













## Flora and fauna


### Altitude levels

	3,000 – 4,000 m
	2,400 – 3,000 m
	1,600 – 2,400 m
	1,000 – 1,600 m
	400 – 1,000 m

 Moor landscapes of outstanding beauty and national importance

 Federal no-hunting zones

### Core zone

 Core zone with railway and cultural landscape

### Buffer zone

 Buffer zone in the near area

 Horizon line

### Other contents

 Other stretches of the Rhaetian Railway

### Sources:

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### 2.a.8 Flora and fauna either side of the Alps

**The profile of the flora and fauna along the railway line from Thusis to Tirano is unique. Besides the close-to-nature cultural landscape that has been formed and influenced by man over thousands of years, the railway also runs through intact natural landscapes. It was even the scene of a pioneer achievement in the conservation of endangered species with the re-introduction of the ibex – enthusiastically supported by the Rhaetian Railway.**

The Albula/Bernina line of the Rhaetian Railway crosses the arc of the Alps near its centre. Geology and climate change continually along the stretch. The central Alpine, dry valleys of the Domleschg and Albula are under the rain shield of the northern ridge of the Alps and enjoy a characteristic continental climate. The continental aspect of the climate is even more pronounced in the Upper Engadin, for example in Val Bever, with low precipitation and low temperatures in winter. In contrast, precipitation on the Bernina Pass is more than double that in Samedan. As one moves south, the volume of precipitation decreases sharply; The lower section of the Poschiavo Valley and the Veltlin enjoy a markedly southern, dry Alpine climate.

This stretch of railway also exhibits an exceptional variety of flora, as it covers the entire range of Alpine vegetation zones. The Domleschg valley, the starting point of the railway, with its mountain sycamore forests lies in a colline-montane zone. In the Albula and Upper Engadin valleys deciduous trees occur only as pioneer growth and in the wetland forests along the rivers. This region lies mostly in the montane and sub-Alpine zone. Forests of larch and Swiss stone pine are characteristic of the Upper Engadin. Around the Bernina Pass, the climatic tree line is at an altitude of virtually 2,300 m,

a limit that is only rarely exceeded in the Alps. From the Bernina Pass the view into the nival zone is unimpaired, yet only 25 km further, the route returns to the colline zone with mixed forests dominated by linden trees.

#### High biodiversity

No specific studies of the biodiversity of plants and animals have been made to date for the area along the Albula/Bernina line. One of the few systematic surveys of the biodiversity in the Alps has been in progress on Alp Flix, in the valley of Oberhalbstein, since 2000. So far some 3,000 different species of plants and animals have been identified there including some that were previously unknown. This confirms the assumption that high biodiversity is to be expected in sub-Alpine and Alpine cultural landscapes and there are many treasures waiting to be discovered. The preconditions for them are excellent in the Albula and Bernina regions due to the variety of geological formations and climatic zones. In the 1900s, a study of nesting birds revealed a density of 110 per 100 km<sup>2</sup> grid square around Thusis and 90–100 in both the Upper Engadin and lower Poschiavo valleys. In the lower-lying parts of the Poschiavo valley, over 1,000 plant species were identified in the same area. So the Poschiavo valley has one of the highest levels of plant diversity in Switzerland.



**Golden eagle** > The railway crosses nine golden eagle territories between Thusis and Tirano.  
K. Gansner



**Stazerwald in the Upper Engadin** > The largest raised bog region in Graubünden.  
Amt für Umwelt und Natur



**Bernina Pass** > Alpine grass land and patches of low-growing bushes.  
Amt für Umwelt und Natur



### Constancy and change of species

Various animal or plant species may change, mix or dominate along the railway line. Among the butterflies, the Blues are a case in point: *Plebiscula escheri* can be observed in the Albula valley, a variety that prefers the French Alpine milk vetch, widespread in sub-Mediterranean zones, and is only found on warm, dry slopes. The Magnificent Blue (*Pseudiaricia nicias*) is found in the Engadin and the Chequered Blue (*Scolitantides orion*) in the Poschiavo valley. Each of these similar types has found its ecological niche. Another interesting example is a very common species that can be seen at every station: the sparrow. The familiar house sparrow (*Passer domesticus*) – the male is distinguished by a grey patch on its head – lives in the north; in contrast, in the south we find the relatively little-known Italian house sparrow (*Passer hispaniolensis italiae*), a sub-species of the Spanish sparrow, which has a brown patch on its head. Both types are found in the Upper Engadin, at times they even mix; the highest nesting places for the house sparrow and the Italian house sparrow in Europe are found on the Bernina Pass. The various salamander subspecies react differently to the varied ecological conditions along the railway line. Salamanders have a preference for worms and must have a certain degree of humidity in their habitat. In the north we find the Alpine salamander (*Salamandra atra*), which is live-bearing. This species is not found in the Engadin, probably because the climate is too dry. But in the Poschiavo valley we find the spotted fire salamander (*Salamandra salamandra salamandra*). However, some animal species that can be observed along this stretch belong to the same species both in the north and in the south, for example the golden eagle, chamois, red deer and the fieldfare. The trip from Thusis to Campoco-

logno crosses nine different golden-eagle territories. With a little luck the traveller may catch a glimpse of this majestic bird of prey from the train.

### Striking features along the railway line

#### Lake of Constance Return

Immediately after leaving Thusis station, the train crosses the Hinterrhein (a headwater of the Rhine) and with it the most southerly spawning place of the Lake of Constance trout (*Salmo trutta*). The trout which hatch here make their way to the Lake of Constance in their first year, where they grow to the imposing 12 kg and 90 cm long Rheinlanken and then return – like salmon – to their birthplace to spawn. The Rheinlanken were once an important staple food for the common otter, which is no longer found in Graubünden.

Migratory birds have their own ‘international timetable’; they make a regular stopover in the Munté nature reserve, below Thusis, a wetland of trans-regional importance. Over 7,000 songbirds were ringed here at the end of the 1980s. Those that have been found again show the extent of these avian ‘international connections’: from southern Sweden, Lithuania via the Czech Republic to Algeria and Tunisia.

#### Hedgerow landscapes and extensive forests

Between the Schin Gorge and the Albula Pass we find a cultural landscape that is close to nature with extensive dry habitats. The field hare, butcher bird, yellow hammer, whinchat and, in southern exposures, even the zilpzalp all live here. The zone gives way to extensive heaths of erica dotted with pine forests, though these are often shaped by man. In the late Middle Ages large



**Butcher bird** > The close-to-nature cultural landscape of the Albula Valley is an excellent habitat for the butcher bird.  
C. Meier-Zwicky



**Yellow hammer** > A species found frequently in the Albula Valley.  
C. Meier-Zwicky



**Fly orchid (Orphys insectifera)** > An orchid that attracts its prey with pheromes.  
C. Meier-Zwicky



**Wallcreeper** > This colourful bird likes a rocky habitat - for example between Bergün and Preda.  
C. Meier-Zwicky

areas of forest were often felled and used to fire the iron-ore smelting furnaces. In spring, during the flowering period, the expanses of heather look like a pink carpet. The rare capercaillie still lives in the heather-carpeted pine forests today. These forests are also the habitat for numerous varieties of orchid such as the pleasantly scented short spurred fragrant orchid (*Gymnadenia odoratissima*), ladies tresses (*Goodyera repens*) and the reddish brown dark-red helleborine (*Epipactis atrorubens*); the latter often grows next to the tracks. One orchid that grows alongside Filisur station attracts its pollinators with pheromones, namely the fly orchid (*Ophrys insectifera*). On the shady side of the Albula valley, the predominant species in the forests are spruces and firs. The highest altitude for firs is reached behind Filisur. They are not encountered again until the descent into the Poschiavo valley. The Alpine wall creeper (*Tichodroma muraria*), a strikingly colourful bird, is found in the previously inaccessible rocky slopes between Filisur and Preda that were opened up by the Rhaetian Railway.

### Stopover for migratory birds

The Upper Engadin has a pronounced valley-floor character, despite the sole altitude of some 1,700 m. This is the highest nesting place in Europe for various species of bird. These include water birds like the little ringed plover, little grebe, common coot and great crested grebe, but other species are also found in the cultural landscape that is so close to nature such as the wood warbler, hoopoe, wryneck, fieldfare and collared dove. The ash is another species that does not grow anywhere in Europe at such a high altitude as in the Upper Engadin. This was taken into account recently when the Flaz stream, that flows through the flat land at Samedan, was re-routed

(cf. 4.a.2). In this way the migratory birds were saved from losing their important Alpine stopover in the Engadin.

The laurel willow-wetland forests along the tributaries of the Inn are a special feature of the Upper Engadin. The laurel willow is rarely found in Switzerland apart from the small stands in the Upper Engadin. In spring, the male plants produce the characteristic fat yellow catkins (pussy willows).

The Stazerwald sustains a bog landscape of national importance; the most extensive raised bog in Graubünden where a large number of northern plant species are found, e.g. various peat mosses, innumerable sedges and carnivorous sundews (*Drosera rotundifolia* and *Drosera intermedia*). There are also extensive stretches of dry grass with continental varieties like feather grasses (*Stipa* sp.) and the northerly dragon's head (*Dracontecephalum ruyschiana*).

### Pioneer conservation

The “Berninahäuser” station (today “Bernina Suot”) on the Bernina line is of historic importance in the conservation of zoological species: it was here that the successful reintroduction of the ibex began with the founding of the Albris ibex colony. The first ibex arrived by train on 14th July 1922, where they were welcomed by an enthusiastic crowd. The animals were then carried up to the high-altitude release area in woven baskets. The ibex thrived in the continental climate of the central Alps; within 40 years some 2,000 of them could be resettled to other mountain areas as the nucleus for new colonies. Once most of the formerly populated regions had been resettled, the colonies continued to flourish so that other forms of population control had to be adopted. Above all, the important protected forests above Pontresina could not sustain more





Alpine ibex > The founding of the Alpine ibex colony in 1922 marked the start of the successful resettlement of the ibex in the Alps.

Graubünden Ferien



European Star-of-seven (*Trientalis europaea*) > a glacial relict found near the Bernina Pass.

Amt für Umwelt und Natur



Chestnut orchard > The sweet chestnut, a species that is widespread in Mediterranean countries, flourishes around Brusio.

Amt für Umwelt und Natur



than a certain number of ibex. The introduction of the Alpine ibex in 1977 meant the beginning of sustainable management of this nationwide protected species; Graubünden's traditional hunting-by-permit system proved that it could also cope with this challenge. The ibex can even be observed from the train, above all in spring when the meadows begin to acquire their lush green appearance.

The area between Pontresina and the Bernina Pass, where the first ibex were released, was already declared a federal no-hunting zone ("Bernina-Albris") in the 1920s. Together with "Piz Ela" and "Piz Campasc", half of the no-hunting zones in Graubünden are in the Albula/Bernina region; they also constitute fundamental elements of animal diversity protection in Graubünden.

### **Express through the biodiversity of the south side of the Alps**

From the Bernina pass as far as the Italian border at Campocologno, a stretch of only 25 km, the Rhaetian Railway runs from the Alpine grass and low bush vegetation zone through the larch and Swiss stone pine stands near the crest of the pass to the colline zone at the edge of the vine-growing region of Veltlin. The star-of-seven (*Trientalis europaea*) that grows in a few places on either side of the Bernina Pass is an otherwise rare glacial relict; one of a number to be found here. Several species thrive at Brusio, for example the sweet chestnut (*Castanea sativa*), the downy oak (*Quercus pubescens*), the hop hornbeam (*Ostrya carpinifolia*), the Mediterranean hackberry (*Celtis australis*), the Mahaleb cherry (*Prunus mahaleb*) and the fig which are found primarily in the Mediterranean zone. The numerous grass patches on the rock terraces along the railway line, supporting very few species, are

particularly striking. They are built up by tussocks of *Festuca varia*. In between, tawny fire lilies (*Lilium bulbiferum croceum*) may occasionally be seen and there are also a number of species of house leek (*Sempervivum* sp.). Similarly, in the animal world, we also find species from the southern or eastern Alps, for example the scorpion (*Euscorpius alpha*) and the barred warbler (*Sylvia nisoria*). In contrast, the *Postsole-nobia thomanni*, a small butterfly and one of the genuine bagworms, found in the lower Poschiavo valley has not been identified anywhere else to date. It is found on the rocks, walls and dykes that are so abundant along the Bernina line and often owe their existence to the railway itself. The birds and bats also have their own 'trans-regional connections' here, and so do the few offspring of the marbled trout (*Trutta marmorata*) that used to migrate as far as the Adriatic.

### **Veltlin Valley**

The original vegetation of the Veltlin Valley has been radically changed by settlement patterns that brought agriculture and forestry as well as livestock grazing. The region's varied geology and morphology determine the diversity of its flora. Deciduous trees, namely sweet chestnuts, beeches, sycamores, oaks and limes grow on the valley floor, while coniferous forests dominate the landscape at higher altitudes. Low bushes such as alpine rhododendron, juniper and myrtle predominate over 2,000 m.

The terraced vineyards along the stretch from Ardenno to Tirano are striking. They present a well-tended, impressive cultural landscape that has been created and looked after by the people of the valley over hundreds of years. There are extensive orchards on the valley floor.

The mountain region of the province of Sondrio with its diverse climatic zones is an ideal habitat



Veltlin > Vineyards have sketched out the cultural landscape pattern.  
Fondazione Provinea



Veltlin > Terraced vineyard near Montagna.  
Fondazione Provinea



Veltlin > Red deer are at home on the southern flank of the valley.  
K. Gansner



for a varied Alpine fauna. Alpine ibex and chamois can be observed both on the south and north-facing slopes. Red deer prefer the south-facing slopes, while hares and marmots are found up to an altitude of 2,000 m. Foxes, stoats and squirrels are common. Rare birds can also be observed: capercaillies in the coniferous forests on the north side of the valley along with black grouse, grouse, rock partridge and ptarmigan. Birds of prey like the eagle owl and golden eagle have always been found here, while the bearded vulture was reintroduced in recent decades. Among the factors harmful to the fauna are over-hunting, the widespread use of insecticides, the construction of more and more roads in the mountain regions and the increasing number of winter sport facilities. However, the decrease in pasture and tilled land has expanded the habitat for wild fowl and red deer. The maintenance of fish populations depends on careful management and regular restocking. Various superior table fish like lake and river trout and grayling are found in the Adda and Mera rivers and the various streams in the Veltlin.

The following areas are registered nature reserves or nature parks: the Farggia Waterfalls at Chiavenna, the “Le Marmite dei Giganti” glacier moulins at Chiavenna, Piuro and Prata Campaccio, Pian di Spagna and Lake Mezzola. The regional park of “Orobic Valtellinesi” covers the entire Orobic Alps, with peaks rising 2,000 to 3,000 metres and including exceptional natural habitats and stretches of countryside. The game park at the entrance to the Parco di Aprica is also notable. Stelvio National Park is one of the oldest national parks in Italy and the largest in the Alps. It lies at the heart of the Central Alps and is flanked by the lofty peaks of the Ortler-Cevedale massif. A hundred years ago, the last ibex survived here: they are the ancestors of the

ibex colonies now thriving throughout the Alps. Another important national nature reserve is the “Paluaccio di Oga”. Although these nature reserves are not within the perimeter of the nominated site, they are adjacent to it.