# Feasibility assessment for a World Heritage nomination of the Colchic Forests and Wetlands under the natural criteria

## Scoping and Feasibility Study

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# Scoping and Feasibility Study: Feasibility assessment for a World Heritage nomination of the Colchic Forests and Wetlands under the natural criteria


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Cover picture: Mtirala National Park, Georgia

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# Abbreviations

| | |
|---|---|
| a.s.l. | above sea level |
| APA | Agency of Protected Areas of Georgia |
| BKNP | Borjomi-Kharagauli National Park |
| CauPO | WWF Caucasus Programme Office |
| CC | Climate change |
| CR | Critically endangered (a Red List category) |
| EN | Endangered (a 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) |
| MENRP | Ministry of Environment and Natural Resources Protection 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 (a Red List category) |
| OG | Operational Guidelines (for the implementation of the ->WHC) |
| OUV | Outstanding Universal Value |
| PA | Protected Area |
| PCA | Proposed Component Area |
| SNR | Strict Nature Reserve |
| SPPA | Support Programme for Protected Areas in Georgia (of ->KfW) |
| TJS | Transboundary Joint Secretariat for the Southern Caucasus (of ->KfW) |
| UNDP | United Nations Development Programme |
| VU | Vulnerable (a Red List category) |
| WH | World Heritage |
| WHC | World Heritage Convention |
| WWF | World Wide Fund for Nature |

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# Executive Summary

Georgia has been a Party to the World Heritage Convention since 1992, and has acknowledged the importance of a natural or mixed World Heritage nomination. This is reflected in national legislation and plans, such as the Law of Georgia on the System of Protected Areas (1996), the 2014 National Biodiversity Strategy and Action Plan of Georgia and the 2012 Ecoregional Conservation Plan. In spite of this, and in spite of the fact that Georgia also belongs to one of WWF's 35 „priority places" (WWF 2017) and overlaps with two of Conservation International's 34 global „biodiversity hotspots", no sites have been nominated as natural or mixed UNESCO World Heritage properties by Georgia to date. There are, however, three cultural sites. Various actors have explored a possible nomination of natural World Heritage sites in Georgia since 2002. As a result, the ***Colchic Forests and Wetlands*** and ***Central Caucasus*** were selected as the most promising sites for possible nomination. A property "Colchis Wetlands and Forests" was entered on the Tentative List of Georgia in 2007. More recently, a scoping study for the Central Caucasus Cluster was carried out by WWF Caucasus in 2015. The need for a similar study for the Colchic Forests and Wetlands site was recognized by the Government of Georgia. Consequently, funding for the project ***"Feasibility assessment for a Colchis World Heritage site"*** was granted to the Michael Succow Foundation by the German Federal Ministry for Environment, Nature Conservation, Building and Nuclear Safety in 2016. Co-funding was provided by WWF Caucasus and the Ludolf-Andreas Stiftung (Germany). The goal of this study – and of a potential resulting nomination – is to strengthen the conservation of Colchic forest and wetland ecosystems with their biodiversity, particularly threatened and endemic species, through enhanced international recognition and national/ local support.

The Colchic area wraps around the southeastern coast of the Black Sea, extending from the Melet River near Ordu in Turkey to the northwestern border of Abkhazia Autonomic Republic in Georgia. Its warm-temperate and very humid climate and bio-geographical setting enable the existence of characteristic forest and wetland ecosystems, including extensive temperate rainforests and peatlands of a unique functional type. The Colchic Forests and Wetlands are part of the Caucasus ecoregion and of the Black Sea basin. They are also part of the neighboring ecoregions of Euxine-Colchic broadleaf and Caucasus mixed forests within the Temperate Broadleaf and Mixed Forests biome of the Palaearctic Realm (Olson et al. 2001).

As a result of a site visit, national expert and stakeholder consultations, mapping and literature studies, the Consultant has identified 13 potential component areas that could contribute to a Colchic World Heritage site, in various spatial configurations including only forests, only wetlands, or both. These potential component areas are nested within seven protected areas. Further analysis of the suitability of the various possible component areas has revealed a serial nomination of the Colchic Forests and Wetlands under World Heritage criteria ix and x as the most appropriate and promising scenario for a Colchic nomination. This nomination would consist of 11 to 13 proposed component areas, which would be parts of the following Protected Areas: Machakhela National Park, Mtirala National Park, Kintrishi Protected Areas, Kobuleti Protected Areas, Kolkheti National Park, as well as potentially Ajameti Managed Reserve and Borjomi-Kharauli National Park.

A serial property consisting of these proposed component areas would have a total area of up to 42,931 ha, with an additional total buffer zone area of 34,481 ha. These values are preliminary as they are based on assumptions about the final zoning of Machakhela National Park, which is still under negotiation between the

Agency of Protected Areas of Georgia and local stakeholders, and subject to changes depending on which areas are finally included.

Based on a description of the landscapes, ecosystems and biodiversity of the Colchic Forests and Wetlands, three attributes of likely Outstanding Universal Value (OUV) relevant to World Heritage criterion ix and another three attributes relevant to World Heritage criterion x have been identified by the Consultant. The attributes relevant to World Heritage criterion ix include **(1)** functional ancient peatlands and Colchic forests (including refugial and old growth forests) with their succession, patch dynamics and zonation, **(2)** long-term evolution and diversification of flora and fauna in a glacial refuge area, starting from the Tertiary and continuing today, and **(3)** origin, development and regeneration of percolation bogs, the simplest type of peat mire which only occurs there. Together with the Hyrcanian forests in Azerbaijan and Iran, the Colchic forests with their associated wetlands are the oldest forests in Western Eurasia in terms of origin and evolutionary history, and the most diverse in terms of relict and endemic woody species and tree diversity. Of additional importance is the occurrence of percolation bogs, i.e. bogs (mires only fed by rain) without a clear acrotelm and with predominantly vertical water flow, which consequently do not develop explicit surface patterning.

The attributes or likely OUV relevant to World Heritage criterion x include **(1)** the overall species richness, **(2)** the richness of endemic species and glacial relict species, and **(3)** the importance of the area for globally threatened species. The proposed component areas of the series are home to almost 1,100 species of vascular plants, and almost 500 species of vertebrates, plus an unknown but high number of invertebrate species. There are 155 vascular plant species with a restricted range, and more than 100 globally threatened or near threatened species in total.

Based on a comparison of the Colchic Forests and Wetlands to other deciduous broadleaf forests of the South-Euro-Siberian plant-geographical Region and the corresponding East-North-American and the Sino-Japanese Regions in the nemoral zone of the Holarctic Realm, as well as to comparable peatlands, the study concludes that the proposed attributes of likely OUV would likely be sufficient to support the OUV of the series. However, some further analysis is needed in relation to both relevant World Heritage criteria.

In terms of integrity, the proposed component areas contain the main features corresponding to the attributes of likely OUV under World Heritage criteria ix and x and are of adequate size to conserve most of them, although this needs to be reviewed for two relatively small proposed component areas within Machakhela National Park once its final zoning is known. The current pressures to the integrity of the series are considered significant but still acceptable with added management and protection efforts. At the same time, a number of potential threats (including development of transport and tourism infrastructure as well as peat extraction) would seriously threaten the integrity of some proposed component areas.

The proposed series consists of parts of legally designated protected areas which correspond almost exclusively to IUCN PA management categories Ia (Strict Nature Reserve) and II (core zones of National Parks), with one proposed component area also including parts of the visitor zone of Mtirala National Park. The buffer zones are also designated as protected areas, including less strict categories. All proposed component areas have management plans either already in place, or under preparation. Existing management plans are being implemented, although there is room for the improvement of some management aspects.

While the described serial approach to the configuration of the Colchic Forests and Wetlands is justified from a technical perspective, this is ultimately at the discretion of the State Party of Georgia. There is also potential for future extensions including additional Georgian and Turkish component areas.

# 1. Introduction

## 1.1 Background and rationale of the study

The Caucasus ecoregion covers a total area of 580,000 km² and is one of the most biologically rich regions on Earth. It belongs to one of WWF's 35 „priority places“ (WWF 2017) and overlaps with two of 34 „biodiversity hotspots“ (Mittermeier et al. 2004, Myers & Mittermeier 2000), which were identified in 2007 by Conservation International as being the richest and at the same time most threatened reservoirs of plant and animal life on Earth. The IUCN Red List of Threatened Species identifies around 86 species of globally threatened animals in the three South Caucasus countries alone (IUCN 2017). Over 6,500 species of vascular plants are found in the Caucasus (CEPF 2003). At least a quarter of the plants are found nowhere else on Earth – the highest level of endemism in the temperate zone of the northern hemisphere. Seventeen endemic plant genera grow in the Caucasus.

The research on the biological diversity and the protection of the natural heritage of the Caucasus eco-region, especially of Georgia, has a long and good tradition within the German-Georgian scientific and cultural cooperation (e.g. Radde 1899, Conwentz 1914, Walter 1974, Succow 1992, WWF Germany 1992, Kotlyakov et al. 1998, Knapp 1998, 2014, Schmidt 2004, Schmidt et al. 2006).

Georgia is located entirely within the Caucasus ecoregion. Major efforts have been undertaken to preserve the unique biodiversity there over the last 20 years. The protected area system was significantly expanded, including the establishment of new national parks at Machakhela, Mtirala, and Kolkheti. Nevertheless, despite the substantial efforts in biodiversity conservation in the country, Georgia is still facing major challenges. Some critically important areas are still not protected by any protection regime and the existing network is not completely representative of the full range of biodiversity in the ecoregion (WWF 2012).

Since 1992 Georgia has been a Party to the World Heritage Convention (succeeding the former U.S.S.R, which had been a State Party since 1988). The Georgian authorities have acknowledged the importance of supporting a natural or mixed nomination, which is reflected in national legislation and regional plans, such as the Law of Georgia on the System of Protected Areas (1996), the National Biodiversity Strategy and Action Plan of Georgia (MENRP 2014) and the updated Ecoregional Conservation Plan (WWF 2012). Furthermore, institutional developments at the level of the Ministry of Environment and Natural Resources Protection (MENRP) and the Agency of Protected Areas (APA) show increased efforts in improvement of protected area management in recent years, which creates a solid foundation for a potential nomination and management of World Heritage sites in the country.

However, despite these developments and the crucial biodiversity value, the rich natural ecosystems and the inclusion of four natural and mixed sites in Georgia's Tentative List (UNESCO 2017), no natural or mixed sites have been nominated as potential UNESCO World Heritage properties to date.

The Western Caucasus (Russian Federation) was inscribed as the first natural World Heritage site of the Caucasus in 1999 (Butorin et al. 2005). The "Colchic bogs and forests" were identified as one of five further candidates in the Caucasus region, during the workshop "Implementation of the World Heritage Convention for the Caucasus region" at the International Academy for Nature Conservation, Isle of Vilm, in March 2002

(Kovalev & Schmidt 2002). Some of the discussed forests and mires in the Colchis were inspected in 2004 (Kirschey & Kovalev 2004). During a follow-up workshop on the Isle of Vilm in November 2005, the scope of a potential serial nomination of "Kolkhic bogs and forests" was outlined (BfN-INA 2005). The "Colchic Wetlands and Forests" were included in the Georgian Tentative List as a candidate for the World Heritage List in 2007.

In order to continue the process towards nomination and management of World Heritage sites in Georgia, WWF Caucasus (CauPO) together with APA including a wide range of local partners and stakeholders conducted a workshop in December 2011 (Garstecki 2012). In a further, action-orientated event in April 2014, some 25 government staff, scientists from Georgian academic institutions, and representatives of NGOs as well as the international development cooperation participated. As a result, the two most likely protected areas (PA) clusters of potential Outstanding Universal Value (OUV) – ***Colchic Forests and Wetlands*** and ***Central Caucasus*** – were selected (Garstecki 2014). This prioritization of the sites was later supported by the IUCN Caucasus Endemic Plant Red List Assessment (Solomon et al. 2014). Updated Tentative List entries were drafted by WWF CauPO and APA for later official inclusion in the Tentative List of Georgia.

According to §122 of the Operational Guidelines for the Implementation of the World Heritage Convention (OG), State Parties are encouraged to "*carry out initial preparatory work to establish that a property has the potential to justify Outstanding Universal Value, including integrity or authenticity, before the development of a full nomination dossier which could be expensive and time-consuming. Such preparatory work might include collection of available information on the property, thematic studies, scoping studies of the potential for demonstrating Outstanding Universal Value, including integrity or authenticity, or an initial comparative study of the property in its wider global or regional context, including an analysis in the context of the Gap Studies produced by the Advisory Bodies*." (UNESCO 2016).

The scoping and feasibility study for the Central Caucasus Cluster was carried out by WWF CauPO in 2015 (Garstecki et al. 2015). The urgent need for a similar study for the Colchic Forests and Wetlands site was recognized by all stakeholders, including the Government of Georgia. This was affirmed by a support letter, which was sent in March 2016 from the Ministry of Environment and Natural Resources Protection of Georgia (MENRP) to the German Ministry of Environment, Nature Conservation, Building and Nuclear Safety (BMUB). The Michael Succow Foundation proposed a project to support the nomination process by a feasibility study in spring 2016 (MSF 2016). This was accepted for funding by the BMUB. The project of the Succow Foundation, in cooperation with WWF Caucasus, started in autumn 2016.

## 1.2 Goal, purpose and objectives

The overarching ***goal*** of the study – and of a potential nomination resulting from it – is to strengthen the conservation of Colchic forest and wetland ecosystems with their biodiversity, particularly threatened and endemic species, through enhanced international recognition and national/ local support.

The ***purpose*** of the study project is to provide all necessary information on the feasibility as well as the most suitable geographic/ thematic scope of a natural World Heritage nomination of the Colchic Forests and Wetlands – as reflected in §122 of the OG – to relevant Georgian decision makers, and to prepare, to the extent possible and sensible, elements of the nomination documentation. In addition, the study will contribute to increasing awareness in Georgia and particularly around the prospective site on the World Heritage Convention and the advantages of a World Heritage Site for the region.

The specific ***objectives*** of the study are reflected in its structure:

- The necessary baseline information on the physical environment, ecosystems and biodiversity of potential component areas of a proposed serial natural World Heritage property "Colchic Forests and Wetlands" is available to decision makers;
- Applicable World Heritage criteria (if any) and attributes of the proposed property of likely Outstanding Universal Value in relation to these criteria are identified and their integrity is assessed, which also implies a recommendation regarding the overall feasibility of a possible nomination;
- Scenarios for the geographic configuration of a serial proposed property with their relative advantages and disadvantages are developed;
- Core elements of a possible nomination dossier including a draft Statement of Outstanding Universal Value and draft Global Comparative Analysis are available for the perusal of decision makers;
- Potential needs for an adjustment of protection and management regimes are identified and possible solutions discussed;
- Critical knowledge gaps and ways to close them are described.

Based on the outcomes of this study, it is planned that the MENRP and other relevant decision makers in Georgia are supported to develop a practical roadmap leading to the submission – and possibly inscription and successful management post-inscription – of the area.


**Figure 1.** Overview over the wider Colchic area (source: Nakhutsrishvili et al. 2015).

# 1.3 Overview over the wider Colchic area

The Colchic area wraps around the southeastern coast of the Black Sea, extending from the Melet River near Ordu in Turkey to the northwestern border of Abkhazia Autonomic Republic in Georgia (Figure 1). Some authors put the northwestern border of the region even further to the northwest, near the Taman Peninsula in the Russia's Krasnodar Krai (e.g. Nakhutsrishvili et al. 2015), corresponding to a latitude range of between ca. 40°30' and 44°60' N. In Georgia, the Colchis includes the Colchic lowlands with the converging slopes of the Greater and Lesser Caucasus, including 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" to the east (Figure 1 – overview map). In terms of altitude, the areas belonging to the Colchis range from sea level to about 2,500 m a.s.l.

The Colchic area has a warm-temperate and very humid climate. The climatic conditions and bio-geographical setting of the Colchis enables the existence of various characteristic forest and wetland ecosystems, including extensive temperate rainforests (Nakhutsrishvili et al. 2010) and peatlands of a globally unique functional type (Krebs et al. 2017).

Within the wider Caucasus ecoregion, the Colchic Forests and Wetlands comprise humid pleiocene/pleistocene refuge areas and among the ecosystem complexes with the longest uninterrupted existence in temperate Eurasia (Tarkhnishvili 2014). These forests and wetlands are considered not only a global Centre of Plant Diversity (Davis et al. 1994, 1995), but also a centre of plant endemism in the Caucasus (Zazanashvili et al. 2012), preserving plant associations from the Tertiary period.

The Colchic Forests and Wetlands also overlap with various types of key biodiversity areas, including Important Plant Areas (e.g. Batsatsashvili 2011), nine Important Bird Areas (BirdLife International 2017a), an Endemic Bird Area (BirdLife International 2017b), the most important hotspot of autumn raptor migration in the western Palaearctic (Harris 2013), and areas of exceptional invertebrate species richness (e.g. Pokryszko et al. 2011).

# 1.4 Geographical scope of the study

This study focuses on the southern/ central Colchic area inside Georgia. All existing protected areas of IUCN PA Management categories Ia, II and IV that are located within this area, and that can be managed by the Government of Georgia, have been considered for possible inclusion into a prospective nomination area. Potential component PAs located within Abkhazia Autonomous Republic have been excluded because the Government of Georgia currently cannot manage them.

The focus on the central/ southern Colchis area is justified because **(a)** the warm-humid Colchic climate is most pronounced there, **(b)** this part of the Colchis has the highest concentration of typical Colchic relict plant species (half-prostrate evergreen underwood species/shrubs) (Dolukhanov 1980, see Figure 11), and **(c)** the Colchic swamp forests and characteristic peatlands are exclusively concentrated inside the Colchic Lowlands of Georgia (Krebs et al. 2017). The study also focuses on existing PAs because only PAs are considered sufficient to meet the integrity and management requirements set out in the Operational Guidelines, and no new PAs are planned in Georgia until the envisaged nomination of a possible Colchic Forests and Lowlands property.

The fact that this study – and potentially a nomination building on it – focuses on existing PAs within the southern/ central Colchic Area of Georgia does not preclude a potential future extension of the property in line with §139 of the Operational Guidelines to the World Heritage Convention (UNESCO 2016), provided that any additional component sites meet the requirements for OUV as set out in the Operational Guidelines.

# 1.5 Screening of IUCN thematic studies

Paragraph 122 of the OG recommends that State Parties consult thematic studies of the Advisory Bodies (i.e. those of IUCN in the case of natural nominations) to the WHC when compiling Tentative Lists or nominations.

However, in the case of the Colchic Forests and Wetlands, these studies provide little assistance in deciding if this serial property may have OUV. Among the thematically relevant studies on PAs of high biodiversity importance (Smith & Jakubowska 2000), forest PAs (Thorsell & Sigati 1997), wetland and marine PAs (Thorsell et al. 1997), mountain PAs (Thorsell & Hamilton 2002) and biomes, habitats and biodiversity (Magin & Chape 2004), only the latter two mention the Caucasus global biodiversity hotspot at all: Thorsell & Hamilton (2002) suggest a serial trans-boundary property in the Greater Caucasus, while Magin and Chape (2004) mention "mountain shrublands of South Caucasus" as possible candidate ecosystem for inclusion in the World Heritage list, without further explanation. All this may be related to the fact that these thematic studies predate the rapid increase in knowledge about and understanding of this region over the last 10-15 years (see e.g. CEPF 2003, Tarkhnishvili 2014, Williams et al. 2006).

Bertzky et al. (2013) represented a more systematic approach to identifying potential new World Heritage sites important for biodiversity. The authors included the Caucasus Global Biodiversity Hotspot among those only represented by one natural WH site, but did not give any site specific recommendations for potential new WH properties within that hotspot. The methodology of Bertzky et al. (2013) would in any case not have detected the Colchic Forests and Wetlands cluster because it **(a)** did not address criterion ix, **(b)** excluded plant diversity from its discussion of criterion x, **(c)** screened only existing individual PAs, but neither PAs in the process of establishment nor PA clusters in its GIS analysis, and **(d)** did not provide guidance on how to deal with large scale latitudinal differences in biodiversity when considering potential OUV under criterion x, thereby effectively biasing against relatively high-latitude sites of high biodiversity importance such as the Colchic Forests and Wetlands. Therefore, the fact that the cluster is not identified as a potential WH site by Bertzky et al. (2013) does not allow any conclusion about its potential OUV under WH criterion ix or x.

At the same time, the methodological shortcomings of Bertsky et al. (2013) and earlier IUCN thematic studies do not indicate in any way that the Colchic Forests and Wetlands ***do*** have OUV under any of the natural criteria. They merely mean that an in-depth analysis as presented in this report is necessary to answer this question.

# 2. Study methodoly

In order to meet the objectives of the study, a field visit to the proposed property was combined with consultations with Georgian experts and stakeholders, an analysis of available literature and other relevant information, and GIS analysis.

## 2.1 Field visit

The five core PAs of the proposed property were visited on 14-16 November 2016 by six of the authors. These visits included meetings and discussions with 16 PA staff and other stakeholders. A detailed report of the visit is enclosed as Appendix 1 of this report.

## 2.2 National consultation and planning workshop

A national consultation and planning workshop was convened by the Agency of Protected Areas of Georgia (APA) in Tbilisi on 17-18 November 2016. This workshop was attended by 31 participants from APA and PAs, the Ministry of Environment and Natural Resources Protection (MENRP), other relevant government organizations, Civil Society and Academia, organizations of the international development cooperation active in the area, and the project team. A detailed report of this workshop is enclosed as Appendix 2 of this report.

## 2.3 Literature review and expert interviews

The study team compiled and analyzed literature, data and information about the proposed property including its ecosystems, biodiversity, integrity and management between November 2016 and March 2017. Information about inscribed properties and other PAs relevant to the Global Comparative Analysis of the Colchic Forests and Wetlands was also assessed. All sources of information used for the study report were referenced in the text and listed in the reference list.

The study team also conducted interviews and discussions with some experts and key stakeholders, including the IUCN Word Heritage Programme.

## 2.4 Mapping and geographical analysis

Maps of the wider Colchic area, of the study area and of all proposed component areas were produced using GIS.

# 3. Identification of the proposed property

The property to be nominated will be named ***Colchic Forests and Wetlands*** if the recommendations of this study regarding its zoning are followed. It is a serial property, for which 12 component areas as listed in Table 1 were taken into consideration. These component parts are located in Ajara Autonomous Republic, Guria Region, Samegrelo-Zemo Svaneti Region, Imereti Region and Samtskhe-Javakheti Region of Georgia (Figure 2).

Note that not all of the component parts as listed in Table 1 have been included in the final recommendation of the Consultant for the spatial configuration of the proposed series. All maps as shown in Figures 2-6 are also available as independent sheets (A4 JPEG) and as GIS data (Appendix 3).

Table 1. Possible component parts of the proposed property (MR: Managed Reserve; NP: National Park).

| No. | Name | Region | Central coordinates | Nominated property (ha) | Buffer zone (ha) | Figure (map) No. |
|---|---|---|---|---|---|---|
| 1 | Machakhela South | Adjara | N 41.45551°<br>E 41.82866° | 1,555 | Total 3,845 | 3 |
| 2 | Machakhela East | Adjara | N 41.51518°<br>E 41.91197° | 507 | | |
| 3 | Machakhela West | Adjara | N 41.47401°<br>E 41.77070° | 514 | | |
| 4 | Mtirala/ Kintrishi South | Adjara | N 41.66695°<br>E 41.86070° | 16,737 | 6,074 | 4 |
| 5 | Kintrishi North | Adjara | N 41.73703°<br>E 42.03404° | 3,918 | 3,204 | |
| 6 | Kobuleti/ Ispani 1+2 | Adjara | N 41.86202°<br>E 41.80153° | 248 | 539 | 5 |
| 7 | Kolkheti/ Grigoleti | Guria | N 42.05327°<br>E 41.73878° | 125 | 328 | 6 |
| 8 | Kolkheti/ Imnati | Samegrelo | N 42.10926°<br>E 41.78901° | 3,545 | Total 14,868 | |
| 9 | Kolkheti/ Pitshora | Samegrelo | N 42.15639°<br>E 41.81667° | 843 | | |
| 10 | Kolkheti/ Nabada | Samegrelo | N 42.23466°<br>E 41.68787° | 2,885 | 2,624 | |
| 11 | Kolkheti/ Churia-Anaklia | Samegrelo | N 42.29905°<br>E 41.66160° | 1,974 | 1,081 | |
| 12 | Ajameti | Imereti | N 42.13425°<br>E 42.80335° | 3,730 | 1,140 | 7 |
| 13 | Borjomi-Kharagauli/ Banishkhevi | Samskhe-Javakheti | N 41.86268°<br>E 43.30065° | 6,350 | 778 | 8 |
| | **Sum** | | | 42,931 | 34,481 | |

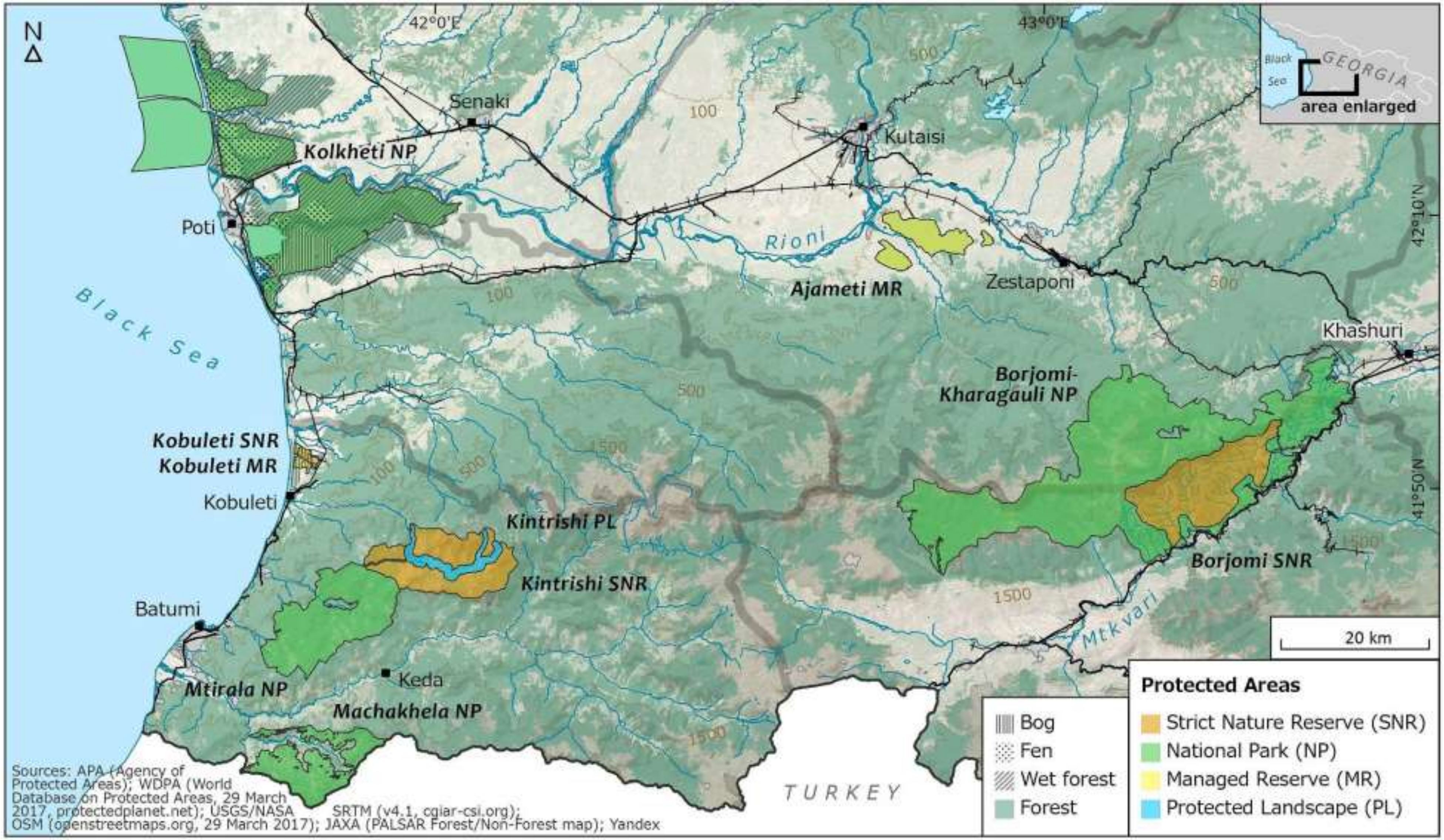


**Figure 2.** Overview map of possible component areas.

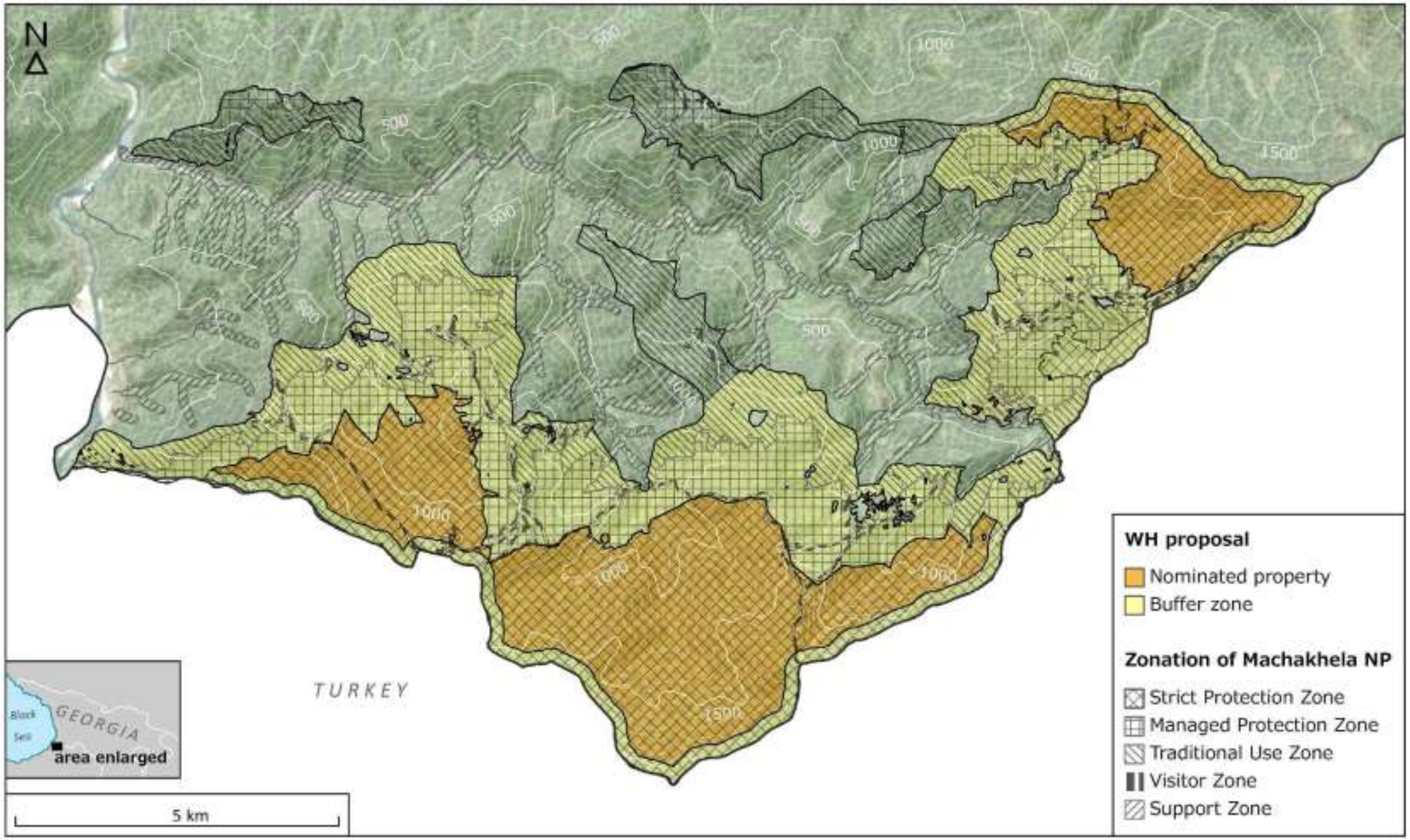


**Figure 3.** Map of the proposed component areas of Machakhela West, South and North.

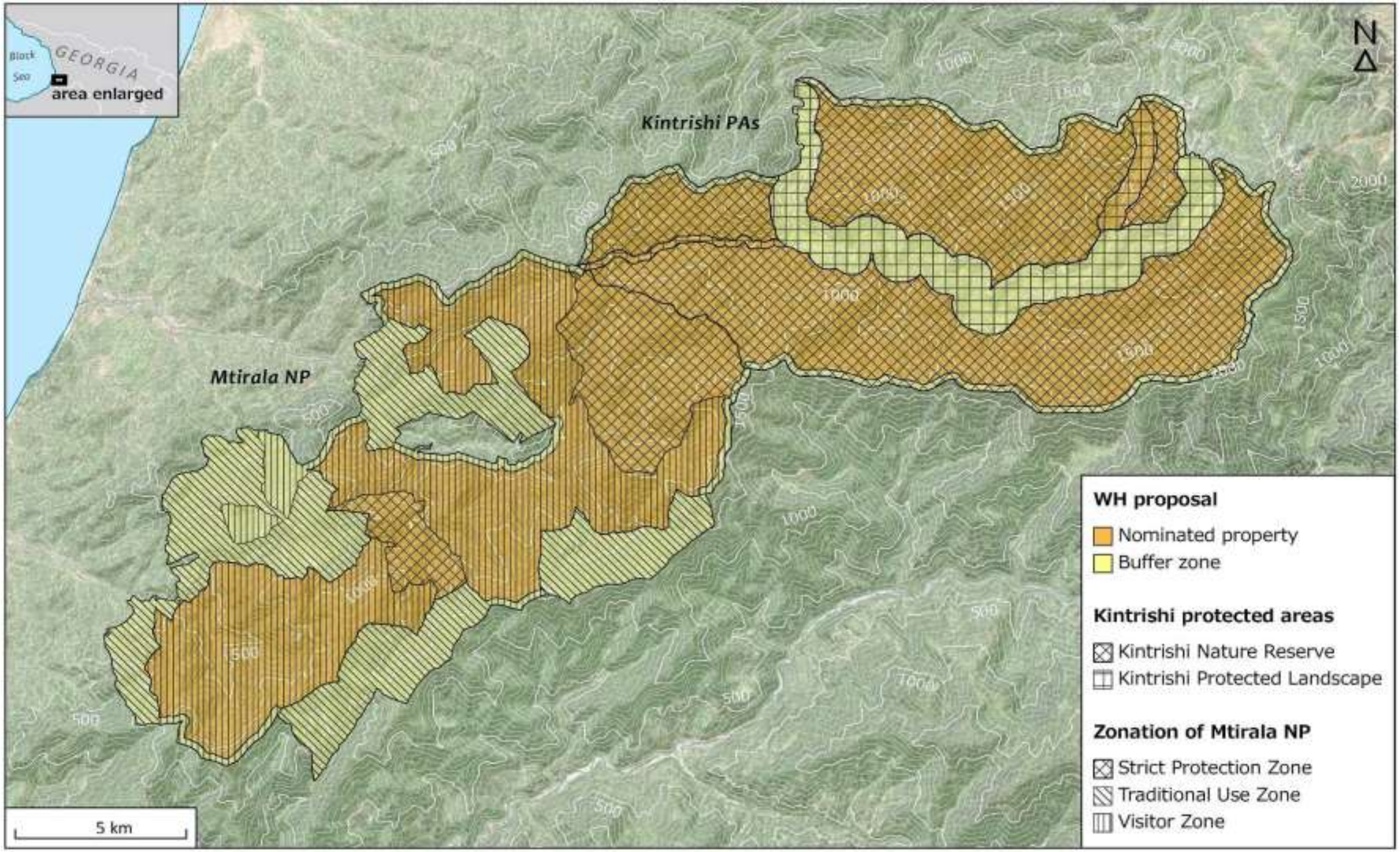


**Figure 4.** Map of the proposed component areas of Mtirala/Kintrishi South and Kintrishi North.

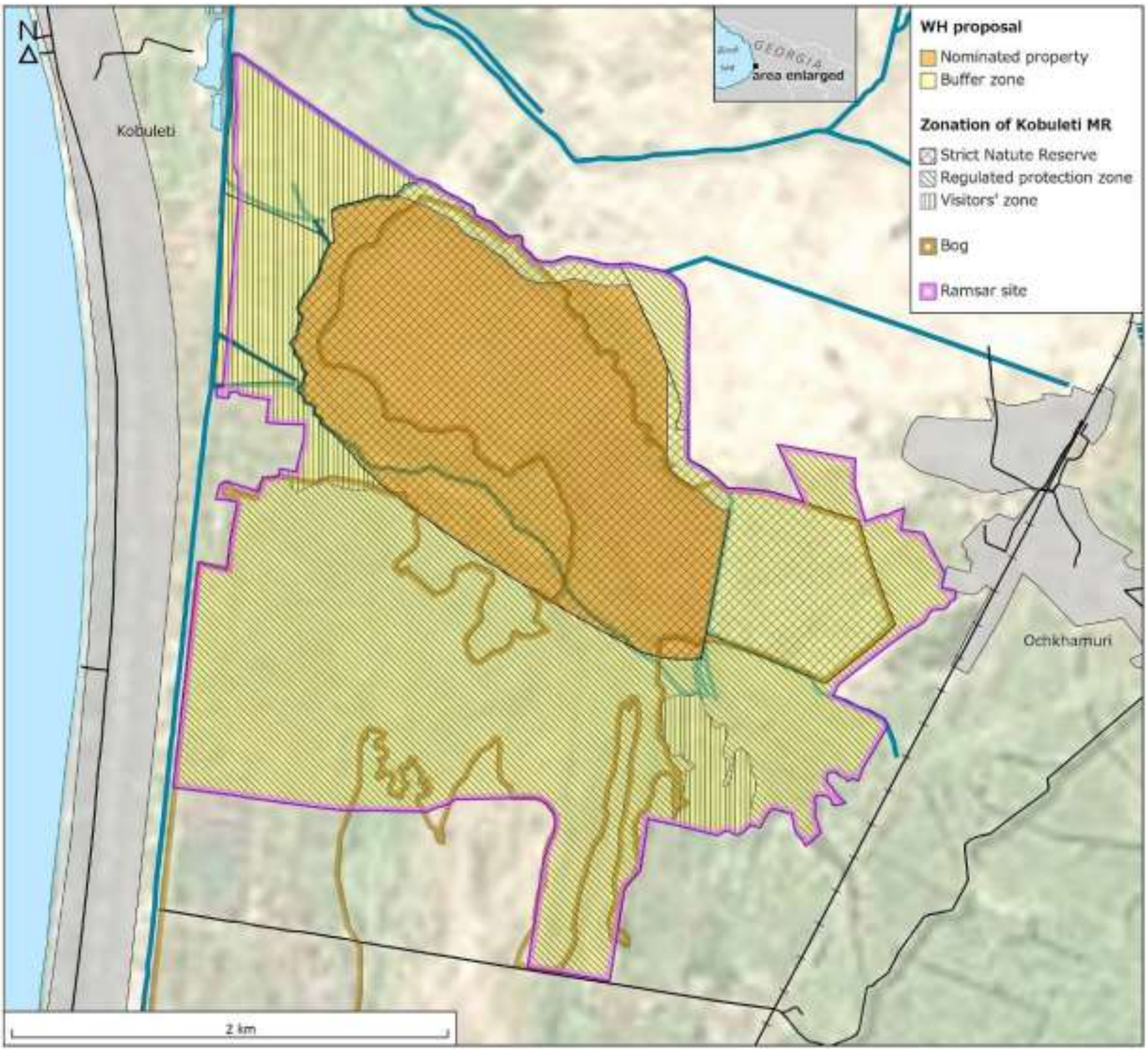


**Figure 5.** Map of Kobuleti/Ispani 1+2 proposed component area.

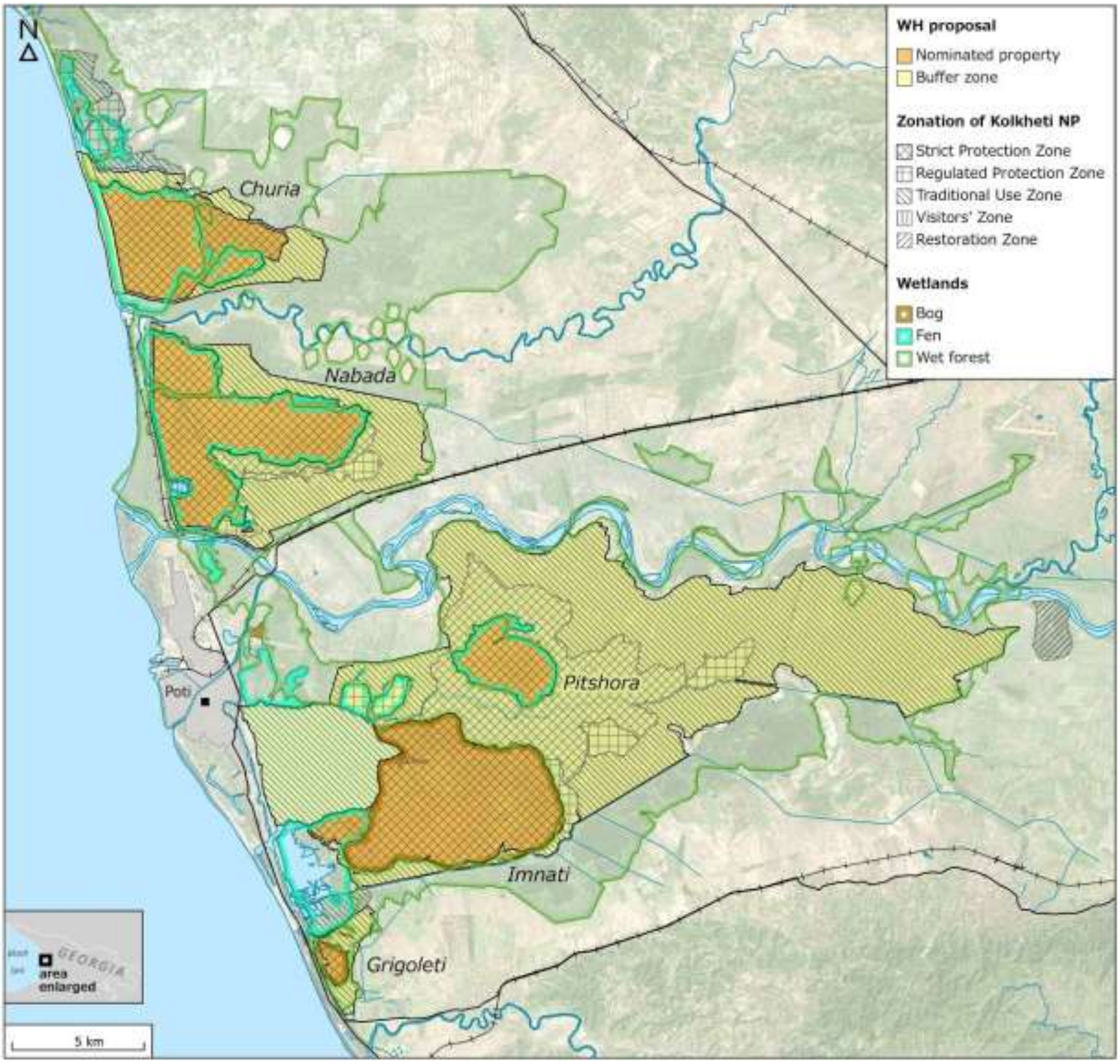


**Figure 6.** Map of Grigoleti, Imnati, Pitshora, Nabada, and Churia/Anaklia proposed component areas within Kolkheti National Park.

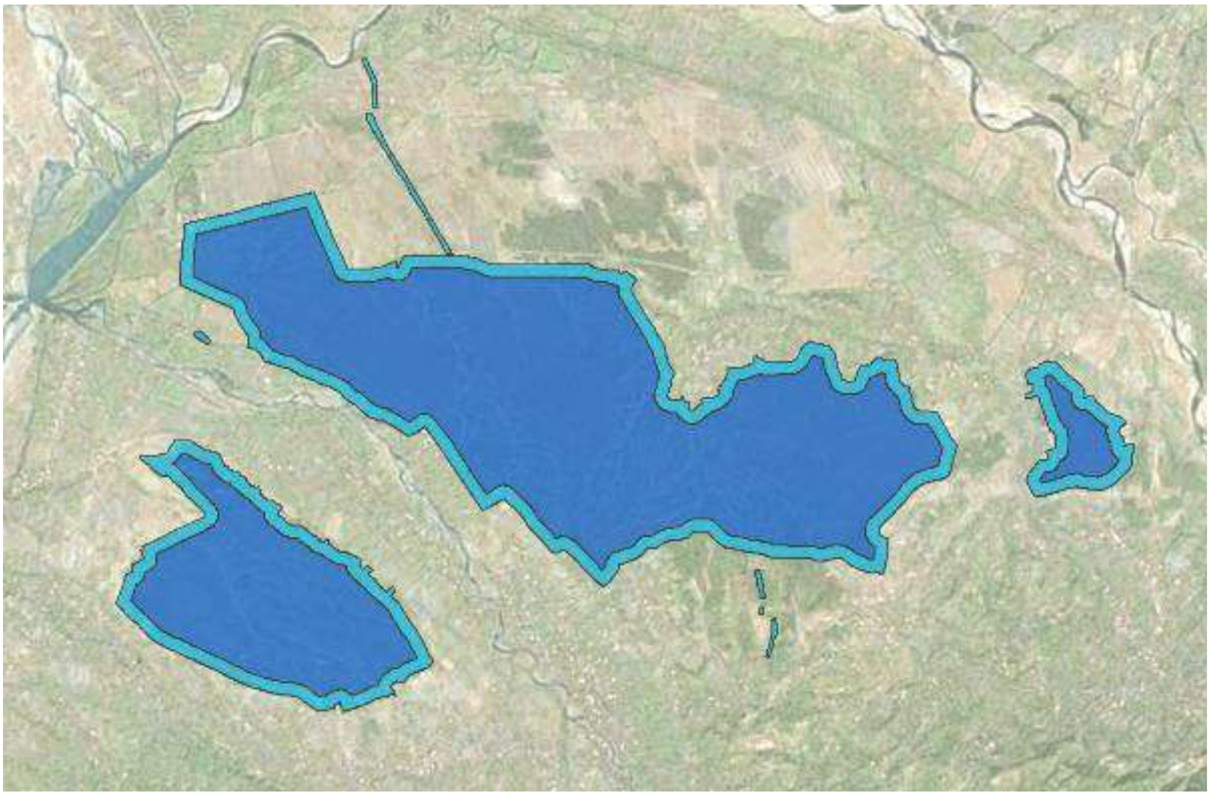

**Figure 7.** Overview map of the possible component area at Ajameti Managed Reserve (dark blue) with 200 m buffer zone (light blue).

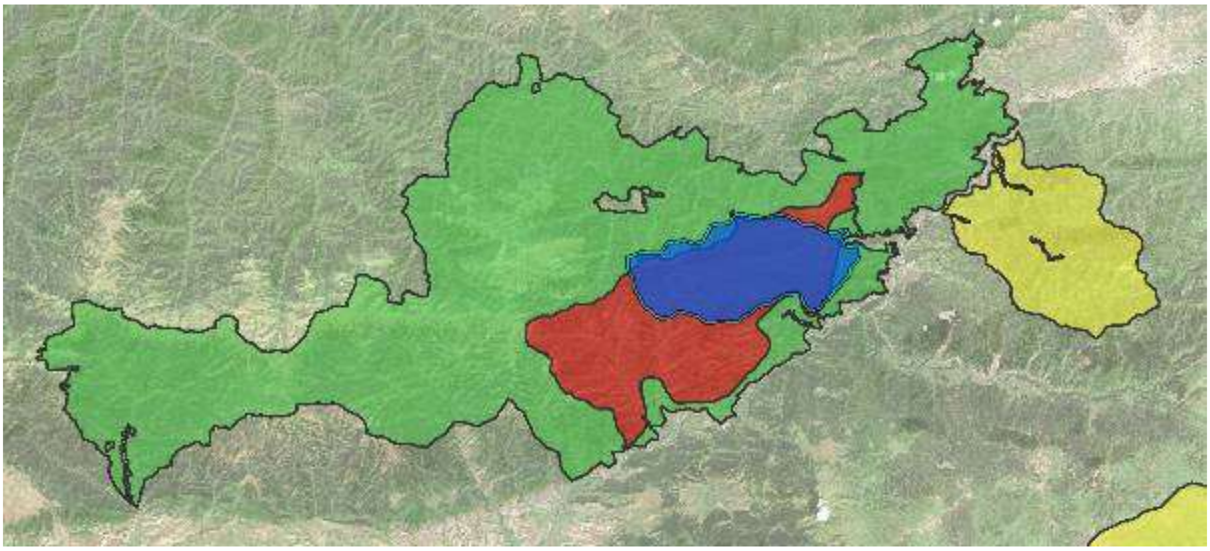

**Figure 8.** Overview map of the location of the possible compont area Banishkhevi (blue) within Borjomi-Kharagauli National Park (green: National Park; red: Strict Nature Reserve; yellow: Managed Reserve; blue: property under consideration).

# 4. Description of the proposed property and its component parts

## 4.1 General setting

### 4.1.1 Biogeographic context

The Colchic Forests and Wetlands are part of the Caucasus ecoregion (in the sense of Williams et al. 2006) and of the Black Sea basin. According to Udvardy (1975), they form part of the provinces ***Mediterranean Sclerophyll*** and ***Caucaso-Iranian Highlands*** of the ***Palaearctic Realm***. However, neither of these provinces accurately reflects the ecological, faunistic or floristic peculiarities of the Colchic region.

In the 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***. The delineation between the two ecoregions appears somewhat arbitrary, as typical Colchic forests also occur within the areas mapped as Caucasus mixed forests by Olson et al. (2001). Olson & Dinerstein (2002) include them in the Global 200 priority ecoregion ***Caucasus-Anatolian-Hyrcanian Temperate Forests***.

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 Forests and Wetlands, they lack both, the thematic focus and the geographic width to support an explanation of the potential OUV of the proposed property and to identify all possible sites for Global Comparative Analysis. Therefore, the study team proposes to complement them with classification schemes that are more relevant to the proposed property's specific attributes of potential OUV:

**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 characterized by deciduous broadleaf forests as natural vegetation, which represent the general and main scope for the comparative analysis. They are divided in few 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).

Because the Colchic Forests can be classified as warm-temperate rainforests, they can be compared to other temperate rainforests as those discussed by DellaSala (2011), which also contains a chapter about Colchic and Hyrcanian temperate rainforests (Nakhutsrishvili et al. 2011).

**Wetlands, particularly peatlands:** As there is no adequate consideration of peatlands in the standard biogeographic wetland classification, we propose to complement them with the most recent typology of mire regions for Europe (Joosten et al. 2017), which takes into account biological, hydrological and geographic criteria. The Colchis peatlands as part of the Colchic wetlands are included in a specific Colchis mire region (Moen et al. 2017). We further propose to use one of the most recent classifications of mires – the hydrogenetic mire classification – as it focuses on the processes that drive peat formation and peatland development, and is both more holistic and more ecological (Joosten et al. 2017). Here special attention is paid to interrelations and feedback mechanisms between 1) water flow and fluctuations, 2) vegetation and 3) peat formation, and to the role peatland development plays in landscape hydrology (Joosten et al. 2017).

The peatlands of the warm-temperate Colchis form a structural and functional transition between the peatlands of the boreal and those of the tropical zones (Joosten et al. 2003). The special character of the area and its peatlands led to recognition of a specific Kolkheti mire region and type within Eurasia (Botch & Masing 1983, Knapp et al. in Succow & Joosten 2001, Krebs et al. 2017). The characteristic mire type for this region is the **"ombrogenous percolation mire"** (Joosten & Clarke 2002), or **"percolation bog"** (Kaffke 2008, de Klerk et al. 2009, Krebs et al. 2017). It only occurs in the Colchis 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). A global classification on hydrogenetic mire types is provided by Succow & Joosten (2001) and Joosten & Clarke (2002). Different classification systems exist as biological, hydrological and geographical criteria are applied e.g. focusing on flora and vegetation as well as mainly regional studies for countries or certain peatland areas are summarized to arrive at one typology of mire regions (Joosten et al. 2017). A global overview of peatland areas with different classification systems is given by Gore (1983). 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 9) (Pfadenhauer et al. 1993). Appendix 12 provides a more detailed overview of European peatland areas.


**Figure 9.** Global distribution of peatlands (area percentage by country). Source: Greifswald Mire Centre.

## 4.1.2 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, Ajara Autonomous Republic of Georgia (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).

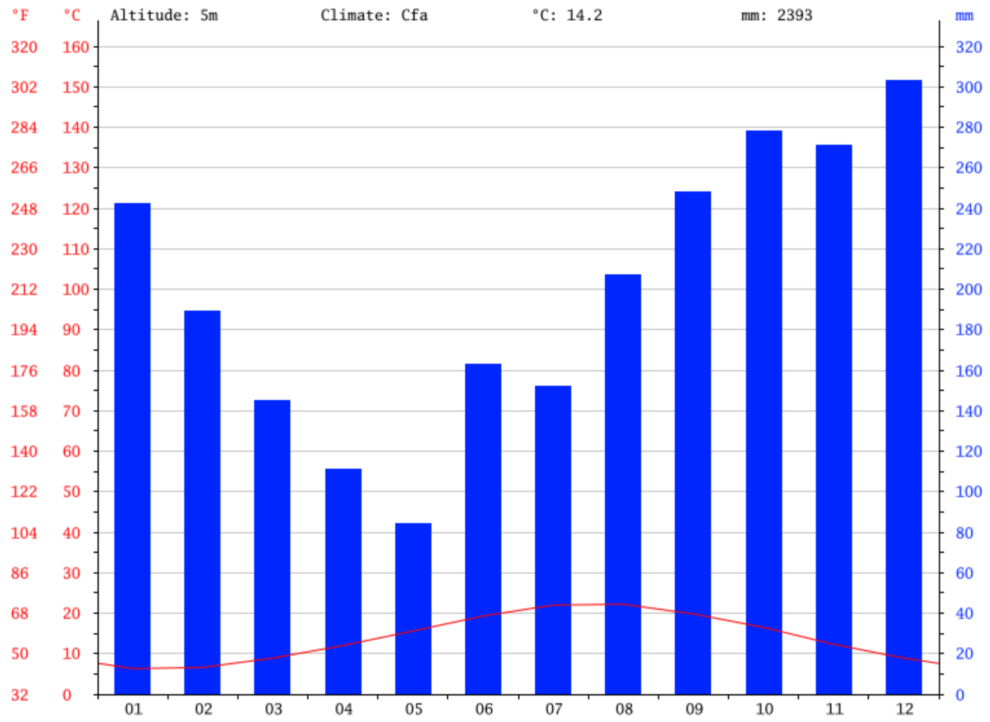


**Figure 10.** Climate diagramme for Batumi, Georgia. Source: Climate-Data.Org.

The exceptionally high precipitation in the Colchic area is the result of a funnel formed by the Greater and Lesser Caucasus, as well as the Likhi range which connects them in the east. These mountain ranges trap much of the moisture arising from the sea on their windward side within the Colchis triangle (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 lacks deciduous broadleaf forest with evergreen understory and is more appropriately described as hygro-thermophilous temperate broadleaf forest (Dolukhanov 1980), or temperate rainforest (Nakhutsrishvili et al. 2011).

### 4.1.3 Geological and ecological history

The Colchic Forests and Wetlands are situated in the western Caucasus (Figure 1). During the Tertiary, 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) 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 global Ice Age refugia (or a network of smaller refugia, according to some authors). As a consequence, the Colchic Forests and Wetlands harbour 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 consequences of this specific geological and ecological history for the biodiversity of the area are explained in more detail in Section 4.3 below.

## 4.2 Landscapes and ecosystems

### 4.2.1 Classification and current distribution of forest landscapes and ecosystems

The Colchic forest include several types (see below) but their major distinguishing feature is semi-prostrate evergreen shrubs characterized by vegetative reproduction forming dense understoreys up to 3-4 m tall and containing evergreens, such as *Rhododendron ponticum, R. ungernii, R. smirnovii* (the last two being local endemics of southern Colchis), *Laurocerasus officinalis, Ilex colchicum* (Ketskhoveli 1960, Nakhutsrishvili 1999, Zazanashvili et al. 2000, Dolukhanov 2010, Nakhutsrishvili et al. 2010). It should be emphasized that the concentration areas of these typical semi-prostrate Colchic relicts in the Caucasus are found in the southern Colchic area (Dolukhanov 1980, Zazanashvili et al. 2000; see Figure 11), where the target PAs are located.

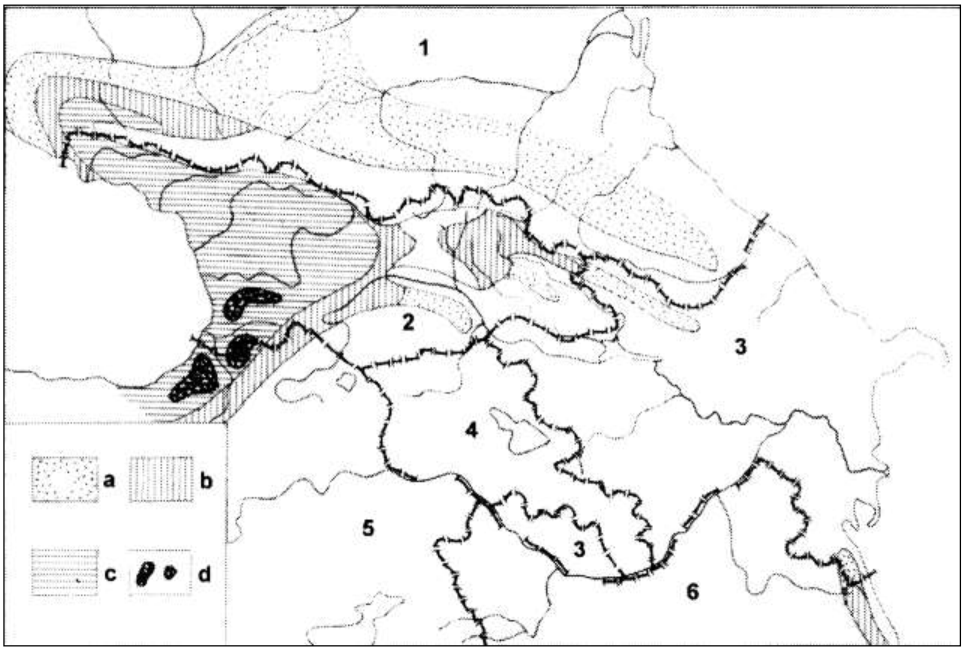


**Figure 11**. Distribution of semi-prostrate Colchic relicts in the Causasus: Laurocerasus officinalis, Rhododendron ponticum, Rh. luteum, Rh. ungernii, Rh. smirnowii, Vaccinium arctostaphylos, Epigaea gaultherioides, Viburnum orientale, Ruscus colchicus, Ilex colchica, I. stenocarpa, I. hyrcana – including 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).

The forest cover of the proposed candidate Areas Machakhela, Mtirala and Kintrishi (Figures 3, 4) is characterized by high diversity of types in dependence of altitudinal belts and site conditions. The list of forest types contains 30 associations in 5 formations, based on the dominance of tree species (Appendix 4). 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 – 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*).

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.

In Machakhela Carpinetum buxosum (1.3) also occurs, with an evergreen understory of the endemic *Buxus colchica*, Carpinetum azaleozum (1.4) with *Rhododendron luteum* in the shrub layer, and Castanetum arctostaphylosum (2.8).

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).

**B – 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. 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.

In Machakhela, there are also a few other Castaneta associations: Castanetum arctostaphylosum (2.8), Castanetum trachystemosum (2.7), Castanetum azaleosum (2.9), Castanetum nudum (2.6), as well Fagetum trachystemosum (4.13). In Kintrishi the Alnetum sambucosum (3.2) is 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.

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

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).

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 Kintrishi, 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.

These three vegetation belts are common in the three proposed candidate areas. Because of the higher elevation in Kintrishi, two other belts can be distinguished there:

**D – The upper montane belt** (1,800-2,200 m a.s.l.) in Kintrishi 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).

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.

**E – The subalpine forest line belt** (>2,200 m a.s.l.), which is formed by **birch forests** of *Betula litwinowii* and *B. medwedewii*: Betuleto caucasico-rhododendrosum (5.1) and Betuletum altherbosa subalpine (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*.

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.

This largely correspondes to the West Caucasus vertical zones as identified by Zazanashvili et al. (2000), and to the vertical zonation as illustrated by Nakhutsrishvili (2013) (Figure 12).

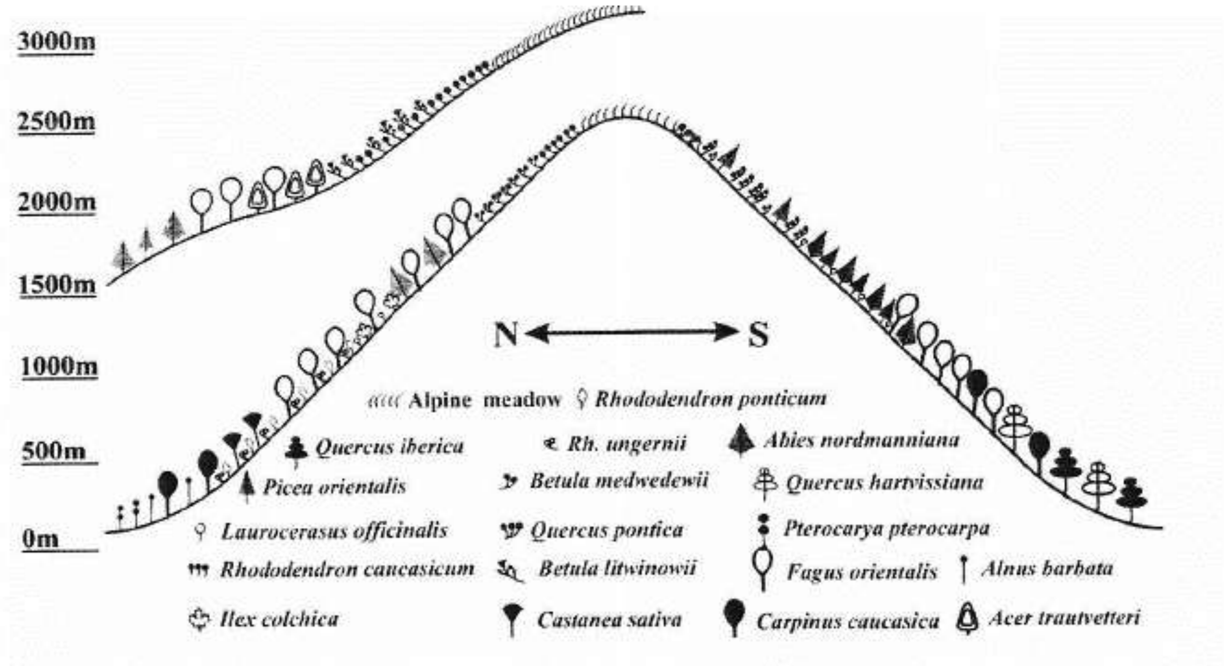


**Figure 12.** Vertical distribution of the vegetation types (the major species are given for forest types) in Ajara, southern Colchis (from Nakhutsrishvili 2013).

## 4.2.2 Classification and current distribution of wetland habitats and ecosystems

**Important terminology on wetlands and peatlands**

The following terminology for wetlands and peatlands is used in this and the following sections:

**Wetland:** An area that is inundated or saturated by water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions.

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

**Mire:** A peatland where peat is currently being formed and accumulating (‚living peatland').

**Bog:** A mire only fed by precipitation.

**Catotelm:** The deeper, permanently water-saturated peat layer in a mire, with a relatively low hydraulic conductivity and a low rate of decay.

**Acrotelm:** The upper peat producing layer of a mire with a high water storage capacity and a distinct hydraulic conductivity gradient. Water table fluctuations and horizontal water flow are predominantly restricted to this layer. The acrotelm stabilizes hydraulic conditions.

**Ombrotrohic:** Fed by precipitation.

**Rheotrophic:** Fed by flowing water, the trophic state is not only determined by the nutrient concentration in the water, but more so by the rate at which the water is exchanged.

**Water rise mire** (mire type in hydrogenetic mire classification): 'Horizontal mire' in a depression which results from a rising water table that does not lead to the origin of a pool or lake.

**Percolation bog** (mire type in hydromorphic and hydrogenetic mire classification): raised ombrogenous/ ombrotrophic 'inclining mire' in which a substantial water flux percolates through a substantial part of the peat body. It has scarcely decomposed peat with high hydraulic conductivity. Its hardly fluctuating water levels guaranteed by a water supply that is large and evenly distributed over the year.

Extensive parts of the Colchic Lowlands are wetlands, owing to the warm and wet climate and numerous rivers flowing from the Caucasus Mountains to the Black Sea. In particular vast areas are paludified adjacent to the Black Sea due to the continuous subsidence of the lowland in combination with high precipitation and backwater of the rivers flowing into the Sea. Hence, the main habitats/ecosystems in the Colchis lowland are peatlands, relict Colchic riparian forest, wet meadows, coastal sand dunes, and open freshwater areas (see Table 2). Appendix 5 shows a high-resolution map of the distribution of these habitats.

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).

Table 2. Wetland habitats of the Colchic Lowlands with short description, important plant species and site examples. 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 (**). Source: Machutadze & Tsinaridze (2016).

| N | Habitat | Definition | Biodiv. value | Locations |
|---|---|---|---|---|
| 1 | Sea coast littoral** | Littoral/benthos with *Zostera marina* | Low | Grigoleti, Tskaltsminda |
| 2 | 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 | Paleostomi lake, Imnati Chorokhi mouth, Grigoleti,Tskaltsminda, Narionali, Grigoleti, Anaklia |
| 3 | Coastal sand dune** | Dominated by: *Pancratium maritimum, Convolvulus persicus, Cakile euxina, Asparagus litoralis, Tamarix tetrandra, Paliurus spina -christi* | High | Choloqi, Maltakva, Grigoleti,Churia, Anaklia |
| 4 | Peatland (mire) | | | |
| 4.1 | Percolation bog* | Fully ombrotrophic bogs. | High | Imnati, Ispani II; transition forms at Pitshora, Grigoleti, degraded: Ispani I. |
| 4.2 | Fen* | Fens -geogenous water | High | Anaklia, Churia, Nabada |
| 5 | Wet grassland** | Pastureland dominated by invasive species including *Paspallum thunbergii, Polygonum thunbergii* | | Supsa, Grigoleti, Kobuleti, Chorokhi |
| 6 | Forest and scrubs | | | |
| 6.1 | 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 | Pitshora, Imnati, Khobi, Churia |
| 6.2 | 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. | High | Churia, Supsa, Khobi, Senaki, Imnati |

The Colchic Lowlands 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). The special character of the area and its peatlands led to recognition of a specific Kolkheti peatland region within Eurasia (Botch & Masing 1983, Succow & Joosten 2001, Krebs et al. 2017).

Peatlands have been present here over a long period. Peat layers in the littoral part of Kolkheti at a depth of 62-65 m b.s.l., and in the Paleostomi 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 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, Anaklia, Imnati; Timofeyev & Bogolyubova 1998).

The following part characterizes the most important peatlands of the Colchic Lowlands. Peatlands of the Central Colchic Lowlands are mainly situated in the Kolkheti National Park, whereas the largest peatland areas in the South Colchic Lowlands are in the Kobuleti Protected Areas. Information is given on mire development, peatland types, site conditions, and human impact. The legend of the peat profiles is presented in Figure 13.

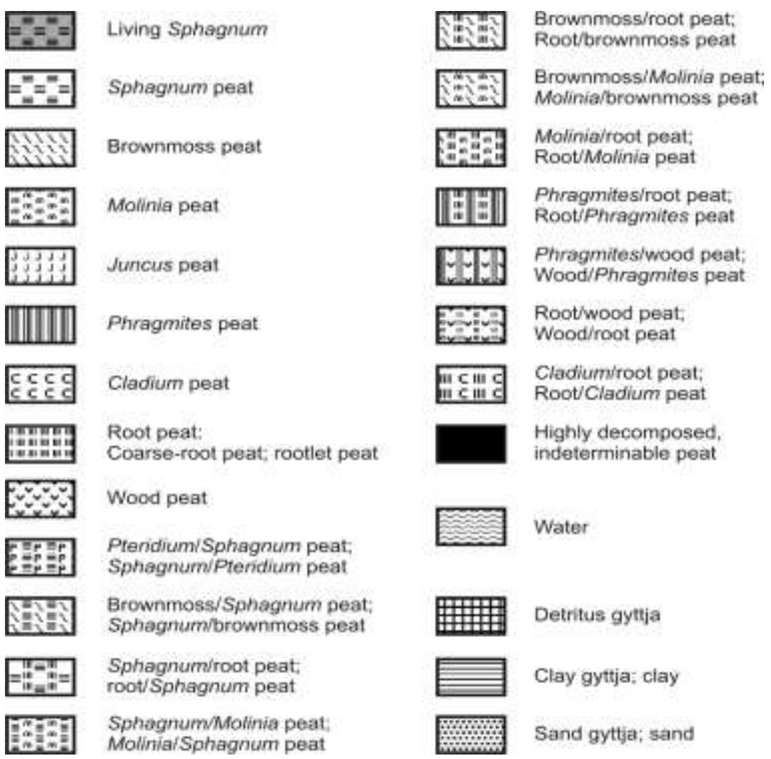


**Figure 13.** Legend for the peat profiles

**Ispani 2 mire (Kobuleti Strict Nature Reserve):** The Ispani 2 Mire (N 41°51.9' E 41°47.9', 1.5–6.5 m asl.) is located near the settlement of Kobuleti, 1–3 km distant from the Black Sea coast. 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 14). 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 undrained, 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 Ajara, drainage maps) and recent deepening of the Togona river (Grootjans et al. 2016).

*Mire development:* The sediments beneath the peat in Ispani 2 consist mainly of clay and detritus gyttjas that were deposited between 5750 and 2525 cal yr BP (3800 – 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.

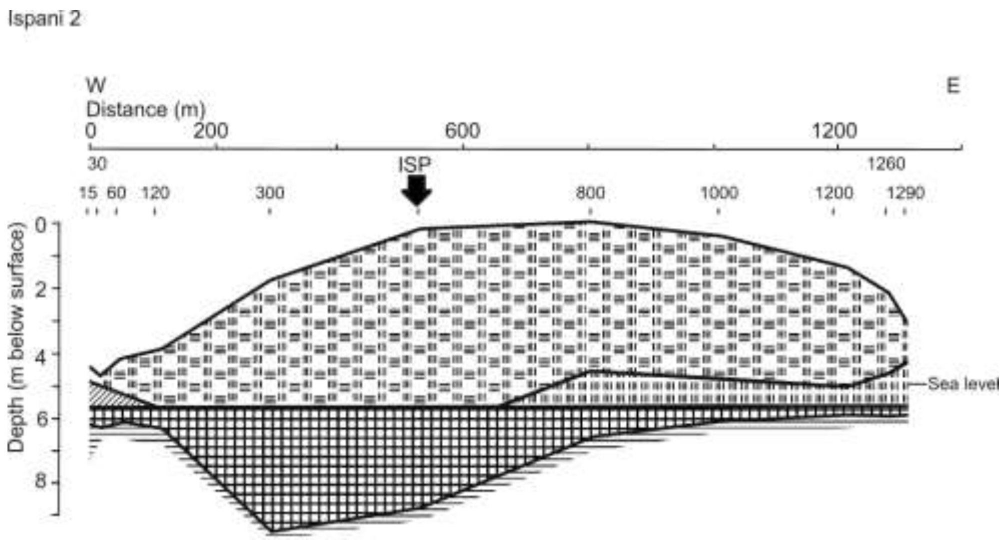


Figure 14. Peat profile Ispani 2 with the location of core ISP (De Klerk et al. 2009).

Peat formation started approximately 2525 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 1800 cal yr BP/AD 150, a real raised bog with a dominance of *Sphagnum austinii* came only into being around 1000 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).

*Site 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.

*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*. The open mire part is characterised by moor grass *Molinia litoralis*, peatmoss species, partly accompanied by *Pteridium aquilinum*, *Rhododendron luteum*, *R. ponticum*, *Vaccinium arctostaphylos* and *Carex lasiocarpa* (Kaffke 2008). Its cover of vascular plants and peatmosses reaches 30-60 % and 60-100 %, respectively in the open mire part. 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).

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). *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 20th century, the species is still common in Ispani 2. Currently the Ispani 2 mire harbours the main population of this peatmoss 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.

Ispani 2 mire borders Ispani 1 peatland, which is protected as a manged reserve (IUCN PA Mgmt. Category IV) and forms part of the buffer zone of the proposed property.

**Imnati mire (core zone of Kolkheti National Park):** The Imnati mire complex is situated 5 km east of Poti and adjacent to the eastern shoreline of Lake Paliastomi in the centre of a former lagoon (Figure 15). The complex comprises 3,800 ha non-forested peatland with two raised peat cupolas. The one between Lake Paliastomi and Lake Imnati rises approximately 5 m above the surrounding peatland. East of Lake Imnati, a second raised peat body of smaller size is located. North of the peat cupolas an open peatmoss/sedge mire plain stretches for 2 km until the marginal alder forests. In the South, Imnati is confined by the channels Cherpalka and Tkhorina and by adjacent alder forests.

*Mire development:* The sediments beneath the peat in Imnati consist mainly of stratified silt and clay gyttjas with enclosed sand gyttja layers. 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 RioniRiver, 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).

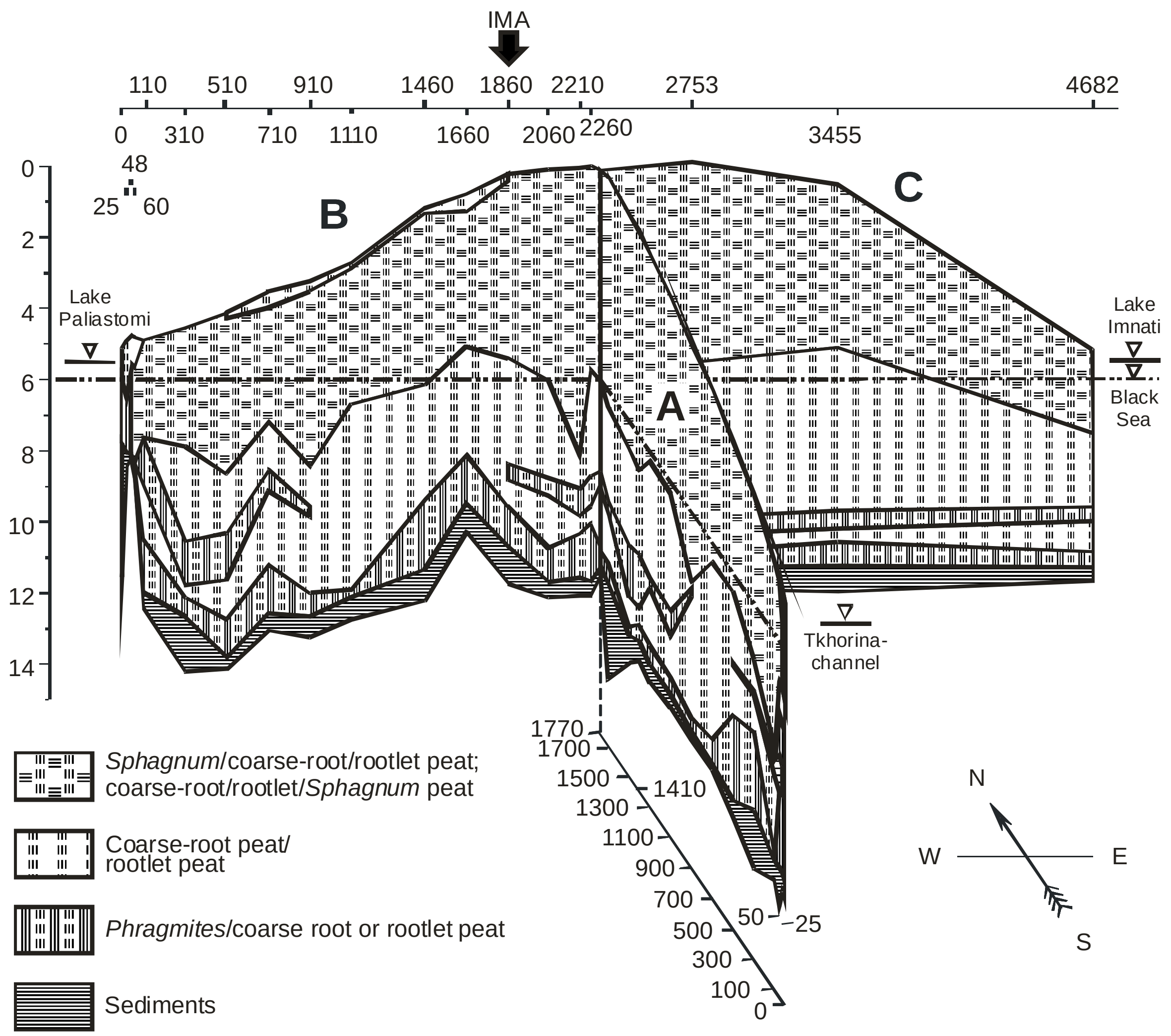


**Figure 15.** Stratigraphy of the Imnati mire along two coring transects from west to east and from north to south (Haberl et al. 2006).

**Figure 16.** Imnati mire (Photo: I. Matchutadze).

Peat formation in Imnati began approx. 6000 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 (6247 - 2943 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).

Around 2943 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 (sensu Joosten & Clarke 2002) the largest bog of this type in the world.

*Site 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.

*Vegetation:* The vegetation of the Imnati mire includes 70 moss and vascular plant species. Today, wide-spread species in the vegetation of Imnati are *Sphagnum papillosum*, *S. imbricatum* (*austinii*), *S. rubellum*, *S. palustre* and *S. magellanicum*. Typical is the association of peatmosses 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 16, Haberl et al. 2006).

The Imnati mire is bordered to the North by the Pitshora mire, which is undergoing restoration and forms part of the buffer zone of the proposed component area.

**Grigoleti mire (core zone of Kolkheti National Park):** The Grigoleti mire is situated east of the settlement of Grigoleti approximately 400 m from the Black Sea (Figure 6). It has an extension of 200 ha with a major part of open mire and surrounding alder forests. The river Karpatsha is bordering the mire to the North.

*Mire development:* 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. 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.

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 it is possible that the mire is an initial phase in the development of a percolation bog (sensu Joosten & Clarke 2002).

*Site conditions:* The mire has a slight slope from north to south. The microrelief mainly consists of peatmoss 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 $\mu S\ cm^{-1}$ 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.

*Vegetation:* The vegetation comprises shrubs, sedges, moorgrass and peat mosses. 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. *Cladium mariscus* grows in stands of several $m^2$ locally, similar to the Imnati mire.

**Churia/Anaklia mire (core zone of KNP):** The mire Churia is situated 15 km north of the city of Poti and is bordered to the South by the river Khobi, and to the North by the river Churia (Figure 6). It is separated from the Black Sea by a narrow stripe of coastal dunes. Beside the dune vegetation in the west it is surrounded by alder forest at all other sides. The mire has an extension of 4.5 km from north to south and 4.0 (- 6.0) km from west to east. The Churia mire has a 2,500 ha open mire part. The following description addresses the open mire parts.

*Mire development:* The peatland is situated in a shallow basin, separated from the Black Sea by a coastal dune strip. Its mineral subsoil consists of clayish coarse sand. The layer above is formed from different sized clay and gyttjas with well-preserved plant materials that must have been deposited in a period of open water. 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 6930 and 5230 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 floodings from the adjacent rivers are 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).

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 peatmosses 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.

*Site 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 heigh, 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 river Khobi, 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, 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.

*Vegetation:* The flora of Churia mire consists of 45 vascular plant species and 8 moss species. The vegetation is largely homogenous and dominated by *Carex elata* and *Molinia litoralis*.Sedges (*Carex acutiformis*, *C. elata*, *C. lasiocarpa*) and moor grass (*Molinia litoralis*) are partly accompanied by a peatmoss layer constituted by *Sphagnum palustre*, *S. denticulatum* and *S. fallax*. Approximately one ha large nearly pure stands of *Cladium mariscus*, *Phragmites australis* or *Calamagrostis epigejos* associated with *Carex elata*, *Lysimachia vulgaris* and *Lythrum salicaria* are typical for the vegetation. Remarkable is a very dense peatmoss lawn consisting of *Sphagnum denticulatum*, *S. palustre* and *S. papillosum* accompanied by *Menyanthes trifoliata*, *Drosera rotundifolia* and *Molinia litoralis* in the centre of the Churia mire, indicating ombrotrophic conditions. Another rarity is the occurrence of the rare and endemic species *Hibiscus ponticus*.

**Nabada mire (core zone of Kolkheti National Park):** The Nabada mire 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. The mire complex consists of three parts (north, east and south), which are divided by the river Ziwa and several channels. It 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.

*Mire development*: The mineral subsoil of Nabada is formed by sand and sand gyttja (Figure 17). 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 the Nabada mire continued to accumulate 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.

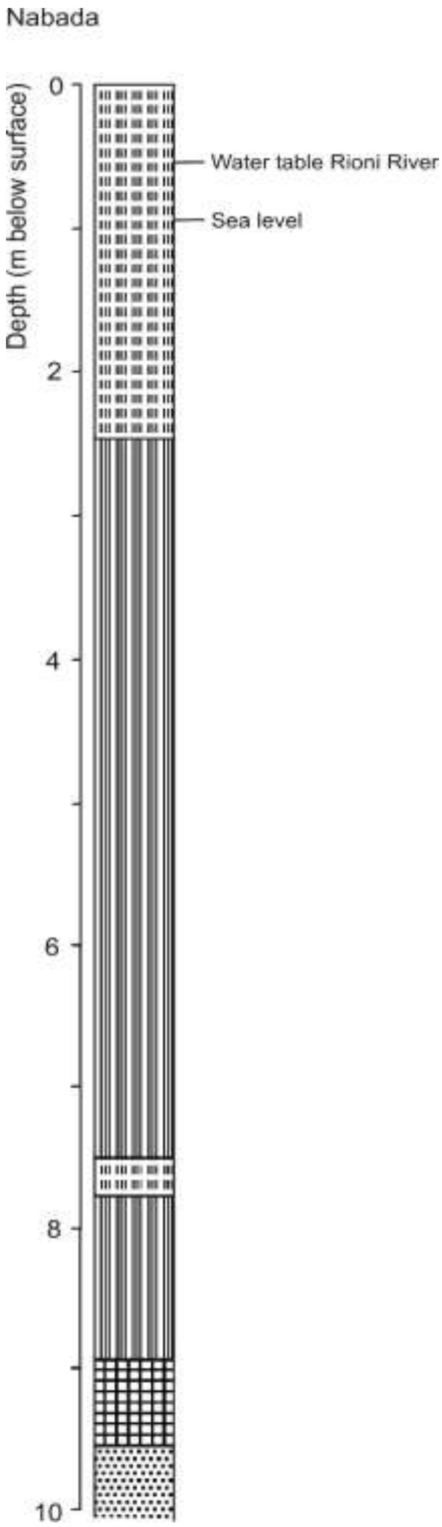


**Figure 17.** Stratigraphy of Nabada mire.

The recent peat layers reach a thickness of 13 m with a mean value of 6 m, i.e. the thickest 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). The mire might be one of the oldest mires of the Colchic Lowlands.

*Site conditions:* The north 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 microrelief 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. Due to channel digging from the Rioni in the South, periodical floodings also of the more distant areas from the river and the input of nutrients by river water can be assumed. The nutrient richer and wetter conditions are indicated by stands of *Phragmites australis* also in more central parts of the mire.

The open mire part mainly consists of a dense cover of Cyperaceae, *Cladium mariscus* and *Molinia litoralis*. Partly *Phragmites australis* stands occur. The margins are covered by forests dominated by *Alnus barbata*, *Frangula alnus*, *Rubus* bushwood and *Carex acutiformis*.

The margins of the open mire area consists 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 1.20 m pointing to the lower nutrient input and lesser river influence.

**Floodplain forests:** The forests typical of the Colchic Lowlands are restricted to only a small, humid part of the Black Sea coast. In the past, their natural distribution area covered more extensive lowlands of the western Caucasus. This was still the case at the end of XIX century. Alexandre Dumas also mentioned about spectacular and mysterious forests of the Kolkheti lowland in his work "The Caucasus". Unfortunately, the actual distribution of forests is significantly smaller (Matchutadze & Davitashvili 2009, Matchutadze 2007), wet alder forest dominated by Alnus glutinosa ssp. barbata are the most common type (Figure 18).

Forests of the Colchic Lowlands are composed of many relict woody taxa including *Quercus hartwissiana, Carpinus betulus, Morus nigra, Pterocarya fraxinifolia, Acer orthocampestre, Carpinus betulus, Alnus barbata, Ilex colchica, Morus nigra, Ficus carica, Ilex colchica, Ruscus ponticus, Humulus lupulus, Clematis vitalba, Smilax colchica,* and *Periploca graeca.* (Denck et al. 2003, Matchutadze & Davitashvili 2003, Matchutadze et al. 2010a, b, Matchutadze et al. 2012). These relict rainforests developed in the periphery of peatlands and along the swampy rivers. *Pterocarya fraxinifolia* together with *Quercus hartwissiana, Acer orthocampestre, Fraxinus excelsior* and *Alnus glutinosa* ssp. *barbata* (Kolkhic-Hyrcanic relict) createsrelict Colchic floodplain forests. Still preserved and in natural state lowland floodplain forests are situated in the periphery of Churia and Anaklia mires and along the river Churia, along the river Pitshora and in the periphery of Imnati, Pitshora and Tchernorechki mires.

**Figure 18.** Forest along the river Pitshora (Photo: I. Matchutadze).

**Freshwater ponds:** The Colchic Lowlands including Kolkheti National Park also comprise a wide range of smaller freshwater ponds, 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.

**Coastal sand dunes:** The vegetation of coastal sandy dunes has preserved its original appearance in the northwestern coastal stripe between the areas of the mouths of the Churia and Khobistskali rivers, Maltakva and Grigoleti beach, and along the Choloqi coast line. These areas correspond partly to the buffer zone of the proposed area. 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. Out of the littoral formations, *Euphorbia paralias, Eryngium ratium, Eryngium maritimum* should be noted. Among the perennial xerophytes, there are *Anthemis euxina, Silene euxina,* and *Stachis maritime*, and among the xerophytes shrubs, *Paliurus spina-christi, Hippophae rhamnoides* and others. The formations of Mediterranean rare species – *Glaucium flavum, Pancratium maritimum* are found in small areas. The flora of dunes includes vascular plants of 125 species in 29 families and 86 genera). Threathened and old Mediterranean plant species such as *Otanthus maritimus, Cakile euxina, Convolvulus persicus, Argusia sibirica, Imperata cylindica, Asparagus officilais* ssp. *litoralis, Scabiosa litoralis, Medicago maritime, Crambe maritime, Glaucium flaum* and *Leymus racemosus* ssp.*subulosus* has a significant importance for conservation.

## 4.2.3 Landscape complexity and ecosystem diversity

Taken together, the component areas of the Colchic Forests and Wetlands at the same time are representative of the natural environment of the Colchic region as a whole, and comprise a wide range of different landscapes and habitats.

The distribution of ecosystems within the Colchic Forests mainly follows an altitudinal zonation, but is also influenced by steep local precipitation and humidity gradients and highly complex as a result. Georgian botanists distinguish five plant formations with 30 associations forming a dense mosaic within the four proposed component areas (located within three protected Areas: Machakhela National Park, Mtirala National Park and Kintrishi Protected Areas) of the Colchic forests in Ajara alone (Appendix 4, see also Section 4.2.1 above). This number would increase significantly – albeit at the expense of the strictly Colchic character of the property – if additional component areas within Ajameti Managed Reserve and Borjomi-Khargauli National Park would be considered for inclusion in the property.

Forest ecosystems are complemented by subalpine ecosystems in the Colchic forests, which further adds to the overall complexity of the series. The component areas are highly complementary with respect to the occurrence of various forest formations and associations (Figure 19).

While relatively species-poor at the individual site level, the various peatland and other wetland ecosystems of the Colchic lowlands form a considerable ß-diversity and thereby also contribute to overall γ -biodiversity throughout the area (Joosten et al. 2003). The five proposed 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, freshwater, and dune 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.

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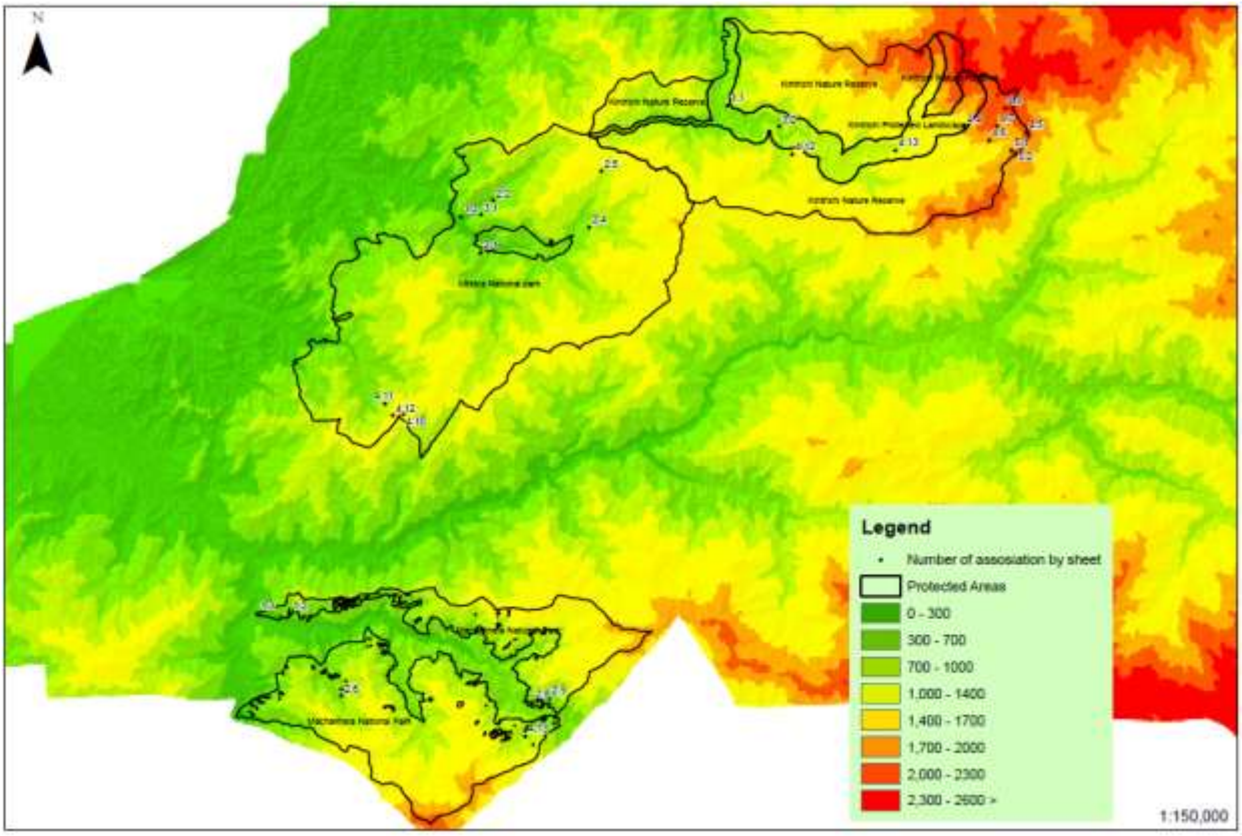


**Figure 19.** Occurrence of plant associations of high conservation value within the proposed component areas of the Colchic forests (Source: Kharazishvili, pers. comm.).

# 4.3 Biodiversity

## 4.3.1 Species richness and composition of flora and fauna

**Flora:** The Colchis region is 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).

The five protected areas of the southern Colchis – three of which protect the major forest types and associated ecosystems (Kintrishi with ca. 850 species, Mtirala and Machakhela with ca. 500 species each); and the other two Colchis lowland wetlands and associated ecosystems (Kolkheti with ca 220 species and Kobuleti with ca. 230 species), contain more than 1200 species of vascular plants and bryophytes in total. About 220 of them are listed as Caucasus endemics by Schatz et al. (2013).

Within the Colchis, perennials are significantly over-represented in endemic species, and they typically occur on limestone soils and in alpine tall herbaceous vegetation (Kikvidze & Ohsawa 2001).

Most of the proposed forest areas are located in Ajara. Together with the Colchic wetlands, their flora contains 1,097 species of vascular plants: 37 pterophytes, 8 gymnosperms and 1,052 angiospermes. 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 growth as shrub or tree, as well as 7 lians, i.e. 139 wooden species in total. The high number of perennial plants (706 species) also indicates mature ecosystems like forests.

From plant-geographical point of view the forest flora is characterized by typical nemoral deciduous forest distribution patterns with low influence of boreal coniferous forest elements, and with a remarkable number of endemic taxa.

Represents of tree **genera** like *Quercus, Fagus, Castanea, Carpinus, Tilia, Ulmus* characterize the forests as part of the Holarctic deciduous forest regions, which are disributed in humid-(semihumid) parts oft he nemoral zone in Eastern North-America, Europe-West-Asia, East-Asia, and differ them from deciduous forests of the austral zone at the Southern hemisphere, e.g. *Nothofagus* forests in Patagonia.

A high number of deciduous forest **species** demonstrate closer relations to **European and Caucasian deciduous forests:**

<u>Trees:</u> 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;* Lians 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 androsaemum, Daphne pontica, but* also by tree species like *Fagus orientalis, Acer laetum, Tilia begoniifolia,* and *Pterocaria fraxinifolia.*

These deciduous trees, the relic trees *Zelkova carpinifolia* and *Diospyros lotus* connect the Colchic forests with **the Hyrcanian forests** in South of the Caspian Sea. Also the endemic evergreen trees/shrubs *Buxus colchica* and *Ilex colchica,* as well as the lian *Hedera colchica* are related to the species of the Hyrcanian forests, such as *Buxus hyrcana*, *Ilex spinigera* and *Hedera pastuchovii* (Knapp 2005b)..

**Distribution of plant diversity between forest PAs:** The major tree and shrubs species, as well as the major Colchic forest ecosystems these species constitute are almost equally represented on the target PAs Kintrishi, Mtirala and Machakhela, albeit but with some exceptions: While flora of the three listed PAs contains the major tree and shrub species of the humid thermophilous Colchic broadleafd forests and humid beech forests as well as highly representative stands of the respective forest types (Kikodze and Gokhelashvili 2007, Dolukhanov 2010), dark coniferous species (*Abies nordmanniana, Picea orientalis*) that make up dark coniferous and mixed beech-dark-coniferous forests (*Abies nordmanniana, Picea orientalis*, with

*Fagus orientalis*) in the upper montane belt are by far best presented in Kintrishi. Mixed beech-dark-coniferous forests also occur in Mtirala but *A. nordmanniana*, one of the two dark coniferous species is not recorded on the latter PA, while Nordmann's fir-Oriental spruce forest stands cover ca. 140 hectares in Kintrishi (Kikodze and Gokhelashvili 2007). *Sorbus* species, components of ash-birch elfin woods in the upper subalpine belt are also only present on Kintrishi PAs. *Quercus hartwissiana* and *Q. dschorochensis*, which are characteristic of the southern Colchic humid thermophilous Colchic broadleafd forests (spreading up to 1,000 (1,200) m a.s.l.) (Zazanashvili et al. 2000, Dolukhanov 2010) are not present in Kintrishi, but they former occur on all other target PAs and the latter in Mtirala and Machakhela.

**Vertebrates:** Almost 500 vertebrate species have been recorded within the component areas of the proposed property (Table 3). By far most of them are birds (327), followed by mammals (70), fish (63), reptiles (20) and amphibians (11). The most noteworthy vertebrate species of the series are either threatened or endemic, and are consequently discussed in Sections 4.3.2 and 4.3.3 below.

Only 123 of the 327 bird species recorded within the series breed there; the majority visits during migration and/ or winter only. The forest PAs of the series are home to most breeding bird species, while Kolkheti National Park and to a lesser degree Kobuleti Protected Areas are visisted by many more migratory species.

The contribution of the component areas to the species richness of other groups of the Colchic Forests and Wetlands also differs strongly: The wetlands and lagoons of Kolkheti National Park 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.

The extensive old continuous forest areas of Kintrishi and Mtirala 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*.

**Invertebrates:** The overall species richness of the invertebrate fauna of the Colchic Forests 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 (see Section 4.3.3 below). For instance, the diversity of land molluscs 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 (Appendix 6). 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 NP 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).

There are also numerious globally threatened invertebrate species inhabiting the proposed cluster (see Section 4.3.2 below).

Table 3. Species richness of vertebrate groups in the proposed component areas of the series. Source: see Apenndixes 7-9.

| | **Vascular plants** | **Fish** | **Amphibians** | **Reptiles** | **Birds** | **Mammals** | **Vertebr.** |
|---|---|---|---|---|---|---|---|
| **Machakhela** | 523 | 8 | 7 | 12 | 116 | 54 | 197 |
| **Mtirala** | 522 | 1 | 7 | 13 | 189 | 60 | 270 |
| **Kintrishi** | 904 | 2 | 8 | 11 | 128 | 62 | 211 |
| **Kobuleti** | 224 | 9 | 6 | 7 | ? | 38 | ? |
| **Kolkheti** | 208 | 53 | 6 | 7 | 296 | 49 | 421 |
| **Ajameti** | ? | 12 | 9 | 14 | ? | 54 | ? |
| **Borjomi-Khragauli** | ? | 6 | 10 | 14 | ? | 70 | ? |
| **All** | **1,097** | **63** | **11** | **20** | **327** | **70** | **491** |

## 4.3.2 Importance of the series for globally threatened species

**Flora:** The protected areas of the Colchic Forests and Wetlands harbor 42 globally threatened[1] or near-threatened species of vascular plants, and an additional 4 species, which are only threatened in Georgia (Table 4). Of the 42 globally threatened or near-threatened species, four are critically endangered and six are endangered. 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 (Schatz et al. 2013), many plant species with a wider geographical distribution have not been assessed for inclusion in the IUCN Red List.

The number of threatened and near-threatened plant species varies between the proposed component areas, reflecting their ecosystems (Table 4). 22 threatened or near-threatened vascular plant species occur in Kintrishi PAs, and five are found in Kobuleti PAs. No reliable estimate of threatened plant species richness is available for Ajameti MR, where the nationally vulnerable *Quercus imeretina* and *Zelkova carpinifolia* grow, or the specific parts of Borjomi-Kharagauli National Park which might be considered for inclusion in the serial property.

The highest number of threatened and near-threatened species (35) including the majority of those occurring on a single PA only (19) are present in Kintrishi. Of the few globally threatened or near-theratened species not recorded on Kintrishi PAs, *Epigaea gaultherioides* is present on Mtirala and Kobuleti PAs, while *Solidago turfosa* and *Rhynchospora caucasica* are present on Kolkheti and Kobuleti PAs.

The seven species each with a single locality on the study area and not recorded on Kintrishi PA are present in the following other PAs: *Rhododendron smirnowii*, one of the components of the Colchic understory, their major distinguishing feature of the Colchic forest (Nakhutsrishvili et al. 2011) though rare compared to other evergreen Rhododendron species of the refugium, is only present on Machakhela PA. *Campanula makaschwilii*, a rare endemic of Colchis, is also present only on Machakhela PA; *Osmanthus decorus* is only present on Mtirala PA; *Hibiscus ponticus*, *Trapa colchica*, *Trapa maleevii* as species associated with wetlands are only present on Kolkheti PA; *Zelkova carpinifolia* although protected on Georgia's other PAs not covered by the study area, of the target PAs is only present in Kolkheti NP. Four of the 37 species from the Red List of the Caucasus endemic species (Schatz et al. 2013) are assessed as CR; of these *Psephellus adjaricus* and *Ranunculus vermirrhizus* are only present in Kintrishi PA, and *Hibiscus ponticus* and *Trapa colchica*, as mentioned above, only on Kolkheti PA.

**Vertebrates:** The number of globally threatened vertebrate species of the Colchic Forests and Wetlands is considerably lower than that of vascular plants (Table 5). However, 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.

[1] According to the IUCN Red List of Threatened Species (IUCN 2012), all species that have been assessed as either vulnerable, endangered, or critically endangered are considered "threatened".

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 potetentially of an extende 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 (Appendix 7).

Noteworthy populations of globally threatened herpetofauna of the Colchic Forests 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 (Appendix 8).

Most of the 33 globally threatened bird species of the series have been recorded during migration (Appendix 9). The only potential breeding bird falling into this category is the globally endangered White-headed Duck *Oxyura leucocephala*, at 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. The southeastern Black Sea including the Kolkheti wetlands is the wintering area of the small Caucasus satellite population of the globally vulnerable Velvet Scoter *Melanitta fusca*, which has undergone a marked decline recently. The critically endangerd Sociable Lapwing *Vanellus gregarius* is an occasional visitor to the Chorokhi Delta near Batumi, which however does not have PA status currently and consequently cannot be included in the series. Apart from the Kolkheti wetlands, the second area of outstanding importance for globally threatened birds within the Colchic Forests and Wetlands is the Batumi bottleneck (overlapping with Mtirala NP), where 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. The Batumi bottleneck is discussed in more detail in Section 4.3.5 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 threated mammals have been found there – only the near-threatened European Otter *Lutra lutra* and Long-clawed Mole-vole *Prometheomys schaposchnikovi* (Appendix 8).

**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 at 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 site cluster only. 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 targeted national parks (Appendix 6). These include the globally vulnerable Noble Crayfish *Astacus astacus* and Apollo butterfly *Parnassius apollo*, as well as the globally endangered freshwater snail *Belgrandiella adsharica* (Appendix 6).

Table 4. Threatened and near-threatened vascular plant species of the Colchic Forests and Wetlands. Sources: Red List of Georgia (2014); Schatz et al. (2013), IUCN Red List of Threatened Species (2016).

| # | Species | Kintrishi | Mtirala | M'akhela | Kolkheti | Kobuleti | Number of PA with the species | The IUCN Red List of Threatened Species | The Red List of the Caucasus endemic species | The Red List of Georgia |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | *Arafoe aromatica* M.Pimen. & Lavrova | 1 | | | | | 1 | | VU B1ab(ii)+2ab(ii) | |
| 2 | *Astragalus doluchanovii* Manden.* | 1 | | | | | 1 | | VU D2 | |
| 3 | *Betula medwedewii* Regel* | 1 | 1 | 1 | | | 3 | | VU B1ab(iii,v) | VU |
| 4 | *Buxus colchica* Pojark. | 1 | 1 | 1 | 1 | | 4 | Lower Risk/near threatened | | VU |
| 5 | *Campanula makaschwilii* E.A.Busch* | | | 1 | | | 1 | | VU D2 | |
| 6 | *Castanea sativa* Mill. | 1 | 1 | 1 | | | 3 | | | VU |
| 7 | *Cerastium oreades* Schischk. | 1 | | | | | 1 | | NT | |
| 8 | *Chaerophyllum astrantiae* Boiss.& Bal. | 1 | | | | | 1 | NT | NT | |
| 9 | *Dactylorhiza euxina* (Nevski) Czerep. | 1 | 1 | 1 | | | 3 | NT | | |
| 10 | *Daphne albowiana* Woronow ex Pobed. | 1 | | | | | 1 | | EN B2ab(iii) | EN |
| 11 | *Epigaea gaultherioides* (Boiss. & Bal.) Takht.* | | 1 | | | | 1 | | VU B2ab(iii) | VU |
| 12 | *Epimedium colchicum* (Boiss.) Trautv.* | 1 | | | | | 1 | | NT | |
| 13 | *Galanthus krasnovii* A. Khokhr.* | 1 | 1 | | | | 2 | | EN B2ab(iii,v) | |
| 14 | *Grossheimia polyphylla* (Ledeb.) Holub.* | 1 | | | | | 1 | | NT | |
| 15 | *Hibiscus ponticus* Rupr.* | | | | 1 | | 1 | | CR C2a(i) | |
| 16 | *Juglans regia* L. | 1 | 1 | 1 | | | 3 | | | VU |
| 17 | *Laserpitium affine* Ledeb.* | 1 | | | | | 1 | | EN B1ab(iii)+2ab(iii) | |
| 18 | *Laurus nobilis* L. | 1 | 1 | 1 | 1 | | 4 | | | VU |
| 19 | *Myosotis lazica* M.Pop.* | 1 | 1 | 1 | | | 3 | NT | NT | |
| 20 | *Onobrychis meschetica* Grossh. | 1 | | | | | 1 | NT | NT | |
| 21 | *Oxytropis lazica* Boiss. | 1 | | | | | 1 | | NT | |
| 22 | *Onobrychis kemulariae* Chinth. | 1 | | | | | 1 | | VU D2 | |
| 23 | *Osmanthus decorus* (Boiss.& Ball.) Kas.* | | 1 | | | | 1 | | VU B2ab(iii) | VU |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 24 | *Paederotella pontica* (Rupr.exBoss.) Kem-Nath.* | 1 | | | | | 1 | | VU B2ac(ii) | |
| 25 | *Paeonia macrophylla* (Albov) Lomak.* | 1 | 1 | 1 | | | 3 | | VU B1ab(iii,v) | |
| 26 | *Psephellus adjaricus* (Albov) Grossh.* | 1 | | | | | 1 | CR B2ab(iii,v) | CR B2ab(iii,v) | |
| 27 | *Quercus hartwissiana* Steven | | 1 | 1 | 1 | 1 | 4 | | | VU |
| 28 | *Quercus imeretina* Steven ex Woronow* | 1 | | | | 1 | 2 | | VU B2ab(iii) | VU |
| 29 | *Quercus pontica* K.Koch* | 1 | 1 | 1 | | | 3 | | VU B2ab(iii) | VU |
| 30 | *Ranunculus vermirrhizus* Khokhr. | 1 | | | | | 1 | | CR B1ab(i,ii,iii)+2ab(i,ii,iii) | |
| 31 | *Rhododendron smirnowii* Trautv.* | | | 1 | | | 1 | | VU B1ab(iii) | VU |
| 32 | *Rhododendron ungernii* Trautv.* | 1 | 1 | 1 | | | 3 | | VU B1ab(iii) | VU |
| 33 | *Rhynchospora caucasica* Palla* | | | | 1 | 1 | 2 | | EN B2ab(iii) | |
| 34 | *Senecio pandurifolius* C.Koch | 1 | | | | | 1 | | NT | |
| 35 | *Salix kikodseae* Goerz* | 1 | | | | | 1 | | VU | VU |
| 36 | *Scabiosa adzharica* Schchian.* | 1 | | | | | 1 | EN B1ab(iii)+2ab(iii) | EN B1ab(iii)+2ab(iii) | |
| 37 | *Solidago turfosa* Woronow ex Grossh.* | | | | 1 | 1 | 2 | | EN B2ab(iii) | |
| 38 | *Staphylea colchica* Steven* | 1 | 1 | 1 | | | 3 | | VU A2c; B1ab(iii)+2ab(iii) | VU |
| 39 | *Swida koenigii* (C.K. Schneid.) Pojark. ex Grossh.* | 1 | 1 | 1 | | | | | VU B2ab(iii) | |
| 40 | *Trapa colchica* Albov* | | | | 1 | | 1 | CR C2a(i) | CR C2a(i) | |
| 41 | *Trapa maleevii* V.N.Vassil.* | | | | 1 | | 1 | VU D2 | VU D2 | |
| 42 | *Tripleurospermum szowitzii* (DC.) Pobed. | 1 | | | | | 1 | | VU D2 | |
| 43 | *Ulmus glabra* Huds. | 1 | 1 | 1 | 1 | | 4 | | | EN |
| 44 | *Verbascum adzharicum* Gritzenko | 1 | 1 | 1 | | | 3 | | VU D2 | |
| 45 | *Viola orthoceras* Ledeb.* | 1 | | | | | 1 | | VU B1ab(iii)+2ab(iii) | |
| 46 | *Zelkova carpinifolia* (Pall.) K. Koch | | | | 1 | | 1 | Lower Risk/near threatened | | VU |
| | **Number of species per PA** | 35 | 18 | 17 | 10 | 4 | | | | |

Table 5. Globally threatened vertebrate species of the Colchic Forests and Wetlands. Source: Appendices 7-9 and literature cited therein.

| | Vascular plants | Fish | Amphibians | Reptiles | Birds | Mammals | Vertebr. |
|---|---|---|---|---|---|---|---|
| **Machakhela** | 10 | - | 3 | 3 | 10 | 2 | 18 |
| **Mtirala** | 11 | - | 3 | 4 | 15 | 2 | 26 |
| **Kintrishi** | 22 | - | 4 | 3 | 11 | 3 | 21 |
| **Kobuleti** | 5 | 1 | 0 | 2 | ? | 1 | ? |
| **Kolkheti** | 6 | 5 | 0 | 2 | 30 | 2 | 39 |
| **Ajameti** | ? | ? | 3 | 3 | ? | 2 | ? |
| **Borjomi-Khragauli** | ? | ? | 4 | 4 | ? | 3 | ? |
| **All** | **40** | **5** | **4** | **8** | **33** | **3** | **53** |

Table 6. Endemic plant species of the Colchic Forests and Wetlands. Source: Appendix 11.

| **Endemism** | **Protected areas** | | | | | |
|---|---|---|---|---|---|---|
| | **Total** | **Kintrishi** | **Mtirala** | **Machakhela** | **Kolkheti** | **Kobuleti** |
| Caucasus | 67 | 64 | 28 | 22 | 2 | 2 |
| Georgian | 17 | 17 | 5 | 4 | 0 | 2 |
| Colchic | 55 | 53 | 19 | 23 | 4 | 2 |
| Ajara-Lazetian | 12 | 7 | 6 | 5 | 0 | 0 |
| Ajarian | 3 | 2 | 2 | 2 | 0 | 1 |
| **Total** | **155** | **144** | **60** | **56** | **6** | **7** |

## 4.3.3 Importance of the series for restricted range species

**Flora:** The Colchic Forests – and to a much lesser extent the Colchic Wetlands – are a stronghold of flora endemic to the Caucasus, Georgia, and the Colchic region (partly together with neighbouring regions in Turkey) (Table 6). Groups with a particulary high contribution of restricted range species include the Asteraceae (22), Rosaceae (14), and Ranunculaceae (12).

The majority of the Caucasus endemic species are present in Kintrishi PA (144): There are ca. 60 and 56 species in Mtirala, and Machakhela, respectively and less than ten in each of the lowland PAs of Kolkheti and Kobuleti. In view of in general wide global distribution of freshwater species, a high number of endemics is not expected in local wetlands. Conservation value of the wetland PAs should be assessed by their capacity to protect living remnants of the Colchis wetlands and their ecosystem functions (i.e. phenomena that are more relevant to World Heritage criterion ix), and should not focus on species diversity. However, some locally distributed endemic species occur there, e.g. the local endemics *Hibiscus ponticus* and *Solidago turfosa* (Schatz et al. 2013).

Among the restricted range species, about 55 are considered Colchic, i. e. species with the core of their distribution ranges within the area of the West Caucasian type of the vegetation vertical zonation. This includes numerous endemics of the southern Colchis (Memiadze et al. 2013).

70% of endemics occur on limestone sites. The largest group of endemics are Caucasian species (84 species including Georgian endemics). The second group are Colchic endemics (55 species), and the third Ajara-Lazetian and Ajaraian endemics (15). ***Caucasian and Georgien endemics*** demonstrate the close evolutionary relation of the Colchis with the whole Caucasus region, e.g. the trees *Acer trautvetteri, Quercus imeretica, 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, Sorbus subfusca, Sorbus colchica, Rhamnus imeretica,* the perennial herb *Paeonia macrophylla* and the geophytes *Galanthus krasnovii, Ornithogalum woronowii, Scilla winogradowii.* ***Ajara-Lazetian and Ajaraian endemics*** are the most specific taxa with the only populations worldwide in this region, e.g. *Quercus dschorochensis, Phyllirea medwedewii, Rhododendron ungernii, Rh. smirnowii, Epigaea gaultherioides,* and *Cyclamen adsharicum.*

**Ichthyofauna:** Distribution ranges of fish typically co-incide with large-scale drainage basins not terrestrial ecoregions. This is also true for the ichthyofauna of the Colchic forests and particularly wetland PAs (including Ajameti MR), which comprise a wide range of species that are endemic either to the southeastern part of the Black Sea Basin (11), or the entire basin (2) or the Ponto-Caspian region (7) (Appendix 7). The only fish species endemic to the Caucasus is the Caucasian Goby *Ponticola constructor*.

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 and Machakhela rivers, which flow through the PAs of the same name, are particularly important spawning grounds of this species (Guchmanidze 2014b, 2016a).

**Terrestrial vertebrates:** Besides the Caucasus endemics Caucasian Toad *Bufo verucosissimus*, Caucasian Parsley Frog *Pelodytes caucasicus*, and Caucasian Salamander *Mertensiella caucasica*, an endemic subspecies of the Northern Banded Newt *Ommatotriton ophryticus* lives in the Colchic forests (Bannikov et al. 1977, Tarkhnishvili & Gokhelashvili 1999). The latter has also been reported from the periphery of Ispani 2 Mire (Kobuleti PAs). The populations of the Caucasian Salamander in Ajarian PAs and in Borjomi-Kharagauli National Park are likely to represent separate cryptic species (Tarkhnishvili et al. 2008).

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 the PAs of the series (Appendix 8). In addition, the Colchis Slow Worm *Anguis fragilis*, Caucasian Viper *Vipera kaznakovi* and Transcaucasian Rat Snake *Zamenis hohenackeri* have been reported from there.

The PAs of the Colchic Forests and Wetlands contribute to the Caucasus Endemic Bird Area (BirdLife International 2017), with breeding populations of the Caucasian Black Grouse *Lyrurus mlokosiewiczi* in Kintrishi PAs and Machakhela NP, as well as of the Caspian Snowcock *Tetraogallus caspius* in Kintrishi.

The series has ten species and one subspecies of mammals endemic to the Caucasus ecoregion, most of them rodents and shrews (Appendix 8). Among them, the enigmatic Long-clawed Mole Vole *Prometheomys schaposchnikowi* is globally near-threatened (IUCN 2017).

**Invertebrates:** Although invertebrates are generally poorly studied in the Caucasus eco-region, it seems that the western Georgian invertebrate species pool is highly diverse with high level of endemism. Southwestern Georgian mountain forests (part of which are covered by protected areas of Kintrishi, Mtirala and Machakhela) as well as The Colchic Forests and Wetlands boast disproportionally high numbers of local endemic species in pan-Europen comparison (Mumladze, et al., 2014). Endemicity is particularly high among the molluscs (Appendix 6).

Table 7. Endemic vertebrate species of the Colchic Forests and Wetlands. Source: Appendices 7-9 and literature cited therein.

| | Amphibians | Reptiles | Birds | Mammals |
|---|---|---|---|---|
| **Machakhela** | 2 | 6 | 1 | 7 |
| **Mtirala** | 3 | 7 | 1 | 8 |
| **Kintrishi** | 3 | 5 | 2 | 8 |
| **Kobuleti** | - | 2 | - | 4 |
| **Kolkheti** | - | 2 | - | 4 |
| **Ajameti** | 2 | 4 | - | 7 |
| **Borjomi-Khragauli** | 3 | 6 | 2 | 8 |
| **All** | **3**[1] | **8** | **2** | **10** |

## 4.3.4 Importance of the series for glacial relict species and ongoing evolution

During the Pleistocene glacial cycles, the Colchis maintained a typical relict biodiversity, including forest landscape and high diversity of animals and plants not adapted to cold climate. 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). As a result, the area hosts an extremely high – for a non-tropical continental region – proportion of endemic and relict species. As mentioned above, the proportion of endemic species among mountain forest snails of the Western Caucasus exceeds 70% (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).

The endemism is unevenly distributed among different taxonomic groups. "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).

Simultaneously, 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). Some animal lineages from the Western Greater Caucasus have been isolated from their closest relatives in the south-eastern Black Sea coast and in central Georgia for millions of years; the populations of the endemic lizard *Darevskia* (Caucasilacerta) *mixta* from the Greater and the Lesser Caucasus are isolated since the early Pleistocene (Gabelaia et al. 2015).

At least three distinct glacial refugial areas exist within the Colchis, including one in the south-west, one in the northwest, and one in the east of this small region, each characterised with an unique species and genetic diversities (Tarkhnishvili 2014). The south-western and the eastern refugia are partly of completely covered by protected areas and hence can be discussed in the context of identifying potential natural World Heritage sites.

**Ongoing evolutionary processes within the Colchis region:** The high ecological or hidden genetic diversity of some taxonomic groups suggests that the Colchis is an important area for on-going evolutionary and speciation processes. 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 speciation (Bell 2008).

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*; 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 soutwestern Georgia. Although genetic differences between these species are minor, there is a taxonomist consensus on their distinct species status.

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. 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 is particularly rich in rock lizard (*Darevskia*) species, with some having extremely narrow distributions (such as *Darevskia dryada*). 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 (including Borjomi-Kharagauli National Park). Up to five species are found sympatrically in some locations described below.

Another type of speciation is a landscape-dependent speciation, when specific conditions, e.g. sharp climatic/landscape gradients in mountains, triggers divergence without full isolation such as described in Endler (1986). The examples provide brown frogs (Tarkhnishvili et al. 2001), snow voles (Buzan & Kryštufek 2008) but probably many more animal and plant groups.

The Colchic lowlands are also important with regard to glacial relict species and ongoing evolution, as several species are known to have survived in the Colchic refugia 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 2 and Imnati (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"), which is now of high economic value. 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 Kolkheti, 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.

In order to preserve and maintain speciation process, one should identify the areas where both the high diversity of "indicator" young speciose groups (i.e. those containing particularly high diversity of species, which derived within the area in relatively recent geological time and which continue to diverge) is observed and where simultaneously a particular extent of landscape diversity that forms unique conditions for the contacts among the species is present.

### 4.3.5 Important phenomena related to the biodiversity of the series

**Bird migration:** The PA series under consideration overlaps with two areas of pan-Europen or even global importance for bird migration: The Batumi bottleneck of raptor migration, which strongly overlaps with Mtirala National Park, and the Colchic Wetlands as a resting and wintering area for migratory waterbirds. The Chorokhi Delta, a third site that is important for bird migration is currently without an appropriate conservation regime.

The **Batumi bottleneck** is the single most important convergence zone for raptors in the western Palearctic – and probably the whole of Eurasia – during autumn migration (Harris 2013). It occurs where migratory birds from the northern hemisphere concentrate *en route* to Africa and southern Asia. The bottleneck is located where the mountains of the Lesser Caucasus, covered with humid relict forests, descend to the Black Sea coast. Overall counts regularly exceed one million passing raptors of 35 species per season (Batumi Raptor Count 2016). 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 NP, although many birds also cross areas outside this park. Roosting happens inside and outside of Mtirala NP, but is poorly understood. There are also many birds going through this site during spring migration, but numbers are much smaller than during autumn migration. It seems that the bottleneck effect occurs primarily during the autumn migration, whereas during the spring migration raptors fly in a much broader front over many other parts of Georgia.

The **Colchic Wetlands** – particularly Kolkheti National Park – harboured 368,000 birds of 40 species during winter counts in 2014. They are a regionally important water bird migration and wintering site. The wintering population has included a number of species of conservation concern at various occasions during the past, including a few White Pelicans *Pelecanus onocrotalus* and 50-100 globally vulnerable Dalmatian Pelicans *Pelecanus crispus* (Javakhishvili et al. 2014), as well as 20-30 globally endangered white-headed Duck *Oxyura leucocephala* and about ten globally endangered Lesser White-fronted Goose *Anser erythropus*. 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 **Chorokhi Delta** is important during migration and also for wintering birds. Over 20,000 Water birds migrate and winter there annually, and about 40,000 migrating passerines have been ringed in the Chorokhi delta since 2010. 300 bird species have been recorded in the Chorokhi Delta.

# 5. Potential justification for inscription

## 5.1 Identification of WH criteria

Based on the description of the property in Section 4, and assuming a nomination of the entire series ***Colchic Forests and Wetlands*** (c.f. Section 9.3 below), a nomination under the following natural World Heritage criteria is envisaged:

- **World Heritage criterion ix:** There are several attributes of potential Outstanding Universal Value relevant to this criterion which justify consideration of a nomination, which are connected with the evolutionary and ecological history of the area as a glacial refuge area with high endemism, many relict species, the presence of restricted range ecosystems such as percolation bogs, the functioning of deciduous broadleaf forests with evergreen understory ("temperate rainforest ecosystems") and peatlands in an extremely humid area with a specific geological setting, and potentially with other evolutionary and ecological phenomena.

- **World Heritage criterion x:** Nomination of the series under this criterion is warranted because of the overall species richness of flora and vertebrates, the richness of globally threatened species of flora and fauna, and particularly the high proportion of restricted range ("endemic") species, particularly among the flora, herpetofauna and some other faunal groups. In addition, it is of utmost importance as a source of glacial relict species which have re-colonized large parts of western Eurasia since the ice age.

The attributes of potential Outstanding Universal Value in relation to both criteria are closely interlinked. They are discussed into more detail in the below sections.

# 5.2 Potential OUV

The potential OUV of the proposed series is discussed by World Heritage criterion below.

## 5.2.1 Arguments and attributes for the use of WH criterion ix

According to the Operational Guidelines to the World Heritage Convention, properties nominated under World Heritage criterion ix 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"*** (UNESCO 2016).

Three interrelated attributes of potential Outstanding Universal Value under criterion ix have been identified:

1. **Functional ancient Colchic forests and wetlands (including refugial and old growth forests and mires) with their succession, patch dynamics and ecological zonation:** While, from a global plant-geographical perspective (Schroeder 1997), the Colchic forests can be linked to those of the East-North-American and the Sino-Japanese regions in the nemoral zone of the Holarctic Realm, the Colchic forests –together with the Hyrcanian forests of northern Iran and Azerbaijan – are distinguished by several factors from all other deciduous broadleafd forests of the Holarctic Realm. The forests and the mires have been present in Colchis over an exceptionally long period, as remarkably stable climatic conditions favoured the survival of the forests and also the continuity of mire development there. This attribute can be further broken down as follows:

   **(1)** The oldest and among the best preserved examples of temperate broadleaf rainforests worldwide. The forests of the region are considered rainforests, as a consequence of the moisture arising from the Balck Sea and trapped by the mountain chains of the Greater and Lesser Caucasus (Nakhutsrishvili et al. 2010). They differ from many other temperate rainforests by the relatively high temperatures, and by the specific role that fog plays in providing moisture to vegetation.

   **(2)** Structure and heterogeneity: On the one hand, the Colchic forests are distinguished by common structural characteristics, first and foremost the prominent semi-prostrate evergreen shrubs characterized by vegetative reproduction forming dense understories around 3-4 m tall and containing evergreens. On the other hand, the warm-temperate and extremely humid conditions of their environment, together with pronounced small-scale climatic heterogeneity and vertical gradients, create an astonishingly rich and dense mosaic of forest types. The 30 different plant associations within the four proposed component areas of the Colchic forests in Ajara alone testify to this.

   **(3)** Species composition, endemism and relict species: The Colchic (and Hyrcanian) forests are the oldest forests in western Euraisa and the most important relicts of Arcto-Tertiary forests in western Eurasia, with many plant species of ancient boreal affinities (Nakhutsrishvili et al. 2010). The resulting high species richness – especially of trees, in comparison to other temperate forests – of the Colchic forests, and particularly their richness in endemic and relict woody species, is closely linked to their biodiversity value in relation to World Heritage criterion x.

**(4)** The Colchis has furthermore a high diversity in hydrogenetic mire types including lithogenous water rise mires and flood mires (Krebs et al. 2017). 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 properties (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. Moreover, these water rise mires are the important basis for the development of percolation bogs (see Attribute 3 relevant to World Heritage criterion ix below).

**(5)** Resilience to climate change: As ecosystems, the Colchic Forests and Wetlands have withstood pronounced climatic fluctuations in the past. This makes them an interesting natural laboratory to study ecological impacts of ongoing and predicted climate change (c.f. Sylven et al. 2008, Zazanashvili 1999).

2. **Long-term evolution and diversification of flora and fauna as well as complex landscapes in a glacial refuge area, starting from the Tertiary and continuing today:** The peculiar relict community that has survived the Pleistocene glacial cycles in the Colchic Forests and – to a lesser degree – Wetlands includes a high diversity of animals and plants not adapted to cold climate. Colchic biota with their many arcto-teriary relicts reflect exceptionally constant climatic conditions which allowed the tertiary species to survive inspite of regularly and deep cooling, which drove many species to extinction elsewhere. Compared to other non-tropical continental regions, the series 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). Likewise, Colchic mires 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). This also means that the Colchic Forests and Wetlands are an outstanding example of manifold long-term evolutionary processes, which have been going on there since the late Tertiary. These continue to this day and can be studied, based on the endemic and relict biota of the region. As the Colchis was the cradle of many species from where they dispersed after the last glaciation the Colchic Forests and Wetlands, these species are also important from the genetic point of view.
3. **Origin, evolution and continuing development of percolation bogs:** The extensive paludified areas along the Black Sea coast within the Colchic region are mainly due to the warm-temperate climatic conditions, which 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, as Colchis is the only warm-temperate region in the world where *Sphagnum* dominated rain-fed peatlands (percolation bogs) occur. The exceptional character of the area and its mires led to the distinction of a specific Colchis mire region within Eurasia (Botch & Masing 1983, Succow & Joosten 2001, Krebs et al. 2017). Of particular global importance is the occurrence of percolation bogs (sensu Joosten & Clarke 2002). They only occur in areas with a large precipitation surplus evenly distributed over the year, a convex shape indicating ombrogeneity (only rain fed conditions), having 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). Moreover, acid with more nutrient-rich conditions prevail compared to 'normal' bogs because of rheotrophy (higher element load per time unit due to water flow, Kulczyński 1949). Currently, only two well-developed examples of this type have been identified worldwide: the Ispani 2 bog near Kobuleti and the Imnati bog east of Paliastomi lake in Kolkheti National Park. Ispani 2 was the first discovered percolation bog in the world (Kaffke 2008, de Klerk et al. 2009) and is the 'type locality'. The percolation bogs in Colchis are also characterised 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 *Sphagnum* biomass productivity (Krebs et al. 2016). ***The percolation bogs in the Colchic region are recognized as the simplest mires globally and could be considered as the overall reference type for mires, i.e. as "ideal" mires***, due to almost permanent water supply by precipitation, and rain as the sole water source. Consequently, this mire type is essential for the understanding of mires (e.g. processes, functions, interrelations between vegetation, water and peat) and is helping to systematize the thinking about mires. Moreover, all mires of the Colchis are important for the on-going development of percolation bogs. Beside the two existing percolation bogs (Ispani 2 and Imnati), two mires are in the initial state of the formation of percolation bogs (Grigoleti, Pitshora). The mires Anaklia, Churia, and Nabada are prospective for the development towards a percolation bog, as water rise mires were the basis for the existing percolation bogs.

## 5.2.2 Arguments and attributes for the use of WH criterion x

According to the Operational Guidelines to the World Heritage Convention, properties nominated under World Heritage criterion x 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"*** (UNESCO 2016).

Three interconnected attributes of potential Outstanding Universal Value under World Heritage criterion x have been identified by Georgian experts.

1. **Overall species richness:** As demonstrated in the description of the series, the component areas of the proposed series are home to almost 1,100 species of vascular plants, and almost 500 species of vertebrates, plus an unknown but high number of invertebrate species. The species richness estimate needs to be seen in the context of the relatively high latitude of the Colchic Forests and Wetlands and their relatively small overall size.
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-islnd region – proportion of endemic species. There are 155 species of plants with a restricted range (14% for the vascular plants), of which 55 only occur in the Colchic region or parts thereof (Table 6). The contribution of endemic species to herpetofauna and mammals (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) and 23 terrestrial endemic 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 biota. 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 and hence extinction of these species would terminate evolutionary processes that have started millions of years before humans first occured. 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 Forests and Wetlands to pan-Europe and northern Eurasia, like *Sphagnum austinii*. Additional relict species have been listed and discussed by Tarkhnishvili (2014).
3. **Number of globally threatened species:** Forty-two globally threatened or near-threatened species of vascular plants, 53 of vertebrates, and eight of invertebrates have been recorded in the Colchic Forests and Wetlands. The globally threatened biota strongly overlap with the endemic and relict species complement of the series, which means that these attributes 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 (Schatz et al. 2013). 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 proposed series also has a potential to contribute even stronger to the conservation of two critically endangered sturgeon species (*Acipenser colchicus* and *A. stellatus*), which currently only visit Kolkheti National Park sporadically. Finally, the property supports healthy populations of a number of large mammal species that are not globally threatened but have declined throughout much of Europe, such as European Brown Bear *Ursus arctos*, Gray Wolf *Canis lupus* and European Lynx *Lynx lynx*.

The Colchic Forests and Wetlands also are among the most species-rich elements of the Caucasus Global Biodiversity Hotspot, one of 34 global priority areas for biodiversity conservation (Conservation International 2007), and also of a WWF Global 200 priority ecoregion (Olson & Dinerstein 2002). They occupy the border area of two global Centres 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..

Another phenomenon of clearly global importance which is related to the biodiversity of the area is the Batumi bottleneck of raptor migration. This feasibility has assessed to what extent this also qualifies for potential Outstanding Universal Value. While the number, species richness, and quantitative importance (in relation to global populations of some raptor species) suggest that this may well be the case, the precedent of the 2006 IUCN evaluation of the nomination "The Great Riftvalley Migration Flyway, the Hula (Israel)" shows that extreme caution is warranted in this regard. IUCN found it difficult to acknowledge the potential OUV related to phenomena that are not clearly tied to properties on the ground, and also noted that – in terms of integrity – OUV could only be associated with an entire flyway and not with a relatively small part of it, such as a migration bottleck (IUCN 2006). In any case, there are currently also major local integrity issues with the Batumi Bottleneck, as there is still intense catching and poaching of raptors in the area (e.g. Batumi Raptor Count 2015, Van Maanen et al. 2001).

## 5.3 Global comparative analysis

The comparative analysis has to focus on the same major ecosystem types as the proposed property; that are nemoral deciduous broadleafd forests and ombrogen mires.

The Colchic Forests and Wetlands comprise six attributes of potential Outstanding Universal Value, three of which are relevant to World Heritage criterion ix, and three of which are relevant to World Heritage criterion x.

A meaningful comparison is only possible if sites that are relevant to these attributes are compared to the Colchic Forests and Wetlands. Therefore, the sites for global and regional comparison are not the same for each of the attributes relevant to criterion ix and the attributes relevant to criterion x.

In relation to World Heritage criterion ix, the same sites can be used for global comparative analysis for the first two attributes of potential OUV, which are closely related (***"Functional ancient Colchic Forests"*** and ***"Long-term evolution and diversification of flora and fauna in a glacial refuge"***). These same sites can also be used for global comparative analysis for the attributes under World Heritage criterion x, as these are closely linked to the second attribute under criterion ix. It is important to note that the abovementioned attributes of potential OUV under World Heritage criterion ix and all attributes of potential OUV under criterion x refer to the entire series, and not just to the Colchic forests.

The third attribute of potential OUV under World Heritage criterion ix refers to the Colchic wetlands only. The comparative analysis for this attribute needs to take into account a different set of sites than that for the other attributes.

Table 8. World Heritage properties, and properties listed on the Tentative Lists of other State Parties to the World Heritage Convention for the comparative analysis of the Colchic Forests components in relation to World Heritage criterion ix (Attributes 1 – forest – and Attribute 2) and x (all attributes).

| Name | Country/ies | Status | Criteria | Area (ha) | Comments |
|---|---|---|---|---|---|
| Western Caucasus | Russian Federation | Inscribed 1999 | ix, x | 298,903 | Mainly coniferous, sub-alpine, alpine, but some deciduous forest |
| Central Sikhote-Alin | Russian Federation | Inscribed 2001 | x | 406,177 | **Glacial refuge area** |
| Białowieża Forest | Belarus, Poland | Inscribed 1979 | ix, x | 141,885 | |
| Primeval/Ancient Beech Forests | Germany, Slovakia, Ukraine | Inscribed 2007 | ix | 33,670 | Complex serial property |
| Shirakami-Sanchi | Japan | Inscribed 1993 | ix | 16,971 | |
| Great Smoky Mountains National Park | USA | Inscribed 1983 | vii, viii, ix, x | 209,000 | **Glacial refuge area** |
| Hyrcanian Forests | Azerbaijan<br>Iran | Tentative List<br>Tentative List | vii, x<br>vii, viii, ix, x | ca. 40,000<br>ca. 100,000 | **Glacial refuge area**, most closely related to Colchic forests, should be paid special attention in comparative analysis |

## 5.3.1 Comparative analysis for WH criterion ix, Attributes 1 and 2

Based on their biogeographical characterization (Section 4.1.1 above), the Colchic forests with their associated wetlands need to be compared to other predominantly deciduous broadleafd forests 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.** Of particular interest in this regard are those forest areas which are also known as glacial refuge areas (c.f. Attribute 2, World Heritage criterion ix). Table 8 summarizes information on World Heritage properties and properties listed on the Tentative Lists of other State Parties.

Taken together, the Colchic and Hyrcanian forests are a special type of nemoral deciduous broadleafd 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. 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 1997).

According to Nakhutsrishvili et al. (2011) *"Colchic and Hyrcanian forests are the oldest forests in Western Eurasia in terms of their origin and evolutionary history, and the most diverse in terms of relict and endemic woody species and tree diversity"*. This can be further highlighted by comparing forest age and numbers of endemic taxa, particularly woody species and trees.

This special warm-temperate humid climate, which has persisted until today, constitutes another distinguishing feature of the Colchic (and also the Hyrcanian) forests, in comparison with all other nemoral deciduous broadleafd forests already inscribed in the World Heritage list (Table 8). The very high average annual precipitation of 1,800-2,200 mm and exceptionally high local precipitation averages such as on Mount Mtirala (4,500 mm), with a high frequency and functional importance of fog, allow their classification as temperate rainforests (DellaSala 2011). However, they also differ so much from other temperate rainforests that they were considered marginal by some authors (DellaSala 2011), particularly by their very mild climate and the special importance of fog for their functioning (Nakhutsrishvili et al. 2011). This can be demonstrated further by comparing the Colchic Forests to the temperate rainforests of the North American Pacific coast, and temperate rainforest of Japan. However, the former are nemoral coniferous forests, and therefore quite different from the Colchic forests.

While the Colchic forests share many characteristics with the Hyrcanian forests along the southern coast of the Caspian Sea, there are also marked differences (Nakhutsrishvili et al. 2015): The Colchic area is located further north and is much more humid. Precipitation in the Colchis is more equally distributed across seasons. Precipitation decreases with altitude in the Hyrcanian forests but not in the Colchic forests, which means that the latter can be found at much higher altitude, right up to the sub-alpine belt at about 2,200 m a.s.l. There are also marked differences in the vertical zonation and species componsition of Colchic and Hyrcanian forests. One visible difference is the predominance of broadleafd, mostly sub-prostrate shrubs in the understorey of Colchic forests with species such as *Rhododendron ponticum*, *R. ungernii*, *R. smirnowii*, *Laurocerasus officinalis*, *Ilex colchica*, which often form up to 4 m high dense underwood and separate communities outside the forest canopy. In contrast, evergreens and particularly broadleafd evergreens play a much less prominent role in the Hyrcanian forests (Nakhutsrishvili et al. 2015). Another difference is the occurrence of mixed coniferous forests in the upper mountain belt of Colchis.

***This supports a separate inscription of the Colchic Forests under World Heritage criterion ix (and x), even if the Hyrcanian forests should be inscribed under the same criteria as well.***

***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, their exceptionally long evolutionary history of the Colchic Forests 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 8, and justifies their inscription for attributes 1 and 2 under World Heritage criterion ix.***

## 5.3.2 Comparative analysis for WH criterion ix, Attribute 3

In spite of the wide distribution of peatlands, no properties have been inscribed on the World Heritage List exclusively because of the existence of peatlands. Some areas inscribed under World Heritage criterion ix contain peatlands (e.g. Laponian area, Sweden – UNEP-WCMC 2011d; Lorentz National Park, Indonesia – IUCN 1999; Talamanca Range – La Amistad Reserves, Costa Rica & Panama – UNEP-WCMC 2011e; Tasmanian Wilderness, Australia – UNEP-WCMC 2011f), but these are usually very small parts of the properties, or areas with bog-like vegetation only. The Statements of OUV of these sites were not based on the presence of peatlands.

This means that a classical global comparative analysis of the percolation bogs of the Colchic wetlands to other, already inscribed peatlands (including bogs) cannot be used to decide whether the existence of this mire type justifies inscription of the area on the World Heritage list. Other comparisons need to be made to further clarify this question.

Comparison to other sites listed on **Tentative Lists of State Parties**: In the absence of natural World Heritage properties that have already been inscribed because they comprised peatlands, Tentative List entries can be consulted to identify other sites for comparison. However, it should be noted that Tentative Lists are merely declarations of intent of the State Parties to the World Heritage Convention, and that tentative listing of a given site does not give any indication whether its suspected OUV would be confirmed during evaluation.

Among properties listed on the Tentative Lists of State Parties, The Great Vasyugan Mire (Russia) and the Flow Country (UK) contain extensive bogs (UNESCO 2017b). These Tentative List entries focus their tentative description of potential OUV on the nomination of mire areas and types.

- The ***Great Vasyugan Mire***, 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).
- An estimated > 300,000 ha of blanket bogs form the core of the planned nomination of the ***Flow Country***. 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). However, in terms of proportional extent, the Colchic area contains all percolation bogs, whereas the Flow Country merely contains a significant but small part of the World's blanket bogs.

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 nomination 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 bogs, mires and peatlands in general:***

With regard to the classification of hydrogenetic mire types (after Succow & Joosten 2001, Joosten & Clarke 2002) the mires referred to in the Tentative List entries are surface flow mires and acrotelm mires (sensu Joosten & Clarke 2002). They differ from the mires of the Colchis, including with regard to the principal functioning of their mire ecosystems (Table 9). Percolation bogs are ***only*** found in the Colchic Lowlands (Krebs et. al. 2017), with two mires representatives: Ispani 2 and Imnati mire.

Percolation bogs are the simplest peatland type, and therefore a reference type of all peatlands worldwide. They 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 9). However, 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.

While neither the World Heritage Convention, nor its Operational Guidelines (UNESCO 2016), 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 an "ideal" type of bogs, and by extension of mires and peatlands in general. Therefore, they are ***the*** quintessential example – in functional terms – of this ecosystem type.

Peatlands occupy three percent of the global land surface (Joosten & Clarke 2002). Considering that 123 properties have been inscribed on the World Heritage list under World Heritage criterion ix to date (34 of which are at least in part coastal or marine sites – WHC 2017), and that none of them has been inscribed because of processes or phenomena related to peatland ecosystems, it is obvious that peatlands are currently underrepresented on the list.

***In combination with the outstanding position of the Colchic percolation bogs among all other peatlands, as discussed above, this further demonstrates that Attribute 3 of the Colchic Forests and Wetlands under World Heritage criterion ix stands up in global comparison.***

Table 9. Hydrogenetic mire types of ombrogenous 'inclining mires' with their functional (including hydrological) and peat properties (modified after Joosten et al. 2017).

| **Hydrogenetic type** (all with ombrogenous water regime) | **Surface flow mire** | **Acrotelm mire** | **Percolation bog** |
|---|---|---|---|
| **Example** | Blanket bogs of the *Flow Country* | Typical raised bogs in the *Great Vasyugan mire* complex | Ispani 2, Imnati |
| **Water supply** | Frequent | Frequent | Continuous |
| **Mire surface slope** | Small/large | Small | Small |
| **Internal water storage** | Very small | Large | Very large |
| **Effect on landscape water storage** | Storage increasing | Storage increasing | Storage increasing |
| **Water table** | Fluctuating, strong fluctuations possible | Less fluctuations than in surface flow mires | Constant relative to mire surface |
| **Water flow** | Water overflows the peat body | Mainly at the surface; less in the lower, stronger decomposed peat layer | Over most of the depth of the peat body |
| **Conditions for peat formation** | Limited to regions with constant water supply and/or little water loss (evapotranspiration) | Relatively stable, due to combination of large pores at the surface preventing water table drops by evapotranspiration, and small pores in lower peat layers reducing run-off | Stable due to peat oscillation in relation to water supply |
| **Peat** | Strongly decomposed | Surface layer weakly decomposed (acrotelm), lower layer strongly decomposed (catotelm) | Weakly decomposed, elastic over a the entire peat body |
| **Hydraulic conductivity** | Low | Distinct vertical gradient, large pores in the surface peat layer and small pores in the lower peat layer | High over the entire peat body |
| **Feedback mechanism** | Positive feedback | Negative feedback, self-regulation | none |

### 5.3.3 Comparative analysis for WH criterion x, all attributes

The comparative analysis for World Heritage criterion x can be based on the sites for comparison that have also been used for the comparative analysis for criterion ix (Attributes 1 and 2), and which are summarized in Table 8 (Section 5.3.1):

- **Western Caucasus (Russia):** The Western Caucasus property is located only ca. 200 km distant from the nearest component site of the Colchic Forests and Wetlands cluster, is inscribed under the same criteria and occupies an area considerably larger (275,000 ha). However, it is focused on a different ecological theme than the Colchic Forests and Wetlands: Its altitude range (250 - 3,360 m a.s.l.) and particularly its medium altitude are considerably higher than that of the Colchic Forests and Wetlands. Because of the location at the northern main slope of Great Caucasus with continental influence, the climate is slightly dryer and cooler, and the particularly biodiversity rich lowland as well as broadleaved relict forests, which form the core of the Colchic Forests, are currently hardly represented within the Western Caucasus property (Natural Heritage Protection Fund 2014). Vascular plant species richness is somewhat higher than that of the Colchic Forests and Wetlands (1,580 species recorded - UNESCO 2014), also reflecting the much larger area of the Western Caucasus property. 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 Forests and Wetlands situated within Georgia because by far the highest diversity of relict Colchic species is reached there (Dolukhanov 1980). 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).

- **Central Sikhote-Alin (Russia):** Central Sikhote-Alin in the Russian Far East is an example of an eastern Eurasian Tertiary/Quarternary refugium with temperate and relatively humid forest. This serial property is located about four degrees further north than the Colchic Forests and Wetlands and is considerably drier (up to 1,500 mm annual precipitation at higher altitude - Greenpeace Russia et al. 2000). It has an area of 406,000 ha and an altitude range of 0 - ca. 1,560 m a.s.l. (UNEP-WCMC 2011a). The area is only listed under criterion x, lacking the outstanding biological processes of long term evolution/succession and bird migration. Vascular plant species richness is about 1,200 species, similar to the Colchic Forests and Wetlands in spite of the huge size of the area. The exact number of relict, restricted range and globally threatened species at the site is not explicitly stated in the nomination dossier, but considered to be high. The terrestrial vertebrate (400 species) and particularly mammal fauna (65 species) of Central Sikhote-Alin may be slightly richer as that of the Colchic Forests and Wetlands and includes iconic large predators such as the Amur Tiger *Panthera tigris*.

- **Great Smoky Mountains National Park (USA):** This North American Tertiary refuge area of 209,000 ha is situated about five degrees south of the Colchic Forests and Wetlands in an area of similar if lesser humidity (average annual precipiation at higher altitude up to 2,100 mm), at an altitude of between 258 and 2,024 m a.s.l. (UNEP-WCMC 2011b). Vascular plant species richness is higher than that of the much smaller Colchic Forests and Wetlands cluster, at about 1,600 species, and also 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 2011b).

- **Hyrcanian Forests (Azerbaijan, Iran):** This humid Pliocene forest refugium extends from the Talysh Mountains in Azerbaijan over 800 km eastwards in Iran. The adjacent part in Azerbaijan was unsuccessfully nominated as a natural World Heritage property in the past. Hirkan National Park in

Azerbaijan has an area of ca. 40,000 ha and an approximate altitude range of <200 - >1,000 m (Protected Planet 2014). There are about 1,200 vascular plant species, including an undefined number of relict and 36 "endemic" species (Hirkan National Park, 2014). These include many relict tree species (such as *Zelkova carpinifolia*), some of which are represented by very old specimens. The fauna of the Hyrcanian forests includes several large carnivores that are missing from the Colchic Forests and Wetlands (e.g. the Leopard *Panthera pardus* and Striped Hyaena *Hyaena hyaena*). Faunal species richness appears lower than that of the Colchic area, with records of 117 bird and 40 mammal species (Hirkan National Park 2014). Iran is currently preparing a serial nomination of its part of the Hyrcanian Forests, which will include approximately ten component parts with approximately 60,000 ha in total.

- **Białowieża Forest (Belarus, Poland):** This large forest complex is located in the transition zone between deciduous and coniferous forest in Europe, and on the border between Poland and Belarus. It has survived in its natural state to this day, because of long-term protection, but is not a glacial refuge area. The Bialowieza National Park, Poland, was inscribed on the World Heritage List in 1979 and extended to include Belovezhskaya Pushcha, Belarus, in 1992. A large extension of the property in 2014 resulted in a property of 141,885 ha. It protects 59 mammal species, over 250 bird species, 13 amphibians, 7 reptiles, and reportedly over 12,000 invertebrates. The 1,060 vascular plant species that have been recorded there – including 26 tree and 138 shrub species – are below the corresponding numbers of the Colchic Forests and wetlands, although the area is five times as large. There are also 3,000 species of fungi, 402 species of lichens and 230 mosses (UNEP-WCMC 2014).

Two additional sites listed in Table 8 (Shirakami-Sanchi, Japan, and the Primeval Beech Forests of the Carpathians and the Ancient Beech Forests of Germany, Slovakia and Ukraine) have been nominated under World Heritage criterion ix only, and are hence not suitable for a comparative analysis for World Heritage criterion x. In any case, these areas are much less species rich than the Colchic Forests and Wetlands, with, for example, only 500 vascular plant species in Shirakami-Sanchi (UNEP-WCMC 2011c).

***The above comparisons show that the Colchic Forests and Wetlands are within, if more towards the lower range of overall species numbers for vascular plants, vertebrates and specific vertebrate groups if compared to other comparable forest properties already inscribed on the World Heritage list or on the Tentative Lists of other State Parties to the World Heritage Convention. Those areas that have higher species counts typically also have much larger territories.***

The same can be demonstrated for the proportion and absolute number of endemic species of vascular plants, vertebrates and invertebrates, as well as globally threatened species.

# 6. Integrity, state of conservation and factors affecting the proposed property

According to § 87 of the Operational Guidelines to the World Heritage Convention (UNESCO 2016), "***all properties nominated for inscription on the World Heritage List shall satisfy the conditions of integrity.***"

According to § 88 of the Operational Guidelines, "***integrity is a measure of the wholeness and intactness of the natural and/or cultural heritage and its attributes. Examining the conditions of integrity therefore requires assessing the extent to which the property:***

***a) includes all elements necessary to express its Outstanding Universal Value;***

***b) is of adequate size to ensure the complete representation of the features and processes which convey the property's significance;***

***c) suffers from adverse effects of development and/or neglect.***"

(…)

The Operational Guidelines further specify these integrity requirements for World Heritage criteria ix and x, respectively. Both the general and the more specific integrity requirements need to be considered in relation to the proposed component areas of the Colchic Forests and Wetlands.

The following sections first discuss the integrity of the property in relation to the proposed attributes of OUV in relation to World Heritage criteria ix and x (Sections 6.1 and 6.2). Since adverse effects of development and/or neglect (cf. § 88 (c) of the OG) equally affect the proposed attributes of likely OUV under World Heritage criteria ix and x, Section 6.3 then takes a more general look into such effects on the proposed component.

## 6.1 Integrity of the proposed property in relation to WH criterion ix

### 6.1.1 Completeness of features for World Heritage criterion ix

Table 10 synthesizes information on the distribution of the attributes of potential OUV among the PAs holding the proposed component areas of the series, which is explained into more detail in the description of the property (Section 4). Table 10 shows that **(1)** all major attributes as identified in the relevant sections are included in the proposed component areas, and that **(2)** the component areas complement each other in expressing the attributes of potential OUV. In addition to this, no major forests or wetlands that could also significantly contribute to the OUV in relation to the attributes of potential OUV occur within Georgia.

In addition to the general integrity requirements as set out in § 87 of the OG, § 94 stipulates that a property *"should have sufficient size and contain the necessary elements to demonstrate the key aspects of processes that are essential for the long term conservation of the ecosystems and the biological diversity they contain. For example, an area of tropical rainforest would meet the conditions of integrity if it includes a certain amount of variation in elevation above sea level, changes in topography and soil types, patch systems and naturally regenerating patches (…)"*. (UNESCO 2016).

The example used in the formulation of the specific integrity requirement for criterion ix can be applied directly to several of the attributes of likely OUV of the Colchic Forests and Wetlands, simply by replacing the word "tropical" with the word "temperate". The Colchic Forests do comprise an adequate elevation range (from sea level to ca. 2,500 me a.s.l.) and topographical as well as meteorological variability (annual precipitation ranging from 2,200 to 4,500 mm). As shown in Section 4.2.1 above, they also cover a dense mosaic of forest associations and varying stages of forest succession and regeneration. Also the different Colchic mires are covered within 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.

The Consultant concludes that the features that are relevant to the proposed attributes of OUV under World Heritage criterion ix are represented sufficiently completely within the proposed series.

**Table 10.** Distribution of the attributes of potential OUV among the proposed component areas of the series.

| **Criterion** | **ix** | | | **x** | | |
|---|---|---|---|---|---|---|
| **Attribute** | Colchic Forests and mires | Ongoing evolution | Percolation bogs | Overall species richn. | Threatened species | Endemic species |
| Machakhela NP | X | X | | X | X | X |
| Mtirala NP | X | X | | X | X | X |
| Kintrishi PAs | X | X | | X | X | X |
| Kobuleti PAs | X | (X) | X | (X) | (X) | (X) |
| Kolkheti NP | X | (X) | X | (X) | (X) | (X) |
| Ajameti MR | X | (X) | | (X) | (X) | (X) |
| Borjomi-Kharagauli NP | (X) | X | | X | X | X |

## 6.1.2 Adequate size for World Heritage criterion ix

In addition to the need to fully represent all features within the property, the question of adequate size in relation to World Heritage criterion ix also needs to take into account the processes that sustain these features, such as patch dynamics and succession. This question needs to be addressed for both forest and wetland areas.

- Table 1 shows that the area of the proposed forest component areas of the favoured configuration of the series ranges between 504 and 16,737 ha. The proposed component areas of Machakhela West (514 ha) and Machakhela East (507 ha) are of relatively small size, which could be considered marginal to support processes such as forest succession and patch dynamics. However, these proposed component areas are embedded in a shared buffer zone of 4,727 ha, which also includes the proposed component area of Machakhela South (1,555 ha). They represent the best preserved forest areas within a larger mosaic of forests in various stages of regeneration. Since the designation of proposed forest areas in Machakhela is in any case based on the – as yet unconfirmed – assumption that final zoning of Machakhela NP will be based on the zoning proposal of Ilia University (Gavashelishvili et al. 2016), ***the Consultant recommends that the delineation of proposed component areas and their suitability to meet the integrity prerequisites as set out in § 87 of the OG are revisited once the final zoning for Machakhela NP has been agreed.*** The other two proposed forest component areas (Mtirala/Kintrishi South with 9,625 ha and Kintrishi North with 3,537 ha) are much larger, contain considerable altitude ranges and mosaics of different forests types, are connected by a joint buffer zone which is formed by Kintrishi Protected Landscape, and are hence considered likely to be of adequate size and configuration to support the ecosystem processes supporting the attributes of likely OUV to which these areas contribute.
- The proposed wetland component areas of the series contain either entire mires (Ispani II, Imnati, Nabada, Grigoleti) or mires with their surrounding forest areas and other wetlands (Pitshora). The only exception is Churia/Anaklia mire, where a 50 m wide stripe of mire has been excluded from Kolkheti National Park. Nevertheless, from an integrity point of view, this means that the size of these component areas should be sufficient to support the key processes supporting these features. The extent to which the buffer zones of the proposed wetland component areas (particularly those of Ispani II) further contribute to the integrity of these processes is discussed further in Section 7.2.2 below.

In conclusion, there remain questions regarding the adequateness of the size of the proposed component areas of Machakhela East and West to meet the integrity requirements of the Word Heritage Convention, while it appears likely that these requirements are met by the other proposed forest as well as the proposed wetland component areas. Section 9.3 and 9.4 below discuss possible consequences of this for the overall configuration of a possible serial property and for the overall viability of the nomination.

# 6.2 Integrity of the proposed property in relation to WH criterion x

## 6.2.1 Completeness of features for World Heritage criterion x

The discussion of the completeness of features in relation to World Heritage criterion x needs to focus mainly on the proposed forest component areas, because they contribute by far the most to the overall species richness, richness in endemic and relict species, as well as globally threatened species count of the series.

According to Kikvidze and Ohsawa (2001), the Colchic forests of Ajara and adjacent areas harbour ca. 1,630 species of **vascular plants**. Furthermore, the flora of Ajara comprises 174 endemic species (Manvelidze 2008). In broad comparison, all proposed component areas of the property (favoured configuration of five PAs) together hold a little under 1,100 species of vascular plants (Section 4.3.1), and 155 endemic species (Section 4.3.3). The lowland areas contribute very little to this count. This means that the majority of the overall plant species richness of Ajara and the adjacent Colchic Lowlands is represented within the proposed component areas of the series, but that a far greater proportion of the endemic plant species found in the wider region is concentrated there. This is highly relevant to the main attribute of likely OUV of the property, which is particularly focusing on endemic species. The proportion of globally threatened plant species that is found within the proposed component areas of the series is expected to be between those for overall species richness and the number of endemics.

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, Sections 4.3.1 - 4.3.5 indicate 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 the proposed forest component areas. The avifauna of the proposed component areas includes wetland associated, forest and subalpine species, and both resident breeders and important populations of migratory waterbirds and raptors (see Section 4.3.5). It is highly unlikely that this count could be increased significantly by adding additional areas within the region to the series.

Data availability for **invertebrate species richness** is even more limited, but the discussion of invertebrates in Sections 4.3.1 and 4.3.3 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 (overall, globally threatened and endemic) 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.

Therefore, the Consultant concludes that the fauna-related attributes of likely OUV under World Heritage criterion x are represented with sufficient completeness within the proposed component areas of the series.

The strong representation of endemic plant species of the wider region within the proposed component areas further supports the notion that the completeness of flora in relation to the attributes relevant to World Heritage criterion x is satisfactory. ***However, the overall species number of vascular plants as determined during this study, which appears relatively low in comparison, should be double checked and discussed further as part of Work Package 2 of the project.***

Addition of component areas within Borjomi-Kharagauli National Park would increase the representation of Caucasus biodiversity elements within the proposed series significantly (by an estimated several hundred species of vascular plants, several species of vertebrates and an unknown number of invertebrate species), but would also add a lot of species that are not considered Colchic, thereby potentially diluting the Colchic character of the proposed series. This option is discussed into more detail in Section 9.2 below.

An even greater increase in species numbers relevant to all three attributes of likely OUV of the proposed property would result from inclusion of additional areas on the southwestern flank of the Greater Caucasus, which forms the northeastern border of the Colchic region. However, no PAs meeting the integrity and management related requirements of the OG have been designated in this region to date. Section 9.5 below discusses the possibility of adding such areas once PAs have been established there in the future, in accordance with § 139 of the Operational Guidelines.

## 6.2.2 Adequate size for World Heritage criterion x

Whether a nominated property is of adequate size to meet the integrity requirements of §§ 88, 90 and 95 of the OG depends on whether it is large enough to represent the attributes of likely OUV in relation to World Heritage criterion on the one hand, and on whether it is large enough to support the processes that support the observed biodiversity on the other hand. The first of these questions is discussed in Section 6.2.1 above.

The second question can be related to gene flow and exchange with neighbouring populations (for flora and fauna), as well as the behavior, movements and home ranges of animal populations. With respect to the first question, the mere term of "restricted range species", related to one of the key attributes of likely OUV of the proposed property under World Heritage criterion x, suggests that these typically have a rather restricted distribution, and may be able to survive and thrive in relatively small component areas. This, however, does not exclude the possibility that some of the proposed component areas cover only small and perhaps insufficient parts of the distribution areas of some of the species that occur there. Although this is unlikely to be of great quantitative importance, ***the Consultant proposes to identify, during Work Package 2 of the project, any restricted range and globally threatened species that occur within one or more proposed component areas but are not sufficiently protected there to ensure their conservation.***

With regard to the aspect of the "sufficient size" requirement that is related to animal behavior, it is important to note that most of the fauna species that are relevant to the attributes of likely OUV of the property (e.g. endemic and globally threatened herpetofauna, mollusks, small mammals – see Sections 4.3.3, 4.3.4) are relatively immobile and have relatively small home ranges and local distribution areas. The arguments in favour of inscription of the Colchic Forests and Wetlands under World Heritage criterion x do not rely on the presence of large, far-ranging mammal species, which would need large component areas to fulfill this aspect of the integrity requirement of World Heritage criterion x.

In conclusion, the Consultant considers that the proposed series, and particularly the proposed forest component areas, which are most relevant to its likely OUV under World Heritage criterion x, is likely to be of sufficient size to meet the integrity requirements associated with this criterion. ***However, this would also need to be re-assessed if the size and distribution of proposed component areas belonging to Machakhela National Park would change significantly (see also Section 6.1.2 above).***

# 6.3. Threats to landscapes, ecosystems and biodiversity

Paragraph 87 of the OG prescribes that a property can only be inscribed on the World Heritage list if it does not suffer from excessive adverse effects of development and/or neglect. A rapid appraisal of current and potential threats to the property is included in Tables 10 and 11 below. This is based on the threats section of the 2012 IUCN World Heritage Outlook Assessment (Osipova et al. 2012).

Tables 10 and 11 show that the integrity of the buffer zones of several proposed component areas of the series is noticeably compromised by the combined effects of a number of current threats including poaching/hunting (particularly of migratory raptors and waterbirds), grazing, fuelwood collection, touristic use etc. This might have knock-on effects within the proposed component areas.

In addition to the current threats, there are a number of potential threats to the integrity of the proposed series, which would significantly reduce the range/ size of potential component areas that can be considered for nomination if they were to become a reality. Some of them would severely affect critical proposed component areas of the series, such as Churia/Anaklia (development of Anaklia Deep Sea Port, north of Kolkheti National Park, reportedly with an access road along the western edge of Churia/ Anaklia under consideration), Imnati (peat extraction, recently banned inside Kolkheti National Park) or Mtirala/Kintrishi South (development of medium tourism infrastructure). This might result in a narrowing of the thematic scope of the planned nomination (exclusion of forests or wetlands) or even render inscription of the Colchic Forests and Wetlands on the World Heritage list impossible.

Therefore, tangible and extended efforts of APA and its partners to diminish identified current threats, and a clear commitment to prevent identified potential threats from becoming a reality, are needed in order to safeguard the integrity of the proposed series.

Table 11. Threat checklist for the proposed Colchic Forests and Wetlands property. (B… Buffer zone; KiPAs... Kintrishi Protected Areas; KNP... Kolkheti National Park; KoPAs... Kobuleti Protected Areas; MaNP... Machakhela National Park; MtNP... Mtirala National Park; PCA... Proposed component area).

| Checklist of threats | | | | |
|---|---|---|---|---|
| **Threat categories** | **Threat sub-categories** | **Specific threat affecting site** | **Inside site?** | **Outside site?** |
| **Residential & Commercial Development** | Housing/ Urban Areas | | | |
| | Commercial/ Industrial Areas | | | |
| | Tourism/ Recreation Areas | Development of small-scale tourism infrastructure in and near the buffer zones of MaNP, MtNP, KiPAs; development of large tourism infrastructure near the buffer zones of KoPAs, KNP. | B | X |
| **Agriculture & Aquaculture** | Annual/Perennial Non-Timber Crops | | | |
| | Forestry/ Wood production | | | |
| | Livestock Farming / Grazing of domesticated animals | Some grazing (mainly cattle) in and near the buffer zones of all PCAs, and within Ajameti PCA. | B | X |
| | Crop production | | | |
| | Marine/ Freshwater Aquaculture | | | |
| **Energy Production & Mining** | Oil/ Gas Drilling | | | |
| | Mining/ Quarrying | | | |
| | Renewable Energy | Medium hydropower stations on Chorokhi River downstream of Machakhela PAs, Kintrishi River downstream of KiPAs;<br>Small hydropower station within Machakhela gorge (but outside buffer zone) | | X |
| **Transportation & Service Corridors** | Roads/ Railways | Small road inside buffer zones, and Mtirala/Kintrishi South PCA;<br>Plans to build a container port NW of Churia/Anaklia PCA (ADC 2017), and reportedly an access road through its western buffer zone (dunes between PCA and Black Sea). | B, X, (X) | X |
| | Utility / Service Lines | | | |
| | Shipping Lanes | | | |

| Checklist of threats | | | | |
|---|---|---|---|---|
| **Threat categories** | **Threat sub-categories** | **Specific threat affecting site** | **Inside site?** | **Outside site?** |
| | Flight Paths | | | |
| **Biological Resource Use** | Commercial hunting | Widespread but usually small-scale commercial hunting of migratory waterbirds at KNP (buffer zones of all KNP PCAs) | B | X |
| | Subsistence hunting | Widespread recreational hunting of migratory waterbirds at KNP (buffer zones of all KNP PCAs);<br>Widespread recreational hunting and trapping of migratory raptors near the buffer zone of MtNP. | B | X |
| | Logging/ Wood Harvesting | Small scale fuelwood harvesting in the buffer zones of all forest PCAs, and within Ajameti PCA. | B | X |
| | Fishing / Harvesting Aquatic Resources | Small to medium scale fishing in the buffer zone of PCAs within KNP; | B | X |
| | Other Biological Resource Use | Small scale harvesting of non-timber forest products in the buffer zone of all forest PCAs, and within Ajameti PCA. | B | X |
| **Human Intrusions & Disturbance** | Impact of tourism/ visitors/ recreation | Low and localized tourism impact and disturbance in the buffer zones of all forest PCAs, and in small parts of the Mtirala/Kintrishi South PCA (Visitor Zone of MtNP). | X | X |
| | War, Civil Unrest/ Military Exercises | Numerous remnants of military exercises at Nabada PCA, KNP (military use discontinued). | X | |
| | Other Activities | | | |
| **Natural System Modifications** | Fire/ Fire Suppression | Occasional burning of vegetation of all peatland PCAs by hunters. | X | |
| | Dams/ Water Management/ Water Use | Changes of the mire hydrology by drainage, recently drainage of adjacent areas for agricultural use (KNP and KoPA) | (X) | X |
| | Other Ecosystem Modifications | Potential risk of peat extraction in Imnati Mire, KNP (adverted for now). | (X) | |

| Checklist of threats | | | | |
|---|---|---|---|---|
| **Threat categories** | **Threat sub-categories** | **Specific threat affecting site** | **Inside site?** | **Outside site?** |
| **Invasive & Other Problematic Species & Genes** | Invasive Non-Native/ Alien Species | Degradation of mires and forests leads to open areas, which are colonized by alien species.<br>In some parts considerable changes of grasslands and lowland forest communities by IAS.<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) | (X) | X |
| | Hyper-Abundant Species | | | |
| | Modified Genetic Material | | | |
| **Pollution** | Water Pollution | Small-scale domestic and livestock pollution of all mountain streams within buffer zones of all forest PCAs.<br>Medium-scale domestic/urban water pollution of buffer zones of all PCAs of KNP. | X | X |
| | Household Sewage/ Urban Waste Water | See above. | X | X |
| | Industrial/ Military Effluents | | | |
| | Agricultural/ Forestry Effluents | | | |
| | Garbage/ Solid Waste | Some diffuse solid waste pollution within the buffer zones of all PCAs;<br>Massive solid waste accumulations (flotsam) along the coastline and dunes forming the buffer zone of Churia/Anaklia PCA, KNP. | | X |
| | Air-Borne Pollutants | Diffuse immissions o fair-borne pollutants my affect sensitive percolation bogs, albeit to a limited degree. | (X) | X |
| **Geological Events** | Volcanoes | | | |

| Checklist of threats | | | | |
|---|---|---|---|---|
| **Threat categories** | **Threat sub-categories** | **Specific threat affecting site** | **Inside site?** | **Outside site?** |
| | Earthquakes/ Tsunamis/ Tidal Waves | | | |
| | Avalanches/ Landslides | Moderate to high natural risk of landslides in localized parts of all forest PCAs and their buffer zones. Aggravated by forest degradation. | X, B | X |
| | Erosion and Siltation/ Deposition | | | |
| **Climate Change & Severe Weather** | Habitat Shifting/ Alteration | Potential for habitat shifts/alterations with ongoing and expected climate change (Sylven et al. 2008, Zazanashvili 1999) | ? | ? |
| | Droughts | Climate of Ajara will become significantly drier and warmer, especially after mid-21st century and, particularly, towards its end (draft Ajara Forest Adaptation Strategy 2016) | X | X |
| | Desertification | | | |
| | Chemical changes to oceanic waters | | | |
| | Temperature changes | Climate of Ajara will become significantly drier and warmer, especially after mid-21st century and, particularly, towards its end (draft Ajara Forest Adaptation Strategy 2016). | X | X |
| | Storms/Flooding | Potential for habitat flooding with ongoing and expected climate change (Sylven et al. 2008) | ? | ? |
| **Social/ Cultural Changes** | Changes in traditional ways of life and knowledge systems | Loss of traditional livelihood activities and out-migration particularly around forest PCAs. | | X |
| | Identity/ Social Cohesion/ Changes in local population and community | Shifts in age structure and local cohesion following out-migration particularly around forest PCAs. | | X |
| **Other** | Other | | | |

Table 12. Analysis of critical threats affecting one or several proposed component areas of the series (additional references to be added). (KiPAs... Kintrishi Protected Areas; KNP... Kolkheti National Park; KoPAs... Kobuleti Protected Areas; MaNP... Machakhela National Park; MtNP... Mtirala National Park; PCA... Proposed component area).

| Worksheet 2(b) : Assessing threats | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Assessment** | | | | |
| **Current threats** | **PCAs affected** | **Justification of assessment** | **Very Low Threat** | **Low Threat** | **High Threat** | **Very High Threat** | **Data deficient** |
| Development of small-scale tourism infrastructure in and near the buffer zones of MaNP, MtNP, KiPAs; development of large tourism infrastructure near the buffer zones of KoPAs, KNP | Buffer zones of all PCAs. | As long as this development is small scale (visitor walking trails, simple small shelters, picnic areas etc.) and restricted to the buffer zones of the PCAs, it should only have a minor effect on their integrity (mainly through disturbance). | | X | | | |
| Some grazing (mainly cattle) in parts of and near the buffer zones of all PCAs. | Buffer zones of all PCAs. | As long as grazing is low intensity, limited to the buffer zones, and areas outside the forest, it should have only a minor effect on their integrity. This would change to "high" if forested buffer zones of forest PCAs would be affected. | | X | | | |
| Small and medium hydropower stations along the Chorokhi, Machakhela and Kintrishi Rivers; | Buffer zones of all forest PCAs. | Larger and older hydropower stations can block the migration of anadromous fish and alter the flow regime, thereby affecting other aquatic fauna. However, anadromous fish and aquatic invertebrates contribute only to a limited extent to the likely OUV of the forest PCAs of the series. | | X | | | |
| Widespread recreational hunting and trapping of migratory raptors near and potentially inside the buffer zone of MtNP. | Surroundings and possibly buffer zone to the SW of Mtirala/Kintrishi South PCA. | Bird migration is excluded from the attributes of likely OUV of the PCAs of the series under WH criterion ix, but all birds are included in the overall species richness estimates listed in relation to criterion x. In addition, the lack of enforcement of legislation banning raptor trapping and hunting also does not bode well for the ability of the enforcement agencies to effectively conserve other | | | X | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | biodiversity of the PCAs, including those relevant to WH criteria ix and x. | | | | | |
| Widespread but usually small-scale commercial and recreational hunting of migratory waterbirds at KNP (buffer zones of all KNP PCAs) | Buffer zones of all PCAs of KNP. | Bird migration is excluded from the attributes of likely OUV of the PCAs of the series under WH criterion ix, but all birds are included in the overall species richness estimates listed in relation to criterion x. In addition, the lack of enforcement of legislation banning waterbird hunting also does not bode well for the ability of the enforcement agencies to effectively conserve other biodiversity of the PCAs of KNP, including those relevant to WH criteria ix and x. | | | X | | |
| Fires by hunters at open mire parts in the KNP | All mire PCAs in KNP, in particular in parts of Imnati, Grigoleti, Pitshora | During bird migration, hunters burn the dry litter at the surface of the open mire parts, causing a damage of the *Sphagnum* moss layer and a change of the nutrient situation. As the fires are short and fast, the damage of the *Sphagnum* moss layer differs and regeneration occurs within the following growing season. Fires have been observed at those parts which are easily accessible. | | X | | | |
| Small scale fuelwood harvesting in the buffer zones of all forest PCAs. | Buffer zones of all forest PCAs. | As long as fuelwood collection is low intensity, and limited to the buffer zones of PCAs, it should have only a minor effect on their integrity. | | X | | | |
| **Potential threats** | **PCAs affected** | **Justification of assessment** | **Very Low Threat** | **Low Threat** | **High Threat** | **Very High Threat** | **Data deficient** |
| Plans to build a container port NW of Churia/Anaklia PCA, (ADC 2017). | Churia/ Anaklia PCA. | The container port is planned to the north of Churia/ Anaklia PCA, but not within the side or its buffer zone. ESIA underway and could be used to ensure compatibility of port development with WH status. | | X | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Possible plan to build an access road to the above port, through the western buffer zone of Churia/Anaklia PCA (dunes between PCA and Black Sea) (ADC 2017). | Churia/ Anaklia PCA. | This would certainly exclude Churia/Anaklia PCA from the series, and might thereby reduce the overall viability of a *Colchic Wetlands* or *Colchic Forests and Wetlands* nomination. | | | X | | |
| Potential risk of peat extraction in Imnati PCA, KNP. | Imnati PCA. | The opening of parts of Imnati Mire for peat extraction has been discusses in the context of the revision of the KNP management plan, but was banned as a result (Krebs, pers. comm.). If peat extraction would be allowed, it would almost certainly exclude Imnati PCA, the largest rain percolation bog of the series, from the series, and might thereby make a nomination of a *Colchic Wetlands* or *Colchic Forests and Wetlands* nomination impossible, leaving a *Colchic Forests* only nomination as the only if option (if at all). | | | X | | |
| Medium scale tourism infrastructure inside MtNP Visitor Zone. | Mtirala/Kintrishi South PCA. | An extensive development of medium scale recreational infrastructure within the Visitor Zone of Mtirala NP, which appears not to be planned currently, would disqualify those parts of the Mtirala/Kintrishi South PCA that overlap with it from inclusion into a possible nomination. This would severely reduce (in size) and fragment the core forest PCA of the series, significantly reducing the chances of success of any nomination involving forests. | | | X | | |
| Potential for habitat shifts/alterations with | All PCAs. | Habitat shifts/alterations as a consequence of climate change are generally likely, but too poorly | | | | | X |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ongoing and expected climate change (Sylven et al. 2008) | | understood to assign a threat level. | | | | | |
| Overall assessment of current threats | | The integrity of the buffer zones of several PCAs of the series is noticeably compromised by the combined effects of a number of current threats. This might have knock-on effects within the PCAs themselves. A special case is Ajameti PCA, which currently does not meet the management/ integrity requirements for World Heritage status. This PCA is, however, not essential to the OUV of the entire series. | | X | | | |
| Overall assessment of potential threats | | With the exception of climate change, the identified potential threats to the integrity of the proposed series would significantly reduce the range/ size of potential component areas that can be considered for nomination if they were to become a reality. Some of them would severely affect critical PCAs of the series, such as Imnati or Mtirala/Kintrishi South. | | | X | | |
| **Overall assessment of threats** | | Taken current and potential threats together, the overall assessment threats is “High”. Tangible and extended efforts of APA and its partners to diminish identified current threats, and a clear commitment to prevent identified potential threats from becoming a reality, are needed in order to safeguard the integrity of the proposed series and ensure a successful nomination. | | | X | | |

# 7. Management of the proposed property

## 7.1 Legal protection status

All of the component areas of the property under consideration – and their buffer zones – form part of protected areas that are legally designated and gazetted under Georgian law (Table 13). With the exception of some parts of Kintrishi Protected Landscape and of the proposed buffer zone of the Mtirala/Kintrishi South proposed component area, they are all situated on State-owned land.

Table 13. Protected area designations and zones (according to PA management plans and zoning maps) of the component parts of the property under consideration and their buffer zones (MR…Managed Reserve; NP… National Park; PA… Protected area; PL… Protected Landscape; SNR… Strict Nature Reserve).

| No. | Proposed component area | PA(s) | PA Mgmt. category | Zone(s) – proposed component area | Zone(s) – proposed buffer zones |
|---|---|---|---|---|---|
| 1 | **Machakhela West** | Machakhela | NP | Strict Protection Zone | Strict Protection Zone, Managed Protection Zone, Visitor Zone |
| 2 | **Machakhela South** | Machakhela | NP | | |
| 3 | **Machakhela East** | Machakhela | NP | | |
| 4 | **Mtirala/Kintrishi South** | Mtirala<br><br>Kintrishi | NP<br><br>SNR<br>PL | Strict Protection Zone<br>Visitor Zone<br>Strict Nature Reserve[1]<br>Protected Landscape[2] | Strict Protection Zone, Visitor Zone, Traditional Use Zone Strict Nature Reserve[1]<br>Protected Landscape[2] |
| 5 | **Kintrishi North** | Kintrishi | SNR<br>PL | Strict Nature Reserve[1]<br>- | Strict Nature Reserve[1]<br>Protected Landscape[2] |
| 6 | **Kobuleti PAs/ Ispani** | Kobuleti | SNR<br>MR | Strict Nature Reserve[1]<br>- | Strict Nature Reserve[1]<br>Visitor Zone<br>Regulated Protection Zone |
| 7 | **Kolkheti NP/ Grigoleti** | Kolkheti | NP | Strict Protection Zone | Strict Protection Zone, Visitor Zone, Traditional Use Zone |
| 8 | **Kolkheti NP/ Imnati** | Kolkheti | NP | | |
| 9 | **Kolkheti NP/ Pitshora** | Kolkheti | NP | | |
| 10 | **Kolkheti NP/ Nabada** | Kolkheti | NP | | |
| 11 | **Kolkheti NP/ Churia-Anaklia** | Kolkheti | NP | | |
| 12 | **Ajameti** | Ajameti | MR | Managed Reserve | Managed Reserve |
| 13 | **Banishkhevi** | Borjomi-Kharagauli | SNR<br>NP | Strict Nature Reserve[3] | Strict Nature Reserve[3] |

1 …Kintrishi Strict Nature Reserve is not divided into zones.

2 …Kintrishi Protected Landscape is not divided into zones.

3 …Borjomi Strict Nature Reserve is nested within Borjomi-Kharagauli National Park and fully surrounded by it. The Strict Nature Reserve itself is not divided into zones.

### 7.1.1 National PA categories and zones of the component parts

Table 13 shows that the proposed component areas and buffer zones are composed of PAs of various management categories, and of various zones of those PAs that are zoned. Eleven of the 13 proposed component areas fully consist of either Strict Protection Zones of National Parks or Strict Nature Reserves. Two other proposed component areas consist partly or fully of other PA management categories or zones:

- Proposed component area No. 3 **Mtirala/Kintrishi South** includes parts of the Strict Protection Zones of Mtirala National Park and Kintrishi Strict Nature Reserve. However, in addition to this, it includes parts of the visitor zone of Mtirala National Park and a very small part (along a gravel road that separates two portions of Kintrishi Strict Nature Reserve). The management plan of Mtirala National Park shows that use of its visitor zone is sufficiently restricted to allow for the effective conservation of the natural dynamics of the target ecosystems and therefore an inclusion into the proposed component area (Appendix 10, MENRP 2015). The part of Kintrishi Protected Landscape that is proposed for inclusion into the component area is a thin (<200 m wide), ca. 6 km long strip along a gravel road that cuts through Kintrishi Strict Nature Reserve (Figure 4). It needs to be clarified if this road is open to the public. ***It still needs to be determined if this track has only minor impacts on the connectivity and integrity of the forest area that it crosses, or if the part of Kintrishi Strict Nature Reserve needs to be considered as a separate component area of the proposed property.***
- The **Ajameti** proposed component area (No. 12) is located within Ajameti Managed Reserve, which corresponds to IUCN PA Management Category IV (Dudley et al. 2013). The management plan of this PA (APA 2014) foresees the limited use of timber resources and non-timber forest products by the local population. The former is conditional on the finalization of a forest inventory, which is pending. Such a use may be incompatible with the integrity requirements of criterion ix as laid out in § 94 of the WHC Operational Guidelines (UNESCO 2016).

The proposed buffer zones of the proposed component areas also consist of various PA zones and categories:

- Where Strict Nature Reserves or the Strict Protection Zones of national parks are divided from non-protected areas by PAs or zones with less strict protection regimes, the border between the former and the latter shall define the border between the corresponding proposed component areas and their buffer zones. I.e., the Strict Nature Reserve or Strict Protection Zone of a national park will be the proposed component area, whereas directly adjacent PAs of other management categories or the less strict zones of national Parks will be the buffer zone in these areas.
- Where Strict Nature Reserves or the Strict Protection Zones of national parks directly border non-protected areas, a buffer zone of 200 m width was defined within these PAs/zones. In these cases, the proposed component areas will be surrounded by a 200 m wide buffer zone of the same IUCN Management Category or zone. The width of the buffer zone was defined based on minimum widths of buffer zones of comparable forest PAs which have already been inscribed on the World Heritage list. The maps enclosed with this study show both the zoning of PAs and the delineation of proposed component areas and their buffer zones (Figure 3-8).

The zoning of Machakhela National Park is currently still under negotiation between APA, the management planning consultant UNDP and the local population. For the purpose of this report, a zoning proposal that was developed by Ilia University on behalf of the UNDP project has been considered as the possible future zoning of Machakhela National Park (Gavashelishvili et al. 2016). ***The final zoning map as included in the future management plan of Machakhela National Park will need to be consulted to update the location, IUCN PA Management Category and zoning of the proposed component areas before a possible World Heritage nomination involving the two proposed component areas within this PA.***

### 7.1.2 Compliance of national PA categories with IUCN PA definition and categories

The Georgian PA definition and categories as laid out in the Law of Georgia on the System of Protected Areas (1997) broadly correspond to the IUCN PA definition and management categories (Dudley et al. 2013). This is also reflected in the management plans of the proposed component areas, which again contain provisions that are broadly consistent with those for the corresponding IUCN categories.

One exception of potential concern is that the strict protection zones (i.e. those zones primarily dedicated to the main purpose of protected areas, which – according to the IUCN PA definition – ought to be nature conservation) are often relatively small in Georgian National Parks, and only rarely meet the "75% rule" (Dudley et al. 2013). In relation to a possible World Heritage nomination, this is primarily reflected in the size of the proposed component areas, as these – with very few exceptions – can only be established in zones with the highest protection regimes (strict protection and partly visitor zones – see § 102 of the WHC Operational Guidelines – UNESCO 2015). In other words, this problem affects the potential OUV of the property to the extent that it reduces the extent of the proposed component areas. The size of proposed component areas is discussed further in Section 6.2 above.

## 7.2 Boundaries and buffer zones

### 7.2.1 Boundaries

According to § 99 of the Operational Guidelines to the WHC (UNESCO 2016), the boundaries of the proposed component areas need to be drawn so that they (1) *incorporate all the attributes that convey the Outstanding Universal Value* and (2) *ensure the integrity of the property*.

- **Incorporation of attributes:** The discussion of integrity in Section 6.1 shows that the boundaries of the serial property – i.e. of the proposed component areas taken together – enclose the distribution of the main attributes of likely OUV. The potential for a future extension of this serial property – in line with § 139 of the Operational Guidelines – to include additional forests expressing these attributes, which may occur in Turkey is discussed in Section 9.6 below.

- **Ensuring integrity:** The boundaries of the PAs in which the proposed component areas are located are officially gazetted by the Government of Georgia and marked on the ground (but generally only where they are crossed by access roads). They are also known to and generally accepted by the local communities living around these areas. This is particularly true for the boundaries of those PAs and zones that coincide with the proposed component areas of the property. The awareness raising and communication activities around the proposed component areas that are planned as part of this project will further verify this general observation and at the same time explain and promote the strictness of these boundaries.
- **Boundary-related integrity challenge at Anaklia Churia:** One potential integrity issue in relation to the boundaries of proposed component areas is the fact that the western border of Kolkheti National Park run ca. 50 m inside the mires at the Anaklia-Churia proposed component area. This boundary may be insufficient to ensure the hydrological integrity of this component area, depending on the use of the areas immediately adjacent to it. This issue needs to be discussed further.

### 7.2.2 Buffer zones

All buffer zones surrounding the proposed component areas of the series are legally designated and managed as PAs (Table 13). The characteristics and authorized uses of the buffer zones are defined in the management plans of the PAs on which they are established. Note that, since the buffer zones of some of the proposed component areas consist of more than one PA zone and/ or PA management category, these stipulations sometimes vary across the parts of the buffer zone corresponding to these PAs / zones.

The buffer zones of the various areas serve a wide range of protective functions, including against disturbance and harmful practices. For the peatland PAs which are proposed for inclusion in the series, these functions also include the following (Krebs et al. 2009):

- **Genetic exchange:** This zone facilitates the genetic exchange between populations of species of high conservation priority, to the extent that this is possible. To take the example of the Ispani II proposed component area, this function is fulfilled by the part of Kobuleti PAs which is occupied by the Ispani I mire, but does not form part of the nominated property.
- **Hydrological buffering:** Hydrological buffer zones shield the core areas they protect against anthropogenic alterations of the hydrological regime in their vicinity. For peatland PAs, this is particularly relevant because of the potential negative effects of draining surrounding agricultural lands. In the case of Ispani II, the surrounding rivers exert a significant buffering function, but an additional extension of the buffer zone to the North of the river Togona (e.g. up to the river Othskhamuri) would be desirable (Krebs et al. 2009).
- **Reduction of direct immissions:** This buffering function is relevant to both nutrients and pesticides. In particular, the percolation bogs are sensitive against nutrient pollution. As the proposed component properties such as Imnati, Ispani 2, Grigoleti, and Pitshora are surrounded by forest, the effect of immission input from the surroundings is minimized.

The buffer zone of the proposed component areas Mtirala/Kintrishi South and Kintrishi North are relatively narrow. It should be explored in the run-up to a possible nomination if an extended functional buffer zone can be established not based on an enlargement of the corresponding protected areas, but using protective forest categories as identified by Georgian forest legislation.

Paragraph 104 of the Operational Guidelines emphasizes that buffer zones may in some cases also be needed to protect *"important views and other areas or attributes that are functionally important as a support to the property and its protection"*. The need for this type of buffer zones has so far not been studied systematically. ***This should be done in the immediate run-up to a possible nomination.***

Implementation of the protection regime of some of the buffer zones, in spite of their official PA status, will require the active participation and support of the local population inhabiting them or their immediate surroundings. This project envisages intensive communication and awareness raising activities to ensure this support.

# 7.3 Protection and management system

All of the PAs overlapping with the proposed component parts and buffer zones have protection and management systems corresponding to Georgian legislation, and broadly 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 way in which they are implemented and the degree of their effectiveness, differ between the individual proposed component areas.

## 7.3.1 Institutional setup

All proposed component areas of the Colchic Forests and Wetlands are managed not as independent legal entities, but as branches of the Agency of Protected Areas of Georgia (APA), a Legal Entity of Public Law (LEPL), which has existed since 2008 and reports to the Ministry of Environment and Natural Resources Protection of Georgia (MENRP). They report to the Agency's headquarters in Tbilisi and are financed from there. 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"*

Each of the PA administrations has a Director who reports to APA. While the administrations of Kintrishi PAs and Kobuleti PAs are located in the coastal town of Kobuleti, the administrations of all other proposed component areas are located in the immediate vicinity of the respective PAs.

***In general, the institutional setup of the proposed component areas of the Colchic Forests and Wetlands is considered conducive to the effective management of the series.***

### 7.3.2 Stakeholder participation and shared understanding of the proposed property

Stakeholder involvement in the general planning and management of the PAs that contribute to the proposed serial property appears satisfactory (see Section 7.3.3 below), but there is still limited awareness of, and hence limited participation of local and national stakeholders in the initiative to nominate parts of these protected areas as a serial natural World Heritage site.

The project acknowledges this fact. Extensive awareness raising and stakeholder engagement activities have been included in Work Package 3 of the project. These include the following:

- Designing and implementing information and PR work on World Natural Heritage.
- Conducting a regional stakeholder workshop for information about UNESCO World Heritage Site Nomination and Operational Guidelines.

***It is expected that, taken together, these measures will ensure a sufficient degree of stakeholder participation and shared understanding of the proposed property to meet the respective requirements of Article 111 of the OG (UNESCO 2016).***

### 7.3.3 Management plans of component parts and their implementtation

All of the proposed component areas – with the exception of Machakhela NP and Kintrishi SNR – have officially approved management plans in place. New management plans of Kolkheti NP and Kobuleti PAs are currently being written, including a strong focus on mires and socio-economic aspects. The management plans of Machakhela NP and Kintrishi PAs are under development, with consultation of the draft management plan for Machakhela NP expected to commence in May 2017, and the management planning process of Kintrishi PAs expected to start later in 2017 or in 2018.

Since 2014, the process and product of PA management planning in Georgia have been guided by a dedicated regulation (Ministerial Decree #110 of 12 March 2014). This regulation – including its strengths and weaknesses – has also been the framework within which the management plan for Mtirala NP has been developed, and within which those of Kolkheti NP and Kobuleti PAs have been renewed. It will also underpin the management planning processes for Machakhela NP and Kintrishi PAs, for which tourism development strategies have already been developed (UNDP 2015a, b).

From the point of view of managing the proposed component areas to protect their likely OUV, the current management planning framework in Georgia has the following main advantages:

- **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 local stakeholder advisory boards.

- **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 will be in a position to build 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, which will be a useful prerequisite for developing a joint management planning framework for the entire series.

At the same time, there is also considerably room for improvement of the current practice as spelled out in Decree 110, in order to make this fully effective in safeguarding the likely OUV of the series. This results in a number of weaknesses of current planning procedures, which are tightly interconnected:

- **Weak linkage between description and design of conservation measures:** The regulation provides for a sufficient description of the biodiversity and requires planners to identify "problems and opportunities" of the PA, but the way in which biodiversity values and their current conservation status as well as direct threats and their underlying causes are then used to identify and prioritize necessary conservation measures is not sufficiently defined. This leaves it to the individual PA planners to decide how firmly management planning is based on the situation analysis for each planning process.
- **Lack of focus on biodiversity conservation in objective setting:** While international good practice would put long-term objectives related to the conservation of identified key biodiversity values at the centre of the management planning process (with other objectives seen as depending on these, and therefore secondary), this hierarchy is not spelled out clearly in Decree 110. This is reflected by some of the management plans which were produced based on this regulation. The management plan of Mtirala, for example, includes two – very general – long-term objectives on biodiversity conservation (142 words) and one on local participation in conservation (53 words) among its six long-term objectives, but provides much more detailed guidance on the development of tourism (246 words).
- **Weak guidance on defining key (conservation) values to be protected, and setting objectives for them:** The process of prioritizing elements of the described biodiversity as key conservation values of a PA and setting smart (i.e. specific, measurable, achievable, realistic, time-specific) objectives for them is not sufficiently defined in the regulation, which leads to very general value descriptions and objectives far too general to measure management progress.
- **Poorly defined procedure for situation analysis:** particularly regarding the conservation status of key conservation values, as well as the direct threats affecting them and their driving factors: Decree 110 does not provide guidance on how to assess the conservation status of key values. In addition,

Article 7 on the situation analysis does not use the terms "threats" or "pressures", but speaks rather generally about "problems and opportunities". This – together with the lack of methodological guidance on how to identify, prioritize and understand threats to biodiversity, may result in a lack of focus of management actions on the most important direct threats to biodiversity.

- **Weak integration of management and monitoring:** The regulation foresees monitoring against indicators for programme objectives, but no monitoring against indicators on species conservation status or the intensity of threats. This may hamper adaptive management in terms of adjusting the management programmes themselves. This provides for only a relatively weak basis for adaptive conservation management:

The current PA management planning framework will not be changed until the revision of the Law of Georgia on the Protected Areas System, which is planned for 2018 or 2019. This means that in order to ensure effective management of the series aimed at effective management of the series in line with current good PA management practice, the current guidelines (Decree 110) need to be implemented comprehensively and at the same time interpreted in such a way that their full potential to meet international good practice standards on strategy, adaptive, participatory PA management is realized. ***If this is done, then the management systems of the component areas of the series should be sufficient to safeguard the likely OUV of this serial property.***

The KfW-funded Support Programme for Protected Areas for Georgia (SPPA Georgia) is currently supporting a PA management planning process for Algeti National Park, which is also based on an interpretation of Decree 110 which aims at maximizing overlap with international good practice. While Algeti NP does not form part of the proposed series, some of the management planning procedures implemented there may be applicable in the PAs of the series as well. This should be explored further during the ongoing and upcoming management planning processes as listed below.

## 7.3.4 Management resources and capacity

Resources to implement the management plans of the proposed component PAs of the series are in place but will need to be extended in order to ensure the effective long-term conservation of the likely OUV of the series. A RAPPAM assessment for the entire PA system of Georgia in 2012 (Kakabadze 2012) concluded that:

- "Lack of personnel, including lack of qualified personnel is a significant problem. … Due to low salary and inexistence of a social package staff draining is a constant problem, while attraction of new staff is problematic too. There is need for capacity building. In order to maintain and attract staff, it is essential to provide adequate employment conditions and to implement regular programmes/courses for capacity building."
- "Although financing and revenues of protected areas has been increased for last years, lack of finances remains to be an important problem. Most of the problems existing in the PA system are caused by insufficient financing. For example, funds for purchasing as well as maintaining transport infrastructure, field equipment and facilities are small. Means and systems for obtaining, processing

> and analysing information are inadequate to needs, which cannot ensure comprehensive management of protected areas. Adequate financing is essential for solving existing problems."

These general observations were true for the proposed component areas of the Colchic Forests and Wetlands as well.

Since 2012, the Agency of Protected Areas and its partners have taken important steps to improve its resourcing and capacity. The Caucasus Nature Fund 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/). 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).

***These activities – as well as a number of specific initiatives aimed at individual PAs as described in Section 7.3.5 below – need to be continued so that the resources and management capacity of the component PAs can be developed in such a way that the likely OUV of the series can be safeguarded in the future.***

## 7.3.5 Ongoing initiatives to develop management capacity

Four initiatives are currently ongoing to improve the management system of individual proposed component areas, and hence the effectiveness and coherence of the overall management system of the property:

- **Support Programme for Protected Areas Georgia (KfW):** This programme supports four Georgian Protected Areas and their support zones, including Kintrishi PAs, in technical, social and economic terms (SPPA Georgia 2017). This support includes a participatory management planning process for Kintrishi PAs, which will commence in 2017 or 2018, and which will be accompanied by training in participatory, strategic, adaptive PA management to both the staff of the responsible branch of APA, and external stakeholders. A baseline study to underpin this process was already finalized in 2016 (Bakuradze et al. 2016).
- **Expansion and Improved Management Effectiveness of the Ajara Region's Protected Areas (UNDP):** Besides various support activities to Mtirala NP and Kintrishi PAs, this project includes a participatory management planning process for Machakhela National Park, which is ongoing. Approval of the management plan is expected for 2017 or 2018. It has also included training in PA management and related aspects. The project also helps promote cooperation of Ajara's PA with Jamili Biosphere Reserve in Turkey, which might become particularly relevant if a trans-boundary extension of the proposed series is envisaged in the future (UNDP 2017).
- **Support to the renewal of the management plan of Kolkheti National Park and Kobuleti Protected Areas (University of Greifswald):** The University of Greifswald has supported the revision of the management plan of Kolkheti National Park and Kobuleti PAs, which is currently pending approval by the Minister of Environment and Natural Resources Protection of Georgia.
- **Promotion of Eco-corridors in the Southern Caucasus (WWF & KfW)**: In addition to the above initiatives and the activities of the Caucasus Nature Fund in relation to Kintrishi PAs, this project aims

to contribute to the connectivity between several PAs (including Machakhela NP, 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.

- **Kolkheti Protected Areas Development Fund:** Based on a compensation agreement between the Ministry of Environment and Natural Resources Protection and the Kulevi Black Sea Terminal, this fund supports the various activities related to the infrastructure, equipment, planning and monitoring of Kolkheti NP and Kobuleti PAs (APA 2017).
- **Caucasus Nature Fund:** This conservation trust fund has supported, or currently supports, the operation of Kintrishi PAs and Mtirala NP (CNF 2017).

It is expected that these projects and activities together will contribute strongly to addressing some of the identified management challenges affecting the proposed component areas of the Colchic Forests and Wetlands.

### 7.3.6 Monitoring of the component parts

The monitoring regime of the proposed component parts of the series is described in their respective management plans. In general, monitoring is relatively ad-hoc, tied to the programme objectives but not to the overall long-term objectives of each protected area, and often conducted with rather limited resources. Even to the extent to which it is tied to objectives, these are often formulated in such a general way that they provide only limited guidance and information.

The Caucasus Nature Fund, 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). This approach might also be applicable to strengthen the monitoring systems of the component protected areas of the proposed property, and should be explored further in the run-up of a potential nomination.

***With a limited degree of strengthening and closer integration with the long-term objectives of each proposed component PA, and particularly with explicit conservation objectives related to the likely OUV of the property, their monitoring systems should be sufficient to qualify for inscription on the World Heritage list, in the sense of Article 111 of the Operational Guidelines.***

# 7.4 Feasibility and options for co-ordinated management of the entire series

Paragraph 114 of the OG stipulates that "In the case of serial properties, a management system or mechanisms for ensuring the co-ordinated management of the separate components are essential and should be documented in the nomination" (UNESCO 2016).

The current setup of the proposed series provides a strong enabling framework for the establishment of its coordinated management, for the following reasons:

- **Limited number and proximity of proposed component areas:** The proposed serial property consists of 10 component areas within 5 PAs in the recommended configuration (see Section 9.3 below). These component areas are situated in close proximity: None of the component areas of the – favoured – five-PA-configuration is more than 20 km isolated from other areas of the series, and the largest distance between two component areas (Machakhela South, Machakhela NP, to Churia/Anaklia, Kolkheti NP) for this configuration is ca. 90 km.
- **Consistency of management frameworks:** As explained in Section 7.3.3 above, most of the proposed component areas of the property have management plans that follow a standard format and have been produced based on a common procedure. Those PAs that form an exception to this rule will have their management plans written or rewritten according to it in the near future. This consistency of management plans is an important prerequisite for co-ordinated management of the entire series.
- **Institutional integration:** All PA administrations responsible for proposed component areas report directly to APA. Assuming a willingness on the Agency's part to coordinate management, this relatively strong centralization should contribute to the feasibility of a coordinated management regime.
- **Ongoing initiative to strengthen connectivity:** Section 7.3.5 lists the WWF/KfW eco-corridor project among the projects supporting the management and conservation status of the PAs involved. This project is aimed directly 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.

Taken together, these observations indicate that a coordinated management approach for the entire series is feasible. The question then is how such a management approach should be designed. The following aspects need to be taken into account to answer this question:

- **Impracticability of replacing existing management plans:** It would not be legally feasible or technically desirable to replace the existing management plans of the proposed component areas of the property by one integrated management plan of the entire property.
- **Room for improvement of monitoring systems:** As explained in Section 7.3.3 above, the monitoring systems of the PAs contributing proposed component areas of the Colchic Forests and Wetlands are not strongly integrated with the long-term objectives of these PAs, and are typically not focused on monitoring the conservation status of key biodiversity values or threats to them. An integrated monitoring system for the proposed component areas of the series would on the one hand

contribute to improving site-level monitoring systems, and on the other hand provide the necessary information to steer coordinated management of a possible property.

Therefore, the Consultant proposes to construct the co-ordinated management system of the property on the following three pillars:

- **Formulation and approval of a strategic guidance document** for the coordinated management of the proposed component areas, which defines a desired overall conservation status – in a SMART way – for all attributes identified as of likely OUV during the pre-nomination process, together with indicators and monitoring protocols for their status and major anthropogenic impacts (direct threats) on them. These can then be used to prioritize management activities from the individual management plans of the proposed component PAs for inclusion in annual work plans, and can also be considered during future updates of management plans. This strategic guidance document should be approved by APA or MENRP, but would in itself not require legal status, as it would only guide implementation of existing management plans. The implementation of the monitoring protocols would be responsibility of APA, who could delegate it to individual PAs as necessary. The framework for this monitoring system could follow that developed for two Georgian PAs by the Caucasus Nature Fund (Garstecki & Rajebashvili 2016 a, b).
- **Creation of a coordination committee for the contributing PAs at APA:** This committee should meet at regular intervals (e.g. quarterly in the initial phase, annually in the future), under the supervision of the APA Director, and agree on joint coordinated management actions which can then be further planned and implemented at the level of individual PAs. Its management decisions could be informed by the strategic guidance document and strategic monitoring results as explained above.
- **Creation of an overall stakeholder consultation council for the entire serial property:** Members of this consultation board could be recruited from the advisory boards of individual PAs plus additional institutional stakeholders of a more regional relevance (e.g. Governments of Ajara, Guria and Samegrelo Regions, Georgian National Tourism Administration, National Commission for UNESCO).

This proposed strategy, monitoring system and institutional setup for the coordinated management of the property should be developed further during the Work Package 2 of the ongoing project.

# 8. Questions to be answered during nomination process

The overall distribution of landscapes, ecosystems and species of flora and fauna is sufficiently well understood to inform decision making about the feasibility and preferable scope and configuration of a nomination. At the same time, a few knowledge gaps persist; closing them would further strengthen a possible future nomination and subsequent management. Among these are the following:

## 8.1 Questions on values, OUV justification and comparative analysis

- What is the exact distribution of forest associations and habitats within each of the proposed component areas of Machakhela NP, Mtirala NP, and Kintrishi PAs?
- What is the exact extent and state of lowland Colchic relict forests within the proposed component areas inside Kolkheti National Park?
- What further examples are there of species that survived the ice age in the Colchic area and have re-colonized other parts of Eurasia since?
- How can the global comparative analysis in relation to World Heritage criterion ix be strengthened, e.g. through a more explicit comparison of forest age, or through more detailed comparisons to the Pacific forests of North America and other relict forests in Japan?

## 8.2 Questions on management and integrity

- What is the exact legal meaning of the formulation “other activities that are allowed by legislation” in the management plan of Mtirala National Park, Article 31, paragraph (c.p), on activities allowed within the Visitor Zone of this NP?
- What exactly is the road cutting through the southwestern part of Kintrishi SNR (Figure 4) used for – how is use restricted?
- What additional management actions ouside the proposed property are needed in order to ensure hydrological integrity of the wetland proposed component areas of Kolkheti National Park and Kobuleti Protected Areas?
- Are there any plans to build an access road to the Anaklia port site along the coastal dune to the west of Churia/Anaklia proposed component area?
- Is there a possibility to strengthen the protection regime of Ajameti MR (non-intervention management in at least a significant part of the area) so that it can be included in a possible nomination?

- Can a second layer of functional buffer zone be added to the Mtirala/Kintrishi South and Kintrishi North proposed component areas? Could this be achieved without enlarging any PAs, simply by using forest use categories as foreseen in Georgian forest legislation?
- Will Kintrishi PAs be re-designated as a national park, and if yes, by when will its zoning be finalized?

## 8.3 Questions on nomination practicalities

- Is there scope for some coordination or cooperation between the State Parties of Georgia and Iran, to ensure success of both the Colchic Forests and Wetlands and the Hyrcanian Forests nominations, which might both be submitted in 2018 or 2019?
- Is a nomination for the 2018/19 nomination cycle still feasible, or should it be postponed to the 2019/20 nomination cycle?

# 9. Overall conclusions and recommendations

## 9.1 Suggested choice of World Heritage criteria for potential future nomination

Based on the discussion of the likely OUV of the series in relation to World Heritage criteria in Section 5 above, ***the Consultant recommends that the property be nominated under World Heritage criteria ix and x***.

The Consultant does not recommend nomination under World Heritage criterion vii because the Colchic Forests and Wetlands – although they are of considerable natural beauty – do not contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

The Consultant does not recommend nomination under World Heritage criterion viii because this criterion would not capture the likely OUV of the series, which is essential connected to ecosystems and biodiversity.

## 9.2 Justification of serial approach

Paragraph 137 of the OG requires a justification of serial nominations in terms of the extent that the property includes functional linkages that provide landscape, ecological, evolutionary and/or habitat connectivity, and requires that all proposed component properties contribute to the overall OUV. In addition, it needs to be shown that the property as a whole is manageable (UNESCO 2016).

### 9.2.1 Functional linkages and complementarity of proposed component areas

The question of functional linkages and complemantarity between the proposed component properties of the Colchic Forests and Wetlands needs to be answered at two levels: **(1)** How clear are the functional linkages between the proposed forest component areas on the one hand and the proposed wetland component areas on the other hand, and **(2)** how closely linked are the Colchic Forests to the Colchic Wetlands.

- **Functional links and complementarity among the proposed component areas predominantly containing forests:** It is beyond doubt that the five proposed forest component areas – considering the favoured configuration of the series – are highly complementary and closely linked to each other in functional terms. These areas differ in altitude range and humidity, and as a result accommodate different parts of the attributes of likely OUV in relation to World Heritage criteria ix and x. This complemantarity of the proposed component areas is spelled out into more detail in Section 4.2.3 and 4.3.1 above. It is closely associated with intimate functional linkages through the processes supporting refuge areas under slightly varying environmental conditions, various interconnected types of temperate rainforest ecosystems as well as succession stages, and gene flow. A further inclusion of component areas of Ajameti MR and parts of Borjomi-Khragauli National Park would strengthen the argument supporting the likely OUV of the series for some attributes (particularly those related to the importance of the property as a glacial refuge area in relation to World Heritage criterion ix and to overall biodiversity in relation to criterion x), albeit at the price of a potentially insufficient management regime in the case of Ajameti MR, and of a dilution of the Colchic character of the nomination in the case of Borjomi-Kharagauli National Park.

- **Functional links and complementarity among the proposed (predominantly) wetland component areas:** Likewise, there are demonstrable functional links between the six proposed wetland component areas of the series, particularly in relation to the attributes of likely OUV under World Heritage criterion ix "Functional ancient Colchic wetlands and forests" and "Origin and continuing development of percolation bogs". As explained in Section 4.2.2 above, the mires of Kobuleti PAs and Kolkheti National Park represent different stages of a long-term ecological succession from water rise mires to percolation bogs, and also reflect stable conditions leading to the persistence of water rise (Figure 20). They are also close to each other as well as linked – to various degrees – hydrologically and through gene flow.

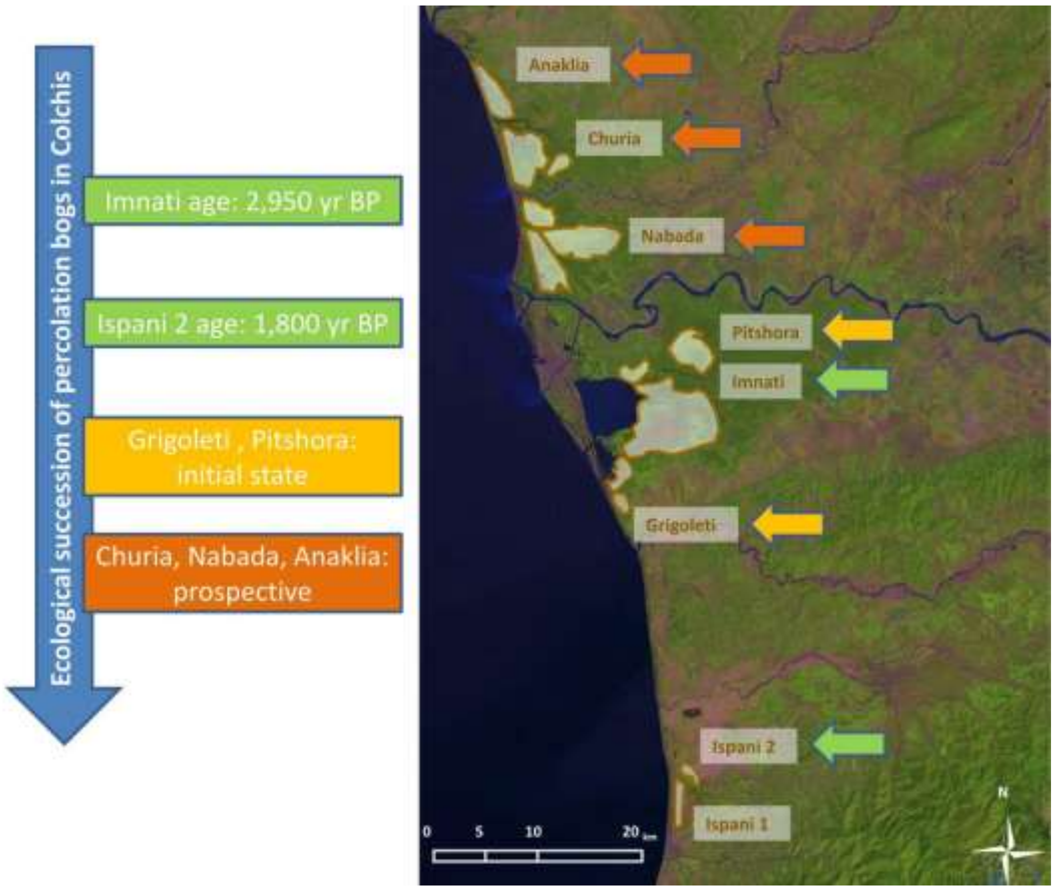


**Figure 20.** The peatland component areas of the Colchic Forests and Wetlands as stages in an ecological succession towards percolation bogs.

- **Functional links and complementarity between proposed predominantly forest and predominantly wetland component areas:** The functional linkages and complementarity between the proposed forest and wetland component areas prove to be equally robust at closer inspection: **(1)** The entire Colchic triangle is affected by a similar, highly humid warm-temperate climate across its entire altitude range, from sea level to the sub-alpine belt. The wetland and particularly peatland ecosystems with adjacent lowland forests of the Colchic Lowlands on the one hand and the nearby rainforest ecosystems of Ajara on the other hand represent two manifestations of the influence of this climatic setting on landscapes, vegetation and habitats at different altitude, and therefore form a functional whole. This is captured – jointly for forests and wetlands - by Attribute 1 of the proposed OUV of the series under World Heritage criterion ix. **(2)** The Colchic Forests and Wetlands share the same evolutionary and ecological history, particularly with regard to their function as glacial refuge areas. This is **(3)** also noticeable in the species complement of the Colchic wetlands, which includes a number of relict and restricted range species closely related to those of the Ajara PAs, in spite of their relatively low overall biodiversity (see Section 4.2.2). Finally, **(4)** Kolkheti National Park also contains a – limited – area of Colchic lowland forest (e.g. to the east of Churia mire), which means that the Colchic forests themselves extend into the Colchic Lowlands and are not restricted to the PAs of Ajara.

These arguments indicate that the full range of attributes of likely OUV of the Colchic region – particularly in relation to World Heritage criterion ix and also in relation to World Heritage criterion x – may be best captured by focusing on the entire complex of the region's ecosystems including forests and wetlands. There is also ecological connectivity between all proposed component properties of the series. This will be further enhanced by the outcomes of the ongoing project "Promotion of Eco-corridors in the Southern Caucasus" (WWF & KfW – see Section 7.3.5 above).

This does not automatically mean that a combined nomination of the Colchic Forests and Wetlands would be the only way forward. As the likely OUV according to some of the attributes identified above is predominantly located in either forest or wetland areas, it might theoretically be possible to concentrate a nomination on either forest and wetland associated attributes and hence on either forests or wetland PAs. The key necessary prerequisite for this approach would be that the values supporting these attributes would be strong enough on their own to justify inscription. The extent to which this prerequisite could be met is explored into more detail in Section 9.3 below.

## 9.2.2 Manageability

As discussed in Section 7.4 of this report, there is a strong enabling framework for a coordinated management of the proposed component areas of the Colchic Forests and Wetlands, so that the overall OUV of the series can be safeguarded. This is based on the limited number of and proximity between the proposed component areas, the consistent management framework and institutional subordination under the Agency of Protected Areas of Georgia, as well as ongoing efforts to enhance the ecological connectivity among the proposed component areas. Section 7.4 further makes detailed proposals for coordinated strategic orientation, monitoring and joint decision making for the coordinated management of all component PAs. The Consultant concludes that a serial World Heritage property Colchic Forests and Wetlands would be manageable in line with the OG, as long as the steps set out in Section 7.4 are taken by APA and its partners.

# 9.3 Alternative options for the spatial configuration of a serial nomination

Section 9.2 above demonstrates that, in terms of the complementarity of the contributions of proposed component sites to overall OUV and general manageability, all potential component areas – those dominated by forest and those dominated by wetlands – deserve further consideration for inclusion in a serial nomination. However, this does not preclude an assessment of the feasibility of a nomination of smaller subset of this site portfolio. Such an assessment needs to be guided by two questions:

1. How does the integrity and management regime of individual component sites affect the overall chances of success of a serial nomination including these sites?
2. Are there valid reasons to concentrate a nomination on only parts of the attributes of likely OUV that have been considered so far, and on only the sites expressing these attributes? If this is the case, how would such a narrowing of the focus of a nomination affect its overall chances of success?

These questions are discussed in Sections 9.3.1 and 9.3.2 below.

## 9.3.1 Potential integrity and management constraints of spatial configuration

As analyzed in Section 6.3 above, all proposed component areas are currently affected by some threats but likely to meet the integrity requirements for inscription under World Heritage criteria ix and x. However, if some of the identified potential threats to individual proposed component areas would become a reality, this would change this situation significantly, particularly in relation to the following proposed component areas:

- If Anaklia Deep Water Port is plannend to the north of the Churia-Anaklia proposed component property. However, there have reportedly also been discussions about an access road through the buffer zone of **Churia/Anaklia**, which might potentially affect the hydrological regime of that proposed component area. If this would be constructed, this would almost inevitably lead to the exclusion of this proposed component area from the series. The question then would be if the nomination of the *Colchic Forests and Wetlands* would still be feasible under these circumstances, of if the thematic scope of a potential nomination would need to be narrowed down to *Colchic Forests*. Churia/Anaklia mire is not a rain percolation bog, but is one of the component areas in a transition state form a nutrient richer lithogenous water supply to ombrogenous water supply, with more nutrient poor and acid conditions. Therefore, it would be important for the overall understanding of the specific mire types of the Colchic lowlands, but not central to the main identified attribute of likely OUV of the peatland ecosystems of the Colchic wetlands under World Heritage criterion ix (existence of rain percolation bogs). While the Consultant believes that a nomination of the Colchic Forests and Wetlands might still be feasible without this proposed component area, this would need careful and critical consideration if the plans to develop Anaklia Deep Water Port were to be confirmed. A scoping report for an ESIA for this development project was published in March 2017 (Anaklia Development Consortium 2017).

- Peat extraction from **Imnati** was discussed, but not permitted during the revision of the management plan of Kolkheti National Park in autumn 2016. If peat extraction from Imnati mire were to be permitted at some stage in the future, this would inevitably lead to the exclusion of Imnati mire from the proposed series. Since Imnati is the largest rain percolation bog in the World, its destruction or degradation would render any nomination of the Colchic wetlands in relation to the identified main attribute under World Heritage criterion ix (existence of rain percolation bogs) which is relevant to the Colchic Wetlands impossible. In addition, such a permission would risk casting serious doubts on the commitment of the State Party to apply the World Heritage Convention to its natural heritage, and would hence jeopardize any natural or mixed nomination in the foreseeable future.
- The proposed component area **Mtirala/Kintrishi South** overlaps with the Visitor Zone of Mtirala National Park. According to the Management Plan of this PA, only small developments of tourism infrastructure are foreseen/ allowed there. If this would change, this proposed component area would need to be reduced in size and reconfigured, which would significantly reduce the viability of any nomination that includes forests. The same would be true for **Kintrishi North** if Kintrishi PAs would indeed be re-designated as a National Park, as has been reported.

In addition to these potential constraints which are related to the integrity of the proposed series, the spatial configuration of the proposed series could also be constrained by management-related decisions of APA:

- Depending on how Machakhela National Park will be zoned as a result of consultations between APA and local land users, the preliminary proposed component areas of **Machakhela East, West and South** may need to be reconfigured and potentially reduced in size. This would not be as serious a constraint as a size reduction and fragmentation of Mtirala/Kintrishi South, but might reduce the size of the two smaller proposed component areas within this PA (Machakhela East and West) so much that they might no longer meet the integrity requirements of World Heritage criteria ix and x. This would gradually – but not catastrophically – reduce the chances of a successful nomination of any nomination involving Colchic forests.

The further discussion of options for the spatial configuration of the Colchic Forests and Wetlands serial property assumes that none of the potential constraints as listed above becomes a reality. However, if this *would* happen, the comparison of options in Section 9.3.2 below and its conclusions would need to be reconsidered.

## 9.3.2 Alternative options for the spatial configuration of the property

Five potential spatial configurations have been considered during the discussions about a potential nomination of a Georgian Colchic serial property for inscription on the World Heritage list since December 2011 (Garstecki 2012, 2014; Appendix 2):

1. ***Nomination of southern/central Colchic forest areas in Ajara only (Machakhela and Mtirala National Parks, Kintrishi Protected Areas or parts thereof);***
2. ***Nomination of Colchic wetlands only (Kolkheti National Park and Kobuleti Protected Areas or parts thereof);***
3. ***Joint nomination of the Colchic Forests and Wetlands;***
4. ***Addition of parts of Borjomi Kharagauli National Park (Banishkhevi Gorge, and possible additional parts on the Kharagauli side of the park) to option (1) or (3) above;***
5. ***Addition of parts of Ajameti Managed Reserve to option (1), (3) or (4) above;***

Table 14 below compares these options based on criteria related to the likelihood of meeting general OUV requirements under World Heritage criteria ix and x, as well as the requirements related to the integrity and management of a possible serial property. The results of this comparison can be summarized as follows:

- To the extent that the attributes of likely OUV as identified in Section 5.2 above stand up in global comparative analysis (GCA), they are best represented by a combined ***Colchic Forests and Wetlands*** serial property nominated under World Heritage criteria ix and x. This thematic and consequently geographical scope of a nomination would also involve a relatively large area (also considering that the area available for nomination is relatively small in comparison to most inscribed properties under World Heritage criteria ix and x, in any case). It could count with broad support of Georgian experts and institutional stakeholders.
- There would also be a justification for a nomination of the ***Colchic Forests*** only under the same World Heritage criteria, also the case for inscription of such a property under World Heritage criterion ix would be weakened in comparison to the previous option (minus one attribute of likely OUV under criterion ix). In addition, the overall area of such a configuration would be much smaller in comparison, and the likelihood of meeting the integrity and management/protection requirements for OUV would be reduced because of a greater vulnerability to potential integrity related challenges, which are primarily related to the as yet unclear zoning of Machakhela NP.
- A nomination of the ***Colchic Wetlands*** alone might also be possible, but would differ considerably from both options above. This would be a highly specialized nomination which would focus mainly on one attribute of likely OUV under World Heritage criterion ix (existence of rain percolation bogs). The reason for this is that the wetlands of Kolkheti National Park and Kobuleti Protected Areas do not sufficiently express the other attributes of likely OUV as identified in Section 5.2 above. As a consequence, the question whether attributes related to biodiversity, speciation and endemism are sufficiently represented within Kolkheti NP and Kobuleti PAs would automatically arise if these attributes were used in conjunction with these PAs (cf. § 88 (a) of the OG), and the answer to this question would clearly be negative. In other words, the Statement of OUV of a pure Colchic Wetlands nomination would rely mainly on the attribute of "existence of percolation bogs and related peatlands" under World Heritage criterion ix. The strengths, weaknesses and risks associated with this argument – and by implication those of relying exclusively on it – are discussed into more detail in Section 5.2.1 and 5.3.1 of this report. In addition to this, a pure Colchic Wetlands nomination would be more exposed to potential integrity risks related to the Chura/Anaklia and Imnati mires (see Section 6.3 above), and would require additional efforts to gain support among Georgian and international experts

and stakeholders, who have so far concluded that the highest chances of a successful nomination would be associated with the Colchic Forests (Garstecki 2012, 2014; Appendix 2).

- Addition of the ***Banishkhevi Gorge***, which is located within Borjomi-Kharagauli National Park, 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. 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 area is outside the Colchic region in the strict sense (cf. Zazanashvili 2005), although sometimes the term "Colchis Refugia" is also applied to all humid forest landscapes with a specific type of vegetation, which includes a number of endemic plant species and understory with evergreen shrubs, considered to be relicts, even if located in the Caspian Sea basin (e. g. Tuniev 1990). The forests of the area are of a clear Colchic type (Batsatsashvili, pers. comm.), but overall species composition is broader and reflects the location of Borjomi-Kharagauli National Park at a bio-geographic crossroads. The main problem with inclusion of this gorge into a possible nomination is that it might attract criticisms of "OUV eclecticism", i.e. of reflecting an attempt to lump as 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. This would be further supported by the relative distance of this potential component area from the other proposed component areas of the series. Therefore, it needs to be discussed further if these disadvantages of inclusion of Banishkhevi Gorge would outweigh the advantages.
- National experts also considered the inclusion of ***Ajameti Managed Reserve*** in the series. This would not significantly increase the species count of the series, but would allow inclusion of lowland Colchic *Quercus imeretina* and *Zelkova carpinifolia* forests, which would contribute to at least one of the attributes of likely OUV under World Heritage criterion ix ("functional ancient Colchic forests", see Section 5.2.1). These are not well-represented in other proposed component areas. However, because of its IUCN Protected Area Management Category (IV) specific management regime, and 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. The reasons for this are explained in more detail in Section 7.1.1 above. This means that inclusion of Ajameti Managed Reserve would potentially strengthen a nomination significantly, but would clearly require an adaptation of the current protection regime towards non-intervention management.

***In conclusion, the Consultant recommends nomination of a serial property consisting of the Colchic Forests and Wetlands. Inclusion of Banishkhevi gorge and Ajameti Managed Reserve needs to be discussed further. The latter would require a stronger management regime.***

Table 14. Comparison of options for the spatial configuration of a potential Colchic World Heritage property

(BKNP - Borjomi-Kharagauli National Park; OG - Operational Guidelines; OUV - Outstanding Universal Value; MR - Managed reserve; NP - National Park; PCA - proposed component area; WH - World Heritage).

| Option | # of PCAs | Area (ha) | WH criteria | # of OUV attributes | Advantages | Disadvantages |
|---|---|---|---|---|---|---|
| **Forests only** | 5 | 23,231 | ix<br>x | 2<br>3 | - clear thematic and geographical focus<br>- focus on under-represented ecosystem type (H. Knapp, pers. comm.) | - Does not cover full range south/central Colchic ecosystems of likely OUV<br>- Would not capture rain percolation bogs as one important consequence of local climate relevant to criterion x<br>- exposure to integrity risks related to Machakhela NP zoning<br>- - relatively small area in comparison to properties inscribed under criterion x |
| **Wetlands only** | 5 | 9,593 | ix | 2 | - clear thematic and geographical focus<br>- focus on under-represented ecosystem type<br>- - opportunity to pioneer use of World Heritage Convention as a tool for peatland conservation | - one two attributes under one WH criterion only<br>- would not capture important attributes of Colchic region of likely OUV related to endemism and glacial refuge history, because of § 88 (a) OG<br>- Does not cover full range south/central Colchic ecosystems of likely OUV<br>- relatively high risk of failure because of strong reliance on a unusual attribute of likely OUV with potentially disputed justification<br>- exposure to potential integrity risks related to Churia/Anaklia and Imnati mires<br>- very small area in comparison to properties already inscribed under criterion x<br>- potentially weak Georgian ownership |
| **Forest and Wetlands** | 10 | 32,824 | ix<br>x | 3<br>3 | - Covers full range of south/central Colchic ecosystems of likely OUV<br>- Relatively – in comparison to other options – large area<br>- Combination of forests and wetlands a distinguishes series from Hyrcanian forests (Iran)<br>- - opportunity to pioneer use of World Heritage Convention as a tool for peatland conservation | - complexity of attributes and criteria involved, complex comparative analysis<br>- potentially vulnerable to – unfounded – claims of "OUV eclecticism" |
| **Plus Banishkhevi, BKNP** | + 1 | + 6,350 | ix<br>x | 3<br>3 | - increased area, species number, and particularly number of threatened and endemic species<br>- - slightly better representation of two attributes of likely OUV in relation to WH criterion ix | - not inside the Colchic triangle (although with typical Colchic forest) and not purely Colchic, as BKNP is a biogeographical crossroads which combines characters of diverse areas<br>- vulnerable to claims of "OUV eclecticism"<br>- relatively wide-spread geographically<br>- Banishkhevi is only a small part of BKNP, which would complicate management |
| **Plus Ajameti MR** | + 1 | + 3,730 | ix<br>x | 3<br>3 | - inclusion of lowland Colchic Quercus imeretina and Zelkova carpinifolia forest<br>- increased area of overall nomination | - currently relatively degraded, and insufficient management and protection regime for World Heritage status (see Section 7.1.1) |

# 9.4 Likelihood and preconditions of a successful nomination

A nomination of the Colchic Forests and Wetlands as defined in Section 9.3 above, for the six attributes relevant to World Heritage Criteria ix and x as identified in Section 4, is likely to be successful, in the view of the consultant, if the following preconditions are met:

- None of the potential threats to the integrity of the series or its proposed component areas as identified in Section 6.3 becomes a reality, and the current pressures are continuously controlled through well-planned, well resourced PA management; no new critical pressures arise.
- The final zoning of Machakhela National Park allows for the establishment of the foreseen proposed component areas there, including a protective buffer zone as described in Section 7.2.2.
- No major infrastructure is established within the Visitor Zone of Mtirala National Park.
- PA management planning for Machakhela NP and Kintrishi PAs is finalized in 2017 or 2018 at the latest. Likewise, the revision of the management plans for Kobuleti PAs and Kolkheti NP is finalized and approved by 2018 at the very latest.
- Identified knowledge gaps (Section 8) are filled and this is reflected in the nomination dossier for the property.
- APA, with the support of the project, succeeds in further building the awareness of and support to a World Heritage nomination among local stakeholders around the proposed component areas.

In order to leave sufficient time for the further development of the management regimes of the abovementioned PAs, for building local stakeholder support, and for the elaboration of a sound nomination dossier, the Consultant recommends that a nomination be submitted in February 2019 (2019/20 nomination cycle).

The Consultant further recommends that a second opinion on the above from a suitable IUCN expert (or several suitable IUCN experts) be sought, based on the final version of this study.

# 9.5 Future extension potential of the series

Paragraph 139 of the Operational Guidelines to the World Heritage Convention (UNESCO 2016) stipulates: "***Serial nominations, whether from one State Party or multiple States, may be submitted for evaluation over several nomination cycles, provided that the first property nominated is of Outstanding Universal Value in its own right. States Parties planning serial nominations phased over several nomination cycles are encouraged to inform the Committee of their intention in order to ensure better planning.***"

The Colchic Forests and Wetlands have future extension potential to even more clearly express their likely OUV. The following areas in Georgia should be considered for future extension:

- Possible future PAs in ***Racha-Lechkhumi and Lower Svaneti***: Creation of new PAs in the southwestern Greater Caucasus, i.e. along the northeastern edge of the Colchic area within Georgia, has been considered for many years (Figure 21) (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, it would be extremely interesting as an additional potential component area of the series. Therefore, the current stage of considerations regarding the designation of such a PA (or PAs), as well as the suitability as future component area of the Colchic Forests and Wetlands, should be assessed further as part of upcoming Work Packages of the project.
- ***Ajameti Managed Reserve*** might qualify for reconsideration as a potential component area of the series in the future if its management regime is adjusted and implemented in such a way that it conforms to the integrity requirements of OUV under World Heritage criterion ix.
- Those PAs that are situated on the territory of Abkhazeti Autonomous Republic of Georgia (***Bichvinta-Misuera Nature Reserve, Pskhu-Gumista Nature Reserve, Ritsa Nature Reserve***) currently cannot be managed by APA. Should this change in the future, the possibility of their inclusion into the series should be assessed.
- If ***Kolkheti National Park is extended to include the lower reaches of the Rioni river*** with its sturgeon population (as currently under consideration), then this extension area could also be considered for future inclusion, as it would significantly increase the OUV of the area in relation to World Heritage criterion x.

In addition, there is at least one PA within the Colchic part of Turkey which might add to the likely OUV of the series in relation to World Heritage criteria ix and x:

- ***Jamili Biosphere Reserve*** in the Artvin Province of Turkey covers 27,152 ha with a core zone of 2,237 ha directly borders Machakhela National Park, which contains several proposed component areas of the Colchic Forests and Wetlands. This PA comprises interesting coniferous and deciduous forests, as well as the Karcal Mountains Important Plant Area (UNESCO MAB Programme 2017). Inclusion of this area might further support the likely OUV of the series in relation to both World Heritage criteria ix and x, because if might widen the thematic scope – under the Colchic theme – of the nomination to slightly higher areas (maximum altitude 2,415 m a.s.l.) with their typical biota. A possible future extension of the series to include Jamili Biosphere Reserve should be discussed during the immediate run-up to the nomination. The UNDP project "Expansion and Improved Management of the Ajara Protected Areas" might be of help in this, as liaison with Jamili Biosphere Reserve is part of the mission of this project (UNDP 2017).

There may be additional PAs along the eastern Black Sea coast of Turkey, within the Colchic region. ***Their potential for future inclusion into the Colchic Forests and Wetlands should be explored during subsequent phases of the project.***

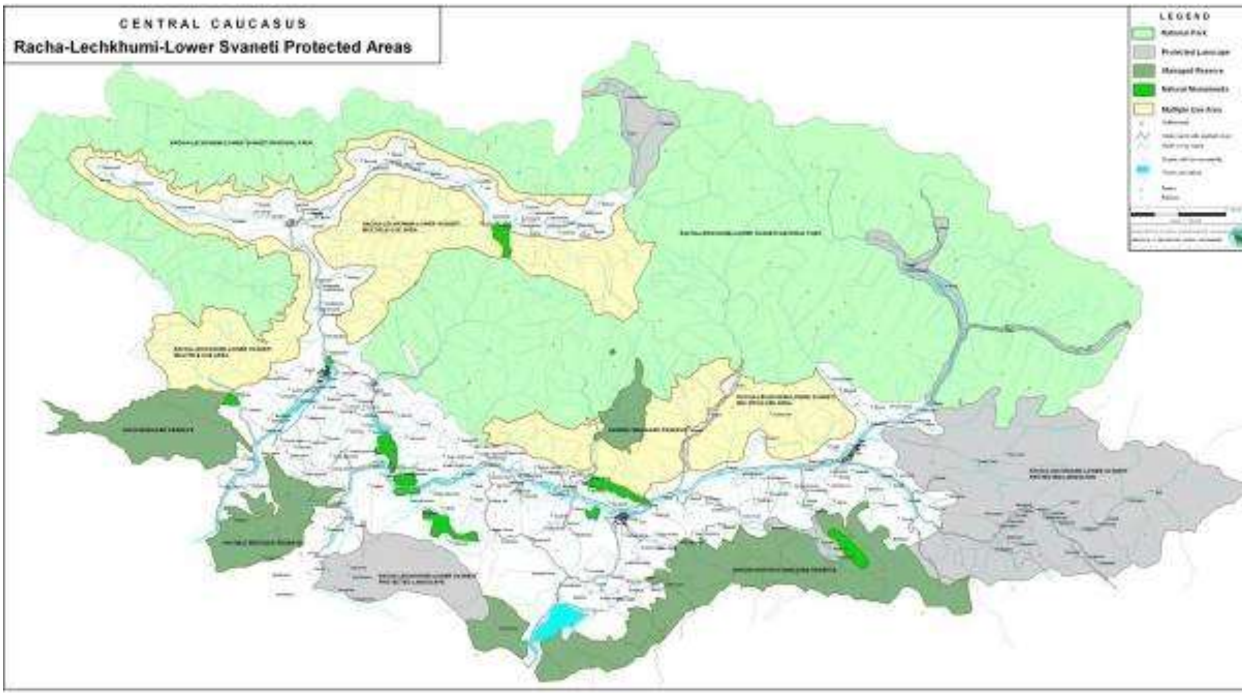


**Figure 21.** Proposed Racha-Lechkhumi-Lower Svaneti Protected Areas (source: GPAP 2008).

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# Appendices and electronic supplements

All appendices are submitted as separate files within one ZIP folder at the stage of draft submission.

- **Appendix 1:** Report of field mission
- **Appendix 2:** Report from national stakeholder and expert workshop
- **Appendix 3:** Original files of maps
- **Appendix 4:** Classification of plant associations of Colchic forests
- **Appendix 5:** High resolution map of habitats of Kolkheti National Park
- **Appendix 6:** Information on invertebrates of the Colchic Forests and Wetlands
- **Appendix 7:** Information on ichthyofauna of the Colchic Forests and Wetlands
- **Appendix 8:** Information on herpetofauna & mammals
- **Appendix 9:** Information on avifauna of the Colchic Forests and Wetlands
- **Appendix 10:** Information on activities allowed within the Visitor Zone of Mtirala NP (MENRP 2015)
- **Appendix 11:** Plant species lists for proposed component areas.
- **Appendix 12:** Overview over peatland areas in Europe. Source: Joosten 2017.