



Terminal Report: Data Collection for the Environmental Baseline



Prepared for the Project
"Integrated Erosion Control in Mountainous Areas of the South Caucasus".

Prepared by
**NACRES - Centre for Biodiversity
Conservation & Research**

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List of abbreviations

| | |
|----------|---|
| GoG | Government of Georgia |
| m.a.s.l. | meters above sea level |
| NACRES | Centre for Biodiversity Conservation and Research |
| TNP | Tusheti National Park |
| TPA | Tusheti Protected Areas |
| TPL | Tusheti Protected Landscape |

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1 Introduction

This report has been prepared by “NACRES - Centre for Biodiversity Conservation & Research for the project: **Integrated Erosion Control in Mountainous Areas of the South Caucasus**, implemented by ECO Consult and financed by GIZ.

The overall purpose of the service was to collect data for the environmental baseline study. All available relevant information was gathered on the species and habitats and their distribution in Tusheti including:

- Information on important biodiversity areas
- Detailed maps of protected areas including boundaries and zoning
- Detailed listing of natural heritage (endangered species and habitats) and its distribution in the project area.

The service envisaged the following total deliverables:

- Description of important natural and semi-natural habitat types in the project area
- List of rare and endangered animal and plant species
- List of rare and endangered habitat types
- Map of protected areas and description of conservation purpose of protected area.
- List of relevant data sources

2 Description of the study area

Tusheti Protected Areas (TPA) is among the most important protected areas in Georgia. Its high conservation value derives from the remarkably large size and unique landscapes and habitats that make it one of the most important reservoirs of the fauna and flora of the Great Caucasus.

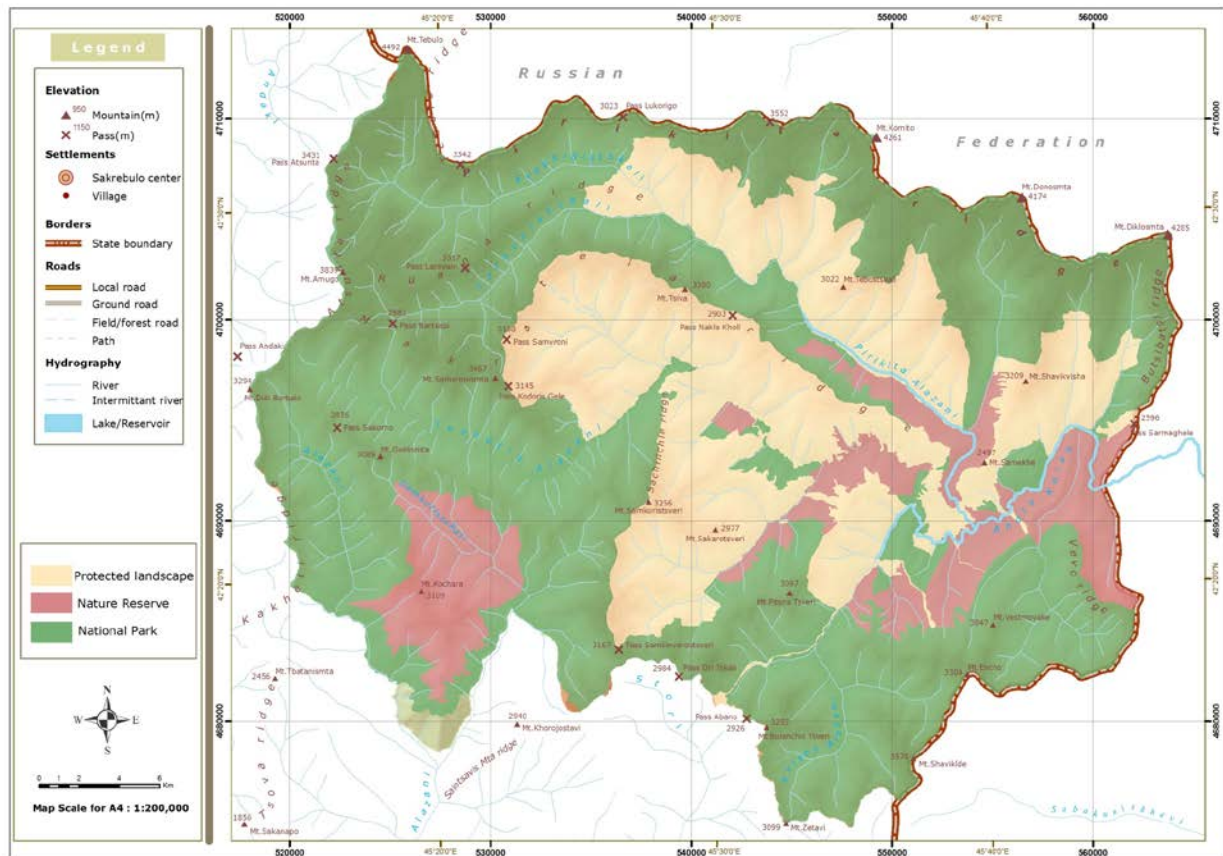
TPA consists of three categories of protected areas, including:

1. Tusheti State Reserve (IUCN Category I)
2. Tusheti National Park (IUCN Category II)
3. Tusheti Protected Landscape (IUCN Category V)

The management of Tusheti Protected Areas (TPA) is the responsibility of two separate government entities. Tusheti State Nature Reserve and National Park are managed by the Agency for Protected Areas (APA), a legal entity of public law and its territorial unit – the administration of Tusheti PAs, while the Tusheti Protected Landscape (TPL) is managed by Akhmeta Municipal government through its territorial unit. Tusheti PAs are located in the Akhmeta Municipality of Kakheti province.

Tusheti protected areas are located in the high mountain province of Tusheti in the northeast of the country (Map 1). Geographically they encompass (i) northern slopes of the main range of the Great Caucasus, (ii) southern slopes of Pirikita Range (a northern side-range of the Great Caucasus), (iii) the Tusheti depression (located between the two ranges) and (iv) the Speroza range. To the north and east the boundaries of the park are marked by the national

border with the Russian Federation. Namely it is bordered by Chechen and Ingush Republics on the north and by Dagestan on the east. The northern border is physically marked by the Pirikita Range (notably in this section of the Great Caucasus the side-range is higher than the main range and attains 4,500 m.a.s.l.). To the south the park borders on Kakheti region of Georgia, where the boundary lies along the main watershed of the Great Caucasus. To the west Tusheti borders on Khevsureti, a mountainous province of Georgia and the boundary is marked by Atsunta Range and Mt. Tebulo.



Map 1. An overview map of Tusheti protected areas

3 The categories and zones of Tusheti protected areas

3.1 Strict Nature Reserve

According to Georgian legislation, the strict nature reserve represents natural or insignificantly modified unique ecosystem which also has a high scientific value. Its protection regime is similar to that of the IUCN Category 1.

Tusheti state reserve was first established in 1980 primarily to preserve unique pine (*Pinis kochiana*) and birch (*Betula litwinowii*, *B. raddeana*) forests. Currently the total area of Tusheti Nature Reserve (TNR) is 12,627.2 ha and does not include zones, but consists of several isolated segments. It comprises gorges of the rivers Pirikita Alazani, Gometsari Alazani and Tchancahkhovani, more specifically: the part of the right slope of the Ortskali

watershed until the confluence of the rivers Gometsari and Tchantchakhovani Alazanis, low reaches of the Pirikita Alazani, extreme eastern part of the Makratela range and surrounding to it the pine forests to mount Diklo; pine forests found on the right slope of the Pirikita Alazani watershed from Dano floodplain to Omalo-Shenako horse bridge; the right side of the Tchantchakhovani watershed from the mouth of the river Nakhiduri Tskali to the mouth of the river Khisos Khevi; forest groves distributed on the right side of the watershed from the confluence of the rivers Gometsari and Pirikita Alazani to the border with Dagestan. One of the largest isolated patches is the so-called Speroza section, located on the south-western part of Tusheti and represented by Tur habitats (Sajikhve) and forest patches.

The pine (*Pinis kochiana*) and birch (*Betula litwinowii*, *B. raddeana*) forests represent important habitats for rare species and greatly contribute to water regulation and the prevention of erosion. Sub-alpine forests and sub-alpine shrubberies (rhododendron) also have erosion, landslide and avalanche control functions. At the same time, plant species creating such plant communities represent tertiary endemic relics.

The majority of the forests within TNR is practically untached forest and habitats or critical areas for many rare species primarily for wild goats (*Capra aegagrus*). Other important species are: chamois, wolf, bear, lynx, etc. The Speroza section of TNR encompasses important East Caucasian tur (*Capra cylindricornis*) habitats. These habitats and in general, the entire Speroza section are important not only for tur, but also for other rare and key species, such as: chamois, wolf, bear and possibly also for leopard (*Panthera pardus*). Among the local avifauna there are Caucasian snowcock, rare vultures and other birds of prey including bearded vulture, black vulture, gryphon vulture, golden eagle, falcon, etc.

3.2 Tusheti National Park

The National Park is created “for the protection of relatively large ecosystems having high ecological value, their essential uses and recreation” (The Law on Protected Areas System, 1996). This category of PA corresponds to Category 2 of IUCN.

As defined in the TPA management plan (2012), the overall goal of Tusheti National Park (TNP) is the protection and preservation of unique mountainous landscapes and ecosystems, conservation of rich flora and fauna, ecotourism development and maintaining of traditional livelihoods based on the sustainable use of natural resources.

The total area of TNP is 69 515. It consists of the following zones:

- Strict Protection zone (12,678 ha)
- Traditional Use zone (56,789 ha)
- Administration zone (48 ha)
- Visitors zone¹

a) Strict Nature Protection Zone

¹ In most part, this is a functional zone but also includes small scale tourist filed infrastructure located in other zones of TPA.

In general, the Strict Nature Protection Zone is established in an area of pristine nature and high potential for ecotourism and scientific research. The strict protection zone of the TNP encompasses practically untouched areas and tur habitats and includes alpine, subalpine and nival zones. Respectively, the objective of this zone is to protect and conserve the tur population and its habitats, and other species found there as well as to protect alpine and sub-nival flora rich in endemic species.

“The Atsunta section” of the strict protection zone (Atsunta ridge and the foothills of Tebulo mount) is particularly important as it represents an ideal tur habitat and the core zone of the population. This area is very important for the Tusheti tur population and probably also for that of Khevsureti. Therefore, the protection of these areas is critical for the long-term maintenance of the local as well as national population of the East Caucasian tur.

b) Traditional Use Zone

The objectives of the Traditional Use Zone of the TNP include: nature protection, meeting the social-economic needs of local population based on the principle of sustainable use of natural resources and, preservation and recovery of domestic animals related to Tush sheep farming. Thus, for the purpose of sustainable pasture management, traditional use zone includes currently used and potential pastures and hey meadows.

Important changes occurred recently in the legal framework for pasture management within protected areas. Until 2011, pastures and hey meadows situated within the TPA were managed by the local municipality. However by the GoG Decision #339 of 7 September 2011 the decision on the lease of pastures is made by APA. The price for pasture use is also set by APA based on recommendations from an independent auditor (expert).

c) Administration zone

Administration zone covers territories where all infrastructure necessary for implementation of tourism, protection, control and safety-related activities is located. The purpose of this zone is to ensure operations and effective protection of the National Park.

d) Visitors Zone

Visitors' zone represents specially arranged territory to receive visitors and may have necessary tourist infrastructure. The objective of the visitors' zone is to allow recreation, ecotourism and educational activities and create relevant conditions for visitors with no or minimum impact on the environment.

3.3 Activities allowed in each category and zone of the TPA

The activities that are permitted in the various categories and zones of the TPA are defined according to general rules and authorities prescribed by the law on Protected Areas System, also based on the charters of the Ministry of Environment and Natural Resources Protection and APA.

a) Activities allowed within the state nature reserve:

- non-manipulative scientific research;
- educational activities;
- during natural and anthropogenic disasters and emergency situations, limited movement of auto-, moto- and air- transport of the personnel of the administration of the state reserve in order to perform work-related duties;
- monitoring activities;
- activities related to land cadastre;
- implementation of measures (physical protection of the reserve) necessary for the protection of the areas as prescribed by the Georgian legislation;
- movement by non-motor transport taking into account restrictions prescribed by the management plan"

Respectively, in the Tusheti State Reserve:

- visitors are allowed only to conduct research and educational activities;
- collection of biological data and samples for the scientific purposes is conducted under the strict control and requires APA's agreement;
- installation of permanent or temporary structures and signs is allowed after APA's official agreement;
- movement is allowed only in specially allocated trails and only on foot or by non-motor transport.

b) In the strict protection zone of Tusheti National Park it is allowed to carry out:

- non-manipulative scientific researches;
- educational activities;
- ecotourism-related activities;
- during natural and anthropogenic disasters and emergency situations, limited movement of auto-, moto- and air- transport of the personnel of the administration of the state reserve in order to perform work-related duties
- activities related to land cadastre;
- implementation of measures (physical protection of the zone) necessary for the protection of the area as prescribed by the Georgian legislation;
- movement by non-motor means of transport taking into account restriction prescribed by the management plan
- visitors stay and movement in accordance with Georgian legislation"

Respectively, on the territory of the strict protection zone of Tusheti National Park:

- visitors' are allowed to carry out scientific researches and educational activities;
- collection of biological data and samples for the scientific purposes is conducted under the strict control and requires APA's/Administration's agreement
- tourists are allowed on the territory only when their presence does not inhibit the implementation of monitoring, scientific and research works and

protection measures; tourists movement is allowed only on the specially allocated paths;

- permanent or temporary constructions or signs can be installed upon the official approval of the Agency/Management;
- movement shall be allowed only along specially allocated paths on foot or by means of no-motor carriers;

c) Traditional agriculture activities, like mowing, grazing (except for land cultivation), and wood collection can be pursued on those sections of the National Park traditionally used for these purposes. At the same time, the intensity of such works is regulated both according to the needs of local population as well as natural productivity levels.

The following activities can be carried out in the traditional use zone of the National Park:

- traditional agricultural activities (namely, traditional sheep farming) and sustainable use of renewable natural resources;
- scientific research;
- monitoring;
- presence of visitors with ecotourism and recreation purposes;
- implementing active management measures for the rehabilitation of ecosystems and natural resources;
- implementation of maintenance and rehabilitation works to support traditional sheep-breeding in Tusheti;
- implementation of cadastral works;
- implementation of physical protection, search and rescue and other necessary measures to maintain protection regime;
- installation of traditional constructions and buildings adapted to the environment;
- movement of transport upon the approval of the Management;
- Implementation of necessary measures for fire prevention.

d) In the visitor's zone of Tusheti National Park it is allowed to:

- develop tourist infrastructure (trails and paths, shelters, viewing platforms, places for rest and other constructions adapted to the environment);
- presence of visitors for ecotourism and recreation;
- car movement (except the areas where movement with motor vehicles is restricted), movement on foot or on a horseback;
- photography and filming, visual observation of the flora and fauna without affecting or disturbing it;
- overnight stay in specially arranged shelters;
- taking necessary measures for fire prevention.

4 Tusheti Protected Landscape

The Protected Landscape (IUCN protection category V) is a large natural or semi-natural area of high aesthetic value. This category of protected area is established to preserve

outstanding natural and/or cultural landscapes for recreation and tourism, and for the maintenance of traditional economic activities.

The protected landscape aims at preserving unique ecosystems as well as historical and cultural sites of Tusheti, to address increasing recreation/tourism in the region by encouraging relevant infrastructure, to maintain and develop traditional culture and arts, and to promote sustainable utilization of renewable natural resources and traditional farming. Tusheti Protected Landscape (TPL) will contribute to the improvement of living conditions of local people, create new sources of income (tourism, market for traditional handcrafts), and encourage the maintenance of endemic landraces of domestic animals.

Tusheti Protected Landscape comprises the villages of Tusheti as well as historic/cultural sites and monuments, forested and agricultural areas, shepherds' summer stations and pastures. Namely it includes lower parts of the southern slopes of the Great Caucasus from village Girevi to mount Lashari; left banks of the Pirikita Alazani from Tsovata to Omalo; left banks of the Gometsari Alazani from village Alisgora to Gogrulta (excluding the territories of the State Nature Reserve); the villages of the Chachakhovani area and adjacent territories on the left banks of the Khiso Alazani from the place called "Urciekhi" to village Khakhabo; villages Omalo, Shenako, and Diklo and adjacent agricultural areas.

Tusheti Protected Landscape abounds in unique high mountain architectural monuments, historical, cultural and religious sites. Combined with exceptional natural and semi-natural landscapes they form a remarkable example of natural-cultural landscape of high aesthetic value.

The architecture and cultural heritage of Tusheti includes: (i) human settlements, e.g. unique high mountain architectural complexes of deserted castle-villages (Chontio, Hegho, Dakiurta, Old Diklo, Tsaro, Mozarta, Indurta, Etelta), villages with old as well as more recent architecture (Dartlo, Docho, Shenako); (ii) churches and other religious sites (so called Jvar-Khatis, tomb-churches such as found at villages Dartlo, Gudaanta, Tsaro, churches (examples of more recent Christian architecture at villages Jvarboseli, Bochora, Iliurta, Omalo, Shenako, Natsikhari, Dartlo, Parsma), (iii) defense structures, castles and towers, (iv) archeological sites such as ancient settlements (Nishtakos Gori at village Shenako), tombs (villages Hegho, Chigho, Alisgori, Tsaro).

Most of the protected landscape has been heavily modified by centuries of human activities. Nevertheless, practically intact patches of subalpine birch forest and Caucasian rhododendron still remain which provide habitat for the Caucasian black grouse (*Tetrao mlodosiewiczi*). This vegetation is also important for avalanche and erosion control. Many areas of the protected landscape are also important temporary or permanent habitats for the local wildlife including large mammals.

The activities that are prohibited on TPL include:

- Encroachment of non-renewable natural resources (violation, damage, extraction);

- Modification of cultural landscapes (i.e. all construction/reconstruction works must be carried out with due regard to the local traditional architectural style and only using traditional building materials).
- Pollution of environment (chemical, bacteriological, radioactive or any other kind of soil, water and air pollution, audio-visual disturbance);
- Distribution of non-native and exotic living organisms;
- Admission of excessive number of visitors;

The following activities are permitted on TPL:

- Activities aimed at the preservation and restoration of natural, historical and cultural heritage sites
- Scientific research and biodiversity monitoring
- Activities related to ecosystem conservation and the rehabilitation of fauna and flora species
- Recreation, tourism and educational activities
- Traditional forms of land use

5 An overview of Tusheti's biodiversity

5.1 Flora

First botanical studies in Tusheti were conducted in the middle 19th century. First flora inventories were carried out in the end of the 19th century and the beginning of the 20th century. A species list for flora was created and the overall picture was created on the flora and vegetation of the region. Later geobotanical studies were conducted and first vegetation maps were created. Systematic botanical studies were carried out during 1986-1990 by the Institute of Botany of the Georgian Academy of Sciences jointly with the State Museum of Georgia.

Despite the above, the flora and vegetation of Tusheti is far from being fully accounted for. Nevertheless the available information allows concluding that Tusheti is one of the richest regions of Georgia in respect of botanical diversity. According to the available data, there are more than 1,000 vascular plants from 92 families in Tusheti (Annex 1). This means that one fourth of all of Georgia's flora species and one sixth of all Caucasian plants are found in Tusheti. The vegetation cover includes forests, subalpine forest, alpine and subalpine meadows, subalpine shrub, subnival vegetation and scree vegetation complexes. Each of these vegetation classes are in turn represented by numerous variants with varying structure and species composition.

The flora of Tusheti includes numerous rare species of which 3 are included in the Georgian Red List (*Betula raddeana*, *Ulmus glabra*, *Ulmus minor*). The level of endemism (proportion of endemic species) is also high. There are 11 Georgian endemics and 230 Caucasian endemics which means that 22.5% of all species found in Tusheti are either Georgian or Caucasian endemics. In addition, at least 8 of them are believed to be extremely rare.

5.2 Fauna

Only occasional zoological studies have been conducted in Tusheti. Even by the time the Tusheti state reserve was created very little or nothing was known about the local fauna and population numbers. Small scale fauna surveys were conducted in 1999-2001² by NACRES with the support of WWF. Particularly little is known about the invertebrates of the region. The first baseline studies of biodiversity including bird and mammal inventories were conducted by NACRES in 2003-2004 within the Georgia Protected Areas Development Project (GEF/WB). Numerous new data were gathered and existing information was updated. But the knowledge of the fauna of Tusheti is still rudimentary and additional detailed surveys are needed to complete species lists for various taxonomic groups.

The latest biodiversity survey in Tusheti was also conducted by NACRES during the summer and autumn of 2010³. The main goal of the survey was to update the existing information on those components of Tusheti's biodiversity that had special conservation importance as well as a potential of sustainable nature-based tourism development.

5.2.1 Mammals

A total of 32 small, medium-sized and large mammal species have been recorded in Tusheti (see species lists in Annex 2). Tusheti harbours the only more or less viable population of Bezoar (Wild) goat (*Capra aegagrus*). Other important large mammal species include East Caucasian tur (*Capra cylindricornis*), chamois (*Rupicapra rupicapra*), roe deer (*Capreolus capreolus*), wild boar (*Sus scrofa*) and red deer (*Cervus elaphus*). Tusheti is also rich in large carnivores including: brown bear (*Ursus arctos*), grey wolf (*Canis lupus*), lynx (*Lynx lynx*) and possibly also Caucasian leopard (*Panthera pardus ciscaucasica*). Among small mammals there are such endemic species as Daghestan pine vole (*Microtus (Terricola) daghestanicus*), Caucasian snow vole (*Chionomis gud*), Radde's shrew (*Sorex raddei*), and Caucasian pygmy shrew (*Sorex volnuchini*).

Below, more detailed information is given on key large mammal species.

- *Bezoar goat (Capra aegagrus)*

In 2010, the minimum population number of the Bezoar goat population of Tusheti was estimated at 130 individuals. This estimate (≥ 130) is considerably higher than that of the 2004 baseline studies (95 individuals). This may be an indicative of population growth but it may also be associated with the increased effort and use of new techniques (camera traps). More recent reports also suggest that the population may be growing.

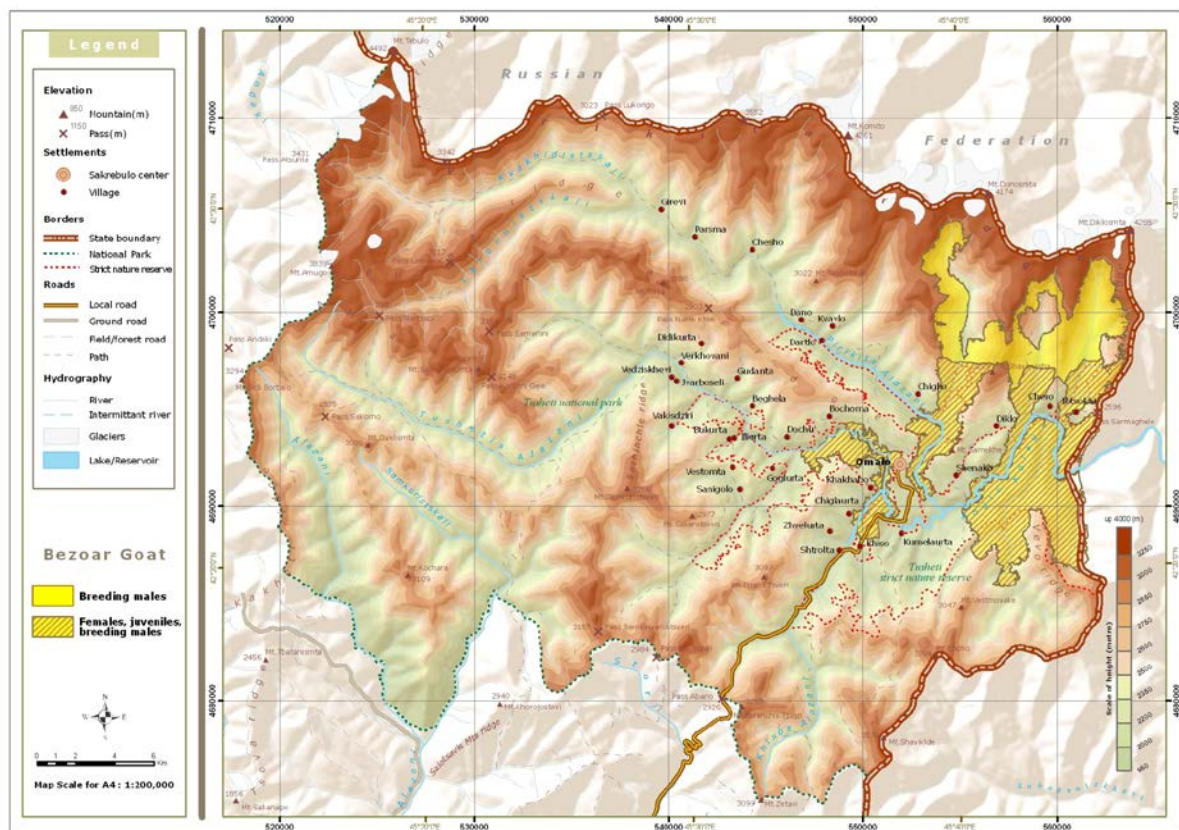
Map 2 below shows the distribution of Bezoar goat in Tusheti during the summer months. This map was also created in 2010. According to this range map, the summer wild goat range covers 95.6 sq. km. which is significantly larger than the 2004 estimation. It is

² Project: Monitoring of Wolf, *Canis lupus*, on the Reserves of East Georgia, NACRES, funded by WWF.

³ Project: UNDP/GEF project "Catalyzing Financial Sustainability of Georgia's Protected Areas System" (00070382) Testing site-level revenue generation mechanisms in Tusheti PAs

important to note that this is the summer range of the wild goat in Tusheti. It is very likely that there is a seasonal variation in the spatial distribution of these animals. In addition to the seasonal weather conditions in Tusheti the situation changes dramatically between the summer and winter months in respect of other factors too. By mid autumn, most of the villages become completely deserted, human movement sharply declines on the roads and trails crossing through the wild goat habitats, all the sheep are driven down to the winter pastures in the lowlands, and there are also likely changes in the distribution of large carnivores primarily wolves. As a result of these changes, the wild goats may expand their territory in various directions primarily toward where the unoccupied forest habitat is available.

Isolated wild goat sightings have been reported from certain forested sections that are not currently included in the summer range. One such section is the forests toward village Dartlo. However based on the available confirmed data and GIS analysis these sections do not meet the criteria of suitable wild goat habitat. Nevertheless, it is not possible to completely exclude the possibility of use of those areas by some individuals.



Map 2. The summer range of Bezoar goat (*Capra aegagrus*) in Tusheti (NACRES, 2010)

- *East Caucasian tur (Capra cylindricornis)*

In Tusheti, during the summer months turs are mainly found in the alpine, subnival and nival areas with the majority of the animals preferring extremely inaccessible territories in the nival and subnival zone. They only rarely come down to the alpine areas to graze on the alpine

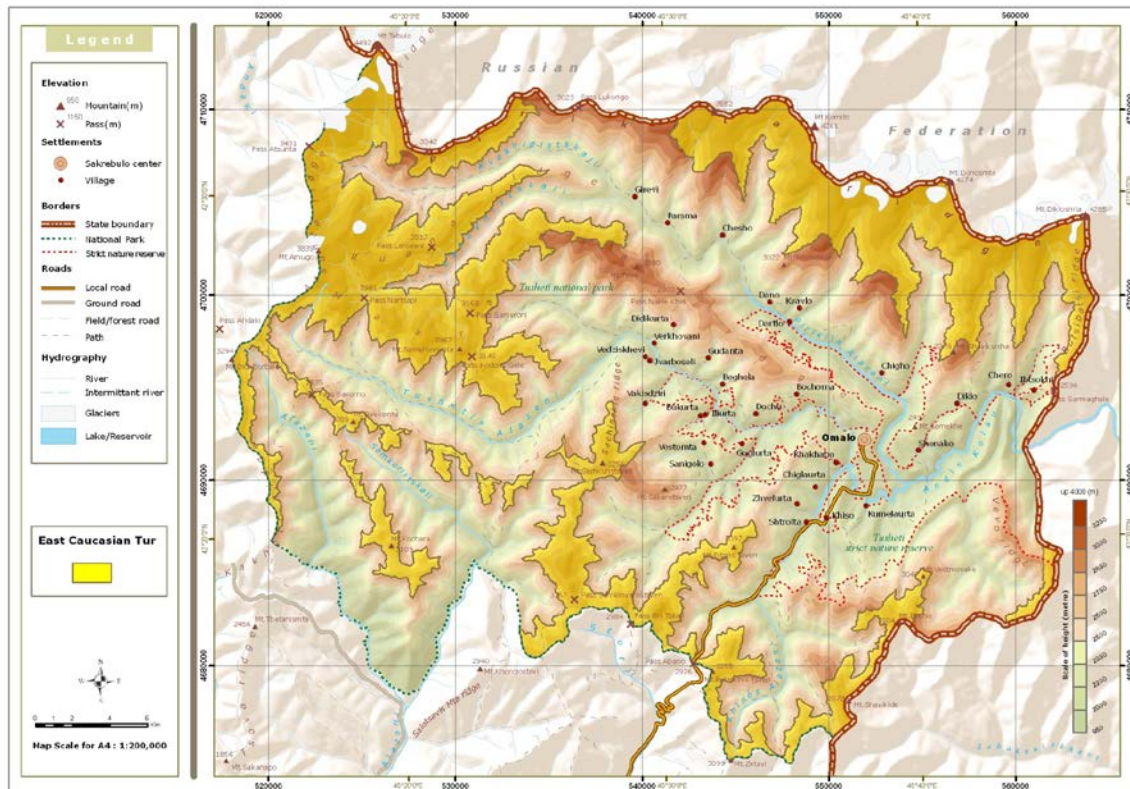
pastures because most of these areas are occupied by livestock (sheep and goats). During the direct counts conducted in 2010, no tur herds were observed below the 3,100 m.a.s.l. mark. However, camera trapping data indicated that individual animals *did* occasionally come down to the lower altitudes such as 2,800 m.a.s.l. Above this altitudinal mark, virtually the whole territory of Tusheti may be considered as tur summer range (see Map 3). The total tur range in Tusheti was calculated to cover 330 sq. km.

The surroundings of the sources of the Chesho and Chigho Khaa appear to be very important tur areas since they feature extremely remote and inaccessible areas that attract large herds of turs.

The Atsunta Ridge is probably the most important core area for tur. This site includes: the Borbalo massif, mount Amugo and surrounding hills, the Atsunta pass and Madnis Khorkhi. The mount Amugo area, namely the Nartsapi pass features practically ideal habitats for the tur. Abundant shelter, good pastures, numerous water sources and also glaciers all make this territory perfect year round tur habitat. According to some locals and the Border Police, this is the only place in all Tusheti where female and male individuals are found together throughout the year. Elsewhere the males usually live separately from the females and keep to higher elevations most of the time. Breeding males are usually extremely vigilant and shy. They take shelter in very remote and naturally protected sections of the habitat because of which it is very difficult to observe them, especially in summer.

Consequently the 2010 survey concluded that the Atsunta ridge is one of the critical parts of the tur range due to the following: (i) typical tur habitats in this part of TPA cover a relatively large continuous area, (ii) the site appears to be preferred by turs because of the abundance of virtually inaccessible places and rugged terrain — if disturbed the animals can quickly rush out of sight and take shelter in the naturally protected sections, (iii) helicopter movement may be less intense and restricted by frequent poor visibility because of fog.

According to the 2010 NACRES surveys, the total Tusheti tur population was estimated at 750 individuals.



Map 3. Range of East Caucasian tur (*Capra cylindricornis*) in Tusheti (NACRES 2010)

5.2.2 Birds

The previous bird list for Tusheti was updated as a result of the last bird inventory conducted in 2010. The new list includes 88 bird species (Annex 2) which is an impressive result for Tusheti as the number is nearly a third of all bird species found in the country. It is also notable that the 2010 survey was only the second bird inventory in Tusheti (the first inventory was conducted in 2003-2004). The previous bird list included 57 species and it was then updated by 31 new species. This list is likely to become significantly longer if ornithological surveys continue, especially if future surveys can be conducted during the pick bird migration (e.g. in October).

Of primary importance are the Caucasian endemics: Caucasian black grouse (*Tetrao mlokosiewiczi*) and Caucasian snowcock (*Tetraogallus caucasicus*). There are also six species from the Georgian Red List including black vulture (*Aegypius monachus*) which is also globally threatened and included in the IUCN Red List as Near Threatened (NT). In general, Tusheti is rich in large birds of prey. Such species as bearded vulture (*Gypaetus barbatus*), griffon vulture (*Gyps fulvus*), goshawk (*Accipiter gentilis*), sparrowhawk (*Accipiter nisus*), kestrel (*Falco tinnunculus*), golden eagle (*Aquila chrysaetos*) as well as aforementioned black vulture are commonly seen in Tusheti. There are also almost all the Georgian bird species that are important for international birdwatching. In addition to aforementioned Caucasian black grouse and Caucasian snowcock, these include Caucasian chiffchaff (*Phylloscopus lorenzii*), green warbler (*Phylloscopus nitidus*), red-fronted serin

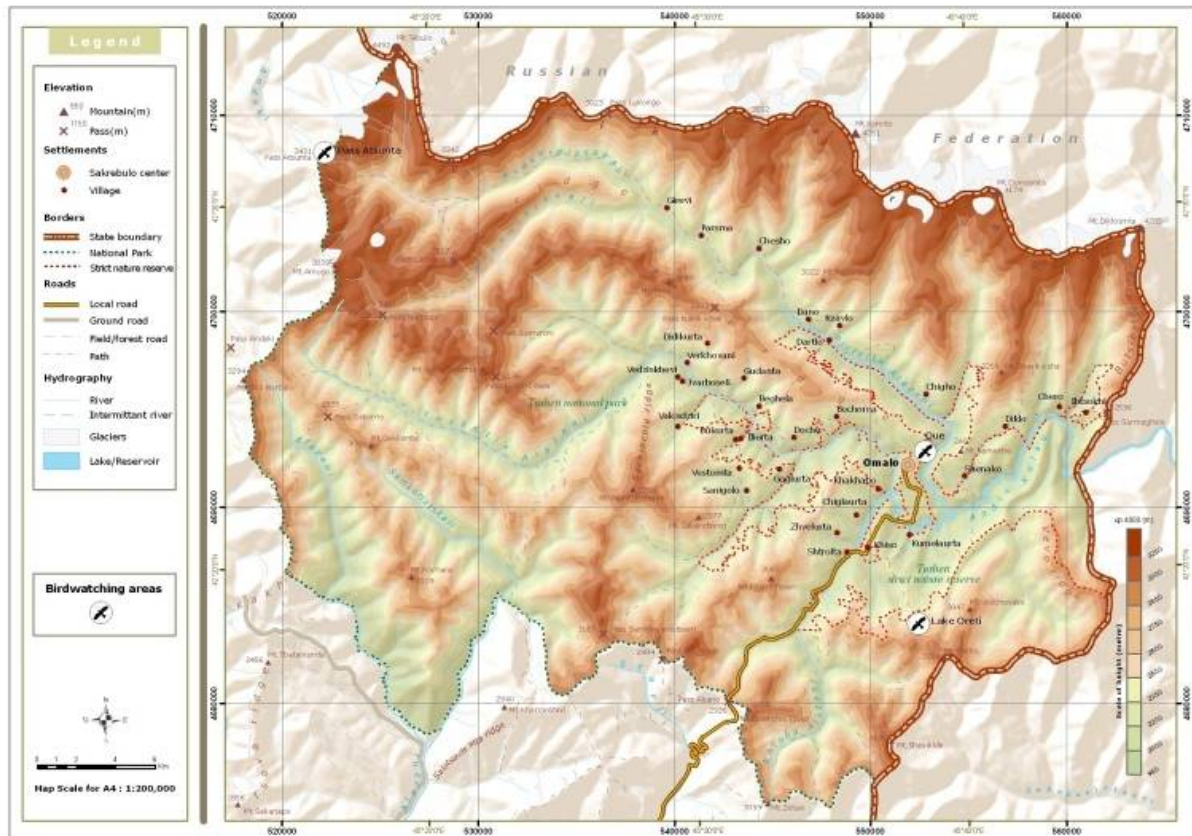
(*Serinus pusillus*), and great rosefinches (*Carpodacus rubicilla*). This latter species has an interesting global distribution — outside its main range in Central Asia, it is only found in the Caucasus as an isolated population.

Table 1. Important bird species found in Tusheti

| # | Scientific name | Common name | Legal status | | Importance to Birdwatching |
|-----|--------------------------------|------------------------|--------------|---------------|----------------------------|
| | | | Geo Red list | IUCN Red list | |
| 1. | <i>Gypaetus barbatus</i> | Bearded vulture | VU | | |
| 2. | <i>Gyps fulvus</i> | Griffon Vulture | VU | | |
| 3. | <i>Aegypius monachus</i> | Eurasian Black Vulture | EN | NT | |
| 4. | <i>Aquila chrysaetos</i> | Golden Eagle | VU | | |
| 5. | <i>Tetrao mlokosiewiczi</i> | Caucasian Black Grouse | VU | DD | + |
| 6. | <i>Tetraogallus Caucasicus</i> | Caucasian Snowcock | | | + |
| 7. | <i>Phylloscopus lorenzii</i> | Caucasian Chiffchaff | | | + |
| 8. | <i>Phylloscopus nitidus</i> | Green Warbler | | | + |
| 9. | <i>Serinus pusillus</i> | Red-fronted Serin | | | + |
| 10. | <i>Carpodacus rubicilla</i> | Great Rosefinch | VU | | + |

Important bird areas in Tusheti

The ornithofauna of Tusheti includes a number of species of conservation and/or tourist interest. There are also certain specific sites that have special importance in respect of bird conservation and nature-based tourism potential. Such sites are: (1) the Atsunta pass as a Great Rosefinch nesting area, (2) the lake Oreti area and the nearby scree as Caucasian snowcock habitat, and (3) Samekhe hillsides as vulture perching site that can be observed from the Kue observation point (see *Map 4* below)



Map 4. Potential bird observation sites

5.2.3 Other fauna

Information is extremely scarce on other groups of vertebrates. There are at least 3 reptile species and at least 4 amphibians and only one fish species – River trout (see species lists in Annex 2).

Very little is known about the invertebrate fauna of Tusheti. A rapid assessment of invertebrates and especially of insects should be considered as one of the research priorities for Tusheti. The 2010 survey revealed the abundance of such butterflies as swallowtail (*Papilio machaon*), red admiral (*Vanessa atalanta*), painted lady (*Vanessa cardui*) and small tortoiseshell (*Aglais urticae*). The rare mountain apollo (*Parnassius apollo*) was noted at village Dartlo, near lake Oreti and also at Sajinchvle ridge. This species is included in the Georgian as well as IUCN Red Lists (VU), is on Appendix II of CITES⁴ and Annex IV of [Habitats Directive](#)⁵. Near mount Borbalo, the endangered endemic Caucasian apollo (*Parnassius nordmanni*) was found. This species has a small fragmented range in the country and is included in the Georgian Red List (EN).

5.2.4 Domestic fauna and flora

⁴ The Convention on International Trade in Endangered Species of Wild Fauna and Flora

⁵ Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora

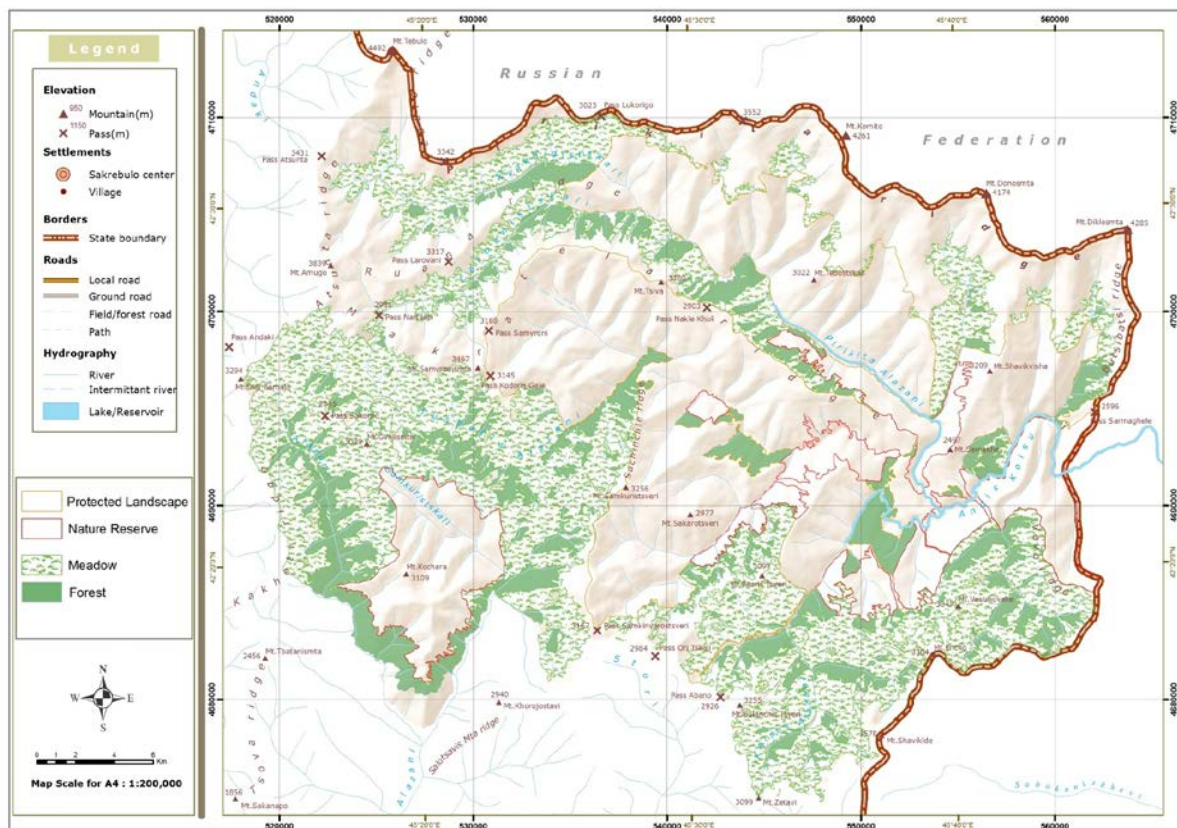
Tusheti is rich in domestic plant and animal species. The region is the site of origin of three endemic breeds: Tushetian horse, Tushetian sheep and Georgian sheepdog, as well as of several endemic domestic plant varieties including the endemic barley "Kershveli".

5.2.5 Species covered by the Berne convention

There are a number of species that are included in the Resolution No. 6 of the Berne Convention on the Conservation of European Wildlife and Natural Habitats (see list in Annex 4).

6 Landscapes and habitats

The mountainous landscape of Tusheti represents a mosaic of forests, subalpine shrubbery, subalpine and alpine meadows, subnival areas and nival zone with permanent snow cover. The Tusheti landscape — in its present form — is a result of the combined action of various landscape generating natural forces (e.g. geological, geographical and biogeographical, climatic, etc.) and historical and more recent human influence (including livestock farming, crops production, etc.). Habitat classification presented below has been largely based upon the physical features and visual characteristics as well as on the coarse classification of vegetation.

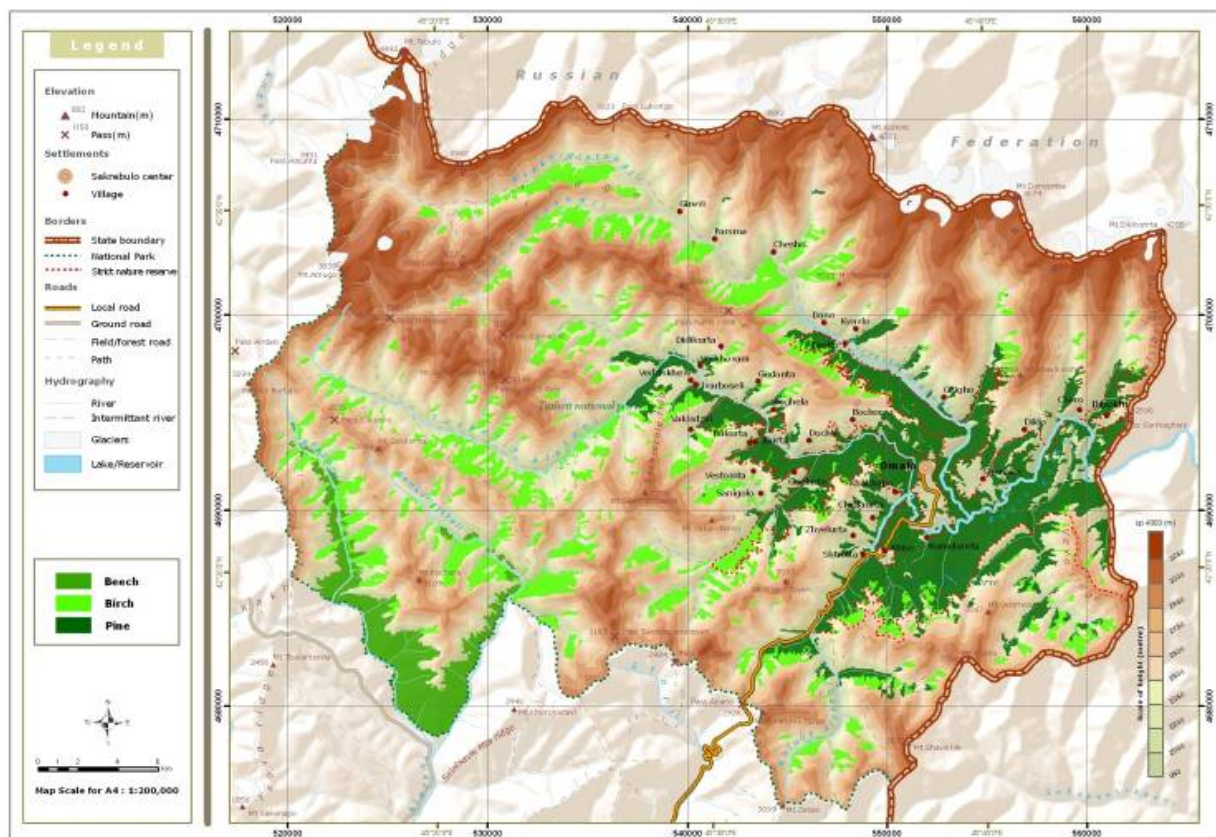


Map 5. Meadows and forests in Tusheti national park and nature reserve (NACRES 2010)

6.1 Forests

Forest habitats in Tusheti are mainly found in the form of pine forest of *Pinus cochiana*. Birch (*Betula spp.*) forest covers a smaller percentage while deciduous mixed forest has even more limited distribution. The total area of the forests found within the National park and Nature Reserve is approximately 20 thousand hectares. The forest belt is represented by the upper forest zone at 1650 m.a.s.l. to 1800-1900 m.a.s.l. Subalpine forests are found at the altitudinal range between 1800-1900 and 2500-2600 m.a.s.l. Birch forests (including crook-stem subalpine birch forest) are found at the altitudinal range 1700 to 2400 m.a.s.l. on average (in certain parts the upper tree line is at 2500-2600 m.a.s.l.). Most common type of birch forest is composed of *Betula pendula* and this is found mainly on northern aspects. An important proportion of the birch forest is also composed by Litvinov's birch (*Betula litwinowii*). Notably in some parts there is no definite boundary between the pine and birch forest and there are intermediary forest communities. Therefore this classification is extremely arbitrary.

The pine forest in Tusheti covers 12,404 ha and the birch forest covers 10,188 ha.



Map 6. Forest habitats in Tusheti (NACRES 2010)

Sacred forests in Tusheti

Sacred forests that are found in Tusheti and elsewhere in the high mountains of Georgia are a classical example of a sacred site that has both religious and conservation values. Typically sacred forests in Georgian mountains are almost intact forest stands often

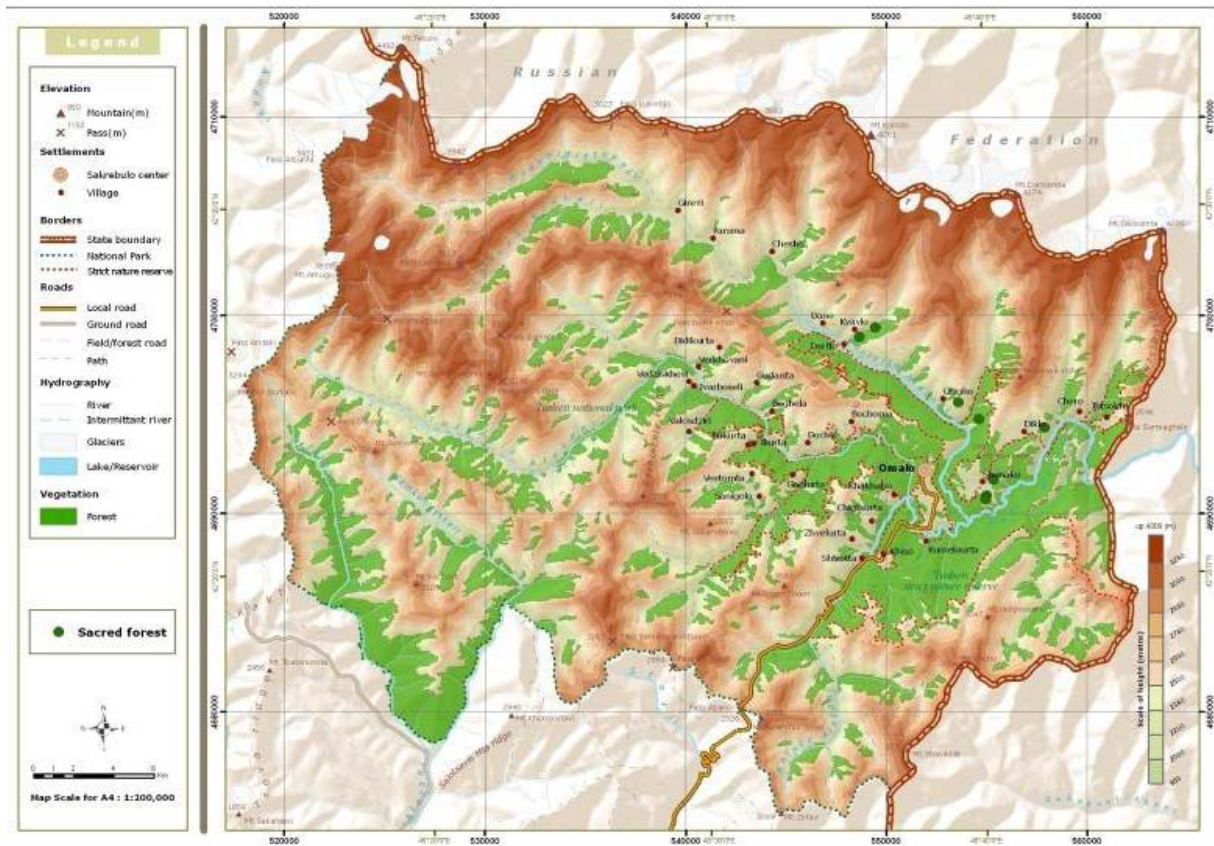
distinguished by high aesthetic value and rich biodiversity. Sacred forests may also represent an example of local forest that has avoided any major human influence completely or over a long period of time. Hence, however small, any sacred forest may still be important for conservation.

In 2010, a total of 10 sacred forest sites were recorded throughout Tusheti (see Table 2) and a primary map was created (Map 7). Further work needs to be done to study the species composition and to create more detailed maps. It would also be interesting to conduct comparative studies i.e. to compare sacred forest to other exploited parts of the forest habitat.

Table 2. Sacred forest sites in Tusheti

| # | Location | Name of religious sites | Geographical coordinates ⁶ | Altitude (m.a.s.l.) | Approximate size (Ha) |
|---|--------------------|-------------------------|---------------------------------------|---------------------|-----------------------|
| | Village Shenako | Ageurta | 0555255 4690498 | 1,868 | 4 |
| | Village Shenako | Tsasne | 0555130 4690850 | 1,832 | 1 |
| | Village Shenako | Kurekhi | 0555218 4691733 | 2,018 | 2 |
| | Village Diklo | Bichekhi | 0557849 4694484 | 2,215 | 2 |
| | Sanare | Shuamta | 0555107 4693905 | 2,449 | 1 |
| | Village Chigho | Lashari | 0553344 4695022 | 2,016 | 20 |
| | Village Chigho | Tursiekhi | 0552747 4695799 | 2,110 | 2 |
| | Village Dartlo | lakhsari | 0547909 4698568 | 1,940 | 6 |
| | Village Kumelaurta | Shapura | 0551924 4688558 | 2,200 | 4 |
| | Village Kumelaurta | Khakha | 0551919 4688548 | 2,180 | 1 |

⁶ Data in the Pulkovo coordinates system.



Map 7. Primary map of sacred forest sites in Tusheti (NACRES 2010)

6.2 Subalpine shrubbery

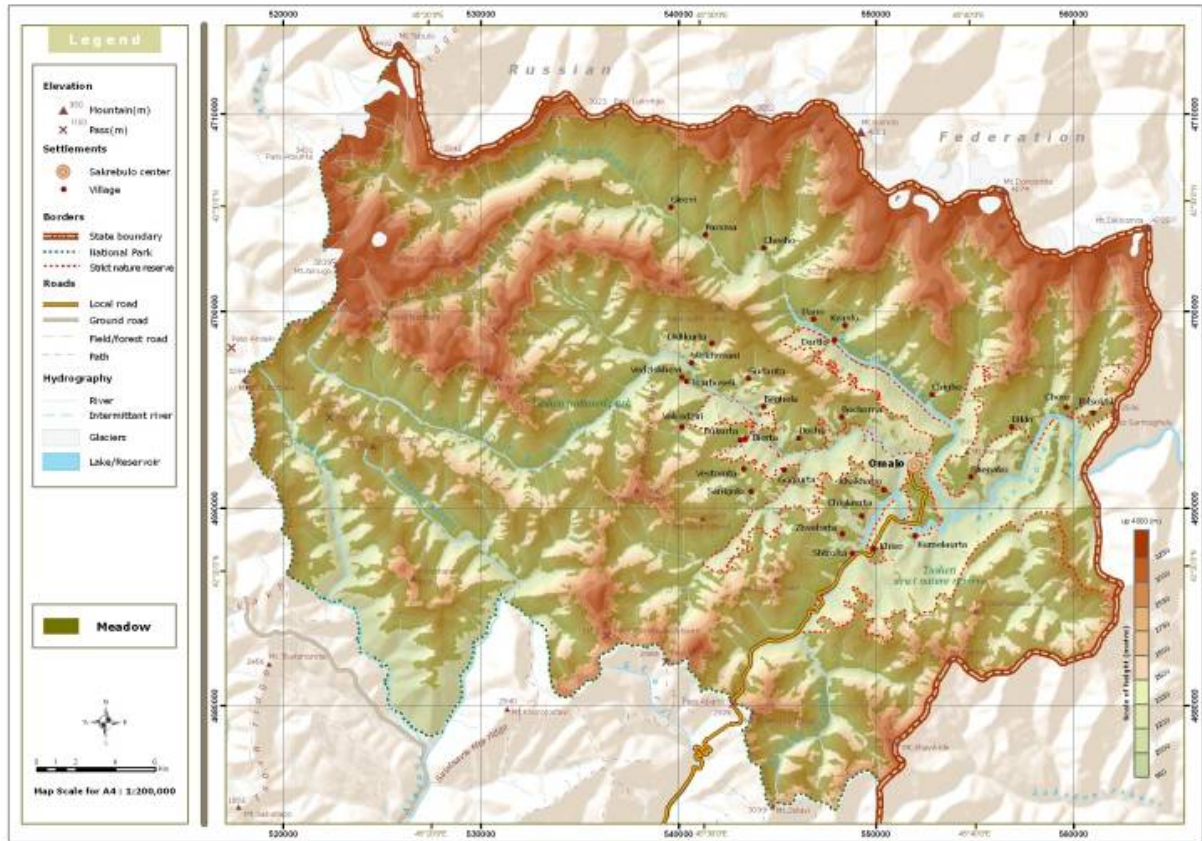
Subalpine shrub habitats are composed of Caucasian rhododendron (*Rhododendron caucasicum*) and occur at the altitudes of 2400-2800 m.a.s.l. Larger fragments of this shrubbery are found as a strap along the Pirikita gorge just above subalpine forests at 2600-2800 m.a.s.l.

6.3 Alpine and subalpine meadows

Meadows are undoubtedly the main element of the Tusheti landscape. According to the recent estimate, they cover more than 60 thousand hectares. This is considerably smaller than the previously calculated area — 70,000 ha. Notably the old estimate was not based on remote sensing technologies, which may explain the big difference between the two figures.

For the purpose of the above estimation, the meadow was defined as relatively large continuous open area, excluding smaller openings in the forest or shrubbery. In reality the meadows in Tusheti are very diverse and are composed of at least three distinct plant communities such as mezophile alpine meadow, so called “alpine moles” and subalpine tall

grass communities⁷. Thus this habitat encompasses all the open land in Tusheti that may be considered as pastures regardless their current use status (the pasture use pattern may change in Tusheti from year to year).



Map 8. Alpine and subalpine meadows in Tusheti (NACRES 2010)

6.4 Subnival habitats and nival zone

Subnival habitats with characteristic vegetation are well represented on Atsunta and Pirikita ranges, namely at the Tebulo, Amugo and Diklo mountainous massifs. Subnival vegetation is poorly represented on the main watershed range. The nival zone with permanent snow and glaciers is found above 3400 m.a.s.l.

6.5 Habitats covered by the Berne Convention

There are several habitats that are included in the Resolution No. 4 of the Convention on the Conservation of European Wildlife and Natural Habitats. These include:

- Basic mountain flushes and streamsides, with a rich arctic-montane flora
- Cave entrances
- Perennial calcareous grassland
- Moist or wet oligotrophic grassland

⁷ Detailed description of these plant communities can be found in NACRES' *Biodiversity Baseline Studies Report, 2004*.

- Rich fens, including eutrophic tall-herb fens and calcareous flushes and soaks
- Beech woodland (*Fagus* woodland).

It is important to note that detailed distribution maps of these habitats in Tusheti are not currently available.

7 Historical and current use of biodiversity

Since ancient times suitable areas of Tusheti were managed for livestock grazing and crops production. Local needs for cereals were almost entirely satisfied by local agriculture. Hence vast areas in upper forest and subalpine zones were cleared for crops production. These were the areas where the climate and soils as well as relief forms were suitable for growing cereals. Later land cultivation was abandoned and cereals were being imported from Georgia's lowlands. Since then sheep and other livestock became the dominated form of human activity. Formerly cultivated areas were transformed into graze lands on which new vegetation has been developing under constant pressure of grazing. As a result large proportions of land in upper forest zone (1800-1900 m.a.s.l.) and on southern aspects of subalpine zone have become open secondary meadows with limited productivity. In more recent historical times sheep farming became gradually more important. Tusheti graze lands have since been used for summer grazing of sheep.

7.1 Traditional sheep farming

The present-day sheep farming in Tusheti is entirely based on a transhumant system. Tushetian sheep herders use high mountain graze lands in Tusheti as summer pastures and migrate to the lowlands (Shiraki in the south-east of the country) in winter. This pattern originated in 17th century and it still entirely depends on natural pastures for livestock feed, hence the distinct seasonality of the grazing system. Until 1950's Tushetians still retained their traditional lifestyle - while engaged in transhumant sheep farming other livestock and agricultural activities were maintained in Tusheti and there was a permanent human population in the region.

The traditional land use strictly followed a vertical zoning. All land was divided into zones with different agricultural use purposes. Plot rotation schemes were also widely applied. This patterns of land use ensured soil maintenance and sustainable use of both cultivated and graze lands.

Since 1960s the above traditional grazing system was entirely abandoned. Soviet economy demanded an increase of sheep numbers and neglected local traditions and ecological conditions. The original zoning of pasturelands and pasture rotation schemes were abandoned causing serious deterioration of both summer and winter pastures. Land degradation is particularly evident in the plots previously used for cultivation but presently used for livestock grazing. All of this caused major shifts in the traditional life-style. Crop production was abandoned and all Tushetians switched to a transhumant life-style i.e. spending the winter season in the lowlands and only returning to Tusheti for the summer.

7.2 Traditional hunting

In the past hunting was an important source of food but it also had cultural importance and was associated with the climbing ability and overall physical and psychological fitness of the hunter. According to the Georgian pre-Christian beliefs and myths (which only survived in the high mountains) big game such as tur, bezoar goat and red deer were regarded as sacred animals that were herded by the goddess Dali and demigod Ochopintre. Dali was in charge in even years and Ochopintre in odd years. Ancient Tushetian hunters believed that in even years hunting was most difficult. The hunters had special pre-hunting rituals and any trophy was to be promised to the gods. They were also to strictly follow unwritten rules and restrictions. For example, it was not allowed to kill more than three animals during one hunt. Ancient hunter also believed that their arms would get "heavy" with the sin of killing animals in time and after they killed 100 animals with a particular arm they had to get rid of it. It was regarded as a disgraceful act to kill a female tur, wild goat or red deer with a young. Nor was it acceptable to kill a sleeping animal.

7.3 Present use of natural resources

At present the local population use biological resources including fuel wood, timber, mushrooms, berries, herbs, fish etc. apparently in very small quantities and only for self-consumption. These natural resources make up only an insignificant share of their incomes.

Timber (fuel wood, construction timber) is mainly collected from the protected landscape. Fuel wood is the main resource for cooking and heating. According to the local population after the ban of hunting as protected areas were established, local Tushetians practically no longer engage in hunting and most incidences of illegal hunting should be attributed to visiting hunters.