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Introductory Report on Nature Conservation in Georgia

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INTRODUCTORY REPORT ON NATURE CONSERVATION IN GEORGIA

1. General Information on Georgia

Georgia is situated in the Caucasus region at the juncture of Eastern Europe and Western Asia. The country with total area of 69,700 km² is bounded to the west by the Black Sea coast (shoreline 310 km), to the north by Russian Federation (border length 723 km), to the south-east by Azerbaijan (322 km), to the south by Armenia (164 km) and to the south-west by Turkey (252 km).

According to the National statistics office data for 2010 year Georgia has a population of 4.4 Million inhabitants and GDP per capita of about 2450.1 USD in 2009 year. Official Language of Georgia is Georgian.

To the north the country is bordered by the Greater Caucasus Mountains and to the south by the Lesser Caucasus. Between these mountain ranges lay the inter-mountain plains of Central Georgia. The Likhi ridge divides the country, from north to south, into western and eastern Georgia. The country is characterized by distinguishable vertical zoning with altitudes of up to 5,069 m.a.s.l. (the Shkhara peak). Mountains occupy the major part of the country with 54% of the territory located at altitudes higher than 1000 m.a.s.l.

Georgia has thousands of rivers, most less than 25 km long, which either drain into the Black Sea to the west or flow through Azerbaijan to the Caspian Sea to the east. The two longest rivers, the Kura (or Mtkvari in Georgian, 1,364 km) and the Rioni (327 km), flow in opposite directions. The Kura originates in Turkey and runs eastward across the plains of eastern Georgia and Azerbaijan into the Caspian Sea, while the Rioni, originating in the Greater Caucasus, with the smaller Inguri and Kodori rivers runs through the fertile Kolkhida Lowlands and empties into the Black Sea to the west.

Georgia has several distinctive climatic zones. The coastal area has a humid subtropical Mediterranean climate year-round. The Greater Caucasus Mountain Range forms a barrier against the cold air from the north, while warm, moist air from the Black Sea can move easily into the coastal lowlands from the west. The plains of eastern Georgia have a more continental climate than the west, with colder winters, hotter summers and lower humidity. Alpine and highland regions and the semi-arid region of the Iori Plateau to the south-east have distinct microclimates. Alpine climates begin at about 2,100 m, and above 3,600 m mountains are covered by snow and ice throughout the year.

The long growing season allows for the cultivation of almost any crop, making Georgia's agriculture very diverse. The main crops are corn and winter wheat. Winemaking has a long tradition in the country, and wine is a very important agricultural product. Other leading crops are citrus and non-citrus fruits. Animal husbandry—mainly the raising of cattle, pigs and sheep—is also important.

Agriculture has considerably transformed the land at lower altitudes, and little of the country's native wildlife remains. Dense forests and woodlands cover 41 per cent of the country, but forests are mostly concentrated in the western and mountainous regions, while in the sparsely wooded eastern uplands, underbrush and grasses predominate

Soils differ markedly between the west, east and south of the country with lowland wetland podsols, mountain-forest and mountain-meadow soil zones prominent in the west; chestnut and black soils in the steppes and brown soils (in the Eldari semi-desert and various areas of the southern parts of Iori upland) are typical for the eastern province.

Up to 40% of Georgia is covered by forests and another 40% by agricultural land. Among these 15% is covered with intensively used (arable land and perennial crops) agricultural fields and 28% with hay meadows and pastures.

2. Policy and Legislative framework

The Georgian Constitution provides the basis for environmental legislation. Article 37 (paragraphs 3 and 4) of this document states that:

”Everyone has the right to live in a healthy environment and use natural and cultural surroundings. Everyone is obliged to protect the natural and cultural environment” also “The state guarantees the protection and rational use of nature to ensure a healthy environment, corresponding to the ecological and economic interests of society, and taking into account the interests of current and future generations”.

The same article also grants the right to everyone to have access to complete, objective and timely information on his or her working and living conditions.

The Law on Environmental Protection, adopted on 10 December 1996, establishes the general legal framework for comprehensive environmental protection and for the use of natural resources. It covers a wide range of issues, including environmental standard setting, licensing of activities connected with natural resource use, environmental permitting, keeping State registers of environmental information, and monitoring. It establishes procedures for the State ecological expertise of economic projects.

The protection of valuable ecosystems is regulated by ***the Law on System of Protected Areas*** adopted in 1996, which established a system of natural reserves, national parks, protected landscapes, biosphere reserves and others, and determines a regime for their use and protection. The types of protected areas explicitly follow the World Conservation Union (IUCN) classification and the Law contains references to IUCN categories.

The main legal instrument for the conservation and sustainable use of wildlife is the ***Law on Wild Fauna*** (1996). This law governs the relationship between the authorities and key users (both individuals and legal entities) relating to the use and protection of wild fauna, and declares all wildlife as state property. It protects wild animal species, their habitats, and their products, it provides for the sustainable use of Georgia’s wild fauna and establishes a legal basis for both *ex situ* and *in situ* conservation of wild animal species. According to the law, both sport and commercial fishing, but only sport hunting, are allowed in Georgia. Sport fishing does not require a licence. With the exception of migratory birds, hunting only permitted on specially designated areas called hunting farms or hunting reserves. Hunting reserves may be owned by a legal entity (e.g. a registered company or organisation, either governmental or non-governmental) or by a private individual. General licences for hunting reserves are awarded by the Ministry of Economy and Sustainable Development through an auction for each potential site.

Georgian ***law on the Red List and the red Book*** was adopted in 2003 and formed a legislative basis for the protection of endangered species, their harvesting and the rules of compilation of “The Red List”. According to this law, the status of the endangered species should be assessed in accordance with IUCN criteria. The removal of species on the Red List from their natural environment is permitted only in special cases with the aim of their saving, medicinal treatment, reproduction and scientific study. These species cannot be harvested for commercial purposes. In accordance with the provisions of this Law, the Commission on Endangered Species of the Academy of Sciences of Georgia conducted an evaluation of the state of flora and fauna species within the country using IUCN criteria and categories, and developed a new Red List of Georgia. This List was approved by Presidential Order #303 (May 2, 2006).

The 1999 ***Forest Code*** comprehensively regulates all forest use and protection, including ownership rights, institutional arrangements, procedures for leasing forests and inspection measures.

International Conventions and Agreements

Georgia’s accession to a number of key international conventions and treaties (including the Convention on Biological Diversity, the Ramsar Convention, CITES and the Bonn Convention and associated agreements such as AEWA, ACCOBAMS and Eurobats), commits the country to international responsibilities for the conservation of biological and natural resources. According to the Georgian Constitution obligations under international treaties and memoranda are given priority over national legislation, provided they do not contradict with the constitution.

Georgia is party to the following International treaties in the field of Biodiversity Conservation:

- Convention on Biological Diversity (1992)

- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention) (1971)
- Protocol on Biological Safety (Cartagena Protocol) (2000)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1973)
- United Nations Framework Convention on Climate Change (UNFCCC)(1992)
- United Nations Convention to Combat Desertification (UNCCD) (1994)
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)
- EUROBATS Agreement on the Conservation of Bats in Europe
- AEWa the Agreement on the Conservation of African-Eurasian Migratory Waterbirds
- ACCOBAMS the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area
- Convention on Persistent Organic Pollutants (Stockholm Convention)
- Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention)
- Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal (Basel Convention)(1989)
- Convention on Long-range Transboundary Air Pollution (Air Convention) (1979)
- Convention on Access to Information, Public Participation in Decisionmaking and Access to Justice in Environmental Matters (Aarhus Convention) (1998)
- Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention)
- Convention for the Protection of the Ozone Layer (Vienna Convention)
- European Landscape Convention
- Bern Convention on the Conservation of European Wildlife and Natural Habitats

Main Policy document in the file of Biodiversity Conservation is the ***National Biodiversity Strategy and Action Plan (NBSAP)*** approved by the Government of Georgia in February 19, 2005. The NBSAP details a ten year strategy for biodiversity protection and sustainable resource use as well as specific activities for the first five year period. It is envisaged that a new action plan for the next five years will be developed taking into account the current situation and the progress made by that time. The following ten issues are distinguished within the NBSAP with due regard to the state of the country's biodiversity and the issues and problems that threaten it: protected areas; species and habitats; agro-biodiversity; hunting and fishing; biodiversity monitoring; bio-safety; environmental education, public awareness and involvement; financial-economic program; sustainable forestry and national legislation. The NBSAP defines 140 activities to achieve the set goals. Besides the governmental structures, the NGOs and scientific institutions take part in implementation of the NBSAP.

3. The Status of Biodiversity in Georgia

Georgia, as part of the Caucasus eco-region, represents one of 34 biodiversity "hotspots" identified by Conservation International as areas distinguished for having high levels of endemism whilst also being seriously threatened by habitat loss. The Caucasus eco-region is also identified as having global significance by WWF due also to high levels of diversity and endemism but also because of specific evolutionary processes and unique historical floral and faunal development.

The main threats for biodiversity in Georgia are destruction/degradation of habitats and the extensive extraction of biological resources. The principal causes for habitat destruction are timber logging, degradation of water ecosystems and intensive grazing. Despite the fact that more recent trends indicate a decrease in illicit extraction of forest resources, wood and fire wood processing remains one of the threats to biodiversity. The problem of intensive grazing is mainly problematic for the sub-alpine, alpine ecosystems of the high mountains as well as the semi-arid zones found in the south-eastern parts of Georgia where, in both cases, large numbers of grazing livestock (especially sheep) result in soil erosion.

Over-extraction of biological resources is principally caused by illegal activities such as poaching (including fishing), illicit logging as well as illegal trade associated with all these. For example,

poaching is the main reason for decreases in the populations of deer, tur, chamois, wild oat bear and several species of fish. In addition, construction of dams along the migration routes of anadromous species (i.e. sturgeon) have formed impassable barrier for individuals moving to spawning areas. At present, for example the extraction of non-timber forest products (food, medicinal purposes and decorative plants) is not legally regulated. In addition, the status assessment for herbaceous species has not yet been completed and so rare, endemic and endangered species of non-woody plants remain unprotected by legislation.

Major Landscapes and Ecosystems

A complex landscape and variations in climatic conditions between the various provinces in Georgia contribute to the overall diversity of the country. The main biomes are: forests, fresh-water and wetlands, marine and coastal, high-mountain, semi-desert and steppes. Forests cover about 39.9% of the territory of Georgia. Leaved and coniferous forests rich with endemic and rare species are the true treasure of the state. The Kolkheti refugium, limestone areas of the Western Caucasus and high mountainous vegetation complexes are especially notable for their species diversity and high levels of endemism.

Unfortunately, habitat classifications used in Georgia do not coincide with those applied in Europe and are not standardised even at the national level and this represents a serious impediment to obtaining reliable information on habitat status as well as the facilitation of effective conservation and management. The MoE, in cooperation with GTZ, is now developing a national habitat classification system based on the Natura 2000 Interpretation Manual for the EU.

Mountains occupy a significant portion of the country: 54% of the country is located at altitudes higher than 1000 m.a.s.l. Agricultural land covers 43.5% of the state area of which 35% is arable land and perennial crops and 65% is hay meadows and pastures (according to 2004 data). However, in recent years the area of arable land and perennial crops (utilized by agricultural households) has decreased.

Forests cover about 40% of the territory of Georgia. Broadleaf and coniferous forests, rich with endemic and rare species, are the true treasure of the state with 97% of Georgian forest being natural. The vast majority (98 %) of forested land is represented by mountainous forests providing such ecosystem services as water regulation, soil protection and climate stabilization whilst also being important habitat for many relict, endemic and endangered species of plants and animals. Almost intact forest stands, which have the greatest conservation value, have been preserved in Georgia.

Forest Ecosystems

Forest ecosystems are outstandingly significant for the conservation of biodiversity in Georgia as these cover about 40% of the land. Furthermore, 97% of this is natural, as opposed to plantation, and is represented primarily by mountainous forests important for the provision of ecosystem services including water regulation, soil protection and climate stabilization. They are also important habitats for many relict populations and endemic and endangered plants and animals. Almost intact forest stands, with high conservation value, have been preserved in Georgia and forest ecosystems are found in almost all regions of the country, with the exception of the Javakheti plateau, and in the Khevi and Tusheti regions forests occupy only very small areas.

In Western Georgia forests are present all the way down to sea level while in Eastern Georgia the forest belt starts at 600-700 m.a.s.l. About 400 arborescent species grow in the forests of Georgia and 26% (104 species) of the dendro-flora here are either Georgian or Caucasian endemics. Due mainly to the prevalent soil and climatic conditions the main forest types in Georgia are: broadleaf, coniferous, sub-alpine thin and crook stem, arid thin and floodplain forests. **Broadleaf forests** occupy 81% of forest cover while **coniferous forests** cover around 19%. By species forest composition is represented as: beech, *Fagus orientalis*, (46.6%), oak *Quercus spp.*(10.6%), hornbeam, *Carpinus caucasica*, (8.8%), Caucasian fir, *Abies nordmaniana*, (7%), alder *Alnus barbata* (5.5%), spruce, *Picea orientalis* (4.5%), pine, *Pinus spp.* (4%) and chestnut, *Castanea sativa* (3.2%).

An understory of evergreen broadleaf arborescent species is typical for the forests of the Western Georgia and is formed with relict genera such as Rhododendron, Epigaea, Ruscus, Ilex, Daphne,

Hedera, and Laurocerasus. More specifically: rhododendron (*Rhododendron ponticum*), Ungern's rhododendron (*R. ungerii*), Smirnov's rhododendron (*R. smizhowii*), cherry laurel (*Laurocerasus officinalis*), holly (*Ilex colchica*), Colchic holly (*Ruscus calchicus*), ground laurel (*Epigaea gaultheroides*), Colchic ivy (*Hedera colchica*), *Daphne albobiana*, *D. pontica*. These species, then, form the understory of forests in the bio-geographical province of Kolkheti both individually and in a variety of combinations, thus granting the forests unique status and high conservation value. Colchic understory is especially well developed in the South-Western Kolkheti until 2,300-2,400 m.a.s.l. The yew (*Taxus baccata*) and Zelkova (*Zelkova carpinifolia*) relict forests found in the East Georgia reserves of Batsara and Babaneura are also worthy of mention.

Sub-alpine thin or "park" forests start from 1,800-1,900 m.a.s.l. and are mainly formed by red bud maple (*Acer trautvetteri*) and Caucasian oak (*Quercus macranthera*).

Sub-alpine crook stem forests are, in the Caucasus, formed by beech (*Fagus orientalis*), birch (*Betula litwinowii*) and Imeretian buckthorn (*Rhamnus imeretina*). These forests are rich in endemic and relict species such as Megrelian birch (*B. megrelica*), Medvedev's birch (*B. medwedewii*) and Pontic oak (*Q. pontica*).

Floodplain forests are developed in East Georgia, on the lowlands and foothill rivers of Kura, Iori, Alazani and the lower reaches of Ktsia. Oak (*Q. pedunculiflora*) and aspen (*Populus canescens* and *P. hybrida*) are dominant in these forests, which are rich with lianas. Alders (*Alnus spp.*) are dominant in the floodplain forests of the Western Georgia.

During the last years of the Soviet Union cheap wood was imported from Russia to Georgia, resulting in very little pressure on Georgian forests for extraction and allowing forest management to focus on recreational purposes. Currently, around 10% of forests are within protected areas and special protection is afforded to floodplain forests and sub-alpine forests outside of protected areas.

The majority of the fauna species of Georgia are associated with the forest ecosystems and among these brown bear (*Ursus arctos*), wild goat (*Capra aegagrus*), chamois (*Rupicapra rupicapra*), red deer (*Cervus elaphus*) and the endemic Caucasian salamander (*Martensiella caucasica*) are all included on the Red List of Georgia. The avifauna of Georgian forests is also very rich, although endemic and globally vulnerable species are relatively small in number.

After acquiring independence in the 1990s the transition to a market economy, along with a significant reduction in the gross domestic product, increasing poverty and energetic deficits inflicted serious damage to the country's forest ecosystems. The end of wood imports and a rise in cheap exports, as well as the domestic extraction of fuel-wood and the ineffective control of all these activities resulted in an unsystematic timber industry and significant degradation in the composition and quality of the forests in Georgia.

The pressure on beech forests was especially severe because of the high demand for this species and the proximity of beech forests to roads and villages, facilitating access for extraction. The structure of such forests is now heavily degraded and human-induced succession is evident.

As in many European countries economic activities caused especially severe damage to floodplain forests. In Georgia this is particularly evident as these forests represent a significant component of landscape diversity acting as important corridors and refuges for many animal species. Today only fragments of the original floodplain forests have been preserved where the expansion of arable land and the hydrological changes caused by several artificial structures along the river have resulted in serious disruption of this ecosystem.

The main threat for most of Georgia's forest ecosystems is unsustainable timber logging. Unfortunately, reliable information on logging and remaining forest cover is not available as forest inventories simply have not been conducted and there is no monitoring system in place. Accurate research (i.e. using satellite imagery and GIS-based analysis) has not yet been carried out and so a real picture of the current national forested cover or changes and trends in the general health of forests is not available. According to data gathered in 2009, 26,760.5 ha of forest need active management and restoration as result of thinning, mudslides and other causes.

Another threat to Georgia's forests is damage inflicted by forest parasites. It should be noted that studies of pathologies of the forests have not been conducted in the recent years but, according to 2004 data, 192,900 ha of forest suffers from various diseases. Beech withering, caused by various diseases, in Imereti and Adjara is especially noteworthy.

Forest fires represent another threat and in recent history, the largest forest fire was connected with the armed conflict with Russia in 2008, when 951 ha of unique forest massifs were eliminated near Borjomi-Kharagauli National Park.

Inland Waters

With a total of 26,060 rivers Georgia has a large river network, though the majority of these are less than 25 km long. The longest is the river Kura which starts in Turkey and crosses Eastern Georgia before flowing into the Mingechauri reservoir in Azerbaijan. Two more large rivers, the Alazani and the Iori, also flow into this reservoir but they begin their journey in the mountains of the Great Caucasus, passing through Kakheti region. Other rivers in the east of the country are the Liakhvi, Khrami and Aragvi. Western Georgia holds the majority of the country's rivers, the majority of which begin in the mountains of the Great Caucasus and flow into the Black Sea. The main rivers here are the Rioni, Enguri, Tchorokhi, Kodori, Bzifi and the Tskhenistskhali.

More than 850 lakes are located in Georgia but the majority are very small and the total area of lakes does not exceed 170 km² (0.24% of total area). The largest lake in Georgia, the Faravani (37.5 km²), is situated on the Javakheti upland (2,100 m.a.s.l.) in the south of the country. Other large lakes are the Paliastomi (18 sq²), Ritsa (1.49 km²), Tabatskhuri (14 km²) and Bazaleti (1 km²).

There are also 43 artificial reservoirs in Georgia (35 in the east and eight in the west) including Jvari (13.5 km²), Shaori (13 km²), Sioni (14.4 km²), Jandari (12.5 km²), Jinvali (11.5 km²) and Tbilisi reservoir (12 km²).

Marshes are a typical component of the Georgian landscape with sphagnum bogs distributed up to the sub-alpine belt in western Georgia and to 2,000 m.a.s.l. in the eastern region, where they are affected by the drier climate. Marshes are distributed in both the lowlands and sub-alpine and alpine belts.

The following fresh water ecosystems are considered as national priorities for conservation: the lakes of the Javakheti plateau, the Rioni estuary, the Kolkheti marshes and the trans-boundary areas of the rivers Iori and Alazani.

The wetland alder forests and unique peat bogs (located in the coastal Kolkheti lowlands) as well as Paliastomi Lake are designated as RAMSAR sites. These areas are also covered by Kolkheti national park and Kobuleti nature reserve and managed reserve that includes coastal peat bogs that are especially important for their unique floristic composition, abundance of endemic and relict species.

The lakes situated on Javakheti plateau (Khanchali, Madatafa and Bughdasheni) in Southern Georgia will also be presented for consideration as RAMSAR sites as planning for the establishment of the Javakheti uplands as protected areas is currently underway.

Wetland ecosystems of both the Kolkheti lowlands and the Javakheti plateau are also important habitats for migratory birds with up to 300 species of birds have been registered in the Kolkheti protected territories and adjacent areas. The territory is a significant habitat for endangered species included in the Red List of Georgia (*Pelecanus onocrotalus*, *Pelecanus crispus*, *Ciconia ciconia*, *Coconia nigra*, *Anser erythropus*, *tadorna ferriginea*, *Marmaronetta angustirostris*, *Oxyura leucocephala* (IUCN), *Haliaeetus albicilla*, *Buteo rufinus rufinus*, *Aquila heliaca* (IUCN), *Aquila clanga*, *Falco cherrug* (IUCN), *Falco vespertinus*, *Falco naumanni* (IUCN), *Aegolius funereus*, *Tyto alba*, *Grus grus*.). A further 91 species have been registered at Javakheti lakes, many of them included on both the Georgian and IUCN Red Lists.

Tabatskhuri alpine lake and the neighbouring high mountainous wetlands are included in Ktsia-Tabatskhuri managed reserve; established in 2007.

More than 80 species of freshwater fish are present in Georgia. River/lake trout (*Salmo fario*), included in the Red List of Georgia, is an important species of mountain rivers. Anadromous fish

species, mainly sturgeons and salmon, enter the rivers of Western Georgia from the Black Sea to spawn. The above mentioned species are included in the Red List of Georgia. The main threats to these species are illegal fishing, water pollution and the construction of dams. Unfortunately, there have been no surveys to assess the health of the country's ichthyofauna, which includes some endemics, since 1991 with the exception of the sturgeon and the Black Sea salmon. The conservation status of the majority of species is, then, unknown. Equally, specific information on the numbers of endemic species as well as general population structures, distributions and threats, are scarce and specific conservation needs remain unidentified.

Ultimately, there have been no inventorying or ecological assessments of the country's freshwater systems or wetlands. Many freshwater and wetland ecosystems remain completely unprotected and are prone to anthropogenic modification through a variety of unregulated economic activities that adversely affect water levels. As a result, their structure is disrupted and their ecological value diminished.

Water pollution, illegal fishing, damming and alien invasive species represent the main threats for freshwater ichthyofauna. Poaching and the artificial modification of freshwater and wetland ecosystems also represent significant impacts on migratory birds.

Marine and Coastal areas

Western Georgia is bordered by the Black Sea and has a coastline of 330 km. Of the 184 species living within the Black sea, 110 are present within Georgian waters. There are also three dolphin species resident in the Black Sea (Common dolphin -*Delphinus delphis*, bottlenose dolphin - *Tursiops truncatus*, harbour porpoise - *Phocoena phocoena*) two of which (the harbour porpoise and the bottlenose dolphin) are included in the Red List of Georgia and of which, the harbour porpoise is IUCN listed as globally vulnerable. All three of them are protected under the Bonn Convention on Migratory Species (CMS). The coastal waters of the Black Sea and its associated river estuaries, especially the Rioni estuary, are significant habitats for sturgeon. Six species of sturgeon are observed in the area (*Acipenser sturio*, *A. stellatus*, *A. gueldenstaedti*, *A. nudiventris*, *A. persicus*, *Huso huso*) and all of them are included in the Red List of Georgia whilst *A. sturio* is listed by the IUCN as globally endangered.

The Black Sea coast is also an important habitat for migratory birds with up to 200 species using this area including many that over-winter here: great crested grebe (*Podiceps cristatus*), little grebe (*Tachybaptus ruficollis*), cormorant (*Phalacrocorax carbo*), mute swan (*Cygnus olor*), Dalmatian pelican (*Pelecanus crispus*), graylag goose (*Anser anser*), greater white-fronted goose (*A. albifrons*), mallard (*Anas platyrhynchos*) and gadwall (*A. strepera*). In addition, hundreds of individuals of predatory bird, representing 27 species, pass through a migratory bottleneck over the Georgian coast, near the resort town of Batumi, during the spring and autumn migrations.

The most valuable natural habitats of the Black Sea and Georgian coastline are included in Kolkheti National Park (IUCN category II) and Kobuleti Reserve and Managed Reserve (IUCN categories I and IV respectively) and are under special protection regimes. Kolkheti National Park comprises 15,742 ha of seascape (strict and managed protection zones) and is a significant habitat for dolphins and sturgeons.

The main reasons for the loss pelagic and coastal biodiversity are; drainage, solid and liquid waste pollution, expansion of settlements and inadequately planned development.

Although the composition of sturgeon species in the coastal areas of the Black Sea and its' adjoining rivers has been preserved (*Acipenser sturio*, *A. stellatus*, *A. nudiventris*, *A. persicus colchicus*, *A. gueldenstaedti tanaica* and *Huso huso*), in 2007 an assessment of the total number of sturgeon in Georgian waters revealed historically low numbers: less than 10,000 individuals, a decrease by a factor of 37 since 1907. Accordingly, all sturgeon species distributed in the area are included in the Red List of Georgia. The most important reason for such a dramatic decrease is the destruction of habitats mainly caused by the construction of hydro-electric power station, the pollution of rivers and coastal zones, the extraction of sand-gravel at spawning rivers.

High Mountain Ecosystems

High mountains are traditionally defined as areas higher than 1,800 m.a.s.l. and include sub-alpine, sub-nival and nival ecosystems. The main habitats of the high mountains are shrub, sub-alpine tall grass meadows, alpine meadows, alpine moles and a variety of rock and scree habitats. Due in part to the location of the Caucasus, at the borderline of Europe and Asia, but also to contrasts in climate, severe relief and other factors, high mountain vegetation is fairly diverse in this region. Sub-alpine shrubbery is mainly composed of relict Colchic mesophilous elements: *Rhododendron ponticum*, *R. ungeronii*, *R. smirnowii*, *R. luteum*, *R. caucasicum*, *Accinium arctostaphylos*, *Ilex colchica*, *Ruscus colchicus*, *Laurocerasus officinalis*, *Rhamnus imeretina*, *Corylus colchica*, *Sorbus subfusca*, *Dapne alboboviana* and *Epigaea gaulterioides* most of which are Caucasus endemics. In particular, the tall grass sub-alpine flora is remarkably diverse and rich in Caucasian endemics including species from the genera: *Gadellia*, *Grosshemia*, *Dolychorrisa*. The flora of alpine meadows mainly consists of one or two of the following dominant species: *Nardus glabriculumis*, *Carex tristis*, *Festucetum variae*, *Caricetum tristis*, *Kobresia capilliformis*.

Alpine moles are developed on so called “circuses”, depressed areas in which snow cover persists for longer periods. Despite the fact that the productivity of such areas is low, they are intensively used for grazing by, primarily, sheep. The Caucasian endemic, *Rhododendron caucasicum*, covers the northern and north-western slopes of the alpine belt mountains. Two juniper species reach the alpine belt of the Caucasus (*Juniperus hemisphaeica*, *J. sabina*) and rhododendron and juniper formations play a significant role in the control of erosion. About 250 plant species are distributed in the sub-nival belt of Caucasus and, again, there is a high representation of endemic species (approximately 60-70%). Endemic genera are especially important: *Pseudovesicaria*, *Gymphyloma*, *Pseudobetckea*, *Coluteocarpus*, *Didimophya*, *Eunomia*, *Vavilovia*.

High mountain ecosystems contain important habitats for such key species as; the west and east Caucasian tur, the Caucasian black grouse and the Caucasian snowcock, all of which are endemic to the Caucasus, as well as the bearded vulture (*Gypaetus barbatus*), cinereous vulture (*Aegypius monachus*) and the griffon vulture (*Gyps fulvus*). Some of the animal species which live in the upper forest belt, such as the wild goat, chamois, brown bear and red deer, are also associated with the sub-alpine zone.

High mountain meadows form refuges for small, endemic mammals such as *Prometheomys* Satunin (*Prometheomys schaposchnikovi*), Caucasian snow vole (*Chionomys gud*), Robert's snow vole (*C. roberti*), Kluchor birch mouse, Kazbeg birch mouse and Caucasian birch mouse. According to 1997 estimates, there are around 12,000 east Caucasian tur () present along the Caucasus ridge, while there is no reliable information on the numbers of its' western counterpart (*C. caucasica*); west Caucasian tur population in Georgia may be around 1,000 individuals. Both species are included in IUCN Red List. Since the 1990's *Capra cylindricornis* and *C. caucasica* numbers are believed to have dropped by 20% and 50% respectively primarily due to hunting.

Alpine meadows are mainly used as pastures and, as a result, the vegetation conditions have deteriorated somewhat with an alteration in species composition and a reduction in overall productivity. The upper soil layer is also damaged by erosive processes such as landslides and avalanches.

The key high mountain ecosystems in Georgia can be found in the protected areas of Tusheti, Lagodekhi, Kazbegi and Borjomi-Kharagauli.

Arid and Semi-Arid Ecosystems

Arid and semi-arid ecosystems are mainly found in the south-eastern part of Georgia. These ecosystems are characterised by desert and semi-desert vegetation, steppes, arid light woodlands, Shibliak, phryganoid vegetation, rock xerophytes, halophyte communities. The semi-arid zone also has Tugai forests along the Iori. Up to 500 species of higher plants are distributed in arid and semi-arid ecosystems. There are also 66 mammal species (including 17 featured on the Red List of Georgia) and up to 250 bird species.

High conservation value species are distributed throughout the forests here and include pistachio (*Pistacia mutica*), several species of juniper (*Juniperus foetidissima*, *J. polycarpus*, *J. oxycedrus*), salvia (*Salvia garedji*), Eichlerian tulip (*Tulipa eichleri*), two orchids (*Orchis punctulata* and *O. picta*) and the Georgian iris (*Iris iberica*). High conservation species found in the Tugay forests include the oak (*Quercus pedunculiflora*) while the salt tree (*Halimodendron halodendron*) and the bongardia (*Bongardia chrysogonum*), both included in the Red List of Georgia, are present in the semi-deserts.

The arid and semi-arid ecosystems of Georgia are especially rich in reptiles, predatory and scavenging birds and mammalian predator communities, though the zone is very poor in wild ungulates. The following fauna species, included in the Red List of Georgia, are found in the arid and semi-arid zones: leopard (*Panthera pardus*), striped hyena (*Hyaena hyaena*), lynx (*Lynx lynx*), jungle cat (*Felis chaus*), bear, cinereous vulture, griffon vulture and Greek tortoise (*Testudo graeca*).

The primary anthropogenic use of these areas is as winter grazing. At present, due to uncontrolled pasture loads and grazing terms, the phytocenoses structure of steppes is fairly damaged and, in some areas, has led to a reduction in species diversity amongst the herbs as well as the loss of many annual plants and ephemerals. The degradation of the steppe biome causes an increase in the area covered with weed species such as wormwoods (*Artemisia lerchiana* and *A. fragrans*) and tumble weeds (*Salsola dendroides*, *S. ericoides*, *S. nodulosa* and *Suaeda microphylla*) and a reduction in the area and quality of pastures.

Arid light woodlands, which used to be widely spread in the past, have been preserved intact only in Vashlovani nature reserve. Due to water level regulation and logging, the area covered by the unique Tugai forests of the Iori floodplain has also been significantly reduced.

The inevitable result of such habitat degradation, coupled with the vagaries of unregulated hunting, is a loss of diversity amongst the fauna species. This is particularly evident in the case of the once abundant goitered gazelle (*Gazella subgutturosa*) which was eliminated in the 1930's through a combination of intensive sheep grazing and hunting.

In the last decade, five-toed jerboa (*Allactaga elater*) and Indian porcupine (*Hystrix indica*) have been noted apparently expanding their ranges from Azerbaijan into Georgia. This may indicate shifts in the ecosystem in turn possibly associated with desertification.

The main threats for the Georgian arid and semi-arid ecosystems are intensive and unsystematic grazing (causing soil erosion and the expansion of invasive species), inappropriate irrigation and poaching.

Vashlovani National Park (24,610 ha) was established to protect and conserve the arid and semi-arid ecosystems that are otherwise rare in Georgia and so, the original Vashlovani Reserve (10,143 ha) was extended in 2003. Plans are also underway to establish protected landscapes on the Iori uplands (IUCN category V, area 173,000 ha), although this has not yet been realised.

Species Diversity

Flora: Within Georgian flora 4,130 species of vascular plant are registered, including 79 ferns, 17 gymnosperms, 4,034 angiosperms). The rich nature of Georgian flora is prominent from its high level of endemism with around 21% of Georgian flora (up to 900 species) being endemic. Among these, around 600 (14% of all species) are Caucasus endemics and 300 (9% of all species) are endemic to Georgia. Endemic genera are also significant, with 16 recorded in Georgian and Caucasian flora: *Alboviodoxa*, *Woronowia*, *Chymsydia*, *Trigonocaryum*, *Symphyoloma*, *Pseudobetckea*, *Charesia*, *Mandenovai*, *Sredinskaya*, *Grossheimia*, *Cladocheta*, *Pseudovesicaria*, *Gadellia*, *Agasyllis*, *Paederotella*, and *Kemulariella*.

In terms of diversity, the following 10 families are prominent for species diversity in Georgian flora: *Compositae* (538 species), *Gramineae* (332 species), *Leguminosae* (317 species), *Rosaceae* (238), *Cruciferae* (183), *Scrophulariaceae* (179), *Umbeliferae* (177), *Labiatae* (149), *Caryophyllaceae* (135) and *Liliaceae* (129). More than 800 moss species and about 7,000 species of fungus are recorded for Georgia whilst the inland waters of Georgia are home to at least 2,605 taxa of algae. It is, however, worth noting that these numbers do not necessarily represent the full gamete of these taxa in Georgia which is rich with economically valuable plants. Around 2,000 species have direct economic value,

and are used for a wide variety of purposes ranging from timber and fire-wood, to food (fruit, hazel nut) and forage as well as those used in medicine, for dyeing fabrics and for the extraction of volatile oils. Many local variations of domestic crops as well as their wild relatives (especially wheat and legumes) are found in Georgia. Georgia is part of the Western Asian centre of origin of cultivated plants, considered to be the source barley, wheat, legumes, vines and many species of fruit. As such, Georgia has a rich and ancient history of cultivating a wide variety of all of these types of food and crop species.

Fauna: In terms of the countries faunal components, 16,054 species have been described, 758 of which are chordates. Amongst the Caucasian endemics there are 19 mammals, three birds, 15 reptiles and three amphibians. The Georgian endemics are represented by only one species; the Adjarian lizard (*Darevskia mixta*).

Amongst the Georgian vertebrates 44 species are endangered at global scale included on the IUCN Red List as vulnerable (VU) or higher. Of the Georgian mammals 19 are Caucasus endemics. Among these the Western Caucasian and Eastern Caucasian turs (*Capra caucasica* and *C. cylindricornis*), Caucasian birch mouse (*Sicista caucasica*), Kluchor's birch mouse (*S. kluchorica*), Kazbeg birch mouse (*S. kazbegica*) are also included on both the Georgian and IUCN Red Lists. Of the birds, three are Caucasian endemics; Caucasian grouse (*Tetrao mlokosiewiczzi*), Caucasian snowcock (*Tetraogallus caucasicus*) and Caucasian chiffchaff (*Phylloscopus lorenzii*). Among these, the Caucasian grouse and Caucasian snowcock are included on the national Red List.

Important research on some of the countries predatory birds has been undertaken recently and there have been many studies focusing on Chiroptera (bats) and invertebrates (aphids, dragon-flies, semi-coleoptera, coleoptera, and hymenoptera as well as various groups of worms, spiders and crustacea) in recent years. As elsewhere, the insects dominate the invertebrates with 11,471 species currently recognised and all of the main insect orders have been studied in more or less detail.

The numbers of the species distributed in Georgia, including endemic and endangered species, by taxonomic groups are represented in table 1.

Table 1: Numbers of Plant and Animal Species and Endangered Species by Taxonomic Groups

| Taxonomic group | Number of Species | Number of species included in IUCN Red List as VU or higher category | Number of species included in the Red List of Georgia (According to IUCN categories) | | | |
|-----------------|-------------------|--|--|----|----|----|
| | | | RE | CR | EN | VU |
| Plants | | | | | | |
| Algae | 2,605 | | | | | |
| Mushrooms | 7,000 | | | | | |
| Lichens | 800 | | | | | |
| Mosses | 812 | | | | | |
| Vascular Plants | 4,130 | | - | 2 | 18 | 36 |
| Animals | | | | | | |
| Invertebrates | 15,761 | 6 | | 2 | 8 | 32 |
| Fishes | 188 | 10 | - | 1 | 6 | 7 |
| Amphibians | 13 | 1 | - | - | 1 | 1 |
| Reptiles | 54 | 11 | - | 1 | 2 | 8 |
| Birds | 390 | 14 | | 2 | 9 | 24 |
| Mammals | 111 | 8 | 4 | 5 | 6 | 18 |

Protected Areas

In Georgia special attention is being paid to the development of the system of protected areas, which is a significant tool for the conservation of biodiversity. The first protected area in Caucasus – Lagodekhi Nature Reserve –was established in 1912. 14 strict nature reserves and five hunting

reserves were subsequently established during the Soviet era (until 1990). Strictly protected reserves cover 2.4%, and hunting reserves cover 0.8%, of the country's land area.

In the 1990s a new approach to the creation and development of protected areas began with the development of a system of protected areas of different "regimes" (IUCN categories I-VI). This differs from the past when only separate, strictly protected reserves were founded.

The Law on Protected Areas System was adopted in 1996 and introduces internationally accepted categories of protected areas based on IUCN (The International Union for Conservation of Nature) categories. Categories of PAs of Georgia include:

- Strict Nature Reserve/State Reserve, IUCN Category I;
- National Park, IUCN Category II;
- Natural Monument, IUCN Category III;
- Managed Reserve/Sanctuary, IUCN Category IV;
- Protected Landscape, IUCN Category V
- Multiple-Use Territories, IUCN Category VI

In addition, according to the law it is possible to establish Biosphere Reserves, Sites of World Heritage and Wetlands of International Importance.

Upon the initiative of the WWF the first scheme of the spatial structure development of protected areas was developed in the years 1990-1991 and formed the basis of further planning.

Following the first planning activities and adoption of the legal basis the process of creation of new protected areas and development of the existing ones has begun with the support of the international donor community.

PAs development is one of the main direction in which Georgia closely cooperates with Global Environmental Foundation (GEF), Governments of Germany, USA and Norway, International Organizations WWF, IUCN Conservation International and others. The creation and development of new PA and capacity building activities are mostly funded by financial resources received through the international and bilateral cooperation. German Federal Ministry of Economic Cooperation and Development and KfW have been supporting the development of Borjomi-Kharagauli National Park and establishment of new Protected Areas in Javakheti region. GEF/World Bank have supported establishment and development new protected areas in Kolkheti lowlands and Eastern Georgia and capacity building of Protected Areas Agency as well. International Technical Assistance Program of United States Department of Interior has facilitated development of Tbilisi National Park. British Petroleum in Georgia (BP) and IUCN promote development of Ktsia-Tabatskuri Managed Nature Reserve. Government of Norway has provided funds for establishment Mtirala National Park, development of Chachuna and Iori Managed Reserves and for elaboration of the PAs Development National Strategy and Action Plan.

At present in Georgia there is 14 Strict Nature Reserve /State Reserves (SR), 8 National Parks (NP), 14 Natural Monuments (NM), 12 Managed Reserves/Sanctuary (MR), 2 Protected Landscape (PL) and 5 Multiple-Use Territories. Protected areas cover 495 954, 01 ha (among them marine areas 15,743.00 ha), which is 7.16 % of country's territory.

Dates on areas of PAs by categories are given in Table 2.

| National category | IUCN category | Number | Area | Share in total territory |
|---------------------|---------------|--------|---------------|--------------------------|
| National reserve | I | 14 | 141 534,11 ha | 2% |
| National park | II | 8 | 258 437,1 ha | 3,7% |
| Natural monument | III | 14 | 314,8 ha | |
| Managed reserve | IV | 12 | 61 158 ha | 0,88% |
| Protected Landscape | V | 2 | 34 510 ha | 0,5 % |
| Total | | | 495 954,01 ha | 7,11 % |

Table 3. Protected Areas of Georgia by 2010

| # | Protected area | Area (ha) ¹ | Establishment date |
|--------------------------------------|--------------------------------|------------------------|--------------------|
| Nature Reserves | | | |
| 1 | Lagodekhi | 22 295 | 1912 |
| 2 | Tusheti | 10 858,2 | 1980 |
| 3 | Babaneuri | 862.1 | 1960 |
| 4 | Batsara | 2 985.96 | 1935 |
| 5 | Vashlovani | 10 143 | 1935 |
| 6 | Liavvi ² | 6 388 | 1977 |
| 7 | Mariamjvari | 1 040 | 1935 |
| 8 | Sataplia | 354 | 1935 |
| 9 | Borjomi | 14 820.6 | 1929 |
| 10 | Bichvinta-Mjusera ³ | 3 645 | 1966 |
| | Bichvinta | 165 | 1926 |
| | Lidzava | 1 296 | 1960 |
| | Mjusera | 2 184 | 1946 |
| 11 | Ritsa ⁴ | 16 289 | 1946 |
| 12 | Pskhu-Gumista ⁵ | 40 819 | 1978 |
| | Pskhu | 27 334 | 1978 |
| | Gumista | 13 400 | 1978 |
| | Skurcha | 85 | 1946 |
| 13 | Kintrishi | 10 703 | 1959 |
| 14 | Kobulei | 331.25 | 1998 |
| | total | 141 534,11 | |
| National Parks | | | |
| 1 | Borjom-Kharagauli | 61 234.84 | 1995 |
| 2 | Kolkheti | 45 447.4 ⁶ | 1998 |
| 3 | Tusheti | 71 482 | 2003 |
| 4 | Vashlovani | 24 610.06 | 2003 |
| 5 | Mtiral | 15 806 | 2006 |
| 6 | Tbilisi | 24 327.8 | 1946 |
| 7 | Algeti ⁷ | 6 822 | 1965 |
| 8 | Kazbegi ⁸ | 8 707 | 1976 |
| | total | 258 437,1 | |
| Natural Monuments⁹ | | | |
| 1 | AlazniPlain | 204.4 | 2003 |
| 2 | Takhti-Tefa | 9.7 | 2003 |
| 3 | ArwivisKheoba | 100.7 | 2003 |
| 4 | KumisTavi Cave | | 2007 |
| 5 | TetriCave | | 2007 |
| 6 | KhomulisCave | | 2007 |
| 7 | TsutskhvatiCave | | 2007 |
| 8 | NavenakheviCave | | 2007 |
| 9 | NagareviCave | | 2007 |

¹ Areas are indicated according to the Law.

² Since August of 2008 the territory is not actually owned by the Agency of Protected Areas. *De facto* It is not under the state jurisdiction.

³ The Reserve is not actually owned by the Agency of Protected Areas. *De facto* It is not under the state jurisdiction. It consists of 3 separate independent districts established in different times.

⁴ The territory is not actually owned by the Agency of Protected Areas. *De facto* It is not under the state jurisdiction. It consists of 3 separate independent districts established in different times.

⁵ The territory is not actually owned by the Agency of Protected Areas. *De facto* It is not under the state jurisdiction. It consists of 3 separate independent districts established in different times.

⁶ Including the land _ 29 704.4, Marine area _ 15 743.

⁷ Algeti National Park has been created at the territory of former Algeti Reserve.

⁸ Kazbegi National Park (2007) has been created at the territory of former Kazbegi Reserve.

⁹ Areas of Natural Monuments are to be defined (except of the three mentioned ones).

| | | | |
|----|---|----------------------|------|
| 10 | JasonCave | | 2007 |
| 11 | SakajjisCave | | 2007 |
| 12 | Tskaltsitela Gorge | | 2007 |
| 13 | Okaces Canyon | | 2007 |
| 14 | OkacesWaterfall | | 2007 |
| | Total | 314,8 | |
| | Managed Reserves | | |
| 1 | Gardabani | 3 484 | 1957 |
| 2 | Korugi | 2 068 | 1965 |
| 3 | Iori | 1 336 | 1965 |
| 4 | Chachuna | 5 200 | 1965 |
| 5 | Katsoburi | 295 | 1964 |
| 6 | Ktsia-Tabatskuri | 22 000 ¹⁰ | 1995 |
| 7 | Nedzvi | 8 992 | 1995 |
| 8 | Tetrobi | 3 100 ¹¹ | 1995 |
| 9 | Kobuleti | 438.75 | 1998 |
| 10 | Ilto | 6 971 | 2003 |
| 11 | Lagodekhi | 2 156 | 2003 |
| 12 | Ajameti ¹² | 5 117 | 1946 |
| | total | 61 158 | |
| | Protected Landscapes | | |
| 1 | TushetiProtected Landscape | 31 320 | 2003 |
| 2 | Kintrishiprotected Landscape | 3 190 | 2007 |
| | Total | 34 510 | |
| | Multi purpose areas¹³ | | |
| | Akhmeta | | 2003 |
| | Lagodekhi | | 2003 |
| | Vashlovani | | 2003 |
| | Kolkheti | | 1999 |
| | Kobuleti | | 1999 |
| | | | |

It is planned to establish a number of additional protected areas, such as Javakheti Protected Areas, Pshav-Khevsureti and Machakhela. It is also planned to extend the Kazbegi and Algeti National Park areas, Mariamjvari Reserve and Ktsia-Tabatskuri Managed Reserve.

As part of the ongoing project on the conservation of natural monuments, it is envisaged that up to 40 areas will be evaluated for designation as Natural Monuments. In addition, there are plan to create a National database, and to define appropriate selection criteria, in order to improve the legal base and to provide for better management of designated natural monuments.

¹⁰The territory is not actually owned by the Agency of Protected Areas

¹¹The territory is not actually owned by the Agency of Protected Areas

¹²Ajameti Managed Reserve was established in 2007 at the territory of former Ajameti Reserve.

¹³These territories were not identified and areas defined