Hyrcanian Forests

Transnational Serial Extension of the existing World Heritage property “Hyrcanian Forests”, Islamic Republic of Iran (Ref.: 1584) and proposed modifications to the criteria used to justify inscription on the World Heritage List

Republic of Azerbaijan

Islamic Republic of Iran

Nomination Dossier to the UNESCO World Heritage Centre
for Inscription on the World Heritage List

Report

Baku and Tehran, January 2021

In the Name of Allah; The Beneficent,
The Merciful...

1. Identification of the Property

1.a Countries

Republic of Azerbaijan

Islamic Republic of Iran

1.b State, Province or Region

The existing Hyrcanian Forests serial World Heritage property is comprised of 15 components primarily located in three Northern Iranian provinces: Golestan, Mazandaran and Gilan, with small parts extending into the provinces of Semnan and North Khorasan.

The new proposed component parts are located in:

- Republic of Azerbaijan: The proposed extension nomination is comprised of three components located in Lenkoran district and Astara district
- Islamic Republic of Iran: The proposed extension nomination is comprised of two components located in Eastern Azarbaijan province

1.c Name of Property

Hyrcanian Forests

1.d Geographical coordinates to the nearest second

Table 1-1: The proposed new component parts with coordinates

Id n°	Name of the component part	Region(s) / District(s)	Coordinates of the Central Point	Area of Nominated component of the Property (ha)	Area of the Buffer Zone (ha)	Fig. N°
01	Dangyaband (Northern HNP)	Lenkoran district (Rep. Azerbaijan)	38°45'16.11" N 48°40'57.02" E	2,703	20,670	Fig.1-3
02	Khanbulan (Central HNP)	Astara District (Rep. Azerbaijan)	38°38'11.71" N 48°44'22.26" E	9,068	19,330	Fig. 1-4
03	İstisuchay Valley (Southern HNP)	Astara District (Rep. Azerbaijan)	38°27'17.88" N 48°40'45.49" E	12,817	21,632	Fig. 1-5

04	Dizmar West	East Azarbaijan (I.R. Iran)	38°47'03" N 46°28'17" E	4,706	55,725	Fig. 1-7
05	Dizmar East	East Azarbaijan (I.R. Iran)	38°52'38" N 46°39'30" E	2,416		Fig. 1-8
Total area (in hectares)				**31,710 ha**	**117,357 ha**	

1.e Maps and plans, showing the boundaries of the nominated property and buffer zone

This nomination is a transnational serial nomination proposing boundary modification to the World Heritage Property “Hyrcanian Forests” inscribed by Committee decision 43 COM 8B.4 (Baku, 2019). Furthermore, criterion (x) is proposed as an additional natural inscription criterion.

An initial overview map shows the location of all components of both the existing ‘Hyrcanian Forests’ property and the newly proposed components in Azerbaijan and Iran (Figure 1.1) The subsequent maps showing component clusters by country and each newly proposed component follow the overview map.

Detailed maps of all the new proposed component sites and buffer zones are also provided in the corresponding annex.

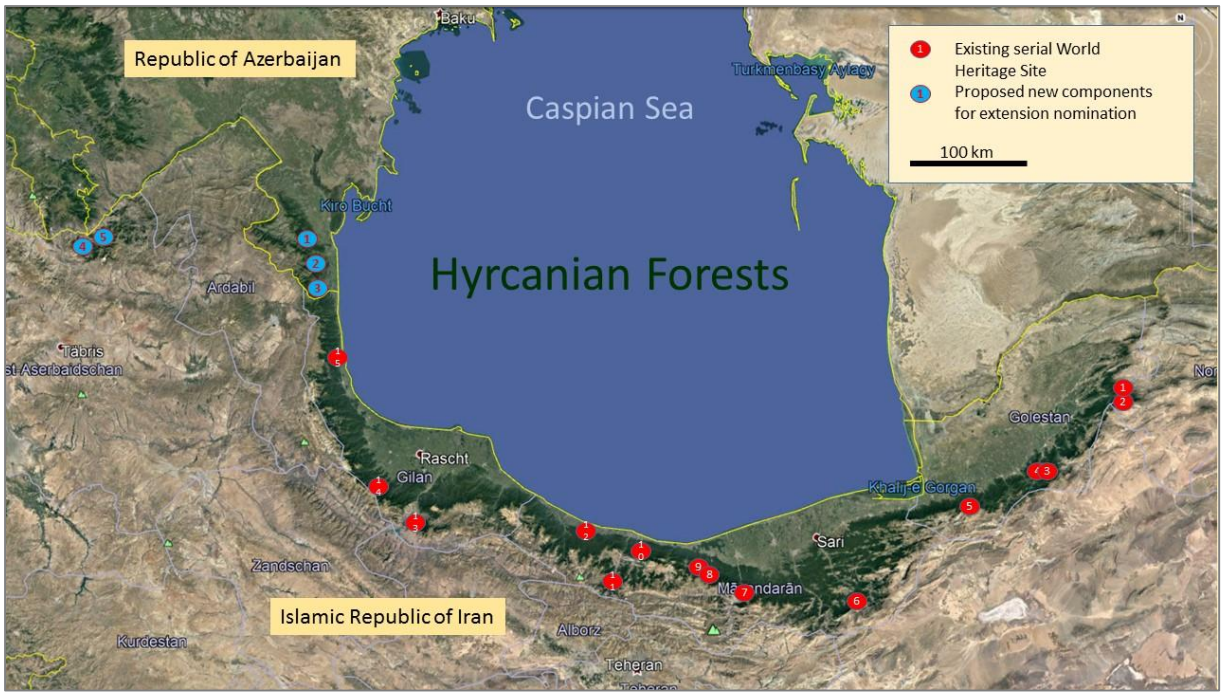

Figure 1-1: Location of the proposed component parts for the transnational serial extension nomination (blue 1-5) in relation to the existing World Heritage Property (red 1-15).

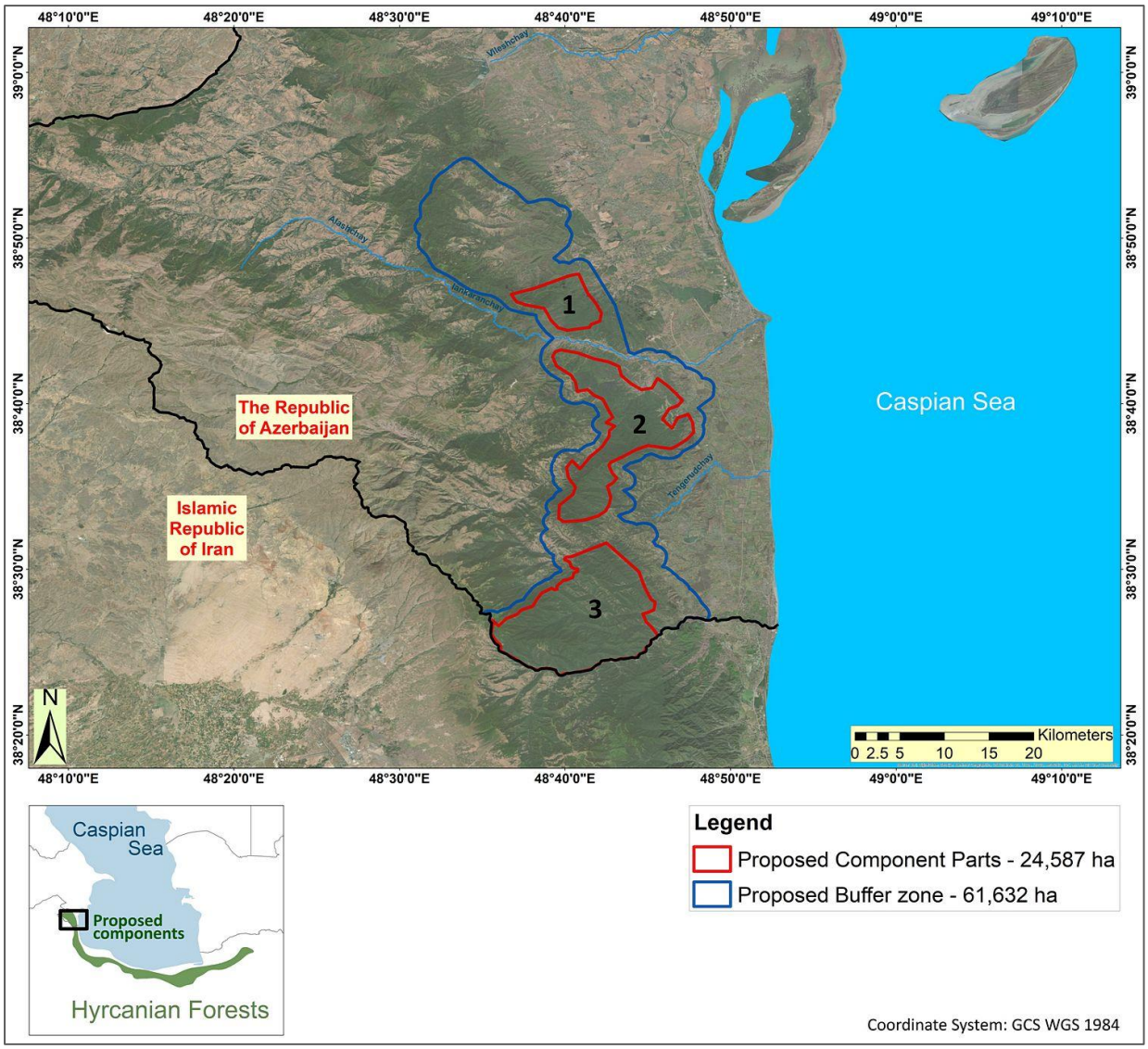

Figure 1-2: The three proposed component parts in the Republic of Azerbaijan.

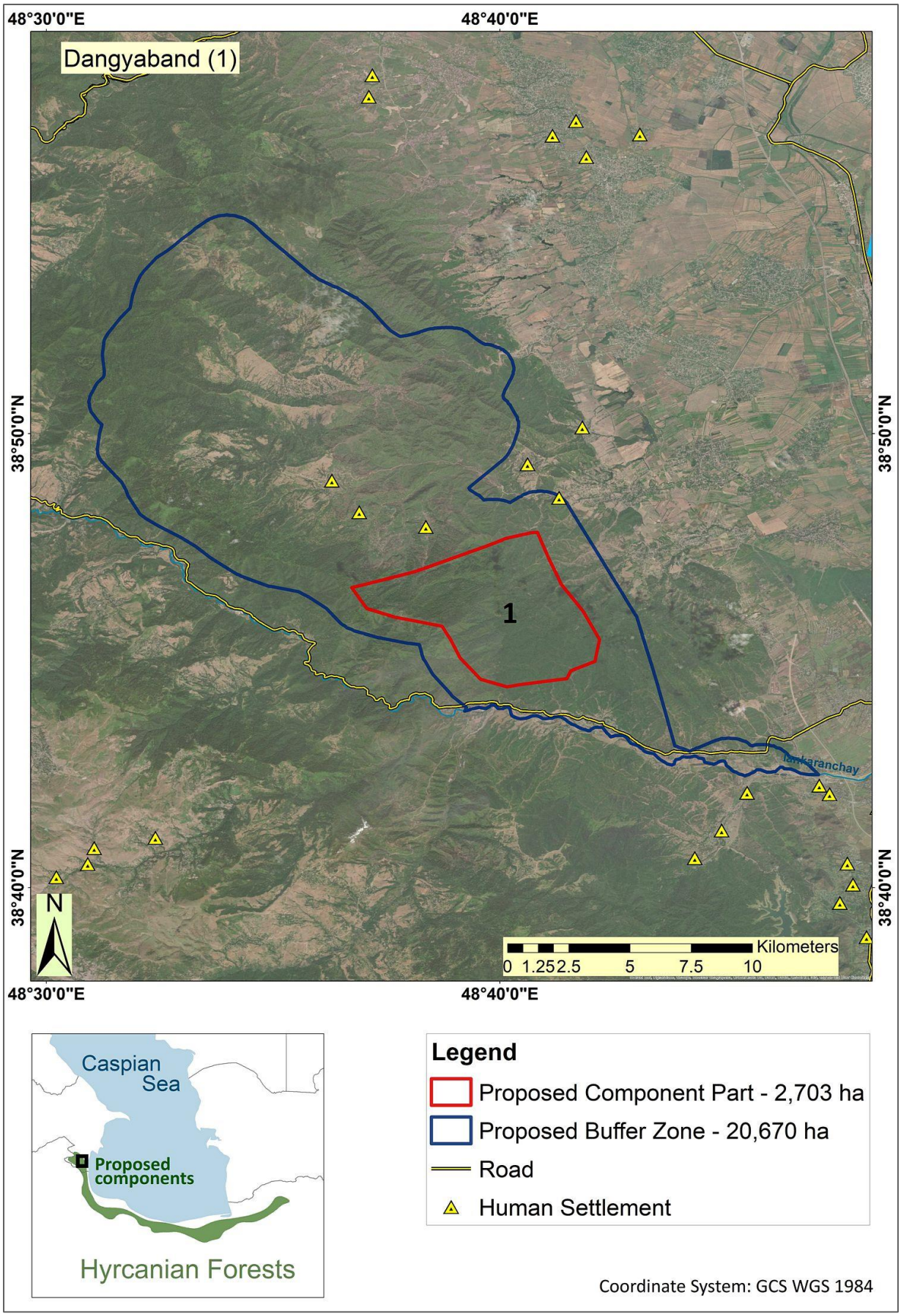

Figure 1-3: (COMPONENT 01) Dangyaband component, Northern Hirkan National Park, Republic of Azerbaijan.

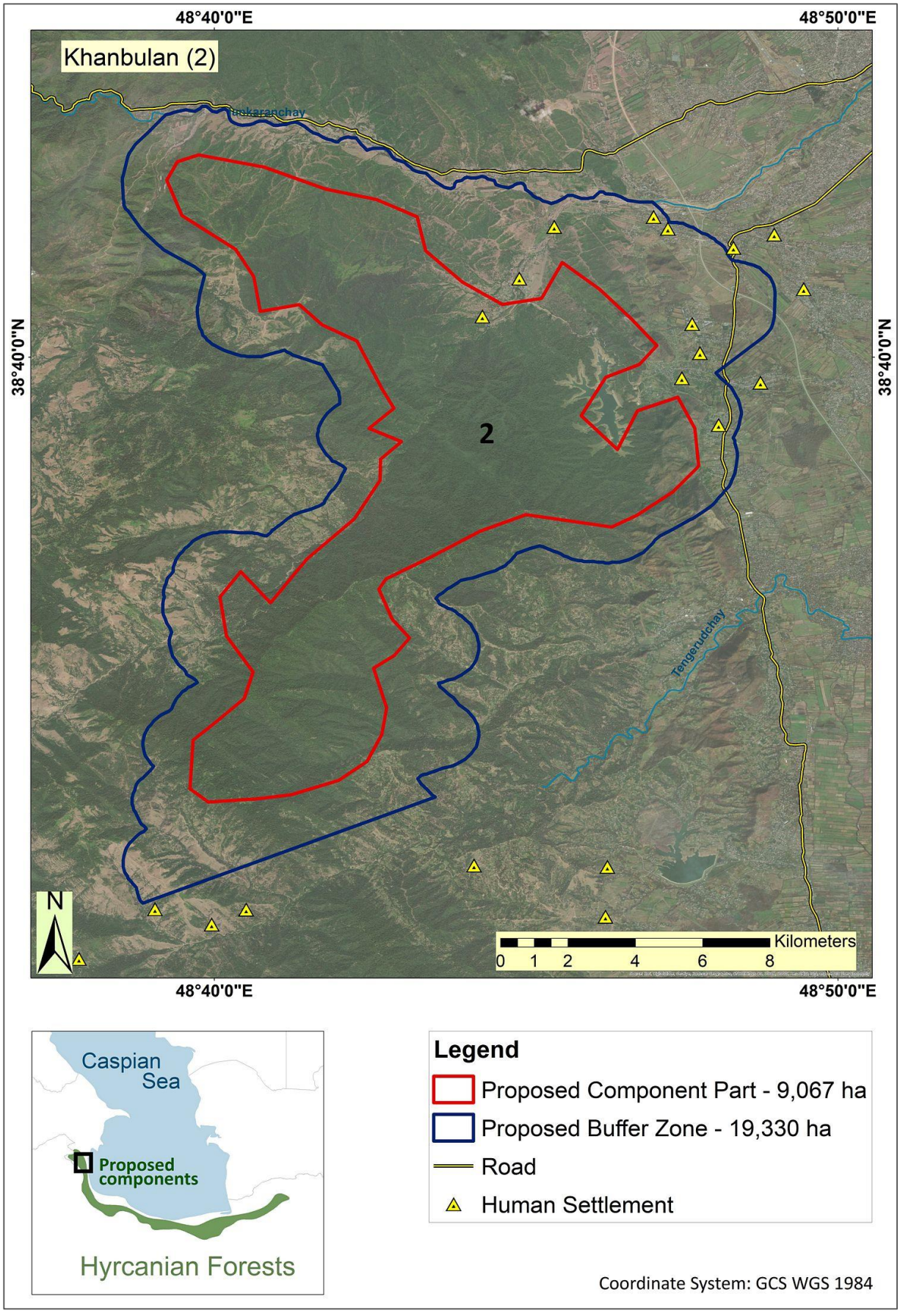

Figure 1-4: (COMPONENT 02) Khanbulan component, Central Hirkan National Park, Republic of Azerbaijan.

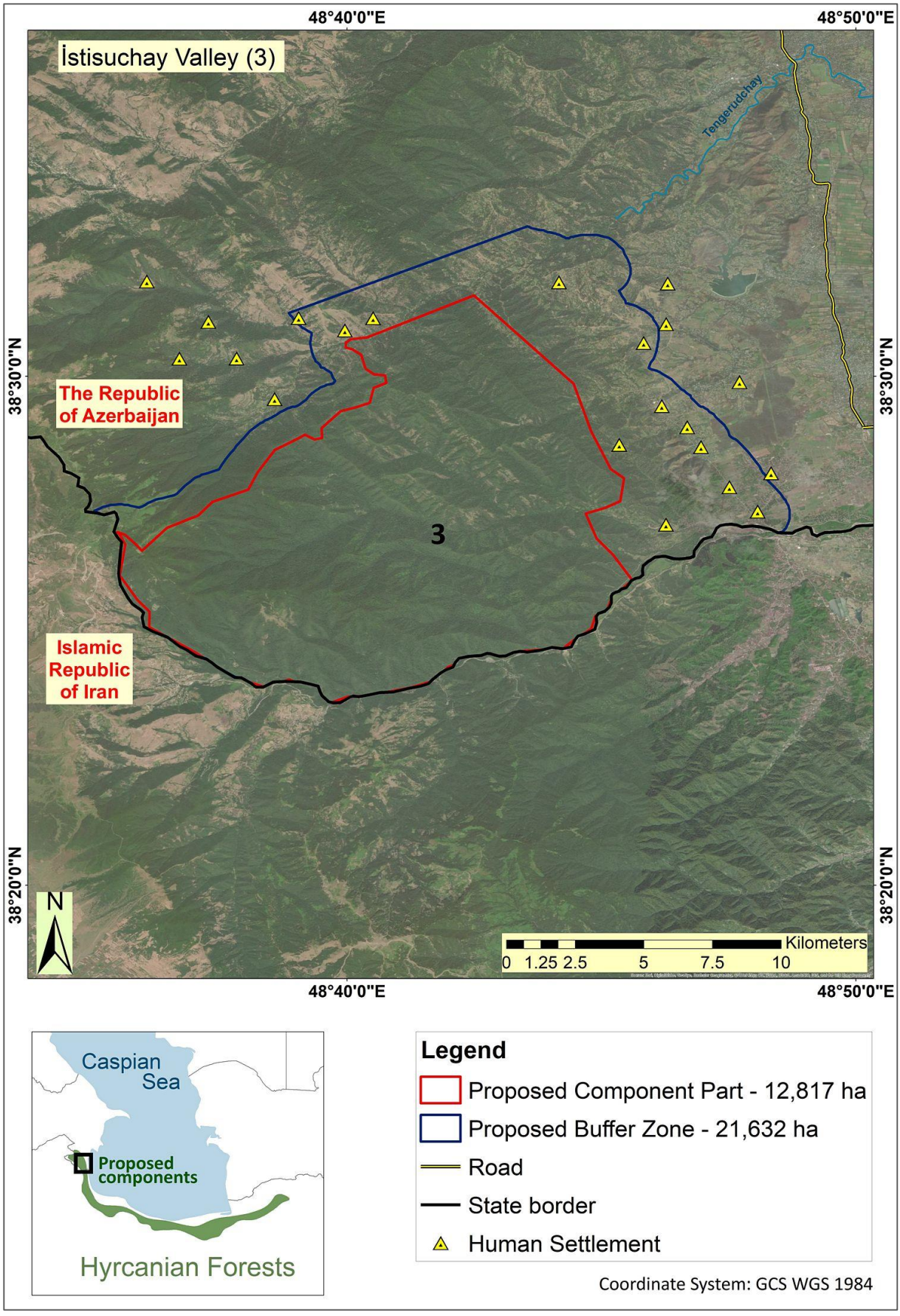

Figure 1-5: (COMPONENT 03) İstisuchay Valley component, Southern Hirkan National Park, Republic of Azerbaijan.

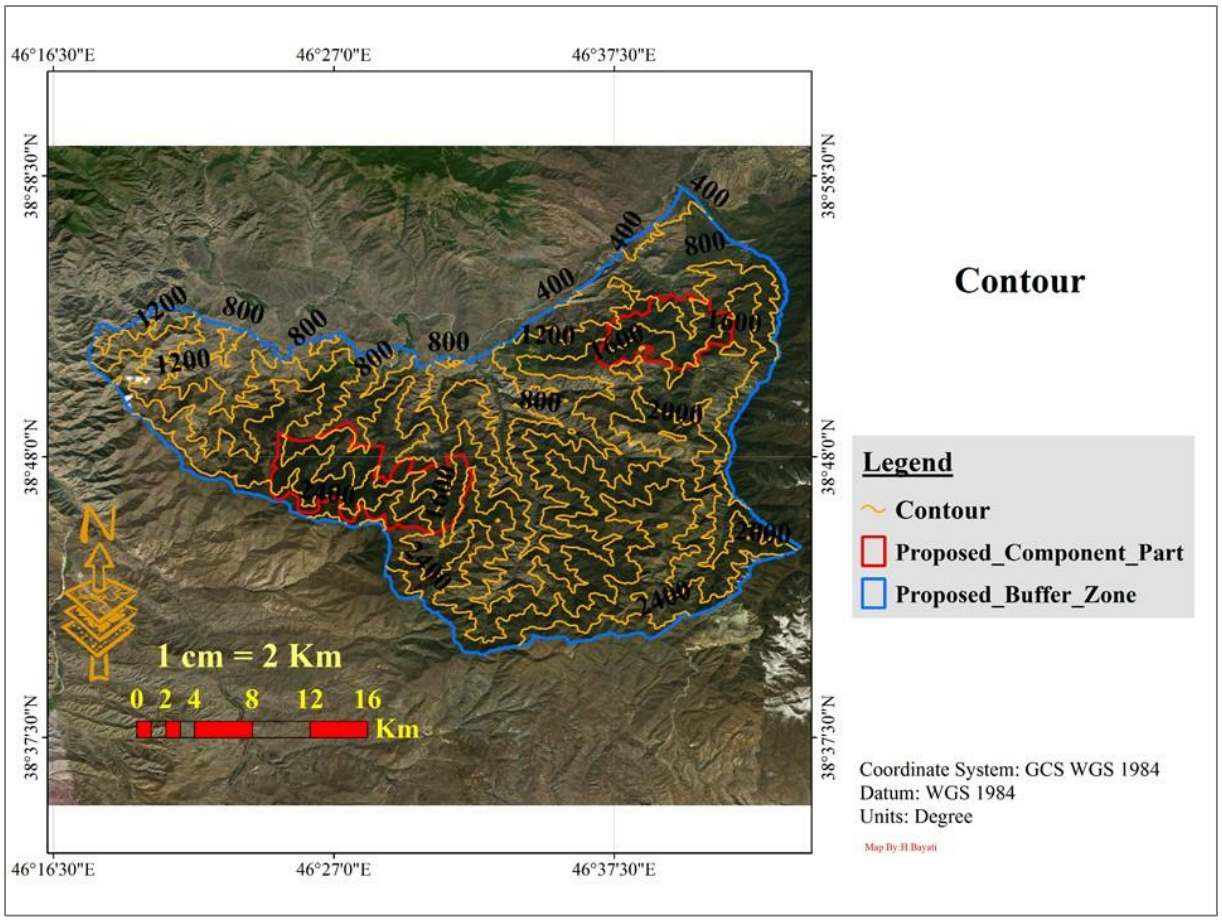

Figure 1-6: Two proposed component parts, Dizmar West and Dizmar East, within Dizmar Protected Area in the Islamic Republic of Iran.

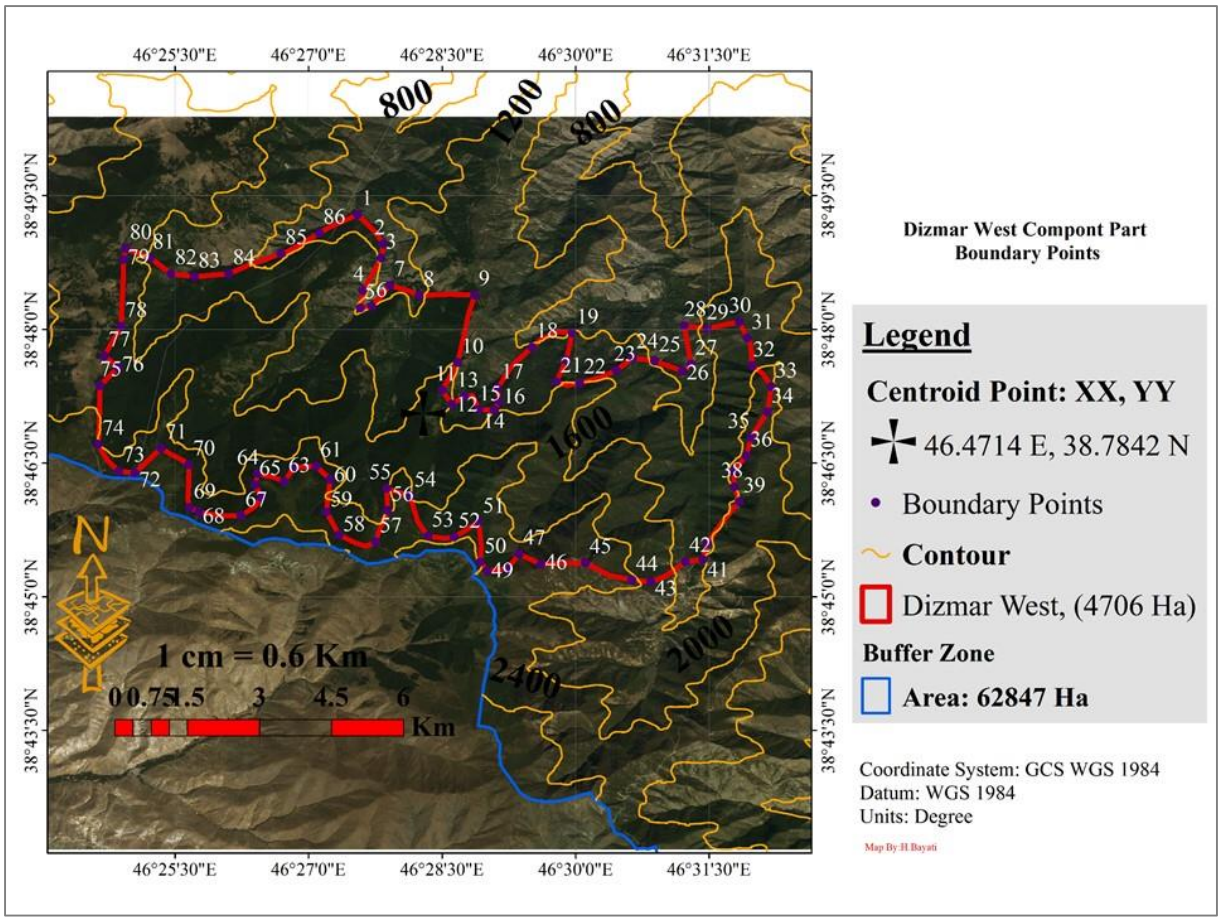

Figure 1-7: (COMPONENT 04) Dizmar West, I.R. Iran (numbers: boundary points, see Annex I).

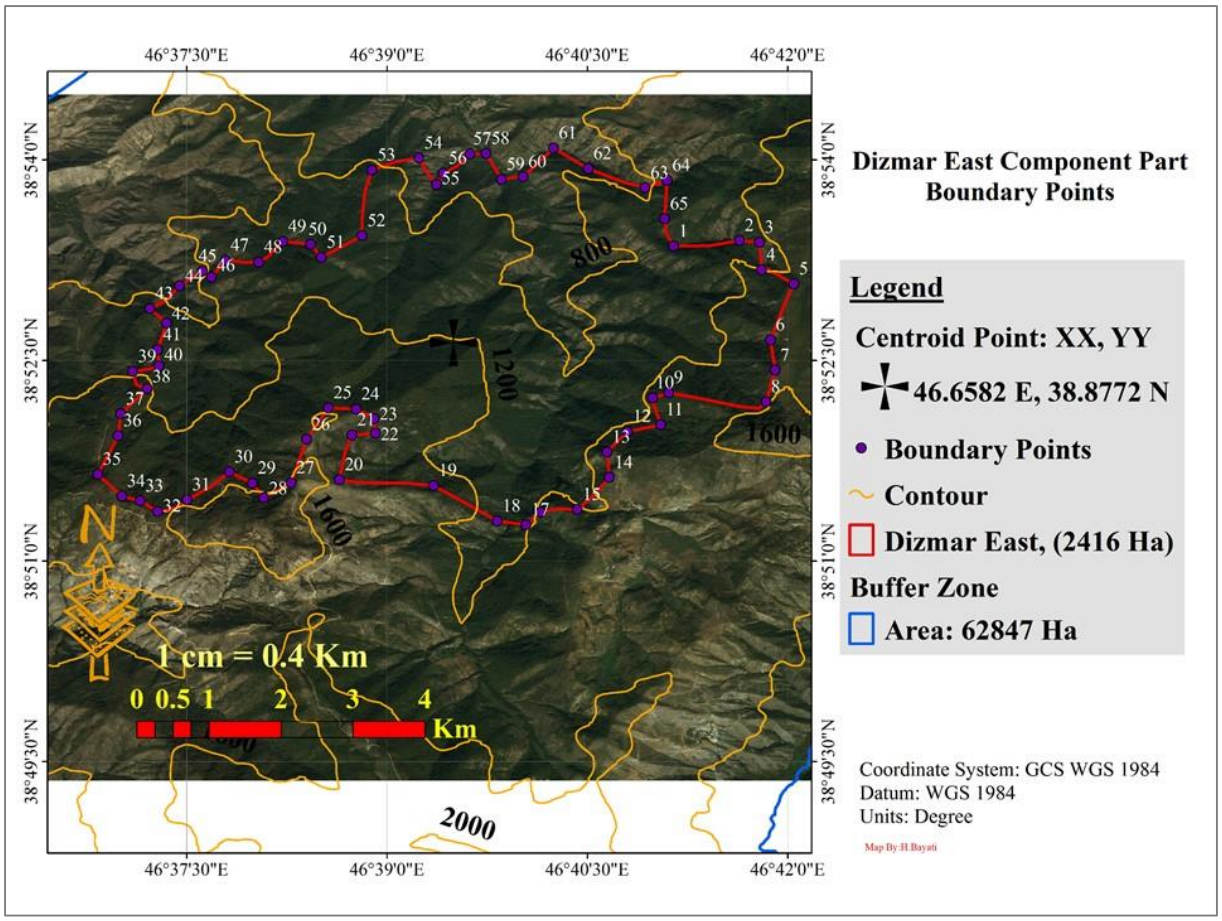

Figure 1-8: (COMPONENT 05) Dizmar East, I. R. Iran (numbers: boundary points, see Annex I)

1.f Area of nominated property (ha) and proposed buffer zone (ha)

Table 1-2: The proposed new component parts, location and size

Id n°	Name of the component part	Region(s) / District(s)	Coordinates of the Central Point	Area of Nominated component of the Property (ha)	Area of the Buffer Zone (ha)
01	Dangyaband (Northern HNP)	Lenkoran district (Rep. Azerbaijan)	38°45'16.11" N 48°40'57.02" E	2,703	20,670
02	Khanbulan (Central HNP)	Astara District (Rep. Azerbaijan)	38°38'11.71" N 48°44'22.26" E	9,068	19,330
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Total area (in hectares)				**31,710 ha**	**117,357 ha**

2. Description

2 a. Description of Property

2.a.1. General description of the Hyrcanian Forests

Along more than 900 kilometres, the Hyrcanian Forests[1] cover the slopes of the Talish and Alborz Mountains, which face the Caspian Sea, as a continuous green belt. The almost two million hectares of deciduous broadleaf forest extend from Lenkoran District in the Republic of Azerbaijan through the Provinces Gilan, Mazandaran and Golestan in the Islamic Republic of Iran. In 2018, the State Party of Iran submitted a serial nomination encompassing 15 component parts with a total surface area of 129,483 ha, for inscription in the World Heritage List under criteria (ix) and (x). On the occasion of the 43rd Session of the World Heritage Committee held in mid-2019 in Baku, Azerbaijan, the nomination was inscribed under natural World Heritage criterion (ix), as specified in the Operational Guidelines.

While constituting one contiguous forest region, the Hyrcanian Forests encompass a remarkable diversity of forest types along two major ecological gradients: The first from the northwest to the east; the second being a major altitudinal gradient from slightly below sea level all the way to the tree line at around 2,500 to 2,800 m a.s.l. in rugged mountainous terrain. While large areas have been subject to deforestation and forest degradation, especially in the lowlands and in easily accessible valleys, a significant portion of the Hyrcanian Forests has remained exceptionally intact. Thereby, the Hyrcanian Forests constitute one of the most important remnants of primary temperate deciduous broad-leaved forests anywhere on the planet.

The irreplaceable forest relics tell a fascinating story of the uninterrupted and ongoing evolution of temperate deciduous forests over some 25 million years from the Tertiary period[2] to this day, a fascinating story of continuity and survival, persistence and flexibility, adaptation and diversification. Two distinct ecotones further set the Hyrcanian Forests apart. While the ecologically fascinating transition from forests to subalpine and alpine vegetation at the tree line is not unusual per se, the abrupt encounter of lush temperate forests with rugged drylands and semi-deserts is most extraordinary. Maintaining the full range of natural forest dynamics, processes and features, the Hyrcanian Forests are renowned for their high biodiversity, numerous relic and fossil species of both flora and fauna, a high degree of endemism across numerous taxonomic groups and consequently an irreplaceable genetic pool in a limited area.

Noteworthy species include, for example, several relic tree species such as the famous Parrotia (*Parrotia persica*) tree, which also stands out during the spectacular autumn foliage coloring. Charismatic large mammals include the endangered Persian Leopard,

[1] From „Hyrcania“, the Greek form of an old Persian word to describe the region of Gorgan
[2] The term includes the geological epochs Paleocene, Eocene, Oligocene (Paleogene), Miocene and Pliocene (Neogene)

Brown Bear and Wild Cat. Unfortunately, the Hyrcanian Forests have not been spared from the human pressures, which have destroyed or fundamentally modified most of the world's temperate forests. The serial World Heritage approach to the Hyrcanian Forests is based on the selection of a network of the most intact, formally protected forests representing the biological wealth and diversity of forest types and ecotones across the forest region. This approach was successfully applied in the Islamic Republic of Iran.

The serial property encompasses 15 component parts cover a total area of 129,485ha, that are 7% of the total area of the Hyrcanian Forests, representing key examples of the various stages and features of natural Hyrcanian forest ecosystems as follows (component number in brackets):
Lisar (15) represents the northernmost and westernmost extremes of the Hyrcanian Forests, showcasing the most humid area in the Hyrcanian region. Golestan (01/02) is the eastern most and Boola (06) the southernmost extremes of the Hyrcanian Forests. They include major ecotones. Kojoor (10) is the centre and "heart" of the Hyrcanian Forests. It includes a closed forest massif on steep slopes as well as on mountain plains and valleys with optimal conditions for forest growth. Vaz (08, 09), Alimestan (07) and Chahar-Bagh (11) complete the altitudinal gradient representing higher elevation and ecotones in the central, beech dominated parts of the Hyrcanian Forests. Jahan Nama (05) represents the eastern border of the Beech Forests and the transition to mixed Oak Forests in the middle mountain belt, and Abr (03,04) is the "most well known" of the eastern parts of the Hyrcanian Forests, which is located outside the beech forests' relam. Khoshk-e-Daran (12) is the only remaining lowland swamp forest of high integrity, and Siahroud-e-Roudbar (13) includes a very distinctive mountain massif with closed forests, open woodlands and ecotones, considering the diverse climatic conditions this area is subject to (Fig. 2-1).

Although most of the ecological particularities characterizing the Hyrcanian Forests are represented in the inscribed property, there is considerable potential for further serial extension to include additional areas of global conservation value in both the Islamic Republic of Iran and the republic of Azerbaijan and. Therefore, the Islamic Republic of Iran explicitly invited the Republic of Azerbaijan to consider a serial transboundary extension in case of a successful inscription (ICHHTO 2018).

The extension proposed here is based on the same approach. Concretely, this extension is based on the highly selective identification of the most valuable and intact representations in the Republic of Azerbaijan while further refining the identification of the best representations of the Hyrcanian Forests in the Islamic Republic of Iran.

The Iranian nomination dossier (ICHHTO, 2018) underpinning the successful inscription in 2019 provides a detailed general description of the Hyrcanian Forests. It was considered unhelpful to duplicate the existing and readily available full text. Rather, this dossier making the case for the transboundary extension of the existing property synthesizes key aspects while also adding specific information about the newly nominated components.

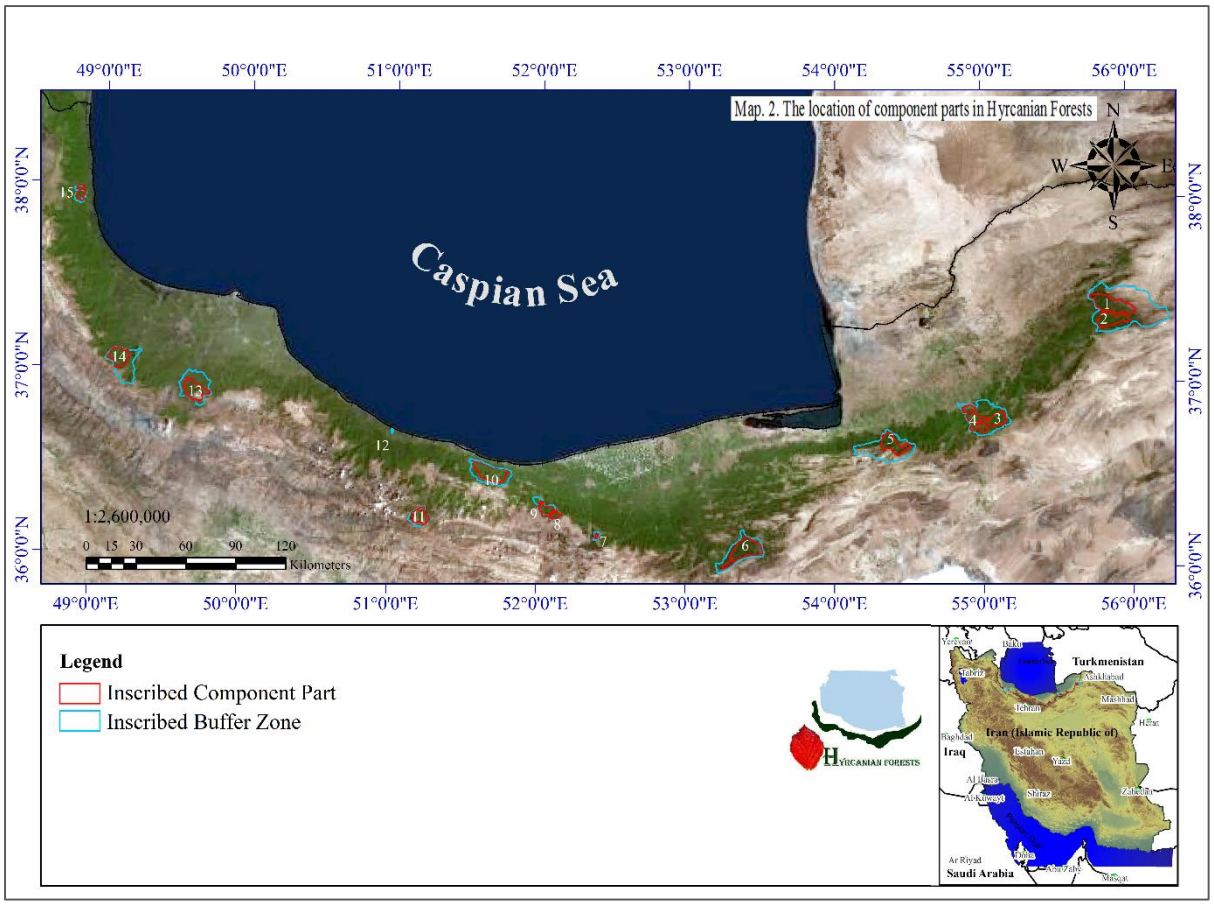

Figure 2-1: Location of the component parts of the existing World Heritage Site "Hyrcanian Forests" (from East to West).

The flora is characterized by the following phyto-geographical elements:
1 – Hyrcanian endemics
2 – Hyrcanian-(Caucasian)-Euxinian endemics
3 – Hyrcanian-Euxinian-Submediterranean elements
4 – Hyrcanian-Euxinian-European deciduous forest elements
5 – Hyrcanian-Mediterranean elements
6 – Hyrcanian-Mediterranean-Irano-Turanian elements

Seven groups of forest types are distinguished in several altitudinal belts. The fauna is rich in species of vertebrates and insects, especially saproxylic beetles.

The proposed additional components are three component parts situated within Hirkan National Park of Azerbaijan Republic (01-03), and two component parts with joint buffer zone within Dizmar Protected area in north west of Iran (04, 05) (see Fig. 2-2). All add value to the inscribed property in terms of inscription criteria (ix) and (x). It deserves to be emphasized that the Committee explicitly encouraged a transnational approach (see Decisions 30COM 8B.24 and 43 COM 8B.4).

Figure 2-2: Location of the proposed component parts for extension nomination (blue 1-5) in relation to the existing World Heritage Property (red 1-15).

Additional values of the new component nominated as serial extensions in the territroy of both States Parties include the following:

- They increase the size of the World Heritage property “Hyrcanian Forests” by 31,709 ha (24.5%) and its buffer zone by 117,357 ha (66.3%).
- They expand the existing World Heritage property both to the North and the Northwest, thereby completing the enormous climatic and biogeographic gradient of the serial approach.
- The World Heritage property “Hyrcanian Forests” is completed by missing forest types in the most Northern and Western part of Hyrcanion region. They increase the potential for adaptation of Hyrcanian forest ecosystems to changing climate conditions as an ongoing ecological process.
- They add important habitat for the survival of the endangered Persian leopard.
- Via the inclusion of a transition area, the meeting point of several floristic zones, including the Hyrcanian, they connect the Hyrcanian Forests with distinct but related Caucasian forests within the Caucasian ecoregion.
- With the transnational extension they open an unprecendented platforma and opportunity for transnational cooperation, as well as coordinated conservation and management of the Hyrcanian Forests and a broad range of further activities in diplomatic, cultural and scientific exchange.

2.a.2 Description of new component parts proposed as serial extensions

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

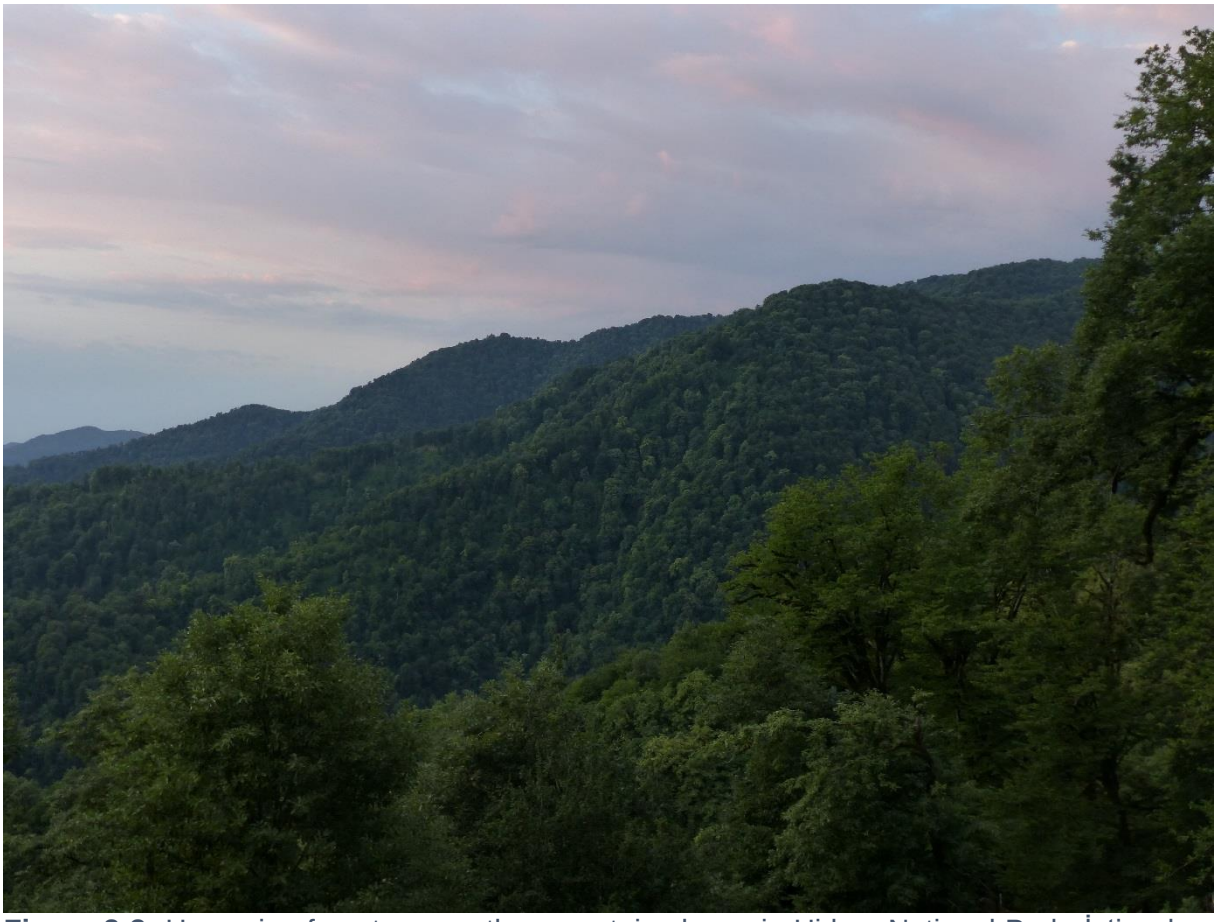

Figure 2-3: Hyrcanian forests cover the mountain slopes in Hirkan National Park. İstisuchay Valley (Southern part of HNP). (Photo by H. D. Knapp, 2019).

Hirkan National Park (HNP) includes three component parts, which constitute the most intact and best protected parts of HNP: Dangyaband (northern part), Khanbulan (central part), İstisuchay Valley (southern part) (01, 02, 03)

Table 2-1: The proposed new component parts in Azerbaijan Republic, including surface area and buffer zones.

ID	District of Lenkoran Region	Component parts of Hirkan National Park component cluster	Size of the component part [ha]	Size of the buffer zone [ha]
01	Lenkoran	Dangyaband (Northern HNP)	2,703	20,670
02	Astara	Khanbulan (Central HNP)	9,068	19,330
03	Astara	İstisuchay Valley (Southern HNP)	12,817	21,632
Total			**24,587**	**61,632**

The proposed new component parts are located within the Hirkan National Park and build a component cluster with a joint buffer zone. They are jointly described in the following section.

According to the physical-geographic subdivision of Azerbaijan, the region where all three components proposed for nomination are located, belongs to the Lenkoran region (also named Talish region), limited in the North by the Kura-Araks Lowland (Mugan Steppe), in the East by the Caspian Sea, in the West and South by the water division of the Talish mountain range and by the Astarachai River, at the same time forming the border with Iran.

The nominated area, an integral and valuable part of the Hyrcanian Forests, is representative of the whole south-Caspian forest area from the coastal plain at the Caspian Sea up the adjacent mountains (Talish Mts., Elburs Mts.), extending from the southeast of Azerbaijan into northern Iran. Here, an independent, highly particular natural region has evolved, shaped by the geological development and the climatic situation created by the Caspian Sea among other factors (cf. subsequent chapters).

The part of this trans-border natural region located in Azerbaijan comprises the Lenkoran Lowland at the Caspian Sea and the areas of Talish Mountains heading towards and influenced by the Sea.

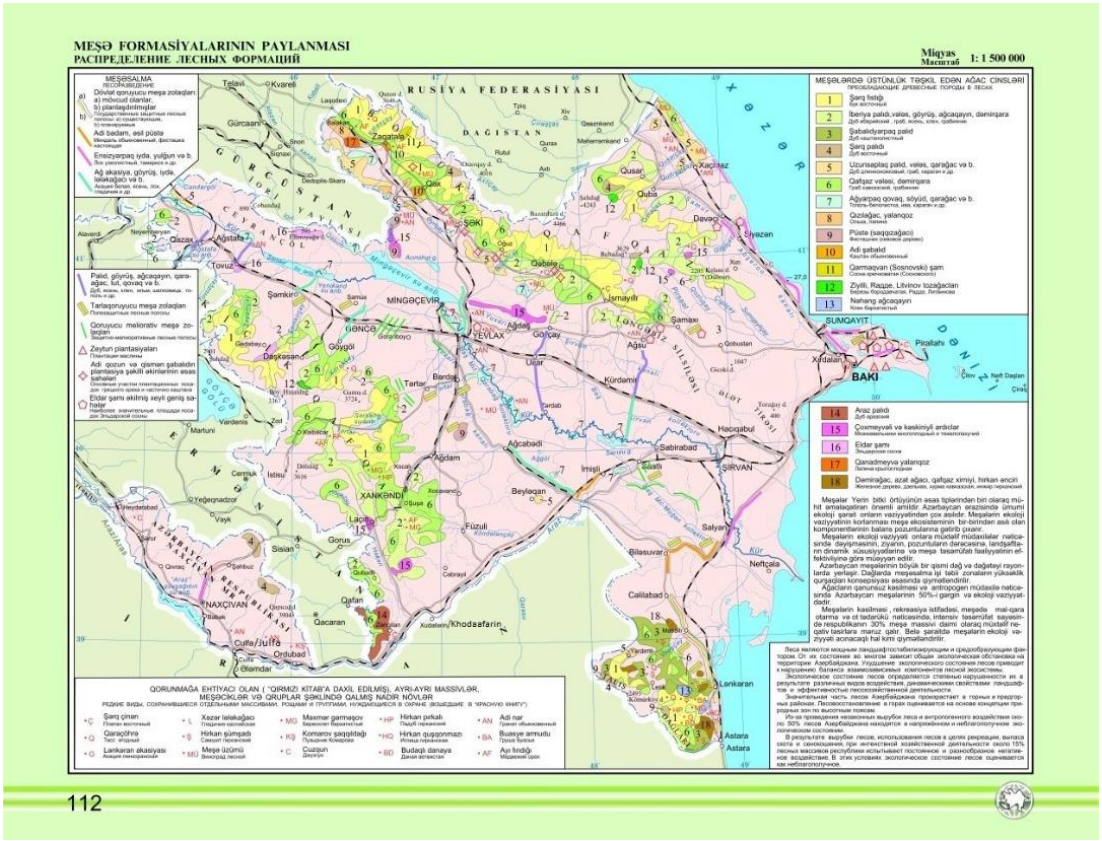

Figure 2-4: The distribution of forest types in Azerbaijan Republic.

The nominated area covers essential parts of the still forest-covered sections of the Talish. It extends from the mountains' foothills with the fringes of floodplain forests, that in river valleys, proceed as far as the lower mountainous belt up to the alto-montane zone (approx.1,800 m a.s.l.). The actual coastal plain, being largely deforested today,

and the subalpine belt (pasture land) remain unconsidered for the purpose of this serial extension. Hence, the proposed World Heritage property comprises the colline to montane hygro-thermophilous mixed forests and oak (*Quercus castaneifolia*) forests rich in tertiary relicts and in endemics.

The oriental beech (*Fagus orientalis*) forests that pdominate above 800 m a.s.l., in which the proportion of the typical Hyrcanian species decreases with increasing elevation, and locally oak-dry forests of *Quercus macranthera*, are sparsely stocked towards the timberline.

The nominated area is based on a serial approach uniting components, which were carefully selected according to the following criteria:

- Coverage of the largest and most intact remnants of primary forests;
- Representativeness in terms of the diversity of forest types, and of the specific plant and animal life including the endemic and relic species and most important wildlife habitats;
- Effective conservation and unambiguous governmental commitment to consolidate the conservation efforts for the selected components.

The selected parts of the Hyrcanian Forests have been fully dedicated to nature conservation at the highest political in both countries; all feature exceptional ancient trees among other attributes of old, almost undisturbed forests. A significant part of the forests proposed for nomination is of completely virgin nature, naturally preserved by steep slopes, harsh terrain and steep gorges. To this day, the areas of highest conservation value are difficult to access.

The proposed new component parts are situated in the Talish Mountains, which are recognized as a tertiary flora centre, represent a vast natural museum featuring numerous endemic and relic species. The so-called Talish centre with broad-leaved deciduous forest vegetation (nemoral forest biome) stretched from the foothills to the upper mountains. Jointly with the Colchis of Georgia, it is the most important arcto-tertiary relic and diversity centre of broad-leaved deciduous forest vegetation (nemoral forest biome) and its flora and fauna in Western Eurasia.

The three component parts - Dangyaband (Northern HNP), Khanbulan (Central HNP) and İstisuchay Valley (Southern HNP) proposed in the mountain ridges of the Talish Range in Azerbaijan represent the most northern extension of the Hyrcanian Forests.

Geological Composition

Stratigraphy

Two major mountain ranges have formed the folded fringe of the vast Iranian plateau and built the Alborz Mountains. The first movements occurred in the Palaeocene and the Alborz Mountain ranges were formed in the early Cenozoic. The second phase of mountain formation initiated in the early or mid-Oligocene. These phases resulted in the elevation and subsequent erosion of the central Alborz belt and eventually the thick deposition of Molas. Studies hold that the Alborz Mountains cannot be considered the result of an individual mountain formation movement, their formation is part of a considerably wider movement that included Iran in its entirety and the Caucasian Mountains, surrounded by the Saudi Arabian plate in the south and the Russian plate in the north (Khosrotehrani 1988).

Palaeo-geographic reconstructions revealed that the southern section of the present Alborz Mountains most likely formed a mountain range in the late Cretaceous, at ca. 65 Ma, and were non-depositional/erosional areas. The northern part that is geologically younger than the southern divide was submerged under the Paratethys Ocean until the middle Miocene at about 15–10 Ma (Berberian and King 1981). It is obvious that large water bodies were present in the current area of the Caspian and Aral Seas, which might have been a major source of humidity for the southern part of the Caspian region since the early Cenozoic. The size of these water bodies was considerably bigger than that of the Caspian Sea as we know it today, these were all during the main part of the Palaeogene and the early Neogene to the end of the Miocene (ca. 5.2 Ma) when major tectonic movements disconnected the Caspian basin from the ocean.

During the last glacial period, the Caspian Sea level raised to up to +50 m and became connected to the Black Sea signifying that it had a considerably larger size during some time intervals (Yanko-Hombach et al., 2010).

The Caspian western coasts (such as Asalem), geologically consists of acidic igneous rocks (granite), occasionally alkaline diorite, andesite, perfirite, and metamorphic rocks like quartz schist, belonging to the beginning of the Tertiary.

In the central parts (such as Nowshahr, Veisar and Kheiroodkenar forests in Iran), the geological substrate are mainly dolomite and calcic layers. These are sometimes associated with Paleozoic red sandstones surrounded by calcic layers of the Jurassic, Cretaceous or Carboniferous. Athigh altitudes, intrusive igneous rocks, often alkaline, are seen. In the eastern Mazandaran (Sangdeh and Neka forests) the geological formations are often composed by lime and dolomite, belonging to the Triassic and Jurassic.

However, the formations belonging to the late Tertiary such as metamorphic rocks and red quartz schist, are also found in some parts. In the easternmost Beech Forests in Gorgan, the geological formations mainly include lime, dolomite, and sandstones of Devonian or Carboniferous and Jurassic calcic layers. Metamorphic rocks such as quartz schist are also found in some areas (Sarmadian & Jafari, 2001).
Different geological types are one of the reason for the formation of different forest types in the Hyrcanian Forests.

Figure 2-5: Geographical location of the Hyrcanian Forests within the Caucasian and Caspian Region.

Tectonics

The Talish Mountains represent a big anticlinorium of the first order, consisting of two anticlinoria and a synclinorium of the second order dividing them. The Astara synclinorium occupies the south-western part of Lenkoran and refers to the Talish and Peshtasar Ridges. The anticlinorium consists of the Paleocene (the Astara assize) and Eocene (Kosmalyan, Neslin and Peshtar assises) measures gathered implications.

In total there are four full anticlines separated with small troughs (syncline). The south-eastern part of the Astara anticlinorium, the plications wings of which are characterized by a steep decrease of layers and complicated with destructions, has the most strained folding. Intensive folding of the described part of the Lenkoran region gets a clear reflect and is peculiar to the modern erosive relief.

Soils

The altitude range varies of selected parts from lowlands up to 600 meters, although individual stands are found at elevations of up to 900 meters. In the Hyrcanian coastal strip marine sediments form the geological substratum in a series of sequential terraces up to an altitude of 300 - 400 m a.s.l. The Talish Mountains are characterized by high variation of top-soils.

Taking into account all the physical-geographical, geological-geomorphologic and chemical-biological factors, the soils of the Talish are consist of the following types (table 2-1):

Table 2-1: Soil types of Talish

1	**mountain-meadow turfy and mountain-brown desert-steppe soils**
2	Mountain-forest brown leached soils
3	Mountain-forest brown and podzol soils
4	Mountain-forest yellow-green strongly and slightly podzol soils
5	Mountain-grey-brown soils
6	Chestnut after-forest alkali soils
7	Yellow-green podzol gley and marsh soils
8	Meadow and meadow-marsh carbonated soils
9	Meadow-averagely-humus
10	Partially alkaline and saline soils

The peculiarity of the climate, particularly the influence of the desert climate of the Iranian upland plateau, facilitated the formation of the mountain-meadow crop soils and mountain-brown desert-steppe soils in the territory of the Talish Ridge, which is a little different from the similar soils of the Greater and Lesser Caucasus. The soils of this kind are formed under less rich vegetation and represent mainly slightly formed top-soils. Their profile is often shorter and represents turf (sod), developed directly on the detritus material of products got by the weathering of dense rocks.

The mountainous-forest brown and brown soils are spread in the zones from 700 to 1800 m and have been formed in the climate with an average annual temperature of 6-10°C. The last type of soil is widely spread in the sub-mountain and low-mountain areas with humid-subtropical climate. This soil changes into different types of mountainous-forest brown soils above 700 m a.s.l.

Mountainous-forest yellow-green soils are formed due to weathering of various slates, tuff-sandstones and others. The zone of mountainous-forest yellow-green soils borders in the east with the zone of yellow-green podzol gley and marsh soils of the Lenkeran plain, formed under conditions of redundant surface humidity and often near the ground water level. The distinguishing feature of yellow-green gley soils is their brightly evident podzolity. Redundant surface and ground moistening favour the formation of the gley levels in them. These soils are mainly spread in the Caspian terraces of different ages. These soils, set free from marsh vegetation and forests, are very favourable for the cultivation of vegetables like melons or gourds, crops, citrus plants, and tea plantations as well. The humus content makes up 6-8 percent. In short: various forms of yellow soils (Ferrasols) are characteristic soil types for the tree communities in the Nominated Area. Yellow soils are widespread in Hyrcania.

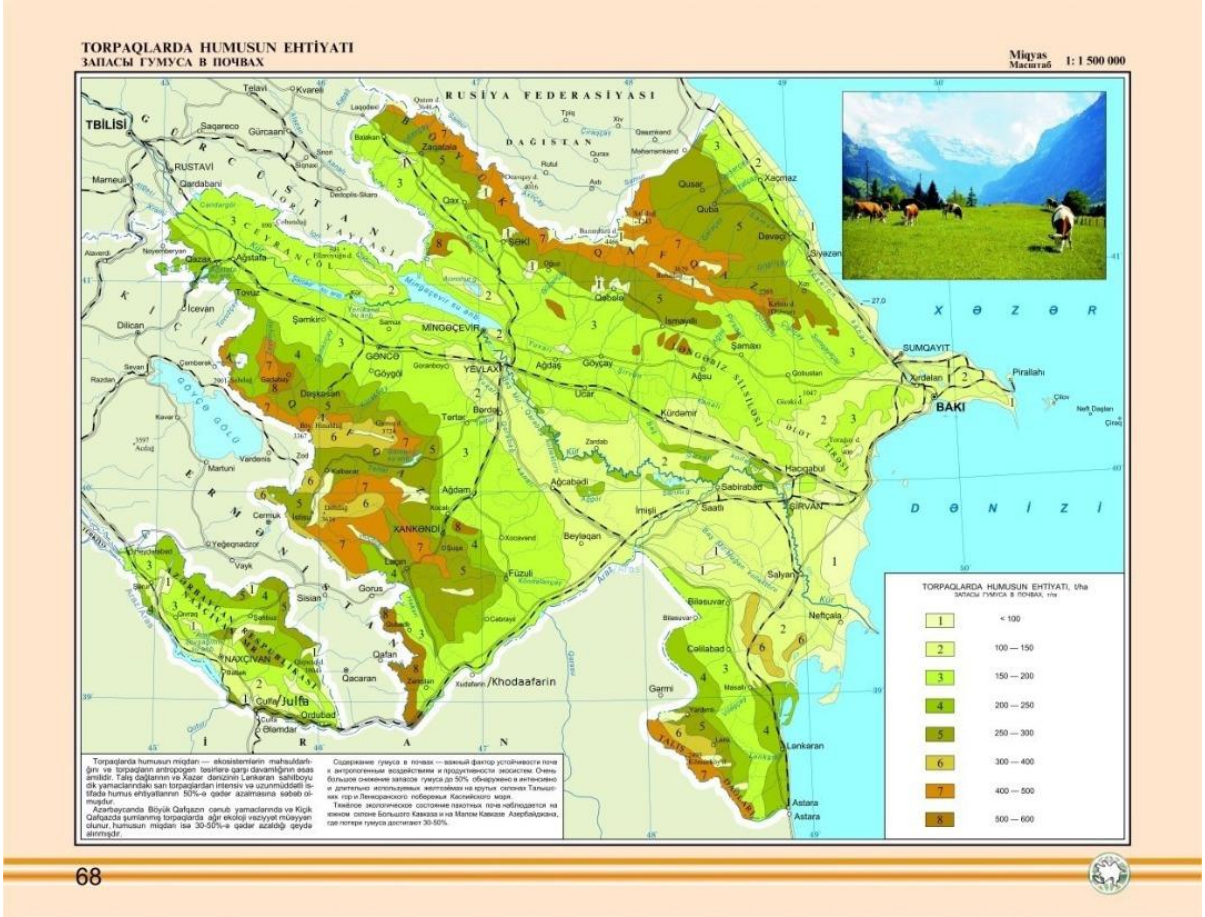

Figure 2-6: Content of Humus in the soils in Azerbaijan Republic

They show a moderate base saturation and occur in typical and in lixivated variants. In the Hyrcan foothills, yellow brown soils and mountain brown forest soils (Cambisols) have also formed in some places. In Hyrcania, mountain cinnamon-coloured forest hills (Chromic Cambisols) are found. Locally you can find extensive areas of humus carbonate soils (Rendzinas), as well as alluvial and gley soils.

Hydrology

The Hyrcanian Forests region spreads as far as the catchment area of the Caspian Sea. As a result, the waters of the Caspian create high precipitation and humidity in the northern main slopes of the Alborz Highlands. A dense net of streams, rivers and creeks in about 104 watersheds brings the water back to the sea. This ongoing cycle of water supply is a prerequisite enabling the Hyrcanian Forests s to self-sustain themselves.

The Caspian Sea is an endorheic lake, the world's largest lake in terms of both area and volume, extending roughly from 35 - 48° N and 47 - 55° E, respectively. Three basins divide the sea, becoming deeper southwards: the northern basin (80,000 km²) with an average depth of 5-6 m and a maximum depth of 15-20 m; the middle basin (138,000 km²) with an average depth of 175 m and a maximum depth of 788 m; and the southern basin (168,000 km²) with an average depth of 325 m and a maximum depth of 1,025 m (Leroy et al., 2007). The southern basin holds more than 65% of the Caspian Sea water. Such a huge water resource has been in the vicinity of the Hyrcanian forests for more than million years.

The mountainous rivers of the Talish cross the folded structures and flow in deep narrow valleys. The rivers of Astarachay, Istisuchay, Tanqaru, Vesharu, Lenkeranchay, Vilyachay, Bolqarchay, Qeoktepe and others with numerous tributaries belong to these rivers. The highest amount of water in the rivers is found during autumn, winter and spring.

The Astarachay River is one of the biggest water arteries of Talish. Its estuary is located in Iran; its length is 38 km, the reservoir area is 242 km2. Its main tributaries are the Istisuchay, Navashtaru and Kalan rivers with their estuaries on the north-eastern slope of the Talish Ridge (near mount Shadan-Kalasi). They cut through volcanogenic, volcanogenic-sedimentary and sedimentary rocks of the Eocene and Dania Paleocene, respectively. The steep slopes of their valleys in the headwaters form canyons. In the middle part they are more slopping and in the lowest part their height does not drop below 2-3 m.

Orography

The surface structure of the Talish is divided into two parts: mountainous and low-lying. Unlike the other major mountains of Azerbaijan (the Greater and Lesser Caucasus), the Talish lacks a high-mountainous belt of relief in its mountainous part. The highest peaks, with a height of slightly more than 2,400 m a.s.l., are situated in the area of development of relatively weakly split relief with flat watersheds and gentle slopes without creating sharp forms of relief, usually peculiar to the high-mountainous belt. This part fully lacks the relief forms of old glaciations, and the whole mountainous relief of the Talish is defined as an erosive one. The proportion of the tectonic structures – spread to a general picture of a modern hydrographical system – influences the split type and character. The biggest rivers of the Talish, the Lenkeranchay and the Tanqaru are mainly crossing; and while crossing the mountainous ridges they form narrow and deep gorges.

Basic features of the modern relief of the mountainous Talish are a direct function of its geological structure. It is expressed by the presence of a number of relief steps (blocks) on a wide area. The mountainous part of the Talish is characterized by numerous crossing (as to the tectonic structures) erosive ridges extending for many kilometres like narrow crest-watersheds. They are mostly typical for the basins of the Tanqaru and the Astarachay, where a degree of erosive partition of relief is the highest. Numerous inter-mountainous hollows of typical erosive origin are peculiar to this region as well. A part of them is of litho-sculpture form and they have originated from the rock's wash-out, easily susceptible to erosion.

The relief is formed under the influence of loose material coming down from the mountains and their confluence with coastal currents. This factor and the absence of dense rocks within the bounds of foothills as well have apparently predetermined the lack of intense pebble measures in the whole lowland.

The Main Talish and the Peshtasar Ridges overlpa with the nominated areas. The Main Talish ridge stretches from north-west to south-east. Noteworthy peaks inlcude Qizyurdu (2,455 m a.s.l.), Zelenaya Sopka (2,002 m a.s.l.), Bombadka (2,194 m a.s.l.), Kalaputa (2,095 m a.s.l.), Divashi (2,013 m a.s.l.), and Shandan-Qalasi (1,817 m a.s.l.). These peaks are the volcanic centres of low-mideocene volcanoes with characteristic spreading areoles of the lava-pyroclastic formations around them.

A gradual decrease of the absolute peaks of the Main Talish Ridge begins from the cross-sectional ridge of Dizdiliq-Panavant located to the North-West in the direction of the Kosmalyan trough. The height in this area does not exceed 1,900 m a.s.l. The relief in the hollows is characterized by more smooth and weakly crossed river-valleys.

The Peshtasar Ridge, located to the north-east of the Main Talish, extends from north-west to south-east, nearly in parallel with the latter. The following peaks deserve to be noted: Pashaqol (2238 m a.s.l.), Sibirda (2282 m a.s.l.), Tilikh (2342 m a.s.l.), Qiz-Qalasi (2269 m a.s.l.), Sakhalabaran (2230 m a.s.l.), Davabayni (2087 m a.s.l.) and Uzunbashi (2202 m a.s.l.).

Climate

The average climate is evenly warm-temperate with mean annual temperatures between 12 -15 °C across the Hyrcanian region. What could be referred to the Hyrcanian climate differs from that ofthe Colchis, for example. The latter belongs to the hygrophilous thermophytic mixed deciduous broadleaved forests, marked by more pronounced seasonality, a more pronouced dry summer phase precipitation peaking in autumn. In the Hyrcanian realm, winters are cooler compared to the Colchis with an average-temperature ranging from -2 to 3 °C in January.

The summers are somewhat warmer (average temperature of the warmest month 24-26 °C). The annual amplitude of the average temperatures is higher (22 - 24 °C), while annual precipitation is considerably lower, barely exceeding 1.500 mm. Beyond these general conditions, it is important to recall. that the nominated areas is marked by highly diverse climatic conditions.

Various factors influence the nominated area: The Talish Mountains are a natural barrier for the incursion of northern and north-eastern air masses. As most air from the Caspian Sea is pushed upwards clouds form resulting in orographic precipitation. This factor is especially important around an altitude of some 700 to 900 m a.s.l. The climatic conditions of the coastal and sub-mountain region are similar to those of the Mediterranean Region, characterized by dry and rainless summer months and mild, humid winters.

It is highly exceptional and peculiar that, especially in the cold period of the year, up to six distinct air masses directly influence the climate conditions of Hirkan National Park and thereby the nominated components:

- continental and marine air masses come from the north and north-east. During this time air temperature decreases to 8-10 °C; cloudiness and winds are common.
- Air masses of the Azores maximum penetrate through western Trans-Caucasia from the Atlantic Ocean. Depending on the season, an increase of temperature and thunderstorms can be observed.
- Subtropical anticyclones and southern cyclones are formed as a result of high pressure over Iraq, Iran, Turkey and the Mediterranean Sea.
- Continental anticyclones penetrate from the temperate latitude of Siberia and Kazakhstan and are peculiar to cold months. As the result the air temperature drops below 0 °C.
- Influence of the Central Asian anticyclones lead to warm and dry weather conditions and to less clouds in the Talish, decreasing humidity.

- Local, mainly daily atmospheric circulations appear during the increase of the bar pressure difference over the Caspian Sea and the Talish mountain chain.
Thus, climatic alternations in the Talish during days, nights, months and a year are conditioned by the mutual relationships of the atmospheric masses mentioned above and by the local physical, geographic and geomorphologic factors. A temperate warm climate, with dry summer and a humid subtropical climate, covers the whole Lenkeran Plain, the surrounding foothills and the Yardimli Hollow as well. This zone is characterized by moderate or even strong humidity, mild winters, temperately hot dry summers and very rainy autumns. Annual precipitation is around 600-1200 mm.

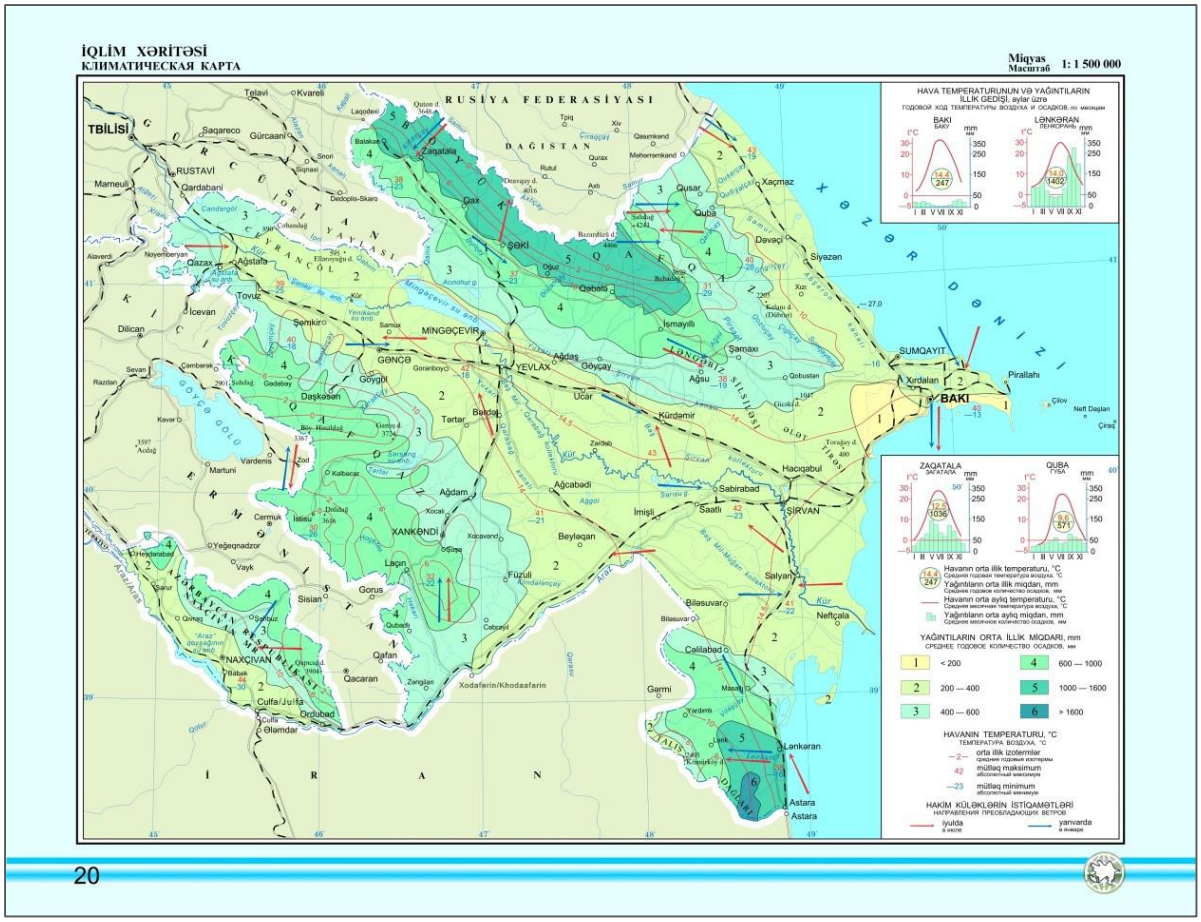

Figure 2-7: Climate map of Azerbaijan Republic. Different colors indicate quantity of annual precipitation.

Flora and Vegetation

Plant geographical classification

The documented flora of the Hyrcanian Forests in Azerbaijan encompasses 1,204 species (approx. 31% of the species numbers of the vascular plants of Azerbaijan), belonging to 563 genera of 132 families. As many as 121 species were entered into the Red Book of Azerbaijan as rare or threatened species, 100 species of which only occurring here.

The components proposed as extensions of the existing World Heritage property are within a clearly defined, very distinctive natural area, not only in the geological, geomorphological, climatic, hydrological and ecological sense, but also under phytogeographic and floristic aspects. The area is referred to as the Hyrcanian Floral Province (Oriental-Turanian Region, Meusel & Jäger 1992). Other authors describe it as the Hyrcanian Subprovince of the Euxino-Hyrcanian Province (Euro-Siberian Region, Zohary 1973) or allocated to the Euxino-Hyrcanian Province (Schroeder 1998). In accordance with the Global Ecoregions of WWF, it is referred to here as the Caspian Hyrcanian mixed forests eco-region (WWF 2001). In the global classification of biogeographical provinces by Udvardy (1975), Hyrcania is part of the very heterogeneous Caucaso-Iranian Province of the Palaearctic Biogeographical Realm.

On the basis of the subdivisions of the Caucasus region, the proposed extension to the Hyrcanian Forests World Heritage property is located in a landscape shaped by the Lenkoran coastal plain and the Talish Mountains. The area is therefore referred to partly as Lenkoran and partly as Talish (cf. Flora Azerbaidzhana 1950-1961, Prilipko 1970, Gulisashvili et al. 1975, Gadzhiev et al. 1979, Safarov & Olisaev 1991, Krever et al. 2001). Specifically, it comprises

- the Lenkeran coastal plain up to the foothills of Talish Mountains,
- the colline up to the altomontane belts of Talish Mountains, and
- a small area called Diabar (Zuvand) of high-mountain character (sub-alpine belt of Talish Mountains above 1800 – 2000 m a.s.l.).

The nominated area essentially extends from the colline up to the subalpine belt, thus comprising the forests up to about 1800 m a.s.l.

Plant diversity – Endemics – Relicts

The Caucasus ecoregion, which includes the Colchis and Hyrcania, is among the 36 global biodiversityhotspots, areas with considerable richness in species (including large number of endemic, rare and threatened species) which are also highly threatened. The region is also categorized among the IUCN's recognized centres of plant diversity and endemism (Davis et al. 1995).

The Hyrcanian Province is characterized by warm-humid climate, hygrophilous and mesophytic deciduous broad-leaved forests, and a remarkbale number of endemic and relic species. It includes coastal surroundings in the south and south-west of the Caspian Sea and occupies three main habitats:

- alluvial flats of the coastal plain,
- the Talish Mountains and northern main slopes of the Alborz Mountains, and
- the subalpine meadows and thorn-cushions of these mountains.

The most outstanding features of this area are the broad-leaved deciduous forests, which spread in altitude from sea-level to 2,500 m above sea-level. The province is well distinguished from other areas by high annual precipitation (500 - 2,000 mm), a considerable part of which falls in autumn. This distribution of annual precipitation underlines the influence of the Mediterranean climate and the plant geographical relation to the Eastern Submediterranean Sub-Region. The high precipitations, the high air humidity and the moderate winter temperatures at the lower altitudes are the decisive climate conditions for the evolution of hygrophilous and mesophytic deciduous broad-leaved forests in the Hyrcanian Province. The high number of species, endemic

to the Hyrcanian Province (138 plant species in forest areas) add much to this forest type‘s significance.

Species such as *Diospyros lotus* and *Albizia julibrissin* found in the Hyrcanian Forests are evidence of relationships with tropical forests*. Albizia julibrissin* is the only species represented in the temperate zone, different from the around 150 species of the genus of the sub-family Mimosoideae, which is distributed in tropical regions. *Diospyros lotus* is one of very few species of the around 700 tree and shrub species of the tropical genus *Diospyros* of the tropical family Ebenaceae, extending to temperate regions.

The most distinctive endemic woody species is the Persian ironwood (*Parrotia persica*). It is a nearly monotypic genus of the Hamamelidaceae, which only includes *P. persica* and *P. subaequalis* otherwise, the latter endemic to Southeast China). *P. persica* is a characteristic tree of the Hyrcanian mixed forests in the lower altitudinal belts of the Hyrcanian Province.

Plant geographical elements

The flora of the Hyrcanian forests based on available data can be grouped into the following categories with some prominent examples (Akhani 1998, Knapp 2005):

1. Hyrcanian endemics

The species belonging to this group characterize the unique position of the Hyrcanian Forests as relics with origin in “Arcto-Teriary” forests. All are deciduous trees and shrubs, as well as some herbaceous deciduous understorey plants. The endemic tree species are liested hereafter, followed by herbaceous plants:

Parrotia persica, Acer velutinum, Gleditsia caspica, Albizia julibrissin (also found in East Asia), *Quercus castaneifolia, Alnus subcordata, Populus caspica, Tilia hyrcana, T. sabetii, T. stellatopilosa, Sorbus tiliifolia, Pyrus boissieriana, P. Mazandaranica, Buxus hyrcana, Ilex spinigera, Hedera pastuchovii, Ruscus hyrcanus, Ficus hyrcana, Danae racemosa,*

Herbs: *Allium paradoxum, Crocus caspicus, Primula heterochroma, Lilium ledebourii, Phlomis mazandaranica, Alcea hyrcana, Saxifraga ramsarica, Atropa pallidiflora.*

2. Hyrcanian (Caucasian) - Euxinian endemics

The species of this group underline the close relation of the Hyrcanian and Euxinian plant geographical provinces. They are likewise deciduous forest plants in their majority, including tree species like *Zelkova carpinifolia, Pterocarya fraxinifolia, Fagus orientalis, Quercus macranthera, Diospyros lotus, Acer cappadocicum, Acer hyrcanum,* the liana *Periploca gracea*, the shrub *Vaccinium actostaphylos*, but also herbs like *Dryopteris caucasica, Epimedium pinnnatum, Cyclamen coum, Ornithogalum bungei, Solanum kieseritzkii, Pteris cretica.*

3. Hyrcanian – Euxinian - Submediterranean elements

This group includes mainly thermophilous deciduous forest plants including many trees and shrubs, which are distributed from Southern Europe to the Hyrcanian phyto-geographical Province and which underline their relations: *Castanea sativa, Celtis australis, Carpinus orientalis, Corylus colurna, Punica granatum, Morus alba, Sorbus torminalis, Cornus mas, Mespilus germanica, Paliurus spina-christi, Berberis vulgaris,*

Evonymus latifolia, Cotinus coggygria, Viburnum lantana, Smilax excels (climber), and perennial forest herbs like *Lithospermum purpureo-caeruleum, Euphorbia amygdaloides, Salvia glutinosa* and the ferns *Matteucia sthrutiopteris* and *Scolopendrium vulgare.*

4. Hyrcanian – Euxinian - European deciduous forest elements

This group encloses trees, shrubs and herbal plants, which are wider distributed across, and typical, for deciduous broad-leaved forests in Western Eurasia:

Tree species: *Carpinus betulus, Fraxinus excelsior, Taxus baccata, Alnus glutinosa, Ulmus glabra, Ulmus carpinifolia, Acer platanoides, A. campestre, Cerasus avium.*

Shrubs: *Corylus avellana, Cornus sanguinea, Evonymus europaeus*.

5. Hyrcanian - Mediterranean elements

A limited number of Mediterranean elements also occur in the Hyrcanian phyto-geographical Province. They are characteritic in open woodlands under particular site conditions within the Hyrcanian Forests, and along the ecotones, i.e. transitions between biological communities. They include, for example, *Cupressus sempervirens, Juniperus excelsa, Limodorum abortivum, Orchis coriophora, O. simia, Polypodium interjectum*.

6. Hyrcanian-Mediterranean-Irano-Turanian elements

A considerable number of species occurring in the Hyrcanian Province have a common distribution in the Irano-Turanian, Mediterranean and European regions. These are mainly herbs of open, often anthropogenic and ruderal sites outsides of the forests. Examples are: *Falcaria vulgaris, Anthemis altissima, Chondrilla juncea, Filago arvensis, Lactuca serriola, Arabis glabra*. Also pluri-regional species and widespread subcosmopolitan elements as well as few neophytes occur mostly as weeds and ruderal plants in the area or as hygrophilous and aquatic plants. They are not typical of the Hyrcanian forests.

Forest Vegetation

The natural vegetation of the Hyrcanian Phytogeographical Province is a complex of different types of dominating deciduous broad-leaved forests. The forests are interspersed by small-scale areas of open vegetation naturally occuring at extreme sites like sea shore and dunes, rocks and boulder fields, wetlands, mires, lakes and streams and above the timberline. The Hyrcanian Forests today are remarkably large and closed remnants of natural climax vegetation with an uninterrupted evolution of around 25 million years. The current diversity of types is the preliminary current result of the ongoing process of adaptation to “oscillating” temperature and/or precipitation within the persistent warm - (semi)humid deciduous forest climate, which is based on the combination of three main factors: The latitude in the temperate (nemoral) zone, the Caspian Sea as source of humidity and the orography, characterized by the high mountain range of Alborz functioning as barrier for humid air masses from the Caspian Sea. While vast areas of Hyrcanian Forest continue to thrive in intact or mostly intact status, the current vegetation across vast areas, especially in the lowlands and in some of the mountain valleys has been transformed when natural ecosystems gave way to cultural landscapes and anthropogenic vegetation types.

The Hyrcanian Forests cover the plains of the South Caspian lowland like a dense green carpet, and especially the slopes and valleys and ranges of the slopes of the Talish Mountains. They are almost exclusively deciduous forests, of which the most dominant species are Oriental Beech *(Fagus orientalis),* Chestnut-leaved Oak *(Quercus castaneifolia)* and European Hornbeam *(Carpinus betulus).* A total of 80 native tree species have been recorded. The Hyrcanian Forests at lower altitudes contain a number of arcto-tertiary thermophilous relic species, such as Ironwood *(Parrotia persica),* Caspian Locust *(Gleditsia caspica),* Persian Silk tree *(Albizia julibrissin),* Caucasian Zelkova *(Zelkova carpinifolia)* and Caucasian Wingnut *(Pterocarya fraxinifolia)* (Akhani et al. 2010). The area is dominated by deciduous tree species, the European Yew *(Taxus baccata)* is the only conifer tree. However, it is a typical element of deciduous forests. Conifers like the genera *Abies, Picea, Pinus* or *Larix*, which form typical mountain mixed forests in the Caucasus, the Carpathians, the Alps and across large parts of Eurasia are missing in the Hyrcanian Talish and Alborz Mountains; *Taxus baccata* being a rare exception to the absence of conifers.

The global significance of the Hyrcanian Forests has three ancient roots of origin in the "Tertiary" period:

1. The "arcto-tertiary" forests of Northern Hemisphere as origin of the nemoral deciduous broad-leaved forests (e.g. *Parrotia, Zelkova, Pterocarya, Fagus, Carpinus, Quercus, Alnus, Tilia, Ulmus*), which survived the glacial periods of Pleistocene in Hyrcania as one of the most important refuge areas, containing many relic and endemic species of wooden and herbal plants;

2) The thermophilous, dryness adapted woodland of the (Sub)-Mediterranean and West-Asian regions (e.g. *Cupressus sempervirens, Olea europaea, Quercus macranthera*); and

3) A few tree species, which represent genera and family with wide distribution in subtropical areas, e.g. *Albiza julibrissin, Diospyros lotus, Gleditsia caspica.*

The broadleaved deciduous forests consist of several layers (up to four layers of woody plants). In the tree layers, relict species are dominant. In the shrub layer evergreen Tertiary relicts occur, in gaps various lianas are found, epiphytes (mainly cryptogams) are abundant.

Various forest vegetation types are encountered in the nominated area, they depend on the different altitudinal belts and on the river valleys and ravines. In general, four main types can be differentiated. The diversity, however being much greater, since the forest mosaic shows changes on a small scale. Over time and space, tree species can gain dominance under certain conditions prior to giving room to other species again.

The major general forest types of Talish Mountains, which can reasonably be distinguished according to altitudinal belts are presented hereafter (Prilipko 1970, Doluchanov & Nachucrishvili in Bohn & Neuhäusl (ed.) 2000, 2003):

1. Hyrcanian or south Caspian hygro-thermophilous deciduous broad-leaved forests

Sspecies-rich nemoral summer-green forests with evergreen understory species).

1.1 Hyrcanian lowland-colline mixed broad-leaved forests

South Caspian lowland forest with *Quercus castaneifolia*, *Parrotia persica*, *Zelkova carpinifolia*, *Diospyros lotus*), partly in combination with *Alnus glutinosa* ssp. *barbata* - *Pterocarya fraxinifolia* alluvial forests. **1.2 Hyrcanian colline to montane oak (*Quercus castaneifolia*) and hornbeam - (Carpinus betulus-) oak forests** Oak and mixed hornbeam-oak forest of south Caspian mountains, partly with *Parrotia persica*, *Zelkova carpinifolia*, *Diospyros lotus*, *Acer velutinum*, *Gleditsa caspica, Alnus subcordata*.
2. South Caspian (or Caucasian, respectively) Oriental beech forests **2.1 Montane Oriental beech (*Fagus orientalis*) forest with evergreens** *Buxus hyrcana*, *Ilex spinigera*, *Ruscus hyrcanus*, *Danae racemosa*, *Hedera pastucho* alternating with mixed deciduous broad-leaved forests (*Quercus castaneifolia*, *Al* *subcordata*, *Acer velutinum*). **2.2 Altimontane Oriental beech (Fagus orientalis) forest without evergreens**
3. Xerophytic oak (*Quercus macranthera*) forest At the upper timberline, assuming stunted growth because uppermost part of this forest belt is subject to drought, as cloud cover from the humid air masses coming from the sea is lower lying, only distributed in small areas in the nominated area.

The Hyrcanian mixed and oak forests consisting of Tertiary relicts and endemics are particularly characteristic - and a decisive factor for the proposed serial extension of the World Heritage property. Further particularities are described hereafter in more detail.

- Forests dominated by the Hyrcanian endemic and Tertiary relict Ironwood (*Parrotia persica*); these forests mainly occur on mountain slopes of the colline to submontane belt. Ironwood develops unusual and manifold forms of vegetative propagation and adnations (a form of unions) between shoots of a tree and neighboring trees. Uneven-aged stands give evidence of natural regeneration, in densely closed stands vegetative propagation is of prime importance.

- In mixed forests, among other species *Albizia julibrissin*, *Zelkova carpinifolia*, *Ficus carica* (incl. *Ficus hirkana*) are found. In some places, *Diospyros lotus* may be predominant or an evergreen undergrowth of *Ruscus hyrcanus* can be encountered.

- Forests of moist lowlands, river terraces and ravines with a predominance of the Tertiary relicts *Alnus subcordata* (Hyrcanian endemic) and *Pterocarya fraxinifolia* (Hyrcanian - East Caucasian - Colkhic endemic).
- Mixed oak forests with the Tertiary relict and the Hyrcanian endemic *Quercus castaneifolia* from the submontane belts up to 600 – 800 m a.s.l.

In the mixed oak forests in addition to hornbeam (*Carpinus betulus*, incl. *C. caucasisus*) and ironwood (*Parrotia persica*). Tertiary relicts like *Zelkova carpinifolia* or *Diospyros lotus* occur as additional tree species or may locally be predominant. Unless a second tree layer (e.g. consisting of *Parrotia*) stocks too densely or unless the evergreen Hyrcanian endemic *Buxus hyrcana* occurs over the total area in the undergrowth, oaks regenerate fairly well.

The shade-tolerant Hyrcanian box-tree (*Buxus hyrcana*) used to be more widely distributed in the second tree layer, the distribution area was, however, strongly

reduced because of felling operations for high-grade timber. In the forests that used to be forest pasture and that partly are still serving this purpose, box-tree stands were preserved mainly in such sites as sacred places and historic graves.

As elevation increases, the woodland loses its Hyrcanian character, the typical Hyrcanian elements becoming more rare, being replaced by a mountain beech forest of Caucasian type. In the higher mountainous belts *Quercus castaneifolia* retreats to the southern slopes, being replaced by Oriental beech (*Fagus orientalis*). Finally, the Oriental beech becomes predominant in the montane forests, in addition to generally occurring nemoral species (e.g. *Carpinus betulus*). Other representatives of the Hyrcanian Tertiary forest, like *Acer velutinum* or *Diospyros lotus*, are also still found. Hyrcanian species also still exist as evergreens, such as in the undergrowth *Ilex spinigera* or *Danae racemosa* and the climber *Hedera pastuchowii*. Although species of a wider distribution of nemoral forests of Europe are not absent in the forests of the nomination area, the typical structural elements are largely endemics and Tertiary relicts.

Table 2-2: Trees and shrubs in HNP according to Red Data Book of Azerbaijan

	Species	Hirkan relict	Relict	Endemic to Hirkan	Endemic to Caucasus
1	*Albizia julibrissin*		x		
2	*Alnus subcordata*	x			**x**
3	*Buxus hyrcana*	x		x	
4	*Castanea sativa*		x		
5	*Danae racemosa*	x			**x**
6	*Diospyros lotus*		x		**x**
7	*Euonymus velutina*	x		x	
8	*Ficus hyrcana*	x		x	
9	*Frangula grandiflora*	x		x	
10	*Gleditsia caspia*	x		x	
11	*Hedera pastuchowii*	x			**x**
12	*Ilex hyrcana*	x		x	
13	*Laurocerasus officinalis*		x		**x**
14	*Parrotia persica*	x			**x**
15	*Pterocarya pterocarpa*		x		**x**
16	*Punica granatum*		x		
17	*Pyrus boissierana*	x		x	
18	*Pyrus hyrcana*	x		x	
19	*Quercus castaneifolia*	x			**x**
20	*Ruscus hyrcanus*	x			**x**
21	*Taxus baccata*		x		
22	*Vitis sylvestris*		x		
23	***Zelcova carpinifolia***		**x**		**x**

Fauna

Zoogeography

The part of the Hyrcanian Forests nominated as an extension of the inscribed World Heritage property is part of the Holoarctic zoogeographic region and, according to faunistic zonation, belongs within the Circumboreal zoogeographic sub-region represented by the Caucasus forest district of the forest province and its Hyrcanian cluster, which is an outlying part located hundreds of kilometers away from other sites of this province. Thus, most animal species have inhabited this area since ancient times, being isolated from the main habitat and are often represented by endemic subspecies.

The richness of the region's plant kingdom and its heterogeneous origin, relict nature and isolated location (the forests are surrounded by arid areas – Kura to the north and Zuvand to the south – sites of the Iranian desert and dry steppe district) are one reason for the emergence of a highly diverse fauna, composed of a large number of relicts and endemics. The vertebrate fauna is represented by 213 species, many of which are relicts of the Tertiary Age or endemics. Of these vertebrates, 46 species are either threatened with extinction in Azerbaijan and the rest of the world, or rare and therefore listed in the Red Data Book of Azerbaijan and IUCN Red Data Book (see Annex 2 tab.2). There is a particularly diverse representation of invertebrates of which insects are the best studied.

Vertebrates in Hirkan National Park featured in the Red Data Book of Azerbaijan and/or IUCN Red List are listed in subsequent table 2-3.

Table 2-3: Vertebrates in HNP according to Red Book of Azerbaijan and IUCN Red List

	Species	National Red Data Book	IUCN Red List
		Fish	
1	*Salmo fario (S. trutta fario)*	*x*	***LC***
2	*Abramis sapa*	*x*	***Not included***
		Amphibians	
3	*Triturus vulgaris*	*x*	***LC***
4	*T. cristatus*	*x*	***LC***
5	*Pelobates syriacus*	*x*	***LC***
6	*Pelodytes caucasicus*	*x*	***LC***
7	*Bufo verrucosissimus*	*x*	***LC***
		Reptiles	
8	*Testudo graeca*	*x*	***VU A1cd***
9	*Elaphe longissima*	*x*	***Not included***
		Birds	
10	*Ciconia nigra*	*x*	***LC***
11	*Pandion haliaetus*	*x*	***LC***
12	*Haliaeetus albicilla*	*x*	***NT***
13	*Accipiter gentiles*	*x*	***LC***
14	*Accipiter badius*	*x*	***LC***
15	*Aquila clanga*		***VU C1***
16	*Aquila heliaca*	*x*	***VU C1***
17	*Aquila chrysaetos*	*x*	***LC***
18	*Gypaetus barbatus*	*x*	***LC***

19	*Aegypius monachus*		***NT***
20	*Circaetus gallicus*	*x*	***LC***
21	*Falco cherrug*	*x*	***EN A2bcd+3bcd***
22	*Falco peregrinus*	*x*	***LC***
23	*Phasianus colchicus talishensis*	*x*	***LC***
24	*Parus lugubris*	*x*	***LC***
	Mammals		
25	*Panthera pardus saxicolor*	*x*	***EN C2a***
26	*Lynx lynx*	*x*	***NT***
27	***Lutra lutra***		***NT***

Insects

The insect fauna is not completely studied. The most complete data is available for bees (83 species), wasps (27 species), beetles, orthopteras, butterflies and bugs, altogether some 250 species.

In the Hyrcanian Forests, a large diversity of scorpions, centipedes, ants, termites, earwigs and especially coleopterons are active in the soil or on leaves. The larva of a group of insects can be found on the outer layer or within inner layers of the forest ground. Tree trunks and their branches are also a suitable habitat for a group of insects, arthropods, woody insects, as well as arachnids. A number of crickets are usually found on the trunk of forest trees, squil beetles live under tree trunks. Leaves and branches of trees are a good habitat for the larva of insects. The larva of a number of spiders and beetles live on new tree leaves.

The Hyrcanian Forests are an important habitat for many endangered insect species: *Daphnis nerii, Calosoma sycophanta, Hemidicera fritillum, Manduca atropos*. Dozens of endemic and relict species along with Caucasian endemic species (*Bombus daghestanicus, Bombus mlokoseivitzii, Bombus persicus*) and endemics of Hirkan (*Purpuricenus talyschensis, Parandra caspia, Carabus clypeatus talyschensis, Pararge andrastoides, Argynnis alexandra, Brahmaea christophi*) are also listed in the Red Data Book of Azerbaijan.

A first list of about one hundred saproxylic beetles (Coleoptera) ant true bugs (Heteroptera) sampled from Hyrcanian beech forests in Iran (Müller et al. 2005) contains 21 Hyrcanian endemics and 12 so-called “Urwald” relict species. It is expected that most of them and others also in Talish Mountains occur.

Table 2-4: Insects in HNP according to Red Data Book of Azerbaijan

	Species	National Red Data Book	Endemic
1	*Pararge adrastoides*	x	**x**
2	*Bombus daghestanicus*	x	
3	*Parandra caspia*	x	
4	*Carabus clypeatus talyschensis*	x	**x**
5	*Purpuricenus talyschensis*	x	**x**
6	*Hemidicera fritillum*	x	
7	*Manduca atropos*	x	
8	*Brahmaea christophi*	x	

9	*Danais chrysippus*	x	
10	*Hippotion celerio.*	x	
11	*Argynnis alexandra*	x	
12	***Daphnis nerii***	**x**	

Arachnids

According to tentative data, a remarkable 310 species of Arachnids occur in the nominated area alone: Acarinas (72); Opiliones (8); Pseudoscorpiones (23); Araneidas (207). SeveralAraneidas should be especially pointed out due to an unusual Caucasian - Far Eastern disjunctive habitat area: *Argyrodes Hirkanus, Argurodes saganus, Howaia mogera, Yaginumela maculosa*. These species occur only in the Hirkan Forests of Lenkoran and in subtropical forests of the Far East (Primorski region of Russia, South-Eastern China and Japan). The populations of these species are isolated by a distance of at least 10,000 kilometers, with no populations detected anywhere in between. Thereby, it highlights the evolutionary process taking place among the representatives of Hyrcanian forests fauna and the ancient historical links with remote areas of the earth.

Vertebrates

Fish

The freshwater ichthyofauna numbers 16 species (see Annex 2 tab.1); two of which are listed in the Red Data Book of Azerbaijan. *Caspiomyzon wagneri* (which is actually not a fish) and *Salmo fario. Cyprinus caprio, Abramis brama, Chalcalburnus chalcoides, Rutilus frisii, Vimba vimba, Varicorhinus capoeta, Perca fluviatilis, Esox lucius, Tinca tinca* enter the mountain rivers of Hirkan National Park. Common species are *Sardinius erytrophthalmus, Alburnoides bipunctatus*, Cobitis teania; such endemics as *Barbus cyri, Varicorhinus capoeta, Nemachilus angorae lenkoranensis* are frequently found.

Amphibians

The amphibian fauna within the nominated areas is highly peculiar. The amphibianfauna includes two orders represented by nine species of which seven are listed in the Red Data Book of Azerbaijan. The order Caudata is represented by two species. *Triturus cristatus* is listed in the Red List as endangered not only in Azerbaijan, but also globally. It inhabits small ponds and is common all over the place in the national park. *Triturus vulgaris* is listed in the Red Data Book of Azerbaijan. The order Salientia is represented by eight species (Annex 2). The Caucasian Parsley Frog, *Pelodytes caucasicus,* is a Caucasian endemic and inhabits mountain forests of the Western and Central Caucasus and also the Hyrcanian Forests more than 1000 kilometers away from the Caucasus. The numbers of this species in the habitat area is on the decline and it is listed in the Red Data Book of Azerbaijan. The Parsley Frog is widely spread in Hyrcanian Forests.

The Common Tree Frog, *Hyla arborea,* and the Caucasian Toad, *Bufo verrusissimus,* are listed in the IUCN Red Data Book. *Bufo verrusissimus* is an endemic of the forests

of the Western and South-Eastern Caucasus. It has a small habitat area and its numbers are declining.

Reptiles

The reptilefauna of the Hyrcanian Forests is represented by 22 species of which two are listed in the IUCN Red List and four are listed in the Red Data Book of Azerbaijan. The order Testudines is represented by three species, of them Mediterranean spur-thighed tortoise, *Testudo graeca,* and European Pond Turtle, *Emys orbicularis,* are listed in the IUCN Red Data Book. The number of *Testudo graeca* is increasingly declining and some populations are threatened with extinction. It is also listed in the Red Data Book of Azerbaijan.

Of the Order Sauria, eight species are found within the Hyrcanian Forests. Along with widely spread species - The European Legless Lizard (*Ophisaurus apodus*), The Slow Worm (*Anguis fragilis*), The Striped Lizard (*Lacerta strigata*), The Green-bellied Lizard (*Lacerta chlorogaster*), and the Meadow Lizard (*Lacerta praticol*) - endemics also occur here: the Saxicola Lizar,(*Lacerta saxicola*) and the Caspian Gecko (*Cyrtopodion caspius*). The Syrian Agama, *Agama ruderata,* is listed in the Red Data Book of Azerbaijan.

The order Serpentes has the most diverse representation; out of 11 species occurring here, two are listed in the Red Data Book of Azerbaijan: the Transcaucasian Ratsnake (*Elaphe hohenackeri*) and the Aesculapian Snake (*Elaphe longissima*). The *Elaphe longissima* is a rare species globally. It was listed in the Red Data Book of the USSR and the IUCN Red List. In the nominated areas, it occurs in broad-leaved and on stony slopes covered with shrubs.

Birds

As a result of ornithological studies it has been found that there are two key ornithological areas of international significance in Hirkan National Park.The avifauna of the nominated areas encompasses 118 species from 11 orders. About half the number of species nest in the nominated areas; 16 species are listed in the Red Data Book of Azerbaijan and 5 species are included in the IUCN Red List.

There is a considerable number of species here that enjoy endemic or restricted habitat area. In some cases, the distribution is limited to a single location: the Elbur Nuthatch (*Sitta europea rubiginoza*) and the wallcreeper (*Tichodroma muraria*).

Along with such typical representatives of European forest ornithofauna, such as the Golden Oriole (*Oriolus oriolus*), the Wood Pigeon (*Columba palumbus*), The Eurasian woodcoc, (*Scolopax rusticola*), the Tree pipit (*Anthus trivialis*), endemic subspecies, such as the Caspian Tit (*Parus lugubris*), the Great Spotted Woodpecker (*Dendrocopos major poelzami*), the Grey-capped Woodpecker (*Dendrocopos minor quadrifasciatus*) also occur in forests of this area. Typical inhabitants of the nominated areas are often rare, endangered species: The White stork (*Ciconia ciconia*), the Golden Eagle (*Aquila chrysaetos*, The Levant Sparrowhawk (*Accipiter brevipes*), the Northern goshawk (*Accipiter gentiles*), all are listed in the Red Data Book of Azerbaijan.

Diurnal avian predators encompass 28 species inhabiting the nominated areas; 12 are listed in the Red Data Book of Azerbaijan and 5 are included in the IUCN Red List. Among them are the mighty White-tailed Eagle (*Haliaeetus albicilla*), the Cinereous Vulture (*Aegypius monachus*), both rare all over the world, while the Short-toed Eagle (*Circaetus gallicus*) and the Egyptian Vulture (*Neophron percnopterus*) are threatened with extinction. The Osprey (*Pandion haliaetus*), Golden Eagle (*Aquila chrysaetos*) and Peregrine Falcon (*Falco peregrinus*) are rare all over the world.

The Talish Caucasian pheasant (*Phasianus colchicus talischensis*), and the Caspian Tit (*Parus lugubris*), are local endemics listed in the Red Data Book of Azerbaijan as rare species, the number of which is declining. The Hyrcanian Forests are their main stronghold.

Mammals

As is common, the mammal fauna is the best studied taxonomic group in the Hyrcanian Forests. Almost the complete species assemblage totaling 47 from 6 orders (Annex 2 tab.1) continues to be present. The one exception is the Turanian or Caspian tiger (*Panthera* tigris virgata) who was exterminated which went extinct in the 1950s. Seven species are listed in the Red Data Book of Azerbaijan with 11 species included in the IUCN Red List (Annex 2 tab.2).

The smallest representatives of mammals belong to the order of Insectivora. The most abundant genus is Crocidura (white-toothed shrews) distributed across the full altitudinal range. All species representing the genus are rare.. All seven species of Insectivora are liested hereafter: the white-breasted hedgehog (*Erinaceus concolor*), the Levant mole (*Talpa levantis*), the Transcaucasian water shrew (*Neomys schelkovnikovi*), the Caspian white-toothed shrew (*Crocidura caspica*), the longtail white-toothed shrew, (*Crocidura guldenstaedti*), the Iranian white-toothed shrew (C*rocidura persica*) and the lesser white-toothed shrew (*Crocidura suaveolens*).

Chrioptera, bats, are the most abundant order of mammals in the nomated area with a total of 14 species. Four of them are threatened with extinction globally according to the IUCN Red List. .The lesser horseshoe bat (*Rhinolophus hipposideros*) and the great horseshoe bat (*Rhinolophus ferrumequinum*), both mainly inhabiting caves, are rare outside the Hyrcanian Forests.. The smallest representatives of chiroptera are *Pippistrellus, Eptesicus and Nyctalus* find shelter in tree holes. These species benefit and even depend on the old trees only found in in old and effectively conserved forests.

The most widely distributed order is *Rodentia*. Nine species inhabit the entire forest zone of this area. The forest dormouse (*Dryomys nitedula*) and the dormouse (*Glis glis*) are listed in the IUCN Red List. They are, however, abundat and widely distributed in the nominated area. Local endemics commonly met are Shelkovnikov's vole (*Microtus schelkovnikovi*) and the Hirkan wood mouse (*Apodemus hyrcanicus*). The latter is also included in the IUCN Red List.

13 carnivorouss mammals presently inhabit the nominated area; all are is included in the Red List. The red fox (*Vulpes vulpes alpherakyi*), golden jackal (*Canis aureus*), the grey wolf (*Canis lupus*), the Eurasian badger (*Meles meles*), The least weasel (*Mustela nivalis*), the wild cat (*Felis sylvestris*) and the jungle cat (*Felis chaus*) are common and widely spread. The largest predator, the brown bear (*Ursus arctos*) is also common in

the Hyrcanian Forests. Along with the brown bear, the European otter (*Lutra lutra*) and the Eurasian lynx (*Felis lynx*) are included in the Red Data Book of Azerbaijan.

The rarest species in the nominated area is the Leopard, (*Panthera pardus saxicolor*). According to recent studies by Askerov (2002) 2-3 specimens inhabit the Hirkan national park. The leopard subspecies otherwise known to prefer arid landscapes (Iranian-Afghan highland) inhabits humid broad-leaved forests here. In fact, this small part of the Hyrcanian Forests is one of last forest habitats used by the species. The almost impenetrable mountainous parts of the Hyrcanian Forests are thus an important habitat and migration route of leopards. Elsewhere, the subspecies has been completely eradicated by poachers.

Two species have been introduced to this area: The raccoon (*Procyon lotor*) and the Sika deer (*Cervus nippon*). As opposed to deer, which was not successful in wide spread establishment and is very rarely encountered nowadays, the Raccoon has become a common species.

Figure 2-8: Hyrcanian beech forest with evergreen understory of *Ilex spinigera;* river valley in Hirkan National Park, Republic of Azerbaijan. (Photos by H. D. Knapp, 2000).

On a Russian expedition to Khorasan in 1857-1859, Alexander von Bunge (1803-1890) also visited the Hyrcanian forests. He was impressed by the wilderness charcter and wrote about the Hyrcanian lowland forests "*…üppige Vegetation mit fast tropischem*

Charakter. Den grössten Ttheil des Landes bedeckt die prachtvollste Laubbewaldung…"[3], and about mountain forests "*alle Höhen mit Ausnahme …einiger Felsiger Abhänge nach Süden, selbst die steilsten Abstürze sind mit dichtem Laubwald bedeckt…"*[4] (Bunge 1860, p. 205).

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Figure 2-9: Dizmar Protected Area's forest (photo by: Ahmad Hajizadeh)

"Dizmar" means in Persian etymology "high mountain". Iran's Dizmar Protected Area includes two component parts, Dizmar East and Dizmar West (04, 05), summarized in the subsequent table.

Table 2-5: Area size of the component Dizmar (East and West)

ID	Province	Component /cluster	Size area (ha)	Size buffer zone (ha)

[3] "... lush vegetation with an almost tropical character. The largest part of the country is covered by the most magnificent deciduous forest ... "

[4] „all altitudes except ... some rocky slopes to the south, even the steepest drops are covered with dense deciduous forest ..."

04	East Azarbaijan	Dizmar West)	4,706	55,725
05	East Azarbaijan	Dizmar (East)	2,416	
		ITota	7,122	55,725

Both new proposed component parts, Dizmar East and Dizmar West, are located in Dizmar Protected Area, managed by one administration, and embedded in a common buffer zone. Dizmar Protected Area is found in a transition type of the mountainous Hyrcanian Forests located in northwestern Iran at the border of Azerbaijan and Armenia. It was designated as a protected area on 05 October 2011. The region extends to the Aras River, which marks the international border, to the north and the mountain areas to the east, west and south.

Despite annual rainfall or around 300 - 600 mm, trapped moisture as air is pushed against the high mountains results in a large number of foggy days and thereby “hidden precipitation”, effectively providing additional water supply permitting ancient, dense deciduous broad-leaved forests, stretched from 400 m up to 2,600 m a.s.l. The presence of quite a few rare and endemic plant species leads to a highly complex and interesting vegetation structure in the region.

Despite occupying small area, a highly remarkable species richness boasting rich flora (documenred 994 plant species) and fauna (more than 360 documented vertebrate species) and a high degree of endemism. The presence of one of the rarest bird species deserves to be noted, such as the Caucasian (black) grouse or (*Lyrurus mlokosiewiczi*, NT). Their presence in fact contributed to the establishment of Dizmar Protected Area in 2011.

The area serves as the stepping stone for numerous threatened species; it is home of some spectacular, invaluable species of large mammals, include the Persian leopard (*Panthera pardus saxicolor*, VU), the Brown bear (*Ursus arctos*), the Wild goat (*Capra aegagrus*, NT), the Striped hyena (*Hyaena hyaena*, NT) and the wild cat (*Felis silvestris*). Dizmar Protected Area is contiguous protected areas in Iran, Azerbaijan and Armenia. The broader complex constitutes an ecological corridor for unimpeded wildlife movements in addition to being key area for the conservation of many threatened species. Dizmar is also a vital site for passing migratory birds flying between Northern breeding grounds and southern wintering areas.

Location and Topography

Dizmar is a forested mountain protected area with steep slopes and deep valleys located in East Azarbaijan province, in the northwest of Iran at the border of Azerbaijan and Armenia.

The region with a total surface area of about 62,847 ha is limited by the border river Aras in the north, and it includes the mountainous landscape in the south of Aras River. The Ilganehchay River forms the eastern border. Elevation rage in this region vary from 329 m a.s.l. near the Aras River in the north-east up to 2,729 m a.s.l. on Andol Peak in the southern parts. Qazandagh (2,572 m a.s.l), Cheraghali (2,550 m a.s.l),

Dusteshah, Gachi Gunaei, Dalankesh, Saribolagh and Gharghadashi are among the most important summits in the area.

Dizmar Protected Area is contiguous with two other protected areas: Arasbaran Biosphere Reserve to the east and Kiyasmaki Protected Area to the west.

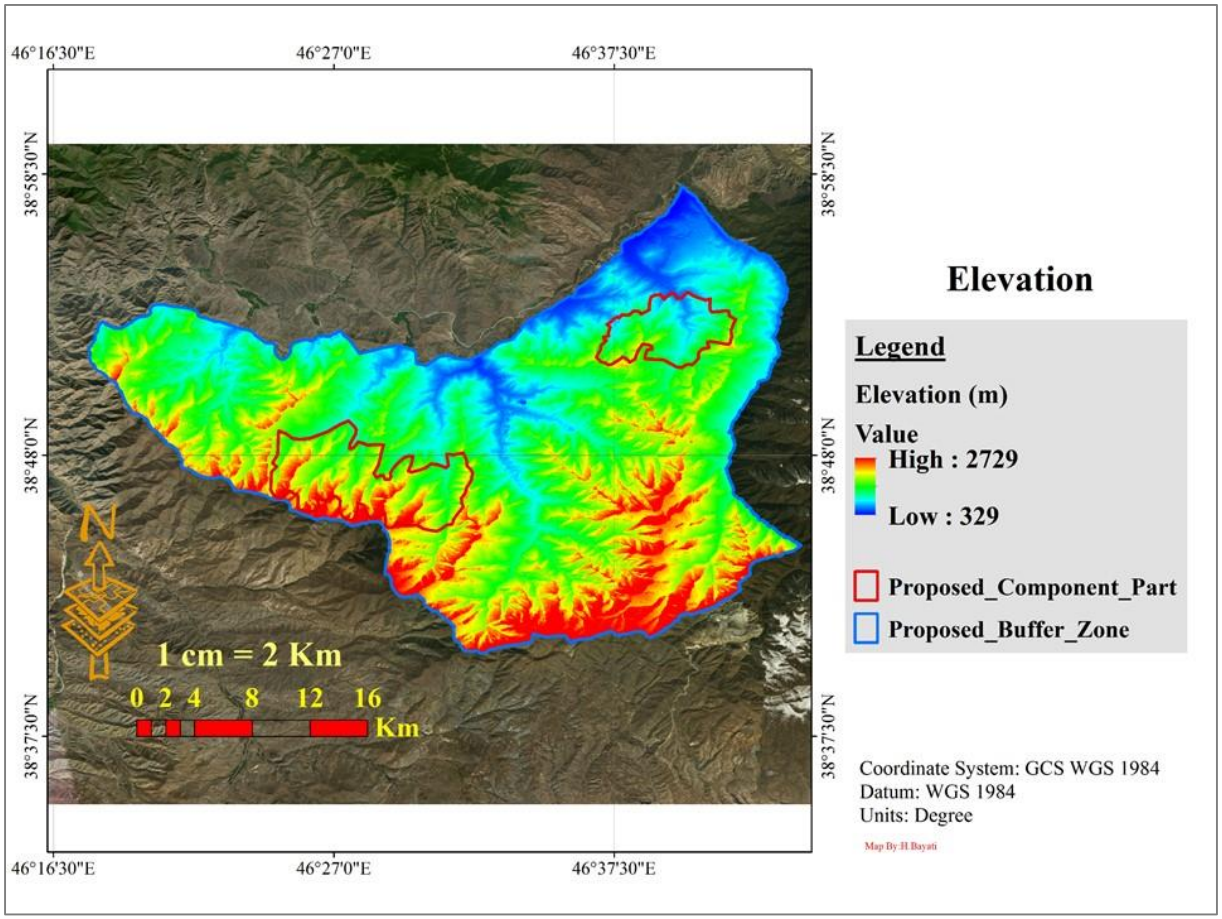

Figure 2-10: Elevation map of Dizmar West (04) and East (05) components within Dizmar Protected Area in Iran.

Connectivity with the main part of the Hyrcanian Forests

Dizmar area represents the western extreme of the Hyrcanian Forests as an isolated forest area. Fig. 2-12 shows the Euxino - Hyrcanian Province of Iran where the proposed component parts of Dizmar are located in the north western part of the map (Jalili & Jamzad 1999, Frey & Kuerschner 1983).

There are some isolated parts of Hyrcanian Forests, one in the East Azarbaijan Province and the forests located some 55 km West of Bojnurd, in Northern Khorassan Province (Akhani, 2010). The westernmost boundary of the Hyrcanian Forests anywhere is Aras (Zohary 1973).

Evidence of a fossil forest in Northwest Iran with large well-preserved logs in Ardebil Province called Meshgin shahr Fossil Forest offers evidence of the connection of the Hyrcanian Forests to the Dizmar Protected Areas in Nortwest Iran. The fossil forest lived during the Early Miocene and consists of two elements: trees that lived during the Early

Miocene during a time of volcanic quiescence and a forest that flourished during the volcanically active Pleistocene. The majority of the discovered fossil logs were observed in Pleistocene volcanoclastic strata that were formed under plate tectonic conditions that were similar to the modern era, but at a time of episodic volcanic eruptions and in a paleoclimate that was cooler and wetter than the current climate.

Volcanic activities were associated with Mt. Sabalan (4,820 m a.s.l), the largest volcano in northwest Iran between Hyrcanian and Dizmar regions. Mt. Sabalam produced pyroclastic flows that buried local forests. Sabalan eruptions began in the Miocene, but the major volcanic events occurred from the Pliocene to Quaternary (Mustoe *et al*. 2020).

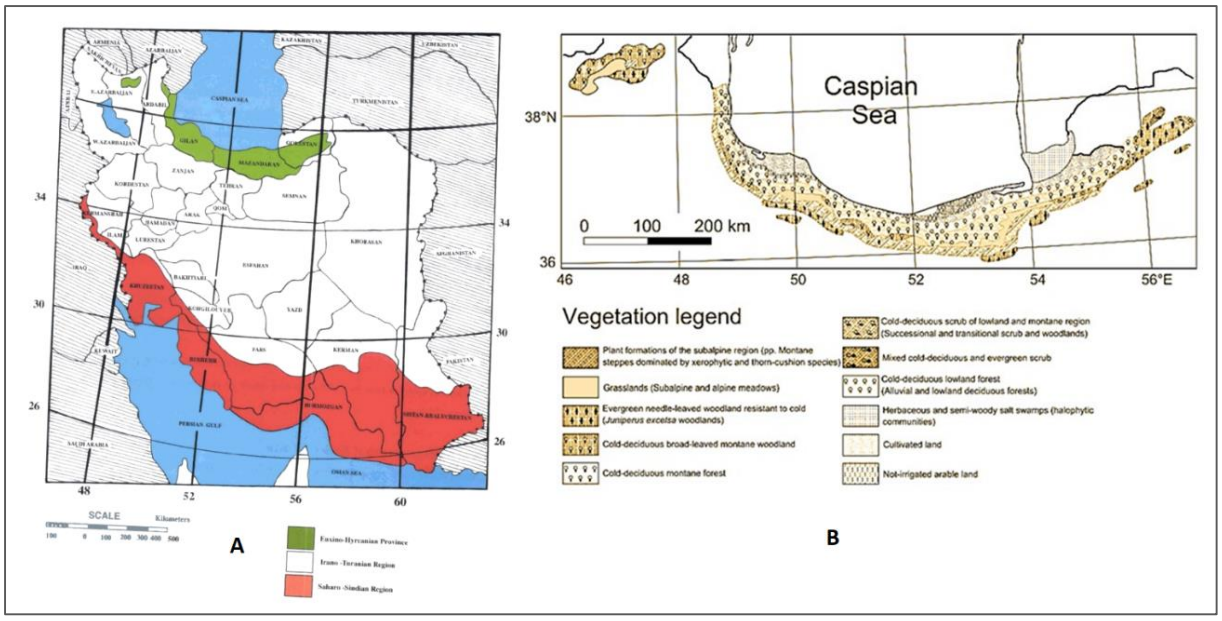

Figure. 2-11: Hyrcanian sub-provcince of the Euxino-Hyrcanian province. The proposed component parts of Dizmar are located in the north western isolated part of the map (A:Jalili & Jamzad 1999 and B: Frey & Kuerschner 1983).

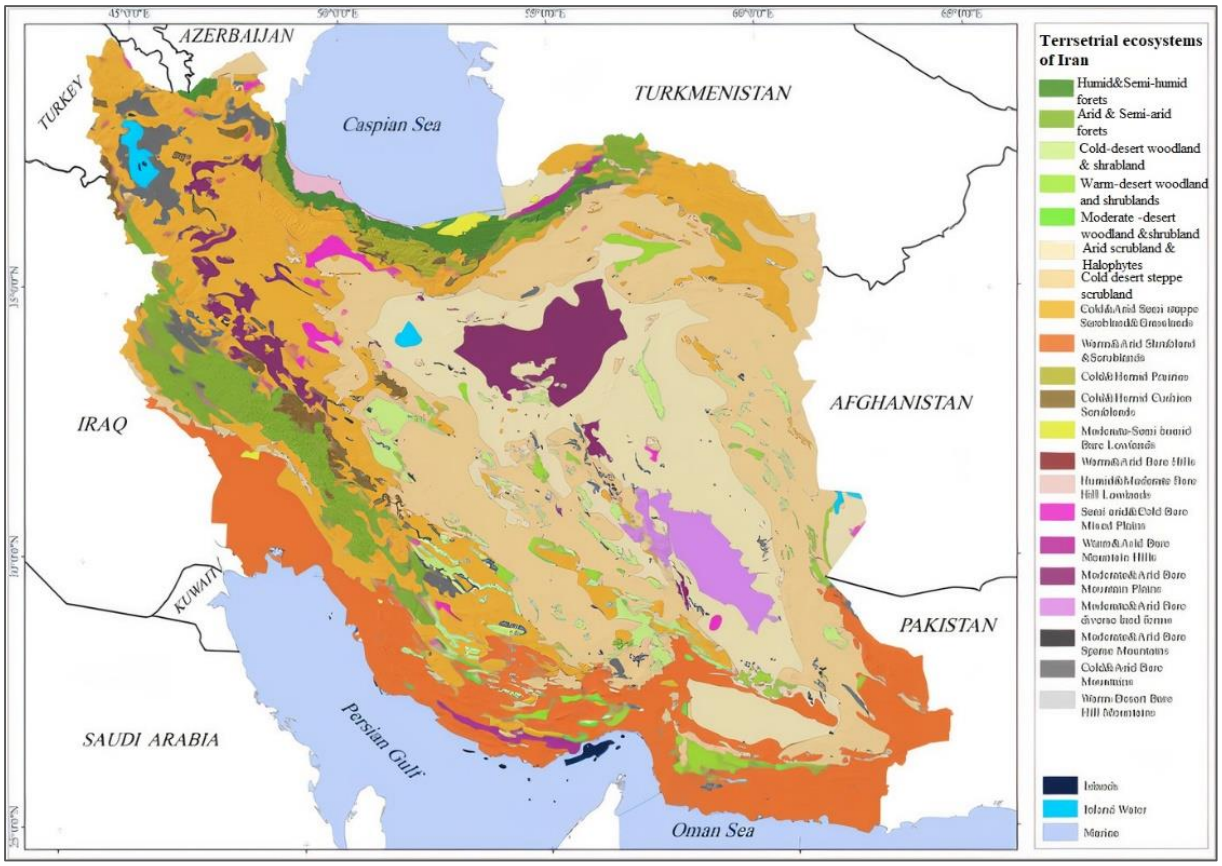

Figure 2-12: Terrestrial ecosystems of Iran (Jalilian et al. 2020).

However, volcanism alone cannot be invoked as a source of forest extinction. Glacial fluctuations are another reasons for extinction of this forests. The Meshgin Shahr forest presumably developed during the moist mild-temperature climate of an interglacial episode; the cool, dry conditions of a subsequent glacial phase may have created an unfavorable environment.

There is also an extant forest, isolated from the Hyrcanian Forests called Fandoqlo Forest, in the east of Ardabil (formerly Ardabil was a part of Azarbaijan Province of Iran) with *Corylus avellana* as a dominated species. *Fagus orientalis*, *Ligustrum vulgare*, *Acer campestre*, *Acer cappadocicum*, *Malus orientalis, Acer hyrcanum*, *Mespilus germanica*, *Carpinus betulus*, *Prunus divaricate*, *Quercus castaneifolia*, *Carpinus orientalis*, *Quercus macranthera*, *Carpinus schuschaensis*, *Vaccinium arctostaphylos*, *Corylus maxima*, *Rosa canina*, *Crataegus pseudoheterophylla*, *Rosa boissieri*, *Crataegus pentagyna*, *Rubus raddeanus*, *Cornus mas*, *Salix aegyptiaca*, *Cotoneaster nummularius*, *Sorbus graeca*, *Sorbus torminalis, Euonymus latifolius* and *Euonymus velutina* are the most important wooden species in this forest.

Existence of these two extinct and extant forests is interpreted as evidence confirming the connection between the Hyrcanian and Dizmar regions.

Climate

Depending on the main mountain direction in Dizmar Protected Area, winds carries in humidity from the Caspian Sea in the east, the Mediterranean Sea in the west and by Siberian low pressure fronts from the north. The average annual rainfall is estimated to be

around a modest 300 – 600 mm, but the large number of foggy days and their hidden precipitation effectively provide an additional supply of water to the soil, especially at altitudes between 1,000 and 2,000 m. Moreover, the eastern part is under the influence of cyclonic and anti-cyclonic air movements which results in a higher humidity (Sagheb-Talebi *et al*. 2013). Cyclonic air, supplying 80 % of the humidity in the region, passes eastwards and precipitates when it meets mountains. The Caspian anti-cyclonic air streams move westwards and pass across the eastern plains and precipitate in the eastern parts of the forest region, resulting in a higher vegetation density and diversity (Anon. 2004, Yazdian 2000).

The seasonal distribution of precipitation corresponds to the Hyrcanian climate type with predominant winter rain and summer dryness (see Fig. 2-13). May is the wettest month (mean rainfall amount equal to 42.8 mm) and August is the driest (mean value equal to 9.7 mm).

The mean annual air temperature is 14.3 ºC. January (3.3 °C) and July (24.7 °C) are respectively the coldest and the warmest months. Information on temperature variation at three different altitudes in the forest region are presented in Table 2.3 (Sagheb-Talebi *et al*. 2014).

Mean annual relative humidity, wind speed, and reference evapotranspiration (ET0) were 60.6%, 2.4 m s-1, and 2.8 mm d-1, respectively. The data show mean annual reference evapotranspiration (ET0) is 1,021 mm, with the highest average monthly reference evaporation value of 156.6 mm in July and the lowest value of 25.8 mm in January and December (Fig 2-14).

Table 2-6: Temperature variation in Dizmar protected area (Sagheb-Talebi et al. 2014).

Altitude	Mean annual temperature (°C)	Mean temperature of the warmest month (°C)	Mean temperature of the coldest month (°C)
High lands	5	12	-2
Mid-lands	8	15	1
Low lands	14	21	17

Table 2-7: Characteristics of the meteorological stations, meteorological data collected since 1986.

Station	Latitude (N)	Longitude (E)	Elevation (m a.s.l.)
Khoda Afarin	39° 01′	46° 50′	307
Arasbaran	38° 56′	46° 45′	1,100
Kaleibar	38° 52′	47° 01′	1,180
Jolfa	38° 45′	45° 40′	736
Ahar	38° 26′	47° 04′	1,390

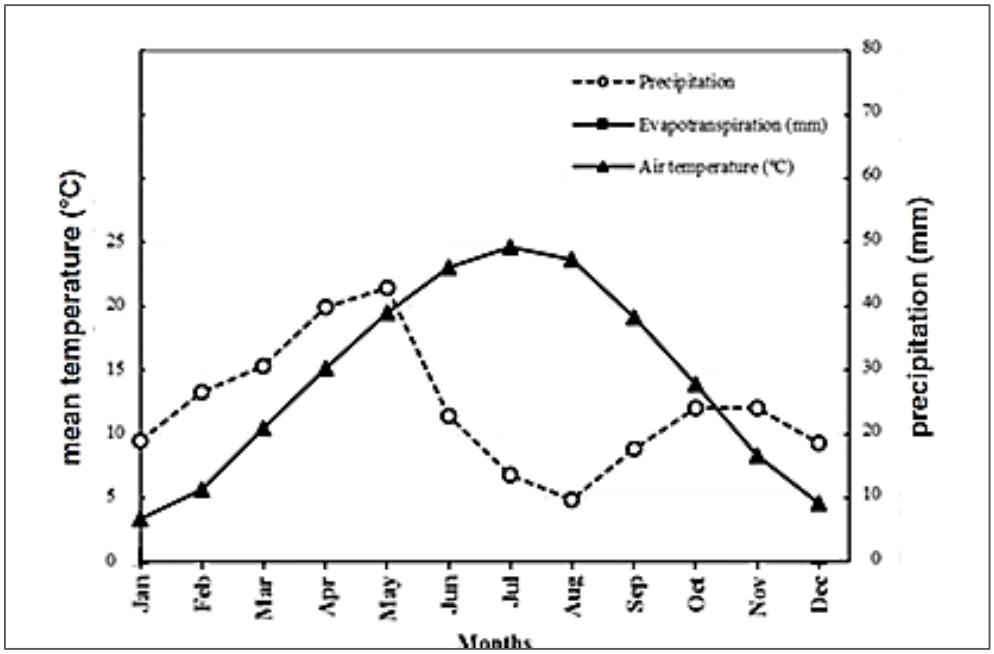

Figure 2-13: Climate diagram of Dizmar by the data of five nearest synoptic weather stations to the area since 1986.

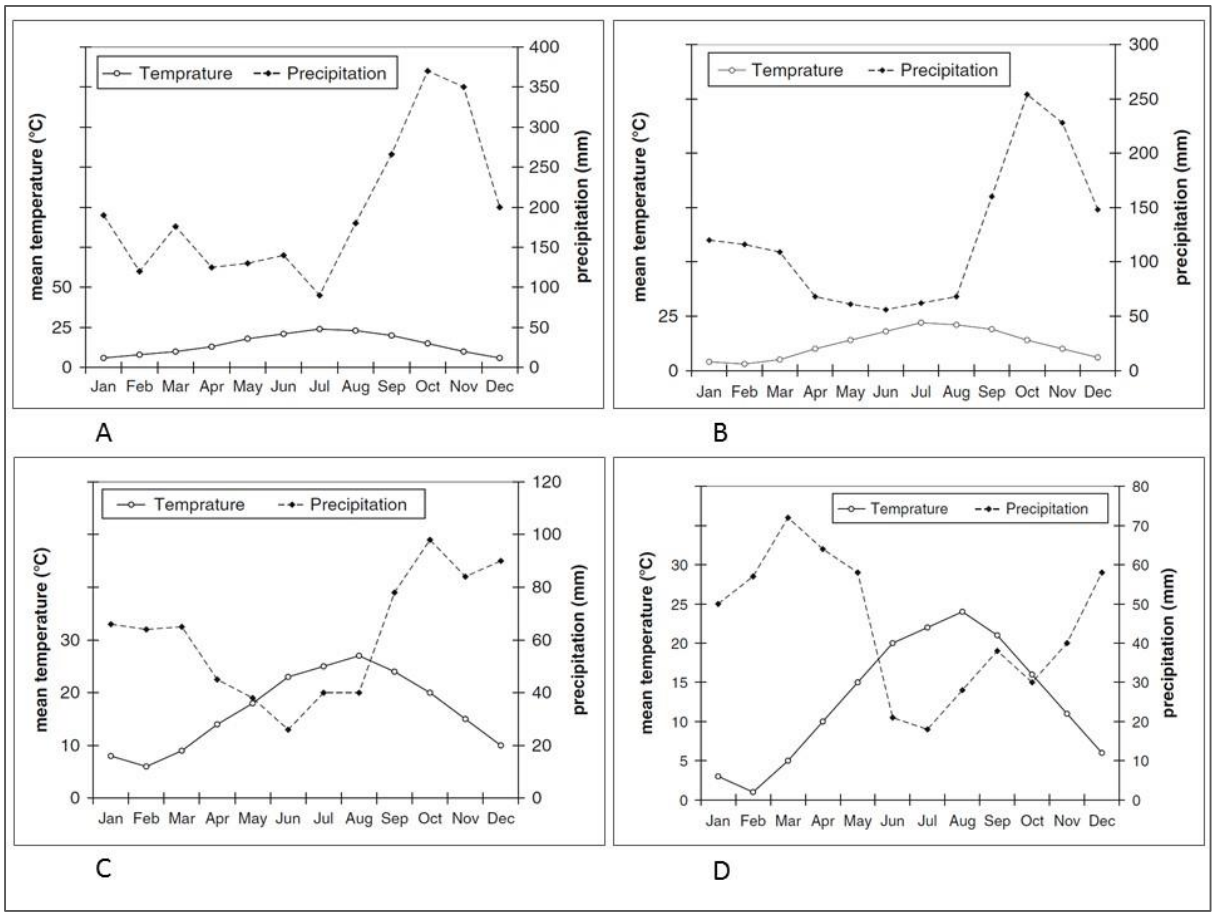

Figure 2-14: Climate diagrams from Hyrcanian region (Sagheb-Talebi et al., 2014). A - western Hyrcanian region; Pilambara in Guilan Province; B - Nowshahr in the western part of Mazandaran Province, central Hyrcanian region; C - Neka in the eastern part of Mazandaran Province, central Hyrcanian region; D - eastern Hyrcanian region; Gorgan in Golestan Province,

The Hyrcanian Forests are affected by humid weather from Euro-Siberia and the Caspian Sea. The effect of humid weather from the Caspian Sea in Eastern extreme of the Hyrcanian Forests in Golestan National Park and western extreme of Hyrcanian forest in Dizmar is low. Due to this situation these areas have lower precipitation than other parts. The period with low precipitation in summer is typical for all parts of Hyrcanian region including Dizmar.

Global Bioclimatic Classification System, based on multivariate analyses of climatic parameters notably the annual distribution and inter-annual variations of precipitation (Domroes et al. 1998; Dinpashoh et al. 2004; Ghasemi & Khalili 2008) and a range of other parameters including air humidity, wind speed, warm/cold season rains, and prevailing wind velocity (Alijani et al. 2008), recently proposed for Iran (Djamali et al, 2011). Applying this method to meteorological data of Iran (Djamali et al, 2011) showed that several isolated territories within the Temperate macro-bioclimate of the west Caspian region (near Rasht) and in NW Iran (e.g. E of Ardebil and Dizmar protected area) present Mediterranean pluviseasonal-oceanic (Mpo) bioclimate, which characterized by: low continentality, relatively high precipitation during growing season or months with mean temperature >0°C, at least two consecutive dry summer months. Mpo becomes discontinuous forming several isolated patches in the central and eastern extension of the Alborz Mts including the Golestan National Park and in the western parts of the Kopeh Dagh Mts up to the border of Turkmenistan. This patchy pattern in the east must be partly due to the complex orography of the area at the junction of Alborz and Kopeh Dagh ranges (Fig. 2-15).

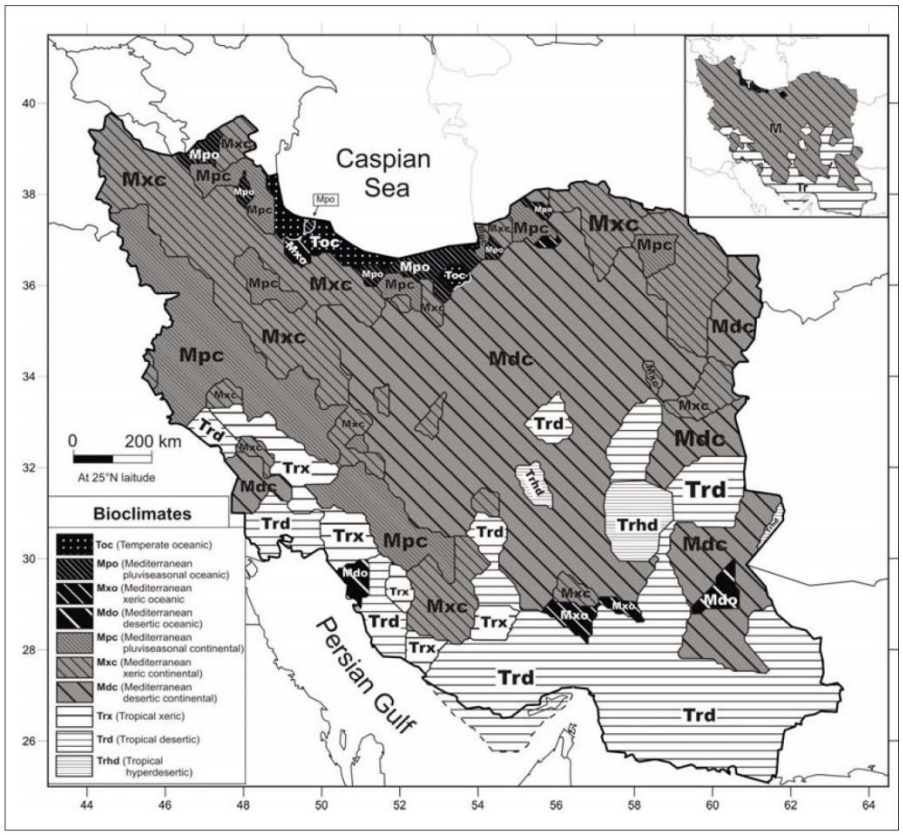

Figure 2-15: Map showing the bioclimatic zonation of Iran based on Global Bioclimatic Classification System. Macro-bioclimates have been illustrated in the inset picture at the top right corner) (Djamali *et al*. 2011).

Hydrology

Dizmar includes the catchment areas of many rivers originated from the high mountains dominated in the southern, western and eastern parts and feed the mighty Aras River in the North. Otherwise, the Mardanaqom, Ilganehchay, Kanzrod and Karangan are the most important rivers in the Dizmar watershed. Moisture bring in from the Caspian Sea, the Mediterranean, and Siberian low-pressure fronts, resulting precipitation in the region feeding these rivers and streams directly shed to the Aras River. Along the Aras River floodplains are widespread. Plateaus are generally high plains consisting of old alluvium with low to moderate slope and the piedmont plains are low slopes. In order to integrate with the Eastern catchment (Ilganehchay catchment) has also been added to Dizmar Protected Area.

Geology and Soils

The mountain formation process in Area has been started by two sets of factors: Tertiary geological activities leading to the formation of low mountains and volcanic activities giving rise to high and huge mountains. Generally, the geological structure of the region has the same characteristics as in central Iran. During the Paleozoic it was mainly a plateau area, but the region remained highly active in the **Mesozoic and Cenozoic** resulting in distinct unconformities and magmatic activities seen in volcanic rocks and granites. Young faults were active in the Quaternary (Khosrotehrani 1988). Overall, this area's mountains have been shaped as a set of irregular folds amidst three huge volcanoes, namely Ararat, Sabalan and Sahand, and recurring eruptions and

earthquakes. The steep slopes in the northern parts have given rise to the development of plains and vast alluvial lands while in some parts, such as at the eastern slopes of the Aras River valley, which are difficult to access, gigantic rocky cliffs are observed (Sagheb-Talebi *et al*. 2014).

Soils are generally shallow or of medium thickness and parent rock is often exposed. Soil pH is acidic and becomes more acidic in denser forest areas. The main soil types are forest brown and calcic brown soils. Oak stands are often established on calcic brown soils with a pH value of 5–7.5, whereas hornbeam stands are found on forest brown soils having higher pH values, ranging from 6 to 8 (Abasloo 2000).

Biodiversity

The Caspian Sea is a major source of humidity for the southern part of the Hyrcanian region. *Fagus orientalis, Carpinus betulus* and *Quercus spp.* are dominating tree species in these area. *Fagus orientalis* distributed in the western and central parts of the Hyrcanian region, from Gilan to Golestan. These parts are dramatically influenced by the Caspian Sea which led to the high precipitation with annual mean of 1,500-2,000 mm. *Carpinus betulus* and *Quercus spp.* are dominated in the western and eastern limits. Among the 15 component parts of the inscribed site of the Hyrcanian forests, Jahan Nama (05) represents the eastern border of the Beech Forests and the transition to mixed Oak Forests in the middle mountain belt, and Abr (03,04) is the "most well-known" of the eastern parts of the Hyrcanian Forests, which is located outside the beech forests' realm. Dominated species in the Eastern most site, Golestan (01, 02) with annual precipitation of 380 – 946 mm, is *Quercus castaneifolia*.

The two components within Dizmar Protected Area (04, 05) proposed as a serial extension to the Hyrcanian Forests, is the westernmost outlier of the forest type. *Quercus petraea* subsp. *iberica* and *Carpinus betulus* are the dominant tree species in this forest.

The Hyrcanian Forests include two main important gradients: first gradient from east to west with about 900 km length and the second is from lowlands to highlands with about 2,800m difference in elevation. These effective gradients cause very diverse ecological situation in the Hyrcanian Forests with different precipitation and temperature. This situation causes considerable fauna and flora diversity. The East and West of Hyrcania show marked differences and so do the highlands compared to the lower elevations. The Hyrcanian Forests in Gilan boast various exclusive species not found in Mazandaran and Golestan, including four major tree species. Some important species are restricted to the west or east, for example the oriental beech is absent in both the eastern extreme of the serial property, Golestan National Park, and western extreme, Dizmar Protected Area.

Fig. 2-16 shows the woody density diagram of Hyrcanian/Euxinian species (Zohary, 1973).

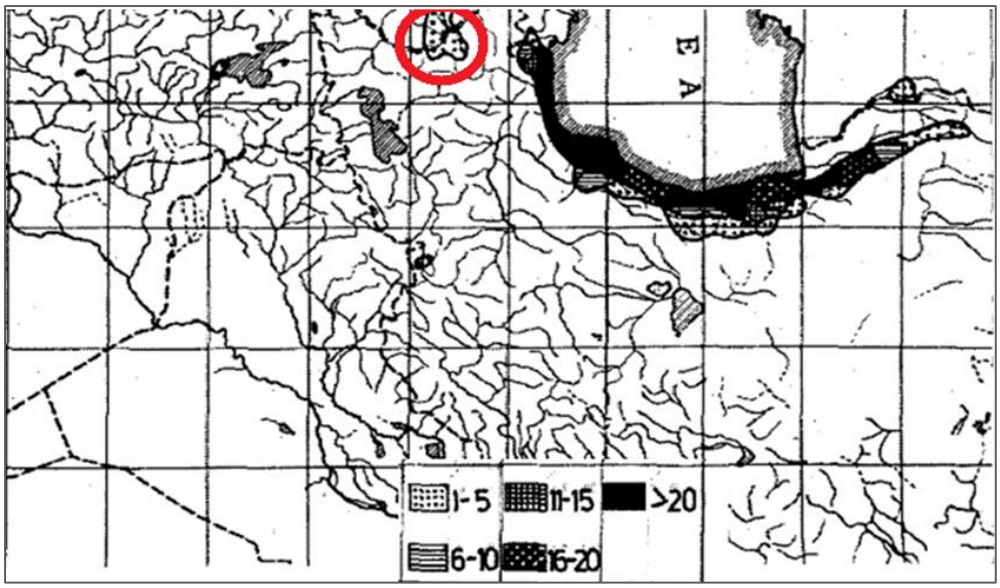

Figure 2-16: The woody density diagram of Hyrcanian /Euxinian tree species (Zohary 1973).

The most interesting thing is that the Eastern and Western parts of the Hyrcanian region are characterized with high biodiversity. Golestan as the oldest and richest national park of Iran, represents the driest and most continental part of the Hyrcanian Forests. The forest cover is characterized by dryness adapted thermophilous Oak-Hornbeam forests in different variants including transition types to rocky cliff vegetation, open woodland, shrubs and mountain steppes/semi-deserts. It includes the ecotone between the Euro-Siberian / Sub-Mediterranean and Irano-Turanian phyto-geographical regions. All Hyrcanian forest surrounded by Irano-Turanian Region and theire areas are affected by dryland ecosystems and the number of Irano-Turanian elements is considerable there.

Dizmar's forests show peculiar climatic features, a high biodiversity, the presence of rare fauna and flora, and vegetation elements associated with various climates and phytogeographical regions as well. Similar to Golestan (with 1,302 plant species and 69 species of mammals, as well 150 species of birds, 8 fish species, 3 amphibians, 24 reptiles), Dizmar area is rich in fauna and flora (994 plant species, within 493 genera of 97 families of which 97 are woody species; there are 56 mammalian species, 235 bird species, 45 reptile species, 7 amphibian species and 17 fish species). Both Golestan and Dizmar have some exclusive species. *Cotinus coggygria* and black grouse are restricted to Dizmar in the Hyrcanian region. Dizmar Protected Area is recognized as a haven for numerous threatened species at a global scale. It supports , for example, 15 vertebrate species listed in the IUCN Red List. Its location in an important wildlife adds to its role as a priority protected area.

As regards wildlife, spectacular animal species of the Hyrcanian region roam in Dizmar include the Persian leopard (*Panthera pardus saxicolor* VU), the Brown bear (*Ursus arctos*), the Red deer (*Cervus elaphus*), the Roe deer (*Capreolus capreolus*), the Wild goat (*Capra aegagrus*) and the Striped hyena (*Hyaena hyaena*). Moreover, this area is currently the only known viable site for the major vole (*Microtus majori*) in Iran.

The black grouse (*Lyrurus mlokosiewiczi* NT), the Armenian viper (*Montivipera raddei* NT), the Persian rat snake (*Zamenis persica* DD), Eichwald's toad or the Talysh toad (*Bufo eichwaldi* VU), Persian Mountain Salamander (*Iranodon persicus* NT) are further invaluable species found in Dizmar Protected Area.

Dizmar Protected Area - as a part of the Caucasus hotspot - is also a vital site for passing migratory birds flying between Northern breeding grounds and southern wintering areas.

Euxino-Hyrcanian representatives in Dizmar Protected Area are: *Acer hyrcanum, Lonicera caucasica, Lonicera iberica, Quercus macranthera, Q.petraea* subsp. *iberica*, *Ribes biebersteinii, Lathyrus roseus, Fraxinus excelsa,* subsp. *coriarifolia, Valeriana leucophaea, Digitalis nervosa, Verbascum gossypinum, Pyrus hyrcana,* and *Hesperis hyrcana*. Assadi (1988) reported 42 species of Hyrcano-Euxine and 34 species of Euxine phytocorian elements in Dizmar Protected Area.

Flora

Despite occupying a small area only, Dizmar Protected Area has a remarkably rich flora and a high degree of endemism (76 plant species). Dense forests grow from some 750 up to 2,000 m a.s.l. covering steep slopes and deep valleys. Due to the rugged topography, the area is not subject to human land use. Environmental factors, such as altitude above the sea, slope and soil type affect the habitat establishment of the plant communities. Three valuable species, *Quercus macranthera*, *Q. petraea* subsp. *iberica* and *Carpinus betulus*, have a fundamental role in the structure of forests in Dizmar Protected Area .

The main tree communities in this area are as follow:

- *C. betulus* usually associated with *Q. macranthera* constitute the dominant association between altitudes of 1,500 and 2,000 m a.s.l.
- *Carpinus betulus* mainly creates the communities from 750 to 1,550 m a.s.l in the northern and north-western slopes.
- *C. betulus* and *Taxus baccata* between 1,100 and 1,300 m a.s.l on the slopes of northwest and rarely northeast of the humid and deep soil have developed one of the most interesting communities in this area.
- *Q. petraea* subsp. *iberica* is presented as a dominant species or with *C. betulus* as the co-dominant species at an altitude of about 800 to 1,500 m a.s.l., up to about 1,600 m it is gradually appeared only.

In addition to the above species, species such as *Acer hyrcanum*, *A. campestre*, *Evonymus latifolia*, *Lonicera iberica*, and in the wetter areas *Cerasus avium* and *Sorbus torminalis* contribute to the diversity of tree formations.

The following woody species are characteristic for the forests in the proposed components of Dizmar Protected Area :

Acer campestre, Acer hyrcanum, Acer monspessulanum, Amygdalus fenzliana, Berberis integerrima, Berberis vulgaris, Carpinus betulus, Celtis caucasica, Cerasus avium, Cerasus incana, Cerasus mahaleb, Cerasus microcarpa, Cornus mas, Corylus avellana, Crataegus caucasica, Crataegus meyeri, Crataegus orientalis, Cydonia oblonga, Evonymus europaeus, Evonymus latifolius, Ficus carica, Fraxinus excelsior, Juniperus communis, Juniperus excelsa, Juniperus foetidissima, Juniperus oblonga, Paliurus spina-Christi, Prunus divaricata, Prunus spinosa, Punica granatum, Pyrus hyrcana, Pyrus salicifolia, Pyrus syriaca, Quercus robur, Quercus macranthera, Quercus petraea, Rhamnus cathartica, Rhamnus pallasii, Salix aegyptica, Salix alba,

Salix excelsa, Sorbus graeca, Sorbus persica, Sorbus torminalis, Sorbus aucuparia, Taxus baccata, Ulmus glabra and Ulmus minor.

Based on the database, the complete list of flora of the south Caspian Area is a total number of 3,234 species (Akhani *et al*. 2010). Dizmar area has 994 recorded plant species, equivalent to some 30 percent of the full list just in 62,847 ha.

Dizmar area is contact point of Hyrcanian forests with Irano-Turanian, Anatolian, Caucasian and Mediterranean regions and affecting by presence of elements of these vegetation regions. The floristic list of Dizmar Protected Area (See Appendix) shows some species with Chorotypes of Cosmopolitan (Cosm), Euro-Sibirian (ES), Irano-Turanian (IT), Mediterranean (M) and Pluriregional (PL). This story is for all of Hyrcanian ecosystems with remarkable presence of other vegetation region there. In floristic study on Mazibon and Sibon protected forests in Ramsar in the western Hyrcanian forests, across the altitudinal gradient (300-2300 m) showed considerable presence of elements of Euro-Sibirian region (23.8%) Pluriregional elements (19.9%), EuroSibirian /Irano-Turanian (19.3%), Euro-Sibirian/Irano-Turanian/Mediterranean (16.6%). In the flora, and chorology of the *Parrotia persica* habitats in Izdeh-e Noor area in central Hyrcanian forests (Akhondnejad and Asri, 2016) Euro-Siberian elements was (28.7%), and Pluriregional elements (20.4%),Irano-Turanian/Mediterranean elements (19.7%) and Euro-Siberian/Irano-Turanian elements (17.2%). Also in eastern Hyrcanian forests for example in Golestan National Park the presence of elements from other vegetation region especially Irano-Turanian elements is more remarkable.

Fauna

Invertebrates

Although there have only been limited invertebrate studies in Iran, recent references reveal some 20,000-25,000 species for the whole country (Official website of DoE, 2015). Dizmar is rich in invertebrate species, and an extraordinary diversity of invertebrates reported from the Dizmar and the vicinity protected areas which most were new to the Iranian fauna, and some were new to science (Table 2-5).

In a study, a total of 114 species in 87 genera and 19 families were determined among the invertebrates of this region of Iran (Ghahari et al, 2010). In another study the invertebrates belong to seven orders including Coleoptera (36%), Lepidoptera (29%), Hymenoptera (13.40%), Homoptera (6.20%), Diptera (5.60%), Heteroptera (4.50%), and Orthoptera 4%) (Research Center of Agriculture and Natural Resources of East Azarbaijan Province, Tabriz 1991).

Table 2-8: List of insects and EPNs sampled from the proposed area (Research Center of Agriculture and Natural Resources of East Azarbaijan Province, Tabriz 1991).
(* Newly record for Iran)

Order and Family	Species name	Status
Coleoptera		
Cerambycidae	**Anisorus quercus* (Goetze)	
	**Stenurella bifasciata* (Muller)	
	**Brachyleptura cordigera* (Füssli)	
Curculionidae	**Tychius tridentinus* Penecke	
	**Gymnetron linkei* Reitter	
Apionidae	**Mesotrichapion subglabrum* (Desbrochers)	
	**Perapion violaceum* (Kirby)	
Lepidoptera		
Pieridae	**Gonepteryx farinose* L.	
Hymenoptera		
Ichneumonidae	**Pimpla (Coccigomimus) turionellae* L.	
	**Diplazon laetatorius* (F.)	
	**Alcima pictor* Aubert	
	**Diadegma armillatum* (Gravenhorst)	
Torymidae	**Monodontomerus aerus* Walker	
	**Idiomacromerus balasi* (Szelenyi)	
Braconidae	**Meteorus versicolor* (Wesmael)	
	**Meteorus obsoletus* (Wesmael)	
Pteromalidae	**Conomorium patulum* (Walker)	
Cynipidae	**Synergus gallaepomiformis* (Boyer)	
	**Synergus pallipes* Hartig	
	**Synergus reinhardi* Mayr	
	**Synergus thaumacerus* (Dalman)	
	**Trigonaspis megaptera* Panzer	
	**Andricus malpighii* Alder	
	Andricus askewi Melika &Stone	Endemic
	Andricus assareh Melika &Sadeghi	Endemic
	Andricus csokai Melika &Tavakoli	Endemic
	Andricus dentimitratus Rejto	Endemic
	Andricus pseudoaries Melika et al.	Endemic
	Andricus sadeghii Melika et al.	Endemic
	Andricus megalucidus Melika et al.	Endemic
Heteroptera		
Cydnidae	**Sehirus luctuosus* Mulsant & Rey	

Lygaeidae	**Heterogaster affinis* Herrich-Schäffer	
Miridae	**Cyllecoris histrionius* (Linnaeus)	
	**Blepharidopterus angulatus* Fallen	
Reduviidae	**Peirates hybridus* (Scopoli)	
Stenocephalidae	**Dicranocephalus medius* (Mulsant)	
	**Dicranocephalus agilis* (Scopoli)	
Corixidae	**Trichocorixa* sp.	
	**Hesperocorixa scabricula* (Walley)	
Gerridae	**Aquarius (=Gerris) lacustris* (L.)	
Diptera		
Chironomidae	**Conops longiventris* Kröber	
	**Physocephala laticincta* (Brulle)	
Tachinidae	**Goniophthalmus halii* Mesnil	
	**Zenillia libatrix* (Panzer)	
	**Townsendiellomyia nidicola* (Townsend)	
	**Peleteria umbratica* Zimin	
	**Phryxe caudata (Rondani)*	
Simuliidae	**Simulium margaritae (Rubtsov)*	
Orthoptera		
Tettigonidae	**Saga* sp.	
Entomopathogenic nematodes (EPNs)		
Steinernematidae	**Steinernema bicornutum* Tallosi	
	**Steinernema glaseri* (Steiner) Wouts	
	**Steinernema kraussei* (Steiner) Travassos	
	**Steinernema scapterisci* Nguyen & Smart	
	**Hexamermis albicans* Kaiser	
	Steinernema arasbaranense Nikdel, Niknam & Ye	Endemic

Vertebrates

Despite occupying a small area only, more than 360 vertebrate species, including 56 mammal species (29 percent of Iran's mammals), 235 bird species (44 percent of Iran's birds), 45 reptile species (20 percent of Iran's reptiles), seven amphibian species (32 percent of Iran's amphibians) and 17 fish species (nine percent of Iran's fishe) have been observed and recorded from Dizmar and the vicinity protected areas so far, which is a significant number in comparison to the small area.

Mammals

The current species list of terrestrial mammals of Iran comprises between 192 and 197 species (Yusefi *et al*. 2019; Department of the Environment of IR of Iran), distributed among 90 genera within 34 families, and seven orders. Eight mammals species are endemic to Iran. The Alborz and Zagros mountains accumulate the highest species richness. Nearly 13% of the species in Iran are threatened, and a further 14%

are near to qualifying for threatened status (*Yusefi et al*., 2019). Some invaluable of mammals inhabit in Dizmar protected area, include leopard (*Panthera pardus saxicolor*), Wild goat (*Capra aegagrus*), lynx (*Lynx lynx*), brown bear (*Ursus arctos*), wolf (*Canis lupus*), jackal (*Canis aureus*), jungle cat (*Felis chaus*), badger (*Meles meles*), and otter (*Lutra lutra*). Some other important wildlife species that live in the region include: *Capreolus capreolus, Cervus elaphus, Mustela nivalis, Felis silvestris, Martes foina, Sus scrofa and Hystrix indica*.

Capra aegagrus (NT), one the ancestors of the domestic goat, is the most threatened large mammals included on the IUCN Red List, with a further 5 species included as Near Threatened. According to the law, some species such as roe deer, red deer, wolf, otter, brown bear and jungle cat are under strict protection by the Iranian Department of Environment (DoE).

Cats in Dizmar: Iran has a remarkable diversity of cats. Until recently, ten cat species from the cuddly sand cat to the mighty Caspian tiger roamed the country. The two largest species, the Caspian tiger and the Asiatic lion, have disappeared a bit more than half a century ago, but eight species are still extant and five of them are found in Dizmar Protected Area: the Persian leopard, the Wild cat, the Jungle cat, the Eurasian Lynx and Pallas's cat (see Table 2-6). Predators including these cat species play a keystone role in healthy ecosystems.

The Persian leopard is the last remaining *Panthera* species in West Asia after the extinction of the Asiatic lion (*Panthera leo persica*) and the Caspian tiger (*Panthera tigris virgatae*) (Sanei *et al*. 2020, 2016). It has more than 75% of its extant range within Iran (Jacobson *et al*. 2016). As the only extant big cat within Eurasia, the subspecies Persian leopard (*Panthera pardus saxicolor*) is a flagship species distributed in the remote mountains and rugged foothills of Iran, Afghanistan, Turkmenistan, Azerbaijan, Iraq and the broader Caucasus (Breitenmoser *et al*. 2007, Gavashelishvili & Lukarevskiy 2008). Despite recent reduction in occupancy and number within the range countries, the subspecies still exists in large areas within Iran, including the northwest which is considered the only promising source from which this leopard might recolonize its former range (Fig. 2-18).

East Azarbaijan Province of Iran has the longest borderline (45 km) and the main common leopard habitats with two neighboring countries. Leopard numbers in the neighboring PA around Dizmar Protected Area were estimated at 2-3 leopards in Marakan Protected Area , 10-12 in Kiamaki Wildlife Refuge and 7-9 in Arasbaran Protected Area (Jacobson *et al*. 2016). Wild goat and wild sheep followed by wild boar are the most widely distributed potential prey species for the leopard, as the region's top predator, in these protected areas (Sanei *et al*. 2011).

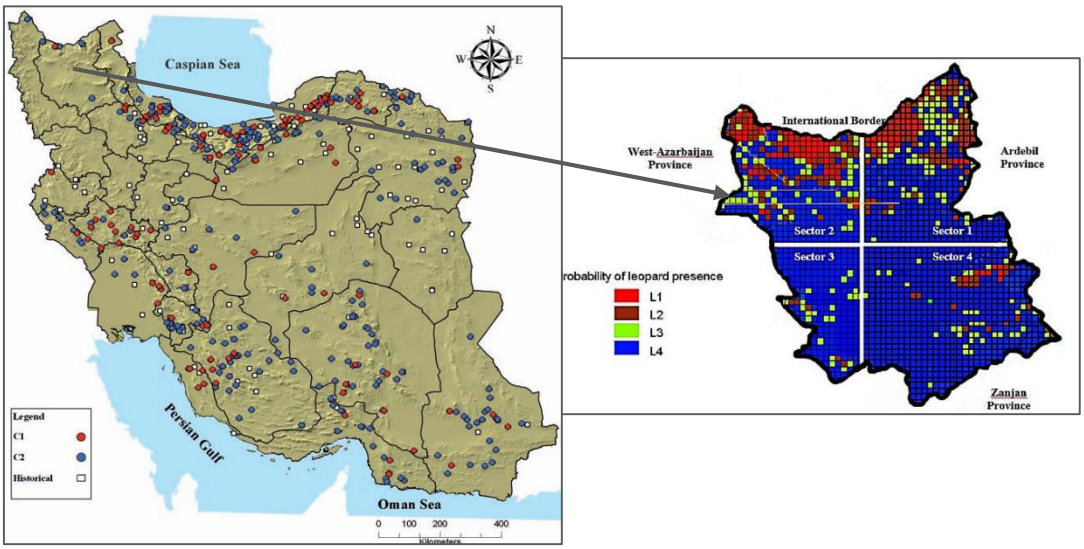

Figure 2-18: Left: Leopard presence point locations in Iran assessed from 2007 to 2011. C1 = confirmed presence, C2 = probable presence; sources for the historical records: Etemad (1985), Ziaie (1996), Kiabi et al. (2002), Sanei (2004, 2007) and unpubl. reports of DoE provincial offices. Administrative division of provinces refers to the initiation of data collection activities in 2007. – Right: Location of sectors and main identified potential leopard habitats in East Azarbaijan province, Iran, each cell covers an area of 5 km × 5 km. Habitat suitability is decreasing from L1 to L4.

The Persian leopard is listed as Vulnerable on the IUCN Red List; the population is estimated at fewer than 871 – 1,290 mature individuals and considered as declining. This species was most likely distributed over the whole Caucasus, except for steppe areas. Leopards have a wide distribution in Iran, mostly in the region of the two mountain chains consisting of Alborz, running northwest to northeast, and Zagros from northwest to the south (Sanei & Zakaria 2011).

A few recently confirmed records from Iraq and Turkey are restricted to the mountainous areas of Kurdistan (B. Avgan and H. Raza pers. comms. 2014), where Leopard is known to be scarce. There are numerous camera-trap records dated 2013-2014 confirming the presence of a small population in the Zangezur Ridge shared by Azerbaijan and Armenia (B. Avgan and A. Malkhasyan pers. comms. 2014, Voskanyan 2014, Sarukhanova 2014). Two individuals are recorded in Talish Mountains of Azerbaijan (Sarukhanova 2014).

There is recent camera trapping evidence from Nakhchivan Autonomous Republic, Azerbaijan (Avgan et al. 2012). Recently, a Leopard was video-trapped in North Ossetia, Georgia (P. Weinberg pers. comm. 2014). There are no confirmed recent records in Dagestan although Leopards definitely lived here in low numbers in the 1980s and the last confirmed photograph was taken in 2009 (Yarovenko 2010, Y. Yarovenko pers. comm. 2014).

Figure 2-19: Persian leopard (*Panthera pardus saxicolor*) (Photo by Jalil Hassanzadeh).

Persian Leopard's habitat comprises climates with temperatures ranging from −23°C to 49°C, but they are most often found in habitats with temperatures of 13 to 18°C, maximum 20 days of ice cover per year and rainfall of more than 200 mm per year.

In 2007, conservation experts of the six countries sharing the Caucasus Ecoregion – Armenia, Azerbaijan, Georgia, Iran, Russia, and Turkey – and representatives of international conservation organizations developed the Strategy for the Conservation of the Leopard in the Caucasus Ecoregion (Breitenmoser et al., 2007).

The wild goat (*Capra aegagrus*) is a wild goat species, inhabiting forests, shrublands and rocky areas ranging from Turkey and the Caucasus in the west to Turkmenistan, Afghanistan and Pakistan in the east. It has been listed as near threatened on the IUCN Red List and is threatened by destruction and degradation of habitat. The largest population of wild goat in Iranian part of Caucasian ecoregion as a prey for Persian leopard, is in Marakan Protected Area, Kiamaky Wildlife Refuge, Arasbaran Protected Area and Dizmar (Karami *et al*., 2016, Krever *et al*., 2001, Iranian Department of Environment, unpublished reports, Weinberg et al. 2008).

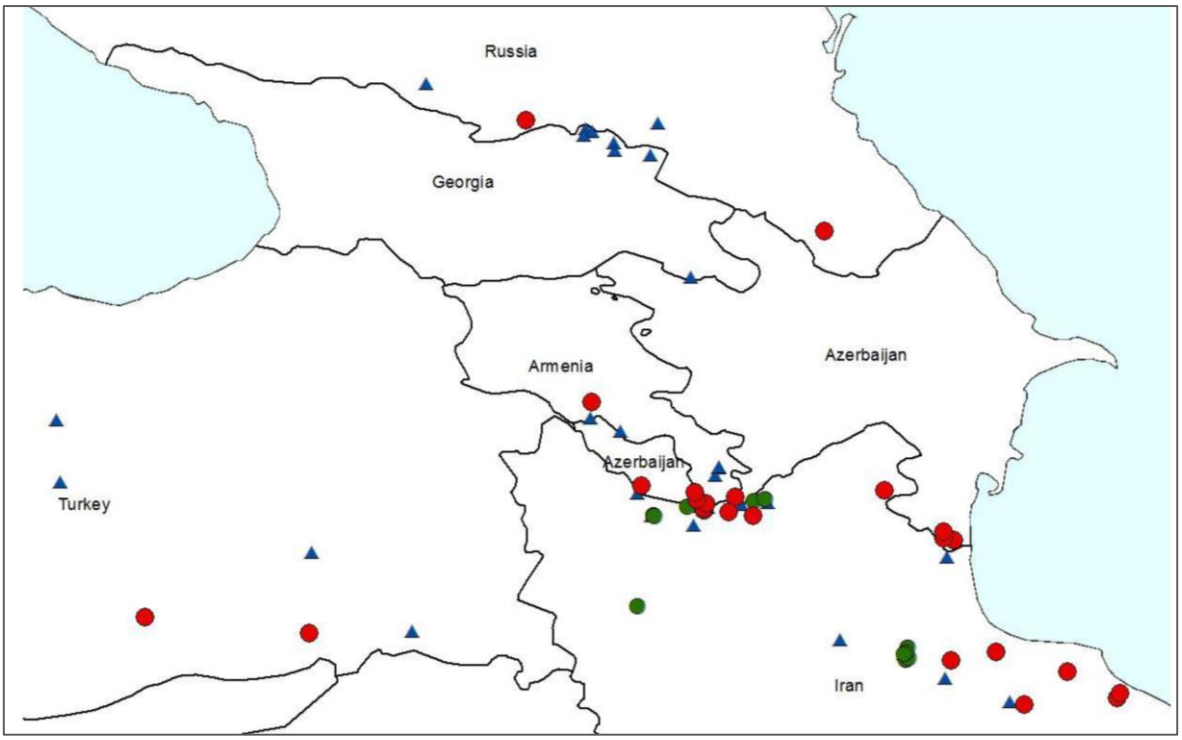

Figure 2-20: Distribution of leopard records in the six range countries. Red dots = C1“hard facts” (photos, genetic samples, carcasses…); green dots= C2, "observations confirmed by trained person"; and blue triangles= C3 "unconfirmed observation or observation that cannot be confirmed" (Caucasus leopard – Tbilisi workshop 9 – 10 October 2014). The map demonstrates a concentration of leopard records in Dizmar region and underlines the importance of Dizmar PA for the protection of this invaluable species.

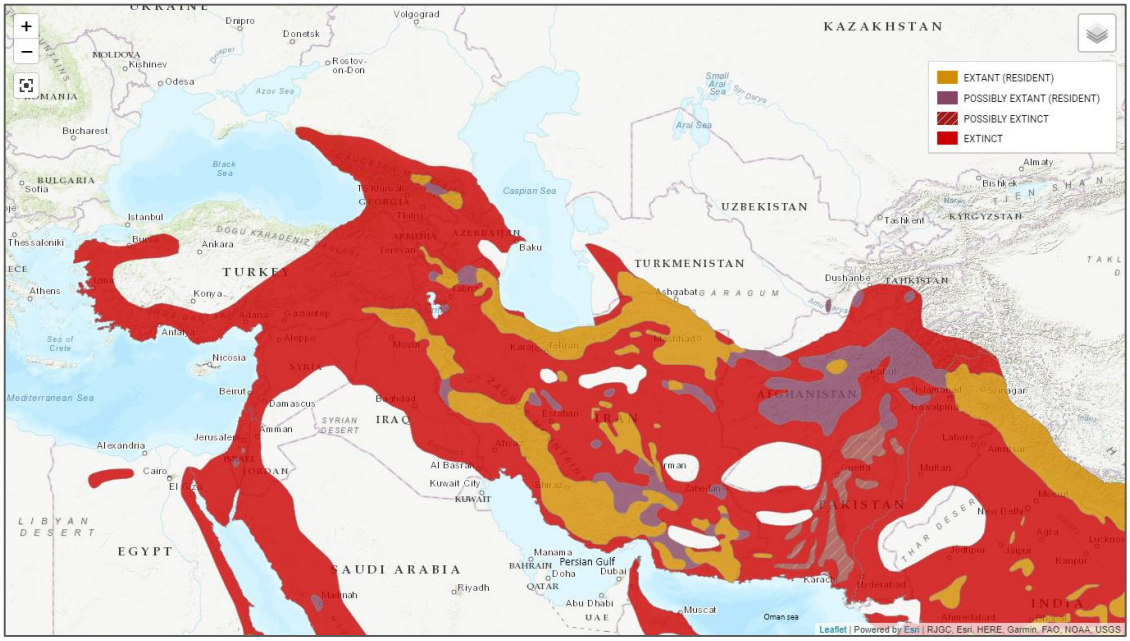

Figure 2-21: *Panthera pardus* distribution in West-Asia (Gerngross, 2019). The IUCN Red List of Threatened Species. Version 2020-2.

Table 2-9: The mammalian species reported from the Dizmar protected area and the vicinity areas under the IUCN, CITES and Iran's conservation laws. * Common species within the component parts of the existing Hyrcanian Forests World Heritage Site.

English name	Scientific name	Family	Species Conservation Status				
			Iran's Conservation Laws			International Conservation Laws	
			Endangered	Protected	Not protected	IUCN	CITES
Southern White-Breasted Hedgehog	*Erinaceus concolor**	Erinaceidae			*		
Mediterranean Water Shrew	*Neomys anomalus**	Soricidae			*		
Transcaucasian Water Shrew	*Neomys teres*	Soricidae			*		
Caucasian Pygmy Shrew	*Sorex volnuchini*	Soricidae			*		
Pygmy White-toothed Shrew	*Suncus etruscus**	Soricidae			*		
Bi-coloured Shrew	*Crocidura leucodon**	Soricidae			*		
Naked-rumped Tomb Bat	*Taphozous nudiventris**	Emballonuridae			*		
Greater Horseshoe Bat	*Rhinolophus ferrumequinum**	Rhinolophidae			*		
Lesser Horseshoe Bat	*Rhinolophus hipposideros**	Rhinolophidae			*		
Mehely's Horseshoe Bat	*Rhinolophus mehelyi*	Rhinolophidae	*			VU	
Mediterranean Horseshoe Bat	*Rhinolophus Euryale**	Rhinolophidae			*	NT	
Greater Mouse-eared Bat	*Myotis myotis*	Vespertilionidae			*		
Lesser Mouse-eared Myotis	*Myotis blythii**	Vespertilionidae			*		
Whiskered Bat	*Myotis mystacinus**	Vespertilionidae			*		
Natterer's Bat	*Myotis nattereri**	Vespertilionidae			*		
Schaub's Myotis	*Myotis schaubi**	Vespertilionidae			*	DD	
Common Pipistrelle	*Pipistrellus pipistrellus**	Vespertilionidae			*		
Kuhl's Pipistrelle	*Pipistrellus kuhlii**	Vespertilionidae			*		
Noctule	*Nyctalus noctula**	Vespertilionidae			*		
Serotine	*Eptesicus serotinus**	Vespertilionidae			*		

Schreibers's Long-fingered Bat	*Miniopterus schreibersii**	Vespertilionidae			*	NT	
Forest Dormouse	*Dryomys nitedula**	Gliridae			*		
Brandt's Hamster	*Mesocricetus auratus*	Cricetidae			*	NT	
Gray Dwarf Hamster	*Cricetulus migratorius**	Cricetidae			*		
Eurasian Water Vole	*Arvicola amphibious**	Cricetidae			*		
Common Vole	*Microtus arvalis**	Cricetidae			*		
Social Vole	*Microtus socialis**	Cricetidae			*		
East European Vole	*Microtus levis*	Cricetidae			*		
Major's Pine Vole	*Microtus majori*	Cricetidae			*		
Persian Jird	*Meriones persicus*	Muridae			*		
Tristram's Jird	*Meriones tristrami**	Muridae			*		
House Mouse	*Mus musculus**	Muridae			*		
Herb Field Mouse	*Apodemus uralensis*	Muridae			*		
Small Five-toed Jerboa	*Allactaga elater*	Dipodidae			*		
Williams' Jerboa	*Allactaga williamsi*	Dipodidae			*		
Indian Crested Porcupine	*Hystrix indica**	Hystricidae			*		
European Hare	*Lepus europeus*	Leporidae			*		
Stripped Hyaena	*Hyaena hyaena*	Hyaenidae			*	NT	
Gray Wolf	*Canis lupus**	Canidae			*		Appendix II
Golden Jackal	*Canis aureus**	Canidae			*		
Red Fox	*Vulpes vulpes**	Canidae			*		
Persian Leopard	*Panthera pardus saxicolor**	Felidae		*		VU	Appendix I
Wild Cat	*Felis silvestris**	Felidae			*		
Jungle Cat	*Felis chaus**	Felidae		*			
Eurasian Lynx	*Lynx lynx**	Felidae		*			
Pallas's Cat	*Otocolobus manul**	Felidae	*	*			
Brown Bear	*Ursus arctos**	Ursidae		*			Appendix II
Least Weasel	*Mustela nivalis**	Mustelidae			*		
Marbled Polecat	*Vormela peregusna*	Mustelidae			*	VU	
Stone Marten	*Martes foina**	Mustelidae			*		
Eurasian Badger	*Meles meles**	Mustelidae			*		

European Otter	*Lutra lutra**	Mustelidae			*	NT	Appendix I
Wild Boar	*Sus scrofa**	Suidae			*		
Red Deer	*Cervus elaphus**	Cervidae		*			
European Roe Deer	*Capreolus capreolus**	Cervidae		*			
Wild Goat	*Capra aegagrus (hircus)**	Bovidae			*	NT	

Birds

A total of 535 species of birds have been identified in Iran, belonging to 78 families in 22 orders. The largest number of species belongs to the Passeriformes order, while the smallest one fits in Gaviiformes, Phoenicopteriformes and Psittaciformes (with two species in each order). Dizmar and the vicinity protected areas with 235 species of birds of Iran (about 44 percent), are one of the most valuable bird sites of Iran. This area holds some globally threatened species or other species of global conservation concern (Table 2-4) (See appendix for the full checklist of the bird species of this area). The Caucasus hotspot is home to millions of migratory birds flying between Northern breeding lands and southern wintering lands (Heiss and Gauger, 2011), which makes Dizmar Protected Area a vital site for passing migratory birds.

Some species such as common pheasant (*Phasianus colchicus*), black grouse (*Lyrurus mlokosiewiczi* NT), Caspian snowcock (*Tetraogallus caspius*), Bearded vulture (*Gypaetus barbatus* NT), Griffon vulture (*Gyps fulvus*), Mountain chiffchaff (*Phylloscopus sindianus*), Greenish warbler (*Phylloscopus trochiloides*), Water pipit (*Anthus spinoletta*), Crimson-winged finch (*Rhodopechys sanguineus*) are trigger species in this area (Table 2-7). Saker Falcon (*Falco cherrug*), with population size of 11,200, is listed as Critically Endangered because its population has undergone a very rapid reduction, for reasons that are poorly understood (http://datazone.birdlife.org/).

Figure 2-22: Sociable Plover *(Vanellus gregarius* CR), photo by: Meysam Ghasemi, Saker Falcon (*Falco cherrug* EN) (photo by Mohammadreza Sadeghi)

Table 2-10: Populations of IBA trigger species (after Birdlife International). **A1**: Species of global conservation concern, **A2**: Restricted-range species, **A3**: Biome-restricted species, **B2:** Species with an unfavorable conservation status in the Middle East, **B3:** Species with a favorable conservation status but concentrated in the Middle East. * Common species within the component parts of the existing Hyrcanian Forests World Heritage Site.

Species	Season	Period	Population estimate	Quality of estimate	IBA Criteria	IUCN category
Common pheasant ***Phasianus colchicus****	Resident	1977	common		B2	
Caucasian black grouse *Lyrurus mlokosiewiczi*	resident	1977	37-67 breeding pairs	good	A1, A2, A3, B2	NT
Caspina snowcock *Tetraogallus caspius**	resident	1977	4 breeding pairs	good	A3, B3	
Bearded vulture ***Gypaetus barbatus****	resident	1977	1 breeding pairs	good	B2	NT
Griffon vulture ***Gyps fulvus****	resident	1977	4 breeding pairs	good	B2	
Mountain chiffchaff *Phylloscopus sindianus**	breeding	1974	7 breeding pairs	good	A2, B3	
Greenish warbler *Phylloscopus trochiloides*	breeding	1977	abundant		B3	
Water pipit ***Anthus spinoletta***	breeding	1977	abundant		A3	
Grimson -winged finch *Rhodopechys sanguineus*	resident	1977	frequent		A3	

Table 2-11: Checklist of globally threatened birds of the Dizmar Protected Area listed under the IUCN, CITES and Iran's conservation laws. * Common species within the component parts of the existing Hyrcanian Forests World Heritage Site.

English name	Scientific name	Family	Species Conservation Status				
			Iran's Conservation Laws			**International Conservation Laws**	
			Endangered	Protected	Not protected	IUCN	CITES

Lesser White-fronted Goose	*Anser erythropus*	Anatidae		*		VU	
Eurasian Black Vulture	*Aegypius monachus**	Accipiteridae		*		NT	
Egyptian Vulture	*Neophron percnopterus**	Accipiteridae		*		EN	
Lammergeyer	*Gypaetus barbatus**	Accipiteridae	*			NT	
Eastern Imperial Eagle	*Aquila heliacal*	Accipiteridae	*			VU	Appendix I
Greater Spotted Eagle	*Aquila clanga*	Accipiteridae		*		VU	
Saker Falcon	*Falco cherrug**	Falconidae	*			EN	
Black Grouse	*Lyrurus mlokosiewiczi*	Phasianidae	*			NT	
Sociable Plover	*Vanellus gregarious*	Charadriidae			*	CR	
Eurasian Curlew	*Numenius arquata*	Scolopacidae			*	NT	

Reptiles

Currently, 225 reptile species are known to inhabit Iran, subdivided in 25 families and three orders. To date, 45 species of reptiles have been identified in Dizmar and its neigboring protected areas (some 20 percent of Iran reptiles, see Table 2-9). Moreover, four reptile species which are endemic to the Caucasus hotspot have been recorded from this area, two of which belong to the Viperidae including the Armenian viper (*Montivipera raddei* NT) and the Armenian steppe viper (*Vipera eriwanensis* VU) (Rajabzadeh et al, 2012), one belongs to the Colubridae, the Persian rat snake (*Zamenis persica* DD), and one belongs to the Lacertidae, the Raddei lizard (*Darevskia raddei*).

Table 2-12: Checklist of reptiles of Dizmar Protected Area listed under the IUCN, CITES and Iran's conservation laws. * Common species within the component parts of the existing Hyrcanian Forests World Heritage Site.

English name	***Scientific name***	***Family***	***Species Conservation Status***				
			Iran's Conservation Laws			***International Conservation Laws***	
			Endangered	***Protected***	***Not Protected***	***IUCN***	***CITES***
Longnosed Worm Snake	*Myriopholis macrorhyncha*	Leptotyphlopidae			*	NE	
European Blind snake	*Typhlops vermicularis*	Typhlopidae			*		
Common Sand Boa	*Eryx jaculus*	Boidae			*	NE	
Slender Sand Boa	*Eryx elegans*	Boidae			*	NE	
Tatar Sand Boa	*Eryx tataricus*	Boidae			*	NE	

Large Whip Snake	*Dolichophis jugularis*	Coluburidae			*		
Red-Bellied Racer	*Dolichophis schmidti**	Coluburidae			*		
Dahl's Whip Snake	*Platyceps najadum **	Coluburidae			*		
Spotted Desert Raser	*Platyceps karelini **	Coluburidae			*	NE	
Collared Dwarf Snake	*Eirenis collaris*	Coluburidae			*		
Narrow-striped Dwarf Snake	*Eirenis decemlineatus*	Coluburidae			*		
Dotted Dwarf Snake	*Eirenis punctatolineatus*	Coluburidae			*		
Striped Dwarf Snake	*Eirenis medus*	Coluburidae			*		
Four-lined Rat Snake	*Elaphe sauromates*	Coluburidae			*		
Asian Racer	*Hemorrhois numiffer*	Coluburidae			*		
Spotted Wipe Snake	*Hemorrhois ravergieri*	Coluburidae			*	NE	
Dice Snake	*Natrix tessellata*	Coluburidae			*		
Grass Snake	*Natrix natrix*	Coluburidae			*		
Cat Snake	*Telescopus fallax*	Coluburidae			*		
Persian Rat Snake	*Zamenis persica*	Coluburidae			*	DD	
Aesculapean Snake	*Zamenis longissimus **	Coluburidae			*		
Smooth Snake	*Coronella austriaca*	Coluburidae			*		
Eastern Montpellier Snake	*Malpolon insignitus*	Coluburidae			*	NE	
Radde's Viper	*Montivipera raddei*	Viperidae			*	NT	
Armenian Steppe Viper	*Vipera eriwanensis*	Viperidae			*	VU	
Levantine Viper	*Macrovipera lebetina*	Viperidae			*	NE	
Caucasian Agama	*Laudakia caucasia*	Agamidae			*		
Persian Toad Agama	*Phrynocephalus persicus*	Agamidae			*	VU	
Horny-scaled Agama	*Trapelus lessonae*	Agamidae			*		
Glass Lizard	*Pseudopus apodus*	Anguidae			*	NE	
Keeled Gecko	*Cyrtopodion scabrum*	Gekkonidae			*		
Caspian Bent-toed Gecko	*Tenuidactylus caspius*	Gekkonidae			*		
Radde's Lizard	*Darevskia raddei*	Lacertidae			*		
Steppe Runner	*Eremias arguta*	Lacertidae			*		

Strauch's Racerunner	*Eremias strauchi*	Lacertidae			*		
Brandt's Persian Lizard	*Iranolacerta brandtii*	Lacertidae			*	DD	
Three-lined Lizard	*Lacerta media*	Lacertidae			*		
Caspian Green Lizard	*Lacerta strigata* *	Lacertidae			*		
Snake-eyed Lizard	*Ophisops elegans*	Lacertidae			*	NE	
Twin-striped Skink	*Ablepharusbivittatus*	Scincidae			*		
Schneider's Skink	*Eumecesschneiderii*	Scincidae			*	NE	
Levant Skink	*Trachylepis aurata*	Scincidae			*		
Spur-thighed Tortoise	*Testudo graeca**	Testudinidae		*		VU	
Caspian turtle	*Mauremys caspica* *	Emydidae		*		NE	
European Pond Turtle	*Emys orbicularis* *	Emydidae		*		NT	

Amphibians

Overall, 22 amphibian species have been recorded in Iran from six families and two orders (Rastegar-pouyani *et al*., 2008). There are now seven amphibian species which are present in Dizmar and constitute some 32 percent of Iran's amphibians (Table 2-10), among which, the Persian brook salamander (*Paradactylodon persicus*) of the Hynobiidae family is endemic to Iran (Rastegar-pouyani et al., 2008). There it occurs only in Elburz Mountains (Ardabil, Gilan, Golestan, and Mazanderan provinces). The salamander inhabits wetter slopes which are exposed to the Caspian Sea. The species lives in montane, fishless streams in the broad-leafed forests.[5] It is a Hyrcanian element of the fauna.

The Talysh toad *(Bufo eichwaldi)* is a typical Hyrcanian endemic. It occurs in the entire Hyrcanian region[6], and was found newly also in Dizmar. The occurrence of this two Hyrcanian amphibians in Dizmar Protected Area, another piece of evidence showing the relation to the Hyrcanian Forests.

Table 2-13: Checklist of amphibians of Dizmar Protected Area listed under the IUCN, CITES and Iran's conservation laws. * Common species within the component parts of the existing Hyrcanian Forests World Heritage Site.

English name	Scientific name	Family	Species Conservation Status

[5] https://amphibiaweb.org/cgi/amphib_query?where-scientific_name=Paradactylodon+persicus

[6] https://berkeleymapper.berkeley.edu/index.html?tabfile=https://amphibiaweb.org/tmpfiles/94488&configfile=https://amphibiaweb.org/tmpfiles/bm_config_65317.xml&ViewResults=tab&sourcename=AmphibiaWeb+Species+Map:+Bufo+eichwaldi&amphibiaweb=true&label=1&opacity=0.50&pointDisplay=pointMarkers

			Iran's Conservation Laws			International Conservation Laws	
			Endangered	Protected	Not Protected	IUCN	CITES
Persian Brook Salamander	*Paradactylodon persicus* *	Hynobiidae		*		NT	
Talysh Toad	*Bufo eichwaldi**	Bufonidae			*	VU	
Varying Toad	*Bufotes variabilis*	Bufonidae			*	DD	
Lemon-Yellow Tree Fog	*Hyla savignyi*	Hilydae			*		
Eastern Spadefoot	*Pelobates syriacus* *	Pelobatidae			*		
Eurasian Marsh Frog	*Pelophylax ridibundus* *	Ranidae			*		
Iranian Long-legged Frog	*Rana macrocnemis* *	Ranidae			*		


Figure 2-23: left: Persian brook salamander (*Paradactylodon persicus* NT), right: Talysh Toad (*Bufo eichwaldi* VU) (Photo by Omid Mozaffari).

Fish

Iran hosts a total of 202 species of freshwater fishes from over 28 families and 17 orders (Esmaeili *et al*., 2010). Thus far, 17 fish species belonging to five families have been identified in the Dizmar Protected Area (Table 2-11), which approximately constitute nine percent of Iran's freshwater fish. Four endemic fish of the Caucasus hotspot including the Blackbrow bleak (*Acanthalburnus microlepis*), the Kura bleak (*Alburnus filippii*), Mursa (*Luciobarbus mursa*) and the Caucasian scraper (*Capoeta capoeta*) of the Cyprinidae family are also found in this protected area.

Table 2-14: Checklist of fish of Dizmar Protected Area listed under the IUCN, CITES and Iran's conservation laws. * Common species within the component parts of the existing Hyrcanian Forests World Heritage Site.

English name	Scientific name	Family	Species Conservation Status				
			Iran's Conservation Laws			International Conservation Laws	
			Endangered	Protected	Not Protected	IUCN	CITES
Bream	*Abramis brama**	Cyprinidae			*		
Blackbrow bleak	*Acanthalburnus microlepis**	Cyprinidae			*	NE	
South Caspian Sprilin	*Alburnoides eichwaldii*	Cyprinidae			*		
Kura bleak	*Alburnus filippii**	Cyprinidae			*		
Asp	*Aspius aspius*	Cyprinidae			*		
Lizard barbel	*Barbus lacerta**	Cyprinidae		*			
Mursa	*Luciobarbus mursa*	Cyprinidae		*			
Silver bream	*Blicca bjoorkna*	Cyprinidae			*		
Caucasian scraper	*Capoeta capoeta**	Cyprinidae			*		
Goldfish	*Carassius auratus**	Cyprinidae			*		
Sharpbelly	*Hemiculter leucisculus*	Cyprinidae			*		
Caspian spiny loach	*Sabanejewia caspia**	Cobitidae			*	NE	
Caspian Bighead Goby	*Ponticola gorlap*	Cobitidae			*		
Kura Sportive Loach	*Oxynoemacheilus bergianus*	Balitoridae			*		
Wels Catfish	*Silurus glanis*	Siluridae			*		
Pike-perch	*Sander lucioperca**	Percidae			*		

The Blackbrow bleak (*Acanthalburnus microlepis*) and Kura bleak (*Alburnus filippii*) are endemic for the south-western catchment area of the Caspian Sea including the river catchments from Kura to Sefid Rud rivers. Dizmar Protected Area is part of this catchment.

2.b History and Development

The Talish Mountains[7] and its foothill zone (Azerbaijan Republic), located in the south-western coast of the Caspian Sea, have a mild and humid "subtropical" climate which affected both natural development of the region and people's population and development of the area. As research shows, mastering of the Talish Mountains zone commenced in upper paleolith age (40-50 thousand years ago).

Several cave stands of upper paleolith age have been registered there. The stand near the village of Buseir is distinguished among them, archeologists have found numerous stone instruments of upper paleolith age.

The forms and functional variety of these instruments, perfect for stone instruments of those times, testify to the high level of development of the people working stone populating the cave. Unfortunately, the small-scale of archeological work in this cave doesn't enable us to entirely reveal the faunal picture of the site in the specified period. Undoubtedly, however, the upper paleolith age inhabitants of the area hunted deer, mountain goats, wild boars and other artiodactyl grass-feeding and predatory animals. The foothill site of the Talish Mountains, including the area adjoining Hyrcanian forests, is one of the earliest agriculture centres in the entire South Caucasus. Some husbandry farming settlements of neolith and early bronce age (4-5,000 BC) have been registered in the sites of Misharachay, Velvelechay and other river valleys.

Presumably, with the transition from the appropriating economy to the producing one, many inhabitants of the site migrated from the Talish Mountains and its foothills to river valleys and other water basins to develop fertile lands of mountain and river valleys. Consequently, the first large agricultural settlements that have multi meter cultural layers, rich in remainders of material culture of that period emerged. Archeological facts attained from these settlements: ceramic product fragments and carbonized residuals of grains verify that they had high husbandry culture for those times.

In the Second Millennium BC, thse area was part of the region of the migrating flow of local Caucasian ethnos and newly arriving Persian tribes. By settling in the Talish Mountains site and mutually influencing each other, in the course of time these people created a steady ethnic group that were the ancestors of the contemporary Talish that still live in that region. The high level of ceramic and bronze metallurgy development distinguishes this culture, basically studied on the basis of funeral monuments that were buried in stone boxes and dolmens.

Bronze blades and swards with grips of various original configurations, bronze adornments, ceramic products of original forms and zoomorphic vessels and many other things are the basic elements of Talish-Mugan archeological culture, the remainders of which have been recorded in the greater Hyrcanian Forests site.

Starting in the Second <illennium AD up to present time the Talish Mountains zone including Hirkan forests have experienced the influence of human economic activity.

[7] The texts of 2.b has been taken – in a shortened and sometimes added version – from papers being given to the Ministry of Ecology and Natural Resources by scientists of Azerbaijan for use in the nomination process. The name is G. Goshgkarli – Institute of Archeology and Ethnography of the National Academy of Sciences of the Azerbaijan Republic.

Barrows, ancient and middle-age burial grounds and settlements have been found within the site of Hirkan forests, which testifies to human's active influence upon the nature complexes and its modification resulting from human activity.

In recent centuries (XIX-XX) due to Russian-Iranian wars, the consolidation of frontiers, the growth of population in foothill and highland zones, including Hirkan forests massive site, and the enhancement of husbandry and cattle farming, human influence on the nature complex has multiply increased.

Forest massive sites have diminished, precious kinds of trees have uncontrollably been cut down. In other words, much damage was done to the ecosystem which nature had formed through thousands of years. All this urges the protection problem of the unique Hirkan forests zone.

Dizmar Protected Area (IR Iran) is a mountainous area with steep slopes and rugged topography. There is low human settlement in this area. But the history of human settlement in the vicinity protected areas such as Arasbaran date back thousands of years. Ancient monuments in Arasbaran area indicate the presence of various ethnic groups in the millennium BC. Hoorian and Kadoos are the most important tribes that were later assigned a part of Urartu and the Medes governments. In addition, evidences of early settlement in different historical periods were discovered in the excavations of the Khoda-afarin alongside Aras River valley that are as follows:

- The late Neolithic period dating back to five thousand years BC.
- Chalcolithic period dating back to four thousand years BC
- The period of ancient bronze dating back to about 2000- 3500 BC
- The late Bronze period, dating back to approximately 1500- 2000 BC
- Old iron period dating back to about 800- 1500 BC
- And different periods AD relating to a period before and after Islam

Discovered inscriptions and excavations of various artifacts including potteries demonstrates the strong presence of the governments in different periods in the property. Also there are different castles such as Babak and Avarsin which represent the region in terms of numerous wars, military and social importance**.**

3. Justification for Inscription

3.1.a Brief Synthesis

In 2005, the Republic of Azerbaijan submitted a nomination dossier named “Hirkan Forests of Azerbaijan” for inscription on the World Heritage List (MENR 2004). The nomination was subsequently evaluated by IUCN (2006). In line with the IUCN recommendation, the World Heritage Committee deferred the inscription on the occasion of its 30th session in 2006 in Vilnius, Lithuania, in its Decision 30COM 8B.24. *“to allow the State Party to consider options for renominating the property as part of a transnational serial property with other Hirkanian forests areas in Iran”.*

The Committee further recommended that the State Party also address several issues as synthesized hereafter:
- Consideration of additional forest areas of high conservation value;
- Consideration of a formal buffer zone for the property;
- Adequate resourcing;
- Addressing threats.

The full text of the decision is provided as Annex 4 for ease of reference.

Several years later, in 2018, the Islamic Republic of Iran submitted the World Heritage nomination of the “Hyrcanian Forests”, proposed as a serial property. In its nomination, the Islamic Republic of Iran explicitly invited the Republic of Azerbaijan to consider a serial transboundary extension in case of a successful inscription (ICHHTO 2018).

The serial World Heritage nomination of carefully selected representations of the Hyrcanian Forests located in the Islamic Republic of Iran was inscribed on the occasion of the 43rd session of World Heritage Committee in Baku, Azerbaijan, according to criterion (ix) (Decision 43 COM 8B.4, see Annex 4 for full text). The serial property encompasses 15 component parts representing key examples of the various stages and features of natural Hyrcanian forest ecosystems. While most of the ecological particularities characterizing the Hyrcanian Forests are represented in the inscribed property, there is considerable potential for further serial extension to include additional areas of global conservation value in both the Republic of Azerbaijan and the Islamic Republic of Iran. It deserves to be emphasized that the Committee explicitly encouraged a transnational approach (see Decisions 30COM 8B.24 and 43 COM 8B.4).

The proposed serial transnational extension amounts to a full nomination, triggering a prior updating of the Tentative Lists of both involved States Parties. All proposed components strongly complement and add value to the inscribed property.

The Hyrcanian Forests form a green arc of deciduous mixed broad-leaved forests stretching across some 900 kilometres along the Caspian Sea, from the Talish Mountains in the Republic of Azerbaijan across the Alborz Mountains all the way east to Golestan Province in the Islamic Republic of Iran. As the main climatic barrier and watershed between the Caspian Sea and the arid Irano-Turanian Plateau, the steep

ridges of the Talish and Alborz mountain systems serve as an insuperable barrier of moist air accumulated above the Caspian Sea. As a result, there is ample precipitation feeding many rivers and creeks rapidly flowing down steep slopes and mountain gorges into the Caspian Sea. Thus, the Hyrcanian Forests (sometimes also referred as “Caspian Forests”), are metaphorically squeezed in between the “claws” of the Caspian Sea and arid drylands.

The Hyrcanian Forests are geographically separated and biogeographically distinct from Caucasus mountain forests, but linked with the latter by transition types found in Dizmar Protected Area (Islamic Republic of Iran). Due to highly particular topographic and climatic conditions, the Hyrcanian Forests survived the ice age periods as extremely rare “Tertiary relict forests” and have subsequently been adapting to the postglacial climate changes. Their natural distribution area is limited by the Caspian Sea, and by two main ecotones: first, the altitudinal treeline in the mountains and the dryness treeline where the forests transition into the mountain grasslands and semi-deserts of the South-Caucasian and Irano-Turanian dryland regions.

The proposed new component parts are situated in the Talish Mountains, which are recognized as a tertiary flora centre, represent a vast natural museum featuring numerous endemic and relic species. The so-called Talish centre with broad-leaved deciduous forest vegetation (nemoral forest biome) stretched from the foothills to the upper mountains. Jointly with the Colchis of Georgia, it is the most important arcto-tertiary relic and diversity centre of broad-leaved deciduous forest vegetation (nemoral forest biome) and its flora and fauna in Western Eurasia.

Based on earlier protected area designation, Hirkan National Park today is the most important protected area established to ensure the conservation and continued evolution of the Hyrcanian Forests in Azerbaijan. The three selected component parts are all within the national park and include virgin parts of the mountain ridges of Talish, which are remarkable for their peculiar natural representations of the Hyrcanian Forests. All phases of the natural forest regeneration cycles can be found in the selected component parts.

3.1.b Criteria under which inscription is proposed

Selected parts of the Hyrcanian Forests located in the Islamic Republic of Iran were inscribed on the World Heritage List in 2019 under criterion (ix). The proposed transnational serial extension is based on criteria (ix) and (x). In other words, an additional criterion is being proposed in addition to the enlargement of the serial property.

The serial property contains exceptional and ancient broad-leaved forests, which retreated during periods of glaciation and later expanded again under milder climatic conditions. Due to this repeated process of isolation, the serial property hosts many relict, endangered, and regionally and locally endemic species of flora, contributing to the high ecological value of the property and the Hyrcanian region in general.

Criterion (ix): The existing property brings together a carefully selected series of intact representations of the Hyrcanian Forest ecosystems. Its component parts contain exceptional broad-leaved forests with a history dating back 25 - 50 million years ago, when such forests covered most of the Northern Temperate Region. These huge

ancient forest areas retreated during Quaternary glaciations and later, during milder climate periods, expanded again from these refugia. The property covers most ecological and biological features values of the Hyrcanian region, thereby displaying key environmental processes illustrating the genesis of these forests, including succession, evolution and speciation. Additionally proposed component parts will further enhance the completeness and integrity of the property and to conserve these remarkable forests located in the territory of two States Parties.

Criterion (x): The Hyrcanian Forests are home to globally significant plant and animal diversity. Because of the uninterrupted and ongoing evolution, the floristic biodiversity of the Hyrcanian region is highly remarkable for a temperate forest ecosystem at the global level with over 3,200 vascular plants including 130 wooden species documented. Due to its isolation, the property hosts populations of many relict, endangered, and regionally and locally endemic plant species, contributing to the ecological significance of the forests, and the Hyrcanian region in general. About 300 taxa are endemic and sub-endemic for the Hyrcanian region, and many plant species are endemic for Azerbaijan and/or Iran. The most conspicuous “living fossils” include tree species like the Persian Ironwood *(Parrotia persica),* a monotypic endemic tree genus, Caucasian Wingnut (*Pterocarya fraxinifolia)* and Caucasian Elm *(Zelkova carpinifolia).*

The ancient forests display all phases of natural regeneration cycles at a large scale. As a result, the intact parts of the Hyrcanian Forests continue to harbour all of the features of natural temperate broad-leaved forests, many of which are missing in degraded and/or managed forests. These features include a high share of ancient trees, which offer habitat for an enormous array of life forms. The same holds true for the massive quantities of standing deadwood and coarse woody debris on the ground. For this reason, the Hyrcanian Forests offer, for example, habitat for an extraordinary number of highly specialized and endemic saproxylic beetles (Coleoptera). The presence of numerous so-called “Urwald relic species” illustrates the unusually high level of integrity. Impressive 18 bat species indicate both intact habitat and a great amount of insects within the forest ecosystem.

Many of the reptiles and amphibians occurring in the Hyrcanian Forests are endangered or near threatened according to the IUCN Red List. The fauna contains representatives of all functional groups that are necessary for food chains and material cycles in the forest ecosystem, that means small mammals and large herbivores like Wild Goat *(Capra aegagrus)* and Wild Sheep *(Ovis ammon arkal),* predators like Persian Leopard *(Panthera pardus saxicolor)* and two other cat species *(Lynx lynx, Felis chaus)* as well as destructors like saproxylic beetles and other insects.

3.1.c Statement of Integrity

The component parts of the inscribed property as well as the component parts nominated for extension are functionally linked through the shared evolutionary history of the Hyrcanian mixed forest ecoregion and there are no major barriers (without the border fence between the two States) to the ecological connectivity in higher elevations of the Hyrcanian forest region. While the lowland forests near the Caspian Sea have been subject to major conversion and degradation, most of the selected components continue to be embedded in a much larger forest landscape,

which continues to constitute a vast and almost uninterrupted forest. All inscribed component parts have been selected based on careful analysis of conservation values, representativeness and integrity. The same approach is applied to the serial extension.

Both the inscribed component parts and the ones additionally proposed through a transnational serial extension therefore represent the most intact representations of the various forest sub-types of the vast forest region. A successful extension would round off the completeness of this representation. The high degree of naturalness is in most cases a function of natural protection due to remoteness and rugged terrain and explicit conservation efforts. Unlike most comparable temperate forests in the northern hemisphere, the selected forests show all the elements characterizing ancient natural forests with very limited human impacts. These characteristics include large numbers of very old trees.

All phases of natural forest regeneration cycles are present in a spatial and temporal mosaic, as are large amounts of standing dead trees (snags) and coarse woody debris on the ground. Accordingly, the full spectrum of species depending on such characteristics is present, the extinct Caspian tiger being the only species missing in the natural mammalian species assemblage. Jointly, the inscribed components constitute a meaningful and representative portion of one of the world's most remarkable forest regions.

The additional components are intact representations of the enormous diversity of the Hyrcanian Forests not yet represented, including the important forest transition found in parts of the component parts nominated as a serial extension. The proposed component parts are nearly unsettled except for a few small households in a traditional way of life, adapted to the special conditions of the Hyrcanian mountain forests.

3.1.e Protection and Management Requirements

The three proposed components in the Republic of Azerbaijan are all situated within Hirkan National Park, which is managed by the State National Park Administration under the supervision of the Ministry for Ecology and Natural Resources. The main office of the National Park Administration is located in Lenkoran City.

The area has a long history of protection. The forests of Astara and Lenkoran districts, including all forests of the Hirkan National Park today, were considered to be protected forests of Category 1 under Forestry Legislation of the Azerbaijan Republic during Soviet times and were banned for economic use. Furthermore, for several decades the southern frontier of Soviet Union was guarded by the USSR Ministry of Defence as a restricted border zone.

In 1936, a part of the Talish Mountains was designated as "Girkan Zapovednik", a strictly protected area referred as Hirkan State Nature Reserve (IUCN Category 1). Thus, Hirkan National Park (IUCN Category 2), established by Decree № 81 of the President of the Azerbaijan Republic dated 09 February 2004, comprises the forests where no commercial forestry has ever been carried out. However, the forests do have a history of traditional use around small settlements, such as for firewood collection and forest pasture.

According to order No. 137 of the Cabinet of Ministers of the Republic of Azerbaijan dated 23April 2008, Hirkan National Park was enlarged. The total surface area today is of 40,358 ha. Within the proposed component parts, jointly amounting to 24,587 ha, all key natural characteristics of the Hyrcanian forests are preserved in their nearly natural conditions or in natural regeneration.

The evolution over several decades and the present state of the ecosystems conserved by Hirkan National Park are well documented in the Annals of the Hirkan State Nature Reserve as well as in various student works (in Russian or Azerbaijani languages).

The two proposed components in I. R. Iran are located within the Dizmar Protected Area, which was designated 2011. The Department of Environment (DoE) is legally and administratively the main responsible governmental body for the protection of the area, which is owned by the State.

3.2 Comparative Analysis

Nemoral broad-leaved forests occur not only in the Hyrcanian Region, but also in humid and semi-humid parts of the temperate zone of Europe, Eastern Asia and Eastern North America. However, nemoral broad-leaved forests elsewhere have typically been altered by human activities or they have been completely replaced by agricultural ecosystems. The large-scale and intact representation of Tertiary flora in the Hyrcanian Region is therefore exceptional. Both the forests already inscribed and the components proposed here as extensions of the existing property can be regarded as a model of Holarctic deciduous forests.

The nomination dossier of the Hyrcanian Forests property inscribed in 2019 contains a detailed comparative analysis, which remains fully applicable to the proposed transnational serial extension (ICHHTO 2018). It was not considered helpful to repeat the information contained in the recent nomination dossier resulting in the inscription of the existing property. Readers are invited to consult for the more detailed comparative analysis, which continues to be fully valid. Key information is summarized hereafter:

Of the roughly 110 properties, which can reasonably be referred to as “Forest World Heritage sites” (while acknowledging the absence of a formal category of this kind), temperate forests are an underrepresented category for the simple reason that those forests have disproportionately suffered from forest loss and degradation (Patry et al. 2005, Mittermeier *et al*. 2016). Most of the comparable forests have disappeared or are in a state of conservation, which does not permit World Heritage consideration. While the lowland forests along the Caspian shore for the most part share the fate the world’s temperate forests elsewhere, the more remote locations of the Hyrcanian Forests are a rare exception to the global pattern.

Due to fundamental ecological differences, a comparison with sub-arctic, boreal, tropical and sub-tropical forests is considered unhelpful. Compared to the (mixed) and deciduous broad-leaved forests of the world, it was also considered unhelpful to engage in comparison with the likewise very distinct temperate forests of the southern hemisphere, such as in the southern zone of South America or Tasmania. The most relevant comparisons thus have to be made with (mixed) and deciduous broad-leaved

forests in the northern hemisphere, also referred to as nemoral deciduous forest regions. As noted, not many large and intact remnants of such forests exist. Where they exist, they have attracted major conservation attention due to their rarity, which has in some case resulted in the establishment of protected areas. The comparative analysis prepared for the successful initial nomination of the Hyrcanian Forests located in the Islamic Republic of Iran (see ICHHTO 2018, pp. 173-197) presents and compares 32 natural and mixed World Heritage Sites, as well as 10 sites on the Tentative Lists within the nemoral deciduous forest regions in Eastern North-America, East Asia, Europe and Caucasus Ecoregion.

The Hyrcanian Forests stand out within the relatively small number of meaningful remnants of nemoral deciduous forests due to their unique isolated location between the Caspian Sea, high mountains and non-forested drylands. In terms of the sheer age and duration of evolutionary processes, the Hyrcanian Forests can only be compared to the forests of the Colchis in Georgia, which 2019 were nominated for the World Heritage List as “Colchic Wetlands and Forests”. However, the latter differ substantially in terms of species composition and structure. Both the scale of the overall forest ecosystem and the intactness of representations along enormous altitudinal and longitudinal gradients are unmatched.

Despite the similarities, there are important differences between Colchic and Hyrcanian forests in terms of climate, forest structure and composition as well as altitudinal zoning. For example, the upper mountainous forest belt in the Colchis is formed by evergreen coniferous forests of *Abies nordmanniana* and *Picea orientalis*, whereas deciduous broad-leaved forests of *Quercus macranthera* and *Carpinus orientalis* dominate this altitudinal belt in the Hyrcanian region.

The most characteristic and specific relic tree species of the Hyrcanian forests, *Parrotia persica*, is entirely missing in the Colchis. While nemoral broad-leaved forests also occur in Europe, Eastern Asia and North America, they have mostly been converted to agricultural land or fundamentally altered and degraded by human activities there. Unlike anywhere else at this scale, the Tertiary flora continues to be exceptionally intact, both in the inscribed property and the components proposed as extensions. The most intact representations of the Hyrcanian Forests can thus be regarded as the best available representation of intact Holarctic mixed and deciduous forests worldwide.

As the full comparative analysis in the nomination dossier for the inscribed property concludes, there are “no comparable World Heritage Forest Sites globally with similar values inscribed on the World Heritage List” and, within the deciduous broad-leaved forest biome worldwide, there are *“*no properties with a comparable combination of values and attributes.*”* It deserves to be noted that the comparative analysis for the existing property identified Hirkan National Park in Azerbaijan as a protected area containing “the potential areas for a possible future serial extension”. Parts of the western extreme of Hyrcanian Forests in Iran, specifically Dizmar Protected Area, have also been identified as possible future components, which can be biologically and ecologically linked to the Hyrcanian Forests. It is located in the North of Iran as western outpost of the Hyrcanian Forests.

3.3 Proposed Statement of Outstanding Universal Value

Brief synthesis

Along more than 900 kilometers, the Hyrcanian Forests cover the slopes of the Talish and Alborz Mountains faced to the Caspian Sea as a continuous green belt. In their vast majority, the almost two million hectares of deciduous broadleaf forest are located in the North of Iran with a smaller portion reaching into neighbouring Azerbaijan. While constituting one contiguous forest region, the Hyrcanian Forests encompass a remarkable diversity of forest types along two major ecological gradients: The first from the northwest to the east; the second being a major altitudinal gradient from slightly below sea level all the way to the tree line at around 2,500 to 2,800 m a.s.l. in rugged mountainous terrain. While large areas have been subject to deforestation and forest degradation, especially in the lowlands and in easily accessible valleys, a significant portion of the Hyrcanian Forests has remained exceptionally intact. Thereby, the Hyrcanian Forests constitute one of the most important remnants of primary temperate deciduous broad-leaved forests anywhere on the planet.

The irreplaceable forest relics tell a unique story of the uninterrupted and ongoing evolution of temperate deciduous forests over some 25 million years from the Tertiary period to this day, a fascinating story of continuity and survival, persistence and flexibility, adaptation and diversification. Two distinct ecotones further set the Hyrcanian forests apart. While the ecologically fascinating transition from forests to subalpine and alpine vegetation at the tree line is not unusual per se, the abrupt encounter of lush temperate forests with rugged drylands and semi-deserts is most extraordinary.

Maintaining the full range of natural forest dynamics, processes and features, the Hyrcanian Forests are renowned for their high biodiversity, numerous relic and fossil species of both flora and fauna, a high degree of endemism across numerous taxonomic groups and consequently an irreplaceable genetic pool. Noteworthy species include, for example, several relic tree species such as the famous Persian Ironwood *(Parrotia persica)*, which also stands out during the spectacular autumn coloring. Charismatic large mammals include the endangered Persian Leopard, Brown Bear and Wild Cat. The serial World Heritage approach to the Hyrcanian Forests is based on the selection of a network of the most intact, formally protected forests representing the biological wealth and diversity of forest types and ecotones across the forest region.

Criteria

Criterion (ix): As part of the so-called Arcto-Tertiary Geoflora, vast deciduous and mixed forests historically covered much of the land of the Northern Hemisphere. Following historic climate change resulting in widespread glaciation, these forests were reduced to refuges in North America, Western Eurasia and East Asia. Countless species went extinct, while others survived as relics. During warmer, interglacial periods, the forests expanded again. Globally, it is extremely rare that the evolution of a temperate deciduous forest region has never been interrupted over such a long period of time and is ongoing at such a large scale and with such a high degree of naturalness. The forests could thereby diversify into an exceptional range of forest

types along a gradient from sea level up to the tree line at some 2,500 to 2,800 m a.s.l., as well as in a gradient of decreasing humidity along the southwestern and southern shore of the Caspian Sea from the northwest to the east.

The extension will cover the north-western extreme to complete the west-east gradient. The annual precipitation exceeds 2,000 mm in Northwest, dropping to some 500 mm in the East. Particularities include an exceptionally diverse and complex understory, an unusually high proportion of large, old trees and rare plant communities. There are two major ecotones between the Hyrcanian Forests and adjacent ecosystems. In the higher altitudes of the Alborz Mountains, the mostly deciduous forests meet subalpine and alpine thorn-cushion vegetation without the coniferous forest belt commonly found as a transition zone in comparable ecological settings in the Northern Hemisphere. Elsewhere, the deciduous forests are adjacent to open juniper woodland, semiarid grassland and even semi-desert ecosystems, a highly unusual setting. The forests are not only of irreplaceable conservation value, but also a unique scientific reference area helping us understand natural temperate forest ecosystems and their relationships with immediately adjacent yet markedly distinct ecosystems.

Criterion (x): The Hyrcanian forests are a critically important and irreplaceable refuge for countless species of flora and fauna associated with the relic Arcto-Tertiary forest. The most conspicuous “living fossils” include tree species like the Persian Ironwood (*Parrotia persica*), a monotypic endemic tree genus, Caucasian Wingnut (*Pterocarya fraxinifolia*), Caspian Honey Locust (*Gleditsia caspica*) and Caucasian Elm (*Zelkova carpinifolia*). Silk tree *(Albizia julibrissin)* and Caucasian Persimmon (*Diospyros lotus)* are temperate representatives of tropical genera. Overall, more than 3,200 vascular plants have been documented in the forests and immediately adjacent ecosystems. The ancient forests are associated with hundreds of mosses and rare insect and fungal specialists. An impressive 80 tree species have been documented, mostly broadleaf species with only four native conifers, including spectacularly old and large specimen and groves of European Yew (*Taxus baccata*), typical in mountain beech forests, Cypress (*Cupressus sempervirens* var. *horizontalis)*, forming a specialized forest type in intra-mountain valleys with Mediterranean climate, and Juniper *(Juniperus excelsa),* forming open woodland at the ecotone to dryland ecosystems. Moreover, there is a noteworthy restricted relic population of *Thuja orientalis*.

The longstanding, isolated evolution of the Hyrcanian Forests has resulted in a high degree of relic and endemic species across many taxonomic groups. While the Caspian Tiger (*Panthera tigris virgata*) went extinct in the mid 20th century, the rich mammal fauna continues to include all other large predators, such as the Brown Bear, Wolf and Persian Leopard, along with three other native cat species. The recorded 58 mammals include 18 bat species. The Hyrcanian Forests encompass several internationally recognized Important Bird Areas with a noteworthy total number of some 180 species. The herpetofauna includes more than 30 reptiles and several endemic amphibians, while more than 50 species of native freshwater fish are found in the streams and creeks of the Hyrcanian Forest region. While the invertebrate fauna is less known, the existing studies indicate an exceptional diversity and a high degree of endemism. There can be no doubt that the Hyrcanian Forests include the most important refuge areas of Arcto-Tertiary forest elements in West Eurasia, which are the only chance for the in-situ conservation of a great number of relic and endemic species of plants and animals and of invaluable scientific importance.

Integrity

The Hyrcanian Forests are subject to strong human pressure comparable to the pressures underlying the loss or fundamental alteration of most of the temperate forests of North America, Eurasia and East Asia, as well as in the Southern Hemisphere. However, remarkably large areas have maintained a very high degree of naturalness due to a combination of remote location, difficult access and active conservation efforts. To this day, there are remote areas free of road access and any industrial use. Over decades, various types of protected areas and forest reserves - de facto protected areas - have been established in an attempt to conserve the most intact remaining forest areas.

This network or system of protected areas underpins the transnational serial World Heritage approach. Concretely, the existing World Heritage property and the components nominated as an extension are comprised of carefully selected protected forests constituting the most significant intact forest remnants and representing the ecological and biological wealth and diversity of the Hyrcanian Forests. Jointly, the components of the transnational serial nomination constitute an even more meaningful and representation of this extraordinary forest region. The components are embedded in a much larger forest landscape, which continues to maintain important ecological linkages even though the human footprint is high and increasing, particularly in the lowlands towards the Caspian Sea.

Requirements for protection and management

The management of the proposed components within Hirkan National Park in the Republic of Azerbaijan is the responsibility of a single governmental institution, the Hirkan National Park Administration under the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan. Clear and specific legal provisions, fully in line with to the requirements of the Operational Guidelines and the understanding of IUCN protected area category II, serve as the framework for management.

On the Iranian site of the Hyrcanian Forests, including in the existing property, de facto two complementary protected area systems are in place: The Forest Range and Watershed Management Organization (FRWO) is legally in charge of the overall protection, rehabilitation, development and harvesting of forests and rangelands. In this capacity and under this mandate, FRWO is also responsible for Forest Reserves, Natural Forest Parks and Nature Parks.

The Department of Environment (DoE), in turn, has the mandate and responsibility to identify and protect areas of particular conservation importance across Iran. This has resulted in the creation of important protected areas across Iran and in the Hyrcanian Forest region under four national categories: National Park, Wildlife Refuge, Protected Area and National Natural Monument. The existing serial World Heritage property integrates the two systems by bringing together the most valuable protected areas under one coherent, previously lacking umbrella. Furthermore, the nomination process identified intact forests and added those to the existing protected areas, thereby refining the existing forest protected areas.

With the 2019 inscription, the serial property received a new protection status as a World Heritage property by national legislation, managed by a joint management system in cooperation of FRWO, DoE and the Ministry of Cultural Heritage, Tourism and Handicrafts (MCHTH).

The extension, amounting to a full nomination, is an unprecedented opportunity to establish an overarching framework for the development of a coordinated management system bringing together the responsible institutions in the Islamic Republic of Iran and Republic of Azerbaijan. The previously non-existing and innovative framework can explicitly serve to consolidate the communication, coordination and cooperation of the various institutions involved in forest management and conservation. Equally important, the World Heritage umbrella can and must serve to address the question of landscape connectivity between protected forest areas. A consolidation of the management and conservation is needed in order to address a multitude of complex challenges and threats.

4. State of conservation and factors affecting the Property

4.a Present state of conservation

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

In 1936, most of what is today Hirkan National Park (HNP) was declared as a “strictly protected area” named Hirkan State Nature Reserve (IUCN category 1). Before its establishment, the forests of Astara and Lenkoran districts, like the rest of what is today HNP, were considered to be “protected forests of category 1” under applicable forestry legislation of the Azerbaijan Republic implying a ban on economic use. Furthermore, it deserves to be recalled that the area under consideration at the time marked the southern frontier of the Union of Soviet Socialist Republics (USSR). Accordingly, the area was guarded by the USSR Defense Ministry as a buffer zone in the military sense of the term.

As a result of its noteworthy conservation history and its geopolitical setting, the forests were not subject to industrial-scale timber extraction or forestry. This serves as the foundation of the establishment of Hirkan National Park (IUCN category 2) by Decree № 81 of the President of the Azerbaijan Republic dated 09 February 2004. All natural features characteristic of this part of the Hyrcanian Forests are represented with a high degree of naturalness.

According to the order No. 137’s of the Cabinet of Ministers of the Republic of Azerbaijan dated 23 April 2008, HNP was subsequently enlarged to the current total surface area of 40,358 ha.

At the national level, the following indicators for monitoring, conservation and management programs were approved by the Cabinet of Ministries in the realm of protected areas:

1) Extent (forest area): The nominated components include extended forest areas. Some of them have the potential for forest expansion as a means to adapt to climate change.
2) Economic, social and cultural roles of forests: The nominated components themselves have no (consumptive) economic role, but it will contribute to improving rural sustainable development in its neighboring residential areas.
3) Conservation of forest biodiversity: This is one of the three main functions of the nominated components (see points 5 and 6).
4) Forest production capacity: Not relevant for the nominated components.
5) Role and functions of forests in the global ecological cycle: This is one of the main roles of the nominated components.
6) The role of forests in protecting water and soil and environmental values: The forests in the nominated components are critically important for water supply, soil protection, carbon sequestration, and adaptation to climate change.
7) Organizational rules and structure: It is regulated according to governmental rules and structures.

Regular and long-term monitoring can underpin informed decision-making in order to ultimately improve the management strategy in the nominated components and broader property and guarantee ecological integrity.

Table 4-1: State of conservation of the components within Hirkan National Park, Azerbaijan Republic.

Nominated Component	Protection category and processes under legal protection since	Supervised/ managed by	State of conservation
Dangyaband, Khanbulan İstisuchayValley	Partly as IUCN cat. 1 since 1936 Main part as IUCN cat. 2 since 2004	Ministry of Ecology and Natural Resources (MENR)	It is Azerbaijan's oldest and one of the largest national parks, which is not much impacted by anthropogenic factors. There are no signs of intensive use of natural resources in the park. Some 81 rangers protect the park day and night from manipulations of any kind, including hunting, fishing, unauthorized camping and visits by tourists. Poaching, cutting and intentional fire are potential threats in this area, which are controlled by strict legislation and the adoption of protective measures. All 3 components are in the core zone of the national park and well protected

The present state of the ecosystems and selected taxa found in the national park is documented in the annals of strictly protected area "Hirkan" and in various academic papers (see the bibliography chapter 7e). Further helpful information can be found in the Reports of Zoology Institute of the National Academy of Sciences of Azerbaijan and at https://nationalparks.az/

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Iran's Department of Environment (DoE) legally and administratively has the primary responsibility for the protection of the two nominated components. In addition, the protection of the historical, cultural and natural heritage of the property is also a responsibility of the Ministry of Cultural Heritage, Tourism and Handicrafts. Dizmar Base is responsible for all of the operational activities within the nominated property. All managerial actions related to the base are fully supervised by the Hyrcanian Forests National Steering Committee.

Dizmar Protected Area is state-owned in its entirety as a national resources. Villages and farmlands in the buffer zone have private owners. Dizmar was designated as a protected area (nature reserve) in 2011. The protected area is contiguous with further protected areas in the IR of Iran, Azerbaijan and Armenia.

The two components show a very high degree of naturalness in line with World Heritage expectations in terms of integrity. The nominated components are not inhabited while the .population density in the buffer zone is low; it has in fact been decreasing over recent years because out-migration to urban areas. Thanks to steep slopes, rugged terrain, as well as limited and difficult access, human impacts to the area have been modest to this day. Potential threats like poaching, logging, intentional fire, and habitat degradation are now controlled because of protective measures adopted by the DoE.

This area act as an ecological corridor for the free movement of a wide range animals and a key area for the conservation of endangered species such, such as the Persian leopard (*Panthera pardus* saxicolor). The absence of human-made barriers ensures full ecological connectivity and wildlife movements in this component.

Cultivated areas and settlements stem from the time before formal protection. Fishing, hunting, mining, logging and any destructive activities are prohibited. There is no forestry history in Dizmar, i.e. neither noteworthy timber extraction nor modification of the natural forest structure has occurred. Local people use some products, such as medicinal plants and forest fruits and other non-timber forest products as well as firewood in the buffer zone. Major transportation, such as railways are absent, and so are groundwater extraction and mineral resource extraction. Scattered villages with an ancient history spanning several millennia are linked by connecting routes, but these are restricted to the buffer zone.

Only non-destructive and conservation activities are permitted in the nominated components. These include monitoring, surveillance, scientific research, firefighting, pest and disease control and guided tourism. The use of periodical monitoring of flora and fauna (species richness, endemic and rare plants, plant communities and habitat of threatened species etc.) is used to assess the integrity and the conservation status of the property over time. The assessment of the integrity of the nominated components is based on regular site visits, sample plots and remote sensing including land use mapping.

4.b Factors affecting the property

(i) Development pressures (e.g. encroachment, adaption, agriculture, mining)

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

No industrial activity is permitted or illegally occurring in the nominated components. Power plants, factories and mineral extraction negatively affecting the environment predating formal protection are not found in the proposed property.

The only major infrastructure inside HNP, the road from Lenkoran City to Lerik City, is located in the northern part of the park. This important road has a so-called “republic status” in the national road infrastructure system; it connects several villages of the mountainous Lerik District with the administrative center of Lerik City and otherwise with important infrastructure in the lowlands of the Lenkoran District. Out of the total length of some 55 km, approximately 6 km of the road cross HNP, including parts of the buffer zone surrounding the proposed Dangyaband and Khanbulan components. The nominated components themselves are not affected by the physical footprint of the road. The road is managed by the Azerbaijan Automobile Roads State Agency and is currently under full renovation.

The proposed Khanbulan component includes the northern part of the Khanbulanchay Reservoir built in the Soviet era. The reservoir is within HNP, occupying a total surface area of

some 2,600 ha; the water capacity is 52 million m³. The reservoir provides water for the irrigation of approximately 25,000 ha of agricultural lands in the downstream lowlands. The main water supply for the Khanbulanchay is the artificial channel diverting water from the Vasharud River, which is a branch of the Lankaranchay River. The dam and associated infrastructure are excluded from the proposed Khanbulan component.

Small local communities have been practicing traditional husbandry for centuries in what became HNP. The longstanding interaction between people, livestock and their natural environment is accepted as a minor anthropogenic influence in HNP and there are no signs of noteworthy negative impacts on the nominated components.

The local livelihoods in the communities near HNP are based on animal husbandry and irrigation agriculture (vegetables, tea and rice). Rural reforms and privatization of land have enabled the development of a private sector producing, for example, melons and vegetables for local and foreign markets. Bee-keeping and harvesting of wild biodiversity products, such as fruits and berries in the highlands, complement local livelihoods.

Excessive numbers of livestock against limited pastureland generate intensive pressure in forest and steppe ecosystems outside of HNP. It is clear that such pressure increases the attractiveness of HNP for pastoral use and hay-making.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Dizmar is a forested mountain area with a rugged topography compromising access to all parts of the two components. As noted, this explains the limited human footprint when compared to the more accessible surrounding areas.

Nonetheless, there are multiple threats to the nominated components. These include livestock over-grazing; habitat loss and degradation due to human activities around residential areas; fragmentation and loss of connectivity due to road construction or other developments; poaching and direct killings, such as retaliation killings of livestock predators, competition and disease transmission between livestock and wildlife; land use change, such as the conversion of forests to orchards and cropland etc. Furthermore, plant collection for medicinal, food or commercial purposes, extensive usage of agrochemicals (pesticides, herbicides, fungicides etc.), alien species, pests and diseases, human disturbance and forest fires are the most important threats with the potential to affect the nominated components. Among this wide range of threats, poaching, land use change, livestock over-grazing and human-induced fires can be considered serious concerns requiring management responses even though the nominated components themselves are not directly affected at this point in time.

The nominated components are uninhabited and there is no sign of anthropogenic pressures directly affecting them at this point in time. The buffer zone is sparsely populated. Local economic activities, such as agriculture and animal husbandry around the villages are for the most part following ancient traditions and are deemed compatible with the conservation of the nominated components. Hunting and grazing are not allowed in the nominated components, whereas the require licensing in some parts of buffer zone under control by DoE.

To promote the conservation of endangered species known to generate human-wildlife conflict, such as Persian Leopard and wolf, selected species are covered under an insurance scheme provided by an insurance company affiliated to the Mellat Bank, known as Bimeh-e-Ma. Under this scheme, the Government compensates loss of livestock (sheep, goat, horse, mule and donkey, camel, and shepherd's dog in case of confirmed leopard or wolf attacks), but also encroachments on human safety, injuries inflicted on domestic animals by road accidents or the provision of poisonous food, drought, flood, wildfire, and cases other than age-related deaths.

No forestry operations occur in the area, unsustainable natural resource exploitation, mineral or groundwater extraction occur in the property. The intoroduction of any non-native species is prohibited.

(ii) Environmental Pressures (e.g. pollution, climate change)

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

The absence of industrial activities in Astara and Lenkoran districts favorably affects the environment. Air pollution monitoring shows that - on average over the last three years – the annual concentration of dust in 1 cubic meter of air has made up 0.1 mg, sulfuric gas 0.045 mg and nitrogen dioxide 0.05 mg, respectively. Over the same period, the background data for the Lenkoran and Astara districts were as follows: concentration of dust 0.1 mg /m^3, sulfuric gas 0.045 mg/m^3 and nitrogen dioxide 0.04-0.06 mg/m^3. The results are in compliance with applicable norms and standards.

The background composition of atmosphere sediments in the period of 2001 / 2002 / 2003 (average data due to the results of monitoring) in Lenkoran District contained 6.4 / 6.8 / 6.5 mg/l hydrogen ion; 18.7 / 5.9 / 10.6 mg/l chloride and 0.0v- 0.3 mg/l fluoride. This shows that the results of longer term monitoring, do not indicate major change.

In terms of water quality of the area under consideration, data is available from the monitoring of the Tangerud, Vilyashchay and Lenkoranchay rivers. Since these rivers have been exposed to minor anthropogenic impact, they are referred to the 4th category of pollution qualification, defined as being within applicable norms. In 2001-2003 no contamination was observed in these rivers and fluctuations of the pollution range were as follows: general mineralization 400-600 mg/l, oxygen 7.65-12.05 mg/l, ammonium 0.04-0.177 mg/l, nitrates 0.07-0.21 mg/l, nitrites 0.001-0.012 mg/l and phosphorus 0.014-0.049 mg/l.

Soil contamination has not been registered during recent years of monitoring in Lenkoran and Astara. The background composition of sulphates, nitrates, fluorides and hydrogen has been identified and can serve as a useful baseline. In the period from 2001 to 2003, the amount of sulphate ions fluctuated between 50-256 mg/kg, nitrates 13-41 mg/kg, fluorine compositions 0.4-40 mg/kg and hydrogen pH 6.9-7.3. The results of the analysis showed that these exponents comprise 18-80% of background level.

Radioactivity monitoring of environment for β-radioactivity of atmospheric aerosols and natural background gamma-radioactivity has been carried out. In 2001-2003 daily background radioactivity in Lenkoran and Astara changed respectively between 7-14 and 7-20 mkr/hour. In seasonal break down these exponents change within the following fluctuations; in winter 7-14 and 7-16 mkr/hour, in spring 8-14 and 8-18 mkr/hour, in summer 7-20 and 9-12 mkr/hour and in autumn 7-16 mkr/hour, which is within the norm.

Taking into consideration that most of Hirkan National Park is covered by forests, water and winter erosion are quite low and within the limits of natural processes, although in some places landslides and signs of erosion are visible. Such processes are a function of lacking vegetation or poor land cover on rocky soils combined with intensive rainfalls. Prior to becoming part of Hirkan National Park, most forested land in Astara district was managed by the Astara Forest Unit. During that period, illegal grazing was a major challenge from the perspective of the forest management administration. Some areas of Hirkan National Park in Astara district, still show signs of related degraded vegetation as a result of this land use history.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Due to the absence of cropland, industrial activities and mining, there is no corresponding air or water pollution in the nominated components. However, the use of agrochemicals on farms and orchards in the buffer zone can pollute soil, underground and surface water besides affecting human health. Promoting biological control methods comes with the hope that such pollution will eventually be reduced.

Weather stations in Western Iran's Zagros region showed unusual meteorological data over the decade from 2000 to 2010 in comparison to previous decades from 1961 to 1999. Annual air temperatures on average increased by approximately 4%, whereas annual precipitation and relative humidity notable decreased by 12% and 7.3%, respectively**.** Reference evapotranspiration was found to have increased by around 5% in the selected stations. The results demonstrated that the Zagros region is on a trajectory towards drier and warmer conditions. However, it deserves to be noted that the available data suggested no severe changes in meteorological parameters for the Dizmar region specifically.

Global warming in temperate forests can lead to outbreaks of new diseases and pests (Khosravi & Tohidifar, 2015), while fully acknowledging that many other factors need to be considered. There is no known evidence of forest dieback and declining forest health in Dizmar, whereas a study showed that 45.32% of the oak forests have high and very high potential for dieback in the central and western parts of Zagros region (Motlagh et al, 2020). This could be an indication of higher resilience of the diverse forests in Dizmar with their high degree of naturalness.

(iii) Natural Disasters and Risk Preparedness

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

Natural disasters threatening the integrity of Hirkan National Park occur rarely. Basically, the nominated area is located in the high humidity zone (88%), which significantly prevents the spread of fires. For fire prevention the Ministry of Environment and Natural Resources of the Azerbaijan Republic, together with the Ministry of Agriculture and Fire Prevention Department, have developed a Fire Security Program.

Flooding of the nominated property has not been registered. The highest amount of precipitation falls in September to October. The highest recorded precipitation is around 1,800 mm per annum.

There have been cases of heavy snowfall in the mountains generating avalanche risks. However, such risks are considered negligible.

Only the Talish Mountains in the nominated property are exposed to earthquake threat. Tremors of 6-7 magnitude on the Richter scale were registered in 1861, 1879, 1896, 1902, 1910, 1924, 1931, 1983, 1984, 1986, 1992 and 1998.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

There is no record of earthquakes negatively impacting the nominated components. However, earthquakes occasionally occurred for example in the cities of Ahar and Varzaghan which, however, are quite far away from the nominated components.

Despite of existence of many permanent rivers and streams in the region, no damage stemming from flooding or erosion are on record.

Natural fires in Dizmar or the vicinity protected areas are normally negligible or occur very rarely only. However, intentional or unintentional fires that rarely occur in forest areas and rangelands potentially threaten the forest areas and rangelands, including in the nominated property. In the event of fire, relevant governmental entities such as Forests, Range and Watershed Management Organization (FRWO), the Ministry of Defense and the Ministry of Jihad-e Agriculture (with allocating funds, personnel and equipment) join forces with local people and NGOs to control the situation and to protect people, assets and natural resources. The preparation of fire hazard severity zone maps, training workshops for local communities and capacity development in terms of fire-fighting techniques are also promoted.

(iv) Responsible visitation at World Heritage sites

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

Much of HNP is rarely visited by tourists and not managed for tourism. Thereby, most of HNP is not affected by tourism and visitation. Eco-trails for walking are restricted to the tourism zone of the park. All of these trails are located outside of the three proposed component parts.

Over the last years, the number of “domestic and foreign tourists” has steadily increased as shown in the below table. Compared to 2008, the increase of tourist numbers is substantial. However, the overall numbers are still modest. Nonetheless, the direct and indirect impacts of tourism and visitation are an integral part of management requirements.

Table 4-2: Number of tourists in the Hirkan National Park

Year	2008	2009	2010	2011	2012	2013	201	2015	2016	2017	2018	2019
Number of tourists	**49**	**62**	**71**	**95**	**122**	**102**	**12**	**226**	**473**	**1,042**	**1,357**	**7,090**

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

The area is close to pristine and not part of any known or promoted tourist circuit. The bulk of the area is unsuitable for standard tourism because of the rugged topography and the absence lack of standard road infrastructure. Tourism infrastructure and offers are very limited, which comes with benefits in terms of conservation but also with limitations in terms of local economic benefits. The number of visitors is expected to increase significantly after a possible inscription as additional parts of the existing World Heritage property. The unusual degree of naturalness, breath-taking scenery, wild rivers, diverse topography and high biodiversity featuring rare and endangered fauna and flora undoubtedly combine for an attractive destination for mountaineering and other outdoor activities, research and recreational observation of nature.

The Ministry of Cultural Heritage, Tourism and Handicrafts (MCHTH) is responsible for enabling and preparing facilities for tourists and training tour guides in the components. It seems that the historical villages in the buffer zone and the neighboring regions also have potential for tourism development. Local communities could provide facilities for both national and international visitors.

It is no secret, however, that tourism also puts enormous stress on local land use and resources, and can lead to soil erosion, increased pollution, natural habitat loss, and more pressure on endangered species. Therefore, careful and comprehensive tourism planning is necessary as a priority for sustainable management embedded in a regional Tourism Development Strategy. To prevent any damage to the components, tourists are allowed in the property only by the prior consent of the DoE and accompanied by DoE staff.

(v) Number of inhabitants within the property and the buffer zone

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

As noted, Hirkan National Park occupies a part of the territories of Lenkoran and Astara districts. Land of 11 municipalities overlap with the national park, 6 of them are in Lankaran District and 5 in Astara District. The villages with official status and lands situated inside Hirkan National Park – approximately 40 villages (completely or partly within the park's boundaries). There are also approximately 25 settlements, which have no official status, some being separate settlements in mountains, some are illegal extensions of villages with official status). The municipalities which are partly located within the boundaries of Hirkan National Park, are listed in the following table:

Table 4-3: Settlements in the vicinity of Hirkan National Park

#	MUNICIPALITY	POPULATION (people)	SETTLEMENTS IN JURISDICTION OF MINICIPALITY
Lankoran district			
1.	Gagiran	3,836	Gagiran, Jidi, Diryan, Tuado, Kohne Gagir villages
2.	Osakuche	5,194	Osakuche, Sinovli, Moloja, Tatoba, Pambeyi and Haftaruon
3.	Gunehir	3,090	Gunehir, Turkanjil, Godese, Beliton, Horavenj and Shivlik villages
4.	Rvo	5,865	Rvo, Mollakend, Eshle, Shovu, Tengivan, Siyabli, Gurumba and
5.	Bilasar	1,910	Bilasar, Alazapin, Seligavol and Viy villages
6.	Khanbulan	5,404	Khanbulan, Burchali, Dashtatuk, Serinbulag, Ashagi Apu and
Astara district			
1.	Kijaba	12,500	Kijaba settlement, Burzubend, Khichaso, Noyabud, Ojakeran, Ovala, Sipiyaelfetik, Shemetuk, Tulekuvan, Veneshikesh
2.	Shuvi	5,619	Degadi, Sekeshan, Seliveç Serek, Siyetuk, Shuvi and Veznesh
3.	Artupa	6,043	Alasha, Artupa, Sancaradi, Shuvash, Zungulesh
4.	Askhanakaran	2,516	Anbuba, Askhanakaran, Motlayatag, Belbay, Azaru, Bursut, Destor, Sikhimpeshte, Vilepargo, Akbarmehelle
5.	Pelikesh	6,300	Avyarud, Chukesh, Digo, Dolu, Durriye, Lomin, Pelikesh, Sım, Sibiyyet, Sipiyepart, Shevgo, Shumrud, Vovada villages

Estimated population located within the buffer zone is around 58,000 inhabitants (2018) with decreasing tendency. Within the nominated property are no longer any residents.

Estimated population located within:

Area of nominated property:	0
Buffer zone:	58,277
Total:	58,277
Year:	2018

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

There are no residents in the property and the population density in the buffer zone is about 9.2 people per square kilometer. According the last population census in 2016, the population in this area has declined by about 20% from 2011 to 2016. The main reasons for this rapid decrease in population is out-migration from rural areas due to unemployment, lack of sanitary, education and living facilities etc. Unless the relative attractiveness of the area in comparison to urban centres changes, the notable population decline is expected to continue.

Estimated population located within:

Area of nominated property:	0
Buffer zone:	6,132
Total:	6,132
Year:	2016

5. Protection and Management of the Property

5.a Ownership

Hirkan National Park is a legally protected nature reserve corresponding to IUCN category 2 according to the Law on Specially Protected Natural Areas and Objects of the Azerbaijan Republic of 24 March 2000. The entire national park and thus all three components proposed as extensions in Azerbaijan are state property.

All lands within **Dizmar Protected Area** are state-owned as national resources according to the Law on Nationalization of the Country's Forests of 01 January 1962, approved by the Council of Ministers. The law consists of 14 articles and was published in the Official Journal No. 5446 on 11 November 1963. Villages and farmlands are exempt from and have private owners.

5.b Protective designation

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

Today, Hirkan National Park is a specifically protected nature reserve, which corresponds to the IUCN category 2. According to the Law on Specially Protected Natural Areas and Objects of the Azerbaijan Republic of 24 March 2000 national parks serve to preserve nature complexes (or ecosystems) comprised of ground, soil, water, flora and fauna. Such areas are identified because they are representations of typical or rare landscape formations or because they harbor important plant and animal genetic resources and as such are of particular significance for nature protection, science, tourism and ecological (environmental) education.

Since 1936, most of what today is Hirkan National Park was designated as a a strictly protected area, at the time referred to as Hirkan State Nature Reserve (IUCN category 1). Before the establishment of the strict protected area, the forests of Astara and Lenkoran districts - like the rest of what is today Hirkan National Park - were de facto category 1 protected forests under Forestry Legislation of the Azerbaijan Republic. This legislation excluded direct (consumptive) economic use of such forests.

Hirkan National Park was established by Presidential Decree No. 81 dated 09 February 2004 on the lands of former Hirkan Strict Nature Reserve and adjacent forest districts. In addition to the whole area of the former strict nature reserve (2,904 ha), forested land of the Lenkoran Forest Unit (Seifidor Forestry, 622 ha) and Astara Forest Units (Askhanakaran Forestry, Tangerud Forestry and Shuvi Forestry, jointly comprising 17,909 ha) were transferred to the national park, which then comprised a total of 21,435 ha of unique forest ecosystems. The surface area of the national park was subsequently enlarged to 40,358 hectares on 23 April 2008 by Resolution of the Cabinet of Cabinets, No. 137s to include areas under the Lenkoran Forest Restoration Department (18,923 ha).

Today, Hirkan National Park has its own administration dedicated to all aspects of management. The head office is located in the village of Burjali in the Lenkoran District.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Iran's legal and policy framework contains numerous laws and regulations that deal directly or indirectly with biodiversity conservation. Selected key references of particular note are listed hereafter:

- Articles 45, 50 and 110 of the Constitution of the Islamic Republic of Iran;
- National Macro-Policies on Environment (Endorsed by the Supreme Leader);
- The sixth Five-Year National Development Plan;
- Draft Strategies of the Department of Environment (DoE) in line with the sixth Five-Year National Development Plan;
- Strategies for Implementing the Sustainable Development Goals (SDGs);
- Law for the Protection and Improvement of the Environment;
- Vision 2025 for Development.

The Supreme Council of Environment is the country's highest decision-making body on environmental matters. The President is the head of the council and the members are: Head of Department of Environment (DoE), Ministers of Agriculture Jihad, Industry, Mines and Commerce, Ways and Urban Development, Health and Medical Education, Head of Management and Planning Organization; and four authorities recommended by the Head of the Environment Department. The Council has the responsibility for approval and notification of policy implementation, designing a goal accomplishments mechanism, improving the structure and related processes, coordination and coherence in policies, programs and supervision of the implementation of national action plans for achieving the approved document, using the capabilities of the Department of Environment and other relevant institutions and facilities in the country. All of the institutions are obliged to implement action plans adopted by the Supreme Council of Environment.

Dizmar was designated as a protected area in 2011. Protected areas in the Islamic Republic of Iran are under the management of DoE (note that the institution in charge of forest management, the Forests, Range and Watershed Management Organization, (FRWO), has a role in the management of some forest protected areas). Such protection refers to the full range of natural resources of the country, including forests, grasslands, plains, water and mountains, which are of particular importance and protected in terms of the necessity of preserving and propagating wildlife or preserving or restoring vegetation and its natural state, fully in line with the IUCN definition of protected areas updated in 2008. Any trespassing on and/or illegal and unauthorized use of land protected by the DoE is subject to legal prosecution. The DoE represents all other related organizations on this matter and is authorized to act on their behalf (Article 3 of the Act on the Conservation and Optimization of the Environment dated 1974).

The boundaries of the two component parts within the Dizmar Protected Area were selected in order to include the areas which (i) have not been affected by human use or other impacts; (ii) have no commercial logging history; (iii) show no signs of intensive use of natural resources and past or current forest use. The buffer zone boundary is selected in order to reduce any potential and actual threats and to act as a shield

around the nominated components. It also ensures a full coverage of all faunistic and floristic species so as to add highest ecological values to the extension and thereby the existing property.

Boundary selection fully takes into account ecological connectivity between Dizmar and the various neighboring protected areas in order to facilitate free and safe wildlife movement. Due to Dizmar's location in the westernmost distribution of the Hyrcanian Forests, the protection of these new components not only increases the surface area and ecological values of the existing Hyrcanian Forests World Heritage property, but also enhances the resilience to climate change.

According to Article 45 of the Constitution of the Islamic Republic of Iran, all public wealth shall be at the disposal of the Islamic Republic Government to be utilized in accordance with the public interest. The government has also assigned responsibility to the Forests, Range and Watershed Management Organization (FRWO) in this regard. Any kind of interference in the lands shall not be allowed by the FRWO. Iranian Department of Environment (DoE) is responsible for management and conservation of the areas with particular ecological relevance. Overall, three organizations, the Department of Environment, the Forests, Range and Watershed Management and the Ministry of Cultural Heritage, Tourism and Handicrafts are thus in charge of integrated management and conservation of the region.

5.c Protective measures and means of implementing them

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

The applicable protection framework is summarized hereafter.

1. Protection of nature complexes and property on the territory is exercised through specific area protection inspections and their employees, namely the Hirkan National Park staff.

2. The Director of the national park and his deputies, including the Chief Security Officer, and the Chief State Inspector and his deputies, are responsible for the protection of Hirkan National Park.

3. The national park employees, as State Inspectors responsible for the protection of the given territory have far-reaching authority under Azerbaijan Republic legislation. The rights of State Inspectors with respect to the protection of Hirkan National Park include the authority to:

a) ask individuals on the territory of Specially Protected Natural Areas and Objects of the Azerbaijan Republic to present documents demonstrating the right to be within its boundaries and a license to store and carry a fire arm issued by law enforcement agencies;

b) detain those who violate the Statute on Specially Protected Natural Areas and Objects of the Azerbaijan Republic on the territory of the national park, to record the infringement of the law and convey those transgressors to law enforcement agencies;

c) conduct inspections of belongings and search detainees, to stop and inspect transportation and to check guns and other instruments of procuring animals and output;

d) send materials to impose an administrative penalty on culprits who have violated the legal stipulations set for Specially Protected Natural Areas and Objects of the Azerbaijan Republic;

e) confiscate from the transgressor of the Azerbaijan Republic legislation the instrument and output of illegal nature abuse, means of transport as well as draw documentation on confiscation in the respective order;

f) attend freely any establishment within the territory of Specially Protected Natural Areas and Objects of the Azerbaijan Republic with the purpose to control maintenance of the Azerbaijan Republic Legislation on Specially Protected Natural Areas and Objects of the Azerbaijan Republic;

g) suspend economical or any other sort of activities that do not comply with the specific regime for national park protection.

The Chief State Inspector and his deputies shall be granted all the aforementioned rights of state inspectors. Furthermore the stated persons shall have the right to:

a) prohibit economical or other sort of activities that do not conform with specific regime for national park protection;

b) impose an administrative penalty for infringement of the Law of the Azerbaijan Republic on Specially Protected Natural Areas and Objects of the Azerbaijan Republic;

c) bring suit against individuals and artificial persons about confiscation in favor of Specially Protected Natural Areas and Objects of the Azerbaijan Republic resources in order to recover the damage having been done to natural complexes and establishments of Specially Protected Natural Areas and Objects of the Azerbaijan Republic to the zone secured by them and other territories under the control of the Chief State Inspector and his deputies as a consequence of regulation breaches;

d) refer the materials about infringement of the Law of the Azerbaijan Republic on Specially Protected Natural Areas and Objects of the Azerbaijan Republic to law enforcement agencies.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Dizmar protected area is state owned; protection and management of the area is based on the applicable protective regulations under the responsibility of the Forests, Range and Watershed Management Organization (FRWO), the Department of Environment (DoE), and the Ministry of Cultural Heritage, Tourism and Handicrafts (MCHTH) in line with the overarching governance of the existing Hyrcanian Forests World Heritage property.

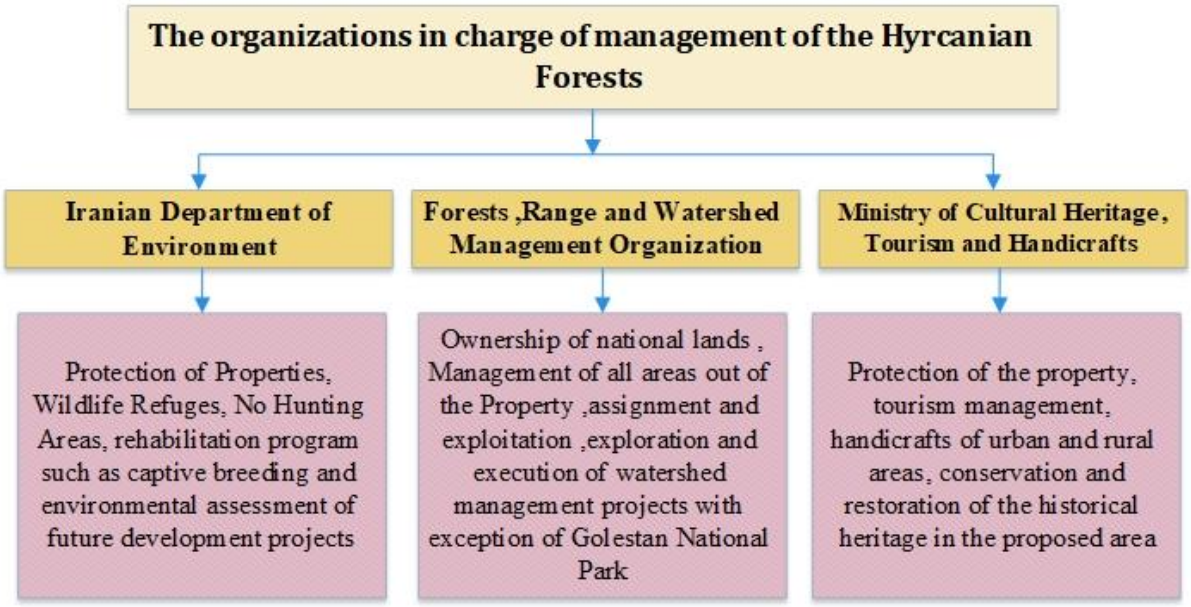

Figure 5-1: Administrative tasks of the organizations in charge of management of the Hyrcanian forests

At the first step for the protection of an area, the entire area is fully enclosed and a so-called Uniform Protection Unit is established in the area. Illegal hunting, fishing, unauthorized camping, resorting of tourists, cutting of trees and bushes, fire making, new construction, overgrazing and land use changes in the forests and pastures and any kind of destructive activities are not permitted and subject to legal prosecution. Staff of DoE and forest guards permanently patrol to protect the area from any manipulation. Protective regulations grant the guards the authority to arrest criminals and deliver them to the judicial authorities. Local people and non-governmental organizations (NGOs) also get involved in protection of the property especially as regards wildfires and the conservation and protection of biodiversity, ecological processes and the overall integrity of the area. There are hundreds of NGOs in Iran dedicated to the environment and natural resources which cooperate with the government with a focus on protection of the natural resource. These NGOs include, for example:

- The Centre for Sustainable Development and Environment (CENESTA);
- Women Society Against Environmental Pollution (WSAEP);
- Earth Watchers Center (EWC);
- Green Front of Iran;
- Iran Society for Development of Landscape and Environmental Conservation (ISDLE); and
- Iranian Society of Environmentalists (IRSEN)

5.d Existing plans related to municipality and region in which the proposed property is located

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

The key planning schemes and documents guiding planning in the region are listed herafter:

- The State Programme for Socio-Economic Development of the Regions of the Republic of Azerbaijan for 2019-2023 approved by the Decree № 500 of the Republic of Azerbaijan dated 29 January 2019;

- The State Programme for the Development of Tea Growing in the Republic of Azerbaijan for 2018-2027 approved by the Decree № 3660 of the Republic of Azerbaijan dated 12 February 2018;

- The Strategic Road Map for the Development of the Specialized Tourism Industry in the Republic of Azerbaijan approved by the Presidential Decree dated 06 December 2016.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Dizmar protected area has a protection plan since its esablishment in 2011. The area is under study in order to become part of the evolving comprehensive management plan for the Hyrcanian Forests. Protective regulations related to the property and the buffer zone are as follows:

Regulations related to the proposed property:

1. Any kind of interference and consequently degradation and damage to the property is prohibited;

2. All conservation, researches, and excavations must be first approved by the National Steering Committee of Hyrcanian Forests;

3. Any intervention altering the integrity of the property is not allowed;

4. Any kind of tourism activities such as sports and other activities must be permitted by the Ministry of Cultural Heritage, Tourism and Handicrafts and Department of Environment;

5. Application of heavy machinery and environmental pollutants harmful to the property is not allowed;

6. Supplementary plans regarding illumination, electronic protection as well as mechanical and electronic utilities must be done only after the approval of the National Steering Committee of the Hyrcanian Forests.

Regulations related to buffer zone:

1. Any kind of intervention and damage to the integrity and ownership of the property is not allowed in the buffer zone;

2. Any project of reorganization, expansion of rural areas, development of green spaces, and initiation of tourism infrastructures is just allowed when approved by the Steering Committee of Hyrcanian Base and by getting permission from said committee;

3. Installation and establishment of polluting equipment and topographic changes (unearthing) resulting in damage to the property is not allowed;

4. Any intervention in natural resources and rivers shall be in accordance with the regulations of Forests, Range and Watershed Management Organization (FRWO) and the Department of Environment (DoE);

5. Deploying power lines, installing poles, establishing industrial facilities and developing roads within this area is subject to getting relevant permits from Hyrcanian Base;

6. Cultivation of the lands belonging to the Forests, Range and Watershed Management Organization (FRWO) or the Department of Environment (DoE) in the property without legal permission from the organization is prohibited.

Furthermore, the Management Plan for the Sustainable Development of Rural Areas was initiated in 1999 with the primary objective to sustainably enhance the status of villages. This improvement, or reform, is to take place through various means, such as determining the size and place for the safe future enlargement of villages and modality of land use for residential, business, agricultural and public service purposes in a manner to avoid the least threat or harm, including to the values and integrity of the nominated components. Once agreed upon, each item will be dealt with separately in the framework of separate rules such as the rule for spatial reorganization of rural residencies and other relevant comprehensive rulings.

5.e Property management plan or other management system

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

The Management Plan for Hirkan National Park was approved in 2004 and has since been in vigor. The plan is enclosed to this nomination dossier. Revision and updating of the management plan are scheduled to start in 2021 in the framework of an FAO cooperation project. The Ministry of Ecology and Natural Resources of the Azerbaijan Republic jointly with FAO representatives in the Caucasus will finance, elaborate and implement a management plan, also to develop the national park infrastructure.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Following the successful inscription of the Hyrcanian Forests, the elaboration of master plans has been underway as a necessary precondition for the management of the numerous components of the inscribed property under the Ministry of Cultural Heritage, Tourism and Handicrafts in close coordination with the Department of Environment (DoE) and different ministries and universities, NGOs and organizations.

The components proposed as extensions are to become part of the master plans for the Hyrcanian Forests so as to ensure compliance with the applicable protection and management requirements. It is very important to note that the components proposed

for World Heritage status are not subject to any zonation and the management is based on non-intervention.

After the desired inscription of the extension, the local base of the Dizmar will be responsible for the implementation of the plan in the nominated property.

The supervision system of the Hyrcanian Forests currently consists of five provincial bases covering all 15 inscribed components. Dizmar base would become the sixth base covering Dizmar West and East (04, 05) and would have its provincial structure for management. Each base is responsible for the full range of activities within the inscribed components. All managerial actions related to the bases are fully supervised by the National Steering Committee, a top decision-making body, composed of representatives of all the related entities (FRWO, DoE, MCHTH), as well as the Iranian National Commission for UNESCO.

The National Steering Committee has 6 permanent members (FRWO, DoE, MCHTH, Iranian National Commission for UNESCO, Ministry of Interior, and the project manager) and a maximum number of 3 temporary members. Selection of the temporary members will take place on a needs-based basis. There is also a Technical Advisory Committee at the national level. The members to the technical advisory committee are seven. The steering committee will elect the members of the technical advisory committee who would include experts, scientists from universities, research institutes and related organization.

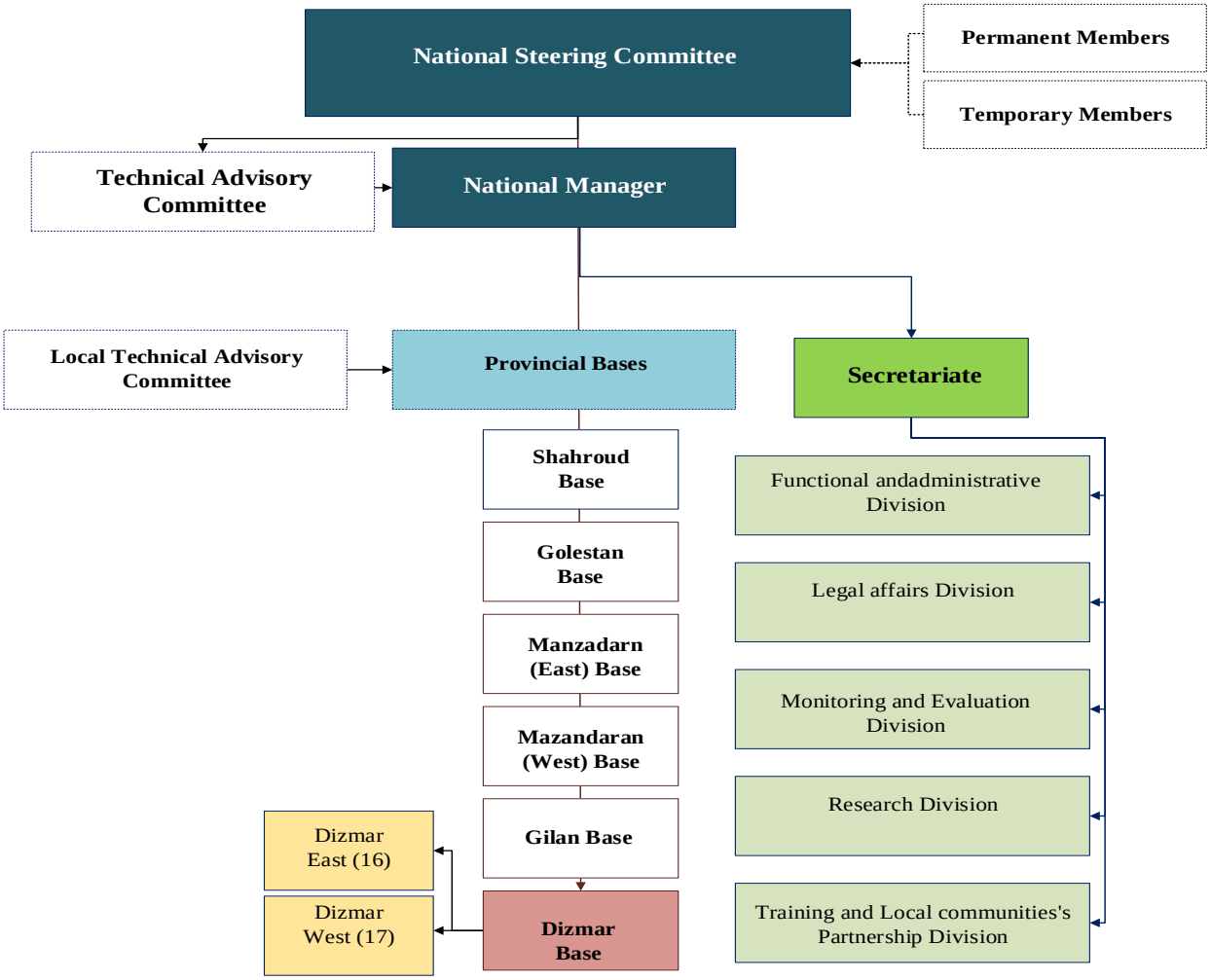

Figure 5-2: Supervisory system of the Hyrcanian Forests

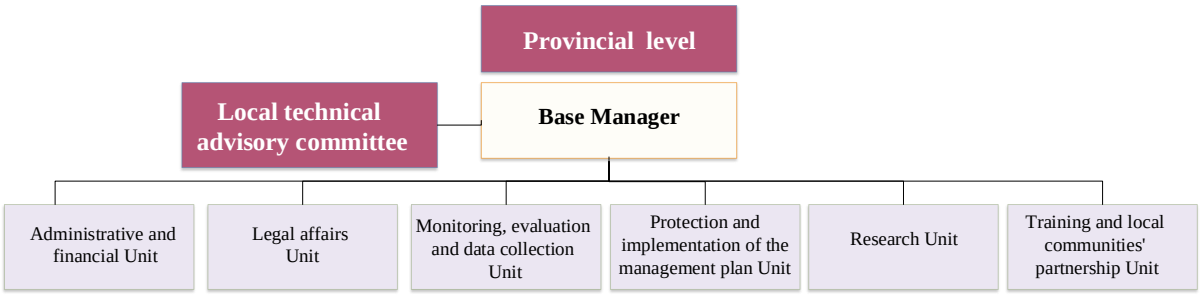

Figure 5-3: Managerial Structure at the Provincial level

The National Steering Committee elects the members of the Local Technical Advisory Committee in consultation with the Base Manager. The Local Technical Advisory Committee has an advisory function for all bases. In the Base, regular meetings of the Technical Advisory Committees provide the members with the opportunity to share their ideas and experience. A Technical Advisory Committee was established to better integrate the management of the proposed components. The tasks of the committee are to offer advice on strategic issues for research, conservation and management actions in the proposed components. Regular meeting of the National Steering Committee (based in the capital Tehran) brings together Bases managers and organizations with their specified duties.

Following the inscription of the Hyrcanian Forests in Iran in 2019, a project was established bringing together the two States Parties in order to ensure coordinated follow-up. In line with Decision 43 COM 8B.4 of the World Heritage Committee (Baku, 2019) and also recalling Decision 30 COM 8B.24 (Vilnius, 2006), a 'Declaration of Intent', formulated jointly by both States Parties and agreed in March 2020. Specifically, the two State Parties agreed on the following pillars for the path towards transnational communication, coordination and cooperation among others:

1. Full support by both States Parties for the serial transnational extension of the Hyrcanian Forests World Heritage property based on a carefully selected and coherent network of the remaining forest areas of highest conservation value in both countries;

(...)

5. Designated national focal points shall communicate the steps of the process with each other and to the responsible bodies;

(...)

12. Full support to develop a coordinated approach for eventual joint management of a serial transnational World Heritage between Iran and Azerbaijan as well as the individual sites during the project and beyond.

Adopting the advice of the World Heritage Committee for further transboundary cooperation (see above decisions), many online meetings and brainstorming sessions brought the representatives and authorities from Iran and Azerbaijan together to strengthen the cooperation between the two States Parties. Regrettably, the consequences of COVID-19, ongoing at the time of writing, impeded in-person meetings and joint site visits.

A major workshop was designed to develop a coordinated management approach for the Hyrcanian Forests between Iran and Azerbaijan. The workshop had to be

postponed to take place when travel to and within the region will be possible again in light of the pandemic.

The desired transnational inscription will consolidate the envisaged cooperation with the eventual ambition to manage all inscribed and currently nominated components under a single and comprehensive umbrella of an overarching management plan for the Hyrcanian Forests. Preparatory work is already underway.

The overall goal of the comprehensive management plan for the Hyrcanian Forests is the protection of the property's Outstanding Universal Value (OUV), including its extension, if applicable. The plan is being prepared in the form of long-term (covering a period of 30 years), mid-term (10 years) and short term planning (1-5 years).

Mid-term and short-term plans mainly focus on addressing and reducing current threats, improving conservation policies in the components, research and education purposes and promoting tourism in line with national and international standards. All these efforts are primarily aimed at conserving nature for future generations.

5.f Sources and levels of finance

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

Hirkan National Park is primarily financed by the central state budget via the Ministry of Finance. In addition, a trust fund serves as a financing instrument. The main income of the trust fund stems from tourism.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Currently DoE and FRWO provide the budget for different management activities within the proposed components. The targeted rate of total annual budget increase is of about 20%. In line with applicable law, after inscription of a nominated property on the World Heritage List, the Government allocates a considerable exclusive, separate and independent budget to management activities related to the safeguarding, research and other activities. This budget has been allocated to the Hyrcanian Forests. Also, capacity building for local communities, local community conservation partnerships, educational activities, facilities, researches and policy making level improve after World Heritage inscription for all of Iranian properties.

Table 5-1: The sources and amount of funds for the property (average of the recent five years)

No	Components	Organization	Annual Budget (US$)
04	Dizmar (West) Dizmar (East)	DoE	200,700
		FRWO	75,000
05		MCHTH	150,000
		Other organization	100,000

5.g Sources of expertise and training in conservation and management techniques

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

1. At its regular meetings, the Scientific Board of the National Academy of Sciences of Azerbaijan considers, and approves of, research programs, as well as reports elaborated by staff. Moreover, research is conducted on the basis of a partnership with scientific establishments and research centers, as well as through practical fieldwork and academic dissertation work.

2. The Appraisal Commission grants professional qualification ranks.

3. Post-graduate and doctorate studies for national park staff training have been developed by the National Academy of Sciences of Azerbaijan.

4. The Ecology Department at Baku State University trains specialists for nature protection and preservation.

5. Biology students of universities pass internships in Hirkan National Park.

6. The Ministry of Ecology and Natural Resources of the Azerbaijan Republic holds quarterly corporate meetings of the directors of strictly protected areas and regional and district committees of the Ministry.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Currently, about 63 experts have been employed in relation to the management and protection in the areas nominated for inscription, as detailed in the below Table 5-2. All of these experts are trained in the Iranian Universities, such as the University of Tehran, University of Tarbiat Modares, University of Golestan, University of Environment, University of Isfahan, University of Gilan, University of Mazandaran, University of Shiraz and many other universities that have many students in different academic disciplines.

The diversity of disciplines helps to better identify the most suitable approaches. As required in relation to the conservation and management issues in order to develop the skills and knowledge of trainers, the Iranian Department of Environment (DoE), Forests, Range and Watershed Management Organization (FRWO) and the Ministry of Cultural Heritage, Tourism and Handicrafts (MCHTH) provide various kinds of training in cooperation with the universities.

In addition, training courses and inter-organizational centers for higher education at the DoE and the FRWO, various capacity building workshops and preparatory meetings for world heritage inscriptions, capacity building training courses for the local communities, for raising awareness on the importance of world heritage inscriptions, are other training activities for conservation of the Hyrcanian Forests which are in progress. The detailed number of experts and employees is given in table 5-2.

Table 5-2: Number of expertise and employees per each component.

No	Components	Organization	Number	Expertise
04, 05	**Dizmar (East, West)**	DoE	**35**	Ph.D., M.Sc., B.Sc., high school educated and guards
		FRWO	**23**	Ph.D., M.Sc., B.Sc., high school educated and guards
		MCHTH	**5**	Ph.D., M.Sc., B.Sc., high school educated and guards

5.h Visitors facilities and infrastructure

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

Currently, there are 11 ecotourism routes in the national park, all in the buffer zone of the nominiated area. The construction of a chain of hotels to accommodate visitors-tourists has been started in the immediate proximity of the park, tour routes and ecological paths are being developed. Furthermore, a visit-center and shelter set-up are under current construction.

There is a recreational and wellness center in next to Istisu village in Astara District, near the southern boundary of Hirkan National Park. There are 7-8 bungalows, all equipped with hot sulphur baths. Most of the bungalows were constructed within the framework of international projects. They are owned by the national park and under long-term lease.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Dizmar Protected Area is almost untouched and is still not known to tourists. The bulk of the area is not suitable for visitation because of the extreme topography and the lack of suitable access roads. Tourist facilities are poor and there are not enough tourist agencies and trained tour guides**.** The overall natural and cultural attractiveness is accompanied by rare and invaluable species of fauna and flora. Consequently, the area lends itself as an ideal destination for mountaineer, researchers**,** nature tourists, botanists etc. rather than mainstream forms of tourism. The area also has high potential for geo-tourism development. Moreover, there are some villages in the surrounding area of the proposed components that could accommodate tourists with corresponding local economic benefits. Community- based ecotourism projects in these villages would be a tool for conservation and sustainable management of the property.

In the vicinity of the nominated components, there are some hotels and restaurants that can provide services to tourists. Moreover, there are many other hotels in Tabriz, the capital of the East Azarbaijan Province, that can offer such services. Because of

the short distance between Tabriz and the nominated areas, most of the tourists prefer to start their visits from Tabriz. There are environmental guards inside the nominated area that provide both safety and guidance tasks for the people.

5.i Policies and programmers related to the presentation and promotion of the property

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

Hirkan National Park is increasingly known domestically. The desired inscription as an extension of the existing World Heritage property in the Islamic Republic of Iran is expected to significantly boost the image of the national park and to communicate its global importance. In order to systematically accompany the presentation and promotion of the park and, in case of a successful extension, the future World Heritage property, several major activities are foreseen.

1. Preparation of a promotion and public awareness action plan with the National UNESCO Commission.

2. Close cooperation between the park authorities and the State Tourism Agency in order to promote the national park and, if applicable, the future property.

3. Preparation of a designated section on the web site of the Ministry of Ecology and Natural Resources and other digital resources in the public domain.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Despite high and invaluable biodiversity, surprisingly little research has been conducted in Dizmar before its designation as a protected area. However, it is expected that this area will rank highly on the list of high research interest in relation to ecosystems sustainability, ecological process, biological diversity, geology, climatology, socio-economy, eco-tourism and other valuable aspects of the nominated property, after inscription. Selected studies of the note in the context of the nomination are listed hereafter: Plant biodiversity of Hyrcanian relict forests, N Iran: an overview of the flora, vegetation, paleoecology and conservation (Akhani et al., 2010), Forests of Iran (Khosro Sagheb Talebi, Toktam Sajedi, Mehdi Pourhashemi, 2014), Forest Ecology (Ahmad Mossadegh, 2009), Trees and shrubs of Iran (Valiollah Mozaffarian, 2005), Forests, trees, and shrubs of Iran (Ḥabīb Allāh Ṣābitī, 1976), Atlas of woody plants and shrubs of Iran (Djavanshir, 1976). Also, some papers and reports are published in international journals, which contribute to the presentation and promotion of the area.

All of the policies, plans and decision-making that affect the property are based on the plans that the memberships of the Local Technical Advisory Committee and managers of the Bases have elaborated for approval by the National Steering Committee (based in Tehran) have approved them (see 5.e.).

Presentation and promotion of the nominated property can be implemented by use of different ways and policies as follows:

a) The rural and nomadic handicrafts

- Empowerment of the rural communities and the taking advantage and the opportunities of nomad and rural women;
- Economic development;
- Cultural development;
- tourist promotion;
- marketing.

b) Advertisement (internet, newsletters **and social networks, brochures, books, radio, television, work shop etc.)**

- Raising regional, national and international awareness;
- Raising awareness of tourists from the proposed World Heritage of the Hyrcanian forests and tourism facilities;
- tourist promotion;
- marketing;
- improving protection and management.

c) Training programs in the tourism industry

- education and updating the methods and techniques for management of tourism**;**
- Publications and documentation of tourism;
- Education of professional teachers;
- Upgrading the skills in English, especially for tour that is supposed to provide their services for foreign tourists.

d) The government role in tourism Management

- Political stability ;
- Making and security of the law and financial frameworks which are needed by the tourists;
- Providing the basic infrastructure and required services for tourism;
- management of the public sector;
- Solving the both formal and informal problems in tourism.

5.j Staffing levels (professional, technical, maintenance)

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

At the time of nomination, Hirkan National Park has a total staff of 92 employees. The breakdown is as follows: 7 administrative and 2 scientific workers, 10 protection inspectors, 56 game keepers and 17 technical personnel. The National Park owns 2 vehicles.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Currently, 63 full-time staff with different level of educations work in the Dizmar Protected Area.

This is specified in the subsequent table.

Table 5-3: Professional management personnel and technique personnel					
Component No.	**Professional management personnel and technique personnel**				
	College educated or above		**High school educated**	**Not high school educated** (most of the guards)	**Total**
	Msc	**Bsc**			
04, 05	13	28	11	11	63

6. Monitoring

6.a Key indicators for measuring state of conservation

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

The monitoring of the area is conducted based on the following indicators:

Table 6-1: Indicators for the biodiversity monitoring in the Hirkan National Park

Indicator	Periodicity	Location of records
C**hemical composition of sediments and natural water basins**	4 years	Service of Protection of Biodiversity under the Ministry of Ecology and Natural Resources
Q**uantity and structure of the main protected species of animals (birds and mammals)**	4 years	Service of Protection of Biodiversity under the Ministry of Ecology and Natural Resources
P**opulation** status **of background and** selected **rare relict and endemic plant s**pecies	4 years	Service of Protection of Biodiversity under the Ministry of Ecology and Natural Resources
S**pecifics and structure of background and rare biocenosis**	4 years	Service of Protection of Biodiversity under the Ministry of Ecology and Natural Resources

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

In the absence of any developmental pressures for the time being, the monitoring of the nominated components is being implemented as a periodically repeated systematic observation and quantitative collecting of data on the state of biotic and abiotic elements of the forest ecosystem. Concretely, air, water, soils and biota including trees, animals etc. are being considered, as well as the protection and quality improvement areas, reduction of the pollution and destructive parameters.

To ensure the appropriate accomplishment of conservation procedures, a plan is required to be developed to monitor them. This program prescribes all parameters to be monitored, frequency, tasks and responsibilities.

The key indicators for assessing and monitoring the state of conservation in the nominated components are as follows:

Flora: rarity, extinction or entrance of exotic species, total surface areas, average number of trees per hectare, protection level, species' richness, endemism and number of red data fauna species will be monitored.

Fauna: The number and variety of migratory indicator birds, mammals, reptiles and amphibians during different years for resuscitation and return to the nature, the size of wildlife populations, main protected species of wildlife and the population dynamics of wildlife will be scientifically monitored. Estimate qualitative and quantitative features of insects within the different habitats of the property**.**

The distribution, sex and age structure of important wildlife populations as well as all issues with negative impact on the sustainability of wildlife will be assessed and recorded. Numbers of livestock removed that had entered the forest from neighboring areas will also be monitored. Additionally, red data fauna species will be monitored too. The use of camera traps in Iranian wildlife habitats is quite common and will be continued for monitoring purposes.

Climate: study and analyze of the meteorological data in an attempt to monitor the region's climate, make daily records of rainfall and temperature and document all unusual climatic phenomena, particularly heavy snowfalls, storms and frost.

Soil: Stabile soil indicators (soil profile description and soil classification, textural analysis, physical properties, humus and chemical analysis), labile soil indicators (pH, mobile nutrient and ecological and genetic humus quality, humus layer), microbial activity of soils, CO_2 production in the spring, summer and autumn. Analysis of soil erosion and the relation between soil fertility and micro level environmental factors becomes highlighted in such cases, especially when there is little or no data available for scientific purposes.

Socio – economic: studying the specific characteristics of the local communities i.e. population specificities, literacy, income and migration rates, age pyramid and sex ratio is of significant importance.

Tourism: Number and type of the tourists.

Table 6-2: Indicators for the biodiversity monitoring in the Dizmar Protected Area, I.R. of Iran.

Indicator	Periodicity	Location of Records
Number of plants, rarity, extinction or entrance of exotic species	Every 5 years	Property
Changes in (dominant surfaces and floristic composition) of plant communities	Every 2 years	
Ecological process and plant diversities (plant succession, effect of climate, altitude and soils on plants, diversities according to IUCN categories using biodiversity indices)	Every 5 years	
Silviculture studies (Canopy, species richness, dead trees volume evaluation and presence of the Nobel species in the forest	Every 10 years	

Evaluation changes of the physical and chemical features of soil, erosion and it's compactness in the areas of tourism management	Every 5 years	
Estimating the number and diversity of bird and animal population (Focal species).	Every 5 years	
The study of insects (Focal species)	Every 10 years	
Increase or decrease of monthly precipitation, maximum, minimum and average temperature, evapotranspiration, wind, radiation, evaporation and cloudy days	Every years	
Detection and monitoring of fluctuation of pest and disease (Oak death and Dutch elm disease)	Every two years	Property, Buffer zone, and surrounding areas
Population changes in rural and nomadic areas	Every 5 years	Buffer zone and surrounding areas
Changes in the number and level of literacy in rural and nomadic areas		
Changes in the age pyramid in rural and nomadic areas		
Changes in income levels in rural and nomadic areas		
Survey of changes in relation to the number and type of tourists under the influence of conservation and management plans in the property	Every 2 years	

6.b Administrative arrangements for monitoring property

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

1. The Hirkan National Park research department annually conducts background monitoring of nature complexes on the basis of which “Annals of Nature” are drawn up.
2. Regular observations are registered by inspectors and game-keepers in their diaries.
3. Registration of numbers of the main protected species is exercised twice a year with the participation of experts from the Ministry of Ecology and Natural Resources of Azerbaijan and the National Academy of Sciences.
4. The meteorological station in the immediate proximity of the National Park (Parakend village) has been in operation since 2003.
5. Changes in the water regime within the site of the national park are monitored.
6. Scientific institutions and research centers conduct research on the national park area.
7. A monitoring department (radioactive phone analysis, state of gas composition of the atmosphere, chemical analysis of soil and water, birds and large mammals numbers, dynamics registration services) is operating under the Ministry of Ecology and Natural Resources of Azerbaijan.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

Title and addresses of the organizations that are responsible for monitoring tasks are listed in Table 6-3:

Table 6-3: Address and contact number of organizations responsible for monitoring

Departments	Contact tel.	Address	Website
Ministry of Cultural Heritage Tourism and Handicrafts	+98-21-66084577	Azadi avenue, Emam intersection, Tehran , Iran	https://www.mcth.ir/
Department of Environment	+98-21-42781000	Park-e Pardisan, Shahid Hakim highway, Tehran, Iran	http://en.doe.ir/Portal/Home/default.aspx
Forests, Rangeland and Watershed Organization	+98-21-22446508	Ozgol, Tehran, Iran	http://frw.org.ir/00/En/default.aspx
Research Institute of Forests and Rangelands	+98-21-44580222	Research Institute of Forests and Rangelands, Tehran, Iran, P.O.Box 13185-116	http://www.rifr-ac.org/EN/Default.aspx?PageID=57
Iranian Research Institute of Plant Protection	+98-21-22403012-16	No. 1, Yaman (Tabnak) St., Chamran Highway, Tehran, Iran , P.O. Box: 19395-1454	http://portalold.iripp.ir/EnglishPages/EngContact.htm
Social reinsurance organization of farmers, villagers and nomads	+98-21-84680000	N.170, Bahar-e Shiraz, Haft-e Tir Square,Tehran, Iran P.O.Box: 15745/165	http://roostaa.ir/

6.c Results of previous reporting exercises

Hirkan National Park, Azerbaijan Republic (proposed components 01 - 03)

Annual volumes of research results titled “Chronicle of Nature” and publications stored in the Department of Bio-Resources and Strictly Protected Areas of the Ministry of Ecology and Natural Resources of the Azerbaijan Republic.

Results of annual registrations of large mammals and birds stored in the Department of Bio-Resources and Strictly Protected Areas of the Ministry of Ecology and Natural Resources of the Azerbaijan Republic.

Results of meteorological observations conducted by the meteorological station in the village of Parakend.

Results of observations conducted by monitoring services of the Ministry of Ecology and Natural Resources of the Azerbaijan Republic.

Dizmar Protected Area, Islamic Republic of Iran (proposed components 04 - 05)

The most important reports and publications about the property are as follows (see tabl.6-5):

Table 6-4: Some significant scientific publications and reports on the Dizmar Protected Area

Work	Content	Author (s)	Published by/Stored in
Atlas of woody plants and shrubs of Iran	Introducing the woody plants of Iran	Prof. Karim Djavanshir (University of Tehran)	Iranian Department of Environment, (1990)
Parmelioid lichens of Iran and the Caucasus Region	lichen	Mohammad Sohrabi	Mycologia Balcanica, (2007) 4(1), 21-30
Annotated Checklist of Amphibians and Reptiles of Iran	Amphibians and Reptiles	Nasrullah Rastegar-Pouyani	Iranian journal of animal biosystematics (2008), 4(1): 7-30.
Plant biodiversity of Hyrcanian relict forests, N Iran: An overview of the flora, vegetation, palaeoecology and conservation	Plant biodiversity	Hossein Akhani	Pakistan Journal of Botany, (2010) 42: 231-258

Preliminary Introduction to Caucasian Black Grouse in Iran	Caucasian Black Grouse	Nader Habibzadeh and Omid Rafieyan	Islamic Azad University Tabriz Branch (2014)
Report to the Persian leopard status and conservation in the Iranian part of the Caucasus ecoregion	Persian Leopard	Arezoo Sanei and Mohamad Reza Masoud	East Azarbaijan Provincial DoE and Asian Leopard Specialist Society(2014)
First Records of the Fruit Flies (Diptera, Tephritidae) in the Fauna of Iran." Vestnik zoologii	Insect	Ebrahim Zarghani	Vestnik zoologii, (2016) 50(2), 123-134
Predicting future dynamics of landscape structure within protected areas using CA-Markov model (Case study: Dizmar protected area)	Landscape structure	Amini Parsa, V., & Nejadi, A.	Physical Geography Research Quarterly, (2016) 48(4): 661-674
Simulating soil organic carbon stock as affected by land cover change and climate change, Hyrcanian forests (northern Iran)	Global warming	Azam Soleimani Seyed Mohsen Hosseini Ali Massah Mostaa Jafari Rosa Francaviglia	Science of the total environment (2017) 599–600 :1646–1657
Climate change impacts on the distribution and diversity of major tree species in the temperate forests of Northern Iran	Climate Change	Hamid Taleshi Seyed Gholamali Jalali Seyed Jalil Alavi Seyed Mohsen Hosseini Babak Naimi Niklaus E Zimmermann	Regional Environmental Change (2019) 19:2711–2728

The species diversity, distribution, and conservation status of the terrestrial mammals of Iran	Mammalian species of Iran	Gholam Hosein Yusefi *et al*.	Journal of Mammalogy (2019) 100(1): 55-71
Endemic diversity and distribution of the Iranian vascular flora across phyto-geographical regions, biodiversity hotspots and areas of endemism	Plant biodiversity	Noroozi *et al*.	Scientific reports, (2019) 9(1), 1-12
The potential impact of future climate on the distribution of European yew (*Taxus baccata* L.) in the Hyrcanian Forest region (Iran)	Climate Change	Kourosh Ahmadi Seyed Jalil Alavi Ghavamudin Zahedi Amiri Seyed Mohsen Hosseini Josep M. Serra-Diaz Jens-Christian Svenning	International Journal of Biometeorology (2020) 64:1451–1462

7. Documentation

7.a Photographs and audiovisual image inventory and authorization form

Table 7-1: List of photographs

Id. №	Format (slide/print/video)	Caption	Date of photo (mo/yr)	Photographer	Copyright owner (if different than photographer)	Contact details of copyright owner (name, address, tel/fax and e-mail)	Non exclusive cession of rights
Azerbaijan							
1	slide	Ironwood in Hirkan NP	09.07.2019	Hans D. Knapp	-	-	-
2	slide	"Şindan" forest unite	07.06.2011	anonym	-	-	Hirkan National Park
3	slide	Forest regeneration by *Diospyrus*	09.07.2019	Hans D. Knapp	-	-	-
4	slide	"Xanbulan" route	27.02.2020	Bakhshiyev Saleh	-	+994 50 437 60 37	-
5	slide	"Gölətrafı" route, Chestnut-leaved oak	27.02.2020	Bakhshiyev Saleh	-	+994 50 437 60 37	-
6	slide	The road to the "Şəlalə" route, İronwood	10.04.2020	Bakhshiyev Saleh	-	+994 50 437 60 37	-
7	slide		10.11.2013	Emil Khalilov	-	www.emilkhalilov.com	-
8	slide	*Buxus* trees along the river bank	?	Hajiaga Sapharov	-	-	Hirkan National Park
9	slide	"Piyəkənərud" route, Beech tree	10.11.2016	anonym	-	-	Hirkan National Park
10	slide	Wild river in Hirkan NP	09.07.2019	Hans D. Knapp	-	-	-
11	slide	"Sağlam həyat" route, Oak tree	10.04.2020	Bakhshiyev Saleh	-	+994 50 437 60 37	-
12	slide	Mixed deciduous forest with lime tree	?	Hajiaga Sapharov	-	-	Hirkan National Park
13	slide	Mixed deciduous forest with deadwood	09.07.2019	Hans D. Knapp	-	-	-
14	slide	Oriental beech forest	09.07.2019	Hans D. Knapp	-	-	-
15	slide	Old-growth beech forest	09.07.2019	Hans D. Knapp	-	-	-

16	slide	*Diospyros lotus*	09.07.2019	Hans D. Knapp	-	-	-
17	slide	*Albizia julibrissin*	09.07.2019	Hans D. Knapp	-	-	-
Iran							
18	Fig. 2-9	Dizmar Protected Area's closed forest	2015	Ahmad Hajizadeh	-	hajizadeahmad1971@gmail.com	Authorized
19	Fig. 2-19	Persian or Caucasian leopard *Panthera pardus* saxicolor VU	2015	Jalil Hassanzadeh	-		Authorized
20	Fig. 2-22	Sociable Plover (*Vanellus gregarius* CR),	2015	Meysam Ghasemi	-		Authorized
21	Fig. 2-23	Saker Falcon (*Falco cherrug* EN)	2015	Mohammadreza Sadeghi	-		Authorized
22	Fig. 2-24	Persian brook salamander (*Paradactylodon persicus* NT)	2011	Omid Mozaffari	-		Authorized
23	Fig. 2-25	Talysh Toad (*Bufo eichwaldi* VU)	2011	Omid Mozaffari	-		Authorized

7.b Texts relating to protective designation, copies of property management plans or documented management systems and extracts of other plans relevant to the property

The component cluster containing three proposed components in the territory of Azerbaijan is located within the Hirkan National Park (HNP).

Hirkan National Park (IUCN category 2), was established by Decree № 81 of the President of the Azerbaijan Republic dated 09 February 2004, with an area of 21,435 ha comprising the forests with no history of industrial forestry at any time. According to the order No. 137 of the Cabinet of Ministers of the Republic of Azerbaijan dated 23 April 2008, the surface area of HNP was subsequently increased to 40,358 ha. 'Hirkan National Park', like the other protected areas in Azerbaijan, is under the subordination of the Ministry of Ecology and Natural resources of the republic of Azerbaijan (MoE), namely the Department of Biodiversity Protection and Protected Areas Development, which is responsible for supervising and approval of annual plans submitted by protected areas administrations.

The management plan for HNP is based on a long-term vision statement with an overriding objective to maintain the current wilderness character of the HNP and to manage it as a globally important conservation area within the framework of minimum management intervention whilst ensuring the maintenance and natural evolution of ecosystem structure and function.

According to the management plan, following major goals and objectives are being pursued:

<u>Goal 1</u>: Sustainable protection of the Park's biodiversity and ecological integrity.

This will be achieved through:

- zoning the park into different use areas;
- the design and implementation of sustainable management programs (detailed in the officially approved management plan);
- the implementation of the management plan by a well trained and equipped management team in close cooperation with the support zone communities;
- a clear definition and delimitation of the park boundaries;
- continuous support to and cooperation with support zone communities in order to achieve a harmonic and environmentally compatible support zone development.

<u>Goal 2</u>: Commitment by the Government (all levels), support zone communities and park users to the harmonic development and protection of the HNP according to the management plan.

This will be achieved through:

- convincing the Azerbaijan Government on the district and local level about the importance of the HNP for the development process of the region and the country at large;
- providing the support to (buffer) zone communities in order to provide direct and indirect benefits of the HNP to them.

<u>Goal 3</u>: The economic development of the region and the surrounding zone is enhanced through the existence of the HNP.

This will be achieved through:

- assisting support (buffer) zone communities in their economic advancement compatible with the park's conservation objectives;
- equitable flow of benefits through fair distribution of tourism development, human resource development and capacity building, improved natural resource management, protection of high quality drinking water etc.;
- promoting international donor support for the benefit of regional development.

<u>Goal 4</u>: Develop the HNP and its support zone into a well-known and recognized tourist destination without threatening its ecological integrity.

This will be achieved through:

- the elaboration of a well-designed, targeted, marketed and implemented responsible visitor program that makes full use of the cultural, educational and recreational opportunities offered through the Park as an outstanding wilderness area and the support (buffer) zone;

- the development of a visitor infrastructure inside and outside the HNP that complies with the overall conservation objectives of the Park but also meets international standards;
- provide assistance to support (buffer) zone communities in the establishment of tourism facilities and providing corresponding training.

<u>Goal 5</u>: Ensure the financial sustainability of the HNP.

This will be achieved through:

- the elaboration and implementation of a well-designed business plan that takes benefit of revenue generating opportunities by the Park, Government commitment and the establishment of an endowment fund that will assist in covering potential shortfalls of the park's operational budget.

<u>Goal 6</u>: The HNP serve as a model for Azerbaijan's protected area system.

This will be achieved through:

- hands-on training of personnel of other protected areas in the country by HNP personnel;
- participation of Park personnel in the elaboration of management plans for other protected areas to be based on the HNP experience;
- managing and developing the HNP in the interest of the people of Azerbaijan, both with respect to Biodiversity Conservation and with respect to making a contribution to the sustainable socio-economic development of the region and the country.

For more details please refer to the management plan for HNP provided as an annex.

Key policy and legal documents are listed hereafter.

- Decree of the President of the Republic of Azerbaijan;
- Decision by the Head of Lenkoran City Executive Authority of the Republic of Azerbaijan;
- Decision by the Head of Executive Authority of Astara District of the Republic of Azerbaijan;
- Common Charter of National Parks of Republic of Azerbaijan;
- Charter of Hirkan National Park of Republic of Azerbaijan;
- Decision by Council of Ministers of Azerbaijan SSR;
- The Law on Specially Protected Natural Areas and Objects of the Republic of Azerbaijan;
- National Biodiversity and Action Plan (NBSAP) 2017 - 2020.

The component cluster containing two proposed components in the territory of Iran is located in the 'Dizmar Protected Area'. Dizmar protected area (nature reserve) was established in 2011. All the lands of Dizmar Protected Area are state owned as national resources and its ownership is related to the government in exception of villages and farmlands in the buffer zone which have private owners. The Department of

Environment (DoE) is legally and administratively the main responsible body for the protection of this protected area.

Dizmar Protected Area is being managed in accordance to the management plan prepared by DoE. After potential inscription, the nominated cluster will be managed in accordance of the comprehensive management plan of the 'Hyrcanian Forests' World Heritage property which is underway. Based on this comprehensive management plan, the steering committee of the Hyrcanian Forests property (consisting of six permanent representatives and a few temporary members, also refer to chapter 5.e), in cooperation with other related ministries and entities are responsible for management of the property. After potential inscription, the local administration office located in Dizmar will be responsible for the implementation of the plan in the component cluster.

The overall goal of the comprehensive management plan of the Hyrcanian Forests is protection of the property's integrity and OUV. The plan prepared in the form of long term (covered a period of 30 years), mid-term (10 years) and short term plan (1-5 years).

Mid-term and short-term plans mainly focus on decreasing current threats, improving policies for better conservation within the components, research and education purposes and promoting tourism in line with national and international standards. All these efforts are primarily aimed at conserving nature for future generations.

7.c Form and date of most recent records or inventory of property

Table 7-2: Most recent records of the nominated component (Rep. Azerbaijan)	**Date**
Annual monitoring of species in Azerbaijan	2020
Conservation of Persian leopard (*Panthera pardus* saxicolor) in the Caucasus Region	2015
Red book of Azerbaijan - flora	2013
Red book of Azerbaijan - flora	2013
Monitoring Persian leopard *(Panthera pardus saxicolor)* in Hirkan National Park	2019
Annotated Checklist of mammals and birds in Azerbaijan	2019
Annotated Checklist of flora in Hirkan National Park	2020
Leopard (Panthera pardus) status, distribution, and the research efforts across its range	2019
https://nationalparks.az/parklar/hirkan-milli-parki	2020
Property inventory	
Wildlife monitoring in the protected areas (annual basis)	2019
General count of population in Hirkan National Park	2019
Annual count of tourists in Hirkan National Park	2020

Annual “Nature legend”of Hirkan National Park	2019
https://nationalparks.az/parklar/hirkan-milli-parki	2020
Most recent records of the nominated component (I. R. Iran)	Date
endemic diversity and distribution of the Iranian vascular flora across phytogeographical regions, biodiversity hotspots and areas of endemism	2019
Mitochondrial DNA analysis of Iranian brown bears (Ursus arctos) reveals new phylogeographic lineage	2016
Leveraging trans-boundary conservation partnerships: Persistence of Persian leopard (*Panthera pardus* saxicolor) in the Iranian Caucasus	2015
An annotated list of the weevils (Coleoptera: Curculionidae) from the Arasbaran biosphere reserve and vicinity, Northwestern Iran	2009
Determination of the best geostatistical method for climatic zoning in Iran	2016
Annotated Checklist of Amphibians and Reptiles of Iran	2008
A report to the Persian leopard status and conservation in the Iranian part of the Caucasus ecoregion	2014
Application of the Global Bioclimatic Classification to Iran: implications for understanding the modern vegetation and biogeography	2011
Monitoring landscape changes in Caucasian black grouse (*Tetrao mlokosiewiczi*) habitat in Iran during the last two decades	2015
The species diversity, distribution, and conservation status of the terrestrial mammals of Iran	2019
Predicting future dynamics of landscape structure within protected areas using CA-Markov model (Case study: Dizmar protected area)	2016
Reproductive cycle of Miniopterus schreibersii (Chiroptera: Vespertilionidae) in western Iran.	2002
Parmelioid lichens of Iran and the Caucasus Region	2007
Evaluating the hazardous potential of the dieback of the Zagros Oak forests using the multi-criteria decision-making methods	2020
Prey composition in the Persian leopard distribution range in Iran	2011
Leopard (Panthera pardus) status, distribution, and the research efforts across its range	2016
Property inventory	
Wildlife monitoring in the protected areas (annual basis)	2017
General count of population and housing (5-year basis)	2016
Annual count of tourism population	2017

7.d Address where inventory, records and archives are held

Rep. Azerbaijan

- Ministry of Ecology and Natural Resources of the Azerbaijan Republic B.Aghayev str., 100-A, Baku AZ1073, Azerbaijan, www.eco.gov.az

Table 7-3: Address where inventory, records and archives are held (I. R. Iran)

Type of Record	Depository where kept	Brief Description	Address
Botanical inventory	Central Herbarium of Iran (TARI)	Data on and location of recorded plants	Research Institute of Forests and Rangelands, P.O.Box 13185-116 Tehran-Iranb
Number of inhabitants and households	Statistical Center of Iran	Information on numbers of inhabitants and households, on a 10-year basis	No. 145, Shahid Sartip Fakori St., Baba Taher St., Dr. Fatemi St., Tehran, Islamic Republic of Iran. Postal code: 14137 17911
Inventory, records and archives	Department of Environment	Wildlife counts, Record of fire break outs, Record of arrested hunters	Department of Environment, Post box 15871, Pardisan Nature Park, Shahid Hakim Highway, Tehran, Iran
Inventory, records and archives	Forests, Range and Watershed Management Organization	Periodical inventory of forest resources	Post code 1955756113, Lashkarak Road, Minicity, Artesh Blvd. Ozgol, Tehran, Iran
Inventory, records and archives	ministry of cultural heritage tourism and handicrafts	Tourism records	MCHTH , Azadi St, Tehran, Iran

7.e Bibliography

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