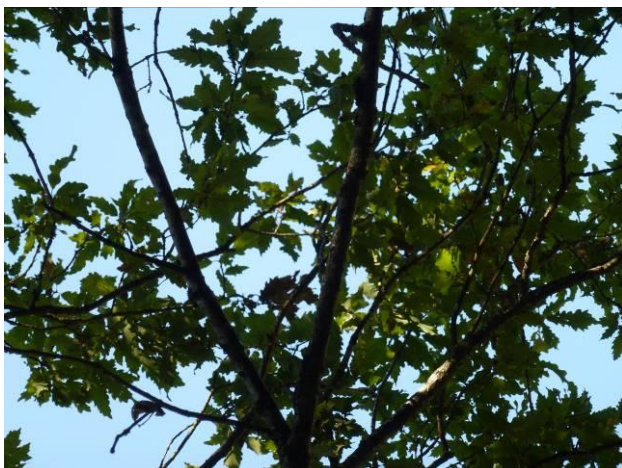


Figure 4.12: *Sedum caucasicum* (Shuakhevi Scheme)



Figure 4.13: *Linaria adzharica* near Shuakhevi Power House (Shuakhevi Scheme)



Figure 4.14: *Hedera colchica* near Skhaltá dam (Shuakhevi Scheme)



4.6 Birds

The species names referred to in this section follow the International Ornithologists' Union (IOU) 'World Bird Names' (Gill and Donsker, 2012).

The eastern coast of the Black Sea, and in particular the Batumi area, is one of the most important bottlenecks for raptor migration during autumn in the Eurasian-African migration system (Verhelst et al., 2011). The autumn migration bird counts in 2008 and 2009 near Batumi exceeded 1% of the estimated world populations for ten species: European honey buzzard (*Pernis apivorus*), steppe buzzard (*Buteo buteo vulpinus*), black kite (*Milvus migrans*), Eurasian sparrowhawk (*Accipiter nissus*), Levant sparrowhawk (*Accipiter brevipes*), Montagu's harrier (*Circus pygargus*), pallid harrier (*Circus macrourus*), lesser spotted eagle (*Aquila pomarina*), greater spotted eagle (*Aquila clanga*) and booted eagle (*Aquila pennata*). The migration bottleneck is narrow near Batumi as migrants are funnelled between the Black Sea and the Lesser Caucasus mountains. South of Batumi, the autumn migrants continue their journey along the Black Sea coast or follow the Chorokhi valley (Verhelst et al., 2011).

The autumn 2012 and spring 2013 bird migration surveys undertaken to inform the electricity transmission line routeing study (Mott MacDonald, 2013) found that in general the migration of raptors and storks is more intense with respect to westerly sites along the proposed route (between Chorokhi-Adjaristsqali confluence and Batumi), although large numbers of birds can be expected anywhere along the route. The largest numbers of birds recorded in autumn 2012 (totals for the entire route) were for steppe buzzard (*Buteo buteo vulpinus*) (32488) and black kite (1523). The numbers of birds migrating in spring 2013 were even higher (especially between Chorokhi-Adjaristsqali confluence and Batumi), with the following species being in the top five: European honey buzzard (7384), steppe buzzard (3046), unidentified medium raptor (2641), buzzard species (2241) and European bee-eater (*Merops apiaster*) (1557) (see Appendix A1). In the Adjaristsqali Valley, most birds (78%) fly above 60 m due to the topography of the area.

Bird diversity along the Adjaristsqali is relatively high, reflective of the diversity of modified and natural habitats along the gorge and its position within the internationally important Batumi migratory bottleneck. Bird diversity is greatest in the Khelvachauri and Keda municipalities. . A total of 161 species have been

recorded within the Study Area to date (Appendix A1). Of these, the following are protected and threatened species:

- One Caucasus endemic species, *Tetrao mlokosiewiczzi* (Caucasian grouse), which has been recorded in Kintrishi IBA, Adjara-Imereti IBA and Shavsheti Ridge IBA;
- 57 species are listed on two relevant international conventions (42 species on the Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) and 27 species on the The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (also known as AEWA or African-Eurasian Waterbird Agreement);
- 3 species are globally threatened: great spotted eagle (*Aquila clanga*)- 'vulnerable', eastern imperial eagle (*Aquila heliaca*)- 'vulnerable' and Egyptian vulture (*Neophron percnopterus*)- 'endangered'; and
- 14 species are nationally threatened and are classified as 'vulnerable' to 'critically endangered' on the Red List of Georgia e.g. lesser kestrel (*Falco naumanni*)- 'critically endangered', red-footed falcon (*Falco vespertinus*) – 'endangered', golden eagle (*Aquila chrysaetos*)- 'vulnerable', long-legged buzzard (*Buteo rufinus*)- 'vulnerable'.

Table 4.3 lists the bird species threatened at global and national levels; details of the globally and nationally endangered species recorded in the Adjaristsqali River basin are provided in Section 5.2.1. None of the species classified as endangered in Georgia or globally (Egyptian vulture, lesser kestrel and red-footed falcon) breed in the Adjaristsqali River Basin.

Globally and nationally threatened bird species are present along the Adjaristsqali throughout the year and particularly during bird migration periods. Notable bird species recorded during late autumn migration surveys along the Adjaristsqali include great spotted eagle (*Aquila clanga*), eastern imperial eagle (*Aquila heliaca*), Levant sparrowhawk (*Accipiter brevipes*), golden eagle (*Aquila chrysaetos*), long-legged buzzard (*Buteo rufinus*), white stork (*Ciconia ciconia*), black stork (*Ciconia nigra*), griffon vulture (*Gyps fulvus*) and lesser kestrel (*Falco naumanni*).

Downstream of the Adjaristsqali (outside the Study Area) is the Chorokhi Delta which is of national importance and has been periodically surveyed, in part, by Wetlands International and by members of the Batumi Raptor Count (BRC). Wetlands International recorded 42 waterbird species in autumn and winter surveys between 1995 and 2010 (Kostiushyn, 2012a, 2012b). The wildfowl assemblage was estimated to be a maximum of 12,822 birds (Kostiushyn, 2012a). BRC have recorded 93 species, including passerines, in autumn (BRC, 2012a, 2012b, 2012c). The full list of bird species recorded in the delta includes 97 species and can be found in Appendix A1; notable species recorded there include red-footed falcon (*Falco vespertinus*), Dalmatian pelican (*Pelecanus crispus*), Yelkouan shearwater (*Puffinus yelkouan*), Eurasian stone-curlew (*Burhinus oedicephalus*), black stork and red-necked grebe

(*Podiceps grisegena*). The Chorokhi River connects the delta to the western end of the Study Area. Nevertheless, project impacts on the Chorokhi Delta and its species are unlikely and therefore this aspects is not addressed further in this report.

Table 4.3: Threatened and protected bird species recorded recently in the Adjaristsqali River Basin

IOU Scientific Name	IOU English Name	Georgia Red List	IUCN Red List	CMS*	AEWA [^]	Western Part of Study Area	Koromkheti Scheme	Shuakhevi Scheme	Proposed Transmission Line Corridor
<i>Accipiter brevipes</i>	Levant Sparrowhawk	VU	LC	X		X	X		X
<i>Aegolius funereus</i>	Boreal Owl	VU	LC	X				X	
<i>Aquila chrysaetos</i>	Golden Eagle	VU	LC	X				X	X
<i>Aquila clanga</i>	Greater Spotted Eagle	VU	VU	X		X	X		X
<i>Aquila heliaca</i>	Eastern Imperial Eagle	VU	VU	X		X	X		X
<i>Buteo rufinus</i>	Long-legged Buzzard	VU	LC	X		X	X		X
<i>Carpodacus erythrinus</i>	Common Rosefinch	VU	LC				X	X	
<i>Ciconia ciconia</i>	White Stork	VU	LC	X	X				X
<i>Ciconia nigra</i>	Black Stork	VU	LC	X	X				X
<i>Falco naumanni</i>	Lesser Kestrel	CR	LC	X		X	X		X
<i>Falco vespertinus</i>	Red-footed Falcon	EN	NT	X		X	X		
<i>Gyps fulvus</i>	Griffon Vulture	VU	LC	X					X
<i>Tetrao mlokosiewiczii</i>	Caucasian Grouse	VU	NT					X	X
<i>Neophron percnopterus</i>	Egyptian Vulture	VU	EN	X		X	X	X	X

* Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention).

[^] The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (also known as AEWA or African-Eurasian Waterbird Agreement)

4.7 Mammals

Sixty-two mammal species were recorded along the Adjaristsqali during the biodiversity surveys undertaken by Gamma in 2011, but other species are also known to occur within the Study Area (Mott MacDonald, 2012b). The mammal species that are protected under Georgian and international legislation and conventions are listed in Table 4.4.

Two globally threatened mammal species were found in 2011 or are known to occur in the Study Area:

- Eurasian otter (*Lutra lutra*), listed as 'vulnerable' on the IUCN Red List and the Red List of Georgia. The otter is considered rare in the Study Area due to a lack of fish and other food sources; and
- Mehely's horseshoe bat (*Rhinolophus mehelyi*), listed as 'vulnerable' on the IUCN Red List and the Red List of Georgia.

Mehely's horseshoe bat (*Rhinolophus mehelyi*) and Mediterranean horseshoe bat (*Rhinolophus euryale*) are listed as 'vulnerable' on the Red List of Georgia. In Europe, all bat species are protected under The Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1982) and the EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (1992). In total, twenty European bat species are known from the Adjaristsqali, fifteen of which were identified during the 2011 surveys. Currently, only four species of bats are on the Red List for Georgia, although all species should be of conservation concern in Georgia (Table 4.4).

The following mammal species that are ‘critically endangered’ or ‘endangered’ in Georgia have been assessed against the Critical Habitat criteria in Section 5.2.1:

- Eurasian lynx (*Lynx lynx*) – this species is believed to occur in the Shuakhevi and Khulo municipalities but not recorded during the surveys in 2011 or the recent literature (Gamma, 2012). It is understood that the Centre for Biodiversity Conservation and Research (NACRES) recorded field signs of lynx in some parts of the Adjara mountains (B. Lortkipanidze, pers. comm.).
- Brown bear (*Ursus arctos*) – this species was recorded in 2011 on the bank of Modulistsqali River (a tributary of Chirukhistsqali River) (Gamma, 2012) and small numbers are reported by local people from the upper limit of the forest, including Tetrobi village and Beshumi (Mogtt MacDonald, 2013). Their present distribution extends over most of Adjara with the exception of the coastal areas. The field signs found during a rapid assessment of large mammals in Adjara suggested that brown bear was abundant, but it is recognised that accurate/quantitative data data does not exist (Lortkipanidze, 2010; B. Lortkipanidze, pers. comm.).
- Red-backed vole (*Myodes glareolus ponticus*) (formerly *Clethrionomys glareolus ponticus*) – this species is mentioned in the literature from Adjara (IUCN, 2012) but was not recorded during the 2011 surveys (Gamma, 2012);
- Northern chamois (*Rupicapra rupicapra*) – this species is known to occur to the north of the Adjaristsqali River, east of Keda (IUCN, 2012) and in some other parts of Adjara (B. Lortkipanidze, pers. comm.), but it was not recorded during the 2011 surveys (Gamma, 2012) and has not been seen by local people anywhere in the eastern part of the Adjaristsqali River Basin (Mott MacDonald, 2013);
- Wild goat (*Capra aegagrus*) – the historical range of this species included the southern and south-east parts of Adjara but the species is not present there any longer (Weinberg et al., 2008; B. Lortkipanidze, pers. comm.).

Other mammal species on the Red List of Georgia, which were identified during the biodiversity surveys undertaken in 2011 include:

- Long-clawed mole vole (*Prometheomys schaposchnikowi*) - ‘vulnerable’ ;
- Grey dwarf hamster (*Cricetulus migratorius*) - ‘vulnerable’;
- Caucasian squirrel (*Sciurus anomalus*) – ‘vulnerable’, known from the Khelvachauri (to the west and outside the Study Area) and Khulo municipalities but it is suggested that this species might be under recorded in other regions (Mott MacDonald, 2012b).

The mammal species mentioned above are of conservation importance in Adjara and Georgia, but they are not restricted to the Project area.

Table 4.4: Protected threatened and Caucasus endemic mammal species known or likely to occur within the study area

Latin name	Common name	Georgia Red List status	IUCN Red Data Book status	European Protected Species	Caucasus Endemic species	Shuakhevi	Koromkheti	Western Part of Study Area
Bats								
<i>Eptesicus nilssonii</i>	Northern Bat			X				X
<i>Eptesicus serotinus</i>	Serotine Bat			X			X	X
<i>Hypsugo (Pipistrellus) savii</i>	Savi’s Pipistrelle			X		X	X	
<i>Myotis blythii</i>	Lesser Mouse-eared Bat			X				X

Latin name	Common name	Georgia Red List status	IUCN Red Data Book status	European Protected Species	Caucasus Endemic species	Shuakhevi	Koromkheti	Western Part of Study Area
<i>Myotis daubentonii</i>	Daubenton's Bat			X				
<i>Myotis emarginatus</i>	Geoffroy's Bat			X				
<i>Myotis mystacinus</i>	Whiskered Bat			X		X	X	X
<i>Myotis nattereri</i>	Natterer's Bat			X		X	X	X
<i>Nyctalus lasiopterus</i>	Giant Noctule Bat		NT	X			X	X
<i>Nyctalus leisleri</i>	Lesser Noctule Bat			X		X	X	X
<i>Nyctalus noctula</i>	Common Noctule			X		X	X	X
<i>Pipistrellus nathusii</i>	Nathusius's Pipistrelle			X		X	X	X
<i>Pipistrellus pipistrellus</i>	Common Pipistrelle			X		X	X	X
<i>Pipistrellus pygmaeus</i>	Soprano Pipistrelle			X				
<i>Plecotus auritus</i>	Brown Big-eared Bat			X			X	X
<i>Rhinolophus euryale</i>	Mediterranean Horseshoe Bat	VU	NT	X				
<i>Rhinolophus ferrumequinum</i>	Greater Horseshoe Bat			X				X
<i>Rhinolophus hipposideros</i>	Lesser Horseshoe Bat			X				X
<i>Rhinolophus mehelyi</i>	Mehely's Horseshoe Bat	VU	VU	X				
<i>Vespertilio murinus</i>	Frosted Bat			X				X
Other mammals								
<i>Apodemus (Sylvaemus) ponticus</i>	Black Sea Field Mouse				X	X		X
<i>Chionomys gud</i>	Caucasian Snow Vole				X	X	X	
<i>Chionomys roberti</i>	Robert's Snow Vole				X	X	X	X
<i>Cricetulus migratorius</i>	Grey Dwarf Hamster	VU				X	X	
<i>Lutra lutra</i>	Eurasian Otter	VU	VU	X		X	X	X
<i>Lynx lynx</i>	Eurasian Lynx	CR		X		X	X	
<i>Microtus (Terricola) daghestanicus</i>	Daghestan Pine Vole				X	X		
<i>Myodes (Clethrionomys) glareolus ponticus</i>	Red-backed Vole	EN			X	X	X	
<i>Neomys teres</i>	Transcaucasian Water Shrew				X			X
<i>Prometheomys schaposchnikowi</i>	Long-clawed Mole Vole	VU	NT		X	X	X	
<i>Rupicapra rupicapra</i>	Northern Chamois	EN				X	X	
<i>Sciurus anomalus</i>	Caucasian Squirrel	VU				X		X
<i>Sorex raddei</i>	Radde's Shrew				X	X	X	X
<i>Sorex satunini</i>	Caucasian Shrew				X	X		
<i>Sorex volnuchini</i>	Caucasian Pygmy				X		X	X

Latin name	Common name	Georgia Red List status	IUCN Red Data Book status	European Protected Species	Caucasus Endemic species	Shuakhevi	Koromkheti	Western Part of Study Area
	Shrew							
<i>Talpa caucasica</i>	Caucasian Mole				X	X	X	X
<i>Talpa levantis</i>	Levantine Mole				X			X
<i>Ursus arctos</i>	Brown Bear	EN		X		X	X	

4.8 Reptiles and Amphibians

Fourteen species of reptiles have been recorded or are likely to occur within the Study Area (Mott MacDonald, 2012b). Of these, two species are globally and nationally threatened and are protected in Georgia (Table 4.5):

- Clark's lizard (*Darevskia clarkorum*): 'endangered' on the IUCN Red List and on the Red List of Georgia; and
- Caucasus viper (*Vipera (Pelias) kaznakovi*): 'endangered' on the IUCN Red List and on the Red List of Georgia.

A small and isolated population of Clark's lizard is known to occur in the Charnali River gorge and Mtirala Mountain in the vicinity of Batumi (Tuniyev et al., 2009c; www.nacres.org). These locations are outside and to the west of Adjaristsqali River Basin. This species was not recorded during the 2011 surveys to inform the ESIA for this project (Gamma, 2012). Clark's lizard is considered unlikely to occur within the Adjaristsqali River Basin.

The Caucasus viper is endemic to the Caucasus and more a specialist of coastal areas, inhabiting the forested slopes of mountains, the beds of wet ravines and post-forested clearings. The species has a very restricted global distribution (<500 km²) and is believed to occur in the western half of the Adjaristsqali River Basin (Tuniyev et al., 2009e), although there are no confirmed records from this basin. Caucasus viper emerges from hibernation in March on the Black-Sea coast, and reproduces from the end of March to mid May. Hibernation begins at the start November for coastal populations (Tuniyev et al., 2009e). More details on this species are provided in the Critical Habitat Assessment section below (Section 5.2.1).

Derjugin's lizard (*Darevskia derjugini*) and Transcaucasian long-nosed viper (*Vipera transcaucasiana*) are listed as 'near-threatened' on the IUCN Red List. There are six described subspecies of *Darevskia derjugini*, five of which are distributed in the Caucasus. *D. d. abchasica* inhabits the coast of the Black Sea of Abkhazia and the adjacent regions of western Georgia and *D. d. barani* is known from coastal mountain regions of Ajara and of neighbouring part of north-eastern Turkey (Tuniyev et al., 2009d). There is some controversy concerning the taxonomic status of *Vipera transcaucasiana*, which is considered by some authors to be a sub-species of *Vipera ammodytes*. The characteristic habitats for this species are situated in the zones of xerophytic forests and rocky areas, frequently on forest edges, stony screens overgrown with lichens and rocky outcrops in river valleys. In the mountains it can be found up to the zones of montane steppes. Hibernation begins at end of October (Tuniyev et al., 2009a).

Five species of amphibians have been recorded in the Study Area (Mott MacDonald, 2012b). Of these, Caucasian salamander (*Mertensiella caucasica*) is listed as 'vulnerable' on the IUCN Red List and the Red

List of Georgia. The Caucasian toad (*Bufo verrucosissimus*) is listed as 'near-threatened' on the IUCN Red List.

Caucasian salamander is a restricted-range species and is undergoing a rapid reduction of its range owing to habitat fragmentation. The Caucasian salamander has been recorded in the Chorokhi and Adjaristsqali River conjunction area. This species occurs in broadleaved and mixed forest, and is also found in the sub-alpine belt and alpine meadows (Mott MacDonald 2012a). In Adjara, Caucasian salamander has been recorded at 19 sites, including Kintrishi Nature Reserve, Mtirala National Park and Machakhela National Park (Tarkhnishvili and Kaya, 2009; Manvelidze, 2012), which are to the north-west and south-west of the Adjaristsqali River Basin. In Georgia, this species is known only from the western spurs of the Trialeti Mountain Ridge, Meskhetian and Lazistanian ridges (Kaya et al., 2009). This species tends to avoid large streams and lives mainly in the tributaries of rivers, usually less than 1-1.5 m in width and about 20-30 cm in depth in spring. Caucasian salamander has been assessed against the Critical Habitat criteria and details are provided in Section 5.2.1 below.

The Caucasian toad is common in the study area (Gamma 2012) and until recently was considered a subspecies of *Bufo bufo*. Its habitat is mountain coniferous, mixed and deciduous forests upwards to the sub-alpine belt. The toad prefers wet, shaded sites in forests, bush lands, their edges and glades. Spawning occurs in clear, flowing or semi-flowing water, mainly in brooks, springs and small rivers, but also in puddles, ponds, lakes and seepage pools (Tuniyev et al., 2009b).

No other protected reptile or amphibian species are likely to occur in the Study Area.

Table 4.5: Protected and threatened reptile and amphibian species within or near the study area

Latin name	Common name	Georgia Red List status	IUCN Red Data Book status	European Protected Species	Caucasus Endemic Species	Shuakhevi	Koromkheti	Western Part of Study Area
Reptiles								
<i>Darevskia clarkorum</i>	Clark's lizard	EN	EN	N/A				
<i>Vipera kaznakovi</i>	Caucasus viper	EN	EN	N/A	X		X	
<i>Darevskia derjugini</i>	Derjugin's lizard	-	NT	N/A		X		
<i>Vipera transcaucasiana</i>	Transcaucasian long-nosed viper	-	NT	N/A		X		
Amphibians								
<i>Mertensiella caucasica</i>	Caucasian salamander	VU	VU	N/A		X	X	X
<i>Bufo verrucosissimus</i>	Caucasian toad	-	NT	N/A			X	X

4.9 Fish

A total of 47 fish species from 17 families are known to be present in the Adjara rivers, which include freshwater and anadromous fish species (Mott MacDonald, 2012b). The fish community is considered to be diverse but with a low abundance. None of the species present are abundant enough to be important for commercial fishing; however, subsistence fishing is popular and valued by the local population. Within the Study Area, 17 fish species belonging to five families (salmonids *Salmonidae*, gobies *Gobiidae*, freshwater eels *Anguillidae*, loaches *Cobitidae* and carps *Cyprinidae*) were recorded in 2011. Most of these species

recorded belong to the *Cyprinidae* family. The 2012 fish surveys on the Shuakhevi Scheme recorded 12 species, but only one species, mursa (*Barbus mursa*), is additional to the species recorded in 2011 (Appendix A2).

The 2011 and 2012 fish surveys identified the following protected species of fish within the Study Area:

- Black Sea salmon (*Salmo labrax*, *S. labrax pallas*)- ‘vulnerable’ on the Red List of Georgia and ‘least concern/trend unknown’ on the IUCN Red List. This species is found in the Adjaristsqali River at the confluence with the Chorokhi River and, as mentioned by some interviewees, permanently lives in the Machakhlistsqali River.
- Sea trout/brown trout (*Salmo trutta*, *S. labrax fario*) - ‘vulnerable’ on the Red List of Georgia and ‘least concern/trend unknown’ on the IUCN Red List. It is found in upper reaches in the tributaries of the Skhalta and Chirukhistsqali, Chvanistsqali and Adjaristsqali confluences, Machakhlistsqali, and Akavreta.
- Colchic khramulya (*Capoeta sieboldii*)- ‘vulnerable’ on the Red List of Georgia and not yet assessed on the IUCN Red List. It is present in the Chirukhistsqali, Adjaristsqali and Chorokhi confluence, and Machakhlistsqali.
- European eel (*Anguilla anguilla*)- ‘critically endangered/decreasing’ on the IUCN Red List. This species was not recorded during the 2011/2012 fish surveys but local fishermen reported the presence of single and rare individuals at the Adjaristsqali and Chorokhi confluence. . More details on this species are provided in the Critical Habitat Assessment section (Section 5.2.1).

The Black Sea salmon (*Salmo labrax*) used to be classified as a sub-species of the European trout (*Salmo trutta*) and was previously known as (*Salmo trutta labrax*). It is similar to the *Salmo trutta* of north-west Europe as it migrates to the sea to feed and returns to freshwater to spawn. Female *Salmo labrax* (and *Salmo trutta*) are predominant in the migrating population and can interbreed with non-migratory individuals of resident populations in which males predominate. Caryological studies support the belief that the Black Sea salmon is genetically closer to *Salmo trutta* than the Atlantic salmon *Salmon salar* (Solomon *et al.*, 2000).

The rivers of Adjara Region and Abkhazia appear to be the last strongholds of Black Sea salmon, but even here the populations are in considerable threat (Solomon *et al.*, 2000).

The distribution of the anadromous² form, Black Sea salmon, is not clear. Resident trout populations are reported in the most upstream reaches of the Adjaristsqali catchment but Black Sea salmon are not. However, Solomon *et al.* (2000) recognise that the Black Sea salmon and freshwater trout, where they lived together form a single freely inter-breeding population. The freshwater/brown trout (previously recorded as *Salmo trutta fario*) is now believed to be a non-migrating ecotype and is called Black Sea trout (*Salmo labrax fario*). Black Sea salmon is the ecotype that migrate to the Black Sea and is classified as *Salmo labrax pallas* (Black Sea Monitoring Agency, personal communication).

Interviews with fishermen in 2011 revealed that their catches tended to be dominated by Colchic barbel (*Luciobarbus escherichii*) and chub (*Squalius cephalus*) throughout the catchment; in areas of low flow, minnows (*Alburnoides fasciatus* and *Phoxinus colchicus*) and khramulya dominated the catch. The ecoregion is characterised by a pronounced vertical zonation in the dispersal of fish. The trout is present at an elevation of 800 m to 1500 m, in the mountainous areas and the upper reaches of the tributaries.

² Spending most of the time at sea and returning to freshwater to spawn

Colchic barbel and other species are not recorded above 1000 m; the remaining species in the *Cyprinidae* family tend to occur up to 700-800 m of altitude.

During the 2011 surveys, fry schools were detected in the tributaries of the Adjaristsqali. Fry species detected included roach (*Rutilus rutilus*), European bitterling (*Rhodeus amarus*), rock minnow (*Alburnoides fasciatus*), Caucasian chub (*Squalius cephalus orientalis*) and colchic minnow (*Phoxinus colchicus*). In autumn these species move into the Adjaristsqali River. The presence of these species indicates a favourable habitat for fry to thrive. However, the fish stock has decreased in the last years, according to the fishermen interviewed.

In the 2012 surveys, of note is the presence of the Black Sea trout on the Uchambistsqali (nine individuals) and on the Heva (five individuals). A summary of the results from the 2011 and 2012 fish surveys is provided in Appendix C2 of this report.

4.10 Invertebrates and Algae

There is a lack of data on invertebrates in the Study Area and Georgia in general.

No specific invertebrate or algae surveys were carried out to inform the Adjaristsqali Hydropower ESIA or the BAP, but samples were collected along with fish surveys to evaluate fish food resources. The identification was only to the family, order or class level. Overall, benthic species composition in the surveyed rivers contains 43 groups of flora and fauna, which include invertebrates, algae and detritus (Mott MacDonald, 2012a). The algae were represented by diatoms (*Bacillariophyta*) and green algae (*Chlorophyta*). The animal fish food is diverse and include infusorians (*Ciliophora*), worms (*Plathelminthes*, *Oligochaeta*, *Nematoda*), rotifers (*Rotatoria*), crustaceans (*Cladocera*, *Copepoda*, *Isopoda*), insects (many groups, including *Ephemeroptera*, *Plecoptera*, *Odonata*, *Trichoptera*), as well as adult fish. The fish also feed on terrestrial invertebrates found in water, and individuals of 17 groups were found in the samples, including ants (*Hymenoptera/Formicoidea*), lepidoptera (*Lepidoptera*) and spiders (*Arachnida*).

It is assumed that the measures proposed to avoid, minimise, mitigate and offset adverse impacts on terrestrial and aquatic habitats, as well as habitat creation and enhancement measures will also benefit the invertebrate species which may occur within the Study Area.

5. Critical Habitat Assessment

5.1 Background Information

Based on the biodiversity baseline summarised above, a Critical Habitat Assessment (CHA) has been undertaken to help identify the conservation priorities in this BAP and to determine which IFC PS6 requirements apply to this project. It is important to mention that the CHA (this chapter and the following chapters) are only relevant to the Shuakhevi and Koromkheta schemes of the project; there is no intention to progress the Khertvisi scheme. This assessment is designed to identify areas of high biodiversity value in which development would be particularly sensitive and require special attention. The project type, impacts and proposed mitigation are not relevant in the CHA process (IFC, 2012b).

Critical habitat is a description of the most significant and highest priority areas of the planet for biodiversity conservation. It takes into account both global and national priority setting systems and builds on the conservation biology principles of 'vulnerability' (degree of threat) and 'irreplaceability' (rarity or uniqueness). Determination of critical habitat is based upon quantitative thresholds of biodiversity priority which are largely based on globally accepted precedents such as IUCN Red List (IUCN, 2012) criteria and Key Biodiversity Area (KBA) thresholds. It is recognised that not all critical habitat is equal: there are grades of critical habitat of varying importance. The IFC distinguish two main grades: Tier 1 critical habitat, highest importance, in which development is generally very difficult to implement and offsets are generally not possible except in exceptional circumstances. Tier 2 critical habitat, high importance, in which development can be implemented through appropriate planning and mitigation, and offsets may be possible under some circumstances.

The identification of IFC Critical Habitat is based on five criteria (IFC, 2012a, 2012b):

- C1: Critically endangered and/or endangered species;
- C2: Endemic and/or restricted-range species;
- C3: Concentrations of migratory and congregatory species;
- C4: Highly-threatened and unique ecosystems; and
- C5: Key evolutionary processes.

In addition to the above five biological criteria, the IFC Guidance Note 6 (IFC, 2012b) clarifies further circumstances in which an area may be recognised as Critical Habitat. The additional criteria that are relevant to this project include:

- C6: Legally Protected Areas in IUCN Categories I-II; and
- C7: Internationally Recognised Areas.

5.2 Determination of Critical Habitat

5.2.1 Introduction

In order to conduct a CHA, a discrete management unit (DMU) (i.e. the geographic area which is being investigated) must be defined with regard to criteria 1 to 3 (IFC, 2012b). For the purposes of the Adjaristsqali BAP, the DMU is defined as Adjaristsqali River Basin (ARB). The ARB is approximately 156,496 ha (1565 km²) and is larger than the project's ZoI (see Section 2.4) - this is a precautionary approach to account for data gaps and uncertainties that exist on the biodiversity of the study area.

To determine whether the project is located in critical habitat, a comprehensive literature review and consultation with stakeholders and biodiversity specialists have been undertaken (Section 2.3 and

Appendix B.2). In addition, biodiversity surveys were undertaken as part of the ESIA and BAP for the hydropower project and the routing study for the electricity transmission line (Section 4.1.2).

The following potential critical habitat features are known or likely to be present in the DMU:

- Critically endangered and/or endangered species;
- Endemic species and/or restricted-range species;
- Concentrations of migratory and congregatory species
- Legally protected areas and internationally recognised areas

The following sections present the rationale for each critical habitat assessment criterion. The biodiversity features which meet the thresholds for critical habitat in the Adjaristsqali basin DMU are then summarised in Table 5.2.

5.2.2 Critically endangered and/or endangered species at global and/or national level

European eel (*Anguilla anguilla*) – IUCN critically endangered

This species was not recorded during the fish surveys in 2011, but local fishermen reported the presence of single and rare individuals at the Adjaristsqali-Chorokhi confluence (Gamma, 2012). European eel is present in most European rivers draining into the Mediterranean Sea but occurs at low abundances in the Black Sea; this species is not mentioned from Georgia in the latest IUCN assessment (Freyhof and Kottelat, 2010). It is considered that this species does not meet the Tier 1 or Tier 2 thresholds for critical habitat in the DMU.

Egyptian vulture (*Neophron percnopterus*) – IUCN endangered, Georgia vulnerable

This species is mentioned in the literature but it was not recorded during the surveys undertaken in 2011 (Gamma, 2012), 2012 and 2013 (Mott MacDonald, 2013). Egyptian vulture has not been recorded breeding in the Adjaristsqali basin. It is known to breed to the east of the DMU (east of Goderdzi Pass), in the Adigeni and Akhaltsikhe administrative regions (Gamma, 2012; Mott MacDonald, 2013; Galvez et al., 2005; Abuladze, 2013; PSOVI, pers.comm.- see Appendix B.2). Globally, this species occupies a large range, with European population (migratory and breeding, including in the Caucasus) showing a severe long-term decline (>50%) in the last 42 years (Birdlife International, 2012b). It is considered that this species does not meet the Tier 1 or Tier 2 thresholds for critical habitat in the DMU.

Clark's lizard (*Darevskia clarkorum*) – IUCN and Georgia endangered

This species is known from the coastal areas of Turkey and Georgia; a small and disjunct population of Clark's lizard is known from Mtirala Mountain near Batumi (Tuniyev et al., 2009c). NACRES database mentions this species from the Charnali River gorge only (near the Black Sea coast), with no abundance data available (www.nacres.org). Both locations are outside the Adjaristsqali basin DMU. This species was not recorded in the Adjaristsqali basin DMU during the 2011 surveys or in the literature (Gamma, 2012). It is considered that this species does not meet the Tier 1 or Tier 2 thresholds for critical habitat in the DMU.

Caucasus viper (*Vipera (Pelias) kaznakovi*) – IUCN and Georgia endangered

Caucasus viper inhabits the forested slopes of mountains, the beds of wet ravines and post-forested clearings. This species is endemic to Caucasus, has a very restricted distribution (<500 km²) and is known

to occur on or near the Black Sea coast, including the western half of the Adjaristsqali basin DMU (Tuniyev et al., 2009e). However, confirmed records are only from the coastal part of Adjara (near Poti, Batumi and Charnali Gorge), Kintrishi Nature Reserve and Mtirala National Park, which are all outside the Adjaristsqali basin DMU. The estimated number of Caucasus viper in Georgia is just above 3000 individuals (Tuniyev and Tuniyev, 2009). The species was not recorded in the Adjaristsqali basin DMU during the surveys in 2011 (Gamma, 2011). The IUCN reptile expert and a Georgian expert in reptiles have confirmed that there are no known or regular occurrences of Caucasus viper in the Adjaristsqali river basin (B. Tuniyev, pers. comm.; D. Tarkhnishvili, pers. comm. – see Appendix B.2). Dr Tuniyev has also confirmed that the Adjaristsqali basin does not support regionally important concentrations of this species. Nevertheless, the habitats in the Adjaristsqali basin are suitable for this species and the DMU can support more than 1% (but less than 10%) of the global population of this species (B. Tuniyev, pers. comm. – see Appendix B.2).

This species does not meet the Tier 1 thresholds for critical habitat. However, the habitats in the Adjaristsqali basin DMU may be of significant importance to Caucasus viper, a species whose population distribution is not well understood because of lack of surveys in the area.

Lesser kestrel (*Falco naumanni*) – Georgia critically endangered

This is a migratory raptor species, which breeds in Georgia and is of least concern globally (IUCN, 2012). One individual was recorded in the Akhaltsikhe Substation to Benara section of the electricity transmission line, during the autumn migration bird surveys in 2012 (Mott MacDonald, 2013). This location is to the east of and outside the Adjaristsqali basin DMU. There are also old records of lesser kestrel in the Kintrishi Nature Reserve and IBA, to the north of the Adjaristsqali basin DMU. According to published literature, breeding of lesser kestrel has not been recorded in the Adjaristsqali river basin. The nearest breeding pairs recorded in Georgia are in the Dedoplistskaro region, approximately 300 km to the east of the DMU. This species can be seen irregularly in small numbers during migration (Galvez et al., 2005; Abuladze, 2013; PSOVI, pers.comm.- see Appendix B.2). It is considered that the habitats in the Adjaristsqali basin DMU do not support nationally important concentrations of this critically endangered species in Georgia. Therefore, this species does not meet the Tier 2 threshold for critical habitat in the DMU.

Red-footed falcon (*Falco vespertinus*) – Georgia endangered

This species is recorded in the literature in the wider area but it was not observed during the 2011 (Gamma, 2012), 2012 or 2013 surveys (Mott MacDonald, 2013). The red-footed falcon is not known to breed in the Adjaristsqali river basin. The nearest breeding population is recorded in the Javakheti upland area, approximately 100 km east of the DMU. Small numbers of this species can be seen irregularly during migration (Galvez et al., 2005; Abuladze, 2013; PSOVI, pers.comm.- see Appendix B.2). It is considered that the habitats in the Adjaristsqali basin DMU do not support nationally important concentrations of this endangered species in Georgia. Therefore, this species does not meet the Tier 2 threshold for critical habitat in the DMU.

Hop hornbeam (*Ostrya carpinifolia*) – Georgia and Adjara endangered

Hop hornbeam has a wide global distribution and is found in Transcaucasia (including Georgia), south-west Asia (including Turkey), south-east, southern and central Europe, and Russia (Uotila, 2009). In Georgia, hop hornbeam is rare and has been recorded in Abkhazia, Racha-Lechkhumi, Samegrelo,

Imereti, Guria, Kartli, Meskheta (Eristavi et al. 2013). As part of the surveys for this project, hop hornbeam was recorded in 2011 near Zamleti, on the right bank of Adjaristsqali River (Gamma, 2011); in 2012 near

the village of Nenia (between Shuakhevi and Zamleti) and in 2013 at the confluence of Diditzkali and Skhalta Rivers, near Purtio Bridge and at the confluence of Adjaristsqali and Skhalta Rivers (Mott MacDonald, 2013). In addition, a Georgian expert in botany has confirmed that the hop hornbeam is present in the Shuakhevi and Khulo municipalities, in particular along the Adjaristsqali, and the downstream sections of Chirukhistsqali and Skhalta rivers (Z. Manvelidze, pers. comm. – see Appendix B.2).

Nevertheless, it is considered that the habitats in the Adjaristsqali basin DMU do not support nationally or regionally important concentrations of this endangered species. This is because hop hornbeam is present with similar abundance in many parts of Georgia. Therefore, this species does not meet the Tier 2 threshold for critical habitat in the DMU.

Greek strawberry tree (*Arbutus andrachne*) – Georgia and Adjara endangered

This species is only known from one location in Adjara, which is 5 km to the west of Shuakhevi, on the right side of the Adjaristsqali river, and next to the village of Gornakhul. It usually occurs in oak (*Quercus hartwissiana*, *Q. petraea* ssp. *dschorochensis*) and pine (*Pinus sosnowskyi*) woodland. The area where Greek strawberry grows is approximately 2-3 hectares (Z. Manvelidze, pers. comm. – see Appendix B.2). In Georgia, this species is rare and is found in Abkhazia and Adjara (Melia et al., 2012; Eristavi et al. 2013). Globally this species is confined to the Mediterranean region, the Middle East, and southwestern Asia.

It is considered that the habitats in the Adjaristsqali basin DMU support a nationally important population ('concentration') of this endangered species in Georgia. Therefore, this species meets the Tier 2 threshold for critical habitat in the DMU.

Milk-vetch species (*Astragalus sommieri*) – Georgia and Adjara endangered

A small and isolated patch of this species was recorded in 2012 on a cliff next to a road, near the village of Zamleti, in the eastern part of the Adjaristsqali DMU (Mott MacDonald, 2013). This species is found on dry, stony slopes in the middle mountain belt of Transcaucasus. It is a rare species in Georgia, where it has been recorded in Adjara only (Eristavi et al. 2013). *Astragalus sommieri* is an endemic species to the Adjara-Lazetian area, with a distribution in Adjara (Georgia) and north-east Turkey. In Georgia, this species is only known from the Shuakhevi area in Adjara (Manvelidze et al., 2009). The population is restricted to a small area (150x400 m) on the right side of the Adjaristsqali river and near the main Khulo road (Z. Manvelidze, pers. comm. – see Appendix B.2).

It is considered that the habitats in the Adjaristsqali basin DMU support a nationally important population ('concentration'), which is the only population of this endangered species in Georgia. Therefore, this species meets the Tier 2 threshold for critical habitat in the DMU.

Eurasian lynx (*Lynx lynx*) – Georgia critically endangered

Eurasian lynx has a wide range and is listed as of least concern globally (IUCN, 2012). The action plan for the conservation of Eurasian lynx in Europe does not include the Caucasus and Georgia (Breitenmoser et al., 2000). It is mentioned in the literature from the Shuakhevi and Khulo municipalities (eastern part of the Adjaristsqali basin DMU), although the information local people suggests the species is also present in the Keda municipality (western part of the DMU). The species was not recorded during the 2011 surveys or in the recent literature (Gamma, 2012). In June 2013, Mott MacDonald ecologist interviewed people from

local villages in the eastern part of the Adjaristsqali basin (Skhalta valley up to Beshumi). No one had seen lynx in the area.

NACRES carried out a rapid assessment of large mammals in Adjara in 2002. Field signs of lynx were recorded in some places of the Adjara mountains. NACRES have also assessed lynx population size through capture-mark-recapture using live and camera traps in the semiarid ecosystems of Georgia (Vashlovani National Park and Chachuna Nature Reserve) and are planning to assess the lynx number in the Borjomi-Kharagauli National Park) (Dr B. Lortkipanidze, pers. comm. – see Appendix B.2).

It is considered that the habitats in the Adjaristsqali basin DMU do not support nationally important concentrations of this critically endangered species in Georgia. Therefore, this species does not meet the Tier 2 threshold for critical habitat in the DMU.

Brown bear (*Ursus arctos*) – Georgia endangered

Brown bear has a wide range and is listed as of least concern globally, although there has been a decline in Europe, Asia and North America (IUCN, 2012). The species was recorded during the 2011 surveys in a fir-pine forest on the left bank of the Modulistsqali River, which is a tributary of the Chirukhistsqali (Gamma, 2012). Since 1999, The Centre for Biodiversity Conservation and Research (NACRES) has been collecting data on brown bear population status and distribution in the South Caucasus including Georgia (Lortkipanidze, 2010). The present distribution of brown bear extends over the majority of the Adjara autonomous republic with the exception of the coastal areas. The Adjara brown bear range is relatively small compared to the areas where this species occurs in the northern part of Georgia and Borjomi area. The total brown bear range in Georgia covers approximately 34,000 km² (Adjaristsqali basin DMU covers 1573 km²) with a minimum bear population of 450 individuals, although there is no accurate census data. The bear population in Georgia is believed to be declining, in particular to due illegal hunting and partly because of habitat destruction (Lortkipanidze, 2010).

NACRES carried out a rapid assessment of large mammals in Adjara in 2002. Field signs of brown bear were recorded in many places of the Adjara mountains. Based on the field signs frequency NACRES estimated that the brown bear population was numerous, but it has been recognised that proper data on the brown bear distribution and population size does not exist for Georgia (Dr B. Lortkipanidze, pers. comm. – see Appendix B.2). In June 2013, Mott MacDonald ecologist interviewed people from local villages in the eastern part of the Adjaristsqali basin (Skhalta valley up to Beshumi). Only small numbers of bears had been seen occasionally, especially near the upper limit of the forest, including Tetrobi village.

It is considered that the habitats in the Adjaristsqali basin DMU do not support nationally important concentrations of this endangered species in Georgia. Therefore, this species does not meet the Tier 2 threshold for critical habitat in the DMU.

Wild goat (*Capra aegagrus*) – Georgia critically endangered and IUCN vulnerable

This species has a discontinuous distribution in Caucasus, Turkey, Afghanistan, Pakistan and Iran. The subspecies present in Georgia is *C. aegagrus ssp. aegagrus*. The IUCN red list distribution map for wild goat does not include Adjara (Weinberg et al., 2008). The historical range of this species included the southern and south-east parts of Adjara (which overlap with the Adjaristsqali river basin) but the species is not present there any longer (Dr B. Lortkipanidze, pers. comm. – see Appendix B.2)

It is considered that the habitats in the Adjaristsqali basin DMU do not support nationally important concentrations of this critically endangered species in Georgia. Therefore, this species does not meet the Tier 2 threshold for critical habitat in the DMU.

Northern chamois (*Rupicapra rupicapra*) – Georgia endangered

Northern chamois is widely distributed (listed as of least concern globally) but the Caucasus subspecies (*R. rupicapra ssp. caucasica*) is declining and becoming fragmented. It occurs to the north of the Adjaristsqali River, east of Keda (IUCN, 2012). The current threats to chamois are (www.lhnet.org):

- Poaching and over-hunting;
- Human disturbance, particularly as a result of increased tourism and leisure activities in mountain areas;
- Competition with domestic livestock and introduced species such as the mouflon; and
- Habitat loss when its range falls outside protected areas.

This species was not recorded during the 2011 surveys (Gamma, 2012). People from villages in the eastern part of the Adjaristsqali basin DMU were interviewed by Mott MacDonald ecologist in June 2013 and Northern chamois had not been seen by anyone. However, chamois is known to present in some parts of the Adjara region (Dr B. Lortkipanidze, pers. comm. – see appendix B.2).

Dr B. Lortkipanidze, a Georgian expert on mammals who works for the Centre for Biodiversity Conservation and Research (NACRES), has confirmed that very little is known on chamois in Georgia. The species is present in small numbers and the actual population size is unknown. Illegal hunting is supposed to have reduced the numbers of chamois significantly, which is also valid for the Adjara region. NACRES are planning to assess chamois population in Borjom-Kharagauli national park (Dr B. Lortkipanidze, pers. comm. – see appendix B.2).

It is considered that the habitats in the Adjaristsqali basin DMU do not support nationally important concentrations of this endangered species in Georgia. Therefore, this species does not meet the Tier 2 threshold for critical habitat in the DMU.

Red-backed vole (*Myodes (Clethrionomys) glareolus ponticus*) – Georgia endangered

This species has a wide range and is very common in the Palearctic (listed as of least concern globally). It occurs in the Adjara region of Georgia (IUCN, 2012). The species was not recorded during the 2011 surveys but it is mentioned in the literature in the wider area (Gamma, 2012). It is considered that the habitats in the Adjaristsqali basin DMU do not support nationally important concentrations of this endangered species in Georgia. Therefore, this species does not meet the Tier 2 threshold for critical habitat in the DMU.

5.2.3 Endemic and/or restricted-range species

Endemic plant species

The flora surveys undertaken in 2011 (Gamma, 2011) and 2012 (Mott MacDonald, 2013) revealed the presence of a number of Caucasus, Colchic (western Caucasus) and Adjara-Lazetian (Adjara and north-east Turkey) endemic plant species in the area of the Adjaristsqali hydropower project (see Section 4.5). However, these species do not meet the definition of an endemic species as specified in Guidance Note 6 (IFC, 2012b). No species endemic to Georgia or Adjara have been recorded during the surveys for this

project. However, the presence of the following Georgia and Adjara endemic species has been recorded in the Adjaristsqali river basin DMU (Z. Manvelidze & N. Memiadze, pers. comm. – see Appendix B.2):

- Georgia endemic species recorded in the Adjaristsqali DMU: *Galanthus woronowii*, *Cirsium caput-medusae*, *Cirsium imereticum*, *Alcea transcucasica*, *Rubus woronowii*; and
- Adjara endemic species recorded in the Adjaristsqali DMU: *Centaurea adzharica*, *Erysimum contractum*.

Paracynoglossum glochidiatum (*P. imereticum*) is mentioned in the Georgian literature as being endemic to Georgia (Eristavi et al. 2013) but this species is a synonym of *Cynoglossum wallichii* var. *glochidiatum* (www.theplantlist.org). *Genista adzharica* is classified as an Adjara endemic species in Georgian literature (Manvelidze et al., 2009; Eristavi et al. 2013) but this is a synonym of *Genista suanica* (www.theplantlist.org), which occurs in Abkhazia and Adjara in Georgia, and Krasnodar in Russia (www.legumes-online.net). *Rubus woronowii* and *Centaurea adzharica* are 'unresolved' names (www.theplantlist.org) but they are included in this assessment using the precautionary approach.

None of the species mentioned above are on the red list of Georgia or Adjara and they have not been evaluated by the IUCN red list (IUCN, 2012). It is considered that the Adjaristsqali river basin DMU may support between 1% and 95% of the global populations of these species (Z. Manvelidze & N. Memiadze, pers. comm. – see Appendix B.2). Therefore, these species are likely to meet the Tier 2 threshold for critical habitat in the DMU.

Endemic and restricted-range animal species

Caucasus viper (*Vipera kaznakovi*) qualifies as a restricted-range species, with an extent of occurrence of less than 50,000 km² on or near the Black Sea coast in Georgia, Russia and Turkey (Tuniyev et al., 2009e). Additional information on this species is provided in Section 5.2.2 above. This species is likely to meet the threshold under Tier 2 sub-criteria for restricted-range species (criterion 2), which means the habitats in the Adjaristsqali basin DMU may support between 1 and 95% of the global population of Caucasus viper. In the absence of adequate data and records from the Adjaristsqali basin DMU, the IUCN reptile specialist has confirmed that the DMU can support more than 1% but less than 10% of the global population of this species (B. Tuniyev, pers. comm. – see Appendix B.2). A Georgian reptile expert has stated that in the absence of data, one can assume that the Adjaristsqali basin DMU is likely to support support more than 1% of the global population of this species (D. Tarkhnishvili, pers. comm. – see Appendix B.2).

Caucasian salamander (*Mertensiella caucasica*) is listed as vulnerable on the IUCN red-list because its area of occupancy is less than 2,000 km², its distribution is severely fragmented and confined to small streams free of fish, and there is continuing decline in the extent and quality of its habitat in Turkey and Georgia. The species is undergoing a rapid reduction across its range. The current distribution includes the north-east part of Anatolia in Turkey and south-west Georgia including Adjara (Kaya et al., 2009). In Adjara, Caucasian Salamander has been recorded in 19 sites, including Mtirala National Park, Kintrishi Nature Reserve and Machakhela National Park (Tarkhnishvili and Kaya, 2009; Manvelidze, 2012); these protected areas are adjacent to the Adjaristsqali basin DMU. This species occurs in broadleaved and mixed forests, the subalpine belt and in alpine meadows. The species tends to avoid large streams and lives mainly in small streams with stony substrate (Kaya et al., 2009; Tarkhnishvili and Kaya, 2009). This species is likely to meet the Tier 2 threshold for critical habitat in the DMU.

Caucasian grouse (*Tetrao mlokosiewiczzi*) is endemic to the Greater and Lesser Caucasus and has been recorded in the Kintrishi IBA, Adjara-Imereti Ridge IBA and Shavsheti Ridge IBA. However, this species does not qualify as an endemic species for the purpose of IFC PS6 (IFC, 2012b).

5.2.4 Migratory and/or congregatory species

The eastern coast of the Black Sea, and in particular the Batumi area, is one of the most important bottlenecks for raptor migration (especially during autumn) in the Eurasian-African migration system (Verhelst et al., 2011). Species that move through bottleneck sites where significant numbers of individuals of a species pass over a concentrated period of time are classified as congregatory species (IFC, 2012b). The autumn migration bird counts in 2008 and 2009 near Batumi exceeded 1% of the estimated world populations for ten species: European honey buzzard (*Pernis apivorus*), steppe buzzard (*Buteo buteo vulpinus*), black kite (*Milvus migrans*), Eurasian sparrowhawk (*Accipiter nissus*), Levant sparrowhawk (*Accipiter brevipes*), Montagu's harrier (*Circus pygargus*), pallid harrier (*Circus macrourus*), lesser spotted eagle (*Aquila pomarina*), greater spotted eagle (*Aquila clanga*) and booted eagle (*Aquila pennata*). The migration bottleneck is narrow near Batumi as migrants are funnelled between the Black Sea and the Lesser Caucasus mountains. South of Batumi, the autumn migrants continue their journey along the Black Sea coast or follow the Chorokhi valley (Verhelst et al., 2011).

Chorokhi River represents the western boundary of the Adjaristsqali basin DMU. Autumn bird migration is less studied in this section of the Chorokhi River but significant numbers of raptors have been recorded near the village of Simoneti, to the east of the Chorokhi-Adjaristsqali confluence (PSOVI, pers. comm. – see Appendix B.2). The western end of the Adjaristsqali basin DMU may sustain on a cyclical basis (autumn) more than 1% and less than 95% of the global populations of some of the migratory raptor species listed above. This part of the DMU is likely to meet the critical habitat Tier 2 sub-criteria (IFC, 2012b).

5.2.5 Legally protected and internationally recognised areas

Mtirala National Park (IUCN category II) and Kintrishi Nature Reserve (IUCN category Ia) are legally protected areas that are adjacent to the Adjaristsqali basin DMU (Figure 2.2). A small part of the Machakhela National Park (IUCN category II) overlaps with the Adjaristaqali basin DMU. Protected areas corresponding to IUCN categories I and II are classified as critical habitat (IFC, 2012b). However, the project is not 'located within a legally protected area' as specified in IFC PS6 and Guidance Note 6 (IFC, 2012a, IFC, 2012b).

The Adjaristsqali river basin DMU (156,496 ha) overlaps partly with four Important Bird Areas (IBAs) and one National Park (see Table 5.1 below), but the project is not located within these areas (Figure 2.2). IBAs have been identified using criteria and thresholds almost identical to those for the KBAs and therefore IBAs represent the avian subset of KBAs. Usually, IBAs can be incorporated directly into KBAs provided the trigger species are still present and are still assessed as globally threatened (Langhammer et al., 2007).

KBAs are internationally recognised areas and are likely to be classified as critical habitat (IFC, 2012a, 2012b). It is understood that the KBA evaluation process has not started in Georgia (N. Zazanashvili, pers. comm. - see Appendix B.2), but a number of Key Biodiversity Areas (KBAs) were identified in the Caucasus region by WWF-Caucasus and the Georgian Centre for the Conservation of Wildlife (Langhammer et al., 2007). Adjara-Imereti Ridge IBA and Mtirala National Park, which are adjacent to the Study Area for this BAP, are proposed KBAs. The IFC PS6 requirements are the same for established and proposed designations.

It is however considered that the requirements in Paragraph 20 of the IFC PS6 (IFC, 2012a) are not applicable to the Adjaristsqali Hydropower Project and the critical habitat is not triggered by internationally recognised or nationally protected areas. This is because the Project is not within any of these nature conservation areas and no indirect impacts are likely.

Table 5.1: Legally protected and internationally recognised areas overlapping with the Adjaristsqali basin DMU or adjacent to it

Protected Area	Status	Total Area	Area overlapping with Adjaristsqali basin DMU
Kintrishi Nature Reserve	Legally protected area (IUCN category Ia)	18,893 ha	adjacent
Machakhela National Park	Legally protected area (IUCN category II)	8,733 ha	1,220 ha
Mtirala National Park and proposed KBA	Legally protected area (IUCN category II) Internationally recognised area	15,698 ha	adjacent
Batumi IBA (potential KBA)	Internationally recognised area	41,938 ha	2,520 ha
Kintrishi IBA (potential KBA)	Internationally recognised area	15,725 ha	8400 ha
Adjara-Imereti Ridge IBA and proposed KBA	Internationally recognised area	173,279 ha	450 ha
Shavsheti Ridge IBA (potential KBA)	Internationally recognised area	38,253 ha	11,770 ha

5.2.6 Critical habitat trigger features

Table 5.2 below presents a summary of the biodiversity features that are likely to trigger the critical habitat, according to IFC PS6 (IFC, 2012a, 2012b).

The Adjaristsqali basin DMU qualifies as critical habitat by being globally important for biodiversity, based on the presence of the biodiversity features listed in Table 5.2. However, the Adjaristsqali Hydropower Project is unlikely to have any residual impacts on the critical habitat triggers; this is detailed in Section 5.3 below.

Table 5.2: Biodiversity features which meet the threshold for critical habitat in the Adjaristsqali basin DMU

Feature	Scientific Name	Status	CH Criteria*
Caucasus viper	<i>Vipera (Pelias) kaznakovi</i>	IUCN endangered Georgia endangered Caucasus endemic Restricted-range species	C1(2), C2(2)

Feature	Scientific Name	Status	CH Criteria*
Milk-vetch species	<i>Astragalus sommierii</i>	IUCN not evaluated Georgia endangered Adjara-Lazetian endemic	C1(2)
Greek strawberry tree	<i>Arbutus andrachne</i>	IUCN not evaluated Georgia endangered	C1(2)
Snowdrop species	<i>Galanthus woronowii</i>	Georgia endemic	C2(2)
Thistle species	<i>Cirsium caput-medusae</i>	Georgia endemic	C2(2)
Thistle species	<i>Cirsium imereticum</i>	Georgia endemic	C2(2)
Hollyhock species	<i>Alcea transcaucasica</i>	Georgia endemic	C2(2)
Bramble species	<i>Rubus woronowii</i>	Georgia endemic	C2(2)
Adjara knapweed	<i>Centaurea adzharica</i>	Adjara endemic	C2(2)
Wallflower species	<i>Erysimum contractum</i>	Adjara endemic	C2(2)
Caucasian salamander	<i>Mertensiella caucasica</i>	IUCN vulnerable Georgia vulnerable Restricted-range species	C2(2)
European honey buzzard	<i>Pernis apivorus</i>	IUCN least concern	C3(2)
Steppe buzzard	<i>Buteo buteo vulpinus</i>	IUCN least concern	C3(2)
Black kite	<i>Milvus migrans</i>	IUCN least concern	C3(2)
Eurasian sparrowhawk	<i>Accipiter nisus</i>	IUCN least concern	C3(2)
Levant sparrowhawk	<i>Accipiter brevipes</i>	IUCN least concern Georgia vulnerable	C3(2)
Montagu's harrier	<i>Circus pygargus</i>	IUCN least concern	C3(2)
Pallid harrier	<i>Circus macrourus</i>	IUCN near threatened	C3(2)
Lesser spotted eagle	<i>Aquila pomarina</i>	IUCN least concern	C3(2)
Greater spotted eagle	<i>Aquila clanga</i>	IUCN vulnerable Georgia vulnerable	C3(2)
Booted eagle	<i>Hieraaetus pennatus</i> (syn. <i>Aquila pennata</i>)	IUCN least concern	C3(2)

* The number in brackets refers to the Critical Habitat Tier level which is met for the DMU. See IFC (2012b).

5.3 Critical habitat impacts and project requirements

5.3.1 Overview

The location of a project within critical habitat does not mean that the project should not proceed. IFC PS6 2012 focusses on appropriate mitigation and offset actions to ensure net gain to critical habitat in the country or region as a result of the presence of the project. Through wise application of the mitigation hierarchy, measurable adverse residual impacts on the critical habitat features are unlikely on this project.

The Adjaristsqali River is the main river in the Adjara semi-autonomous republic and no other viable alternatives exists within the region for the development of the Project within natural or modified habitat. The vast majority of the habitats would be classified as natural under the IFC PS6 criteria (IFC, 2012a).

The Project's impacts onto the features that may trigger critical habitat (see Section 5.2.5 above), and AGL's requirements with regard to critical habitat are discussed in the following sections; see paragraphs GN98 to GN112 in IFC Guidance Note 6 (IFC, 2012b).

To inform this assessment, the habitat areas to be affected by the Project have been calculated and the results are presented in Table 5.3 below. A habitat classification for the areas under the footprint of the Project has been prepared through interpretation of satellite imagery and ground truthing (see Section 4.1.2.2). The total area to be affected by the project is much smaller compared to the calculation included in the ESIA (Mott MacDonald, 2012a). The calculations of land-take areas for the ESIA were based on the design at the feasibility stage and therefore included conservative options that have now been refined.

Table 5.3: Habitat areas to be affected by the Project (Shuakhevi and Koromkheti Schemes)

Habitat Type	Permanent Loss (ha)	Temporary Loss (ha)	Total (ha)
Bracken	0.09	0.65	0.74
Broadleaved Woodland	1.23	2.64	3.87
Buildings	0.31	2.65	2.97
Coniferous Woodland	1.36	6.89	8.25
Cultivated Land	6.49	23.21	29.70
Lakes/Ponds	0.38	0.18	0.56
Mixed Woodland	6.58	15.32	21.90
River	14.50	6.22	20.72
River bed	14.53	9.33	23.86
Roads	6.04	15.79	21.83
Rock Outcrops	1.77	4.28	6.05
Semi Natural Grassland	4.00	12.29	16.29
Unclassified (snow/cloud)	0.16	0.71	0.87
Total	57.42	100.16	157.58

Permanent loss = reservoirs, weirs, dams, power houses, permanent new roads

Temporary loss = spoil heaps, construction laydown areas and worksites, construction camps, temporary roads

5.3.2 Critically endangered and/or endangered species at global and national level

Caucasus viper (*Vipera (Pelias) kaznakovi*)

This species is thought to occur in the Adjaristsqali River Basin DMU but it has not been confirmed there. The DMU may support between 1 and 10% of the global population of this species. However, the areas affected by the Project account for 0.10% of the DMU. Of the areas affected by the Project (including both temporary and permanent loss), only 34.02 ha (i.e. 0.02% of the DMU) represents suitable habitat for this species (forested slopes, wet ravines and forest clearings) and falls within the known area of distribution (western half of the DMU only). It is therefore considered that the Project is unlikely to have any measurable adverse impacts on Caucasus viper or on the ecological processes (including the local climatic

regime) supporting this species in the Adjaristsqali DMU. The Project is unlikely to lead to a net reduction in the population of Caucasus viper on the national scale and until the decommissioning of the project (see footnote 13 under paragraph 17 in IFC PS6 and GN104). On site protection measures and long-term monitoring and evaluation will be implemented to ensure compliance with IFC PS6. These measures are detailed in Section 7.4. Biodiversity offsets are not required for Caucasus viper as there will be no significant residual impacts on this species from the Project.

Greek strawberry tree (*Arbutus andrachne*) This species occupies a small area (2-3 ha) near the village of Gornakhul, 5 km east of Shuakhevi, on the right bank of the Adjaristsqali River (see Section 5.2.1). The Project will not have any measurable adverse impacts (direct or indirect) onto the area where this species occurs or on the ecological processes supporting this species (including local climatic regime and soil chemistry/nutrient cycling). Long-term monitoring and evaluation will be implemented to ensure compliance with IFC PS6. These measures are detailed in Sections 7.2 and 9. Biodiversity offsets are not required as there will be no significant residual impacts on this species from the Project.

Milk-vetch (*Astragalus sommierii*)

This species occupies a very small area (150x400 m) near the village of Zamleti (east of Shuakhevi) near the main road (see Section 5.2.1). The Project will not have any measurable adverse impacts (direct or indirect) onto the area where this species occurs or on the ecological processes supporting this species (including local climatic regime and soil chemistry/nutrient cycling). Long-term monitoring and evaluation will be implemented to ensure compliance with IFC PS6. These measures are detailed in Section 7.2. Biodiversity offsets are not required as there will be no significant residual impacts on this species from the Project.

5.3.3 Endemic and/or restricted range species

Georgia and Adjara endemic plant species

The Georgia and Adjara endemic species listed in Section 5.2.2 above are known to occur in the Adjaristsqali River Basin DMU but there is no accurate information about locations. Using the precautionary principle, there is a risk that the Project may affect the populations of some of these species. The DMU may support between 1 and 95% of the global population of these species. However, the areas affected by the Project account for 0.10% of the DMU. Of the areas affected by the Project, maximum 50.31 ha (i.e. 0.03% of the DMU) represents suitable habitat for these species; however, some of these species are likely to occur in smaller areas and away from the Project infrastructure – additional consultation with experts will be undertaken to confirm this.

It is therefore considered that the Project is unlikely to have any measurable adverse impacts on these species or on the ecological processes (including the hydrologic regime, local climatic regime and soil chemistry/nutrient cycling) supporting these species in the Adjaristsqali DMU. On site protection measures and long-term monitoring and evaluation will be implemented to ensure compliance with IFC PS6 and to demonstrate net gains for Georgia and Adjara endemic plant species. These measures are detailed in Section 7.2. Biodiversity offsets are not required for Georgia and Adjara endemic plant species as there will be no significant residual impacts on these species from the Project.

Caucasus viper (*Vipera (Pelias) kaznakovi*)

Caucasian viper is a restricted-range species, which is believed to occur in the western half of the Adjaristsqali DMU but there are no confirmed records. The impacts of the Project onto this species and the IFC PS6 requirements are explained in Section 5.3.1 above.

Caucasian salamander (*Mertensiella caucasica*)

This species has a restricted-range distribution, with an area of occupancy of less than 2000 km² (see Section 5.2.2 for details). There are confirmed records within and adjacent to the Adjaristsqali DMU. However, Caucasian salamander occurs mainly in small streams (it avoids large streams), usually less than 1-1.5 m in width and about 20-30 cm in depth in spring (Kaya et al., 2009). The Project will not affect any of the small streams of this type and therefore no measurable adverse impacts on this species or on the ecological processes supporting this species (especially the hydrologic regime) are anticipated. Using the precautionary approach, on-site protection measures and long-term monitoring and evaluation will be implemented to ensure compliance with IFC PS6. These measures are detailed in Section 7.3. Biodiversity offsets are not required as there will be no significant residual impacts on this species from the Project.

5.3.4 Migratory and/or congregatory species

At least ten species of raptor birds use the Batumi bottleneck during the autumn and spring migration (see Section 5.2.3). The main migration corridor (bottleneck) is outside the Adjaristsqali basin DMU, but some birds migrate along the Chorokhi river south of Batumi. This area is at the western end of the Adjaristsqali basin DMU and the Project is unlikely to have any measurable adverse impacts on migratory raptor species. Therefore, no mitigation (including offsetting) is required on this Project. However, when the associated electricity transmission line will be progressed, this BAP will be updated to include mitigation to avoid or minimise adverse impacts on migratory birds.

5.3.5 Legally protected and internationally recognised areas

The Adjaristsqali Hydropower Project (Shuakhevi and Koromkheti schemes) is unlikely to have any adverse impacts on any legally protected or internationally recognised areas. This is because the project is not located in any of these areas and no indirect impacts are likely (see Section 5.2.4).

6. Priorities for Biodiversity Conservation

6.1 Selection criteria

Based on the literature review and the field surveys carried out in 2011, 2012 and 2013, a description of the biodiversity baseline for the Study Area is presented in Chapter 4 of this document, with additional information being provided in Chapter 5. The information on the biodiversity of the Study Area is not comprehensive, but together with the advice from biodiversity experts and stakeholders' feedback, the biodiversity baseline is considered to be sufficient to inform the BAP.

A BAP needs to focus on species and habitats that need special management rather than dealing with all the biodiversity in the Study Area. As part of the Adjaristsqali Hydropower BAP, the priorities for biodiversity conservation have been selected based on:

- The global, national and/or regional conservation importance of some species and habitats in the Study Area – this category includes rare, restricted-range and threatened species in Adjara/Georgia or globally (IUCN Red List), as well as the habitats where these species occur;
- The critical habitat trigger species, habitats and legally protected areas that are affected by the project (see Section 5);
- The protection status of some areas within the Study Area – this category includes nature conservation areas which are protected in Georgia or internationally; and
- The predicted impacts of the Adjaristsqali Hydropower Project onto the above features – protected areas and features of high conservation importance which are not affected by the Project do not have to be dealt with in this BAP, although some additional conservation (biodiversity enhancement) actions are included in this document.

The feedback provided by biodiversity experts and by the stakeholders during the Batumi workshop has been considered in the selection of the priorities for conservation.

6.2 Priorities

6.2.1 Habitats

The following habitat types of high and medium conservation value have been selected as priorities for conservation in this BAP:

- Oak forest – *Quercus petraea* ssp. *Dschorochensis* ;
- Oak-hornbeam forest - *Carpinus caucasica*, *Quercus petraea* ssp. *dschorochensis* and/or *Quercus hartwissiana*;
- Mixed, species-rich deciduous forest with *Castanea sativa*, *Alnus barbata*, *Aristolochia pontica*, *Tamus communis*;
- Liana-rich mixed deciduous forest with spruce – *Picea orientalis*, *Carpinus caucasica*, *Alnus barbata*, *Salix caprea*;
- Chestnut forest with cherry-laurel – *Castanea sativa*, *Acer campestre*, *Alnus barbata*;
- Riparian woodland – *Alnus barbata* dominant;
- Pontic rhododendron (*Rhododendron ponticum*) scrub; and
- Rivers and streams.

6.2.2 Species

The species listed below have been identified as priorities for conservation as part of this BAP. None of these species are restricted to the Study Area; they are known or likely to occur in other parts of Adjara and Georgia.

6.2.2.1 Plant species of conservation importance in Adjara, Georgia and Caucasus

The following plant species of conservation importance in Adjara, Georgia and Caucasus occur within the Study Area and are priority species in this BAP:

- *Castanea sativa* – ‘vulnerable’ Georgia and Adjara Red Lists;
- *Juglans regia* – ‘vulnerable’ Georgia and Adjara Red Lists;
- *Ostrya carpinifolia* – ‘endangered’ Georgia and Adjara Red Lists;
- *Quercus hartwissiana* – ‘vulnerable’ Georgia and Adjara Red Lists;
- *Staphylea colchica* – ‘vulnerable’ Adjara, Georgia and Caucasus Red Lists; Colchic endemic;
- *Ulmus glabra* – ‘vulnerable’ Georgia and Adjara Red Lists;
- *Osmanthus decorus* – ‘vulnerable’ Adjara, Georgia and Caucasus Red Lists; Adjara-Lazetian endemic;
- *Taxus baccata* – ‘vulnerable’ Georgia and Adjara Red Lists;
- *Buxus colchica* (*B. sempervirens?*) – ‘vulnerable’ Georgia and Adjara Red Lists; Colchic endemic;
- *Astragalus sommierii* – ‘endangered’ Georgia and Adjara Red Lists; Adjara-Lazetian endemic;
- *Arbutus andrachne* - ‘endangered’ Georgia and Adjara Red Lists;
- *Galanthus woronowii* - Georgia endemic;
- *Cirsium caput-medusae* - Georgia endemic;
- *Cirsium imereticum* - Georgia endemic;
- *Alcea transcucasica* - Georgia endemic;
- *Rubus woronowii* - Georgia endemic;
- *Centaurea adzharica* - Adjara endemic;
- *Erysimum contractum* - Adjara endemic;
- *Hedera colchica* - Colchic endemic;
- *Quercus petraea* ssp. *dschorochensis* (*Q. dschorochensis*) - Adjara-Lazetian endemic;
- *Origanum* (*Amaracus*) *rotundifolium* - Adjara-Lazetian endemic;
- *Linaria adzharica* - Adjara-Lazetian endemic;
- *Ficus carica* (*F. colchica*) - Colchic endemic; and
- *Cyclamen adzharicum* (*C. coum* ssp. *caucasicum*, *C. vernum*) - Adjara-Lazetian endemic.

6.2.2.2 Mammal species of Georgian and/or global conservation importance

- Eurasian otter (*Lutra lutra*), listed as ‘vulnerable’ on the IUCN Red List and the Red List of Georgia. The otter is considered rare in the Study Area due to a lack of fish and other food sources;
- All bat species, and in particular Mehely’s horseshoe bat (*Rhinolophus mehelyi*), listed as ‘vulnerable’ on the IUCN Red List and the Red List of Georgia, and Mediterranean horseshoe bat (*Rhinolophus euryale*), listed as ‘vulnerable’ on the Red List of Georgia;
- Long-clawed mole vole (*Prometheomys schaposchnikowi*) - ‘vulnerable’ on the Red List of Georgia;
- Red-backed vole (*Myodes glareolus ponticus*) (formerly *Clethrionomys glareolus ponticus*) - ‘endangered’ on the Red List of Georgia;
- Grey dwarf hamster (*Cricetulus migratorius*)- ‘vulnerable’ on the Red List of Georgia;
- Brown bear (*Ursus arctos*) - ‘endangered’ on the Red List of Georgia;
- Eurasian lynx (*Lynx lynx*) - ‘critically endangered’ on the Red List of Georgia; and
- Caucasian squirrel (*Sciurus anomalus*) - ‘vulnerable’ on the Red List of Georgia.

6.2.2.3 Bird species of global and national importance

Resident

- Eastern imperial eagle – ‘vulnerable’ on the IUCN Red List;
- Greater spotted eagle – ‘vulnerable’ on the IUCN Red List;
- Boreal owl – ‘vulnerable’ on the Red List of Georgia;
- Caucasian grouse - ‘vulnerable’ on the Red List of Georgia;
- Golden eagle - ‘vulnerable’ on the Red List of Georgia;
- Griffon vulture - ‘vulnerable’ on the Red List of Georgia; and
- Long-legged buzzard - ‘vulnerable’ on the Red List of Georgia.

Breeding

- Eurasian stone-curlew - ‘vulnerable’ on the Red List of Georgia; and
- Common rosefinch - ‘vulnerable’ on the Red List of Georgia.

Breeding/Passage Migrant

- Black stork - ‘vulnerable’ on the Red List of Georgia; and
- White stork - ‘vulnerable’ on the Red List of Georgia.

Passage Migrant

- Levant sparrowhawk - ‘vulnerable’ on the Red List of Georgia;
- European honey buzzard (*Pernis apivorus*);
- Steppe buzzard (*Buteo buteo vulpinus*);
- Black kite (*Milvus migrans*);
- Eurasian sparrowhawk (*Accipiter nisus*);
- Levant sparrowhawk (*Accipiter brevipes*) – ‘vulnerable’ on the Red List of Georgia;
- Montagu’s harrier (*Circus pygargus*);
- Pallid harrier (*Circus macrourus*);
- Lesser spotted eagle (*Aquila pomarina*);
- Greater spotted eagle (*Aquila clanga*) – ‘vulnerable’ on the Red List of Georgia; and
- Booted eagle (*Hieraaetus pennatus* syn. *Aquila pennata*).

6.2.2.4 Globally and nationally threatened species of reptiles and amphibians

- Caucasus viper (*Vipera kaznakovi*) – restricted-range species and ‘endangered’ on the IUCN Red List and on the Red List of Georgia; and
- Caucasian salamander (*Mertensiella caucasica*) – restricted-range species and ‘vulnerable’ on the IUCN Red List and on the Red List of Georgia.

6.2.2.5 Fish species of national conservation importance

- Black Sea salmon (*Salmo labrax pallas*) - ‘vulnerable’ on the Red List of Georgia;
- Sea/brown trout (*Salmo labrax fario*, *S. trutta*) - ‘vulnerable’ on the Red List of Georgia; and
- Colchic khramulya (*Capoeta sieboldii*) - ‘vulnerable’ on the Red List of Georgia.

7. BAP Actions

7.1 Overview

This chapter sets out all the proposed actions structured from the perspective of biodiversity conservation. Section 8.1 recasts the conservation actions by their place in the mitigation hierarchy.

Conservation objectives and actions have been developed for each priority biodiversity feature or groups of features to ensure the systematic implementation of the mitigation hierarchy i.e. avoid, reduce (minimise), remedy (restore) and offset. The concept of the mitigation hierarchy is outlined in Figure 2.1. This will allow for the careful management of risk and the best possible outcomes for the Project and local communities, without compromising the health, function and integrity of the ecological system. In addition to the actions linked to the mitigation hierarchy, this BAP includes Additional Conservation Actions (ACA), which are actions to enhance the biodiversity of the Study Area, irrespective of the development taking place there.

The conservation actions have been established with the aim of achieving 'no net loss' to biodiversity in accordance with IFC PS6 (IFC, 2012a). IFC PS6 requires evidence that the mitigation hierarchy has been applied, that avoidance is prioritised, and that offsets are measurable and only applied as a last resort where residual impacts are unavoidable.

The conservation objectives and actions have been identified and developed based on:

- The legal, policy, regulatory and third party requirements;
- The international and national standards, guidance and best practice (e.g. IPIECA, 2005; IFC, 2007; IFC, 2012a, 2012b; EBRD, 2008);
- The feedback provided by stakeholders during the Batumi workshop; and
- The other biodiversity conservation initiatives in the wider area (UNDP/GEF, FFI, USAID, WWF).

The Adjaristsqali Hydropower BAP is composed of four sub-plans, and each sub-plan comprises one or several conservation objectives. A number of actions have been identified to achieve each objective. Under each sub-plan, the objectives and actions relevant to impact avoidance and reduction are presented first as they have high priority. The objectives and actions which involve further monitoring and research, biodiversity enhancement, and stakeholder engagement come after the impact mitigation actions. The order of the actions generally follows the mitigation hierarchy (Figure 2.1), but this is not always possible as one action can be relevant to more than one category in the mitigation hierarchy.

A summary of the objectives is provided in Table 7.1 below, with details of the actions in Sections 7.2 to 7.5.

Table 7.1: Summary of conservation objectives under the Adjaristsqali BAP

Action Plan for Forest Habitats and Notable Plant Species (Action 'A' Khertvisi, has been removed due to Machekeheala Park)	
B1	Protect the natural forest habitats and the populations of notable plant species during construction of the Project
B2	Replant affected forest and enhance forest habitat within the Study Area
Action Plan for Rivers and Associated Species	
C1	Protect river habitat and associated species during construction and operation of the Project
C2	Provide support for the enhancement of river habitats, fisheries and awareness raising within the Study Area in the period 2013-2016
Action Plan for Protected and Threatened Terrestrial Mammal and Reptile Species	
D1	Protect terrestrial mammals and reptiles during construction of the Project
D2	Provide offsetting and enhancement for the protected mammal and reptile populations in the Study Area
Action Plan for Protected and Threatened Bird Species	
E1	Protect bird species during construction
E2	Provide compensation and increase understanding of priority bird species in the Study Area

7.2 Action Plan for Forest Habitat and Notable Plant Species

7.2.1 Current Status

Valuable forest habitats

The following forest habitats present in the Study Area are of high to medium conservation value and are classified as 'natural' using the IFC criteria (IFC, 2012a):

- Oak forest – *Quercus petraea ssp. dschorochensis* ;
- Oak-hornbeam forest - *Carpinus caucasica*, *Quercus petraea ssp. dschorochensis* or *Quercus hartwissiana*;
- Mixed, species-rich deciduous forest with *Castanea sativa*, *Alnus barbata*, *Aristolochia pontica*, *Tamus communis*;
- Liana-rich mixed deciduous forest with spruce – *Picea orientalis*, *Carpinus caucasica*, *Alnus barbata*, *Salix caprea*;
- Chestnut forest with cherry-laurel – *Castanea sativa*, *Acer campestre*, *Alnus barbata*;
- Riparian woodland – *Alnus barbata* dominant; and
- Pontic rhododendron (*Rhododendron ponticum*) scrub.

The forest habitats in the Study Area support a high diversity of plant species, of which many are protected and/or endemic. A large number of protected animal species occur in these forests, including 20 species of bats, large carnivorous mammals (European lynx, brown bear), Caucasian squirrel, and many species of birds of conservation concern.

All the above habitats are of high to medium conservation value and are classified as 'natural' using the IFC criteria (IFC, 2012a).

Protected and notable plant species

The following plant species of conservation importance in Adjara, Georgia and Caucasus occur within the Study Area and are priority species in this BAP:

- *Castanea sativa* – ‘vulnerable’ Georgia and Adjara Red Lists;
- *Juglans regia* – ‘vulnerable’ Georgia and Adjara Red Lists;
- *Ostrya carpinifolia* – ‘endangered’ Georgia and Adjara Red Lists;
- *Quercus hartwissiana* – ‘vulnerable’ Georgia and Adjara Red Lists;
- *Staphylea colchica* – ‘vulnerable’ Adjara, Georgia and Caucasus Red Lists; Colchic endemic;
- *Ulmus glabra* – ‘vulnerable’ Georgia and Adjara Red Lists;
- *Osmanthus decorus* – ‘vulnerable’ Adjara, Georgia and Caucasus Red Lists; Adjara-Lazetian endemic;
- *Taxus baccata* – ‘vulnerable’ Georgia and Adjara Red Lists;
- *Buxus colchica* (*B. sempervirens?*) – ‘vulnerable’ Georgia and Adjara Red Lists; Colchic endemic;
- *Astragalus sommieri* – ‘endangered’ Georgia and Adjara Red Lists; Adjara-Lazetian Endemic; and
- *Arbutus andrachne* - ‘endangered’ Georgia and Adjara Red Lists.

All of these species are protected under the Georgian legislation. None of these species are threatened globally (*Juglans regia* and *Buxus colchica* are ‘near-threatened’ on the IUCN Red Lists). *Astragalus sommieri*, a species ‘endangered’ in Georgia and Adjara, is present within the Study Area (near Zamleti, Shuakhevi Scheme) but is unlikely to be affected by the Project. *Ostrya carpinifolia*, which is ‘endangered’ in Georgia and Adjara, is present in the Shuakhevi and Khulo municipalities, along the Adjaristsqali River and the downstream sections of the Chirukhistsqali and Skhalta Rivers. With the exception of *Astragalus sommieri*, all species listed above are woody species (shrubs or trees).

The following Georgia, Adjara, Adjara-Lazetian and Colchic endemic species are also a priority for conservation under this BAP:

- *Galanthus woronowii* - Georgia endemic;
- *Cirsium caput-medusae* - Georgia endemic;
- *Cirsium imereticum* - Georgia endemic;
- *Alcea transcaucasica* - Georgia endemic;
- *Rubus woronowii* - Georgia endemic;
- *Centaurea adzharica* - Adjara endemic;
- *Erysimum contractum* - Adjara endemic;
- *Hedera colchica* - Colchic endemic;
- *Quercus petraea* ssp. *dschorochensis* (*Q. dschorochensis*) - Adjara-Lazetian endemic;
- *Origanum* (*Amaracus*) *rotundifolium* - Adjara-Lazetian endemic;
- *Linaria adzharica* - Adjara-Lazetian endemic;
- *Ficus carica* (*F. colchica*) - Colchic endemic; and
- *Cyclamen adzharicum* (*C. coum* ssp. *caucasicum*, *C. vernum*) - Adjara-Lazetian endemic.

This action plan also covers alien invasive species, as these are a global environmental problem and are the second main cause of biodiversity loss after habitat destruction.

7.2.2 Current Factors Affecting the Forest Habitats in the Study Area

The forests and associated species in the Study Area are affected by illegal felling, development, land slides and fragmentation.

The Project’s impacts on the forest habitats are likely to be significant in the absence of mitigation. The successful implementation of the actions below will ensure ‘no net loss’ on forest habitat.

7.2.3 Current Actions

Habitat and flora surveys and monitoring and some conservation actions have been undertaken in the Mtirala National Park, Machakhela National Park and Kintrishi Nature Reserve (Manvelidze, 2012). There are no specific conservation actions dealing with the forest habitats in the Study Area.

7.2.4 Action Plan Objectives and Actions

Objective B1: Protect the natural forest habitats and the populations of notable plant species during construction of the Project

Action B1.1: Inform construction staff on the importance of natural forest habitats and notable plant species					
<p>Target: All construction and operation staff to be aware of the importance of forest habitats and notable plant species within the Study Area Indicator: Number of staff and contractors reached through toolbox talks and training. Number of leaflets, office posters, wildlife photo competition etc.</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: Start of construction End: End of construction Frequency: During staff induction, continuous during construction</p>					

All construction staff will be informed about the areas supporting natural and sensitive forest habitats, protected, threatened and endemic species, and why these features are important. The Wildlife Officer (see Section 8.2) will prepare and give this information as part of the staff inductions and will display relevant information, maps, photographs, posters in the site offices.

Action B1.2: Prepare habitat maps for project sites using LiDAR, aerial photography and high resolution satellite imagery
<p>Target: Obtain high resolution satellite images for all Project sites and prepare habitat maps before construction. Indicator: Habitat maps prepared and issued to AGL one month before construction and amendments incorporated into the plan before actual start of construction.</p>

Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: At least 2 months before start of construction End: One month before start of construction Frequency: Complete at least one month before start of construction					

LiDAR surveys, high resolution aerial photography and satellite imagery have been obtained for some Project areas, especially where there is overlap with the associated electricity transmission line. New imagery will be obtained for the project sites (including a 2 km buffer zone) and will be interpreted to produce maps with the main habitat types within each Project site. Habitat information and data collected in 2011, 2012 and 2013 will be used to ground truth the remote sensing images. The habitat maps will be used to manage the construction impacts of the Project, avoid or minimise adverse impacts on the valuable habitats and locations supporting protected and threatened species, and to inform the habitat reinstatement where feasible. The maps will be also used to compare the habitat areas before and after construction on each site. The habitat maps will be made available to any organisation undertaking conservation projects in the area.

The habitat mapping method involves using a supervised classification technique on satellite imagery of 5 m resolution (Rapid Eye). Other supplemental data will also be used to inform the classification process; this includes LiDAR and aerial photographs, these will help understand the land cover along with field survey information where available. ArcGIS Spatial Analyst will be used to identify habitats based on the spectral reflectance characteristics of the ground features. This is a semi-automated approach to allow for human assessment and checking of the features for a more intelligent classification result. The ground truthing will be undertaken using existing field survey information, ground photos and local knowledge. Once initially classified, further processing will be carried out to clean and remove spuriously classed pixels through a neighbourhood analysis and converted to vector layers for further analysis and querying of the results. By using this supervised process, the classification will be a more efficient workflow process and less subjective than manual digitising of features leading to a more reliable, robust and readily available result. The process will be repeatable allowing for periodic updates and change detection analysis.

This action has been further developed into a Biodiversity Monitoring and Evaluation Programme (see Section 8.4 for details).

Action B1.3: Avoid or minimise loss/degradation of natural habitat during Project construction

Target: No net loss or significant degradation of natural habitat within the Study Area as a result of construction activities

Indicator: Area and percentage of natural habitat affected by construction

Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: Project design End: End of construction Frequency: Design stage and continuous during construction					

The locations for spoil deposits, quarrying areas, construction laydown areas, bridges and other associated facilities have all been selected based on the minimum likely ecological and environmental impacts.

Light water sprays will be implemented for reduction of dust during construction. Speed limits will be imposed, which should also minimise the dust levels. Off-road vehicle movements can cause habitat degradation and loss. The movement of AGL or Contractor vehicles across the Project areas will be strictly monitored and drivers will be required to use designated roads only. Detailed procedures outlining in detail the mitigation measures to be adopted during the Construction phase of the project have been prepared in the form of Construction Environmental Management Plans (CEMPs) (Mott MacDonald, 2012d).

The design of the Project has considered and incorporated the use of existing infrastructure corridors in order to avoid or minimise habitat loss and degradation. Additional measures to avoid or minimise habitat degradation and loss will include:

- Minimise land requirements for above ground permanent facilities and minimise areas to be cleared.
- Minimise the width of an access road during construction and operation as far as possible.
- Minimise areas to be cleared. Use hand cutting where possible, avoiding the use of heavy equipment such as bulldozers, especially on steep slopes, water and wetland crossings, and forested areas.

Particular attention will be given to avoid or minimise impacts on the habitat areas known to support protected, threatened or endemic plant species.

The habitat maps to be prepared for each Project site (see Action B1.2) will be used to refine the design in order to avoid the most valuable habitat areas and locations known to support protected and threatened plants species.

Action B1.4: Undertake pre-construction surveys and mitigation to minimise impacts on natural habitats and protected and threatened plants					
Target: Targeted botanic surveys before construction to identify and map the habitats and locations of protected/threatened plant species on each Project site Indicator: Report on habitats and locations of protected/threatened plant species to be issued to AGL within 4 weeks of each site visit					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions

Start: Project design
 End: One month prior to start of construction
 Frequency: Complete at least one month before start of construction (surveys June-August)

Botanical surveys of the areas to be directly affected by construction will be carried out before the start of construction (but within the vegetation season i.e. June to August) to identify and map the habitats, plant communities and the locations of protected, threatened and invasive plant species. This information can be used in the ground truthing of the habitat classification (Action B1.2). An inventory of all tree species to be felled will be carried out and records will be provided to the Directorate of Environmental and Natural Resources of Adjara.

Before start of construction, saplings of protected shrubs and trees (<2 m) directly affected by construction will be translocated to suitable areas outside the footprint of the Project. The following protected trees and shrubs have been recorded in the Study Area and will be considered for translocation of saplings if affected and where feasible:

- *Castanea sativa*;
- *Juglans regia*;
- *Ostrya carpinifolia*;
- *Quercus hartwissiana*;
- *Staphylea colchica*;
- *Ulmus glabra*;
- *Osmanthus decorus*;
- *Taxus baccata*;
- *Buxus colchica* (*B. sempervirens?*); and
- *Arbutus andrachne*.

The protected herbaceous species *Astragalus sommieri* will be also translocated before construction in the unlikely case when the plants are directly affected by construction. In addition, seeds of protected and endemic herbaceous plants (see Section 7.2.1) will be collected before construction from the areas to be directly affected by construction. The purpose of collecting seeds is to preserve the genetic diversity of these species and to use the seed for habitat reinstatement. Seed collection will be undertaken by a qualified botanist, at the optimum time of year (August/September, starting in 2013). Some of the collected seed will be handed to the Batumi Botanic Gardens for ex-situ propagation and conservation.

Action B1.5: Prepare and implement a habitat/soil removal and re-instatement plan

Target: Habitat/soil removal and reinstatement plan (HRRP) to follow clear and best practice guidance to minimise adverse impacts
Indicator: HRRP prepared and issued to AGL one month before construction and amendments incorporated into the plan before actual start of construction

Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
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Start: Preparation of HRRP at least 2 months before start of construction; start implementation of HRRP at start of construction

End: Complete preparation one month before start of construction. End implementation at end of construction (this excludes the long-term post-construction monitoring).

Frequency: Complete at least one month before start of construction and implement during construction

A habitat removal and re-instatement plan (HRRP) will be produced by the Contractors before the start of construction. The HRRP will set out the minimum requirements for such activities, and will detail how re-instatement activities should be carried out. The reinstatement plan will include 10 year post construction monitoring, along with remediation actions if unsuccessful (this is covered by Action B1.6 below). The HRRP will be reviewed by an ecologist from Mott MacDonald (International Environmental Consultant for AGL). The following aspects and measures will be included as a minimum in the HRRP:

Vegetation clearance and soil stripping

- Translocation or seed collection for protected plants (see Action B1.4 for details).
- Vegetation is to be cut down and cut material will be removed before soil stripping.
- Use hand cutting where possible, avoiding the use of heavy equipment such as bulldozers, especially on steep slopes and ecologically sensitive areas.

Soil handling and storage

- Store top soil separately from subsoil or other materials. Top soil and subsoil will be stored in demarcated areas and will be clearly labelled to prevent mixing of different materials and to allow reinstatement in the correct order (temporary sites only) or to re-use these materials on other sites.
- The seed/root-bearing topsoil will be formed into a shallow mound not higher than 1.5 m in height. The subsoil will be stored separately in the same way.
- Any weeds on the soil mounds will be controlled by strimming.
- To maintain the germination capacity of the seed bank, the top soil storage will not exceed 15 weeks if this material is used for reinstatement.

Soil reinstatement and habitat restoration

Soils will be reinstated after construction in the temporary sites (workforce accommodation camps, storage yards, access roads). Soil reinstatement will be carried out to ensure the top soil is returned to the surface in line with international standards and best practice. Following top soil reinstatement, erosion control measures will be implemented on steep slopes. This may take the form of either the use of a nursery crop or the use of biodegradable erosion control geotextile blankets.

Post-project restoration of any damaged natural habitats will be implemented to ensure no net loss in long-term.

On small unforested areas, it is expected that the vegetation will gradually establish on its own on the reinstated top soils (after a number of years) as most plants will regenerate from the seed bank in the top soil. However, approximately 25 ha of natural woodland (broadleaved, mixed and coniferous) that is likely to be affected by the Project temporarily (see table 5.3) will be replanted immediately after construction to prevent soil erosion. Additionally, compensatory planting for the permanent forest loss will be carried out off-site, as described in Action B2.1 below. Only native species will be used in any planting taking place on or off site.

Action B1.6: Long-term monitoring of reinstated habitats and translocated plants					
<p>Target: 75% establishment success of reinstated habitats and translocated plants after 10 years, compared to baseline Indicator: Percentage of establishment success. Report on habitat reinstatement and translocation including recommendations for any remediation actions to be issued to AGL within 4 weeks of each site visit</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: One year after construction End: 10 years from start of monitoring Frequency: Every two years</p>					

The reinstated habitats and any translocated plants will be monitored annually for 10 years to ensure successful establishment. A partnership between AGL and Batumi Botanic Gardens will be established and the scientists from the botanic gardens will undertake the post-construction monitoring of the reinstated habitats and any translocated plants. A report will be prepared after each monitoring visit and

recommendations on any remediation measures required will be given, should the habitats not recover satisfactorily. The monitoring reports will be provided to the Directorate of Environmental and Natural Resources of Adjara and the Forestry Agency of Adjara. Mott MacDonald will provide expert advice on the monitoring methods, results and recommendations for remediation.

Action B1.7: Prevent the spread of alien invasive species during construction of the Project					
<p>Target: No alien invasive species to be introduced or spread as a result to the Project Indicator: Number of alien invasive species introduced into the Project sites or spread to other areas as a result of Project activities</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: Start of construction End: End of construction Frequency: Monthly monitoring during construction</p>					

Non-native (alien) invasive species (AIS) are the second threat to the global biodiversity after habitat destruction. The likelihood of invasions by alien species is higher in habitats that are altered and disturbed, for example during construction. Invasive species have the following traits:

- Fast growth;
- Rapid reproduction;
- High dispersal ability;
- Ability to alter growth form to suit current conditions;
- Tolerance of a wide range of environmental conditions;
- Ability to live off of a wide range of food types; and
- Association with humans.

Two non-native and invasive species, *Phytolacca americana* and *Spiraea japonica*, are known to pose some problems to the native forests in Adjara but this threat is not considered to be very significant (Manvelidze, 2012). These two species and any other invasive species will be targeted during the pre-construction botanical surveys (see Action B1.4). In addition, based on the traits listed above, the Contractor and AGL staff will identify and report potentially invasive species establishing on the Project sites. The Wildlife Officer will check this information or contact a botanist to confirm/inform the presence of invasive species.

Implementing measures to prevent the accidental introductions of invasive species are required under the IFC PS6 (IFC, 2012a) and EBRD PR6 (EBRD, 2008). IFC PS6 (IFC, 2012a) includes the following requirements with regard to AIS:

- Must not intentionally introduce **alien invasive species** unless this is in accordance with existing regulatory framework;
- Must not deliberately introduce **AIS** irrespective of regulatory framework;
- Introduction of AIS (e.g. in planting) must be subject to a risk assessment;
- Implement measures to avoid accidental introduction or spreading of alien species (see below); and
- Consider the implementation of measures to eradicate AIS from natural habitats over which client has management control.

Detailed guidelines on the prevention and management of AIS have been published by IPIECA (2010) for the oil and gas industry, but these guidelines are relevant to many other project types, including hydropower projects.

Preventative, control and monitoring measures will be implemented with regard to the following aspects of the Project:

Packaging and movement of materials

- Minimise traffic and the distance it has travelled;
- Source goods/materials locally where possible; and
- Contain any alien invasive species (AIS) and report their presence (the Wildlife Officer will produce a short leaflet about AIS likely to be found in the contract area and will brief construction staff).

Vehicles and plant

- Clean all vehicles and plant immediately before deployment;
- 'As-new' wash-down is essential before entering non-infested areas and after working in infested areas;
- Train and raise awareness regarding AIS;
- Pressure wash vehicle tyres in a contained area;
- Contain and destroy residue; and

- Record and report the presence of any AIS.

Soil and vegetation

- Minimize disturbance to, or movement of, soil and vegetation;
- Prevent soil damage and erosion;
- Ensure imported soil/other materials are safe and free of AIS (source from a reputable supplier, request information on the soil’s origin and certification of AIS-free status if possible);
- Prevent AIS establishment on exposed stored soil (do not store bare soil near known sources of AIS, consider using matting to cover exposed soil);
- Ensure infested material is disposed of safely; and
- Retain as much natural vegetation as possible.

Habitat reclamation

- Use native plants for reinstatement and landscaping;
- Assess any non-native species (to be used in landscaping) for AIS potential;
- Consider that some AIS may be soil-based; and
- Avoid altering soil and water body properties.

The Wildlife Officer will monitor the construction activities to ensure compliance with the IPIECA guidelines on alien invasive species. In addition, an Invasive Species Management Plan will be produced should invasive species be identified within the footprint of the works.

Objective B2: Replant affected forest and enhance forest habitat within the Study Area

Action B2.1: Implement forest creation scheme to offset for forest habitat loss caused by the Project					
Target: No net loss or forest degradation as a result of the Project Indicator: Area of forest habitat lost or degraded 10 years after construction, after implementation of forest creation scheme					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: Planting in 2013 End: Planting by 2016; monitoring until 2025 Frequency: Monitoring of planted forest annually					

Reinstatement of any forest habitat affected temporarily during construction will be undertaken as explained under Action B1.5. Due to the permanent loss of natural forest habitats (largely from the road construction and inundation from the reservoirs), offsetting through the creation of similar habitats is also required to reduce the long-term impacts. Although there will be a delay before the new habitats become of equal conservation value, the habitat creation is an important component in offsetting the overall impacts of the Project on biodiversity.

The forest creation scheme will include the planting of 9.2 ha of mixed species forest to be undertaken by AGL or financial support provided to another organisation or land owner. This is based on the total area of forest habitat which is likely to be permanently lost under the Project. It has to be mentioned that some of this forest area to be affected supports walnut plantations, which are considered to represent modified habitat; these plantations (where affected) will be replaced with forest replicating natural habitat.

The areas to be planted with forest will be established following discussions and negotiations with the Directorate of Environmental and Natural Resources of Adjara, the Forestry Agency of Adjara, and land owners. The planted forest will be managed by the land owner or administrator, with support provided by AGL in the next 10 years after planting. The planted forest will be subjected to monitoring and maintenance activities to ensure the forest habitat is established successfully. Maintenance will be required for five years and will involve two visits per year to replace any dead or affected trees, control the weeds, provide protection against pests etc. The monitoring will continue for 10 years and will involve an annual visit by a qualified botanist to record species composition and habitat structure in the planted forest.

As an additional conservation action, AGL will also examine the possibility of providing support for the establishment of tree nurseries at local schools, where children can learn to identify and grow native and endemic tree species, and monitor the life cycle of trees and the influences of factors such as climate change, altitude, diseases etc.

Action B2.2: Provide support for reforestation scheme to enhance the forest habitats in the Study Area					
Target: Net increase in the extent and condition of the forest habitat in the Study Area					
Indicator: Extent and condition of forest habitat in the Study Area after 10 years					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: 2013					
End: Planting by 2016, monitoring until 2025					
Frequency: Monitoring of planted forest annually					

In many areas along the Adjaristsqali, agricultural activities and illegal tree felling have resulted in significant habitat loss, soil erosion and land slippage. A reforestation scheme is needed to help restore the natural forest habitats, as well as assist with soil/land stability.

AGL will examine the possibility and may provide financial and logistical support to an existing reforestation scheme in the Study Area. This will include planting of areas affected by erosion and restoration of degraded forests in the Study Area. Support provided by AGL may include the procurement and distribution of native trees for planting, maintenance and monitoring of the planted areas etc.

The planted forest will be subjected to monitoring and maintenance activities to ensure the forest habitat is established successfully. Maintenance will be required for five years and will involve two visits per year to

replace any dead or affected trees, control the weeds, provide protection against pests etc. The monitoring will continue for 10 years and will involve an annual visit by a qualified botanist to record species composition and habitat structure in the planted forest.

The reforestation scheme where AGL will provide support will be established following discussions and negotiations with the Directorate of Environmental and Natural Resources of Adjara, the Forestry Agency of Adjara, and land owners.

Action Plan for Forest Habitat and Notable Plant Species – Summary of Actions

Action	Description	Responsible	Partnerships & Stakeholders	Timescale
B1.1	Inform construction staff on the importance of natural forest habitats and notable plant species	Wildlife Officer		During project construction
B1.2	Prepare habitat map for project area using LiDAR, aerial photography and high resolution imagery	AGL HSE Manager and Wildlife Officer	Mott MacDonald	One month prior to construction
B1.3	Avoid or minimise loss/degradation of natural habitat during Project construction	AGL HSE Manager, Contractor HSE Manager & Environmental Officer, Wildlife Officer		During project construction
B1.4	Undertake pre-construction surveys and mitigation to minimise impacts on natural habitats and protected and threatened plants	Wildlife Officer	Batumi Botanic Gardens, Mott MacDonald	One month prior to construction
B1.5	Prepare and implement a habitat/soil removal and re-instatement plan (HRRP)	Contractor HSE Manager	Batumi Botanic Gardens	Preparation of HRRP before construction; Implementation during construction.
B1.6	Long-term monitoring of reinstated habitats and translocated plants	AGL HSE Manager, Wildlife Officer	Batumi Botanic Gardens, Mott MacDonald	Starts one year after construction; Continues annually for 10 years
B1.7	Prevent the spread of alien invasive species during construction of the Project	AGL HSE Manager, Contractor HSE Manager & Environmental Officer, Wildlife Officer		Monthly monitoring during project construction
B2.1	Implement forest creation scheme to offset for forest habitat loss caused by the Project	AGL HSE Manager, Wildlife Officer	Directorate of Environmental and Natural Resources of Adjara, the Forestry Agency of Adjara, and land owners	Planting 2013-2016 5 years of maintenance 10 years of monitoring
B2.2	Provide support for reforestation scheme to improve forest habitats in the Study Area	AGL HSE Manager, Wildlife Officer	Directorate of Environmental and Natural Resources of Adjara, the Forestry Agency of Adjara, and land owners	Planting 2013-2016 5 years of maintenance 10 years of monitoring

7.3 Action Plan for Rivers and Associated Species

7.3.1 Current Status

Rivers and streams are of high conservation value and are classified as 'natural' using the IFC criteria (IFC, 2012a). The rivers and streams in the Study Area provide habitat for a range of protected aquatic and amphibian species including the Eurasian otter, Black Sea salmon, brown trout, Colchic khramulya, European eel and Caucasian salamander (restricted-range species and 'vulnerable' on the IUCN Red List and on the Red List of Georgia). The invertebrate fauna of the rivers is thought to be diverse but no specific studies have been carried out to date.

7.3.2 Current Factors Affecting Rivers and Associated Species

The rivers are currently already alerted and impacted to some extent by untreated sewage discharges, pollution from agricultural areas, existing dams and weirs, as well as naturally high levels of sedimentation (Mott MacDonald 2012a, 2012b)

Caucasian salamander is listed as vulnerable on the IUCN red-list because its area of occupancy is less than 2,000 km², its distribution is severely fragmented and confined to small streams free of fish, and there is continuing decline in the extent and quality of its habitat in Turkey and Georgia. The destruction of forests (tree felling), use of brooks as roads for the transportation of cut trees, and destruction of habitats by cattle are known causes of population declines in Georgia (Kaya et al., 2009).

In the absence of mitigation and offsetting, the Project's impacts on river habitats are likely to be moderate and significant due to the reduction in river flows and the subsequent impacts on river species. The successful implementation of the actions below will ensure 'no net loss' on river habitat and associated species.

7.3.3 Current Actions

There are no specific conservation actions dealing with the river habitats and associated species in the Study Area. However, an EU funded project "Environmental Protection of International River Basins" is being implemented by Austrian company Human Dynamics in six Eastern European and South Caucasus countries: Belarus, Moldova, Ukraine, Georgia, Armenia and Azerbaijan. The overall objective of the project is to improve water quality in the transboundary river basins of the wider Black Sea region and Belarus. The project will be undertaken over 4 year period. There are two main project results expected:

(1) Increased capacity of the respective national authorities for hydro-biological, chemical and hydro-morphological monitoring of water quality incl. groundwater; quality assurance procedures in place in laboratories and,

(2) Increased technical capacities by means of development and implementation of River Basin Management Plans (RBMP) for selected river basins/sub-river basins, according to the requirements of the WFD.

To implement the above objectives five pilot projects have been selected within the river basins of the South Caucasus and Easter European regions for which RBMPs will be developed according to the EU Water Framework Directive. The Chorokhi-Adjaristsqali River basin has been selected as a pilot area in Georgia and will commence the first phase of the RBMP activity – a River Basin Analysis in 2012-2013.

7.3.4 Action Plan Objectives and Actions

Objective C1: Protect river habitat and associated species during construction and operation of the Project

Action C1.1: Inform construction staff on the importance of river habitats and associated species					
<p>Target: All construction and operation staff to be aware of the importance of river habitats and associated species within the Study Area Indicator: Number of staff and contractors reached through toolbox talks and training. Number of leaflets, office posters, wildlife photo competition etc.</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: Start of construction End: End of construction Frequency: During staff induction and continuous during construction</p>					

All construction staff will be informed about the importance of river habitats and the protected and threatened species they support. The Wildlife Officer will prepare and give this information as part of the staff inductions and will display relevant information and maps in the site offices.

Action C1.2: Avoid or minimise loss/degradation/pollution of river habitat during Project construction					
<p>Target: No degradation of river habitat owing to construction activities Indicator: Number of reported environmental incidents</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: Project design</p>					

End: End of construction
 Frequency: Design and continuous during construction

The original scheme design included dams and weirs on a number of tributaries of the Adjaristsqali River. Due to the higher sensitivity and conservation value of the habitats on these tributaries, the scheme has been modified and the locations of the dams and weirs have been changed to other locations which are less sensitive.

The following measures will be implemented to minimise adverse impacts during construction:

- Construction of the infrastructure will not occur during the migratory period of Black Sea salmon (between early April and early September);
- To reduce dust deposition in the watercourses, light water sprays will be implemented during construction;
- The locations for spoil deposits, quarrying areas, substations, hostel, bridges and other associated facilities will be selected to avoid adverse impacts on rivers; and
- Use sediment traps and pollution spill kits to control the release of pollutants and potentially contaminated sediments into water courses during construction.

Action C1.3: Install fish passes on the rivers affected by dams and weirs					
Target: Maintain natural migration of fish species during construction and operation					
Indicator: Evidence of fish pass installation					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: Project design					
End: End of construction					
Frequency: Design and during construction					

Fish passes will be introduced into the Chirukhistsqali, Chvanistsqali and Khichauridams and weirs and will be specifically designed to effectively entice fish into the appropriate channel. The design of the fish pass will allow for upstream passage of fish and also consider measures for the safe passage of fish downstream.

Action C1.4: Inform fish farmers about opening of dam gates
Target: No negative impact to fish farming downstream of dams
Indicator: Evidence of farmers being informed about opening of dam gates

Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: Prior to operation End: End of operation Frequency: Continuous during operation					

Fish farmers downstream of the dams will be informed of when the dam gates will be opened and the subsequent release of sediment, so that they can plan accordingly.

Action C1.5: Assess impacts of environmental flows based on data collection by river sections					
Target: Identify and implement specific measures to mitigate for the loss or degradation of river habitat as a result of the Project Indicator: Overall proportion of broad meso-habitat types before, during and after construction					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: 2012 End: 2013 Frequency: two assessments at different times during the two years to capture different flow conditions					

Typically, hydro-power schemes in Georgia have used an environmental flow of 10% of the mean annual flow. However, this rarely reflects the seasonal changes in hydrological conditions that are very important to the river geo-morphology and river biota.

As part of this Project, a two-tier approach has been used to assess environmental flows:

- Phase I - environmental flows were set at a level assumed to be 10% of the mean annual flow, in line with what has been used in the past for other schemes in Georgia; and
- Phase II - this uses a different method to identify impacts from changes in the flows. This method was implemented in 2012 and will be completed in 2013; it is strongly based on further data collection (see Action C1.6), which will identify sensitive sections of the affected rivers. This will allow determination of the hydrological conditions and ecological requirements of the river system, which is critical in reducing the potentially significant impacts of the Project on the river habitat and associated species.

Action C1.6: Implement monitoring of river habitat and biota during construction and operation					
<p>Target: Implementation of monitoring of river meso-habitat, otters, fish, Casucasian salamander and water flow, depth and quality to inform the environmental flows</p> <p>Indicator: Overall proportion of broad meso-habitat types before, during and after construction</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: Pre-construction</p> <p>End: 10 years after construction</p> <p>Frequency: Annually</p>					

Monitoring of river meso-habitat, fish and water flow, depth and quality is essential to inform the environmental flows (see Action C1.5). Monitoring of these features is also important to identify any significant change following construction and to establish appropriate remediation measures.

The monitoring for river meso-habitat, fish and hydrology started in 2012 and will continue annually for 10 years after the construction of Project. The monitoring may need to be extended after the 10 year period, should significant changes in the above features be detected due to the Project operation.

Monitoring of otters, macro-invertebrates and Caucasian salamander (threatened globally and in Georgia) will be also undertaken before and after construction for 10 years annually to identify any adverse impacts from the Project and the mitigation required.

AGL will employ one or several specialist consultants to undertake the above monitoring each year.

Action C1.7: Avoid construction activities during migration of priority fish species					
<p>Target: No negative impact on migrating fish populations during construction</p> <p>Indicator: State of fish populations affected by construction</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: Project design</p> <p>End: End of construction</p> <p>Frequency: Design and continuous during construction</p>					

No construction activities will be undertaken during the migration of Black Sea salmon and brown trout along the Adjaristsqali River. Spawning takes place between October and March, while upstream migration of Black Sea salmon occurs between April and October. The downstream migration of the brown trout is usually in April and May (Gamma, 2012). More accurate information on the fish migration periods and the sections of Adjaristsqali River supporting Black Sea salmon and trout will be obtained from Black Sea Monitoring Agency.

Objective C2: Provide support for the enhancement of river habitats, fisheries and awareness raising within the Study Area in the period 2013-2016

Action C2.1: Provide support for the preparation of a River Basin Management Plan for Adjaristsqali					
<p>Target: Financial and logistical support to ensure improved water quality and water resources management within the catchment</p> <p>Indicator: Pilot project implementation and development of River Basin Management Plan by 2016.</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: 2013</p> <p>End: 2016</p> <p>Frequency: Continuously during this period</p>					

AGL will discuss with stakeholders and will provide support for the preparation of the proposed pilot project for the development of a River Basin Management Plan (RBMP) for the Adjaristsqali. The overall goal of the RBMP will be to improve water quality and water resources management as well as data collection within the catchment.

Action C2.2: Raise awareness of the local communities on the importance of protected amphibian, fish and otter species					
<p>Target: Reduce threat to protected amphibian, fish and otter species by providing information, leaflets, posters and workshops</p> <p>Indicator: Numbers of fishermen and fish farmers taught sustainable practices and numbers of fishing facilities created on the new reservoirs.</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions

Start: 2013
 End: 2016
 Frequency: Continuous during this period

AGL will provide support to raise awareness of the local communities about the importance of conserving the threatened and endemic species of amphibian (Caucasian salamander), fish and otter, sustainable fish farming, avoidance of poison/electrofishing or dynamite, and preventing the spread of invasive species of fish.

AGL’s involvement can include support for the production and delivery of information, leaflets, posters, workshops in at least five villages in the Study Area.

Action C2.3: Provide support to fisheries and fishing in the Study Area					
<p>Target: Provide financial and logistical support to local fishing practices Indicators: Number of community members taught sustainable fishing practices. Number of community members using sustainable practices one month and four months later</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: 2013 End: 2016 Frequency: Continuous during this period</p>					

AGL will examine the possibility of providing financial and logistical support and technical advice to local fish farmers with regard to sustainable fish farming and capture fishing. Artificial reproduction of threatened and native species of fish can also be supported by AGL.

The new reservoirs will be populated with native fish and will include facilities for recreational fishing.

Action Plan for River Habitat and Associated Species – Summary of Actions

Action	Description	Responsible	Partnerships & Stakeholders	Timescale
C1.1	Inform construction staff on the importance of river habitats and associated species	Wildlife Officer	Mott MacDonald	During project construction
C1.2	Avoid or minimise loss/degradation/pollution of river habitat during Project construction	AGL HSE Manager, Contractor HSE Manager & Environmental Officer, Wildlife Officer		During project construction
C1.3	Install fish passes on the rivers affected by dams and weirs	AGL HSE Manager, Wildlife Officer		Before and during construction
C1.4	Inform fish farmers about opening of dam gates	AGL HSE Manager		During operation
C1.5	Assess impacts of environmental flows based on data collection by river sections	AGL HSE Manager, Wildlife Officer	Mott MacDonald	2012-2013
C1.6	Implement monitoring of river habitat and biota during construction and operation	AGL HSE Manager, Wildlife Officer	Black Sea Monitoring Agency, Mott MacDonald, Batumi University	Pre and during construction Monitoring annually for ten years after construction
C1.7	Avoid construction activities during migration of priority fish species	AGL HSE Manager		Before and during construction
C2.1	Provide support for the preparation of a River Basin Management Plan for Adjaristsqali	HSE Manager		2013-2016
C2.2	Raise awareness of the local communities on the importance of protected amphibian, fish and other species	Wildlife Officer	Local schools	2013-2016
C2.3	Provide support to fisheries and fishing in the Study Area	AGL HSE Manager	Fish farmers and fishermen	2013-2016

7.4 Action Plan for Protected and Threatened Terrestrial Mammal and Reptile Species

7.4.1 Current Status

The following protected and threatened terrestrial mammal species have been recorded or are likely to occur within the Study Area:

- All bat species, and in particular Mehely's horseshoe bat (*Rhinolophus mehelyi*), listed as 'vulnerable' on the IUCN Red List and the Red List of Georgia, and Mediterranean horseshoe bat (*Rhinolophus euryale*), listed as 'vulnerable' on the Red List of Georgia;
- Long-clawed mole vole (*Prometheomys schaposchnikowi*) - 'vulnerable' on the Red List of Georgia;
- Red-backed vole (*Myodes glareolus ponticus*) (formerly *Clethrionomys glareolus ponticus*) - 'endangered' on the Red List of Georgia;
- Grey dwarf hamster (*Cricetulus migratorius*) - 'vulnerable' on the Red List of Georgia;
- Brown bear (*Ursus arctos*) - 'endangered' on the Red List of Georgia;
- Eurasian lynx (*Lynx lynx*) - 'critically endangered' on the Red List of Georgia; and
- Caucasian squirrel (*Sciurus anomalus*) - 'vulnerable' on the Red List of Georgia.

Only three bat species are protected in Georgia (of which Mehely's horseshoe bat and Mediterranean horseshoe bat occur within the Study Area). However, all bat species are protected in Europe under The Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1982) and the EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (1992).

One protected and threatened reptile species is thought to occur in the Study Area but there are no confirmed records:

- Caucasus viper (*Vipera kaznakovi*) – restricted-range species and 'endangered' on the IUCN Red List and on the Red List of Georgia.

7.4.2 Current Factors affecting the Protected and Threatened Mammals and Reptiles

The protected terrestrial mammals listed above are affected by forest habitat loss, degradation and fragmentation, which are caused by illegal tree felling and developments.

Given the traditional shepherd lifestyle of many rural people, large carnivores such as brown bear, Eurasian lynx and grey wolf are perceived as threats to people and livestock. Brown bear attacks on domestic sheep, the destruction of beehives and raids on agricultural crops and fruit orchards are all major sources of conflict with humans. There is also a strong hunting culture in Georgia and the large mammals are threatened as a result of this.

Caucasus viper is threatened by illegal overcollection for the international pet trade and habitat conversion for urban development, tourism and agriculture (Tuniyev et al., 2009e).

7.4.3 Current Actions in Georgia

Fauna and Flora International (FFI) has worked on the conservation of carnivores in Georgia since 2004 (www.fauna-flora.org). FFI and the Centre for Biodiversity Conservation and Research (NACRES) are working on the Georgian Carnivore Conservation Project (EU funded) and are addressing the threats on

carnivorous mammals by improving law enforcement, biological monitoring and raising awareness. FFI and NACRES have worked with shepherds to improve stock protection and to mitigate the loss of livestock to wild predators. Nevertheless, the main focus of the FFI project is the conservation of the semi-arid landscape in the south-east of Georgia, which is in a totally different part of Georgia to the Adjaristsqali Hydropower Project.

Most of the species listed in Section 7.4.1 above have been recorded in the protected areas adjacent to the Study Area (especially Mtirala National Park and Kintrishi Nature Reserve) and other protected areas in Georgia. Populations of these species are therefore afforded a certain level of protection in these areas. Nevertheless, with the exception of large carnivores, there are no specific conservation actions for the other species outside the protected areas.

7.4.4 Action Plan Objectives and Actions

Objective D1: Protect terrestrial mammals and reptiles during construction of the Project

Action D1.1: Ensure construction staff are aware of the importance of protected mammals and reptiles, and the national legislation					
<p>Target: All construction and operation staff to be aware of the importance of wild and threatened mammals and reptiles in the Study Area Indicator: Provision of information through staff induction, toolbox talks, leaflets, office posters, wildlife photo competition</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: Start of construction End: End of construction Frequency: During staff induction, continuously through leaflets and posters</p>					

This will involve raising awareness amongst construction staff on the conservation importance of protected mammals and reptiles, and the national legislation protecting them, including the fines that are imposed on those who violate the law. Appropriate information will be given to all staff as part of their site induction and illustrated leaflets will be displayed in site offices.

Action D1.2: Minimise the time excavations are left open and provide protection	
<p>Target: No wild mammal or reptile injuries/deaths owing to excavations Indicator: Number of wild mammals and reptiles injured or dead owing to excavations in the Study</p>	

Area, as reported in the contractor's environmental audit report					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: Project design End: End of construction Frequency: Continuous during construction					

The time excavations and trenches are left open will be minimised to avoid mammals and reptiles being entrapped and injured. Protection of deep excavations will be provided overnight or when not actively worked.

Action D1.3: Minimise habitat loss/damage and off-road vehicle movement					
Target: Construction and vehicle movement will be avoided in sensitive habitats and key areas for priority species Indicator: Area and condition of sensitive habitat					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: Project design End: End of construction Frequency: Design stage and continuous during construction					

The land take for permanent and temporary project structures and the need to clear vegetation will be minimised (see Action B1.3 for more details). Vehicle movements within Project area will be strictly monitored and controlled and drivers will be required to follow designated routes only.

Action D1.4: Active control of hunting and poaching ban					
Target: No hunting or poaching by AGL or Contractor staff in the Project area and surroundings during construction and operation Indicator: Reported incidents of staff violating the hunting ban to Wildlife Officer					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional

		actions
Start: Start of construction End: End of operation Frequency: Continuous		

All construction and operation staff will be required to follow company rules and code of conduct. To ensure the national legislation prohibiting hunting and poaching of protected species is not breached; additional measures will be implemented to protect the mammals and reptiles within the Project area and surroundings. All staff of construction and service organizations will be under an obligation not to undertake poaching or hunting throughout the whole area of the development.

A key responsibility of the Wildlife Officer shall be enforcement of the hunting ban and raising awareness about the conservation importance of mammals and the national law protecting them (see Action D1.1). Any member of staff (AGL or Contractor) found in violation of the hunting ban will be subject to company disciplinary action, in addition to the fine under the national law.

Action D1.5: Minimise noise and artificial lighting at night during construction					
Target: No disturbance to bat species through noise or light pollution Indicator: Evidence of provisions for minimising light and noise practices during construction					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: Project design End: End of construction Frequency: Continuous during construction					

Avoiding or minimising the artificial lighting at night is particularly important for bats. Any artificial lighting required should be pointed downwards to minimise light spill.

Best practice noise reduction measures will be implemented during construction and these will include:

- Avoidance of unnecessary revving of engines and switch off equipment when not required;
- Vehicles and equipment will be properly maintained to meet the manufacturers' noise rating levels. Any silencers or bearings which become defective would be replaced as soon as possible;
- Using reverse warning systems incorporating broadband noise where practicable;
- Using enclosures for noisy plant such as pumps or generators;
- Minimising drop height of materials;
- Limiting the use of particularly noisy plant or vehicles where practicable; and
- Plant and vehicles will be operated with noise control hoods closed.

Action D1.6: Undertake pre-construction surveys for bats					
<p>Target: Targeted bat surveys to identify bat activity and roost locations, and inform mitigation measures for the same</p> <p>Indicator: Report on bat activity and roost locations including recommendations for mitigation (should it be required) to be issued to AGL within 4 weeks of each site visit</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: Five months before start of construction</p> <p>End: One month prior to start of construction</p> <p>Frequency: Complete at least one month before start of construction (surveys May-September)</p>					

The mature trees to be felled as part of the Project will be subjected to pre-construction bat surveys, which may include inspection from the ground or by climbing, and activity surveys (emergence/re-entry) undertaken at dusk and dawn. Bat activity surveys can only be undertaken between May and September, but inspection of the trees for bat roosts can happen any time of the year.

Similar inspections and/or activity surveys for bats will be undertaken for any rock crevices and caves which are likely to be affected by tunnelling or building of the dams.

Should any bat roosts be found in areas to be affected by construction, then mitigation measures will be agreed with the Directorate of Environmental and Natural Resources of Adjara. The mitigation may require the removal of the bats by a qualified ecologist and the installation of artificial roosting facilities for bats.

Objective D2: Provide offsetting and enhancement for the protected mammal and reptile populations in the Study Area

Action D2.1: Install 100 bat boxes in each scheme					
<p>Target: Provide financial/logistical support for the installation of 100 bat boxes in each scheme</p> <p>Indicator: Evidence of installation of bat boxes</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: 2013</p>					

End: Installation 2014, monitoring until 2017
 Frequency: Continuous during this period

To offset for the loss of suitable roosting sites for bats, AGL will provide financial/logistical support to a specialist consultancy to install 100 bat boxes in each scheme. The boxes will be monitored and maintained by the same organisation for five years.

Action D2.2: Support existing research projects and conservation programmes					
<p>Target: Provide financial and/or logistical support for new or existing conservation projects or initiatives Indicator: Number of conservation or research projects supported by AGL in the Study Area</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: 2014 End: 2017 Frequency: Continuous during this period</p>					

Owing to the high conservation importance of threatened mammals and reptiles and their continuous decline, further research is necessary to understand their distribution and ecology in the Study Area.

Consultation will be carried out with FFI, Batumi University, NACRES and other relevant organisations to determine areas of support for further research and conservation programmes. This could include providing financial and/or logistical support for existing or new conservation projects or initiatives.

AGL will consider providing funding for one student fellowship or research project which will focus on the ecology, distribution, conservation status, breeding, and population size of one or several from the following species which are protected, threatened or restricted-range: brown bear, European lynx, red-backed vole, Caucasus squirrel and Caucasus viper. The research project will involve the use of camera traps (and live traps for small mammals) to collect reliable information. The camera and live traps will be installed and checked by the specialists undertaking the monitoring.

Small carnivores and other mid-size mammals will be captured in large, folding live traps, which will be baited with fish or meat bait. Rodents will be collected using folding Sherman live traps near their burrows or at expected foraging areas and will be baited with peanut butter and bread. Trapped animals will be identified, aged and sexed (where possible) and then released at the point of their capture. In order to avoid exposure of trapped animals to extremes of temperature and to minimise the risk of predation and human interference, all traps will be set as near to dusk as is practicable and checked the following morning as close to dawn as possible.

The surveys methods for reptiles will involve visual observations of diurnal species and recording their tracks, dropping and remains; hand searches, night time torch surveys (when/where possible), fall traps. In parallel with recording direct observations and field signs of reptiles present on each site, the survey methodology will involve the use of artificial refugia. These methods will allow the collection of more objective information on the distribution and abundance of the reptile species in the study area. Plywood boards measuring approximately 0.5m x 0.5 m would be placed in suitable habitat along a transect around each reservoir site. Boards will be no closer than 50 m from the nearest board and 30 boards will be used on each transect. Each board will be numbered and GPS co-ordinates recorded. Boards will be checked five times each year (four years in total) in May-June and any missing boards replaced. The observer will record the species and number of individuals. The surveys will involve using a variety of methods including visual surveys of diurnal species and recording their tracks, dropping and remains; hand searches, night time torch surveys (when/where possible), fall traps. they observed under the boards.

The results of the monitoring will be analysed each year to identify trends in the populations of mammals and reptiles.

Action D2.3: Raise awareness in the local communities on the importance of protected mammals and reptiles and the relevant national law					
<p>Target: Local communities to be aware of the importance of wild and threatened mammals and reptiles in the Study Area and the relevant wildlife laws</p> <p>Indicator: Provision of information through school activities, workshops, videos, posters and leaflets</p>					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
<p>Start: 2013</p> <p>End: 2016</p> <p>Frequency: Continuous</p>					

Raising awareness of the local population on the importance of protected and threatened mammal and reptile species will be undertaken through ecology activities in schools (including field trips), workshops, videos, posters and leaflets. AGL will provide financial and/or logistical support to some of these activities.

Action Plan for Protected and Threatened Mammal and Reptile Species – Summary of Actions

Actions	Description	Responsible	Partnerships & Stakeholders	Timescale
D1.1	Ensure construction staff are aware of the importance of protected mammals and reptiles and the national legislation	Wildlife Officer	-	During project construction
D1.2	Minimise the time excavations are left open and provide protection	AGL HSE Manager, Contractor HSE Manager Wildlife Officer	-	Before and during project construction
D1.3	Minimise habitat loss/damage and off-road vehicle movement	AGL HSE Manager, Contractor HSE Manager & Environmental Officer, Wildlife Officer	-	Before and during project construction
D1.4	Active control of hunting and poaching ban	Wildlife Officer	-	During project construction and operation
D1.5	Minimise noise and artificial lighting at night during construction	Contractor HSE Manager & Environmental Officer, Wildlife Officer	-	Before and during project construction
D1.6	Undertake pre-construction surveys for bats	Wildlife Officer	Mott MacDonald	At least one month before project construction
D2.1	Install 100 bat boxes in each scheme	Wildlife Officer		Installation 2013-2014 Monitoring for five years
D2.2	Support existing research projects and conservation programmes	AGL HSE Manager, Wildlife Officer	Batumi University, FFI, NACRES	2014-2017
D2.3	Raise awareness in the local communities on the importance of protected mammals and the relevant national law	Wildlife Officer	Local schools, FFI	2013-2016

7.5 Action Plan for Protected and Threatened Bird Species

7.5.1 Current Status

The following species of global and/or national conservation importance are present in the Study Area:

Resident

- Eastern imperial eagle – ‘vulnerable’ on the IUCN Red List;
- Greater spotted eagle – ‘vulnerable’ on the IUCN Red List;
- Boreal owl – ‘vulnerable’ on the Red List of Georgia;
- Caucasian grouse - ‘vulnerable’ on the Red List of Georgia;
- Golden eagle - ‘vulnerable’ on the Red List of Georgia;
- Griffon vulture - ‘vulnerable’ on the Red List of Georgia; and
- Long-legged buzzard - ‘vulnerable’ on the Red List of Georgia.

Breeding

- Eurasian stone-curlew - ‘vulnerable’ on the Red List of Georgia; and
- Common rosefinch - ‘vulnerable’ on the Red List of Georgia.

Breeding/Passage Migrant

- Black stork - ‘vulnerable’ on the Red List of Georgia; and
- White stork - ‘vulnerable’ on the Red List of Georgia.

Passage Migrant

- Levant sparrowhawk - ‘vulnerable’ on the Red List of Georgia;
- European honey buzzard (*Pernis apivorus*);
- Steppe buzzard (*Buteo buteo vulpinus*);
- Black kite (*Milvus migrans*);
- Eurasian sparrowhawk (*Accipiter nisus*);
- Levant sparrowhawk (*Accipiter brevipes*) – ‘vulnerable’ on the Red List of Georgia;
- Montagu’s harrier (*Circus pygargus*);
- Pallid harrier (*Circus macrourus*);
- Lesser spotted eagle (*Aquila pomarina*);
- Greater spotted eagle (*Aquila clanga*) – ‘vulnerable’ on the Red List of Georgia; and
- Booted eagle (*Hieraaetus pennatus syn. Aquila pennata*).

7.5.2 Current Factors Affecting the Birds of Conservation Concern in the Study Area

The factors affecting the raptor species include hunting, habitat loss/degradation, fragmentation and climate change.

Wildfowl species are affected by hunting, degradation and decrease of the areas of wetland habitats, water abstraction and pollution of the freshwater.

7.5.3 Current Actions

There have been surveys and monitoring programmes for the raptor species on the Black Sea coast (Batumi area and Chorokhi Delta) but it is understood that there have been few concrete conservation actions for these species in the Study Area.

7.5.4 Action Plan Objectives and Actions

Objective E1: Protect bird species during construction

Action E1.1: Schedule construction outside sensitive periods for key species					
Target: Construction will be avoided in the sensitive periods for priority species Indicator: Number of non-compliance events reported to the Wildlife Officer					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: Project design End: End of construction Frequency: Design stage and during specified months for breeding birds					

Vegetation clearance and/or construction in nesting areas for priority bird species (see Section 7.5.1) will be undertaken outside the breeding season where possible. All project construction sites will be surveyed prior to vegetation clearance if activities are taking place within the breeding season to identify whether priority breeding bird species are present. The priority bird species known to breed within the two Project schemes and their breeding seasons are presented in Table 7.2 below. Consultation with PSOVI will be undertaken regarding the specific locations where these species are known or likely to breed. It may be also possible to specify a narrower breeding season for certain species, which will mean that restrictions to construction activities only apply to short periods and at specific locations. The Wildlife Officer will ensure construction staff are aware of these restrictions.

Bird migration surveys have been undertaken in autumn 2012 and spring 2013. The western part of the Study Area (Chorokhi-Adjaristsqali confluence) has been identified as being more sensitive as birds fly in large numbers at relatively lower altitudes (Mott MacDonald, 2013). However, no construction activities will take place in this area. Most birds fly above 60 m in the areas of the Koromokheti and Shuakhevi Schemes and the Project is unlikely to affect migratory birds. However, when the electricity transmission line project is progressed, mitigation will be required to reduce the risk of migratory birds colliding or being electrocuted by the power line.

Table 7.2: Estimated breeding season for IUCN and Georgian Red List threatened bird species recorded in the Study Area

Species/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Eastern Imperial Eagle												
Long-legged Buzzard												
Common Rosefinch												

Species/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Greater Spotted Eagle				Red	Red	Red	Red	Red				
Lesser Kestrel				Red	Red	Red	Red	Red				
Boreal Owl		Red	Red	Red	Red	Red	Red	Red	Red			
Caucasian Grouse				Red	Red	Red	Red	Red	Red	Red	Red	
Golden Eagle			Red	Red	Red	Red	Red	Red	Red			

Action E1.2: Implement noise reduction measures to reduce impacts on breeding or migrating birds during construction

Target: Measures to reduce noise levels and artificial lighting to be implemented during construction
Indicator: Number of non-compliance events as reported to the Wildlife Officer

Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
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Start: Design and start of construction
 End: End of construction
 Frequency: During design and construction and the specified months for breeding and migrating birds

The following measures will be implemented by the Contractors and monitored by AGL & OE on construction sites:

- Avoidance of unnecessary revving of engines and switch off equipment when not required;
- Vehicles and equipment will be properly maintained to meet the manufacturers’ noise rating levels. Any silencers or bearings which become defective would be replaced as soon as possible;
- Using reverse warning systems incorporating broadband noise where practicable;
- Using enclosures for noisy plant such as pumps or generators;
- Minimising drop height of materials;
- Limiting the use of particularly noisy plant or vehicles where practicable; and
- Plant and vehicles will be operated with noise control hoods closed.

Action E1.3: Implement ban on bird hunting and raise awareness

Target: No bird hunting by AGL or Contractor staff within the Study Area during construction and operation
Indicator: Reported incidents of staff violating the hunting ban to the Wildlife Officer

Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: Start of construction End: End of operation Frequency: Continuous					

All construction and operation staff will be required to follow company rules and code of conduct. The Wildlife Officer will be responsible of implementation of this action. Any staff member breaching the bird and mammal hunting ban will be subject to disciplinary action by AGL.

Objective E2: Provide compensation and increase understanding of priority bird species in the Study Area

Action E2.1: Provide artificial nesting opportunities for priority bird species					
Target: 100 bird boxes to be installed in each of the schemes by 2016 Indicator: Evidence of bird boxes installed					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: 2013 End: Installation by 2014 and monitoring until 2019 Frequency: Continuous					

Approximately 5 ha of forest habitat, which is highly suitable habitat for nesting birds, will be lost under the Project. Compensatory forest planting will be undertaken, as explained under Action B2.1. In addition, to compensate for this loss of habitat for breeding birds, bird boxes will be installed.

One hundred bird boxes will be installed on trees in each of the two Project schemes. AGL will provide financial/logistical support to a specialist consultancy to install the bird boxes. The boxes will be monitored and maintained by the same organisation for five years. A suitable NGO will be appointed to ensure that appropriate sites and specifications for bird boxes are identified.

Action E2.2: Provide support to academic organisation or NGO to undertake monitoring of priority bird species in the Study Area					
Target: Annual surveys at a minimum of 6 monitoring sites between 2014 and 2018					

Indicator: Report on conservation status, threats and required actions within 4 weeks after each site visit					
Mitigation hierarchy:	Avoid	Reduce	Remedy	Offset	Additional actions
Start: 2014 End: Monitoring until 2018 Frequency: Annually					

This action will focus on the resident and breeding bird species listed in Section 7.5.1 as little is known about these species in the Study Area. Surveys so far have mainly focused on migratory raptor species given the importance of the Batumi bottleneck.

Surveys for breeding birds will be undertaken using the methodology published by the British Trust of Ornithology (BTO). Transects of 500 m each or point counts will be surveyed during the breeding period for each species as specified under Action E1.1.

Action Plan for Protected and Threatened Bird Species – Summary of Actions

Actions	Description	Responsible	Partnerships & Stakeholders	Timescale
E1.1	Schedule construction outside sensitive periods for key species	AGL HSE Manager, Contractor HSE Manager, Wildlife Officer	PSOVI	Before and during project construction during breeding periods
E1.2	Implement noise reduction measures to reduce impacts on breeding or migrating birds during construction	AGL HSE Manager, Contractor HSE Manager & Environmental Officer, Wildlife Officer	-	Before and during project construction, in particular during breeding periods
E1.3	Implement ban on bird hunting and raise awareness	Wildlife Officer	-	During project construction and operation
E2.1	Provide artificial nesting opportunities for priority bird species	AGL HSE Manager, Wildlife Officer	PSOVI	Installation 2013-2014; Monitoring for five years
E2.2	Provide support to academic organisation or NGO to undertake monitoring of priority bird species in the Study Area	AGL HSE Manager, Wildlife Officer	Batumi University, FFI, NACRES	2013-2016

8. BAP Implementation, Monitoring and Reporting

8.1 Mitigation Ranking

IFC PS6 requires verification that the mitigation hierarchy has been applied, and that as much effort as possible is given to avoidance, and that offsets are measurable and only employed as a last resort where residual impacts are unavoidable. The elements of the mitigation hierarchy can be defined as follows (BBOP):

- *Avoid*: measures taken to avoid creating adverse impacts from the outset, such as the sensitive spatial or temporal placement of elements of infrastructure, in order to completely avoid impacts on certain components of biodiversity.
- *Reduce*: measures taken to reduce or minimise the duration, intensity and / or extent of impacts (including direct, indirect and cumulative impacts, as appropriate) that cannot be completely avoided, as far as is practically feasible.
- *Remedy*: measures taken to rehabilitate degraded ecosystems or restore/reinstate cleared ecosystems following exposure to impacts that cannot be completely avoided and/ or reduced/minimised.
- *Offset*: measures taken to compensate (offset) any residual significant, adverse impacts that cannot be avoided, reduced and / or rehabilitated or restored, in order to achieve no net loss or a net gain of biodiversity. Offsets can take the form of positive management interventions such as restoration of degraded habitat, arrested degradation or averted risk, and protecting areas where there is imminent or projected loss of biodiversity.

In accordance with the mitigation hierarchy, the mitigation measures detailed in Chapter 7 have been classified as Avoid, Reduce, Remedy and Offset as shown in Table 8.1. Arranging the measures in this manner is intended to assist in the planning of project activities by prioritising the order in which the measures should be considered.

In addition to the measures defined by the mitigation hierarchy, the BAP also includes a number of actions which can be classified as enhancements in that they create additional biodiversity value on the ground and actions that do not directly lead to value creation, but rather indirectly may have a positive effect on the area, e.g. education of local communities or research. These enhancement actions are called 'Additional Conservation Actions' (ACAs). The successful implementation of the ACAs by AGL is likely to exceed the 'no net loss of biodiversity' goal stated in Section 2.1. The full implementation of the Adjaristsqali Hydropower BAP will probably achieve 'net biodiversity gain' on the Project but this positive impact cannot be quantified (at least at this stage) as most of the ACA involve further biodiversity monitoring and awareness raising of local communities.

Table 8.1: Adjaristsqali Hydropower BAP actions in relation to the mitigation hierarchy

BAP actions (see Chapter 7 for details)		Avoid	Reduce	Remedy	Offset	Additional Conservation Actions
Action Plan for Forest Habitat and Notable Plant Species						
B1.1	Raise staff awareness	X	X			
B1.2	Prepare habitat maps	X	X	X		
B1.3	Avoid loss of natural habitat	X	X			
B1.4	Pre-construction surveys	X	X			
B1.5	HRRP	X	X	X		
B1.6	Long-term monitoring			X		X
B1.7	Control alien invasive species	X	X			

BAP actions (see Chapter 7 for details)		Avoid	Reduce	Remedy	Offset	Additional Conservation Actions
B2.1	Forest creation scheme				X	X
B2.2	Support reforestation scheme					X
Action Plan for Rivers and Associated Species						
C1.1	Raise staff awareness	X	X			
C1.2	Avoid loss of river habitat	X	X			
C1.3	Fish pass installation			X		
C1.4	Dam gate information	X	X			
C1.5	Adjust environmental flows			X		
C1.6	Monitor river habitat			X		
C1.7	Avoid fish migration period	X	X			
C2.1	River Basin Management Plan					X
C2.2	Raise community awareness					X
C2.3	Support local fisheries					X
Action Plan for Protected and Threatened Terrestrial Mammals and Reptiles						
D1.1	Raise staff awareness	X	X			
D1.2	Reduce open excavations	X	X			
D1.3	Habitat damage avoidance	X	X			
D1.4	Hunting/poaching ban	X				
D1.5	Noise/light reduction	X	X			
D1.6	Pre-construction bat surveys	X	X			
D2.1	Bat box installation				X	X
D2.2	Support research projects					X
D2.3	Raise community awareness					X
Action Plan for Protected and Threatened Birds						
E1.1	Avoid sensitive periods	X				
E1.2	Noise reduction measures	X	X			
E1.3	Bird hunting ban	X				
E2.1	Bird box installation				X	X
E2.2	Support bird monitoring				X	X

8.2 Implementation of the Adjaristsqali BAP

The summary tables in Section 7 present what actions will be implemented, when this will happen and who is responsible for the implementation. Additional information on the implementation and coordination of the BAP is provided in this section.

Before the start of construction, AGL will employ a Wildlife Officer who will have most of the responsibilities for implementing the BAP and the associated ecological mitigation and monitoring measures as outlined in the Adjaristsqali Hydropower ESMP and CEMP.

The Wildlife Officer will have the overall responsibility to ensure an effective implementation of the protection and enhancement of biodiversity during construction of the Project. The responsibilities of the Wildlife Officer include but are not limited to:

- To inform, explain and where necessary enforce the biodiversity legislation, policies and lender requirements associated with the Project.
- To enforce the ban on all hunting across the Project area, raise awareness of the importance of the ban across all employees.
- To undertake patrols across the Project area and oversee and provide guidance on activities which may affect the biodiversity features within the Project area.
- To undertake and arrange for the clear demarcation and signage which may prohibit entry to ecologically sensitive areas.
- To provide advice to contractors regarding the ecological sensitivities within the Project area, and if necessary supervise contractors to ensure that they adhere to environmental requirements to avoid or minimise disturbance to habitats, flora and fauna.
- To ensure the implementation of best practice guidelines on the prevention and management of alien invasive species.
- To develop working relations with local community groups, land-owners, land-managers and business interests by maintaining close liaison with local individuals and communities.
- To provide advice to AGL and Project staff, as necessary, in relation to the conservation and management of wildlife areas.

Apart from the Wildlife Officer, AGL will have a number of other persons responsible for the implementation of the BAP and the measures in the ESMP and CEMP. The roles and responsibilities within AGL and Contractors are detailed in the Adjaristsqali CEMP (Mott MacDonald, 2012c). The following roles will be or have already been created within AGL for the duration of construction:

- AGL HSE Manager (head office)
- OE Environmental Manager (head office)
- AGL Environmental Officers (on site)

Contractors will be required to have their own HSE Manager and Environmental Officers to work in conjunction with the AGL environmental staff to ensure the BAP is implemented, along with all the other environmental mitigation measures.

8.3 Monitoring, Evaluation and Reporting

8.3.1 Overview

Key to a successful BAP is the continuous monitoring of its actions and evaluation of their effectiveness in meeting the BAP conservation objectives. These monitoring activities need to be undertaken during construction and post construction. This section deals with the monitoring and evaluation of the BAP actions. A draft Biodiversity Monitoring and Evaluation Programme (BMEP) for the long-term monitoring of habitat change in the Adjaristsqali River Basin is included in Chapter 9.

8.3.2 Monitoring during Construction

For the construction phase the monitoring activities will include:

- Daily monitoring of construction areas for general disturbance of habitats and fauna through encroachment, noise and extent of working area;
- Monthly audit of construction areas to monitor temporary working area size, number and extent of temporary access routes, construction vehicle use of specified access routes, levels of noise and light disturbance;

- Weekly monitoring of hunting activities across the project areas during construction. The Wildlife Officer will check with the site manager, environmental officer and environmental engineer whether they are aware of breaches of the hunting ban, and will carry out random checks in the field.
- Monitoring of vegetation for endangered species and breeding birds, burrowing mammals, reptiles and amphibians one day before vegetation clearance;
- Bi-weekly checks of any open excavations to release any entrapped animals; and
- Monthly monitoring of the presence and extent of invasive species on the Project sites.

Most of the monitoring activities above will be undertaken by the Wildlife Officer, but the AGL and Contractor environmental officers and environmental engineers based on site will also have monitoring responsibilities (see Section 8.2 and the summary tables in Section 7).

8.3.3 Post-construction Monitoring

The BAP includes a 10 year post-construction monitoring programme of the following features: water quality/depth and flow, otters, fish and reinstated or created habitat.

Additional monitoring will be to check for evidence of bird collision and electrocution following the construction of the new power lines. This monitoring will be undertaken by a local group such as the Batumi Raptor Count and will happen monthly for one year. Any remediation actions will be discussed and agreed with this organisation.

8.3.4 Reporting

The reporting requirements during construction are detailed in the Adjaristsqali Hydropower CEMP (Mott MacDonald, 2012c). In summary, the Contractors will have internal reporting responsibilities, which will include reporting the daily site inspections in the site diary; using the inspection checklist to report weekly site inspections; and prepare monthly HSE reports to AGL.

AGL will be responsible for the following reporting HSE requirements: non-compliance incidents, corrective actions, HSE training, weekly inspection reports and checklists, and three monthly audits. AGL will also report externally on the compliance with the ecological mitigation and the BAP implementation to the financing parties and regulatory bodies.

Annual post-construction monitoring reports and reports on the BAP implementation will be prepared and made available to regulatory bodies, financing parties, research institutes and nature conservation NGOs. If evidence suggests a decline in the ecological conditions relating to the construction and operational activities of the Project then intervention and further measures will be defined and implemented.

9. Draft Biodiversity Monitoring and Evaluation Programme

9.1 Aim and Objectives

As mentioned in Section 5.3, the Project is unlikely to have any significant residual adverse impacts on the trigger features of critical habitat and therefore no biodiversity offsets are required. Nevertheless, IFC PS6 requires that for projects located in critical habitat (irrespective of impacts), a Biodiversity Monitoring and Evaluation Programme (BMEP) is prepared and integrated into the client's management programme (IFC, 2012a).

The BMEP outlined in this section will be further developed in consultation with external biodiversity experts and stakeholders. This BMEP represents an extension of Action B1.2 in the BAP (Section 7.2.4) to cover the whole of the Study Area rather than Project sites only. The BMEP will be fully integrated into the Project's ESMP.

The implementation of the BMEP will be initially for a period of 13 years, from 2013 until 2026. AGL will sponsor the preparation of the BMEP and will initiate its implementation, at which stage the implementation will be transferred to a suitable external organisation based in Adjara (referred to as the BMEP leading organisation).

The aim of this BMEP is to monitor the nature, extent, quality and spacial configuration of the habitats in the Adjaristsqali River Basin (ARB) in relation to Project impacts and human activities. After consultation with specialists, climate change can be added as another factor during the development of this BMEP. Given that there is no similar monitoring in the ARB, this BMEP will demonstrate leading practice for both the private and public sectors in Adjara and Georgia. The preparation and implementation of the BMEP will prove AGL's commitment to go beyond compliance given that the monitoring will be undertaken for the whole of the ARB, which is much larger than the Project's area of influence.

It is well recognised that habitat loss, destruction and fragmentation are the main cause of biodiversity loss worldwide. This is also valid for Georgia, where these threats to habitats and biodiversity are caused by development projects and overexploitation, including illegal tree felling. Given that the nature, extent and spacial configuration of the habitats reflect the level of biodiversity they support, the proposed monitoring in this BMEP will provide a rapid and cost-effective way of detecting any significant changes in the biodiversity of the Study Area. It is impossible to measure all biodiversity aspects on a site. Any monitoring programme should focus on key biodiversity elements and source of threats for these elements. This BMEP will focus on monitoring trends rather than measuring biodiversity values (World Bank, 1998). To distinguish between Project-related impacts and changes caused by human activities, a number of socio-economic factors will be also included in this monitoring.

The objectives of this BMEP are to:

- Prepare a baseline habitat map for the Adjaristsqali River Basin;
- Undertake long-term monitoring to detect any significant changes in the nature, extent, quality and spacial configuration of the habitats;
- Analyse data and identify the reasons for any significant changes in consultation with specialists, local communities and other stakeholders; and
- Develop and implement measures to mitigate for any significant changes, in consultation with specialists, local communities and other stakeholders.

9.2 Monitoring Indicators

Biodiversity monitoring indicators need to be realistic, practical, simple, sensitive to anthropogenic impacts, dynamic (responsive to ongoing changes), meaningful, and cost-effective to monitor (World Bank, 1998; EBI, 2009). The monitoring as part of this BMEP will be undertaken at several levels: regional/landscape, community/ecosystem, species/population and socio-economic.

9.2.1 Regional/Landscape Level

- Change in the extent of each type of natural habitat
- Change in the spatial arrangement of habitats (habitat horizontal structure or patterns)

The nature and spatial arrangement of habitats and plant communities (vegetation patterns or vegetation horizontal structure) are important as they influence many ecological processes, such as the movement of matter and energy and the spread and extent of disturbance. The term 'landscape structure' is used to describe the composition and spatial configuration of vegetation patches within an area. Landscape structure is quantified by the means of landscape indices (metrics) e.g. patch richness, patch density, edge density, patch shape complexity, patch connectivity and fragmentation (Turner et al., 2001).

As there is a close relationship between landscape structure and biodiversity, landscape structure indices can be used to assess/predict biodiversity at ecosystem and species levels (Innes and Koch, 1998; Coroi et al., 2006). In addition, landscape structure influences the factors and processes (e.g. competition, dispersal ability and environmental conditions) that determine plant diversity and distribution.

9.2.2 Community/Ecosystem Level

The only indicator to be monitored at this level will be the change in habitat quality or health. Monitoring methodology is provided below.

9.2.3 Species/Population Level

It is difficult to establish monitoring indicators at this level given that reliable and accurate baseline studies on the species distribution, population size and demographics do not exist for the Study Area. In consultation with biodiversity experts, indicators at this level may be included in the final version of this BMEP. If this is the case, the focus should be on undertaking population studies on large carnivores, reptiles and amphibians, as the area is known to support a number of protected and threatened species, in particular brown bear, European lynx, Caucasus viper and Caucasian salamander.

9.2.4 Socio-Economic Factors

The actual socio-economic indicators will be developed following consultation with local communities, biodiversity and social specialists and other stakeholders. One important category of socio-economic indicators that will be included in the BMEP will be the utilisation of provisioning ecosystem services by local communities.

Examples of specific indicators to be considered are:

- Change in the human population in the Study Area;
- Change in the proportion of income derived from provisioning ecosystem services;
- Change in the number of people depending on provisioning ecosystem services;
- Change in the total amount of medicinal plants and wild food harvested;

- Change in the volume of timber extracted – official data to be obtained from the Forestry Agency of Adjara but data on illegal tree felling will be also needed; and
- Changes in the number of confirmed instances of hunting.

9.3 Monitoring Methodology

9.3.1 Interpretation of Satellite Imagery and Habitat Classification

The initial step will be to visually inspect the different spatial datasets to note any areas of cloud cover, colour distortion, image distortion. An uncompressed image format is preferred to minimise distortion caused by the compression procedures. Following this inspection some initial processing may be required such clipping imagery to the study area, mosaic production and histogram adjustments for display optimisation. During this inspection an understanding of the area and changes in land cover will also be gained.

Before performing the image classification sample areas of different habitat types must be digitised to provide a training dataset of typical spectral characteristics for the land cover classes that appear in the image. This will be achieved through visual inspection of the image in combination with review of other supporting datasets as mentioned above.

The training dataset and image files are processed using maximum likelihood supervised classification method. In short this process analyses the pixel spectral response from all image input bands and assess the most likely class that it would belong to based on the training dataset class statistics.

A visual inspection of the classification will be carried out and compared to the original image dataset and other supporting information (aerial photographs, field surveys photographs etc.) and a decision on the acceptability of the result made. If acceptable the neighbourhood cleansing process will be carried to remove any spurious miss-classified pixels.

Available independent field data, or local knowledge not used during the classification process will be used to verify the accuracy of the classification results.

The final classification dataset will then be exported to a vector feature class to allow for further analysis related to assessment of areas of habitat type within sub project areas or for an assessment of potential impacts from planned development etc.

These habitat and land cover layers can also be loaded onto a field GIS unit with integrated GPS enabling use in the field to either further verify the classification results or to target further in-situ surveys, or provide information to engineers on the ground.

9.3.2 Habitat Ground Truthing

Ground truthing will be undertaken by selecting a number of sample points along transects across the area. Transects will be selected to cross as many land-use/habitat types as possible, including watercourse and wetlands (transects to go across the surface water gradient). Sample points will be mainly established in homogeneous areas of habitat, although information on the ecotones (i.e. transitional areas) will be also recorded.

Habitat type will be recorded in the field using a simple habitat classification that most people can use. Based on the preliminary habitat classification undertaken by Mott MacDonald for some parts of the Study Area, these are the broad habitat types known to occur there:

- Bracken;
- Broadleaved Woodland;
- Coniferous Woodland;
- Mixed Woodland;
- Lakes/Ponds;
- River and riverbed;
- Rock Outcrops;
- Alpine grassland;
- Semi Natural Grassland;
- Eroded/Bare Land;
- Cultivated Land
- Buildings; and
- Roads.

9.3.3 Habitat Quality

The monitoring of habitat quality will need to be undertaken by specialists as this requires some botanical skills. At the very least the dominant plant species will be recorded at each sample site, along with species listed on the IUCN, Georgia and Adjara red lists, and endemic species (see Section 6.2.2.1 and Manvelidze et al., 2009). Any non-native and invasive species will be also recorded. The relative abundance of the plant species and the substrate will be recorded in each area. Relative abundance, for example using the DAFOR scale (D=dominant, A=abundant, F=frequent, O=occasional, R=rare), is less time consuming than recording the percentage cover.

Plant species will be identified in the field or subsequently using detailed photographs or samples collected in the field. Accurate measurements of plant species richness or calculation of diversity indices within the Study Area are not considered necessary for the purpose of this BMEP or the BAP.

The following habitat condition (health or quality) information will be recorded on standard recording forms (to be developed) for each monitoring site:

- Habitat boundaries and extent: habitat types and their boundaries will be confirmed or defined in the field using the preliminary habitat classification prepared by interpretation of satellite imagery. The actual habitat areas will be calculated in GIS after field surveys;
- Habitat structure: e.g. water depth and width, bank height and slope, vegetation cover and height, vegetation layers in woodland, percentage of bare soil or open water;
- Vegetation: record dominant plant species in each habitat;
- Protected, threatened, endemic, rare and other notable species: presence or potential presence and relative abundance (DAFOR);
- Non-native invasive species and undesirable native species: species name and relative abundance (DAFOR) to be recorded;
- Environmental disturbance: e.g. artificial barriers, pollution, overgrazing, timber extraction, trampling, drainage, burning, fishing; and
- Management recommendations: e.g. reducing grazing level, reducing fishing pressure, invasive species control.

9.3.4 Monitoring of populations size for threatened species of mammals and reptiles

Reliable and accurate baseline information does not exist in the Study Area and therefore the monitoring methodology is not included here at this stage. Given the difficulty of sighting the threatened mammals in the wild, secondary indicators such as field signs will have to be used. Additionally, camera traps and live traps (for small mammals) should be considered in the monitoring (see Action D2.2 for details).

For reptiles, the use of artificial refugia is highly recommended as this method will collect more objective data on the population size, demographics and species distribution.

9.3.5 Monitoring of Socio-economic Factors

This monitoring methodology will be developed together with socio-economic and biodiversity specialists. The following methods will be considered: market surveys and observations in local villages, community workshops and Ecosystem Services Review (Hanson et al., 2012).

9.4 Monitoring Timescale and Reporting

New high-resolution satellite imagery will be obtained every three years and will be interpreted to produce a habitat classification and map. AGL will obtain the new satellite imagery in 2014 and will sponsor the preparation of the baseline habitat classification/map and analysis. After this, the BMEP leading organisation will obtain the satellite imagery and will repeat the habitat classification every three years.

The field ground truthing for habitats and monitoring of habitat condition, along with the socio-economic and ecosystem services surveys will start in 2014 and will be repeated every three years (the same year with the satellite imagery) until 2026.

One interim report will be prepared every three years to include all sets of data, analysis, conclusions and recommendations for management interventions. A final report including a more detailed analysis of trends will be prepared in 2026.

AGL will sponsor the fieldwork, data analysis and report preparation in 2014, after which this will be the responsibility of the BMEP leading organisation.

9.5 Evaluation

This monitoring will be periodically evaluated to determine its effectiveness and meeting of the objectives, and identify any necessary remediation.

The findings of the above monitoring programme will be evaluated every six years and the outcomes will be used to adapt the management and ongoing mitigation measures. The evaluation will be undertaken by a panel of specialists from academic institutions and NGOs in Adjara.

Management interventions will need to be identified when there is a negative trend in the areas of natural habitat and/or the connectivity of the habitats. The threshold for interventions will be when the area of any natural habitat has decreased by more than 5%. The outcome of the evaluation and any management interventions required will be fed to the relevant managers and land owners.

9.6 Dissemination

This BMEP will contribute directly and significantly to the achievement of the following strategic goal in the National Biodiversity Strategy and Action Plan (NBSAP) for Georgia (2005):

- To develop a biodiversity monitoring system and an active and integrated biodiversity database to ensure sustainable use and conservation of biological resources (see Section 3.1.3 for details).

The habitat and GIS database will be provided to the regional and national monitoring systems when these will be in place. The following local government agencies are likely to be interested in the data and outcomes from this monitoring:

- Directorate of Environmental and Natural Resources of Adjara;
- Autonomous Republic of Adjara Ministry of Agriculture; and
- Forestry Agency of Adjara and counterparts within each municipality.

Local authorities in the Khulo, Shuakhevi and Keda municipalities will use this information in planning. In addition, the habitat information and GIS database will provide the starting point for many research projects to be undertaken by academic institutions and NGOs in the Adjaristsqali River Basin.

9.7 Resources

AGL and their external advisors will prepare the BMEP and will start implementation in the first four years (one year after end of construction for the Project). It is intended that after that, the implementation of the BMEP will be sustained with local capacity and resources.

Involvement of the local communities is an important aspect of the BMEP because a) the plan will be more sustainable if communities are involved; b) local communities have useful information on the relationships between threats and effects; and c) stakeholder involvement can contribute to the development of a sense of ownership of the resource management regime and responsibility for biodiversity health (World Bank, 1998).

Staff resources required to implement this plan will be assessed at the completion of the BMEP but are likely to include:

- Habitat ground truthing and quality assessment: 4 ecologists – total of 28 person days every three years;
- Analysis of habitat field data and reporting: 2 ecologists – total of 20 days every three years;
- Socio-economic and ecosystem services surveys: 2 social scientists – total of 20 person days;
- Analysis of socio-economic and ecosystem services data and reporting: 1 social scientist – total of 8 person days every three years; and
- GIS analysis (interpretation of satellite imagery, habitat classification, calculation of landscape areas and landscape indices): one specialist – total of 7 days every three years.

The equipment needed to implement this plan includes:

- Fieldwork equipment: cameras, GPS, binoculars; and
- One computer with ArcGIS and Spatial Analyst software.

A financial estimation will be carried out when this BMEP is fully developed. The items to cover here will include: staff cost for fieldwork, data analysis (including GIS) and reporting, cost of equipment (or hire) including maintenance, software licence, satellite imagery purchase, training and capacity building.

9.8 Training and Capacity Building

AGL will sponsor the provision of initial training to the leading BMEP organisation on:

- Interpretation of satellite imagery and other remote sensing and prepare habitat classification and maps;
- Calculation and interpretation of landscape indices;
- Field ground truthing for habitats, habitat condition monitoring and monitoring at the species/population level; and
- Socio-economic surveys and ecosystem services surveys and assessments.

Mott MacDonald, the International Environmental Consultant of AGL, can provide this training.

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Appendices

Appendix A. Baseline Species Data _____	114
Appendix B. Consultation with Stakeholders and Experts _____	124

Appendix A. Baseline Species Data

A.1. Bird Data

Bird species recorded in the Study Area and Chorokhi Delta

IOU Scientific Name	IOU English Name	Georgia Red List	IUCN Red List	CMS*	AEWA [^]	EU Birds Directive (Annex 1)	Chorokhi Delta	Western Part of Study Area	Koromkheti Scheme	Shuakhevi Scheme	Proposed Transmission Line Corridor
<i>Accipiter brevipes</i>	Levant Sparrowhawk	VU	LC	X		X		X	X		X
<i>Aegolius funereus</i>	Boreal Owl	VU	LC	X		X				X	
<i>Aquila chrysaetos</i>	Golden Eagle	VU	LC	X		X				X	X
<i>Aquila clanga</i>	Greater Spotted Eagle	VU	VU	X		X		X	X		X
<i>Aquila heliaca</i>	Eastern Imperial Eagle	VU	VU	X		X		X	X		X
<i>Burhinus oedicephalus</i>	Eurasian Stone-curlew	VU	LC	X		X	X				
<i>Buteo rufinus</i>	Long-legged Buzzard	VU	LC	X		X		X	X		X
<i>Carpodacus erythrinus</i>	Common Rosefinch	VU	LC						X	X	
<i>Ciconia ciconia</i>	White Stork	VU	LC	X	X	X					X
<i>Ciconia nigra</i>	Black Stork	VU	LC	X	X	X	X				X
<i>Falco naumanni</i>	Lesser Kestrel	CR	LC	X		X		X	X		X
<i>Falco vespertinus</i>	Red-footed Falcon	EN	NT	X		X	X	X	X		
<i>Gyps fulvus</i>	Griffon Vulture	VU	LC	X		X					X
<i>Tetrao mlokosiewiczi</i>	Caucasian Grouse	VU	NT							X	
<i>Neophron percnopterus</i>	Egyptian Vulture	VU	EN	X		X		X	X		
<i>Pelecanus crispus</i>	Dalmatian Pelican	EN	VU	X	X	X	X	X			
<i>Podiceps grisegena</i>	Red-necked Grebe	VU	LC		X		X				
<i>Tadorna ferruginea</i>	Ruddy Shelduck	VU	LC	X	X	X		X			
<i>Puffinus yelkouan</i>	Yelkouan Shearwater		VU				X				
<i>Aythya nyroca</i>	Ferruginous Duck		NT	X	X	X	X				
<i>Circus macrourus</i>	Pallid Harrier		NT	X		X	X	X	X		X
<i>Ficedula semitorquata</i>	Semicollared Flycatcher		NT			X		X	X	X	
<i>Gallinago media</i>	Great Snipe		NT	X	X	X	X				
<i>Sitta krueperi</i>	Krüper's Nuthatch		NT					X	X	X	
<i>Accipiter gentilis</i>	Northern Goshawk		LC	X				X	X	X	
<i>Accipiter nisus</i>	Eurasian Sparrowhawk		LC	X			X	X	X		X
<i>Acrocephalus arundinaceus</i>	Great Reed Warbler		LC				X				
<i>Acrocephalus dumetorum</i>	Blyth's Reed Warbler		LC			X	X				
<i>Acrocephalus melanopogon</i>	Moustached Warbler		LC				X				

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<i>Acrocephalus scirpaceus</i>	Eurasian Reed Warbler		LC				X				
<i>Actitis hypoleucos</i>	Common Sandpiper		LC				X	X	X	X	
<i>Aegithalos caudatus</i>	Long-tailed Tit		LC					X	X	X	
<i>Alauda arvensis</i>	Eurasian Skylark		LC			X		X	X		X
<i>Alcedo atthis</i>	Common Kingfisher		LC				X				
<i>Anas acuta</i>	Northern Pintail		LC	X	X		X				
<i>Anas clypeata</i>	Northern Shoveler		LC	X	X		X				
<i>Anas crecca</i>	Eurasian Teal		LC	X	X		X				
<i>Anas penelope</i>	Eurasian Wigeon		LC	X	X		X		X	X	
<i>Anas platyrhynchos</i>	Mallard		LC	X	X		X		X	X	
<i>Anas querquedula</i>	Garganey		LC	X	X		X				
<i>Anas strepera</i>	Gadwall		LC	X	X		X		X	X	
<i>Anser albifrons</i>	Greater White-fronted Goose		LC	X	X		X				
<i>Anser anser</i>	Greylag Goose		LC	X	X		X	X		X	
<i>Anser fabalis</i>	Taiga Bean Goose		LC	X	X	X		X	X	X	
<i>Anthus campestris</i>	Tawny Pipit		LC				X	X	X		X
<i>Anthus cervinus</i>	Red-throated Pipit		LC				X				X
<i>Anthus pratensis</i>	Meadow Pipit		LC					X	X		
<i>Anthus richardi</i>	Richard's Pipit		LC				X				
<i>Anthus spinoletta</i>	Water Pipit		LC							X	X
<i>Anthus trivialis</i>	Tree Pipit		LC					X	X	X	X
<i>Apus apus</i>	Common Swift		LC					X	X	X	X
<i>Aquila nipalensis</i>	Steppe Eagle		LC	X		X		X	X		X
<i>Aquila pomarina</i>	Lesser Spotted Eagle		LC	X				X	X		X
<i>Ardea alba</i>	Great Egret		LC				X			X	
<i>Ardea cinerea</i>	Grey Heron		LC		X	X	X				
<i>Ardea purpurea</i>	Purple Heron		LC		X	X	X		X	X	
<i>Ardeola ralloides</i>	Squacco Heron		LC		X		X	X	X	X	
<i>Asio otus</i>	Long-eared Owl		LC	X				X	X	X	
<i>Aythya ferina</i>	Common Pochard		LC	X	X		X				
<i>Aythya fuligula</i>	Tufted Duck		LC	X	X	X	X				
<i>Botaurus stellaris</i>	Eurasian Bittern		LC		X	X	X				
<i>Bubo bubo</i>	Eurasian Eagle-Owl		LC							X	
<i>Bubulcus ibis</i>	Western Cattle Egret		LC		X			X		X	
<i>Buteo buteo</i>	Common/Steppe Buzzard		LC	X		X		X	X	X	X
<i>Calandrella brachydactyla</i>	Greater Short-toed Lark		LC				X				
<i>Calidris alba</i>	Sanderling		LC	X	X		X				

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<i>Calidris alpina</i>	Dunlin		LC	X	X		X				
<i>Calidris ferruginea</i>	Curlew Sandpiper		LC	X	X		X				
<i>Calidris minuta</i>	Little Stint		LC	X	X		X				
<i>Carduelis cannabina</i>	Common Linnet		LC					X	X	X	X
<i>Carduelis carduelis</i>	European Goldfinch		LC					X	X	X	X
<i>Carduelis spinus</i>	Eurasian Siskin		LC						X	X	
<i>Certhia brachydactyla</i>	Short-toed Treecreeper		LC					X	X	X	
<i>Certhia familiaris</i>	Eurasian Treecreeper		LC					X	X	X	
<i>Cettia cetti</i>	Cetti's Warbler		LC					X	X		
<i>Charadrius dubius</i>	Little Ringed Plover		LC	X	X			X	X		
<i>Charadrius hiaticula</i>	Common Ringed Plover		LC	X	X		X				
<i>Chlidonias hybrida</i>	Whiskered Tern		LC		X		X				
<i>Chlidonias leucopterus</i>	White-winged Tern		LC	X	X		X				
<i>Chloris chloris</i>	European Greenfinch		LC					X	X	X	X
<i>Chroicocephalus genei</i>	Slender-billed Gull		LC		X		X				
<i>Chroicocephalus ridibundus</i>	Black-headed Gull		LC		X		X	X	X		
<i>Cinclus cinclus</i>	White-throated Dipper		LC			X		X	X	X	
<i>Circaetus gallicus</i>	Short-toed Snake Eagle		LC	X		X		X	X		X
<i>Circus aeruginosus</i>	Western Marsh Harrier		LC	X		X	X	X	X		X
<i>Circus cyaneus</i>	Hen Harrier		LC	X		X		X	X		
<i>Circus pygargus</i>	Montagu's Harrier		LC	X			X	X	X		X
<i>Coccothraustes coccothraustes</i>	Hawfinch		LC					X	X	X	
<i>Coloeus monedula</i>	Western Jackdaw		LC								X
<i>Columba livia</i>	Rock Dove		LC					X	X	X	
<i>Columba oenas</i>	Stock Dove		LC					X	X	X	X
<i>Columba palumbus</i>	Common Wood Pigeon		LC					X	X	X	X
<i>Corvus corax</i>	Northern Raven		LC					X	X	X	X
<i>Corvus cornix</i>	Hooded Crow		LC					X	X	X	X
<i>Corvus frugilegus</i>	Rook		LC					X	X	X	
<i>Coturnix coturnix</i>	Common Quail		LC			X		X	X	X	
<i>Crex crex</i>	Corn Crane		LC	X	X			X	X		
<i>Cuculus canorus</i>	Common Cuckoo		LC					X	X	X	X
<i>Cyanistes caeruleus</i>	Eurasian Blue Tit		LC			X		X	X	X	X
<i>Cygnus cygnus</i>	Whooper Swan		LC	X	X		X				
<i>Cygnus olor</i>	Mute Swan		LC	X	X		X				

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<i>Delichon urbicum</i>	Common House Martin		LC			X		X	X	X	X
<i>Dendrocopos leucotos</i>	White-backed Woodpecker		LC					X		X	
<i>Dendrocopos major</i>	Great Spotted Woodpecker		LC			X		X	X	X	
<i>Dendrocopos medius</i>	Middle Spotted Woodpecker		LC					X	X	X	
<i>Dendrocopos minor</i>	Lesser Spotted Woodpecker		LC			X		X	X	X	
<i>Dryocopus martius</i>	Black Woodpecker		LC			X			X	X	
<i>Egretta garzetta</i>	Little Egret		LC		X		X				
<i>Emberiza calandra</i>	Corn Bunting		LC					X	X		X
<i>Emberiza cia</i>	Rock Bunting		LC						X	X	
<i>Erithacus rubecula</i>	European Robin		LC			X		X	X	X	
<i>Falco columbarius</i>	Merlin		LC	X		X	X	X	X		
<i>Falco peregrinus brookei</i>	Peregrine Falcon		LC				X	X	X		X
<i>Falco subbuteo</i>	Eurasian Hobby		LC	X				X	X		X
<i>Falco tinnunculus</i>	Common Kestrel		LC	X		X	X	X	X		
<i>Ficedula albicollis</i>	Collared Flycatcher		LC			X		X	X		
<i>Ficedula parva</i>	Red-breasted Flycatcher		LC					X	X		
<i>Fringilla coelebs</i>	Common Chaffinch		LC					X	X	X	X
<i>Fulica atra</i>	Eurasian Coot		LC		X		X				
<i>Gallinago gallinago</i>	Common Snipe		LC	X	X		X	X	X		
<i>Garrulus glandarius</i>	Eurasian Jay		LC			X		X	X	X	X
<i>Gavia arctica</i>	Black-throated Loon		LC		X	X	X				
<i>Gelochelidon nilotica</i>	Gull-billed Tern		LC		X	X	X				
<i>Hieraaetus pennatus</i>	Booted Eagle		LC	X				X	X		X
<i>Hirundo rustica</i>	Barn Swallow		LC					X	X	X	X
<i>Iduna caligata</i>	Booted Warbler		LC				X				
<i>Iduna pallida</i>	Eastern Olivaceous Warbler		LC			X	X				
<i>Ixobrychus minutus</i>	Little Bittern		LC		X		X				
<i>Jynx torquilla</i>	Eurasian Wryneck		LC			X			X		
<i>Lanius collurio</i>	Red-backed Shrike		LC			X	X	X	X	X	
<i>Lanius minor</i>	Lesser Grey Shrike		LC				X	X	X	X	
<i>Larus cachinnans</i>	Caspian Gull		LC		X		X	X	X	X	
<i>Larus fuscus heuglini</i>	Lesser Black-backed Gull		LC		X		X				
<i>Larus michahellis</i>	Yellow-legged Gull		LC		X		X				X
<i>Limicola falcinellus</i>	Broad-billed Sandpiper		LC	X	X		X				

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<i>Loxia curvirostra</i>	Red Crossbill		LC			X			X	X	X
<i>Lullula arborea</i>	Woodlark		LC					X	X	X	X
<i>Luscinia luscinia</i>	Thrush Nightingale		LC					X	X	X	
<i>Luscinia megarhynchos</i>	Common Nightingale		LC			X		X	X	X	
<i>Luscinia svecica</i>	Bluethroat		LC			X		X	X	X	
<i>Melanocorypha calandra</i>	Calandra Lark		LC				X				X
<i>Mergellus albellus</i>	Smew		LC		X		X				
<i>Merops apiaster</i>	European Bee-eater		LC	X		X		X	X	X	X
<i>Milvus migrans</i>	Black Kite		LC	X				X	X		X
<i>Monticola saxatilis</i>	Common Rock Thrush		LC							X	
<i>Monticola solitarius</i>	Blue Rock Thrush		LC							X	
<i>Motacilla alba</i>	White Wagtail		LC					X	X	X	X
<i>Motacilla cinerea</i>	Grey Wagtail		LC					X	X	X	X
<i>Motacilla citreola</i>	Citrine Wagtail		LC				X				
<i>Motacilla flava</i>	Western Yellow Wagtail		LC				X	X	X	X	X
<i>Muscicapa striata</i>	Spotted Flycatcher		LC				X	X	X	X	
<i>Netta rufina</i>	Red-crested Pochard		LC	X	X		X				
<i>Nucifraga caryocatactes</i>	Spotted Nutcracker		LC			X			X		
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron		LC		X			X			
<i>Oenanthe deserti</i>	Desert Wheatear		LC				X				
<i>Oenanthe hispanica melanoleuca</i>	Black-eared Wheatear		LC				X				
<i>Oenanthe isabellina</i>	Isabelline Wheatear		LC				X				
<i>Oenanthe oenanthe</i>	Northern Wheatear		LC				X	X	X	X	
<i>Oriolus oriolus</i>	Eurasian Golden Oriole		LC					X	X		X
<i>Otus scops</i>	Eurasian Scops Owl		LC	X		X		X	X		
<i>Pandion haliaetus</i>	Western Osprey		LC	X			X	X	X		X
<i>Parus major</i>	Great Tit		LC					X	X	X	X
<i>Passer domesticus</i>	House Sparrow		LC					X	X		
<i>Passer montanus</i>	Eurasian Tree Sparrow		LC								X
<i>Pastor roseus</i>	Rosy Starling		LC				X				
<i>Periparus ater</i>	Coal Tit		LC			X		X	X	X	X
<i>Pernis apivorus</i>	European Honey Buzzard		LC	X			X	X	X		X
<i>Phalacrocorax carbo</i>	Great Cormorant		LC		X		X				
<i>Phoenicurus ochruros</i>	Black Redstart		LC								X
<i>Phoenicurus</i>	Common Redstart		LC					X	X	X	

IOU Scientific Name	IOU English Name	Georgia Red List	IUCN Red List	CMS*	AEWA [^]	EU Birds Directive (Annex 1)	Chorokhi Delta	Western Part of Study Area	Koromkheti Scheme	Shuakhevi Scheme	Proposed Transmission Line Corridor
<i>phoenicurus</i>											
<i>Phylloscopus collybita</i>	Common Chiffchaff		LC								X
<i>Phylloscopus sindianus lorenzii</i>	Mountain Chiffchaff		LC					X	X	X	
<i>Phylloscopus trochilus</i>	Willow Warbler		LC					X	X	X	
<i>Pica pica</i>	Eurasian Magpie		LC								X
<i>Picus viridis</i>	European Green Woodpecker		LC			X		X	X	X	
<i>Pluvialis apricaria</i>	European Golden Plover		LC	X	X		X				
<i>Pluvialis squatarola</i>	Grey Plover		LC	X	X	X	X				
<i>Podiceps auritus</i>	Horned Grebe		LC	X	X				X		
<i>Podiceps cristatus</i>	Great Crested Grebe		LC		X		X				
<i>Podiceps nigricollis</i>	Black-necked Grebe		LC		X	X	X				
<i>Porphyrio porphyrio</i>	Purple Swamphen		LC			X	X				
<i>Porzana parva</i>	Little Crake		LC		X	X	X				
<i>Porzana porzana</i>	Spotted Crake		LC	X	X	X		X	X		
<i>Porzana pusilla</i>	Baillon's Crake		LC		X		X				
<i>Prunella modularis</i>	Dunnock		LC					X	X	X	
<i>Ptyonoprogne rupestris</i>	Eurasian Crag Martin		LC					X	X	X	X
<i>Pyrrhula pyrrhula</i>	Eurasian Bullfinch		LC						X	X	
<i>Regulus ignicapilla</i>	Common Firecrest		LC					X	X	X	
<i>Regulus regulus</i>	Goldcrest		LC					X	X	X	X
<i>Riparia riparia</i>	Sand Martin		LC					X	X	X	X
<i>Saxicola rubetra</i>	Whinchat		LC				X	X	X	X	X
<i>Scolopax rusticola</i>	Eurasian Woodcock		LC		X			X	X	X	
<i>Serinus pusillus</i>	Red-fronted Serin		LC							X	X
<i>Sitta europaea</i>	Eurasian Nuthatch		LC					X	X	X	
<i>Stercorarius parasiticus</i>	Parasitic Jaeger		LC			X	X				
<i>Sterna hirundo</i>	Common Tern		LC		X		X				
<i>Streptopelia turtur</i>	European Turtle Dove		LC				X				
<i>Strix aluco</i>	Tawny Owl		LC					X	X	X	
<i>Sturnus vulgaris</i>	Common Starling		LC					X	X	X	
<i>Sylvia atricapilla</i>	Eurasian Blackcap		LC					X	X	X	
<i>Sylvia communis</i>	Common Whitethroat		LC					X	X	X	
<i>Sylvia curruca</i>	Lesser Whitethroat		LC			X		X	X	X	
<i>Sylvia nisoria</i>	Barred Warbler		LC				X	X	X	X	
<i>Tachybaptus ruficollis</i>	Little Grebe		LC		X		X				
<i>Tadorna tadorna</i>	Common Shelduck		LC	X	X	X			X	X	
<i>Thalasseus sandvicensis</i>	Sandwich Tern		LC		X	X	X				

IOU Scientific Name	IOU English Name	Georgia Red List	IUCN Red List	CMS*	AEWA [^]	EU Birds Directive (Annex 1)	Chorokhi Delta	Western Part of Study Area	Koromkheti Scheme	Shuakhevi Scheme	Proposed Transmission Line Corridor
<i>Tringa glareola</i>	Wood Sandpiper		LC	X	X		X				
<i>Tringa ochropus</i>	Green Sandpiper		LC	X	X		X	X	X		
<i>Tringa totanus</i>	Common Redshank		LC	X	X		X				
<i>Troglodytes troglodytes</i>	Eurasian Wren		LC					X	X	X	
<i>Turdus iliacus</i>	Redwing		LC					X	X	X	
<i>Turdus merula</i>	Common Blackbird		LC					X	X	X	X
<i>Turdus philomelos</i>	Song Thrush		LC					X	X	X	
<i>Turdus pilaris</i>	Fieldfare		LC					X	X		
<i>Turdus torquatus</i>	Ring Ouzel		LC							X	
<i>Turdus viscivorus</i>	Mistle Thrush		LC					X	X	X	X
<i>Upupa epops</i>	Eurasian Hoopoe		LC					X	X	X	
<i>Vanellus vanellus</i>	Northern Lapwing		LC	X	X	X					X
<i>Xenus cinereus</i>	Terek Sandpiper		LC		X		X				
<i>Larus armenicus</i>	Armenian Gull		NE	X	X			X			
<i>Phylloscopus nitidus</i>	Green Warbler		NE			X		X	X	X	
<i>Saxicola maurus/rubicola</i>	Siberian/European Stonechat		NE/LC			X	X	X	X	X	X

* Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention).

[^] The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (also known as AEWA or African-Eurasian Waterbird Agreement)

Most abundant species observed during bird migration surveys for Adjaristsqali Electricity Transmission Line in Autumn 2012 and Spring 2013

Note: The western section (between Chorokhi-Adjaristsqali confluence) and eastern section (east of Goderdzi pass) of the electricity transmission line are outside the Study Area. The data presented in the table below is relevant to the entire length of the transmission line, including the areas outside the Study Area.

Species	Total numbers recorded in Spring 2013	Total numbers recorded in Autumn 2012
Honey buzzard	7384	413
Steppe buzzard	3046	32488
Medium raptor	2641	
Buzzard sp.	2241	16
Bee-eater	1557	312
Black kite	797	1523
Unidentified raptor	433	

Raven	200	96
Yellow legged/caspian gull	128	
Sparrowhawk sp.	88	42
Hooded crow	82	108
Sparrowhawk	82	37
Lesser spotted eagle	75	197
Booted eagle	72	125
Levant sparrowhawk	61	50
Aquila sp.	39	
Common buzzard	38	
Short toed eagle	34	60
Montagu's harrier	32	
Marsh harrier	30	342
Jackdaw	27	
Kestrel	23	
Montagu/pallid harrier	23	
Long legged buzzard	22	
Gull sp.	18	
Montagu/pallid/hen harrier	17	34
Lesser spotted/greater/steppe eagle	15	268
Black stork	10	69
Swallow	-	65
Swallow sp	-	567
White wagtail	-	91
Wood pigeon	-	46

A.2. Fish Data

Fish species recorded in the Adjaristsqali River and its and tributaries during the 2011 surveys (Gamma, 2012).

Taxonomic group	Environmental group	Skhalta	Khikhanistskali	Chirukhistkali	Chvanistskali & Adjaristskali confluence	Ghorjomistskali & Adjaristskali confluence	Adjaristskali Makhuntseti	Adjaristskali Tega bridge	Adjaristskali and Chorokhi confluence	Machakhlistsqali	Akavreta	Chirukhistkali	Information source
<i>Alburnoides fasciatus</i>	F.L.	X	X	X	X	X	X	X	X	X	X	X	ch
<i>Alburnus derugini</i>	F.L.								X				i
<i>Anguilla anguilla</i>	Pas.								X				i
<i>Capoeta sieboldii</i>	F.R.			X			X		X	X		X	i
<i>Capoeta tinca</i>	F.R.	X	X		X		X		X	X		X	ch
<i>Chondrostoma colchicum</i>	F.L.			X	X		X		X	X		X	ch

Taxonomic group	Environmental group	Skhalta	Khikhanistskali	Chirukhistskali	Chvanistskali & Adjaristskali confluence	Ghorjomistskali & Adjaristskali confluence	Adjaristskali Makhuntseti	Adjaristskali Tega bridge	Adjaristskali and Chorokhi confluence	Machakhistsqali	Akavreta	Chirukhistskali	Information source
<i>Cobitis satunini</i>	F.L.			X					X				i
<i>Gobio gobio lepidolaemus n. caucasicus</i>	F.R.	X	X	X	X	X	X	X	X	X	X	X	ch
<i>Luciobarbus escherichii</i>	F.R.	X	X	X	X	X	X	X	X	X	X	X	ch
<i>Nemacheilus angorae</i>	F.L.	X	X	X	X	X	X	X	X	X	X	X	i
<i>Phoxinus colchicus</i>	F.L.	X		X		X		X	X		X	X	ch
<i>Ponticola constructor</i>	F.R.			X	X		X		X			X	i
<i>Rhodeus colchicus</i>	F.L.				X	X	X	X	X	X		X	ch
<i>Rutilus rutilus</i>	F.L.	X	X	X	X	X	X	X	X	X	X	X	ch
<i>Salmo labrax</i>										X			i
<i>Salmo trutta</i>	F.R.	Trib.	Trib.		X					X	X	X	ch
<i>Squalius cephalus orientalis</i>	F.R.			X	X		X		X			X	ch

F.L. = freshwater limnophilic, F.R.=freshwater reophilic, pas. = passing, ✓ =present, I =interview with local fishermen; ch = control fishing; fm =flow measurements

* Classified in the 2012 surveys as the resident form *Salmo labrax fario* (black sea trout) of the black sea salmon

** Anadromous form Black sea salmon (*Salmo labrax pallas*).

Fish species recorded in the Adjaristsqali River and its and tributaries (Shuakhevi Scheme only) during the 2012 surveys (Black Sea Monitoring Agency)

Taxonomic group	Environmental group	Adjaristsqali	Uchkotskali (near Diakonibzeebi)	Ghorjamistskali	Skhalta	Un-named tributary of the Skhalta	Chirukistsqali	Uchambistsqali (>800m altitude)	Heva (tributary of the Chivanistsqali)
<i>Alburnoides bipunctatus fasciatus</i>							X		
<i>Barbus mursa</i>	Mursa	X							
<i>Capoeta sieboldii</i>	Colchic khramulya	F.R.	X						
<i>Capoeta tinca</i>	Anatolian khramulya	F.R.	X						
<i>Chondrostoma colchicum</i>	Colchic nase	F.L.	X						
<i>Cobitis satunini</i>	Satunini loach	F.L.	X		X	X			
<i>Gobio lepidolaemus caucasica</i>	Gudeon	F.R.	X						
<i>Luciobarbus (Barbus) escherichii</i>		F.R.	X	X	X	X	X		

Taxonomic group		Environmental group	Adjaristsqali	Uchkotskali (near Diakonibzeebi)	Ghorjamistskali	Skhalta	Un-named tributary of the Skhalta	Chirukistsqali	Uchambistsqali (>800m altitude)	Heva (tributary of the Chivanistsqali)
<i>Nemacheilus angorae</i>	Angora loach	F.L.	X			X				
<i>Rutilus rutilus</i>	Roach	F.L.	X			X				
<i>Salmo labrax fario</i>	Black Sea trout								X	X
<i>Squalius cephalus</i>	Chub	F.R.	X							

F.L. = freshwater limnophilic; F.R.= freshwater reophilic; Pas. = passing

Appendix B. Consultation with Stakeholders and Experts

B.1. Biodiversity Action Plan Workshop

Biodiversity Action Plan Workshop (Batumi, 14th September 2012)

Present

Organisation	Name	Position
Adjaristsqali Georgia LLC	Ms. Nino Diasamidze (ND)	Community Liaison Officer
	Mr. Jeff Terry (JT)	Health, Safety & Environmental Director
Mott MacDonald	Dr. Mihai Coroi (MC)	Principal Ecologist
	Ms. Zoë Trent (ZT)	Senior Ecologist
Batumi Raptor Count	Mr. Johannes Jansen (JJ)	
	Mr. Wolter Vansteelant (WV)	Secretary
	Mr. Stijn Baeten (SB)	International intern
Ministry of Agriculture	Ms. Nargiz Bezhanidze (NB)	Assistant to Minister
	Mr. Jondo Jakeli (JJa)	Head of Agro development Division
Ministry of Economy (Department of urban development)	Mr. Nugzar Dzneladze (NDz)	Head of Urban Development Department
Directorate of Environmental Protection of Adjara	Mr. Nugzar Papunidze (NP)	
	Ms. Izolda Abuladze (IA)	
Forestry Agency	Mr. Ruslan Davitadze (RD)	Head of Forestry Monitoring Division
Batumi Botanical Gardens	Dr. Nino Memiadze (NM)	Botanist
Association of Adjara Sustainable Development	Dr. Zurab Manvelidze (ZM)	Botanist and nature conservation expert
Black Sea Monitoring Agency	Mr. Rezo Goradze (RG)	Ichthyologist
	Mr. David Bagrationi (DB)	Ichthyologist

Minutes of meeting

Item	Text	Action on
1	<p>Nino presented the scheme in Georgian</p> <p>She explained that the 3rd scheme may not go ahead as it may not be economical and also it is recognised that there are greater environmental impacts. RG said he would be happy if the 3rd scheme did not go ahead.</p> <p>Questions were asked on:</p> <p>The effect of the scheme on groundwater;</p> <p>The area of land take;</p> <p>The size of the reservoirs;</p> <p>Whether the micro-climate would be affected and whether there would be more rainfall.</p>	<p>ND to send stakeholders the details on the size of the reservoirs.</p>
2	<p>Presentation by MC</p> <p>MC explained that the BAP is still being developed and this meeting is important so that everyone has an opportunity to make suggestions and provide their opinion.</p> <p>MC asked who had seen the ESIA and attended previous stakeholder meetings and five people raised their hand.</p>	
Legislation	<p>MC explained why there was a need for a BAP and what legislation and guidelines were relevant.</p> <p>ZM commented that there is a new Biodiversity Strategy being developed but that it is not yet published. MC requested that we be told when this became available. ZM said could supply the draft.</p>	<p>ZM</p>
Aim	<p>MC explained the aim of the BAP was to ensure the biodiversity on the Adjaristsqali Project area is conserved and enhanced</p>	
Structure	<p>MC described BAP process and structure</p>	

<p>Stakeholders</p>	<p>Table of stakeholders was shown and MC asked if anyone knew of other organisations which should be involved.</p> <p>MC also asked if any of the organisations should be in a different 'influence/interest' box.</p> <p><i>Note: Batumi Raptor Count representative requested table to be made available to them in English (as presentation on screen in Georgian).</i></p> <p>MC requested that people from the same organisation combine their comments into one email rather than many individuals in the same organisation sending emails.</p>	<p>Batumi Raptor Count will receive the table in English when they are sent the copy of the presentation.</p> <p>ALL</p>
<p>Biodiversity Baseline</p>	<p>MC explained surveys had been carried out by GAMMA and that a literature review was being carried out.</p> <p>MC asked if anyone knew of other reports/projects which would inform the BAP.</p> <p>NM mentioned the Caucasian Red List and Adjara Red List.</p>	
<p>Designated Areas</p>	<p>MC showed map of designated areas and explained on most likely to be affected was the Machakhela National Park.</p> <p>Map of boundary of this new National Park publicly available on the internet shows the river is not within the boundary. However, ZM said this was a mistake and that it would be corrected to include the river.</p> <p>Representative of Batumi Raptor Count asked if the Chorokhi Delta had been considered and explained project had potential to cause devastating affect on critically endangered species. Not only is the area extremely important for migrating birds but also for breeding birds and so the availability of food resources is very important. The dam in Turkey on the Chorokhi appears to have significantly reduced the sediment input into the delta and has therefore significantly reduced the food resources available in the delta.</p> <p>MC explained the ESIA indicated that the flow and sediment reaching the delta would not be significantly altered. MC and ND explained sediment would be released from time-to-time. Batumi Raptor Count Representative emphasised importance of enough sediment reaching the delta and that it had to be the right kind of sediment.</p>	
<p>Habitats</p>	<p>MC presented list of main habitat types present within scheme footprint.</p>	

<p>Flora</p>	<p>Question was asked as to whether walnut plantation habitat contained cultivars or natural walnut. MC explained that a tree inventory would be carried out but at present this information was not known.</p> <p>DB said that every walnut tree has an owner and they are all still important whether they are cultivars or not.</p> <p>MC presented list of notable plants and explained there were some issues with the nomenclature.</p> <p>NM and ZM said that some of the species listed were not relevant as they are not in the study area and others had been missed which were more important.</p> <p>The point was made for example that <i>Pyrus caucasica</i> is present in all three schemes and not just the Koromkheti scheme.</p> <p>NM said the Adjara List should be consulted and MC said that only the National List had been reviewed as he did not have the Adjara List. NM said a copy of the Adjara list could be supplied.</p> <p>MC explained that further pre-construction vegetation surveys would be carried out which would address help address these issues.</p> <p>ZM said he could help correct the nomenclature.</p>	
<p>Birds</p>	<p>MC presented the list of threatened bird species which could be impacted. He explained that habitats supporting critically threatened birds are protected and therefore more habitat conservation/mitigation may be needed than if based only on the habitat type.</p> <p>Batumi Raptor Count asked if migratory and breeding birds had both been considered and MC said that they had.</p> <p>Batumi Raptor Count commented that for the Egyptian Vulture it would be necessary to look for nesting opportunities. For example cliffs and more open areas with no forest.</p>	
<p>Mammals</p>	<p>MC presented list of mammals which had been considered.</p> <p>A question was asked if any studies had been done on the migration of mammals. MC did not know of any and said this had not been done for the project.</p> <p>MC made the point that although bats are not specifically protected in Georgia, all bats are protected under EU legislation and as Georgia is keen to comply with EU legislation bats would need to be considered.</p>	
<p>Reptiles and</p>	<p>MC presented list of reptiles and amphibians which had been considered.</p>	

Amphibians	
Fish	<p>MC presented list of threatened fish.</p> <p>RG explained that <i>Salmo trutta</i> has now shown to be <i>Salmo labrax fario</i> which is a distinct species from <i>Salmo trutta</i>. This nomenclature change had been decided within the last 6 months. MC asked if a paper had been written on this but RG said none was available. RG explained that all trout associated with the Black Sea were to be known as <i>Salmo labrax fario</i> (and all those associated with the Caspian Sea were to be known as <i>Salmo caspius fario</i>).</p>
Actions	<p>MC explained that the actions he would present were preliminary and that the purpose of this meeting would be to discuss them. He explained that it would not necessarily be possible to implement all actions and that it would be import to prioritise and focus on the ones which would have the best outcomes.</p> <p>Machakhela National Park</p> <p>MC presented possible actions and asked if the park had a management plan.</p> <p>ZM said he was involved with this and that it is currently being updated (funded by UNDP)</p> <p>MC said it would be helpful to know about the management structure of the park.</p> <p>ZM said there would be a meeting on 20th which we could attend. MC explained we would not be in Georgia on the 20th.</p> <p>ZM said they already have a project called 'developing villages' which may relate to the biodiversity education programme action.</p> <p>Protection and enhancement of terrestrial habitats and notable plant populations within the study area</p> <p>MC presented possible actions.</p> <p>ZM said the Directorate of the Environment are running a new project to have a nursery for plants of Adjara. MC suggested that we could use plants from them for planting on the scheme (e.g. for re-instatement of temporary work areas) and ZM said this was a good idea.</p> <p>ZM also said that the Environmental Protection Agency has some schemes for forest restoration. MC said that an option could be to provide support for the existing scheme.</p>

Protection and enhancement of river habitats and species

MC presented possible actions and asked if there was something like a 'River Basin Management Plan'.

The answer was given that there is one for the Chorokhi because it is a transboundary river but there is not one for other rivers. MC asked who was in charge of implementing it and an answer was given that no one is and that it is quite new and not fully developed.

MC commented that if people think this is important then to let us know and give suggestions as to how to implement it.

RG said that he would be keen to be involved as he had been commissioned to do this type of thing before by the Ministry of Economy. RG said he had already approached the Ministry of Economy and they were interested in the proposals but need to see some maps and he had none to show them. ND said that she would supply some maps.

ND to supply
RG with maps.

RG said the Black Sea Monitoring Agency also had some proposals regarding hatcheries to breed the native threatened fish species. RG also said that a hatchery during construction would be desirable and this would focus on five key species.

Questions were asked as to why there were to be no fish passes on Didachara and Skhalta dams and ND explained that the phase two meso-habitat surveys would clarify whether this was necessary.

Protection & enhancement of threatened mammal populations

MC presented possible actions.

Most Georgians in the room thought that a ban on hunting for construction workers was not necessary as there were already strict hunting laws.

Batumi Raptor Count asked how big an area a hunting ban would cover and said that although there were existing laws, these were not implemented and were certainly a big problem for birds.

MC asked if anyone knew of existing projects for example to conserve large carnivores e.g. university studies and to email him with details.

ALL

RG said that their monitoring agency have some experience with mammals and have receiving training from UK and Dutch experts. They would therefore be very keen to be involved with any mammal actions.

Protection and enhancement of populations of birds of conservation concern within the study area

MC presented possible actions.

Batumi Raptor Count explained they were beginning a survey tomorrow to see where the proposed transmission line may have an impact on birds. This would determine if the route of the transmission line would need to be altered or if other mitigation could be developed.

MC said we would be grateful to be supplied with the preliminary results of the survey for the BAP.

Batumi Raptor Count said that the reservoirs should be designed with shallow edges (so that birds can reach fish). Also the dams can be designed in such a way that they provide nesting opportunities for species such as swallows. Also artificial walls of soft sediment would provide habitat for sand martins and bee-eaters. However, they emphasised that there was already a great richness and the priority should be to preserve existing habitats rather than creating new habitats which would be likely to support quite different species.

There was also some discussion that the creation of reservoirs could attract coastal birds (e.g. Pelicans).

Batumi Raptor Count also re-emphasised importance on the Chorokhi Delta and said massive illegal hunting of birds was taking place and that maybe some funds could be directed to this area to help educate people and enforce hunting laws.

Other Suggestions

ZM suggested that the project could invest in the re-establishment of meteorological stations (as they had during Soviet times). These were important to help interpret observed changes in biodiversity and also useful as an educational resource for schools which would enhance pupils connection and understanding of the environment.

B.2. Consultation with Biodiversity Experts

Birds

From: Environmental Association PSOVI [mailto:ea_psovi@yahoo.com]

Sent: 12 June 2013 10:05

To: Coroi, Mihai; goradze@gmail.com

Cc: Barnard, Mark; anne.tone.steinsvik@cleanenergygroup.no; Prytherch, John D; Zviad Diasamidze; Jeff Terry; zure17@gmail.com

Subject: Re: Request for information on endangered and migratory bird species in Adjara

Dear Mr. Coroi,

Mr. Zurab Javakhishvili, our ornithology expert has provided feedback to your queries. The comments are incorporated into the text of your email under the respective sections. Please see below. Let us know if you will need clarifications.

best regards

Jimsher Mamuchadze

Endangered and critically endangered species at global and national level

We understand that Egyptian vulture *Neophron percnopterus* (IUCN endangered) is known to breed to the east of the Adjaristsqali river basin, near Goderdzi Pass and this species was recorded in 2013 near Akhaltsikhe. Do you have additional records of this species from the Adjaristsqali basin? Can you please confirm whether these statements are true:

- The habitats in the Adjaristsqali river basin do not support regionally-important concentrations of Egyptian vulture.
- The habitats in the Adjaristsqali river basin are not of significant importance to Egyptian vulture

Expert Response:

According to published literature, breeding of Egyptian Vulture hasn't been recorded in Adjaristskali basin. Closest recorded breeding pairs are east from Goderdzi pass in Adigeni and Akhaltsikhe administrative regions. Species can be seen in small numbers during post breeding movements and during migration (Galvez, Gavashelishvili & Javakhishvili 2005, Gavashelishvili 2005, Abuladze 2013).

During monitoring activities by PSOVI at the study area, all species of breeding birds will be recorded and mapped.

One individual of lesser kestrel *Falco naumanni* (critically endangered in Georgia) was recorded near Akhaltsikhe in 2012 and there are also old records of lesser kestrel in the Kintrishi Nature Reserve and IBA. Could you please confirm that this statement is true:

- The habitats in the Adjaristsqali river basin do not support nationally or regionally important concentrations of lesser kestrel.

Expert Response:

According to published literature breeding of Lesser Kestrel hasn't been recorded in Adjaristskali basin. Closest recorded in Georgia breeding pairs are in Dedoplistskaro administrative region about 300 km east of study area. Species can be seen irregularly in small numbers during migration (Galvez, Gavashelishvili & Javakhishvili 2005, Abuladze 2013).

Are you aware of any recent records of red-footed falcon *Falco vespertinus* (endangered in Georgia) in the Adjaristsqali river basin?

Expert Response:

Based on literature review red-footed falcon is not breeding in Adjaristskhali basin. Closest breeding population of the species is recorded on Javakheti upland about 100 km east of study area. Small numbers of this species can be seen irregularly during the migration (Galvez, Gavashelishvili & Javakhishvili 2005, Abuladze 2013).

Are there any other bird species that are globally or nationally endangered, for which the Adjaristsqali river basin supports nationally/regionally important concentrations?

Expert Response:

During monitoring activities by PSOVI at the study area, all species of breeding birds will be recorded and mapped.

Migratory and congregatory species

The birds migrating through the Batumi bottleneck during autumn continue their journey along the Black Sea coast or follow the Chorokhi valley (Verhelst et al., 2011). Chorokhi River represents the western boundary of the Adjaristsqali river basin (see map attached).

- Could you please send us any studies on the bird migration between the Chorokhi-Adjaristsqali confluence and the Turkish border?
- In your opinion, what is the width of the bird migration corridor in this part of the Chorokhi river?
- Do any of the species migrating along this section of the Chorokhi river exceed 1% of the world populations? Species that may exceed this threshold include honey buzzard (*Pernis apivorus*), steppe buzzard (*Buteo buteo vulpinus*), black kite (*Milvus migrans*), Eurasian sparrowhawk (*Accipiter nissus*), Levant sparrowhawk (*Accipiter brevipes*), Montagu's harrier (*Circus pygargus*), pallid harrier (*Circus macrourus*), lesser spotted eagle (*Aquila pomarina*), greater spotted eagle (*Aquila clanga*) and booted eagle (*Aquila pennata*).

Expert Response:

Eastern Black Sea raptor migration bottleneck is the most important raptor migration route in western Palearctic. The Bottleneck was studied starting from early 80s of 20th century and importance of the bottleneck was acknowledged in number of publications (Lofgren 1982; Sojamo 1983; Celmins & Bergmanis 1990; Abuladze 1994; Zalles & Bildstein 2000; Maanen, Goradze, Gavashelishvili & Goradze 2001; Gavashelishvili & Javakhishvili 2002; Galvez, Gavashelishvili & Javakhishvili 2005; Verhst et al., 2011; Abuladze 2013) since 2008 long-term international project started to conduct monitoring of autumn raptor migration (batumiraptorcount.org).

The width of migration bottleneck is not fixed and depends on number of geographical and meteorological factors.

Number of times heavy raptor migration was recorded by our team near Gonio and Simoneti Villages and Goderdzi pass. However, the negative effect of building tunnels and small scale dams on long distance, high flying soaring birds seems speculative and should be minimal. In contrast influence of same activities on local breeding birds and specially river dependent species such as Dipper, Gray and Paid wagtails, Common Sandpipers etc. is more realistic and should be in the centre of monitoring and research.

Reptiles

----- Пересылаемое сообщение-----
07.06.2013, 23:31, "Борис Туниев" <btuniyev@mail.ru>:

Dear Dr. Coroi

I confirm the following statements are true in modern conditions of knowledge on herpetofauna of Shavsheti Ridge:

- Yes, Adjaristsqali river basin does not sustain >10% of the global population of Caucasus viper and there are no known and regular occurrences of this species in the Adjaristsqali basin. The same time it is almost absent investigations at left bank Adjaristsqali river basin along the small valleys of left tributaries of this river (Shavsheti Ridge). Finds of *Pelias kaznakovi* are very possible because of suitable habitat present on Shavsheti Ridge. Necessary to note *Pelias kaznakovi* recently was found on Shavsheti Ridge in Turkey [Afsar M, Afsar B. 2009. A new locality for *Vipera (Pelias) kaznakovi* Nikolsky, 1909 (Reptilia, Viperidae) in the North-Eastern Anatolia // Russ. J. Herpetol. Vol.16. No.2. P. 155-158].
- Adjaristsqali river basin is not one of 10 or fewer discrete management sites globally for this species (in particular because there are no known and regular occurrences of this species);
- Adjaristsqali river basin does not support regionally important concentrations of Caucasian viper because of poorer investigated area which actually need in detailed observation.

The *Pelias kaznakovi* qualify as a restricted-range species, with an extent of occurrence of less than 500 km². The Adjaristsqali river basin can support at least 1% of the global population of Caucasus viper.

Finally it is necessary to underline that Adjaristsqali river basin is the part of distributional areas of several IUCN Red List species of amphibians and reptiles such as *Mertensiella caucasica*, *Ommatotriton ophryticus*, *Bufo verrucosissimus*, *Pelodytes caucasicus*, *Darevskia derjugini*, *D. mixta*, *Natrix megalcephala* what makes very carefully attention to transformation of this area.

Dr. Boris Tuniyev, Grand Ph.D.,
Honored Ecologist of the Russian Federation,
IUCN reptile expert

From: David Tarkhnishvili [mailto:david_tarkhnishvili@iliauni.edu.ge]
Sent: 11 June 2013 17:57
To: Barnard, Mark
Subject: Re: Request for information on Caucasus viper in Adjara, Georgia

Hi Mark,

1) Adjaristsqali river basin does not sustain >10% of the global population of Caucasus viper and there are no known and regular occurrences of this species in the Adjaristsqali basin

- the species has a hidden life mode and difficult to found. It does exist in Ajaristskali river basin. I don't have at the moment specific references on the specific findings, but you can consult RedList site for this species and the pdf of paper attached to this letter. The species is at least known from Batumi, Charnali, and "Western Lesser Caucasus". I myself never found kaznakovi in Ajaristskali basin, but to be specific I never did a special research on this species. The species' area of occupancy is small, and Ajaristskali basin may cover over 10% of this area.

2) Adjaristsqali river basin is not one of 10 or fewer discrete management sites globally for this species (in particular because there are no known and regular occurrences of this species)

- The species does not have literally "management sites". "(in particular because there are no known or regular occurrences of this species) - this is partly true. There are no regular occurrences but there are seldom findings.

3) Adjaristsqali river basin does not support regionally important concentrations of Caucasus viper.

- I cannot either confirm or reject this. There is simply lack of the data. There are certainly no trustful information on the population size of the species. Ajaristskali basin covers between 5 and 20% of the extent of occurrence of this species, hence, most likely this is between 1% and 15-20% of the species' global population.

With kind regards, David

Mammals

From: Bejan Lortkipanidze [<mailto:bejan.lortkipanidze@nacres.org>]
Sent: 19 June 2013 09:29
To: Coroi, Mihai
Subject: RE: Request for information on the

Dear Dr. Coroi,

Information on the large mammal's population status and number is very scarce in Georgia and especially from Adjara region. We carried out rapid assessment of large mammals only in 2002. We could not find bezoar (wild) goat (*Capra aegagrus*) in Adjara Mountains, which was there few decades ago. We found signs of brown bear (*Ursus arctos*) and lynx (*Lynx lynx*). According to the signs bears were distributed in many places of the Adjara Mountains and based on the sign frequency we can guess that bear population was numerous there. According to local population chamois (*Rupicapra rupicapra*) still represented in some parts of Adjara Mountains. As we were focused on the large mammals we do not have any information on red-backed vole.

As you probably know brown bear and chamois are listed under the category Endangered in the Georgian red list. Lynx has category Critically Endangered. Although the real data on these species is not available at the moment and there are no credible information on the species population number country wide.

We have assessed lynx population number (via Capture-Mark-Recapture method using camera traps) in semiarid ecosystem of Georgia (Vashlovani national park and Chachuna managed reserve) and are planning to assess the lynx population number in central part of Georgia (Borjom-Kharagauli n.p.).

I believe that brown bear population range did not change much since I have analysed data (included in bear status article that you have read already). According to captive bear monitoring data some bear cubs are originated from Adjara Mountains and many illegal hunters try to hunt on bear there. It may indirectly indicate that the population is quite well presented in the Adjara Mountains. But further good scientific data is needed to assess status of brown bear sub-population in the Adjara. We have plans to assess brown bear population in several parts of Georgia, but at moment we are in stage of fundraising process.

Very little is known on chamois in Georgia. The species is almost everywhere but in a few numbers and real status is unknown. I suspect that because it is relatively easy to kill chamois, illegal hunting influenced on its number heavily. That should be true for Adjara as well. It is planned to assess chamois population in Borjom-Kharagauli national park.

As endangered species habitats are concerned, I think it is important to take into account wild goat habitat as well. The species is not there but ensuring conservation of the wild goat habitat will allow us to think on reintroduction of the species in its historical range (please see historical range of the wild goat in the attachment).

Please let me know if you have any additional question.

Best regards,

Bejan

Plants

From: Coroi, Mihai

Sent: 05 June 2013 18:50

To: 'zurab58@yahoo.com'

Cc: Barnard, Mark; 'anne.tone.steinsvik@cleanenergygroup.no'; Prytherch, John D; 'Zviad Diasamidze'; 'Jeff Terry'

Subject: Request for information on endangered and endemic plant species in Adjaristsqali river basin

Dear Zurab,

As you know, we are preparing a Biodiversity Action Plan (BAP) for the Adjaristsqali Hydropower Project, which is briefly described below. To comply with the International Finance Corporation (IFC) Performance Standard 6 requirements, we are also undertaking a Critical Habitat Assessment (CHA) for the whole of the Adjaristsqali river basin (see map attached). Species that are endangered/critically endangered at global and national levels, together with endemic/restricted-range species are key aspects to address in a BAP and they represent criteria for the identification of critical habitats.

Given your expert knowledge on the flora of Adjara, we would be very grateful if you could confirm and provide the following information:

Endangered plant species in Georgia and Adjara

As part of the surveys for the Adjaristsqali hydropower and transmission line projects, hop hornbeam (*Ostrya carpinifolia*) was recorded in 2012 near the village of Nenia and in 2011 near Zamleti. I assume you have other records of the species from the Adjaristsqali basin. However, do you think that the habitats in the Adjaristsqali river basin support nationally or regionally important concentrations of hop hornbeam? If this is the case, do you have any papers, reports or information to support this?

Expert Response (GEO)

Hop hornbeam (Ostrya carpinifolia) Adjaristsqali basin -ში გვხვდება მხოლოდ შუახევის და ხულოს მუნიციპალიტეტის სატყეო ფართობების ტერიტორიაზე, როგორც უშუალოდ მდ. აჭარისწყალის ხეობაში, ასევე მისი შენაკადების მდ. ჩირუხისწყალის და მდ. სხალთისწყალის ხეობაში; ძირითადად მოიცავს ნათელი და მშრალი ფერდობების და მდინარისპირების ჰაბიტატებს დაბა შუახევსა და ხულოს შორის და შედის მდინარე აჭარისწყალის შენაკადების-მდ. ჩირუხისწყალის და სხალთისწყალის ხეობებში 15-20 კმ მანძილზე .

უხვი პოპულაციებით განსაკუთრებით გამოირჩევა მდ. ჩირუხისწყალის ხეობა, კერძოდ მდ. ჩირუხისწყლის მდ. აჭარისწყალთან შესართავიდან 6 კმ სიგრძის და მდ. ჩირუხისწყალის მარჯვენა და მარცხენა სანაპიროების 500 მეტრიანი ზოლი, სადაც გვხვდება ცალკეული ცენოზები მისი ამკარა დომინანტობით, რომელიც სახეობათა კონსერვაციის ცენტრის (NACRES) მიერ რეკომენდირებულია საქართველოს ბუნების ძეგლი, როგორც იშვიათი და ქრობადი სახეობის - hop hornbeam (*Ostrya carpinifolia*) ყველაზე თვალსაჩინოდ შემონახული ფიტოცენოტური დაჯგუფებები საქართველოს მასშტაბით. ფართობი გასაანგარიშებელია რუკის მიხედვით (*please see map 1*).

Expert Response (ENG Translation)

Hop hornbeam (Ostrya carpinifolia) in Adjaristsqali basin is located only in the forest areas of Shuakevi and Khulo municipalities: in particular, in the gorge of Adjaristkhali river and in the gorge of the Adjaristkhali river's tributaries Khirukistskali and Skhaltatskali as well. It includes mainly dry and light slopes and riversides habitats between Shuakhevi and Khulo and goes deep into in the gorge of the Adjaristkhali river's tributaries Khirukistskali and Skhaltatskali around 15-20 km.

*We have plentiful population of them in the Khirukistskali gorge. Particularly, from the confluence of Khirukistskali River from the Adjaristkhali River 6 km long and 500 metre from the Khirukistskali river's right and left cost. We are facing here dominance of the separate bios koinos, which is recommended by NACRES Georgia's as rarely and disappearing art - hop hornbeam (*Ostrya carpinifolia*) (please see map 1).*

Reference:

1. Manvelidze Z., Memiadze N., Kharazishvili D. Diversity of floral area of Adjara (List of wild grown plants species // *Annals of Agrarian Sscience*, 2008, vol .6, No2, pp. 93-164; ISSN 1512-1887 <http://www.agrscience.ge/abstracts.htm>
2. Manvelidze Z. Botanical-Geographical zoning of Ajara // *Bulletin LELP Batumi Botanical Garden XXXIII, the publishing house "Shota Rustaveli State University"*, Batumi, 2009, pp. 74-87; ISSN 1987-8621 (in Georgian).
3. Manvelidze Z.K., Memiadze N.V., Kharazishvili D.Sh., N. I. Varshanidze. Dendroflora of Adjara (Ajara floristic region) // *Annals of Agrarian Sscience*, 2010, vol. 8, No2, Tbilisi, pp. 114-123. ISSN 1512-1887; <http://www.agrscience.ge/abstracts.htm>
4. Manvelidze Z.K., Memiadze N.V., Kharazishvili D.Sh. Monuments of Wild Life in Adjara (Evaluation and Conservation Initiative), *Materials of the National Scientific Conference: "Biodiversity of Georgia", devoted to the 70 anniversary of the Georgian NAS. Tbilisi, 16-17 june, 2011* pp. 221-224.
5. Kharazishvili D., Memiadze N., Manvelidze Z. Analysis of the flora and vegetation of the highmountain ajara (south colchic) // *The role of botanical gardens in conservation of Plant diversity, Proceedings of the anniversary International Scientific Practical Conference Dedicated to 100th Anniversary of Batumi Botanical Garden Batumi, Georgia, 8-10 May, 2013, Part II*, pp. 87-89.

A small and isolated patch of *Astragalus sommierii* was recorded in 2012 near the village of Zamleti. We believe that the habitats in the Adjaristsqali river basin do not support nationally or regionally important concentrations of this species. Would you agree with this? What information is there to support the opposite?

Expert Response (GEO)

დაახ. *Astragalus sommierii* Freyn, აჭარაში გვხვდება მხოლოდ ერთ ლოკალურ ადგილსამყოფელში, near the village of Zamleti და მოიცავს მდ. აჭარისწყალის მრგვკენა სანაპიროს 150 მ-მდე სიგანის და 300-400 მ-მდე სიმაღლის ნათელ და მშრალ ჰაბიტატებს ბათუმი ხულოს მიმართულების მთავარი საავტომობილო გზის მიმდებარე ფერდობზე (**please see map 2**). *Astragalus sommierii* Freyn is the species support nationally important: **EN (B1a)**

Expert Response (ENG Translation)

Yes, *Astragalus sommierii* Freyn, we face only in one location, near the village of Zamleti and covers the right cost of the Adjaristkhali River's 150 metre wide and 300-400 metre high dry and light habitats on the slopes of Batumi Khulo main auto route (please see map 2). *Astragalus sommierii* Freyn is the species support nationally important: EN (B1a)

Reference:

1. Red List of Georgia (Georgian President's Decree #303 of May 2006 <http://www.garemo.itdc.ge>)

Are you aware of any other endangered plant species in Georgia, which may have nationally or regionally important concentrations in the Adjaristsqali river basin?

Expert Response (GEO)

ამ მხრივ უნდა აღინიშნოს *Arbutus andrachne* L., რომელიც აჭარაში გვხვდება მხოლოდ ერთ ლოკალურ ადგილსამყოფელში, 5 km მოშორებით daba Suaxevidan-ქ. ბათუმისაკენ md. aWariswylis მარჯვენა სანაპიროზე, სოფ. გორხანაულთან; იზრდება მუხასთან და ფიჭვთან ერთად (*Quercus hartwissiana*, *Q.dshorochensis*, *Pinus sosnowskyi*). მოიცავს დაახლოებით 2-3 ჰა ფართობს (**please see map 2**). *Arbutus andrachne* L. is the species support nationally important: **EN (B1a+2a)**

Expert Response (ENG Translation)

In this regards, must be mentioned *Arbutus andrachne* L., that we face only in one location, 5 km away from village Shuakhevi to Batumi on the right slope of the Adjaristkhali River, by village Gornakhul. Usually it growth along with oak and pine-tree (*Quercus hartwissiana*, *Q.dsho-rochensis*, *Pinus sosnowskyi*). It covers around 2-3 hectare area (please see map 2).

Reference:

1.Red List of Georgia (Georgian President's Decree #303 of May 2 2006 <http://www.garemo.itdc.ge>)
 2.Workshop: "Coordination and Development of Plant Red List Assessments for the Caucasus Biodiversity Hotspot"/3rd regional workshop / Tbilisi, 24 -28 May, 2009 // Role/Title: discussion and recommendation to participate in the preparation of proposals.
 3.Manvelidze Z.K., Memiadze N.V., Kharazishvili D.Sh. Monuments of Wild Life in Adjara (Evaluation and Conservation Initiative), Materials of the Ntional Scientific Conference: "Biodiversity of Georgia", devoted to the 70 anniversary of the Georgian NAS. Tbilisi, 16-17 june, 2011 pp. 221-224.

Endemic plant species

The flora surveys undertaken in 2011 and 2012 as part of this project revealed the presence of a number of Caucasus, Colchic and Adjara-Lazetian endemic species in the area of the Adjaristsqali hydropower project. However, for the purpose of IFC PS6, only the species endemic to Georgia or Adjara are important.

I have reviewed the list of endemic plants in Adjara and Georgia endemics recorded in Adjara – do you think any of the following statements apply for any of the species listed below?

- Adjaristsqali river basin includes habitats known to sustain more than 95 of the global population of that endemic species;
- Adjaristsqali river basin includes habitats known to sustain between 1% and 95% of the global population of that endemic species;

Expert Response:

Adjaristsqali river basin includes habitats known to sustain between 1% and 95% of the global population of that endemic species.

In case your answer is yes, could you please send us any papers, reports and information to support this?

Expert Response:

Georgia endemic species recorded in Adjara: *Allium ponticum, Galanthus woronowii, Ligusticum alatum, Asplenium pseudolanceolatum, Tripleurospermum rupestre, Anthemis schischkiniana, Senecioclado botrys, Lapsanapinnatisecta, Helichrysum polyphyium, Symphytum ibericum, Cynoglossum imeretinum, Campanula symphytifolia, Cerastium sosnowskyi, Onobrychis kemulariae, Hypericum grossheimii, Thymus grossheimii, Orobanche raddeana, Ranunculus buhsei, Ranunculus makaschwilii, Sorbus migarica, Rubus woronowii, Saxifraga pontica, Verbascum sessiliflorum.*

Adjara endemic species: *Galanthus krasnovii, Angelica adzharica, Dryopteris liliana, Dryopteris kemulariae, Centaurea adzharica, Erysimum contractum, Campanula makaschwilii, Astragalus doluchanovii, Genista adzharica, Ficaria popovii, Rubus adzharicus, Verbascum adzharicum.*

Georgia endemic species recorded in the area of the Adjaristsqali hydropower project):

Galanthus woronowii; Cirsium caput-medusae; Cirsium imereticum; Paracynoglossum glochidiatum; Alcea transcaucasica; Rubus woronowii

Ajaraian endemic species in the area of the Adjaristsqali hydropower project:

Centaurea adzharica; Erysimum contractum; Genista adzharica; Psoralea acaulis var. adzharica

Georgia endemic and Ajaraian endemic species სია მთლიანად აჭარის ტერიტორიისათვის:

Georgia endemic species recorded in Adjara: *Galanthus woronowii; Anthemis schischkiniana; Tripleurospermum szowitsii; Cirsium caput-medusae; Cirsium imereticum; Helichrysum polyphyium; Paracynoglossum glochidiatum; Campanula symphytifolia; Cerastium sosnowskyi; Euphorbia palustris; Astragalus chordorhuizus; Onobrychis kemulariae; Onobrychis meschetica; Quercus imeretina; Hypericum grossheimii; Alcea transcaucasica; Sorbus migarica; Rubus moschus; Rubus woronowii; Saxifraga pontica; Verbascum sessiliflorum; Verbascum adzharicum; Melampyrum albiflorum; Solanum woronowii; Hieracium cromolepium*

Ajaraian endemic species: *Allium adzharicum; Angelica adzharica; Centaurea adzharica; Erysimum contractum; Astragalus doluchanovii; Genista adzharica; Psoralea acaulis var. adzharica; Ranunculus ampelophylus var. adzharica; Ficaria popovii; Ficaria calthifolia var. adzharica*

Expert Response (continued):**Reference:**

1. Memiadze N. *Botanical and Geographic Review of Adjara-Shavsheti Endemics. Herald of the Georgian Academy of Sciences*, 168, #3, 2003. pp. 62-64.
2. Memiadze N. *Botanical and Geographic Survey of the Endemics of Adjara-Lazeti flora. Herald of the Georgian Academy of Sciences*, 169, #2, 2004. pp. 341-343.
- 3., 169, #2, 2004. gv. 341-343.
4. Memiadze N. *Geographical and Botanical Characteristics of Colchian Endemics species Distributed in Ajara. Herald of the Georgian Academy of Sciences*, 170, #1, 2004. pp. 119-121
5. Memiadze N. *Diversity of endemic flora in Ajara. The Georgian Academy of Sciences of Batumi Botanical Garden bulletin*, #32. 2003. 8
6. Memiadze N., Kharazishvili D., Manvelidze Z. *Diversity of endemic flora in ajara protected areas// The role of botanical gardens in conservation of Plant diversity, Proceedings of the anniversary International Scientific Practical Conference Dedicated to 100th Anniversary of Batumi Botanical Garden, Batumi, Georgia, 8-10 May, 2013, Part II, pp. 107-109.*
7. Kikodze, D., Mc. Gough, N., Smith, M., Wilford, R., Garrett, L., Memiadze, N., Kharazishvili, D., Manvelidze, Z., Khutsishvili, M., Deisadze, G., Pantsulaia, T., and Eristavi, M. *Trade in Georgian Snowdrops - A Roadmap to Sustainability.// Report of CITES project No S302 Improving Implementation of CITES for Galanthus woronowii and Cyclamen coum from Georgia MSR-TR-2010-65; <http://research.microsoft.com/en-us/people/mattsmi/>*

Brief project description

After a competitive tender, CEG was awarded a license to develop the hydropower potential of the Adjaristsqaliriver and its tributaries in the Autonomous Republic of Adjara, in South Western Georgia, close to the Turkish border. Adjaristsqali hydro power project is expected to supply the Georgian and Turkish power systems with clean renewable energy. The project will also enable Georgia to use more of its energy resources to meet electricity demand during the winter. The project is expected to have an installed capacity of 175-400 MW. Two hydropower stations are currently planned, Shuakhevi HPP and Koromkheti HPP. The estimated construction cost is between \$300-700 million. If developed as planned, the Adjaristsqali project will be one of the largest foreign direct investment projects in Georgia to date, and a main contributor to export earnings for the country. The aim is that the Adjaristsqali project will contribute to regional employment opportunities for local people as well as significant tax income to the municipalities in the region where the project will be developed.

I look forward to your response,

Kind regards,

Mihai

Dr Mihai Coroi PhD BSc CEnv MCIEEM

290039/TRD/EFR/BAP/01/E 22 July 2013
<http://pims01/pims/llisapi.dll/open/1516754514>

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From: Nugzar Zazanashvili [mailto:nzazanashvili@wwfcaucasus.org]
Sent: 10 July 2013 10:27
To: Coroi, Mihai
Cc: Tamaz Gamkrelidze
Subject: KBA_Adjara

Dear Dr. Mihai Coroi,

This is to inform you that valid document is the Ecosystem Profile for the Caucasus you can find at <http://www.cepf.net/Documents/final.caucasus.ep.pdf> (with maps and attachments).

It was endorsed by GEF focal points of five countries involved:
http://www.cepf.net/Documents/Caucasus_focal_point_endorsements.pdf

Process of evaluating the KBAs did not start and is not planned for near future.

IBAs and other important species areas have been considered during development of above mentioned Profile: the document includes some information on methodology too.

With best wishes,
Nugzar Zazanashvili, Ph.D.
Conservation Director
WWF-Caucasus Programme Office

სს.ი.პ.დაცული ტერიტორიების სააგენტო

http://192.168.0.220/nom_2_0/2/nomfileserver/GetFile?file_id=105...

საბიოლოგების გარემოსა და ზუნებრივი
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MINISTRY OF ENVIRONMENT PROTECTION OF GEORGIA
LEGAL ENTITY UNDER PUBLIC LAW
AGENCY OF PROTECTED AREAS

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N1127

09 / July / 2013

To Mr. Olafur Birgisson
Deputy Project Director

Dear Birgisson,

In response to your letter of June 14, 2013 regarding the preparing a Biodiversity Action Plan for the Adjaristskali Hydropower we would like to inform you that Mtirala National Park is identified as a Key Biodiversity Area (KBA) by WWF – Caucasus and the Georgian Center for the conservation of Wildlife. National Park is also known as an Important Bird Area (IBA) and the western part of the protected area is a main road for the migratory predators. Mtirala National Park has a proposed buffer zone but it has not been approved yet. Mtirala National Park located in 30-35 km from the Shuakhevi Municipality.

Kintrishi Protected Areas is not identified as a Key Biodiversity Area (KBA) by WWF – Caucasus and the Georgian Center for the conservation of Wildlife and is located in 20-25 km from the Shuakhevi Municipality.

Regarding the boundaries (in GIS) of the Machakhela National Park, Mtirala National Park and Kintrishi Protected Areas we are sending you the boundaries of the above mentioned territories.

Please see the attached CD.

Best regards,

Deputy Head

Lasha Moistrapishvili