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## Areas of the outstanding natural beauty of the Triglav National Park, in Slovenia

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## **ABSTRACT**

This paper is a photographic summary of a scientific and touristic expedition carried out in June 2022 in the Triglav National Park, located in the northwestern of Slovenia. The Flora and fauna of the Park are very rich and diverse, and also has a huge number of rivers, streams, and crystalline lakes, emerald-blue in color and connected by a series of cascades and waterfalls, embedded in a network of mountains in the Julian Alps. The photos show park structures and wilderness areas, with spacious forest complexes, lakes, small streams, and waterfalls extending, besides geological formations, plants, and animal species.

**Keywords:** Triglav National Park, Slovenia, Yugoslavia, protected areas

## **INTRODUCTION**

Triglav National Park (Triglavski Narodni Park in Slovene) is the only national park in Slovenia (**Figure 1**). It covers an area of 838 km<sup>2</sup> and is one of the oldest and largest national parks in Europe [1], and it was established in its modern form in 1981, when there was still the Socialist Republic of Yugoslavia, and is located in the northwestern part of the country, respectively the southeastern part of the Alpine massif (**Photo 1**). Mount Triglav, the highest peak of the Julian Alps, stands almost in the middle of the national park. From it the valleys spread out radially, supplying water to two large river systems with their sources in the Julian Alps: the Soča and the Sava [2-9].

The Soča or Isonzo (in Italian) is a 138 km (86 miles) long river that flows through western Slovenia and northeastern Italy. The Soča river is a true pearl of the Julian Alps and one of the most beautiful rivers in Europe. It is an Alpine River in character, its source lies in the Trenta Valley in the Julian Alps in northwestern Slovenia, at an elevation of 876 m (2,874 ft). This river runs past the towns of Bovec, Kobarid, Tolmin, Kanal ob Soči (**Photo 2**), Nova Gorica, and Gorizia, entering the Adriatic Sea close to the town of Monfalcone. Due to its emerald-green water, the river is marketed as "the emerald beauty" (**Photos 3, 4**). It is said to be one of the rare rivers in the world that retain such a color throughout its length. The river inspired the poet Simon Gregorčič to write his best-known poem Soči (to the Soča), one of the masterpieces of Slovene poetry [10-12]. The river is also well known for the marble trout (*Salmo marmoratus*); this species is native to northern Adriatic basin rivers and lives in the river's upper course. This species is endangered due to the introduction of other non-indigenous trout species like brown trout (*Salmo trutta*) [13-15].

The Sava is the longest tributary of the Danube. It is 990 km (615 miles) long. This river flows through Slovenia, Croatia, along its border with Bosnia and Herzegovina, and finally through Serbia, feeding into the Danube in its capital, Belgrade. The Sava forms the main northern limit of the Balkan Peninsula, and the southern edge of the Pannonian Plain. The Sava River is formed from the Sava Dolinka (**Photo 5**) and the Sava Bohinjka headwaters. The Sava Dolinka rises at the Zelenci Pools near Kranjska Gora, Slovenia, in a valley separating the Julian Alps from the Karavanke mountain range. The spring is near the Slovene-Italian border at 833 m (2,733 ft) above sea level in a drainage divide between the Adriatic and Danube basins.

The Sava Dolinka spring is fed by groundwater possibly exhibiting bifurcation of the source karst aquifer to the Sava and Soča basins. The Sava Bohinjka originates in Ribčev Laz, at the confluence of the Jezernica, a short watercourse flowing out from Lake Bohinj and the Mostnica River. The watercourse flows 41 km (25 miles) including the length of the Savica, east to Radovljica (**Photo 6**), where it discharges into the Sava Dolinka [16-18].

The main objective of this scientific and touristic expedition, realized in June 2022 was to know the natural beauties of the different ecosystems and the structure existing in the Triglav National Park, identifying and photographing the natural riches accessible to my lens and the main plant and animal species that we were lucky to see.



**Figure 1.** Location of Triglav National Park (TNP) in Slovenia (Podobnikar, 2009).

Mount Triglav, with 2,864 m (9,396 ft) is the highest summit of the Julian Alps and Slovenia (**Photo 7**). To Slovenes, it represents a prime national symbol; it is also included in the coat-of-arms of the Republic of Slovenia. On the symbolic level, Triglav established itself during WWII as a symbol of the Liberation front. Following the war, Triglav also took the central position in the coat of arms of the Socialist Republic of Slovenia. In 1991, when Slovenia declared its independence, a stylized Triglav became the central element of the Republic of Slovenia's coat-of-arms along with three golden stars, stemming from the coat-of-arms of the Counts of Celje, and the sea; Triglav thus landed also on the flag of the Republic of Slovenia [19] (**Photo 8**).

The Triglav National Park is an area of varied relief that is manifested in a wealth of natural forms: crystal clear water remains of virgin forests, high-altitude ridges, and summits, glacier-carved valleys, mountain lakes, raised bogs, etc. The forest covers two-thirds of the Park's territory, overgrowing valley floors, steep slopes, and high-altitude plateaus [20] (**Photos 9-12**). Efforts to protect this region go back a long way. Over the past decade, there has been a very intense expert debate on the impact of protected areas on regional development, and this issue has increasingly been at the forefront in Slovenia as well [21]. The Triglav National Park, there is an increasing interest in visitors' relationship with the park and the role of its residents in maintaining the cultural landscape like Alpine meadows [22].

Bohinj is a paradise valley involved in the Julian Alps. Lake Bohinj which lies in the heart of the Triglav National Park is the largest Slovenian natural lake, nested at the foot of unspoiled mountains and mountain tops (**Photos 13, 14**). It is located in a glacially formed lake basin, and it is suitable for water activities like swim, riding a boat, kayaking or canoeing, fishing, and snorkeling. Lake Bohinj is the habitat of 53 species of planktonic algae, around 60 species of invertebrate fauna, and at least 16 species of fish. Aside from the lake itself, St John the Baptist church is the hallmark of Bohinj. This postcard-worthy medieval church and stone bridge are more than 700 years old, covering periods from Romanticism to Baroque. This church is one of the finest examples of Slovenian medieval architecture and mural painting (**Photos 15, 16**). The around Lake Bohinj is famed for its natural beauty (**Photos 17-22**).

Several scientific studies investigated the vegetation history and sedimentary processes in the catchment of Lake Bohinj. The results of mineralogical, sedimentological, geochemical, stable isotope, and pollen analysis are presented to better understand the impact of people (agriculture, grazing, mining) on the environment, and climate-human interactions over the last 6,600 years. The results of palynological research suggest that at ca. 6,000 yr cal BP Lake Bohinj was surrounded by mixed forest composed of *Picea*, *Abies*, deciduous *Quercus*, with *Fagus* becoming dominant after ca. 3,300 yr cal BP. In the Bronze and especially the Iron Age (3,500-2,500 yr cal BP), when the region was, according to archaeological data, densely populated, clearing of forests due to agriculture, livestock production, and metallurgical activities were detected through *Cerealia*-type pollen, *Plantago lanceolata*, and the decline of *Abies*. These activities probably triggered soil erosion recorded as increased sedimentation rates. In the subsequent centuries, human impact on the environment continued, but it seems that the watershed was not destabilized again. These flood patterns match with periods of enhanced flood activity in the wider Alpine region [23].

Zelenci Springs is a nature reserve near the town of Kranjska Gora, in the far northwestern corner of Slovenia. It is the source of the Sava Dolinka River. At Zelenci Springs, water from underground Nadiža Creek (originating in the Planica Valley) re-emerges through the porous bottom of a 2 m (6.5 ft) deep lake, whose waters are noted for their deep, brilliant green [24] (**Photos 23, 24**). The spring and its surrounding area are named after this color (Zelenci is a deadjectival plural noun from Slovene *zelen* 'green'). The area of the nature reserve is 47 hectares and is home to numerous endangered animal and plant species.

The maintained trails in Zelenci Springs feature informational signage (**Photo 25**), as well as viewing bridges and an observation tower. The surroundings of the spring are hospitable to plant life adapted to riparian habitats with damp soils: alder (*Alnus glutinosa*), willows (*Salix fragilis*), and an assortment of flowering plants like marsh arrowgrass (*Triglochin palustris*), marsh lousewort (*Pedicularis palustris*), bogbean (*Menyanthes trifoliata*), and white butterbur (*Petasites albus*), a flowering plant species in the family Asteraceae (**Photo 26**). In addition to

trout, which inhabit the lakes and feed on mayfly (Ephemeroptera) and stonefly (Plecoptera) larvae, the area has several endangered species on the Red List of Endangered Animal Species of Slovenia like a whiskered bat (*Myotis mystacinus*), viviparous lizard (*Lacerta vivipara*), and European adder (*Vipera berus*).

Located just 2 km (1,2 miles) from Kranjska Gora, Lake Jasna is a stunning alpine lake covering a surface area of 2.2 hectares, and it is surrounded by mountains that are nothing short of breathtaking (**Photos 27-29**). The lake is guarded by a statue of a Zlatorog (golden horn), the mythical chamois of Mt. Triglav (**Photo 30**). His face appears on the Slovenian beer, Laško. Near this paradise is Planica (**Photos 31-33**). It is an amazing Alpine valley, extending south from the border village of Rateče. Planica is famous for ski jumping (**Photo 34**). The first ski jumping hill was constructed before 1930, and in 1933, was constructed a larger hill, known as the Bloudek Giant (Bloudkova velikanka) after Stanko Bloudek, a Slovenian athlete, aviation constructor, and planner of sports structures. The venue was completed in 1934. At the time, it was the biggest jumping hill in the world. The first ski jump over 100 m (330 ft) in history was achieved at the hill in 1936 by Sepp Bradl, an Austrian ski jumper.

The Tamar is a beautiful glacier valley. The valley continues from the Planica, for about an hour-long walk (**Photos 35, 36**). The Peričnik Waterfall, with its 52 m (170 ft) height is one of the highest and most famous waterfalls in Slovenia. It is set in the Vrata Valley and offers magnificent views (**Photos 37-41**). The maximum water flow is in autumn and springtime and in winter both waterfalls turn into innumerable icicles and floes in shades of blue and green. Another beautiful feature that enhances its visitors is a cave situated at the bottom of the falls, which allows one to walk behind it and see the waterfall from a different angle.

Powerful karst springs rise from valley bottoms. Where water drops over a ledge, a waterfall is created. Springs grow into streams that can erode deep into the surface and create steep mountain ravines, gorges, canyons, and troughs. The waters which fill them are torrential in character. The spectacular Vintgar gorge is 1,600 m (about a mile) long and till 250 m (0,15 mile) deep gorge on the eastern part of Triglav National Park, 4 km (1,2 miles) northwest of the center of Bled. The roar of the Radovna river echoes along the gorge, full of small waterfalls, rapids, and erosion potholes where the river slows down its pace. Trails, narrow passages, and bridges lead a visitor to the end of the gorge, which is marked by the magnificent 16 m-high (52,5 ft) waterfall Šum, the highest fluvial waterfall in Slovenia (**Photos 42-55**).

Another wonder of nature is the Tolmin Gorge, in the Soča Valley, a common name for the Tolminka and Zadlaščica Gorges, which are one of the most magnificent natural attractions in the Triglav National Park. The confluence of Tolminka and Zadlaščica is located in the nearness of the narrowest part of the Tolmin Gorge. The confluence is in the lower part of the Triglav National Park. It is situated in about 180 m (590,5 ft) height at sea level. The wild water channels with the typical breakings, which are seen like the smooth vertical rocks, have been done with the engraving of Tolminka to the limestone. The Zadlaščica River had excavated water channels with depth erosion. The Zadlaščica is the natural aquarium for marble trout (**Photos 56-66**).

Fishing has traditionally been an important economic activity in the Soča Valley. In the remote mountain villages sprinkled around the River Soča and its tributaries, it represented a vital element of survival as well. The best-known fish in the mountain rivers is the indigenous marble trout (*Salmo marmoratus*). It is believed that in Slovenia, the marble trout used to be the single indigenous trout until the introduction of the non-native brown trout in 1906. Because of the hybridization between them, the existence of the indigenous marble trout was threatened

with extinction as one of the most endangered local wild fish. Fish were always an integral part of the everyday cuisine of the Soča Valley, where restaurants prepare and serve rainbow trout (*Salmo trutta*) instead (**Photo 67**).

Wrap your taste buds around traditional Slovenian food. If you are a foodie-loving traveler, you will be thrilled to discover the distinctive flavors of traditional Slovenian dishes during your visit. There is not one flavor or dish that defines Slovenian cuisine. And, with more than half of the country covered in forest, fresh produce certainly is not difficult to come by. Among the foods that we taste and adore are, besides the trout and the wide variety of delicious cheeses, the Slovenian sausage Kranjska Klobasa, a blend of the best pork meat and bacon with its own secret seasonings. This delight is accompanied by sauerkraut, warm bread with mustard, and peppery horseradish.

The dessert is another specialty of Slovenian cuisine. The Prekmurska gibanica graces the displays of bakeries (pekarna, in Slovenian) across the country. The recipe is as delicious as it is simple: layer apple, walnut, cottage cheese, and raisins into a half-cake-half-pastry treat. The Kremna rezina (kremšnita) is another regional treat. Layers of custard, cream, and puff pastry make this Slovenian dessert utterly irresistible (**Photo 68**).

Slovenia is the land of beekeeping. If you are a honey lover, your "axe will (definitely) fall into honey" when you visit Slovenia. This Slovenian proverb, which refers to unexpected happiness, will surely prove to be true when you get to know the honey experiences of this amazing green country. The Slovenian beekeeping tradition is rich and strongly rooted in people's consciousness. This is the home of the Carniolan honeybee, an autochthonous Slovenian bee, which is considered one of the most widespread honeybees in the world. Painted beehive panels are a characteristic feature of Slovenian beekeeping and a manifestation of folk art. Slovenian beekeepers used to express their artistic creativity on these panels. The oldest are motifs with a religious theme, but later secular motifs appeared that reflected everyday life, historical events, and also some humorous stories. The art of painting beehive panels has been proposed for entry into the UNESCO List of Intangible Cultural Heritage (**Photos 69, 70**).

The Carniolan honeybee (*Apis mellifera carnica*) is the subspecies of the western honeybee that has naturalized and adapted to the Kočevje (sub-region of Carniola), Slovenia, the southern of the Austrian Alps, Dinarides region, southern Pannonian plain, and the northern Balkans. At present this subspecies is the second most popular among beekeepers, after the Italian bee. It is favored among beekeepers for several reasons: its ability to defend itself successfully against insect pests while at the same time being extremely gentle in its behavior toward beekeepers. These bees are particularly adept at adjusting worker populations to nectar availability [25, 26].

In Slovenia, it is possible to find accommodation to suit every budget and every taste, from luxury hotels to tourist farms, from private rooms to camping grounds (**Photos 71, 72**). Inside the Triglav National Park, you can choose accommodations located in borgos with beautiful scenery or in small medieval towns (**Photos 73, 74**).

Near Kobarid, above the emerald green Soča River, there is a gorge of the Kozjak stream, where the 15 meter-high (49,2 ft) Kozjak Waterfall particularly stands out. This natural sight creates the image of a heavenly corner hidden from the everyday world by tall, dark walls, covered in limestone sediments, just like in the karstic caves. An arranged footpath will lead you to the waterfall. In some places, it is complemented by small wooden bridges and ends with a terrace with a mystical view of the rocky amphitheater with a green pool and a white beam of water (**Photos 75-82**).

The most characteristic tree species in the Triglav National Park are beech (*Fagus sylvatica*), spruce (*Picea excelsa*), and larch (*Larix decidua*). Although the Alpine environment is normally associated with larch, spruce, and dwarf pines, stands of thermophilus hop hornbeam (*Ostrya carpinifolia*) and dwarf ash are common features of the Julian Alps. The beech (*Fagus sylvatica*) is one of the predominant tree species in the Triglav National Park (**Photos 83-84**). It is a large tree, normally growing to 25-35 m (82-115 ft) tall and up to 1.5 m (4.9 ft) trunk diameter, but in rare instances, it may of reaching heights of up to 50 m (160 ft) tall and 3 m (9.8 ft) trunk diameter. The leaves of beech are often not abscised (dropped) in the autumn and remain on the tree until the spring [27]. Because beech trees live for so long, they provide gnarled and knotted habitats for many deadwood specialist animals, such as hole-nesting birds and wood-boring insects. The bark is often home to a variety of fungi, mosses, and lichens [28, 29].

Looking at the dense forests of the Triglav National Park, we come across the beech zone (predominant) and European silver fir zone, which both represent a permanent vegetation form or climate-zonal vegetation. The European silver fir (*Abies alba*) is a large evergreen coniferous tree growing to 40-50 m (130-160 ft) (exceptionally 60 m (200 ft)) tall and with a trunk diameter of up to 1.5 m (4.9 ft). It occurs at altitudes of 300-1,700 m (980-5,580 ft) (over 500 m (1,640 ft)), on mountains with rainfall over 1,000 mm (39 in) per year [30].

As a long-lived tree, fir is considered a significant ecological and functional species, which stabilizes soils and retains water. Fir is also considered a fundamental species for maintaining high biodiversity in forest ecosystems because of its shade tolerance, ability to survive long periods in the understory and to respond when light conditions become more favorable, plasticity to environmental conditions, and ability to coexist with many tree species [31]. Both beech and fir, as main coexisting species in montane, mixed-species forests, are shade tolerant and could thrive under conditions of shade for longer periods [32, 33].

Within these beech and European silver fir forests, a range of non-zonal flora is developed concerning relief, geological background, soil depth, soil moisture, e.g., willow (*Salix alba*), European alder (*Alnus glutinosa*) (**Photo 85**), ash (*Fraxinus excelsior*) (**Photo 86**), hop-hornbeam (*Ostrya carpinifolia*), and spruce forests (*Picea excelsa*). Hop hornbeam is a small to medium-sized deciduous tree Betulaceae family, native to southern Europe, the Balkans, Western Asia, and the Caucasus region. It often grows in rocky, shallow, and poor limestone soils and usually on sunny hillsides facing south or as a dominating species in the understorey of sub-Mediterranean forests [34]. *Fraxinus excelsior*, known as European ash to distinguish it from other types of ash, is a flowering plant species in the olive family Oleaceae. Ash is particularly associated with basic soils on calcareous substrates [35].

The forests of the Triglav National Park apart from representing habitats for such an abundance of forest flora are also home to various wildlife species (**Photos 87-91**). In addition to species from the plant and animal world, the Park is also abundant in fungi species. Fungi are a large and very significant group of organisms (**Photo 92**). Being very well preserved, and nearly pristine, these ecosystems are crucial in nature and wildlife diversity preservation. The surrounding river valleys, well, and plentiful alpine meadows are a heady mix of Central European and alpine flora. The glacial lake of Bohinj, elevation 526 m (1,725 ft) lies on an east-west axis and is surrounded by dramatic mountains.

Above the Bohinj Valley, heading east, is the Pokljuka plateau, a large area of open, peaty bog fringed by pine forest. The moist ground here is covered by a tight tapestry of ferns, velvety mosses, and the crimson, round-leaved sundew *Drosera rotundifolia*. Forageable cranberries



and bilberries form dense thickets, the whiter-than-white common wood sorrel (*Oxalis acetosella*) brightening the shade alongside deep-blue bugle (*Ajuga pyramidalis*). The well-camouflaged bogland orchids exploit this terrain, as do the lesser twayblade (*Listera cordata*) and partially parasitic coral root orchid (*Corallorrhiza trifida*), both beautiful in flower.

In the villages near Bohinj, there are vibrant, orchid-rich hay meadows like the sweetly scented Sternberg's pink (*Dianthus hyssopifolius*). In these colorful meadows, the striking, blue flowerheads of clustered bellflower (*Campanula glomerata*) and indigo spires of meadow clary (*Salvia pratensis*) are especially noticeable in their abundance. The white helleborines (*Cephalanthera damasonium*) are in the woodland edges, whereas hellebores, pulmonarias, *Sanicula epipactis*, lily of the valley, and the heavenly, fragrant *Daphne mezereum* are all found in the forest.

Flora of the Triglav National Park is very reach and diverse (**Photos 93-95, 97, 98**). In Slovenia, Siberian iris (*Iris sibirica*) is a frequent species of plant growing in wet meadows which may be flooded at times, while Kojnik Siberian iris (*Iris sibirica* subsp. *erirrhiza*), its subspecies, can only be found in very dry habitats in Slovenian (and Croatian) Istria, in the Kras region, on Mount Nanos and, probably, on Mount Kojca and in several other dry mountainous habitats. Kojnik Siberian iris differs from the common Siberian iris in that its rhizome neck is thicker, its leaves are hardly any shorter than the stem, its petals are narrower or even linear, and in that it requires different growing conditions. The natural habitat of Kojnik Siberian iris is Mount Kojnik, located in the Slovenian part of the Istrian Peninsula near the border with Croatia. In 1897, Eduard Pospíchal described the plant as a separate species, but not without hesitation and only years after he had first found it. Regardless of the value and rank ascribed to it, the Kojnik Siberian iris is an interesting and beautiful plant found in a very limited area [36].

The peach-leaved bellflower (*Campanula persicifolia*) is an herbaceous plant. Its flowers are cup-shaped and lilac-blue. It is common in the mountain ranges, and normally it flowers in June. The natural habitat of this plant is woodland margins, broad-leaved forests, rocky outcrops in broad-leaved woods, meadows, and banks, like in the Soča Valley. Although peach-leaved bellflower is bisexual, the stamens and pistils ripen at different times. When the corolla opens the stigma's lobes are closed, but the stamens' open flowers attract pollen-eating insects to the flower. Although a large part of the precious pollen ends up being eaten by the pollinating insect, some achieves to another plant. The pistil's stigmas only mature when insects have collected all the pollen from the flower. Peach-leaved bellflower's most common pollinators are bumblebees, flies, and large honeybees [37] (**Photo 96**).

The fauna, which represents the wildlife of the Triglav National Park, is extremely rich and diverse due to the conservation and sustainability of the habitat. Fire salamander (*Salamandra salamandra*) is the most frequent species of salamander that can be seen in springtime on walkways and roads. It is black with yellow spots or stripes to varying degrees. This conspicuous coloration acts to deter predators by honestly signaling its toxicity, and this salamander can have a very long lifespan, for more than 50 years [38].

Another interesting salamander species in Triglav National Park is *Salamandra atra* (alpine salamander). This salamander is a shiny black salamander found in the Alps from the Swiss-French border at the western end of its range through Austria to the Dinaric Alps at the eastern end of its range, at altitudes above 700 m (2,300 ft) [39]. The Balkan Lake frog occurs from sea level up to about 1,000 m (3,280 ft), but larger populations are not found higher than 600 m (1,968 ft) [40]. The most frequent frogs are the European common frog (*Rana*

*temporaris*) and the agile frog (*Rana dalmatina*). The biggest frog in this area is the European toad (*Bufo bufo*), which is easy to find in the forests and in damp Park sections where it hides during the day, in small rodent holes [41-43].

Reptiles are represented in the Triglav National Park by some interesting species of lizards, like *Zootoca vivipara* (common lizard), *Lacerta viridis* (European green lizard), *Lacerta bilineata* (western green lizard), *Podarcis muralis* (common wall lizard), and *Iberolacerta horvathi* (Horvath's rock lizard). *Podarcis muralis* is a species of lizard with a large distribution in Europe. It prefers rocky environments, including urban settings, where it can scurry between rock and rubble. Its small scales are highly variable in color and pattern. Its coloration is brownish or greyish and may occasionally be tinged with green [44-46] (**Photos 99, 100**). *Zootoca vivipara* is the only reptile that lives on the top of the mountains and far, in the north of Europe [47], but it can be seen in the Triglav National Park. The Horvath's rock lizard (**Photo 101**) is a lizard native to northwestern Croatia, Slovenia, and the adjoining parts of northeastern Italy and southern Austria. It is a rock specialist and is very agile, even leaping into the air to catch prey [48].

There are also many species of snakes recorded in the Triglav National Park (**Photo 102**), like *Vipera ammodytes* (horned viper), whose main distribution area is on the Balkan Peninsula [49], and the *Vipera berus* (common viper) [50]. The *Vipera ammodytes* are quite a frequent species and which can be seen particularly in spring, in places exposed to the sun. It is considered the most venomous and dangerous snake in Europe [51, 52].

Among the mammals in the Triglav National Park were recorded *Ursus arctos* (brown-bear), *Canis lupus* (wolf), *Lynx lynx* (lynx), *Meles meles* (badger), *Martes foina* (beech-marten), *Martes martes* (pine-marten), *Vulpes vulpes* (red-fox), *Marmota marmota* (marmot), *Lutra lutra* (otter), *Capreolus capreolus* (roe deer), *Capra hircus* (goat), *Capra ibex* (Alpine ibex), *Cervus elaphus* (elk), *Rupicapra rupicapra* (chamois), and *Sciurus vulgaris* (red-squirrel) (**Photo 103**).

In several eastern European countries, in countries like Slovenia, Slovakia, Bulgaria, or Romania the bear was and still is, seen as a valuable game species and it was largely hunters' interest that resulted in stable or increasing bear populations, despite bear-human conflicts [53]. In northern Slovenia, a radical change in brown bear (*Ursus arctos*) management, from a policy of bear suppression to a policy of bear protection, resulted in a considerable increase in sheep predation by bears. In the bear core area in southern Slovenia, on the other hand, bears have always been present, cause little damage, and are an important game species. From the Slovenian perspective it is much more efficient to translocate selected bears from the bear core area to a desired recovery area in the Alps, thus sparing Slovenia the burden of tolerating bears in high conflict zones [54, 55]. However, without international support and financial incentive, it will be difficult to guarantee the protection of the bear in the subalpine and alpine areas of Slovenia [56].

The wolf (*Canis lupus*) is a large-carnivore species with a historically controversial relationship with humans. The wolf is an important species listed in conservation documents such as the EU Habitat Directive and the Bern Convention. The animal is indigenous to the mosaic of natural and cultural landscapes of Slovenia. Forests, which represent a high-quality habitat for wolves, are well preserved in the country and create an excellent base for successful long-term conservation of the animal. The main conservation challenge is the reconciliation of the spectrum of human activities, interests, and fears with the needs of the wolf. All wolf monitoring data indicate that wolf conservation in Slovenia is successful [57], but population

growth may be decreasing. Monitoring continues to provide a sound scientific basis for the management and protection of wolves in Slovenia. The multi-year and consecutive monitoring projects allow us to know the structure of Slovenian wolf packs on a "personal" level for several generations and to understand in detail the social structure, abundance, and long-term dynamics of the population.

The lynx disappeared from Slovenia and Croatia at the beginning of the 20th century. In 1973, six lynxes from the Slovakian Carpathian Mountains were translocated to Kocevje in southern Slovenia. In this densely forested region where prey animals are plentiful, a core population developed immediately and spread over Slovenia and Croatia. In 1984 the first lynx reached the Julian Alps and crossed over to Italy. The population increased so fast that already in 1978, the hunting of lynx was legalized. From 1978 to the present, a total of 229 individuals were hunted, and another 48 deaths from other reasons are also known. The intense harvest hindered further expansion of the population, especially the re-colonization of the Alps. In recent years, the hunting season and the hunting quota were reduced, and in Slovenia hunting is now restricted to the core area of the population [58-60].

Brown bear (*Ursus arctos*), wolf (*Canis lupus*), and lynx (*Lynx lynx*) are regularly observed in the Triglav National Park (TNP) area. In the past years, most conflicts with humans (property damages) were due to the brown bear presence but during the wintertime of 2018/2019, the genetic analyses of collected field samples confirmed the presence of five wolves. Furthermore, a wolf pack of seven animals was confirmed in autumn and wolves are regularly observed in TNP. If the number of conflicts with the brown bear is in decreases, the wolf conflicts are increasing significantly. The question of proper and effective management of large carnivores will become a priority issue in forthcoming years. To reduce the possibility of conflict situations to appear, the TNP Public Institution collaborates closely with competent institutions and other bodies, preventative tools (electric fences) were purchased and distributed to the farmers and the grazing herds have been equipped with GPS collars. Discussions with farmers started within the context of the project LIFE Wolf Alps (2013-2018) will continue to identify necessary mitigation measures. Furthermore, several educational and awareness-raising activities (e.g., guided school visits, exhibitions, media, etc.) took place in 2019 to increase the acceptance of large carnivores by the public and different users of the Triglav National Park area. A strategy for managing large carnivores within the protected area which was accepted by the TNP Scientific advisory board (2013) defines criteria and measures for interventions in conflict situations. The latter, together with the Act Regulating the Intervention Culling of Specimens of Brown Bear (*Ursus arctos*) and Common Wolf (*Canis lupus*) from the Wild (OJ RS, N<sup>o</sup> 43/19) applied in TNP in 2019 by taking from the wild of one conflict brown bear [61].

Alpine Chamois (*Rupicapra rupicapra*) is one of the ecologically most important and attractive hunting species of mountain ungulates. Climate change is predicted to have a strong impact on several species and ecosystems in the future, especially in the Alpine regions. This impact could also affect chamois, which is therefore a candidate indicator species for these changes. The use of habitat modeling based on systematic observations and the first telemetry study of chamois in Slovenia provided insight into the species' habitat use in Triglav National Park. Results obtained from both methods indicate that habitat suitability will probably decrease in the future due to forestation and related poorer food availability, as well as because of predicted climate change, temperature increase in particular, and its direct and indirect effects.

Another factor negatively affecting the quality of habitat for chamois use is the human disturbance, which calls for the zoning of recreational activities [62-65].

The vitality, spatial distribution, and population dynamics of Alpine chamois can also be profoundly affected by anthropogenic disturbances, as has been stressed by several foreign studies and a comprehensive national project. In the range of recreational activities, paragliding poses the most serious threat as it frequently forces chamois to flee great distances to lower-lying forests or other vertically developed forms of vegetation, causing considerable energy loss. It seems that through evolution chamois, trying to escape air predators, e.g., eagles, have adopted fleeing as the most important predator avoidance strategy. To mitigate the negative effects of such recreational activities, many countries in the world have imposed complete or seasonal bans on the most threatening forms of recreation in the habitats of greatest value or exposure. Considering the scope of recreation practiced over practically the entire park area and the expected future increase in recreation intensity, this would also be a sensible measure to introduce in Triglav National Park [65].

Slovenia's diverse landscapes and climates offer a lot to ornithologists and amateur bird watchers alike. So far, 386 bird species have been recorded in Slovenia, many of these naturally occurring species in the Triglav National Park (**Photos 104-120**) [66-96], like *Fringilla coelebs* (common-chaffinch), *Loxia curvirostra* (red-crossbill), *Pyrrhula pyrrhula* (Eurasian bullfinch), *Pyrrhocorax graculus* (Alpine-chough), *Garrulus glandarius* (Eurasian jay), *Corvus corax* (common-raven), *Buteo buteo* (common-buzzard), *Prunella collaris* (Alpine-accentor), *Motacilla alba* (white-wagtail), *Motacilla cinerea* (mountain-wagtail), *Anas platyrhynchos* (mallard), *Mergus merganser* (goosander), *Pernis apivorus* (European honey-buzzard), *Dendrocopos major* (great-spotted woodpecker), *Ptyonoprogne rupestris* (Eurasian crag-martin), *Erithacus rubecula* (robin), *Carduelis carduelis* (European goldfinch), *Phalacrocorax carbo* (great-cormorant), *Mergus merganser* (merganser), *Parus major* (great-tit), *Poecile palustris* (marsh-titmouise), *Poecile montanus* (mountain-titmouise), *Turdus merula* (common-blackbird), *Turdus torquatus* (ring-ouzel), *Turdus pilaris* (fieldfare), *Turdus philomelos* (song-thrush), *Passer domesticus* (sparrow), *Hirundo rustica* (barn-swallow), *Ciconia nigra* (black-stork), *Asio flammeus* (short-eared owl), *Ardea cinerea* (common-heron), *Coloeus monedula* (western-jackdaw), and *Cyanistes caeruleus* (Eurasian blue-tit).

The photos presented in this report were realized by Fabio Rossano Dario and Cristina De Vincenzo, using a digital photo camera Canon PowerShot.

## CONCLUSIONS

Triglav National Park is one of the most beautiful and interesting parks in Slovenia and Europe. The natural environments host a wide variety of plant and animals species, some endemic, others endangered. There is a huge number of rivers, streams, and crystalline lakes, emerald-blue in color and connected by a series of cascades and waterfalls, embedded in a network of mountains in the Julian Alps. The Triglav National Park is an area of varied relief that is manifested in a wealth of natural forms: crystal clear waters remains of virgin forests, high-altitude ridges, and summits, glacier-carved valleys, mountain lakes, and raised bogs. All this biodiversity and scenic beauty, integrated with the very well-organized infrastructure of the visiting places, the excellent cuisine, and the friendliness of the local population, make the park one of the most interesting natural areas for tourism in Europe.

## References

- [1] T. Podobnikar. Georeferencing and quality assessment of Josephine survey maps for the mountainous region in the Triglav National Park. *Acta Geodaetica et Geophysica Hungarica* 44(1) (2009) 49-66
- [2] S. Buser. Development of the Dinaric and the Julian Carbonate Platforms and of the intermediate Slovenian Basin (NW Yugoslavia). *Memorie della Società Geologica Italiana* 40 (1989) 313-320
- [3] M. Cousin. Esquisse géologique des confins italo-yougoslaves: Leur place dans les Dinarides et les Alpes meridionales. *Bulletin de la Société Géologique de France* 7(6) (1970) 1034-1047
- [4] M. Cousin. Le sillon slovène: Les formations triasiques, jurassiques at neocomiennes au Nord-Est de Tolmin (Slovène occidentale, Alpes méridionales) et leurs affinités dinariques. *Bulletin de la Société Géologique de France* 15(3-4) (1973) 326-339
- [5] B. Rožič. Perbla and Tolmin formations: Revised Toarcian to Tithonian stratigraphy of the Tolmin Basin (NW Slovenia) and regional correlations. *Bulletin de la Société Géologique de France* 180(5) (2009) 411-430
- [6] A. Šmuc, B. Rožič. The Jurassic Prehodavci Formation of the Julian Alps: easternmost outcrops of Rosso Ammonitico in the Southern Alps (NW Slovenia). *Swiss Journal of Geosciences* 103 (2010) 241-255
- [7] A. Carey, D. Smith, S. Welch, M. Zorn, J. Tičar, M. Lipar, B. Komac, B. Lyons. The geochemistry of ice in the Southeastern Alps, Slovenia. *Acta Geographica Slovenica* 60(2) (2020) 141-153
- [8] M. Gabrovec, J. Ortar, M. Pavšek, M. Zorn. The Triglav Glacier between the years 1999 and 2012. *Acta Geographica Slovenica* (2013) 53-2
- [9] A. Šmuc, G. Rožič. Tectonic geomorphology of the Triglav Lakes Valley (easternmost Southern Alps, NW Slovenia). *Geomorphology* (2009) 103-104
- [10] V. Brečko Grubar, G. Kovačič. Landscape ecological characterization of the Adriatic sea basin in Slovenia with an emphasis on water resource quality. *Annales. Series Historia et Sociologia* 20(1) (2010) 153-168
- [11] F. Bressan, F. Cucchi, E. Montagnari Kokelj, C. Piano, L. Zini. A GIS of the archaeological sites in the valley of the Isonzo River and its affluents (north-eastern Italy). *Memorie Società Geologica Italiana* 57 (2002) 613-619
- [12] N. Saunders, N. Faulkner, U. Košir, M. Črešnar, S. Thomas. Conflict Landscapes of the Soča/Isonzo Front, 1915– 2013: Archaeological-Anthropological Evaluation of the Soča Valley, Slovenia. *Arheo* 30 (2013) 47-66
- [13] L. Fumagalli; A. Snoj, D. Jesenšek, F. Balloux, T. Jug, O. Duron, F. Brossier, A.J. Crivelli, P. Berrebi. Extreme genetic differentiation among the remnant populations of marble trout (*Salmo marmoratus*) in Slovenia. *Molecular Ecology* 11(12) (2002) 2711-2716

- [14] A. Razpet, S. Sušnik, S., T. Jug, A. Snoj. Genetic variation among trout in the River Neretva basin, Bosnia and Herzegovina. *Journal of Fish Biology* 70(Suppl. A) (2007) 94-110
- [15] M. Povz, D. Jesensek, P. Berrebi, A.J. Crivelli. The marble trout *Salmo trutta marmoratus*, Cuvier 1817 in the Soča River basin, Slovenia. *Publications de la Tour du Valat* (1996) 65
- [16] M. Buzov. Ancient Settlements along the Sava river. *Histria Antiqua* 20(20) (2011) 355-373
- [17] B. Nadilo. Reconstruction of border bridges on Sava. *Grādevinar* 52(3) (2000) 181-185
- [18] S. Šterc. Sava - Odra - Sava canal as floodwater protection structure of the city of Zagreb. *Croatian Geographic Society* 41-42(1) (1979) 95-117
- [19] P. Mikša. Exploring the Mountains: Triglav at the end of the 18th Century. *Man, Nature and Environment Between the Northern Adriatic and the Eastern Alps in Premodern Times* (2014) 202-215
- [20] S. Becken, H. Job. Protected Areas in an era of global-local change. *Journal of Sustainable Tourism* 22(4) (2014) 507-527
- [21] M. Hribar, M. Šmid Hribar, B. Erhartič. Premislek o razvoju zavarovanih območij. *Regionalni Razvoj* 3 (2011) 11-21
- [22] M. Gabrovec, B. Komac, J. Kozina, K.P. Horvat, J. Nared, A. Smrekar, M. Topole, M. Urbanc. Triglav National Park, Slovenia, and its contribution to regional development. *Eco.mont* 9 (2017) 57-66
- [23] M. Andric, P. Sabatier, W. Rapuc, N. Ogrinc, M. Dolenc, F. Arnaud, U. von Grafenstein, A. Smuc. 6600 years of human and climate impacts on lake-catchment and vegetation in the Julian Alps (Lake Bohinj, Slovenia). *Quaternary Science Reviews* 227 (2020) 1-19
- [24] I. Zelnik, T. Balanč, M.J. Tolman. Diversity and structure of the Tychoplankton diatom community in the Limnocene Spring Zelenci (Slovenia) in relation to environmental factors. *Water* 10(4) (2018) 361-373
- [25] K.P. Gramacho, L.S. Gonçalves L.S. Comparative study of the hygienic behavior of Carniolan and Africanized honey bees directed towards grouped versus isolated dead brood cells. *Genetics and Molecular Research* 8 (2) 744-750
- [26] S. Sušnik, P. Kozmus, J. Poklucar, V Meglič. Molecular characterization of indigenous *Apis mellifera carnica* in Slovenia. *Apidologie* 35 (2004) 623-636
- [27] B. Vornam, N. Recarli, O. Gailing. Spatial distribution of genetic variation in a natural beech stand (*Fagus sylvatica* L.) based on microsatellite markers. *Conservation Genetics* 5 (2004) 561-570
- [28] Å. Berg, U. Gärdenfors, T. Hallingbäck, M. Norén. Habitat preferences of red-listed fungi and bryophytes in woodland key habitats in southern Sweden: analyses of data from a national survey. *Biodiversity and Conservation* 11 (2002) 1479-1503

- [29] Ö. Fritz, K. Larsson. The significance of long forest continuity to red-listed lichens: a study of beech forest in the province of Halland, Sweden. *Svensk Botanisk Tidskrift* 91 (1996) 241-262
- [30] M. Konnert, F. Bergmann. The geographical distribution of genetic variation of silver fir (*Abies alba*, Pinaceae) in relation to its migration history. *Plant Systematics and Evolution* 196 (1995) 19-30
- [31] D. Dobrowolska, A. Bončina, R. Klumpp. Ecology and silviculture of silver fir (*Abies alba* Mill.): A review. *Journal of Forest Research* 22 (2017) 326-335
- [32] M. Čater, J. Diaci. Divergent response of European beech, silver fir and Norway spruce advance regeneration to increased light levels following natural disturbance. *Forest Ecology and Management* 399 (2017) 206-212
- [33] M. Čater, J. Diaci, D. Roženbergar. Gap size and position influence variable response of *Fagus sylvatica* L. and *Abies alba* Mill. *Forest Ecology and Management* 325 (2014) 128-135
- [34] D. Sekulić, B. Karadžić, N. Kuzmanović, S. Jarić, M. Mitrović, P. Pavlović. Diversity of *Ostrya carpinifolia* forests in ravine habitats of Serbia (S-E Europe). *Diversity* 13(2) (2021) 59
- [35] P.A. Thomas. Biological flora of the British Isles: *Fraxinus excelsior*. *Journal of Ecology* 104(4) (2016) 1158-1209
- [36] J. Bavcon, B. Ravnjak. Seed banks as a partnership for global plant conservation. *Acta Biologica Slovenica* 57(1) (2014) 3-13
- [37] L.Å. Janzon. Pollination studies of *Campanula persicifolia* (Campanulaceae) in Sweden. *Grana* 22(3) (1983) 153-165
- [38] B.A. Caspers. Developmental costs of yellow colouration in fire salamanders and experiments to test the efficiency of yellow as a warning colouration. *Amphibia-Reptilia* 41(3) (2020) 373-385
- [39] L. Bonato, S. Steinfartz. Evolution of the melanistic color in the Alpine salamander *Salamandra atra* as revealed by a new subspecies from the Venetian prealps. *Italian Journal of Zoology* 72 (2001) 253-260
- [40] H. Schneider, U. Sinsch, T.S. Sofianidou. The water frogs of Greece. *Zeitschrift für Zoologische Systematik und Evolutionsforschung* 31 (1993) 47-63
- [41] C.J. Reading, J. Loman, T. Madsen. Breeding pond fidelity in the common toad, *Bufo bufo*. *Journal of Zoology* 225(2) (1991) 201-211
- [42] N.B. Davies, T.R. Halliday. Deep croaks and fighting assessment in toads *Bufo bufo*. *Nature* 274(5672) (1978) 683-685
- [43] A. Hemelaar. Age, growth and other population characteristics of *Bufo bufo* from different latitudes and altitudes. *Journal of Herpetology* 22(4) (1988) 369-388
- [44] G. Pérez de Lanuza, P. Carazo, E. Font. Colours of quality: structural (but not pigment) coloration informs about male quality in a polychromatic lizard. *Animal Behaviour* 90 (2014) 73-81

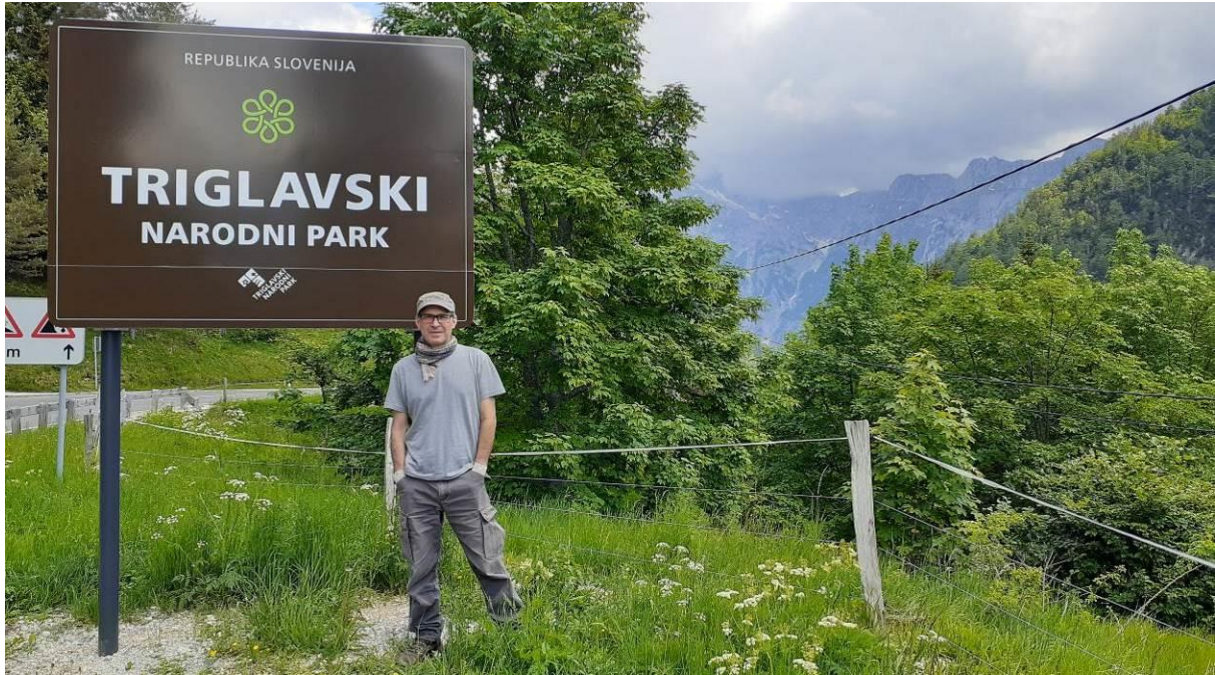
- [45] E. Font, P. Carazo, G. Pérez Lanuza, M. Kramer. Predator-elicited foot shakes in wall lizards (*Podarcis muralis*): Evidence for a pursuit-deterrent function. *Journal of Comparative Psychology* 126(1) (2012) 87-96
- [46] D. Pellitteri-Rosa. Chemical polymorphism in male femoral gland secretions matches polymorphic coloration in common wall lizards (*Podarcis muralis*). *Chemoecology* 24(2) (2014) 67-78
- [47] J.F. Schmidtler, W. Böhme. Synonymy and nomenclatural history of the Common or Viviparous Lizard, by this time: *Zootoca vivipara* (Lichtenstein, 1823). *Bonn Zoological Bulletin* 60(2) (2011) 214-228
- [48] A. Žagar, M.A. Carretero, M. Krofel, M. Lužnik, M. Podnar, N. Tvrtković. Reptile survey in Dinara Mountain (Croatia) revealed the southernmost known population of Horvath's rock lizard (*Iberolacerta horvathi*). *Natura Croatica* 23(1) (2014) 235-240
- [49] L. Luiselli. Food habits of an alpine population of the sand viper (*Vipera ammodytes*). *Journal of Herpetology* 30 (1996) 92-94
- [50] A. Strugariu, S. Zamfirescu, R. Ștefan, I. Gherghel. First record of the adder (*Vipera berus berus*) in Argeș County (Southern Romania). *Bihorean Biologist* 3(2) (2009) 164
- [51] A. Plettenberg-Laing. Observations on the diet of the nose-horned viper (*Vipera ammodytes*) in Greece. *Herpetological Bulletin* 153 (2020) 37-39
- [52] M. Lang Balija, A. Leonardi, M. Brgles, D. Sviben, T. Kurtović, B. Halassy, I. Križaj. Biological activities and proteomic profile of the venom of *Vipera ursinii* ssp., a very rare karst viper from Croatia. *Toxins* 12 (2020) 187
- [53] P. Kaczensky. Large carnivore predation on livestock in Europe. *Ursus* 11 (1999) 59-72
- [54] M. Adamic. Decision making in the conservation management of problem wildlife species in Slovenia, based on the knowledge gained through current research projects. *Gozd* 54 (1996) 297-306
- [55] M. Adamic. The expanding brown bear population of Slovenia: a chance for bear recovery in the southeastern Alps. *International Conference on Bear Research and Management* 9(2) (1997) 25-29
- [56] P. Kaczensky, M. Blazic, H. Gossow. Public attitudes towards brown bears (*Ursus arctos*) in Slovenia. *Biological Conservation* 118 (2004) 661-674
- [57] M. Bartol, R. Černe, J. Črtalič, L. Hočevnar. Monitoring of Conservation Status of Wolves in Slovenia in 2020-2021 season - final report summary. *Technical Report* (2021) 1-15
- [58] J. Čop, A. Frković. The re-introduction of the lynx in Slovenia and its present status in Slovenia and Croatia. *Hystrix* 10(1) (1998) 65-76
- [59] A. Frković. Ris (*Lynx lynx* L.) u Hrvatskoj - naseljavanje, odlov i brojnost (1974-2000). *Šumarski List* 11-12 (2001) 625-634
- [60] J. Čop. Propagation pattern of re-introduced population of lynx (*Lynx lynx* L) in Yugoslavia (1973. Slovenia – Kocevsko) and its impact on the ungulate community. *Atti del convegno Reintroduzione dei predatori nelle aree protette* (1987) 83-91



- [61] Triglav National Park. European Diploma. *Annual report* (2019) 1-7
- [62] N. Pettorelli, F. Pelletier, A. von Hardenberg, M. Festa-Bianchet, S.D. Cote. Early onset of vegetation growth vs. rapid green-up: Impacts on juvenile mountain ungulates. *Ecology* 88 (2007) 381-390
- [63] L. Pompilio, A. Meriggi. Modelling wild ungulate distribution in alpine habitat: A case study. *Italian Journal of Zoology* 68 (2001) 281-289
- [64] R. Schnidrig-Petrig, P. Ingold. Effects of paragliding on alpine chamois. *Wildlife Biology* 7 (2001) 285-294
- [65] M. Krofel, R. Luštrik, M. Stergar, K. Jerina. Habitat use of Alpine chamois (*Rupicapra rupicapra*) in Triglav National Park. *Technical Report* (2013) 1-12
- [66] A. Pavlova, R.M. Zink, S. Rohwer, E.A. Koblik, Y.A. Red'kin, I.V. Fadeev, E.V. Nesterov. Mitochondrial DNA and plumage evolution in the white wagtail *Motacilla alba*. *Journal of Avian Biology* 36(4) (2005) 322-336
- [67] C. Randler. Is tail wagging in white wagtails, *Motacilla alba*, an honest signal of vigilance? *Animal Behaviour* 71 (5) (2006) 1089-1093
- [68] J. Partecke, E. Gwinner. Increased sedentariness in European blackbirds following urbanization: a consequence of local adaptation?. *Ecology* 88(4) (2007) 882-90
- [69] I. Galván, L. Amo, J.J. Sanz. Ultraviolet-blue reflectance of some nestling plumage patches mediates parental favoritism in great tits *Parus major*. *Journal of Avian Biology* 39(3) (2008) 277-82
- [70] T.A. Wilkin, L.E. King, B.C. Sheldon. Habitat quality, nestling diet, and provisioning behaviour in great tits *Parus major*. *Journal of Avian Biology* 40(2) (2009) 135-145
- [71] W. Cresswell, R. McCleery. How Great Tits maintain synchronization of their hatch date with food supply in response to long-term variability in temperature. *Journal of Animal Ecology* 72(2) (2003) 356-366
- [72] P.H. Harvey, P.J. Greenwood, C.M. Perrins. Breeding area fidelity of Great Tits (*Parus major*). *Journal of Animal Ecology* 48(1) (1979) 305-313
- [73] M. Metzmacher. Imitations et transmission culturelle dans le chant du Pinson des arbres *Fringilla coelebs*? *Alauda* 84 (2016) 203-220
- [74] P. de Knijf. How carrion and hooded crows defeat Linnaeus's curse. *Science* 344(6190) (2014) 1345-1346
- [75] L. Božič. Numbers, distribution and nest site characteristics of Jackdaw *Corvus monedula* in Slovenia and its conservation status. *Acrocephalus* 37(170/171) (2016) 123-150
- [76] P. Zduniak. The prey of Hooded Crow (*Corvus cornix* L.) in wetland: Study of damaged egg shells of birds. *Polish Journal of Ecology* 54(3) (2006) 491-498
- [77] P.E. Fjeld, G.A. Sonerud. Food catching, cache recovery, and the use of an egg shell dump in Hooded Crows *Corvus corone cornix*. *Ornis Scandinavica* 19 (1988) 268-274

- [78] W. Grabiński. Breeding ecology of the Hooded Crow *Corvus corone cornix* in a fishpond habitat. *Ptaki Śląska* 11 (1996) 5-38
- [79] R. Offereins. Identification of eastern subspecies of Western Jackdaw and occurrence in the Netherlands. *Dutch Birding* 25(4) (2003) 209-220
- [80] P. Mikula. Western Jackdaw (*Corvus monedula*) attacking bats (Chiroptera): observations from Bardejov, northeastern Slovakia. *Sylvia* 49 (2013) 157-159
- [81] K. Johnsson. Colonial Breeding and Nest Predation in the Jackdaw *Corvus monedula* using old Black Woodpecker *Dryocopus martius* Holes. *Ibis* 136(3) (1994) 313-317
- [82] T. Hetmański, M. Barkowska. Density and age of breeding pairs influence feral pigeon, *Columba livia* reproduction. *Folia Zoologica* 56(1) (2007) 71-83
- [83] L. Baptista. Darwin's pigeons and the evolution of the columbiforms: recapitulation of ancient genes. *Acta Zoológica Mexicana* 25(3) (2009) 719-741
- [84] J.M. Davis. Socially induced flight reactions in pigeons. *Animal Behaviour* 23 (1975) 597-601
- [85] K. Przybylska, A. Haidt, Ł. Myczko, A. Ekner-Grzyb, Z.M. Rosin, Z. Kwieciński, P. Tryjanowski, J. Suchodolska, V. Takacs, Ł. Jankowiak, M. Tobółka, O. Wasielewski, A. Graclik, A.J. Krawczyk, A. Kasprzak, P. Sz wajkowski, P. Wylegała, A.W. Malecha, T. Mizera, P. Skórka. Local and landscape-level factors affecting the density and distribution of the feral pigeon *Columba livia* var. *domestica* in an urban environment. *Acta Ornithologica* 47(1) (2012) 37-45
- [86] J. Böhner, K. Witt. Distribution, abundance and dynamics of the House Sparrow (*Passer domesticus*) in Berlin: a review. *International Studies on Sparrows* 32 (2007) 14-29
- [87] P. Bricchetti, D. Rubolini, P. Galeotti, M. Fasola. Recent declines in urban Italian Sparrow *Passer (domesticus) italiae* populations in northern Italy. *Ibis* 150 (2008) 177-181
- [88] D. Chamberlain, M. Toms, R. Cleary-McHarg, A. Banks. House Sparrow (*Passer domesticus*) habitat use in urbanized landscapes. *Journal of Ornithology* 148 (2007) 453-462
- [89] L. Shaw, D. Chamberlain, M. Evans. The House Sparrow *Passer domesticus* in urban areas: reviewing a possible link between post-decline distribution and human socioeconomic status. *Journal of Ornithology* 149 (2008) 293-299
- [90] N. Wilkinson. Factors influencing the small-scale distribution of House Sparrow *Passer domesticus* in a suburban environment. *Bird Study* 53 (2006) 39-46
- [91] R. Yosef, P. Tryjanowski, K.L. Bildstein. Spring migration of adult and immature buzzards (*Buteo buteo*) through Elat, Israel: timing and body size. *Journal of Raptor Research* 36(2) (2002) 115-120
- [92] J. Nagy. Phylogeny and evolution of the European Goldfinch (*Carduelis carduelis*) and its allies: a review of the "bird of the year." *Ornis Hungarica* 25(2) (2017) 1-10
- [93] J.A. Craves. Current status of European Goldfinch (*Carduelis carduelis*) in the western Great Lakes region. *North American Birds* 62 (2008) 498-501.

- [94] R.J. Safran. Nest-site selection in the barn swallow, *Hirundo rustica*: What predicts seasonal reproductive success?. *Canadian Journal of Zoology* 84(11) (2006) 1533-1539
- [95] M. Kose, A.P Møller. Sexual selection, feather breakage and parasites: the importance of white spots in the tail of the barn swallow (*Hirundo rustica*). *Behavioral Ecology and Sociobiology* 45(6) (1999) 430-436
- [96] A.P. Møller. Mixed reproductive strategy and mate guarding in a semi-colonial passerine, the swallow *Hirundo rustica*. *Behavioral Ecology and Sociobiology* 17(4) (1985) 401-40



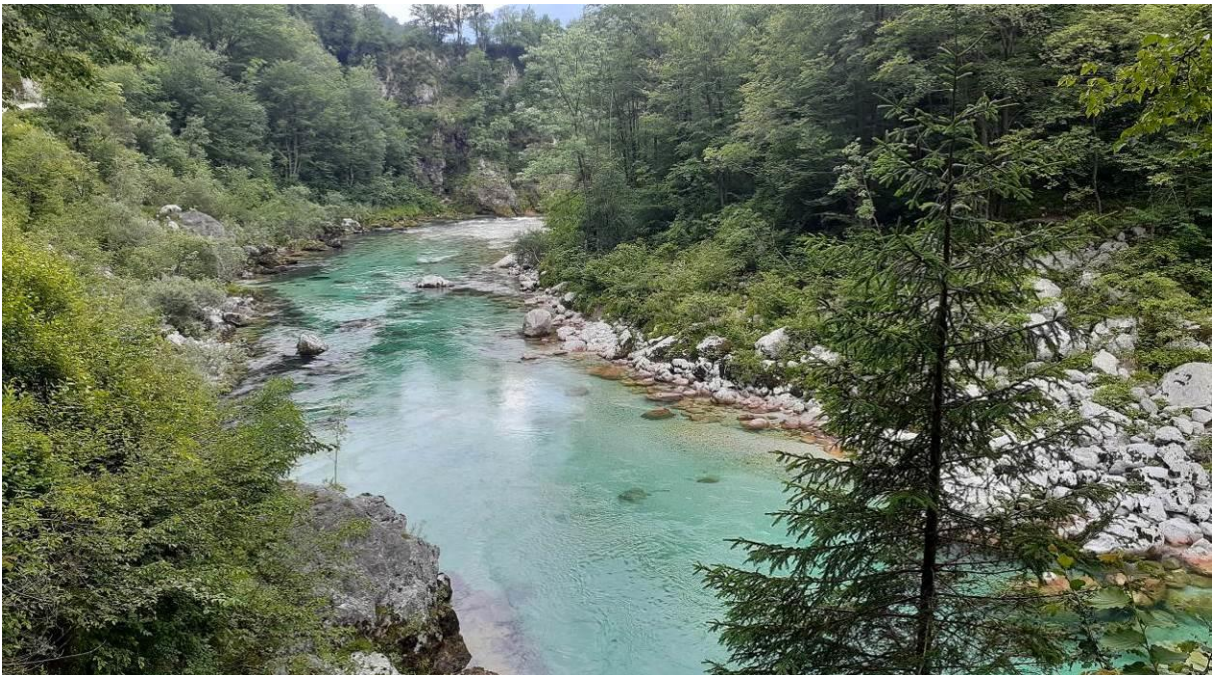
**Photo 1.** Triglav National Park (Triglavski Narodni Park in Slovene) is Slovenia's largest protected area.



**Photo 2.** The Soča is an Alpine River that flows through western Slovenia and passes through beautiful cities like Kanal ob Soči.



**Photo 3.** The waters of the Soča river have incredible emerald-green color and retain such a color throughout their length.



**Photo 4.** The Soča river is the “emerald beauty” that inspired the poet Simon Gregorčič to write his best-known poem, considered one of the masterpieces of Slovene poetry.



**Photo 5.** The Sava Dolinka is a river that rises at the Zelenci Pools near Kranjska Gora. It is one of the main tributaries of the Sava River.



**Photo 6.** The Savica river feeds Lake Bohinj at the west end and flows out of the east end as the Sava Bohinjka River.



**Photo 7.** Mount Triglav (2,864 m) is the highest summit of the Julian Alps and Slovenia. To Slovenes, it represents a prime national symbol.



**Photo 8.** Mount Triglav stylized is the central element of the Republic of Slovenia's coat-of-arms along with three golden stars, stemming from the coat-of-arms of the Counts of Celje, and the sea, present in the national flag.



**Photo 9.** The Triglav National Park is an area of varied relief that is manifested in a wealth of natural forms.



**Photo 10.** The landscape of the Triglav National Park in Planica Valley, near the city of Kranjska Gora.





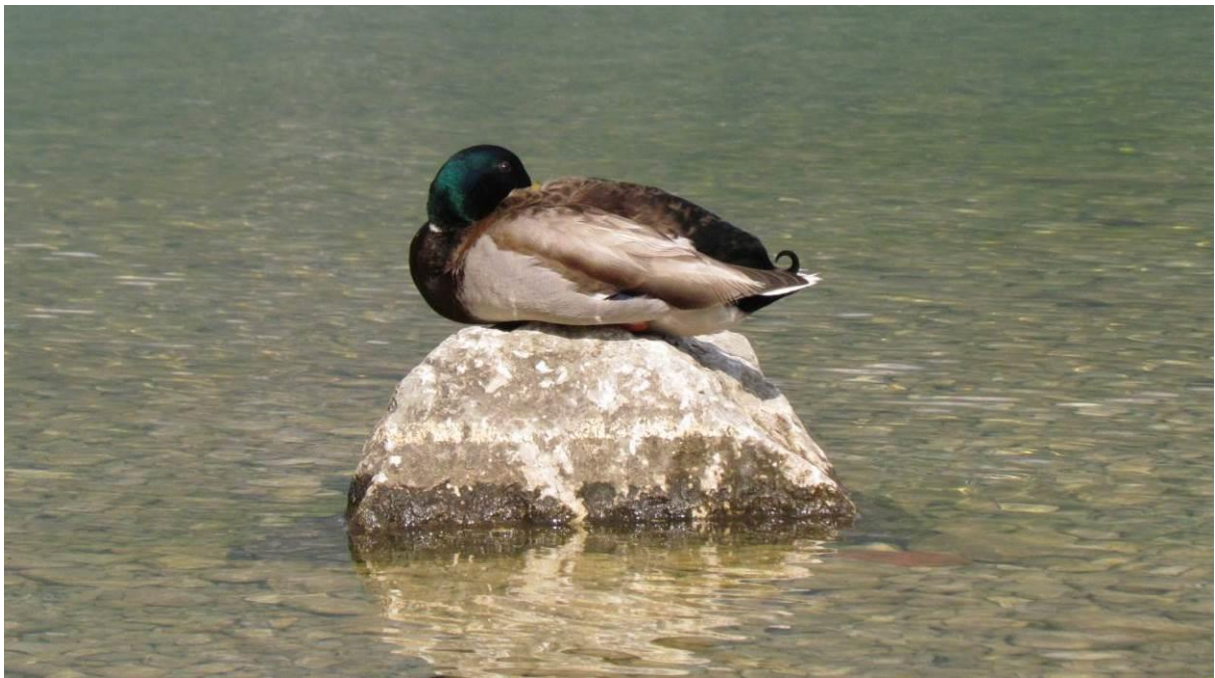
**Photo 11.** The Planica Valley is a real tourist magnet, not only for mountaineering and climbing but also for family-friendly cycling and hiking.



**Photo 12.** The Planica Valley is located between 2,500-meter-high mountains in the northern part of the Triglav National Park, next to the alpine village of Kranjska Gora.



**Photo 13.** Lake Bohinj which lies in the heart of the Triglav National Park is the largest Slovenian natural lake, nestled at the foot of unspoilt mountains and mountain tops.



**Photo 14.** Mallard (*Anas platyrhynchos*) is the most recognized waterfowl in the world, and very present in the lakes of the Triglav National Park.



**Photo 15.** Aside from the lake itself, St. John the Baptist church is the hallmark of Bohinj. It is one of the finest examples of Slovenian medieval architecture and mural painting.



**Photo 16.** This postcard-worthy medieval church and stone bridge are more than 700 years old, covering time periods from Romanticism to Baroque.



**Photo 17.** The around Lake Bohinj is famed for its natural beauty.



**Photo 18.** In the Triglav National Park there are many nice spots for meditation.



**Photo 19.** Forests embedded in a network of mountains in the Julian Alps.



**Photo 20.** The forests of the Triglav National Park apart from representing habitats for such an abundance forest flora, they are also home to various wildlife species.



**Photo 21.** Triglav National Park.



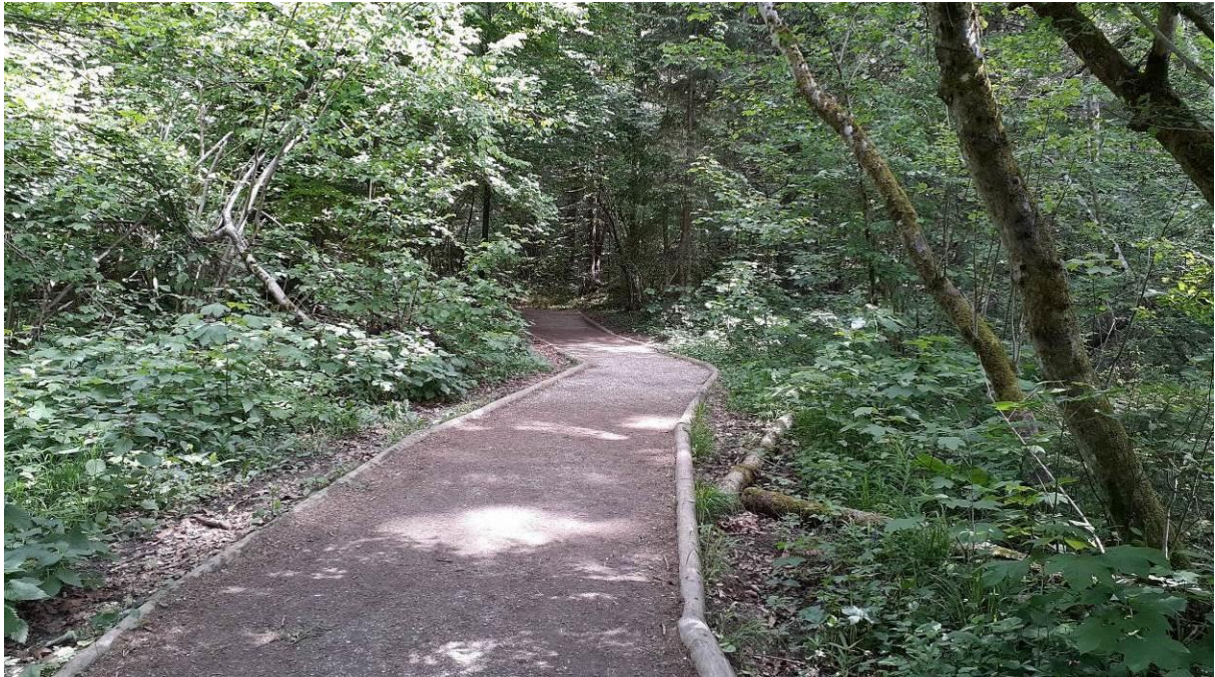
**Photo 22.** Signposts are distributed along the trails. They were made of wood and are in perfect harmony with the environment.



**Photo 23.** Zelenci Springs is a nature reserve near the town of Kranjska Gora, in the far northwestern corner of Slovenia. It is the source of the Sava Dolinka River.



**Photo 24.** At Zelenci Springs, water from underground Nadiža Creek re-emerges through the porous bottom of a two meters deep lake, whose waters are noted for their deep, brilliant green.

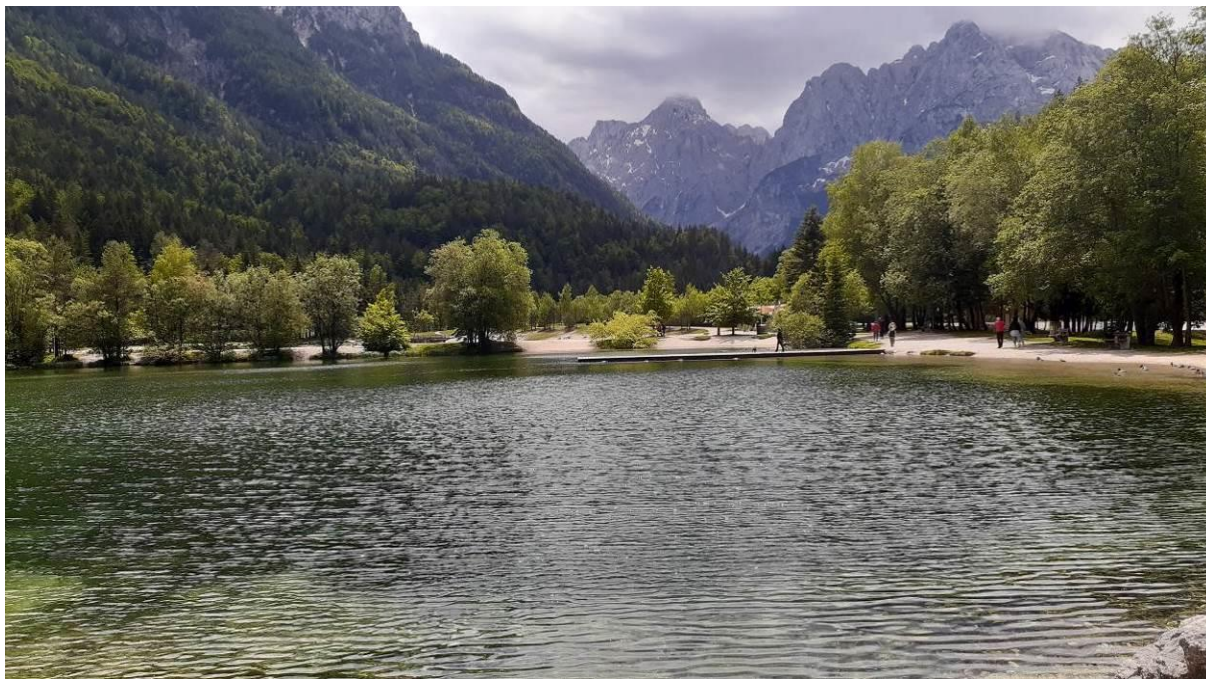


**Photo 25.** The trails in Zelenci Springs feature informational signage, as well as viewing bridges and an observation tower.



**Photo 26.** The white butterbur (*Petasites albus*) is a plant species in the family Asteraceae. It is native to central Europe and the Caucasus. It prefers damp soils in deciduous forests, mountain pastures, and streamsides.





**Photo 27.** Located just 2 km from Kranjska Gora, Lake Jasna is a stunning alpine lake.



**Photo 28.** The Lake Jasna is surrounded by mountains.



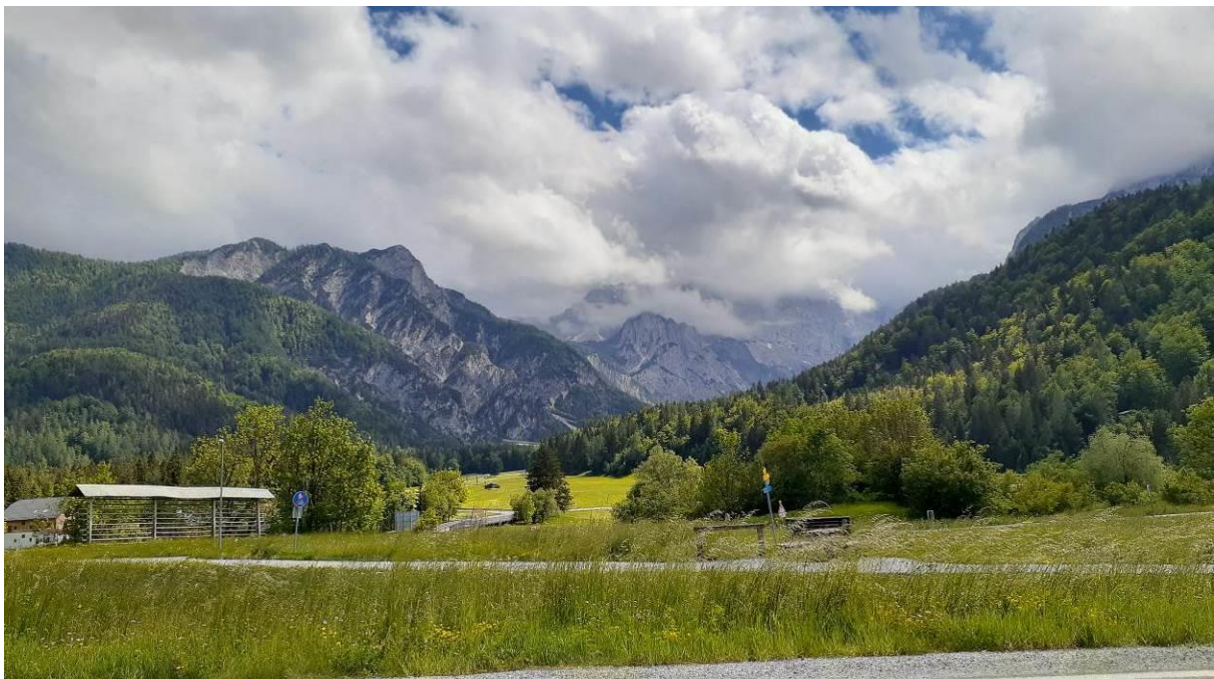
**Photo 29.** The Lake Jasna region is surrounded by dense forests.



**Photo 30.** The Lake Jasna is guarded by a statue of a Zlatorog (golden horn), the legendary chamois of Mount Triglav. The work is by Slovene sculptor Stojan Batič.



**Photo 31.** Planica is a long, typical glacial valley in the northern of the Slovenian Julian Alps.



**Photo 32.** Planica Valley is a beautiful valley in the Triglav National Park.



**Photo 33.** Triglav National Park.



**Photo 34.** Planica is famous for ski jumping. The first ski jumping hill was constructed before 1930 and became very well-known ski jumping competitions in Yugoslavia.



**Photo 35.** The Triglav National Park has a notably wide variety of plant communities, due to its range of microclimates, differing soils and varying levels of altitude.



**Photo 36.** Triglav National Park.



**Photo 37.** Forest around Peričnik Waterfall.



**Photo 38.** Lots of wooden footbridges and pathways cross lakes, rivers, streams and swamps edges, creating gentle trails for visitors to wander, explore, and take in the views.



**Photo 39.** A quick hike to one of Slovenia's highest and most powerful waterfalls.



**P**

**hoto 40.** The wooden handrail ensures the safety of walkers and is in harmony with the environment.

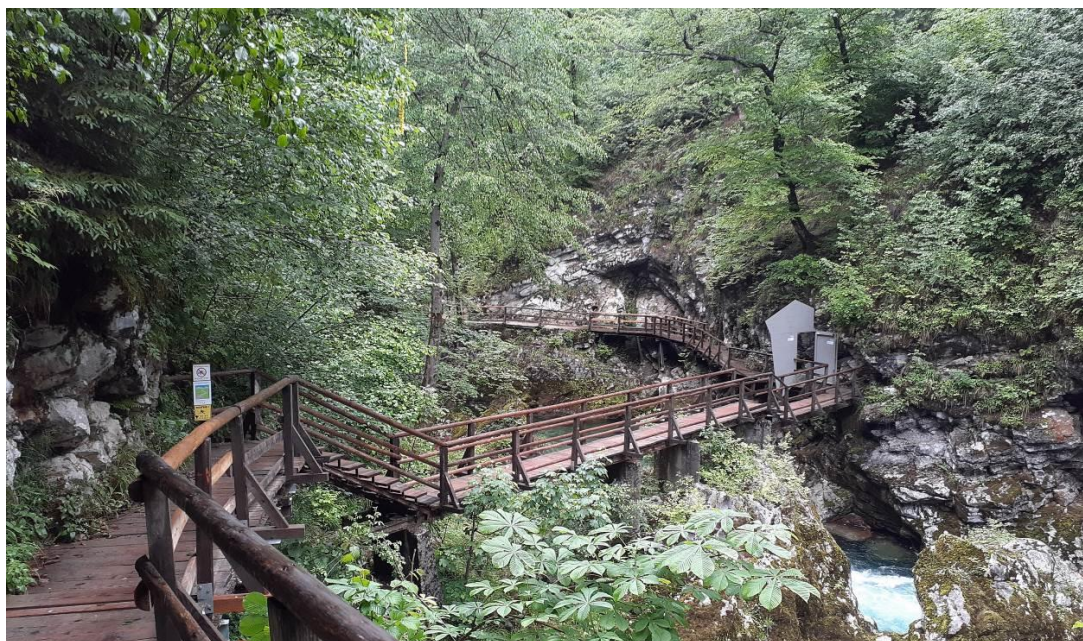


**Photo 41.** The Peričnik Waterfall, with its 52 m (170 ft.) of height is one of the highest and most famous waterfalls in Slovenia.

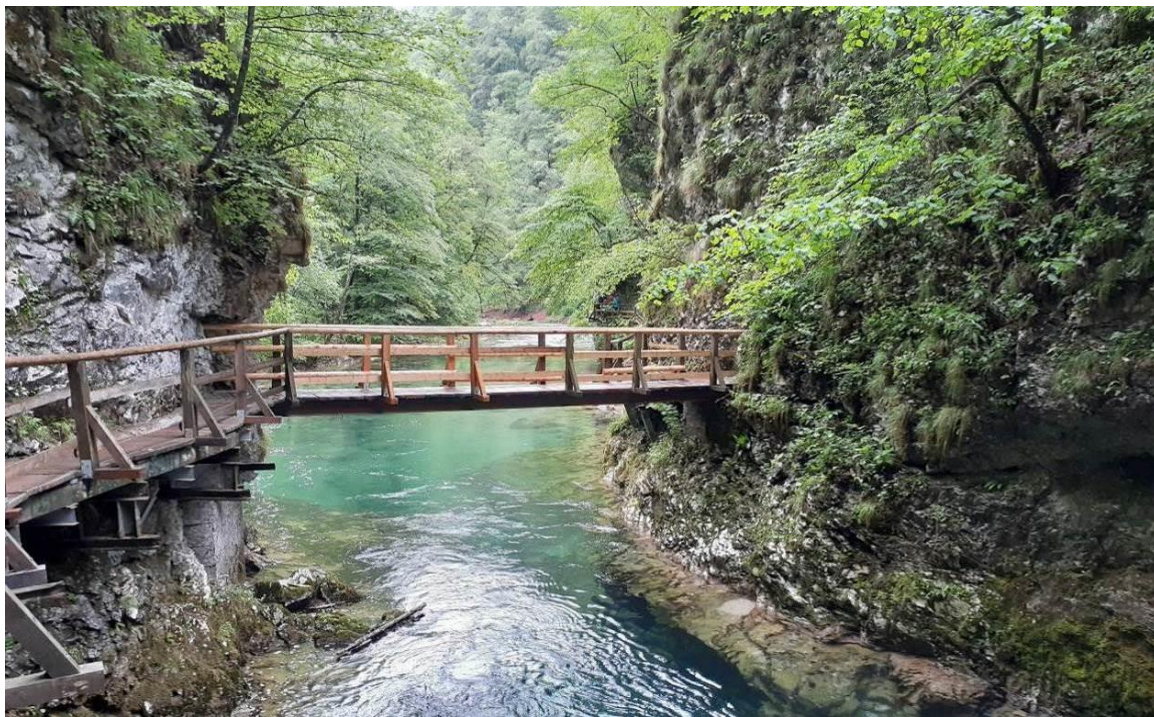




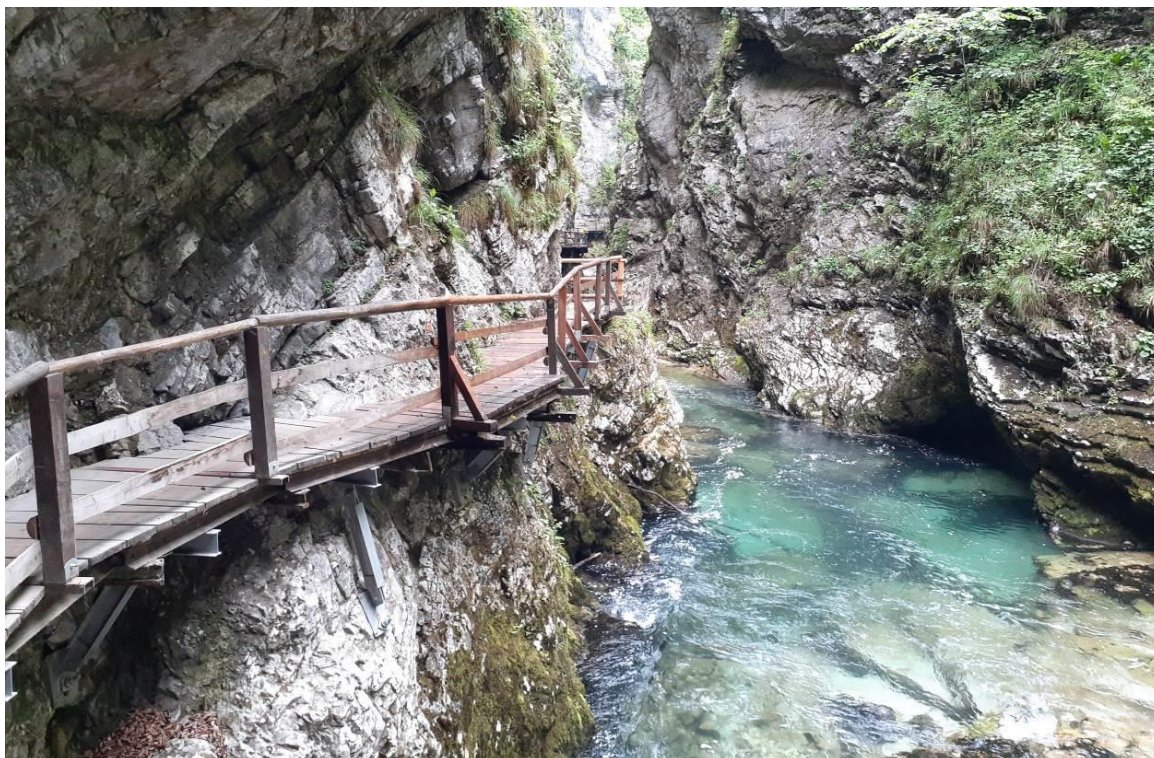
**Photo 42.** Signposts are distributed along the trails. They were made of wood and are in perfect harmony with the environment.



**Photo 43.** Wooden paths by riverside in the Vintgar gorge, Triglav National Park.



**Photo 44.** Vintgar gorge, Triglav National Park.



**Photo 45.** The handrail ensures the safety of walkers in dangerous areas.



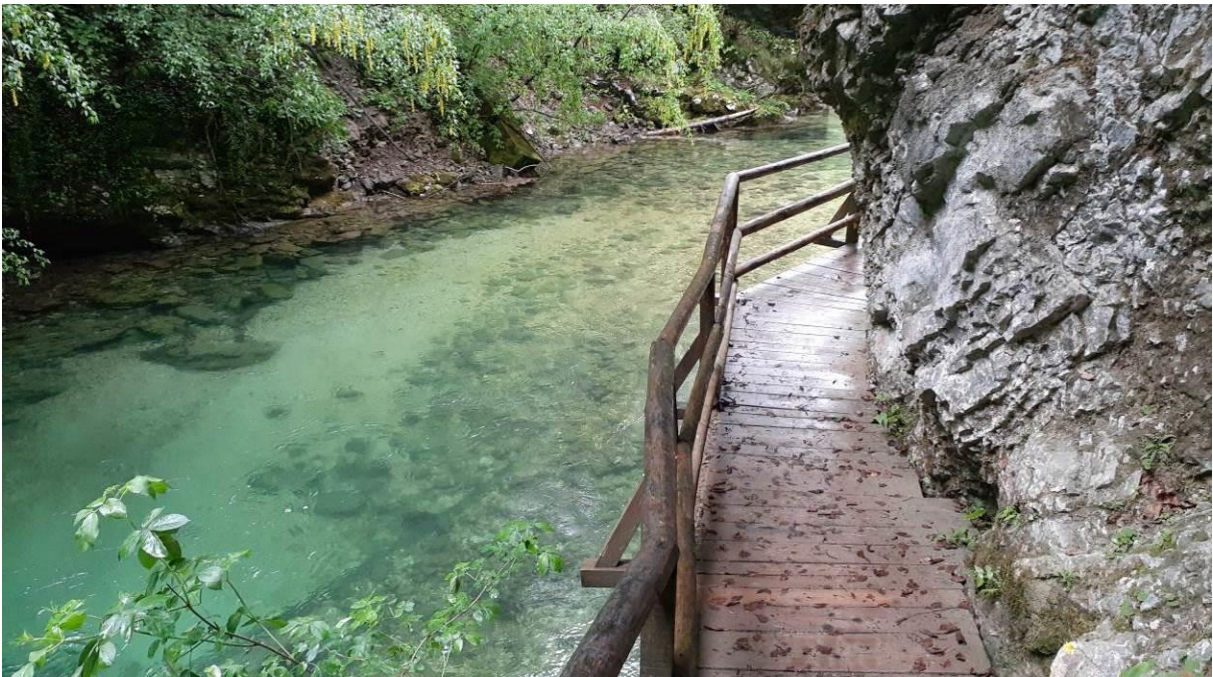
**Photo 46.** Vintgar gorge, Triglav National Park.



**Photo 47.** The wooden handrail ensures the safety of walkers and is in harmony with the environment in the Vintgar gorge, Triglav.



**Photo 48.** Wooden elevated walkway.



**Photo 49.** Wooden walkway with handrail in the Vintgar gorge.



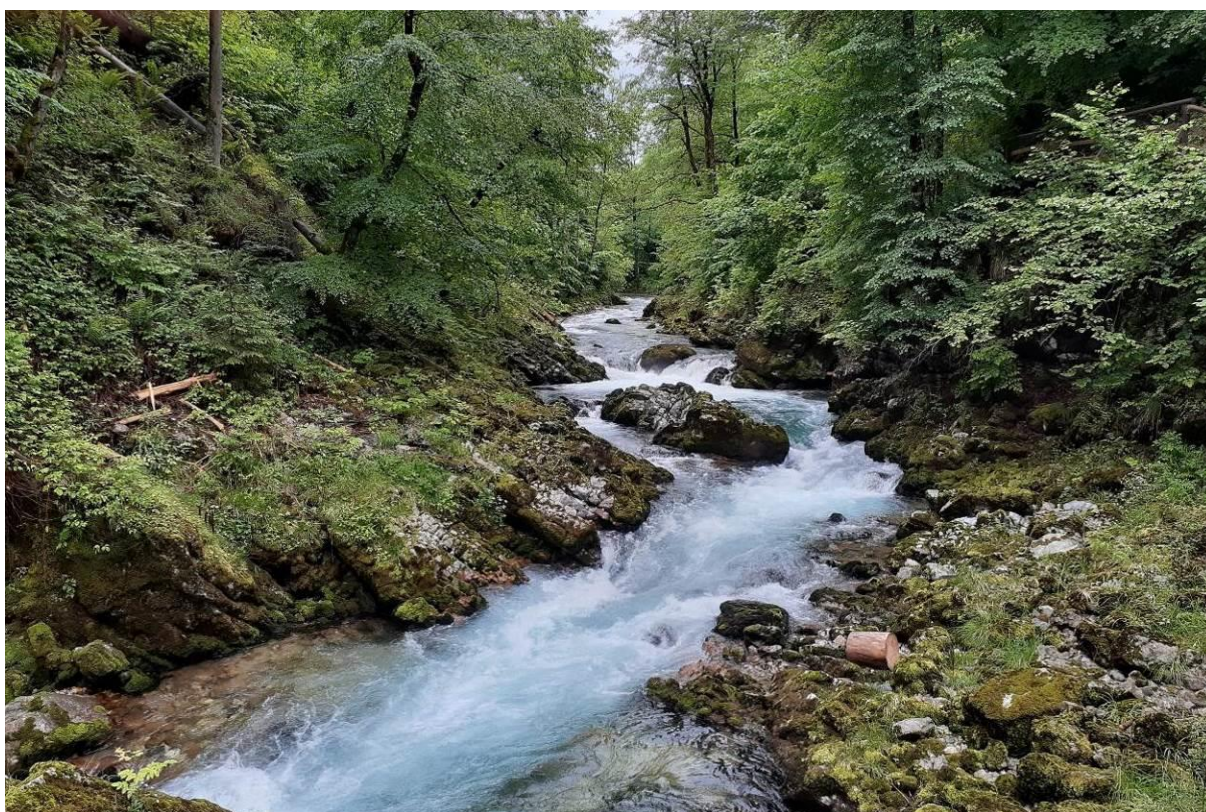
**Photo 50.** Vintgar gorge, Triglav National Park.



**Photo 51.** The wooden handrail ensures the safety of walkers and is in harmony with the environment. Observe the lucidity and clarity of water.



**Photo 52.** Vintgar gorge, Triglav National Park.



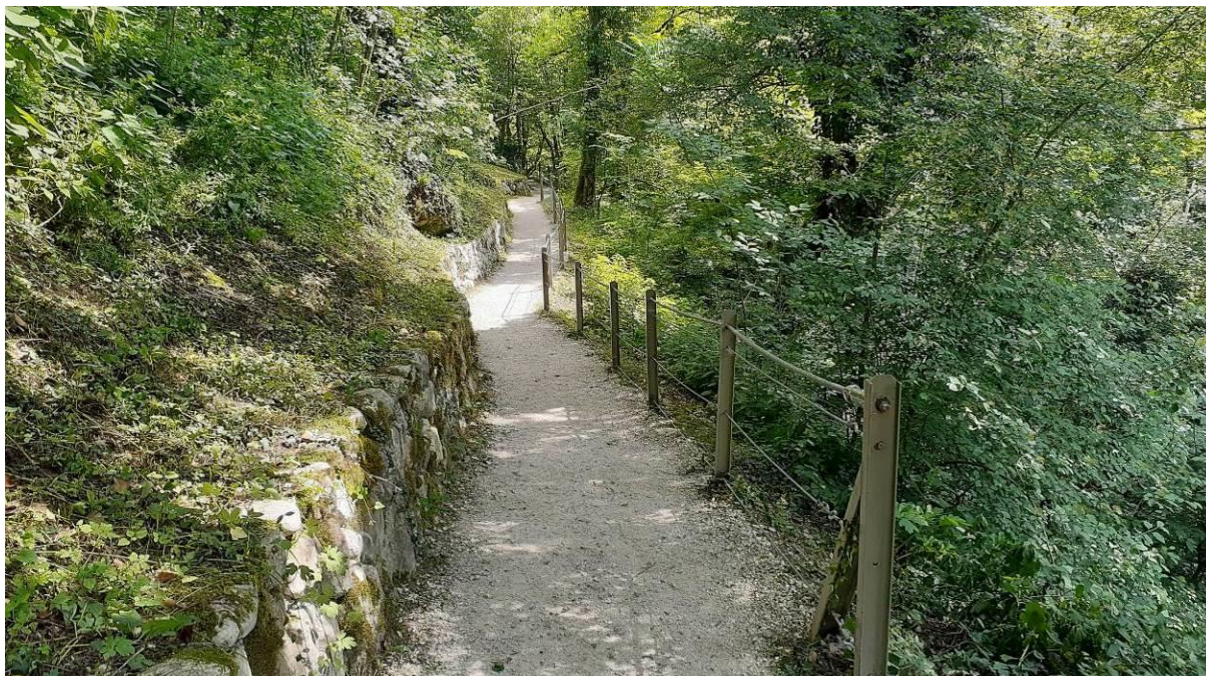
**Photo 53.** Vintgar gorge, Triglav National Park.



**Photo 54.** Vintgar gorge, Triglav National Park.



**Photo 55.** Vintgar gorge, Triglav National Park.



**Photo 56.** Trail to Zadlaščica River Canyon, Tolmin Gorges, Triglav National Park (Triglavski Narodni Park), Slovenia.

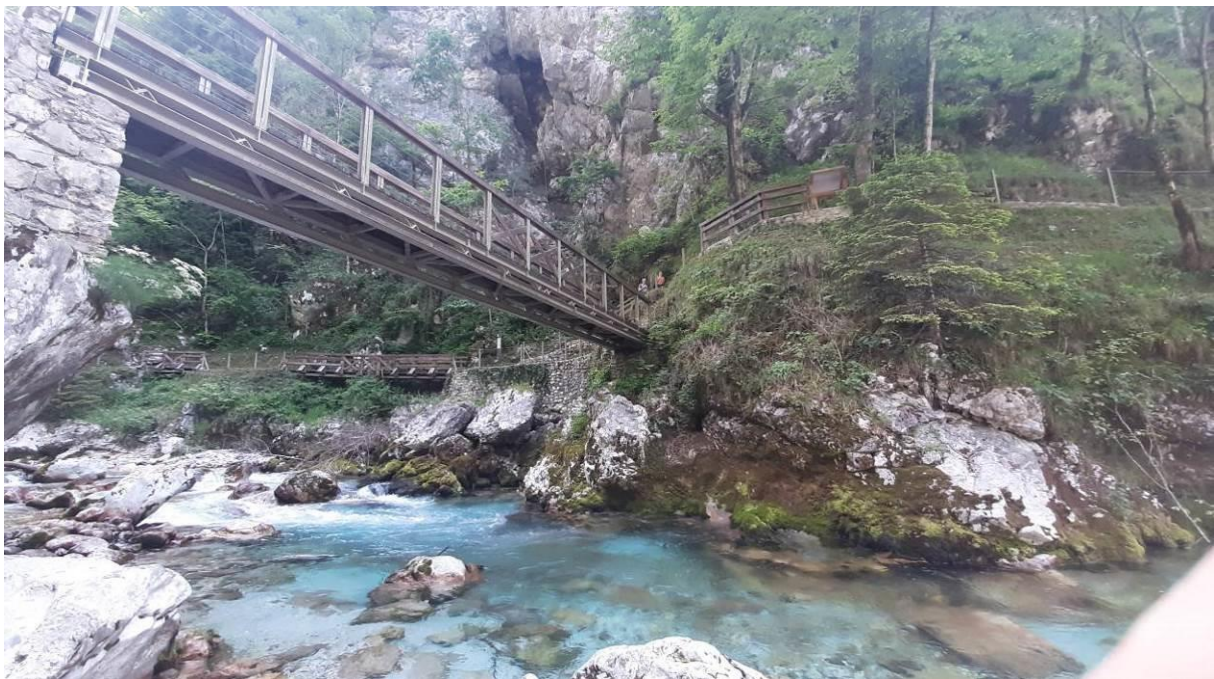


**Photo 57.** Zadlaščica River Canyon, Tolmin Gorges, Triglav National Park.

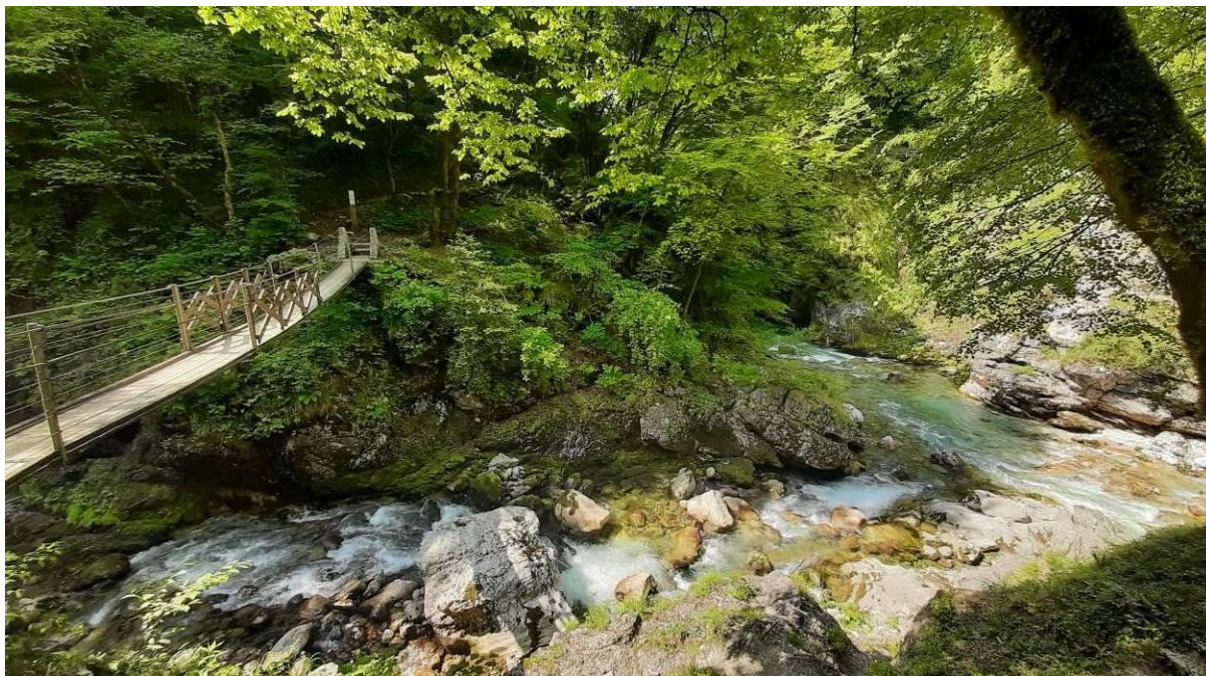




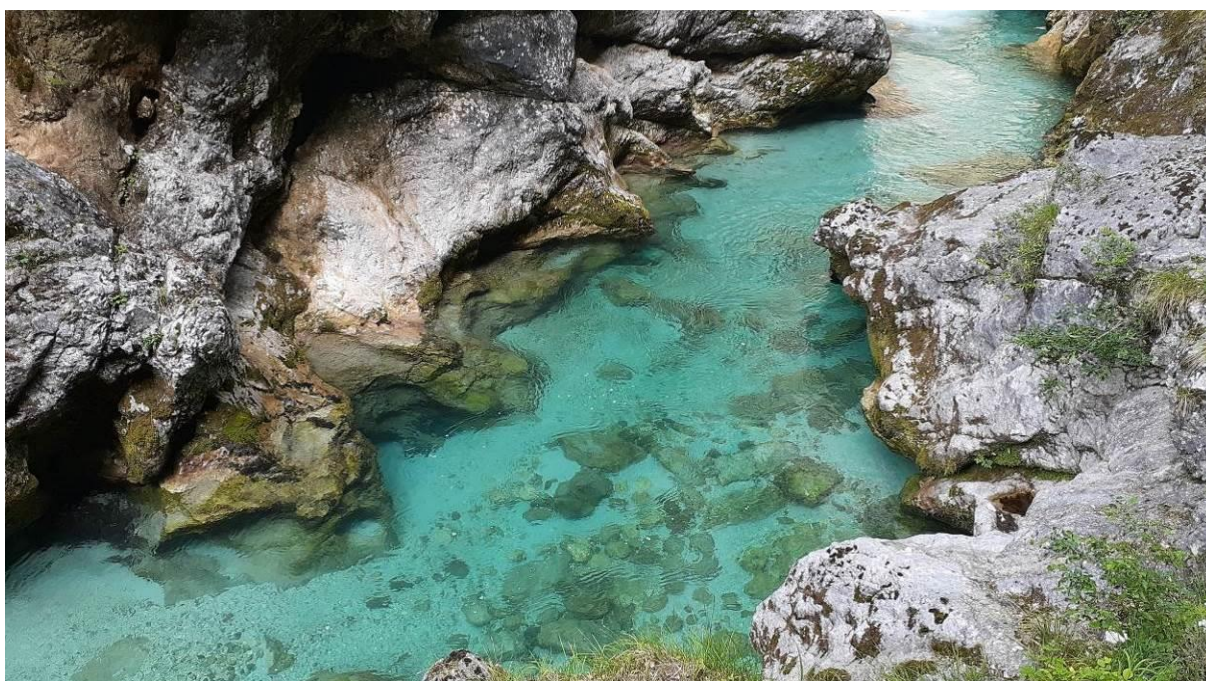
**Photo 58.** The iron handrail ensures the safety of walkers in dangerous areas in the Tolmin Gorges, Triglav National Park.



**Photo 59.** Tolmin Gorges, Triglav National Park.



**Photo 60.** In this part you can see the confluence of Tolminka and Zadlaščica. The Zadlaščica is the natural aquarium for marble trout.



**Photo 61.** Detail of the Tolminka river, with its turquoise waters.



**Photo 62.** The iron handrail ensures the safety of walkers in dangerous areas.



**Photo 63.** Tolmin Gorges, Triglav National Park.



**Photo 64.** Tolmin Gorges, Triglav National Park (Triglavski Narodni Park), Slovenia.



**Photo 65.** Tolmin Gorges, Triglav National Park.



**Photo 66.** Tolmin Gorges, Triglav National Park.



**Photo 67.** Fish were always an integral part of the everyday cuisine of the Soča Valley, where restaurants prepare and serve rainbow trout (*Salmo trutta*) instead.



**Photo 68.** The Kremna rezina (kremšnita) is a regional treat. Layers of custard, cream and puff pastry make this Slovenian dessert utterly irresistible.



**Photo 69.** Slovenia is the home of the Carniolan honeybee, an autochthonous Slovenian bee. Painted beehive panels are a characteristic feature of Slovenian beekeeping and an expression of folk art.



**Photo 70.** These plants produce nectar, pollen and essential blossoms for bee pollinators. The flowers' reproductive success results in a growing bee population. The flowers tend to blossom in the spring through to summer and entice bees with their brightly-colored petals.





**Photo 71.** In Slovenia, you will find accommodation to suit every budget and every taste, from luxury hotels to tourist farms...



**Photo 72.** ... from private rooms to camping grounds.



**Photo 73.** Inside the Triglav National Park, you can choose accommodations located in borgos with beautiful scenery...



**Photo 74.** ... or in small medieval towns.



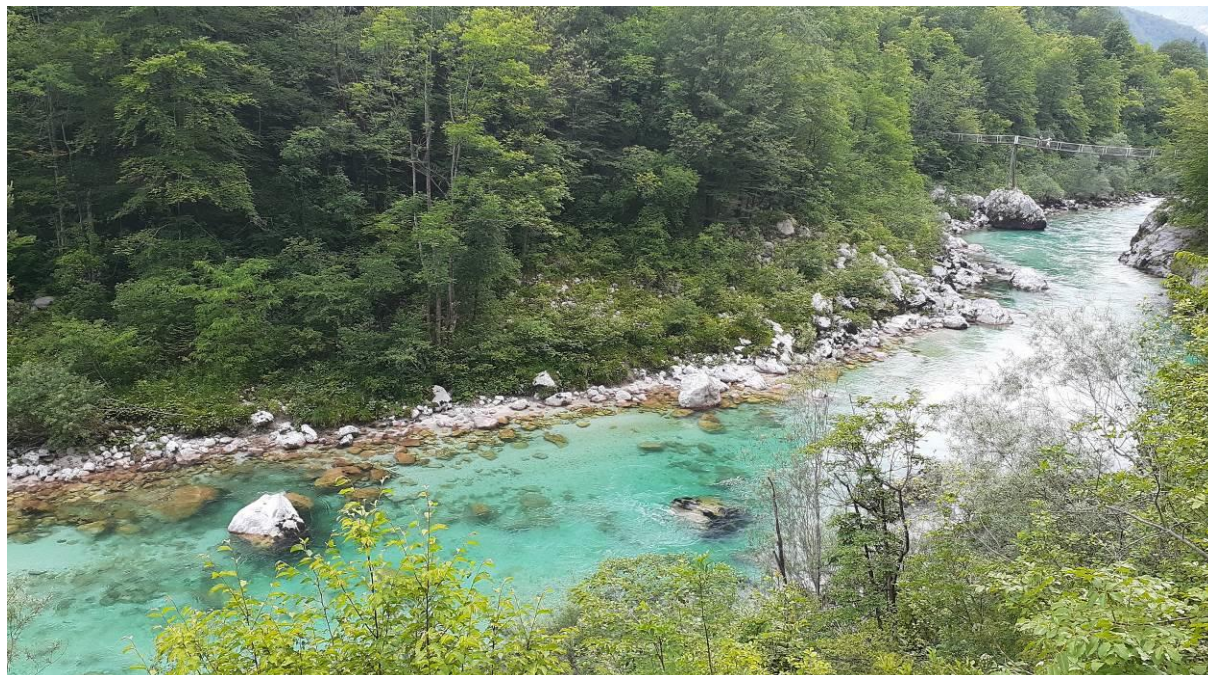
**Photo 75.** Signposts are distributed along the trails, showing the trails and places of interest.



**Photo 76.** The white butterbur (*Petasites albus*) is a flowering plant species very common in the streambanks in the Triglav National Park.



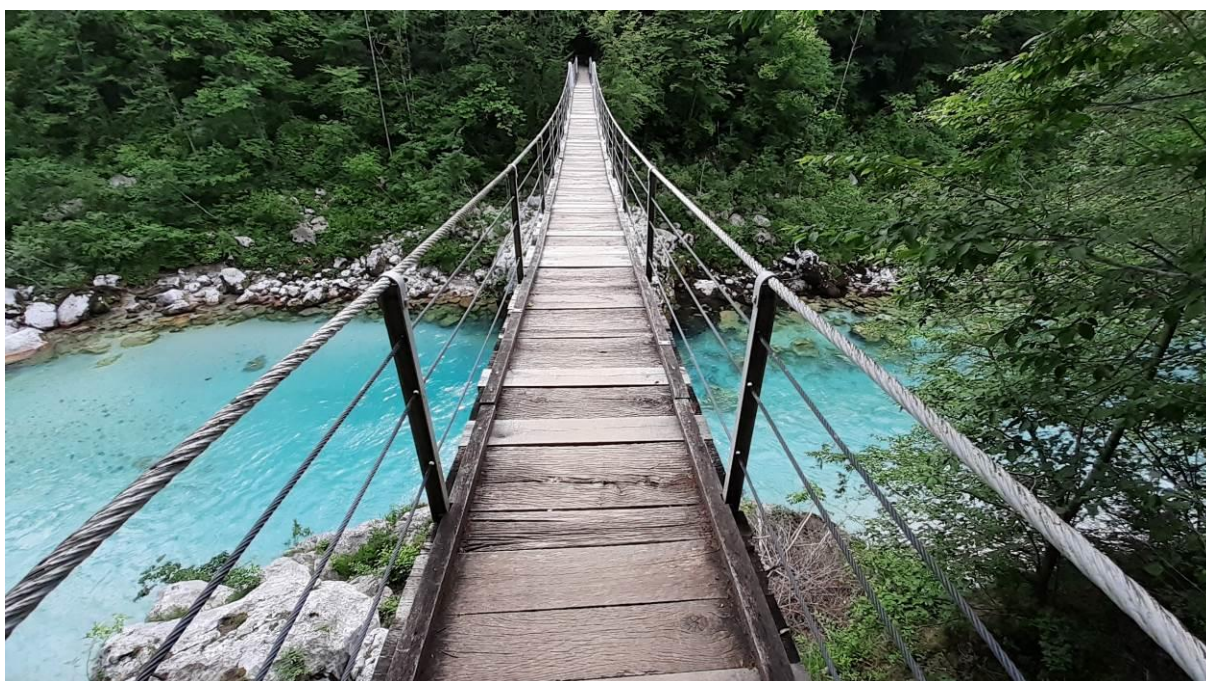
**Photo 77.** The Kozjak Waterfall is accessible from the arranged footpath, half hour easy walk from the car park to the waterfall.



**Photo 78.** Detail of the emerald green Kozjak stream.



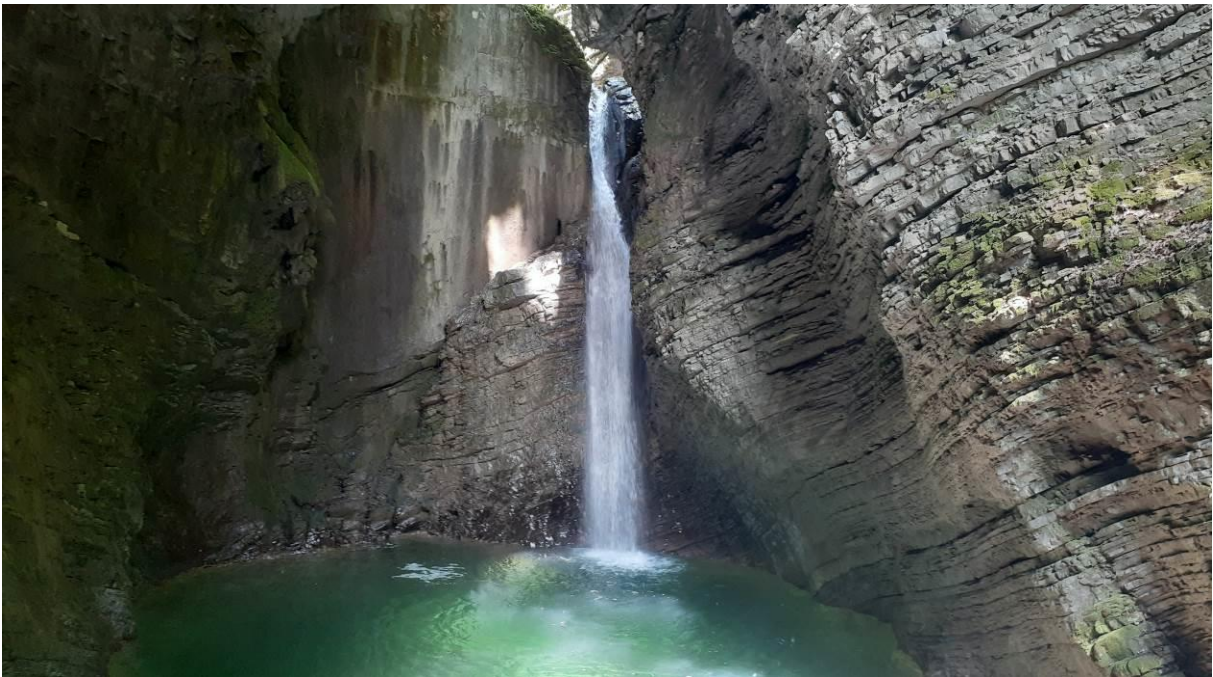
**Photo 79.** Detail of the emerald green Kozjak stream.



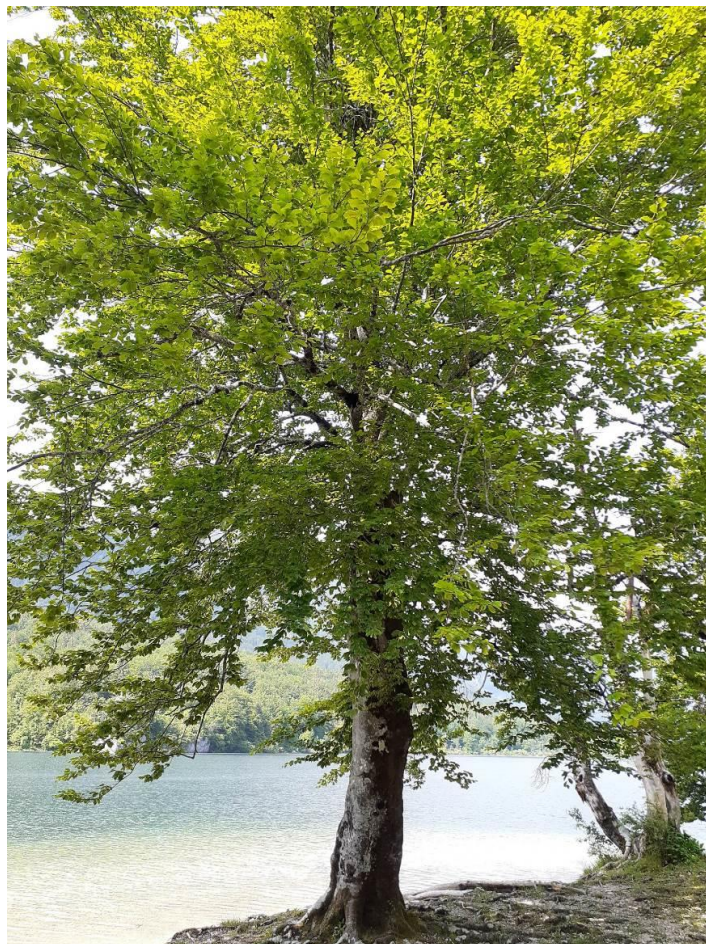
**Photo 80.** Suspension bridge over the Kozjak stream.



**Photo 81.** Detail of the emerald green Kozjak stream.



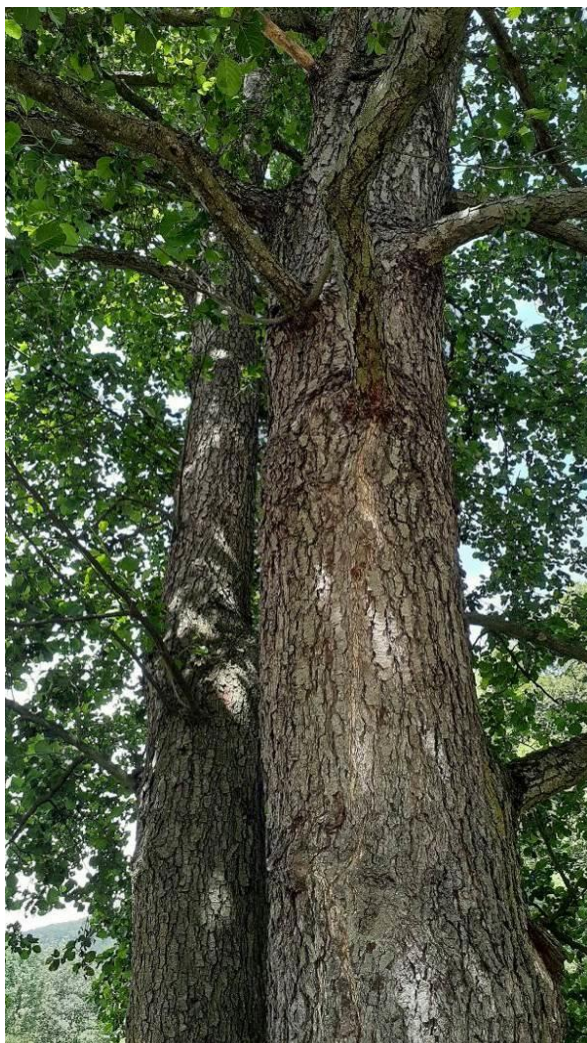
**Photo 82.** The mystical view of the rocky amphitheater with the green pool and the white beam of water of the Kozjak Waterfall.



**Photo 83.** The beech (*Fagus sylvatica*) is one of the predominant tree species in the Triglav National Park.



**Photo 84.** Detail of a branch of beech (*Fagus sylvatica*).

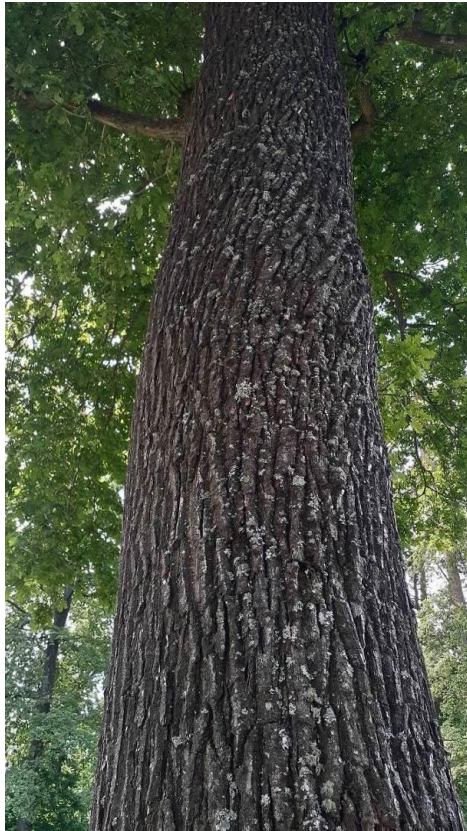


**Photo 85.** European alder (*Alnus glutinosa*).

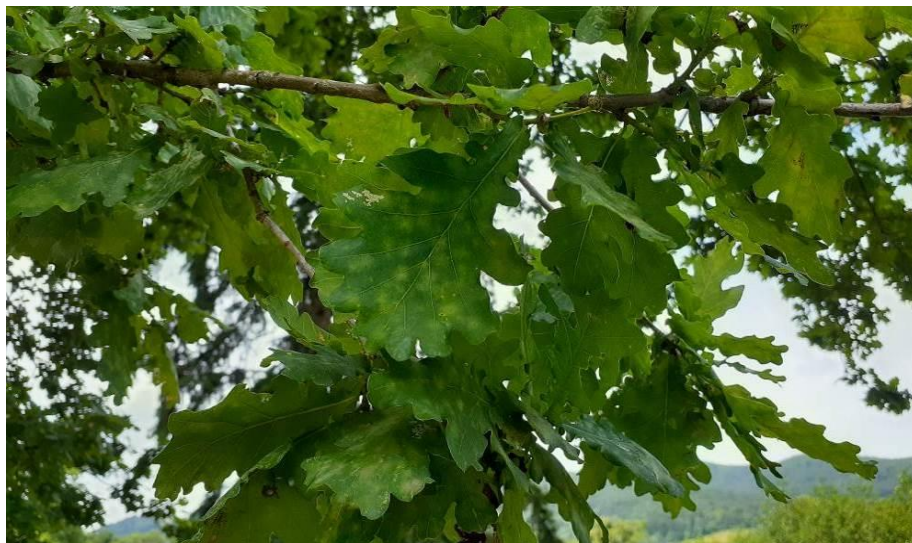


**Photo 86.** Ash (*Fraxinus excelsior*).





**Photo 87.** *Quercus robur*, commonly known as European oak, is a species of tree in the beech and oak family.



**Photo 88.** Detail of a branch of oak (*Quercus robur*). This specie is valued for its importance to insects and other wildlife. The acorns form a valuable food resource for several small mammals (notably squirrels who tend to hoard acorns and other nuts) and some birds.



**Photo 89.** Small-leaved lime (*Tilia cordata*).



**Photo 90.** Detail of a branch with flowers of small-leaved lime (*Tilia cordata*).



**Photo 91.** The litter of a forest in the Triglav National Park.



**Photo 92.** In addition to species from the plant and animal world, the park is also abundant in fungi species. Fungi are a large and very significant group of organisms.



**Photo 93.** *Nepeta micrantha* is a species of herb in the family Lamiaceae. It is an herb popular amongst honeybees and other pollinators.



**Photo 94.** *Sambucus nigra* is a European shrub known as elder. Both the flowers and the berries have a long tradition of culinary use.



**Photo 95.** The *Iris sibirica* subsp. *erirrhiza*, can only be found in very dry habitats in Slovenian (and Croatian) Istria, in the Kras region, on Mount Nanos and, probably, on Mount Kojca and in a number of other dry mountainous habitats.



**Photo 96.** The peach-leaved bellflower (*Campanula persicifolia*) is common in rocky outcrops. Its flowers are cup-shaped and lilac-blue.



**Photo 97.** These plants produces nectar, pollen and essential blossoms for bee pollinators.



**Photo 98.** The flowers tends to blossom in the spring through to summer and entice bees with their brightly-colored petals.



**Photo 99.** *Podarcis muralis* is a species of lizard with a wide distribution in Europe. It prefers rocky environments, including urban settings, where it can scurry between rock, and rubble.



**Photo 100.** *Podarcis muralis* has scales highly variable in color and pattern. Its coloration is brownish or greyish and may occasionally be tinged with green.

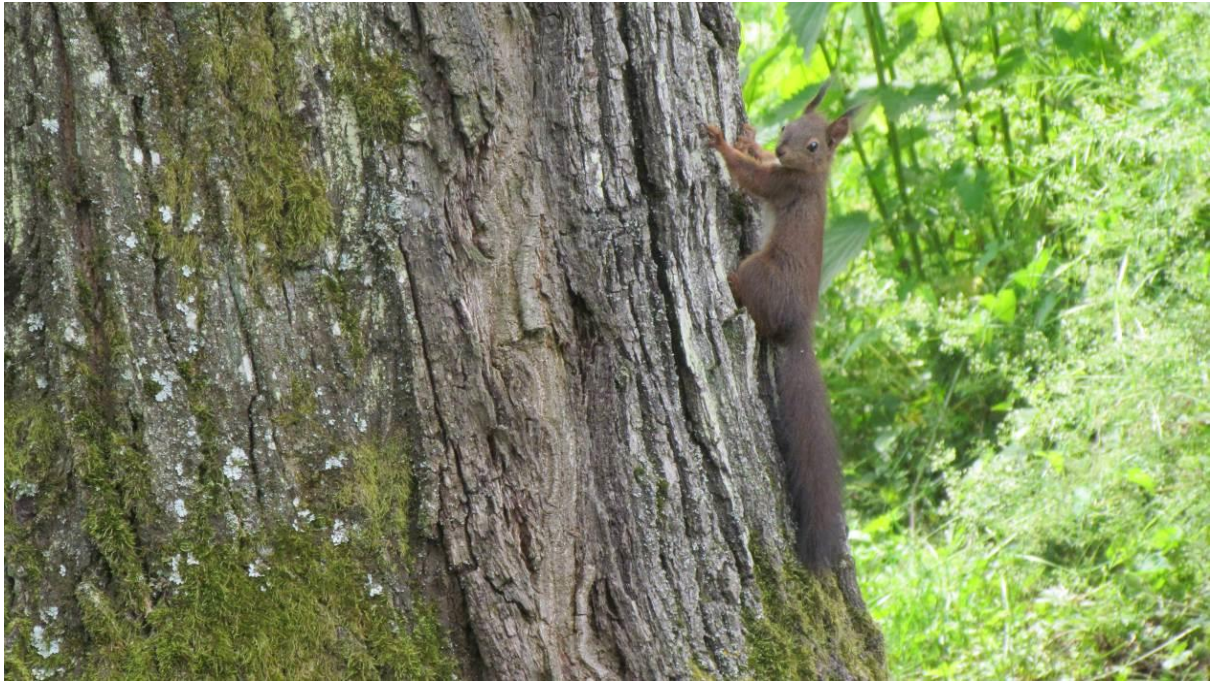


**Photo 101.** *Iberolacerta horvathi* is a lizard native to northwestern Croatia, Slovenia and the adjoining parts of northeastern Italy and southern Austria. It is a rock specialist and is very agile, even leaping into the air to catch prey.



**Photo 102.** Triglav National Park's fauna is very reach and diverse.





**Photo 103.** The squirrels are very common presence in Triglav National Park forests.



**Photo 104.** Swans are birds of the geese and ducks family. They are almost entirely herbivorous. In the water, food is obtained by up-ending or dabbling, and their diet is composed of the tubers, roots, stems and leaves of aquatic and submerged plants.



**Photo 105.** Mallard (*Anas platyrhynchos*, ♂) is the most recognized waterfowl in the world. Most often, they prefer wetlands, where highly productive waters produce large amounts of floating, emergent and submerged vegetation wetlands also produce a great deal of aquatic invertebrates on which mallards feed.



**Photo 106.** A mother merganser and her flock. *Mergus merganser* is a large sea duck of rivers and lakes in forested areas of Slovenia. It eats mainly fish, and nests in holes in trees.



**Photo 107.** The hooded-crow (*Corvus cornix*) is a Eurasian bird species widely distributed. Just like other corvids, it is an omnivorous and opportunistic forager and feeder.



**Photo 108.** The western-jackdaw (*Coloeus monedula*) is a bird in the crow family. Commonly wary of people in the forest or countryside, western-jackdaws are much tamer in urban areas.



**Photo 109.** The domestic pigeon (*Columba livia*) is a member of the bird family Columbidae (pigeons and doves). They have become established in cities around the world.



**Photo 110.** The house-sparrow (*Passer domesticus*, ♂) is a small bird, native to Eurasia, who was intentionally introduced to the Americas. It is often closely associated with human populations and is found in highest abundance in agricultural, suburban and urban areas.



**Photo 111.** The barn-swallow (*Hirundo rustica*) is the most widely distributed and abundant swallow in the world. It breeds throughout most of North America and Eurasia.



**Photo 112.** Barn-swallow nests are quite incredible. To secure the nest to the wall, it trowel mud and mix it with grass, stems, and other foliage. After, it plaster the mud to the wall before lining the nest with soft leaves and feathers. The result is a mud-cup nest ‘glued’ to a wall.



**Photo 113.** The common chaffinch (*Fringilla coelebs*, ♂) is a common small passerine bird in the finch family. The male is brightly colored with a blue-grey cap and rust-red underparts. It has a strong voice and sings from perches to attract a mate.



**Photo 114.** The European goldfinch (*Carduelis carduelis*) is a beautiful small bird found in open, partially wooded lowlands. The song is pleasant and melodic.



**Photo 115.** The great-tit (*Parus major*) is a widespread and common species throughout Europe. It is predominantly insectivorous, common and familiar bird in urban parks and gardens.



**Photo 116.** The robin (*Erithacus rubecula*) inhabiting farmland and woodland, as well as gardens and parks in towns and cities. Its diet consists of seeds, fruits, insects, worms and other invertebrates.



**Photo 117.** The common blackbird (*Turdus merula*) is a species of true thrush. It breeds in woods and gardens, and builds a neat, cup-shaped nest, bound together with mud. It is an omnivorous bird, eating a wide range of insects, earthworms, berries, and fruits.



**Photo 118.** The fieldfare (*Turdus pilaris*) is a member of the thrush family. It breeds in woodland and scrub and is strongly migratory. It is omnivorous, eating a wide range of insects, mollusks and earthworms in the summer, and berries, grain and seeds in the winter.





**Photo 119.** The white-wagtail (*Motacilla alba*) is a small insectivorous passerine bird. It is a bird of open country, often near habitation and water.



**Photo 120.** Observing the natural beauties of the Triglav National Park.