# COLCHIC RAINFORESTS AND WETLANDS

NOMINATION FOR INSCRIPTION ON THE WORLD HERITAGE LIST UNDER WORLD HERITAGE CRITERIA IX AND X

VOLUME 1 – NOMINATION DOSSIER

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* Volume 2 contains all Appendixes to this nomination dossier.

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| a.s.l. | above sea level |
| APA | Agency of Protected Areas of Georgia |
| CNF | Caucasus Nature Fund |
| CR | Critically endangered (an IUCN Red List category) |
| EN | Endangered (an IUCN Red List category) |
| EU | European Union |
| EUR | Euro(s) |
| GEL | Georgian Lari(s) |
| IUCN | International Union for the Conservation of Nature |
| KfW | German Development Bank (Kreditanstalt für Wiederaufbau) |
| MEPA | Ministry of Environment Protection and Agriculture of Georgia |
| MR | Managed Reserve |
| MSF | Michael Succow Foundation |
| NBSAP | National Biodiversity Strategy and Action Plan |
| NGO | Non-governmental Organization |
| NP | National Park |
| NT | Near-threatened (an IUCN Red List category) |
| OG | Operational Guidelines (for the implementation of the ->WHC) |
| OUV | Outstanding Universal Value |
| PA | Protected Area |
| NCA | Nominated Component Area |
| SNR | Strict Nature Reserve |
| SPPA | Support Programme for Protected Areas in Georgia (of ->KfW) |
| SPZ | Strict Protection Zone (of Georgian national parks) |
| TJS | Transboundary Joint Secretariat for the Southern Caucasus (of ->KfW) |
| TUZ | Traditional Use Zone (of Georgian national parks) |
| UNDP | United Nations Development Programme |
| VU | Vulnerable (an IUCN Red List category) |
| WH | World Heritage |
| WHC | World Heritage Convention |
| WWF | World Wide Fund for Nature |

# EXECUTIVE SUMMARY

**State Party:**

Georgia

**State, Province or Region:**

Adjara Autonomous Republic, Guria and Samegrelo - Zemo Svaneti Regions

**Name of Property:**

Colchic Rainforests and Wetlands

**Geographical coordinates of nominated component areas and regions:**

| No. | Name | Region | GuCentral coordinates |
|---|---|---|---|
| 1 | Kintrishi-Mtirala | Adjara | N 41.70228°<br>E 41.95120° |
| 2 | Ispani | Adjara | N 41.86202°<br>E 41.80153° |
| 3 | Grigoleti | Guria | N 42.05327°<br>E 41.73878° |
| 4 | Imnati | Guria | N 42.10997°<br>E 41.78880° |
| 5 | Pitshora | Samegrelo – Zemo Svaneti | N 42.15760°<br>E 41.81514° |
| 6 | Nabada | Samegrelo – Zemo Svaneti | N 42.23466°<br>E 41.68787° |
| 7 | Churia | Samegrelo – Zemo Svaneti | N 42.29947°<br>E 41.66229° |

### TEXTUAL DESCRIPTION OF THE BOUNDARIES OF THE NOMINATED PROPERTY

This serial property consists of seven nominated component areas, which are located within Adjara Autonomous Republic, Guria Region and Samegrelo - Zemo Svaneti Region in western Georgia. The nominated component areas stretch for about 80 km along the coast of the Black Sea from north to south, with the maximum distance from the sea of about 27 km at the eastern boundary of the Kintrishi nominated component area. They are situated within five protected areas (PAs), i.e., Mtirala National Park, Kintrishi Strict Nature Reserve, a small part of Kintrishi Protected Landscape, Kobuleti Strict Nature Reserve and Kolkheti National Park. The boundaries of the buffer zones – where they exist – mostly coincide with those of the Traditional Use Zones of Mtirala National Park and Kolkheti National Park, with parts of Kintrishi Protected Landscape and Kobuleti Managed Reserve.

## *Boundary of nominated component area No. 1: Mtirala-Kintrishi*

The Mtirala-Kintrishi nominated component area is located in the mountains to the east of the Black Sea coast between the city of Batumi and the town of Kobuleti. Its boundary follows the borders of the Strict Protection Zone (SPZ) and Visitor Zone of Mtirala National Park in the southwest as well as the borders of the

adjacent Kintrishi State Nature Reserve (SNR) in the northeast, with the following exceptions: The southernmost part of the Visitor Zone of Mtirala National Park northwest of Mount Didi Mtirala is excluded from the nominated component area and forms part of the buffer zone. The border runs from the Korolistskali River to the Meshketi Ridge. The same is true for a part of Mtirala National Park's Visitor Zone 6 km east of the village of Chakvistavi, and southwest of Murvili Mountain (where the border runs from the 960 m mark at the Murvili River and follows the south-east of its valley), two isolated patches of the park's visitor zone to the north and west of Mtsire Mtirala Mountain, for an area of subalpine meadows at the south-eastern border of Kintrishi SNR to the south of Tbikeli Mountain, and for some of the lower parts of Kintrishi SNR inside Kintrishi Valley. In addition, a 200 m stripe of Visitor Zone to the south and east of Chakvistavi has been excluded from the nominated component area. Small corridors of Kintrishi Protected Landscape along the trail connecting the lower main valley to Kheknara Mountain and connecting the southern and northern parts of Kintrishi SNR in the upper Kintrishi Valley are also part of this nominated component area. The boundaries of the buffer zone of this nominated component area – where present – are those of the Traditional Use Zone of Mtirala National Park, of Kintrishi Protected Landscape, and of the areas excluded from this nominated component area as described above.

## *Boundary of nominated component area No. 2: Ispani*

Ispani nominated component area is centred upon Ispani 2 Mire about 1 km northeast of the coastal town of Kobuleti. Its boundaries follow those of Kobuleti Strict Nature Reserve (SNR), with two exceptions: The northern and north-eastern boundary of the nominated component area runs about 50 m south (inside) of the border of the Strict Nature Reserve, which is formed by the Togona River there. It excludes the extreme periphery of the mire with its shrubby vegetation, which serves as part of its buffer zone. Likewise, the easternmost part of Ispani 2 Mire, to the east of the small channel which is connected to the Togona River, is excluded from the nominated component area and included as part of the buffer zone. The southern and western boundary of the nominated component area follows the borders of Kobuleti SNR. The rest of its buffer zone follows the boundaries of Kobuleti Managed Reserve, which partly surrounds Kobuleti Strict Nature Reserve.

## *Boundary of nominated component area No. 3: Grigoleti*

Grigoleti nominated component area encloses Grigoleti Mire in the southern part of Kolkheti National Park, ca. 1 km to the south-east of the village of Maltakva. The boundary of Grigoleti nominated component area fully coincides with that of the part of the Strict Protection Zone (SPZ) of Kolkheti National Park that has been established around Grigoleti Mire. It forms a roughly oval shape, with its longer axis orientated in the north-south direction, less than 1 km east of the Black Sea coast. The buffer zone follows the border of the Traditional Use Zone (TUZ) of this part of Kolkheti National Park.

## *Boundary of nominated component area No. 4: Imnati*

The boundary of Imnati nominated component area mostly follows that of the part of the SPZ of Kolkheti National Park that has been established around Imnati Mire on the south-eastern bank of Lake Paliastomi, east of the city of Poti. The north-western part of the boundary runs along the bank of Lake Paliastomi to the mouth of the Pitshora River. From there, it follows the northern edge of the Imnati Mire itself eastwards for 7 km. After re-joining the border of the SPZ, it continues to follow the edge of Imnati Mire, until 3.2 km before the village of Maltakva, and then another 3 km northwards to the bank of Lake Paliastomi. The buffer zone mostly follows the borders of the Traditional Use Zones and Managed Protection Zones of this part of Kolkheti National Park, but also includes a small part of its SPZ in the north and east.

## *Boundary of nominated component area No. 5: Pitshora*

Pitshora nominated component area encloses Pitshora Mire and surrounding Colchic lowland forests. It lies to the north of Imnati nominated component area (NCA), which is part of the Traditional Use Zone (TUZ) of Kolkheti National Park and the joint buffer zone of both NCAs. The boundary of Imnati nominated component area follows that of the part of the SPZ of Kolkheti National Park that has been established around Pitshora Mire, with a few exceptions: After following the northern bank of the Pitshora River (facing Imnati NCA) westwards to 3.5 km upstream of Paliastomi Lake, the boundary runs northwards, skirting the western edge of Pitshora Mire. One kilometre northwest of the village of Sakorkio, the boundary turns east, following that of the SPZ for 7.8 km. The easternmost part of this SPZ is excluded from the nominated component area, and is part of its buffer zone. Here, the border of the nominated component area follows the Sazgvargalu stream, which runs in a north-southerly direction until it discharges into the Pitshora River, where it also rejoins the border of the SPZ. The buffer zone, which encloses both this and Imnati nominated component area, follows the borders of the Traditional Use Zones and Managed Protection Zones of this part of Kolkheti National Park, with the exception mentioned above.

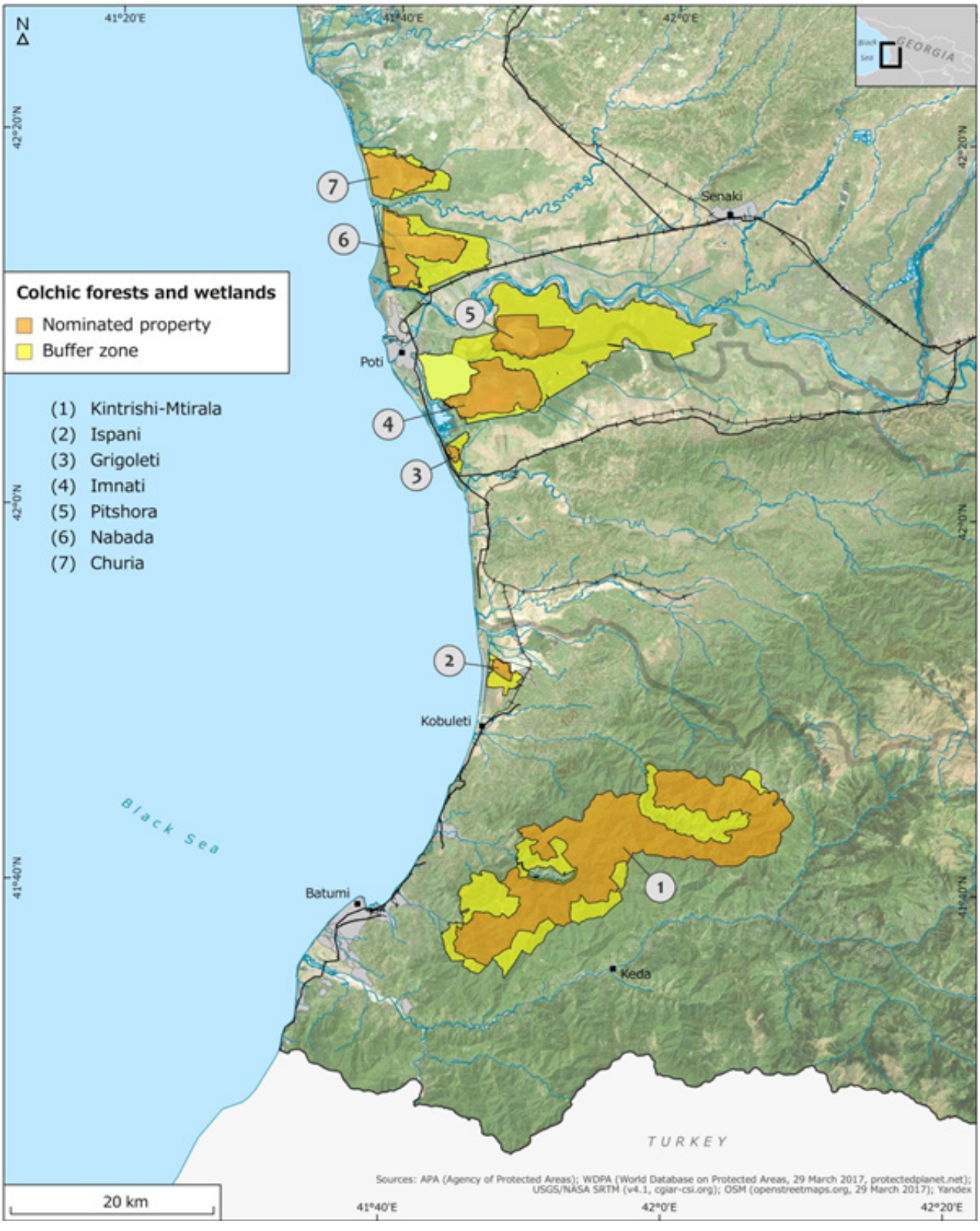
## *Boundaries of nominated component area No. 6: Nabada*

Nabada nominated component area stretches along the coast of the Black Sea – but between 0.5 and 3 km inland – from the mouth of the Rioni River in the south to the Khobistskali River in the north. It is situated about 3 km to the north of the city of Poti and extends 9 km inland. The boundary of Nabada nominated component area mostly follows that of the part of the SPZ of Kolkheti National Park that has been established around Nabada Mire and its surrounding Colchic lowland forests. From the Rioni River, this border runs roughly northwards for 8.5 km, only forming a small dent to exclude the Partotskali Lake and its immediate surroundings. About 400 m before reaching the Khobistskali River, the boundary turns sharply towards the southeast and follows the northern, western and southern edge of Nabada Mire for 24 km, until it returns to the Rioni River. In this area, parts of the SPZ of Kolkheti National Park outside Nabada Mire are excluded from the nominated component area. The buffer zone follows the borders of the Traditional Use Zone of this part of Kolkheti National Park.

## *Boundary of nominated component area No. 7: Churia*

Churia nominated component area stretches for 5 km along the coast of the Black Sea from the mouth of the Khobistskali River in the south to the mouth of the Churia River in the north, and extending up to 6.8 km inland. Its boundary coincides with that of the part of the SPZ of Kolkheti National Park that has been established around Churia Mire and its surrounding Colchic lowland forests: It runs north from the mouth of the Khobistskali River for 4.8 km, separated from the sea by a low sand dune. About 1 km south of the mouth of the Churia River, the boundary turns inland to the east and follows the southern bank of that river, first in a distance of about 600 m and then directly on the bank. After about 7 km, the boundary turns south and then roughly south-westwards, again following that of the SPZ, until it joins the seashore again near the mouth of the Khobistskali River. The buffer zone follows the borders of the Traditional Use Zone of this part of Kolkheti National Park.

Map of the nominated property, showing boundaries and buffer zone where present:



**Criteria under which property is nominated: (ix), (x)**

**Draft Statement of Outstanding Universal Value:**

***a) Brief synthesis***

The Colchic Rainforests and Wetlands are situated in Georgia, within the Autonomous Republic of Adjara as well as the regions of Guria and Samegrelo-Zemo Svaneti. They are a series of seven component areas, which are located close to each other within an 80 km long corridor along the warm-temperate and extremely humid (annual precipitation up to 4,500 mm) eastern coast of the Black Sea. They consist of an almost complete altitudinal series of the most typical Colchic ecosystems running from sea level to > 2,500 m a.s.l. The main ecosystems are ancient deciduous Colchic rainforests on the one hand, and wetlands – particularly percolation bogs and other mire types of the Colchic mire region, a distinct mire region within Europe and Eurasia – on the other hand. These ecosystems harbour a peculiar and diverse flora and fauna, which is extremely rich in endemic and relict species of flora and fauna.

The property holds the oldest broad-leaved forests – together with the Hyrcanian forests of Iran and Azerbaijan – in western Eurasia. These are relict forests, which have survived the glacial cycles of the ice ages, and at the same time the most humid nemoral broad-leaved rainforests globally. They comprise an astonishingly diverse flora and fauna, with impressive densities of endemic and relict species. This is the result of millions of years of uninterrupted evolution and speciation processes within the Colchic Pliocene refugium.

The peatlands of the Colchis mire region, which are closely interlinked with lowland Colchic rainforests, also reflect the mild and extremely humid conditions there. These allow for the existence of percolation bogs, the simplest functional type of mires, which is fundamental to the understanding of mires and peatlands in general, and only occurs in the Colchis mire region. Percolation bogs are accompanied by a complete series of other succession stages of mire development in the Colchic wetlands.

***b) Justification for Criteria***

Criterion ix: The property comprises ancient Colchic rainforests with their characteristic vertical zoning and ecological succession, and wetlands (particularly Colchic mires) with their supporting processes and succession. The Colchic rainforests are the most humid temperate deciduous rainforests, and among the oldest nemoral broad-leaved forests globally. While they are distinguished from other temperate forests by their rich evergreen understoreys, they also display a remarkably dense mosaic of forest types, with 23 forest associations co-existing within an area of only about 200 km2. Together with the Hyrcanian forests, they are the most important relicts of Arcto-Tertiary forests in western Eurasia. Their peculiar and diverse community, which has survived the Pleistocene glacial cycles, includes a multitude of relict and endemic species. It reflects exceptionally constant climatic conditions and is an invaluable example of the manifold long-term evolutionary processes of forest biota over at least 10-15 million years.

The extensive paludified areas along the Black Sea coast are also due to the warm-temperate and very humid climate, which is extremely favourable for the growth of mires. Their exceptional character has led to the recognition of a distinct Colchis mire region. Of particular global importance are their percolation bogs, which exist nowhere else in the World and can be considered the simplest and hence “ideal” mire type, due to almost permanent water supply exclusively by precipitation. Percolation bogs are essential for the functional understanding of all mires, and hence of terrestrial carbon storage in general.

Criterion x: The series is home to almost 1,100 species of vascular plants (particularly woody species) and bryophytes, as well as almost 500 species of vertebrates, plus a high number of invertebrate species. It hosts an extremely high – for a non-tropical, non-island region – proportion of endemic species. There are 149 species of plants with a restricted range. The contribution of endemic species to herpetofauna and mammals of

the region (excl. bats) is 28%. Among these species are many relict species, which survived the glacial cycles of the Tertiary in this glacial refuge area and hence provide a window into the ancient past of Eurasia's natural heritage. Some of the Caucasian relict species, such as Nordmann's fir and Caucasian Salamander, have been isolated for over 14-15 millions of years from their closest relatives elsewhere. Of outstanding importance are also the gene pool and species which dispersed after the glaciations from the Colchic Rainforests and Wetlands to pan-Europe and northern Eurasia. Forty-four globally threatened or near-threatened species of vascular plants, 50 of vertebrates, and eight of invertebrates have been recorded in the Colchic Rainforests and Wetlands.

***c) Statement of Integrity***

The nominated component areas of the Colchic Rainforests and Wetlands have been selected based on a careful regional analysis. They cover most of the existing mires of the Colchis mire region, and the best preserved and most representative rainforests. They include more than 90% of the altitudinal range at which Colchic rainforests occur, and the great majority of typical forest associations. They also comprise a complete successional series of the mires characteristic of the Colchis mire region. The nominated component areas of the series together hold the great majority of the Colchic flora and fauna, and an even greater proportion of the endemic plant species found in the wider region is concentrated there.

There have been significant losses to the Colchic rainforests and mires of the Colchic region until the late 20th Century. In contrast, their representatives inside the nominated component areas of the series have remained fully intact both structurally and functionally, as shown by their community structure and ecological processes. While some of the Colchic mires were slightly degraded by nearby draining in the past, their current hydrological intactness and resilience is ensured by their dependence on atmospheric precipitation, high mire oscillation capacity, the stabilizing effect of the nearby sea, and extensive upstream buffer zones.

The nominated component areas are effectively protected against anthropogenic threats. Only small parts of the buffer zones of some of the component areas are slightly affected by traditional natural resource use.

***d) Requirements for protection and management***

The integrity of the Colchic Rainforests and Wetlands is ensured through effective protected areas management. All proposed component areas of the series – and all but 208 ha of the buffer zone – are situated on State-owned land within legally designated protected areas. These are either strictly protected areas (IUCN PA category Ia), or those zones of National Parks (IUCN PA category II) that afford the highest levels of protection. Only a very small part of the nominated property belongs to a protected landscape (IUCN PA category V). The boundaries of component areas incorporate all the attributes as set out in the nomination, mostly follow natural features (e.g. mountain ridges), and are known and accepted by the local population.

All four protected areas are managed by the Agency of Protected Areas of the Ministry of Environmental Protection and Agriculture of Georgia, through its local PA administrations. Comprehensive management plans for three of them are in place, with the management plan of the fourth one in preparation and expected to be finalized by mid-2019. Coordination of component areas is ensured, as they are all managed by the Agency of Protected Areas and geographically close to each other. An integrated management framework of the property has been developed by the Agency of Protected Areas.

The capacity and resourcing of the local protected areas administrations to manage the Colchic Rainforests and Wetlands is sufficient, but could be improved. The Agency of Protected Areas and its partners have already taken steps to do so, in cooperation with local stakeholders, municipalities, and international partners: Three international cooperation projects have been investing in infrastructure, equipment, training, management capacity and institutional development of the three largest protected areas contributing to the series (i.e., Kolkheti National Park, Mtirala National Park and Kintrishi Protected Areas). In addition, Kintrishi Protected Areas and Mtirala National Park receive operational funding support from the Caucasus Nature

Fund, an ecoregional conservation trust fund. A National Capacity Building Plan for Protected Area Staff was developed in 2016, and is being implemented.

**Name and contact information of official local institution/agency:**

**Agency: Agency of Protected Areas**

**Address: Gulua Street #6, Tbilisi, Georgia, 0114**

**Tel: +995 322 723 049**

**E-mail:** daculebi@gmail.com
**Official Web Address:** http://www.apa.gov.ge

**Figure 1.** *Rhododendron ungernii,* a typical endemic of the Colchic Rainforests and Lowlands. (Photo: Zurab Manvelidze)

# PROPERTIES FOR INSCRIPTION ON THE WORLD HERITAGE LIST

## 1. IDENTIFICATION OF PROPERTY

### *1.a Country and State Party*

Georgia

### *1.b State, Province or Region*

The component areas of the nominated series are distributed between Adjara Autonomous Republic and the regions of Guria and Samegrelo – Zemo Svaneti, all of Georgia (Table 1).

**Table 1.** Names, regions, central coordinates and areas (nominated area and buffer zone) of the nominated component areas of the Colchic Rainforests and Wetlands.

| No. | Name | Region | Central coordinates | Nominated property (ha) | Buffer zone (ha) |
|---|---|---|---|---|---|
| 1 | Kintrishi-Mtirala | Adjara | N 41.70228°<br>E 41.95120° | 20,150 | 9,140 |
| 2 | Ispani | Adjara | N 41.86202°<br>E 41.80153° | 248 | 531 |
| 3 | Grigoleti | Guria | N 42.05327°<br>E 41.73878° | 125 | 328 |
| 4 | Imnati | Guria | N 42.10997°<br>E 41.78880° | 3,418 | 13,386[1] |
| 5 | Pitshora | Samegrelo – Zemo Svaneti | N 42.15760°<br>E 41.81514° | 2,393 | |
| 6 | Nabada | Samegrelo – Zemo Svaneti | N 42.23466°<br>E 41.68787° | 2,976 | 2,586 |
| 7 | Churia | Samegrelo – Zemo Svaneti | N 42.29947°<br>E 41.66229° | 1,943 | 879 |
| | **Sum** | | | **31,253** | **26,850** |

[1] ***Imnati and Pitshora nominated component areas have a joint buffer zone.***

### *1.c Name of Property*

Colchic Rainforests and Wetlands

### *1.d Geographical coordinates to the nearest second*

The nominated property is a series consisting of seven component areas, the coordinates of which are shown in Table 1.

### *1.e Maps and plans, showing the boundaries of the nominated property*

Table 2 lists all the maps included in the nomination file along with their title, scale and location within the file. Figures 2-6 provide an overview of the series as a whole and of all nominated component areas. Detailed maps of all nominated component areas are enclosed as Appendix 1 to this nomination.

**Table 2.** Maps included in the nomination file. In addition, original maps of the nominated component areas of the series with and without the borders of the corresponding PAs at the scale of 1:50,000 are enclosed as Appendix 1 of the dossier.

| Title of map | Scale | Location |
|---|---|---|
| **(No title)** A4 Overview map of all nominated component areas of the Colchic Rainforests and Wetlands and their buffer zones. | 1:600,000 | Page 10 |
| **Figure 2.** Overview map of Mtirala-Kintrishi nominated component area (No. 1) and its buffer zone. | 1:56,000 | Page 18 |
| **Figure 3.** Overview map of Ispani nominated component area (No. 2) and its buffer zone. | 1:37,000 | Page 18 |
| **Figure 4.** Overview map of Grigoleti nominated component area (No. 3) and its buffer zone. | 1,50,000 | Page 19 |
| **Figure 5.** Overview map of Imnati and Pitshora nominated component areas (No. 4 & 5) and their buffer zones. | 1:217,000 | Page 19 |
| **Figure 6.** Overview map of Nabada and Churia nominated component areas (No. 6 and 7) and their buffer zones. | 1:139,000 | Page 20 |
| **Figure 7.** Overview map of the wider Colchic area. Source: Nakhutsrishvili et al. 2015. | 1:6,250,000 | Page 21 |
| **Figure 8.** Global distribution of peatlands (area percentage by country). Source: Greifswald Mire Centre. | Not defined | Page 24 |
| **Figure 11.** Map of Georgia showing mean annual precipitation and temperature in the areas under study. Climatic diagrams after Walter & Lieth (1960–67). Source: Denk et al. (2001). | 1:5,740,000 | Page 26 |
| **Figure 14.** Distribution of semi-prostrate Colchic relicts in the Causasus. (Source: Zazanashvili et al. 2010) | 1:7,800,000 | Page 31 |
| **Figure 74.** Distribution of deciduous broad-leaved forests of the nemoral zone of the Holarctic Realm. (Source: Schroeder 1998) | Not defined | Page 96 |
| **Figure 76.** The Colchis mire region in relation to other mire regions of Europe. (Source: Moen et al. 2017) | Not defined | Page 112 |
| **Figure 80.** Overview map of the Mtirala-Kintrishi nominated component area and its buffer zone (No. 1) with boundaries and zoning of Mtirala National Park and Kintrishi Protected Areas. | 1:56,000 | Page 137 |
| **Figure 81.** Overview map of the Ispani nominated component area and its buffer zone (No. 2) with boundaries and zoning of Kobuleti Protected Areas. | 1:37,000 | Page 137 |
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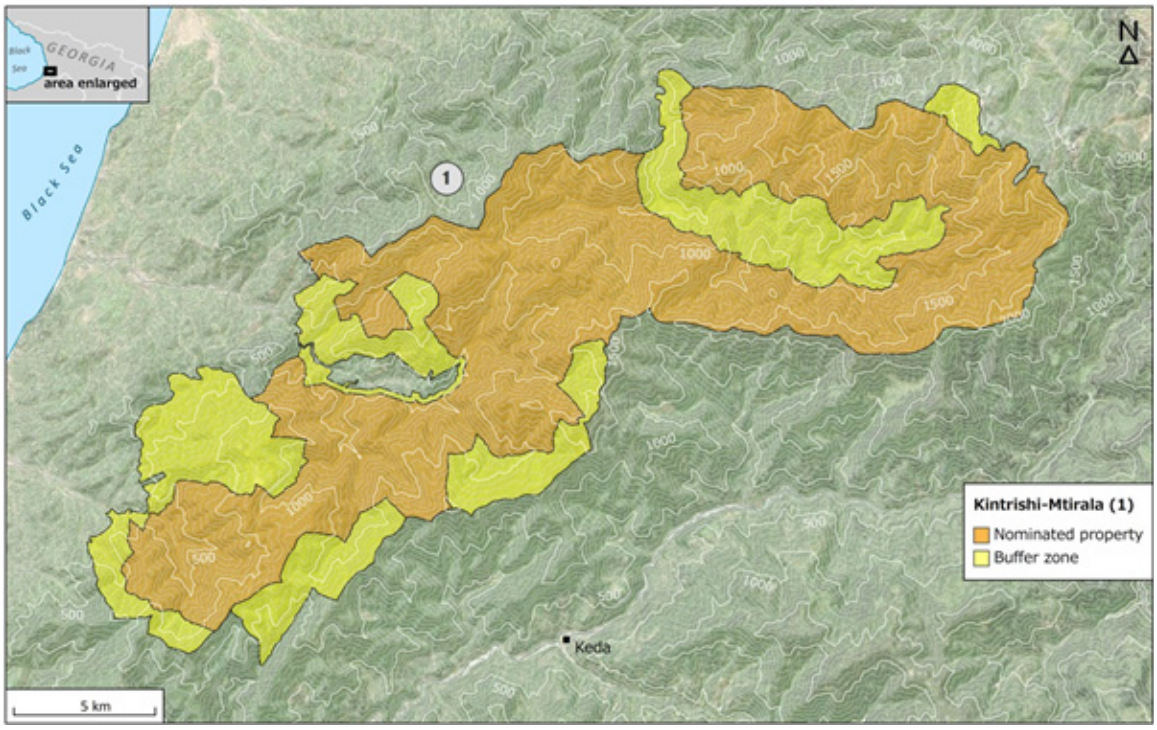



**Figure 2.** Overview map of Mtirala-Kintrishi nominated component area (No. 1) and its buffer zone.

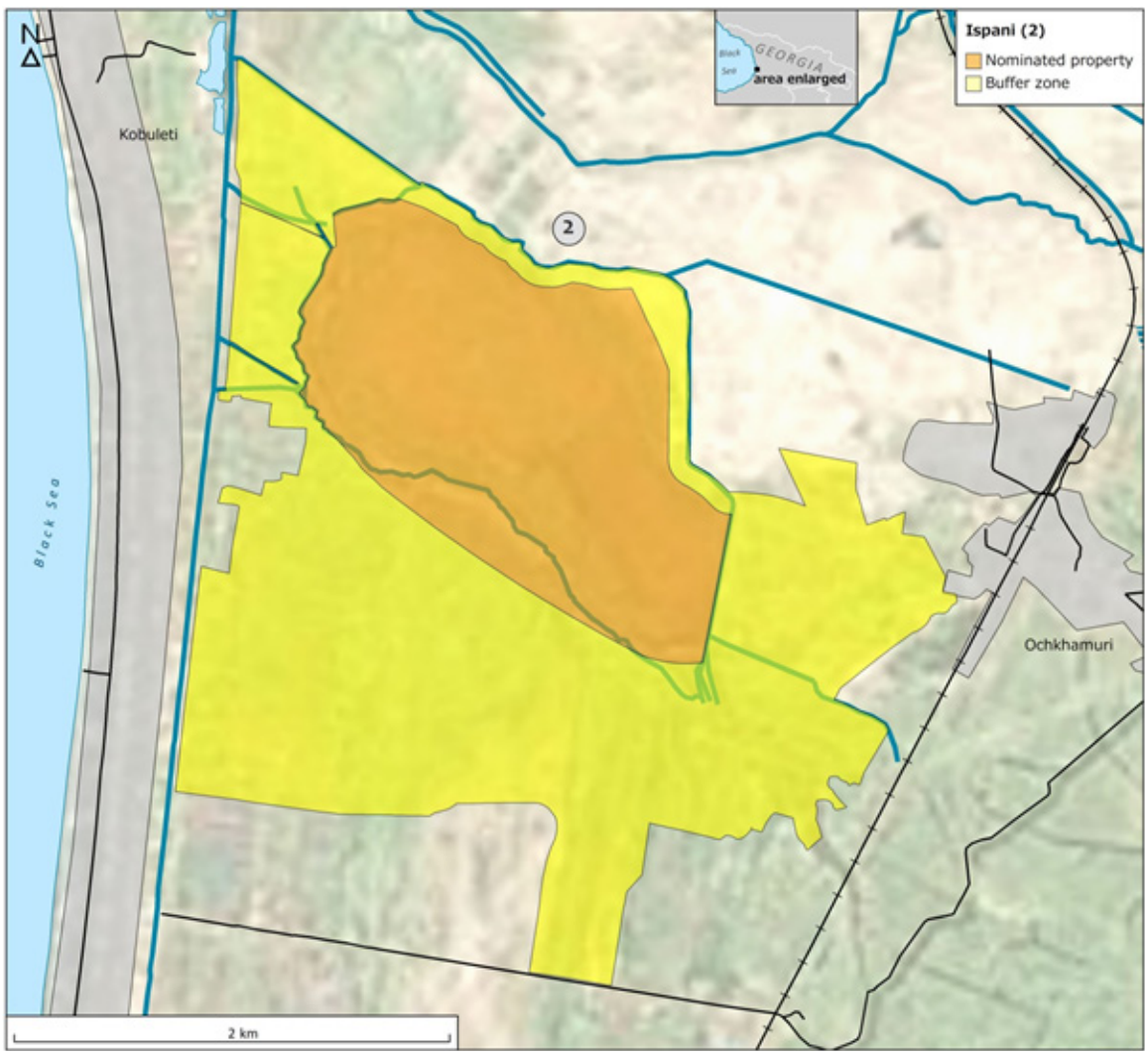



**Figure 3.** Overview map of Ispani nominated component area (No. 2) and its buffer zone

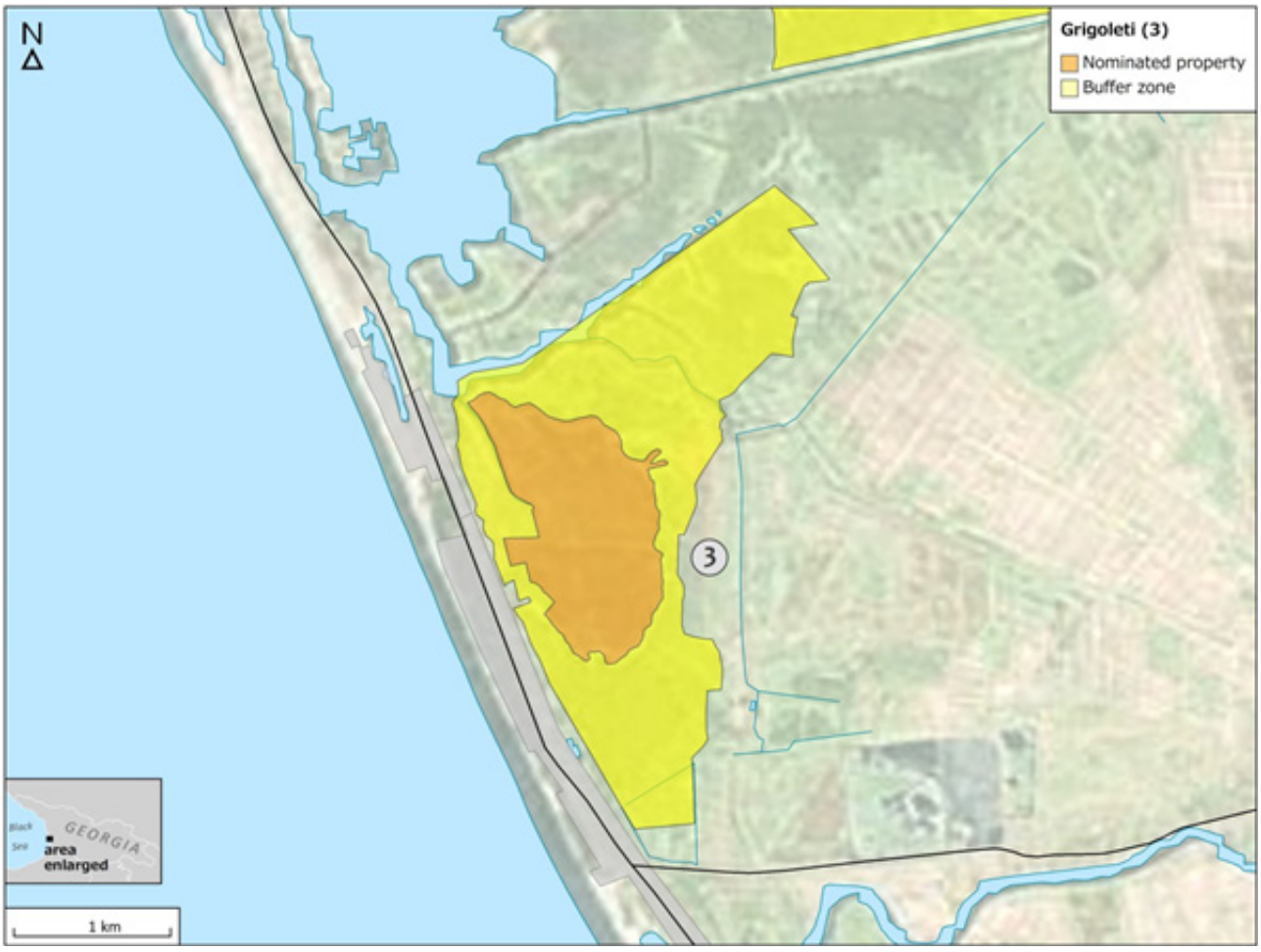



**Figure 4.** Overview map of Grigoleti nominated component area (No. 3) and its buffer zone.

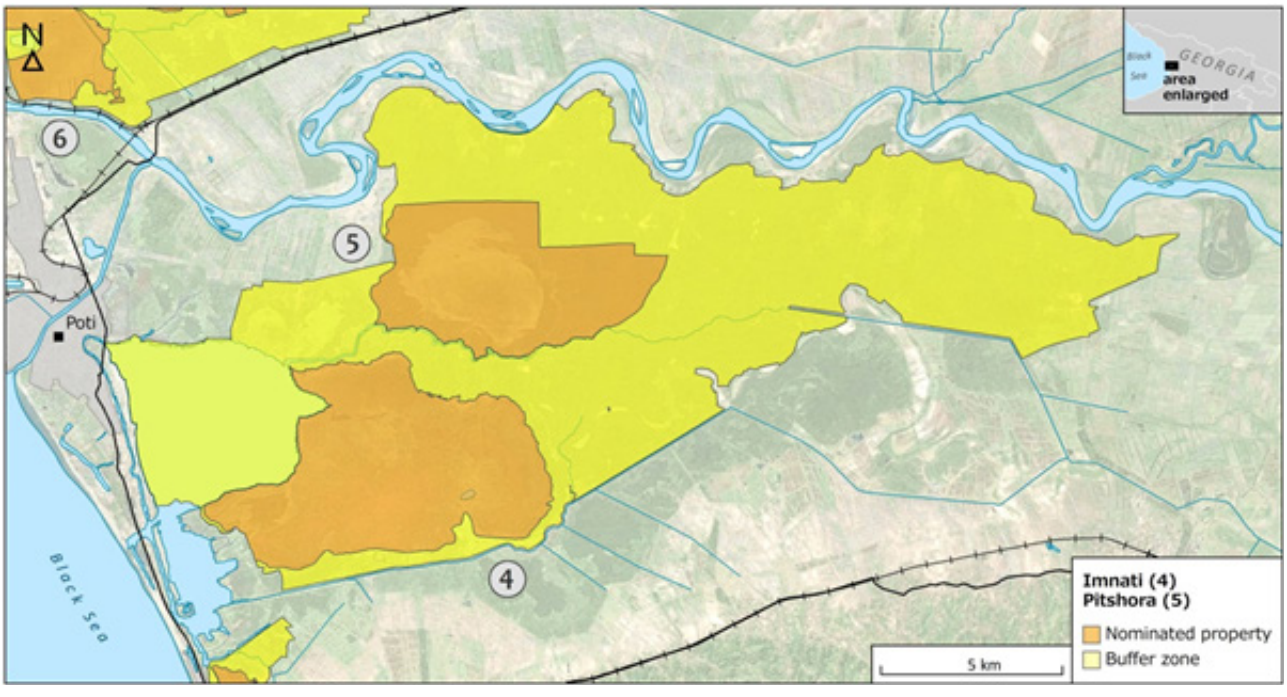



**Figure 5.** Overview map of Imnati and Pitshora nominated component areas (No. 4 & 5) and their buffer zones.

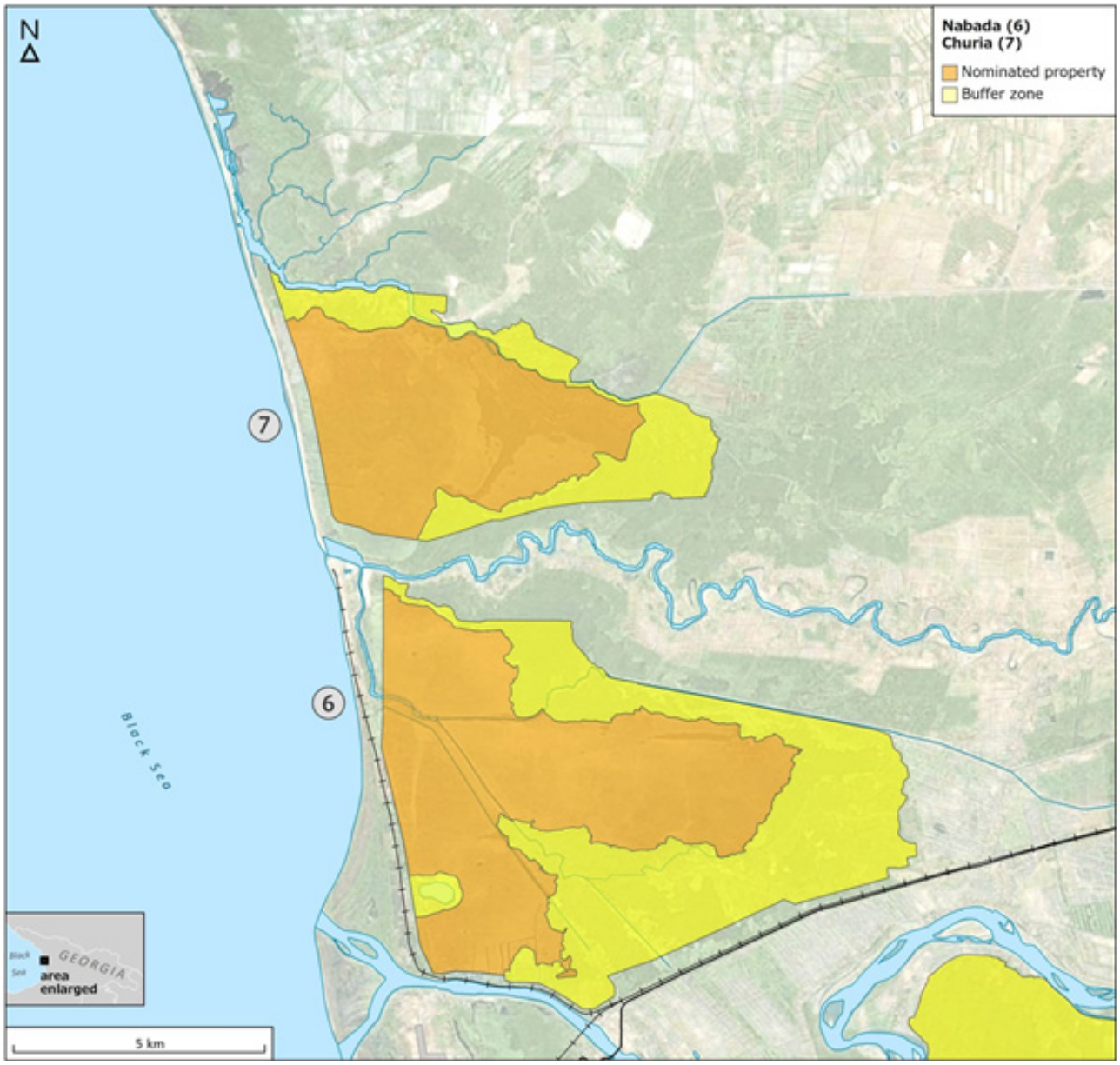



**Figure 6.** Overview map of Nabada and Churia nominated component areas (No. 6 and 7) and their buffer zones.

## *1.f Area of nominated property and proposed buffer zone*

Area of nominated property: 31,253 ha

Buffer zone: 26,850 ha

Total: 58,103ha

# 2. DESCRIPTION

## 2.A DESCRIPTION OF PROPERTY

This Chapter starts with a general description of the Colchic Rainforests and Wetlands (Section 2.a.1), which is followed by an overview of how the features with relevance to its proposed Outstanding Universal Value are distributed in a complementary way between the nominated component areas of the series (Section 2.a.2). A detailed separate description of each of the seven nominated component areas of the series concludes this Chapter (Section 2.a.3 – 2.a.9).

### *2.a.1 General description of the Colchic Rainforests and Wetlands*

#### ***Location and topography***

The Colchic Rainforests and Wetlands occupy the central part of the Colchic region, which in turn is part of the Caucasus region. The Colchic region wraps around the eastern coast of the Black Sea, extending from the Melet River near Ordu in Turkey to the northern border of Abkhazia Autonomic Republic in Georgia (Figure 7). Some authors put its northern border even further to the north, near the Taman Peninsula in Russia's Krasnodar Krai (e.g. Nakhutsrishvili et al. 2015), corresponding to a latitude range of between ca. 40°30' and 44°60' N. This means that the Colchic region extends into Turkey to the south and – depending on the author – into Russia to the north, but has its central and most typical part within Georgia.


**Figure 7.** Overview over the wider Colchic area (source: Nakhutsrishvili et al. 2015).

This central part of the Colchic region, where the Colchic Rainforests and Wetlands are located, includes the Colchic Lowlands, as well as the converging slopes of the Greater Caucasus to the north and the Lesser Caucasus to the south. Both are connected by the Likhi (or Surami) range. This range links Greater and Lesser Caucasus to the east of the Colchic Lowlands, closing the so-called "Colchic Triangle" (Figure 7). In terms of altitude, the central Colchis area ranges from sea level to about 2,800 m a.s.l.

As a consequence of this context, the nominated component areas of the Colchic Rainforests and Wetlands (Figure 2-6) are distributed between two different but immediately adjacent and interconnected topographical settings: The largest and southernmost nominated component area (Mtirala-Kintrishi) is situated in the Adjara-Imeretian (Meskheti) mountain range within the western Lesser Caucasus, at altitudes ranging from 250 m to > 2,700 m a. s. l (Figure 2). This steep mountainous area has a complex relief (see Section 2.a.3 for details).

All other nominated component areas of the Colchic Rainforests and Wetlands are situated within the Colchic Lowlands, at altitudes below 10 m a.s.l. (Figures 3-6). All are within 20 km from the seashore, and four out of six are less than 2 km distant from the seashore at the nearest point. However, these are not coastal wetlands in the strict sense and do not correspond to any of the coastal wetland types as identified by the Ramsar Convention (Ramsar Convention Secretariat 2008). They lack a direct connection to the Black Sea and the water bodies located there are only slightly brackish (maximum salinity at lake Paliastomi 12 Practical Salinity Units). This is because the Black Sea has a salinity of less than 17 PSU and is non-tidal, and because there is a constant inflow of freshwater from streams and precipitation (cf. discussion of climate below). This prevents brackish water inflow even where indirect connections through rivers or coastal freshwater lagoons to the sea exist.

## ***Biogeographic context***

The Colchic Rainforests and Wetlands are part of the ***Caucasus Ecoregion***, a global biodiversity hotspot (Mittermeier et al. 2004, Williams et al. 2006). The "System of Biogeographical Provinces of the World" established by Udvardy (1975) does not capture this ecoregion well: Geographically, the Colchic region overlaps with the provinces ***"Mediterranean Sclerophyll" and "Caucaso-Iranian Highlands" of the Palaearctic Realm***, but these categories do not reflect its peculiarities.

In the more recent classification of terrestrial ecosystems of Olson et al. (2001), the Colchic forests are part of the neighbouring ecoregions of ***Euxine-Colchic Broadleaf Forests and Caucasus Mixed Forests within the Temperate Broadleaf and Mixed Forests Biome of the Palaearctic Realm***. Olson & Dinerstein (2002) include them in the Global 200 Priority Ecoregion ***Caucasus-Anatolian-Hyrcanian Temperate Forests***.

From a freshwater perspective, the Colchic wetlands fall into the freshwater ecoregion of Western Transcaucasia as identified by Abell et al. (2008), and do not coincide with any freshwater priority ecoregion as listed by Olson & Dinerstein (2002).

While the above biogeographic classification schemes set the general biogeographic context of the Colchic Rainforests and Wetlands, they lack both the thematic focus and the geographic width to provide a reference framework to explain the Outstanding Universal Value (OUV) of the nominated property, or to identify all possible sites for Global Comparative Analysis. Therefore, they need to be complemented with biogeographic classification schemes that are more relevant to the property's proposed OUV. Since the proposed OUV of the property is associated mainly with forests and wetlands (particularly peatlands), these global classification schemes also focus on forests and peatlands.

**Forests:**

- From a global plant-geographical perspective (Schroeder 1997) the Colchis is part of the ***South-Euro-Siberian plant-geographical Region***, which corresponds with the East-North-American and the Sino-Japanese Regions in the ***nemoral zone*** of the ***Holarctic Realm***. The humid parts of these three large regions are divided in several types, according to the climatic subdivisions of the temperate humid deciduous forest climate.
- In the plant-geographical division by Meusel et al. (1968-1992) the Colchis is defined as the ***Colchic Sub-province of the Euxinic Province within the Sub-Mediterranean Sub-region of the wider Macaronesian-Mediterranean plant-geographical Region***. From the vegetation-geographical point of view the Colchis is defined on this basis as ***Colchic District within the Euxinic-Hyrcanian oak mixed and beech forest Province of the Sub-Mediterranean deciduous forest region*** (Knapp 2005a).

- Within the above context, the map of natural vegetation of Europe (Dolukhanov & Nakhutsrishvili in Bohn et al. 2000/2003) characterizes the Colchis vegetation complex based on a number of specific components according to the altitudinal belts (Box 1).
- The Colchic Forests can also be classified as warm-temperate rainforests (Nakhutsrishvili et al. 2011), and have been compared with other temperate rainforests (e.g. DellaSala 2011).

**Box 1.** Characterization of the Colchic forests based on components of its vegetation in the Map of the Natural Vegetation of Europe, according to the altitudinal belts (Dolukhanov & Nakhutsrishvili in Bohn et al. 2000/2003).

- S 26 – Colchic herb-rich tall sedge fens with *Carex acuta, Cladium mariscus, Ludwigia palustris* in combination with *Sphagnum* mires (*Sphagnum austinii, S. papillosum*) with *Rhododendron luteum, Osmunda regalis, Rhynchospora caucasica*.
- T 3 – Colchic alder cars (*Alnus barbata*) in combination with alluvial forests (*Alnus barbata, Fraxinus excelsior, Pterocarya pterocarpa*), tall reed vegetation (*Phragmites australis, Typha latifolia*) and sedge swamps (*Carex* spec.).
- H 1 – Colchic lowland to submontane mixed oak forests (*Quercus imeretina, Qu. Hartwissiana, Zelkova carpinifolia, Carpinus betulus, Castanea sativa, Fagus orientalis*) with evergreen understory species (*Rhododdendron ponticum, Prunus laurocerasus*), alternating with oak and hornbeam-oak forests (*Quercus iberica, Carpinus betulus*) in the submontane belt.
- F 169 - Colin-submontane East-Euxinian oak and hornbeam-oak forests (*Quercus iberica, Carpinus orientalis, C. betulus*), alternating with hornbeam-chestnut-beech forests (*Fagus orientalis, Castanea sativa, Carpinus betulus*) with evergreen understorey.
- F 163 – East-Euxinian beech forests (*Fagus orientalis*) partly with Picea orientalis, mostly with evergreen understory (*Prunus laurocarasus, Rhododendron ponticum, Daphne ponticum*) with *Hedera colchica, Ilex colchica, Ruscus colchicus*.

In conclusion, the most humid parts of the South-Euro-Siberian, East-North-American and Sino-Japanese plant-geographical Regions represent the general and main biogeographic context for the further evaluation of the Colchic forests (Chapter 3).

**Wetlands, particularly peatlands:**

The Colchic Wetlands comprise a wide range of ecosystems (see Section on ecosystems, habitats and vegetation below for details) but by far the most relevant to the proposed OUV of the series are peatlands. Box 6 explains key terms in relation to them.

Peatlands are mainly distributed in the temperate and cold belt of the northern hemisphere with a proportion being around 90% (Lappalainen 1996). The main peatland areas are in northern Europe, western Siberia, North America and also in the humid tropics (Figure 8) (Pfadenhauer et al. 1993).

The Colchic mires can be put into biogeographical and functional context using (1) the pan-European typology of mire regions of Moen et al. (2017), and (2) the hydrogenetic mire classification of Succow & Joosten (2001) and Joosten and Clarke (2002).

- The typology of European mire regions takes into account biological, hydrological and geographic criteria. Within this typology, the peatlands of the Colchis form one of ten distinct mire regions of pan-Europe, the Colchis mire region (Moen et al. 2017). Reflecting the warm-temperate environment, this region forms a structural and functional transition between the peatlands of the boreal and those of the tropical zones (Joosten et al. 2003).

- The globally applicable hydrogenetic mire classification was derived from a synthesis of various mire classification systems and focuses on the processes that drive peat formation and peatland development (Joosten et al. 2017). Special attention is paid to interrelations and feedback mechanisms between (a) water flow and fluctuations, (b) vegetation and (c) peat formation, as well as to the role peatland development plays in landscape hydrology. According to this fundamental classification, the characteristic hydrogenetic mire type of the Colchis mire region is the ombrogenous percolation mire (Joosten & Clarke 2002), or percolation bog (Kaffke 2008, de Klerk et al. 2009, Krebs et al. 2017), where water flows through the entire peat body (Figure 9). Percolation bogs have a convex shape indicating ombrogeneity (purely rain fed conditions), are typically weakly decomposed over a large depth (without a clear horizontal zonation in acrotelm and catotelm) and with predominantly vertical water flow, which consequently do not develop explicit surface patterning (Joosten & Clarke 2002, Couwenberg & Joosten 1999, de Klerk et al. 2009). This mire type only occurs in the Colchis mire region and nowhere else in the World. This is due to the combination of a high annual temperature (~14.5 °C) and a high amount of precipitation (~2,000 mm), evenly distributed over the year (Krebs et al. 2017).

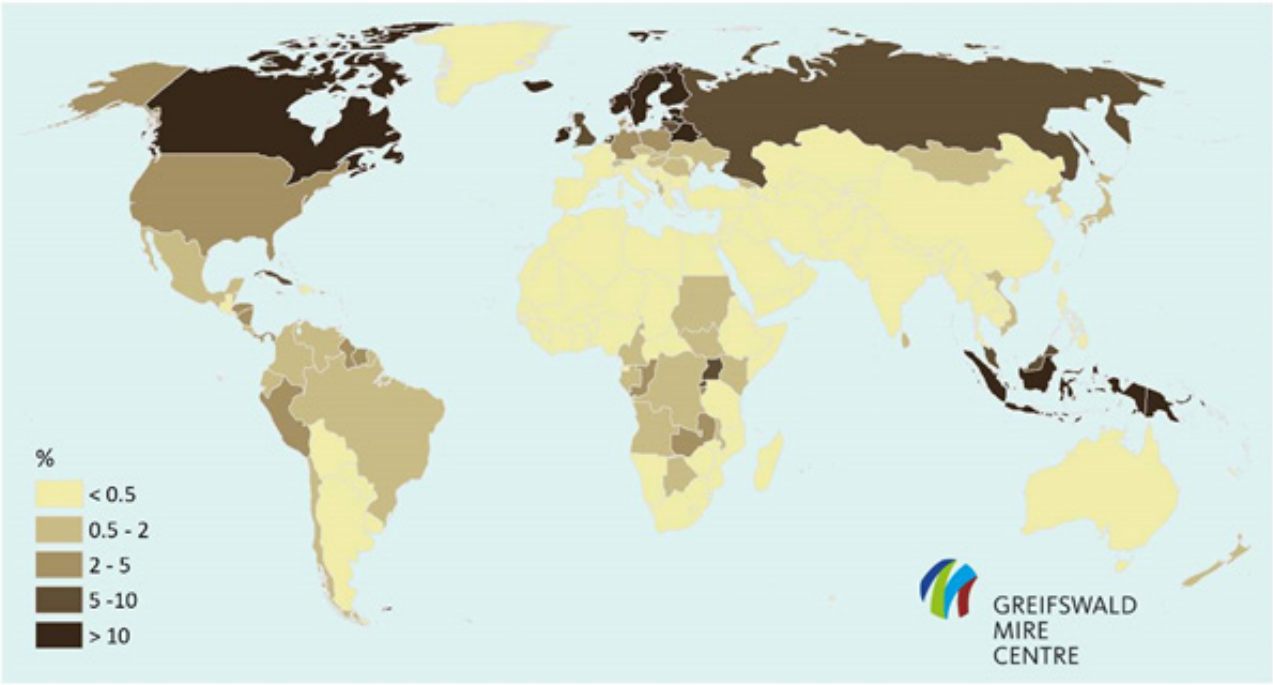



**Figure 8.** Global distribution of peatlands (area percentage by country). Source: Greifswald Mire Centre

In conclusion, the interrelated systems of pan-European mire regions by Moen et al. (2017) and of globally applicable hydrogenetic mire types by Joosten et al. (2017) set the biogeographic context within which the Colchic peatlands as the dominating and most relevant wetland ecosystem of the Colchic wetlands – from the point of view of its proposed OUV – will be evaluated further (Chapter 3.2.2).

## ***Geology***

The Adjara-Imeretian (Meskheti) mountain range, where the southernmost nominated component area of the Colchic Rainforests and Wetlands is situated, belongs to the Lesser Caucasus, a mountainous area formed mainly by a segment of the Alpine-Himalayan mountain belt. It is composed of Eocene volcanogenic and sedimentary rocks. Among them are basalts, andesites, massive and thick-layered breccias, tuffs, tuffo-sandstones, and marls. The layering is complicated by faults and overthrusts (Gobejishvili & Tielidze 2018).

To the north of the Adjara-Imeretian mountain range lies the Kolkheti Lowland. This has been created by river sediments in a sea gulf. Its present relief reflects both submersion and accumulation of river deposits (Krebs et al. 2017). The Kolkheti Lowland is a subsiding basin that may have originated during the Late Eocene or the Oligocene-Miocene Boundary (Saintot et al. 2006).

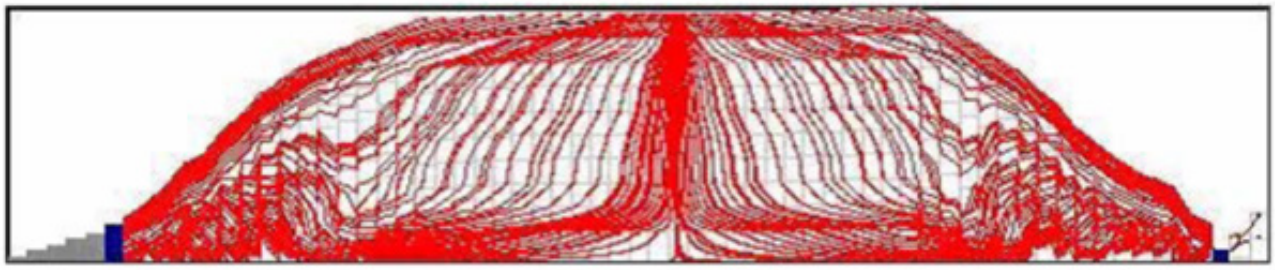


**Figure 9.** Schematic representation of water flow through a rain percolation bog, as the typical type of bog in the Colchic Rainforests and Wetlands. In contrast to other types of mires, water flows through the entire peat body, making this an "ideal" type of bog. (Source: Matthias Krebs

## ***Climate***

The Colchic zone has a warm-temperate climate (Figure 10). Summers are moderately warm (24-25 °C) and winters cool (4-6 °C) (Nakhutsrishvili et al. 2011). The location and topography of the Colchic triangle result in ***very high average*** annual precipitation of 1,800-2,200 mm, and ***exceptionally high local*** precipitation averages, such as on Mount Mtirala within Mtirala-Kintrishi nominated component area (4,500 mm). Precipitation is distributed relatively evenly throughout the year (Nakhutsrishvili et al. 2011), with maxima in December (303 mm in Batumi) and minima in May (84 mm) (Climate-Data.Org 2017).

The exceptionally high precipitation in the Colchic area is the result of the funnel formed by the Greater and Lesser Caucasus, as well as the Likhi range which connects them in the east (see discussion of Colchic triangle above). These mountain ranges trap much of the moisture arising from the Black Sea on their windward side (Nakhutsrishvili et al. 2011).

The Colchic climate should be considered warm-temperate not subtropical: Air temperatures are lower compared with subtropical areas, and the seasonality of precipitation is not as pronounced, with significant rainfall throughout the year. This is reflected in the Colchic forest vegetation, which is more appropriately described as hygro-thermophilous temperate broadleaf forest (Dolukhanov 1980), or temperate rainforest (Nakhutsrishvili et al. 2011). The warm-temperate and extremely humid climate of the Colchic Rainforests and Wetlands is an important determining factor of their vegetation and biodiversity, which in turn support their proposed OUV. The structure and function of both forest and peatland ecosystems within the series can be understood as its result.

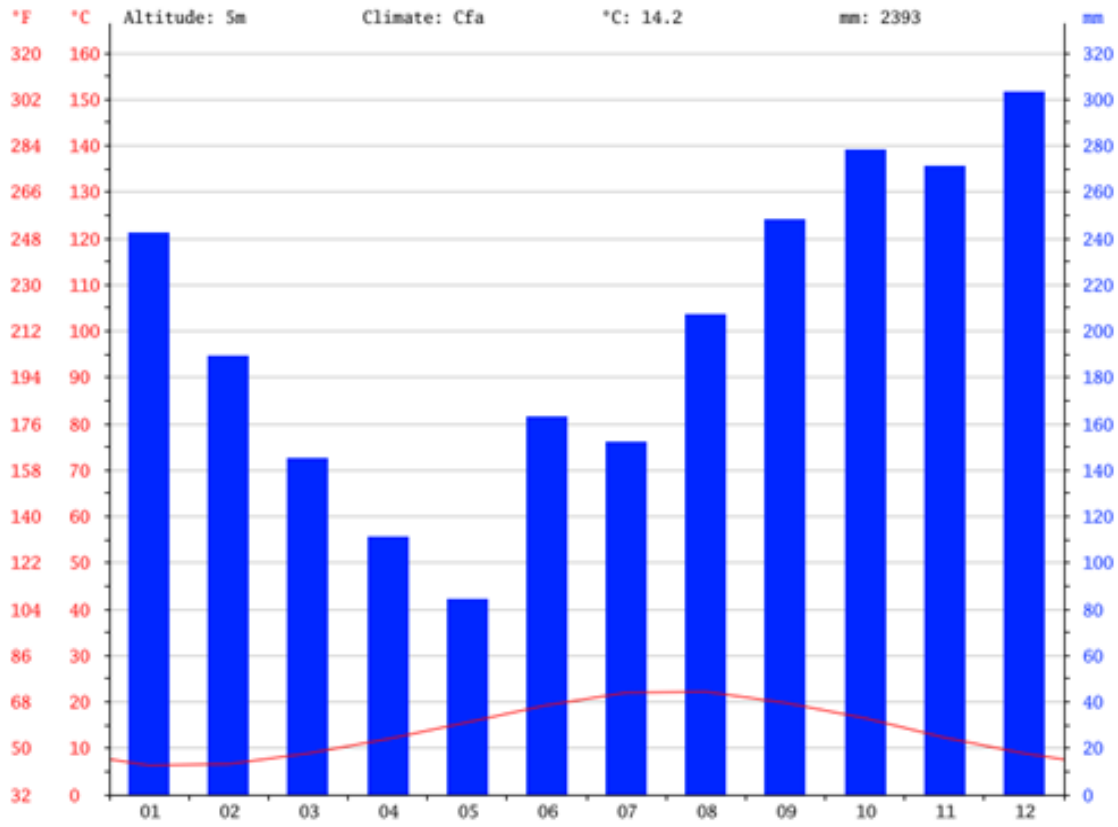



**Figure 10.** Climate diagramme for the city of Batumi, Georgia. See also specific climate diagrams for nominated component areas. Source: Climate-Data.Org.

Precipitation decreases from the southern (up to 4,500 mm annual precipitation) to the northern nominated component areas of the series (less than 1,900 mm) (Joosten et al. 2003). An overview putting climate and precipitation patterns in the Colchic Rainforests and Wetlands into eco-regional context is presented in Figure 11.

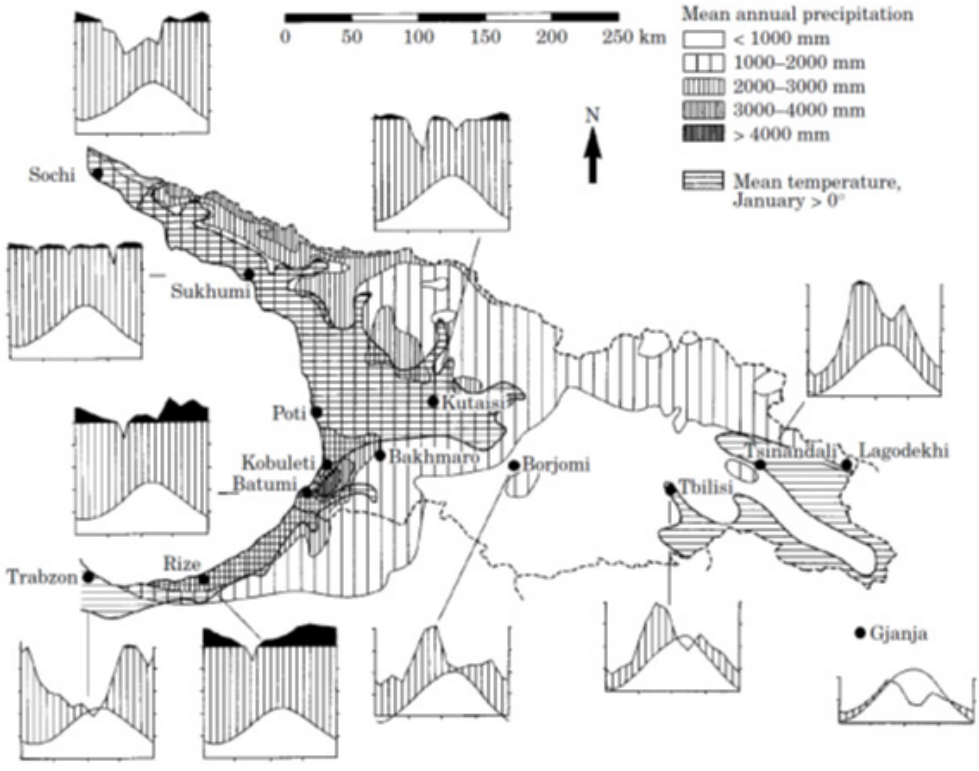



**Figure 11.** Map of Georgia showing mean annual precipitation and temperature in the areas under study. Climatic diagrams after Walter & Lieth (1960–67). Source: Denk et al. (2001).

The Colchic forests and their biota have survived the glacial cycles of the Pleistocene, which partly explains their current biodiversity, particularly regarding endemic and relict species. However, the region is currently experiencing a trend towards increased temperature and humidity (EnvSec 2011), and is likely to continue doing so in the future (Sylven et al. 2008). Based on temperature and precipitation data dating back to 1936 and assuming that observed trends will continue, it has been projected that precipitation on the Black Sea coastline and Colchis lowland will increase by 50% and amounts to 3,000 and 6,000 mm by the end of the century; a longer rainy period might increase the risk of flooding. An increase in the number of hot days in the area has also been projected (Elizbarashvili et al. 2017).

## ***Hydrology***

The hydrology and hydrological regime of the Colchic Rainforests and Wetlands has a vital importance for its ecosystems and habitats. The area is characterized by numerous big, medium and small-size rivers as well as lakes and wetlands. The river Rioni is the main artery of the hydrographical network of the Colchic Lowlands, although most of the nominated component areas depend on other, smaller rivers (see Section 2.a.3 below). The length of the river is 327 km and it heads on the southern slope of the Caucasus Ridge, at 2,620 m a.s.l. It crosses the whole of Kolkheti Valley and flows into the Black Sea at the city of Poti. The area of its catch basin is 13,400 km$^2$. The catchment of the river covers almost half of West Georgia, with Kolkheti Valley occupying 19% of it. The River Rioni is fed with glaciers, snow, rain and ground waters. Its water regime is characterized by spring floods and freshets. A relatively stable low-flow period is fixed in autumn and winter months. The river is flown by its most important tributaries as it flows across Kolkheti valley, such as Jojora (with the length of 50 km), Kvirila (140 km), Khanistskali (57 km), Tskhenistskali (176 km), Noghela (59 km), Tekhuri (101 km), Tsivi (33 km).

The main hydro-arteries on the slope of Kobuleti-Chakvi ridge (Mtirala-Kintrishi nominated component area) are the rivers Chakvistskali and Korolistskali directly running into the Black Sea, and tributaries of the rivers Ajaristskali, Dologani, Zundagistskali and some others on the south slope of the ridge, outside the nominated component area. Several of them run through beautiful gorges creating rapids and waterfalls.

The rivers - Natanebi, Ochkhamuri, Cholokhi, Shavi Ghele, Togoni, Adjkhva and Kintrishi are flowing into the Kobuleti wetlands (around Ispani nominated component area) and adjacent north and south parts of the sea-side. No river of Kobuleti municipality originates from permanent snow and glaciers. They are mostly fed by precipitation, seasonal snow-melting and groundwater. Therefore, they are often characterized by high level of volume, fast flow and cause often floods during spring and autumn seasons.

The Supsa, Rioni, Khobistskali, Tekhuri and Enguri are the biggest transit rivers that are flowing through the territories of Kolkheti National Park. Maltakva, Dedbera, Cia, Tsivi and Churia are non-transit rivers that are generated by the Colchic wetlands. The macrometer index of some small rivers in the Kolkheti Area is as follows: The river Churia, which is 11 km long and has the basin area 295-km$^2$, flows into the Black Sea. The river Pitshora, the length of which is 61 km and the basin is 406 km$^2$ and the river Thkorina with 16 km length and 56-km$^2$ basin area is connected to the Paliastomi Lake. The river Munchia with 39 km length and 80 km$^2$ basin is connected to the river Churia. The 11 km long river Tsia with 28.9-km$^2$ basin joins the river Tsivi and the latter with 33 km length and 254 km$^2$ basin flows into the river Khobistskali. The rivers of the Kolkheti area are generally characterized by seasonal runoff. Floods in all seasons of the year are common. Periodically, catastrophic floods, especially on the river Rioni were observed in 1842, 1895, 1922, 1983 and 1987.

A significant role within the hydrologic regime of the Kolkheti territories plays also Paliastomi Lake which is the largest of over 40 other smaller lakes in the Kolkheti wetland complex. It area is 23.2 km$^2$ with a catchment area of 547 km$^2$. The maximum depth of the lake is 2.6 m and the average depth is 1.3 m. In the lake, there are inflows from the three rivers: Shavi Ghele - in the northwest, Pitshora in the north-east and Tkhorina (its tributary Gurinca) in the south. From the lake, the river Kaparcha is flowing out. The river Shavi Ghele is 4 km long. During the floods of the Rioni River, turbid water masses reach the lake through the Shavi Ghele River.

Oppositely, the Shavi Ghele river basin is fed by the Paliastomi Lake when the water level in the river is low.

A crucial role for the Paliastomi lake and the neighbouring nominated component areas of Imnati and Pitshora has the River Pitshora. Similarly to the Shavi Ghele River Rioni river water flows to the lake through Pitshora. The river Tkhorina originates from the Imnati mire territories. Lithological, paleontological and other analyses of the Paliastomi Lake showed that the lake was created from Lake sediment (clay, sapropel) and peat monolithic layers. The Paliastomi Lake is the best example of different sedimentary horizons of the same age. The deepest and the oldest layer (10-11 m) is the upper layer of the Paliastomi Lake. The fact that the sea-origin sediments are developed in the Paliastomi lake areas and that they are located under the peat and lake generated clay-sapropel layers indicates that the Paliastomi lake formation started 5-6 thousand years ago from the relict lagoon of the sea and this process is still continuing.

A number of the nominated component areas are located in the vicinity of the Black Sea coast. The sea coastal area includes a shelf that covers an average 5 miles from the coastline. The surface of the shelf is not very inclined. For example, the depth of 20 m from the coastline continues until 1,300-1,400 m from the shore. Circulation of air masses on the Black Sea coastal waters leads to cyclonic rotation of water flow (counter-clockwise rotation). The speed of the flow is usually approximately 1 km per hour, while during the strong winds the speed reaches up to 5-6 km. Western winds and waves prevail over the year and the North-West winds are observed during winter. There are also strong storms during which the maximum height of the waves varies between 3-6 m. Very rarely the wave height can reach 8 m. Water salinity on the surface of the open sea is 17-18 %, varying with the 3-9 % at the large river inflows.

## ***Soils***

The soils in the area of the Colchic Rainforests and Wetlands form a marked altitudinal series but are also influenced by local variability in bedrock and vegetation. The following main soil types predominate (Urushadze & Blum 2014):

- **Marshy organic soils:** This is the predominant soil type of the Kolkheti Lowland. These soils involve silt and organic (peat) bog soils. The soils are partly composed of alluvial material, which is produced by rock weathering in the North and South Caucasus. These deposits contain mostly carbonates, which are shared with clay in the upper stratum. Mineral marshy soils are characterized by weakly acid or neutral reaction, a high content of humus and a heavy texture in all profiles, highly dispersive. Bog soils are characterized by an increased content of different forms of iron. While an accumulation of amorphous iron oxides is found in the upper part of the profile, well crystallized oxides are found deeper down.
- **Red Soils:** This soil type, which is usually found in the humid tropics and subtropics, is characterized by its red colour, clayization and usually by great soil depths. The soil profile shows the following horizons: A-AB-B-BC-C. They are distributed in the lower part of the Adjara-Imeretian mountain range up to 300 m a.s.l. and formed by red weathering products of effusive rocks (primarily andesite) and their derivatives. The depth of the ground water table is 8-10 m. Red soils are acid, and characterized by heavy clay loam, clay and heavy clay texture. The content of humus is medium or high. The mineral part of soils is characterized by ferrallitic weathering. The formation of red soils needs drainage and intensive leaching conditions, so that an intensive and long weathering is necessary for the formation of these soils.
- **Yellow soils:** These are characterized by yellow colours, clayization and usually by deep profiles. The soils show the following horizons: A-AB-B-BC-C. These acid soils are widely distributed in the lower mountainous belt of the Adjara-Imeretian mountain range at altitudes of 250 to 600 m a.s.l. The soil forming rocks are acid, and typically consist of weathered schists. On the terraces, these soils are usually developed on clay deposits. Soil forming rocks are characterized by properties that promote erosion and landslides. The content of humus ranges from 2% to 7%, and sharply decreases with depth. The texture also changes significantly with depth. The distribution and properties of yellow soils are determined by their parent rocks. During the soil forming processes a mobilisation of iron takes place, parallel to the formation of iron hydroxides. The latter determines the yellow colour of the soils.

- **Yellow-brown forest soils:** These soils are characterized by well expressed humus and a yellowish brown illuvial horizon, with the horizons: A-AB-B1-B2-C1-C2orA-B1-B2-C1-C2orA-AB-B-B1B2-BC. They are distributed in the Colchic region between the yellow, red and brown forest soils at altitudes from 400 to 1,000 m a.s.l. The parent rocks of these acid, humus-rich soils are middle jurassic porphyrite, porphyr and effusive rocks and their derivates on old denudation surfaces. Yellow brown forest soils have a heavy loamy texture. They are characterized by an insignificant or a total lack of clay movement. In comparison to brown forest soils, yellow brown soils are richer in iron oxides. Their accumulation in the illuvial horizon is explained by intensive leaching. In the formation of the yellow brown forest soil biological turnover processes are of particular significance. This biological activity limits the podzolization process.
- **Brown forest soils:** This forest type is characterized by a weakly differentiated profile, with the A0 - A - Bm - C. The main diagnostic feature is the metamorphic clay in the Bm horizon. These soils occur between 800 m and 2,000 m a.s.l. and are the most widespread soil type of the Colchic forests. Brown forest soils are mainly developed on slopes, which determine free inter-soil drainage. Their formation of these soils occurs on tertiary sandstones and clay slates, clay deposits and conglomerates. They do not freeze or freeze only for a short period, which allows an intensive weathering and formation of secondary minerals. Brown forest soils are characterized by a weak acid reaction. The content of humus sometimes reaches 1% in the lowest horizons. The texture of brown forest soils is light sandy, loamy, rarely heavy. In most cases, the content of clay and silt increases with depth. Brown forest soils develop under humid conditions in deciduous, mixed or coniferous forests with well developed grass cover, in well-drained conditions, in the absence of prolonged soil freezing.
- **Mountain meadow soils:** These soils are characterized by non-differentiated profiles, with the horizons At-A-B-BC. The main diagnostic signs are a well-expressed humus horizon over a small weathering horizon. Mountain meadow soils are widely distributed in the narrow subalpine belt that forms part of the series at Mtirala-Kintrishi, above 1,800 m a.s.l. They are formed under extreme climatic conditions, with long snow cover and cool summers. The cold climate of the high mountains supports an intensive weathering of the rocks and this leads to an accumulation of a great number of rock fragments on the soil surface. As a result denudation processes in mountain meadow soils are comparatively young. They are characterized by an average or little depth, turf material of the surface, loamy or clayey texture, mainly acid or weakly acid reaction, with high and deep humus formation.

## ***Ecosystems, habitats and vegetation***

The Colchic Rainforests and Wetlands capture an entire altitudinal series of typical Colchic ecosystems running from sea level to almost 2,800 m a.s.l. (Figure 12). Reflecting their geographic location and biogeographic context as discussed above, their predominant ecosystems are forests and peatlands. These are also by far the most important ecosystems of the Colchic Rainforests and Wetlands in terms of their proposed Outstanding Universal Value, particularly in relation to World Heritage criterion ix.

In addition, there are a number of other ecosystems that immediately surround these key elements, functionally interact with them, and provide habitats for some of their biodiversity (at least during parts of the lifecycle). These are also included within the nominated component areas where appropriate. They include permanent freshwater bodies and some subalpine meadow ecosystems.

While only Colchic forests and some subalpine meadow ecosystems are found at the mountainous Mtirala-Kintrishi nominated component area, Colchic lowland forests and peatlands are intricately mixed in several of the other nominated component areas in the Colchic Lowlands (see Chaper 2.a.2 and 2.1.3 below).

On the basis of this general overview, the general description of the ecosystems, habitats and vegetation of the Colchic Rainforests and Wetlands can be structured as follows:

**Characterization of forest ecosystems, habitats and vegetation of the Colchic Rainforests and Wetlands:** The Colchic rainforests include several types (see below) but their major and overall distinguishing feature is

semi-prostrate evergreen shrubs characterized by vegetative reproduction forming dense understoreys up to 3-4 m tall and containing evergreens (Figure 13), such as *Rhododendron ponticum, R. ungernii, R. smirnovii* (the last two being local endemics of southern Colchis), *Laurocerasus officinalis,* and *Ilex colchicum* (Ketskhoveli 1960, Nakhutsrishvili 1999, Zazanashvili et al. 2000, Dolukhanov 2010, Nakhutsrishvili et al. 2010).

**Figure 12.** View over Paliastomi Lake and Imnati nominated component area towards Mtirala-Kintrishi nominated component area in winter. (Photo: Izolda Matchutadze)


**Figure 13.** Castanetum laurocerasum, an example of Colchic forest with understorey of semi-prostrate evergreen shrubs, in the Collin-submontane belt of Mtirala-Kintrishi nominated component area. (Photo: Zurab Manvelidze).

The main concentration areas of these typical semi-prostrate Colchic relicts, in the Caucasus, and therefore the most typical Colchic rainforests, are found in the southern Colchic area (Dolukhanov 1980, Zazanashvili et al. 2000; see Figure 14), particularly on the territory of the Mtirala-Kintrishi nominated component area.

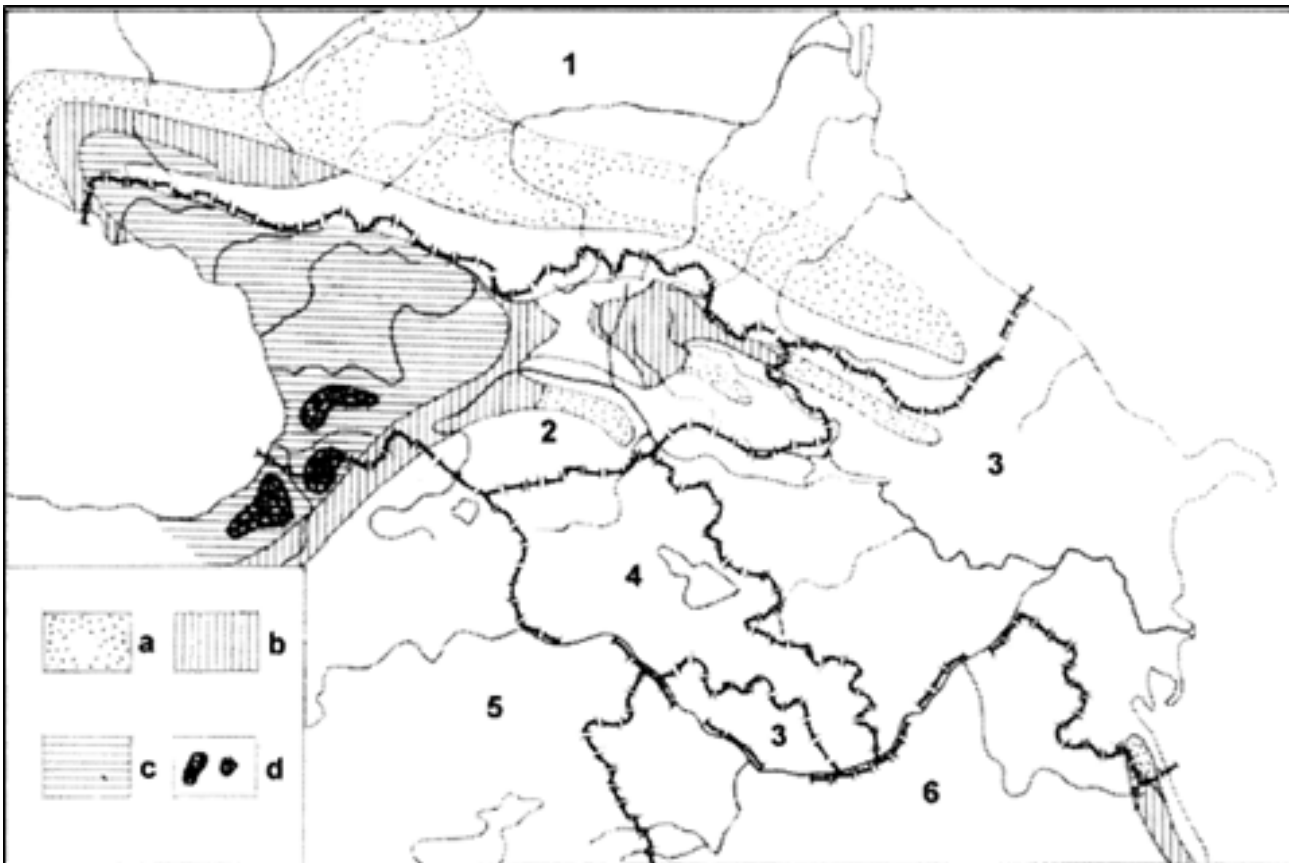



**Figure 14.** Distribution of semi-prostrate Colchic relicts in the Causasus: L*aurocerasus officinalis, Rhododendron ponticum, Rh. luteum, Rh. ungernii, Rh. smirnowii, Vaccinium arctostaphylos, Epigaea gaultherioides, Viburnum orientale, Ruscus colchicus, Ilex colchica, I. stenocarpa, I. hyrcana – including Rh. × sochadze* but excluding *Rh. causasicum.* a = areas with 1 - 2 species; b = 3 - 4 species; c = 5 - 8 species; d = 9 - 11 species (Dolukhanov, 1980). 1 = Russian Federation; 2 = Georgia; 3 = Azerbaijan; 4 = Armenia; 5 = Turkey; 6 = Iran (from Zazanashvili et al. 2010).

**Classification of forest ecosystems, habitats and vegetation:** Forest cover of the nominated component areas is characterized by a high diversity of types in dependence of altitudinal belts and site conditions (Figure 15). The list of forest types contains 23 associations in 5 formations (Appendix 4), based on the dominance of tree species. These associations form the following altitudinal complexes, which correspond with vegetation units of the Map of natural vegetation of Europe (Bohn et al. 2000):

**A –Colchic lowland forest** (0-25 m a. s. l.) is characterized by polydominant deciduous forest (Figure 16) with woody species of *Alnus glutinosa* subsp. *barbata, Pterocarya fraxinifolia,* endemic *Quercus hartwissiana*, *Fraxinus excelsior*, *Carpinus betulus, Acer orthocampestre,* with some individuals of *Zelcova carpinifolia and Fagus orientalis,* and shrubs *Viburnum opulus, Ficus colchica, Morus nigra,* with an evergreen understory of *Ilex colchica,* endemic *Buxus colchica* and creeping lianas, such as *Hedera colchica, Humulus lupulus, Periploca graeca, Lonicera caprifolia.*

At the lowest elevations at around sea level, very swampy alder dominanted forests with *Alnus glutinosa* subsp. *barbata* occur, mixed with some individuals of *Pterocarya fraxinifolia* occur.

**B – The Collin-submontane belt** (25-500 m a.s.l.) is characterized by the formations Carpineta and Castanetea: ***Carpinus betulus-Castanea sativa* mixed forests** with evergreen understorey of *Rhododendron ponticum, Laurocerasus officinalis, Ilex colchica* and with dominance of ferns in herbal layer (e.g. *Pteris cretica, Phyllites scolopendrium, Blechnum spicant, Athyrium felix-femina, Dryopteris filix-mas*) (Figure 17).

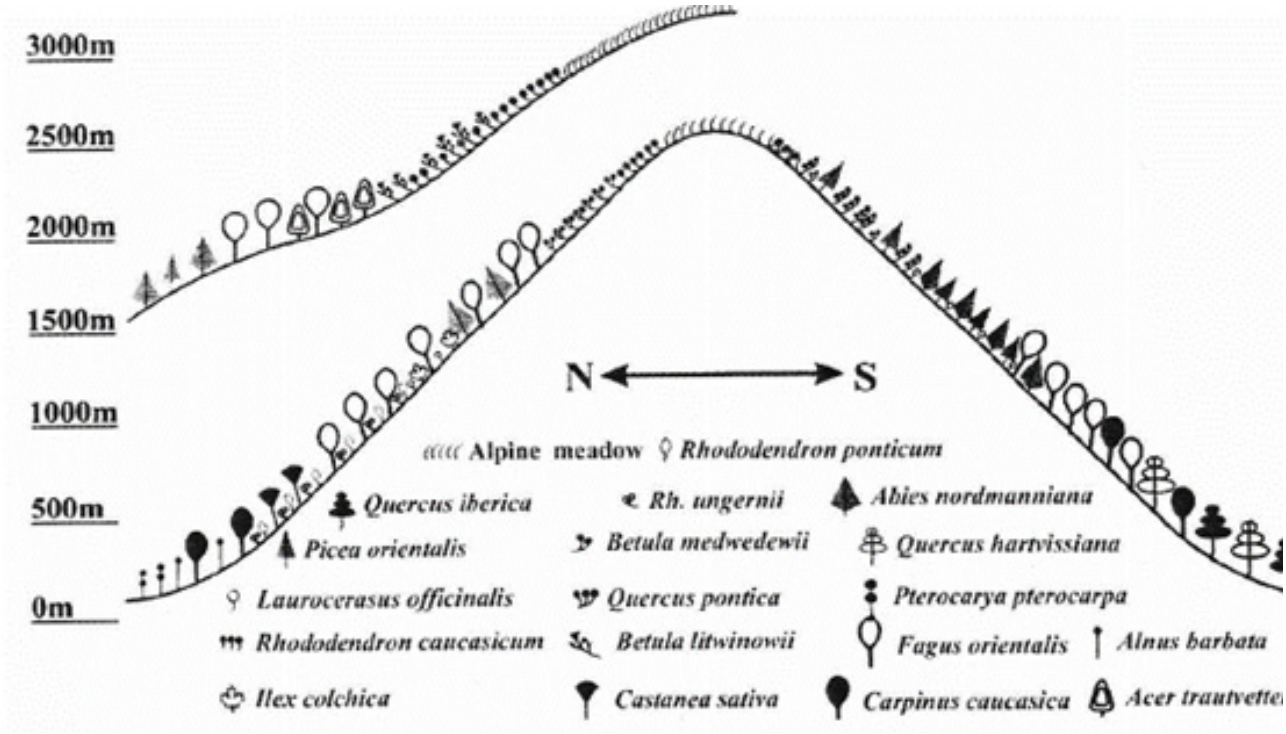



**Figure 15.** Vertical distribution of the vegetation types (the major species are given for forest types) in Ajara, southern Colchis (from Nakhutsrishvili 2013).

**Figure 16.** Colchic lowland forest and backwater at Pitshora nominated component area. (Photo: Paata Vardanishvili)

**Figure 17.** Carpinetum rhododendrosum in the collin-submontane belt of Mtirala-Kintrishi nominated component area. (Photo: Zurab Manvelidze)

Carpinetum rhododendrosum (1.1) and Fageto-Castaneto-Carpinetum rhododendrosum (1.2) only occur in this belt.

Castanetum rhododendrosum (2.1), Fageto-Carpineto-Castanetum laurocerasosum (2.5) and Castanetum laurocerasosum (2.3) connect this belt with the lower montane belt.

These types represent the **Hygro-thermophilous mixed deciduous broadleafd forests of the Colchis** (H 1) in the map of natural vegetation of Europe (Bohn et al. 2000).

**C – The Lower montane belt** (500-1,000 m a.s.l.) is characterized by the highest diversity of forest types and dominance of ***Castanea sativa-Fagus orientalis*** mixed forests with evergreen understory (Figure 18). While Castanetum rhododendrosum (2.1), Fageto-Carpineto-Castanetum laurocerasosum (2.5) and Castanetum laurocerasosum (2.3) connect this belt with the colline-submontane belt, Carpineto-Castanetum laurocerasosum (2.4), Fageto-Carpineto-Castanetum rhododendrosum (2.2), and Alnetum matteuccioso-rubosum (3.1) along rivers only occur in this lower montane belt.

Three associations of the Fageta formation have increasing share with increasing altitude. Fagetum nudum (4.12), Fagetum laurocerasosum (4.2) and Fagetum rhododendrosumn (4.1) start in the lower montane belt, but they are distributed until the middle montane belt and higher. The Alnetum sambucosum (3.2) is also described.

This diverse forest complex of the lower montane belt is described as **Euxinian hornbeam-chestnut-oriental beech forest** (*Fagus orientalis, Castanea sativas, Carpinus betulus*) with evergreen understory (F 169) in the map of natural vegetation of Europe.

**D – The middle montane belt** (1,000-1,800 m a.s.l.) is absolute dominated by **beech forests** (Figure 19)**.**

Fagetum laurocerasosum (4.2), Fagetum rhododendrosum (4.1) and Fagetum Rhododendroso-laurocerasosum (4.3) are the dominating beech forest associations with evergreen understory. Their also occur Fagetum arctostaphylosum (4.9).


**Figure 18.** Fagetum-Castanetum-Carpinetum rhododendrosum in the lower montane belt of Mtirala-Kintrishi nominated component area. (Photo: Zurab Manvelidze).

Two further Fageta associations are described from Mtirala: Fagetum viburnosum (4.10) and Fagetum mixtofruticosum (4.11).

In the upper parts of this belt in Mtirala-Kintrishi nominated component area, Fagetum seneciosum (4.4) and Abieto- Fagetum seneciosum (4.5) with coniferous trees of *Abies nordmanniana* and *Picea orientalis* occur.

These associations are summarized as **Euxinian-Caucasian Oriental beech forests** (*Fagus orientalis*) mostly with evergreen understory (*Prunus laurocerasus, Rhododendron ponticum, Daphne pontica*), with *Hedera colchica, Ilex colchica, Ruscus colchicus* (F 163) in the Map of natural vegetation of Europe.

**E – The upper montane belt** (1,800-2,200 m a.s.l.) in the upper part of Mtirala-Kintrishi nominated component area is characterized by **mixed beech forests** with coniferous trees of *Abies nordmanniana* and *Picea orientalis*: Fagetum seneciosum (4.4), Fagetum graminoso-mixtoherbosum (4.6), Fagetum altherbosum (4.7) (Figure 20).

They are summarized as **West Caucasian fir, spruce-fir and beech-fir forests** with evergreen understory (D 32) in the map of natural vegetation of Europe.

The Betuleto-Fagetum caucasico-rhododendrosum (4.8) connects this belt with the following belt.

**F – The subalpine forest line belt** (2,200-2,500 m a.s.l.), which is formed by **birch forests** of *Betula litwinowii* and *B. medwedewii*: Betuleto caucasico-rhododendrosum (5.1) and Betuletum altherbosa subalpina (5.2). The Betuleto-Fagetum caucasico-rhododendrosum (4.8) forms the forest line at 2,400m a.s.l. with *Fagus orientalis, Betula litwinowii, B. medwedewii, Acer trautvetteri* and *Sorbus subfusca* (Figure 21).

This complex is described in the Map of natural vegetation of Europe as **Western Low Caucasian krummholz and open woodland** (C 45) in the subalpine belt.

**Figure 19.** Fagetum laurocerasosum in the middle montane belt of Mtirala-Kintrishi nominated component area. (Photo: Zurab Manvelidze)

**Figure 20.** Abieto-Fagetum seneciosum in the upper montane belt of Mtirala-Kintrishi nominated component area.

**Figure 21.** Betuletum altherbosa subalpina in the subalpine forest line belt of Mtirala-Kintrishi nominated component area. (Photo. Zurab Manvelidze)

**G – The lower alpine grassland and thicket belt** (2,400-2,750 m a.s.l.) frames the typical Colchic forest ecosystems above the tree line at the highest altitudes of Mtirala-Kintrishi nominated component area. It is characterized by grasslands (with *Nardus stricta*, *Festuca djimilensis*, *Agrostis lazica*, *Geranium gymnocaulon*), as well as *Rhododendron caucasicum* thickets (Figure 22).

**Figure 22.** Rhododendrion subalpina, a typical plant association of upper Kintrishi valley, Mtirala-Kintrishi nominated component area. (Photo: Zurab Manvelidze)

This classification largely corresponds to the West Caucasus vertical zones as identified by Zazanashvili et al. (2000), and to the vertical zonation as illustrated by Nakhutsrishvili (2013) (Box 2, Figure 15).

Box 2. The East Caucasian type vertical zones as by Zazanashvili et al. (2000). The altitudes covered by the Colchic Forests and Wetlands are also shown.

IA. Humid thermophilous Colchic broad-leaved forest zone, up to 1,000(1,200) m a.s.l.

IA1. Mixed broad-leaved forest belt, up to 500-600 m a.s.l.

- Forests of *Castanea sativa, Carpinus caucasica, Fagus orientalis, Quercus hartwissiana* and *Zelkova carpinifolia,* with Colchic understorey including *Rhododendron ponticum, Laurocerasus officinalis* and *Ruscus colchicus* as well as the lianas *Hedera colchica, H. helix, Vitis sylvestris*;
- In relatively dry habitats thermophilous hornbeam-oak forests with *Quercus iberica, Carpinus caucasica* and *C. orientalis*;

- In southern Colchis (from 200 m upwards) pine-oak forests with *Quercus iberica, Q. dschorochensis* and *Pinus kochiana* as well as Colchic thickets with *Rhododendron ponticum, Ilex colchica, Laurocerasus officinalis* and *Ruscus colchicus*.

IA2. Chestnut forest belt, up to 500-1,000 (1,200) m a.s.l.

- *Fagus orientalis* forest often with a Colchic understorey;
- Dark coniferous and mixed beech-dark-coniferous forests (*Abies nordmanniana, Picea orientalis, Fagus orientalis*), partly with a Colchic understorey.
- Colchic thickets (see IA1, with *Rhododendron ponticum, Rh. ungernii, Laurocerasus officinalis, Ilex colchica, Ruscus colchicus, Vaccinium arctostaphylos, Viburnum orientale*)

IB. Humid beech forest zone, 1,000(800)-1,400(1,800) m a.s.l.

IIB2. Upper mountain belt, 1,500-1,900 (2000) m a.s.l.

- *Fagus orientalis* forests; *Quercus macranthera* forests
- *Pinus kochiana* forests and woodlands

IC. Nemoral humid coniferous forest zone, 1400(1,000)-1,800(2,100) m a.s.l.

- Forests with *Abies nordmanniana, Picea orientalis* and *Fagus orientalis*, partly with Colchic understorey.

ID. Subalpine elfin wood and meadow zone, 1,800(1,600)-2,400(2,700) m a.s.l.

ID1. Lower subalpine belt

- Beech, oak and birch elfin woods (*Fagus orientalis, Quercus pontica, Betula medwedewii, B. megrelica*), often with Colchic understorey;
- Tall herbaceous vegetation (*Heracleum ponticum, Ligusticum physospermifolium, Senecio cladobotrys*);
- *Rhamnus imeretina, Sorbus subfusca* or *Corylus colchica* thickets;
- Colchic thickets (*Rhododendron ponticum, Rh. ungernii, Laurocerasus officinalis, Ilex colchica, Ruscus colchicus, Vaccinium arctostaphylos*);
- Subalpine meadows (*Calamagrostis arundinacea, Poa iberica, Geranium platypetalum*).

ID2. Upper subalpine belt, 2,100-2,400(2,700) m a.s.l.

- Birch/ash-birch elfin woods with *Betula litwinowii, Sorbus caucasigena*;
- *Rhododendron caucasicum* thickets;
- Subalpine meadows on limestone (*Calamagrostis arundinacea, Festuca djimilensis*);
- *Woronowia speciosa, Carex pontica*.

IE. Alpine grassland and thicket zone, 2,400-2,900(3,000) m a.s.l.

IE1. Lower alpine belt, 2,400-2,750 m a.s.l.

- Grasslands (*Nardus stricta, Festuca djimilensis, Agrostis lazica, Geranium gymnocaulon*);
- *Rhododendron caucasicum* thickets.

IE2. Upper alpine belt, 2,750-2,900(3,000) m a.s.l.

- Grasslands (*Festuca supina, Kobresia schoenoides* and *Geranium gymnocaulon*);
- Mats (*Cerastium cerastoides, Ranunculus svaneticus, Potentilla crantzii*);
- Rock and scree vegetation

IF. Subnival zone, 2,900-3,700(4,000) m a.s.l.

- Open plant communities (*Cerastium polymorphum, Minuartia trautvetteriana, Saxifraga scleropoda*).

IG. Nival cryptogam zone. > 3700 m.

**Description and classification peatland ecosystems, habitats and vegetation:** Extensive parts of the Colchic Lowlands are wetlands (Figure 23), owing to the warm and wet climate and numerous rivers flowing from the Caucasus Mountains to the Black Sea. In particular vast areas adjacent to the Black Sea are paludified due to the continuous subsidence of the lowland in combination with high precipitation and backwater of the rivers flowing into the Sea. The main natural ecosystems of the Colchis lowland are peatlands, relict Colchic riparian forest, open freshwater areas, wet meadows, and coastal sand dunes (see Table 3). Peatlands and Colchic lowland forest, but also some of the other ecosystem types with their habitats and vegetation are represent-

**Figure 23.** Aerial view of the Pitshora River with the Imnati (left) and Pitshora (right) nominated component areas of the Colchic Rainforests and Wetlands, showing mire and Colchic lowland forest areas. Note Lake Paliastomi and the Black Sea in the background. (Photo: Paata Vardanishvili)

**Table 3.** General overview over the distribution of main ecosystems, habitats and vegetation between the nominated component areas of the Colchic Rainforests and Wetlands. Habitats included into parts of the proposed property are marked with an asterisk (*), and those included into the proposed buffer zone with a double asterisk (**). Adapted from Matchutadze & Tsinaridze (2016).

| Ecosystem/habitat | Definition | Biodiv. value | Nominated component areas |
|---|---|---|---|
| **Forest** | | | |
| All forest types other than the below* | Diverse – see text for details | High | Mtirala-Kintrishi |
| Relict riparian forest* | The relict riparian forests developed in the periphery of peatlands rich in endemic and relict tertiary species (*Pterocaria fraxinifolia, Quercus hartwissiana, Buxus colchic,a Ficus carica*) and *Carpinus betulus, Fraxinus excelsior, Humulus lupulus, Salix caprea.* | High | Imnati, Pitshora, Churia |
| Swamp alder forest* ** | *Alnus glutinosa* subsp. *barbata* forms dense monospecific stands which show extremely low species richness. This could depend on the marshy feature of the site, with conditions of waterlogged subsoil all year round. | Low | Imnati, Pitshora, Churia |
| **Sub-alpine & lower alpine** | | | |
| Sub-alpine & lower alpine grassland and thickets* ** | Grasslands (with *Nardus stricta, Festuca djimilensis, Agrostis lazica, Geranium gymnocaulon*), as well as *Rhododendron caucasicum* thickets. | High | Mtirala-Kintrishi |
| **Peatland (mire)** | | | |
| Percolation bog* | Fully ombrotrophic bogs. | High | Imnati, Ispani; transition forms at Pitshora, Grigoleti |
| Fen* | Fens – geogenous water | High | Churia, Nabada |
| **Aquatic ecosystems** | | | |
| Permanent freshwater* ** | Channels with submerged plants such as: *Potamogeton sp. Ceratophylum demersum, Egeria denca* (as invasive species) by *Nymphaea alba, Nymphaea colchica*, *Nuphar lutea,* is *Trapa colchica, Trapa maleevi, Trapa hyrcana, Salvinia natans, Marsilea quadrifolia* | High | Imnati, Pitshora, Grigoleti, Nabada, Churia |

Total current peatland area consists of approximately 17,000 ha peatland area and 30,000-50,000 ha wet forest with unknown extent of peat layers, with the majority situated in the Colchic Lowlands (Krebs et al. 2017). Globally extraordinary habitats in the Kolkheti lowland are the percolation bogs, which only exist here. The diversity of peatlands and partly still pristine mires in this ancient cultural landscape is remarkable (Joosten et al. 2003).

The Colchic wetlands are characterized by a high diversity of ombrotrophic, *Sphagnum*-dominated and minerotrophic, *Carex*-dominated peatlands (e.g. Joosten et al. 2003, Kimeridze 1999, Krebs et al. 2017). This diversity can be structured based on a broad successional classification: The peatlands of Churia and Nabada nominated component areas are dominated by sedge vegetation and represent a bog development stage preceding the development of percolation bogs, the so-called water rise mires. Water rise mires are dependent on the water table of the adjacent groundwater for peat formation and thus - in the case of the Colchis - provide valuable palaeoecological information on the changes in the (relative) Black Sea water level through time. Several remarkably old, continuously-accumulated water rise mires are among the proposed component areas (e.g. Nabada, which dates back 7,000 years ago). This is owing to the slow and constant subsidence of the Colchis lowland (in Central Colchis with c. 5.5-6.5 mm per year, Svanidze 1989) and a gradual, long-term slow increase of the Black Sea water table. The mires of Grigoleti and Pitshora nominated component areas are already characterized by a relatively high contribution of Sphagnum mosses and can be considered percolation bogs *in statu nascendi.* The peatlands at Imnati and Ispani nominated component areas are the only fully developed percolation bogs found worldwide, with that of Imnati being significantly larger and older than that of Ispani 2 (Figure 24).

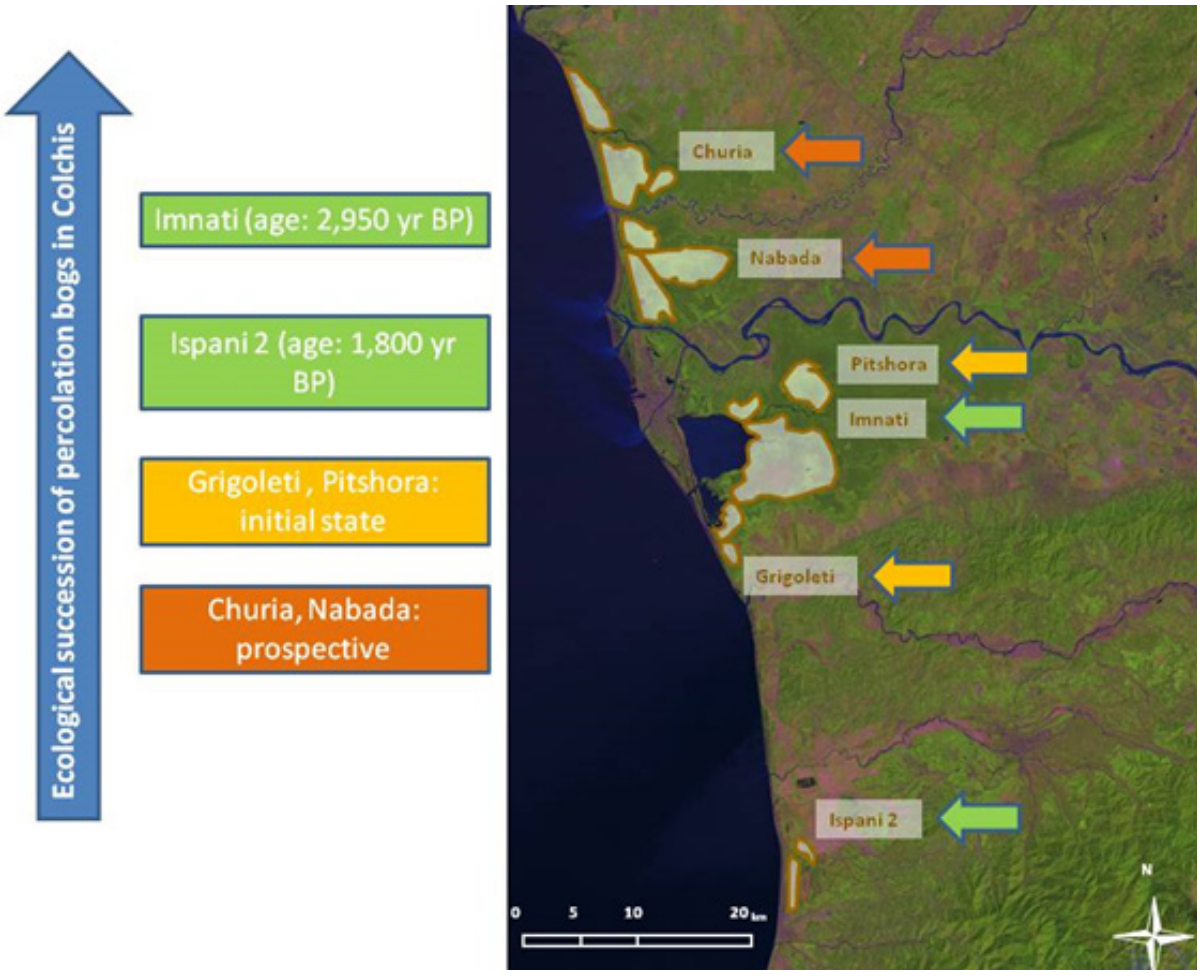



**Figure 24.** Successional relationships between the peatlands of the nominated component areas of Ispani, Grigoleti, Imnati, Pitshora, Nabada and Churia. (Source: Matthias Krebs, pers. comm.)

**Description of other wetland ecosystems, habitats and vegetation:** The peatlands of the Colchic Lowlands are accompanied not only by Colchic lowland forests but also by other types of wetlands including **freshwater ponds and streams** (Figure 25) and coastal dunes. Freshwater ponds are inhabited by species such

as *Trapa colchica, Trapa natans, Trapa hyrcana, Salvinia natans, Ceratophyllum demersum, Ceratophyllum submersum,* and *Potamogeton natans. Salvinia natans* only exists in such systems in the Colchic Lowlands. There is also *Typha minima.* Freshwater ponds are interspersed with other habitats of the proposed property in all lowland component areas and also occur in the proposed buffer zone. The buffer zone (but not the nominated property) also includes coastal sandy dunes and has preserved its original appearance in the north-western coastal stripe between the areas of the mouths of the Churia and Khobistskali rivers, Maltakva and Grigoleti beach, and along the Choloqi coast line. On the sandy substrata of this narrow strip, periodically salted by seawater, typical littoral, bulb, perennial xerophytes, xerophytes shrubs and ephemeral vegetation formations sharply distinct from each other are developed.

**Figure 25.** Freshwater pond at Ispani nominated component area, in the Colchic Lowlands. (Photo: Izolda Matchutadze)

## ***Flora***

The Colchis region is of one of the most important refugia of the flora and vegetation of the Tertiary and centre of biodiversity in western Eurasia, along with the Hyrcan region located in the southern coastal area of the Caspian Sea (Knapp 2005b). Many plants there have ancient boreal affinities (Nakhutsrishvili et al. 2010). Tertiary relict floras contain glaciation survivors from plant communities that were distributed in the Northern Hemisphere in the Tertiary, the first period of the Cenozoic era, now mainly restricted to warm humid areas (refugia) in southeastern and western North America, East Asia and southwest Eurasia (Milne and Abbott, 2002).

Among the nominated component areas of the Colchic Rainforests and Wetlands, Mtirala-Kintrishi nominated component area protects the major forest types and associated ecosystems with their flora (> 900 species). The other nominated component areas in the Colchic Lowlands protect peatlands, lowland forests and associate ecosystems and contain an additional 200 species, which brings the overall species count of vascular plants and bryophytes to > 1,100 (Table 4, Appendix 2). They include 37 pterophytes, 8 gymnosperms and ca. 1,050 angiospermes. About 220 of the flora of these areas and their surroundings are listed as Caucasus endemics by Solomon et al. (2014).

A high number of wooden plants underline the importance of forest ecosystems in the plant cover of the region. The list contains 48 tree species, 65 shrub species and 19 species that can grow as shrub or tree, as well

as 7 lianas, i.e. 139 wooden species in total. The high number of perennial plants (706 species) also reflects the mature forest ecosystems of the series.

From a **plant-geographical** point of view, the Colchic forest flora is characterized by typical nemoral deciduous forest distribution patterns with low influence of boreal coniferous forest elements. Representatives of tree **genera** like *Quercus, Fagus, Castanea, Carpinus, Tilia, Ulmus* characterize the forests as part of the Holarctic deciduous forest regions, which are distributed in humid-(semihumid) parts of the nemoral zone in Eastern North-America, Europe-West-Asia and East-Asia. A high number of deciduous forest species demonstrate closer relations to European and Caucasian deciduous forests:

- Trees: e.g. *Acer campestre, A. platanoides, Carpinus betulus, Fraxinus excelsior, Ulmus glabra, Cerasus avium, Alnus glutinosa, Taxus baccata;*
- Shrubs: e.g. *Corylus avellana, Euonymus europaea, Ribes alpinum, Daphne mezereum, Viburnum opulus, Sambucus nigra;*
- Circumpolar distributed pterophytes (ferns): *Matteucia struthiopteris, Athyrium filix-femina, Dryopteris filix-mas, Dryopteris carthusiana, Gymnocarpium dryopteris, Polypodium vulgare, Huperzia selago, Diphasium alpinum, Lycopodium clavatum, Polystichum lonchitis, Asplenium trichomanes, A. viride;*
- Circumpolar distributed forest and mire plants: e.g. *Populus tremula, Sorbus aucuparia, Chamaenerion angiuistifolium, Oxalis acetosella, Vaccinium myrtillus, V. vitis-idaea, V. uliginosum, Pyrola media, P. minor, P. rotundifolia* and the mire plants *Drosera rotundifolia, Carex lasiocarpa, Menyanthes trifoliata, Rhynchospora alba.*
- European oceanic pterophytes (ferns): *Equisetum telmateija, Blechnum spicant, Asplenium adianthum-nigrum, A. septentrionale, Phyllitis scolopendrium;* to this distribution type also *Carex pendula;*
- Perennial herbs, which are common in European deciduous forests: *Sanicula europaea, Actea spicata, Stellaria holostea, Galiium odoratum, Galeobdolon luteum, Circaea lutetiana, Impatiens noli-tangere, Polygonatum multiflorum, Allium ursinum, Hordelymus europaeus, Carex sylvatica, C. remota, C. digitata, Cephalanthera damasonium, Epipactis helleborine, Neottia nidus-avis;*
- Perennial herbs, which connect mainly with Balcanic and Carpathian montane forests: *Petasites albus, Dentaria bulbifera, D. quinquefolia, Euphorbia amygdaloides, Salvia glutinosa, Telekia speciosa;*
- Thermophilous forest plants, which are wider distributed in southern (and South-Central) Europe: Trees such as *Carpinus orientalis*, *Ficus carica, Morus alba, M. nigra;* Shrubs such as *Mespilus germanica, Staphylea pinnata, Viburnum lantana;* Lianas such as *Periploca graeca, Clematis vitalba, Vitis sylvestris, Smilax excelsa;*
- The Colchis is part of the **Euxinian plant-geographical province**, which is characterized by e.g. evergreen shrubs like *Rhododendron ponticum, Laurocerasus officinale, Vaccinium arctostaphylos, Hypericum adzharicum* (Figure 26)*, Daphne pontica, but* also by tree species like *Fagus orientalis, Acer laetum, Tilia begoniifolia,* and *Pterocaria fraxinifolia (*Figure 27)
- These deciduous trees, as well as the relic trees *Zelkova carpinifolia* and *Diospyros lotus* connect the Colchic forests with **the Hyrcanian forests** in the south of the Caspian Sea. The endemic evergreen trees/shrubs *Buxus colchica* and *Ilex colchica,* as well as the liana *Hedera colchica* (Figure 28) are also related to species of the Hyrcanian forests, such as *Buxus hyrcana*, *Ilex spinigera* and *Hedera pastuchovii* (Knapp 2005b).

The majority of the Caucasus **endemic species** of the Colchic Rainforests and Wetlands are present in Mtirala-Kintrishi nominated component area, while the other nominated component areas contain a much lower number of the regional endemics: there are ten endemic species in Ispani nominated component area and another ten in the remaining five nominated component areas belonging to Kolkheti National Park, taken together (Table 4, Appendix 2). In view of in general wide global distribution of freshwater species, a high number of endemics are not expected to be present in local wetlands. The conservation value of the wetland

PAs should be assessed by their capacity to protect remnants of the Colchis wetland ecosystems, which also contain locally distributed endemic species. These include *Hibiscus ponticus* Rupr., a local endemic, which is listed as Critically Endangered, and *Solidago turfosa*, another local endemic which is listed as Endangered (Solomon et al. 2014) (Table 5).

**Figure 26.** *Hypericum adzharicum*, a typical evergreen shrub species of the Euxinian plant-geographical province, at Mtirala-Kintrishi nominated component area. (Photo: Zurab Manvelidze)

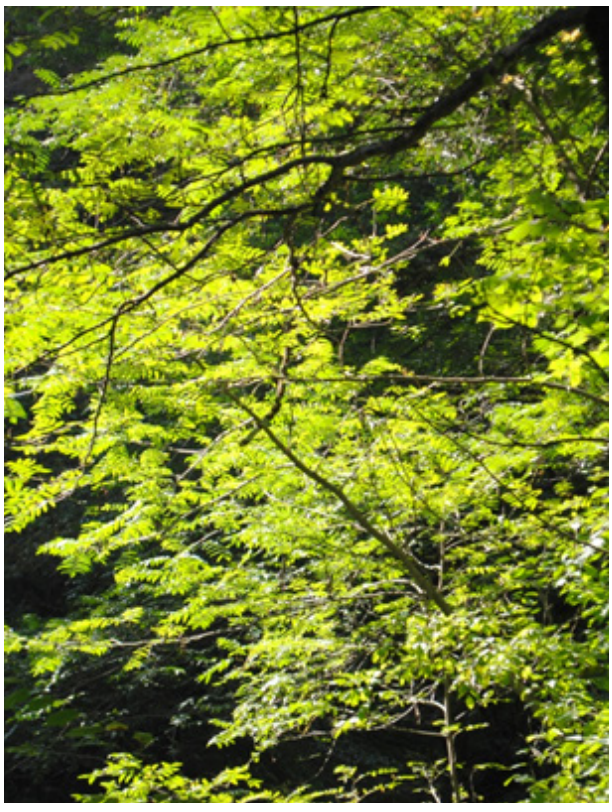


**Figure 27.** *Pterocarya fraxinifolia*, a typical tree species of the Euxinian plant-geographical province, at Churia nominated component area. (Photo: Nino Davitashvili)

**Figure 28.** *Hedera colchica,* an endemic liana of the Colchic region, at Churia nominated compoment area. (Photo: Tobias Garstecki)

**Table 4.** Overall species richness of mosses and vascular plants and species richness of plant species with a restricted range in the seven nominated component areas of the Colchic Rainforests and Wetlands. (Source: Appendix 2).

| | Mtirala-Kintr-ishi | Ispani | Grigoleti | Imnati | Pitshora | Nabada | Churia | **All** |
|---|---|---|---|---|---|---|---|---|
| **Species No.** | 906 | 261 | 36 | 101 | 69 | 70 | 228 | 1,108 |
| **Number of species with ranges restricted to:** | | | | | | | | |
| **Caucasus** | 65 | 3 | 2 | 3 | 2 | 1 | 2 | 66 |
| **Georgia** | 17 | 2 | 0 | 0 | 0 | 0 | 0 | 17 |
| **Colchis** | 52 | 2 | 2 | 2 | 4 | 1 | 3 | 54 |
| **Adjara-Laze-tian** | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |

**Table 5.** Threatened and near-threatened vascular plant species of the Colchic Forests and Wetlands. Those species already listed on the Red List of the Caucasus endemic plant species are in the process of also being entered on the (global) IUCN Red List. Sources: Red List of Georgia (2014); Solomon et al. (2014), IUCN Red List of Threatened Species (2016).

| # | Species | Kintrishi-Mtirala | Kolkheti areas[1] | Kobuleti | Compo-nent ar-eas with species[1] | The IUCN Red List of Threatened Species (Assessment year) | The Red List of the Caucasus endemic species (2014) | The Red List of Georgia (2014) |
|---|---|---|---|---|---|---|---|---|
| 1 | *Arafoe aromatica* M.Pi-men. & Lavrova | 1 | | | 1 | | VU B1ab(ii)+2ab(ii) | |
| 2 | *Astragalus doluchanovii* Manden.* | 1 | | | 1 | | VU D2 | |
| 3 | *Betula medwediewii* Regel* | 1 | | | 1 | DD (2014) | VU B1ab(iii,v) | VU |
| 4 | *Buxus colchica* Pojark. | 1 | 1 | | 2 | Lower Risk/near threatened (1998) | | VU |
| 5 | *Castanea sativa* Mill. | 1 | | | 1 | LC (2017) | | VU |
| 6 | *Cerastium oreades* Schischk. | 1 | | | 1 | | NT | |
| 7 | *Chaerophyllum astranti-ae* Boiss.& Bal. | 1 | | | 1 | NT (2008) | NT | |
| 8 | *Dactylorhiza euxina* (Nevski) Czerep. | 1 | | | 1 | NT (2008) | | |
| 9 | *Daphne albowiana* Woronow ex Pobed. | 1 | | | 1 | | EN B2ab(iii) | EN |
| 10 | *Epigaea gaultherioides* (Boiss. & Bal.) Takht.* | 1 | | 1 | 2 | | VU B2ab(iii) | VU |
| 11 | *Epimedium colchicum* (Boiss.) Trautv.* | 1 | | | 1 | | NT | |
| 12 | *Galanthus krasnovii* A. Khokhr.* | 1 | | | 1 | | EN B2ab(iii,v) | |
| 13 | *Grossheimia polyphylla* (Ledeb.) Holub.* | 1 | | | 1 | | NT | |
| 14 | *Hibiscus ponticus* Rupr.* | | 1 | | 1 | | CR C2a(i) | |
| 15 | *Juglans regia* L. | 1 | | | 1 | LC (2017) | | VU |
| 16 | *Laserpitium affine* Ledeb.* | 1 | | | 1 | | EN B1ab(iii)+2ab(iii) | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 17 | *Laurus nobilis* L. | 1 | | | 1 | LC (2017) | | VU |
| 18 | *Myosotis lazica* M.Pop.* | 1 | | | 1 | NT (2008) | NT | |
| 19 | *Onobrychis meschetica* Grossh. | 1 | | | 1 | NT (2008) | NT | |
| 20 | *Oxytropis lazica* Boiss. | 1 | | | 1 | | NT | |
| 21 | *Onobrychis kemulariae* Chinth. | 1 | | | 1 | | VU D2 | |
| 22 | *Osmanthus decorus* (Boiss.& Ball.) Kas.* | 1 | | | 1 | | VU B2ab(iii) | VU |
| 23 | *Paederotella pontica* (Rupr.exBoss.) Kem-Nath.* | 1 | | | 1 | | VU B2ac(ii) | |
| 24 | *Paeonia macrophylla* (Albov) Lomak.* | 1 | | | 1 | | VU B1ab(iii,v) | |
| 25 | *Psephellus adjaricus* (Albov) Grossh.* | 1 | | | 1 | CR B2ab(iii,v) (2008) | CR B2ab(iii,v) | |
| 26 | *Quercus hartwissiana* Steven | 1 | 1 | | 2 | DD (2017) | | VU |
| 27 | *Quercus imeretina* Steven ex Woronow* | 1 | | 1 | 2 | | VU B2ab(iii) | VU |
| 28 | *Quercus pontica* K.Koch* | 1 | | 1 | 2 | | VU B2ab(iii) | VU |
| 29 | *Ranunculus vermirrhizus* Khokhr. | 1 | | | 1 | | CR B1ab(i,ii,iii)+2ab(i,ii,iii) | |
| 30 | *Rhododendron ungernii* Trautv.* | 1 | | | 1 | | VU B1ab(iii) | VU |
| 31 | *Rhynchospora caucasica* Palla* | | 1 | 1 | 2 | | EN B2ab(iii) | |
| 32 | *Senecio pandurifolius* C.Koch | 1 | | | 1 | | NT | |
| 33 | *Salix kikodseae* Goerz* | 1 | | | 1 | | VU | VU |
| 34 | *Scabiosa adzharica* Schchian.* | 1 | | | 1 | EN B1ab(iii)+2ab(iii) (2008) | EN B1ab(iii)+2ab(iii) | |
| 35 | *Solidago turfosa* Woronow ex Grossh.* | | 1 | 1 | 2 | | EN B2ab(iii) | |
| 36 | *Staphylea colchica* Steven* | 1 | | | 1 | | VU A2c; B1ab(i-ii)+2ab(iii) | VU |
| 37 | *Swida koenigii* (C.K. Schneid.) Pojark. ex Grossh.* | 1 | | | 1 | | VU B2ab(iii) | |
| 38 | *Trapa colchica* Albov* | | 1 | | 1 | CR C2a(i) (2008) | CR C2a(i) | |
| 39 | *Trapa maleevii* V.N.Vassil.* | | 1 | | 1 | VU D2 (2008) | VU D2 | |
| 40 | *Tripleurospermum szowitzii* (DC.) Pobed. | 1 | | | 1 | | VU D2 | |
| 41 | *Ulmus glabra* Huds. | 1 | | | 1 | DD (2017) | | EN |
| 42 | *Verbascum adzharicum* Gritzenko | 1 | | | 1 | | VU D2 | |
| 43 | *Viola orthoceras* Ledeb.* | 1 | | | 1 | | VU B1ab(iii)+2ab(iii) | |
| 44 | *Zelkova carpinifolia* (Pall.) K. Koch | | 1 | | 1 | VU A2cd (2018) | | VU |
| | **Number of species per component area** | 38 | 8 | 5 | | | | |

[1] In this analysis, the five component areas within Kolkheti National Park are treated jointly as one component. See Appendix 2 for occurrence of species in individual component areas.

**Figure 29.** *Quercus imeretina,* a tree species of the Colchic Forests and Wetlands that is endemic to the Caucasus. (Photo: Ketevan Batsatsashvili)

The largest group of endemics are Caucasian species (82 species including Georgian endemics). The second group are Colchic endemics (52 species), and the third Adjara-Lazetian/Adjaraian endemics (12) (Memiadze et al. 2013). ***Caucasian and Georgian endemics*** demonstrate the close evolutionary relation of the Colchis with the whole Caucasus region, e.g. the trees *Acer trautvetteri, Quercus imeretina* (Figure 29)*, Pyrus caucasica, Betula litwinowii,* the perennial herbs *Primula pseudoelatior, Symphytum caucasicum, Helleborus caucasica, Galanthus woronowii, Atropa caucasica, Verbascum adsharicum, Digitalis schischkini* and a lot of other herbs. ***Colchic endemics*** are e.g. *Betula medwedewii, Quercus pontica* (Figure 30)*, Sorbus subfusca, Sorbus colchica, Rhamnus imeretica,* the perennial herb *Paeonia macrophylla* and the geophytes *Galanthus krasnovii* (Figure 31)*, Ornithogalum woronowii, Scilla winogradowii.* ***Adjara-Lazetian and Adjarian endemics*** are the most specific taxa with the only populations worldwide in this region, e.g. *Quercus dschorochensis, Phyllirea medwedewii, Rhododendron ungernii* (Figures 1, 32)*, Epigaea gaultherioides,* and *Cyclamen adsharicum.* (Figure 33)

**Figure 30.** *Quercus pontica,* a tree species of the Colchic Rainforests and Wetlands that is endemic to the Colchic region. (Photo: Ketevan Batsatsashvili

**Figure 31.** *Galanthus krasnovii,* a species of the Colchic Rainforests and Wetlands that is endemic to the Colchic region. (Photo: Ketevan Batsatsashvili)

**Figure 32.** The rare Ajara-Lazeti endemic *Rhododendron ungernii* at Mtirala-Kintrishi nominated component area. (Photo: Zurab Manvelidze)

**Figure 33.** The Ajara-Lazeti endemic *Cyclamen adzharicum* at Mtirala-Kintrishi nominated component area. (Photo: Zurab Manvelidze)

The flora of the nominated component areas contains 44 **threatened or near-threatened species**, of which 39 are endemic to the Caucasus (Solomon et al. 2014), the latter including 35 species endemic to Colchis (Memiadze et al. 2013). Of the threatened / near-threatened species, 10 are from the IUCN Red List of Threatened Species (eight of them Caucasus endemics). 16 species are listed on the Red List of Georgia. There is some overlap of species between the Red Lists, with differences in categories as a result of global vs. national levels of assessment (Table 5).

The highest number of threatened species including the majority of the species occurring inside a single nominated component area are present in Mtirala-Kintrishi nominated component area: 35 (incl. 26 endemics of Colchis), and 19 (incl. 8 endemics of Colchis) of 26 in total, respectively. Of the species not recorded there, *Solidago turfosa* and *Rhynchospora caucasica* are present at the nominated component areas in the Colchic Lowlands (excl. Ispani).

The 7 species each with a single locality on the study area and not recorded on Mtirala-Kintrishi component area are present in the following other areas: *Hibiscus ponticus, Trapa colchica, Trapa maleevii* as typical wetlands species and *Zelkova carpinifolia* are only present in the nominated component areas of the Colchic Lowlands. *Rhododendron smirnovii* and *Campanula makaschwili* are other important threatened Colchic species, but do not occur inside the nominated component areas.

Four of the 37 species from the Red List of the Caucasus endemic species (Solomon et al., 2014) are assessed as CR. Two of these assessments are published on the IUCN Red List of Threatened Species. Of these, *Psephellus adjaricus* and *Ranunculus vermirrhizus* are only present in the north-eastern part of the Mtirala-Kintrishi nominated component area (in Kintrishi SNR), and *Hibiscus ponticus* and *Trapa colchica*, as mentioned above, only in the nominated component areas inside Kolkheti National Park.

The above figures are likely to be a minimum estimate: While relatively reliable data are available for the species endemic to Georgia or the Caucasus, thanks to the recent IUCN Caucasus Endemic Plant Red List Assessment (Solomon et al. 2014), many plant species with a wider geographical distribution have not been assessed for inclusion in the IUCN Red List.

**Intraspecific genetic diversity in plants:** Some plant species of the Colchic Lowlands also show conspicuous intraspecific genetic diversity, which would be consistent with ongoing evolution and speciation processes. For example, genetic diversity in the peat moss *Sphagnum austinii* is generally low throughout Europe, but high in western Georgia including the nominated component areas within Kolkheti National Park (Kyrkjeeide et al. 2016).

## ***Fauna***

The Colchic Rainforests and Wetlands are not only a global centre of plant diversity, but equally important for fauna, including many endemic and globally threatened species.

**Species richness in vertebrates:** 474 vertebrate species have been recorded within the nominated component areas of the proposed property (Table 6, Appendix 3). By far most of them are birds (327), followed by mammals (67), fish (55), reptiles (15) and amphibians (10).

**Table 6.** Species richness of main vertebrate groups in the nominated component areas of the Colchic Rainforests and Wetlands. Note that the five component areas within Kolkheti National Park (Grigoleti, Imnati, Pitshora, Nabada, Churia) are treated as one in this analysis. (Source and further details: Appendix 3)

| | Fish | Amphibians | Reptiles | Birds | Mammals[1] | All |
|---|---|---|---|---|---|---|
| **Mtirala-Kintrishi** | 2 | 8 | 14 | 189 | 62 | 275 |
| **Ispani** | 9 | 6 | 8 | ?[2] | 38 | 61[3] |
| **Kolkheti National Park** | 53 | 6 | 8 | 296 | 49 | 412 |
| **All** | **55** | **10** | **15** | **327** | **67** | **474** |

[1] including bats

[2] No data on avifauna of Ispani nominated component area available. The avifauna of this area is a subset of that of the nominated component areas within Kolkheti National Park

[3] excluding birds

**Avifauna:** Only 123 of the 327 bird species recorded within the series breed there; the majority visits during migration and/ or winter only. The nominated component areas within the Colchic Lowlands (e.g. all nominated component areas except Mtirala-Kintrishi) with their buffer zones harbored 368,000 birds of 40 species during winter counts in 2014 (Javakhishvili et al. 2014). They are a regionally important water bird migration and wintering site (e.g. Figure 34). It is also noteworthy for its very high winter abundances of a number of common pan-European species such as the Crested Grebe *Podiceps cristatus*.

The **Batumi bottleneck of raptor migration**, which strongly overlaps with Mtirala-Kintrishi nominated component area, is the single most important convergence zone for raptors in the western Palearctic – and probably the whole of Eurasia – during autumn migration (Harris 2013, Verhelst et al. 2011). The bottleneck is located where the mountains of the Lesser Caucasus descend to the Black Sea coast. Overall counts regularly exceed one million passing raptors of 35 species per season (Batumi Raptor Count 2016, 2017). This includes 50% of the global populations of three species of raptors (European Honey-buzzard *Pernis apivorus*, Levant Sparrowhawk *Accipiter brevipes*, and Booted Eagle *Hieraaetus pennatus*), over 10% of the global populations of another three species (Black Kite *Milvus migrans*, Lesser Spotted Eagle *Aquila pomarina*, and Pallid Harrier *Circus macrourus*) and more than 1% of the global population of another four species of raptors. The biggest part of the Batumi bottleneck overlaps with Mtirala-Kintrishi nominated component area (Figure 35), although many birds also cross areas outside. Roosting happens inside and outside the component area, but is poorly understood.

**Figure 34.** Resting Dalmatian pelicans *(Pelecanus crispus),* a globally near-threatened species, in the buffer zone of Imnati and Pitshora nominated component areas. (Photo: Levan Ninua)

**Figure 35.** Honey buzzards *(Pernis apivorus)* congregate during autumn migration at the Batumi raptor migration hotspot, at Mtirala-Kintrishi nominated component area. (Photo: Christian Gelpke)

The extensive old continuous forest areas of Mtirala-Kintrishi nominated component area are highly important for forest bat species such as *Barbastella barbastellus*, *Myotis nattereri*, *Myotis mystacinus*, *Myotis brandtii*, *Myotis aurascens*, *Myotis alcathoe*, *Nyctalus noctula*, *Nyctalus leisleri*, the globally vulnerable *Nyctalus lasiopterus*, *Pipistrellus nathusii*, *Plecotus auritus*, and *Plecotus macrobullaris* (I. Natradze, pers. comm.).

**Invertebrates:** The overall species richness of the invertebrate fauna of the Colchic Rainforests and Wetlands cannot be estimated currently, due to a lack of sufficient data. However, some well-studied groups show both high species richness – particularly if calculated in relation to the study area – and high endemism. For instance, the diversity of land mollusks of Georgia is moderately well investigated comprising at least 265

terrestrial species (Mumladze, 2013, Mumladze et al. 2014, Walther et al. 2014). This unusually high species density (projected per 1,000 km$^2$) makes the country one of the speciose in Europe. Southwestern Georgian mountain forests (part of which are covered by protected areas of Kintrishi, Mtirala and Machakhela) as well as the Colchic lowlands and Borjomi-Kharagauli National Park are the most species rich areas within Georgia. A high species diversity is also notable for other invertebrate groups such as butterflies, dragonflies, mayflies etc., although accurate distributional data for these charismatic groups of species are limited. Articles reporting the species distribution of some targeted areas appeared only recently for dragonflies (Schröter et al. 2015) and mayflies (Martynov et al. 2015, Kluge et al. 2013, Godunko et al. 2015). After recording 34 species (with a number of pontic endemics), Kintrishi PAs were suggested as a regional hotspot of mayfly diversity (Martynov et al. 2016).

Any survey of invertebrates results in new species either for science or for the area, indicating only a very basic understanding of invertebrate biodiversity of the targeted territories. As example, a recent survey of small streams in Mtirala-Kintrishi nominated component area resulted in a discovery of *Helicopsyche* sp. (not yet published) which is a first record of this genus from the Caucasus ecoregion. This genus is most abundant in the tropics and Australia, while only a 4-5 species are known from southern Europe. The closest previously known locality is 800 km to the South-west, in Turkey (Johanson, 1995).

**Figure 36.** The globally vulnerable Caucasian salamander *(Mertensiella caucasica),* which is endemic to the Caucasus and represented by a cryptic species of even more restricted range within the Mtirala-Kintrishi nominated component area. (Photo: Giorgi Rajebashvili)

**Endemic terrestrial vertebrates (Table 7):** Besides the Caucasus endemics Caucasian Toad *Bufo verucosissimus*, Caucasian Parsley Frog *Pelodytes caucasicus*, and Caucasian Salamander *Mertensiella caucasica* (Figure 36), an endemic subspecies of the Northern Banded Newt *Ommatotriton ophryticus* lives in the Colchic forests including Mtirala-Kintrishi nominated component area (Bannikov et al. 1977, Tarkhnishvili & Gokhelashvili 1999). The latter has also been reported from the periphery of Ispani nominated component area. The populations of the Caucasian Salamander in Mtirala-Kintrishi nominated component area and in Borjomi-Kharagauli National Park further east are likely to represent separate cryptic species (Tarkhnishvili et al. 2008).

**Table 7.** Richness of restricted range species (Caucasus1 or narrower) within the main vertebrate groups in the nominated component areas of the Colchic Rainforests and Wetlands. Note that the component areas within Kolkheti National Park (Grigoleti, Imnati, Pitshora, Nabada, Churia) are treated as one in this analysis. (Source and further details: Appendix 3)

| | Fish | Amphibians | Reptiles | Birds | Mammals | All |
|---|---|---|---|---|---|---|
| **Mtirala-Kintrishi** | 1 | 3 | 7 | 1 (2?) | 8 | 20 |
| **Kobuleti** | 2 | 0 | 2 | 0 | 4 | 8 |
| **Kolkheti** | 13 | 0 | 2 | 0 | 4 | 19 |
| **All** | **14** | **3** | **7** | **1 (2?)** | **8** | **33** |

[1] Black Sea for fish

Some amphibians (e.g. brown frogs – Tarkhnishvili et al. 2001) provide interesting examples of landscape-dependent speciation in the Colchic Rainforests and Wetlands, when specific conditions, e.g. sharp climatic/landscape gradients in mountains, triggers divergence without full isolation such as described in Endler (1986).

The reptile genus of the Colchic region with the highest proportion of Caucasus endemics is the rock lizard genus *Darevskia*. Three (potentially even four) ecoregional endemics are found within Mtirala-Kintrishi nominated component area. In addition, the Colchis Slow Worm *Anguis fragilis*, Caucasian Viper *Vipera kaznakovi* (Figure 37) and Transcaucasian Rat Snake *Zamenis hohenackeri* have been reported from there. The endemic herpetofauna of Mtirala-Kintrishi nominated component area and its surroundings also provide compelling examples of ongoing evolution and speciation within this refuge area (Box 3, Figure 38).

The PAs of the Colchic Rainforests and Wetlands contribute to the Caucasus Endemic Bird Area (BirdLife International 2017), with breeding populations of the Caucasian Black Grouse *Lyrurus mlokosiewiczi* (Figure 39), as well as potentially of the Caspian Snowcock *Tetraogallus caspius* in the upper Kintrishi Valley within Mtirala-Kintrishi nominated component area. The status of the Caucasian Chiffchaff Phylloscopus (simianus) lorenzii, which also occurs there, is contested.

The series has ten species and one subspecies of mammals endemic to the Caucasus ecoregion, most of them rodents and shrews. Among them, the enigmatic Long-clawed Mole Vole *Prometheomys schaposchnikowi* is globally near-threatened (IUCN 2017). Landscape dependent speciation has been observed in the snow voles (Buzan & Kryštufek 2008).

**Endemic Ichthyofauna:** Distribution ranges of fish typically coincide with large-scale drainage basins not terrestrial ecoregions. This is also true for the ichthyofauna of the Colchic forests and particularly wetlands, which comprise a wide range of species (14) that are endemic either to the southeastern part of the Black Sea Basin, or the entire basin, or the Ponto-Caspian region (details: Appendix 3). The only fish species endemic to the Caucasus is the Caucasian Goby *Ponticola constructor*, of Imnati and Pitshora nominated component areas.

The spawning areas of the Black Sea Salmon *Salmo labrax*, which – as its name suggests – is endemic to the Black Sea, are concentrated in mountain rivers of western Georgia. Among them, the Kintrishi River within Mtirala-Kintrishi nominated component area is a particularly important spawning ground of this species (Guchmanidze 2014b, 2016a).

**Endemic invertebrates:** Although invertebrates are generally poorly studied in the Caucasus eco-region, it seems that the western Georgian (Colchic) invertebrate species pool is highly diverse with high level of endemism. One iconic example is the Colchic crayfish Astacus colchicus (Figure 40). The mountain forests of Mtirala-Kintrishi nominated component area as well as those of the lowland component areas boast disproportionally high numbers of local endemic species in pan-European comparison (Mumladze, et al., 2014). Endemism is particularly widespread among the mollusks (Figure 41).

**Box 3.** Ongoing speciation and evolution within the Colchic Rainforests and Wetlands.

The high ecological or hidden genetic diversity of some taxonomic groups suggests that the Colchic Rainforests and Wetlands are an important area for on-going evolutionary and speciation processes.

The examples of actively evolving highly speciose groups of organisms include rock lizards (*Darevskia*, syn. *Caucasilacerta*) and vipers (subgenus *Pelias*). Caucasian mountain vipers, until recent time, were considered to represent two or three species, a wide-spread *Vipera ursini* and Colchis endemic *Vipera kaznakovi* (Figure 37).; some scientists separated a third species, *Vipera dinnicki*. Recent genetic and morphological studies triggered description of several new species (Tuniyev et al. 2009). Some of them are found only or almost exclusively in the Colchis region. These species are: *Vipera kaznakovi* – existing throughout the mountain forest belt of Colchis; *V. dinnicki* – from the uplands of the Greater Caucasus (including high mountains within the basin of the Black Sea, e.g. upper Svaneti region); *V. orlovi* and *V. lotievi* – north-western and the northern Caucasus; *V. darevskyi* – southern Georgia and Armenia; *V. erivanensis* – from Armenia and some parts of SW Georgia including Shavsheti Range in the Black sea Basin (Guram Iremashvili, pers. com.); *V. barani* – from parts of Turkey close to southwestern Georgia. Although genetic differences between these species are minor, there is a taxonomist consensus on their distinct species status.

**Figure 37.** The globally endangered *Vipera kaznakovi*. Photo: David Tarkhnishvili.

The situation with *Darevskia* (Caucasilacerta) is probably even more interesting. There are 26-28 described sexually breeding species of this monophyletic group, most of which are endemic to the Caucasus Ecoregion, such as *Darevskia mixta*. Hence, they probably are the most speciose vertebrate group per unit area within the non-tropical northern hemisphere. The group also has seven distinct parthenogenetic (asexually reproducing) "species" (Tarkhnishvili 2012). Most of the species are distinct and sometimes up to 4-5 species coexist in a single habitat. Occasionally, hybridization occurs, but this does not cause assimilation or loss of morpho-ecological distinctness. Reticulate speciation has clear evidence in some cases (Darevsky 1967, Tarkhnishvili et al. 2013). The Colchis including particularly Mtirala-Kintrishi nominated component area is particularly rich in rock lizard (*Darevskia*) species, with some having extremely narrow distributions (such as *Darevskia dryada* Figure 38b). Altogether, there are over 25 species of this group found from Turkmenistan to the Balkans, and the Colchis has at least ten of them, probably being the centre of diversification of the group (Tarkhnishvili 2012). Six of that are found exclusively in the wider Colchis area. Up to five species are found sympatrically in some locations described below.

**Figure 38.** The globally critically endangered *Darevskia dryada.* Photo: David Tarkhnishvili.

**Figure 39.** Caucasian black grouse *(Tetrao mlokosiewiczi),* a globally near-threatened Caucasus endemic and one of the trigger species of the Caucasus Endemic Bird Area, which breeds within Mtirala-Kintrishi nominated component area. (Photo: Giorgi Darchiashvili)

**Figure 40.** The Colchic crayfish *Astacus colchicus,* a Colchic endemite among the invertebrates. (Photo: Levan Mumladze)

**Globally threatened vertebrates:** The number of globally threatened vertebrate species of the Colchic Rainforests and Wetlands is considerably lower than that of vascular plants (Table 8, Appendix 3). However, the wider area including the series is home to important populations of globally threatened fish as well as herpetofauna, and supports considerable numbers of Red-listed breeding and migratory bird species.

**Figure 41.** The gastropod *Helix buchii,* a Colchic endemic and relict species. (Photo: Levan Mumladze)

**Table 8.** Number of globally near-threatened and threatened species within the main vertebrate groups in the nominated component areas of the Colchic Rainforests and Wetlands. Note that the component areas within Kolkheti National Park (Grigoleti, Imnati, Pitshora, Nabada, Churia) are treated as one in this analysis. (Source and further details: Appendix 3)

| | Fish | Amphibians | Reptiles | Birds | Mammals[1] | All |
|---|---|---|---|---|---|---|
| **Mtirala-Kintrishi** | 0 | 4 | 4 | 16 | 3 | 26 |
| **Ispani** | 1 | 0 | 3 | ?[2] | 2 | 5[3] |
| **Kolkheti National Park** | 5 | 0 | 3 | 30 | 2 | 39 |
| **All** | **5** | **4** | **5** | **33** | **3** | **50** |

[1] including bats

[2] No data on avifauna of Ispani nominated component area available. The avifauna of this area is a subset of that of the nominated component areas within Kolkheti National Park

[3] excluding birds

The Colchic region is one of the very last areas in the world where Ponto-Caspian sturgeons are still regularly spawning. The Rioni, which borders the potential property, is one of four still active spawning rivers for Ponto-Caspian sturgeons in the world (together with the Danube, the Volga and the Ural). It is the last active sturgeon river in Georgia: four species of sturgeons that are critically endangered globally spawn in the Rioni, and two additional species might still occur - Beluga *Huso huso*, Russian Sturgeon *Acipenser gueldenstaedtii*, Stellate Sturgeon *Acipenser stellatus*, Ship Sturgeon *Acipenser nudiventris*, Atlantic Sturgeon *Acipenser sturio* and Colchic Sturgeon *Acipenser colchicus*. After its extirpation in Russia and Turkey - the Colchic Sturgeon is now endemic to the rivers of Kolkheti.

However, only small numbers of sturgeon juveniles (Colchic Sturgeon and Stellate Sturgeon) visit Paliastomi Lake within Kolkheti National Park for feeding purposes - but not for breeding - nowadays (Guchmanidze 2009, 2012, 2014a, 2016c, Ninua & Guchmanidze, 2012). An extension of Kolkheti National Park to include the lower reaches of the Rioni River is in preparation, with support of WWF Caucasus. This would increase the relevance of the park – and potentially of an extended nominated property – for sturgeon conservation. In addition, the critically endangered European Eel *Anguilla anguilla* and the vulnerable Common Carp *Cyprinus carpio* occur in the Paliastomi lake, which belongs to the buffer zone of the property.

Noteworthy populations of globally threatened herpetofauna of the Colchic Rainforests and Wetlands include those of the globally vulnerable Caucasian Salamander *Mertensiella caucasica*, as well as Clarke's Lizard *Darevskia clarkorum* and the Caucasian viper *Vipera kaznakovi*, which are both globally endangered (IUCN 2018).

Most of the 33 globally threatened bird species of the series have been recorded during migration. The only potential breeding bird falling into this category is the globally endangered White-headed Duck *Oxyura leucocephala*, at the nominated component areas within Kolkheti National Park. This species also occurs at the Kolkheti wetlands during migration, along with other migratory waterbirds including the Dalmatian Pelican *Pelecanus crispus*, Lesser White-fronted Goose *Anser erythropus*, and Common Pochard *Aythia ferina*, which are all globally vulnerable (Javakhishvili et al. 2014).

Apart from the Kolkheti wetlands, the second area of outstanding importance for globally threatened birds within the Colchic Rainforests and Wetlands is the Batumi bottleneck of raptor migration, which overlaps with the southwestern end of Mtirala-Kintrishi nominated component area. Several globally endangered (e.g. the Steppe Eagle *Aquila nipalensis*, Egyptian Vulture *Neophron percnopterus*, and Saker Falcon *Falco cherrug*) as well as vulnerable raptor species (e.g. Eastern Imperial Eagle *Aquila heliaca* and Greater Spotted Eagle *Clanga clanga*) are observed regularly – and sometimes in considerable numbers – during autumn migration (Batumi Raptor Count 2016, 2017). The Batumi bottleneck is discussed in more detail below.

While the Colchic Forest and Wetlands support significant populations of some large mammals which have become relatively rare in other parts of pan-Europe (e.g. Brown Bear *Ursus arctos* and European Lynx *Lynx*

*lynx*), no globally threatened mammals have been found there – only the near-threatened European Otter *Lutra lutra* and Long-clawed Mole-vole *Prometheomys schaposchnikovi*.

**Globally threatened invertebrates:** A number of invertebrate species occurring in western Georgia are threatened and included in the IUCN Red List. However, all of these species are known from pan-Europe, and Georgian populations were not considered (or only to a very limited extent) during the assessment of their conservations status. At the same time, Georgian populations of each these species are of particular importance as they represent either marginal or well-preserved and abundant populations. More than 90% of globally threatened species occurring in Georgia are represented in western Georgia including the series. The conservation status of the great majority of local or regional endemic invertebrates has not been assessed. Nevertheless, all the invertebrate species included in international or national red lists are mostly occurring in western Georgia and specifically one or more nominated component areas. These include the globally vulnerable Noble Crayfish *Astacus astacus* and Apollo butterfly *Parnassius apollo*, as well as the globally endangered freshwater snail *Belgrandiella adsharica*.

## *2.a.2 Overview of distribution of values among nominated component areas*

Before the nominated component areas of the series are described in detail, this section provides a concise overview over the distribution of the main ecosystems, habitats and vegetation as well as flora and fauna between the nominated component areas of the Colchic Rainforests and Wetlands.

### *Ecosystems, habitats and vegetation*

Most of the forest ecosystems of the Colchic Rainforests and Wetlands as well as the subalpine ecosystems that accompany them at their highest altitude are concentrated in Mtirala-Kintrishi nominated component area.

However, there are also important – if smaller – areas of Colchic forests in two of the nominated component areas in the Colchic Lowlands (Figure 23), namely inside Kolkheti National Park at the nominated component areas of Pitshora and Churia. The latter all belong to Type A – Colchic lowland forests.

The main ecosystems in the six nominated component areas inside the Colchic Lowlands (Ispani within Kobuleti Strict Nature Reserve, as well as Grigoleti, Imnati, Pitshora, Nabada and Churia within Kolkheti National Park) are different types of peatlands, which are accompanied by other wetland habitats to varying degrees.

Table 3 provides an overview of the distribution of ecosystems, habitats and vegetation across the nominated component areas of the Colchic Rainforests and Wetlands.

### *Flora*

Reflecting the distribution of ecosystems and habitats, the flora of the Colchic Rainforests and Wetlands is also distributed unevenly (Table 4, 5, Appendix 2). There is a remarkable difference between Mtirala-Kintrishi nominated component area with its Colchic rainforest on the one hand, and the peatland and associated ecosystems of the Colchic Lowlands on the other hand: The species diversity of vascular plants as well as the number of endemics is much greater in the former than in the latter. In all distinguished groups of endemics, the Mtirala-Kintrishi nominated component area has the highest number of endemic plants.

While relatively species-poor at the individual site level, the diverse peatland and other wetland ecosystems of the Colchic lowlands form a considerable ß-diversity and thereby also contribute to overall γ- biodiversity throughout the Colchic Rainforests and Wetlands (Joosten et al. 2003). The six nominated component areas within the Colchic Lowlands alone represent various stages of peatland succession, partly towards pure ombrotrophic percolation bogs. These stages also create different habitats for flora (and fauna), together with

the riparian forest and freshwater ecosystems that are directly associated with them. Ecological flows and the life cycles of the fauna and flora of the area link these diverse ecosystems intimately to each other.

Thus, Mtirala-Kintrishi nominated component area is the richest not only in forest vegetation types, but also has the highest general species richness as well as endemic and threatened species richness. However, all the nominated component areas together ensure conservation of the major forest and wetland ecosystems of the Colchis with their plant diversity.

### *Fauna*

The same pattern as for flora is observed for fauna (Table 6, 7, 8, Appendix 3), with some notable exceptions: Mtirala-Kintrishi nominated component area is home to most breeding bird species, while the nominated component areas in the Colchic Lowlands are visited by many more migratory species (particularly migratory waterbirds).

The contribution of the component areas to the species richness of other groups of the Colchic Rainforests and Wetlands also differs strongly: The freshwater bodies of Kolkheti National Park (i.e. Grigoleti, Imnati, Pitshora, Nabada and Churia nominated component areas with their buffer zones) support the great majority of ichthyofauna, whereas the forest PAs are more important for herpetofauna and mammals. The terrestrial vertebrate faunas of the forest and wetland areas are generally rather different, and complement each other. While the invertebrates of the Colchic Lowlands are relatively poorly studied, it is likely that a similar relationship exists there.

## *2.a.3 Description of nominated component area No. 1.: Mtirala-Kintrishi*

### *Size, location and topography*

The nominated component area (20,150 ha) of Mtirala-Kintrishi is located in Adjara Autonomous Republic, to the east of the Black Sea coast between the city of Batumi and the town of Kobuleti (Figure 2). It lies fully within Mtirala National Park, Kintrishi Strict Nature Reserve and Kintrishi Protected Landscape[1], which form a continuous series of PAs. Further information on its boundaries is presented in the textual description of boundaries in the Executive Summary.

Mtirala-Kintrishi nominated component area is part of the western Adjara-Imeretian (Meskheti) mountain range within the western Lesser Caucasus, i.e. the central Colchic area, ranging from 250 m to 2,596 m a. s. l. The area has a complex orography with frequent changes in valley orientation, and shifting slope exposure as well as inclination (Figure 42).

### *Geology and soils*

The geological structure of Mtirala-Kintrishi is formed by Paleocene, Eocene, Oligocene, Pliocene and post-Pliocene sedimentary and volcanic rocks of the Cretaceous and Tertiary periods. Basalts, andesites, various tuffs, and tuff-breccias dominate (APA, 2015; GeoGraphic, 2016).

The soil types of Mtirala-Kintrishi nominated component area form an altitudinal series of red soils (250-300 m a.s.l.), yellow soils (250-600 m a.s.l.), yellow-brown forest soils (400-1,000 m a.s.l.), brown forest soils (800-2,000 m a.s.l.) and mountain meadow soils (above 1,800 m a.s.l.) as described in Section 2.a.1 above (cf. Urushadze & Blum 2014).

*1 Kintrishi Strict Nature Reserve and Kintrishi Protected Landscape are currently undergoing a re-designation and re-zoning process, which will be finalized in mid-2019. A new Kintrishi National Park will integrate the Protected Landscape and parts of the Strict Nature Reserve. This may lead to a minor re-configuration of the protected areas constituting the Mtirala-Kintrishi nominated component area by mid-2019, but in any case not to a net loss of adequate protection of its Outstanding Universal Value.*

**Figure 42.** Mountain landscape in Mtirala-Kintrishi nominated component area. (Photo: Zurab Manvelidze)

## *Climate*

The climate of Mtirala-Kintrishi nominated component area is warm-temperate and humid. It is the most humid of the entire series and among the most humid areas in the temperate climate zone. Annual precipitation exceeds 4,500 mm at Mount Mtirala within Mtirala National Park, and 2,700 mm in Kintrishi Gorge (Figures 43, 44). Precipitation tends to increase with altitude and also depends on local topography, with pronounced small-scale heterogeneity (GeoGraphic, 2016).

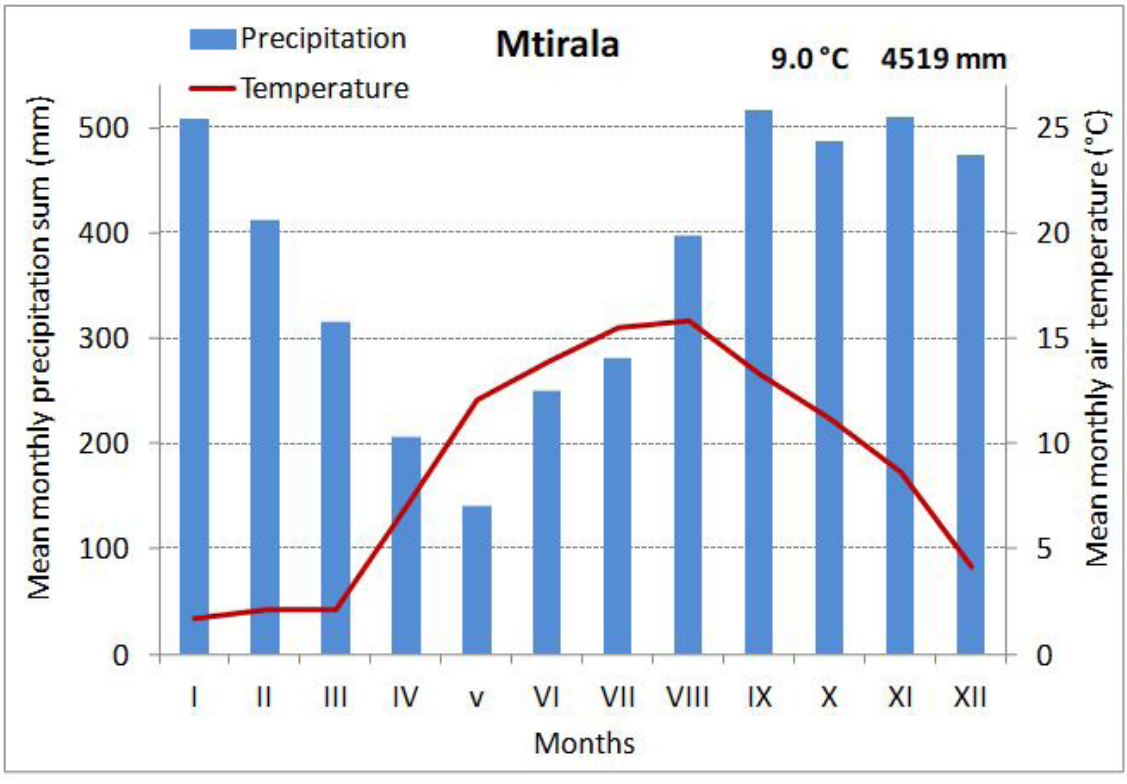



**Figure 43.** Climate diagram of Mount Mtirala, Mtirala-Kintrishi nominated component area. Source: Mtirala climate station data 1980 – 85.

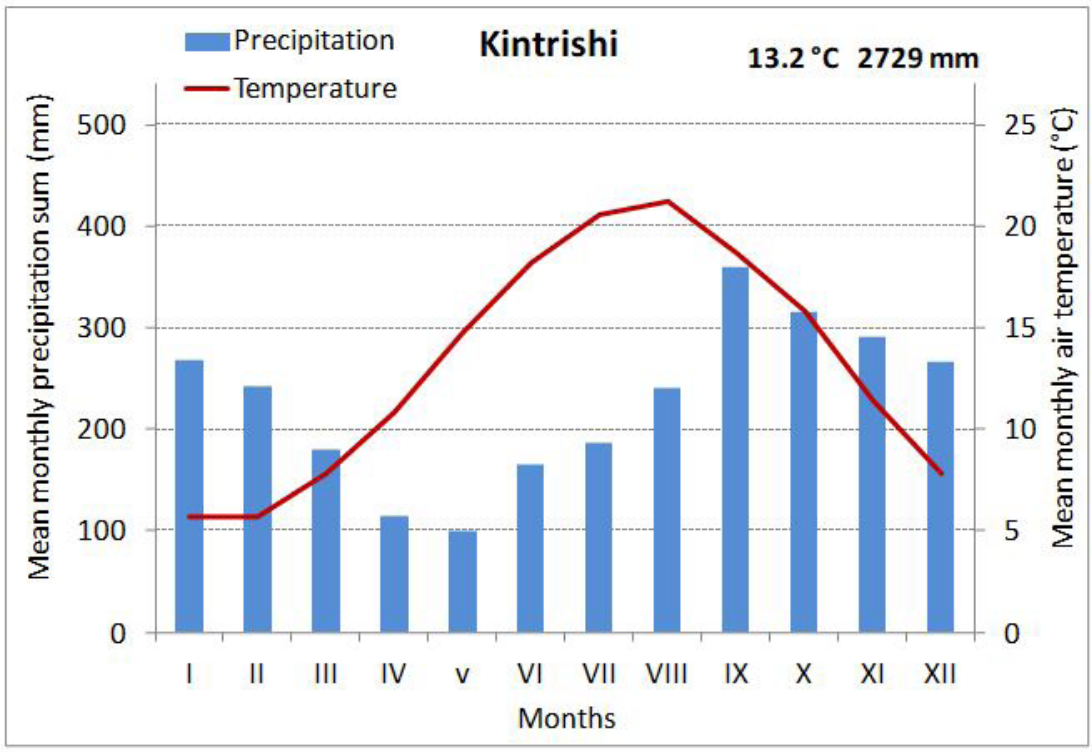



**Figure 44.** Climate diagram of Kintrishi Gorge, Mtirala-Kintrishi nominated component area. Source: Mandjavidze 1975.

Annual mean temperatures and seasonality within the nominated component area also depend on altitude. Below 500 m a.s.l., summers are long and warm (average August temperature 24 °C at Kintrishi valley) and the average January temperature is 4 °C. In contrast, summers are relatively short (vegetation period 3.5 – 4.5 months) and cool above 1,800 m a.s.l., with long winters as well as considerable and snow cover lasting well into spring (GeoGraphic, 2016).

## ***Hydrology***

The area includes the upper watersheds of the Chakvistskali and Kintrishi rivers, which both discharge into the Black Sea. In addition, most of the upper part of the Korolistskali watershed (also discharging into the Black Sea) is included within the south-western part of this component area. Rivers and small streams are mainly fed by springs and snow-melt waters from alpine and sub-alpine mountains. Some rivers form waterfalls (Figure 45). There is 30-m waterfall at the Misanati River and a two-step 70 m waterfall at the Chrdial River. There are two small alpine lakes (Tbikeli and Didvake, Figure 46) and various river ponds (Figure 47) located within the area.

**Figure 45.** Waterfall within Mtirala National Park, Mtirala-Kintrishi nominated component area. (Photo: Paata Vardanishvili)

**Figure 46.** Tbikeli Lake, Mtirala-Kintrishi nominated component area, 2,230 m. a.s.l. (Photo: Zurab Manvelidze)

**Figure 47.** Stream pool at Mtirala National Park, Mtirala-Kintrishi nominated component area, in winter. Note evergreen vegetation. (Photo: Paata Vardanashvili)

## ***Ecosystems, habitats and vegetation***

All major Colchic rainforest ecosystems as discussed in Section 2.a.1 with the exception of Colchic lowland forest are present within the Mtirala-Kintrishi nominated component area. It contains highly representative stands of the respective forest types of these zones (Kikodze and Gokhelashvili 2007, Dolukhanov 2010). 23 forest plant associations within five formations have been documented from the component area, in spite of its relatively small size. The Fageta are the richest in associations (12 formations), followed by the Castaneta (5), Carpineta (2), Alneta (2) and Betuleta (2) (Appendix 4).

In most of these associations, there is a characteristically rich undergrowth often of evergreen species. This includes Caucasian bladdernut (*Staphylea colchica*), Colchic box tree (*Buxus colchica*), rhododendron (*Rhododendron ponticum*), azalea (*Rh. luteum*), cherry laurel (*Laurocerasus officinalis*), viburnum (*Viburnum orientalis*), wild blackberry (*Rubus caucasicus*), Caucasian wortleberry (*Vaccinium arctostaphyllos*) and others.

The evergreen, high-bushy formations of *Shkeriani* (shrubbery Phytocenoses; Figure 48) are a particularly interesting phenomenon of the area. Here we have many highly characteristic Colchic relict shrubs: *Rhododendron ponticum, Rh. ungernii, Rh. luteum, Ilex colchica, Laurocerasus officinalis, Ruscus colchicus* etc. This vegetation growths in the Korolistskali Gorge (along the Namtsvavistskali, its right tributary), in the south-eastern part of the component area. The rare Ajara-Lazeti endemic *Epigaea gaultherioides* can be found there (Figure 49). The special conservation value of *Shkeriani* is that here 30-35 species of trees, bushes, and lianas can be found on one hectare. This is extraordinary for the temperate zone. The shrubbery in these areas is not rich in herbaceous cover, because of the dense evergreen undergrowth. However, some species loving humidity and shadow still can be found here, such as *Dryopteris oreopteris, Athyrium filix-femina, Blechnum spicant, Oxalis villosa* etc.

**Figure 48.** Fagetum mixtofructicosum (Shkeriani). (Photo: Zurab Manvelidze).

**Figure 49.** The rare Ajara-Lazeti endemic *Epigaea gaultherioides* at Mtirala-Kintrishi nominated component area. (Photo: Zurab Manvelidze)

There is marked spatial heterogeneity within the vegetation of this component area: Alneta are mainly found

in the ravines, with dominant *Alnus barbata* in the lower zone and *A. incana* in the middle zone. Dark coniferous species (*Abies nordmanniana, Picea orientalis*) that make up dark coniferous and mixed beech-dark-coniferous forests with *Fagus orientalis* are best present in the north-eastern (Kintrishi) part of the area. Mixed beech-dark-coniferous forests also occur in its southwestern part. Nordmann's fir-Oriental spruce forest stands cover ca. 140 ha in Kintrishi Valley (Kikodze and Gokhelashvili, 2007). Sorbus species, components of ash-birch elfin woods in upper subalpine belt are also present at the highest altitudes of the Kintrishi part of this component area. *Quercus hartwissiana* and *Q. dschorochensis*, which are characteristic of the southern Colchic humid thermophilous Colchic broad-leaved forest zone up to 1,000-1,200 m a.s.l., occur in the south-western part.

The highest altitudes of Mtirala-Kintrishi nominated component area (in upper Kintrishi Gorge) are characterized by Fageta and Betuleta formations, forest shrubberies, Subalpine high herbaceous, subalpine and alpine meadows and crushed stones floristic complexes of the Tertiary period, with participation of Colchic and Caucasian elements.

### ***Flora***

The flora of Mtirala-Kintrishi nominated component area is the species-richest of the series (906 species), and also the richest in relict, endemic (146 species) and globally threatened species (38 species) (Table 4, 5). It contains all the elements that are typical of the Colchic rainforests, as described in more detail in Section 2.a.1 (flora).

### ***Fauna***

Similar to the flora, Mtirala-Kintrishi nominated component harbours all the forest fauna of the Colchic Rainforests and Wetlands as discussed in Section 2.a.1 (fauna). It is the richest in diversity of herpetofauna, mammals and invertebrates, including relict, endemic and globally threatened species, and therefore the groups that demonstrate its proposed Outstanding Universal Value as a site of ongoing evolution and speciation (Table 6-8; see also Appendix 3).

All of the discussed species of fauna associated with the past of the Colchic Rainforests and Wetlands as a glaciation refuge, as well as ongoing evolution and speciation processes (see Section 2.a.1), occur in Mtirala-Kintrishi. These include the Caucasian salamander (*Mertensiella caucasica*), the Caucasian viper (*Vipera kaznakovi*), the lizards of the *Darevskia* genus, various small mammals as well as other vertebrate species and invertebrates.

Mtirala-Kintrishi is a refuge for large charismatic mammal species such as the Brown Bear (*Ursus arctos*) and Eurasian Lynx (*Lynx lynx*), an important stronghold of forest bats, and a hotspot of resident and breeding forest avifauna (Appendix 3). It holds populations of one (potentially two) bird species endemic to the Caucasus – the Caucasian Black Grouse (*Tetrao mlokosiewiczi*) and potentially the Caspian Snowcock (*Tetraogallus caspius*). The Batumi bottleneck of raptor migration strongly overlaps with the south-western part of this nominated component area.

## *2.a.4 Description of nominated component area No. 2: Ispani*

### ***Size, location and topography***

The Ispani nominated component area (N 41°51.9' E 41°47.9', 248 ha, 1.5–6.5 m a.s.l.) consists mainly of the Ispani 2 Mire (Figure 50), which is located near the settlement of Kobuleti, 1-3 km distant from the Black Sea coast (Figure 3). Further information on its boundaries is presented in the textual description of boundaries in the Executive Summary.

**Figure 50.** Peatland landscape at Ispani 2 Mire, Ispani nominated component area. (Photo: Izolda Matchutadze)

The bog (250 ha) consists of a 160 ha large open part, surrounded by a margin of *Alnus* shrubland. Ispani 2 is dome shaped with a 5 m height difference between bog centre and margins (Figure 51, 52). The mire is surrounded by the river Togona to the North and East, and by the river Shavi Gele to the South and West. The bog borders on Ispani 1 to the South. Other land adjacent to the mire is used as arable or pasture land and partly laying fallow. The bog is not drained, except for some minor ditches in the margins, but has suffered from channel construction in the SE part in the 1950s (pers. comm. Gurami Kotrikadze, Department of Drainage of Adjara, drainage maps). There may also have been minor impacts of the recent deepening of the Togona river (Grootjans et al. 2016).

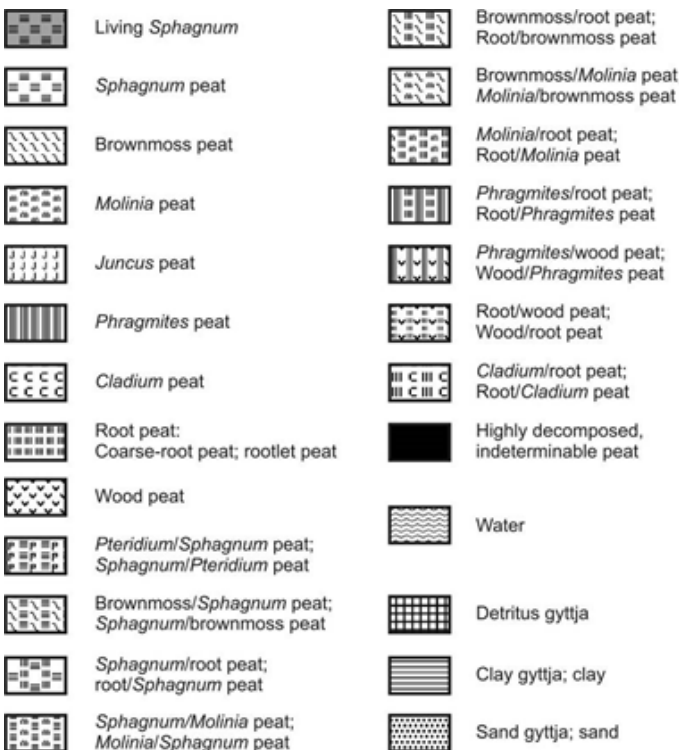



**Figure 51.** Legend for all peat profiles.

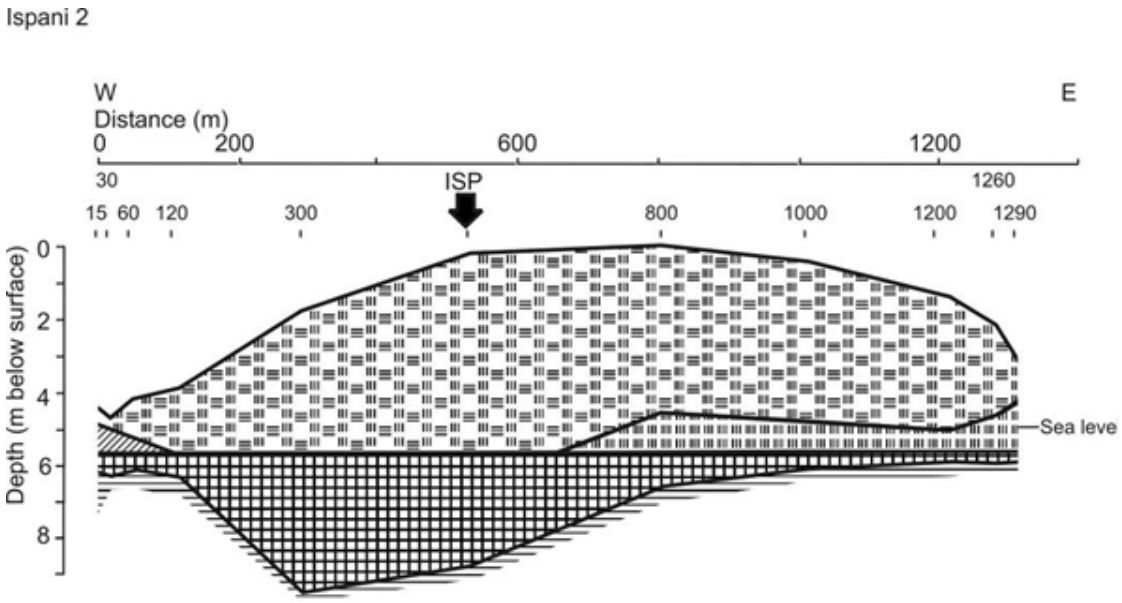



**Figure 52.** Peat profile of Ispani 2 Mire with the location of core ISP (De Klerk et al. 2009).

Ispani 2 Mire, which is protected as a managed reserve (IUCN PA Management Category IV), borders Ispani 1 Mire, and forms part of the buffer zone of the proposed property.

## ***Development, structure and function of Ispani 2 Mire***

The sediments beneath the peat in Ispani 2 consist mainly of clay and detritus gyttjas that were deposited between 5,750 and 2,525 cal yr BP (3,800 – 525 BC, De Klerk et al. 2009.) The fine texture of the sediments indicates a stagnant water regime or low flow velocities (Hjulström 1935) in the water body of the former lake or lagoon.

Peat formation started approximately 2,525 cal yr BP (De Klerk et al. 2009). The peat stratigraphy reflects a fen phase dominated by Cyperaceae partly accompanied by *Phragmites* and *Alnus* that terrestrialized the open water area (lithogenous immersion mire sensu Joosten & Clarke 2002). Rainwater influence in this fen gradually increased to develop a *Sphagnum*/Cyperaceae root peat with initial bog character. Whereas a *Sphagnum*/*Molinia* peat with *Sphagnum papillosum*, *S. palustre* and *S. austinii* increased since around 1,800 cal yr BP/AD 150, a real raised bog with a dominance of *Sphagnum austinii* came only into being around 1,000 cal yr BP(AD 950). This peat layer is hardly decomposed and has accumulated with a rate of over 4 mm per year (Joosten et al. 2003). **The current mire can be described as a percolation bog (sensu Joosten & Clarke 2002) and may be considered as the 'type locality' of the hydrogenetic mire type *percolation bog* (Krebs et al. 2017).**

*Physical and chemical conditions:* The macrorelief of Ispani 2 shows a dome shape with 5 m height difference between bog centre and margin (Kaffke 2008). The microrelief consists of hummock and hollows at the mire margin and *Sphagnum* lawns in the centre. The pH of the upper peat layer is around 3.5 with negligible differences over the mire. The low C/N ratios ranging from 18–26 in the upper peat layer, correlating with a high N content, are remarkable for an ombrotrophic bog but can be explained by input of windblown material from surrounding agriculture and the regular burning of the peatland (Kaffke 2008). The degree of humification of the peat is low (H2-H3) over large depths in the centre of the mire and higher at the margins (Kaffke 2008). Water levels clearly increase and water level fluctuations decrease going from the bog edge to the centre (Kaffke 2008). One characteristic feature of Ispani 2 mire is the very high mire oscillation capacity (*Mooratmung*, Weber 1902), which compensates absolute water level fluctuations leading to permanent high relative water levels.

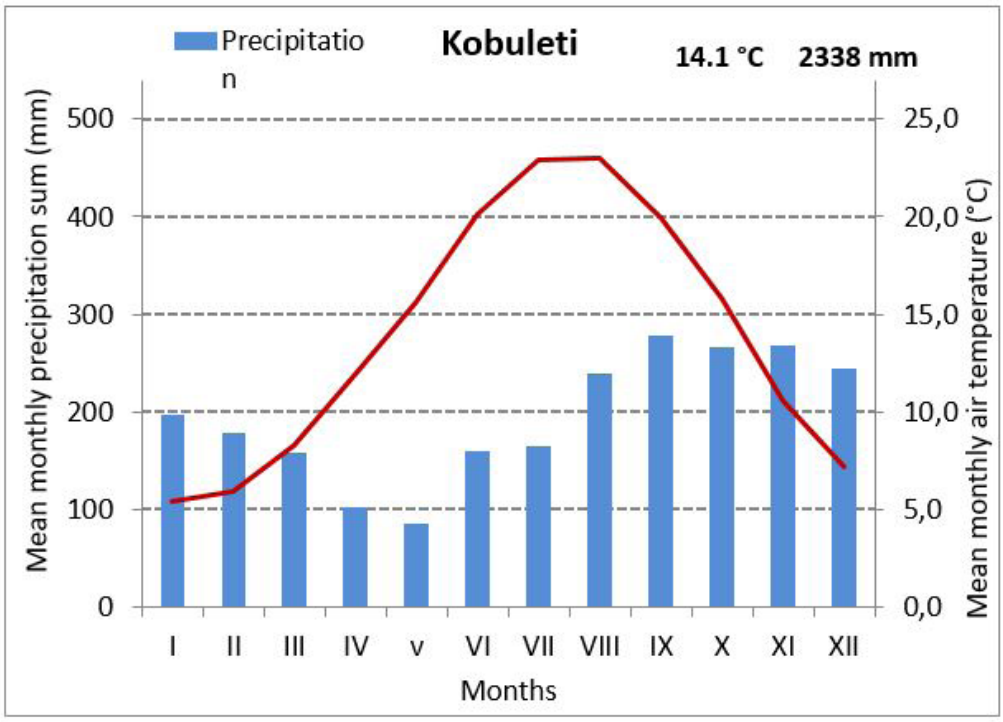



**Figure 53.** Climate diagram of Kobuleti, near Ispani nominated component area. Source: Climate station Kobuleti, 1971-2003 (temperature), 1955-2005 (precipitation).

## *Climate*

The climate of Ispani nominated component area is warm-temperate and highly humid, with 2,338 mm of annual precipitation and a precipitation maximum in autumn (Figure 53).

## *Hydrology*

The percolation bog at Ispani 2 nominated component area is fed by atmospheric precipitation. It has a weak hydrological connection to the Shavi Ghele River. The proximity of the Black Sea coast (ca. 1.2 km at the nearest point) has a strong stabilizing effect on the water level at and around Ispani 2 Mire.

## *Ecosystems and vegetation*

The Ispani nominated component area is dominated by a percolation bog, a special type of peatland ecosystem that is only found in the Colchic Lowlands (see Section 2.a.1 – ecosystems, habitats and vegetation).

In terms of vegetation, the margin of the Ispani 2 Mire consists of trees dominated by *Alnus barbata,* accompanied by *Frangula alnus* with *Smilax excelsior*, *Rubus* and *Sphagnum palustre*. In the transition zone to the open mire, there are also relict the relict ferns *Osmunda regalis* and *Thelypteris palustris*, and shrubs (some of them colchic) such as *Rhododendron ponticum*, *Rh. luteum*, *Vaccinium arctostapyllus*, *Calluna vulgaris*.

The vegetation of the open mire is characterized by the associations of Sphagnetum-Molinietum, with Molinia litoralis dominance and four species of Sphagnum: Sphagnum austinii, S. papillosum, S. rubellum, and S. palustre. Association species are Rhynchospora alba and Drosera rotundifolia. Other accompanying species are Pteridium aquilinum, Rhododendron luteum, R. ponticum, Vaccinium arctostaphylos and Carex lasiocarpa (Kaffke 2008). Its cover of vascular plants and peat mosses reaches 30-60 % and 60-100 %, respectively in the open mire part (Figure 54). The height and cover of the vascular plant species decrease from the margin to the mire centre. The clear decrease in water level fluctuations from the bog edge to the centre seems to be responsible for this (Kaffke 2008) as prolonged near-surface water levels are unfavourable for vascular plants

growth (Dierssen & Dierssen 2001). Another cause will be the decrease of nutrients going from the margin to the mire centre (Krebs & Gaudig 2005) as is indicated by the C/N values of the upper peat layer. The margin is influenced by periodical flooding by the adjacent river. The rather sharp border of the forested margin corresponds with the flooding level of the mire. The upper peat layer at the margin is also decomposed more strongly, leading to higher nutrient availability (Krebs & Gaudig 2005). (Figure 54)

**Figure 54.** Vegetation of percolation bog Ispani 2, Ispani nominated component area, with *Sphagnum austinii, Sph.rubellum and Sph. papilosum.* (Photo: Matthias Krebs)

## ***Flora***

The species composition is largely explained by distance to the bog margin, ash content and C/N ratio, reflecting different nutrient availability, and to slope, reflecting different water levels (Kaffke 2008). The Ispani 2 Mire currently harbours – next to Tertiary relict species like *Rhododendron ponticum* and *Osmunda regalis* – several (sub-) mediterranean, temperate, and boreal relict species (Denk et al. 2001). Temperate and boreal mire flora elements include *Drosera rotundifolia, Menyanthes trifoliata*, *Rhynchospora alba* and *Carex lasiocarpa*. Among the main peat accumulating species, the very dense lawns of *Sphagnum* deserve special attention. The permanent high water level (see site conditions) leads to a very productive peat moss growth (Krebs & Gaudig 2005, Krebs et al. 2016). The dense *Sphagnum* lawns are dominated by *Sphagnum papillosum* accompanied by *S. austinii, S. rubellum,* and *S. capillifolium*. *Sphagnum palustre* grows here under ombrotrophic conditions, whereas the species elsewhere is restricted to minerotrophic sites (Daniels & Eddy 1985) (Figure 55). *Sphagnum austinii (imbricatum)* is a main peat forming species in Ispani 2 (Dokturowsky 1931, Dokturovskij 1936, Potskhishvili et al. 1997, Kaffke et al. 2000, De Klerk et al. 2009). In recent centuries, the species has become rare in many parts of Western Europe (Green 1968), its massive decline being ascribed to climate change, drainage, fires, grazing and eutrophication (Mauquoy & Barber 1999). Despite its decrease during the 20$^{th}$ century, the species is still common in Ispani 2. Currently the Ispani 2 mire harbours the main population of this peat moss species in the Colchic Lowlands. It further only occurs over small areas in the Ispani 1 and Imnati mires. The occurrence of *Calluna vulgaris* (Kaffke et al. 2002, Connor et al. 2007) and *Spiranthes amoena* (Akhalkatsi et al. 2004) in the flora of Ispani 2 is remarkable.

**Figure 55.** Peat mosses and vascular plants at Ispani 2 Mire, Ispani nominated component area. (Photo: Izolda Matchutadze)

### *Fauna*

Ispani nominated component area contributes to the value of the series because it contains a percolation bog with its characteristic flora and vegetation. Its fauna has not been studied to the same extent as that of Mtirala-Kintrishi nominated component area or some of those within Kolkheti National Park, and is probably of relatively limited significance. Being a relatively small and uniform area without extensive tree cover, it is not important for larger mammals or any species of forest fauna (Tables 6-8, Appendix 3). Because of the lack of larger freshwater areas within or near the component area, it is also not an important resting area for migratory water birds.

## *2.a.5 Description of nominated component area No. 3: Grigoleti*

### *Size, location and topography*

Grigoleti nominated component area is situated around Grigoleti Mire east of the settlement of Grigoleti/ Maltakva approximately 400 m from the Black Sea (Figure 4). The nominated component area has an extension of 125 ha a with a major part of open mire and very limited surrounding alder forests. The river Karpatsha is bordering the area to the North. Further information on its boundaries is presented in the textual description of boundaries in the Executive Summary.

### *Development, structure and function of Grigoleti Mire*

The mire is situated in a shallow basin. Its development started with the terrestrialization of a lagoon. The open water period is indicated by clay and detritus gyttjas (Figure 56). The terrestrialization is reflected by the accumulation of *Phragmites* peat and wood peat. The northern part of Grigoleti Mire is characterised by (mainly alder) wood peat and clay and detritus gyttja, indicating shifts between drier and open water periods, respectively. The southern part shows a very diverse sequence of thin layers of *Phragmites* peat, root peat and its mixtures, partly accompanied with wood remnants, indicating alternations of drier and wetter conditions. The part must have differed from the mainly forested northern area by its open character of small

patches of sedges and *Phragmites* stands. As alder grows under drier conditions than *Phragmites*, it can be assumed that the southern part was subject to more constant wet conditions. The northern part must have been more strongly influenced by the nearby river Karpatsha. The changing water levels of the river caused by transgressions and regressions of the Black Sea lead to stronger shifts between wetter and drier periods in the mire.

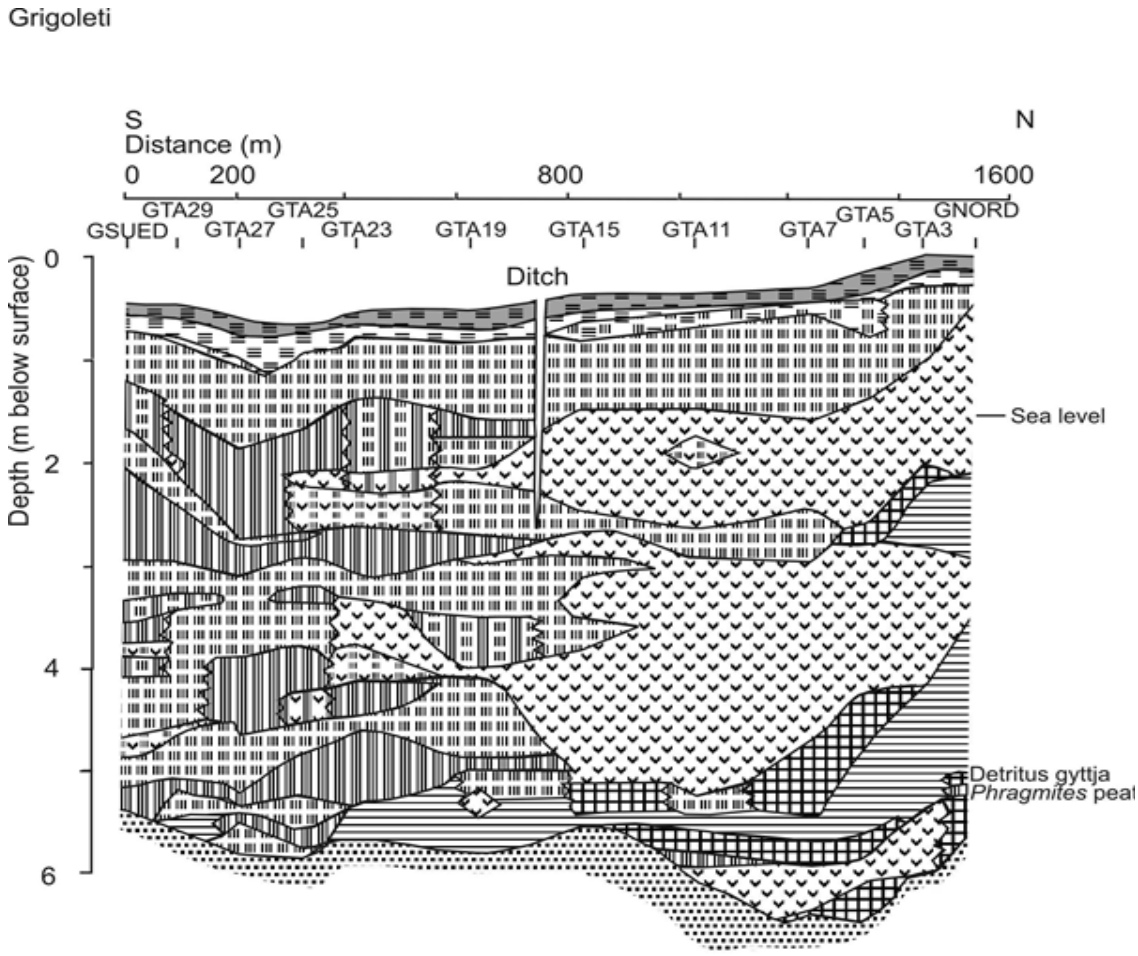



**Figure 56.** Peat stratigraphy of Grigoleti Mire along a South-North transect.

The upper peat layers consist of root peat and *Sphagnum* peat over the entire mire area, indicating similar, drier and non-forested conditions. The influence of the river had probably decreased when this was accumulated. The disappearance of the forest can be due to wood cutting and frequent burning, inhibiting the new growth of trees. The drier conditions are caused by the drainage of the mire. The decreased influence of lithogenous water, the abundant precipitation in the region, and the inhibition of tree growth in combination support the growth of *Sphagnum.*

The Grigoleti Mire can be characterised as a lithogenous water rise mire (sensu Joosten & Clarke 2002). *Sphagnum* has been growing for several years in a dense cover, and the accumulation of hardly decomposed *Sphagnum* peat illustrates the severe changes in the character of the mire. **At present the Grigoleti Mire shows similar conditions as the two percolation bogs Ispani 2 and Imnati. It is possible that the mire is an initial phase in the development of a percolation bog (sensu Joosten & Clarke 2002).**

*Physical and chemical conditions:* The mire has a slight slope from north to south. The microrelief mainly consists of peat moss lawns. Locally also hummocks and hollows occur, i.e. at the mire margins or on spots that recently have suffered from fire. The peat pore water is acid and nutrient poor conditions with pH-values of 4.26 - 5.65 and EC values of 22 - 134 µS $cm^{-1}$ prevail. The C/N ratios of the upper peat range from 14 to 29, with a mean of 20. These values are rather low for bogs, indicating a higher nitrogen supply than normal. Kaffke (2008) attributes this – for the Ispani 2 bog - to fire decreasing the C/N values.

## *Climate*

The climate of Grigoleti nominated component area is typical of the Colchic Lowlands, i.e., warm-temperate and highly humid, with ca. 2,000 mm of annual precipitation and a precipitation maximum in autumn (Figure 57).

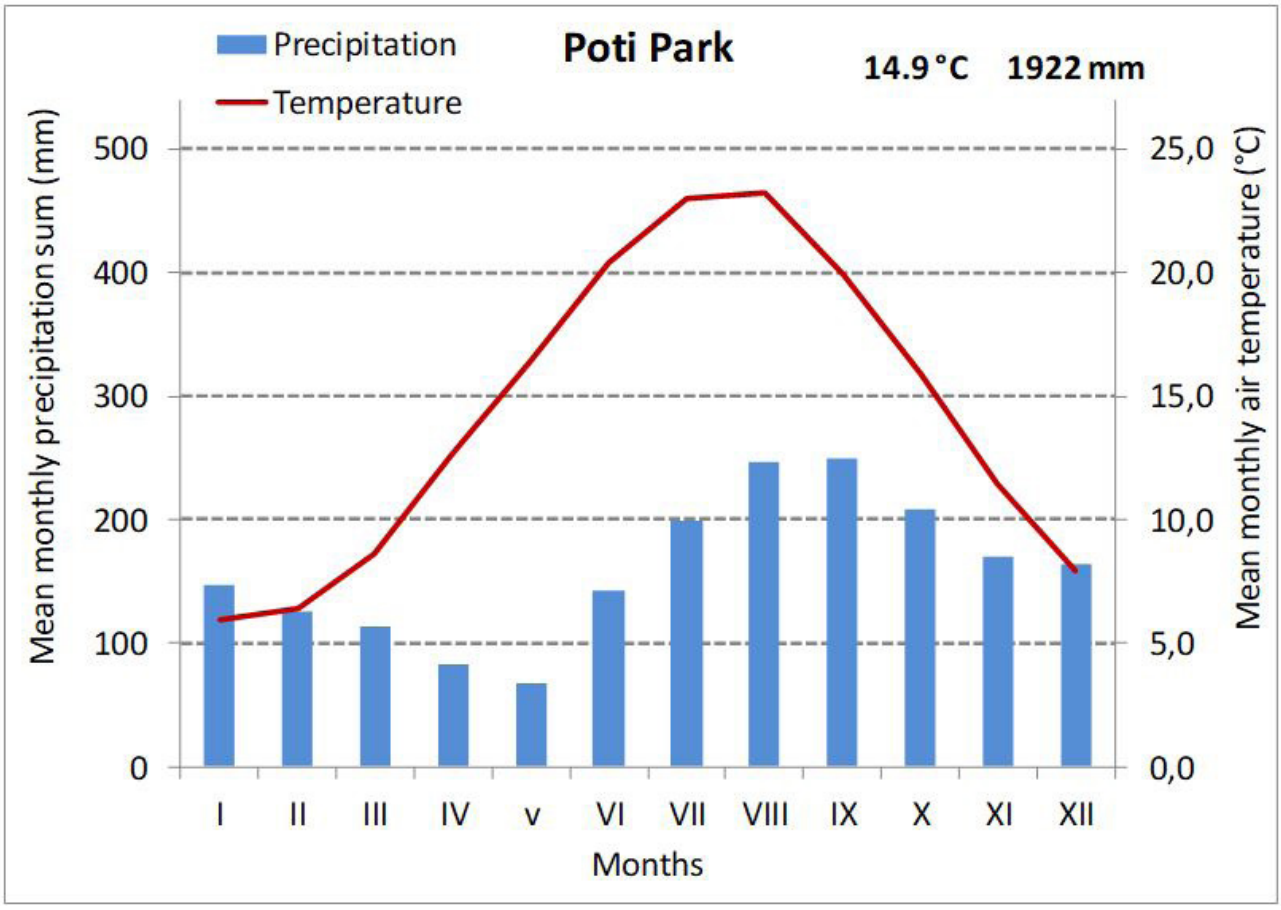



**Figure 57.** Climate diagram of Poti Park, near Grigoleti, Imnati, Pitshora, Nabada and Churia nominated component areas. Source: Climate station Poti Park, 1955-2006.

## *Hydrology*

The peatlands at Grigoleti nominated component area are mainly fed by atmospheric precipitation. The mire has a weak hydrological connection to the Karpatsha River. The proximity of the Black Sea coast (ca. 400 m at the nearest point) has a strong stabilizing effect on the water level at and around Grigoleti nominated component area.

## *Ecosystems, habitats and vegetation*

The nominated component area of Grigoleti is dominated by a percolation bog in statu nascendi. Some alder forest occurs along its margins. The vegetation is characterized by the formations of *Sphagnetum-Molinietum (Molinia litoralis), with Sphagnum papillosum, S. palustre, and Molinia litoralis, accompanied with Carex lasiocarpa and Rhynchospora caucasica* partly with Spiranthes amoena. It also comprises shrubs and sedges. The height of the vascular plants increases at the mire margins. A dense Sphagnum cover of around 80% and vascular plants with a cover of around 60% are characteristic for the vegetation of Grigoleti Mire.

## *Flora*

The flora of Grigoleti Mire and surroundings is broadly similar to that of Imnati Mire (see Section 2.a.5 below), and typical of the Colchic mire flora as described in detail in Section 2.a.1 (flora). *Cladium mariscus* grows in stands of several $m^2$ locally.

### *Fauna*

Similar to Ispani, Grigoleti nominated component area has been included into the series mainly because of its special Colchic mire ecosystem with its characteristic flora and vegetation. Its fauna is of relatively limited significance to the overall values of the series, as it is also rather small, open, and devoid of larger freshwater areas (Table 6-8).

## *2.a.6 Description of nominated component area No. 4: Imnati*

### *Size, location and topography*

The proposed component area of Imnati (3,418 ha) is  located around a mire complex of the same name (Figure 58), which is situated 5 km east of Poti and adjacent to the eastern shoreline of Lake Paliastomi in the centre of a former lagoon (Figure 5). Further information on its boundaries is presented in the textual description of boundaries in the Executive Summary.

**Figure 58.** Landscape at Imnati mire with intermittent freshwater bodies. Photo: Izolda Matchutadze.

The complex comprises 3,800 ha non-forested peatland with two raised peat cupolas, plus small areas of Colchic lowland forest along the northern and north-eastern edges of the mire. The raised peat cupola between Lake Paliastomi and Lake Imnati rises approximately 5 m above the surrounding peatland (Figure 59. East of Lake Imnati, a second raised peat body of smaller size is located. North of the peat cupolas an open peat moss/sedge mire plain stretches for 2 km until the marginal forests. In the South, the nominated component area is confined by the channels Cherpalka and Tkhorina and by adjacent forests.

### *Development, structure and function of Imnati Mire*

The sediments beneath the peat in Imnati consist mainly of stratified silt and clay gyttjas with enclosed sand gyttja layers (Figure 59). They show upward decreasing carbonate contents. The fine texture of the sediments indicates a stagnant water regime or low flow velocities (Hjulström 1935) in the water body of the former lagoon. Layers of sand gyttja reflect the periodically stronger influence of the Rioni River, which had from the eastern side direct access to the lagoon via the recent back water, named Orpiri Rioni, which fed the lagoon

with carbonate rich glacial abrasion material from the Caucasus mountains. Closer to the Black Sea periodically marine influence was possible until 5,000 – 6,000 BP, i.e. before a spit separated the lagoon from the sea (Potskhishvili et al. 1997).

Peat formation in Imnati began approx. 6,000 BP (6247 cal.BP at 10.25 m depth at core 1860). The peat stratigraphy reveals two major phases of mire development. The *Phragmites* / coarse root and rootlet peat and the coarse root and rootlet peat reflect a fen phase dominated by *Phragmites* and Cyperaceae reeds that occupied and finally closed the shore lake (lithogenous immersion mire sensu Joosten & Clarke 2002). The fen prevailed for a long period (6,247 - 2,943 cal. BP) during which water level and nutrient rich conditions will have been stabilized by the high tectonic subsidence rates of the central Colchis costal area (actual annual rates near Poti are 6.5 mm; Potskhisvili et al. 1997). As a consequence, the runoff of the feeding rivers was hampered and the fen water level rose synchronously with the growing fen peat (lithogenous water rise mire sensu Joosten & Clarke 2002).

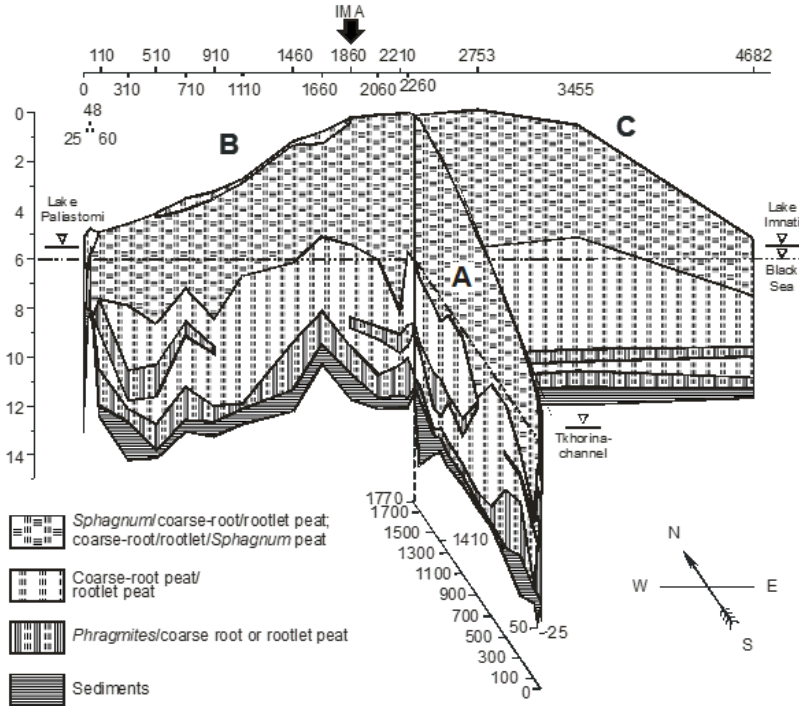



**Figure 59.** Stratigraphy of the Imnati mire along two coring transects from west to east and from north to south. (Haberl et al. 2006)

Around 2,943 cal.BP (5.85 m depth in core 1860) the formation of highly decomposed *Sphagnum* peat started under more acid and nutrient poor conditions, indicating that the mire water level was gradually decoupled from that of the surroundings, the influence by precipitation increased and changed towards an ombrogenous regime. A loosely arranged, hardly mummified *Sphagnum* (mixed) peat accumulated with a high root content mainly from *Molinia litoralis*, *Carex rostrata* and *Carex lasiocarpa* but also from Ericaceae (*Rhododendron ponticum*, *Rh. luteum*). These roots and rootlets cause the loose peat to maintain a high permeability over significant depths of the bog peat body. **The Imnati Mire is described as a percolation bog (Joosten & Clarke 2002) the largest representative of this type.**

*Physical and chemical conditions:* The centre of Imnati shows hardly microrelief and largely consists of *Sphagnum* lawns. At the mire margins a differentiation in hummock and hollows indicates a stronger lateral water flow near the surface. The phreatic water level in Imnati is quite high over the entire area (Kahrmann & Haberl 2005, Krebs et al. 2016).

The pH of the upper pore water amounts to 4.0-5.5. The EC (Electric conductivity) values of the pore water to 1 m depth range from 40- 70 µS $cm^{-1}$. Both values point at ombrotrophic conditions. The C/N ratio of the peat (10 cm deep) has values from 9.8-51.6 indicating mesotrophic and oligotrophic conditions.

## Climate

The climate of Imnati nominated component area is warm-temperate and highly humid, with ca. 1,900 mm of annual precipitation and a precipitation maximum in late summer and early autumn (Figure 57).

## Hydrology

The peatlands and forests at Imnati nominated component area are fed by atmospheric precipitation. The mire has a hydrological connection to the Pitshora River system and to Lake Paliastomi, which in turn is connected to the Black Sea. The proximity of the Black Sea coast (ca. 3 km at the nearest point) has a stabilizing effect on the water level at and around Imnati nominated component area.

## Ecosystems, habitats and vegetation

The nominated component area of Imnati nominated component area is dominated by Imnati Mire, the largest and oldest percolation bog. Some limited areas of Colchic lowland forest and open freshwater bodies are also included.

**Figure 60.** Sphagnetum-Cladietum mariscus at Imnati nominated component area. (Photo: A. Haberl)

The vegetation of Imnati Mire is characterized by the formations of Sphagnetum-Cladietum mariscus (Figure 60), with *Sphagnum papillosum, S. magellanicum, S.rubellum, S. palustre some small patches of Sphagnum austinii, Cladium mariscus, Molinia litoralis, Carex lasiocarpa. A*t the periphery of the mire association are relict ferns such as *Osmunda regalis, Thelypteris palustris,* and other relict species such as *Menyanthes trifoliate.* There are also some ponds and lakes interspersed in Imnati Mire (Figure 61), which are dominated by *Nymphaea colchica and Salvinia natans.*

Typical is the association of these peat mosses with the grass *Molinia litoralis* and dwarf shrubs like *Frangula alnus*, *Rhododendron ponticum* and *Rh. luteum* (Dokturovski 1931). A characteristic feature are the stands of *Cladium mariscus* prospering on 5 m of *Sphagnum* peat under fully ombrotrophic infiltration conditions in the central parts of the western cupola (Figure 59 , Haberl et al. 2006).

**Figure 61.** Freshwater ponds dominated by *Salvinia natans and Trapa natans* at Imnati nominated component area. (Photo: Hans Joosten)

### ***Flora***

The flora of the Imnati Mire is made up of 70 moss and vascular plant species (Table 4, Appendix 2). It is typical of the peatland flora of the Colchic Lowlands.

### ***Fauna***

In addition to a large percolation bog with a species-poor fauna, Imnati nominated component area contains significant Colchic lowland forest and open water bodies. The forest makes it an important habitat for lowland forest fauna (e.g. bats, herpetofauna), while the open water areas within this nominated component area and its buffer zone contribute to the importance of the area for ichthyofauna, migratory as well as breeding waterbirds, as described in more detail in Section 2.a.1 (fauna). The area is also important for freshwater invertebrates. 126 species of waterbirds (incl. shorebirds) have been recorded there, including 18 globally threatened and near-threatened species (Appendix 3.2.a, 3.2.b).

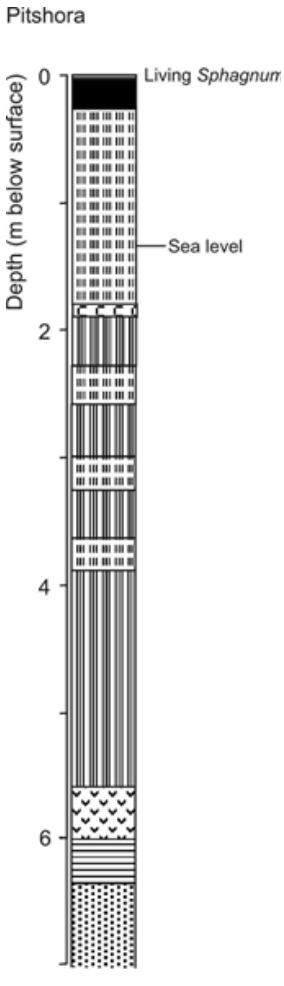
## *2.a.7 Description of nominated component area No. 5: Pitshora*

### ***Size, location and topography***

Pitshora nominated component area (2,393 ha) includes Pitshora Mire, which is situated 3 km north east of Lake Paliastomi, to the north of the Imnati Mire, and its surroundings. Both mire complexes are divided by the river Pitshora (Figures 5, 62). Further information on the boundaries of Pitshora Mire is presented in the textual description of boundaries in the Executive Summary.

The Pitshora Mire has an open part and a forested part with alder, like the Imnati Mire.

**Figure 62.** Aerial view of the landscape of the Colchic Lowlands along the Pitshora River, with forest and peatland areas within Imnati and Pitshora nominated component areas. (Photo: Paata Vardanishvili)




## *Development, structure and function of Pitshora Mire*

The peat accumulation in Pitshora Mire started after an open water phase with a decreasing influence of streaming water, as is indicated by the sand, sand gyttja and clay gyttja (Figure 63). Later a forest established, probably due to drier conditions. Since then the Pitshora Mire has developed as a lithogenous water rise mire (Joosten & Clarke 2002) with wetter and drier periods as is indicated by the alternations of *Phragmites* peats and root peats.

The upper peat player is strongly decomposed. This is probably attributable to drainage by the channels that were excavated in the middle of the 20$^{th}$ century and to frequent burning by hunters in the last century. However, these threats have now largely seized.

Despite that the Pitshora Mire is situated close to Imnati Mire, their mire development is strongly different. We assume that both mire areas have always been separated by Pitshora River or its precursors, causing different hydrological conditions for mire formation. **An increase of *Sphagnum* cover has been observed recently at Pitshora Mire, justifying its classification as a potential precursor of the typical percolation bogs of the series and an important step within the succession of Colchic mire types (cf. Figure 24).**

*Physical and chemical conditions:* The macrorelief of the Pitshora Mire shows a slight cupola in its centre. The microrelief consists of tussocks and hollows. The pH value of the pore water of 5 and the EC value of 47 µS cm$^{-1}$ indicate acid and nutrient poor conditions.

**Figure 63.** Stratigraphy of Pitshora Mire.

## Climate

The climate of Pitshora nominated component area is typical of the Colchic lowlands, i.e., warm-temperate and highly humid, with ca. 1,900 mm of annual precipitation and a precipitation maximum in late summer and early autumn (Figure 57).

## Hydrology

The peatlands and forests at Pitshora nominated component area are fed by atmospheric precipitation. The mire has a hydrological connection to the Pitshora system. The proximity of Lake Paliastomi, which is itself connected to the Black Sea (ca. 3 km at the nearest point) has a stabilizing effect on the water level at and around Pitshora nominated component area.

The mire was influenced by several channels draining from north to south in the past. As these channels are not cleaned anymore, their draining effect has decreased substantially, and is expected to decrease more in the future.

## Ecosystems, habitats and vegetation

Pitshora nominated component area comprises Pitshora Mire, which can be considered a percolation bog *in statu nascendi*, and bordering areas of Colchic lowland forest.

The vegetation of Pitshora Mire belongs to the formations of *Sphagnetum-Molinietum* with *Molina litoralis, Carex acutiformis, C. pallascens, C. panicea, Cladium mariscus* and also the endemic *Solidago turfosa*. The mire is characterized by a dense cover of sedges and moor grass. Important species are summarized in Appendix 2. *Sphagnum denticulatum* and *S. palustre occur* in some parts with low, but increasing covers.

The Colchic **relict** forest of Pitshora (see Figure 64 for a schematic overview) nominated component area is dominated by the Colchic-Hyrcan relict *Alnus glutinosa spp. barbata* overall but contains many other relict woody taxa including *Acer orthocampestre* (Figure 65), *Quercus hartwissiana* (Figure 66), C*arpinus betulus, Morus nigra, Pterocarya fraxinifolia, Carpinus betulus, Ilex colchica, Morus nigra, Ficus carica, Ilex colchica, Ruscus ponticus, Humulus lupulus, Clematis vitalba, Smilax colchica, and Periploca graeca* (Denk et al. 2001, Matchutadze & Davitashvili 2003, Matchutadze et al. 2010a, b, Matchutadze et al. 2012). In very wet areas with mixed peat and clay soil there is also a less diverse swamp alder forest.

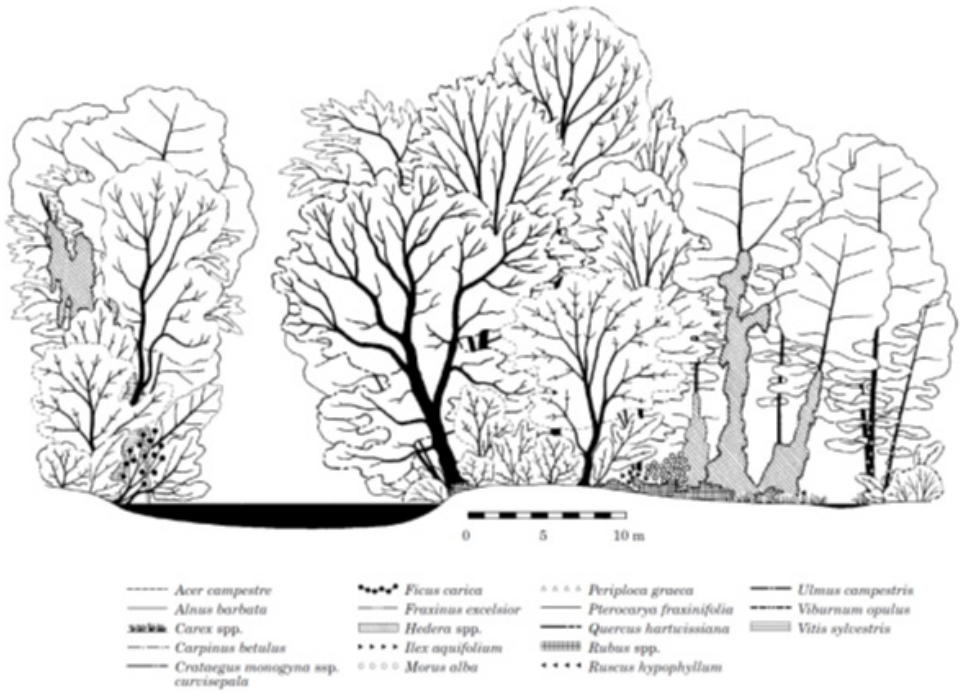



**Figure 64.** Vegetation transect showing typical Colchic lowland forest of Pitshora nominated component area. (Denk et al. 2001)

**Figure 65.** The relict tree *Acer orthocampestre* at Pitshora nominated component area. (Photo: Tobias Garstecki)

**Figure 66.** The Strandzha oak *(Quercus hartwissiana),* a relict species, in the Colchic lowland forest at Pitshora nominated component area. (Photo: Tobias Garstecki)

### *Flora*

The flora of Pitshora Mire has not been studied to the same extent as that of Ispani, Imnati and Churia mires. It shows considerable overlap with that of other Colchic lowland mires (Appendix 2), and a subset of the species as listed for these areas in Appendix 2. The forest flora of Pitshora Mire is distinguished by a various Colchic relict species (Appendix 2).

### *Fauna*

Pitshora nominated component area contains significant Colchic lowland forest and some open water bodies (the latter mainly within the forest), in addition to peatland habitats. This means that its typical fauna of lowland forests is similar to that of Imnati. In contrast, open water areas are more limited although they also have some importance for ichthyofauna and waterbirds.

## *2.a.8 Description of nominated component area No. 6: Nabada*

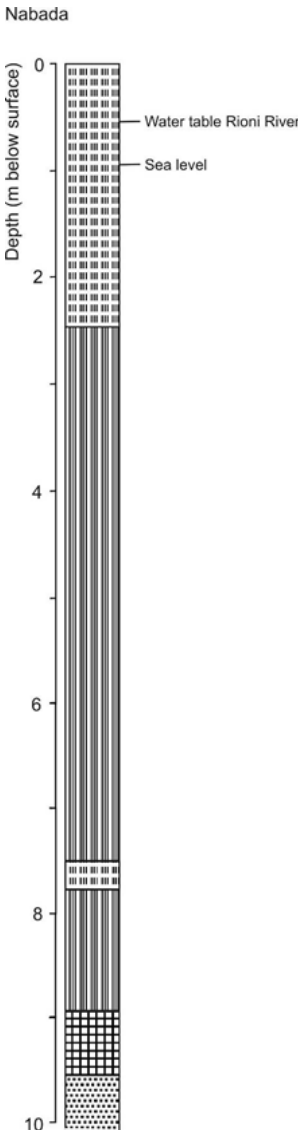
### *Size, location and topography*

The Nabada nominated component area (2,976 ha) is located north of the settlement of Poti and bordered to the West by the Black Sea and to the South by the river Rioni (Figures 1, 6). It is centred around the Nabada Mire complex (Figure 67), which consists of three parts (north, east and south). These are divided by the river Ziwa and its tributaries and channels.

**Figure 67.** Landscape at Nabada nominated component area. (Photo: Izolda Matchutadze)

The mire has an extension of 7.5 km from North to South and 8.0 km from West to East. Besides the Imnati Mire, it is the largest open peatland area of the Colchic Lowlands, with 3,300 ha open peatland area. Further information on its boundaries is presented in the textual description of boundaries in the Executive Summary.

## *Development, structure and function of Nabada Mire*




The mineral subsoil of Nabada is formed by sand and sand gyttja (Figure 68). The detritus gyttja reflects a period of open water but the presence of only little amounts of sand or silt show that little flow energy was involved. Probably the area also belonged to a lagoon like the area of the Imnati Mire. The lagoon terrestrialized with *Phragmites* stands. Peat accumulation began between 6,930 and 5,230 BP (Timofejew & Bogolyubowa 1998) in a lithogenous immersion mire (sensu Joosten & Clarke 2002). **After terrestrialization Nabada Mire has continued as a lithogenous water rise mire (sensu Joosten & Clarke 2002) in which nutrient rich and wet conditions prevailed.** This is shown by the continuous accumulation of *Phragmites* peat for long periods. High contents of fine sand or silt in the peat imply the influence of flowing water. Root peats with less *Phragmites* indicate periods in which water level was not rising that rapidly, probably because of regression of the Black Sea (Chepalyga 1984), or less water supply by the rivers due to river bed changes.

The recent peat layers reach a thickness of 13 m with a mean value of 6 m, i.e. the thickest recent peat layer of the mires of the Colchic Lowlands (Menagarishvili 1949, Buatshidse 1963). Its peat accumulation rate is estimated at 1.2 mm $a^{-1}$ (Dshanelidse 1989). This mire might be one of the oldest of the Colchic Lowlands.

*Physical and chemical conditions:* The northern part of the mire is nearly flat. The eastern part slightly slopes from East to West. A cupola in the southwest of the southern part close to the Black Sea forms slopes to all directions. The micro-relief of Nabada Mire is characterised by tussocks with partly open water in between. The pH of the upper pore water is neutral (6.7). The low EC-value (140 µs $cm^{-1}$) indicates mesotrophic conditions. The nutrient richer and wetter conditions are reflected by stands of *Phragmites australis* also in more central parts of the mire.

**Figure 68.** Stratigraphy of Nabada mire.

## *Climate*

The climate of Nabada nominated component area is typical of the Colchic Lowlands, i.e. warm-temperate and highly humid, with < 1,900 mm of annual precipitation (Figure 57).

## *Hydrology*

The peatlands and forests at Nabada nominated component area are fed by atmospheric precipitation and river water. The mire has a hydrological connection to the Khobi River system to the north. Due to past, now discontinued channel digging from the Rioni in the south, periodical floodings also of the areas more distant from the river, and input of nutrients by river water can be assumed. The proximity of the Black Sea coast (< 1 km at the nearest point) has a stabilizing effect on the water level at and around Nabada nominated component area.

## *Ecosystems, habitats and vegetation*

The main ecosystem of Nabada nominated component area is the Nabada Mire, a lithogenous water rise mire. It is surrounded by some limited lowland Colchic forest and also includes open freshwater bodies.

The open mire part is characterized by the formations of *Sphagnetum-Caricetum* (*Carex rostrata*) with *Sphagnum papillosum*, *S. palustre*, *Carex rostrata*, *Carex vesicarya, Carex lasiocarpa, Cladium mariscus, Molinia litoralis*. An important association species is *Orchis palustris*. In some parts *Phragmites australis* stands occur (Figure 69). The margins are covered by forests dominated by *Alnus barbata*, *Frangula alnus*, *Rubus* bushwood and *Carex acutiformis*.

**Figure 69.** *Phragmites* stands at Nabada mire. (Photo: Matthias Krebs)

The margins of the open mire area consist mainly of *Phragmites australis* stands with heights up to 2.5 m. indicating nutrient input by the adjacent rivers. The dense vegetation of the open mire centre reaches heights of 1.2 m, pointing to a lower nutrient input and reduced river influence.

## ***Flora***

The flora of Nabada Mire reflects its relative nutrient richness. Important common species within its flora are summarized in Appendix 2.

## ***Fauna***

Apart from the relatively species-poor mire habitats, Nabada nominated component area is mainly notable for its aquatic habitats, some of which are connected to the Khobi river system and afford spawning/nursery areas for fish. Aquatic invertebrates are little studied.

## *2.a.9 Description of nominated component area No. 7: Churia*

### *Size, location and topography*

The Churia nominated component area (1,943 ha) comprises Churia Mire (Figure 70), which is situated 15 km north of the city of Poti and is bordered to the South by the river Khobiskali, and to the North by the river Churia, plus some Colchic lowland forest to the east of it (Figure 6). The component area is separated from the Black Sea by a narrow strip of low coastal dunes. Further information on its boundaries is presented in the textual description of boundaries in the Executive Summary.

**Figure 70.** Landscape of Churia Mire, Churia nominated component area. (Photo: Tobias Garstecki)

Beside the dune vegetation in the west it is surrounded by Colchic lowland forest in all other directions (Figure 71). The mire has an extension of 4.5 km from north to south and 4.0 (- 6.0) km from east to west. It includes a 2,500 ha open mire part.

**Figure 71.** Landscape with Colchic lowland forest and freshwater pond at Churia nominated component area. (Photo: Tobias Garstecki)

## ***Development, structure and function of Churia Mire***

This peatland area is situated in a shallow basin, separated from the Black Sea by a low coastal dune. Its mineral subsoil consists of clayish coarse sand. The layer above is formed from different sized clay and gyttjas, with well-preserved plant material that must have been deposited during a period of open water (Figure 72). The deposits of clay gyttja are thin or even partly absent. It is thus assumed that the open water body was situated in a very shallow basin and that the main peat accumulation process was paludification as a result of relative sea level rise (Chepalyga 1984). Peat accumulation began between 6,930 and 5,230 years BP (Timofejew & Bogolyubowa 1998). Mainly root peat with a high amount of Phragmites radicels, but also with remnants of wood, Cladium and Molinia accumulated. The degree of decomposition of the peat varies, but the mean degree of decomposition is H5 – H6 (after Von Post). Peatland development took place under wet conditions and probably good nutrient supply, with periodic changes of the hydrology resulting in wetter phases. This is reflected by the occurrence of detritus gyttja within the peat. Periodical flooding from the adjacent rivers is also conceivable. This is supported by the high content of mineral substances like clay and sand in the peat. The current mean depth of the peat amounts to 5 m with a maximum of 7 m. The peat accumulation rate is high and achieves 1.2 mm a-1 (Dshanelidse 1989). **The Churia Mire can hence be classified as a lithogenous water rise mire (sensu Joosten & Clarke 2002) ), which is remarkable for the long-term constant conditions for peat accumulation.**

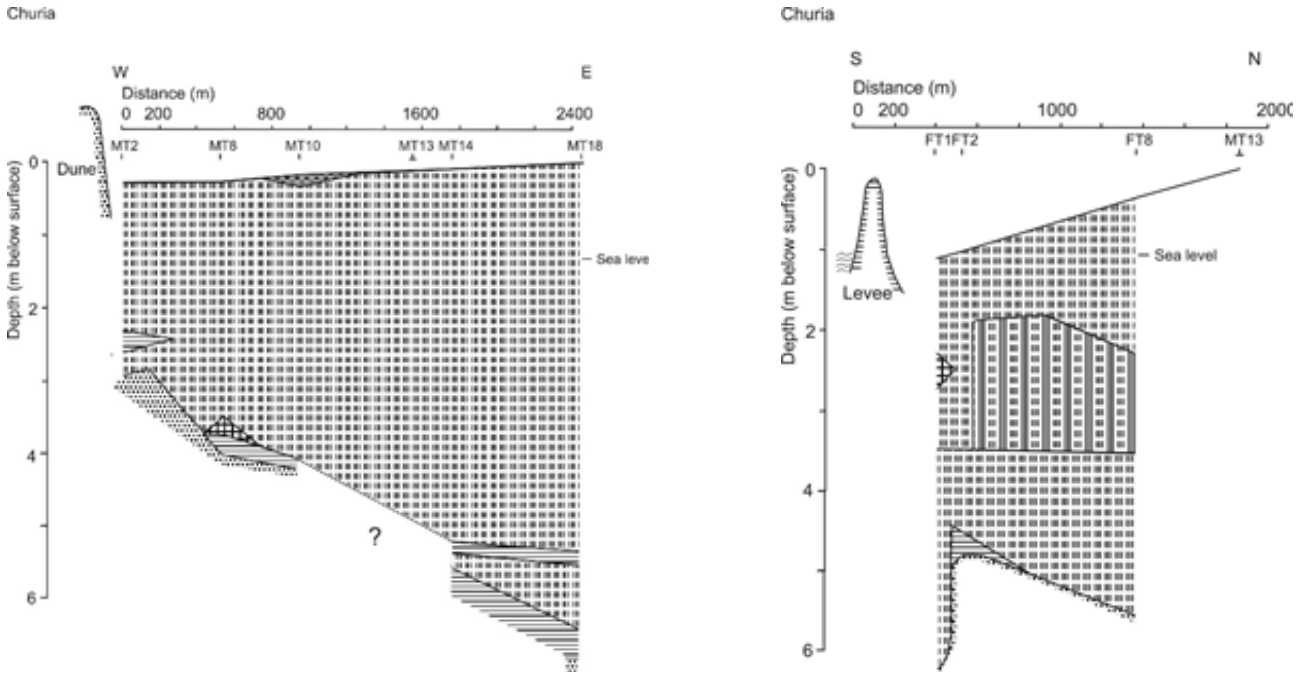



**Figure 72.** Stratigraphy of Churia mire along a W-E (left) and a S-N transect (right).

Remarkable is a small area in the centre of the Churia Mire with hardly decomposed *Sphagnum* peat in the upper layer, whereas in deeper layers only few remnants of peat mosses were found. Its depth only reaches a few centimetres. It indicates the shift from a nutrient richer lithogenous water supply to ombrogenous water supply with more nutrient poor and acid conditions.

*Physical and chemical conditions:* The recent macrorelief of the peatland slightly slopes from East to West and from North to South. Its surface is situated at approximately 1 m a.s.l. Thus the main water movement is assumed to be laterally to the Sea and the river Churia. The microrelief consists of tussocks of 10-45 cm height, which decreased towards the centre of the mire. The tussocks indicate water level fluctuations, which will be connected to the high degree of peat decomposition.

At the southern margin the Churia Mire has a similar height as the Black Sea and is below the mean water level of the nearby Khobistskali River, only separated by an 80 cm high river bank of 150 m width. Thus the

Churia Mire is periodically flooded by the river. The water level seems to be high, but data are absent. The differences in water level in the mire are small and range around 40 cm. The pH of the pore water is 4.0-5.7, and the EC values 90- 200 µS $cm^{-1}$, reflecting a predominance of rainwater supply to the top of the mire system. It can be assumed that the lithogenous water supply from the east and north is filtered by the adjacent peatland forests.

## Climate

The climate of Churia nominated component area is typical of the Colchic Lowlands, i.e. warm-temperate and highly humid, with < 1,900 mm of annual precipitation (Figure 57).

## Hydrology

The peatlands and forests at Churia nominated component area are fed by atmospheric precipitation and river water. The mire has a hydrological connection to the Khobistskali and Churia River systems to the north and South. The proximity of the Black Sea coast (200 m at the nearest point) has a stabilizing effect on the water level at and around Churia nominated component area.

## Ecosystems, habitats and vegetation

The vegetation is formed by the formations of *Sphagnetum-Caricetum* with *Sphagnum papillosum*, *S. palustre, S. fallax, S. denticulatum, Carex rostrata, Carex vesicaria, C. lasiocarpa, Cladium mariscus, and Molinia litoralis.* Vegetation is largely homogenous and dominated by *Carex elata and Molinia litoralis*. Sedges and moor grass are partly accompanied by a peat moss layer constituted by Sphagnum spp. Approximately one hectare of large nearly pure stands of *Cladium mariscus, Phragmites australis or Calamagrostis epigejos* associated with *Lysimachia vulgaris* and *Lythrum salicaria* are typical for the vegetation. Remarkable is a very dense peat moss lawn consisting of *Sphagnum palustre* and *S. papillosum* accompanied by *Menyanthes trifoliata, Drosera rotundifolia* and *Molinia litoralis* in the centre of the Churia Mire, indicating ombrotrophic conditions.

The Colchic lowland forests of this component area are similar to those of Pitshora nominated component area.

## Flora

The flora of Churia Mire consists of 45 vascular plant species and 8 moss species (Appendix 2). A special feature is the occurrence of the rare and endemic species *Hibiscus ponticus* (Figure 73).

## Fauna

Similar to Nabada nominated component area, Churia nominated component area is relatively poor in species of fauna and mainly notable for its aquatic habitats, which are connected to the Churia river system and provide valuable spawning areas for fish. Aquatic invertebrates are little studied.

**Figure 73.** The critically endangerd local endemic *Hibiscus ponticus* at Churia Mire, Churia nominated component area. (Photo: Izolda Matchutadze)

## 2.B HISTORY AND DEVELOPMENT

The ecosystems, vegetation, flora and fauna of the Colchic Rainforests and Wetlands have been shaped by a series of key events in several distinct periods of the history of Earth, and need to be understood in this context. Being situated in an area that has been inhabited for millennia, they have also been affected by humans during their more recent history. The following key phases of the history and development of the Colchic Rainforests and Wetlands need to be distinguished:

### *2.b.1 Glaciation refuge during glaciation cycles of the Pleistocene*

The Colchic Forests and Wetlands cannot be understood without their geological and climatological pre-history, which has profoundly affected their evolution: During the Paleogene, climate in the northern hemisphere was warm and wet and rich subtropical and tropical woody plants were distributed here. Global cooling which started approximately 15 million years ago (Moran et al. 2006) then culminated into cooling cycles. Therefore woody plants migrated southwards and survived only in refugia, places in which the climate remained relatively warm and wet during the Ice Age. Such refugia are situated in eastern Asia, south-eastern North America, south-western North America and western Asia.

Similar to the Hyrcanian Forests along the southern coast of the Caspian Sea, the western Caucasus and especially the Colchic Area, as a part of western Asia, represents one of the outstanding global Ice Age refugia. This is proven by evidence coming from current distribution of plants and animals considered to be “relict” (van Zeist & Bottema 1991, Tuniyev 1990, Zazanashvili et al. 2004, Milne 2006), by fossil, specifically palinological evidence (Adams & Faure 1997, Connor 2011, Connor et al. 2007, Shatilova et al. 2011), by phylogeographic patterns of various organisms (Weisrock et al., 2001, Veith et al. 2003, Milne 2004, Zakšek et al. 2007, Aguirre-Planter et al. 2012, etc.), and by ecological modelling (Tarkhnishvili et al. 2012 – see also Tarkhnishvili 2014, for a recent review). This explains the extremely high – for a non-tropical continental region – proportion of endemic and relict species within the flora and fauna of the Colchic Rainforests and Wetlands, such as the high proportion (>70%) of endemic species among mountain forest snails of the Western Caucasus (Pokryszko et al. 2011). The proportion of relict and endemic species of amphibians, reptiles, and small mammals exceeds 20% if the entire fauna is considered. The same applies to vascular plants and freshwater fish (Tarkhnishvili & Chaladze 2013, Tarkhnishvili 2014).

“True” relict species are those which are members of the groups with disjunct distribution, such as evergreen shrubs whose closest relatives are commonly in East Asia or North America. Milne (2004) showed that of five species of the western Caucasus Rhododendron, neither are closest relatives to each other, but their sister species currently exist in East Asia, Indochina, and Appalachian Mountains in the USA. Similarly, endemic amphibians such as Caucasian salamander and Caucasian parsley frog have closest relatives at the Atlantic coast of Europe (Weisrock et al. 2001, Garcia-Paris et al. 2003). Many other examples are provided crustaceans, butterflies, reptiles, amphibians, and small mammals (Tarkhnishvili 2014).

The Colchis is not a uniform refugial area and supposedly is comprised of several once distinct refugia differing from each other by species and genetic diversity. This is in line with the concept of cryptic refugia by Provan & Bennett (2008), suggesting that molecular genetic/ phylogeographic studies help to understand finer structure of refugia roughly identified by older traditional methodologies. Tarkhnishvili et al. (2001) showed that the salamander populations from the Black Sea coastal mountains and from the Borjomi-Kharagauli National Park area differ genetically to an extent suggesting they have been separated for over 5-7 millions of years. A similar pattern was later shown for the Helix buchi species group, a group of large endemic beach snails (Mumladze et al. 2013). This refugium has also been described as a network of smaller refugia by some authors. As a consequence, the Colchic Forests and Wetlands harbor many relict woody and herbaceous plants, e.g. plants which were widespread in Europe many millions of years ago and became extinct there during the Ice Ages (Radde 1899, Grossheim 1936, Flerev 1951, Kolakovskyi 1961, Zohary 1973, Nakhutsrishvili 1995, Shatilova & Rukhadze 1995, Denk et al. 2001, Milne 2004, etc).

The past isolation among individual mini-refugia described in the previous subsection triggered the development of genetically distinct evolutionary lineages (species) with a very limited distribution, such as the two forms of Caucasian salamander (Mertensiella caucasica), or two sister species of large terrestrial snails (Helix buchi and H. goderdziana). The isolation during unfavourable climatic periods, such as glacial maxima, leads to genetically distinct forms that, after re-establishment of the contact among the lineages, deepen the divergence as a result of character displacement and reinforcement, the evolutionary mechanisms leading to speciation (Bell 2008).

The Colchic Lowlands are also important with regard to the ongoing evolution of glacial relict species, as several species are known to have there and then dispersed in Europe after the melting of the ice. One example from the Colchic peatlands is the species Sphagnum austinii. It has been suggested that this species re-colonized Europe after the glaciations from the Colchis. It is is a main peat forming species in Ispani and Imnati nominated component areas (Dokturowski 1931, 1933, Potskhishvili et al. 1997, de Klerk et al. 2009). From 800 years BC onwards, its massive occurrence in the bogs of Central and Western Europe (Overbeck 1975) led to the accumulation of slightly decomposed Sphagnum peat ("white peat"). In recent centuries, the species has become extremely rare in Europe (Green 1968), its massive decline being ascribed to climate change, fires, and eutrophication (cf. Mauquoy & Barber 1999). In the Ispani 2 and Imnati mires, the widespread dominance of Sphagnum austinii (Haberl et al. 2006, Kaffke 2008) enables the study of vegetational characteristics and peat accumulation processes of this species.

## *2.b.2 Paludification of the Colchic Lowlands during the Holocene*

Peatlands have been present in the Colchic Lowlands for a long time. Peat layers in the littoral part of Kolkheti at a depth of 62-65 m b.s.l., and in the Paliastomi Lake and Patara-Poti areas at 120-160 m b.s.l., have been estimated to be 31,000 and 80-140,000 years old, respectively (Dzhanelidze 1980). Present-day peatlands are much younger, and have developed due to the rise of the Black Sea water level and the subsidence of the Kolkheti lowlands (Svanidze 1989). Mire development generally began with the terrestrialisation of an aquatic environment, most likely a coastal lagoon or lake, separated by sand dunes from the Black Sea, at 5,230-6,930 BP (e.g. Nabada, Churia, Imnati; Timofeyev & Bogolyubova 1998).

## *2.b.3 Human impact since the Neolithic period*

According to the earliest records of human inhabitation available, Colchic tribes were known as skillful farmers, cattle-breeders and metallurgists. Various archaeological discoveries, as well as ancient oriental and Georgian manuscripts testify to an early economical, social and cultural development of the Georgian people in this area. According to these data, the leading branches of economy were (1) agriculture (field crop cultivation, vine making, horticulture, vegetable growing, etc.); (2) cattle breeding; (3) domestic craft (weaving, wood work, blacksmith work, textile production, pottery, ceramics, etc.). The diversity of climate and relief of the Colchic Triangle has also been highly important for its economic development since the early stages of human activities, which in turn have helped shaped the current landscape. Numerous rivers promoted intensive agriculture even without irrigation. Besides, these rivers served as trade-routes. Due to their rapid current, the rivers were used for transportation of timber. Vakhushti Bagrationi, the prominent Georgian historian and geographer of the 18th Century, distinguished two botanical and agricultural zones within the Colchic area: the mountainous and the lowland one. Since the Neolithic revolution, these two zones represented one closely integrated system. The lowlands were characterized by rich harvest of grain crops, vineyards and orchards. In the mountainous areas the harvest of grain crops was much poorer, vineyards and orchards were absent. Lowland forests surrounding the peatlands of the Colchic Lowlands formed a continuous forest cover until the early-mid-20th Century, but were felled for architecture after that. There was also some peatland draining for mechanized agriculture during this period (Connor et al. 2007), which – at least for the nominated component areas within this zone – has been reversed since.

## 2.b.4 Protected areas history since the 20th Century

In terms of the nature protection history, the protected areas contributing to the series were established between 1959 and 2012 (Table 9). The first one was Kintrishi Strict Nature Reserve in 1959, which became one of the best preserved PAs and main points of reference for biodiversity research during Soviet times (Balandin et al. 1990). Georgian independence in 1991 triggered another wave of PA establishment, with the designation of Kobuleti Protected Areas and Kolkheti National Park in 1998 and Mtirala National Park in 2006.

**Table 9.** History of protected areas contributing to the protection of the nominated component areas of the Colchic Rainforests and Wetlands.

| Protected Area | Year of establishment | Re-designations |
|---|---|---|
| Mtirala National Park | 2006 | No |
| Kintrishi Strict Nature Reserve | 1959 | In 2007 part of the reserve was designated as Kintrishi Protected Landscape.<br>A re-designation of parts of Kintrishi Strict Nature Reserve and the entire Protected Landscape as a National Park (with a nested Strict Nature Reserve), and re-zoning is underway, and will be concluded in mid-2019. This will not lead to a reduction of the overall area under strict protection in Kintrishi. |
| Kobuleti Protected Areas (Strict Nature Reserve and Managed Reserve) | 1998 | no |
| Kolkheti National Park | 1998 | no |

# 3. JUSTIFICATION FOR INSCRIPTION

## 3.1.A BRIEF SYNTHESIS

### *(i) Summary of factual information*

The Colchic Rainforests and Wetlands are located in Georgia, within the Autonomous Republic of Adjara as well as the regions of Guria and Samegrelo-Zemo Svaneti. They are a series of seven component areas of between 125 ha and 20,150 ha, which are located within an 80 km long corridor along the eastern coast of the Black Sea, with the maximum distance from the sea at about 27 km. The distance between individual component areas ranges from < 1 km to 60 km.

The Colchic Rainforests and Wetlands belong to the Caucasus ecoregion and to the Black Sea basin. One of the nominated component areas is situated in mountainous terrain in the Adjara-Imeretian (Meskheti) mountain range within the western Lesser Caucasus, at altitudes ranging from 250 m to > 2,500 m a. s. l. All other nominated component areas of the Colchic Rainforests and Wetlands are situated within the Colchic Lowlands. These are flanked by the converging slopes of the Greater Caucasus to the north and the Lesser Caucasus to the south, which create the so-called "Colchic Triangle". Moisture arising from the Black Sea is trapped in this triangle, causing the characteristic mild and very humid climate (annual precipitation up to 4,500 mm) of the Colchic Rainforests and Wetlands, which is partly responsible for the peculiar ecosystems and biodiversity of proposed Outstanding Universal Value.

The Colchic Rainforests and Wetlands occupy one of the outstanding global Ice Age refugia, where woody plants – and other forest-dependent flora and fauna – migrated to and survived throughout the Pleistocene cooling cycles. As a result, the area has been forested, and forests have been evolving there, for at least 10-15 million years. This explains the overall richness and extremely high – for a non-tropical continental region – proportion of endemic and relict species within the flora and fauna of the Colchic Rainforests and Wetlands. The peatlands of the Colchic Lowlands are much younger, and have developed due to the rise of the Black Sea water level and the subsidence of the Colchic lowlands, which continues today. The extremely humid Colchic climate also plays a key role in their existence and functioning.

The Colchic Rainforests and Wetlands consist of an almost complete altitudinal series of typical Colchic ecosystems running from sea level to the tree line at > 2,500 m a.s.l. The main ecosystems are ancient deciduous Colchic rainforests on the one hand, and wetlands – particularly percolation bogs and other mire types of the Colchis mire region, a distinct mire region in Europe and Eurasia – on the other hand. These ecosystems harbour a peculiar and diverse flora and fauna rich in endemics, relict species and globally threatened as well as near-threatened species.

### *(ii) Summary of qualities*

The Colchic Rainforests and Wetlands are of proposed Outstanding Universal Value in relation to the World Heritage criteria ix and x. The features supporting this proposition are closely interrelated. In relation to criterion ix, they comprise three features of proposed Outstanding Universal Value:

**Ancient Colchic rainforests:** Together with the Hyrcanian Forests, the Colchic rainforests are the oldest deciduous forests in Western Eurasia, the most diverse in woody species and trees, and the most natural (Nakhutsrishvili et al. 2011). This puts them among the oldest and best preserved examples of temperate broad-leaved forests worldwide. They are also the most humid nemoral broad-leaved rainforests globally. They boast an exceptionally rich and dense mosaic of forest vegetation types. Twenty-three forest associations have been documented within Mtirala-Kintrishi nominated component area alone. They also have a peculiar species composition, with not only high overall species richness (with the overwhelming part of the ca. 1,100 species of flora and almost 500 species of vertebrates recorded in the entire series occurring in the rainforests), but also an impressive degree of endemism and many relict species, all concentrated in a very small regional bio-

diversity hotspot. As one of two of the outstanding arcto-tertiary refuge areas in western Eurasia, the Colchic rainforests are not only an exciting window into the past of nemoral deciduous forest ecosystems, but also a natural laboratory to study ecological impacts of past, ongoing and projected climate change.

**Percolation bogs and other peatlands of the Colchis mire region:** The Colchic wetlands comprise the Colchis mire region, a distinct mire region within Eurasia. The mire types of this region form a structural and functional transition between the mires of the boreal and those of the tropical zones, and comprise an un-paralleled successional series, reflecting the warm-temperate and extremely humid climatic conditions that are very favourable for the growth of mires. Particular important are the percolation bogs of the Colchic mire region, which occur nowhere else in the World – again reflecting the mild-humid climate with continuous precipitation of the Colchis – and at the same time are recognized as the simplest mires globally. They are essential for the understanding of peat formation, preservation and decomposition processes, self-regulation mechanisms and structureal patterns of mires in general and have thus helped to systematize the thinking about all mires. This is all the more important as peatlands are the most important terrestrial carbon store globally. The mires of the Colchis mire region – particularly the percolation bogs - are also distinguished by their vegetation and species composition, their extremely high peat accumulation rates, and a remarkably high mire oscillation capacity.

**Long term evolution and ongoing speciation in the Colchis glacial refuge area:** The Colchic rainforests – and to a lesser degree the Colchic wetlands – harbour a peculiar glacial relict community. As a result, and compared to other non-tropical continental regions, the region is home to an extremely high proportion of endemic and relict species – i.e. more than 20% among the amphibians, reptiles, and small mammals. The Colchic flora and fauna with their many arcto-tertiary relicts offer an unusual opportunity to study long-running and ongoing evolutionary and speciation processes, including examples of cryptic speciation, landscape-dependent speciation, and speciation in very restricted geographical ranges. For instance,

in relation to **World Heritage criterion x**, the proposed Outstanding Universal Value of the Colchic Rainforests and Wetlands is based on their overall species richness, their richness in endemic and relict species, and their role in the conservation of globally threatened and near-threatened species. This can be broken down as follows:

**Overall species richness:** The Colchic Rainforests and Wetlands are home to more than 1,100 species of vascular plants and bryophytes, almost 500 species of vertebrates, and an unknown but high number of invertebrate species – although they only cover a small geographic area. Among the flora, the diversity of woody plants is particularly significant, with an astonishing 132 tree or shrub species, and 7 lianas. Some herpetofauna (e.g. rock lizards), bats and small terrestrial mammals are also very species rich.

**Endemic and glacial relict species:** There are a remarkable 149 species of plants with a restricted range (14% for the vascular plants) in the Colchic Rainforests and Wetlands, of which 66 only occur in the Colchic region or parts thereof. Similarly, endemic species contribute 28% to herpetofauna and mammals (excl. bats) of the region. Among the 19 endemic terrestrial vertebrate species, some are distributed across the entire Caucasus and others much more narrowly. Endemism in some groups of invertebrates is also stunningly high, such as up to 70% among the mountain forest snails of the Western Caucasus.

**Globally threatened species:** The Colchic Rainforests and Wetlands are of paramount importance for the conservation of globally threatened and near-threatened species in the Caucasus Global Biodiversity Hotspot, the WWF Global 200 Ecoregion No. 78 *Caucasus-Anatolian-Hyrcanian Temperate Forests*, two adjacent Global Centres of Plant Diversity, the Caucasus Endemic Bird Area, two Ramsar sites and other internationally recognized areas of outstanding biodiversity importance. Forty-four globally threatened or near-threatened species of vascular plants, 50 of vertebrates, and eight known species of invertebrates are on record. For the flora, this has recently been highlighted by the IUCN Caucasus Endemic Plant Red List Assessment. There are also 12 species of globally threatened or near-threatened, resident herpetofauna. In addition, the property is home to a number of large mammal species that have declined throughout much of pan-Europe in the recent past, such as European Lynx.

The ecosystems, flora and fauna of the Colchic Rainforests and Wetlands are intact, not subject to critical threats and pressures, and completely represented within the nominated component areas. Their protection is ensured through four protected areas, which have functioning management systems that are sufficiently resourced and staffed. Coordinated management is ensured through an integrated management framework.

## 3.1.B CRITERIA UNDER WHICH INSCRIPTION IS PROPOSED AND JUSTIFICATION FOR INSCRIPTION UNDER CRITERIA

The Colchic Rainforests and Wetlands are nominated under both biodiversity criteria, World Heritage criterion ix and x. The features of proposed Outstanding Universal Value under both criteria are closely and mutually interdependent: On the one hand, the ongoing evolutionary and ecological processes justifying nomination under criterion ix have given rise to, and continue to support, the exceptional and peculiar biodiversity of the Colchic Rainforests and Wetlands. On the other hand, the populations of flora and fauna of the series jointly manifest and enable these evolutionary and ecological processes. The justification of inscription is based on this understanding of mutual interdependence and enhancement in one integrated system, even where the various features are discussed separately in the following sections.

### *3.1.b.1 World Heritage criterion ix*

Three interrelated features of proposed Outstanding Universal Value under World Heritage criterion ix (Box 4) have been identified. Two of them focus on the principal ecosystems of the Colchic Rainforests and Wetlands with their ongoing ecological dynamics. The third feature focuses on evolution and speciation of the flora and fauna of the series, and bears a particularly close relationship to its proposed Outstanding Universal Value under World Heritage criterion x. In other words, the first two features are primarily ecological, whereas the third is essentially evolutionary.

**Box 4.** World Heritage criterion ix according to the Operational Guidelines (UNESCO 2017).

In order to be considered of Outstanding Universal Value under World Heritage criterion ix, properties shall *"be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals".*

#### ***3.1.b.1.1 Ancient Colchic rainforests with their zoning, ecological processes and ongoing succession***

While concentrated in a small area, the Colchic Rainforests – together with the Hyrcanian forests of northern Iran and Azerbaijan – are the **oldest forests in Western Eurasia** in terms of their origin and evolutionary history, the most diverse in woody species and trees, and the most natural in terms of transformation of historically developed structure (Nakhutsrishvili et al. 2011). This makes them also the oldest – and among the best preserved – examples of temperate broad-leaved forests worldwide.

The western Lesser Caucasus including the Colchic Rainforests and Wetlands has been **continually forested since before the Middle to Late Miocene** (for at least 10-15 million years), while forest cover in other parts of North Eurasia shrunk and oscillated throughout the glacial cycles of the Pleistocene (Tarkhnishvili 2014).

The extremely old age and long development history of the Colchic Rainforests has also lead to an **astonishing structural diversity** of Colchic rainforest vegetation. On the one hand, the Colchic rainforests are distin-

guished by common structural characteristics, first and foremost the prominent understoreys of semi-prostrate evergreen shrubs. On the other hand, their long-term development in warm-temperate and extremely humid conditions, together with vertical gradients and small-scale climatic heterogeneity, has created an exceptionally rich and dense mosaic of forest types. The 23 different types of forest association co-existing within an area of little more than 200 km$^2$ in Mtirala-Kintrishi nominated component area testify to this (cf. Chapter 2.a.1).

An additional consequence of the ancient history and mild ecological conditions of the Colchic rainforests is that they have a **peculiar species composition**, which is characterized not only by high overall species richness (with the overwhelming part of the >1,100 species of flora and almost 500 species of vertebrates recorded in the entire series occurring in the rainforests), but also by an impressive degree of endemism (149 species of vascular plants) and many relict species (cf. Appendix 2, 3). Many plant species with ancient boreal affinities exist, reflecting that the Colchic (and Hyrcanian) forests are the most important relicts of Arcto-Tertiary forests in western Eurasia. The high species richness – especially of trees, in comparison to other temperate forests – of the Colchic rainforests, and particularly their richness in endemic and relict woody species, is closely linked to their biodiversity value in relation to World Heritage criterion x.

The Colchic rainforests have withstood pronounced fluctuations of global climate in the past, partly thanks to the specific climatic conditions in the Colchic triangle. This makes them not only an exciting window into the past of nemoral deciduous forests ecosystems of the northern hemisphere, but also an interesting natural laboratory to study ecological impacts of past, ongoing and projected climate change (c.f. Sylven et al. 2008, Zazanashvili 1999).

The series comprises important forest areas not only in Mtirala-Kintrishi nominated component area in the western Lesser Caucasus, but also in Pitshora and Churia nominated component areas, i.e., in the Colchic Lowlands.

### ***3.1.b.1.2 Percolation bogs and other peatlands of the Colchis mire region, with their zoning and ongoing succession***

The extensive paludified areas within the Colchic region along the Black Sea coast comprise the Colchis mire region, a **distinct mire region within Eurasia and the World** (Botch & Masing 1983, Succow & Joosten 2001, Krebs et al. 2017). This region is characterized by an entire series of mire types, which together form a globally un-paralleled successional continuum. The existence of this remarkable range of peatlands is due in part to the same warm-temperate climatic conditions which have enabled the persistence of the Colchic rainforests. These warm-temperate climatic conditions are extremely favourable for the growth of mires (Joosten et al. 2003). The mires of the humid, warm-temperate Colchis with their luxurious *Sphagnum* vegetation form a structural and functional transition between the mires of the boreal and those of the tropical zones.

Of particular global importance is the occurrence of **percolation bogs** (*sensu* Joosten & Clarke 2002), which are recognized as the **simplest mires globally** and could be considered as the overall reference type for mires, i.e., as “ideal” mires. This is due to almost permanent water supply by precipitation, and rain as the sole water source. The Colchis, with its large precipitation surplus evenly distributed over the year, is the only region in the world where percolation bogs (rain-fed peatlands which are characterized by *Sphagnum* vegetation) occur.

Only two well-developed examples of this type have been identified worldwide to date: the Ispani 2 mire near Kobuleti (Ispani nominated component area) and the Imnati mire east of Paliastomi lake in Kolkheti National Park (Imnati nominated component area). Ispani 2 was the first discovered percolation bog in the world (Kaffke 2008, de Klerk et al. 2009) and is the ‘type locality’. In functional terms, the percolation bogs in the Colchic Lowlands are distinguished by slightly decomposed *Sphagnum* peat with **extremely high peat accumulation rates** of 4 mm per year (Joosten et al. 2003, de Klerk et al. 2009), a **remarkably high mire oscillation capacity** (‘Mooratmung’, cf. Weber 1902) and a very high *Sphagnum* biomass productivity (Krebs et al. 2016).

Consequently, the percolation bogs of the Colchic lowlands are **essential for the understanding of mires in general** (in particular the understanding of the interrelations between vegetation, water and peat) and have helped to systematize the thinking about mires (cf. Joosten et al. 2017). The constant water supply by precipitation causes a predominantly vertical water flow through the entire low decomposed peat layer as there is no differenciation of the hydraulic conductivity with increasing peat depth like in other peatlands. As a consequence percolation bogs do not develop explicit microtope patterning as it is typical for other peatlands. The development and existence of other peatlands can be explained by positive or negative feedback mechanisms related to the prevailing water table. In percolation bogs the water table is not fluctuating due to constant water supply by precipitation and the high intrinsic mire oscillation capacity (*Sphagnum* vegetation), which maintains water tables close to the mire surface during times of water shortage. Thus, remarkably, percolation bogs exist without these feedback mechanisms.

The fully developed percolation bogs of the Colchic Lowlands are accompanied not only by Colchic lowland forests, but also by a **full series of earlier successional stages** that are important for the on-going development of percolation bogs, as well as their understanding. Beside the two existing percolation bogs (Ispani and Imnati nominated component areas), two mires are in the initial state of the formation of percolation bogs (Grigoleti and Pitshora nominated component areas). The mires of Nabada and Churia are prospective for the development towards percolation bogs, as water rise mires historically were the basis for the existing percolation bogs. Among them, Nabada mire is 7,000 years old, which puts it on a different time scale than the Colchic rainforests, but is nevertheless remarkable for a peatland. It reflects conditions at the Black Sea coast (Sea level rise and subsidence of Colchic Lowland), which lead to constant conditions for peat accumulation with the same vegetation.

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### *3.1.b.1.3 Long term evolution and ongoing speciation of flora and fauna in the Colchis glacial refuge area*

A peculiar **relict community** has survived first the Pleistocene glacial cycles and later historical anthropogenic pressures in the very inaccessible Colchic rainforests and – to a lesser degree – wetlands. This community includes a high diversity of animals and plants not adapted to cold climate. Survival of this community has been possible only in this persistent system with its exceptionally constant climatic conditions. These allowed tertiary species to survive in spite of regularly and deep cooling, which drove many species to extinction elsewhere.

As a result, and compared to other non-tropical continental regions, the region is home to an extremely **high proportion of endemic and relict species** – i.e. more than 20% among the amphibians, reptiles, and small mammals (Tarkhnishvili & Chaladze 2013, Tarkhnishvili 2014). To some degree, this is also true for the Colchic mires, which display some endemic species and relicts from the glacial period, consisting of Tertiary, (sub-) mediterranean, temperate, and boreal species (Denk et al. 2001), because of their biogeographic history (Ketzkhoveli 1960, Tarasov et al. 2000).

The Colchic flora and fauna with their many arcto-tertiary relicts offer an exquisite **window into long-running evolutionary and particularly speciation processes**, many of which continue today and can be studied there. Remarkable examples of cryptic speciation (e.g. in the Caucasian salamander), landscape-dependent speciation (e.g. in brown frogs), character displacement (e.g. in terrestrial snails) and very restricted ranges (e.g. in rock lizards) have been documented from the Colchic Rainforests and Wetlands.

## *3.1.b.2 World Heritage criterion x*

The Colchic Rainforests and Wetlands are globally recognized as a regional biodiversity hotspot within a Global Biodiversity Hotspot, and critically contribute to several broad-scale global conservation priority systems.

This is a result of the unusual geographic as well as climatic conditions, history and system level features as demonstrated above. The Colchic Rainforests and Wetlands

- are among the most species-rich elements of the **Caucasus Global Biodiversity Hotspot**, one of 34 global priority areas for biodiversity conservation as identified by Conservation International (2007);
- cover a central part of the **WWF Global 200 Ecoregion** No. 78 – Caucasus-Anatolian-Hyrcanian Temperate Forests (Olson & Dinerstein 2002);
- occupy the border area of two **Global Centers of Plant Diversity** (Davis et al. 1994, 1995);
- critically contribute to the **Caucasus Endemic Bird Area** (BirdLife International 2014); and
- comprise numerous **Important Bird Areas** (BirdLife International 2014), numerous **Important Plant Areas** (e.g. those suggested by Batsatsashvili 2011), two **Ramsar sites** (Wetlands International 2014) and other areas rich in biodiversity values.

The special importance of the area for the in-situ conservation of biological diversity can be broken down to three interrelated features of proposed Outstanding Universal Value under World Heritage criterion x (Box 5).

**Box 5.** World Heritage criterion x according to the Operational Guidelines (UNESCO 2017).

In order to be considered of Outstanding Universal Value under World Heritage criterion ix, properties shall "*contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of Outstanding Universal Value from the point of view of science or conservation".*

### *3.1.b.2.1 Overall species richness*

As demonstrated in Chapter 2, the component areas of the proposed series are home to more than 1,100 species of vascular plants and bryophytes, almost 500 species of vertebrates, and an unknown but high number of invertebrate species. These species richness estimates needs to be seen in the context of the relatively high latitude of the Colchic Rainforests and Wetlands and their very small overall size. Among the flora, the diversity of woody plants is particularly significant, with 48 tree species, 65 shrub species, 19 species that can grow as shrub or tree, and 7 lianas. Among the fauna, there are high species counts among some herpetofauna (e.g. rock lizards), bats and small terrestrial mammals.

### *3.1.b.2.2 Importance of the area for restricted range species and glacial relict species*

As shown in the description, the area hosts an extremely high – for a non-tropical, non-island region – proportion of endemic species. There are 149 species of plants with a restricted range (14% for the vascular plants), of which 66 only occur in the Colchic region or parts thereof (Table 4). The contribution of endemic species to herpetofauna and mammals of the region (excl. bats) is 28%. There are also 20 fish species with a restricted range (either south-eastern Black Sea basin, the entire basin or the Ponto-Caspian region), most of them in the nominated component areas inside Kolkheti National Park and their buffer zones, and 19 endemic terrestrial vertebrate species, some with a distribution encompassing the entire Caucasus and others with much smaller distribution ranges. Among these species are many relict species, which survived the glacial cycles of the Tertiary in this glacial refuge area and hence provide a window into the ancient past of Eurasia's natural heritage.

This adds superb scientific value to the already exceptional conservation value of these communities of flora and fauna. Some of the Caucasian relict species, such as Nordmann's fir and Caucasian Salamander, have

been isolated for millions of years from their closest relatives elsewhere and hence extinction of these species would terminate evolutionary processes that have started long before human society arose.

The invertebrate fauna is poorly studied in general but endemism in some groups is stunningly high, such as up to 70% among the mountain forest snails of the Western Caucasus (Pokryszko et al. 2011). Of outstanding importance are also the gene pool and species which dispersed after the glaciation from the Colchic Rainforests and Wetlands to pan-Europe and northern Eurasia, like *Sphagnum austinii*. Additional relict species have been listed and discussed by Tarkhnishvili (2014).

### *3.1.b.2.3 Number of globally threatened and near-threatened species*

Forty-four globally threatened or near-threatened species of vascular plants, 50 of vertebrates, and eight known species of invertebrates have been recorded in the Colchic Rainforests and Wetlands. The globally threatened biota strongly overlap with the endemic and relict species complement of the series, which means that these features mutually reinforce each other. This has recently been highlighted by the IUCN Caucasus Endemic Plant Red List Assessment, which has shown that almost all of the threatened and near-threatened plant species of the series have a geographically restricted distribution (Solomon et al. 2014).

The real number of globally threatened invertebrates is likely to be at least one order of magnitude higher, as none of the many invertebrates of restricted range have been assessed for the IUCN Red List. While most of the globally threatened or near-threatened bird species only visit the area during migration, there are also 12 species of globally threatened or near-threatened, resident herpetofauna.

The property also supports healthy populations of a number of large mammal species that are not globally threatened but have declined throughout much of pan-Europe, such as European Brown Bear *Ursus arctos*, Grey Wolf *Canis lupus* and European Lynx *Lynx lynx*.

## 3.1.C STATEMENT OF INTEGRITY

The integrity of the features that convey the proposed Outstanding Universal Value of the Colchic Rainforests and Wetlands can be demonstrated in terms of their wholeness, intactness and the absence of significant threats.

### *3.1.c.1 Wholeness*

The nominated series Colchic Rainforests and Wetlands covers most of the existing Colchic wetlands (particularly peatlands), but only parts of the existing areas of Colchic rainforest (cf. Nakhutsrshvili et al. 2011, Williams et al. 2006).

However, the nominated property nevertheless comprises all the listed features of Outstanding Universal Value within its boundaries and is highly representative of Colchic rainforests and wetlands in general, because of the following reasons:

As for the forests, the series includes **> 90% of the entire altitudinal range** at which Colchic rainforests occur, from Colchic lowland forests at sea level to the forest line at > 2,500 m a.s.l., with considerable topographical as well as meteorological variability (annual precipitation ranging from ca. 2,000 to 4,500 mm). It covers > 90% of all the typical forest associations and varying stages of forest succession and regeneration that are encountered throughout the wider area where similar forests occur.

The series and particularly Mtirala-Kintrishi nominated component area is located in the central-southern part of the distribution range of Colchic rainforests, where conditions are most warm/humid (Figure 11) and the highest densities of the semi-prostrate Colchic relict flora/vegetation are found (Figure 14, see also Dolukhanov 1980, Zazanashvili et al. 2010). This means that it coincides with the **most typical manifestation** of Colchic rainforests.

Along with rainforests, the series includes also wetlands (particularly peatlands) as the other characteristic ecosystem of the Colchic region. A **complete successional series** of the mires characteristic of the Colchis mire region (cf. Krebs et al. 2017) is covered (Figure 24). This corresponds to a range from the greatest tectonic subsidence leading to stable conditions for water rise mires, to less tectonic influence supporting the development of percolation bogs.

According to Kikvidze and Ohsawa (2001), the Colchic forests of Adjara and adjacent areas harbour ca. 1,630 species of vascular plants. Furthermore, the flora of Adjara comprises 174 endemic species (Manvelidze 2008). In broad comparison, all nominated component areas of the series together hold ca. 1,100 species of vascular plants and bryophytes, and 149 endemic species. This means that the **majority of the overall flora** of Adjara and the adjacent Colchic Lowlands is represented within the proposed component areas of the series, and that an **even greater proportion of the endemic plant species** found in the wider region is concentrated there.

No direct comparison of overall faunal species richness, number of endemic and number of globally threatened species of fauna of the proposed component areas to that of the wider region is possible, as there are no data on the latter. However, the description of the area indicates that the proposed component areas hold an even higher proportion of overall, endemic and globally threatened species numbers of vertebrates: Most of the fish of the wider region occur in Kolkheti National Park, while most of the herpetofauna and mammals are concentrated in forests, which strongly overlap with Mtirala-Kintrishi nominated component area. The discussion of invertebrates above at least suggests that the proposed component areas harbour a very high absolute species number, and hence a very high proportion of the overall species richness of invertebrates of the wider Colchic area. However, the possibility that there are some pockets of high invertebrate species richness outside the proposed component areas, but within the Colchic region, cannot be fully excluded based on the available information.

The nominated component areas of the series are the **best preserved and most complete** (in terms of altitude coverage and vegetation types) representations of Colchic rainforests and wetlands currently existing (cf. Chapter 3.2). No major forests or wetlands that would contribute significantly more to the features of proposed OUV, while meeting its integrity requirements, occur within protected areas inside or outside Georgia. This is supported by a regional comparative analysis, as presented in Section 3.2.4.

It is concluded that the nominated series represents all the key features of proposed OUV of the Colchic Rainforests and Wetlands. Table 10 gives a more detailed overview over the distribution of these features among the individual nominated component areas. It shows how the nominated component areas complement each other in expressing the proposed OUV of the series.

**Table 10.** Distribution of the features of proposed OUV according to Chapter 3.1.b among the nominated component areas of the Colchic Rainforests and Wetlands. X… Nominated component area strongly represents feature; (X)… Nominated component area represents feature to a certain degree.

| **Criterion** | **ix** | | | **x** | | |
|---|---|---|---|---|---|---|
| **Feature / Nominated component area** | Colchic rainforests | Colchis mires | Ongoing evolution & speciation | Overall species richness | Restricted range species | Threatened species |
| 1. Mtirala-Kintrishi | X | | X | X | X | X |
| 2. Ispani | | X | (X) | (X) | (X) | (X) |
| 3. Grigoleti | | X | (X) | (X) | (X) | (X) |
| 4. Imnati | | X | (X) | (X) | (X) | (X) |
| 5. Pitshora | X | X | (X) | (X) | (X) | (X) |
| 6. Nabada | | X | (X) | (X) | (X) | (X) |
| 7. Churia | X | X | (X) | (X) | (X) | (X) |

## *3.1.c.2 Intactness*

The rainforest and peatland ecosystems, as well as all associated ecosystems and the flora and fauna contributing to the proposed Outstanding Universal Value of the Colchic Rainforests and Wetlands, are present and intact – both structurally and functionally – within the nominated component areas of the series.

The **structural intactness of the Colchic rainforests** is proven by the continuous forest cover and natural species composition and age distribution, the presence of a wide range of forest associations along a natural vertical zoning gradient, and the completeness of their species complement of flora and fauna (cf. Chapter 2).

Similarly, the **structural intactness of the Colchic wetlands** – particularly the peatlands – can be deduced from the physical (peat profiles, overall shape, and surface characteristics), chemical (e.g. pH, nutrient concentrations) and biological characteristics (e.g. peat decomposition over depth, species composition) of each of the nominated mires (cf. Chapter 2).

The nominated lowland component areas of the series contain either entire mires (Ispani, Imnati, Nabada, Grigoleti) or mires with their surrounding forest areas (Pitshora). The only exception is Churia mire, which also contains a mire and forests, but where a 50 m wide stripe of mire has been excluded from Kolkheti National Park. However, in practice this is not accessible, and is not managed for any other purpose than nature conservation.

The **functional intactness** of the series primarily depends on whether it is large and undisturbed enough to support the processes that support the ecosystems and biodiversity that are considered of Outstanding Universal Value. This question can be answered in terms of ecosystem function, gene flow and exchange with neighbouring populations (for flora and fauna), as well as the behavior, movements and home ranges of animal populations.

The boundaries of Mtirala-Kintrishi nominated component area, which holds most of the forest ecosystems of the series, follow those of several mountain gorges with their watersheds, with very small exceptions (cf. Chapter 1). These watersheds form functional units within the wider forest landscape, which contributes to the functional intactness of the forest ecosystems there. The forests of this nominated component area have either been undisturbed because of long-term protection within strict PAs since Soviet times (as is the case for Kintrishi Gorge, which has been protected since 1959), have been protected naturally because of their inaccessibility (as is the case in most parts of Mtirala National Park), or are in an advanced stage of recovery after moderate degradation (e.g. low intensity fuel wood removal) in the second half of the 20$^{th}$ Century.

The mires of Ispani nominated component area and of the nominated component areas within Kolkheit National Park with their accompanying Colchic lowlands forests are also functionally intact, which is demonstrated by the fact that fundamental processes involved in their function such as *Sphagnum* growth, peat decomposition, and *mooratmung* (oscillation capacity) continue there.

The six mires in the Colchic lowlands included as nominated component also have a remarkable hydrological integrity, which is supported by five mutually stabilizing factors:

The mires of Ispani, Imnati, and Grigoleti nominated component areas are **ombrotrophic**, i.e., exclusively or predominantly fed by atmospheric precipitation. This makes them hydrologically relatively independent of upstream water input from neighbouring rivers and streams. The minerotrophic mires of Pitshora, Nabada and Churia are also partly rain-fed.

- One characteristic feature of the rain-fed percolation bogs Ispani 2 and Imnati is their very high vertical mire **oscillation capacity** (Mooratmung, Weber 1902), which compensates absolute water level fluctuations, leading to permanent high relative water levels. This effect, which occurs in Grigoleti and Pitshora mire in reduced form, again buffers the mire system against external hydrological disturbance.
- All six mires of the series are located in the immediate vicinity of the sea. The fresh groundwater lens on which they have grown is stabilized by **coastal forcing** from the underlying saltwater layer, which adds to the stabilizing effect of the other factors as discussed above. Moreover, the Nabada and Churia mires

with their flat surface and only low elevation above sea water level are situated in the largest subsidence area of the Colchic Lowlands, guarantying at least a continuous peat accumulation.

- While the seaward buffer zones of some nominated component areas are narrow or even missing in some areas (e.g. Nabada, Churia mires) they all **have extensive buffer zones on the landward, upstream side**. Significant parts of these buffer zones are forested, which leads to a further stabilization of the hydrological regimes affecting the functional integrity of the nominated mires in the Colchic Lowlands.
- The high biomass production and mire growth rates – reflecting the warm-temperate, humid climate – also ensure a high regeneration capacity of Colchic mires after past draining efforts, as **historic draining channels are quickly closed** by anewed peat accumulation.

The satisfactory functional integrity of the peatlands of the Colchic Lowlands, which is a cultural landscape described already in antiquity, holds true in spite of the fact that some of the mires in the Colchic lowlands are still recovering from moderate degradation as a result of anthropogenic pressures in the 20th Century.

With respect to **gene flow**, the restricted range species, which are of particular relevance to the proposed OUV of the series in relation to World Heritage criterion x, typically have a rather restricted distribution (as the name suggests), and may be able to survive and thrive in relatively small component areas. Some of the processes contributing to evolution and speciation in the Colchic Rainforests and Wetlands even depend on barriers to genetic exchange between populations.

With regard to sufficient size for **animal behavior**, it is important to note that most of the fauna that are relevant to the features of likely OUV of the property (e.g. endemic and globally threatened herpetofauna, mollusks, small mammals) are relatively immobile and have relatively small home ranges and local distribution areas. The arguments in favour of inscription of the Colchic Rainforests and Wetlands under World Heritage criterion x do not rely on the presence of large, far-ranging mammal species, which would require large component areas to survive.

### *3.1.c.3 Absence of threats*

The property currently does not suffer from excessive adverse effects of unsustainable resource use, development and/or neglect.

The population in the valleys of Mtirala-Kintrishi nominated component area – and particularly of Kintrishi Valley – has decreased significantly in the last one hundred years (GeoGraphic 2016), which has also led to a reduction of pressures from fuel wood use, grazing and other natural resource use, as well as the development of living or transport infrastructure. The upper part of this nominated component area is only accessible in summer.

No major infrastructure development projects are ongoing or planned inside any of the nominated component areas of the series or their buffer zones. There are no hydropower stations inside the nominated component areas of the series, although there is one in the lower Kintrishi Valley downstream of Mtirala-Kintrishi nominated component area. There are also currently no plans to construct new hydropower stations inside any of the component areas.

Past negative effects on the Colchic mires from draining channels and conversion to agriculture during the 20th century have seized, and the peatland areas affected are now recovering from them.

Visitor infrastructure in the nominated component areas is being developed in a planned manner, which is in agreement with the maintenance of its proposed Outstanding Universal Value. Existing and planned infrastructure are at a small scale and have a negligible impact on the integrity of the features of proposed Outstanding Universal Value (cf. Section 5.h).

An appraisal of current and potential pressures to the property is included in Section 4.b. This shows that the integrity of some of the buffer zones – but not of the nominated component areas themselves – is moderately affected by the combined effects of a number of current low-intensity threats including grazing, fuel wood collection, and poaching (particularly where this has led to the burning of vegetation).

## 3.1.E PROTECTION AND MANAGEMENT REQUIREMENTS

The integrity of the Colchic Rainforests and Wetlands is ensured through protected areas management.

All proposed component areas of the series – and all but 209 ha of the buffer zone – are situated on State-owned land. The nominated property is covered by four legally established protected areas that were established between 1959 and 2006. These are either strictly protected areas (IUCN PA management category Ia), or those zones of National Parks (IUCN PA management category II) that afford the highest levels of protection, or – for a small part of Mtirala-Kintrishi nominated component area, a protected landscape (IUCN PA management category V). Their boundaries incorporate all the features as set out in the nomination, mostly follow natural features (e.g. mountain ridges), and are known and generally accepted by the local population (cf. Section 5.b).

The buffer zones also consist of protected areas, typically either of PAs corresponding to IUCN PA Management Categories IV or V, or of Traditional Use Zones and/or Visitor Zones of National Parks (IUCN PA Management Category II). No buffer zone is required for some of the borders of some proposed component areas, because these are protected either naturally, through the steepness of their terrain, or through well-guarded State boundaries.

All of the protected areas in which the proposed component areas are situated are managed by the Agency of Protected Areas of the Ministry of Environmental Protection and Agriculture of Georgia, through its local PA administrations. Comprehensive management plans for them in line with IUCN WCPA guidelines (Thomas & Middleton 2003) are either in place (component areas within Mtirala National Park, Kobuleti Protected Areas and Kolkheti National Park) or under preparation with international donor support, and expected for finalization in mid-2019 (Kintrishi Protected Areas). Coordination of management of component areas is ensured, as they are all managed by the Agency of Protected Areas and geographically close to each other. An integrated management framework for the coordinated management of all component areas is enclosed in Section 5.e.2 of the dossier.

Management is sufficiently participatory, in line with relevant Georgian legislation and in particular with Decree No. 110 of the Minister of the Environment and Natural Resources Protection (2014). Monitoring systems are in place but will benefit from being improved and streamlined.

The staffing, capacity and resourcing of the local protected areas administrations to manage the Colchic Rainforests and Wetlands is considered sufficient but with potential for improvement by APA.

The Agency of Protected Areas and its partners have already taken important steps to do so. The Caucasus Nature Fund supports running costs of Kintrishi PAs and Mtirala National Park. The Caucasus Nature Fund is a Conservation Trust Fund which has been designed to partly cover the operational expenses of its beneficiary PAs in the long term, thereby avoiding the sustainability risks of using non-permanent project funding for PA operations. A National Capacity Building Plan for Protected Area Staff was developed in 2016, and several other donor supported projects include activities contributing to its implementation.

## 3.2 COMPARATIVE ANALYSIS

The Colchic Rainforests and Wetlands consist of two closely interrelated types of ecosystems, including the ecotone between both in two nominated component areas (Pitshora and Churia within Kolkheti National Park). As detailed in Table 10, two of their features of proposed OUV under World Heritage criterion ix (functional Colchic rainforests and ongoing evolution and speciation) are associated with the rainforests, whereas the third feature is associated with the wetlands (particularly peatlands). The features of proposed OUV under World Heritage criterion x are primarily associated with the rainforests, with significant additional contributions by the wetlands.

This means that the Colchic Rainforests and Wetlands have such a complex pattern of features of proposed

OUV that comparable sites with the same overall pattern for the comparative analysis would be very difficult to find. As a consequence, the initial comparative analysis of the nominated property has been based on features of proposed OUV, rather than the property as a whole, as follows:

- The series needs to be compared to other **nemoral deciduous broad-leaved forest** areas in relation to Features 1 and 3 (***"Functional ancient Colchic rainforests"*** and ***"Long-term evolution and diversification of flora and fauna in a glacial refuge"***), as these are closely related (Chapter 3.2.1).
- These same sites as for the above comparison, which include a few properties also comprising a range of ecosystems, can be used for global comparative analysis for all three features under World Heritage criterion x (***overall species richness***, ***richness of endemic*** and ***richness of globally threatened and near-threatened species***), as these are also primarily linked to the Colchic rainforests (Chapter 3.2.3).
- The series needs to be compared to other boreal/nemoral ***peatlands*** in relation to Feature 2 (Colchic mires, particularly percolation bogs) under World Heritage criterion ix (Chapter 3.2.2).

The State Party assumes that, if the comparative analysis supports the proposed OUV of its individual features, then this means that it has OUV as a whole. Since the combination of rainforests and wetlands further adds to the proposed Outstanding Universal Value of the series, a synthesis across all features is presented at the end of the comparative analysis.

Since this is a serial property, the global comparative analysis for the features as listed above is complemented by a regional analysis, which justifies the choice of nominated component areas to express the full OUV of the Colchic Rainforests and Wetlands. This regional comparative analysis is presented in Section 3.2.4.

## *3.2.1 Global comparative analysis for WH criterion ix: rainforests and evolution/speciation*

The biogeographic characterization of the Colchic rainforests (Chapter 2.a.1) defines the scope for the global comparative analysis of the features that are associated with them: The Colchic rainforests need to be compared to other predominantly **deciduous broad-leaved forests** of the South-Euro-Siberian plant-geographical Region, as well as the corresponding forests of the East-North-American and the Sino-Japanese Regions in the **nemoral zone** of the **Holarctic Realm.** Of particular interest in this comparison are other rainforests among these forests, and those forest areas which are also known as glacial refuge areas (c.f. Feature 3, World Heritage criterion ix).

These deciduous broad-leaved forests of the nemoral zone of the Holarctic Realm regions are mapped in Figure 74. The relative position and context of the Colchic rainforests within the wider vegetation zones of the northern hemisphere is presented schematically in Figure 75.


**Figure 74.** Distribution of deciduous broad-leaved forests of the nemoral zone of the Holarctic Realm. (Source: Schroeder 1998)

| Zone/Humidity | Humid | Semihumid | | Semiarid | Arid |
|---|---|---|---|---|---|
| | | Summer rain | Winter rain | | |
| **Boreal** | Dark taiga | Light taiga | - | - | - |
| **Nemoral** (at least 4 months above 10 °C, less than -10 °C freezing) | Summer-green deciduous forest<br>*Colchic rainforests* | | Nemoral coniferous forest | Dry shrub and step vegetation | Desert |
| **Meridional** | Juniper forest | | Sclerophyllous forest | Dry shrub and steppe vegetation | Desert |

**Figure 75.** Schematic representation of the relative position and context of the Colchic rainforests within the wider vegetation zones of the northern hemisphere. (Source: Schröder 1998, adapted).

An initial screening of the World Heritage list (UNESCO 2019a) and of the Tentative Lists of State Parties (UNESCO 2019b) yielded 25 terrestrial properties falling into the geographic scope as defined in Figure 74, and inscribed or tentatively listed under World Heritage criteria ix and/or x. These properties were subjected to another, thematic filter (focus of the justification of OUV on deciduous broad-leaved forest), which used information from the UNEP-WCMC World Heritage Information Sheets (UNEP-WCMC 2016) and other sources, narrowed down the range of properties to 14 (Table 11).

All other natural and mixed World Heritage sites from the first screening step were excluded from the more detailed comparison presented in Table 11, because of the following reasons:

- **Focus primarily on non-forest ecosystems and other features:** Plitvice Lakes National Park (Croatia) – karst features; Pirin National Park (Bulgaria) – mountain flora; Swiss Alps Jungfrau-Aletsch (Switzerland) – high alpine ecosystems; Shiretoko (Japan) – interaction of marine and terrestrial ecosystems, only small and fragmented nemoral forest areas; Mammoth Cave National Park (USA) – limestone caves; Mt. Sorak-san Nature Reserve (Republic of Korea – mountain flora); Vertical Vegetation Landscape and Volcanic Landscape in Changbai Mountain (China – some deciduous and coniferous forest but mainly sub-alpine and alpine habitats);
- **Focus primarily on different forest ecosystems:** Durmitor National Park (Montenegro – coniferous forests), Mount Emel Scenic Area (China) – subtropical evergreen forest, subalpine conifer forest;
- **Focus on individual species or specific taxonomic groups:** Sichuan Giant Panda Sanctuaries (China – giant Pandas and other large fauna), Mount Huangshan (China – bryophytes and pteridophytes);

**Table 11.** World Heritage properties and properties listed on the Tentative Lists of other State Parties to the World Heritage Convention for the global comparative analysis of the Colchic Rainforests and Wetlands in relation to World Heritage criterion ix (Attributes 1 – forest – and Attribute 3 – evolution/speciation) and x (all attributes). The screening procedure underpinning the choice of sites is described in Chapter 3.2.1.

| Name | State Party/ies | Status | Criteria | Features in relation to WH criterion ix | Area (ha) | Comments |
|---|---|---|---|---|---|---|
| **Caucasus eco-region** | | | | | | |
| Western Caucasus | Russian Federation | Inscribed 1999 | **(ix)**, **(x)** | Mainly coniferous forest, sub-alpine, alpine habitats | 298,903 | Only limited area of deciduous forest |
| Hyrcanian Forest | Iran | Nominated 2018 | (vii), (viii), **(ix)**, **(x)** | Glacial refuge, nemoral deciduous forest | ca. 130,000 | Most closely related to Colchic rainforests |
| Hirkan State Reservation | Azerbaijan | TL since 1998 | (vii), **(x)** | Glacial refuge, nemoral deciduous forest | 2,900 | Most closely related to Hyrcanian Forest (Iran), Colchic rainforests |
| **Pan-Europe (including European nemoral deciduous forest region)[1]** | | | | | | |
| Białowieża Forest | Belarus, Poland | Inscribed 1979, last extended 2014 | **(ix)**, **(x)** | Coniferous an nemoral deciduous forest | 141,885 | |
| Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe | 12 pan-European countries | Inscribed 2007, last extended 2017 | **(ix)** | Pure and mixed beech forests | 92,023 | Complex serial property – almost 80 component areas in 12 countries |
| Bashkir Ural | Russian Federation | TL since 2012 | (viii), **(x)** | European broad-leaved forests and Siberian parvifoliate hemiboreal forests with grass | 45,000 | Mixed site, also on TL under criteria (i), (iii), (v), (vi) |
| Strict Nature Reserve Primeval forest "Perucica" | Bosnia and Herzegovina | TL since 2017 | (vii), **(ix)**, **(x)** | South-eastern Euopean mixed forests | 1,434 | Glacial refuge (?) |
| Biogradska Gora National Park | Montenegro | TL since 2010 | (vii), (viii), **(x)** | Beech, spruce, maple and ash forests | 5,650 | |
| The broader region of Mount Olympos | Greece | TL since 2014 | (viii), **(ix)**, **(x)** | Beech and Mediterranean forest | Not specified in TL entry | Mixed site, also on TL under criterion vi |
| **Asia (including East-Asian nemoral deciduous forest region)** | | | | | | |
| Central Sikhote-Alin | Russian Federation | Inscribed 2001, last extended 2018 | **(x)** | Glacial refuge, primary forest, tiger population | 1,567 million | No rainforests |
| Shirakami-Sanchi | Japan | Inscribed 1993 | **(ix)** | Pure beech forest | 16,971 | Exclusively *Fagus crenata* forests; no rainforests |
| Three Parallel Rivers of Yunnan Protected Areas | China | Inscribed 2003 | (vii), (viii), **(ix)**, **(x)** | Various ecosystems, including deciduous forest | 960,000 | Diverse ecosystems within Mountains of SW China Hotspot |

| | | | | | | |
|---|---|---|---|---|---|---|
| Hubei Shennongjia | China | Inscribed 2016 | **(ix), (x)** | Primary forest | 73,318 | |
| **North America (including Eastern North-American nemoral deciduous forest region)** | | | | | | |
| Great Smoky Mountains National Park | USA | Inscribed 1983 | (vii), (viii), **(ix), (x)** | Glacial refuge area, deciduous forest and other forest types | 209,000 | Last fragments of primary deciduous forest in North America; much less humid than Colchis |

## *Caucasus eco-region*

While the global comparative analysis of the Colchic Rainforests and Wetlands has to comprise all comparable properties globally, it is equally important for it to include the few sites of confirmed or potential Outstanding Universal Value within the same ecoregion, the Caucasus global biodiversity hotspot. The initial screening of inscribed, nominated and tentatively listed properties within the Caucasus ecoregion yielded one inscribed comparable property – the Western Caucasus (Russian Federation) – and one area with two adjacent, tentatively listed properties, one of which has been nominated in 2018 (Table 11). The latter is of particular importance:

The Hyrcanian Forests (nominated by Iran, 2018) and Hirkan State Reservation (Tentative List of Azerbaijan since 1998) differ from all other properties in this comparison in that they have clear similarities with the Colchic rainforests. The parts of these forests in Azerbaijan and Iran are discussed jointly in the below comparison, as they form an ecological unit.

## *Similarities*

The Hyrcanian forests are similar to the Colchic rainforests in the following respects:

- Both reflect and depend on a warm-temperate and humid climate, which is the result of moist air masses (from the Caspian vs. Black Sea) rising in front of mountain barriers (of the Western Lesser Caucasus vs. the Alborz Mountains).
- Both are Pliocene forest refugia with a characteristic complement of relict and endemic species, as well as an extremely long, uninterrupted evolution of forest biota and succession of forest ecosystems.
- There are overlaps between both areas in forest flora including tree species, particularly regarding species with a wider distribution range such as *Fagus orientalis*, *Carpinus betulus*, *Pterocarya fraxinifolia*, and *Taxus baccata*. There are also some closely related – in almost a sibling pattern – species of plants, for instance within the genera Buxus, Ilex and Acer (see Section 2.1 for details).
- Overall, both Hyrcanian and Colchic forests (jointly) form a special type of nemoral deciduous broad-leaved forests, which only occurs in the Hyrcanian and Colchic regions, on a global scale, and has its only reminiscences outside western Eurasia, i.e. in the mixed mesophytic forests and laurophyll forests of North America and East Asia.

## *Differences*

At the same time, there are important differences between the Colchic and Hyrcanian forests, which would justify the separate inscription of both properties even if the Colchic rainforests were not combined with the Colchic wetlands, particularly mires:

- While both the Colchic rainforests and the Hyrcanian forests are sustained by a warm-temperate and

humid climate, the climate of the Colchic region is significantly more humid than that of even the most humid parts of the northern Alborz: The City of Rasht within the most humid north-western part of the Hyrcanian area receives less than 1,400 mm annual precipitation (Climates to Travel 2019). Annual precipitation along the northern slopes of the Alborz Mountains rarely exceeds 2,000 mm, and decreases with altitude and towards the east. Precipitation in the Hyrcanian forests is also much more heterogeneous across seasons than in the Colchic rainforests, with comparatively dry summers (Encyclopaedia Iranica 2019). As a consequence, only some of the Hyrcanian forests can be classified as rainforests, in stark contrast to the Colchic rainforests.

- Partly as a result of the above, the dense, up to 4 m tall understoreys of semi-prostrate evergreen shrubs characterized by vegetative reproduction, which are the distinguishing feature of the Colchic rainforests, are largely absent from the Hyrcanian forests. This also implies an absence of the highly charismatic *Rhododendron* species from the latter. On the other hand, and because of the more arid conditions, those have some vegetation types absent from the Colchic forests, such as cypress and juniper woodland.
- There are also differences in the vertical zoning of both forests, owing to the overall less humid conditions and decreasing precipitation with altitude in the Alborz Mountains: The low-latitude mixed deciduous forest associations of the Colchic forests differ from those of the Hyrcanian forests. The former have some conifers (*Abies nordmannia, Picea orientalis*) at higher altitudes, which are replaced by deciduous species in the latter. Alpine scrublands are dominated by *Rhododendron caucasicum* in the Colchic rainforests, whereas they are dominated by *Juniperus* spp. and others in the Hyrcanian forests.
- There are also significant differences in species composition, including tree species composition, between both areas. For example, the endemic genus *Parrotia* with its only species *Parrotia persica*, a characteristic species of the Hyrcanian forests, is absent from the Colchic rainforests. On the other hand, several other tree species (such as *Betula medwedii* and *Quercus petraea*) and particularly evergreen shrubs such as *Rhododendron ungernii* only occur in the Colchic rainforests.
- It is possible that similar phenomena related to evolution and speciation of fauna – in addition to flora – as those documented for the Colchic Forests (c.f. feature of proposed OUV No. 3, which is based on herpetofauna, small mammals and invertebrates) exist in the Hyrcanian Forests, but such phenomena have not been documented and/or are not listed as justification for the inscription of the latter. This represents another – if secondary – difference of the nomination of the Colchic Rainforests and Wetlands to that of the Hyrcanian Forests.

## *Conclusion of comparison between Colchic rainforests and Hyrcanian forests*

The Colchic rainforests and Hyrcanian forests have an unrivalled joint significance as the "the oldest forests in Western Eurasia in terms of their origin and evolutionary history, and the most diverse (forests) in terms of relict and endemic woody species and tree diversity" (Nakhutsrishvili et al. 2011), and some important joint characteristics such as the astonishing long evolution of some of their biota and equally long succession of the forest ecosystems as such, as well as their dependence on a warm-temperate, more or less humid climate. They are also located in close proximity (on a global scale) and show some overlaps in community structure.

In spite of these affinities, there are profound climatic, structural and functional differences between the Colchic rainforests and the much more arid Hyrcanian forests. Both reflect similar but essentially different selective pressures, adaptive trajectories and successional dynamics in the evolution of nemoral deciduous forests, and therefore justify the separate inscription under World Heritage criteria ix and x on the World Heritage list.

The above conclusion is based on the comparison of the Colchic rainforests to the Hyrcanian Forests alone. Since the latter are not associated with wetlands – particularly a special type of mires – in the same way as the Colchic rainforests, this conclusion is further re-enforced if the entire complex of the Colchic Rainforests

and Wetlands is compared to the Hyrcanian forests.

All other forest properties on the World Heritage list or on the Tentative Lists of State Parties – be it within the Caucasus ecoregion, within pan Europe or beyond – differ much more markedly from the Colchic rainforests:

The **Western Caucasus** (Russian Federation) is one of the few large mountain areas of Europe. The property consists primarily of subalpine and alpine pastures, as well as coniferous forests, but also includes small parts of deciduous forests. This property is focused on a different ecological theme than the Colchic rainforests: Its altitude range (250 - 3,360 m a.s.l.) and particularly its medium altitude are considerably higher. As a consequence, broad-leaved relict forests are "at present hardly available within the boundaries of the property" (Natural Heritage Protection Fund 2014). Because of the location at the northern macroslope of Great Caucasus with continental influence, the climate is dryer and cooler. Species composition and plant community distribution differ strongly, with a much lower contribution of narrow endemic and relict species and a higher proportion of sub-alpine and alpine flora in the Western Caucasus. Even if additional broadleaved relict forests would be added to the West Caucasus property, it would still not match the southern Colchic Rainforests and Wetlands situated within Georgia because by far the highest diversity of relict Colchic species is reached there (Dolukhanov 1980). There are also other, secondary differences: The fauna of the Western Caucasus includes some alpine species that are missing from the Colchic Forests and the introduced bison *Bison bison/bonasus*, but lacks its importance for raptor and migratory waterbird migration (WHC 2014).

## ***European nemoral deciduous forest region***

Beyond the Caucasus ecoregion, there are a number of important inscribed properties and an even greater number of properties on the Tentative Lists of various State Parties within pan-Europe, which also warrant closer comparison with the Colchic Rainforests and Wetlands:

The **Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe** (Albania, Austria, Belgium, Bulgaria, Croatia, Germany, Italy, Romania, Slovakia, Slovenia, Spain, Ukraine) is a large series of 80 component areas, which is dedicated to the various forms of pure and mixed European beech forest, which has been spreading from a few isolated refuge areas in the Alps, Carpathians, Dinarides, Mediterranean and Pyrenees over much of Europe over the last few thousand years. The Ancient and Primeval Beech Forests significantly differ from the Colchic rainforests, in both formal and thematic respect: In formal terms, they aim to represent the considerable diversity of pure and mixed beech forests throughout Europe, whereas the Colchic rainforests are much more focused on one highly concentrated and at the same time highly diverse (at small spatial scale, within only three nominated component areas) type of forest. In thematic terms, the Ancient and Primeval Beech forests are typically not rainforests (although some of the component areas enclose forests in rather humid areas, which have been classified as rainforests by some authors), and only a few of them overlap with the glacial refuge areas from which Europe was re-colonized by this type of vegetation over the last few thousand years. Most importantly, the common denominator of this large series is dominance by one tree species (*Fagus sylvatica*), which strongly contrasts with the Colchic rainforests, the distinguishing feature of which is the diversity of different forest associations dominated by various species, and the occurrence of multi-dominant forest, within one clearly defined and very small biodiversity hotspot.

The bi-national World Heritage site **Białowieża Forest** (Belarus/Poland) is a large primary forest including both conifers and broadleaved trees (UNEP-WCMC 2016). This forest differs in multiple ways from the Colchic rainforests: **(1)** This is not a rainforest (mean annual precipitation only 620 mm) **(2)** nor a glacial refuge area, **(3)** it lacks the pronounced vertical gradients of the Colchic rainforests, covering an altitude range of 145 – 202 m a.s.l. only, and **(4)** represents a totally different and much more species poor type of deciduous forest, namely the continental Eastern European type, which is dominated by lime tree, with other broad-leaved trees like oak, maple, and elm (UNEP-WCMC 2016). Significantly, **(5)** there are also extensive areas of spruce and pine forest at Białowieża.

The **Bashkir Ural** (Tentative List of the Russian Federation) occupies the easternmost margins of the European nemoral deciduous forest region, as well as the bordering light coniferous and Siberia-type parvifoliate he-

miboreal forests with grass layer (UNESCO 2019b). This property consists not only of deciduous forests, but also of mountain rivers gorges, plateau-like summated szyrts, steep-sloped ranges, bottom-lands and water storage basins. Its deciduous forests are not rainforests, and the area is not a glacial refuge. It is and has been moderately affected by humans, which is one of the reasons that it has been envisaged as a potential mixed nomination. Its biodiversity and vegetation diversity owes primarily to the overlap of European and Siberian floral/faunal elements, i.e. processes that are profoundly different to those that gave rise to the biodiversity of the Colchic rainforests.

**The Strict Nature Reserve - Primeval forest "Perućica"** (Tentative List of Bosnia and Herzegovina) is a small (1,434 ha) area of primeval old-growth forest of spruce, fir and beech in Sutjeska National Park near the border with Montenegro (UNESCO 2019b). While this is reportedly a glacial refuge, it is much more arid than the Colchic rainforests, and its deciduous (beech) stands would be much more comparable to those of the Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe than to the Colchic rainforests. This area also lacks the vertical range and compositional diversity of the Colchic rainforests, as a result of its small size.

**Biogradska Gora National Park** (Tentative List of Montenegro) consists of four mountain ridges in north-eastern Montenegro, which are divided by deep river valleys (UNESCO 2019b). It includes ca. 1,600 ha of virgin forests, including characteristic maple tree and ash associations (Aceri-Fraxinetum montenegrinum), as well as beech, spruce and pine forests. Its beech forests would be most comparable to the Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe – similar to those of the Strict Nature Reserve - Primeval forest "Perućica" (above) – the overall size, vertical range and diversity of forest associations of this area is dwarfed by that of the Colchic rainforests. Biogradska Gora National Park is also more arid than the Colchic rainforests.

**The Broader Region of Mount Olympos** (Tentative List of Greece) is another area that is envisaged for a mixed nomination, including under World Heritage criteria ix and x (UNESCO 2019b). It is a glacial refuge with vertically zoned forest vegetation. which consists of evergreen sclerophyllous vegetation with shrubs and low trees at 300 – 500 m a.s.l., a zone of beech-fir and montane conifers (particularly black pine *Pinus nigra var. pallasiana*) at 600 – 1,400 m a.s.l., boreal conifers dominated by Bosnian pine (*Pinus heldreichii*) at 1,400 – 2,500 m a.s.l., and sub-alpine vegetation above 2,500 m a.s.l. There are no rainforests but some ancient beech forests, which again would be most comparable to those of the Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe. Apart from these beech forests, most of the forests of the Broader Region of Mount Olympos are either sclerophyllous or coniferous, and hence profoundly different from the Colchic rainforests. This is a consequence of the climate there, which is also much more arid in comparison, with an annual precipitation range from 1,490 – 1,700 mm, due to the Mediterranean climate with continental influence (Aristotle University Thessaloniki 2019).

In addition to these properties, several others from the European nemoral broad-leaved forest region were included in the initial screening of sites but excluded from in-depth comparison as described above.

## ***East-Asian nemoral deciduous forest region***

Europe including the Caucasus ecoregion is not the only continent where nemoral deciduous forests occur. Similar forests can also be found in East Asia and North America, which consequently have been included in the site screening, yielding the following sites for more in-depth comparison:

**Central Sikhote-Alin** in the Russian Far East (extended by the Bikin River Valley in 2018, which brings its area to > 1.5 million ha) is an example of an eastern Eurasian Tertiary/Quaternary refugium from the East-Asian nemoral deciduous forest region, with temperate and relatively humid forest (UNESCO 2019a). This serial property is located about four degrees further north than the Colchic Rainforests and Wetlands, is influenced both by East Asian monsoons and winter-cold eastern Siberian climate, and is considerably drier on average (up to 1,500 mm annual precipitation at higher altitude - Greenpeace Russia et al. 2000). This means that most of the forests there are not temperate rainforests, and are adapted to a much harsher climate, in com-

parison to the warm-temperate climate of the Colchis. In addition, this area is inscribed under criterion x only.

Also within the East-Asian nemoral deciduous forest region, **Shirakami-Sanchi** (Japan) is an example for a mono-dominant (by Siebold's beech *Fagus crenata*) forest in a cool-temperate, moderately humid (mean annual precipitation ca. 1,600 mm) region with strong snow-fall in winter, which strongly contrasts with the highly diverse forest vegetation (23 different associations) and adaptation to the warm-temperate, very humid climate of the Colchic rainforests (Japan Hoppers 2019). In addition, Shirakami-Sanchi is not a glacial refuge, but reflects the natural re-forestation of suitable areas after the Pleistocene, ca. 8000 years ago (UNEP-WCMC 2016). This also results in different flora which is much less diverse (500 species) and much poorer in endemic and particularly relict species.

The **Three Parallel Rivers of Yunnan Protected Areas** (China), with their huge inscribed area of almost a million ha (UNEP-WCMC 2016), their location at a bio-geographical crossroads where temperate and tropical areas meet, and their vast range of altitude (almost 6,000 m), landscapes and ecosystems, are one of the richest temperate regions of the world in terms of biodiversity. However, only parts of the diversity and richness of the Three Parallel Rivers of Yunnan Protected Areas are contributed by deciduous forests, with evergreen broadleaved forests, sclerophyllous evergreen broadleaved forests, warm coniferous forests, temperate coniferous forests, savannah scrublands, shrub lands, alpine and sub-alpine meadows as well as alpine lacustrine vegetation also present. All these are adapted to a rather distinct monsoon climate. Only few of the forests are rainforests (and those that are strongly differ in vegetation, flora and fauna), because due to its topography and geographical location, the Three Parallel Rivers region contains many climate types. Average annual precipitation ranges from 4,600 mm in the Dulongjian area (just exceeding that of Mount Mtirala in the Colchic rainforests) in the west of Gongshan County to a mere 400 mm in the upper valleys of the Yangtze River (Encyclopaedia of Earth 2019). In addition to the composite (in terms of ecosystems) character of the Three Parallel Rivers area, a comparison is also difficult as this area is located about 14 degrees (> 1,500 km) further south than the Colchic rainforests, and have stronger subtropical/tropical influences.

**Hubei Shennongjia** (China) protects the largest primary forests remaining in Central China and provides habitat for many rare animal species (UNEP.WCMC 2016). It is one of three centres of endemic plant species in China. The tree species and genus richness of the site is unparalleled for a deciduous broadleaf forest type worldwide and within the Northern Hemisphere's evergreen and deciduous broad-leaved mixed forests, Hubei Shennongjia contains the most complete altitudinal natural belts in the world. At the same time, this area is not purely warm-temperate, but rather situated at the junction of temperate and sub-tropical climate belts. Mean annual precipitation ranges between 700 and 2,700 mm and predominantly occurs between April and October and in the south of the property (UNEP-WCMC 2016). This means that only part of the forests of the area are rainforests. In any case, these markedly differ from the Colchic rainforests with their more western Eurasian species composition and vegetation.

### ***North American nemoral deciduous forest region***

Only one property within the North American nemoral deciduous forest region was included in the in-depth comparison following the initial screening:

Within the Eastern North-American nemoral deciduous forest region, the only property relevant to the global comparison of the Colchic rainforests is **Great Smoky Mountains National Park** (USA) (UNEP-WCMC 2016). This park contains the last fragments of primary deciduous forest in North America, along with other forest types. It is also a Pleistocene refuge for flora and fauna, which is superficially similar to the Colchic region but contains a totally different species complement and functions differently, e.g. by facilitating north-south migration of flora along its slopes, as a result of its northeast-to-southwest orientation. Great Smoky Mountains National Park is less humid than the Colchic rainforests, with average annual precipitation ranging from 1,400 mm in the valleys to 2,200 mm at peak level. The altitude range of Great Smoky Mountains National Park is 267 – 2,025 m a.s.l., which means that it protects more high-altitude forests than the Colchic rainforests, which have their lower altitude limit at sea level. Finally, the species composition of flora and fauna as well

as the forest vegetation there is completely different from that of the Colchic rainforests, as it is situated in North America.

## *The Colchic rainforests in global comparison to other temperate rainforests*

In addition to other nemoral deciduous forests of the Holarctic realm as the primary scope for the Global Comparative Analysis of the Colchic Rainforests and Wetlands in relation to the first and third feature of proposed Outstanding Universal Value under World Heritage criterion ix (functional Colchic rainforests and ongoing evolution and speciation), they also stand out among all temperate rainforests globally (cf. DellaSala 2011): The Colchic rainforests are the best and most humid surviving example of nemoral deciduous rainforests in the World (and among the most humid temperate rainforests at all). Among the existing temperate rainforests, most are made up of podocarps (such as the New Zealand and temperate rainforests or the Knysna-Amatole coastal rain forests in South Africa), other conifers (e.g. the Pacific rainforests of North America or the coastal rainforests of Norway), or evergreen broad-leaved trees (such as the Valdivian and Magellanic temperate rainforests, the Taijeiyo forests of Japan or most Australian rainforests).

The few existing examples of nemoral deciduous rainforests are either discussed along other nemoral deciduous forests in the comparative analysis above (e.g. as part of the Three Parallel Rivers of Yunnan Protected Areas or Great Smoky Mountains National Park), or they are too degraded or fragmented to justify inscription on the World Heritage list (e.g. the Atlantic Oakwood Forests of the United Kingdom and Ireland). This once more supports the proposed Outstanding Universal Value of the Colchic rainforests.

## *Conclusion of Global Comparative Analysis for World Heritage criterion ix (Colchic rainforests and evolution/speciation)*

The above series of comparison clearly supports the special position of the Colchic rainforests – along with the Hyrcanian forests – among all nemoral deciduous forests of the Holarctic, and among all temperate rainforests globally: These forests are specifically adapted to a warm-temperate, humid climate, have been evolving for an astonishingly long time, including during the glaciations since the Pliocene, are a glacial forest refuge with an astounding diversity, particularly of endemic and relict species as well as woody plants, and show a pronounced vertical zoning and spatial heterogeneity of forest plant associations ranging from sea level to > 2,500 m a.s.l.

Taken together, the Colchic and Hyrcanian forests are a special type of nemoral deciduous broad-leaved forests which is not found anywhere else in the World. They are related to the “Mixed Mesophytic Forests”, typical for eastern North America (the “optimal variant” of nemoral deciduous forests), and to laurophyll deciduous forests, which occur in eastern North America as well as in East Asia, but not in other areas of western Eurasia. However, the Colchic-Hyrcanian forests differ from all other nemoral deciduous forests by a high number of endemic taxa, because of the longtime isolated evolution and the special warm-temperate humid climate as survival conditions (Schroeder 1998). This can be further highlighted by comparing forest age, which has been estimated at 10-15 million years for the Colchic rainforests (Tarkhnishvili 2014), and numbers of endemic taxa, particularly woody species and trees.

At the same time, and for the reasons outlined above, the Colchic rainforests are set apart from the Hyrcanian forests by a series of profound differences, which would justify their separate inscription on the World Heritage list even without the accompanying Colchic wetlands.

The Colchic rainforests are

- **More humid** than all of the areas in the comparison, with the exception of the most humid parts of the Three Parallel Rivers of Yunnan Protected Areas (China);
- The **best and most humid existing example of nemoral deciduous rainforests globally**;
- **One of only a few glacial refuge areas** in the comparison, along with the Hyrcanian Forests and Hirkan

State Reservation (Iran and Azerbaijan), Central Sikhote-Alin (Russian Federation), Three Parallel Rivers of Yunnan Protected Areas (China), and Great Smoky Mountains National Park (USA), and The Strict Nature Reserve - Primeval forest "Perućica";

- Consisting of a **denser mosaic of nemoral deciduous forest plant associations** than the Western Caucasus, the Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe, Białowieża Forest (Belarus/Poland), Shirakami Sanchi (Japan), and all tentatively listed properties in the comparison, which on top of this is concentrated in an extremely small area;
- The **oldest and most diverse forests in Western Eurasia**, along with the Hyrcanian forests; and
- **Considerably larger** than the Hirkan State Reservation (Azerbaijan), the Strict Nature Reserve Primeval forest "Perucica" (Bosnia and Herzegovina), and Biogradska Gora National Park (Montenegro); (the main nominated component area with forests values, Mtirala-Kintrishi, is much larger than most of the inscribed component areas of the Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe);

***In conclusion, the special structure and species composition, high overall plant species richness (particularly of trees and other woody species) and high number of endemic and relict taxa of flora and fauna, the exceptionally long evolutionary history of the Colchic rainforests with their associated wetlands, as well as their adaptation to a constant warm-temperate and unusually humid climate, clearly sets them apart from other comparable forests as listed in Table 11, and justifies their inscription for attributes 1 and 3 under World Heritage criterion ix.***

## *3.2.2 Global comparative analysis for WH criterion ix: mires of the Colchis mire region*

The wetlands of the proposed series consist primarily of peatlands, and more specifically mires, with some other associated wetland ecosystems. Their proposed Outstanding Universal Value of Features 2 under World Heritage criterion ix is based on the existence of percolation bogs (i.e., exclusively rain-fed mires) and related mires of the Colchis mire region, which form a structural and functional transition between the mires of the boreal/nemoral and those of the tropical zones. These are recognized as the simplest mires globally, and essential for the understanding of mires in general. Box 6 explains key terms related to this feature of proposed Outstanding Universal Value.

### *Scope and reference framework for Global Comparative Analysis of Colchic mires*

There is no adequate consideration of peatlands in general biogeographic wetland classifications (e.g. Abell et al 2008, Olson & Dinerstein 2002), which makes these unsuitable as a reference framework for this feature of proposed Outstanding Universal Value. The specific nature of Feature 2, i.e. the fact that its proposed Outstanding Universal Value is based specifically on peatland qualities, rather than on wetland qualities in general, sets the overall scope for its Global Comparative Analysis: The mires of the Colchic mire region need to be compared to other mires of the same broad biogeographic region. Rather than focusing on the Holarctic realm only – as is justified for the Colchic rainforests (c.f. Chapter 3.2.1) – the most sensible geographic scope for this comparison are all boreal and nemoral mires globally, i.e. including those of the southern Hemisphere. This is because there are much stronger structural and functional similarities between the boreal and nemoral mires of both hemispheres than is the case in forests. An important distinguishing characteristic of these mires is dominance of the peat-forming vegetation by *Sphagnum* peat mosses, sometimes accompanied by sedges.

**Box 6.** Key terms relevant to Feature 2 of proposed Outstanding Universal Value under World Heritage criterion ix (mires of the Colchis mire region). (Source: Joosten et al. 2017)

**Acrotelm mire:** A type of -> mire in the -> hydrogenetic mire classification; a mire in which an acrotelm (an upper peat producing layer with high water storage capacity and hydraulic conductivity gradient) enables -> peat production.

**Blanket bog: A** type of -> mire in the -> hydrogenetic mire classification; an -> ombrotrophic ->mire where the surface relief largely follows the underlying mineral soil, like a blanket.

**Bog:** A -> mire only fed by precipitation (i.e., an -> ombrotrophic mire).

**Flood mire:** type of -> mire in the -> hydrogenetic mire classification; a mire in which periodic flooding from an adjacent open water body enables -> peat accumulation.

**Hydrogenetic mire classification:** A globally applicable functional classification of -> mires, which is based on the basic -> peat formation mechanisms as dependent on water dynamics (Succow & Joosten 2001, Joosten & Clarke 2002). The hydrogenetic mire classification is used as a framework of reference in the Global Comparative Analysis for Feature 2 under World Heritage criterion ix.

**Lithogenous:** Formed under the influence of water that has been in contact with the bedrock for a long time, and hence typically has a high ion concentration.

**Mire:** A -> peatland where peat is currently being formed and accumulating.

**Ombrogenous:** Originated under the influence of solely precipitation water.

**Ombrotrophy:** Supply of nutrients by atmospheric precipitation only.

**Peat:** Sedentarily accumulated material consisting of at least 30% (dry weight) of dead organic material.

**Peatland:** An area with or without vegetation with a naturally accumulated -> peat layer at its surface.

**Percolation bog:** A type of -> mire in the -> hydrogenetic mire classification; an inclining mire in which a substantial water flux percolates through a substantial part of the -> peat body, characterized by scarcely decomposed -> peat with high hydraulic conductivity, and enabled by high and seasonally evenly distributed precipitation.

**Raised bog: ->** Ombrotrophic -> mire that is clearly raised above the surroundings.

**Surface flow mire: A** type of -> mire in the -> hydrogenetic mire classification; a -> mire in which most water overflows the -> peat (mostly because of strongly decomposed peat).

The geographic scope of the Global Comparative Analysis excludes tropical mires, because tropical mires differ profoundly from boreal and nemoral mires, in both structural and functional terms. Peat formation there is almost always by trees and sedges, and hardly ever by *Sphagnum* peat mosses. High evapotranspiration requires large water input, and both peat production and decomposition rates are much higher than outside the tropics. Pure ombrotrophy is extremely rare, as the high evapotranspiration at tropical temperatures can usually not be supported by precipitation alone.

In addition to the geographical and thematic scope as defined above, the Global Comparative Analysis of the Colchic mires requires a reference framework, i.e., a consistent series of criteria that is applicable throughout the geographic scope of the analysis, and which allows for a meaningful comparison of all the mires involved. The proposed Outstanding Universal Value of the Colchic mires is not based on quantitative arguments such as area extent, age, depth or similar, but on their special functional qualities and their general importance for the understanding of mires globally. A simple comparison of these quantitative parameters would hence be unsuitable for this analysis.

This means that the most suitable reference framework for this comparison is the hydrogenetic mire classification of Succow & Joosten (2001) and Joosten and Clarke (2002), which focuses on the processes that drive peat formation and peatland development (Joosten et al. 2017). This classification uses interrelations and feedback mechanisms between (a) water flow and fluctuations, (b) vegetation and (c) peat formation as central criteria, as well as (d) the role peatland development plays in landscape hydrology.

## ***Identification of sites for comparison***

In spite of the wide distribution of peatlands (3% of the global land surface – Joosten and Clarke 2002), no properties have been inscribed on the World Heritage List exclusively because of the existence of peatlands, or with peatland-related features of Outstanding Universal Value as central arguments of the justification for inscription.

The following areas from the geographical scope of the analysis inscribed under World Heritage criterion ix contain peatlands (UNEP-WCMC 2016), but these are usually small or very small parts of the properties, and sometimes areas with bog-like vegetation only. Although the Statements of OUV of these sites were not primarily based on the presence of peatlands, they are included in the comparison presented in Table 12:

- Laponian area (Sweden)
- Tasmanian Wilderness (Australia)
- Wood Buffalo National Park (Canada)
- Te Wahipounamu (New Zeeland)
- Volcanoes of Kamchatka (Russian Federation)
- Kluane/ Wrangel – St. Elias/ Glacier Bay/ Tatshenshini-Alsek (USA and Canada)

Among properties listed on the Tentative Lists of State Parties (WHC 2019b), the following contain extensive mires, and their Tentative List entries focus their justification of potential OUV on the nomination of mire areas and types:

- The Great Vasyugan Mire (Russia)
- Flow Country (UK)
- Okefenokee National Wildlife Refuge (USA)

Finally, the Kopuatai Peat Dome (New Zealand), a Ramsar site which is not inscribed or listed on a Tentative List, bears some superficial similarities to the peatlands of the Colchic Mire region and therefore is included in the comparison as well.

As demonstrated in the detailed comparison, the Colchic mires fundamentally differ from all other mires contributing to the Outstanding Universal Values of already inscribed sites, or from those peatland properties on the Tentative Lists of State Parties (Table 12).

**Table 12.** Comparison of the Colchic mires with World Heritage properties, and properties listed on the Tentative Lists of other State Parties, which contain mires, for the global comparative analysis of the Colchic Rainforests and Wetlands in relation to World Heritage criterion ix (Attributes 2 percolation bogs. The screening procedure underpinning the choice of sites for comparison is described in Chapter 3.2.2.

| Name (State Party/ies) | Status | Latitude | Hydrogenetic mire type | Comment |
|---|---|---|---|---|
| | | ***Eurasia*** | | |
| Colchic Rainforests and Wetlands | This nomination | 41° N | Percolation bogs, related successional stages | Only place where percolation bogs are found, globally (Krebs et al. 2017). One of eight separate mire regions in pan-Europe (Moen et al. 2017) and Eurasia (Botch & Masing 1983). |
| Laponian Area (Sweden) | Inscribed 1996 | 67° N | Ombrogenous acrotelm mires (raised bogs), surface flow mires | Inscribed under World Heritage criterion ix among others; Much more northern than Colchic mires, includes the Sjaunja Mire, the largest raised bog in north-western Europe. Part of the northern fen region according to Moen et al. (2017). |
| Volcanoes of Kamchatka (Russian Federation) | Inscribed 1996 | 56° N | Ombrogenous surface flow mires (blanket bogs) | Inscribed under World heritage criterion ix among others; blanket bogs are not central to OUV of property. |
| Flow country (United Kingdom) | TL since 2012 | 58° N | Ombrogenous surface flow mires (blanket bogs) | Tentative List entry under World Heritage criterion ix among others. Extensive blanket bogs. Part of Atlantic mire region according to Moen et al. (2017). |
| The Great Vasyugan Mire (Russia) | TL since 2007 | 56° N | Ombrogenous acrotelm mires (raised bogs) | Tentative List entry under World Heritage criterion ix among others. Largest mire system in the northern hemisphere. Functionally very distinct from Colchis mires. |
| | | ***North America*** | | |
| Wood Buffalo National Park (Canada) | Inscribed 1983 | 59° N | Lithogenous and ombrogenous flood mires, ombrogenous acrotelm mires ("muskeg bogs") | Inscribed under World heritage criterion ix among others; Much more northern than Colchic mires; Part of a landscape mosaic also including lakes, streams and boreal forest, underlain by impervious shale and discontinuous permafrost. |
| Kluane/ Wrangel – St. Elias/ Glacier Bay/ Tatshenshini-Alsek (USA and Canada) | Inscribed 1979, last extended 1994 | 61° N | Ombrogenous acrotelm mires (raised bogs), surface flow mires (blanket bogs) | Only inscribed under World Heritage criteria vii, viii, x. Much higher latitude than Colchic mires with strong (sub-)arctic affinities. Bogs play no major role in justification of inscription. |
| Okefenokee National Wildlife Refuge (USA) | TL since 2008 | 30° N | Lithogenous flood mire | Tentative List entry under World Heritage criterion ix among others, but peat formation predominantly by water lilies, ferns and cypresses. Significantly further south than Colchis mires. |
| | | ***Australia and New Zeeland*** | | |
| Tasmanian Wilderness (Australia) | Inscribed 1982 | 41° S | Lithogenous flood mires, surface flow mires, acrotelm mires | Inscribed under World Heritage criterion ix among others. Largest peatland areas of the southern Hemisphere. Mainly dominated by Cyperaceae, with only limited contributions of *Sphagnum*. More arid and marked seasonal minima of precipitation, in comparison to Colchis mires. |

| | | | | |
|---|---|---|---|---|
| Te Wahipounamu (New Zeeland) | Inscribed 1990 | 45° S | Ombrogenous surface flow mires (blanket bogs), acrotelm mires (raised bogs) | Inscribed under World Heritage criterion ix among others, but mainly for its forest and associated and (sub-alpine) values. Some blanket bogs in coastal lowlands and small alpine bogs in mountain parts. |
| Kopuatai Peat Dome (New Zeeland) | No WH/ TL status | 37° S | Ombrogenous surface flow mires (blanket bogs), acrotelm mires (raised bogs) | 10,000 ha of ombrotrophic mires, but peat formation dominated by *Sporadanthus ferrugineus* (Restionaceae), not *Sphagnum*. |

## ***Eurasia***

The defining and most important peatland of the **Laponian Area** (Sweden) is the Sjaunja Mire, the largest raised bog in north-western Europe. This is part of the northern fen region according to Moen et al. (2017). It is situated 14 degrees further to the north of the Colchis mires, in a much colder climate (annual mean temperature at the nearby city of Kiruna: – 2.2 °C), with less precipitation (ca. 500 mm annually). Functionally, the raised bog ecosystems of Sjaunja are ombrogenous acrotelm mires, with some surface flow mires also occurring (see Box 6, Table 13 and below for further explanations). However, there are no percolation bogs there.

The mires of the **Volcanoes of Kamchatka** (Russian Federation) are located not as far north of those of the Laponian Area, but also functionally different because they are ombrogenous surface flow mires. In addition, these mires do not significantly contribute to the Outstanding Universal value of this property, and it has never been suggested that they alone would justify inscription on the World Heritage list.

The **Great Vasyugan Mire** (Russian Federation), the largest swamp system in the northern hemisphere (ca. 2% of the global peat bog area), is located in the central sector of the West Siberian plain. Mire extension from East to West is about 550 km, and from North to South in the axial part - an average of 50-80 km. The landscape structure of the Great Vasyugan Mire includes bogs (32%), fens (35%) and forested mires (33%). The area intended for nomination is about 500,000 ha, according to the State Party (Ministry of Natural Resources of the Russian Federation 2007). However, there are no percolation bogs within the Great Vasyugan Mire. The predominant mire type there are ombrogenous acrotelm mires.

An estimated > 300,000 ha of blanket bogs (ombrogenous surface flow mires) form the core of the planned nomination of the **Flow Country** (United Kingdom)**,** which forms part of the Atlantic mire region of Moen et al. (2017). According to the State Party of the UK, the outstanding importance of the Flow Country in relation to World Heritage criterion ix lies in its extent and continuity, the diversity of mire and vegetation types, and the on-going processes of bog formation which it exhibits (UK Department for Culture, Media and Sport 2012). In addition, in terms of proportional extent, the nominated component areas of the Colchic Rainforests and Wetlands contain all of the World's percolation bogs, whereas the Flow Country merely contains a significant but small part of the World's blanket bogs.

## ***North America***

**Wood Buffalo National Park** (Canada) is located 18 degrees further North than the Colchic series, which creates a radically different climatic setting for the mires there than that enjoyed by the Colchic mires. The predominant type of mire there are lithogenous and ombrogenous flood mires, as well as ombrogenous acrotelm mires ("muskeg bogs"). These mires represent only one small piece in the larger landscape mosaic that makes up the Outstanding Universal Value of Wood Buffalo National Park, and would certainly not warrant inscription on the World Heritage List on their own.

**Table 13.** Schematic comparison of functional mire types based on water supply and origin, mire slope, internal water storage, and effect on landscape level water storage. The mire types occurring within the Colchis mire region are highlighted in red, while those of other properties from the global comparative analysis are highlighted in yellow. The lithogenous water rise mires of the Colchis mire region are predecessors of ombrogenous percolation mires. See Table 12 for mire types in other properties. Adapted from Succow and Joosten (2001), Joosten and Clarke (2002), Joosten et. al (2017).

| | | | horizontal mires | | | | sloping mires | | |
|---|---|---|---|---|---|---|---|---|---|
| | peat formation mechanism | | schwingmoor | Immersion | water rise | floodwater | surface flow | acrotelm | percolation |
| Water supply | | | continuous | mostly continuous | small | periodic | frequent | frequent | continuous |
| Mire slope | | | none | none | none | none / small | small / large | small | small |
| Internal water storage | | | large | mostly large | none | small / large | very small | rather large | large |
| Effect on landacape water storage | | | storage < | storage < | storage < | storage < (>?) | storage > | storage > | storage > |
| Origin of the water | ombrogenous *bog* | | ombrogenous schwingmoor mire *Schwingmoor in bog* | ombrogenous immersion mire *terrestrialization in bog* | ombrogenous water rise mire *water rise in bog complex* | ombrogenous flood mire *flood mire in bog* | ombrogenous surface flow mire *blanket bog* **(e.g. Flow Country, Kamchatka)** | ombrogenous acrotelm mire *raised bog* **(e.g. Great Vasyugan Mire, Laponian Area)** | ombrogenous percolation mire *percolation bog* **Ispani, Imnati** |
| | | soli-genous | soligenous schwingmoor mire *floating mat in moorpool* | soligenous immersion mire *terrestrialization in moorpool* | soligenous water rise mire *Kesselmoor* | soligenous flood mire *Kessel-standmoor* | soligenous surface flow mires *sloopy fen, Hangmoor* | soligenous acrotelm mire | soligenous percolation mire *some sloping fens* |
| | geoge-nous *fen* | litho-genous | lithogenous schwingmoor mire *floating mat on lake* | lithogenous immersion mire *lake terrestrialization mire* | lithogenous water rise mire *groundwater rise mire* **Grigoleti; Pitshora, Nabada, Churia** | lithogenous flood mire *river floodplain mire* **(e.g. Okefenokee)** | lithogenous surface flow mire *most spring mires* **(e.g. Tasmanian Wilderness)** | lithogenous acrotelm mire **(e.g. Tasmanian Wilderness)** | lithogenous percolation mire *typical percolation mire* |
| | | thalas-so-genous | thalassogenous schwingmoor mire | thalassogenous immersion mire *coastal terrestrialization mire* | thalassogenous water rise mire | thalassogenous flood mire | thalassogenous surface flow mire | thalassogenous acrotelm mire | thalassogenous percolation mires |
| | | | | | *coastal transgression mire, mangrove* | | | | |

Similarly, the complex serial property of **Kluane/Wrangel – St. Elias/Glacier Bay/Tatshenshini-Alsek** (Canada and USA) is situated in an area with arctic, sub-arctic and some slightly more moderate and humid coastal climate. It contains some peatlands, but these are largely coincidental to its Outstanding Universal Value. The peatlands of this property are of a different functional type than those of the Colchic, i.e. ombrogenous acrotelm mires (raised bogs) as well as surface flow mires (blanket bogs).

While all of the peatlands discussed so far in this comparison are at significantly higher latitude than the Colchic mires, **Okefenokee National Wildlife Refuge** (Tentative List of USA) are located about 11 degree further to the south. Annual mean temperature is six degrees above that of the Colchic mires, whereas precipitation is only ca. 1,300 mm. Okefenokee is not a *Sphagnum* moss bog, and not ombrogenous. It is a lithogenous flood mire. Peat cores from the swamp bottom show that the peat is mostly made up of the remains of the most common plants here, such as water lilies (*Nymphaea odorata*), Virginia chain fern (*Woodwardia virginica*), and pond cypress (*Taxodium ascendens*). *Sphagnum* mosses, which along with sedges are the major ingredients of the Colchic mires, are present in the Okefenokee, but they do not play a large role there (Georgia Botanical Society 2019). Another important functional difference is the seasonal drying of peat and occasional natural peat fires in Okefenokee, which have a profound effect on their structure and carbon balance. This natural disturbance is totally absent from the Colchic mires.

## ***Australia and New Zealand***

Peatlands and particularly sphagnum peatlands play a minor role within the habitat mosaic and Outstanding Universal Value of the **Tasmanian Wilderness** (Australia). That property contains the largest peatland areas of the southern hemisphere, but these are mostly dominated by Cyperaceae. Only 1,300 ha of sphagnum peatland occur within this property of 1.5 million ha (< 0.1% area contribution) (Whinam et al. 2003). Functionally, these have been classified as lithogenous flood mires, surface flow mires, and acrotelm mires. The climate of the Tasmanian Wilderness is also more arid and characterized by marked seasonal minima of

precipitation, whereas the percolation bogs of the Colchis mire region depend on very high and (seasonally) evenly distributed rainfall.

**Te Wahipounamu** (New Zealand) is a highly complex series that was inscribed mainly because of its forests, wetlands (including but not limited to peatlands) and alpine values. The mires there are mainly cushion bogs, which differ from the percolation bogs of the Colchis in that they are ombrogenous acrotelm and surface flow mires.

Another large and important mire of this region that is neither inscribed on the World Heritage list nor listed on the Tentative List of the State Party (New Zealand) is the **Kopuatai Peat Dome** on the northern island. It is structurally and functionally peculiar because peat formation is mainly by *Sporadanthus ferrugineus* (Restionaceae), and because again it contains ombrogenous acrotelm and surface flow mires. This sets it apart from the mires of the Colchis. At the same time, the *Sporodanthus* dominance makes it less relevant as a functional model of ombrotrophic mires in general.

## ***Conclusion of Global Comparative Analysis for World Heritage criterion ix (mires of the Colchis mire region***

The global comparative analysis for the mires of the Colchic mire region yields important conclusions that support the inscription of the Colchic Rainforests and Wetlands on the World Heritage list under criterion ix:

**Peatlands are currently under-represented on the World Heritage List:** While peatlands occupy three percent of the global land surface (Joosten & Clarke 2002) and are the largest terrestrial carbon stock (Global Peatlands Initiative 2019), they surprisingly have never been used as a main argument for the inscription of properties under World Heritage criterion ix. Considering that 126 properties have been inscribed on the World Heritage list under World Heritage criterion ix to date, it is suggested that peatlands – and particularly peatland related phenomena as justification of inscription under World Heritage criterion ix - are currently underrepresented on the list.

**The Colchic mires form a structural and functional transition between the mires of the boreal/nemoral zone on the one hand and those of the tropical zone on the other hand:** The existence of the Colchic mires with their pronounced differences to other *Sphagnum* dominated mires is only possible within the warm-temperate and very humid climatic conditions of the Colchic region, which are very favourable for the growth of mires (Joosten et al. 2003). The mires of the humid, warm-temperate Colchis with their luxurious *Sphagnum* vegetation form a structural and functional transition between the mires of the boreal and those of the tropical zones. They have been recognized as one of eight distinct mire types in pan-Europe (Moen et al. 2017 – see Figure 76), and as a distinct mire type in comparison to all Eurasian mires (Botch and Masing 1983).

**The mires of the Colchis mire region include the only percolation bogs in the World,** along with their related succession stages: Percolation bogs are only found in the Colchic Rainforests and Wetlands (Krebs et. al. 2017), namely in Ispani and Imnati nominated component areas. In addition, the nominated component areas of Grigoleti, Pitshora, Nabada and Churia contain a complete series of related mire types which put the former into structural, and functional (including successional) context. With regard to the classification of hydrogenetic mire types (after Succow & Joosten 2001, Joosten & Clarke 2002) the mires referred to in the above comparison are surface flow mires and acrotelm mires (*sensu* Joosten & Clarke 2002). They differ from the mires of the Colchis, particularly with regard to the principal functioning of their mire ecosystems (Table 13).

**Percolation bogs are the simplest peatland type at all, and therefore a reference type of all peatlands worldwide:** Percolation bogs differ with regard to functional (including hydrological) and peat characteristics from all other peatlands. The most similar peatland types are the 'inclining mire' types, surface flow mires and in particular acrotelm mires (Table 13). However, as illustrated in Figure 77, surface flow mires are driven by positive feedback mechanisms (*lower water tables* lead to stronger decomposition of the peat with a decrease of storage capacity, increasing water level fluctuations and run-off, and resulting in increased *lowering*

*of mean water tables*), and acrotelm mires by negative feedbacks ('self-regulation' – lower water tables lead to stronger decomposition of the peat with a decrease in hydraulic conductivity, decreasing the subsurface run-off, and resulting in decreased lowering of the mean water table). In decisive contrast, the water table in percolation bogs is almost constant and feedback mechanisms are not active.

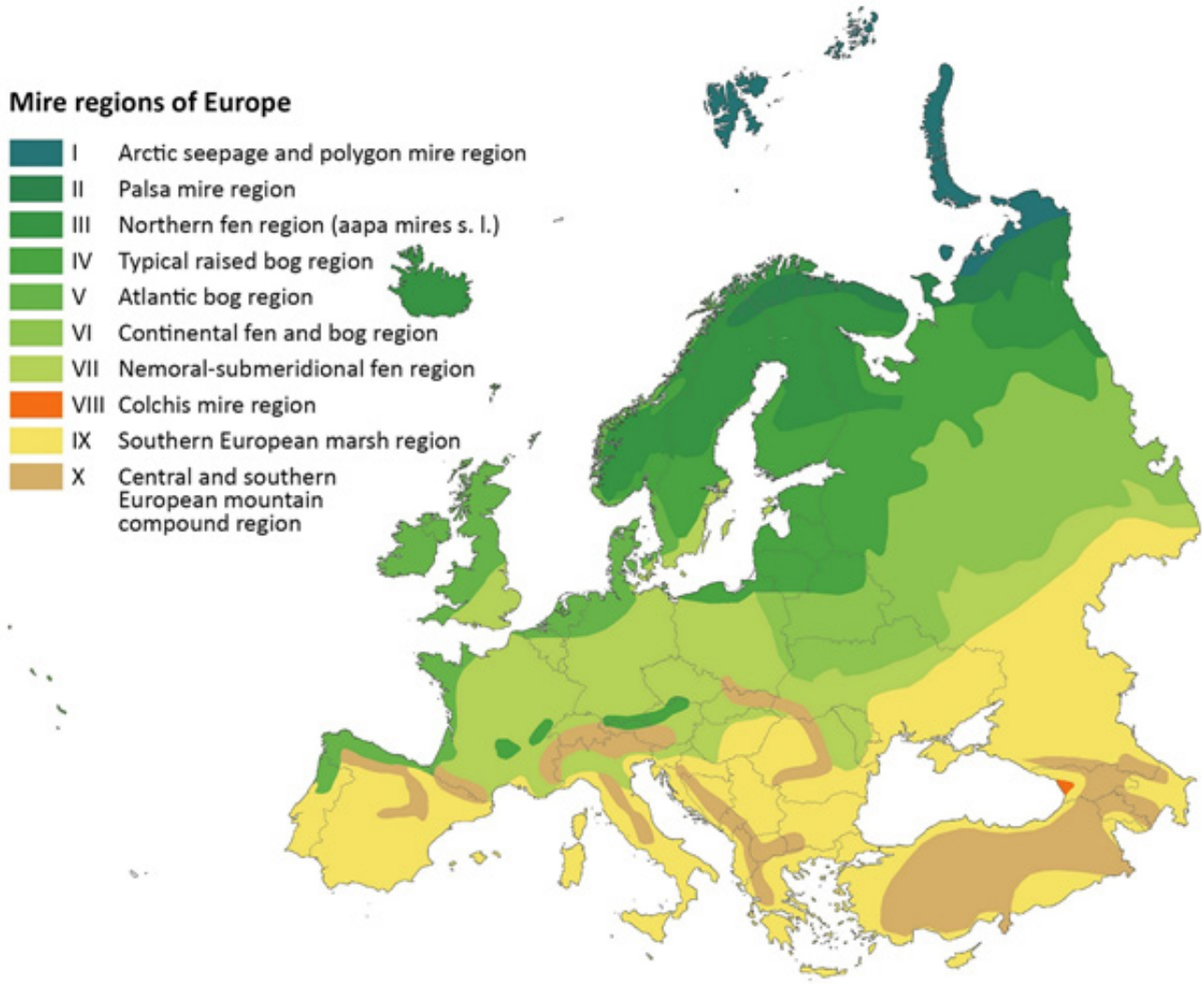


**Figure 76.** The Colchis mire region in relation to other mire regions of Europe. (Source: Moen et al. 2017)

While neither the World Heritage Convention, nor its Operational Guidelines (UNESCO 2017), nor the secondary guidance of IUCN on the application of the concept of OUV (e.g. Badman et al. 2008a, b) support the argument that an area which is the only representation of a functional type of an ecosystem would automatically have OUV, the case of the percolation bogs of the Colchic wetlands is special as they are the only representatives of the simplest and "ideal" type of mires, and peatlands in general. Therefore, they are **the** quintessential example – in functional terms – of this ecosystem type.

The two bog areas listed on Tentative Lists of other State Parties are considerable larger than the combined area of the peat bogs of the Colchic wetlands (< 9,000 ha), and at least the Flow Country entry uses geographic extent to underpin its claim to OUV.

However, the justification for the proposed OUV of the Colchic percolation bogs in relation to World Heritage criterion ix is not based on area extent, but on the marked functional peculiarities of this mire type, which not only set percolation bogs apart from all other peatlands, but also put them into a central position for the understanding of all bogs, mires and peatlands in general.

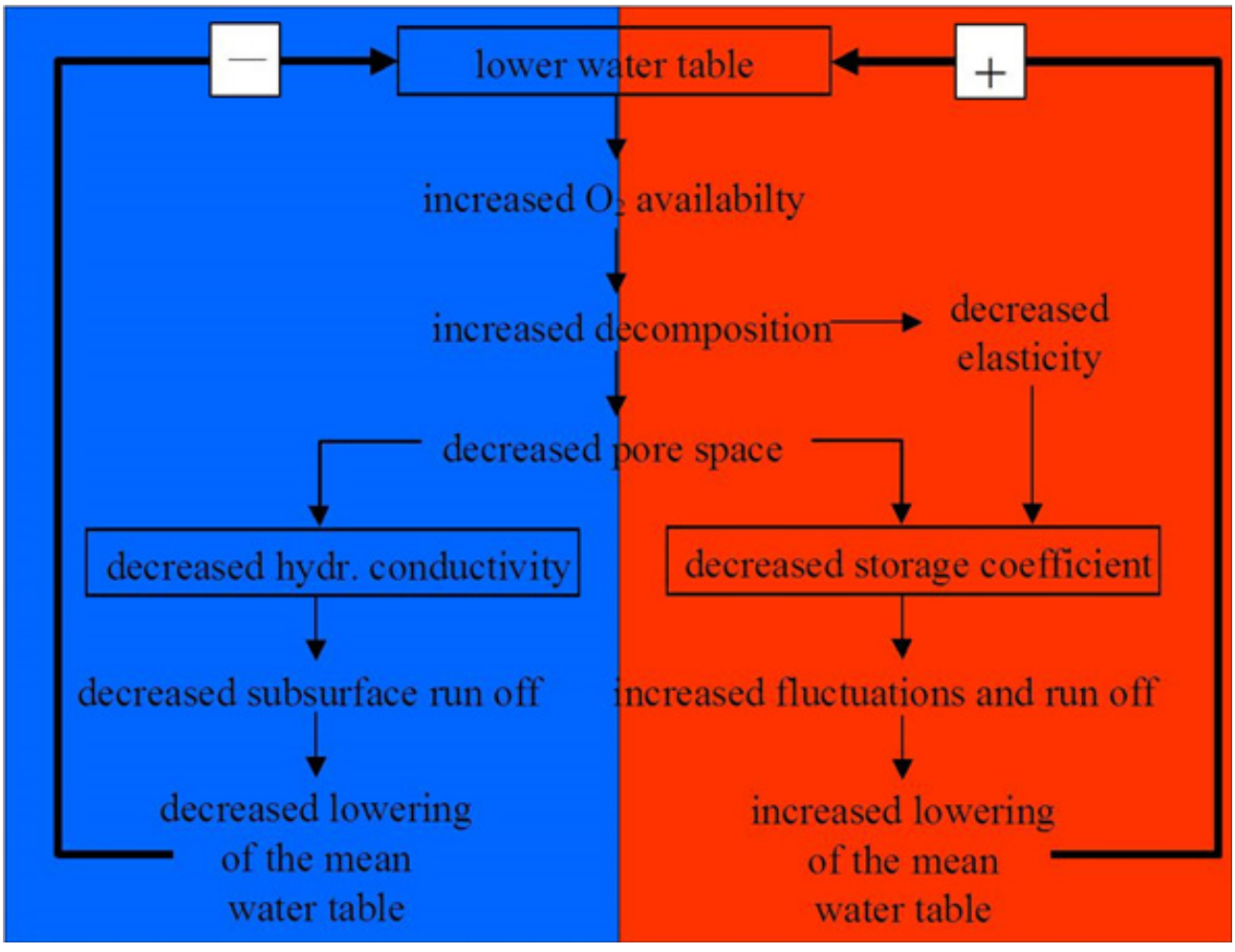


**Figure 77.** Positive and negative feedback mechanisms between water table and hydraulic characteristics in systems having significant lateral water flow, controlling peat formation in typical acrotelm mires (blue) and surface flow mires (red), but not in ombrogenous percolation mires like those of the Colchis mire region. See text for details. Source: Joosten and Clarke (2002).

The global comparative analysis – particularly in terms of mire function – also confirms the importance of the percolation bogs of the Colchis mire region for the study of important fundamental processes in mire functioniong. The Colchic percolation bogs are

- **A model of peat accumulation and preservation under ideal conditions:** Mire formation, development and existence are based on peat accumulation and peat preservation processes. Continuous water supply and plant material that is resistant to decay are the major prerequisites for mires. In the Colchis, the percolation bogs are fed by substantial and continuous rainfall, thus preserving the accumulated peat under continuously water- logged conditions. Moreover, the mires are dominated by *Sphagnum* species, which are highly productive under permanent wet and warm conditions (Krebs et al. 2016), have a high resistance to decay and additionally acidify the substrate, thus slowing down the decay (cf. Rydin and Jeglum 2009), resulting in high peat accumulation rates of 4 mm $yr^{-1}$ (Joosten et al. 2003). This means that the percolation bogs of the Colchis mire region are the best example of continuous, undisturbed peat formation and accumulation, which offers more general insights into these processes.
- **A simple model to help understand hydrological self-regulation mechanisms of mires in general:** Mires consist of elements that obstruct and other elements that do not obstruct the flow of water. Since there always is some water movement, stagnation must be defined in relation to a time scale. Bogs are ecosystems that do not fundamentally change over centuries and millennia, demonstrating that they can maintain a more or less stable water level over the long term (Joosten 1993). This implies a degree of self-regulation. On all levels of the organisation of mires, there is a trade-off between minimum permeability to

avoid water losses and maximum storage of water (in pores, hollows, and pools) leading to water "saving" for times of shortages (Couwenberg and Joosten 1999). Percolation bogs do not allow much stagnation of the water received from rainfall, but also have a large pore space and thus high water storage capacity. This differs completely from all other ombrogenous mires, where only the surficial peat layer is characterised by low decomposition and large pore space, while peat decomposition and pore space – and thus water storage capacity – decreases substantially with peat depth (Figure 78). In the Colchis, due to the continuously high rainfall without much seasonal fluctuation, no substantial drops in water level occur, and thus no feedback mechanisms regarding the water level are observed. This simple mire type can therefore serve as a reference to understand the functioning (including hydrological self-regulation mechanisms) of other mires, such as surface flow mires or acrotelm mires (Figure 77).

- **A model for the verification of concepts of surface patterning in all mires:** Surface patterning (e.g. the formation of hummocks and hollows) of mires has been theoretically linked to water flowing through the uppermost peat layers, and accumulating behind hummocks, causing the formation of hollows upslope (Kulczyński 1949). It was later modelled by several researchers (e.g. Swanson and Grigal 1988, Couwenberg 2005). Percolation bogs are characterised by a deep, weakly decomposed and highly permeable peat layer (high hydraulic conductivity). This enables vertical water flow directly into the deeper peat layers, without substantial lateral, near-surface water displacement. The percolation bogs of the Colchis mire region show no surface patterning. This means that this mire type has provided the opportunity to confirm the proposed and modelled processes for the origin of surface patterning in all mires, including all other types.

This is all the more important as peatlands exceed forests in their importance for terrestrial carbon storage. Understanding the general, fundamental, ecosystem-level mechanisms that govern how this storage is regulated and maintained is of utmost importance not only from a scientific point of view, but also more widely from an applied perspective, such as in the context of climate change mitigation and ecosystem-based adaptation to climate change. In this respect, the percolation bogs of the Colchis mire region not only provide a window into the ecological past of the wider region, but may also contribute to solutions for ensuring its future.

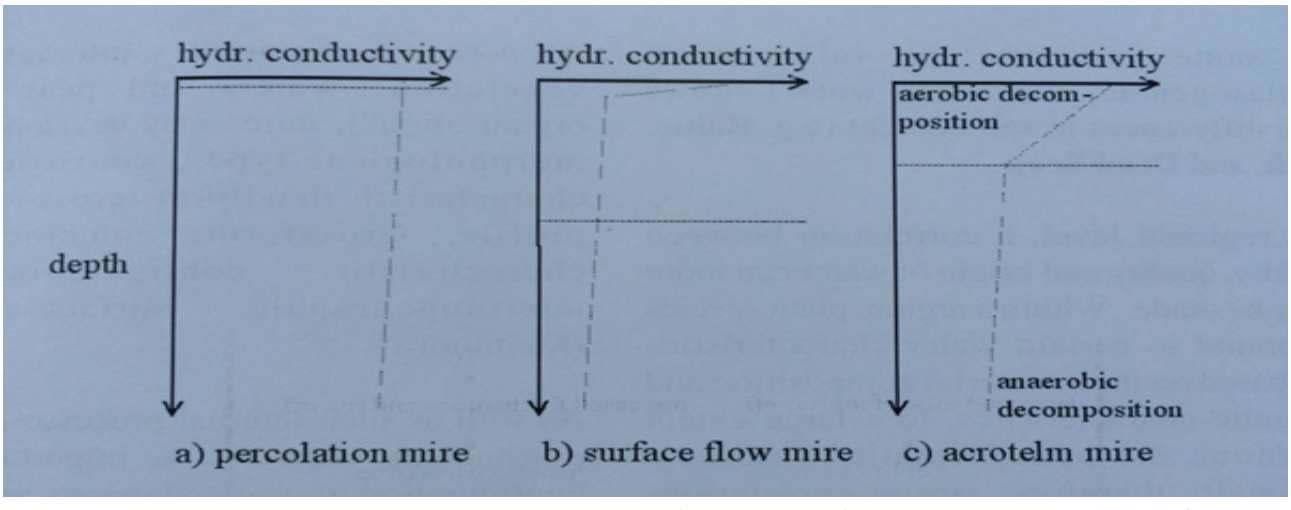


**Figure 78.** Hydraulic characteristics related to depth in different types of mire with substantial water flow. The dotted horizontal line marks the lowest water level, which lasts for short periods only. (Source: Joosten and Clarke 2002).

***The mires of the Colchis mire region, particularly its percolation bogs, represent a functional type of peatland that (a) is not found anywhere else in the World, and at the same time (b) is the simplest type of mire in terms of its functionality. This has helped and will continue to help to increase humankind's understanding of peatlands and peat formation in general. Since peatlands – in spite of their significant global area coverage and their even bigger importance as terrestrial carbon stores – currently appear to be under-represented on the World Heritage list, the inclusion of representative peatlands, and particularly their simplest type, on the World Heritage list is justified by this global comparison.***

### 3.2.3 Comparative analysis for WH criterion x: biodiversity

The proposed Outstanding Universal Value of the Colchic Rainforests and Wetlands under World Heritage criteria x is based on three closely interrelated features, i.e., overall species richness (particularly among the wood plants, vertebrates and some invertebrate groups), the number and relative contribution of endemic species, and the importance of the area for globally threatened and near-threatened species.

#### *Scope of the Global Comparative Analysis for World Heritage criterion x*

Since most of the biodiversity of the Colchic Rainforests and Wetlands is concentrated in the rainforests and their immediately adjacent territories, the comparative analysis for World Heritage criterion x is based on the same globally distributed sites that have been used for the comparative analysis for criterion ix (Features 1 and 3), and which are summarized in Table 11. However, not all of the properties that were discussed in that comparison are also relevant to the Global Comparative Analysis under World Heritage criterion x, for the following reasons:

- **The Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe** have been inscribed under World Heritage criterion ix but not criterion x. Being a mega-series with a huge pan-European geographical scope, a comparison of their species richness to that of the Colchic Rainforests and Wetlands, which is special for its particularly high spatial concentration of biodiversity values, would in any case not make much sense. While this series has therefore been excluded from the comparison for criterion x, its area-specific species richness would in any case be far below the Colchic rainforests and wetlands.
- Similarly, **Shirakami Sanchi** (Japan) has only been listed under World Heritage criterion ix and is excluded from the comparison for criterion x. Limited information is available on the biodiversity of this property, but it is in any case much less than that of the Colchic Rainforests and Wetlands.
- The Tentative List entries and available supplementary information available for the **Strict Nature Reserve Primeval forest "Perucica"** (Bosnia and Herzegovina), **Biogradska Gora National Park** (Montenegro) and the **Broader Region of Mount Olympos** (Greece) provide not enough information for a meaningful comparison, and therefore also have been excluded from the comparison. All of these are rather small properties (with the size of the latter not specified in its Tentative List entry), which would be extremely unlikely to match the well-documented and very high biodiversity of the Colchic Rainforests and Wetlands.

This leaves nine of the 14 properties considered in the comparison for World Heritage criterion ix (Features 1 and 3) for the corresponding comparison for World Heritage criterion x. This comparison is summarized numerically in Table 14. The figures in this table reveal some important general trends, but need to be interpreted with great caution, because of the following reasons:

- **Incompleteness and inconsistency of available information:** While the biodiversity of the Colchic Rainforests and Wetlands has been documented in great detail in Annexes and tables, the same is not true for all properties in the comparison, as reflected by many question marks in Table 14. This applies to estimates of overall species richness but even more so to figures on endemic and globally threatened species. For example, the term "endemic" can refer to more or less restricted species ranges, and many properties report (globally meaningless) national Red List data rather than the number of globally threatened and near-threatened species according to the IUCN Red List of Threatened Species (IUCN 2018). Furthermore, some species estimates refer to the wider surroundings of properties, not necessarily only the properties themselves.
- **Effects of property area and latitude on biodiversity estimates:** Larger properties tend to have higher overall biodiversity. However, in some cases (including the case of the Colchic Rainforests and Wetlands) the proposed Outstanding Universal Value is specifically based on high concentrations of biodiversity in very small geographic areas. These may be masked by comparisons to much larger areas. It is impossible to correct for this mathematically, as species-area relationships are complex and far from linear, and also

depend on factors other than biodiversity. Nevertheless, size effects need to be considered when interpreting the figures of Table 14. The same is true for latitude, as higher latitudes tend to have lower species counts, which is naturally reflected in properties there.

- **Importance of quality as well as quantity of biodiversity:** Numbers alone only give an incomplete picture of the biodiversity of an area as the same species count might reflect a community of ubiquitous species, or an assemblage of restricted range species of high global conservation value. Therefore, the quality of the biodiversity represented in numerical comparisons also needs to be considered when making such comparisons.

## *Observations of the Global Comparative Analysis for World Heritage criterion x*

Keeping these considerations and the comparison of ecosystems as presented in Section 3.2.1 in mind, the following conclusions can be drawn from the comparison presented in Table 14.

**Table 14.** Comparison of the species richness of the Colchic Rainforests and Wetlands, as well as the richness in endemic and globally threatened and near-threatened species, to those of other World Heritage properties and Tentative List properties within the regions with nemoral deciduous forest, as identified in the Global Comparative Analysis for World Heritage criterion ix. Only sites for which relevant information has been available, and only biodiversity related parameters for which there were at least two other sites (in addition to the Colchic Rainforests and Wetlands) have been included in the comparison. See text for details.

| Name | State Party / ies | Status | Criteria | Area (ha) | # vascular plant species | # endemic plant species | # (near-) threatened species (IUCN RL) | # woody species | # vertebrate species | # mammal species | # endemic mammal species | # bird species | # reptile species | # amphibian species | # fish species | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Caucasus eco-region** | | | | | | | | | | | | | | | | |
| **Colchic Rainforests & Wetlands** | Georgia | This nomination | (ix), **(x)** | 31,253 | 1,108 | 149 | 44 | 132 | 474 | 67 | 8 | 327 | 15 | 10 | 55 | Data source: this nomination |
| **Western Caucasus**[5] | Russian Federation | Inscribed 1999 | (ix), **(x)** | 298,903 | 1,580/ 613[1] | ?[1] | ? | ? | 385 | 81 | ? | 246 | 6 | 4 | 5 | Mainly (sub-) alpine |
| **Hyrcanian Forest**[6] | Iran | Nominated 2018 | (vii), (viii), (ix), **(x)** | ca. 130,000 | 3,000[2] | ? | ? | 130 | ca. 330 | 58 | ? | 180 | 30 | ? | > 50 | |
| **Hirkan State Reservation**[7] | Azerbaijan | TL since 1998 | (vii), **(x)** | 2,900 | 1,900 | 162 | ? | ? | ? | ? | ? | ? | ? | ? | ? | |
| **Pan-Europe (including European nemoral deciduous forest region)**[1] | | | | | | | | | | | | | | | | |
| **Białowieża Forest**[5] | Belarus, Poland | Inscribed 1979, last extd. 2014 | (ix), **(x)** | 141,885 | ? | ? | ? | ? | ? | 59 | ? | 250 | 7 | 13 | ? | |
| **Bashkir Ural**[7] | Russian Federation | TL since 2012 | (viii), **(x)** | 45,000 | 895 | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | |
| **Asia (including East-Asian nemoral deciduous forest region)** | | | | | | | | | | | | | | | | |
| **Central Sikhote-Alin**[4, 5] | Russian Federation | Inscribed 2001, last extd. 2018 | **(x)** | 1,567 million | 1,200 | | ? | 180 | 374 | 65 | ? | 241 | 10 | 7 | 51 | |
| **Three Parallel Rivers of Yunnan PAs**[5] | China | Inscribed 2003 | (vii), (viii), (ix), **(x)** | 960,000 | ca. 6,000 | | 105[3] | ? | 761 | 173 | 81 | 417 | 59 | 36 | 76 | Highly diverse ecosystems |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hubei Shennongjia**[8] | China | Inscribed 2016 | (ix), **(x)** | 73,318 | 3,644 | | ? | 874 | > 600 | 87 | ? | 289 | 51 | 36 | 46 | |
| **North America (including Eastern North-American nemoral deciduous forest region)** | | | | | | | | | | | | | | | | |
| **Great Smoky Mountains National Park**[5] | USA | Inscribed 1983 | (vii), (viii), (ix), **(x)** | 209,000 | 1,300 | | ? | | 436 | 66 | ? | 240 | 38 | 42 | 50 | |

[1] ... According to UNEP-WCMC (2016), 967 of the plant species of the Western Caucasus are (sub-)alpine not forest related. This leaves only 613 forest related species. A percentage of endemic species is only provided for (sub-)alpine species.

[2] ... This species richness estimate appears to refer to the wider area, not just the nominated property.

[3] ... Threatened species only

[4] ... UNEP-WCMC (2016) does not include updated information reflecting the (2018) extension of this property, which makes it likely that the figures for it are minimum estimates. However, the OUV of this property as previously inscribed was confirmed by the original inscription.

**Data sources**

[5]... UNEP-WCMC (2016)

[6]... H. Knapp (pers. comm.)

[7]... UNESCO (2019b)

[8]... IUCN (2016)

***The Colchic Rainforests and Wetlands have by far the smallest area in comparison with all inscribed properties of this comparison, but equal or exceed many of them in the richness of their flora and fauna****:* The nominated series occupies only 42% of the area of the next smallest (Hubei Shennongjia, China) and only 2% of the area of the largest inscribed property in the comparison (Central Sikhote Alin, Russian Federation), but concentrates in its relatively tiny area a species richness of vascular plants and vertebrates (including overall counts and endemic species) comparable to the latter, and exceeding those of properties such as the also much larger Białowieża Forest (Belarus/Poland). This supports the notion of the Colchic Rainforests and Wetlands as a local biodiversity hotspot within a global biodiversity hotspot.

***The Colchic Rainforests and Wetlands have a lower overall species count than the Hyrcanian Forests (Iran), but a markedly different flora, more tree and shrub species, and a richer vertebrate fauna***: The estimate of overall vascular plant species richness of the Hyrcanian humid Pliocene forest refugium and immediately adjacent ecosystems (> 3,000 species – H. Knapp, pers. comm.) exceeds the figure for the Colchic Forests and Wetlands, which is backed up by a concise species list (Appendix 2). The estimate may include some species living near rather than inside that series, or be due to the four-fold larger size and slightly different bio-geographic position of the Hyrcanian Forests. Another reason is that some forest formations of the Hyrcanian Forests – such as cypress stands and juniper forest – do not occur in the Colchic Rainforests and Wetlands. The species number of trees and shrubs in both areas is practically identical.

In qualitative terms, important differences between the biodiversity of the Colchic forests and Hyrcanian forests include the species of the semi-prostrate evergreen undergrowth of the former, which are largely absent from the latter (e.g. *Rhododendron ponticum*, *Rh. ungernii*, *Rh. smirnovii*). The flora of the Colchic Rainforests and Wetlands also contains many Asteraceae, Rosaceae and Boraginaceae that do not occur in the Hyrcanian Forests (Appendix 2).

The vertebrate fauna of the Colchic Rainforests and Wetlands (except its reptile fauna) exceeds that of the Hyrcanian forests. It is not clear if (eco-regional and narrower) endemism in herpetofauna in the Hyrcanian Forests matches that of the Colchic Rainforests and Wetlands (55% and 30%, respectively, in reptiles and amphibians). The fauna of the Hyrcanian Forests includes several large carnivores that are missing from the Colchic Rainforests and Wetlands (e.g. the Leopard *Panthera pardus* and Striped Hyaena *Hyaena hyaena*), while its lacks its aquatic avifauna and its importance as a migration bottleneck for Palaearctic raptors.

***The biodiversity of the Western Caucasus (Russian Federation) is markedly different from that of the Colchic Rainforests and Wetlands, and dramatically poorer in forest species***: The Western Caucasus property is located only ca. 200 km distant from the nearest component site of the Colchic Rainforests and Wetlands cluster, is inscribed under the same criteria and occupies an area almost ten times as large. However, almost two thirds of its plant species are associated with (sub-)alpine habitats not forests, and only little more than 600 forest plants occur. This reflects the scarcity of relict deciduous forests within the property (Natural Heritage Protection Fund 2014). Although not reported, the same overall pattern is likely for the endemic and restricted range species there. Reflecting its higher altitude, the Western Caucasus is also much poorer in herpetofauna, ichthyofauna and certainly in forest invertebrates than the Colchic Rainforests and Wetlands.

***The properties Three Parallel Rivers of Yunnan Protected Areas and – to a lesser degree – Hubei Shennongjia (China) exceed all others in the comparison in overall species richness of vascular plants and invertebrates, endemism and their global biodiversity importance, but are profoundly different from the Colchic Rainforests and Wetlands and only partly overlapping with the nemoral deciduous forest region***: The Three Parallel Rivers of Yunnan Protected Areas have a stunning 6,000 species of vascular plants and may hold 25% of all animal species of this planet, including many endemic and/or globally threatened species. This is in part explained by their outstanding topographic and climatic diversity, coupled with their location at the juncture of the East Asia, Southeast Asia, and Tibetan Plateau (with marked tropical influences that are absent from the Colchic Rainforests and Wetlands), biogeographic realms and its function as a N-S corridor for the movement of plants and animals (especially during the ice ages) (UNEP-WCMC 2016). As explained in Chapter 3.2.1, the Three Parallel Rivers of Yunnan Protected Areas form an extremely dense mosaic of the most diverse ecosystems, only one of which (nemoral deciduous forest) is directly comparable to the nominated property. However, in terms of species composition, the Chinese areas are fundamentally different from the nominated series with its West Eurasian species complement.

***Great Smoky Mountains National Park (USA) has a totally distinct and slightly richer vascular plant community and vertebrate fauna, as well as a slightly higher endemism than the Colchic Rainforests and Wetlands, reflecting its different geographical setting and seven-fold larger size***: This North American Tertiary refuge area of 209,000 ha is situated about five degrees south of the Colchic Rainforests and Wetlands. Vascular plant species richness is higher than that of the much smaller Colchic Rainforests and Wetlands cluster, at about 1,300 species, and includes an exceptionally high proportion of relict and restricted range species. There is also a very high diversity of non-vascular plants. Terrestrial vertebrate species richness (ca. 440 species) exceeds that of the Colchic Forests, particularly because of the richer mammal (66 species) and herpetofauna (80 species). Invertebrate endemism appears to be as high as in the Colchic Forests or higher. The area is very important for forest avifauna but not a particular hotspot for either raptor or migratory waterbird migration (UNEP-WCMC 2016). However, the flora and fauna of Great Smoky Mountains National Park is comparable in number, but totally different in composition from that of the Colchic Rainforests and Wetlands, as it is situated in the Nearctic.

## ***Conclusions of the Global Comparative Analysis for World Heritage criterion x***

The above comparisons show that – in spite of their relatively small overall area – the Colchic Rainforests and Wetlands equal or exceed the overall species richness, degree of endemism and importance for globally threatened species of most comparable sites that have already been inscribed, or nominated for inscription on the World Heritage list.

The only properties on the World Heritage list that clearly exceed the Colchic Forests and Wetlands in relation to all statistics relevant to World Heritage criterion ix are two properties from the mega-diverse country of China, which are located significantly further to the South and on biogeographic crossroads.

The significantly larger Hyrcanian Forests appear to be generally richer in vascular plants than the Colchic Rainforests and Wetlands, but this does not apply to woody plants or vertebrates.

***Overall, the Global Comparative Analysis of the Colchic Rainforests and Wetlands confirms their status as***

***a peculiar regional biodiversity hotspot within the wider Caucasus Global Biodiversity Hotspot, where a rich flora and fauna adapted to warm-temperate and extremely humid climate is concentrated, and as one of the two most important refuge areas of Arcto-Tertiary geoflora in western Eurasia (together with the Hyrcanian Forests). The Colchic Rainforests and Wetlands also critically contribute to several overlapping broad-scale global conservation priorities. Taken together, this supports their Outstanding Universal Value in relation to World Heritage criterion x.***

## 3.2.4 Regional comparative analysis

The nominated component areas of the Colchic Rainforests and Wetlands have been selected by the Agency of Protected Areas of Georgia based on a systematic and rigorous screening process of potentially suitable areas within the wider Colchic region, which started in 2011 (Garstecki 2012) with a general national screening, continued in the following years (Garstecki 2014) and included a comprehensive screening and feasibility study (Garstecki et al. 2017). Only sites that fulfil the following criteria have been included in the nomination:

1. A clear and distinct contribution to the OUV of the Colchic Rainforests and Wetlands, i.e. the existence of Colchic rainforest or wetlands – particularly peatlands – of sufficient size and integrity to contribute significantly to the OUV of the area, and to maintain the natural succession and other ecosystem processes supporting the Outstanding Universal Value in relation to World Heritage criteria ix and x.
2. A legally established protection regime in line with the requirements of the Operational Guidelines for the Implementation of the World Heritage Convention, which in this geographic context typically translates into the existence of protected areas of IUCN PA Management Categories I or II.
3. An overall enabling institutional and policy environment, institutional setup and practical management system that is likely to safeguard the OUV of these component areas.

Apart from Kobuleti Protected Areas and Kolkheti National Park, there are no protected areas anywhere within the Colchic region that have percolation bogs or any of their successional pre-stages. Peatlands have been described historically for the Georgian Autonomous Republic of Abkhazia, but these were not associated with protected areas and current data are not available. Presumably percolation bogs and probably water rise mires have disappeared due to intensified land use and peat extraction (Krebs et al. 2017).

**Table 15.** Screening of potential component areas for inclusion in the serial property of the Colchic Rainforests and Wetlands by criteria of **(1)** contribution to OUV under World Heritage criteria ix and x, **(2)** legally designated PA status, and **(3)** a level of integrity and management that is sufficient to safeguard the OUV. (NP... national park; PA... protected area(s); SNR... strict nature reserve)

| Protected area | Area (ha) | IUCN PA mgmt. category | (1) OUV contribtn. | (2) Legal PA status | (3) Integrt. | Inclusion | Comments |
|---|---|---|---|---|---|---|---|
| Mtirala NP | 15,699 | II | *V* | *V* | *V* | **Yes** | See Chapters 2, 4, 5 for how these PAs meet criteria 1-3 |
| Kintrishi PAs | 13,893 | Ia & V | *V* | *V* | *V* | **Yes** | |
| Kobuleti PAs | 779 | Ia & IV | *V* | *V* | *V* | **Yes** | |
| Kolkheti NP | 44,308 | II | *V* | *V* | *V* | **Yes** | |
| Machakhela NP | 7,325 | II | (*V*) | *V* | X | No | Small area of sufficient protection status, little added value for OUV, young NP with forest still in regeneration |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ajameti Managed Reserve | 5,117 | IV | (*V*) | *V* | X | No | Some potentially valuable lowland Colchic forest, but young MR with forest still in regeneration, no sufficient protection status |
| Borjomi-Kharagauli NP | 85,083 | II | X | *V* | *V* | No | Overwhelmingly part of Caspian basin, only minor parts overlapping with Colchic region; flora & fauna not typically Colchic |
| Hatila Valley NP (Turkey) | 17,138 | II | (*V*) | V | ? | No | Established primarily because of geomorphological features - mainly sub-alpine and alpine areas; vegetation a sub-set of Mtirala-Kintrishi nominated component area |
| Kackar Mountains NP (Turkey) | 51,550 | II | (V) | V | X | No | Established primarily because of geomorphological features - mainly sub-alpine and alpine areas; 11 villages inside park, strong tourism pressure. |
| Altindere Valley NP (Turkey) | 4,800 | II | X | V | V | No | Established primarily because of Sumela Monastery. Some semi-humid forest areas (mostly coniferous) but added value questionable. |
| Camili SNRs (Turkey) | 670 | Ia | X | V | ? | No | Very small areas with little added value to OUV of series. |

Eleven existing forest protected areas with a potential to be included in the series were identified in Georgia and Turkey (Table 15). Of these, only four were considered suitable to contribute to the Colchic Rainforests and Wetlands nomination, as a result of careful consideration. The other areas were excluded, because of the following reasons:

**Machakhela National Park** (Georgia) was established in 2012 only. Some of its forests appear still to be in regeneration. Management capacity as well as local acceptance are still less consolidated there than in Mtirala National Park or Kintrishi Protected Areas. This would decrease the overall average level of protection as perceived during the evaluation of the nomination, and might thereby reduce its chances of success. Due to the relatively large Traditional Use Zone in this park, only two sections (of 1,424 and 429 ha, respectively) would have been available as component areas, and the forests which occur within these sections, alongside with scrub and rocky areas, add little to the OUV already represented by the much bigger and more humid Mtirala-Kintrishi nominated component area.

Inclusion of **Ajameti Managed Reserve** (Georgia) would add lowland Colchic *Quercus imeretina* and *Zelkova carpinifolia* forests, which are not well-represented in other proposed component areas. However, because of its IUCN Protected Area Management Category (IV) specific management regime, and ongoing regeneration after a history of relatively intense natural resource use, this potential component area would currently be unlikely to meet the integrity requirements of OUV, as spelled out in §§ 88 and 94 of the Operational Guidelines. This means that inclusion of Ajameti Managed Reserve would potentially strengthen a nomination significantly, but would clearly require more time for regeneration and an adaptation of the current protection regime towards non-intervention management.

Addition of parts of **Borjomi-Kharagauli National Park** (such as the Banishkhevi Gorge), would add to the overall area, species count (overall, restricted range and globally threatened) and to the clarity representation of some of the attributes of likely OUV under World Heritage criterion ix within the overall series, but would considerably weaken its Colchic focus. The increase in absolute species count particularly of vascular plants would be considerably (potentially several hundred spp.), but the increase in the numbers of fauna as well as endemic and globally threatened species would be less pronounced. Geographically, this national park is mainly located in the Caspian basin and outside the Colchic region in the strict sense (cf. Zazanashvili 2005). Some of the forests of the area are Colchic (if not rainforests), but overall species composition is broader and

reflects the location of Borjomi-Kharagauli National Park at a bio-geographic crossroads. This might give the impression of eclecticism, i.e., of lumping many heterogeneous areas into a serial nomination, with the aim of increasing the chances of success at the expense of a true reflection of identified attributes of likely OUV.

**Hatila Valley National Park** (Turkey) protects ca. 17,000 ha of forest (but no rainforests) and subalpine/alpine habitats on the eastern slope of the Kackar Mountains. It is a semi-humid area which is significantly drier than Mtirala-Kintrishi nominated component area. Annual precipitation at Artvin, near the valley's entrance, was reported as only 661 mm by Eminagaloglu and Ansin (2003). This is because this area is situated at the south-eastern (leeward) flank of the Kackar-mountains and Lesser Caucasus. Significant tree cover loss has been reported by Global Forest Watch for some parts of the upper Hatila Valley, e.g. to the west of the village of Taslica (Global Forest Watch 2019).

**Kackar Mountains National Park** (Turkey) was established primarily to protect the geo-morphological phenomena of the Kackar mountains, and contains some Colchic relict forest but predominantly sub-alpine, alpine and nival habitats (Erol et al. 2011). There would be concerns about the integrity of any potential contributions of this national park to the OUV of the Colchic Rainforests and Wetlands, because there are 11 villages inside the Park, along with strong touristic pressure (Somuncu 2007).

**Altindere Valley National Park** (Turkey) was established primarily because of the cultural-historical values associated with the 4-th Century Sumela Monastery (Erol et al. 2011). It is situated in a dramatically drier area than the Colchic Rainforests and Wetlands, with an annual precipitation of < 1,000 mm. There are some forest areas – particularly of spruce - but these are not rainforests, and their added value to the OUV of the Colchic Rainforests and Wetlands would be very limited.

The **Strict Nature Reserves of Camili-Efeler and Camili-Gorgit** (Turkey) are very small (total combined area 670 ha), i.e., not large enough to sustain Colchic rainforest function there. These are the only areas with a potentially sufficient degree of protection within the larger Camili Biosphere Reserve. Being situated in Artvin province like Hatila Valley National Park, the Camili area is also much less humid than Mtirala-Kintrishi nominated component area, and includes only a subset of the Colchic rainforest vegetation there.

As a result of the regional comparative analysis as presented in Table 15, it was concluded that by far the best– in terms of the representation of the values that make up the Outstanding Universal Value of the Colchic Rainforests and Wetlands – and at the same time by far the most suitable in terms of their management regime and the resulting integrity (including in terms of the outlook), are **Mtirala National Park, Kintrishi Protected Areas, Kobuleti Protected Areas** and **Kolkheti National Park**.

The remaining Georgian protected areas in the regional comparison are either not sufficiently Colchic in character but more typical of a bio-geographic crossroads (Borjomi-Kharagauli National Park), do not have a non-intervention management regime (Ajameti Managed Reserve), or comprise forests that are still in the process of regeneration after discontinuation of use and protected areas establishment or strengthening (Ajameti Managed Reserve, Machakhela National Park). All of them would contribute only very modestly to the overall Outstanding Universal Value of the Colchic Rainforests and Wetlands as defined in the Statement of Outstanding Universal Value.

All but one of the protected areas in Turkey that have been analyzed are not humid enough (Hatila Valley and Altindere Valley National Parks) and also too small (Strict Nature Reserves of Camili-Efeler and Camili-Gorgit) to add significantly to the Outstanding Universal Value of the Colchic Rainforests and Wetlands. Only the forested lower-altitude sections of one area (Kackar National Park) might contribute somewhat to the proposed Outstanding Universal Value relating to Features 1 and 3 (Colchic relict rainforests and ongoing evolution/speciation) under World Heritage criterion ix and also to the proposed OUV under criterion x. However, there are significant doubts if this national park would pass the integrity threshold as defined in the Operational Guidelines, as there are several villages inside this park, along with reports of significant tourism related pressures. In combination, the limited added value of inclusion, increased overall risk (in terms of integrity) and expected increased challenges in terms of coordinated trans-boundary management do not justify inclusion of Kackar National Park at this stage.

Beyond the sites included in Table 15, three additional protected areas in Georgia (Ritsa Strict Nature Reserve, Pskhu-Gumista Strict Nature Reserve and Bichvinta-Miusera Strict Nature Reserve) and Sochinsky National Park in the Russian Federation would also warrant screening because some nemoral deciduous forest with Colchic elements grows there. However, the first three areas currently cannot be managed by the Agency of Protected Areas of Georgia so as to ensure any contributions to the Outstanding Universal Value will be safeguarded, which also means that the third screening criterion would not be met by them. This is why they have been excluded from the regional analysis and the series. In any case, the most typical Colchic rainforests with the highest concentration of semi-prostrate Colchic relicts are found in the southern Colchic area (Dolukhanov 1980, Zazanashvili et al. 2000; see Figure 14), particularly on the territory of the Mtirala-Kintrishi nominated component area. Birchvinta-Miusera Strict Nature Reserve has no rainforest at all, and the other two areas include extensive tracts of sub-alpine and alpine habitats. Sochinsky National Park in the Russian Federation is part of the northern Colchic area and also has nemoral deciduous forest with some Cochic relicts. However, precipitation is much lower than in the southern Colchis (1,500 mm annual average in Sochi). Parts of this national park have been considered for extension of the Western Caucasus property (Natural Heritage Protection Fund 2014), which would exclude them from any hypothetical extension scenarios of the Colchic Rainforests and Wetlands.

There are also additional possible future PAs in the south-western Greater Caucasus, i.e., along the north-eastern edge of the Colchic area within Georgia, which have been considered for many years (e.g. GPAP 2006, 2008). These considerations are reportedly ongoing, specifically in relation to the potential creation of a Racha-Lechkhumi-Lower Svaneti National Park. If a PA with sufficiently high protection status for forests and biodiversity would be created in this region in the future, it would be interesting as an additional potential component area of the series.

It is acknowledged that the possible future creation of new protected areas, long-term progress in forest regeneration and further consolidation of the management regimes of some areas including Machakhela National Park and Ajameti Managed Reserve, improved enabling conditions for protected areas management by the Agency of Protected Areas throughout Georgia and further eco-regional cooperation in analysis and protected areas management might provide opportunities for a further extension of the Colchic Rainforests and Wetlands in the future. If this were the case, the Agency of Protected Areas of Georgia would explore the possibility of a future extension of the series in line with Paragraph 139 of the Operational Guidelines.

***The above analysis demonstrates that the current nominated component areas of the Colchic Rainforests and Wetlands belonging to Mtirala National Park, Kintrishi Protected Areas, Kobuleti Protected Areas and Kolkheti National Park as defined in Chapter 1 jointly remain the best representation of their proposed Outstanding Universal Value in relation to all proposed features under World Heritage criteria ix and x, and at the same time the areas with the highest overall integrity and strongest management regime. This includes a robust integrated management system.***

## *3.2.5 Synthesis of comparative analysis*

The separate analyses for the identified features of proposed Outstanding Universal Value under World Heritage criterion ix and x as presented in Sections 3.2.1 – 3.2.4 above show that:

- the Colchic rainforests are in a class of their own as nemoral deciduous rainforests, thanks to their past as a Pliocene refuge area and evolutionary history which spans at least 10-15 millions of years, their seasonally constant warm-temperate, unusually humid climate, as well as the manifold evolutionary and ecological adaptations of its biota and exceptionally richness of forest vegetation;
- the mires of the Colchis mire region, i.e., The percolation bogs and related mires of the Colchis mire region, are a functional type of peatland not found anywhere else in the World, and critical for the understanding of peatlands and peat formation in general;

- particularly the rain forests but also the mires constitute a stunning regional biodiversity hotspot within the wider Caucasus Global Biodiversity Hotspot, where a rich flora and fauna including many endemic and relict species adapted to warm-temperate and extremely humid climate are concentrated, and which critically contributes to a suite of broad-scale global conservation priorities; and
- the nominated component areas of the series provide the most representative, complete, unspoiled and manageable series of specific sites representing the core values above.

According to these analyses, the inscription of the Colchic Rainforests and Wetlands on the World Heritage list would be justified by each of these individual features by the above analysis. However, the series expresses an Outstanding Universal value that goes far beyond the sum of its parts:

- Together, the Colchic rainforests and wetlands (particularly mires) constitute a broad spectrum of closely interlinked ecosystem level adaptations to the warm-temperate and very humid climate of the Colchis region, which is much more complete than would be presented by each of them alone;
- The property – namely Pitshora and Churia nominated component areas - includes the ecotones between Colchic lowland rainforests and mires, which enable direct geo-ecological (e.g. matter flow between forest and mires) and biological (e.g. lifecycles of fauna) connections and thereby further add to the overall value of the series;
- The Colchic rainforests and mires provide context for each other in terms of both altitudinal patterns and the evolutionary and successional timescales over which they have evolved: While the Colchic rainforests – particularly those of Mtirala-Kintrishi nominated component area – have been in this area for many millions of years, the various mire ecosystems have commenced their ongoing development more recently at a time scale of only thousands to ten thousands of years.
- The relatively few but highly interesting endemic and relict species of the Colchic mires are the result of evolutionary trajectories which complement the range of trajectories reflected by the flora and fauna of the Colchic rainforests.

***None of the properties discussed in Sections 3.2.1 – 3.2.4 above – with perhaps the Three Parallel Rivers of Yunnan Protected Areas as the only, if hardly comparable exception – offers such a complete and complex profile of features representing the long-term evolution of flora and fauna and succession of nemoral broadleaved forest and peatland ecosystems under warm-temperate and very humid conditions. This further re-enforces the conclusions of these individual sub-chapters.***

## 3.3 PROPOSED STATEMENT OF OUTSTANDING UNIVERSAL VALUE

### *a) Brief synthesis*

The Colchic Rainforests and Wetlands are situated in Georgia, within the Autonomous Republic of Adjara as well as the regions of Guria and Samegrelo-Zemo Svaneti. They are a series of seven component areas, which are located close to each other within an 80 km long corridor along the warm-temperate and extremely humid (annual precipitation up to 4,500 mm) eastern coast of the Black Sea. They consist of an almost complete altitudinal series of the most typical Colchic ecosystems running from sea level to > 2,500 m a.s.l. The main ecosystems are ancient deciduous Colchic rainforests on the one hand, and wetlands – particularly percolation bogs and other mire types of the Colchic mire region, a distinct mire region within Europe and Eurasia – on the other hand. These ecosystems harbour a peculiar and diverse flora and fauna, which is extremely rich in endemic and relict species of flora and fauna.

The property holds the oldest broad-leaved forests – together with the Hyrcanian forests of Iran and Azerbai-

jan – in western Eurasia. These are relict forests, which have survived the glacial cycles of the ice ages, and at the same time the most humid nemoral broad-leaved rainforests globally. They comprise an astonishingly diverse flora and fauna, with impressive densities of endemic and relict species. This is the result of millions of years of uninterrupted evolution and speciation processes within the Colchic Pliocene refugium.

The peatlands of the Colchis mire region, which are closely interlinked with lowland Colchic rainforests, also reflect the mild and extremely humid conditions there. These allow for the existence of percolation bogs, the simplest functional type of mires, which is fundamental to the understanding of mires and peatlands in general, and only occurs in the Colchis mire region. Percolation bogs are accompanied by a complete series of other succession stages of mire development in the Colchic wetlands.

## *b) Justification for Criteria*

Criterion ix: The property comprises ancient Colchic rainforests with their characteristic vertical zoning and ecological succession, and wetlands (particularly Colchic mires) with their supporting processes and succession. The Colchic rainforests are the most humid temperate deciduous rainforests, and among the oldest nemoral broad-leaved forests globally. While they are distinguished from other temperate forests by their rich evergreen understoreys, they also display a remarkably dense mosaic of forest types, with 23 forest associations co-existing within an area of only about 200 $km^2$. Together with the Hyrcanian forests, they are the most important relicts of Arcto-Tertiary forests in western Eurasia. Their peculiar and diverse community, which has survived the Pleistocene glacial cycles, includes a multitude of relict and endemic species. It reflects exceptionally constant climatic conditions and is an invaluable example of the manifold long-term evolutionary processes of forest biota over at least 10-15 million years.

The extensive paludified areas along the Black Sea coast are also due to the warm-temperate and very humid climate, which is extremely favourable for the growth of mires. Their exceptional character has led to the recognition of a distinct Colchis mire region. Of particular global importance are their percolation bogs, which exist nowhere else in the World and can be considered the simplest and hence “ideal” mire type, due to almost permanent water supply exclusively by precipitation. Percolation bogs are essential for the functional understanding of all mires, and hence of terrestrial carbon storage in general.

Criterion x: The series is home to almost 1,100 species of vascular plants (particularly woody species) and bryophytes, as well as almost 500 species of vertebrates, plus a high number of invertebrate species. It hosts an extremely high – for a non-tropical, non-island region – proportion of endemic species. There are 149 species of plants with a restricted range. The contribution of endemic species to herpetofauna and mammals of the region (excl. bats) is 28%. Among these species are many relict species, which survived the glacial cycles of the Tertiary in this glacial refuge area and hence provide a window into the ancient past of Eurasia’s natural heritage. Some of the Caucasian relict species, such as Nordmann’s fir and Caucasian Salamander, have been isolated for over 14-15 millions of years from their closest relatives elsewhere. Of outstanding importance are also the gene pool and species which dispersed after the glaciations from the Colchic Rainforests and Wetlands to pan-Europe and northern Eurasia. Forty-four globally threatened or near-threatened species of vascular plants, 50 of vertebrates, and eight of invertebrates have been recorded in the Colchic Rainforests and Wetlands.

## *c) Statement of Integrity*

The nominated component areas of the Colchic Rainforests and Wetlands have been selected based on a careful regional analysis. They cover most of the existing mires of the Colchis mire region, and the best preserved and most representative rainforests. They include more than 90% of the altitudinal range at which Colchic rainforests occur, and the great majority of typical forest associations. They also comprise a complete successional series of the mires characteristic of the Colchis mire region. The nominated component areas of the series together hold the great majority of the Colchic flora and fauna, and an even greater proportion of the endemic plant species found in the wider region is concentrated there.

There have been significant losses to the Colchic rainforests and mires of the Colchic region until the late 20th Century. In contrast, their representatives inside the nominated component areas of the series have remained fully intact both structurally and functionally, as shown by their community structure and ecological processes. While some of the Colchic mires were slightly degraded by nearby draining in the past, their current hydrological intactness and resilience is ensured by their dependence on atmospheric precipitation, high mire oscillation capacity, the stabilizing effect of the nearby sea, and extensive upstream buffer zones.

The nominated component areas are effectively protected against anthropogenic threats. Only small parts of the buffer zones of some of the component areas are slightly affected by traditional natural resource use.

## *d) Requirements for protection and management*

The integrity of the Colchic Rainforests and Wetlands is ensured through effective protected areas management. All proposed component areas of the series – and all but 208 ha of the buffer zone – are situated on State-owned land within legally designated protected areas. These are either strictly protected areas (IUCN PA category Ia), or those zones of National Parks (IUCN PA category II) that afford the highest levels of protection. Only a very small part of the nominated property belongs to a protected landscape (IUCN PA category V). The boundaries of component areas incorporate all the attributes as set out in the nomination, mostly follow natural features (e.g. mountain ridges), and are known and accepted by the local population.

All four protected areas are managed by the Agency of Protected Areas of the Ministry of Environmental Protection and Agriculture of Georgia, through its local PA administrations. Comprehensive management plans for three of them are in place, with the management plan of the fourth one in preparation and expected to be finalized by mid-2019. Coordination of component areas is ensured, as they are all managed by the Agency of Protected Areas and geographically close to each other. An integrated management framework of the property has been developed by the Agency of Protected Areas.

The capacity and resourcing of the local protected areas administrations to manage the Colchic Rainforests and Wetlands is sufficient, but could be improved. The Agency of Protected Areas and its partners have already taken steps to do so, in cooperation with local stakeholders, municipalities, and international partners: Three international cooperation projects have been investing in infrastructure, equipment, training, management capacity and institutional development of the three largest protected areas contributing to the series (i.e., Kolkheti National Park, Mtirala National Park and Kintrishi Protected Areas). In addition, Kintrishi Protected Areas and Mtirala National Park receive operational funding support from the Caucasus Nature Fund, an ecoregional conservation trust fund. A National Capacity Building Plan for Protected Area Staff was developed in 2016, and is being implemented.

# 4. STATE OF CONSERVATION AND FACTORS AFFECTING THE PROPERTY

## 4.A PRESENT STATE OF CONSERVATION

The assessment of the current state of conservation of the Colchic Rainforests and Wetlands is based on records of the component protected areas of the property, of management effectiveness assessments, site visits, and a joint planning workshop in April 2018. In addition, the recent IUCN Caucasus Endemic Plant Red List assessment (Solomon et al. 2014) has provided a sound baseline to monitor shifts in conservation status of flora on a regional level – including but not restricted to the nominated component areas of the series – in the future. The combination of these information sources allows for a separate assessment of the current conservation state of individual nominated component areas and to some extent of the various features of proposed Outstanding Universal Value.

While the wider Colchic forest of Adjara areas – particularly those at lower altitudes – have historically suffered losses to logging and infrastructure development, the **functional ancient Colchic rainforests** of Mtirala-Kintrishi, Pitshora and Churia nominated component areas are in a good conservation state overall. In the case of Mtirala-Kintrishi nominated component area, some small areas are still in the process of regeneration, following the establishment of Mtirala National Park in 2006, and after the closing of a period of poorly controlled, but nevertheless low intensity use during the post-Soviet transition in the 1990s. However, even these areas have been and continue to be protected against adverse affects from logging and other resource use, because of their remoteness and inaccessibility, and increasingly also because of the effective PA management, which allows only very infrequent incidents of illegal natural resource use (Table 17). The forests of the nominated component areas are therefore in a near-pristine state, whereas the forests of the buffer zone are sufficiently intact to support and protect ecosystem functionality within the nominated property (Nakhutsrishvili et al. 2015, Zazanashvili et al. 2012).

There has been extremely little tree cover loss (1-2 ha / yr) in the entire Adjara Autonomous Republic, where most of the Colchic Forests are concentrated, since 2013, with annual tree cover loss for the entire region far below 1 $km^2$ / yr over the last 10 years (Global Forest Watch 2017). Considering the proportion of the Adjaran forests inside the property, this would translate into a theoretical estimate of < 1 ha estimated tree cover loss inside the nominated component areas of the series over the (entire) same period. However, no specific losses – by whichever causes – of even this magnitude have been reported over the period indicated.

**The mires of the Colchic mire region** have lost significant areas to drainage and conversion to agriculture in the past. In contrast to this wider picture, the peatlands of Ispani, Grigoleti, Imnati, Pitshora, Nabada and Churia nominated component areas of the property, i.e. those inside Kobuleti Protected Areas and Kolkheti National Park, are in a good state overall. As explained in more detail in Chapter 3.1.c.2, the hydrological intactness and resilience of these peatlands of the series is underpinned by their (at least partial) ombrotrophy, their high mire oscillation capacity, the stabilizing effect of the nearby sea, and their upstream buffer zones. However, the hydrological integrity of some of these areas has been slightly impaired past drainage projects in their vicinity (Krebs et al. 2009):

- The south-eastern part of Ispani 2 Mire (Ispani nominated component area) has been affected by channel construction in the 1950s, and is recovering from this period. There may also have been minor impacts of the deepening of the Togona river (Grootjans et al. 2016).
- The upper peat layer of Pitshora Mire (Pitshora nominated component area) is strongly decomposed, probably because of channel digging in the second half of the 20th century.
- Flooding from the Rioni via artificially dug channels with associated nutrient influx has affected Nabada Mire (Nabada nominated component area) in the past.

There have also been even less pronounced impacts of the occasional burning of mire vegetation and of water pollution there (Krebs et al. 2017). Nevertheless, the mires of the Colchic Rainforests and Wetlands are fundamentally intact, which is demonstrated by the ongoing natural processes involved in their function such as *Sphagnum* growth, peat decomposition, and *mooratmung*.

The conservation status of **globally threatened, endemic and relict species** as pertinent to World Heritage criterion x can be discussed jointly: While limited information is available about the conservation status of individual species within the nominated areas, no specific evidence has emerged about dramatic deteriorations of conservation status or of local extinctions. The IUCN Caucasus Endemic Plant Red List Assessment (Solomon et al. 2014) identified a number of species as threatened or near-threatened which also occur in the nominated areas, but the assessment was based on a wider area and most of these species were listed under Red List criterion B (IUCN 2017), which is primarily focused on small ranges (a natural attribute of them). The feasibility study for the World Heritage nomination of the Colchic Rainforests and Wetlands clearly identified the component protected areas of the series as strongholds of globally threatened, endemic and relict flora and fauna within the wider region.

However, there are a number of small but significant exceptions to this general trend. The Colchic Boxtree *Buxus colchicus* has been affected by Boxwood Blight in the recent past, which has severly decimated the population of this species in the Colchic Rainforests and Wetlands (Matsiakh 2016). The Box Tree Moth *Cydalima perspectalis* has also been identified on the box tree. Sweet Chestnut Blight has also occurred (Tavadze et al. 2013), but has not had the same negative effect on the forests of the series. APA is applying standard phytosanitary protocols, where appropriate, to control these threats.

In conclusion, and according to the best available information (see also Nakhutsrishvili et al. 2015), the overall community structure and diversity of flora and fauna of the areas contributing to the Colchic Rainforests and Wetlands has not suffered significant degradation in the past, and as a result is in a natural or very near-natural state.

## 4.B FACTORS AFFECTING THE PROPERTY

Similar to the assessment of the current state of conservation of the property, the assessment of pressures and potential threats is based on records of the component protected areas of the property, a joint planning workshop in April 2018 where a full threat rating according to the Open Standards for the Practice of Conservation (CMP 2013) was conducted, and on elements of the IUCN World Heritage Outlook methodology (Osipova et al. 2014). The combination of these methodologies allows for detailed analysis of pressures and potential threats affecting the property.

This nomination dossier uses the term “pressures” for any factors currently affecting the property, and the term “potential threats” for factors that are currently not active and hence not affecting the property, but would do so if they would start to happen.

The results of the assessment show that the component protected areas of the proposed property are currently affected by very weak preassures only, which is consistent with their overall good state of conservation. The more general appraisal summarized in Table 16 shows that the component areas of the property are affected by only a few pressures, and that most of those are minor or – in the worst two cases – moderate. This is supported by enforcement statistics, which show that the integrity of the buffer zones of some component protected areas is mildly affected by only a few cases or suspected cases annually of poaching (particularly of migratory raptors in Mtirala-Kintrishi and waterbirds in the nominated component areas belonging to Kolkheti National Park), illegal logging for fuelwood, illegal grazing, and littering (Table 17).

Legal fuelwood collection is only happening in the buffer zone of Mtirala-Kintrishi nominated component area, and is strictly regulated by APA (see Section 4.b.ii).

These pressures can be further analyzed as below.

**Table 16.** Overview over pressures and potential threats to the Colchic Rainforests and Wetlands. (KiPAs... Kintrishi Protected Areas; KNP... Kolkheti National Park; KoPAs... Kobuleti Protected Areas; MtNP... Mtirala National Park; NCA... Nominated Component Area. Colour code: dark green ... no pressure; light green … minor pressure; yellow … moderate pressure; no colour: potential threat).

| Categories of pressures & potential threats | Specific pressure affecting site or potential threat | Nominated property | Buffer zone |
|---|---|---|---|
| | ***4.b.i Development pressures*** | | |
| **Development of tourism infrastructure** | Planned development of a limited amount of small-scale tourism infrastructure (visitor trails, picnic places) in and near the NCAs and buffer zones of MtNP, KiPAs; development of large tourism infrastructure near the buffer zones of KoPAs, KNP. | X | X |
| **Development of hydropower stations** | Medium hydropower station on Kintrishi River downstream of KiPAs<br>All hydropower stations are outside the nominated area or buffer zone, but have a minor indirect impact including inside it (e.g. through impairing migration of stream biota). | Slight indirect impact of hydropower development outside and downstream of nominated areas and buffer zone on them. | |
| **Existing trails and roads** | Small roads inside buffer zones, and one – currently not operational – crossing Mtirala/Kintrishi NCA. No new developments planned. | X | X |
| **Residual impact of past military training infrastructure** | Small-scale remnants of military training infrastructure at former military exercise area at Nabada NCA, KNP (military use discontinued for 20 yr). | X | X |
| | ***4.b.ii Environmental pressures*** | | |
| **Livestock Farming / Grazing of domesticated animals** | Some limited grazing (mainly cattle) in and near the buffer zones. | | X |
| **Commercial hunting** | Small-scale commercial hunting of migratory waterbirds near KNP (near buffer zones of all KNP NCAs). | | X |
| **Subsistence hunting** | Small scale recreational hunting of migratory waterbirds near KNP (near buffer zones of all KNP NCAs). | | X |
| | Widespread but small scale recreational hunting and trapping of migratory raptors near the buffer zone of MtNP. | | X |
| **Fuel wood harvesting** | Small scale fuelwood harvesting in the buffer zones of Mtirala-Kintrishi nominated component area, regulated by APA. | | X |
| **Fishing** | Small to medium scale legal fishing in the buffer zone of NCAs within KNP. | | X |
| **Non-commercial use of non-timber forest products** | Small scale harvesting of non-timber forest products (including ornamental and medicinal plants, mushrooms) in the buffer zones of all forest NCAs. | | X |
| **Impact of tourism/ visitors/ recreation** | Low and localized tourism impact and disturbance in the buffer zones of both forest NCAs. There is also low-level noise disturbance ot MtNP NCA from the outside (village Chakvistavi). | X | X |
| **Fire** | Occasional past burning of surface vegetation of all peatland NCAs (KNP. KoPAs) by poachers, to deprive migratory birds of hiding areas. It cannot be excluded that this occurs again. | X | X |
| **Water management and melioration** | Moderate past changes of the mire hydrology by drainage, past drainage of adjacent areas for agricultural use (KNP and KoPA). The hydrological regime of all NCAs remains intact, however. | X | X |

| Categories of pressures & potential threats | Specific pressure affecting site or potential threat | Nominated property | Buffer zone |
|---|---|---|---|
| **Invasive non-native/ alien species** | In general, degradation of mires and forests leads to open areas, which sometimes are colonized by alien species. In some parts of the surroundings of the nominated property and buffer zone there have been considerable changes of grasslands and lowland forest communities by IAS. There are also some minor impacts of this pressure inside the buffer zone.<br>Notable invasive species include *Amorpha fruticosa* in degraded forest areas, *Polygonum thunbergii* in clearings, and *Miscanthus sinensis, Crassocephalum crepidioides, Andropogon virginicus* in degraded, dried mire locations (Krebs et al. 2017). | Potential threat, particularly considering climate change | X |
| **Water pollution** | Small-scale and minor pollution of Kintrishi river inside buffer zone of Mtirala/Kintrishi NCA from domestic sources and livestock during summer; medium-scale domestic/urban water pollution of buffer zone of Imnati and Pitshora NCAs of KNP. | | X |
| **Garbage/ solid waste** | Very weak diffuse solid waste pollution from littering by visitors within the buffer zones of all NCAs; Solid waste accumulations (flotsam) along the coastline and dunes acting as a de-facto buffer zone of Churia NCA, KNP. | | X |
| **Air-borne pollutants** | Diffuse immissions o fair-borne pollutants my affect sensitive percolation bogs, albeit to a limited degree. | | Potential threat |
| ***4.b.iii Natural disasters and risk preparedness*** | | | |
| **Avalanches/ landslides** | Moderate to high natural risk of landslides in localized parts of all forest NCAs and their buffer zones. This is part of the natural dynamics of this area with its high precipitation, but my in small places be aggravated by past forest degradation. No serious incidents over the last 10 yr. | | Potential threat |
| **Habitat shifting/ alteration** | Theoretical potential for habitat shifts/alterations with ongoing and expected climate change (Sylven et al. 2008, Zazanashvili 1999), but no evidence of this to date. | | Potential threat |
| **Droughts** | Climate of Adjara may become significantly drier and warmer, especially after mid-21st century and, particularly, towards its end (draft Adjara Forest Adaptation Strategy 2016). | | Potential threat |
| **Temperature changes** | Climate of Adjara may become significantly drier and warmer, especially after mid-21st century and, particularly, towards its end (draft Adjara Forest Adaptation Strategy 2016). | | Potential threat |
| **Storms/ flooding** | Potential for habitat flooding with ongoing and expected climate change (Sylven et al. 2008), but no evidence to date. | | Potential threat |

**Table 17.** Incidents of violations of the protection regime of the protected area contributing to the Colchic Rainforests and Wetlands in 2014-2018. (Source: APA).

| PA | Mtirala National Park | | | | | Kintrishi Protected Areas | | | | | Kobuleti Protected Areas | | | | | Kolkheti National Park | | | | | comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Violation/ Year | 14 | 15 | 16 | 17 | 18 | 14 | 15 | 16 | 17 | 18 | 14 | 15 | 16 | 17 | 18 | 14 | 15 | 16 | 17 | 18 | |
| Illegal logging | 1 | | | 3 | 4 | | 4 | 1 | 1 | 2 | | 2 | | 3 | | 18 | 7 | 4 | 3 | 3 | |
| Volume ($m^3$) | ? | | | ? | ? | | 0.84 | 4.07 | 0.78 | 3.34 | | ? | | ? | | ? | ? | ? | ? | ? | Harvested timber only recorded in 1 PA |
| Illegal timber transport | | | | | | | | | | | | | | | | 1 | | | | | |
| Poaching | | | | | | | | | | | | | | | | | | | 5 | 2 | |
| Moving with a gun | | | | | | | | | | | 1 | 1 | | 2 | | 18 | 9 | 33 | 37 | 17 | |
| Moving with net gun | | | | | | | | | | | | | | | | | | 3 | | 1 | |
| Illegal fishing | | | 2 | | | 1 | 1 | | 2 | 2 | | | | | | | | 3 | 1 | 3 | Buffer zones only |
| Moving by motorboat | | | | | | | | | | | | | | | | 1 | 12 | 17 | 10 | 6 | Buffer zones only |
| Illegal grazing | | | | | | | | | | | 1 | | | | | | | | | | |
| Illegal fire | | | | | | | | | 1 | | | | | | | | | | | | |
| Littering | | | | | | | 1 | | | | | | | | | | | 2 | 7 | 5 | |
| Other | 1 | | | | | | 2 | 1 | | | | 1 | 1 | | 1 | | | | | 2 | |
| **Total** | **2** | **0** | **2** | **3** | **4** | **1** | **8** | **2** | **4** | **4** | **2** | **4** | **1** | **5** | **1** | **38** | **28** | **62** | **63** | **39** | |

## *4.b.i Development pressures*

There is some small-scale APA-operated visitor infrastructure (visitor trails, picnic places, small shelters) in and near the buffer zones of Mtirala National Park and Kintrishi Protected Areas (see Section 5.h), as well as large tourism infrastructure near (but outside) the buffer zones of Kobuleti Protected Areas and Kolkheti National Park. It is planned that additional small scale visitor infrastructure be developed in all buffer zones, and to a small extent within the nominated areas, but without compromising their natural values (HIDRIA Ciencia 2016a, b, Schülein 2017a, b). No plans exist to develop any larger tourism infrastructure (e.g. hotels, skiing areas, paved roads) inside any of the nominated areas of buffer zones. As the development of visitor infrastructure is limited to small scale installations in very limited places and conducted in line with the provisions of existing site management plans and tourism development strategies, they will only have very a minor effect on the integrity of the Outstanding Universal Value of the series.

A medium hydropower station has been developed on the lower Kintrishi River, but outside the component areas of the series and their buffer zones. This powerstation is of modern design, but there is concern about its effect on fish migration into Kintrishi Valley: Anadromous fish populations (trout, salmon) in the Kintrishi River have decreased after construction. The water level is reduced particularly in summer. The most frequent causes of fish pass failure include lack of attraction flow, unsuitable location of the entrance, inadequate maintenance, and hydraulic conditions in the fish pass not adapted to the target species. It is acknowledged that there is a need for passage way research and practical improvements for the native spcies (upstream and downstream). However, in any case, anadromous fish and other river biota contribute only to a very limited extent to the likely OUV of the series.

## 4.b.ii Environmental pressures

There have been small-scale commercial and recreational hunting and poaching of migratory waterbirds near, and also a few cases of poaching inside the traditional use zone of Kolkheti National Park over the last years (buffer zones of all nominated component areas within this park) (Table 17). There is reportedly also some illegal hunting and trapping of migratory raptors near the buffer zones of the nominated component area of Mtirala-Kintrishi, although this has not been recorded by rangers inside the properties. Hunting is not permitted anywhere in any of the protected areas contributing to the property.

The functionality of the mire and rainforest ecosystems there is not affected by poaching and bird migration is excluded from the attributes of likely OUV of the nominated component areas of the series under WH criterion ix, but all birds are included in the overall species richness estimates listed in relation to criterion x. Therefore, this pressure has a small but noteworthy impact on one of the attributes of Outstanding Universal Value of these areas under World Heritage criterion x.

Poachers have burned the dry litter at the surface of the open mires of Kolkheti National Park at some occasions in the past, causing damage to the *Sphagnum* moss layer and a change of the nutrient situation. No recent fires have been reported. As the fires are short and fast, this damage is typically minor and full regeneration occurs within the following growing season. No peat burning has occured. Fires were observed at those parts which are easily accessible.

Some grazing (mainly cattle) occurs in non-forested parts of and near the buffer zones of all nominated component areas, but not inside the nominated component areas. As grazing is of low intensity, and limited to areas outside the forest within the buffer zones, it has only a negligible effect on their integrity.

Fuelwood is harvested legally by local communities in a regulated manner in the buffer zone of Mtirala-Kintrishi nominated component area, but not from any other buffer zones or any nominated component areas. Very modest totals of 178 $m^3$ and 159 $m^3$ of fuel wood were harvested by local inhabitants under the control of APA from the entire buffer zone of this nominated component area in 2017 and 2018, respectively. APA considers that these amounts are fully sustainable and do not compromise the effectiveness of the buffer zone, or the Outstanding Universal Value of Mtirala-Kintrishi nominated component area.

These environmental pressures discussed above are associated with traditional resource use by local communities, which has been going on for millennia in the most accessible parts of the protected areas of the series. These typically correspond to the current buffer zones. This use has allowed the preservation of the Outstanding Unversal Value of the series until today. Furthermore, it has decreased dramatically in the recent past, as a result of decreasing populations and consolidated protected areas management (see Section 5).

## 4.b.iii Natural disasters and risk preparedness

Some natural phenomena that would be considered potentially disastrous to cultural heritage are part of the natural dynamics of the Colchic Rainforests and Wetlands, have occurred there for ages, and do not threaten the integrity of their Outstanding Universal Value. For example, the high precipitation and steep terrain of the area lead to frequent avalanches in winter and sometimes to mudslides. It is likely that climate change will enhance these phenomena but there is currently no indication that this could turn them into pressures to the ecosystems there. Potential future climate change related threats to the integrity of the series are still poorly understood by the scientific community, and are therefore treated as potential threats.

In conclusion, the integrity of the buffer zones – but not of the nominated component areas – of several nominated component areas of the series is moderately affected by the combined effects of a number of current development and natural resource use related pressures, but not to an extent that would compromise their capacity to buffer the nominated property against external impacts.

***Potential future threats to the Colchic Rainforests and Wetlands***

In addition to the current pressures, there are a number of potential threats to the integrity of the proposed series:

- **Possible plans to build a container port to the northwest of Churia nominated component area, (ADC 2017):** The container port is planned ca. 7 km to the north of Churia nominated component area, but not within the nominated property or its buffer zone. An ESIA is underway and will be used to ensure compatibility of port development with the WH status. APA will be consulted in the course of this process, as is legally prescribed and established practice in Georgia.
- **Potential for habitat shifts/alterations with ongoing and expected climate change (Sylven et al. 2008):** Future habitat shifts/alterations, species introductions and pathogen outbreaks as a consequence of climate change are generally likely, but too poorly understood to assess them as a pressure. The monitoring system of the Colchic Rainforests and Wetlands includes indicators that will detect any such phenomena in the future, and will enable the management authorities of the series to manage adaptively to control them.

## *4.b.iv Responsible visitation of World Heritage sites*

Almost 111,000 individual visits were recorded in the four protected areas of the Colchic Rainforests and Wetlands combined in 2018, with Mtirala National Park being visited by most people and Kintrishi Protected Areas by the fewest (Table 18). These are moderate but nevertheless significant numbers in national and international comparison. There is also a significant increase in visitation of all these PAs over the last years, reflecting the increased interest of the Georgian public and international visitors in the natural beauty of the Colchic area, and APA's efforts to enable visitors to experience it. The five-year increase has been by a factor of 3.5 for Mtirala National Park, and by factors of almost two for the other protected areas contributing to the series.

However, the visitor numbers as reported in Table 18 do refer to the entire protected areas plus their visitor centres, which are located outside the actual protected areas. The number of visitors to the nominated component areas of the Colchic Rainforests and Wetlands is much lower, because of the following situation:

- **Mtirala National Park:** Most of the visitation is concentrated in and immediately around the village of Chakvistavi, in the buffer zone of Mtirala-Kintrishi nominated component area. There is a trail that enters the nominted component area itself and leads up to a small tourism shelter. This trail is only used by a few hundred visitors every year (113 in 2018, with additional visitors using the trail without staying at the shelter).
- **Kintrishi Protected Areas:** The parts of Mtirala-Kintrishi nominated component area that overlap with Kintrishi Protected Areas are even less accessible for visitors. The trail connecting Kintrishi Protected Landscape to Mtirala National Park is not usable at the moment, as several bridges on the Mtirala site have been destroyed. This trail might be re-constructed in the future, but only as a small hiking trail (HIDRIA Ciencia 2016a, b, Schülein 2017a, b). There is only a small trail at the head of Kintrisihi Valley leading up to Tbikeli Lake, wich will undergo restoration for hiking use in 2019. This leads to visitation of Kintrishi Valley being concentrated almost exclusively in Kintrishi Protected Landscape, i.e. the buffer zone of Mtirala-Kintrishi nominated component area.
- **Kobuleti Protected Areas:** Ispani nominated component area is not accessible to visitors. Visitors can observe it from an observation tower that is accessible via board walks, and located outside the actual mire (cf. Chapter 5.h). There are no boardwalks on Ispani 2 mire (and none is planned), and the soft peaty ground makes walking there impossible.
- **Kolkheti National Park:** The only nominated component areas inside Kolkheti National Park that is currently directly accessible to visitors is Imnati nominated component area, where there is an observation tower (accessible by boat only), and the Colchic lowland forests on the right bank of the Pitshora River at

Pitshora nominated component area and neaer the village of Sakorkio. However, only small picnic places directly on the river and no trails or other infrastructure leading deeper into the forest or to Pitshora Mire are open to visitors. Visitors can also access the boundary of – but not enter – Nabada and Churia nominated component areas.

**Table 18.** Visitor numbers at the protected areas contributing to the nominated component areas of the Colchic Forests and Wetlands. (Source: APA)

| Year | Mtirala National Park | Kintrishi Protected Areas | Kobuleti Protected Areas | Kolkheti National Park |
|---|---|---|---|---|
| 2008 | 628 | 458 | 756 | 1,994 |
| 2009 | 2,533 | 1,393 | 1,138 | 1,490 |
| 2010 | 15,350 | 3,464 | 6,140 | 15,311 |
| 2011 | 19,400 | 3,212 | 10,294 | 16,760 |
| 2012 | 21,939 | 4,843 | 10,412 | 22,924 |
| 2013 | 16,358 | 3,364 | 7,553 | 17,552 |
| 2014 | 22,968 | 3,696 | 8,426 | 17,699 |
| 2015 | 21,981 | 3,758 | 8,737 | 13,747 |
| 2016 | 33,774 | 5,138 | 9,175 | 26,816 |
| 2017 | 47,460 | 5,384 | 11,286 | 29,523 |
| 2018 | 56,604 | 6,453 | 14,010 | 33,806 |

In conclusion, fewer visitors than suggested by the overall visitor numbers of the four protected areas contributing to the Colchic Rainforests and Wetlands **currently** visit the actual nominated component areas of the property. Visitation of these areas is currently far below carrying capacity, and absolutely negligible in comparison to the level of visitation of many sites already inscribed on the World Heritage list.

**Tourism development and visitor management plans:** APA has undertaken efforts to ensure that visitation of the Colchic Rainforests and Wetlands will become possible, but at the same time remain sustainable and will not compromise the Outstanding Universal Value of the property. This is true even if visitor numbers increase in the future, as is expected. Sustainable tourism development strategy and action plans have been developed for Mtirala National Park and Kintrishi Protected Areas (HIDRIA Ciencia 2016a, b, Schülein 2017a, b). The development of visitation and visitor infrastructure in Kobuleti Protected Areas and Kolkheti National Park is regulated by their respective management plans (APA 2018a, b). The existing management plans of all protected areas contributing to the series also contain provisions on visitation and sustainable tourism development. Taken together, these regulate the admissible development of infrastructure, allowed and prohibited activities, and other aspects of responsible visitation.

## *4.b.v Number of inhabitants within the property and the buffer zone*

Estimated population located within:

**Area of nominated property:** 0

**Buffer zone:** 25 families in Kintrishi Protected Landscape, buffer zone of Mtirala-Kintrishi nominated component area (< 100 individuals, seasonal inhabitation only)

**Total:** 25 Families (< 100 individuals, seasonal inhabitation only)

**Year:** 2017

# 5. PROTECTION AND MANAGEMENT OF THE PROPERTY

## 5.A OWNERSHIP

The entire area of all nominated component areas and the overwhelming majority of the buffer zone are situated on State-owned land.

All protected areas in Georgia except protected landscapes are exclusively and entirely located on State-owned land. This also applies to the entire nominated area of the Colchic Rainforests and Wetlands, which is currently part of two national parks (Mtirala and Kolkheti National Parks), two strict nature reserves, (Kintrishi and Kobuleti Strict Nature Reserve), and a small part of Kintrishi Protected Landscape (Table 19)[1].

**Table 19.** Protected area designations and zones (according to legally binding PA management plans and zoning maps) of the nominated component areas of the series and their buffer zones. See maps for details. (MR… Managed Reserve; NP… National Park; PA… Protected area; PL… Protected Landscape; SNR… Strict Nature Reserve).

| No. | Nominated component area | PA(s) | PA Mgmt. category | Zone(s) – nominated component area | Zone(s) – buffer zones |
|---|---|---|---|---|---|
| 1 | **Mtirala/Kintrishi** | Mtirala | NP | Strict Protection Zone<br>Visitor Zone | Visitor Zone,<br>Traditional Use Zone |
| | | Kintrishi | SNR<br>PL | n.a. [1]<br>n.a.[1] | n.a.[1]<br>n.a.[1] |
| 2 | **Ispani** | Kobuleti | SNR<br>MR | n.a.[1]<br>- | n.a.[1]<br>n.a.[1] |
| 3 | **Grigoleti** | Kolkheti | NP | Strict Protection Zone | Strict Protection Zone<br>Traditional Use Zone<br>Managed Zone |
| 4 | **Imnati** | | | | |
| 5 | **Pitshora** | | | | |
| 6 | **Nabada** | | | | |
| 7 | **Churia** | | | | |

1 …Kintrishi Strict Nature Reserve, Kintrishi Protected Landscape, Kobuleti Strict Nature Reserve and Kobuleti Managed Reserve are not divided into zones.

Furthermore, >99% of the overall area of the buffer zones of the nominated component areas are State-owned. Only 209 ha of the buffer zone – scattered in small plots – of the series in Kintrishi Protected Landscape, Mtirala-Kintrishi nominated component area, are privately owned.

No part of the nominated component areas is on private land: While an area of 691 ha (3.4%) of the Mtirala-Kintrishi nominated component area (in upper Kintrishi Valley) and 1.954 ha (21.4%) of its buffer zone are currently situated within Kintrishi Protected Landscape, those areas included in the nominated component area fully on State-owned land. 89 % of the area of the buffer zone within Kintrishi Protected Landscape is also situated on State-owned land.

Kintrishi Strict Nature Reserve (Figure 79) and Kintrishi Protected Landscape are currently undergoing a re-designation and re-zoning process, which will be finalized in mid-2019. This will not affect the land ownership in this nominated component area or its buffer zone.

**1** Kintrishi Protected Areas are currently being re-designated as a National Park (with a nested Strict Nature Reserve) and re-zoned, with no reduction in strict protection expected. This process will be finished in mid-2019. The State Party will update UNESCO about the progress of the re-zoning and any possible necessary minor adjustments of the boundaries of Mtirala-Kintrishi nominated component area.


**Figure 79.** Entry gate to Kintrishi Protected Areas, Mtirala-Kintrishi nominated component area. (Photo: Tobias Garstecki)

## 5.B PROTECTIVE DESIGNATION

All nominated component areas of the series and their buffer zones are on existing, legally established and gazetted protected areas (Table 19, Figures 80 – 84, Appendix 1).

The following PAs harbour parts of the nominated component areas and/or their buffer zones (see Table 19 for details):

- **Mtirala National Park** (15,699 ha), which was established in 2006 (parts of Mtirala-Kintrishi nominated component area and parts of its buffer zone);
- **Kintrishi Strict Nature Reserve** (10,703 ha), which was established in 1959 (parts of Mtirala-Kintrishi nominated component area and parts of its buffer zone);
- **Kintrishi Protected Landscape** (3,190 ha), which was established in 2007 (parts of Mtirala-Kintrishi nominated component area and parts of its buffer zone);
- **Kobuleti Strict Nature Reserve** (316 ha), which was established in 1998 (Ispani nominated component area and parts of its buffer zone);
- **Kobuleti Managed Reserve** (466 ha), which was established in 1998 (parts of the buffer zone of Ispani nominated component area);
- **Kolkheti National Park** (44,308 ha), which was established in 1998 (Grigoleti, Imnati, Pitshora, Nabada and Churia nominated component areas and their buffer zones).

Instead of the nominated component areas coinciding with one protected area each, there are three different types of spatial relationship of the nominated component areas of the Colchic Rainforests and Wetlands to the protected areas around them:

- **Mtirala-Kintrishi (No. 1) nominated component area** covers parts of three different, but directly adjacent protected areas (Mtirala National Park, Kintrishi Strict Nature Reserve and Kintrishi Protected Land-

scape). These are all managed by APA.

- **Ispani nominated component area (No. 2)** is the only nominated component area within Kobuleti Strict Nature Reserve and does not overlap with other areas.
- **All other nominated component areas (No. 3-7)** are within Kolkheti National Park. However, they are discontinuous, because the park itself consists of four separate parts and (in the case of Imnati and Pitshora nominated component area) because the main features of proposed OUV there are separated by less valuable areas.

The nominated component areas are situated within either strictly protected areas (IUCN PA Management Category Ia), or those zones of National Parks (IUCN PA Management Category II) that afford the highest levels of protection. A very small part of Mtirala-Kintrishi nominated component area is currently situated within Kintrishi Protected Landscape (IUCN PA Management Category V), albeit in an area that is not used by or earmarked for agriculture or development, and is practically not used for natural resources extraction, because of its remoteness and inaccessibility. This area will also become part of a national park (Kintrishi National Park) in 2019, once the re-designation and re-zoning have been completed. According to the current draft map, it will be part of the strict protection zone of the new Kintrishi National Park.

Those nominated component areas that are part of national Parks are either within their strict protection zones or their visitor zones (Table 19, Figures 80 – 84, Appendix 1). According to the Georgian Law on the System of Protected Areas and to the relevant management plan (currently only that of Mtirala National Park, prospectively also in Kintrishi National Park), the visitor zones of national parks differ from strict protection zones only in that they are accessible for visitors along marked trails and that the construction of such trails (un-paved) and of other small-scale visitor infrastructure (e.g. picnic and bivouac places and small shelters) is allowed. The development of small visitor infrastructure has to be in agreement with the long-term conservation objectives of the national park in question. No natural resource extraction is allowed in those visitor zones. The legal provisions for the visitor zone of Mtirala National Park are summarized in its management plan.

Their boundaries of the protected areas enclosing the nominated component areas of the property mostly follow natural features (e.g. mountain ridges, water courses – cf. Appendix 1), and are known and accepted by the local population.

The buffer zones – where necessary – also consist of protected areas, typically either of PAs corresponding to IUCN PA Management Categories IV or V, or of traditional use zones, managed zones or similar zones of National Parks (IUCN PA Management Category II). In a few cases, parts of the strict protection zones of protected areas have been excluded from the nominated component areas protected by them, because they contain small springwater collectors with their access trails, and form part of their buffer zones (Table 20).

No buffer zones are needed outside some of the borders of some nominated component areas as these are naturally protected because of inaccessibility (e.g. because of the steepness of the terrain) (Table 21).

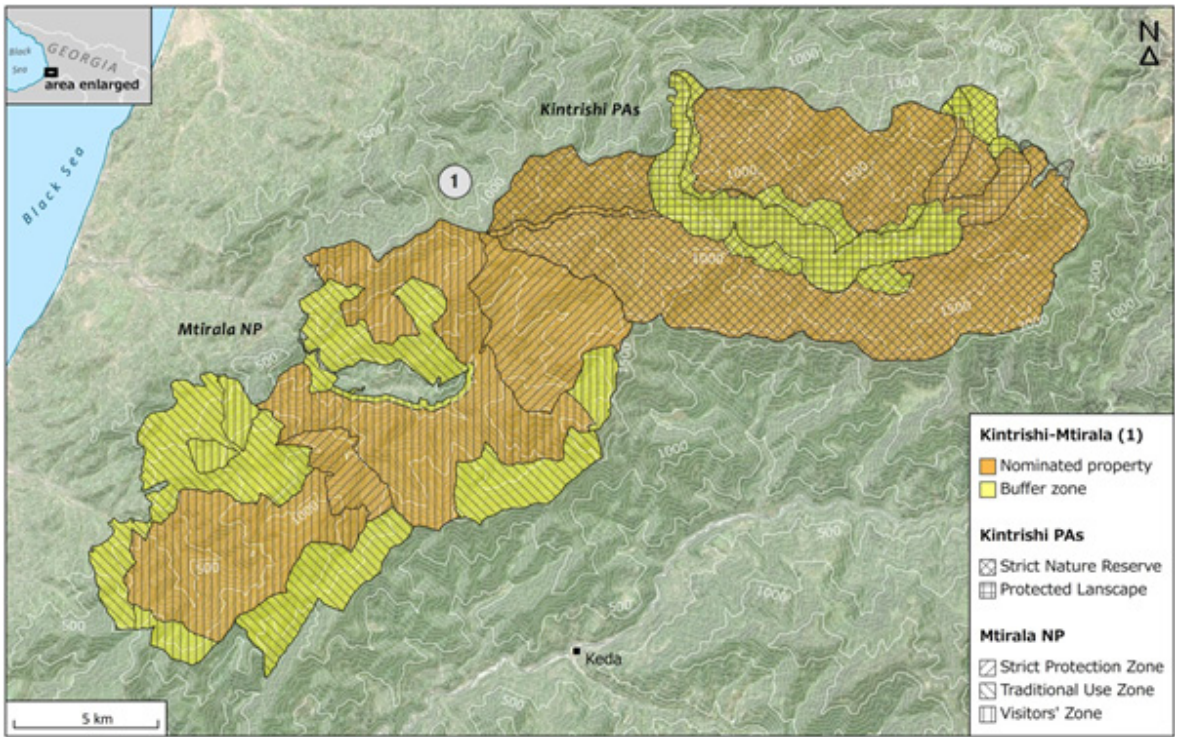


**Figure 80.** Overview map of the Mtirala-Kintrishi nominated component area and its buffer zone (No. 1) with boundaries and zoning of Mtirala National Park and Kintrishi Protected Areas.

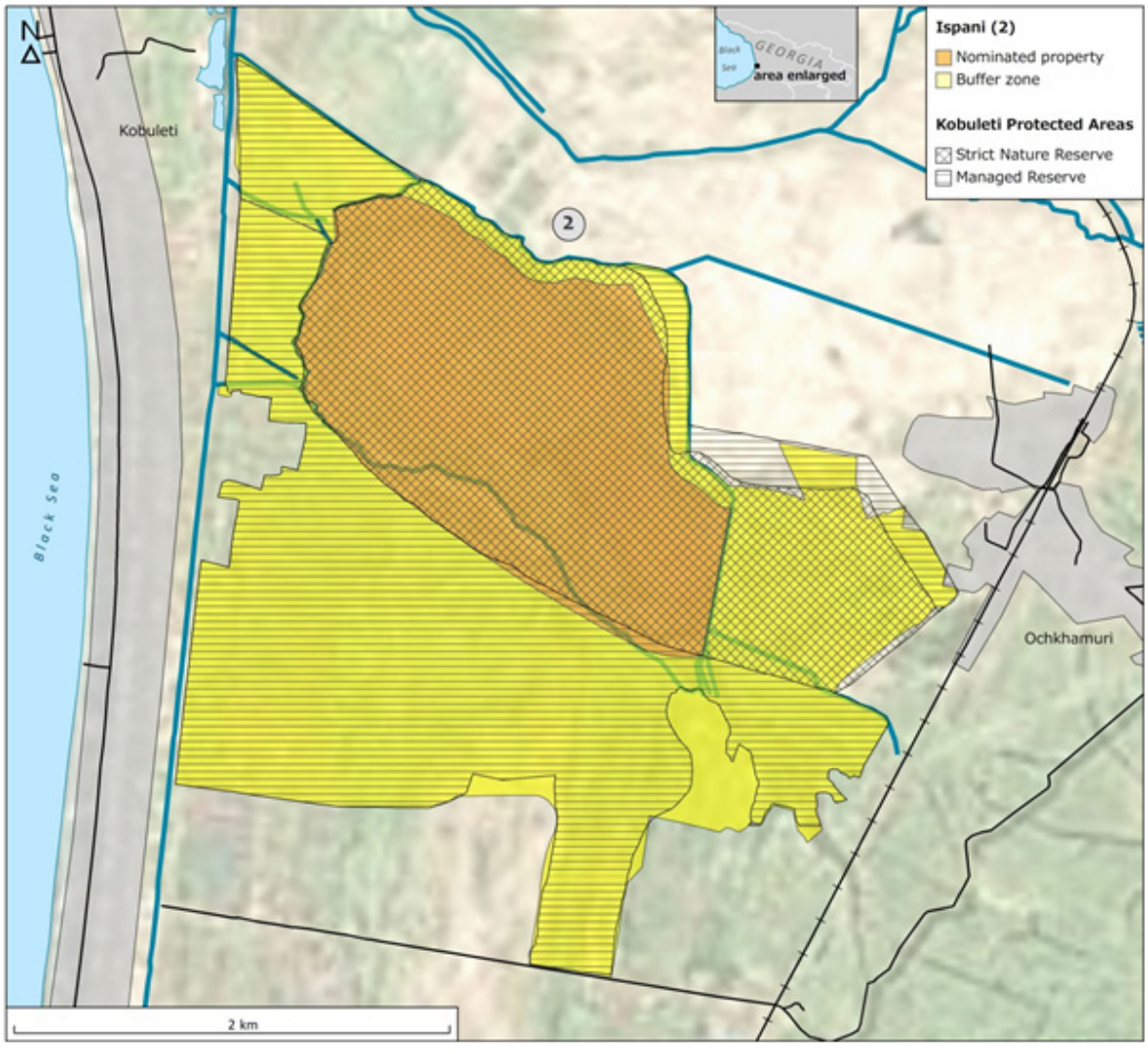


**Figure 81.** Overview map of the Ispani nominated component area and its buffer zone (No. 2) with boundaries and zoning of Kobuleti Protected Areas.

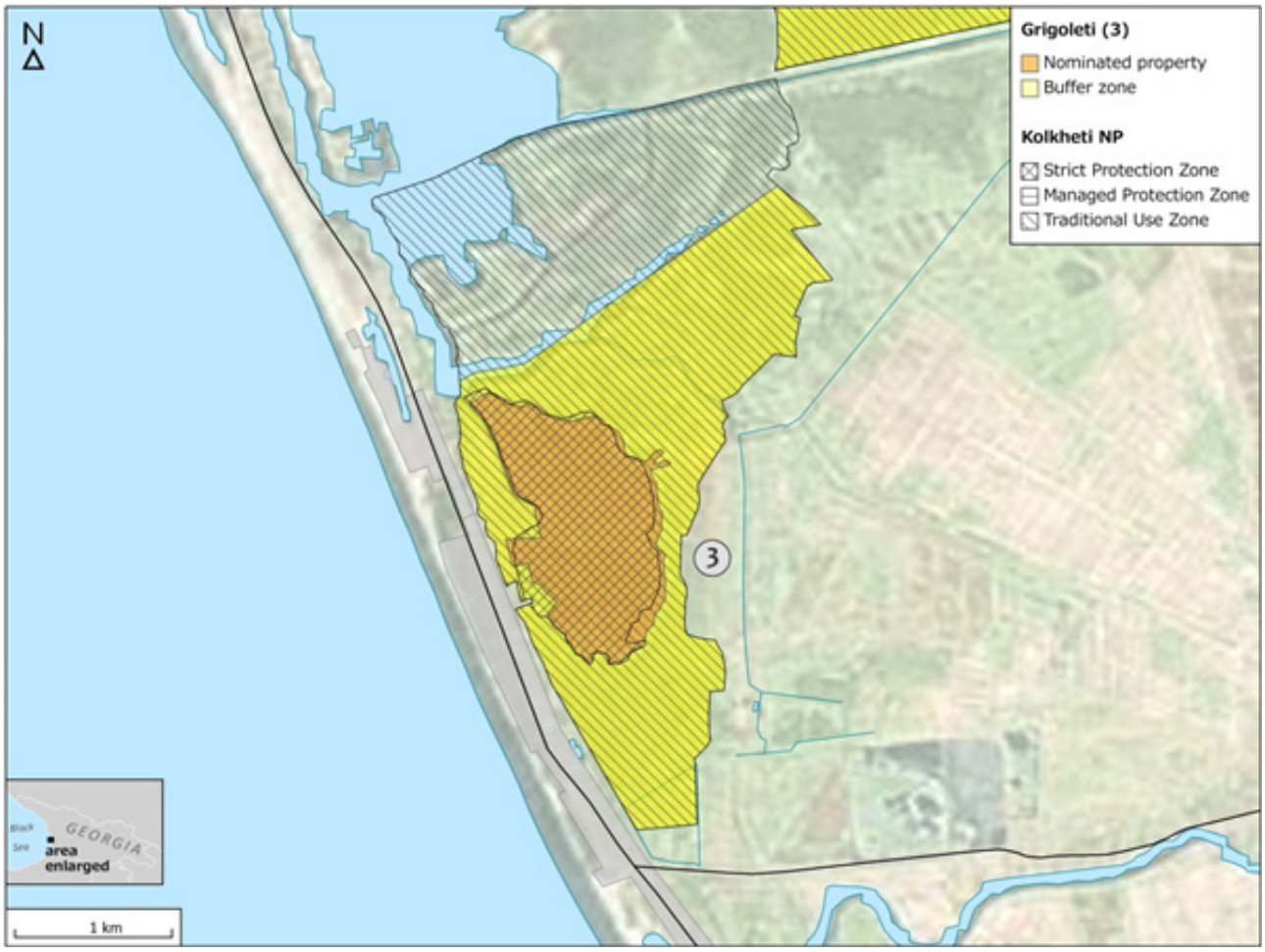


**Figure 82.** Overview map of the Grigoleti nominated component area and its buffer zone (No. 3) with boundaries and zoning of Kolkheti National Park.

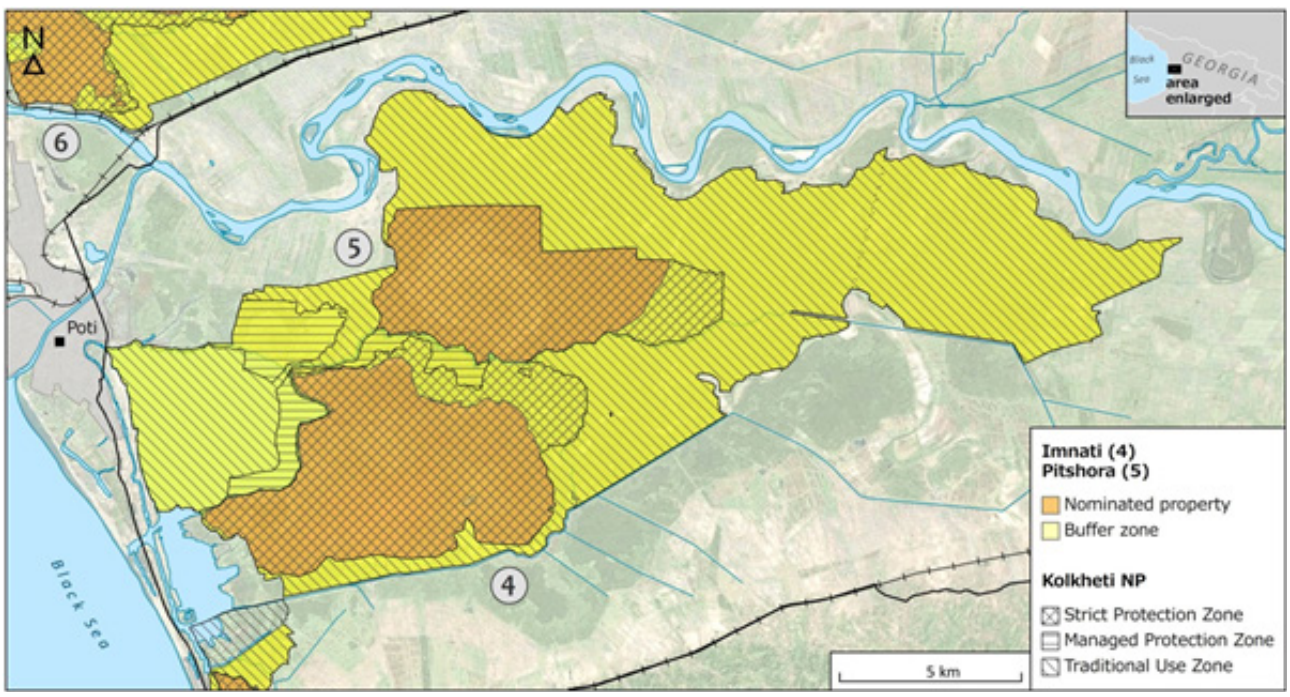


**Figure 83.** Overview map of the Ispani and Pitshora nominated component areas and their buffer zones (No. 4 and 5) with boundaries and zoning of Kolkheti National Park.

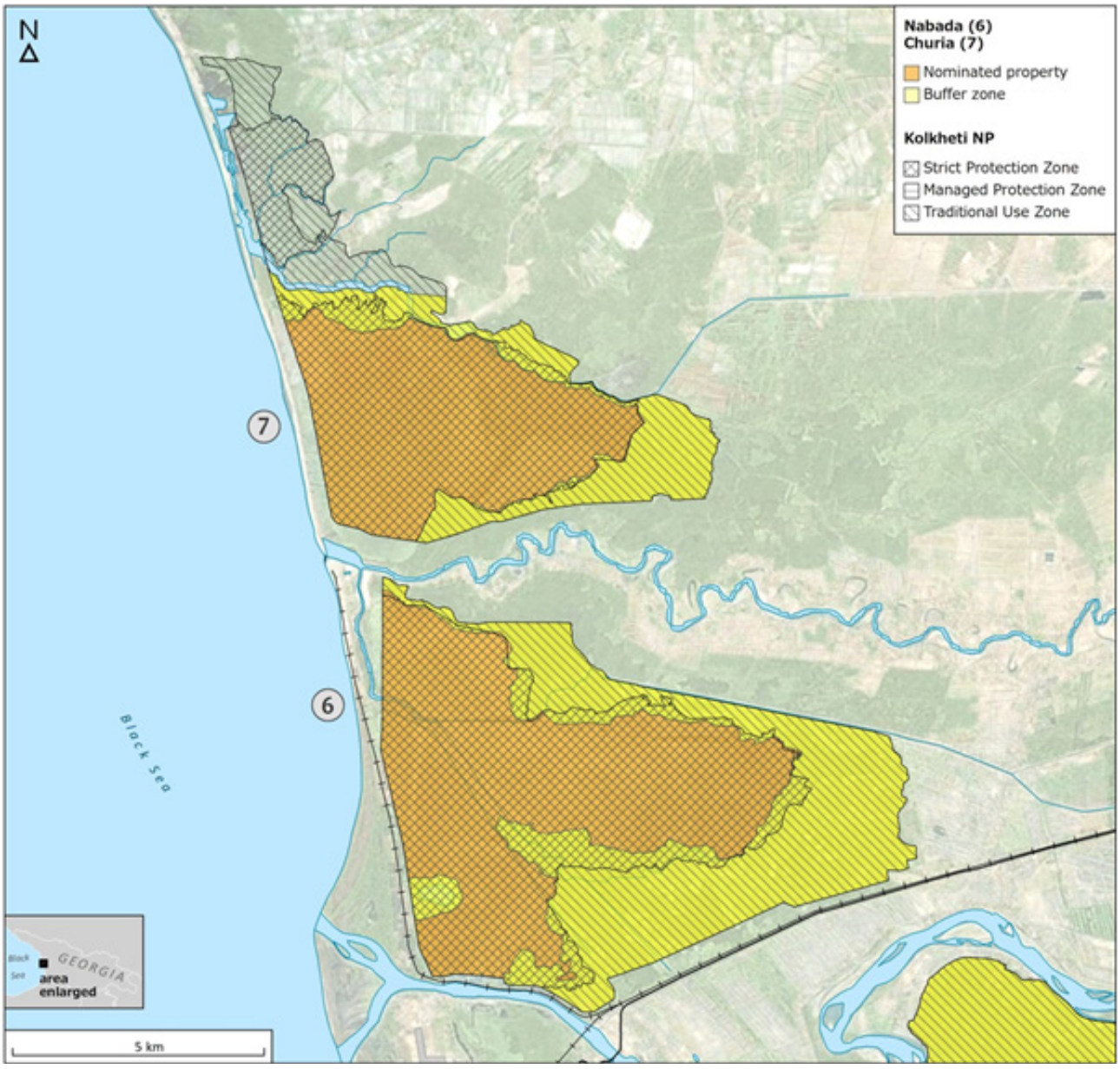


**Figure 84.** Overview map of the Nabada and Churia nominated component areas and their buffer zones (No. 6 and 7) with boundaries and zoning of Kolkheti National Park.

**Table 20.** Parts of the buffer zones of nominated component areas of the Colchic Rainforests and Wetlands included within the Strict Protection Zones or Visitor Zones of the Protected Areas around them.

| Component area | Buffer zone segment | Reason |
|---|---|---|
| **Mtirala-Kintrishi** | Visitor zone NW of Mt. Didi Mtirala | Legal challenge on land ownership in small part of segments pending, possibility of future conflict |
| | Visitor zone SW of Mt. Murvili | |
| | Two isolated patches of visitor zone to NW of Mt. Mtsire Mtirala | Too isolated to be viable as nominated component area |
| | 200 m strip of visitor zone directly S of village of Chakvistavi | Some (limited) noise disturbance to fauna from village possible, better as buffer zone |
| | Small areas of strict protection zone inside Kintrishi Valley | Some (very low intensity) natural resource use along valley trail |
| | Strict protection zone in sub-alpine belt at the upper (NW) end of Kintrishi Valley | Some (low intensity) grazing use in sub-alpine zone |
| **Ispani** | Easternmost part of strict protection zone outside Ispani 2 Mire | Past degradation of peatland ecosystem – might be suitable for inclusion in nomination area in the future |
| | Narrow strip of Strict Protection Zone in N of Ispani 2 Mire | Forest and shrubs without significant biodiversity – better as buffer zone |
| **Imnati** | Strict protection zone in N and NE of Imnati Mire | Regenerating forest after past NR use. Might be suitable for inclusion in nomination area in the future |
| **Pitshora** | Easternmost part of strict protection zone in E of Pitshora mire | |
| **Nabada** | Narrow strip of forest to N, E and S of Nabada Mire, within strict protection zone | |
| **Churia** | Narrow strip of forest to N of Churia Mire, within strict protection zone | |

**Table 21.** Justification for those specific parts of the boundaries of nominated component areas of the Colchic Rainforests and Wetlands that do not need a buffer zone.

| Component area | Boundary segment | Justification |
|---|---|---|
| **Mtirala-Kintrishi** | Parts of SE boundary and eastern part of S boundary at Kintrishi Strict Nature Reserve;<br>N boundary of Kintrishi Strict Nature Reserve; N boundary of Mtirala National Park, ca. 4.5 km N of Chakvistavi Village | Boundary runs along steep mountain ranges, the outward-facing slopes of which provide natural protection because of inaccessibility. No commercial forest use in forests along the outward-facing slopes because of steep gradient. |
| | Ca. 2 km of NW boundary of Mtirala National Park, ca. 4 km W of Chakvistavi Village | Boundary runs along a steep ravine in inaccessible, steep territory, which provides natural protection. |
| **Imnati** | Ca. 1 km of the SW boundary, ca. 3.5 km to the NE of Maltakva village | Surrounding area cut off by watercourses, inaccessible, very little use. |
| **Pitshora** | Ca. 600 m of the W boundary, ca. 900 m SE of Sakorkio Village | Stream acts as natural boundary. |
| **Nabada** | W and parts of SW boundary | Area mostly cut off by Rioni River to the S, no inhabitation and little land use between Nabada Mire and the Black Sea, Mire hydrologically stabilized by proximity of Sea. |
| **Churia** | W and parts of SW boundary | Area fully cut off by Churia and Khobi rivers and inaccessible. No inhabitation or land use between Churia Mire and the Sea. Mire hydrologically stabilized by proximity of Sea. |

## 5.C MEANS OF IMPLEMENTING PROTECTIVE MEASURES

In practice, the protective designation of the four protected areas protecting the seven nominated component areas of the Colchic Rainforests and Wetlands is enforced and implemented through protected areas management by the Agency of Protected Areas of Georgia, in collaboration with surrounding municipalities and institutional stakeholders, as well as local communities and civil society organizations.

As a result, all of the PAs overlapping with the component parts and buffer zones of the nomination have protection and management systems in line with §§ 108-112 of the Operational Guidelines. However, the precision and format in which these systems are currently documented, as well as the degree of their effectiveness, differ between the individual nominated component areas as described below.

## 5.c.1 Institutional basis for protection and management

The protected areas protecting the component areas of the Colchic Rainforests and Wetlands are managed as branches of the Agency of Protected Areas of Georgia (APA) (Figure 85). APA is a Legal Entity of Public Law (LEPL), which was established in 2008 as a result of institutional reform and reports to the Ministry of Environmental Protection and Agriculture of Georgia (MEPA). They report to the Agency's headquarters in Tbilisi and are financed from the central government budget through APA. This means that all four protected areas belong to the same institution. APA's *"primary responsibility is to manage Georgia's strict nature reserves, national parks, natural monuments, managed reserves, protected landscapes, biosphere reserves, world heritage sites and wetland sites of international importance"* (APA 2019).

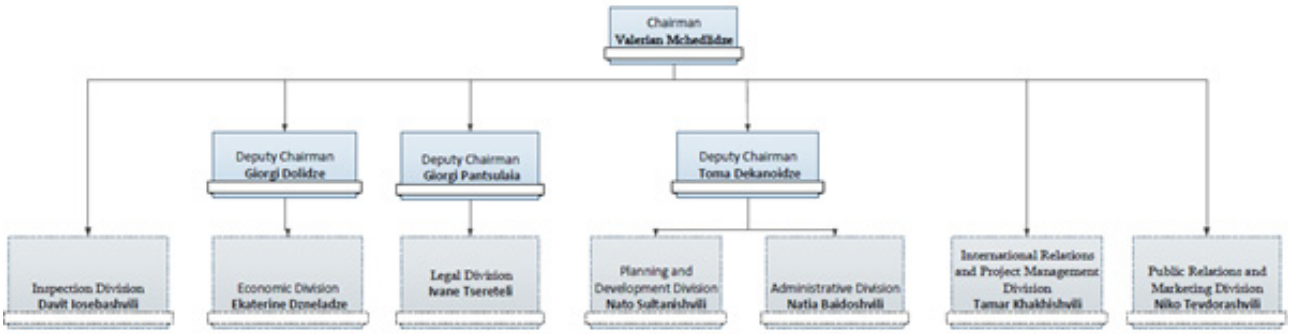


**Figure 85.** Organizational chart of the Agency of Protected Areas of Georgia. The individual protected areas administrations report to the Planning and Development Department (bottom line, 4th box from left). (Source: APA)

Each of the PA administrations has a Director who reports to APA and leads a local PA staff (cf. Chapter 5.j). The administration of Mtirala National Park is located in the town of Chakvi ca. 12 km north of the City of Batumi, those of Kintrishi PAs and Kobuleti PAs are located in the town of Kobuleti ca. 25 km north of Batumi, and that of Kolkheti National Park is located in the outskirts of the city of Poti. Besides the PA administrations, the PAs have various additional protection and visitor infrastructure directly within the protected areas contributing to the series, including visitor centers, touristic trails, ranger stations and shelters (cf. Chapter 5.h), etc.

There is frequent and close communication and collaboration of the individual PAs under the umbrella of APA. In general, the relatively coherent and centralized institutional setup of the nominated component areas of the Colchic Rainforests and Wetlands is considered conducive to the effective management of the series.

## 5.c.2 Legal basis for protection and management

The protected areas system of Georgia is based on the *"Law of Georgia on the System of Protected Areas"* (1996). The Environmental Law Alliance Worldwide provides an English translation of that law (ELAW 2018). All individual protected areas contributing to the series are also legally established based on laws which are passed by parliament.

Of particular relevance to the practical management of Georgian PAs is Decree No. 110 of the Minister of Environment Protection of Georgia (2014) *"On structure and content of protected areas management plan and preparation stages and procedures of methodology of development of thematic topics" (Appendix 5)*. This decree sets out the procedure of management planning and the structure of individual PA management plans (cf. Chapter 5.e), and by implication provides a framework for the organization of management in practice. It has been the framework within which the management plan for Mtirala National Park has been developed, and within which those of Kolkheti National Park and Kobuleti Protected Areas have been renewed. It will also underpin the management planning process for Kintrishi National Park, after re-designation of Kintrishi Strict Nature Reserve and Kintrishi Protected Landscape. These management plans cannot be legally overruled by other plans, according to Georgian legislation.

From the point of view of managing the nominated component areas to protect their likely OUV, the current legal management planning framework as defined by Decree No. 110 of the Minister of Environment Protection of Georgia (2014) in Georgia has the following main strengths:

- **Participatory approach:** The framework foresees stakeholder participation both at the level of planning and during implementation. A stakeholder analysis and engagement plan is developed for each individual planning process, and a public consultation/hearing is foreseen once drafts have been produced. In addition, the planning framework is consistent with the general trend in Georgian PAs to have Regional Advisory Councils (cf. Chapter 5.c.3).
- **Consistency:** Since it is obligatory to apply the regulation in all Georgian PAs, the resulting plans tend to be generally consistent. This is important for the joint management framework of the proposed serial property, which builds on this consistency.
- **Modern, multifunctional PA paradigm:** Decree 110 reflects a modern PA paradigm, which sees PAs not as mono-functional entities that are only aimed at biodiversity conservation through exclusion of other uses, but instead acknowledges their importance for the provision of ecosystem services to a wide range of stakeholders from the local to the global level. This will contribute to overall stakeholder support and hence management effectiveness of the proposed series.
- **Planning capacity:** APA, as well as the national and international consultants supporting the agency, have been able to develop a certain level of capacity to implement the PA management approach as laid out in the regulation, based on its repeated application. This has also contributed to the general level of PA management planning capacity on APA's and its partners' part.

## *5.c.3 Stakeholder participation and shared understanding of the proposed property*

Stakeholder involvement in the general planning and practical management of the PAs protecting the nominated component areas of the Colchic Rainforests and Wetlands, as well as other PAs in Georgia, is legally prescribed by the above legislation and implemented through the following means:

The key instruments for the participation of institutional and non-institutional stakeholders in PA governance in Georgia are ***Regional Advisory Boards*** (specific for each PA), which bring together representatives of municipalities, institutions active in the region, resource users and other important stakeholders (see Box 7 for an example). There are also Junior Ranger Programmes (e.g. in Mtirala National Park) and Friends Associations (e.g. in Kintrishi Protected Areas), which acts as further catalysts of local stakeholder support and communications of the PAs contributing to the series.

**Box 7.** Representatives of the Regional Advisory Council of Kintrishi Protected Areas. (Source: SPPA-Georgia)

1. Representative of Ajara Government - division of Environment and Natural resources
2. Representative of Ajara Government - division Tourism and Resorts
3. Representative of Kobuleti Municipality - from Mayor
4. Representative of Kobuleti Municipality - from Municipality, representative Chakhati Community
5. Representative of Community
6. Representative of Community
7. Representative of APA/PA Administration (Director of Administration)
8. Representative of Educational resource-centre of Kobuleti
9. Representative of NGO (Mta-Bari)
10. Representative of NGO (Kintrishi Friends Association).

Beyond the normal stakeholder engagement activities of the PAs contributing to the series, awareness raising and stakeholder engagement activities were implemented with the financial support from the Government of Germany (BMUB, UBA and BfN) and through close cooperation between the Michael Succow Foundation, WWF Caucasus Programme Office and Agency of Protected Areas of the Ministry of Environment Protection and Agriculture of Georgia in 2018. The awareness raising and stakeholder engagement activities included the following communication materials and events:

- A Georgian language brochure with information on planned nomination of Colchic Forests and Wetlands for inscription on the UNESCO World Heritage List. It also included description of component areas of the proposed property. The brochures were communicated to key stakeholders at the central and local levels.
- A local stakeholder information meeting organized on 13 February 2018 in Kobuleti. The meeting was attended by 36 participants, with high level representation of local decision-makers and other key stakeholders. Information on the planned nomination of Colchic Forests and Wetlands for inscription on the UNESCO's World Heritage List was very well received and supported by all participants. They expressed an interest to be further informed on the nomination progress (see Appendix 6 for workshop protocol).
- A national stakeholder workshop was organized on 25 October 2018 in Batumi with the objectives (i) to increase knowledge and understanding of the World Heritage Concept and enhance stakeholders` participation in the nomination process; and (ii) to update key stakeholders on the progress towards the nomination as well as inform on further steps for completion the official nomination. The workshop was attended by 39 participants and in this case too with high level representation of local decision-makers and other key stakeholders. The stakeholders actively participated in consultations and discussion, demonstrated their interest and support to the nomination and provided valuable feedback (see Appendix 7 for workshop protocol).
- A short video clip with information on the uniqueness of Colchic Forests and Wetlands and its nomination for inscription on the UNESCO's World Heritage List. This video clip will be widely communicated following the official submission of the nomination.

These measures, as well as manifold informal meetings over the entire pre-nominatino phase of about two years, ensured a sufficient degree of stakeholders participation and shared understanding of the proposed property to meet the respective requirements of Article 111 of the Operational Guidelines.

## *5.c.4 Thematic areas and practical procedures for management*

Based on current legislation and practice (including staffing and resourcing – see Sections 5.f, 5.g, 5.j), PA management in Georgia including the PAs contributing to the series comprises the following thematic fields:

- **Guarding** against illegal access to the protected area, illegal use of the protected area's natural resources and other illegal activities: The rangers of each area are responsible for guarding, typically on foot or vehicle on pre-determined patrolling routes (Figure 86). They are supervised by head rangers and the heads of the protection divisions of each area. There is no SMART patrolling yet (SMART Partnership 2018), but its introduction is currently being planned – at least for the PAs of the Mtirala-Kintrishi nominated component area – with the support of the Caucasus Nature Fund.
- **Management of risks** posed by fire, pests and diseases, and other natural features. This excludes the Strict Protection Zones of PAs, i.e. those parts which mainly coincide with the nominated component areas. However, there are regular phyto-pathological surveys even there.
- **Conservation and restoration measures** for species and ecosystems: Limited but significant activities of this type are implemented in the PAs contributing to the series.
- **Environmental education:** Environmental education activities target local inhabitants – particular young

people (via school cooperation – see Figures 87, 88), as well as visitors (via visitor centers, exhibitions, etc.).

- **Community outreach:** This includes work with the Regional Advisory Councils of individual PAs, where they exist, as well as projects to realize the potential of PAs to generate socio-economic benefits to local inhabitants, through the development of biodiversity-friendly livelihoods.
- **Monitoring** of the protected area's key values, including the condition of biodiversity and tendencies: The management plans of the nominated component areas of the series define monitoring needs and measures – typically the occurrence of identified target species of each area and trends in key threats. The monitoring system of Georgian PAs is currently in a transition from a more reactive approach, in which rangers note down anecdotal observations and PA administrations compile these records in annual reports, to a more systematic approach, where targeted monitoring programmes aimed at trends in the status of species and ecosystems as well as threats are implemented, often involving cooperation with external experts. This transition is supported through international cooperation, including the KFW-funded Support Programme for Protected Areas in Georgia, and the Caucasus Nature Fund. Furthermore, the Conservation Coaches Network Europe and Ilia State University conducted a workshop on Adaptive Management based on the Open Standards for the Practice of Conservation (CMP 2013) in Georgia in April 2018, which was used by representatives of the PAs contributing to the series to develop the backbone of an adaptive management system including a monitoring system (cf. Chapter 6, Table 28).
- **Institutional development**. APA considers that institutional development is important to ensure better management performance and service quality on PAs. Various institutional capacity building programs and initiatives are being implemented within the different project frames with the financial and technical support from donor organizations. For instance, SMART trainings have been held in the framework of the financial support of the Caucasus Nature Fund, aiming at the improvement of the patrolling system and biodiversity monitoring in Adjara's protected areas.

**Figure 86.** Rangers patrolling Mtirala National Park, Mtirala-Kintrishi nominated component area. (Photo: Steffen Schülein)

**Figure 87.** Cleaning-up campaign in the framework of the ecological education campaign at Kolkheti National Park, Imnati nominated component area. (Photo: Khatuna Katsarava)

**Figure 88.** Birdwatching in the framework of the ecological education campaign at Kolkheti National Park, near Churia nominated component area. (Photo: Khatuna Katsarava

## 5.c.5 Integrated management of the property

Paragraph 114 of the OG stipulates that "In the case of serial properties, a management system or mechanisms for ensuring the coordinated management of the separate components are essential and should be documented in the nomination" (UNESCO 2017).

The current setup of the proposed series provides a strong enabling framework for the establishment of its coordinated management, because the protected areas protecting the nominated component areas all belong to APA (cf. Chapter 5.c.1), all follow the same management approach and management planning format (cf. Chapter 5.c.2, 5.c.4), and already have a good level of cooperation and staff exchange under the auspices of APA.

There are also strong initiatives to improve connectivity and cooperation between the nominated component areas: the WWF/KFW eco-corridor project is listed among the projects supporting the management and conservation status of the PAs involved. This project is aimed at the factual connectivity between several of the component PAs, on the ground, and is piloting measures which might also be applicable to connecting additional PAs, including those that are not part of the West Lesser Caucasus Corridor, more closely to each other.

However, it would not be legally feasible or technically desirable to replace the existing management plans of the nominated component areas of the property by one integrated management plan of the entire property. Therefore, an integrated management system that is compatible with these existing plans has been developed and is explained in Section 5.e.

## 5.c.6 Management effectiveness of the protected areas of the series

The efforts of APA and the individual PA administrations to improve the management of the protected areas contributing to the series have led to an increase of overall management effectiveness. This is partly reflected in the results of management effectiveness assessments, although these do not give a complete picture.

For instance, Kintrishi Protected Areas (of Mtirala-Kintrishi nominated component area) increased their METT scores (see WWF 2007) from 38.5 (42.5%) in January 2015 to 50 (56%) in December 2017 (SPPA Georgia 2018). Since lowest scores were reached in the "planning" assessment categories, and a management planning process for the area was initiated in October 2018, it is expected that the overall METT score of Kintrishi Protected Areas – or, prospectively, Kintrishi National Park – will continue to improve dramatically.

A METT assessment was also conducted for Mtirala National Park (also Mtirala-Kintrishi nominated component area) in 2015. It reached a 51% relative score (G. Giacomini, Caucasus Nature Fund, pers. comm.).

In national comparison, the protected areas contributing to the series came out in positions 2, 5, 6, 7, 8 and 12 (out of 14 assessed) in a RAPPAM assessment (See Ervin 2003) in 2012 (Kakabadze 2012). In other words, they were assessed slightly above national average at that time. However, it is possible that this has shifted in the seven years since this RAPPAM assessment.

In conclusion, the limited information available from management effectiveness assessments of the protected areas contributing to the series indicates that there is a positive trend, and that in absolute terms management effectiveness of the management systems of Mtirala National Park, Kintrishi Protected Areas, Kobuleti Protected Areas and Kolkheti National Park is relatively good in national comparison and absolute terms. This conclusion is further supported by the overall good ecological state of the Colchic Rainforests and Wetlands, and by the low incidence of violations of their protection regime (cf. Chapter 4).

## 5.D EXISTING PLANS RELATED TO THE SURROUNDING MUNICIPALITIES AND REGIONS

Several but not all of the municipalities surrounding the nominated component areas of the Colchic Rainforests and Wetlands have developed plans for their spatial development. These plans fully recognize and support the existence of the protected areas contributing to the series, and the need for their management as per the individual site management plans. Furthermore, APA as a key institutional stakeholder is always involved in consultations during the development of these plans.

The following specific plans are of particular relevance:

### *5.d.1 Spatial Development Plan of Adjarian Autonomous Republic*

Development of the Spatial Development Plan of Adjarian Autonomous Republic was initiated in 2011 based on the ministerial order #79 of the Minister of Finances and Economy of the Adjarian Autonomous Republic. Various experts from different organisations and sectors were involved in the preparation process. As a result, an extensive and complex document was developed and the work finalized in 2012. This plan is used as a source of information and basis for further planning and decision making by all relevant stakeholders in Adjara. The plan covers the territory within the administrative borders of the Adjarian Autonomous Republic, including Mtirala-Kintrishi and Ispani nominated component areas.

The main purpose of the plan is to ensure spatial and functional preconditions for sustainable development of the Autonomous Republic of Adjara. The main objectives of the plan are the following: (a) ensuring healthy and safe living environment, (b) economic development of the region, (c) preservation of the cultural heritage and natural resources, (d) tourism development, and (e) integration in the Caucasian, European and World systems. The accompanying specific objectives include maintenance and preservation of soils, water resources, flora and fauna, the development of protected areas system, and the minimization of the negative impact of infrastructure development etc.

Chapter 1-19 (pp. 195 - 211) of the Plan is dedicated to protected areas and environment protection. All protected areas of the region including Mtirala, Kintrishi and Kobuleti Protected Areas are described within this chapter. The global importance of the existing habitats (e.g. percolation bogs of Kobuleti Protected Areas) is underlined. It also explains the waste management problem within the region and ecological and sanitary condition of the Black Sea.

Chapter 2-8 (pages 301 – 316) contains additional information regarding existing natural resources (including forest, water resources etc.) and management principles. It covers also objectives and activities for development of the protected areas system as well as SWOT analysis for environment protection and natural resources management. Protected Areas development objectives include:

- Rehabilitation, conservation and protection of various endangered species and habitats;
- Creation of joint effective network of Protected Areas;
- Increase management effectiveness of protected areas through capacity building of the administrations and ensuring financial sustainability;
- Biomonitoring;
- Increase management effectiveness for sustainable fishing and hunting outside PAs, etc.;

In addition, the chapter includes recommendations and rationale for establishment of new protected areas in the region.

The Chapter 2-11.4 of the document identifies environmental restrictions, which are based on the Law on Protected Areas System of Georgia. This unit explains the restrictions according to different categories of the

protected areas. Furthermore, it directly refers to the management plans of the protected areas as guiding documents for the management and restrictions within the areas. The chapter covers also the development restrictions and general regulations according to the Georgian law on Environment Protection. Map of restrictions, indicating different categories of the existing protected areas, is included in the chapter as well (Figure 89).

**Figure 89.** Restriction map from the Spatial Development Plan of Adjarian Autonomous Republic, showing how Mtirala National Park, Kintrishi Protected Areas and Kintrishi Protected Areas are included in the wider spatial planning framework of Adjara Autonomous Republic. (Source: Spatial Development Plan of Adjarian Autonomous Republic)

## *5.d.2 Kobuleti Municipal Spatial Arrangement Plan*

Kobuleti Municipal Spatial Arrangement Plan is relevant to the management of Mtirala-Kintrishi and Ispani nominated component areas. It was developed in 2011 based on regulation №134 of the Kobuleti Municipality Council on the "Approval of the Planned Task of the Kobuleti Municipal Spatial-Territorial Planning". This plan is an integrated document that establishes a vision and policy of spatial-territorial development of Kobuleti Municipality. Moreover, it unites and suggests sector plans, and projects and ensures their harmonization. The plan was developed for the administrative borders of Kobuleti Municipality. Despite specific territorial limits, it also envisages functional and planning linkages that exist or are being planned with the neighbouring regions of Georgia, or spatial arrangements at a higher international level. The Municipal Spatial Arrangement Plan of Kobuleti comprises the following key topics:

- Objectives and tasks of the plan, its territorial boundaries, development methodology and baseline information (including geographic location, climate, hydro-networks, melioration, useful minerals, migration, IDPs, culture, environment protection, etc.);
- Brief description of historical-geographical context and sectors of Kobuleti Municipality (including natural-climatic conditions, existing conflicts, infrastructure, eco-tourism, archaeological zones, natural resources and environment protection, etc.);
- Vision (including infrastructure, tourism, and agriculture, forest resources);
- Public engagement guidance (including strategies, population surveys, migration, etc.).

Chapter 1-14 is dedicated to protected areas. Kobuleti Protected Areas (which protect Ispani nominated component area), Kintrishi Protected Areas, and Mtirala National Park (Mtirala-Kintrishi nominated component area) are considered separately in the document. Similar to the above plan, a special chapter contains short-term and long-term development goals, including the "creation of a united effective network of protected areas" and "increasing management effectiveness of protected areas through territorial administrations' capacity building and establishment of mechanisms for financial sustainability".

There are also tourism development strategies at the national, regional and individual PA level, which are related to the management of the component areas of the series:

## *5.d.3 The Georgia Tourism Strategy 2015/2025*

**The Georgia Tourism Strategy 2015/2025** aims to increase the value, profitability, and sustainability of Georgia's tourism industry. Among the opportunities for tourism development in Georgia, it lists the *"65 protected areas including 10 national parks encompassing more than 8.62 percent of the country's total land area, which create opportunities for the development of world-class ecotourism/nature tourism, skiing, hiking, mountain biking, water sports, and other forms of adventure and outdoor leisure and recreational pursuits"*. Among its guiding principles, the strategy highlights sustainability, through travel that sustains and enhances the geographical character of a place, including its environment, culture, aesthetics, heritage and the well-being of its residents. The following priority actions from the strategy are of particular relevance to the nomination and highlight its alignment with nature conservation objectives:

- **Priority Action 1.1:** Create and implement management plans for cultural sites and protected areas to ensure sustainable use of Georgia's natural and cultural assets;
- **Priority Action 1.2:** Improve coordination between site management entities, tourism industry and local community/government;
- **Priority Action 1.3:** Introduce incentives to Protected Areas and Cultural Heritage sites to improve visitor services and interpretation and generate more visitor income, benefiting local industries and supporting heritage preservation;
- **Priority Action 1.4:** Promote public-private partnerships and investments in protected areas and historic/cultural sites (including small and medium historic urban settlements);
- **Priority Action 1.5:** Improve access to natural and cultural sites through improved infrastructure (roads, trails, trail huts, picnic areas, visitors' centers, bathrooms, parking, etc.);
- **Priority Action 1.7:** Ensure inspection and compliance of all environmental regulations for the tourism industry.

## *5.d.4 Adjara Tourism and Resorts Department Strategic Plan 2015-2018*

**The 2015 – 2018 Strategic Plan of the Tourism and Resorts Department of the Autonomous Republic of Adjara**, which is relevant to Mtirala-Kintrishi nominated component area (Mtirala National Park and Kintrishi PAs) and Ispani nominated component area (Kobuleti PAs), is based on the Constitution of Georgia, the Constitution of Autonomous Republic of Adjara, as well as other legislative acts of Georgia and the Autonomous Republic of Adjara. The current strategic plan includes the following key elements:

- Review of existing situation in the field of governance of the Department;
- Review of institutional self-assessment of the Department;

- Vision and medium-term mission of the Department;
- Action Plan for 2015-2018.

The vision of the plan is that *"Adjara is a recognizable, competitive tourist destination with hospitable population, self-contained culture, organized tourism and communication infrastructure, preserved unique nature and ecologically safe environment. The diversity of tourism products and high level service during the year guarantee sustainable economic development of the region and population welfare"*. Beyond this, the strategy deals mainly with the general functions of the Tourism and Resorts Department, and does contain few provisions that are directly relevant to the protected areas contributing to the series.

Building on this strategic plan, which is still under implementation although its lifespan is officially over, the Government of the Autonomous Republic of Ajdara is currently developing a ***Tourism Strategy of Adjara Autonomous Republic*** as a whole, which will come into force in 2019. In addition, the administration of Kolkheti National Park is part of the consultation process for the USAID-supported development of the ***Samegrelo-Zemo Svaneti Ecotourism Development Strategy***, which is also expected to come into force in 2019.

## *5.d.5 Site level tourism development strategies*

There are also specific **Tourism Development Strategies and Action Plans (2016-2020) for Mtirala NP** and **Kintrishi PAs** (HIDRIA Ciencia 2016a, b, Schülein 2017a, b). These were developed under the UNDP programme "Expansion and Improved Management Effectiveness of the Adjara Region´s Protected Areas", under the Support Programme for Protected Areas – Georgia and with CNF support, and seek to provide a pragmatic strategy and plan for increasing sustainable revenues derived from tourism without negatively affecting the conservation objectives of the protected areas in the Adjara Region. In order to reach this, a set of specific objectives referring to both the protected areas themselves and their support zones has been defined, including:

- To define and create marketable services and activities that add value to the natural and cultural resources of the protected areas;
- To increase visitor numbers and to create new sources of economic revenues and economic development for the local communities through revenue-recapture mechanisms;
- To improve social and economic status of the protected areas and their support zone communities;
- To preserve and enhance natural and cultural resources;
- To involve local communities in the development of tourism and conservation activities, and to improve the cooperation levels among stakeholders; and
- To build the capacities of stakeholders involved in the tourism activity in aspects related to environmental values and tourism hospitality.

Based on an in depth situation and SWOT analysis, the documents develop a strategic framework to reach the above objectives, through improved participation and stakeholder capacity, targeted tourism products, the establishment of low-impact tourism infrastructure and increased national as well as international visibility. With particular relevance to the World Heritage nomination, these strategies and action plans also envisage studies on the tourism carrying capacity of the area, the establishment of visitor and impact monitoring systems[2], ranger training in sustainable tourism management, and CEPA activities. If implemented carefully, these measures will be sufficient to ensure that visitation at these three component areas is managed in such a way that negative impacts on the Outstanding Universal Value of these areas are minimized to acceptable levels.

2 As of December 2018, these planned activities have not been carried out.

## 5.E PROPERTY MANAGEMENT PLAN OR OTHER MANAGEMENT SYSTEM

### *5.e.1 Management plans of the nominated component PAs and their implementation*

Since 2014, the drafting process and structure of PA management plans in Georgia have been guided by a dedicated regulation (Ministerial Decree #110 of 12 March 2014 – see Section 5.c.2). According to this decree, all PA management plans including those affecting the nominated component areas consist of the following parts:

- Introduction;
- Description of the protected area;
- Long-term objectives (typically expressed in terms of the conservation status of key biodiversity elements of each protected area);
- Situation analysis (including threats to biodiversity with their root causes, objectives, management constraints, benefits etc.);
- Internal zoning (if applicable) and allowed activities as per zone;
- Management programmes (on the thematic areas listed in Chapter 5.c.4, with programme objectives, specific activities, and implementation indicators);
- Monitoring of the implementation of the management plan (usually with indicators focusing corresponding to the programme and long-term objectives, as well as important threats in some cases);
- Annexes of the protected area's management plan.

The management plans of the PAs contributing to the series are valid for six years (two three-year operational planning phases). The management plan for Kintrishi Protected Areas may potentially be valid for nine years once in force, as APA is aiming to increase the lifespan of its management plans in general.

Three-year operational plans, which typically assign priorities, staff responsibilities, indicators and budget estimates (plus sources in some cases) to the activities listed under the programmes of the management plan, are drawn up by APA to translate the management plans into concrete action on the ground. These are accompanied by operational budgets. Annual workplans are then formulated by APA based on the operational plans. Management plans are implemented by the local PA administrations with support from APA and in cooperation with municipalities and local stakeholders.

Table 22 summarizes existing site management plans of individual protected areas contributing to the nominated component areas of the series. The Management Plan of Mtirala National Park (English translation) and English language summaries of the management plans of Kobuleti Protected Areas and Kolkheti National Park are enclosed in Section 7.b.1 – 7.b.3. The management plan of Kintrishi Protected Areas is under preparation, with support from the KFW-funded Support Programme for Protected Areas in Georgia, and will be finalized by mid-2019.

By defining key values and conservation goals that reflect the proposed Outstanding Universal Value of the series and its positive conservation status, and including programmes for their protection (see also Chapter 5. , the existing site management systems of the PAs contributing of the series provide specific guidance on the protection and conservation of the proposed Outstanding Universal Value. Decree No. 110 specifies how these management plans are to be developed and updated in a participatory manner, thereby promoting shared understanding of all stakeholders. The management plans set out a clear cycle of planning, implementation, monitoring, learning and adaptation.

**Table 22.** Existing site management plans of individual protected areas contributing to the nominated component areas of the series, and management plans in preparation as of December 2018. (Source: APA)

| Protected area | Nominated component area(s) | Year of entry into force and lifespan | Comments | Section of nomination dossier |
|---|---|---|---|---|
| **Mtirala National Park** | Mtirala-Kintrishi (No. 1) | 2016-2022 | | 7.b.1 |
| **Kintrishi Protected Areas** | | - | Kintrishi is currently managed based on an administrative order. The management planning process has commenced in 2018, MP expected mid-2019. | - |
| **Kobuleti Protected Areas** | Ispani (No. 2) | 2018-2024 | Both management plans have been approved by APA and are pending final approval by the Government of Georgia. However, they are already being implemented. | 7.b.2 |
| **Kolkheti National Park** | Grigoleti, Imnati, Pitshora, Nabada, Churia (Nos. 3-7) | 2018-2024 | | 7.b.3 |

## *5.e.2 Integrated management framework of the entire series*

APA, in cooperation with local and national stakeholders, has developed a draft "Integrated Management and Monitoring Framework for the Proposed Natural World Heritage Site Colchic Rainforests and Wetlands" (Box 8). This framework, in combination with the already existing institutional links and consistency of the management systems of the PAs contributing to the nominated component areas of the series, will provide a legal basis for coordinated management and integrity of the nominated component areas, in line with §114 of the Operational Guidelines. The Ministry of Environmental Protection and Agriculture has committed to officially enacting this framework as and when the Colchic Rainforests and Wetlands are inscribed on the World Heritage List (Appendix 8).

In addition to the integrated management framework, the above initiatives and the activities of the Caucasus Nature Fund in relation to Kintrishi PAs, the project ***Promotion of Eco-corridors in the Southern Caucasus*** (WWF & KFW*)* aims to contribute to the connectivity between several PAs (including Mtirala NP, Kintrishi PAs and Borjomi-Kharagauli NP) along the Western Lesser Caucasus Corridor, and will hence contribute to the overall coherence and integrity of the series (WWF Caucasus 2017). It is conducted by The World Wide Fund for Nature (WWF) Caucasus Programme Office in cooperation with KFW Development Bank. The consortium of GOPA Consultants, DSF and Hessen-Forst are providing the consulting services for the implementation.

**Box 8.** Integrated Management and Monitoring Framework for the Nominated Serial Natural World Heritage Site Colchic Rainforests and Wetlands

## 1. PURPOSE AND OBJECTIVES OF INTEGRATED MANAGEMENT AND MONITORING FRAMEWORK

### 1.1 Purpose

a) The purpose of this integrated management and monitoring framework (hereafter: "the Framework") is to ensure the coordinated management and integrity of the component protected areas of

the serial property "Colchic Rainforests and Wetlands", in line with §114 of the Operational Guidelines for the implementation of the World Heritage Convention (hereafter OG).

b) This includes the sound monitoring of the state of conservation of the serial property and any potential threats, based on the list of indicators in Chapter 6 of the nomination dossier.

### 1.2 Objectives

a) Under the leadership of the Agency for Protected Areas of Georgia (hereafter: "APA"), which has the mission and legal mandate to manage all component protected areas of the "Colchic Rainforests and Wetlands", the managers and stakeholders of all component protected areas have a joint understanding of the overall series with its Outstanding Universal Value, and a common vision for its conservation. There is a shared identity of the "Colchic Rainforests and Wetlands".

b) Any direct or indirect threats (be they current or potential) that affect the Outstanding Universal Value of the series are managed, avoided, minimized and mitigated in a coordinated way. Resources are allocated between component protected areas in an optimal manner, from the point of view of the conservation of the Outstanding Universal Value of the property.

c) The benefits and opportunities that arise from the Outstanding Universal Value and future World Heritage status of the series (e.g. those related to visitation, education and awareness raising, sustainable tourism development) are harnessed jointly and equitably in a coordinated manner. Visitors are enabled to experience and understand the entire series including the interrelationships of the component protected areas.

d) The managers of all component protected areas of the series collaborate to improve their resourcing (e.g. through joint fundraising) and capacity (e.g. though joint training), and to gain the necessary political support at the local, regional and national level.

e) The managers of all component protected areas monitor the state of conservation and possible threats as well as responses to the Outstanding Universal Value in a consistent and coordinated way, which facilitates effective adaptive management at the level of the entire series, as well as concise and timely reporting to the World Heritage Convention.

## 2. ENABLING CONDITIONS FOR COORDINATED MANAGEMENT AND MONITORING

### 2.1 Existing cooperation

a) The existing regular cooperation and coordination offers a strong basis for the establishment of the Framework with its specific mechanisms.

b) APA holds regular meetings and exchanges including of the component protected areas. In addition,

Mtirala NP as well as Kintrishi PAs are regularly meeting to coordinate implementation of the UNDP Project "Enhancing Management of the Protected Areas of Adjara". Both Kintrishi PAs and Mtirala NP are supported by the Caucasus Nature Fund and cooperate in this context. There is also close cooperation between Kobuleti PAs and Kolkheti National Park.

c) APA and representatives of all component protected area administrations have laid the foundation for a joint understanding as well as integrated management and monitoring of the series. They conducted a joint training and management planning workshop for the planned World Heritage site "Colchic Rainforests and Wetlands" in Ikalto, Georgia, on 15-21 April 2018. A joint vision and a joint conceptual model for the entire series were elaborated, and basic steps were taken for the planning of specific management actions related to enforcement and sustainable visitation.

d) APA, the administrations of the component protected areas and other stakeholders have cooperated to create a broad ownership of the Colchic Rainforests and Wetlands, through public – and widely publicized – information and consultation events in the immediate vicinity of the series (Batumi and Kobuleti) in February and October 2018.

### 2.2 Logistical pre-requisites for cooperation

a) The administrations of the component protected areas of the series are located in close proximity, with the maximum distance between those of Mtirala and Kolkheti National Parks (ca. 80 km).

b) There is a protected area administration building and visitor centre with modern conference facilities in the town of Kobuleti, which serves as an administration building for Kobuleti and Kintrishi Protected Areas. The average distance from there to all other component protected areas' administrations is ca. 20 km. APA makes this building available for meetings of any coordination mechanisms within the Framework as defined below, if needed.

## 3. INSTITUTIONAL AND LEGAL STATUS OF THE COLCHIC RAINFORESTS AND WETLANDS

### 3.1 Institutional status of the protected areas of the series

a) All component protected areas of the series are under the full jurisdiction of the Legal Entity of Public Law Agency of Protected Areas of Georgia (APA), and are managed by its branch offices. These are lead and coordinated by the APA headquarters in Tbilisi.

b) The Agency of Protected Areas has the mandate to create special coordination and cooperation mechanisms among the protected areas reporting to it, including in the framework of a serial World Heritage nomination.

### 3.2 Legal status of the integrated management and monitoring framework

a) The individual component protected areas of the series are – and will continue to be – managed based on separate, legally binding management plans or administrative orders, in accordance with the

Law of Georgia on the System of Protected Areas (1996). Comprehensive management plans are in place (Mtirala National Park, Kobuleti Protected Areas and Kolkheti National Park) or under preparation (Kintrishi Protected Areas, management plan expected in mid-2019). Kintrishi Protected Areas are currently managed based on an administrative order approved with the resolution of the Government of Georgia N84 (2014). The existing management plans were written based on similar processes and have a consistent structure. This structure and process are defined in Decree No. 110 of the Minister of Environment of Georgia (2014).

b) The Framework is established under an internal administrative order of the Ministry of Environmental Protection and Agriculture, as soon as the nominated property is inscribed on the World Heritage

List. The Minister of Environmental Protection and Agriculture and the Chairman of the Agency of Protected Areas have committed in written to establishing the Framework as soon as this precondition is met.

c) The framework does not replace the legally binding management plans of individual component protected areas. It establishes a mechanism for their coordinated implementation and monitoring, which focuses particularly on management actions and procedures to maintain, enhance and present the Outstanding Universal Value of the entire series.

d) APA uses its mandate to define three-year operational plans and annual work plans within the framework defined by the existing legally binding management plans of the component protected areas, so as to prioritize management actions that are of particular relevance to maintaining and presenting the overall Outstanding Universal Value of the series, in full accordance with existing protected areas legislation of Georgia.

e) In those cases where the existing legally binding management plans of the component protected areas reach the end of their lifespan (currently six years, according to Decree No. 110 of the Minister of Environment of Georgia (2014) and undergo revision, APA will take into account the World Heritage status of the component area and the special requirements arising from it during the revision process. This will successively lead to the full recognition of the status of each component area as part of a serial World Heritage property and the resulting cooperation and coordination needs in their legally binding management plans.

f) The integrated management and monitoring framework is established for a duration of six years. After that, it is revised by APA as needed and re-approved by the Ministry of Environmental Protection and Agriculture and Georgia.

## 4. THEMATIC AREAS FOR COORDINATED MANAGEMENT AND MONITORING

### 4.1 Selection of thematic areas for cooperation

a) The Framework focuses on those thematic areas that require coordinated management, i.e. those that are relevant to all component protected areas of the series, and/or to the conservation and presentation of the series as a whole.

### 4.2 Joint understanding and vision of the series

a) APA recognizes that a joint understanding of the overall property including its Outstanding Universal Value as well as the requirements for integrity and management is a prerequisite for its integrated and coordinated management.

b) Representatives of APA and the administrations of all component protected areas have identified the following features contributing to the Outstanding Universal Value of the Colchic Rainforests and Wetlands, and hence in need of particular management efforts in April 2018: (i) Colchic relict forest with its associated flora and fauna, particularly relict and endemic as well as globally threatened species, and (ii) rain percolation mires and associated wetlands with their associated flora and fauna.

c) Representatives of APA and the administrations of all component protected areas have formulated a joint vision of the Colchic Rainforests and Wetlands in April 2018: “Long-term guaranteed conservation and international recognition of the Colchic Rainforests and Wetlands with their flora and fauna for future generations, increased environmental awareness and improved socio-economic conditions of local communities”.

### 4.3 Integrated management to maintain the Outstanding Universal Value

#### 4.3.1 Coordination of guarding and patrolling

a) The Administrations of the component protected areas of the Colchic Rainforests and Wetlands support each other with regard to guarding and patrolling, in order to prevent any illegal activities, such as illegal natural resources use (e.g. illegal logging, poaching, illegal collection of wild plants).

b) In order to achieve this, the protection divisions of the component protected areas exchange experience and good practice in relation to the above, e.g. on the use of surveillance tools, patrol planning, detection of violations and other relevant ranger competencies. APA supports them through the organization of training courses on these competencies within the framework of its internal capacity building activities.

c) The component protected areas Grigoleti, Imnati, Pitshora, Nabada and Churia-Anaklia all belong to Kolkheti National Park and are already being managed jointly, based on the legally binding management plan of Kolkheti National Park.

d) The protection services of the adjacent Mtirala National Park and Kintrishi Protected Areas, which jointly form one continuous component protected area of the Colchic Rainforests and Wetlands, also coordinate their patrolling efforts on the ground directly (e.g. through harmonized patrolling schedules, field communications), so as to afford the highest possible level of surveillance and joint law enforcement operations as and when needed, including across the border between Mtirala National Park and Kintrishi Protected Areas.

e) In the case of emergency situations such as natural disasters, the protection services of all component protected areas can be employed jointly within one area, under the guidance of APA.

#### 4.3.2 Cooperation on sustainable visitation and tourism development

a) Under the guidance of APA, the administrations of individual component protected areas of the Colchic Rainforests and Wetlands coordinate the implementation of their existing sustainable tourism and visitation strategies, so that the overall impact of tourism does not impair their Outstanding Universal Value and visitor experience is optimized at the same time.

b) The visitor services of the component protected areas exchange experience and good practice in relation to the above, e.g. on trail maintenance and marking, as well as visitor management and monitoring. APA supports them through the organization of training courses on these competencies within the framework of its internal capacity building activities.

c) APA supports the administrations of the component areas in the establishment and operation of a joint visitor monitoring system.

d) Mtirala National Park and Kintrishi Protected Areas will jointly renovate and manage at least one visitor trail joining both areas. The visitor services of both administrations will cooperate closely in relation to trail development and marking, production of information and interpretation materials, as well as visitor management and guiding.

### 4.4 Integrated management of joint benefits and opportunities

#### 4.4.1 Branding of the serial World Heritage site “Colchic Rainforests and Wetlands”

a) In order to harness the potential of the World Heritage status of the Colchic Rainforests and Wetlands for the development of sustainable nature-based tourism, APA supports the administrations of the component protected areas of the series, as well as other stakeholders such as the Adjara Tourism Board, to develop a joint brand as a serial World Heritage site.

b) Once established, the Colchic Rainforests and Wetlands World Heritage Brand is used by the component protected areas and their recognized cooperation partners.

#### 4.4.2 Sustainable natural resources use within the buffer zone

a) Those parts of the buffer zone of the planned property that are within traditional use zones of component protected areas are managed according to the provisions of their individual management plans for these zones, as well as general APA policy (e.g. on sustainable fuel wood provision to local inhabitants).

b) APA ensures that the cumulative effect of sustainable natural resource use in the traditional use zones of all component protected areas is monitored and that quota for resource use are kept to such a level that the integrity of the Outstanding Universal Value of the entire property is maintained or enhanced.

c) Sustainable natural resource use is limited to those parts of the buffer zone that are part of traditional use zones of component protected areas. There is no natural resource use – and hence no need for its coordinated management - within those parts of the component protected areas that belong to the nominated property.

#### 4.4.3 Interpretation, environmental education and community outreach

a) Under the guidance of APA, the administrations of individual component protected areas of the Colchic Rainforests and Wetlands coordinate their efforts in the field of interpretation and environmental education. Visitors shall be enabled to put the individual component protected areas they visit into the context of the overall series, and to understand and appreciate its Outstanding Universal Value.

b) In order to achieve this, the visitor services of the component protected areas exchange experience and good practice and initiate joint initiatives in relation to interpretation and environmental education, e.g. on production of information and interpretation materials, establishment of exhibitions in their visitor centres, joint school outreach programmes, and a joint presence at relevant national and international meetings and conferences. APA supports them, e.g. through the organization of training courses on these competencies within the framework of its internal capacity building activities.

c) In addition to the community outreach activities prescribed in their individual management plans, the administrations of the component protected areas cooperate in developing and conveying communications messages related to the conservation of the Outstanding Universal Value of the series for local community outreach, and jointly organize local information and consultation events on the World Heritage status of the property.

d) The administrations of the component protected areas, in cooperation with their existing Friends' Associations (where relevant) and other relevant stakeholders, establish a joint Junior World Heritage Ranger Programme with coordinated event schedules, information materials and mutual visits. This focuses particularly on the World Heritage status of the series and its Outstanding Universal Value.

### 4.5 Integrated monitoring and reporting

a) Chapter 6 of the nomination dossier contains indicators for the conservation status of the main attributes of Outstanding Universal Value of the series, along with consistent standardized monitoring methodologies. This monitoring is conducted by the administrations of the component protected areas, and coordinated by APA.

b) The indicators and monitoring protocols build on existing initiatives on biodiversity monitoring in Georgian protected areas, such as those of the Caucasus Nature Fund, UNDP, the Kolkheti Fund, Shota Rustaveli University Batumi, Greifswald University, Ilia State University Tbilisi, the NGO NACRES, and the KfW-funded Support Programme for Protected Areas in Georgia.

c) APA supports the administrations of the component areas in ensuring the necessary capacity (including staff training, equipment and data management procedures) for coordinated monitoring. APA engages international donors to mobilize the necessary resources to achieve this, if necessary.

d) The administrations of the component protected areas use existing monitoring capacities and resources jointly. They exchange monitoring expertise in order to conduct coordinated monitoring in the most cost-effective way.

e) APA collects all monitoring data on the conservation status of the main attributes of Outstanding Universal Value of the series, processes and stores them centrally and electronically, makes them publicly available and uses them for reporting to the World Heritage Convention.

f) The administrations of the component protected areas of the property use the results of the integrated monitoring to periodically adapt their management system, with support from APA. In agreement with existing protected areas legislation of Georgia, this happens whenever (i) management plans are renewed at the end of their 6-year lifespan, (ii) 3-year operational plans are formulated and (iii) management actions from operational plans of the component protected areas are prioritized for inclusi-

on in annual work plans. Adaptive management based on the monitoring results is planned jointly by the administrations of the component protected areas.

### 4.6 Resource mobilization

a) Under the leadership of APA, the administrations of the component protected areas undertake coordinated resource mobilization efforts to ensure that the management actions listed under 4.3 – 4.5 above and other necessary measures to conserve and present the Outstanding Universal Value of the property are sufficiently resourced.

b) APA engages its partners in the international donor community to support investment in and operation of the coordination mechanisms listed in this integrated management and monitoring framework.

## 5. PRACTICAL MECHANISMS FOR THE COORDINATION OF MANAGEMENT

a) APA creates and supports the necessary practical mechanisms for coordination of management among the component protected areas of the property, as well as broad stakeholder participation at the level of the entire series. In doing so, it particularly focuses on the thematic areas identified in Section 5 above. APA engages the administrations of component protected areas and relevant stakeholders to participate in these mechanisms.

b) APA establishes an internal management coordination group consisting of the following members: Deputy Chairman of APA, Head of Planning and Development Division of APA, Chief Monitoring Specialist of APA, Directors of all component protected areas, as well as one representative each of the Ministry of Environmental Protection and Agriculture and the Georgian National Commission for UNESCO. Additional staff of APA, the administrations of component protected areas (e.g. Heads of Protection Units and Administrative Units, Biodiversity and Natural Resources Specialists) or relevant partner organizations join the management coordination group on an ad-hoc basis as and when the need arises. The group is established based on an internal administrative order of the Chairman of the Agency of Protected Areas.

c) The internal management coordination group meets in Tbilisi or at the administration of one of the component protected areas, at least twice annually. Minutes of these meetings are kept at APA.

d) Additional meetings of the management group are arranged as and when the need arises. Each member can request the organization of an additional meeting. The respective request shall be sent to the deputy chairman of APA, indicating the reasons of organizing an additional meeting. Based on the urgency of the indicated issue, the deputy chair of APA takes a decision regarding the organization of an additional meeting.

e) APA also establishes a National Advisory Board for the World Heritage property Colchic Rainforests and Wetlands, consisting of the following stakeholders: APA Chairman (chair) and Deputy Chairman, Directors of the component protected areas, at least one representative each of the Government of Adjara Autonomous Republic and regional Governments of Guria and Samegrelo-Zvemo Svaneti, municipalities in which the component protected areas are situated, National Commission for UNESCO,

Georgian National Tourism Administration, international donors active in or around the component areas, national and international conservation and development NGOs active in or around the component areas, and relevant academic institutions. The National Advisory Board is established based on an internal administrative order of the Chairman of the Agency of Protected Areas.

f) The National Advisory Board meets in Tbilisi or at the administration of one of the component protected areas, at least annually. Additional meetings are arranged and specialist working groups formed as and when the need arises.

g) The board provides non-binding advice to APA on the coordinated management of the series to APA. It further provides support in fundraising, capacity building, stakeholder engagement and the popula-

rization of sites, as well as support in addressing and mitigating threats.

h) At the operational level, each of the protected areas contributing to the series nominates a staff member who will act as the focal point on all World Heritage related business between the meetings of the internal management coordination group.

## 5.F SOURCES AND LEVELS OF FINANCE

Financial resources for the management of the PAs contributing to the nominated component areas of the Colchic Rainforests and Wetlands are in place and sufficient to support the management systems set out by their management plans, but could be improved.

### *5.f.1 Operational funding*

Operational costs (including salaries) of PA management at the nominated component areas are financed from the State Budget of Georgia, the own revenues of each PA and – for Mtirala and Kintrishi – contributions of the Caucasus Nature Fund. The Caucasus Nature Fund is a conservation trust fund that supports the running costs of some Georgian PAs including Kintrishi PAs and Mtirala National Park (CNF 2017 - http://caucasus-naturefund.org/our-program/our-parks/) in the long term.

The total annual operational budgets for Mtirala National Park, Kintrishi Protected Areas, Kobuleti Protected Areas and Kolkheti National Park were GEL 268,000, GEL 120,000, GEL 77,000, and GEL 336,000 in 2017, respectively, with differences mainly explained by the size of these areas (Table 23). In spite of increased funding from the State budget, they decreased to GEL 196,000, GEL 110,000, GEL 63,000, and GEL 274,000 in 2018, respectively, mainly because of a reduction in PA revenues and reduced funding support from CNF.

APA considers that the operational funding available to support management of the nominated component areas of the series is adequate overall, although there may be a small (and unspecified) funding gap in comparison to the full range of activities as detailed in the management plans of the PAs contributing to them.

**Table 23.** Sources and level of operational (including salaries) funding of the PAs contributing to the Colchic Rainforests and Wetlands. All figures in 1,000 Georgian Lari (GEL)[1]. PA... protected area; NP... national park; CNF... Caucasus Nature Fund. (Source: APA)

| | | 2017 | | | | 2018 | | | |
|---|---|---|---|---|---|---|---|---|---|
| PA Administration | Component areas | State Budget | Own revenues | CNF | Total | State Budget | Own revenues | CNF | Total |
| Mtirala NP | Mtirala-Kintrishi (No. 1) | 94 | 71 | 102 | 268 | 108 | 56 | 32 | 196 |
| Kintrishi PAs | | 52 | 31 | 37 | 120 | 68 | 22 | 20 | 110 |
| Kobuleti PAs | Ispani (No. 2) | 37 | 40 | - | 77 | 42 | 21 | - | 63 |
| Kolkheti NP | All others (No. 3-7) | 197 | 139 | - | 336 | 198 | 76 | - | 274 |

[1] As of 15 December 2018, 1 GEL equals 0.33 EUR.

## *5.f.2 Investments and other non-operational funding*

In addition to operational funding, APA cooperates with various international donors to improve the infrastructure (including visitor infrastructure) and organizational capacity of the protected areas contributing to the Colchic Rainforests and Wetlands, as well as the livelihoods and hence acceptance and ownership of local communities living around them. The main ongoing programmes in this regard are the following:

- The GEF/UNDP project ***Expansion and Improved Management Effectiveness of the Adjara Region's Protected Areas*** has supported development of Mtirala National Park and Kintrishi Protected Areas in 2014-2018 (http://www.ge.undp.org/content/georgia/en/home/projects/ajara-protected-areas.html). While a total of almost USD 1.38 million was invested in all PAs of Adjara, only a small part was invested in Mtirala National Park (GEL 112,800 and GEL 73,500 in 2017 and 2018, respectively) and Kintrishi Protected Areas (GEL 9,600 and GEL 12,500 in 2017 and 2018, respectively), which contribute to the series.
- The ***Support Programme for Protected Areas in the Caucasus - Georgia*** (SPPA-Georgia) is a 5 year (2014-2019) programme co-funded by the German Cooperation in the Caucasus through the KFW Development Bank (http://sppa-georgia.org/sppa/index.php/en/about-the-programme/general). During implementation of the Programme, EUR 8.25 million will be invested in four Georgian PAs (including Kintrishi PAs) with their support zones. The purpose of the Programme is the enhancement of natural resources and protected areas management, providing support to the four selected protected areas, while at the same time improving the socio-economic situation of the adjacent local rural communities. About EUR 464,000 have been spent by the programme on Kintrishi PAs in 2014-2017, an amount that is expected to increase to EUR 713,000 by the end of 2019. GEL 648,000 were invested there in 2018 alone. The main areas of investment have been the financial participatory approach for sustainable support zones development, purchase of equipment including vehicles, study tours, demarcation and re-zoning works, trainings and management planning.
- ***The Kolkheti Protected Areas Development Fund*** has supported the development of Kolkheti National Park with GEL 999,000 and GEL 449,000 in 2017 and 2018, respectively.

## 5.G SOURCES OF EXPERTISE AND TRAINING IN CONSERVATION AND MANAGEMENT TECHNIQUES

The Agency of Protected Areas and its various partners have taken important steps to improve its capacity, including but not limited to the PAs contributing to the nominated component areas of the Colchic Rainforests and Wetlands (Table 24).

**Table 24.** Recent projects and centres supporting capacity development for Georgian PAs, including the PA contributing to the nominated component areas of the Colchic Rainforests and Wetlands. (Source: Appleton et al. 2016)

| Programme | Trainings | Year |
|---|---|---|
| ENPI - Twinning - Strengthening Management of Protected Areas of Georgia. | Raising qualification of the staff involved in the management plan elaboration.<br>Preparation of training modules for APA staff and training of trainers in elaboration of management plans. | 2013-2015 |
| Support Programme for Protected Areas - Georgia (Phase 3). | Various trainings on all aspects of PA management. | 2014-2019 |

| | | | |
|---|---|---|---|
| Support for Georgia in the Field of Protected Area Development, UNWTO. | | Various capacity building courses with local tourism stakeholders. Development and implementation of marketing strategies for each protected area.<br>Including on-the-job training, tour operating, safety, guiding techniques, training of trainers, zip-lining, etc. | 2012-2014 |
| US Department of the Interior International Technical Assistance Programme. | | • On site coaching.<br>• Study tours.<br>• Professional exchange. | 2013-2014 |
| CNF | US DoI ITAP | • Maintenance planning on a park level. | 2014 |
| | GIZ/Environmental Education and Information Centre | • Law Enforcement.<br>• Natural Resources Management. | |
| | NACRES | • Biodiversity Monitoring. | Planned |
| Transboundary Joint Secretariat fort he Southern Caucasus. | | • Management.<br>• Business planning.<br>• Financial management.<br>• Human resources.<br>• Change and time management.<br>• Business administration.<br>• Foreign languages.<br>• Visitor services for Imereti Caves PAs. | 2013-2014 |
| UNDP - Expansion and Improved Management Effectiveness of the Achara Region Protected Areas. | | Various trainings on all aspects of PA management. | 2014-2018 |

Building on these past efforts, and in order to improve coordination, a ***National Capacity Building Plan for Protected Area Staff*** was developed in 2016, with support of the German Federal Agency for Nature Conservation and the Romanian NGO ProPark Foundation (Appleton et al. 2016; see Appendix 9). Overall, the plan aims to:

- Create an institutional framework for competence based protected area management
- Establish a systematic programme of capacity development and professional development for all protected area personnel, linked to occupational standards.
- Establish an internal system to support training and learning for all PA staff.
- Develop a functional and effective monitoring and evaluation system which ensures the effectiveness of professional development.
- Ensure permanent support for professional development by mobilizing the financial, material and technical resources (Appleton et al. 2016).

The plan identifies priority areas for training and expertise development, and sets out detailed programmes and activities to improve these areas. APA implements it partly by its own, and partly through cooperation with various partner programmes and projects including the ones listed in Chapter 5.f.2 above. Table 25 summarizes important trainings provided to staff of the PAs contributing to the series in 2014-2017.

Taken together, these institutional and individual capacity development initiatives will contribute to ensuring the necessary expertise and professionalism among the staff of Mtirala and Kolkheti National Park, as well as Kintrishi and Kobuleti Protected Areas.

**Table 25.** Topics of trainings provided to staff of protected areas contributing to the series (Source. APA, December 2017).

| Protected Area | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| **Mtirala NP** | Identification and further response to administrative law violations and forest management training course, relating to the functions and obligations of forest guardians of protected areas | Identification of administrative law violations in the forests of protected areas. | Identification of law violations on protected areas | Habitats and phytopathological studies |
| **Kintrishi PAs** | | Identification of law violations on protected areas;<br>Archive and proceeding;<br>Identification of administrative law violations in the forests of protected areas and response to them;<br>Management of national system of protected areas; | | |
| **Kobuleti PAs** | | Reacting to and displaying of administrative law-violating acts in the forests of Georgian protected areas | Reacting and displaying of administrative law-violating acts in the forests of Georgian protected areas | |
| **Kolkheti NP** | Identification and further response to administrative law violations and forest management training course, relating to the functions and obligations of forest guardians of protected areas | Identification of administrative law violations in the forests of protected areas. | Identification of law violations on protected areas | |

## 5.H VISITOR FACILITIES AND INFRASTRUCTURE

APA develops visitor facilities and infrastructure in the nominated component areas of the Colchic Rainforests and Wetlands based on the management plans of these areas, or on dedicated ecotourism development strategies (HIDRIA Ciencia 2016a, b, Schülein 2017a, b). These ensure that such facilities are developed in a coordinated way, and that they do not compromise the proposed Outstanding Universal Value of the property.

The visitor facilities and infrastructure of the PAs contributing to the Colchic Rainforests and Wetlands are generally small scale and of limited impact (Figure 90, 91), while allowing visitors to experience the natural values of the nominated component areas (Table 26).

**Figure 90.** Tourist shelter at Mtirala National Park, Mtirala-Kintrishi nominated component area. (Photo. Paata Vardanishvili)

**Figure 91.** Aerial view of visitor tower, tourism trails and bridges in the buffer zone of Ispani nominated component area. (Photo: Paata  Vardanishvili)

**Table 26.** Existing and planned visitor facilities and infrastructure in the nominated component areas of the property.

| Protected Area | Existing infrastructure | Planned infrastructure |
|---|---|---|
| **Mtirala National Park** (Mtirala-Kintrishi nominated component area) | Administration building (outside PA)<br>Visitor centre with guest rooms (village Chakvistavi, outside PA)<br>2 marked tourist trails<br>1 small tourist shelter (Figure 90)<br>Bird watching tower<br>Tourist equipment renting service<br>34 picnic tables<br>Camping places<br>Infrastructure for small-scale zip line (buffer zone) | Rehabilitation of the trails and tourist shelter, Placing new signs and information boards (see Schülein 2017 b) |
| **Kintrishi Protected Areas** (Mtirala-Kintrishi nominated component area) | Administration building and visitor centre (buffer zone)<br>2 marked tourist trails<br>3 picnic areas<br>Tourist equipment renting service | Additional visitor infrastructure is in the planning process (see Schülein 2017 a) |
| **Kobuleti Protected Areas** (Ispani nominated component area) | Administration building and visitor centre (Kobuleti town, outside PA)<br>4 hotel rooms (as above)<br>3 tourist trails<br>2 bridges<br>1 bird watching tower (Figure 91)<br>Tourist equipment renting service | Arrangement of trails, bungalows (outside PA), bridge and bird watching tower. |
| **Kolkheti National Park** (Grigoleti, Imnati, Pitshora, Nabada, Churia nominated component areas) | Administration building and visitor centre (City of Poti, outside PA)<br>Hotel with 6 rooms (as above)<br>3 boating routes (buffer zone)<br>3 picnic areas<br>2 camping areas<br>Areas for camping cars (outside PA)<br>4 bird watching towers<br>Parking (outside PA)<br>Tourist shelter (buffer zone)<br>Pontoons, kayaks, boats, motor boat<br>Fishing places for people with disabilities. | 2 new boats and 1 pontoon (for use in buffer zone only)<br>200 m of board walk at/near Imnati mire<br>Picnic area near Pitshora river, S of Pitshora nominated component area |

## 5.I POLICIES AND PROGRAMMES RELATED TO THE PRESENTATION AND PROMOTION OF THE PROPERTY

The key values stated in the management plans of the PAs protecting the Colchic Rainforests and Wetlands, which are almost identical with the proposed Outstanding Universal Value of the series, are promoted through individual awareness raising and communication strategies, but there are currently no policies or programmes related specifically to the presentation and promotion of the entire series of the Colchic Rainforests and Wetlands.

For example, the communication strategy and action plan ***Awareness Raising and Visibility of Kintrishi Protected Areas*** (SPPA 2016) aims at promoting and supporting various effective communication channels and tools to inform the local population, as well as visitors along with the population-at-large, on the PAs of Kintrishi. Thereby, this document identifies or establishes channels and tools for presenting and promoting the Colchic Rainforests and Wetlands once they have been inscribed.

Another foundation of the future framework for the presentation and promotion of the Colchic Rainforests and Wetlands are the sustainable tourism development strategies of the PAs protecting the Mtirala-Kintrishi nominated component area (HIDRIA Ciencia 2016a, b, Schülein 2017a, b). These include provisions for the development of the presentation and interpretation of the values of these areas, which coincide with their proposed OUV (in this case particularly of the Colchic forests).

In addition, Sections 4.3.2, 4.4.1 and 4.4.3 of the Integrated Management and Monitoring Framework for the Proposed Natural World Heritage Site Colchic Rainforests and Wetlands (Box 8) set out a clear guidance on how the presentation and promotion activities of the individual PAs contributing to the series will be streamlined and coordinated to present and promote specifically the Outstanding Universal Value of the entire series, in case of inscription.

## 5.J STAFFING LEVELS AND EXPERTISE (PROFESSIONAL, TECHNICAL, MAINTENANCE)

Employment at the Agency of Protected Areas and its local branch offices is regulated by the Public Service Law of Georgia ("Article-34"), which implies appointment for vacant positions through competition according to the "Regulation of Competition in Public Service", Government Resolution №204.

To conduct such competitions, the Agency of Protected Areas announces vacant positions and their qualification requirements online and forms a commission, which has a chairman and deputy chairman. The competition is conducted in 3 stages: (1) qualified applicants are chosen according to their application forms; (2) pre-selected candidates are subjected to written or oral tests; and (3) job interviews. The final decision is made by the Commission, by a majority vote by open ballot.

The Agency of Protected Areas periodically conducts capacity building for its employees at national and international level, through trainings and experience sharing with foreign colleagues.

Staffing level is considered adequate (Table 27). The senior staff of all protected areas contributing to the property typically hold university degrees (sometimes directly relevant to PA management, sometimes indirectly), while rangers usually have at least secondary education (See Section 7.c). As a result, the Agency of Protected Areas of Georgia considers that the education, qualification and professional experience of staff of all administrations of the component areas of the series ensures sufficient management of these protected areas and related administrative needs. Furthermore, a human resource management strategy has been developed through the Support Program for Protected Areas – Georgia, which is funded by the KFW within the framework of German Financial Cooperation in the Caucasus.

There are additional increases of staff in progress or planned for the near future: Two more rangers have been hired in Mtirala National Park in 2018. It is further envisaged to employ 11 more rangers and two more Senior District Rangers in Kolkheti National Park, and one more ranger in Kobuleti PAs.

**Table 27.** Staffing of protected areas contributing to the series (Source: APA, December 2017). See Table 23 for relationships between nominated component areas and PAs.

| Position | Mtirala NP | Kintrishi PAs | Kobuleti PAs | Kolkheti NP |
|---|---|---|---|---|
| **Director** | 1 | 1 | 1 | 1 |
| **Head of Administration Unit** | 1 | | | 1 |
| **Accountant** | 1 | 1 | 1 (vacant) | 1 |
| **Visitor Service Chief Specialist** | 1 | 1 | 1 | 1 |
| **Head of Security Division** | 1 | 1 | 1 | 1 |
| **Natural Resources Chief Specialist** | 1 | 1 | 1 | 2 |
| **Senior District Ranger** | 2 | | | 4 (1 vacant) |
| **Ranger** | 10 | 6 | 2 | 21 |
| **Total** | 18 | 11 | 6 | 31 |

# 6. MONITORING

The monitoring regime of the Protected Areas contributing to the series is described in their respective management plans. Further provisions for the integrated monitoring of the entire series are provided in Section 4.5 of the Integrated Management and Monitoring Framework for the Proposed Natural World Heritage Site Colchic Rainforests and Wetlands (Box 8).

## 6.A KEY INDICATORS FOR MEASURING STATE OF CONSERVATION

Table 28 summarizes key indicators for the monitoring of the state of conservation of the Colchic Rainforests and Wetlands. While baseline data for a number of indicators (e.g. 1, 4, 11, 13, 14, 15) are available already, the collection of additional baseline data for other indicators is planned for 2019/20.

## 6.B ADMINISTRATIVE ARRANGEMENTS FOR MONITORING THE PROPERTY

The responsible agency for the monitoring of all nominated component areas of the Colchic Rainforests and Wetlands is the Agency of Protected Areas at the Ministry of Environmental Protection and Agriculture of Georgia (APA).

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Depending on specific monitoring needs, APA may enter cooperation with donor organizations (such as the Caucasus Nature Fund), academic institutions (such as Shota Rustaveli State University Batumi or Ilia State University Tbilisi) and NGOs (such as the Georgian BirdLife partner SABUKO or the NGO NACRES) to support the monitoring of the Outstanding Universal Value of the area, as well as pressures and threats to it.

The Caucasus Nature Fund (CNF), in cooperation with APA, has pioneered the development of integrated PA monitoring systems – based on the CMP Open Standards for the Practice of Conservation – for two of the projected areas supported by it (Lagodekhi PAs and Borjomi-Kharagauli National Park) (Garstecki & Rajebashvili 2016a, b). CNF is currently studying options for broader support to monitoring in Georgian protected areas, which might also benefit the PAs protecting the nominated component areas of the series.

## 6.C RESULTS OF PREVIOUS REPORTING EXERCISES

The scoping and feasibility study ***Feasibility assessment for a World Heritage nomination of the Colchic Rainforests and Wetlands under the natural criteria*** (Garstecki et al. 2017) has compiled a wide range of baseline data from literature and field surveys, which are summarized in Chapter 2 of this dossier and its Appendices, particularly Appendix 2 and 3.

There are also a number of accounts of individual PAs contributing to the series, including the descriptive sections of the management plans of Mtirala National Park (APA 2016) and Kolkheti National Park (APA 2018a), as well as Kobuleti Protected Areas (APA 2018b) baseline study report for Kintrishi Protected Areas (GeoGraphic 2016).

A RAPPAM assessment for the entire PA system of Georgia was conducted in 2012 (Kakabadze 2012). The component areas of the series were in the upper mid-field of the evaluated Georgian PAs on average (cf. Chapter 5.c.6). However, only limited conclusions on the conservation status of the property can be drawn from this assessment (1) because it is already relatively old and outdated, and (2) because the RAPPAM methodology focuses on the management effectiveness and relative differences within PA systems (in this case the Georgian national PA system), not individual PAs.

**Table 28.** Key indicators of the state of conservation of the Colchic Rainforests and Wetlands.

| No. | Indicator | Periodicity | Location of records |
|---|---|---|---|
| | ***INDICATORS OF STATE OF CONSERVATION OF RAINFOREST AND ASSOCIATED AREAS*** | | |
| **1** | **Description:** Area of Colchic Forest within the component protected areas of the nominated property containing forest (ha). **Unit:** hectare. **Method:** Remote imagery, ground mapping. **Responsible:** APA. | Every 3 years. | APA |
| **2** | **Description:** Tree species dominance structure of Colchic Forest in 20 fixed sample plots (ha). **Method:** Field survey, based on standard Georgian forest inventory protocol. **Unit:** % dominance of 10 most dominant tree species. **Responsible:** APA. | Every 6 years | APA |
| **3** | **Description:** Age structure of Colchic Forest in 20 fixed sample plots (ha). **Method:** Field survey, based on standard Georgian forest inventory protocol. **Unit:** % of age classes of dominant species. **Responsible:** APA. | Every 6 years | APA |
| **4** | **Description:** Trends in key species of forest fauna: Occupancy of known breeding areas of *Mertensiella caucasica.* **Method:** Field survey. **Unit:** %. **Responsible:** APA, with methodological support from Ilia State University Tbilisi. | Every 3 years | APA and Ilia State University |
| **5** | **Description:** Trends in key species of sub-alpine fauna: Activity density of *Lyurus mlokosiewiczi.* **Method:** Field survey of lekking males (transect) during lekking season. **Unit:** No. per km. **Responsible:** APA, with methodological support from Ilia State University Tbilisi. | Every 3 years | APA and Ilia State University |
| **6** | **Description:** Trends in key species of forest flora: *Epigaea gaultherioides, Betula medwedewii, Buxus colchica, Quercus pontica, taxus baccata, Rhododendron ungernii*. **Method:** Field (transect relevee) survey. **Unit:** coverage per ha in known sampling plots. **Responsible:** APA, with methodological support of Batumi Botanical Garden. | Every 3 years | APA and Batumi Botanical Garden |
| **7** | **Description:** Onset of flowering of *Lilium szovitsianum* and *Allium adzharicum*. Method: Field survey. Unit: Date. APA, with methodological support of Batumi Botanical Garden. | Every 3 years | APA and Batumi Botanical Garden |
| **8** | **Description:** Trends in key species of forest flora: *Buxus colchica, Quercus hartwissiana, Pterocarya fraxinifolia, Fraxinus excelsior, Zellcova carpinifolia.* **Method:** Field (transect relevee) survey. **Unit:** coverage per ha in known sampling plots. **Responsible:** APA, with methodological support of Batumi Botanical Garden, Shota Rustaveli State University Batumi | Every 3 years | APA and Batumi Botanical Garden, Shota Rustaveli State University |
| | ***INDICATORS OF STATE OF CONSERVATION OF WETLAND AREAS*** | | |
| **9** | **Description:** Absolute and relative area of *Sphagnum* mire zone, hump zone and forest/shrub zone within the component protected areas of the nominated property containing mires. **Method:** Field survey and possibly remote sensing. **Unit:** ha and %. **Responsible:** APA, with methodological support of Batumi Shota Rustaveli State University Batumi and Greifswald University. | Every 3 years | APA and Greifswald University |
| **10** | **Description:** Trends in key species of wetland fauna: *Emys obicularis.* **Method:** Field survey. **Unit:** No./ha. **Responsible:** APA, with methodological support of Ilia State University. | Every 3 years | APA and Ilia State University |
| **11** | **Description:** Trends in key species of wetland flora: *Trapa colchica, Salvinia natans, Solidago turfosa.* **Method:** Field survey (relevee method). **Unit:** % coverage. **Responsible:** APA, with methodological support of Shota Rustaveli State University Batumi. | Every 3 years | APA and Shota Rustaveli State University Batumi |
| **12** | **Description:** Trends in key species of wetland flora: plant community composition of Sphagnum austinii, *Sphagnum papillosum, Sphagnum rubellum and Drozera rotundifolia. Rhynchospora caucasica, Solidago turfosa,* **Method:** Field survey relevee method. **Unit:** % coverage. **Responsible:** APA, with methodological support of Shota Rustaveli State University Batumi. | Every 2 years | APA and Shota Rustaveli State University Batumi |
| | ***INDICATORS OF STATE OF CONSERVATION OF ALL AREAS*** | | |
| **13** | **Description:** Forest and wetland area affected by invasive alien species and/or plant pathogens (ha). **Method:** Field survey. **Unit:** ha. **Responsible:** APA. | Every 3 years | APA |
| | ***INDICATORS OF PRESSSURES AND THREATS*** | | |
| **14** | **Description:** Incidences of illegal logging. **Method:** Analysis of enforcement records **Unit:** No. of incidents per year and amount of wood ($m^3$) involved. **Responsible:** APA. | Annually | APA |
| **15** | **Description:** Incidences of poaching. **Method:** Analysis of enforcement records **Unit:** No. of incidents per year and bag sizes involved. **Responsible:** APA | Annually | APA |

# 7 DOCUMENTATION

## 7.A PHOTOGRAPHS, SLIDES AND OTHER AUDIOVISUAL MATERIALS

| ID No | Format | Caption | Date (mo/yr) | Photographer | Copyright owner | Contact Details of owner | Nonexcl. cession of rights |
|---|---|---|---|---|---|---|---|
| 1 | JPEG | Mtirala National Park. Colchic broad-leaved mixed forest. | 08/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 2 | JPEG | Mtirala National Park. Waterfall – 15 m high, 440 m above sea level. | 08/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 3 | JPEG | Mtirala National Park. Visitor shelter, 1,250 meters above sea level. Colchic broad-leaved mixed forest. | 08/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 4 | JPEG | Mtirala National Park. Colchic broad-leaved mixed forest. | 08/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 5 | JPEG | Mtirala National Park. Chakvistskali River. | 02/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 6 | JPEG | Mtirala National Park. Winter. | 02/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 7 | JPEG | Mtirala National Park. Winter. | 02/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 8 | JPEG | Mtirala National Park. Colchic broad-leaved mixed forest. | 02/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 9 | JPEG (Figure 47)[1] | Mtirala National Park. Stream pool, 380 meters above sea level. | 08/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 10 | JPEG | Mtirala National Park. Stream pool, 380 meters above sea level. | 08/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 11 | JPEG | Mtirala National Park. Bird-watching tower on Mtirala Mountain. | 09/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 12 | JPEG | Mtirala National Park. View from Mtirala Mountain. | 09/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |

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|---|---|---|---|---|---|---|---|
| 13 | JPEG | Vicinity of Mtirala National Park. Village Chakvistavi. | 09/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | Yes |
| 14 | JPEG | Mtirala National Park. | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557 e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 15 | JPEG | Mtirala National Park. Traditional beekeeping within the protected area. | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557 e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 16 | JPEG (Figure 19) | Mtirala National Park. Colchic broad-leaved mixed forest. | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557 e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 17 | JPEG | Mtirala National Park. Colchic broad-leaved mixed forest. | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557 e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 18 | JPEG | Mtirala National Park. Waterfall. | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557 e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 19 | JPEG | Mtirala National Park. Small bridge. | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557 e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 20 | JPEG | Mtirala National Park. | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557 e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 21 | JPEG | Mtirala National Park. *Epimedium colchicum* (Boiss.) Trautv. (Syn. Of *Epimedium pinnatum* subsp. *colchicum* (Boiss.) N. Busch) | 04/2005 | Shalva Sikharulidze | Shalva Sikharulidze | Institute of Botany of Ilia State University, 1 Botanikuri str., Tbilisi Georgia 0105, tel. +995 599 573 830, e-mail: shalva.sikharulidze@iliauni.edu.ge | yes |
| 22 | JPEG (Figure 31) | Mtirala National Park. *Galanthus krasnovii* Khokhr. | 03/2011 | Shalva Sikharulidze | Shalva Sikharulidze | Institute of Botany of Ilia State University, 1 Botanikuri str., Tbilisi Georgia 0105, tel. +995 599 573 830, e-mail: shalva.sikharulidze@iliauni.edu.ge | yes |
| 23 | JPEG | Mtirala National Park. *Osmanthus decorus* (Boiss. & Balansa) Kasapligil fruit-bearing | 10/2009 | Shalva Sikharulidze | Shalva Sikharulidze | Institute of Botany of Ilia State University, 1 Botanikuri str., Tbilisi Georgia 0105, tel. +995 599 573 830, e-mail: shalva.sikharulidze@iliauni.edu.ge | yes |
| 24 | JPEG | Mtirala National Park. *Osmanthus decorus* (Boiss. & Balansa) Kasapligil in bloom | 07/2005 | Shalva Sikharulidze | Shalva Sikharulidze | Institute of Botany of Ilia State University, 1 Botanikuri str., Tbilisi Georgia 0105, tel. +995 599 573 830, e-mail: shalva.sikharulidze@iliauni.edu.ge | yes |
| 25 | JPEG | Mtirala National Park. *Paeonia macrophylla* (Albov) Lomakin | 04/2006 | Shalva Sikharulidze | Shalva Sikharulidze | Institute of Botany of Ilia State University, 1 Botanikuri str., Tbilisi Georgia 0105, tel. +995 599 573 830, e-mail: shalva.sikharulidze@iliauni.edu.ge | yes |
| 26 | JPEG (Figure 29) | Mtirala National Park. *Quercus imeretina* Steven | 04/2005 | Shalva Sikharulidze | Shalva Sikharulidze | Institute of Botany of Ilia State University, 1 Botanikuri str., Tbilisi Georgia 0105, tel. +995 599 573 830, e-mail: shalva.sikharulidze@iliauni.edu.ge | yes |

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|---|---|---|---|---|---|---|---|
| 27 | JPEG (Figure 30) | Mtirala National Park.<br>*Quercus pontica* K. Koch | 11/2011 | Shalva Sikharulidze | Shalva Sikharulidze | Institute of Botany of Ilia State University, 1 Botanikuri str., Tbilisi Georgia 0105, tel. +995 599 573 830, e-mail: shalva.sikharulidze@iliauni.edu.ge | yes |
| 28 | JPEG | Kintrishi Protected Areas.<br>Tbikeli lake. Altitude 1,900-2,000 m. | 07/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 29 | JPEG | Kintrishi Protected Areas.<br>View from shelter near Tbikeli Lake. | 07/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 30 | JPEG | Kintrishi Protected Landscape. Waterfall on the River Kintrishi. | 09/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 31 | JPEG | Kintrishi Protected Landscape.<br>Village Khino. | 09/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 32 | JPEG | Kintrishi Protected Landscape.<br>Arch bridge. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 33 | JPEG | Kintrishi Protected Landscape.<br>Arch bridge. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 34 | JPEG | Kintrishi Protected Landscape.<br>Arch bridge. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 35 | JPEG | Kintrishi Protected Landscape.<br>River Kintrishi | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 36 | JPEG | Kintrishi Protected Landscape.<br>River Kintrishi | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 37 | JPEG | Kintrishi Protected Landscape.<br>Colchic mixed forest. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 38 | JPEG | Kintrishi Protected Landscape.<br>Colchic mixed forest. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 39 | JPEG | Kintrishi Protected Landscape.<br>Colchic mixed forest. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 40 | JPEG | Kintrishi Protected Landscape.<br>River Kintrishi. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 41 | JPEG | Kintrishi Protected Landscape.<br>Mountain view. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 42 | JPEG | Kintrishi Protected Landscape.<br>Mountain view. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |

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|---|---|---|---|---|---|---|---|
| 43 | JPEG | Kintrishi Protected Landscape.<br>Mountain view. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 44 | JPEG | Kintrishi Protected Landscape.<br>Mountain view. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 45 | JPEG | Kintrishi Protected Landscape.<br>Mountain view. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 46 | JPEG | Kintrishi Protected Landscape.<br>Mountain view. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 47 | JPEG | Kintrishi Protected Landscape.<br>Tbikeli Lake. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 48 | JPEG | Kintrishi Protected Landscape.<br>Tbikeli Lake. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 49 | JPEG | Kintrishi Protected Landscape.<br>Tbikeli Lake. | 07/2010 | Aleko Khabeishvili | Aleko Khabeishvili | Tel +995577101843 | yes |
| 50 | JPEG | Kintrishi Protected Landscape.<br>Mountain view. | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557<br>e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 51 | JPEG | Kintrishi Protected Landscape.<br>Fagus orientalis. | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557<br>e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 52 | JPEG | Kobuleti Protected Areas.<br>Aerial view, partial (Kobuleti Strict Nature Reserve and Kobuleti Managed Reserve). | 07/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected areas/ 6 gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 53 | JPEG | Kobuleti Protected Areas.<br>Sundew. | 07/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected areas/ 6 gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 54 | JPEG | Kobuleti Protected Areas.<br>Aerial view, partial (Kobuleti Strict Nature Reserve, Kobuleti Managed Reserve). | 07/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 55 | JPEG | Kobuleti Protected Areas.<br>Aerial view, partial (Kobuleti Strict Nature Reserve, Kobuleti Managed Reserve). | 07/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 56 | JPEG | Kobuleti Protected Areas<br>Yellow Water-lily. | 06/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 57 | JPEG | Kobuleti Protected Areas.<br>White Water-lily. | 06/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |

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|---|---|---|---|---|---|---|---|
| 58 | JPEG | Kobuleti Strict Nature Reserve. *Sphagnum* moss. | 06/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 59 | JPEG | Kobuleti Protected Areas<br>Ispani 2 mire. | 08/2003 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557<br>e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 60 | JPEG | Kobuleti Protected Areas<br>Ispani 2 mire. | 08/2003 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557<br>e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 61 | JPEG | Kobuleti Protected Areas<br>Ispani 2 mire. | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557<br>e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 62 | JPEG | Kobuleti Protected Areas<br>Ispani 2 mire. | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557<br>e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 63 | JPEG | Kobuleti Protected Areas<br>Ispani 2 mire. | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Mobile: +995 99 542557<br>e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 64 | JPEG (Figure 50) | Kobuleti Protected Areas<br>View from S-W of Ispani 2 mire. | 01/2007 | Izolda Matchutadze | Izolda Matchutadze | Tel: +995 593 303 957<br>izoldamatchutadze@bsu.edu.ge | yes |
| 65 | JPEG (Figure 55) | Kobuleti Protected Areas<br>Ispani 2 mire. | 07/2004 | Izolda Matchutadze | Izolda Matchutadze | Tel: +995 593 303 957<br>izoldamatchutadze@bsu.edu.ge | yes |
| 66 | JPEG | Kobuleti Protected Areas<br>Ispani 2 mire. - Osmunda regalis | 06/2004 | Zurab Manvelidze | Zurab Manvelidze | Tel: +995 99 542557<br>e-mail: zmanvelidze@wwfcaucasus.org | yes |
| 67 | JPEG (Figure 54) | Kobuleti Protected Areas<br>Sphagnum austinii & Sphagnum rubellum & Sphagnum papillosum communities in Ispani mire. | 07/2012 | Matthias Krebs | Matthias Krebs | krebsm@uni-greifswald.de | |
| 68 | JPEG | Kolkheti National Park.<br>Churia district. White Pelicans. | 02/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 69 | JPEG | Kolkheti National Park.<br>River Pichori. | 09/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 70 | JPEG (Figure 16) | Kolkheti National Park.<br>Tributary of Pichori River. | 09/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |
| 71 | JPEG | Kolkheti National Park.<br>River Pichori. Colchic wetlands and relict forests are spread along the river bank. | 09/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/ 6 Gulua street Tbilisi Georgia 0114/ tel +995 599 474 883 e-mail: pr.apa.gov@gmail.com | yes |

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|---|---|---|---|---|---|---|---|
| 72 | JPEG (Figure 62) | Kolkheti National Park.<br>River Pichori. | 08/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/<br>6 Gulua street Tbilisi Georgia<br>0114/ tel +995 599 474 883<br>e-mail: pr.apa.gov@gmail.com | yes |
| 73 | JPEG (Figure 23) | Kolkheti National Park.<br>River Pichori | 08/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/<br>6 Gulua street Tbilisi Georgia<br>0114/ tel +995 599 474 883<br>e-mail: pr.apa.gov@gmail.com | yes |
| 74 | JPEG | Kolkheti National Park.<br>Paliastomi lake: bird-watching tower. | 08/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/<br>6 Gulua street Tbilisi Georgia<br>0114/ tel +995 599 474 883<br>e-mail: pr.apa.gov@gmail.com | yes |
| 75 | JPEG | Kolkheti National Park.<br>Churia district: visitor Center and bird-watching tower. | 02/2016 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/<br>6 Gulua street Tbilisi Georgia<br>0114/ tel +995 599 474 883<br>e-mail: pr.apa.gov@gmail.com | yes |
| 76 | JPEG | Kolkheti National Park.<br>Churia district. | 09/2017 | Paata Vardanashvili | Agency of Protected Areas | Agency of Protected Areas/<br>6 Gulua street Tbilisi Georgia<br>0114/ tel +995 599 474 883<br>e-mail: pr.apa.gov@gmail.com | yes |
| 77 | JPEG (Figure 61) | Kolkheti National Park<br>Freshwater ponds dominated by Salvinia natans&Trapa in Imnati mire | 09/2017 | Hans Joosten | Hans Joosten | Tel. (+ 49)(0)3834 4204177<br>joosten@uni-greifswald.de | yes |
| 78 | JPEG (Figure 59) | Kolkheti National Park<br>Nabada mire and Phragmites asutralis stands. | 09/2005 | Izolda Matchutadze | Izolda Matchutadze | Tel: +995 593 303 957<br>izoldamatchutadze@bsu.edu.ge | yes |
| 79 | JPEG (Figure 58) | Kolkheti National Park<br>Imnati mire. | 01/2007 | Izolda Matchutadze | Izolda Matchutadze | Tel: +995 593 303 957<br>izoldamatchutadze@bsu.edu.ge | yes |
| 80 | JPEG (Figure 12) | Kolkheti National Park<br>Imnati mire. | 01/2007 | Izolda Matchutadze | Izolda Matchutadze | Tel: +995 593 303 957<br>izoldamatchutadze@bsu.edu.ge | yes |

# 7.B TEXTS RELATING TO PROTECTIVE DESIGNATION, SUMMARIES AND COPIES OF MANAGEMENT PLANS

## *7.b.1 Management Plan of Mtirala National Park*

## CHAPTER I

### *Introduction*

**Article 1. Purpose and Territorial Scope of the Management Plan**

This management plan is for Mtirala National Park. The management plan has been elaborated to comply with the stipulation in the Law on the System of Protected Areas that a management plan is obligatory for every protected area. The purpose of the management plan is to define the long term objectives for the national park, the results which the responsible authority will aim to achieve during the life of the management plan, the actions that need to be carried out to achieve those results, and indicators for monitoring progress. It provides the continuation of the management plan that was approved in May, 2009.

**Article 2. Main Objectives of Establishing the National Park**

Mtirala National Park was established by the Law of Georgia "on Mtirala National Park", May 25th, 2006, No. 3147 for the following purposes:

to maintain the unique biodiversity and landscape diversity;

to develop the long-term protection of eco-systems of the Kolchic forests;

to develop the ecological security;

to provide recreational activity within the borders of Kobuleti, Khelvachauri and Keda administrative districts.

**Article 3. Process of Elaborating the Management Plan**

The management plan was elaborated by the following steps:

a) A stakeholder analysis workshop was held in October 2013 to determine the main local partners of the national park for different steps of management plan elaboration.

Chapters 1 and 2 of the management plan were drafted in March 2014 based on obtained information.

An inception workshop and a first planning workshop were held in March 2014 together with external stakeholders. The planning workshop reviewed the draft of chapters 1 and 2 of the management plan, determined the national park's key values and agreed long term objectives, and identified problems and opportunities that the management plan should address.

Chapters 1 and 2 of the management plan were revised, and Chapters 3 and 4 elaborated, in May 2014 based on the outcomes of the first planning workshop.

A planning workshop was held with partners at the national park administration in Chakvi on July 1st to 2nd, 2014. At this workshop, chapters 3 and 4 were revised and medium term objectives and programmes were formulated. Chapters 5 and 6 were elaborated afterwards.

A complete text of the management plan was discussed with APA representatives on November 11th and 12th. Required changes were incorporated.

The draft management planned was published for public consultation on 28 Feburary 2015.

A consultation meeting for interested organisations was held in the Agency for Protected in Tbilisi on 23 March 2015.

The public hearing of the draft management plan was held in Mtirala National Park administration on 24 March 2015.

**Article 4. Duration of the Management Plan**

The management plan is valid for 6 years from the date of its coming into effect.

**Article 5. Revision and Updating of the Management Plan**

1. Amendments to the management plan shall be made in accordance with the active legislation.

Not later than the first quarter of the sixth year after the management plan has come into effect the Agency of Protected Areas shall start preparing a new management plan that shall be adopted in accordance with the active legislation.

# CHAPTER II

## *Description of the protected area*

**Article 6. Location**

1. Mtirala National Park is located in the Adjara Autonomous Republic, approximately 20 km from Batumi and close to the Black Sea coast (distance from the Sea to the nearest point of the park is 12 km). It is a mountainous area (highest point is at 1,762 m a.s.l. close to Mt. Morvili peak, which lies outside the national park) with several streams – Chakvistskali is the biggest river running through the national park. Mtirala could be considered the westernmost part of the Lesser Caucasus Mountain chain. It belongs to Western part of Adjara-Imereti mountain ridge, located on the Kobuleti-Chakvi mountain ridge. The only settlement inside the outer boundaries of the national park is Chakvistavi, located in the centre of the national park, but excluded from its territory. Mtirala National Park is a forested area and in the north-east is neighboured with Kintrishi Strict Nature Reserve.

2. The area of Mtirala National Park according to the Law on Mtirala National Park is 15,698.8 ha. The National Park is divided into three districts – Kobuleti, Khelvachauri and Keda. The following villages are adjacent to the national park: in Kobuleti municipality: Chakvistavi, Khala, Gorgadzeebi, Chaisubani, Zeda Achkva, Kveda Achkva, Dagva; in Khelvachauri municipality: Korolistavi, Masauri, Chaisubani, Agara, Gantiadi, Kapreshumi, Sameba, Akhalsheni, Khekru, Zemo Jocho, Kapnistavi; in Keda municipality: Zundaga, Makhuntseti, Agara, Gulebi, Tsoniarisi, Zvare, Pirveli Maisi, Zendidi, Khunkuda. (see the map of Mtirala National Park at Annex 2).

The national park is divided into three functional zones: strict protection zone (15.7% of the national park's territory), visitors zone (51.4 %), traditional use zone (32.9 %).

**Article 7. National Setting of the National Park**

1. Mtirala National Park is one of 11 national parks established in Georgia so far. In the Autonomous Republic of Adjara there are the following protected areas in addition to Mtirala National Park: Machakhela National Park, Kintrishi Strict Nature Reserve, Kintrishi Protected Landscape, Kobuleti Strict Nature Reserve and Kobuleti Managed Nature Reserve. The above-mentioned protected areas protect the mountain landscapes and wetlands of the Lesser Caucasus.

Mtirala National Park together with Machakhela National Park and Kintrishi Protected Areas conserves the Kolkhic mountain ecosystems. This is very important with respect to the fact that untouched forests remained here hosting many relict species. Kolkhic lowland and coastal phenomena are protected in Kolkheti National

Park.

A part of Mtirala National Park in the South is part of the Important Bird Area (IBA) GEO 14 "Batumi" with an extent of 41,938 ha which was designated in 2002.

Georgia is in the process of classifying its national habitats according to the Habitat Directive of the European Union (Annex I) as well as the Bern Convention Resolutions No. 4 (1996) and No. 6 (1998). Once habitats have been classified and mapped it is likely that Mtirala National Park or parts of it will be proposed for an Emerald Network of protected areas.

### Article 8. International Setting of the National Park

1. Mtirala National Park is one of several protected areas in the western part of the Lesser Caucasus, the others being Kintrishi Protected Areas and Machakhela National Park in Adjara and Camili Biosphere Reserve in Turkey. Although the Mtirala-Kintrishi protected complex is divided by the valley of Acharistskali river with the main road Batumi-Akhaltsikhe, settlements and deforested and cultivated land from the Machakhela-Camili protected complex, they are close enough to provide communication of species sub-populations and thus also stability of uniquely preserved ecosystems.

The Kolkhic region is internationally important as an ice age refuge and subsequent centre of dispersal of many species. Mtirala National Park conserves the mountainous type of Kolkhic ecosystems. A significant area of the national park's territory has not been altered from its natural state.

### Article 9. History of the National Park

1. Tsiskara state reserve existed between 1959 and 1961. Its area was about 1,400 ha and was located around Korolistskali river and Mount Mtirala. This area is now covered by Mtirala National Park.

Mtirala National Park was established by the Law on Mtirala National Park, May 25th, 2006, No. 3147.

Mtirala National Park Administration was established on 27th June, 2007.

### Article 10. Geology, Soils and Hydrology

1. The territory of the national park does not much differ from the rest of Adjara with regard to its geology: tertiary andesite compound tufagenic rocks are mainly spread here.

There are mainly three types of soils on the park territory. Red soils that are rare for the Caucasus are common at up to 600 m above sea level; small areas of these soils are represented in the park (at its western border) with mixed broad-leaved forests on them. There are two types of these red soils: red shallow (Haplic Ferralsols) and red true or podzolic (Haplic Histosols or Rodic Acrisols). With the change of absolute height red soils are replaced with yellow and cinnamonic soils that are mostly covered by beech forests and mixed beech and chestnut forests. These soils are represented by Brown forest true (Umbric Cambisols) and rusty brown soil - brown forest shallow (Distric Cambisols) under beech forests and Shkeriani shrub vegetation, while under chestnut forests these are mainly represented by yellow-brown forest soils (Ocsic Cambisols). Some fragments of alluvial soils occur on floodplains in the area as well.

There are numerous small and medium-size rivers on the park territory. The main hydro-arteries on the slope of Kobuleti-Chakvi ridge facing the Black Sea are rivers Chakvistskali and Korolistskali directly running into the Black Sea and tributaries of rivers Ajaristskali Dologani, Zundagistskali and some others on the south slope of the ridge. Several of them run through beautiful gorges creating rapids and waterfalls. There are lots of mineral and fresh waters known for their curing features on this territory.

### Article 11. Climate

1. The average annual index of atmospheric precipitation exceeds 2,000 mm and reaches even 4,000 mm at the sea-side slopes of the mountain Didi Mtirala. The high precipitation index significantly determines the uniqueness of local biota. Air humidity is 80-85 %; there are many foggy days and they add a special mag-

nificence to the impassable Kolchic forests covered with evergreen sub-forests. Average annual air temperature varies from 10–12 °C at 500-600 m above sea level to 5–6 °C at 1,000-1,200 m.

The average index of the warmest month of the year (August) in the lower mountain belt is 20 °C and -2 °C during the coldest month (January). The absolute minimum reaches –13.6 °C at 1,000-1,200 m above sea level. The average number of frostless days in the park territory is 274. Snow cover in the middle and upper mountain belts often reaches 3-4 m (and more at some places).

### Article 12. Landscapes

1. Kobuleti-Chakvi mountain ridge (where the park develops) orographically divides Adjara into Western (littoral) and Eastern (mountainous) areas. The park territory that mainly covers the littoral Adjara zone is divided into following zones:

hilly belt on the mountain front (up to 500-600 m above the sea level);

lower mountain belt (higher from previous up to 600-1,200 m);

middle belt (higher from previous up to 1,200-1,500 m);

upper belt (higher from previous above 1,500-1,600 m).

The highest hypsometrical indicator lies near 1,700 m and is relevant for the Morvili ridge that is enclosed by eastern border of the park (the height of Mount Morvili is 1,773 m above sea level, whereas the highest peak of the park is 1,762 m). The mountains Didi Mtirala, Tirati and some others are higher than 1,300 m. Relief is extremely diverse: beautiful narrow gorges (among them, canyons) are remarkable among relief formations.

### Article 13. Habitats

1. Almost 100 % of the territory is covered with forests and impassable shrubbery. Forests have the following hypsometric distribution:

<500-600 m: mixed broad-leaved Kolchic forests of sub-mountain hilly zone;

500 (600)-1000 (1200) m: chestnut (*Castanea sativa*) belt of lower mountain zone;

>1000 (1200 m): beech (*Fagus orientalis*) belt of middle and upper (>1500 m) mountain zones.

Most of the park territory is covered with forest phytocenosis with beech domination: chestnut and beech forests are common in the lower belt, where *Carpinus caucasica*, *Fraxinus excelsior* etc. are also common in the first tier. *Staphylea colchica*, *Buxus colchica*, *Rhododendron ponticum*, *R. luteum*, *Laurocerasus officinalis* etc. are frequently found in the forest understorey. (see Table 1)

Coenoses with chestnut domination are also common in the same belt that compositionally do not much differ from the beech forests (see Table 1).

**Table 1.** Distribution of forest types in the Mtirala National Park (according to data from G. Beruchashvili, WWF Caucasus, 2014)

| Forest type | Area (ha) | Area (%) |
|---|---|---|
| Beech | 10,104.8 | 64.12 |
| Alder | 1,852.6 | 11.76 |
| Chestnut and Walnut | 1,262.8 | 8.01 |
| Hornbeam | 315.1 | 2.00 |
| Maple, Ash, Elm | 5.7 | 0.04 |

| | | |
|---|---|---|
| Fruit trees | 46.0 | 0.29 |
| Shrubbery | 2,127.6 | 13.50 |
| Non-forest area | 44.7 | 0.28 |

At 1,000-1,200 m above sea level one can meet beech forests forming a unique coenosis with an understorey of *Rhododendron ungernii* and other types of evergreen and deciduous subforests (*Rhododendron ponticum*, *Laurocerasus officinalis*, *Vaccinium arctostaphyllos*, *Rhododendron luteum*, *Viburnum orientale*, *Rubus caucasicus*).

As for the gorges, alder forests are very typical with *Alnus barbata* dominating in the lower forest belt and *A. incana* dominating in the middle belt.

Formation of evergreen, high-growing shrubbery of *Rhododendron ponticum* gives special uniqueness to the territory, where impassable shrubberies are abundant. This cenosis was named Shkeriani. Due to representation of Kolchic relict species within *Rhododendron ponticum* shrubbery several rare plants are noticeable, including the following: *Rhododendron ponticum*, *R. ungernii*, *R. luteum*, *Ilex colchica*, *Laurocerasus officinalis*, *Ruscus colchicus*. The most noticeable locality of this plant coenosis was found in the gorge of river Korolistskali (at the head of its right indraft Namtsvavistskali), where most endemic species of *Epigaea gaultherioides* of Adjara-Lazeti can also be met within the shrubbery. Shrubbery does not have a rich herb layer due to shrub density; however some shade and moisture tolerant species can still be found: *Dryopteris oreopteris*, *Athyrium filix-femina*, *Blechnum spicant*, *Oxalis villosa* etc.

### Article 14. Biodiversity

1. During the last glaciation, the Kolkhic region represented a shelter for thermophytes and mesophyllic forests, which have been continuously growing there ever since. Many of those relict species occur here even today. The area at the Adjarian-Turkish border is rich in ancient endemic species. All this makes Mtirala National Park an area of global importance.

Several species of plants and animals that occur on the territory of the national park are included in international or Georgian red lists. More detailed information is presented in subsequent articles.

Mtirala National Park fauna and flora offers great opportunities for attracting nature-loving tourists and foreign researchers. Special visits can be arranged for bird watching (in the period of transmigration in particular), special tours for flora devotees in the period of blossoming of relict rhododendrons. Rhododendrons blossom in April-May and in late summer, but the fruit ripens at the end of summer. Rhododendrons are spread on all levels of forest belts and creates an evergreen undergrowth together with other shrubs (cherry-laurel, ilex). Upon arrival of warm days of autumn it characterizes the second blossoming.

### Article 15. Flora and Vegetation Classes

The national park is remarkable for its exception diversity of endemic and relict plants. The following rare endemic relicts are included in the Red List of Georgia, for example *Quercus pontica*, *Betula medwedewii*, *Rhododendron ungernii*, *Epigaea gaultherioides* (see Table 2). The latter two evergreen bushes and *Betula medwedewii* belong to the rarest local endemic relicts and can be met only in Adjara and adjacent Turkey.

**Table 2.** Tree and shrub species on the Mtirala National Park territory that are included in the Red List of Georgia

| Latin name | Georgian name | National status |
|---|---|---|
| *Betula medwedewii* | მედვედევის არყი | VU |
| *Buxus colchica* | კოლხური ბზა | VU |

| | | |
|---|---|---|
| *Castanea sativa* | ჩვეულებრივი წაბლი | VU |
| *Corylus colchica* | კოლხური თხილი | VU |
| *Epigaea gaultheroides* | გაულთეროიდული ეპიგეა | VU |
| *Juglans regia* | კაკლის ხე | VU |
| *Quercus hartwissiana* | კოლხური მუხა | VU |
| *Q. pontica* | პონტოური მუხა | VU |
| *Rhodedendron ungernii* | უნგერნის შქერი | VU |
| *Staphylea colchica* | კოლხური ჯონჯოლი | VU |
| *Taxus baccata* | უთხოვარი | VU |
| *Ulmus glabra* | შიშველი თელადუმა | VU |

**Article 16. Fauna**

1. There is a high diversity of fauna species, including several tens of species listed in the red List of Georgia (see table 4 for species of Critically Endangered and Endangered categories). Among the large mammals, *Capreolus capreolus* and *Sus scrofa* are widespread in the park. Some relatively large birds can also be met, including: *Hieraeetus pennatus*, *Milvus migrans migrans*, *Pernis apivorus*, *Accipiter gentilis marginatus*.

**Table 3.** Fauna species included in the IUCN Red List (categories CR, EN and VU) and in the Red List of Georgia categories CR and EN to be met on the National Park territory

| Latin name | Georgian name | IUCN category | National Status |
|---|---|---|---|
| **Mammals** | | | |
| *Rhinolophus mehelyi* | მეჰელის ცხვირნალა | VU | VU |
| *Lynx lynx* | ფოცხვერი | | CR |
| *Ursus arctos* | მურა დათვი | | EN |
| *Rupicapra rupicapra* | არჩვი | | EN |
| **Birds** | | | |
| *Aquila clanga* | დიდი მყივანი არწივი | VU | VU |
| *Aquila heliaca* | ბეგობის არწივი | VU | VU |
| *Falco cherrug* | გავაზი | EN | CR |
| *Falco vespertinus* | თვალშავი | | EN |
| *Haliaeetus albicilla* | თეთრკუდა ფსოვი | | EN |
| **Reptiles** | | | |
| *Darevskia clarkorum* | თურქული ხვლიკი | EN | EN |
| **Amphibians** | | | |
| *Mertensiella caucasica* | კავკასიური სალამანდრა | VU | VU |
| **Invertebrates** | | | |
| *Acherontia atropos* | სფინქსი მკვდართავა | | EN |
| *Axiopoena maura* | ამიერკავკასიური დათუნელა | | EN |
| *Daphnis nerii* | ოლეანდრის სფინქსი | | EN |
| *Parnassius apollo* | აპოლონი | VU | VU |
| *Parnassius nordmanni* | კავკასიური აპოლონი | EN | EN |
| *Phassus shamil* | კავკასიური წმინდადგახვიარა | EN | EN |
| *Zerynthia caucasica* | კავკასიური ზერინთია | VU | VU |
| *Inotrechus injaevae* | ინჯაევას ბზუალა | EN | CR |

| | | | |
|---|---|---|---|
| *Omophron limbatum* | მრგვალი ბზუალა | EN | EN |
| *Rosalia alpina* | ალპური ხარაბუზა | VU | EN |
| *Alollobophora kintrishiana* | კინტრიშის ჭიაყელა | | EN |

CR – Critically Endangered; EN – endangered; VU – vulnerable

2. One of the listed fauna species is endemics to Georgia (*Alollobophora kintrishiana*). Approximately 50 fauna species or subspecies are endemics to Caucasus.

**Article 17. Science and Education**

1. The national park is a suitable subject for scientific studies and research due to its unique natural conditions and its position close to a large city with academic institutions (Batumi).

2. The national park has a potential for organising various types of eco-educational activities, mainly for schools from adjacent villages as well the wider public from the Adjara region. Accessible parts of the national park offer observations of natural features; large areas damaged by former intensive logging could be demonstrated to the public to show the differences between natural and overcut forests, long-term influence of logging activities and slow regeneration under the protective regime.

**Article 18. Land Tenure and Land Use**

1. All the land in the national park is state property and the Agency for Protected Areas and Mtirala National Park Administration are responsible for exercising the owner's rights.

2. About 65 % of the national park territory is covered by less altered forests and shrubbery cover, where logging was done only at low intensity. In all other parts timber industry activities have been implemented at different times and different intensity (often even with violations of the relevant rules).

Until the 1990's timber production mainly had an industrial nature, whereas after that time only firewood has been produced for meeting the demands of nearby villages. Timber cutting was mainly done along the motor and tractor roads specifically designed for timber transport (up to 100-150 m distance within each side of the road). There were frequent cases of violating cutting rules. Intensive cuttings were made on flatter terrain. There were some cases of clear felling on areas of up to 1 ha. Poaching also increased. All of the above was caused by the weakening of strict control regime on the use of natural resources and the low level of penalties, but also by social and economic conditions. The situation has been radically improved over the last years: the administration has brought illegal logging to a stop and reduced allocated cutting areas in the park. The current situation will improve further once the living conditions of the population of adjacent villages improve and demand for firewood decreases.

Due to favourable climate conditions the regeneration of forests is more or less satisfactory. There are cases where cut areas are covered with blackberries, ferns and other high-growing grass species and shrubbery. There is no erosion on-going on the cut areas; however, establishment of the new tree layer is difficult. There are cases of landslide at some places after logging.

Damage to the park's forests by the cattle is very limited: there are only a small number of cattle grazed in the park because of the remoteness of population centres and barriers at the national park's entrances. Impact of grazing on forest conditions is insignificant.

Tobacco used to be produced in Chakvistavi but was in conflict with honey production because of tobacco's impact on bees. The villagers decided to stop producing tobacco and now honey is the most typical of the local products that are offered to visitors.

**Article 19. Historical-Cultural Heritage**

1. The three municipalities where Mtirala National Park is located - Kobuleti, Khelvachauri, and Keda – have a lot of prominent monuments of history and culture. The remains of settlements, churches, fortresses, burial places and sacrificial altars, archaeological artefacts, ancient bridges, steel and clay items, old irri-

gation channels are found there - all have an ancient and fascinating history. In the same region Macedonian coins and numerous Roman coins were found.

The fortress Petra-Tsikhisdziri lies in the area adjacent to the National Park, 5 km from Kobuleti. Petra-Tsikhisdziri is believed to have been both a fortress site and a church site. Due to its important strategic location both for military purposes and trade, in the 6th century AD Justinian, the Emperor of Byzantium, ordered that the fortress should be extended and upgraded. The Tsikhisdziri fortress controlled a road going across the coastal zone and connecting the region with Byzantium, Persia, and Armenia, and the Great Silk Road going from Byzantium and on via the Black Sea.

Among architectural sites that have survived to date in Adjara, especially notable are multiple-arch bridges. Bridge building traditions date back to the 4th-5th centuries AD, after Christianity was proclaimed as the state religion and new approaches were introduced to local economy, lifestyle, culture and architecture. Construction of stone arch bridges was of particular importance for Georgia, including Adjara, because of the Great Silk Road crossing the country. Today bridges remain mainly in the valleys of the rivers Acharistskali and Kintrishi in Adjara; there are about 30 bridges in total.

One of the wonderful monuments that have survived to date is St. George's Church in Chakvi that is dated to about 13th-14th century AD, where frescos have also survived. Another interesting site is a stone wine press house in the village of Zeniti located adjacent to Mtirala National Park that is a monument of the Hellenic epoch dating back to the 3rd century BC. It is an 8 m long and 3 m wide monolith cone-shaped structure where levers and the press were placed. The Zeniti wine press had high capacity, which confirms ancient traditions of viticulture and wine production in the region. The development of viticulture in the Chakvistskali valley is also confirmed by remains of ancient wine cellars remaining in almost every village there.

According to a legend, the village of Chakvistavi was established in the 7th or 8th century AD by four brothers who had fled from the neighbouring region of Guria after being involved in a murder. At that time the area in which Chakvistavi was established was virtually unknown: it was cut off from the Black sea coast by flood plains and impenetrable bamboo forest and the only access was by difficult tracks over the forest-covered mountain ridge from Kintrishi. It was only when some men fishing on the lower reaches of the Chakvi river saw off-cuts of timber that had obviously been work by hand that word spread that there was a village at the head of the river. The four founders of the village took wives from nearby villages, presumably in the traditional way of kidnapping, and over the ensuing centuries a vibrant community developed. In the 1870's, towards the end of Ottoman rule over the region, there were 650 households in the village but with the development of tea plantations in Adjara inhabitants began to migrate down to the coast and the village declined. The creation of Mtirala National Park is seen by many former as well as current inhabitants as an opportunity for the village to grow once again by selling products and services to tourists.

There are some remnants of an air-defence base (radio-locator and other buildings) on and near the peak of Mtirala. There is a memorial to an air crash of a Russian aircraft in October 2000 lower on the slope of this mountain, too.

### Article 20. Tourism and Recreation

1. The combination of natural mountain and forest landscapes and rich biodiversity attracts visitors of different nationalities, ages and interests. There is a high potential to attract visitors of various groups: mountain hikers, nature lovers, extreme sports enthusiasts, people who want to rest in a quiet place and people who are interested in local culture products.

2. The attractiveness of the area could be enhanced by improved visitor infrastructure and services.

3. Tourism in the national park is mostly centred around Chakvistavi. The national park administration created a visitors centre and other field infrastructure for visitors in this locality (for details see Article 28). Residents of Chakvistavi village also provide some services.

4. There is a small honey and gift shop operated by a community organisation constructed in Chakvi close to the park administration's headquarters. All the offered products originate from the villages bordering

the national park.

5. Tourist maps have been distributed to partners and visitors several times. There are two marked paths for visitors, for which special maps exist and are distributed among interested partners and visitors. The national park administration gives presentations to tour-agencies and journalists.

6. Some local travel agencies organise day-trips to Mtirala national park.

### Article 21. Local Economy in Relation to the National Park

Mtirala National Park contributes to the local economy in several ways:

a) the brand of the national park attracts tourists, which is an opportunity for local guest houses and family-run restaurants, horse and mountain bike rentals, tourist guides, home food production and other services

b) provides neighbouring villages with firewood;

c) Allows bee-keeping with honey production, which is important not only as a food source for local households but also as a product to sell to tourists.

## CHAPTER III

## *Long term objectives of Mtirala National Park and general principles underlying its management*

### Article 22. Long term objectives

The long term objectives of Mtirala National Park (i.e. the condition which the Agency for Protected Areas aims for the NP to be in 20-25 years' time) are as follows:

Mtirala national park is a part of Georgian and Adjarian natural heritage, one of the natural hotspots of the Caucasus eco-region and a member of some worldwide or European network. Mtirala national park is interconnected with other protected territories of Georgia and natural landscapes by ecological corridors, creating one united network.

The national park's diversity of species is conserved and habitats are maintained close to their natural conditions. Invasive species occur only rarely or not at all and do not have a negative impact on the environment, specifically on local endemic species. Key species' populations (namely red-listed and endemic species) are in favourable conservation status in accordance with their natural and historical occurrence in the area. Long term conservation aims and measures are systematically developed in regards to the box tree (*Buxus colchica*) and associated diseases causing box wood mortality.

Local culture, kitchen, heritage and traditions of the area are maintained, supported and promoted. Local products are appreciated not only by visitors, but also distributed to other Georgian regions. Marketing, sales and service systems are well organized.

Mtirala national park continues to be interesting for scientists for its biodiversity, including its endemic and relict species, natural and pristine landscapes. The national park is a subject of study for local as well as foreign researchers. All the research results are presented to the national park administration and reports and articles sent to the national park administration and APA. All the data is combined and stored in one overall database.

Local people are aware of the importance of biodiversity of Mtirala National Park and its values and take an interest in the management of the national park. The population, including school children and students, are actively taking part in protection actions. The Georgian/Adjarian public is interested in environmental issues including nature conservation.

Mtirala National Park is a main centre for visitors to Adjara in terms of eco-tourism and recreation. Products, services and visitors' experience have the following characteristics:

Conferences and seminars are being organised in the locality about the national park's biodiversity and unique landscapes. Fairs and trades with local products (food and handicrafts) take place in nearby villages, there are shops of the same scope that are located in surrounding villages.

Mtirala National Park is well equipped with visitor infrastructure, which is arranged with enough capacity and diversity. There are numerous guesthouses and restaurants all around offering local cuisine from locally produced, ecologically clean products. All services are provided in sufficient quality.

Special kinds of stay are offered for sports, games and teambuilding. A variety of activities is offered at various places inside and around the national park, including horseback riding, mountain-biking, bird watching, binoculars for the sights, museum, information centre and shops.

Sustainable tourism is conducted, respecting the carrying capacity of natural ecosystems and zonation of the national park as well as expectations and social needs of visitors.

Activities in the national park and surroundings are conducted mainly by the local population and represent a contribution to local economy. Tourism generates revenues and taxes that help the local and state economy and prosperity.

f.f) Mtirala National Park is managed by an effective administration that has the necessary financial and technical means and the required number of qualified and skilled staff.

**Article 23. General principles for the management of the national park**

Mtirala National Park is influenced by various natural events and processes; in terms of short and long term impacts on the special qualities of the national park; significant among these are diseases, and landslides. The national park administration has to maintain a balance between, on the one hand, allowing natural processes to determine the ecological condition of the national park and, on the other hand, taking care of the special qualities which the Agency of Protected Areas together with the Mtirala National Park Administration is responsible for protecting, conserving or enhancing. The Agency of Protected Areas together with the national park administration will manage the national park in accordance with the following general principles:

a) Diseases: Box-tree and Chestnut suffer from fungal diseases. As natural processes, these diseases could be tolerated in the strict protection zone of the national park, but in other zones, where the attacked species are endangered species, it would be appropriate for protective purposes to carry out treatment measures. Non-specific treatment could be used on localities where the surrounding vegetation is of lower conservational value. If any specific way of treatment, that affects only the disease inflictor, will be invented, it has to be preferred and could be used everywhere in the visitor and traditional use zones and for outstanding old individuals of the trees that should be specially conserved even in the strict protection zone of the national park. Identification and propagation of genetically resistant plant material from the genetic stock contained in the National Park should be intensified.

Conservation of exquisite gigantic and old-aged tree individuals: Aging of all living phenomena is one of the basic natural processes. Nevertheless, some of the oldest trees that have survived for many centuries in the national park could be considered prominent and therefore protected against destruction and promoted for better living conditions e. g. by removing neighbouring trees. Such memorable trees should be specially described and monitored, special care could be used if necessary and the trees should be marked in the field and on maps. Information about them should be spread to visitors as well as to local people and used for interpretation of the biodiversity. Inventory of memorable trees should be done throughout the territory of the national park with respect to scientific studies (e.g. Bolashvili, Tsikarishvili *et al.*,2009).

Forest regeneration: Although Kolkhic forest is of high regeneration ability, some of the formerly cut areas remain without trees, overgrown densely with ferns (*Pteridium tauricum*) or shrubs (mainly *Rubus* spp., *Rhododendron* spp., *Laurocerasus officinalis* and others). If this situation persists, the vegetation may be cut and trees of locally-native species planted.

Other natural processes: Floods, landslides and other natural processes should be left for their natural development. Restorative and preventive measures could be done only when it presents a threat to the local population, infrastructure or biodiversity.

# CHAPTER IV

## *Situation analysis*

### Article 24. Conservation of biodiversity and landscapes

1. Condition of the national park's ecosystems and pressures on them:

Natural resource use:

Honey production is one of the traditional means of use of the national park area. Honey producers are located in Chakvistavi and villages outside the national park borders. Taking nectar by bees causes no damage and, even could be considered positive for native plants. Placing bee-hives on the national park territory does not have any negative impacts when not accompanied by cutting the vegetation or building new trails and therefore should be allowed in the traditional use zone. Placing bee-hives in the places which traditionally used to be bee-hive location areas and currently belong to the visitor zones can be allowed because existence of bees in those territories does not cause any damage.

Collecting nuts of walnut tree and chestnut for personal purposes is also traditional without negative impact on natural ecosystems; it is allowed only in the traditional use zone of the national park. Collecting leaves and fruits of various plants for tea and similar use is also allowed in the traditional use zone; the impact of this us on the national park's ecosystems is not known.

Timber extraction could be considered a traditional use but it has a potential to easily destroy the national park's natural plant communities. The current condition of a significant part of the forests in the traditional use zone is poor due to uncontrolled cutting before the establishment of the national park; beech stands along the forest roads are in particularly poor condition. On the other hand, in more remote parts of the traditional use zone, generally at a distance of more than about 50 metres from forest roads, the condition of the forest is good and quite close to natural conditions. More than 95 % of the fuel wood extracted from the national park is beech. Currently all the dying, significantly damaged, broken or fallen trees located close to the forest roads (usually up to 30-40 m) are marked and allocated as fuel wood. Standing, healthy trees are not cut. The wood further away from roads is not attractive for local people because of the effort and cost of transporting it. In order to control extraction of fuel wood numbers are written on each stump to identify the tree. Fuel wood is issued to households in villages adjacent to Mtirala National Park up to an amount of 7 $m^3$ per family per year.

**Table 4.** Amount of fuel wood that has been marked and issued in the last seven years ($m^3$):

| year | marked | issued |
|---|---|---|
| 2008 | 3,232.02 | 1,040.03 |
| 2009 | 2,298.55 | 1,050.10 |
| 2010 | 2,798.99 | 1,420.04 |
| 2011 | 1,519.07 | 205.39 |
| 2012 | 1,776.61* | 922.48 |
| 2013 | 1,028.85** | 278.17 |
| 2014 | 600-650*** | |

* including the amount of 1,313.68 $m^3$ left from 2011

** including the amount of 854.13 $m^3$ left from 2011-2012

*** maximum estimation of newly marked wood

The quantity of fuel wood marked and the quantity actually issued in the years 2008 to 2014 are shown in Table 4. The data shows that the annual quantity of fuel wood actually extracted is far below the amount marked in the field. This is due to the fact that wood is mainly extracted in proximity to forest roads but tree marking is conducted in the entire traditional use zone. .

Fires: Because of a humid climate with high precipitation, fires do not occur often in Mtirala National Park. Nevertheless, rangers and other people should carefully watch the area during patrolling and other activities and minimize the fire risk as some forest fires occurred in the national park in the past. Allowed fireplaces in the national park and close surrounding should be designed not to allow larger campfires.

Water: There are several rivers, on the territory of the National Park. Local people are allowed (upon obtaining a permit from the Ministry of the Environment and Protection of Natural Resources in the traditional use zone) to extract water for household consumption on the territory of the national park and place relevant infrastructure to draw the water into their houses and gardens. On the territory of the national park water is extracted in quartiles Khelvachauri 8, 9, 24, and 25 and Kobuleti 48, 66, 13, 14. No damage to natural features has been recorded regarding these activities.

Pastures: A small number of cattle graze on the territory of the national park. It is allowed only in the traditional use zone. In current numbers grazing does not have significant impacts on the environment.

Flora: 593 species and subspecies are widespread here, among them 28 species of trees and 35 species of shrubs. At least 76 species are relict. 66 species are endemic (see Table 5 for endemism regions).

**Table 5.** Endemism among the Mtirala National Park flora species

| Region | Number of endemics |
|---|---|
| Caucasian | 26 |
| Georgian | 7 |
| Colchis | 25 |
| Adjara-Lazetian | 6 |
| Adjarian | 2 |
| **Total** | **66** |

Fauna: According to the recent observations and the results of studies the animal kingdom of the park territory is represented by 275 species. There are 71 mammal species, 121 bird species, 10 amphibian species, 22 reptile species, 17 fish species and 34 invertebrate species. Among species that occur in the park, 12 species are included in the IUCN Red List as species under global threat (Critically Endangered, Endangered and Vulnerable categories – see Table 3). 66 species are included in the Red List of Georgia (5 Critically Endangered, 16 Endangered and 45 Vulnerable).

2. Protection

The national park administration is sufficiently equipped to ensure basic protection of the area (including rangers' equipment - a quadrocycle, 4WD vehicles, firearms, uniforms, etc). In addition, to ensure more effective protection, the national park administration has several trap cameras. Some GPS receivers are available for use by employees, not all of whom have enough experience to use them effectively. There is only one ranger station - on the border of the national park between Chakvi and Chakvistavi - and this is probably sufficient at the present time. The national park administration lacks high quality maps for use by its protection staff.

Friendly cooperation is established with the municipalities and Ajaran government. Some barriers have been constructed to prevent vehicles and cattle grazing on the national park territory. The national park administration has placed some signs and boundary markers indicating for the local population the national park boundaries and the places where they can graze animals, but more are needed. There is a number of other

issues, as follows:

The intensity of poaching has decreased, but there are still attempts at poaching which might threaten endangered species.

The absence of alternative fuel for population living in surrounding villages and insufficient availability of fuel wood cause some illegal cutting.

3. Biodiversity conservation research and monitoring:

Rangers of the park administration make observations in the national park with a special focus on the following animal species: chamois, brown bear, marten, badger, roe deer, wolf, wild boar, jackal, hedgehog, otter and lynx. Data about the occurrence of these species are related to ranger quartiles and contain observed numbers of individuals or traces.

The results of scientific research by a variety of researchers from a number of different countries are available to the national park administration. Arriving scientists are accompanied by park administration staff and cooperate closely and share the research results. However the results of some research activities are missing.

Nine photo trap cameras have been installed in the national park. Obtained images give interesting results not only about the occurrence of animal species (brown bear, roe deer etc.), but also about people violating rules of the park, including poachers.

Some employees of Batumi botanical garden cooperate through their research activities (e. g. box-tree disease), but no official cooperation with the botanical garden has been arranged.

The national park administration's staff's knowledge of which species occur in the national park is not complete and their knowledge of the condition of their populations is insufficient:

1.a) Detailed inventory on forest, flora, fauna and habitats is missing. Lists of flora and fauna species occurring in the Mtirala National Park could be considered more or less complete, but do not distinguish different parts of the national park.

Data about species occurrence comes from non-systematic observations, partly done by rangers and therefore limited to their knowledge of species (usually only a few species of mammals). Some data comes from camera traps or scientific research.

Methodologies for monitoring, data collection and suitable conservation measures are missing or insufficient. Research material and technology (e. g. suitable databases) are missing.

Data about the condition of populations are missing; it is needed at least for the species on the Red List of Georgia.

The most comprehensive data is that which has been produced by researchers, mainly from the Batumi botanical garden and the Batumi state university. That data too is not detailed enough to describe the biodiversity of the national park adequately.

Georgia is in the process of classifying habitats according to the EUNIS habitat classification system and to identify priority habitats for the designation of conservation sites according to the two European Union Nature Directives (Habitat Directive and Bird Directive) as well as the Bern Convention, establishing an Emerald network of protected areas. Efforts on national level are ongoing to establish the preconditions (databases and monitoring data) as basis for designation.

Knowledge of the distribution and condition of habitats is insufficient:

Information from the last forest inventory is outdated. Information about tree growth is needed mostly only for the traditional use zone, where timber cutting is allowed. In this situation, until a detailed forest inventory is carried out, an assessment of annual allowable cut for individual patches of forest has to be carried out.

A vegetation map of the national park and its close surroundings was compiled during the planning for the creation of the national park. As one of few data about the national park, it is available as a GIS layer.

4. Problems and opportunities related to biodiversity conservation:

a) Baseline information and monitoring. There is a lack of qualified staff for data collection and monitoring. It is partially caused by low salaries and subsequent staff turnover. Specialists for botany and zoology as well as for other scientific fields are missing in the national park administration staff.

b) Invasive species: Some invasive species occur in the territory of Mtirala National Park and its close surroundings (*Spiraea japonica*, *Paspalum dilatatum* and *Robinia pseudacacia*). Nevertheless, Kolchic forest seems to be resilient enough to naturally prevent penetration of non-indigenous species and therefore on the territory of the national park they are distributed only along some trails. As it could be only the naturalisation phase of invasive behaviour, distribution of these species should be monitored. Box-tree (*Buxus colchica*) forests in the national park is affected by various diseases and pathogens, such as a soil phytopathogen, *phytophthora genus,* causing root rot, the fungus *Cylindrocladium buxicola,* causing box blight and the caterpillar *Cydalima perspectalis*. Various research has been conducted in the past five years after having observed an increased mortality of box wood trees in the late 1990's. Today more than 70% of box wood trees in the national park are affected and almost the entire old growth box wood forest is heavily affected. Considering the current condition of the forest there is no feasible management interaction to save the remaining forest as large scale applications of fungicides and insecticides (e.g. by aerial application) are not technically feasible and promising as well as not desirable due to the detrimental impact on all other fungi and insects. Chemical treatment has been successful in plant nursery and park landscapes, where each plant can be treated individually, but not in natural forests. Management measures are limited and should focus on further research identifying genetically resistant plant material. It also needs to be mentioned that box tree forests, once they have died, will not come back naturally in the short to medium term without massive human intervention (e.g. removing blackberry, alder and other shrubs). Most resent research on this topic has been financed by the European Neighborhood and Partnership Instrument East Countries Forest Law Enforcement and Governance II Program; Matsiakh, I. (2014) Assessment of Forest Pests and Diseases in Protected Areas of Georgia, Final Report. eNPI EAST FLEG II.

Other diseases affect the chestnut (*Castanea sativa*), such as the fungus *Cryphonetria parasitica*.

c) Human-wildlife conflicts: Information about this problem is not reliable. Some damage on cattle and bee-hives by brown bear has been recorded. According to reports of villagers, 145 such cases occurred in Mtirala National Park and its surroundings between 2011- and 2013 but only one case of attack on cattle (2011) and one case of 12 bee-hives destroyed by brown bear in Chakvistavi (2013) have been verified by a ranger.

d) Management strategies:

d.a) Methodologies for data collection and monitoring have to be compiled and implemented as daily routines of the national park administration.

d.b) Strategy for detailed inventories of flora, fauna and habitats should be established.

d.c) Strategy for sustainable use of natural resources in traditional use zone of the national park should be created, consisting primarily of setting the annual allowable cut.

d.d) Strategy for prevention and mitigation of damage by predators (e. g. brown bear, wolf and lynx) should be elaborated.

e) Scientific research:

e.a) Lack of finance to conduct research and monitoring at national park administration as well as at universities.

e.b) Lack of precise information.

e.c) Lack of special equipment for carrying out scientific research (e. g. GPS receivers, precise maps, methodology).

### Article 25. Cultural heritage, traditions and kitchen

1. The local culture, traditions and kitchen of the communities around the national park are attractive for visitors and some villagers have responded to this opportunity by offering accommodation, selling

local products and in one case opening a restaurant that offers traditional dishes. However there are several problems regarding the availability and quality of such products and services:

f) Among local people, there is no entrepreneurial culture, mainly how to market the area, products and services (including packing of local products).

g) Food safety standards are not always followed.

h) The quality of services is often not up to the level expected by visitors.

i) Marketing and selling of local products is not well organized.

5. Knowledge of history and culture is insufficient. Some information about historical heritage is probably missing. Some of the features known from historical resources have not yet been detected in the field or examined.

**Article 26. Eco-education**

1. Management of eco-education activities

a) The national park administration implements eco-educational programmes, within which the national park administration regularly holds eco-educational lectures and seminars in public schools and other educational institutions and meets with the population neighbouring the national park. The main goal of this activity is to explain the purpose of establishing the national park and to make people aware of the values of the park.

b) Clean-up actions are regularly arranged by the national park administration. Every year the administration organises several clean-up actions. Information about the National Park and tourist maps are being distributed to hotels in the region.

c) Eco-tours and eco-camps are organised for students of various universities and for other groups of young people. Many actions are organised for schools or public in accordance to Green Calendar. Eco-game on CD and an information booklet were released in 2012 and distributed among partners.

6. Problems and opportunities related to eco-education

a) Lack of information about the national park being a good place for eco-education.

b) Eco-educational culture in the region is very general (lack of books, guidelines etc.).

c) Lack of excursions to the national park (usually only to cultural sites outside the national park).

d) The administration needs more resources for implementing eco-education activities; Eco-education activities are currently the responsibility of the natural resources management specialist. Organisation and implementation of eco-educational activities requires special skills and the responsibility should be assigned to an appropriately qualified specialist.

e) Lack of diversity of eco-educational activities and material, e.g. games for learning about nature.

**Article 27. Contribution to local economy**

1. The national park's contribution to local economy comes from the tourists which the national park attracts and who use the products and services provided by people living around the national park.

7. The Administration's opportunities to support the contribution to local economy are limited to facilitating tourism and recreation and marketing of local products through the use of the Mtirala National Park brand name.

8. The NGO Mta-Bari has established a honey producers' network that serves the villages around the national park. The honey is being sold with a couple of other local products in a small shop next to the national park administration.

9. Every year since 2012 the national park administration has carried out a socio-economic survey

among local residents. The inquiry contains questions related to local economy and attitudes towards the national park. The answers given by respondents to the questionnaires are inconsistent and probably do not reflect their opinions nor the reality. In addition, the results have not been processed properly and some data is lost. The results of the survey are less valuable and reliable. There is no quantitative data on the contribution of Mtirala National Park to the local economy.

**Article 28. Tourism and recreation**

1. Since the creation of Mtirala National Park the national park administration in collaboration with its partners has created infrastructure and a wide range of services, as follows:

a) Visitors centre with accommodation, an exhibition hall and a kitchen (built in 2008), camp sites and with an offer of some tourist equipment (sleeping bags, rucksacks, paralons, tents);

b) Two marked trails leading from Chakvistavi to a waterfall ("Chestnut" route) and to a tourist shelter ("Cold Spring" route) with interpretive panels;

c) Tourist shelter (built in 2011) and several picnic places;

d) Guide service provided by national park rangers (local people provide guide services as well);

e) ZIP-line;

f) Canyoning.

g) Information materials and brochures of the park;

10. Local people provide some services for visitors in the surroundings of the national park, as follows:

a) Family-run guesthouses;

b) Restaurants;

c) Guide service;

d) Horse-riding service;

e) Mountain bike rentals;

f) Sale of local products.

g) In 2014 the United Nations World Tourism Organisation project trained some local people to operate the zip line and canyoning route installed by the project).

11. Since the establishment of national park and tourism infrastructure the national park administration has been providing information to interested people and organisations through presentation or participation in various events (e. g. a special presentation was prepared and provided to 24 tour-agencies in 2012 and to journalists from Ukraine and Belarus in 2013). Presentation of the national park is regularly made at the Expo Batumi international fair of tourism and hotel services.

12. Local travel agencies organise various types of day-trips to Mtirala National Park. Most of the customers are tourists from Poland, Ukraine, Russia and Armenia.

13. Since 2010 visitors to the visitors centre in Chakvistavi have been invited to complete a questionnaire. 51 visitors answered in 2010, 94 in 2011, 350 in 2012, 250 in 2013. Unfortunately, some of the answers are lost, some of the questions in the 2010 and 2011 surveys were different and therefore cannot be compared for the whole period of research. Another survey was also done among the tourist agencies in 2013.

14. Visitor facts and figures:

a) Visitor numbers in the period 2010-2013 according to the national park administration's records from the visitor centre in Chakvistavi are as shown in Table 6. From those numbers it is clear that the proportion of foreigners has been rising continuously (6 % – 13 % – 15 % – 25 %). In 2013 10-15 % of visitors stayed overnight (usually 2-3 nights). Approximately 25 visitors daily visit the national park administration building in

Chakvi in the main tourist season, but considerably less outside the season. There is no reliable information about visitors in other places in the national park; visitors are recorded only if a national park ranger meets them during patrolling.

b)

**Table 6.** Numbers of visitors in Mtirala national park

| | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Citizens of Georgia | 14,461 | 16,803 | 18,731 | 12,353 |
| Foreigners | 889 | 2,597 | 3,219 | 4,100 |
| **Total** | **15,350** | **19,400** | **21,950** | **16,453** |

Visitors are systematically counted in visitors' centre in Chakvistavi. The figures shown in the table contain also non-systematic observations reported by rangers from the field.

c) According to data obtained through the visitor survey the main motivation for visiting the national park is hiking in wilderness (44 %). 42 % prefer hiking on foot without using cars or horses. 39 % prefer stay overnight in a tent, 28 % in a guesthouse, 20 % in the visitors' centre. 65 % answered that the tourist infrastructure is good and does not need improvement. Most of the visitors found the information about the national park on internet or obtained it by private recommendation (both equally 32 %), 13 % on TV or radio. The typical visitor of Mtirala National Park according to that research is a man between 26 and 35 years old, who comes with his friends for hiking and prefers simple, but fully developed infrastructure.

15. Level of use of services and offers:

a) Leaflets are offered to visitors and partners interested in tourism by the national park administration, numbers for 2012-2014 are shown in Table 7.

**Table 7.** Numbers of leaflets about the Mtirala National Park given out

| Year | number of leaflets |
|---|---|
| 2012 | 11,500 |
| 2013 | 3,590 |
| 2014 (I.-VI.) | 1,600 |

Up to 2012 the leaflets have been distributed for free, from 2013 they could be received upon payment (2 GEL).

b) Various services are provided at the visitor centre in Chakvistavi. The number of people using these services is recorded through obtained money and therefore exact numbers of users are not known. Data from 2011-2013 is displayed in Table 8 („hotel room" represents the same income which was later made through a contract („lease")).

**Table 8.** Use of services in visitors' centre in Chakvistavi (in GEL except the furthest right column)

| | 2011 | 2012 | 2013 | 2014 (I-VI) | 2014 (I-VI) nr. of users |
|---|---|---|---|---|---|
| Tent | 17 | 40 | 210 | 35 | 9 |
| Sleeping bag | 0 | 66 | 227 | 50 | 10 |
| Backpack | 5 | 10 | 0 | 0 | 0 |
| Quad | 70 | 0 | 0 | 0 | 0 |
| Picnic place | 400 | 520 | 600 | 400 | 250 |
| Camping place | 160 | 130 | 273 | 90 | 54 |

| | | | | | |
|---|---|---|---|---|---|
| Tourist shelter | 0 | 525 | 255 | 285 | 19 |
| Hotel room | 3,950 | 1,700 | 0 | 1000 | 68 |
| Lease | 0 | 1,389 | 2,953 | 0 | |
| **Total** | **4,602** | **4,591** | **4,550** | **1860** | **410** |

c) There is no information about the intensity of use of services provided by other organisations or by local people.

16. Management of visitor services:

a) the national park administration's administration department is responsible for development and management of the visitors' services. There is only one visitor service specialist in the mentioned Department. The principle functions and responsibilities of visitor unit of Administration Department are as follows:

a.a) Assuming overall responsibility for the development and implementation of the visitor programme

a.b) Monitoring, maintenance and proposals to enhance visitor infrastructure and visitor programmes

a.c) Providing tourists with eco-tourist services in the protected area

a.d) Running the visitor centre of the park administration

a.e) Preparing and distributing informational materials

a.f) Processing the statistical data

b) Currently the position of the Head of Administration Department is vacant; the functions of the position are currently assigned to the Chief Specialist of Visitor Services.

17. Problems and opportunities related to tourism and visitor services:

a) Standards of some of the facilities and services are not high enough

b) Access to the national park is difficult:

b.a) Only 7km of the 15km of public road from Chakvi to Chakvistavi is paved with asphalt. There is no other access road. There are no parking places in Chakvistavi apart from the limited parking area next to the visitor centre and there are none close to the national park's borders.

b.b) A bus service to Chakvistavi operates only during the summer season with only one bus. After closing the season transportation is only provided on few days during the week. No other public transport reaches the national park.

c) National park staff and local people lack foreign language skills.

d) There is a lack of qualified guides.

e) Information about the national park for visitors including maps is not sufficient.

f) There is an opportunity to increase the number of marked tourist trails, including linking Chakvistavi to Kintishi.

g) There is a lack of souvenir/gift shops.

h) Services cannot be booked online.

i) Tourist facilities occur so far only in and in the vicinity of Chakvistavi; no visitor infrastructure has been constructed in other parts of the national park.

# CHAPTER V

## *Zonation*

**Article 29. Functional zones of Mtirala National Park**

Taking into account the special qualities of the Mtirala National Park the present state of, and pressures on, those qualities, and the functional zones that were in effect before the present management plan was elaborated, the functional zones of Mtirala National Park shall be as follows: (zoning of Mtirala National Park is marked on the map in Annex 2):

a) Strict nature protection zone

i.a) The strict nature protection zone is established for the purpose of maintaining untouched nature or habitats that are very close to their natural state and for conducting non-manipulative scientific research and eco-educational activities. The zone is comprised of those parts of the national park twhere the anthropogenic influence has been insignificant. The zone represents rare, untouched ecosystems (beech forests) and core habitats for rare and endangered species of animals and plants: animal species include brown bear (*Ursus arctos*), lynx (*Lynx lynx*), chamois (*Rupicapra rupicapra*). Plant species include yew (*Taxus baccata*), chestnut (*Castanea sativa*), walnut (*Juglans regia*), box-tree (*Buxus colchica*), *Epigaea gaultheroides* and *Rhododendron ungernii*.

j) Visitor zone

j.a) The visitor zone is established for the purpose of protecting nature, for recreation and for educational activities. The zone includes territories that are more or less modified due to human interference but where timber cutting is not allowed and places that represent the most characteristic samples of ecosystems. Restoration or conservation management could be introduced when necessary. The zone includes interesting and attractive sites for visitors, such as: sites of high recreational value and distinguished by their natural features, which are accessible. The infrastructure designated for visitors is practical, easy to be used, controlled and maintained, at the same time – diverse and attractive. The zone also includes the territories that are habitats and migratory routes for various animal species.

k) Traditional use zone

k.a) The traditional use zone is established for the protection of nature as well as traditional use of renewable natural resources. The zone includes those parts of the park that have been traditionally used by people living in the surroundings of the park for fuel wood collection, grazing and collecting nuts and berries. Restoration management can take place at areas disturbed by humans to enhance the development of the ecosystems to their natural state. Conservation management could be done when necessary. All these activities are allowed to be carried out in the traditional use zone within certain limits.

**Article 30. Area and borders of the functional zones of Mtirala National Park**

The area of the functional zones of Mtirala National Park are as follows:

a) Area of the strict protection zone is – 2,452 ha

b) Traditional use zone – 5,133.5 ha

c) Visitor zone – 8,022.8 ha

**Article 31. Activities allowed within each category of the protected areas and zones**

The following activities are allowed in Mtirala National Park.

a) In the strict nature protection zone the following activities are allowed:

a.a) non-manipulative scientific research, monitoring and inventorization

a.b) eco-educational activities not influencing the place

b) In the visitor zone the following activities are allowed:

b.a) conservation, maintenance and restoration of the species of wild animals and plants and habitats distributed on the territory of existing ecosystems and within their boundaries

b.b) Ecosystem protection, implementation of restoration activities

b.c) scientific research and monitoring

b.d) Environmental monitoring and research including the installation of the necessary equipment

b.e) educational activities

b.f) limited movement by vehicles for carrying out business related duties during the natural disasters, catastrophes, emergency situations and restoration activities; unrestricted transport on the road to Chakvistavi

b.g) carrying out cadastral activities

b.h) access of visitors including horse-riding, mountain biking, and snow shoeing on the main trails

b.i) establishment and maintenance of infrastructure necessary for protection and eco-tourism

b.j) collection of nuts, berries and edible fungi for visitor use only

b.k) other activities that are allowed by the legislation

c) In the traditional use zone the following activities are allowed:

c.a) to maintain the ecological balance of the territory

c.b) conservation, maintenance and restoration of the species of wild animals and plants and habitats distributed on the territory of existing ecosystems and within their boundaries

c.c) restoration and monitoring of ecosystems

c.d) scientific research

c.e) Environmental monitoring and research including the study on the inventory and installation of the necessary equipment;

c.f) eco-educational activities;

c.g) sustainable use of natural resources by local people as provided in the management plan

c.h) limited movement by vehicles for carrying out business related duties

c.i) access of visitors including by foot , horse and bike,

c.j) establishment and maintenance of infrastructure necessary for protection and eco-tourism

c.k) carrying out cadastral activities

c.l) use of non-wood products by the population living nearby the protected areas for their personal use following the rules defined by Georgian legislation;

c.m) use of wood and wood secondary products to meet household energy demands for heating and cooking according to the provisions of Annex 6

c.n) allowing for the erecting of bee hives in a way which is not damaging any trees or other natural features of the national park

c.o) ensuring local population with drinking water according to natural conditions

c.p) other activities that are allowed by legislation

# CHAPTER VI

## *Management plan programmes*

### Article 32. Responsibility for management plan implementation

1. The Agency of Protected Areas (i.e. the Agency's central apparatus and the administration of Mtirala National Park) is responsible for arranging and implementing activities foreseen by the management plan, for monitoring its implementation and for achieving the results foreseen by the management plan.

2. The implementation of the management plan will be guided by an annual operational plan. The annual operational plan shall be developed for a period of three years and updated every year and shall contain the detailed activities to be carried out, including an activity-based budget.

3. The Agency will ensure that other organisations and experts will be involved in carrying out certain activities or will cooperate in implementation.

### Article 33. Management plan programmes

1. The Situation Analysis has identified seven distinct themes which also provide for the programmatic structure of management objectives, activities and measures, as follows:

a) Protection and patrolling

b) Biodiversity conservation and research-monitoring

c) Sustainable use of natural resources

d) Eco-tourism

e) Eco-education

f) Communication and Public Relations

g) Development and maintenance of infrastructure

h) Strengthening the staff and technical capacity of the Administration

2. The following articles describe the programme objectives for each of the management programmes. The given list of measures and activities represents a "basket of options" to be drawn upon within the frame of the annual operational plan; the list is not intended to be conclusive and should be complemented and amended on a flexible basis with the aim to achieve the Programme Objectives.

### Article 34. Protection and patrolling

1. The protection and patrolling programme addresses the following issues:

l) The threat to the national park's conservation values from illegal use of natural resources, especially poaching of wild animals and illegal logging.

m) Ensuring that the national park's protection and patrolling staff are adequately trained and equipped.

18. The programme objectives with regard to protection and patrolling are as follows:

| # | Objective (what we want to achieve by the end of the plan's life) | Indicators (what will be measured in order to determine if the objectives have been achieved or not) |
|---|---|---|
| | Establish effective patrolling in defined areas. | • An appropriate, documented patrolling programme exists.<br>• An archive of patrolling reports exists.<br>• Data from patrolling are present in the national park administration's database. |
| | Build capacity of protection department personnel to effectively conduct patrolling. | • Staff members of the protection department are trained in using field equipment.<br>• Staff members of the protection department are trained in various skills, relevant to their job description. |
| | Procure, maintain and replace necessary equipment. | • Adequate equipment for patrolling and monitoring is available<br>• Money is allocated in the budget for the maintenance and replacement of equipment. |
| | Protection of the territory of the national park from damage resulting from illegal access by people, vehicles and cattle. | • Number of cases of unauthorised access.<br>• Number of cases of damage caused by access. |

Activities and actions to be taken to achieve the objectives of the protection and patrolling programme are as follows.

| # | Objective (what we want to achieve by the end of the plan's life) | Possible measures and activities (what can be done to achieve the programme objectives) |
|---|---|---|
| | Establish effective patrolling in defined areas. | • Establish patrolling programmes to define the times at which patrolling should be done and the things to which rangers should pay attention.<br>• Introduce compilation of patrolling reports to record all relevant information from observations made during patrolling.<br>• Introduce an addition to salary for night and weekend patrolling. |
| | Build capacity of protection department personnel to effectively conduct patrolling. | • Train the staff of the protection department in: effective law enforcement related to nature conservation; effective communication; how to levy a fine; first aid; presentation of natural heritage to the public; use of firearms; use of GPS receivers; use of trap cameras. |

| # | Objective (what we want to achieve by the end of the plan's life) | Possible measures and activities (what can be done to achieve the programme objectives) |
|---|---|---|
| | Procure, maintain and replace necessary equipment. | • Plan and budget for adequate equipment within the frame of the annual operational plan.<br>• Develop a maintenance schedule for inventoried equipment, including the required budget provision and method of procuring maintenance services.<br>• Improve transportation possibilities for rangers – at least one 4WD vehicle and one quad per ranger district.<br>• Update, improve and ensure outdoor equipment for every ranger, e. g. more effective torches, digital cameras, proper firearms for self-defence, weatherproof uniforms, boots, night-vision equipment, first aid kits, field kitchen set, binoculars, and tools for trail and infrastructure maintenance.<br>• Establish ranger shelters at suitable locations to allow two-day and night patrolling. |
| | Protection of the territory of the national park from damage resulting from access by people, vehicles and cattle. | • Maintain all forest roads and trails in good condition to prevent erosion.<br>• Regularly check and maintain barriers preventing grazing and unauthorised access by vehicles.<br>• Mark the national park's boundaries at all access points to the national park. |

**Biodiversity conservation and research**

1. The biodiversity conservation and research programme addresses the following issues:

a) Lack of information about the distribution of species in the national park and therefore of the relative importance of different parts of the national park for the conservation of species.

b) Lack of information about the condition of the populations of species and of habitats.

c) Weak or missing plans and methodologies for monitoring the conditions of the populations of species and of habitats.

d) Absence of conservation strategies for species and habitats.

e) The threat to the national park's conservation values from alien invasive species.

f) The threat to the national park's conservation values from diseases.

2. Regarding scientific research, the two following policies should be respected:

a) The national park administration should carry out or support research that is done to help the administration achieve the objectives of the national park.

b) In addition to point a) the national park administration should allow research that is done for the sake of expanding human knowledge, that does not have any immediate connection to the objectives of the national park and that does not negatively impact the natural values of the national park (especially in the strict protection zone).

3. The programme objectives in regards to biodiversity conservation and research are as follows:

| # | Objective (what we want to achieve by the end of the plan's life) | Indicators (what will be measured in order to determine if the objectives have been achieved or not) |
|---|---|---|
| | Compilation of information about the national park's natural features and their conservation values in accessible and suitable form to ensure appropriate conservation and promotion of the national park. | • Data from all needed inventories exists.<br>• A database for all obtained data was created.<br>• Information on natural features is enough for effective conservation and promotion of the national park. |
| | Elaboration and implementation of conservation programmes for key habitats and species and other phenomena of conservation interest. | • Methodologies for research and monitoring exist.<br>• Key habitats and species have been defined; conservation programmes for key habitats and species have been elaborated and are being implemented; records of implemented activities are being maintained.<br>• Outstanding trees are identified and their condition recorded and monitored. |
| | Monitoring of the condition of Box-tree (*Buxus colchica*) and the dynamics of the various diseases affecting it | • Further research into box tree diseases in natural box tree forests has been conducted in Mtriala National Park.<br>• Search for genetically resistant plant material from the genetic stock contained in the National Park to be propagated (e.g. in the Batumi Botanic Garden)<br>• A box tree monitoring plan is developed and implemented. |
| | Monitoring of invasive species. | • A documented plan for monitoring invasive species exists and is being implemented. |
| | Development of cooperation with research institutions | • Extent of cooperation with research institutions |
| | Identification of crop wild relatives in the PA and elaboration of plans for their conservation | • Maps of the locations of crop wild relatives and plans for their conservation exist |
| | | |

Activities and actions to be taken to achieve the objectives are as follows:

| # | Objective (what we want to achieve by the end of the plan's life) | Possible measures and activities (what can be done to achieve the programme objectives) |
|---|---|---|
| | Compilation of information about the national park's natural features, their conservation value and conservation status in accessible and suitable form to ensure appropriate conservation and promotion of the national park. | • Carry out detailed inventories of fauna, flora, habitats and forest.<br>• Categorise species according to their conservation importance. |

| # | Objective (what we want to achieve by the end of the plan's life) | Possible measures and activities (what can be done to achieve the programme objectives) |
|---|---|---|
| | Elaboration and implementation of conservation programmes for key habitats and species and other phenomena of conservation interest. | • Elaborate conservation and monitoring programmes for key habitats and species and start to implement them.<br>• Identify trees outstanding in their age or size and take special measures to conserve these trees in favourable health conditions.<br>• Conduct research and monitoring on other important issues, such as invasive alien species, climate and flow rate in streams. |
| | Monitoring of the condition of Box-tree (*Buxus colchica*) and the dynamics of the various diseases affecting it | • Lobby for increased research efforts into box tree diseases in natural box tree forests.<br>• Elaborate and implement a plan for monitoring the condition of box tree (*Buxus colchica*) and the dynamics of the disease.<br>• Identify and propagate disease resistant plants to conserve the genetical gene pool. |
| | Monitoring of invasive species. | • Elaborate a plan for monitoring invasive species and implement it. |
| | Development of cooperation with research institutions | • Strengthen contact with universities and other academic institutions paying special attention to the Batumi State University and the Batumi Botanical Garden. Offer research topics to those institutions and facilitate research activities. |
| | Identification of crop wild relatives in the PA and elaboration of plans for their conservation | • Conduct an inventory of crop wild relatives (including wild plants harvested for food and medicine) and create a map of their distribution; elaborate a plan for their conservation |

**Sustainable use of natural resources**

1. The sustainable use of natural resources programme addresses the following issues:

a) The continuing demand from households in villages neighbouring the national park for timber and fuel wood.

g) The importance of honey production as a source of income to the local population and the role that the national park plays in the further development of honey production.

2. The objectives of the sustainable use of natural resources programme are as follows:

| # | Objective (what we want to achieve by the end of the plan's life) | Indicators (what will be measured in order to determine if the objectives have been achieved or not) |
|---|---|---|
| | Limited use of the national park's natural resources to help households in villages bordering the park to maintain their living conditions. | • Socio-economic survey data show that people feel they are benefiting from the national park's natural resources. |
| | The national park administration is able to collect, handle and evaluate all the data needed for monitoring the use of natural resources. | • GIS data and software are available at the national park.<br>• Methodologies for data collection and conservation management exist. |
| | | |

Activities and actions to be taken to achieve the objectives are as follows:.

| # | Objective (what we want to achieve by the end of the plan's life) | Possible measures and activities (what can be done to achieve the programme objectives) |
|---|---|---|
| PO.11 | Limited use of the national park's natural resources to help households in villages bordering the park to maintain their living conditions. | • Continue to allocate fuel wood from the traditional use zone to local households within the limits specified in this management plan.<br>• Encourage the installation of beehives in the traditional use zone of the national park. |
| | The national park administration is able to collect, handle and evaluate all the data needed for natural resources monitoring. | • Create and implement a system for collecting, storing and reporting data about the use of natural resources. |

**Eco- tourism**

1. The eco-tourism programme addresses the following issues:

a) Inadequate maintenance of existing tourist facilities.

h) Inadequate service standards and food safety standards.

i) Weak entrepreneurial culture among potential providers of products and services.

j) Weak marketing and selling of local products.

k) Opportunities to increase the number of tourists to the national park, thereby increasing the level of support for the national park and increasing potential for local people to receive income by providing products and services.

2. The programme objectives with regard to eco-tourism are as follows:

| # | Objective (what we want to achieve by the end of the plan's life) | Indicators (what will be measured in order to determine if the objectives have been achieved or not) |
|---|---|---|
| | Improvement of existing facilities, products and services | • Existing facilities, products and services are of a satisfactory standard.<br>• Visitors express satisfaction with the quality of facilities, products and services |
| | Creation of additional, facilities, products and services in accordance with a concept that takes into account demand and limits to development. | • A concept exists and is appropriate for the level of demand and the carrying capacity of the national park.<br>• Additional facilities, products and services have been created in accordance with the concept. |
| | Improvement of facilities, products and services provided by other actors | • Facilities, products and services provided by actors other than the national park administration and that are associated with the national park by their dependence or proximity are of a satisfactory standard. |
| | Improved marketing of Mtirala National Park as a tourist destination. | • Promotional information about the national park as a tourist destination is more widely spread through appropriate media. |
| | Local people are generating more income from eco-tourism. | • Socio-economic survey data show that an increased number of households are receiving more income from eco-tourism. |

The following activities and actions are proposed to achieve the above mentioned objectives.

| # | Objective (what we want to achieve by the end of the plan's life) | Possible measures and activities (what can be done to achieve the programme objectives) |
|---|---|---|
| | Improvement of infrastructure, products and services provided by the national park administration | • Elaborate and implement a facilities maintenance plan that is aimed at maintaining infrastructure in satisfactory condition in terms of safety and appearance, including: the spaces used by visitors at the national park administration; the visitor centre at Chakvistavi; the tourist shelter above Chakvistavi; trails and their markers and interpretive boards; picnic places and fireplaces; drinking water supplies.<br>• Improve the services provided at the visitor centre at Chakvistavi focusing on the following issues:<br>a) Provide English language training to visitor centre staff;<br>b) Improve and update the exhibition.<br>c) Construct a special path for use by persons with disabilities.<br>d) Prepare and distribute better quality maps of the national park's facilities.<br>• Establish coordination of tourism products and services and tourism marketing between the national park administration and Ajara A/R government, municipalities of Kobuleti, Khelvachauri and Keda and local NGOs (Mta-Bari).<br>• Try to find ways of creating regular transportation to the national park and suitable access points on its border at least in the tourist season.<br>• Improve access roads to the national park and equip them with parking places of enough capacity at the points where tourist trails start.<br>• Review the visitor survey questionnaire and revise it as appropriate and necessary. |
| | Creation of additional, facilities, products and services in accordance with a concept that takes into account demand and recognises the limits to development. | • Elaborate and implement the concept. Depending on the results of the assessment of demand and the limits to development the concept could include:<br>• Establish new hiking trails (a proposal is attached in Annex 2d) to offer several day round-trips and access from villages in surroundings of the national park as well as from/to Kintrishi reserve.<br>• Construct additional overnight shelters with capacity of 4-6 people.<br>• Cottages for longer stays. |
| | Improvement of facilities, products and services provided by other actors | • Promote to partners the idea of providing trainings in food safety and service standards to local producers and service providers |
| | Improved marketing of Mtirala National Park as a tourist destination. | • Elaborate and implement a tourism marketing plan. |
| | Local people are generating more income from eco-tourism. | • Promote to partners the idea of running events for local people to raise their awareness of the opportunities to generate income from eco-tourism. |

**Eco-education**

1. The eco-education programme addresses the following issues:

a) The national park offers greater potential for eco-education than is being used at the moment.

l) Eco-educational activities organised by the national park administration can be diversified and supported by better eco-educational materials and more intensive cooperation with schools and school teachers.

2. The programme objectives in regards to eco-education are as follows:

| # | **Objective (what we want to achieve by the end of the plan's life)** | **Indicators (what will be measured in order to determine if the objectives have been achieved or not)** |
|---|---|---|
| | Increased knowledge among the population of Adjara of the national park's nature and nature generally, and of the importance of nature. | • A documented eco-education plan designed for different target groups exists and is being implemented.<br>• Eco-education materials appropriate for different target groups are available at the national park administration.<br>• The number of people in different target groups who participate in eco-education activities organised by the national park administration is in accordance with the plan. |

Activities and actions to be taken to achieve the objectives are as follows:

| # | **Objective (what we want to achieve by the end of the plan's life)** | **Possible measures and activities (what can be done to achieve the programme objectives)** |
|---|---|---|
| | Increased knowledge among the population of Adjara of the national park's nature and nature generally, and of the importance of nature. | • Elaborate an eco-education plan designed for different target groups and implement it. The plan could include:<br>○ Organisation of eco-education seminars at schools or for groups of scholars in the nature.<br>○ Organisation of field seminars and eco-camps consisting of practical work and games.<br>○ Creation of a small educational resource centre in the national park administration's building in Chakvi.<br>○ Organisation of exchange programmes for schools in the region.<br>○ Displaying of information about the national park in local schools.<br>○ Provision of training about the national park and eco-education to teachers at schools in the region and supporting the creation of nature clubs in schools.<br>○ Using village festivals as occasions to distribute eco-educational and informative materials or to conduct eco-educational activities.<br>○ Creation of an interactive educational path in the national park.<br>○ Creation of a museum in some of the villages in close surroundings of the national park.<br>• Prepare eco-educational materials for different target groups to support implementation of the eco-education plan. |

**Communication and public relations**

1. The communications and public relations programme addresses the following issues:

a) Local people's concerns about possible negative impacts of the national park on their livelihoods.

m) Illegal use of the national park's natural resources.

2. The programme objectives in regards to communication and public relations are as follows:

| # | Objective (what we want to achieve by the end of the plan's life) | Indicators (what will be measured in order to determine if the objectives have been achieved or not) |
|---|---|---|
| | Increased support for the national park and for the national park's administration, especially among people whose livelihoods are affected by the national park. | • A documented communication and public relations plan designed for different target groups exists and is being implemented.<br>• Data from the annual socio-economic survey show increased support for the national park and the national park administration.<br>• The number of violations of the national park's rules is decreasing. |
| | | |

Activities and actions to be taken to achieve the objectives are as follows:

| # | Objective (what we want to achieve by the end of the plan's life) | Possible measures and activities (what can be done to achieve the programme objectives) |
|---|---|---|
| | Increased support for the national park and for the national park's administration, especially among people whose livelihoods are affected by the national park. | • Elaborate a communication and public relations plan and implement it. The plan could include:<br>○ free tours for people from surrounding villages a number of times a year.<br>○ Creation and presentation of a commercial promoting the Mtirala National Park on TV and radio in the larger region.<br>○ Creation and distribution of informational material describing the values of the national park.<br>○ Publication of web pages with information about the national park. |
| | | |

**Infrastructure Development and Maintenance Programme**

1. The issues addressed by the infrastructure development and maintenance programmes are as follows:

n) Absence of a maintenance plan

o) Inadequate funds to maintain existing infrastructure

2. The objectives of the infrastructure development and maintenance programme are as follows:

| # | Objective (what we want to achieve by the end of the plan's life) | Indicators (what will be measured in order to determine if the objectives have been achieved or not) |
|---|---|---|
| | Development and implementation of a maintenance plan for the infrastructure of Mtirala National Park | • A maintenance plan is available and being implemented |
| | Adequate funds are available to maintain existing infrastructure | • Adequate funds are budgeted and provided to maintain infrastructure |

Possible measures and activities to achieve the programme objectives in regards to infrastructure development and maintenance are:

| # | Objective (what we want to achieve by the end of the plan's life) | Possible measures and activities (what can be done to achieve the programme objectives) |
|---|---|---|
| | Development and implementation of a maintenance plan for the infrastructure of Mtirala National Park | • Develop a plan, listing the regular and irregular measures that have to be undertaken to maintain existing infrastructure, including funding requirements |
| | Adequate funds are available to maintain existing infrastructure | • Budget for funds to maintain infrastructure according to the maintenance plan |

**Strengthening the staff and technical capacity of the administration**

1. The strengthening the staff and technical capacity of the administration programme addresses the following issues:

a) Gaps in the national park administration's staff list that prevent the administration from carrying out some of its functions effectively.

p) Gaps in knowledge and skills that prevent the administration from carrying out some of its functions effectively.

q) Absence of, or weaknesses in systems and procedures that prevent the administration from carrying out some of its functions effectively.

r) The lack of some items of essential equipment.

s) Sustainable financing of the national park.

t) The need for closer and more effective cooperation with existing and potential new partners.

2. The objectives of the strengthening the staff and technical capacity of the administration programme are as follows:

| # | Objective (what we want to achieve by the end of the plan's life) | Indicators (what will be measured in order to determine if the objectives have been achieved or not) |
|---|---|---|
| | The staff complement of the national park administration matches the administration's functions and workload; positions are filled by people with appropriate qualifications and sufficient knowledge and skills to be able to carry out their functions effectively. | • Appropriateness of the staff complement.<br>• Staff have qualifications, knowledge and skills appropriate to their positions. |
| | Financial sources for the national park administration are sufficient to run all necessary activities. | • Finances from the state budget and other sources are sufficient. |
| | Develop more active cooperation with partners. | • Number of meetings with partners and number of the different partners with whom the administration has meetings. |
| | | |

Activities and actions to be taken to achieve the objectives are as follows:

| # | Objective (what we want to achieve by the end of the plan's life) | Possible measures and activities (what can be done to achieve the programme objectives) |
|---|---|---|
| PO.22 | The staff complement of the national park administration matches the administration's functions and workload; positions are filled by people with appropriate qualifications and sufficient knowledge and skills to be able to carry out their functions effectively. | • Review and revise the staff complement so that it better matches the administration's functions and workload (for example adding the positions of botanist, zoologist, forest ecologist, eco-education specialist).<br>• Improve the administration's staff qualifications knowledge and experience through targeted on- and off-the-job training including in the following topics:<br>a) human resources management<br>b) principles of ecology - use of natural resources, population ecology, etc.<br>c) eco-education<br>d) use of GIS for, for example, recording and monitoring information about species and habitats<br>e) monitoring of species and habitats<br>f) English language<br>g) reading maps<br>h) effective communication with the public<br>i) first aid |
| | Financial sources for the national park administration are sufficient to run all necessary activities. | • Continue cooperation with the Caucasus Nature Fund.<br>• Develop cooperation with the UNDP/GEF "Support for Adjara's Protected Areas" project.<br>• Search for other sources of funding for specific investments. |
| | Develop more active cooperation with partners. | • Establish cooperation the administrations of Kintrishi Protected Areas, Machakhela National Park and Kobuleti Protected Areas to identify, plan and carry out joint activities related especially to eco-tourism, eco-education and communication and public relations. |

# CHAPTER VII

## *Management Plan Monitoring*

### Article 35. Indicators and the rationale for their selection

Management plan performance indicators for the programme objectives are described in Chapter VI. Indicators were selected in accordance with the principles of measurability (quantitative and qualitative) and time bound.

### Article 36. Monitoring, which includes monitoring progress towards the objectives of the management plan

1. Management plan monitoring is oriented on providing information to the Mtirala National Park Administration to facilitate continuous adaptive management. Continuous adaptive management is a process of revising management actions and activities in the light of experience and new information.

2. The administration will carry out monitoring at three intervals:

a) Annual monitoring

In June of each year the national park administration will prepare a report on the actions and activities which have been implemented compared with the actions and activities set out in Chapter VI of the management plan. The report will provide the basis for reviewing and updating the 3-year operational plan, which will provide the basis for the annual budget submission.

b) 3-yearly monitoring of management effectiveness:

Towards the end of the third and sixth years of implementing the management plan the administration will carry out an assessment of management effectiveness using the Management Effectiveness Tracking Tool (METT).

c) Comprehensive review

In the sixth year of implementing the management plan the national park administration will carry out a comprehensive, updated situation analysis and review of objectives and actions. The updated situation analysis and review of objectives and strategic actions will provide the basis for elaborating a new, 6-year management plan.

## *Annexes*

Annex 1. Information sources used during the elaboration of the Management Plan

Annex 2. Maps

a) Mtirala National Park location, boundaries and infrastructure map

b) Mtirala National Park resource utilization map

c) Mtirala National Park zonation map

d) Mtirala National Park map of possible additional hiking trails

Annex 3. Mtirala National Park flora species list

a) Flora

b) Mushrooms

Annex 4. Mtirala National Park fauna species list

a) Mammals

b) Birds

c) Reptiles

d) Amphibians

e) Fishes

f) Invertebrates

Annex 5. Mtirala National Park zone geographic coordinates

a) Mtirala National Park strict protection zone coordinates

b) Mtirala National Park traditional use zone coordinates

c) Mtirala National Park vizitor zone coordinates

Annex 6. Policy for Fuel Wood provision in Mtirala National Park

**Annex 6. Policy for Fuel Wood provision in Mtirala National Park**

1. For some years previously the Agency for protected areas, through its territorial unit – Mtirala National Park Administration - has issued wood from the traditional use zone of the national park for the purpose of providing fuel wood to the neighbouring population. The Agency of Protected Areas will continue to provide fuel wood until the neighbouring population has a reasonable alternative source of energy.

3. In accordance with the results of a study carried out in 2014, the maximum amount of wood that may be removed from the forests (dead wood and standing, live wood) in the traditional use zone in any one calendar year is 5,1,300 $m^3$. The territorial administration first of all issues fuel wood from fallen trees (dead wood), up to a limit of 95% of the total volume of the fallen trees that is measured during the autumn before the season of issuing firewood starts. Standing trees may be felled up to a quantity of 600 $m^3$ per yearfor fuel wood **only after** the limit on wood from fallen trees has been reached and further wood supply is needed.

4. In the case that standing trees are cut to supply fuel wood, in order to maintain the forest eco-system the Administration chooses the trees according to the following guidelines:

a) At least 10 trees per ha shall be left to age and decay naturally; trees with the highest volume and/or holes shall be left in order to support the biodiversity of saproxylic species that live in the dead trees and nesting birds. After the number of living mature trees decline under 10 in each quartile, in this case, at least 10 individual trees shall be chosen, which are dominant in the stand and no further felling of those trees shall take place, but cutting of the sub-dominant species can be conducted, which will be directed to support the growth and development of the dominant trees.

b) Creating new openings (treeless plots) larger than 0.06 ha or enlarging existing openings above the same limit is not allowed. The mentioned limit may be enlarged only if it serves the conservation objectives, such as e.g.: sanitary cuts.

c) Any potential planned cutting should be preceded by an assessment of the current forest condition (presence of hollow trees, occurrence of red list species).

d) Important areas of biodiversity conservation (occurrence of red list species of plants and nesting birds) should be defined and excluded from any cutting or should have a special regime (timing of cutting, less intensity of cutting, bigger amount of decaying wood);

e) All planned cutting should be carried out between 15 August and 1 March to avoid disturbing nesting birds and other breeding animals;

f) Planned cutting should not lead to a change of species compositions (including the proportions of the main species) of the tree layer, except in the case of removing non-native species and other restoration measures.

g) Forest management operations must not lead to soil erosion out of main forest roads;

h) Plots where natural regeneration occurs should be given priority for the planned cutting in order to create the good conditions for the development of the new generation of trees;

i) The cutting should be distributed evenly throughout the whole area of accessible forests. Canopy of individual openings should be located at a minimum distance from each other corresponding to the average height of the stand.

## *7.b.2 English language summary of the Management Plan of Kobuleti Protected Areas*

The management Plan of Kobuleti Protected Areas covers management guidelines and principles for Kobuleti Strict Nature Reserve as well as Kobuleti Managed Reserve. The management planning process was initiated in 2015 and was finalized in September 2018. Currently the plan is under approval process by the government of Georgia. In the participatory management planning process, a wide range of stakeholders, including the Agency of Protected Areas (APA), Kobuleti PA administration, Shota Rustaveli University of Batumi, Kolkheti PA development fund, representatives of local self-government, NGOs and various international and national experts were involved. After approval of the plan it will be valid for 6 years until 2024.

The plan describes key features and objectives for Kobuleti PAs establishment. The aims of Kobuleti Strict Nature Reserve establishment are:

A) Preservation and maintenance of habitats protected by the Ramsar Convention which are important for migratory and water birds;

B) Ensuring sustainable development of natural processes and conservation of globally important Ispani 2 mires through strict protection of hydrologic regime and conservation;

C) Protection of habitats, animals and plants, especially threatened plants and animals gene pool and maintenance of biological diversity;

D) Promote scientific and ecological activities.

The aims of Kobuleti Managed Reserve establishment are:

A) Protection, restoration and maintenance of natural percolation bogs and relict colchic forests flora and fauna, and gene pool of global and national red list species;

C) Creation of favorable conditions for scientific research;

D) Establishment of legal mechanisms to create favorable conditions for the development of ecotourism;

E) Ecological education and environmental awareness raising;

F) Protection, restoration and maintenance of land, water, animals and plants (including forests) and other natural resources within Kobuleti Managed Reserve.

G) Protection of archaeological monument “Ispani”;

H) Protection and monitoring of hydrological regime.

Kobuleti PAs are located in the vicinity of the Black Sea coast and include Kobuleti Strict Nature Reserve with 316,4 ha and Kobuleti Managed Reserve with 466,3 ha (see maps below). Both PAs cover the territories of Ispani 1 and Ispani 2 mires (Figure 92).

The management plan describes the history of Kobuleti PA establishment and development, its local and global importance, geological, hydrological and climatic conditions, landscape, biodiversity, and land tenure. Furthermore it covers scientific, socio-economic, historic-cultural, eco-educational and ecosystem services aspects.

The plan describes long term objectives of the PAs as well as respective management programs. The long term objectives are mainly focused on the maintenance of existing ecosystem functionality as well as services and habitat, flora and fauna biodiversity protection. One of the long term objectives describes Kobuleti PAs as part of a serial UNESCO World Heritage property. Besides that the long term objectives include socio-economic, eco-educational and environmental awareness raising, scientific and educational, eco-tourism and PA administration development objectives.

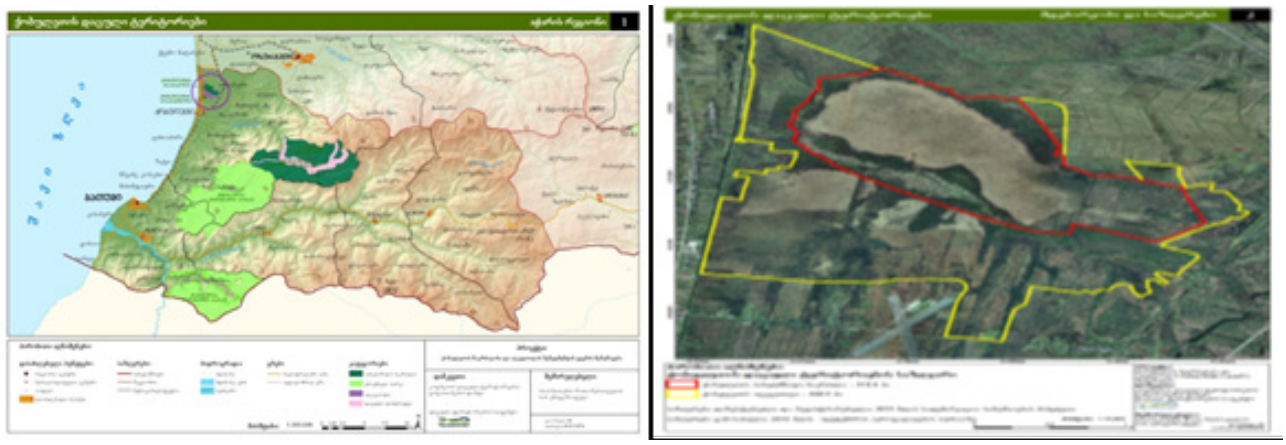

**Figure 92.** Overview map and more detailed map of Kobuleti Protected Areas from the Management Plan of Kobuleti Protected Areas. (Source: APA)

For achieving of the long term objectives the management plan identifies the following management programs to be implemented by the head office of the Agency of Protected Areas and Kobuleti PA administration:

1. Protection, patrolling and law enforcement;

2. Biodiversity conservation;

3. Eco-tourism;

4. Research and monitoring;

5. Eco-education and public relations;

6. Infrastructure and administration development

During implementation of the management plan, APA ensures involvement of additional experts and organizations where needed.

The management plan is implemented through 3 years operational plans which will be renewed annually. The operational plans describe in detail activities to be implemented during the year as well as respective budget.

PA administration will implement regular monitoring of the management plan implementation and will use the monitoring results for adaptive management of the PAs. The monitoring will be done in 3 stages: 1) within annual monitoring process PA administration prepares monitoring report in every June regarding the implementation of planned activities. These reports are used for adjustment of the 3 years operational plans and respective annual budgets; 2) Monitoring through the Management Effectiveness Tracking Tool (METT), which will be done in every 3 years period 3) General review, which will be done during 6th year of the implementation. The review means conducting of situational analysis, review of the objectives and activities. The result of the review is basis for the development of new 6 years valid management plan.

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Article 1. Purpose of the management plan

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Article 3. Legislative and institutional framework regulating the protected area

Article 4. Objectives for the establishment of protected areas

Article 5. The management plan development process

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## *7.b.3 English language summary of the Management Plan of Kolkheti National Park*

The management Plan covers management guidelines and principles for Kolkheti National Park (KNP) as well as Katsoburi Managed Reserve (KMR). The management planning process was initiated in 2015 and was finalized in September 2018. Currently the plan is under approval process by the government of Georgia. In the participatory management planning process, a wide range of stakeholders, including the Agency of Protected Areas (APA), KNP administration, Shota Rustaveli University of Batumi, Kolkheti PAs development fund, representatives of local government, local communities, various international and national experts were involved. After approval of the plan it will be valid for 6 years until 2024.

Kolkheti National Park is located in western Georgia. It includes east coast line of Black Sea and Lake Paliastomi basin. Territories of the national park are located on 5 municipalities – Zugdidi, Khobi, Senaki, Abasha and Lanchkuti and are part of two regions of Georgia – Samegrelo and Guria. Katsoburi Managed Reserve (KMR) is located on the territory of Abasha municipality. Total area of the KNP is 44308.5 ha from which 29032.5 ha is located on land and 15276 ha on the water. Total area of the KMR is 270,8 ha.

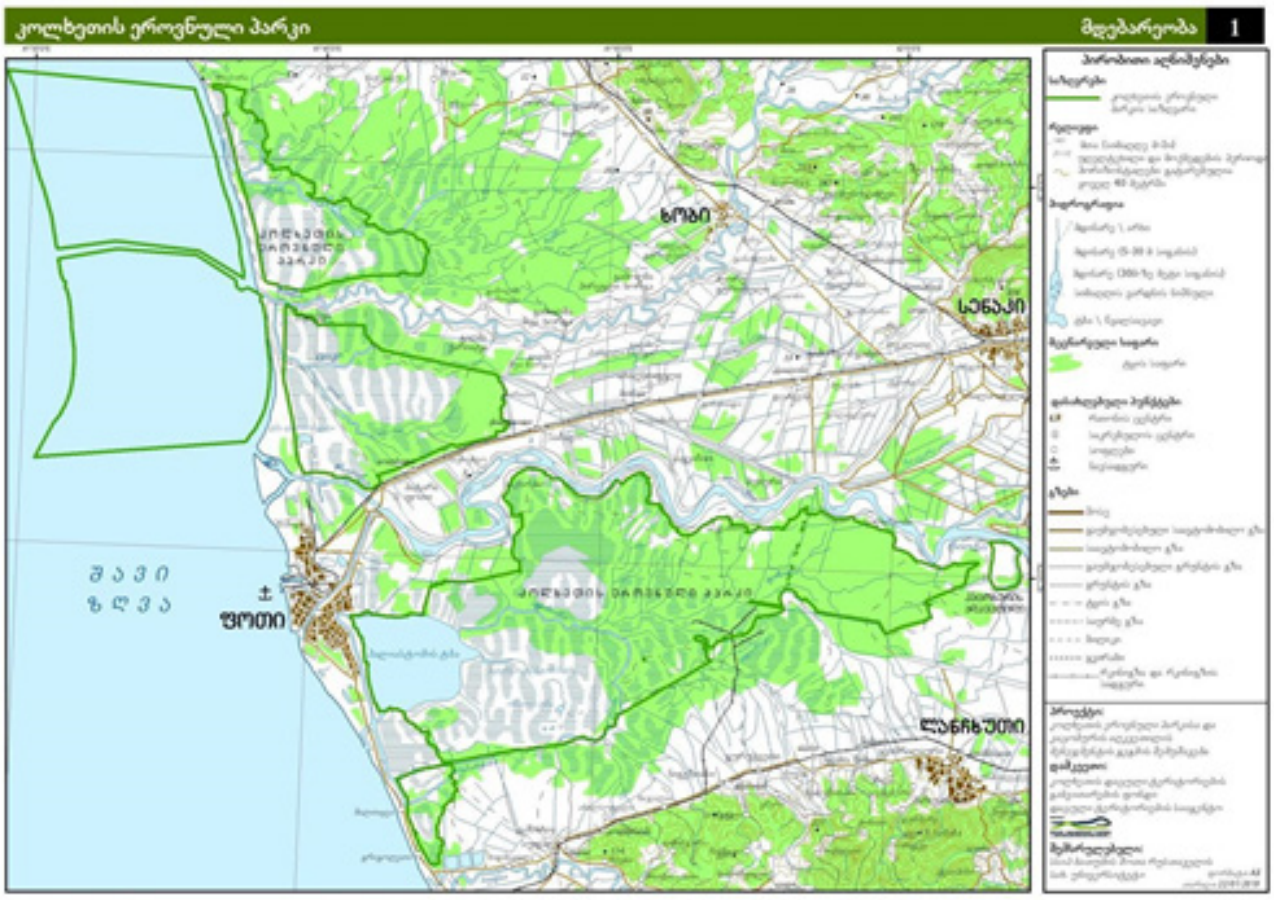
The KNP is located in western Georgia and divided into following zones (see Figure 93):

a) Strict Protection Zone – 12759 ha;

b) Managed Protection Zone – 961 ha;

c) Traditional Use Zone – 15313 ha.

The management plan describes the history of KNP and KMR establishment and development, starting with Kolkheti State Nature Reserve establishment in 1947 and Kotsoburi Hunting Resort establishment in 1964.



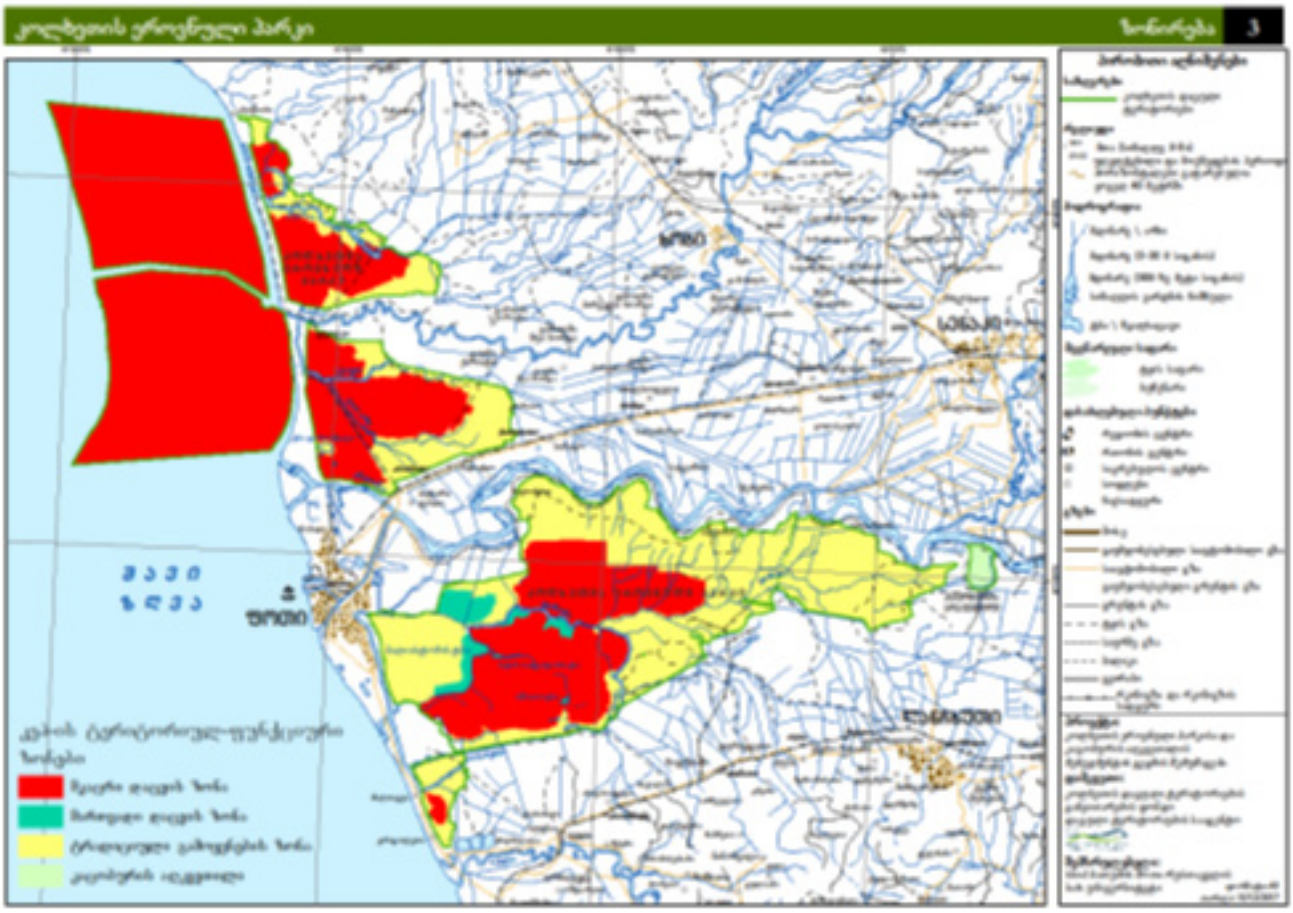


**Figure 93.** Overview map and more detailed map of Kolkheti National Park from the Management Plan of Kolkheti National Park. (Source: APA)

The plan describes key features and objectives for KNP and KMR establishment. The objectives of KNP establishment are:

A) Protect, restore and maintain unique ecosystems and habitats of Kolkheti lowland for migratory and water birds.

B) For continues development of natural processes and supporting the protection and restoration of the areas that are distinguished by biological diversity, natural and historic-cultural characteristics;

C) Protection, maintenance and restoration of natural-ecological habitats such as sphagnum peat, relict forests, natural lakes, flora and fauna relicts and endemic species, national and global red list and endangered species;

D) Protection, restoration and maintenance of the unique hydrological regime of the Colkheti mires;

E) Conservation of black sea mammals;

F) Maintenance of the natural and cultural heritage of Kolkheti and development of ecotourism;

G) Scientific research, biodiversity monitoring, ecological education and public relations;

H) Sustainable use of natural resources by the local population for the maintenance of important functions of the ecosystem.

2. The objective of KMR establishment is:

A) Protection, restoration and maintenance of colchic forests

The document also explains local and global importance of the sites underlying the fact that around 60% of the Georgia's peatlands are located within the KNP, moreover the most important, unique and rare, world's

biggest and oldest Imnati percolation bog is also located within the KNP. The latter serves as the main argument for establishment of the National Park. In addition to the Imnati bog following mires are included in the KNP: Pitshora, Grigoleti, Churia, Anaklia and Nabada.

Besides situational analysis and providing baseline data regarding climate, geology, soils,

hydrology, landscape, biodiversity, land tenure, ecosystem services etc. the document provides detailed information regarding habitats, species, including global and national red list species and their conservation status.

The long term objectives of the KNP and KMR are mainly focused on the maintenance of existing ecosystem functionality as well as services and habitat, flora and fauna biodiversity protection. For achieving of the long term objectives the management plan identifies the following management programs to be implemented by the Protected Areas administration:

1. Protection and patrolling;
2. Conservation and sustainable use of natural resources;
3. Scientific research and monitoring;
4. Eco-education and public relations;
5. Eco-tourism;
6. Administration development.

During implementation of the management plan, APA ensures involvement of additional experts and organizations where needed.

The management plan is implemented through 3 years operational plans which will be renewed annually. The operational plans describe in detail activities to be implemented during the year as well as respective budget.

PA administration will implement regular monitoring of the management plan implementation and will use the monitoring results for adaptive management of the PAs. The monitoring will be done in 3 stages: 1) within annual monitoring process PA administration prepares monitoring report in every June regarding the implementation of planned activities. These reports are used for adjustment of the 3 years operational plans and respective annual budgets; 2) Monitoring through the Management Effectiveness Tracking Tool (METT), which will be done in every 3 years period 3) General review, which will be done during 6th year of the implementation. The review means conducting of situational analysis, review of the objectives and activities. The result of the review is basis for the development of new 6 years valid management plan.

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## *7.b.4 Summaries of sustainable tourism development plans of individual PAs*

**The Mtirala National Park Strategy and Action Plan** 2016 – 2020 (HIDRIA Ciencia 2016a) is aimed at providing guidelines for the effective development of sustainable tourism within the boundaries of the Mtirala National Park and its support zone. It is publicly accessible at http://www.ge.undp.org/content/dam/georgia/docs/publications/GE_UNDP_ENV_Mtirala_NP_Tourism%20Strategy_201216.pdf.

**The Kinrishi Protected Areas Strategy and Action Plan** 2016 – 2020 (HIDRIA Ciencia 2016b) is aimed at providing guidelines for the effective development of sustainable tourism within the boundaries of the Mtirala National Park and its support zone. It is publicly accessible at http://www.ge.undp.org/content/dam/georgia/docs/publications/GE_UNDP_ENV_Kintrishi_PA_Tourism_Strategy_201216.pdf.

## 7.C FORM AND DATE OF MOST RECENT RECORDS OR INVENTORY OF PROPERTY

| Component area | Reference | Form | Year | Comments |
|---|---|---|---|---|
| 1) Mtirala- Kintrishi (Kintrishi Protected Areas) | Bakuradze et al. (2016). Kintrishi Protected Areas Baseline Study Report. Tbilisi: GIS and Remote Sensing Consulting Center "GeoGraphic". 248 pp. Unpublished. | Baseline Study Report | 2016 | The report deals with the part of the Mtirala / Kintrishi component area that coincides with Kintrishi Protected Areas. Available from APA. |
| 1) Mtirala- Kintrishi (Mtirala National Park) | APA (2009). Management Plan of Mtirala National Park. 41 pp. Unpublished | Mgmt.Plan including Description | 2009 | See Section 7.b.1 |
| 2-7 Ispani, Grigoleti, Imnati, Pitshora, Nabada, Churia | Krebs et al. (2017). Georgia, In: Mires and peatlands of Europe: Status, distribution and conservation (ed. by Joosten, H. et al.). Stuttgart: Schweizerbart Science Publishers. PP 403-412 | Book chapter | 2017 | The chapter deals predominantly with the mires included within the component areas of the series. |

## 7.D ADDRESS WHERE INVENTORY, RECORDS AND ARCHIVES ARE HELD

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Minister of Environment Protection and Agriculture of Georgia

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Agency of Protected Areas of Georgia (2018b). Management Plan, Kobuleti Protected Areas. Tbilisi: APA. (see also Chapter 7.b.3)

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# 9. SIGNATURES

Prime Minister of Georgia

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Mamuka Bakhtadze