

May I introduce myself? MY NAME IS ISEL

I am an ancient river, originating in the Hohe Tauern, from the glaciers of the Umbalkees. I am the last untouched glacial river in the Alps. I am over 56 kilometres in length and descend almost 2,000 metres in altitude from my source to my confluence with the Drau near Lienz.

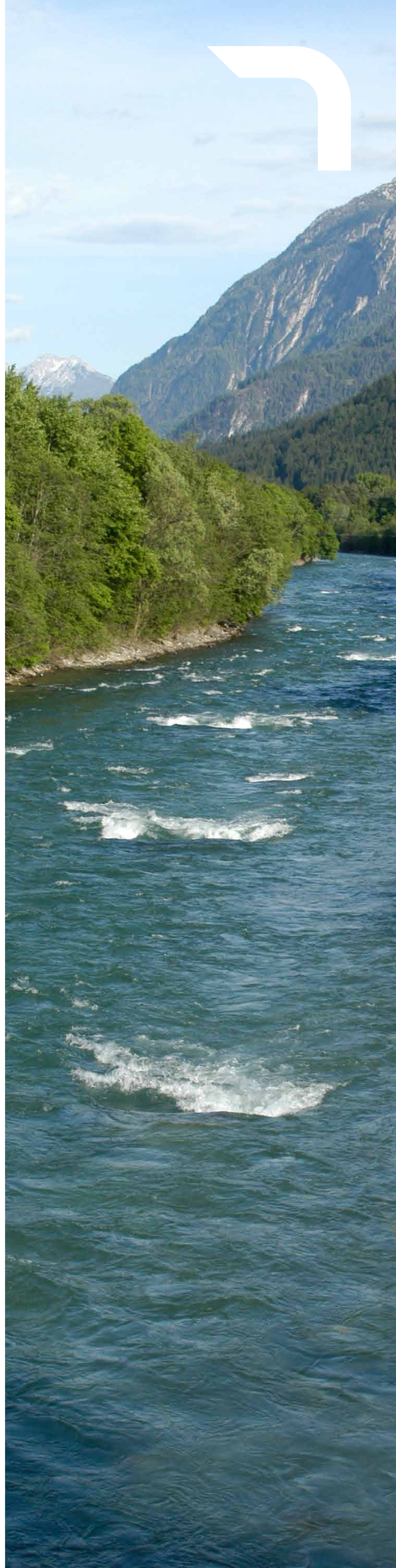
Depending on the season, I can be lively, wild or calm and contemplative. **Winter** is a boring time, with little water, but I flow crystal clear into the valley. Many animal and plant species accompany me on my path. In **spring**, the rare sandpiper breeds on my extensive gravelled areas. Here it can raise its young in a protected environment; there are only a few places left in the Alps where it feels at home. In **summer**, when the heat melts the glaciers, I become a roaring whitewater river and nothing can stand in my way. Then you hear the rumble of the stones I bring with me, new gravel banks are being created and old ones are being demolished.

The **German tamarisk** likes this constant construction and removal of the gravel surfaces. It is a delicate, rare shrub, adapted to extreme locations where other plants have little chance. We are perfectly harmonised, without my high water the gravel banks would come to a standstill and the tamarisk would be displaced by other plants. This has happened to many Alpine rivers that have been altered by power stations. Admittedly, I can be very temperamental. Widening areas are constantly being created to protect settlements from flooding. So I can still live out my character as a glacial stream. This is appreciated by nature lovers and experts alike. I get a lot of visits from scientists, river engineers, water ecologists and, not without a little pride, I can say I am a living textbook for future generations.

The **last free-flowing glacial river** in the entire Alpine region. My power could also be utilised further; there have been plans to build hydroelectric power stations here since the 1930s. This would change my dynamics and many plants and animals would lose their habitat. I wouldn't be the same either, but that's for others to decide. In any case, I'm delighted that so many people are standing up for me.

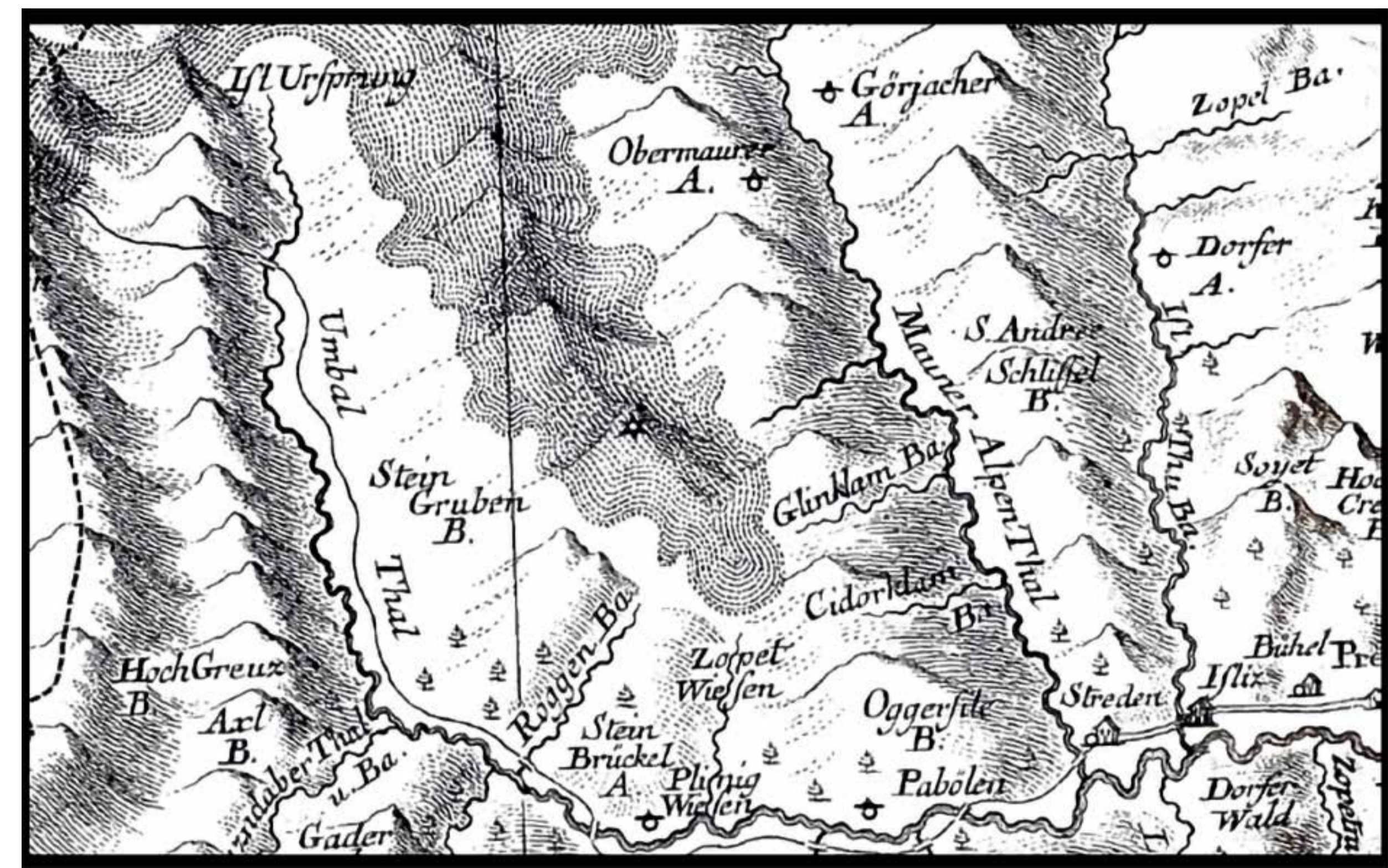
Thank you - from the ancient river.

© Christine Brugger



The Isel - born from glacial ice

Origin: Umbalkees, 2,500 m
Estuary: Drau - Lienz, 660 m
difference in altitude: 1,840 m
Length: 57.3 kilometres
Catchment area: 1,203 km²
Glacier: 70 km²
Main tributaries: Tauernbach, Kalserbach, Schwarzach.
 ¾ of the annual runoff comes to the valley in summer.
Average water flow 39 m³/second.
 In summer up to 50 times more water flow than in winter.



The "origin of the Isel" and the "Umbal-Thal valley" have always been important. Detail from the Atlas Tyrolensis (1774) by Peter Anich and Blasius Hueber.

The Isel - one of the last wild Alpine rivers in Central Europe

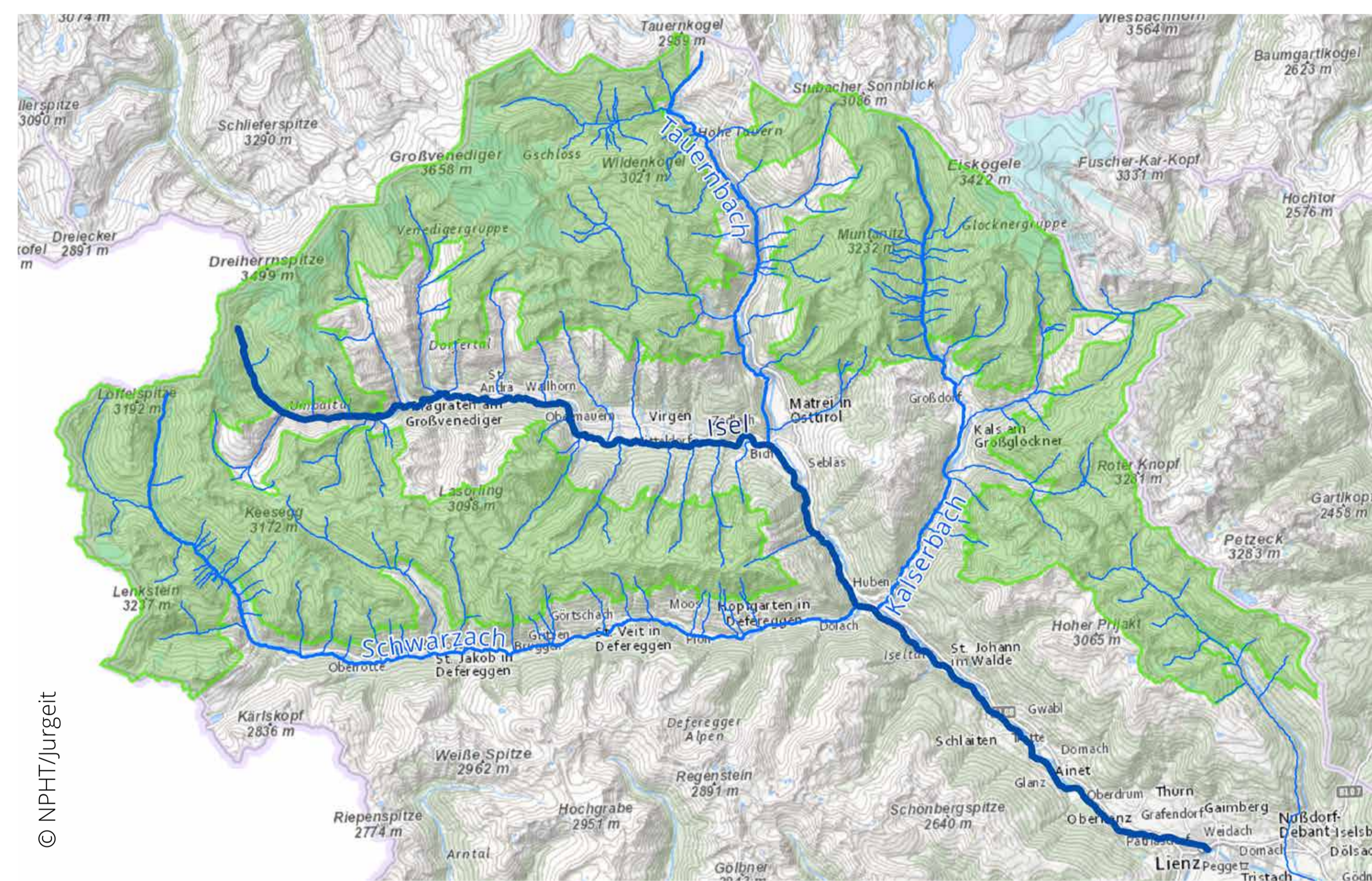
The Isel is one of the last large wild Alpine rivers in Central Europe that is not utilised for energy production by hydropower plants. The little-altered water system originates from the Umbalkees at an altitude of 2,500 metres. The Isel is fed by 20 glaciers that cover an area of approx. 9 km². The Umbalkees at the head of the Umbaltal valley forms the main glacier and is located in the core zone of the Hohe Tauern National Park. In addition to the main tributaries Tauernbach, Kalserbach and Schwarzach, the Isel collects almost all the runoff from the East Tyrolean Alpine ridge.



Origin of the Isel in the Hohe Tauern National Park - at the Umbalkees in Prägraten on the Grossvenediger.

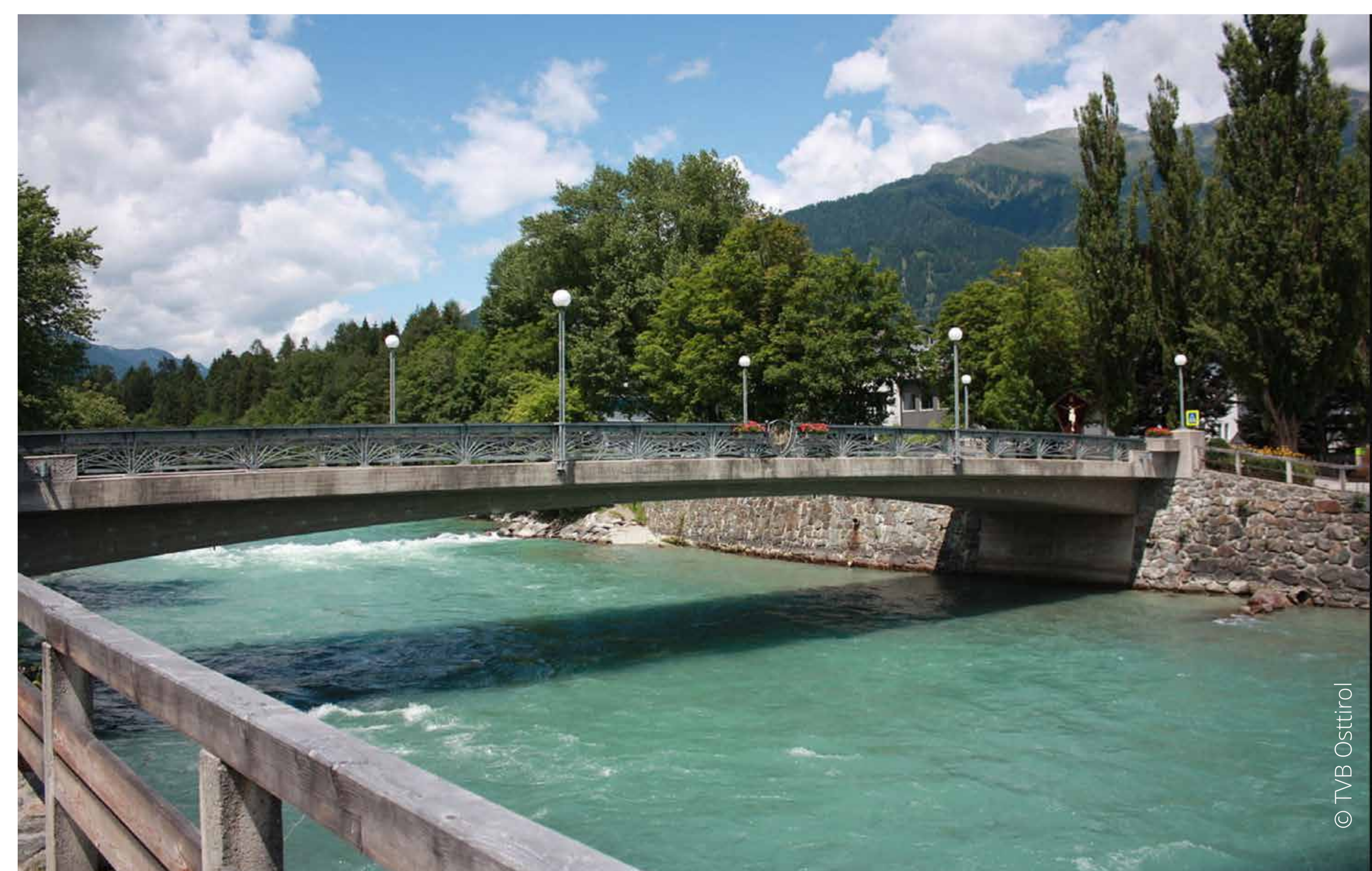
The catchment area of the glacial river covers approx. 1,200 km², which corresponds to around 2/3 of the area of East Tyrol. 70 km² of the catchment area are covered in glaciers

and are located at over 2,500 metres above sea level. In large areas, the Isel still has a dynamic river basin with sand, gravel and stone banks that regularly surround each other.



Nearly all watercourses in the Tyrolean part of the Hohe Tauern National Park drain into the Isel or its main tributaries.

Characteristic of this is the constant emergence of new pioneer sites, which are essential for certain life forms and communities that have adapted to the regular changes and need them for their continued existence.



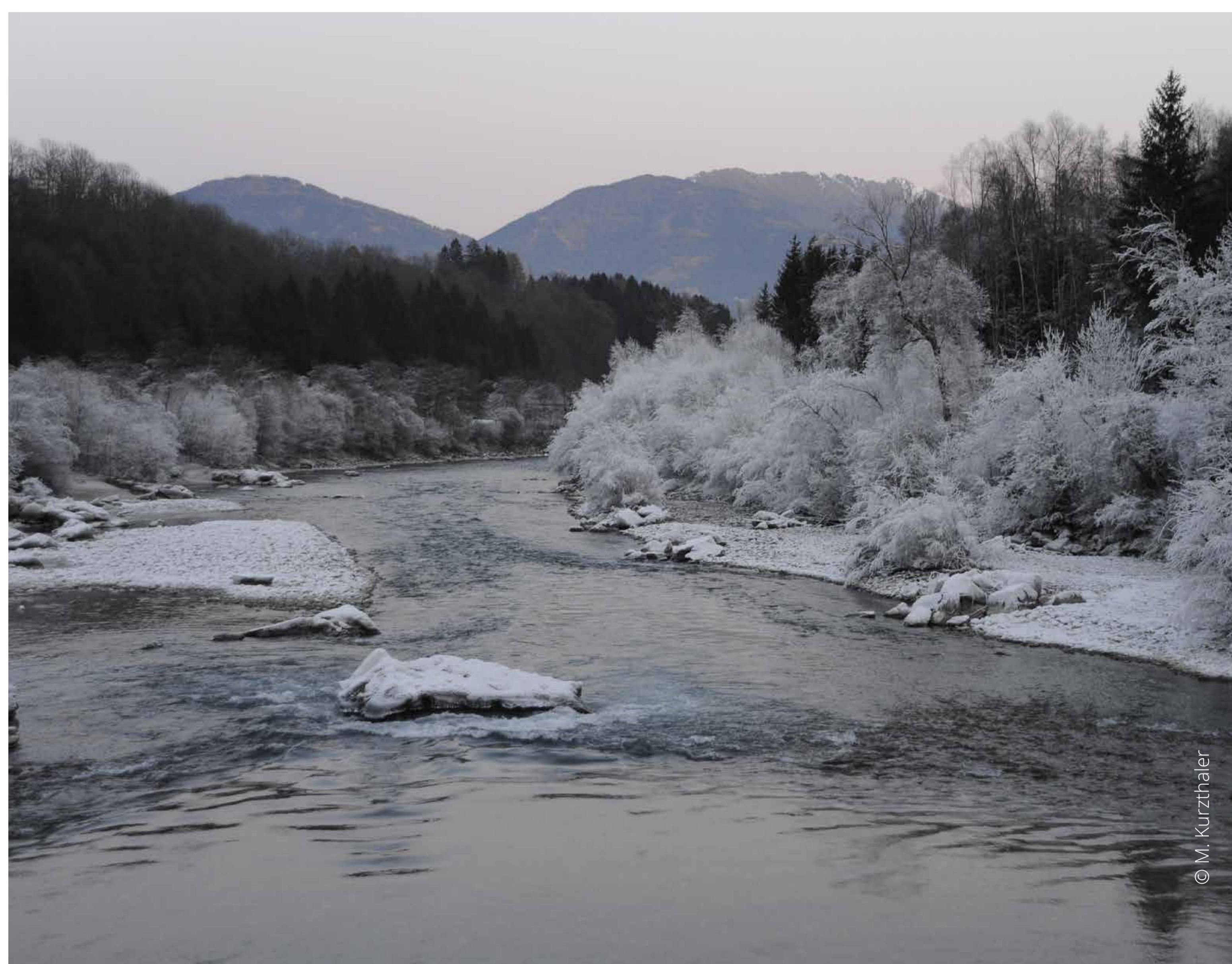
The Pfarrbrücke bridge in Lienz - the Isel continues for a good kilometre, then it flows into the Drau, which carries considerably less water.

The nature of a glacial river

Seasons and times of day



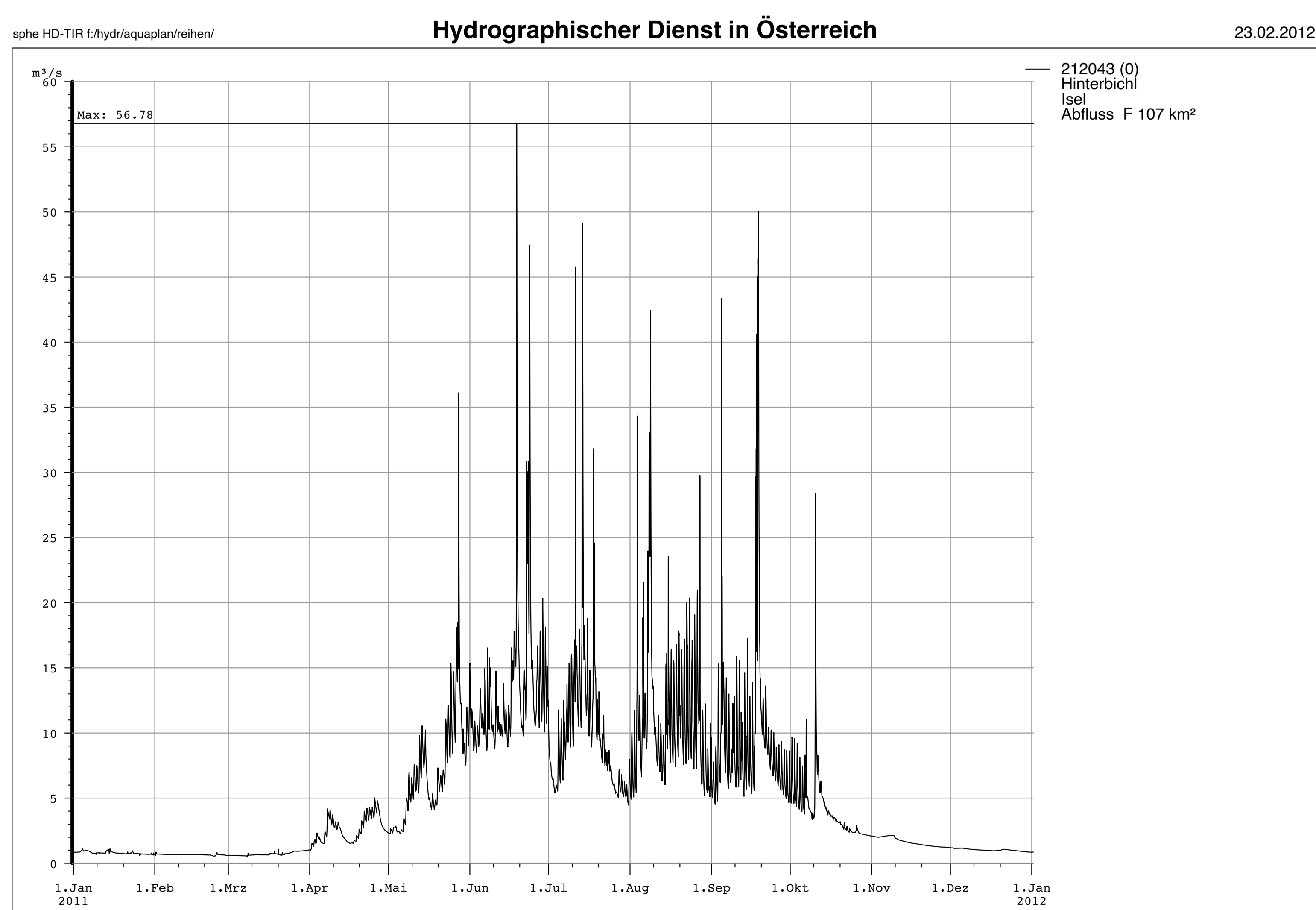
Vast amounts of water, cloudy in colour due to fine material (glacier milk) and strong currents. The Isel in midsummer, a paradise for water sports enthusiasts.



Small amounts of crystal-clear water, hoar frost on the trees and bitterly cold, another face of the Isel

On summer afternoons, it receives an enormous amount of water from the huge glaciers in the hinterland, can develop great forces, transport huge quantities of gravel and fine sand and create its own ecosystem. In summer, it roars down into the valley with elemental force, offering a fantastic natural spectacle and delighting many people. From midday onwards especially, the water begins to rise. Less water flows in the morning, while in the afternoon a lot of snow and ice melts on the glaciers. The water only reaches the district town of Lienz at night.

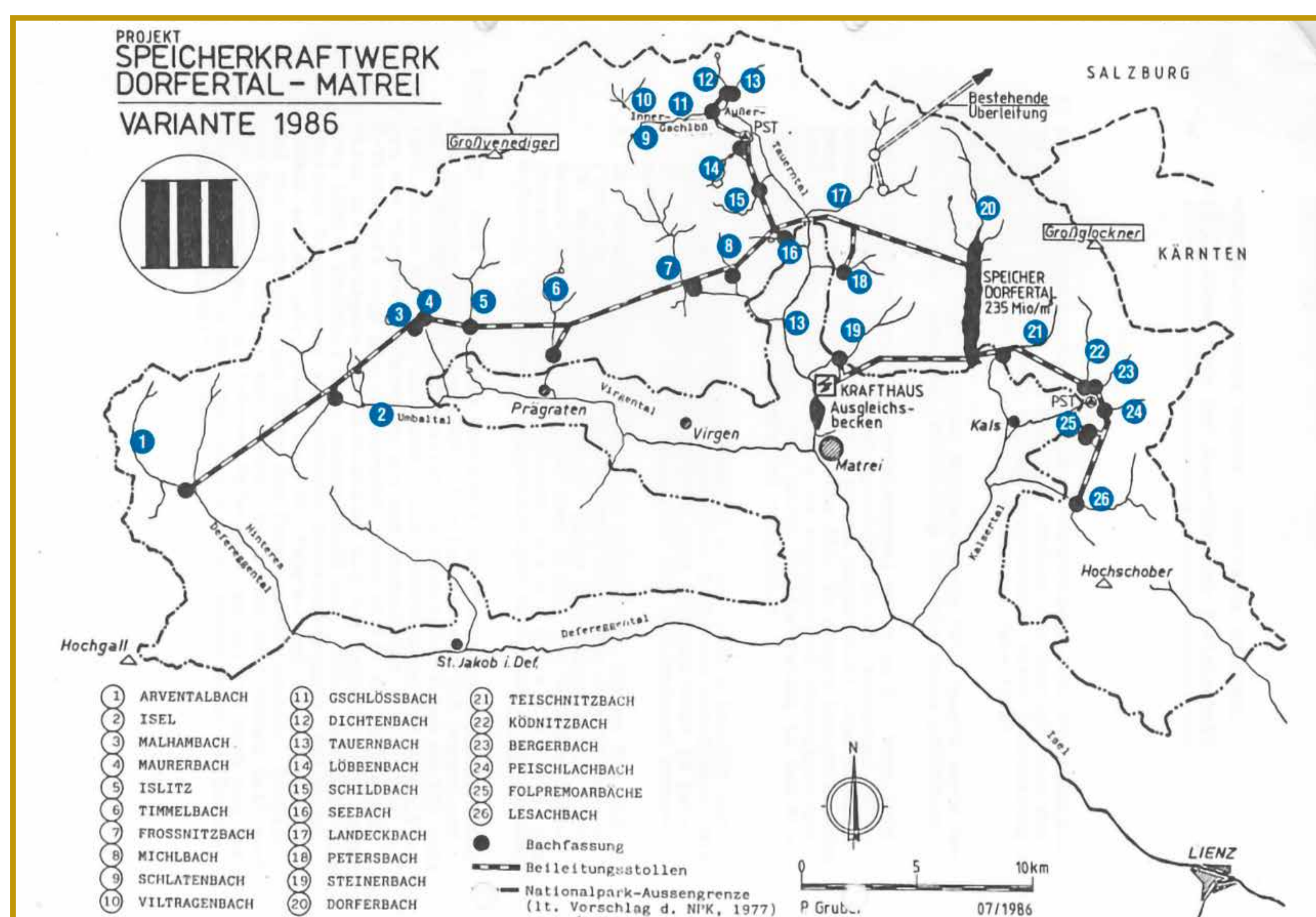
In winter, it is quiet and calm, with very little water, but that water is crystal clear. The Isel characterises and connects the communities of the Virgen and Iseltal valleys - in all their diversity - as a local recreation area. Its banks are a huge playground for children and a resting place for those seeking relaxation. And it provides a habitat for extraordinary fauna and flora, such as the sandpiper and the now particularly rare tamarisk.



In winter, 1 to 2 m³ of water per second flow past the gauging station in Prägraten, in summer it is up to 40 m³ and during flood events the flow even reaches up to 60 m³.

The Isel and its tributaries write nature conservation history

The waters of the Isel and its tributaries in East Tyrol represent a "crystallisation point" in the history of the Hohe Tauern National Park. Glacier ski areas and "Alpine panoramic roads" play an important role here, as do major energy projects that would have involved reservoirs, water diversions from the Isel and its tributaries and the corresponding power station infrastructure. The close link between the history of the Hohe Tauern National Park and conflicts of use surrounding power plant projects meant that, before the Hohe Tauern National Park was legally established in 1981 (Carinthian part), 1984 (Salzburg part) and 1992 (Tyrolean part), 100 years passed from the idea to it becoming reality. In the original plans and ideas, a national park and large-scale industrial developments were to be built in the same area - projects that were mutually exclusive.



Although the "compromise option" from the Osttiroler Kraftwerksgesellschaft (OKG) in 1986 dispensed with the elevation of the waters of the Gschlössstal - not least due to the fact that the planning area was owned by the Alpine Association - these water volumes were replaced by further catchments and diversions in the Matrier Tauertal and an extension of the bypasses into the Deferregental. The plan clearly shows which bodies of water were to be captured and diverted for the Kalser Dorfertal reservoir, including an elevated intake of the upper Isel in the Umbaltal valley.

Through hard wrangling and many negotiations, all major projects that stood in the way of the creation of the Hohe Tauern National Park were cancelled, especially in the 1980s. Taking the Tyrolean part of the Hohe Tauern National Park as an example - where the conflicts prevailed for the longest time - this was achieved in East Tyrol thanks to years of persuasion by numerous organisations and NGOs: the Hohe Tauern National Park Commission based in Matrie i.O., the Austrian Alpine Association, the Association for the Protection of the Recreational Landscape of East Tyrol with Dr Wolfgang Retter and local citizens' initiatives, as well as visionary farmers' representatives in cooperation with national park-friendly policies at federal and state level.



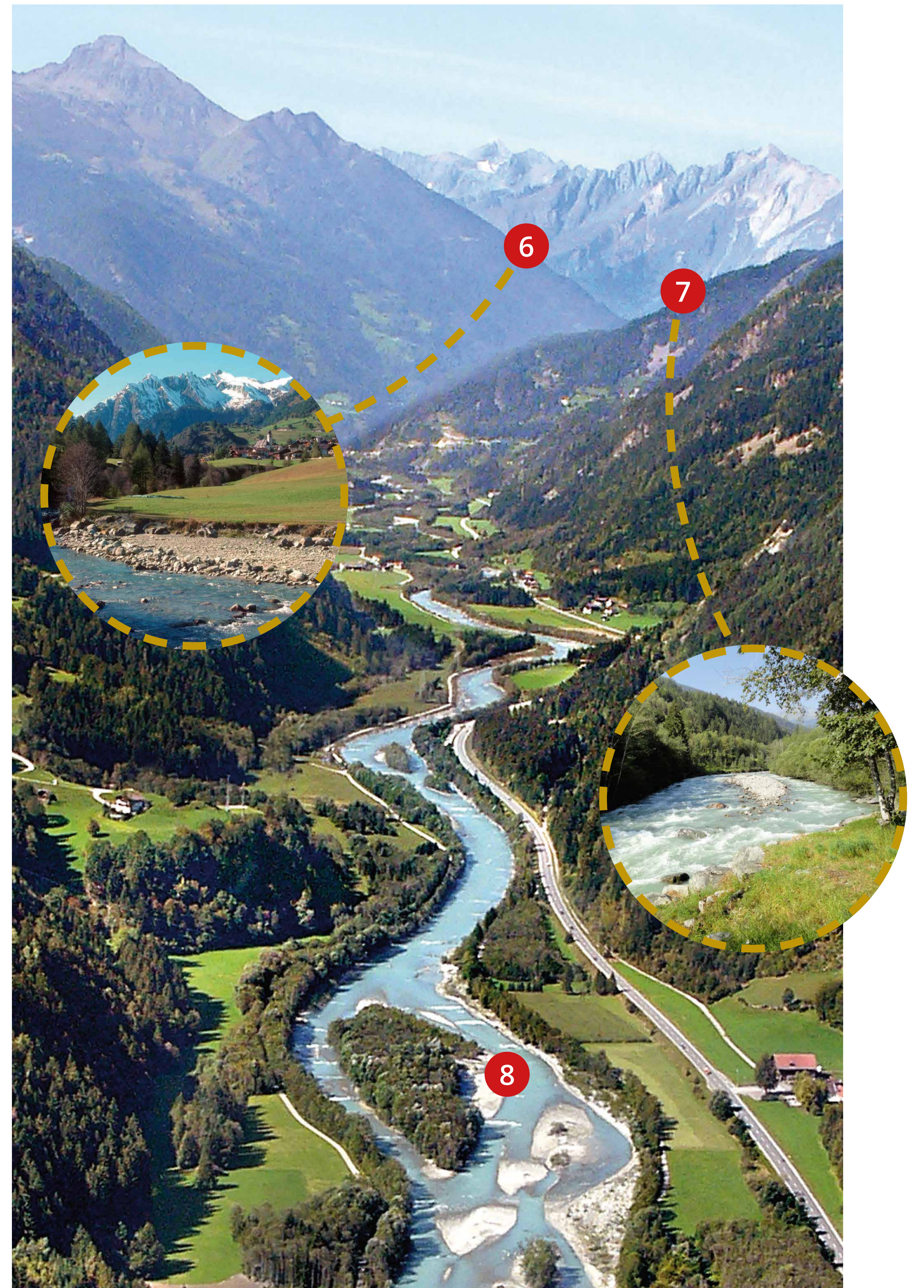
The Isel and the Umbal Falls in the media spotlight. Graphic: Archive Retter W.

In 1989, Robert Graf, the minister responsible for the energy industry at the time, announced the cancellation of the Dorfertal-Matrie i.O. power plant project. This led to the passing of the National Park Act in the Tyrolean Parliament in October 1991 and thus to the essential protection of the Isel tributaries and the Isel system as a whole.

The path of the Isel - a journey through half of Europe



View of the Umbaltal valley



View into the Iseltal valley



- 1 Origin of the Umbalkees in the Hohe Tauern National Park
- 2 Upper Isel
- 3 Upper Umbal Falls
- 4 Lower Umbal Falls
- 5 "Kleine Isel"
- 6 Isel in the Virgental valley
- 7 Isel near Mauterndorf
- 8 Isel near Schlaiten
- 9 "Grosse Isel" - the Isel and the Tauernbach flow together
- 10 Confluence of the Isel with the "kleine Drau" - the Isel becomes the Drau
- 11 Confluence of the Drau with the Danube
- 12 Emptying into the Black Sea

Graphics: NPHT Tirol; Fotos: Archiv NPHT, M. Kurzthaler, W. Retter, BBA Lienz, Fachbereich Wasserwirtschaft, Revital, Mündung Donau – Schwarzes Meer Daniel Petrescu – www.danielpetrescu.ro, Drau-Donau: Mario Romulic <http://www.romulic.com/>

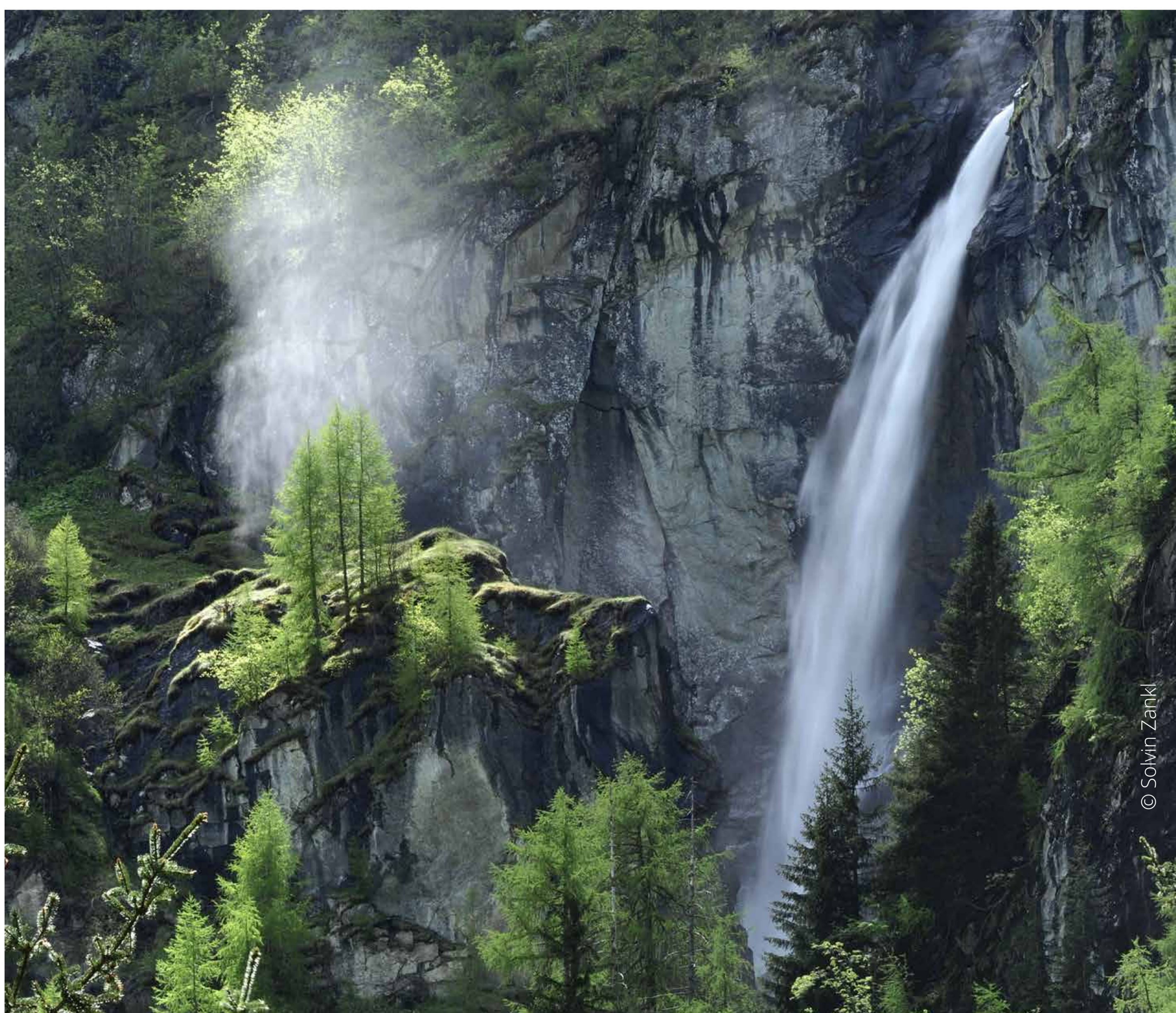
The treasured waters of the Hohe Tauern



Umbalkees glacier gate

Glaciers, streams and lakes: the Hohe Tauern National Park boasts not just high mountains, but also water. It plunges hundreds of metres down into deep gorges, meanders across wide Alpine pastures or ripples over hill and dale: no two streams are the same in the Hohe Tauern National Park. Only one thing is common to all of them: ultimately, the water from all of the national park's streams ends up in the Black Sea. It is a long way for the water to travel from the Hohe Tauern.

There are 279 bodies of running water and 136 bodies of still water in the protected area.



Grossbach Falls

Some streams are fed by glacial meltwater, others originate from a spring or - like the Dorferbach - flow from a lake. If a stream has to overcome high steps in the terrain, a waterfall is created. The origin, location and shape of the watercourses are very different. There are meandering stretches with low gradients or alluvial stretches, in which the stream branches into many main and side branches over large gravel areas - as is true of the Isel in many places. In the high mountains in particular, the different types of water change in a very small area - this is what makes the variety of streams in the Hohe Tauern so interesting.

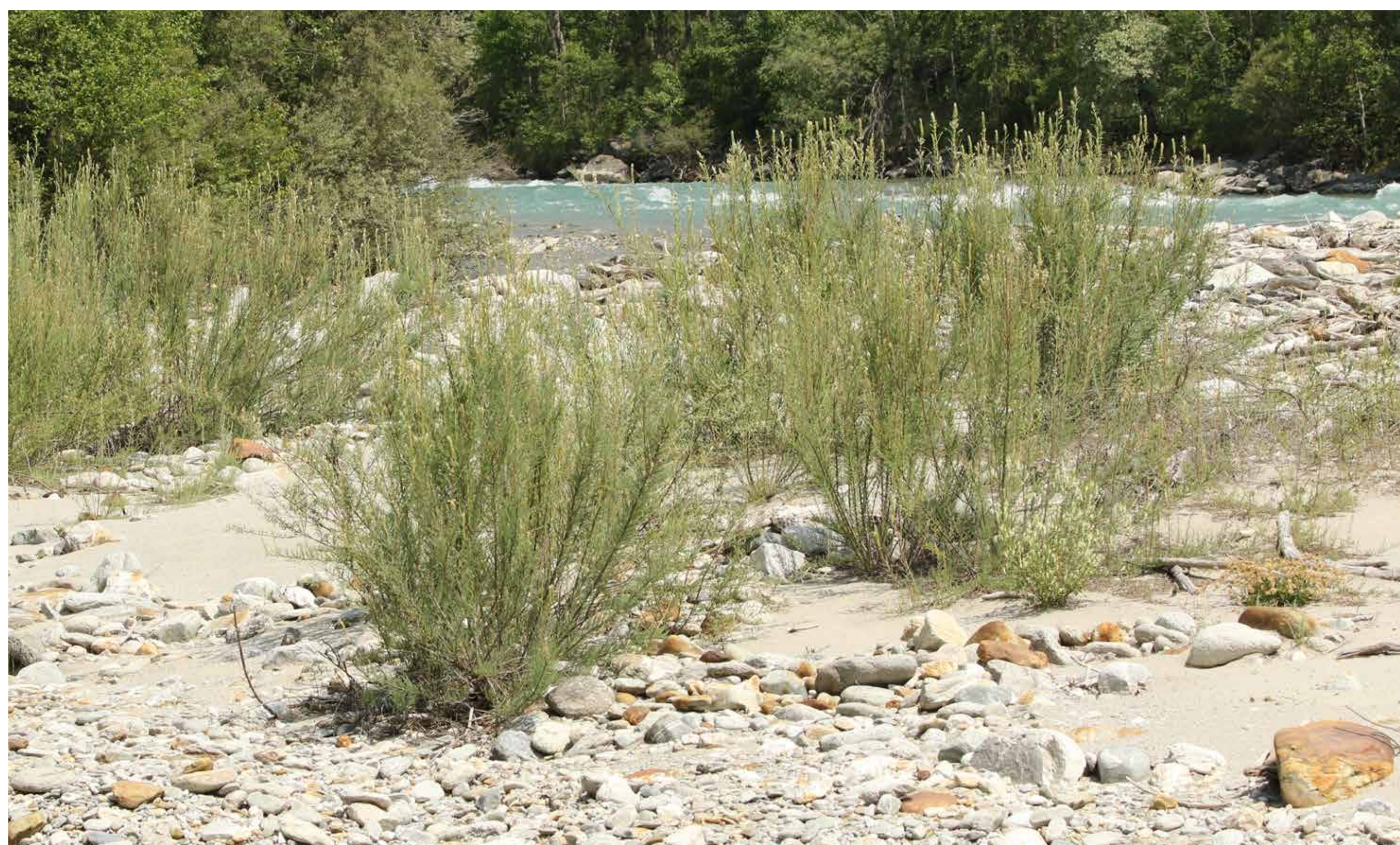


Meandering river in the Trojeralmtal valley

The flora of the River Isel

The ecological quality of the Isel is expressed in two main aspects in the plant kingdom, namely in the significant occurrence of the German tamarisk throughout Austria and - a fact far less commonly known - in the occurrence of numerous Alpine alluvial plants in the alluvial zones of the Isel.

The German tamarisk (*Myricaria germanica*) is undoubtedly the botanical herald of the Isel's vegetation and its significant occurrence throughout Austria was the reason behind the designation of the River Isel and its tributary streams as a "Natura 2000" site in 2015. This indicator species of intact watercourses is threatened with extinction throughout Austria due to massive population declines, but is still relatively widespread on the Isel and its tributaries and there are still some populations that are rich in numbers. As a pioneer shrub, it requires regularly flooded alluvial zones - if the water dynamics are lacking, it will be displaced by willows and other strong competitors.



The German tamarisk (*Myricaria germanica*) is threatened with extinction throughout Europe and can be found on all lists of endangered plants. However, there are still numerous occurrences on the Isel and its tributaries - Austria has a special responsibility for this plant, which is why the Isel has been designated a "Natura 2000" protected area.

Alpine or more generally mountain alluvial plants are commonly defined as plant species living at high, mostly sub-Alpine, Alpine and even subnival altitudes, which are washed down to lower areas by streams and rivers and are able to grow there on sand and gravel

banks. These Alpine alluvial deposits can be traced in several places along the Isel, with the gravel banks in the Virgental, the section between Feld and Huben and the large widenings in the lower Iseltal valley providing suitable habitats.



The Alpine flaxseed (*Linaria alpina*), usually only found high up in the mountains, even at an altitude of 4,200 metres, this delicate beauty sometimes makes it down into the valleys, as seen here on the gravel banks of the Isel - and becomes an alluvial plant.

To date, 65 Alpine alluvial plants have been documented from the Isel alluvial zones, making the Isel one of the most important rivers within Austria, ahead of the Tyrolean Lech. The standard repertoire of Alpine alluvial flora on the Isel includes Alpine kidney vetch (*Anthyllis vulneraria ssp. alpicola*), Alpine goose cress (*Arabis alpina*), Alpine dragonfly (*Astragalus alpinus*), low bellflower (*Campanula cochlearifolia*), creeping gypsophila (*Gypsophila repens*), Alpine flaxwort (*Linaria alpina*) and yellow saxifrage (*Saxifraga aizoides*).



Also an alluvial plant and thus a greeting from the mountains, is the creeping gypsophila (*Gypsophila repens*). As with all alluvial plants, the seeds of the plant reach the valley via the water.

Text and photos: Dr Oliver Stöhr

Bird paradise on the glacial river

The great ornithological speciality on the Isel is the **sandpiper**. It is inextricably linked to near-natural watercourses with sufficiently numerous and large gravel areas. And therefore it is extremely rare now that most rivers in Europe have been heavily dammed and narrowed. This is not the case for the Isel, which has everything this little wading bird needs.



You need a bit of luck to catch sight of a sandpiper. Since many streams and rivers have been extremely controlled or built on, they have also lost their habitat. Here on the Isel there are still many places where the sandpiper lives.

The gravel surfaces serve as a nesting site and the well-camouflaged eggs are laid in a hollow. It lives by the water and needs open gravel areas as nesting sites. Its eggs lie there in a shallow hollow and have perfect camouflage colouring. In case of danger from predators, the sandpiper mimics an injured bird and drags itself in front of the enemy to distract from its clutch or chicks.

The chicks are nest fledglings and leave the nest immediately after hatching. This is absolutely necessary, because the water level could change quickly and the chicks would be washed away. They then find food on the banks on mud and sandy areas, which in turn can only be found on very natural rivers.



The sandpiper needs large gravel banks as a habitat. There are many of them on the Isel.

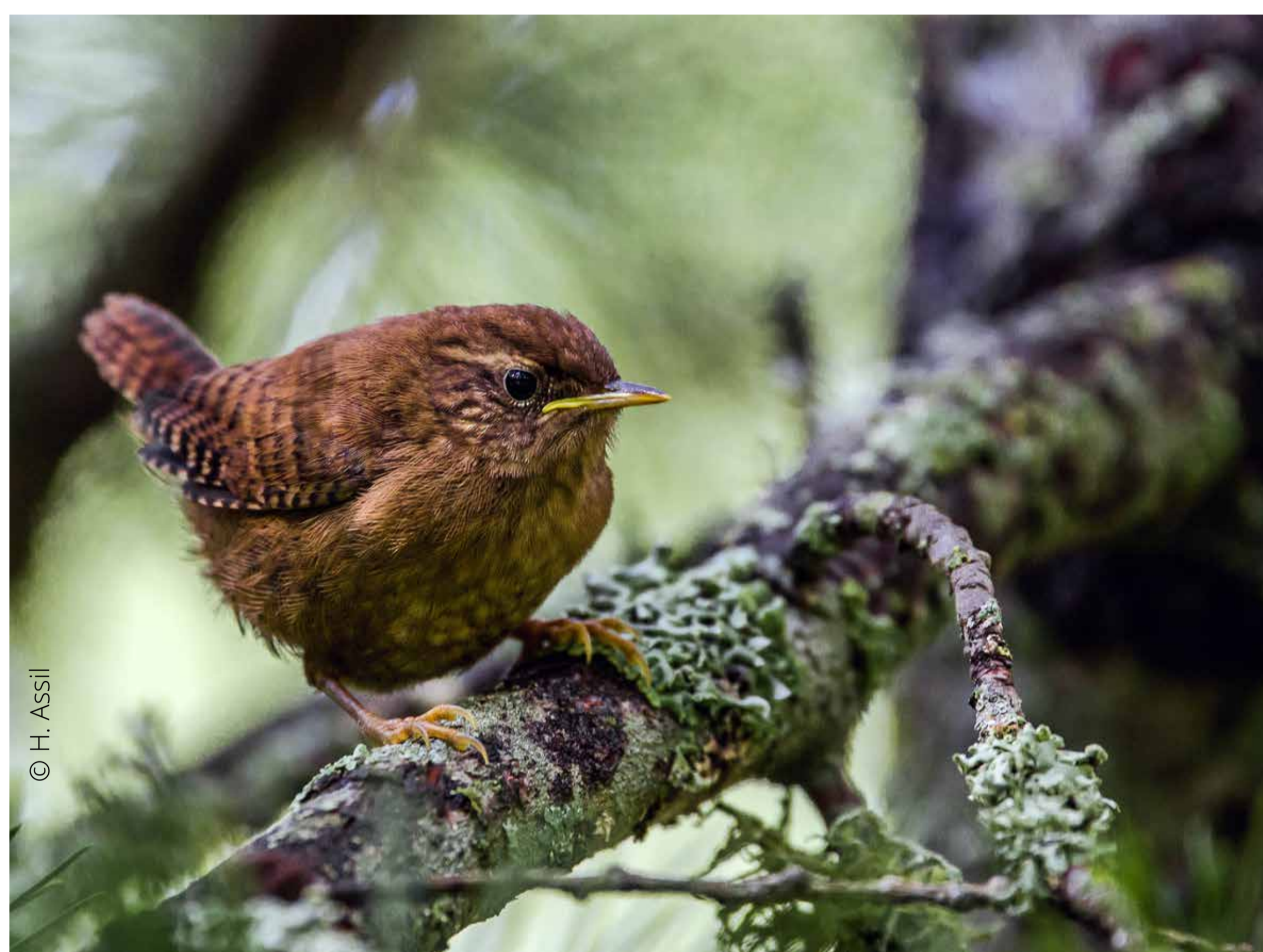
The dipper

The dipper is the only species of songbird that not only swims well, but can also dive very skilfully. It has developed striking adaptations such as heavy, marrow-filled bones (in other birds the bones are air-filled) and short, rounded wings. The eye is protected under water by a transparent third eyelid. A fold of skin covers the ears. So even roaring streams are no problem for this little bird. The spherical nests are built well hidden on rocks near the shore.



The dipper is the only songbird that actually dives underwater to catch prey.

The wren

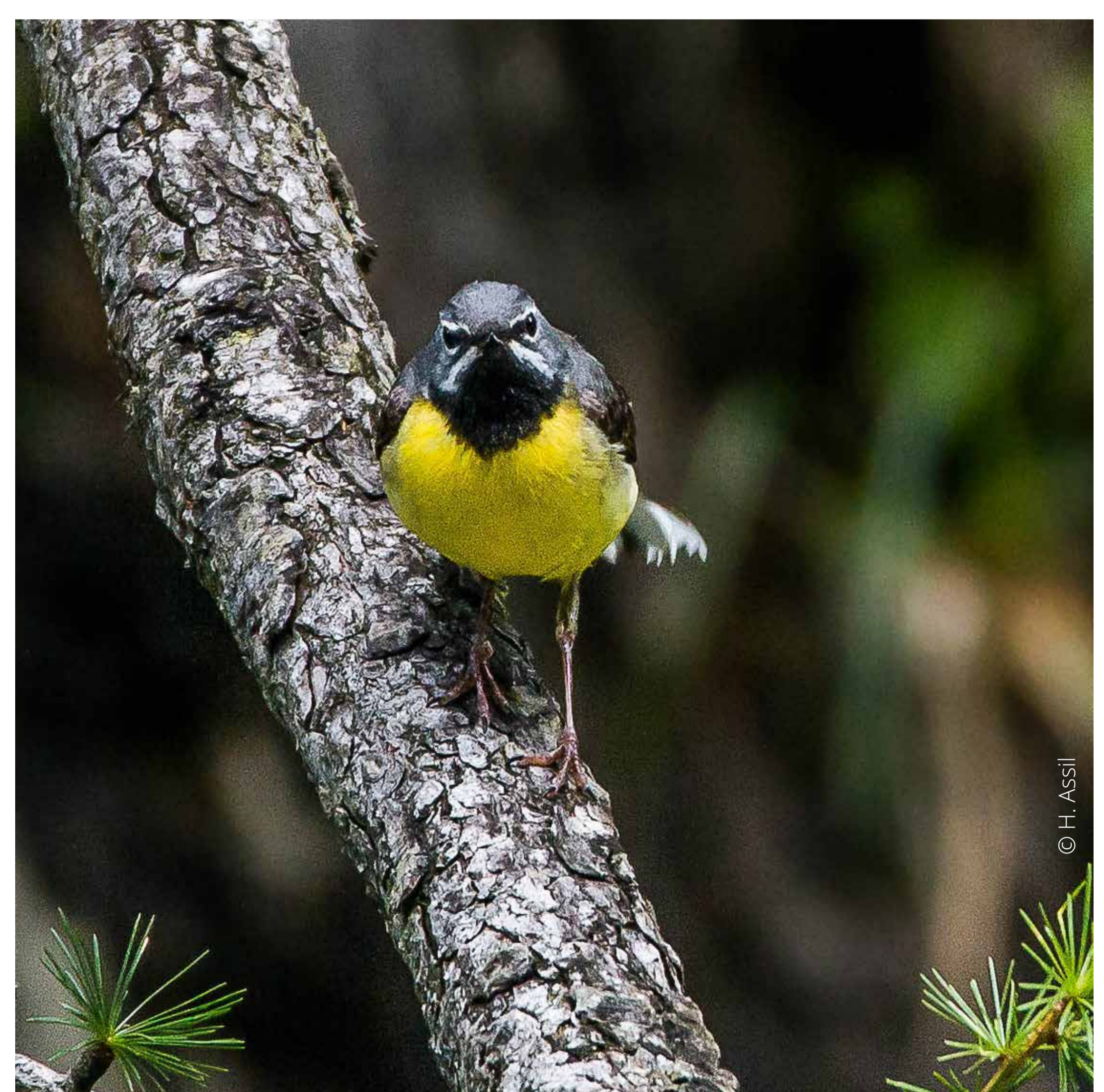


The tiny wren has an amazingly loud voice. He has to, if he wants to make himself heard in his noisy neighbourhood by the stream.

Small but mighty! This is the wren. The very small bird has a surprisingly loud voice. He needs it too, in the noisy environment in which he lives - namely natural riparian areas such as those found in abundance on the Isel. The tiny creatures can scurry like mice through undergrowth close to the ground in search of insects and spiders. The wren often twitches its short, stilted tail, probably to adapt to its constantly moving surroundings. If there is enough food available, a male can also mate with several females.

The grey wagtail

The grey wagtail prefers to colonise fast-flowing streams with gravelly banks. It is an indicator of clean, undisturbed and near-natural watercourses. She constantly bobs her tail and body up and down. The noise of the water drowns out calls and songs, so clearly visible movements are needed for communication between partners and territorial neighbours. In very elegant flight manoeuvres, she hunts for insects, of which there are many near-natural waters.



The pretty grey wagtail prefers fast-flowing small rivers and streams in a near-natural state and ideally with lots of boulders.

Extremists under water

Anyone who has ever dipped a toe in a stream at the bottom of a glacier will know what really cold water is. Water temperature from 0° to 4°C - strong currents, turbid water due to glacier ice, silty eddies, if there are any, and hardly any food. And yet there are creatures that can live a life at the absolute limit of existence under these conditions.

In addition to the various adaptations in their physique, there are actually two strategies: resist or evade the current. The turbulent glacial stream is home to animals that are as small as possible and have a flattened or very slender body. This makes it possible to retreat to calmer areas. Others have suction cups and adhesive discs so that they can "stick" to stones. Two examples:

The predatory **stonefly larva** is extremely robust and has strong muscles. It also has powerful claws and hooks on its legs, which enable it to constantly stay in the turbulent currents and move around safely.

A striking feature of the stonefly larva is its flattened body and highly developed legs, which enable it to hold on well in the current. This species also needs oxygen-rich, clean water in order to survive.

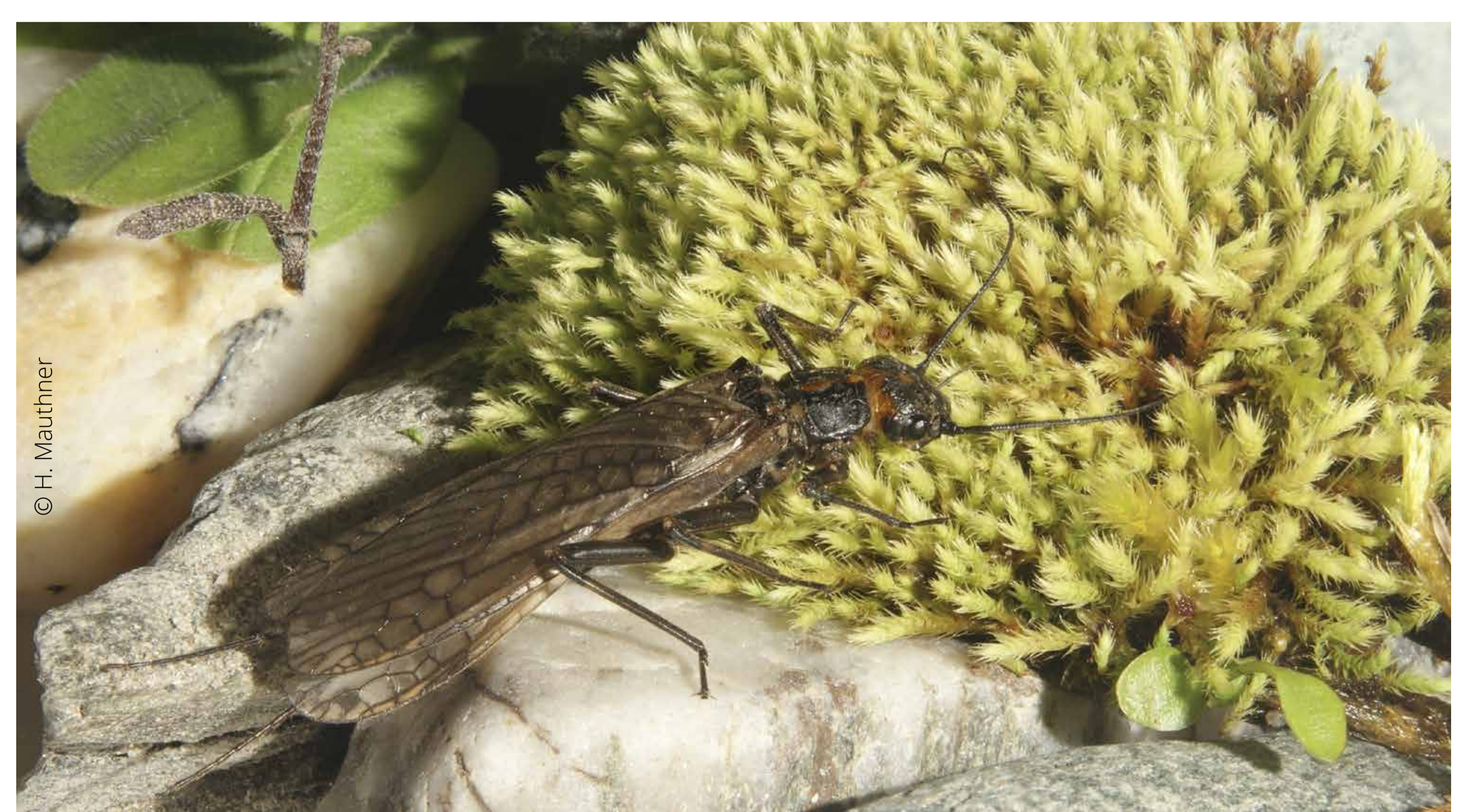


With its broad, flat body, the **mayfly larva** offers the current only a small surface to attack. The gills on its abdomen also act as an adhesive organ, while the three long, hairy tail threads (cerci) stabilise the animal, which mainly sits on stones.

The mayfly can live for several years as a larva - but only in absolutely clean waters. Common in the Isel and its tributaries.



The **mayfly** really only lives as a fly in the air for a few days. This time is used exclusively for reproduction. No more food is ingested.



Stoneflies are not closely related to flies, but form their own order within the insects. Its name refers to its main habitat, streams with stony beds. They are excellent bio-indicators for the assessment of watercourse habitats. They are particularly sensitive to organic contamination or pesticides.

The “fasting food” is back - the beaver

Some 8 years ago, a beaver was spotted in the Lienz valley floor in East Tyrol for the first time in 400 years. Because of its fin-like tail, it was classed as a fish and was therefore allowed to be eaten during Lent. With fatal consequences.... Eradicated! But the 20th century saw the first migrations from Eastern Europe to Germany and also to Eastern Austria. Tentatively at first, but then more and more. There are now beavers again on almost all the larger rivers, including the Isel, for example near Matrei.

Beavers build dams when the water is not deep enough there is no suitable bank to build on. Then the wood is simply felled and dammed up. A landscape archi- Smaller trees are gnawed down to get at the juicy twigs, its favourite food.

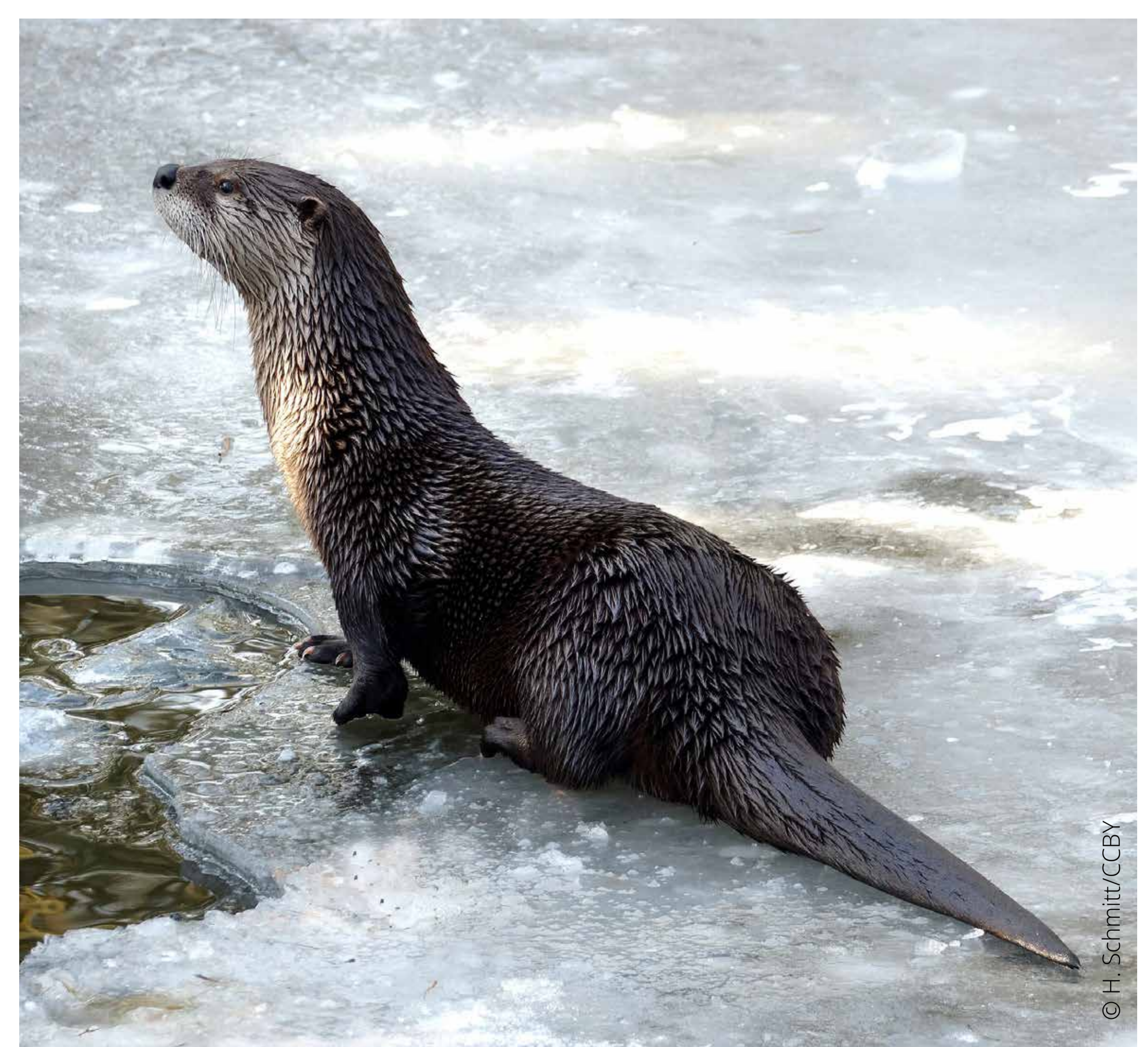
Just as soon as he returns, the beaver becomes the un-come guest again. In many areas, beavers are annoying mers because they are said to cause damage to fields near rivers. But where else should it go? Its original habi- riverine riparian forests, has long since disappeared in many large areas. Partly because of agriculture.



The beaver - the second largest rodent (after the South American capybara) has returned to us after a long absence, even without human intervention.

Here to stay - the otter

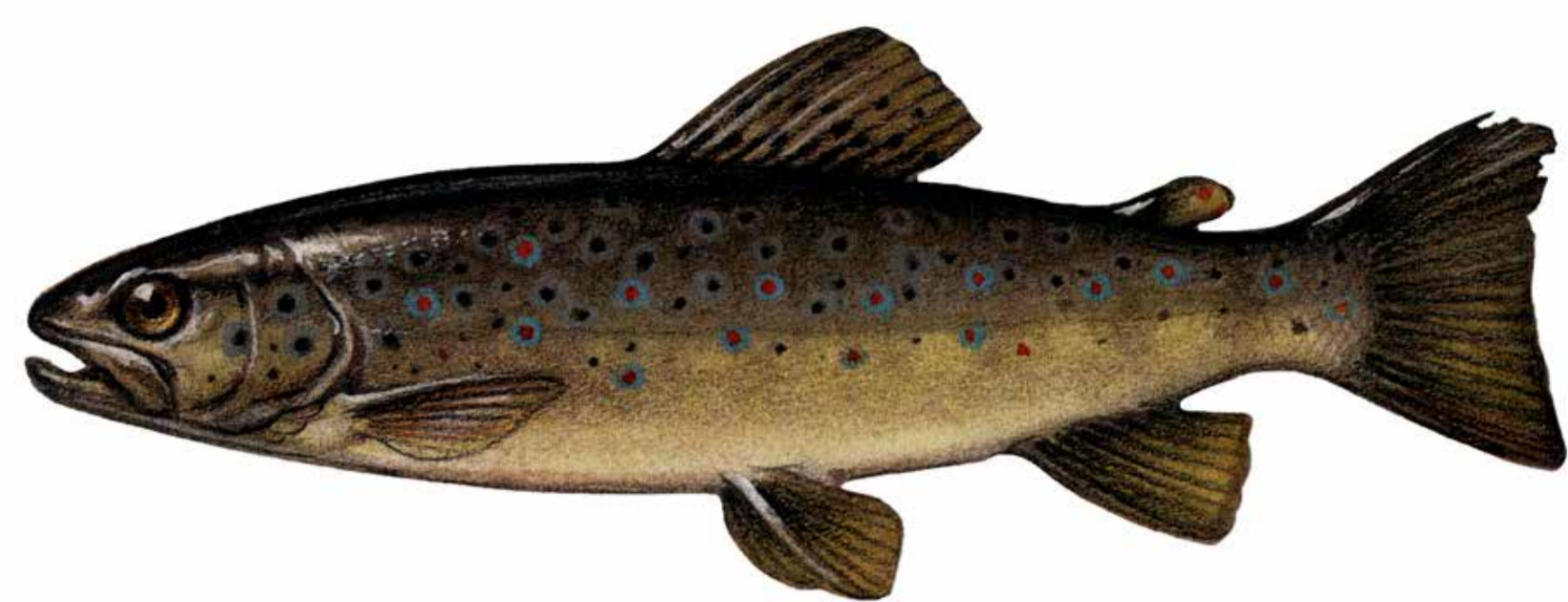
According to a study by the state of Tyrol, this marten species has spread "rapidly" over the past 10 years. There is talk of 57 to 85 animals, a quarter of which are said to live in East Tyrol. However, the first evidence of this strictly protected species was found in East Tyrol 20 years ago. The otter was thought to be extinct in large parts of Austria, but is now making a comeback. And some people aren't too happy about it. Especially not fishermen and fish pond owners. The otter is damaging the already endangered fish stocks and also particularly protected fish species such as the grayling. However, one animal species should not be played off against the other. Near-natural rivers and streams without barriers and with sufficient spawning grounds are important. Watercourse restoration has an important role to play here. Then there is room for both.



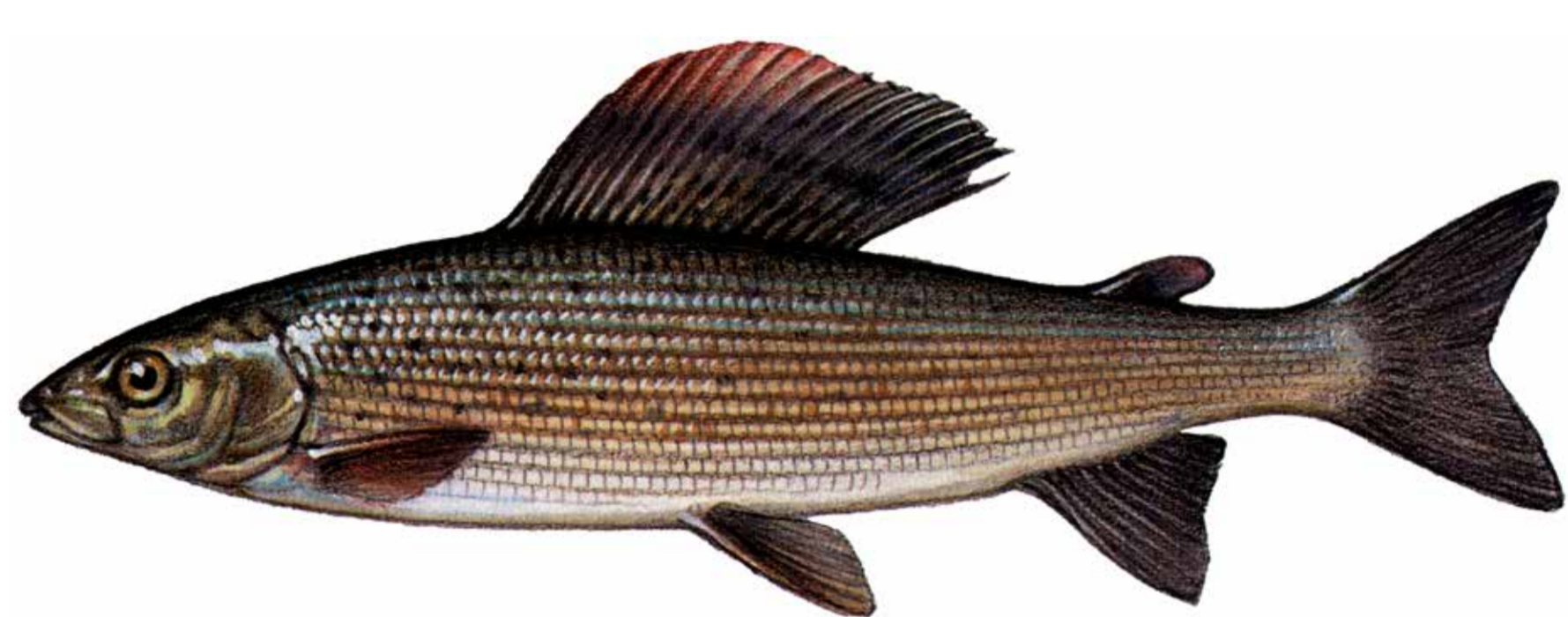
The otter has also returned to us. Perfectly adapted to life in the water, it is one of the best swimmers among land predators.

One river, many fins?

Whether you are walking along the Isel, cycling or even resting on the banks and observing the water, you will rarely see a fish, unless you are a skilled fisherman, especially during the period of glacial runoff with the "glacial milk". The Isel is also a well-known and favourite river for fishermen and therefore home to fish, despite or precisely because of its variety of water levels, structural characteristics ranging from wide to narrow and steep in the cataract stages, cold water, and so on.

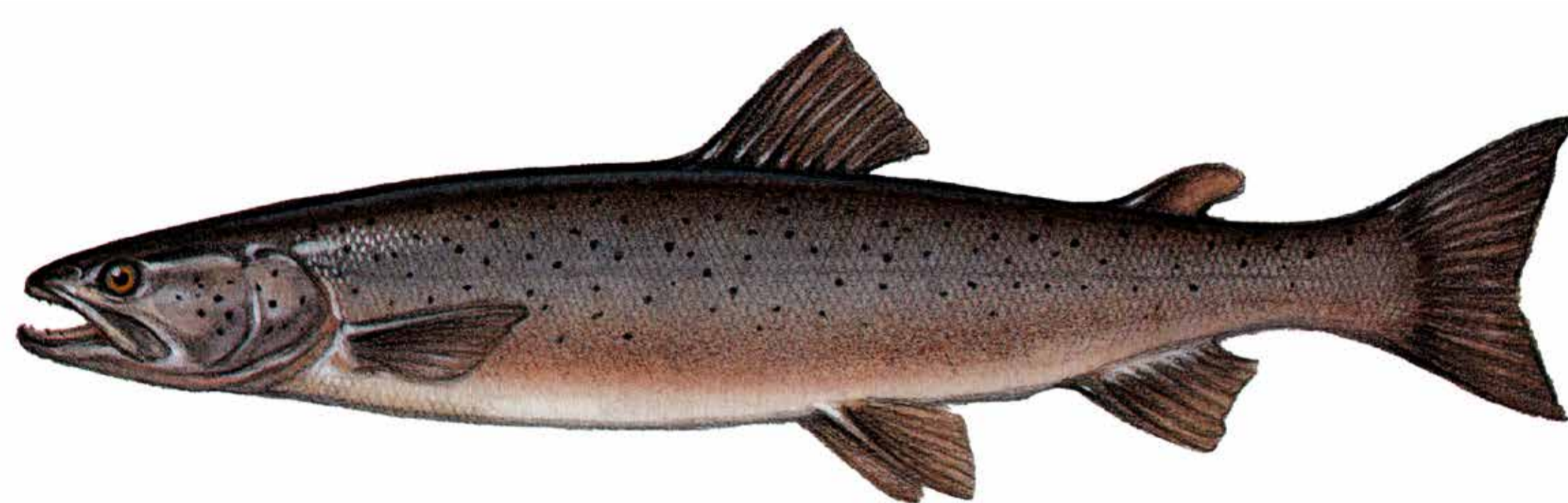


The "Kleine Isel", as it known, between its source in the Hohe Tauern National Park and the confluence with the Tauernbach in Matrei is the habitat of trout - mostly in the form of **brown trout** - and thus makes it part of the upper and lower trout region.



The "Grosse Isel" between Matrei and the confluence with the Drau represents the transition from the trout region to the **grayling region**. This is characterised by the large widenings and the large gravel banks.

In addition to brown trout, rainbow trout, brook trout and grayling, individual specimens of bullhead have also been observed in the Grosse Isel. However, these were probably relics from the past. The Huchen is the largest native salmon fish. It lives only in the Danube river system and also comes from the upper Drau into the Isel. To spawn, it needs gravelly ground in which the female makes spawning pits. The laid eggs are covered with gravel. According to the "Red List", the **Huchen** is considered endangered and is hardly ever found in the Isel.

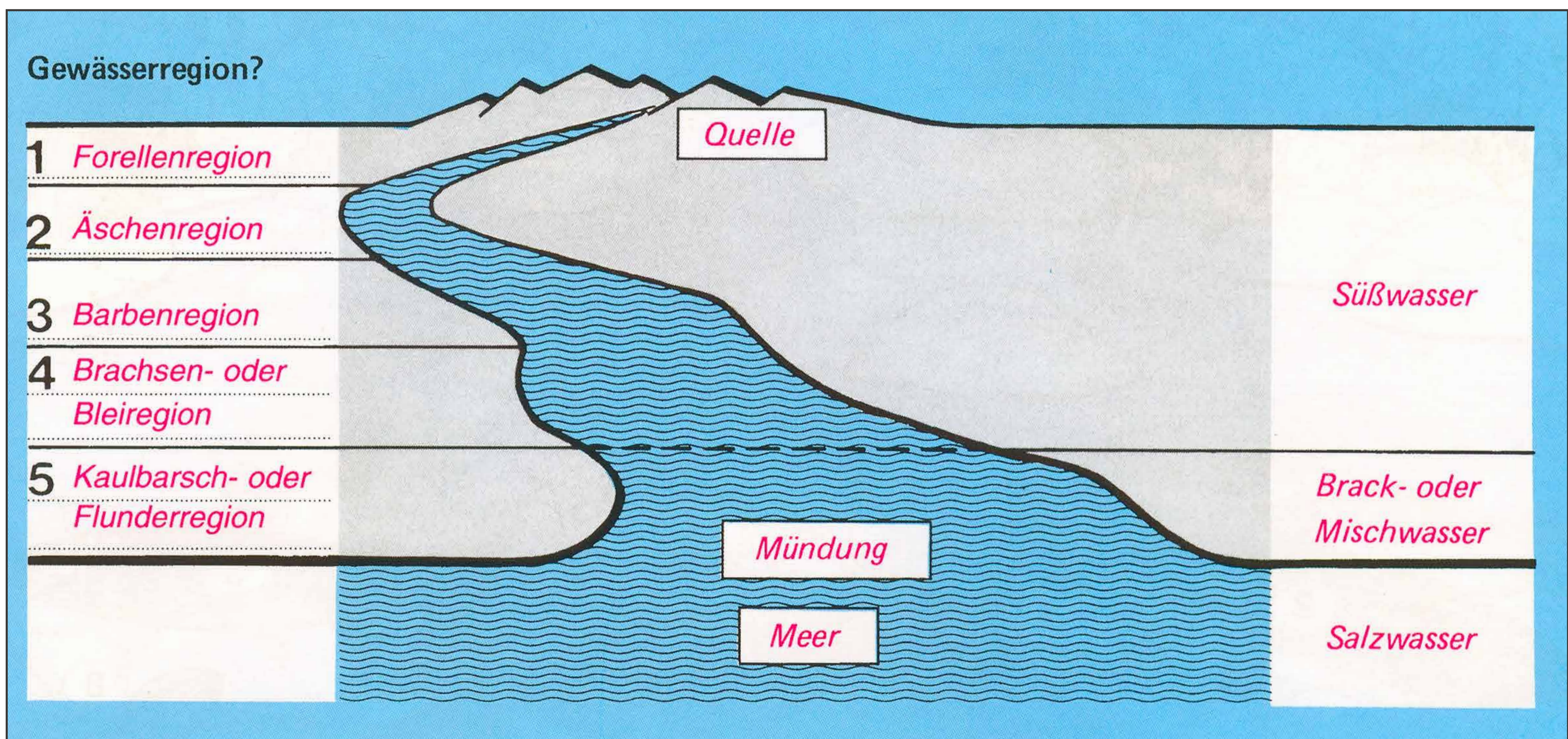


Small but significant!

Small tributaries of the Isel were often structurally reduced in the course of land consolidation and the damming of the Isel on the one hand, and on the other hand were often integrated into the Isel with pipes and insurmountable steep steps. The Michlbach, which flows into the Grosse Isel between Matrei and Lienz, shows the importance of the small side streams and their flowing confluence with the Isel. Although only about 300 metres of the Michlbach upstream of the confluence are passable, the Michlbach is one of the best spawning waters for grayling in East Tyrol. Every year, numerous pairs of spawning grayling can be observed here and thus provide new life in the Isel. Small tributaries that are well connected to the main watercourse often act as "nurseries" for the fish and also serve as an important refuge during flood events, for example.

The watercourses of the Hohe Tauern National Park are part of the trout region. Current-loving species are found in the clear, cold and oxygen-rich streams. The most common fish is the brown trout, which was originally the only salmon-like fish in these waters until the introduction of brook trout and rainbow trout from North America. Possible accompanying fish in this region are the small bullhead, minnow and loach. However, these accompanying fish usually avoid the torrents and are more likely to be found in quieter sections.

From the sea to the mountain ...



Source: Gewässerkunde. Heintges Lehr- und Lernsysteme, 2007.

Fish and other aquatic organisms have adapted to their changing habitat. From the mouth of a river into the sea to its origin in the mountains, numerous characteristics change - in addition to the structure of the riverbed, especially the flow and temperature. Based on the occurrence of certain adapted fish species, water bodies from the source to the sea can be categorised into water regions according to indicator fish species. The upper reaches of the streams and rivers mark the start of the

Trout region: This region is characterised by cold, oxygen-rich, clear water with strong currents and sometimes raging floods. The ground is stony and rocky. Primary fish: Brown trout, rainbow trout, brook trout, bullhead, minnow and loach.

Grayling region: The grayling region is characterised by changing currents and clear, oxygen-rich water. The bottom of the water is mostly gravelly. Primary fish: Grayling, huchen (Danube region), nase, rainbow trout, minnow.

Barbel region: Steady current, slightly turbid water with low oxygen content at the bottom. Gravelly to sandy subsoil. Primary fish: Barbel, nase, pike, huchen (Danube area).

Bream region: Slow current, murky water with little oxygen at the bottom. Sandy to muddy water bottom. Primary fish: Bream, carp, tench, pike, perch, zander.

The bass or flounder region: Changing currents, mixture of salt and fresh water, changing water levels (tides), low oxygen content. Primary fish: Bass, flounder, zander, sturgeon, salmon.

The power of the Isel

The Isel rises at the foot of the Umbalkees at around 2,500 metres above sea level and flows for around 60 km until it flows into the Drau near Lienz at an altitude of 660 metres. With its largest tributaries, the Tauernbach (220 km²), the Schwarzach (320 km²) and the Kalserbach (165 km²), it drains a catchment area of approx. 1,200 km².

At the mouth of the Isel into the Drau, the winter runoff averages 8 to 12 m³/s, while in summer the water flow increases tenfold to approx. 100 m³/s. The available precipitation and the temperature curve essentially determine the dynamics of the runoff events, with the glaciation on summer days with low precipitation essentially determining the runoff events.

Danger of flooding:

South-westerly weather situation with warm air sliding over cool air, cool autumn (frost) with heavy rain, snowy winter with cool spring and subsequent onset of warm weather with rain.

Significant flood events:

1757, 1817, 1827, 1871, 1875, 1879, 1882, 1917, 1945, 1957, 1965, 1966, 1985 (Flutwelle), 1991

2nd to 3rd September 1965:

181 mm of precipitation within 48 hours

Consequences for the district of Lienz:

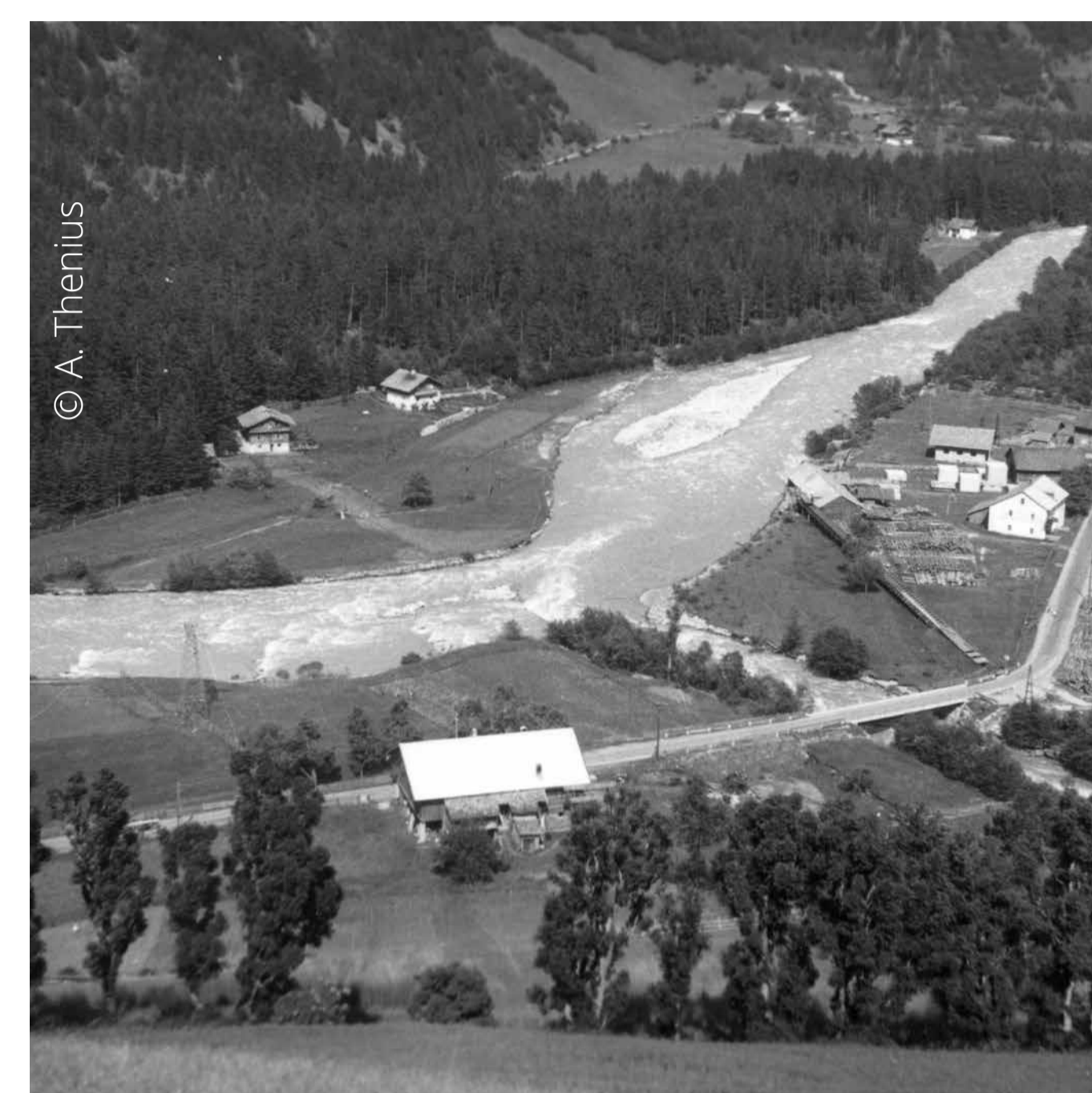
- 11 fatalities
- 36 destroyed buildings
- 141 people homeless
- 36 destroyed bridges
- 148 km of federal road destroyed
- 6.35 km of provincial road destroyed (Source Thenius, BBA-Lienz)

15 to 18 August 1966:

235 mm of precipitation within 69 hours

Consequences for the district of Lienz:

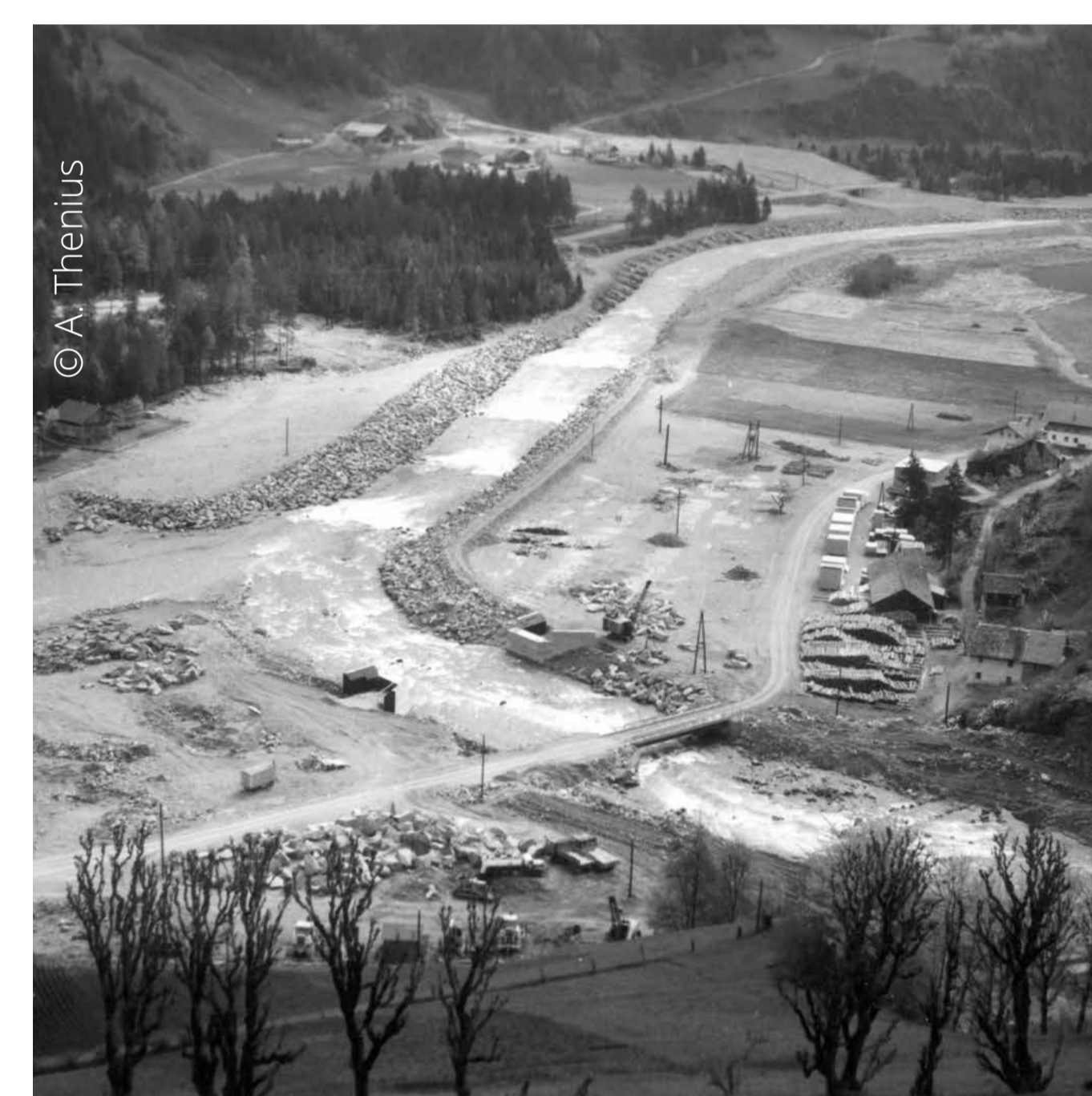
- 11 fatalities
- 21 properties destroyed
- 46 properties severely damaged (Source Thenius, BBA-Lienz)



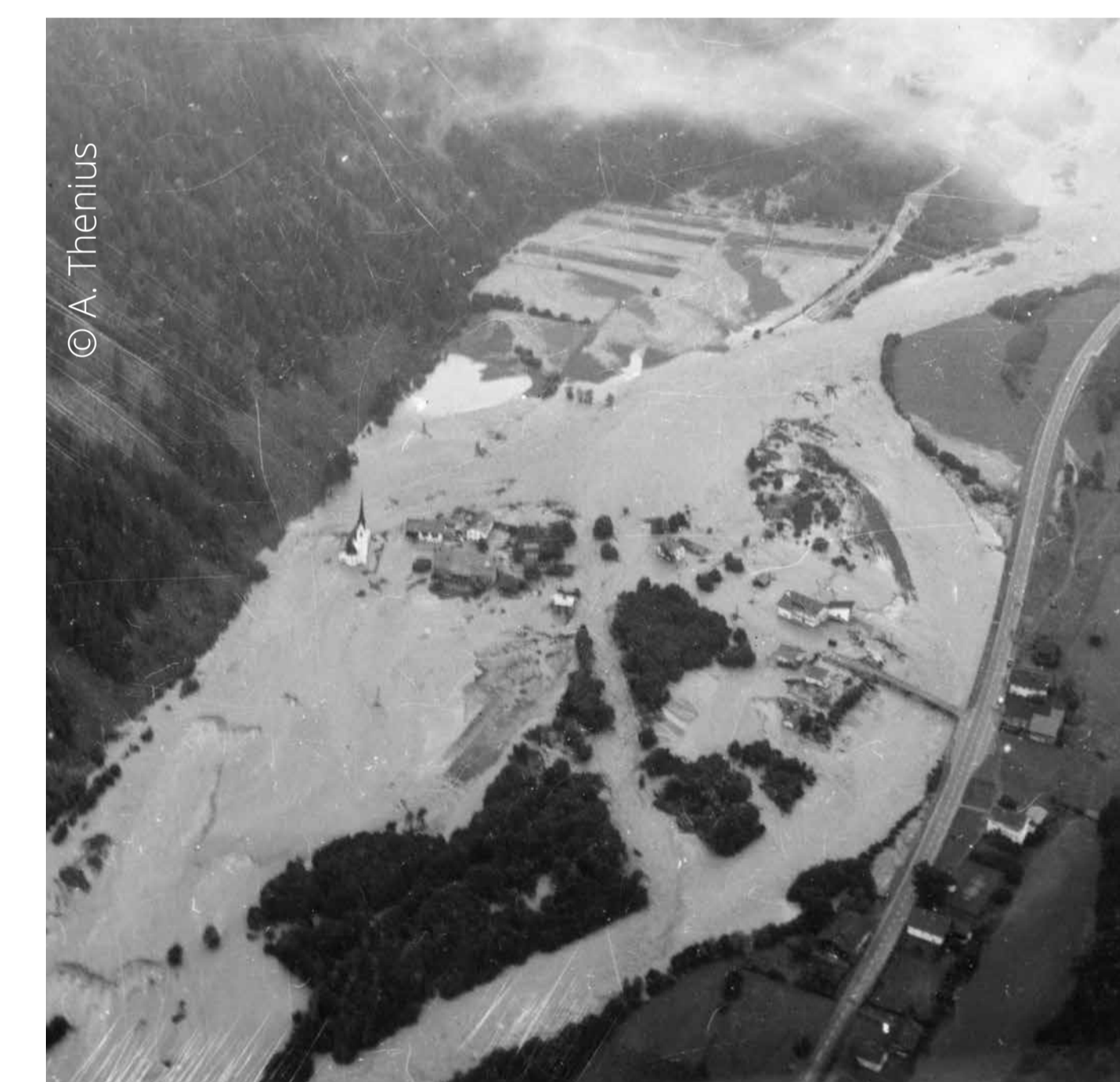
Huben in 1965 (before the catastrophe)



Huben in 1965 (after the catastrophe)



Huben 1966 (after construction)



St. Johann i. W., situation during the 1965 floods



Lienz 1966, the town is very lucky, no flooding



Lienz August 2020, the widening upstream is effective, the extreme flood event has no consequences for the town.

History of river defences, early river engineering measures

Until the 1960s, the Isel between Prägraten and Lienz was only regulated in sections in the area of settlements close to the banks. The technical and financial means were limited, determined by a lot of manual labour and so the course of the Isel, with the exception of the steep gorge sections, was characterised by river shifts with gravel islands, side arms and alluvial forests, especially in the lower reaches. The formative river engineering measures that characterise the course of the Isel today came about after the devastating floods of 1965 and 1966.



Isel in the area of the "Falter" farmstead, ca. 1950



Bretterwandbach stream near Mauterndorf in East Tyrol, 1949

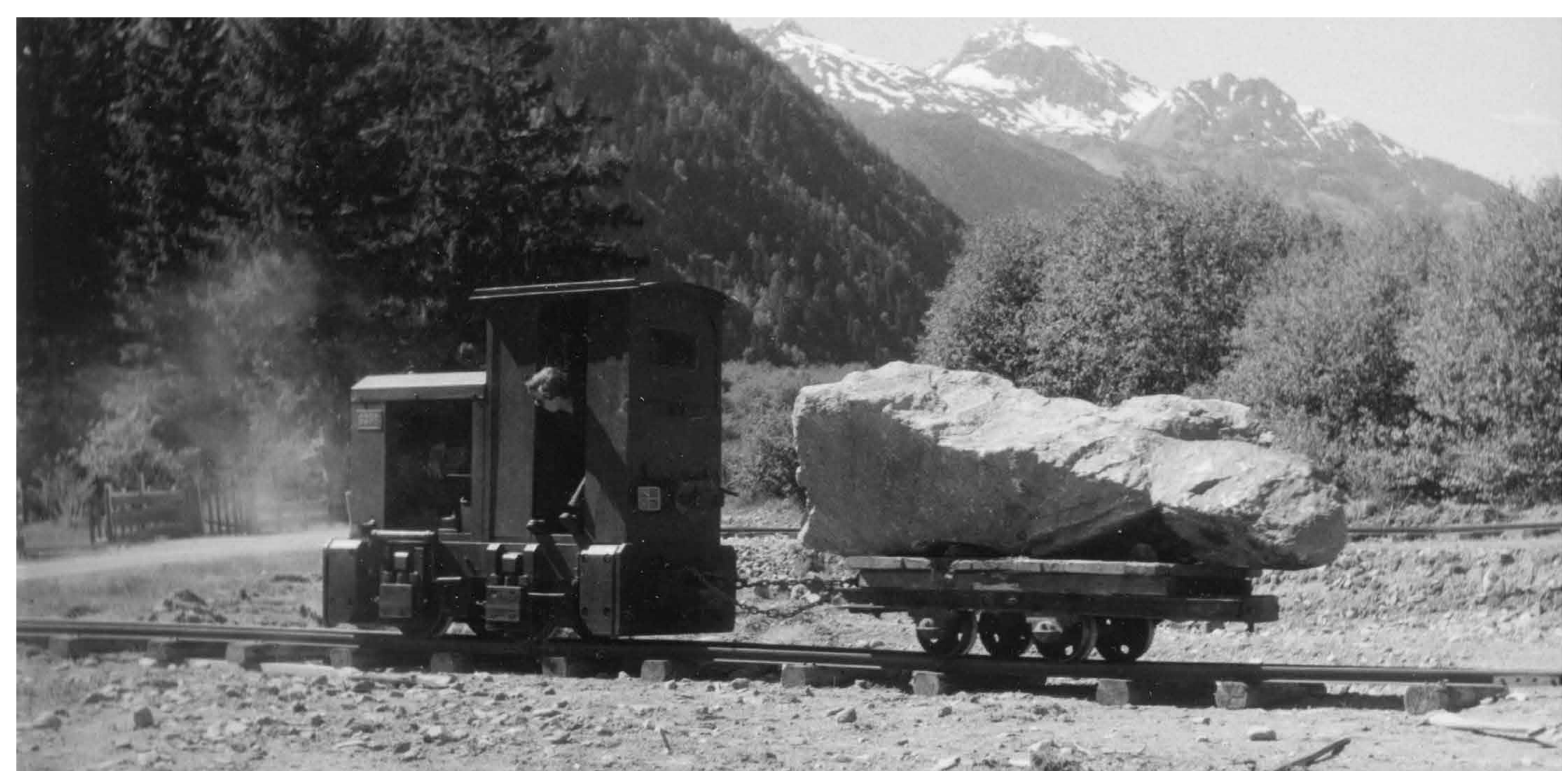
Early construction work:



Loading river blocks with tripod scaffolding and cable winch



Clearing debris landings using wooden sledges and cable winch



Stone transport by means of a provisionally constructed light railway



Moving wooden pilots using a diesel pile driver



Transport of hydraulic construction stones with diesel locomotive on light railway

All photos: BBA Lienz, A. Thenius

Widening and gravel basins of the Isel

Functions of the gravel basins:

- Bedload sorting
- bedload and wildwood retention
- flood retention
- bed stabilisation (fixed points in the longitudinal profile)
- energy conversion
- icebreakers
- reduction of flow velocity
- natural river morphological developments, special sites (Myricaria germanika, Alpine alluvial deposits, fauna-related significance, etc.)

The experiences of the 1965/66 flood events have shown that the dynamic mountain river that is the Isel cannot be continuously regulated, but needs space for bedload and wild wood deposits.

The following gravel basins were created after the events of 1965/66:

Name	Length	Width*
Pöllander	600 m	55 m
Oberlienz	550 m	150 m
Aineterbergl	430 m	180 m
Schlaitenerbrücke	250 m	85 m
Weierburg	900 m	165 m
Fischerwald	850 m	95 m
Falter	1600 m	175 m
Kienburg	700 m	75 m
Göbelhuben	2400 m	150 m

*At its widest point

So even back then, almost a third of the river section was widened and not squeezed between walls. In the last 3 decades, the gravel basins have been partially expanded and additional widening sections have been created. This has also been carried out on important tributaries such as the Schwarzach or the Kalser Bach.



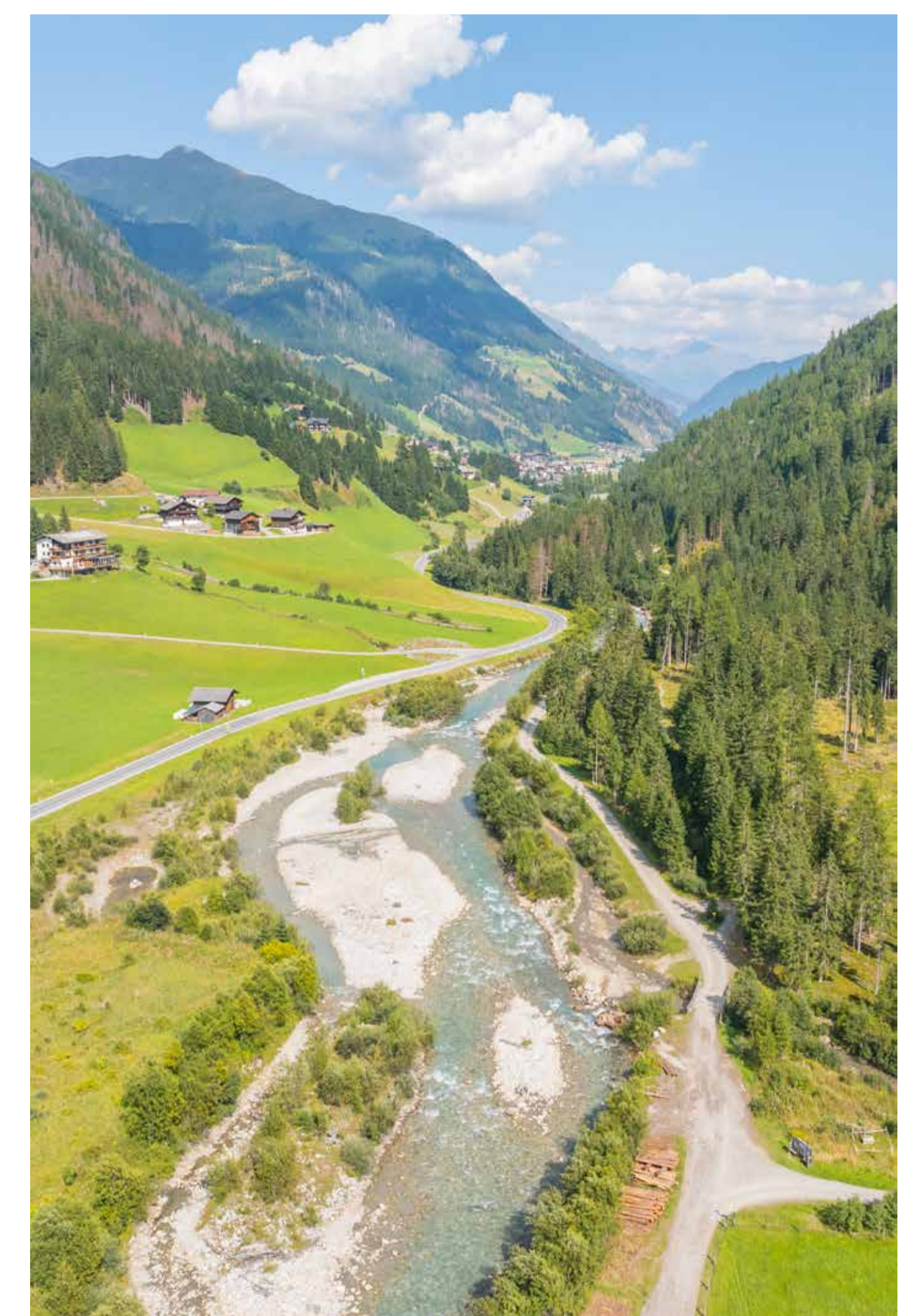
Isel Kienburg



Kalserbach extension



Göbelhuben widening



Widening Schwarzach, Maria Hilf



Widening in St. Johann im Walde: Length 2,500 m



Expansion of Weierburg gravel basin, Ainet: Length 650 m

All photos: BBA Lienz – Tichy

Integrative measures, current and future projects

Due to a lack of technical and financial resources, until the 1960s defence measures on the Isel were essentially limited to localised safety measures in the vicinity of settlements such as Matrei i.O., Ainet and Lienz.

Due to the devastating floods in 1965/66, which affected the entire district of Lienz, extensive safety measures had to be carried out on the lower reaches of the Isel between Matrei i.O. and Oberlienz to secure the infrastructure (roads, bridges, residential areas, electricity pylons, trans-Alpine oil pipeline, etc.). At that time, it was recognised that a wild river must be given sufficient space to deposit debris and wild wood and generous river bed widenings were created for this purpose. In addition to their river engineering significance, these have developed into supra-regionally valuable habitats for the German tamarisk, sandpiper, little ringed plover and many other rare species.



Gravel basin near Kienburg

In the last 3 decades, a number of gravel basins have been expanded and new widenings created. The interests of nature conservation (plant and animal communities, natural balance, landscape and recreatio-

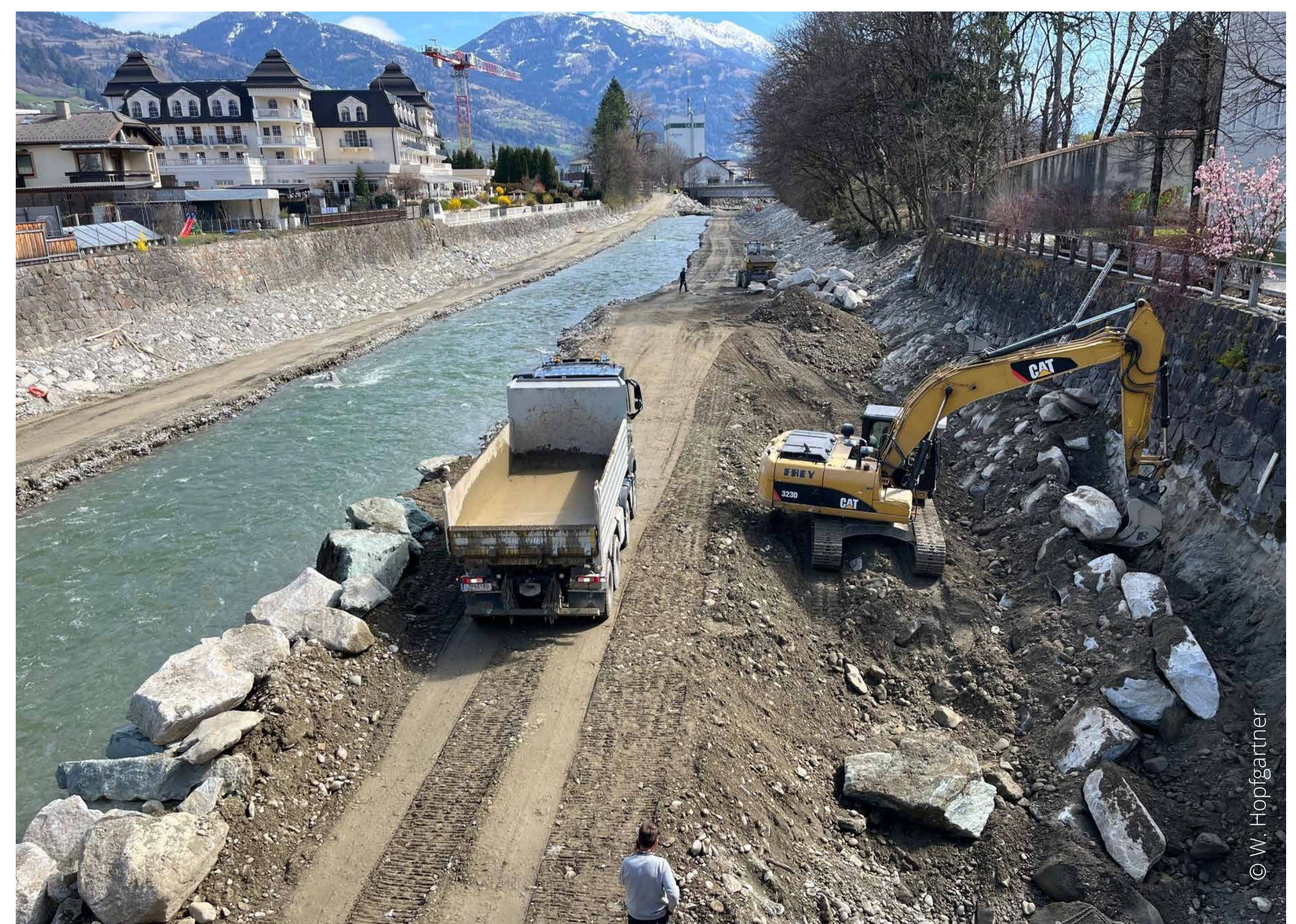
nal value), fisheries and water ecology must also be taken into account in all construction measures. The Isel offers paddlers, rafters, cyclists and hikers a variety of exciting sections, so their interests also need to be taken into account.



Hiking for pleasure along the glacier river

Current and future Isel Lienz projects

The "Isel Lienz flood protection" project began in December 2023 and the measures will be completed in June 2026. The focus here is on protecting the town of Lienz against a hundred-year event of 770 m³/s.



Isel Lienz construction work

Connecting side streams

Where technically possible and ecologically sensible, riverbed falls or pipework on side streams are removed so that fish can migrate back into the side streams.

Overarching plan, outlook

Hazard zone planning

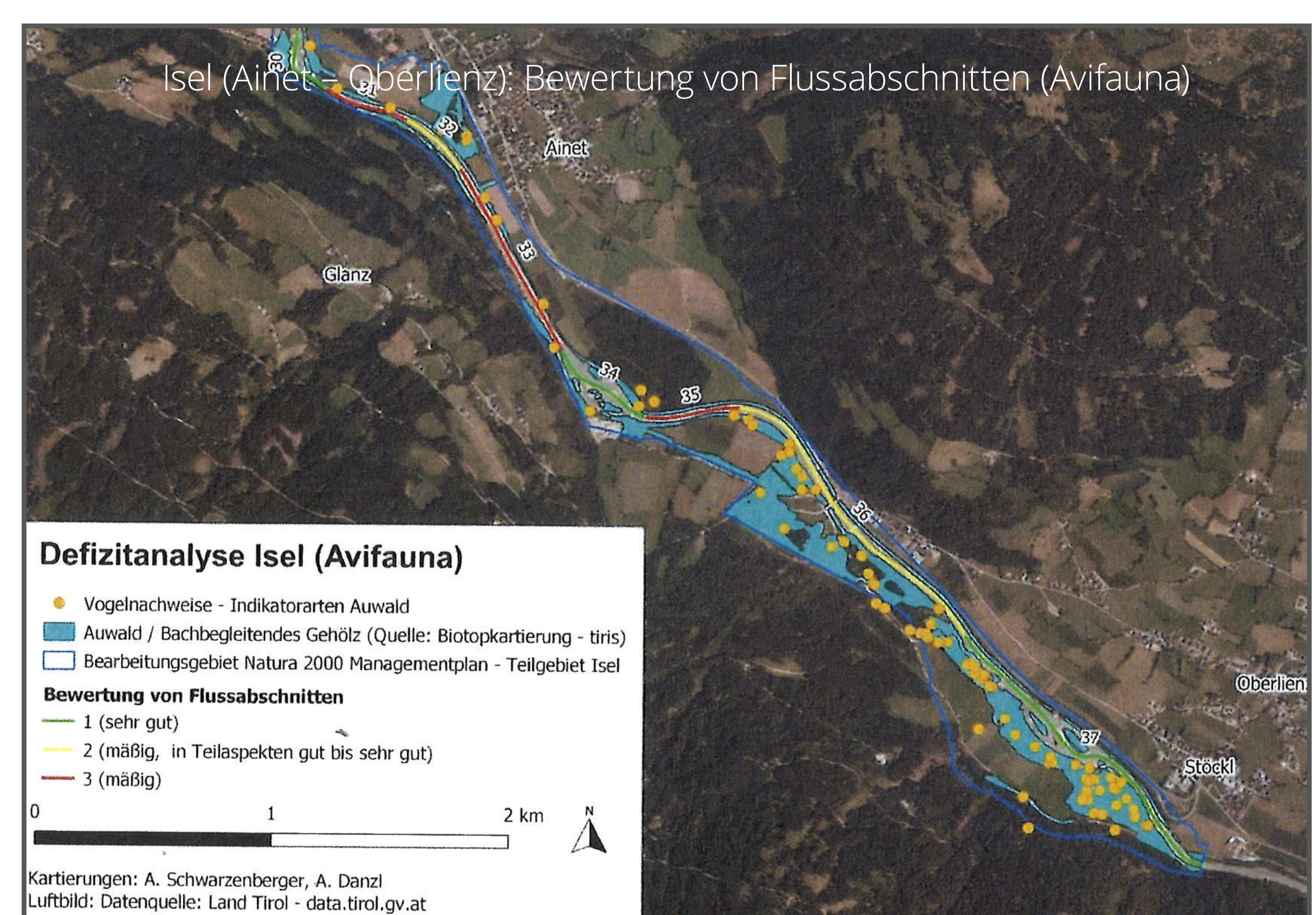
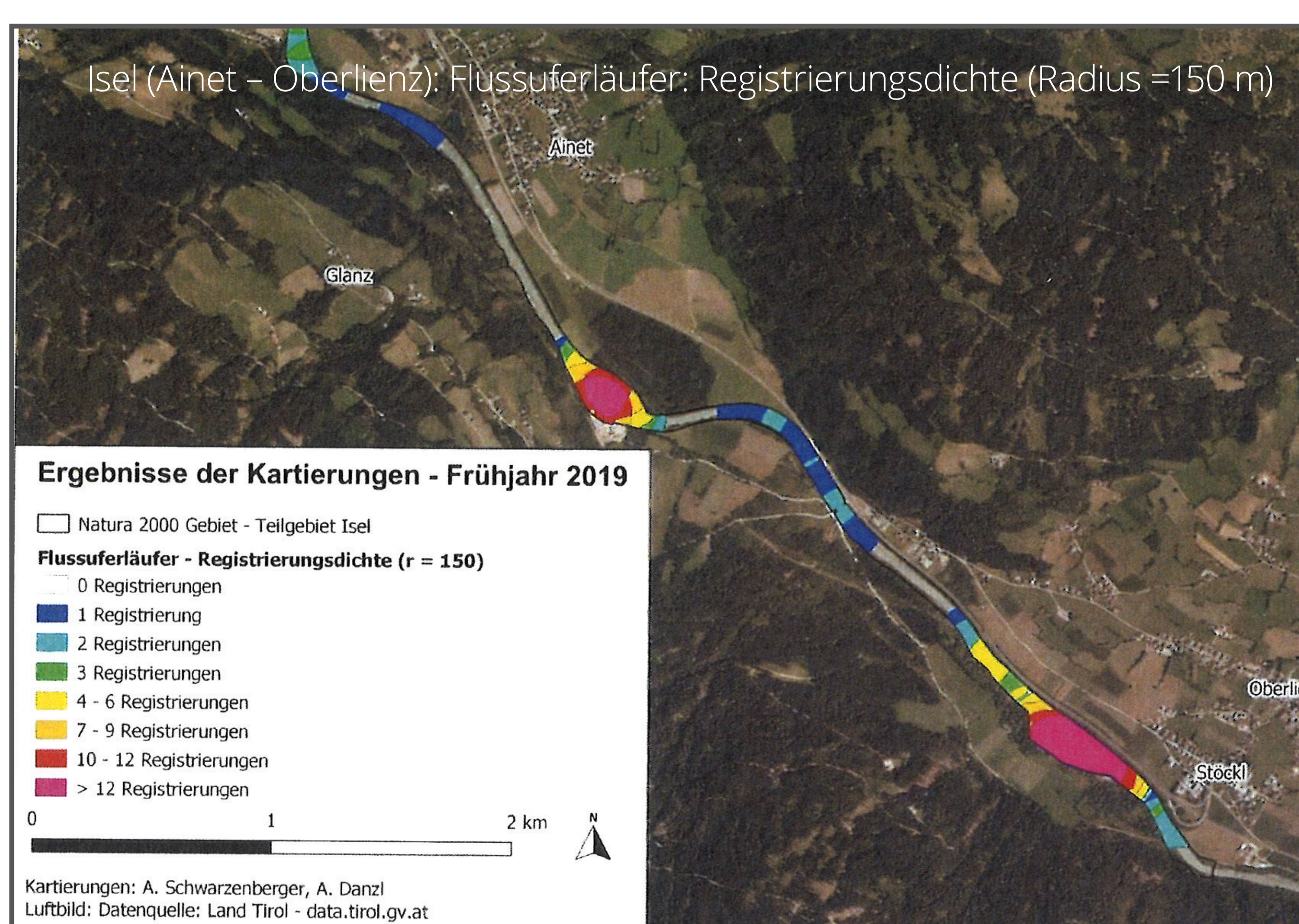
As early as the 1960s, a new approach to river engineering was chosen on the Isel by providing the glacial river with generous space for development in the form of gravel basins. Over the last 30 years, this river engineering method has been consistently implemented in many places, but the work is far from complete. A comprehensive concept was developed. For this purpose, a digital terrain model was created between Lienz and the gorge exit in Virgen and flood calculations were based on this. The calculation results were checked for plausibility on the basis of years of water level records and the experience of past flood events. A HQ100 - i.e. a flood event that statistically occurs once every 100 years - is key for the zoning in the hazard zone plan on the one hand and for planned flood protection measures on the other.

8 Isel von Brühl bis Tauernbachmündung		
Gewässer:	Isel	Fikm 26,75 – 28,67
IST-ZUSTAND		
HOCHWASSER-RISIKOMANAGEMENT		
ABU / GZP	GZP Isel, 2018	
Gefährdete Objekte	HQ ₃₀ 6 (0 höherwertige Objekte) HQ ₁₀₀ 29 (0 höherwertige Objekte) HQ ₃₀₀ 65 (9 höherwertige Objekte)	
Überflutungsräume	<ul style="list-style-type: none"> Bei HQ₃₀ kommt es im Bereich flussaufwärts des Gewerbegebietes Matri (Fikm 26,92) zu großräumigen Überflutungen landwirtschaftlicher Fläche beidseitig der Isel. Die Ausuferungen resultieren aus einem Rückstau in Zubringerbäche. Weitere Überflutungen landwirtschaftlicher Flächen befinden sich oberhalb und unterhalb der Brücke bei Tratten (Fikm 26,14). Ab dem HQ₁₀₀ kommt es insbesondere zwischen dem Sportplatz (Fikm 28,12) und Gewerbegebiet (Fikm 26,92) zu einer erheblichen Ausweitung der Überflutungsfläche. Einzelne Gebäude und Verkehrsinfrastruktur sowie ein Teil der Sportanlagen liegen im Überflutungsraum, höherwertige Objekte sind jedoch nicht betroffen. HQ₃₀₀: Ausweitung der Überflutungsflächen auf landwirtschaftlicher Fläche und den Sportplatz. Weiters liegen Teile des Gewerbegebietes und des Parkplatzes der Liftanlage, sowie einzelne Wohngebäude im Ortsteil Seblas im Überflutungsbereich. 	
Vermessung	<ul style="list-style-type: none"> Vermessung im Zuge der Erstellung der GZP: terrestrische Vermessung der Zubringer und Einbauten (Brücken, Durchlässe, usw.), „Green-Laser“-Laserscanaufnahmen 	
Hydrologie	<ul style="list-style-type: none"> Erstellung Hydrologie im Zuge der Erstellung der GZP 	
Feststoffhaushalt	<ul style="list-style-type: none"> Geringe Datenbasis Keine Ausschotterungsbecken Geschiebeeintrag durch Zubringer Tauernbach 	
Bewertung des Hochwasserrisikos	<ul style="list-style-type: none"> Keine APSFR 	
Hochwasserschutzmaßnahmen	<ul style="list-style-type: none"> Ufer: Flussabwärts des Gewerbegebietes Fikm 26,9 beidseitig abschnittsweise Sicherung der Prallufer durch Blockwurf. Oberhalb davon linksufrig durchgehende Ufersicherung durch Steinschichtung (Fikm 26,9 - 27,53), Bühnenreihen (Fikm 27,53 - 28,44) und Ansatzsteine (Fikm 28,44 - 28,67). Rechtsufrig Ufersicherung durch Steinschichtung (Fikm 27,39 - 28,42). Dämme: linksufrig fast durchgehend Längsdamm, rechtsufrig ausschließlich in der oberen Hälfte des Leitbildabschnittes (oberhalb Aufweitung Hochstein, Fikm 27,36) 	

Survey sheet (current status) for the Isel between Brühl and the mouth of the Tauernbach near Matri in East Tyrol

The Isel Watercourse Development and Risk Management Concept ("GE-RM Isel")

Watercourse development and risk management concepts are regional or supra-regional, interdisciplinary plans for watercourses. Specialist areas such as flood protection, nature conservation, spatial planning and water ecology are surveyed and analysed. These then form the interdisciplinary basis for further development and for concrete programmes of measures to achieve the intended objectives. In total, 73 measures were identified, which are to be implemented in the coming years or decades. It is important to maintain existing protective structures and retention areas to attenuate flood peaks. To increase structural diversity, similarly regulated sections should be structured or widened along the lines of proven stretches, fish barriers removed and fish migration into side streams facilitated. The Isel Lienz flood protection project is already being implemented and the project documents for the removal of seven transverse structures or fish barriers and for the fish-passable connection of side streams between Virgen and Oberlienz are currently being prepared.



Mapping of sandpiper populations between Oberlienz and Ainet and assessment of habitat quality.

A day by the Isel

With its riverbanks, the Isel is a very special experience for more than just kayakers, rafters and fishermen. Families from near and far also like to come to the river, usually with bicycles, to spend many enjoyable hours outdoors. There are plenty of easily accessible bays with sand, gravel and driftwood. The Isel is a big playground, and there are no limits to children's imagination. The little ones can spend many sunny hours inventing stories and then building the landscape to go with them, such as a harbour with boats made from tree bark, a sandcastle or a dam. Even the cold water is no problem. The ideas seem to be inexhaustible and nature provides all the toys. Many children get to know each other while playing and friendships develop. Children also like to go exploring. And there are also flowers, bumblebees, colourful stones and even the extremely rare Alpine groundhopper. There are plenty of quiet retreats for adults to read a book or simply lie in the sun. One of the features of the Isel is that it is constantly changing. What was "built" today may be gone tomorrow, but it is replaced with new natural play equipment. A forest, on the other hand, always looks the same in the eyes of a child. The Isel seems to be alive.



We older people remember our childhood - there were no beeping or flashing toys. We took what nature offered us and that was a lot. We could entertain ourselves for hours.

Iseltrail - From the city up to the glaciers

Pleasure hiking along the longest free-flowing glacial river in the Alps

From the sunny Dolomite town of Lienz in the green valley floor to the arctic glacier gate in the Hohe Tauern National Park. From a lovely cultivated landscape up into secluded Alpine wilderness. Always accompanied by the refreshing primal element of water, past flood plains, gravel banks, gorges, rapids and waterfalls: the new Isel trail reveals the pulsating lifeline of East Tyrol as a conveyor belt of fabulously unspoilt natural beauty. And nature lovers have a magnificent mountain world at their feet. Sometimes calmly rushing past picturesque scenery, sometimes dramatically roaring with unbridled rage, sometimes gushing mysteriously, the river Isel has many faces.

Total length: 73 km

Difficulty: medium

Total walking time: 22 hours

Best hiking time: June to September

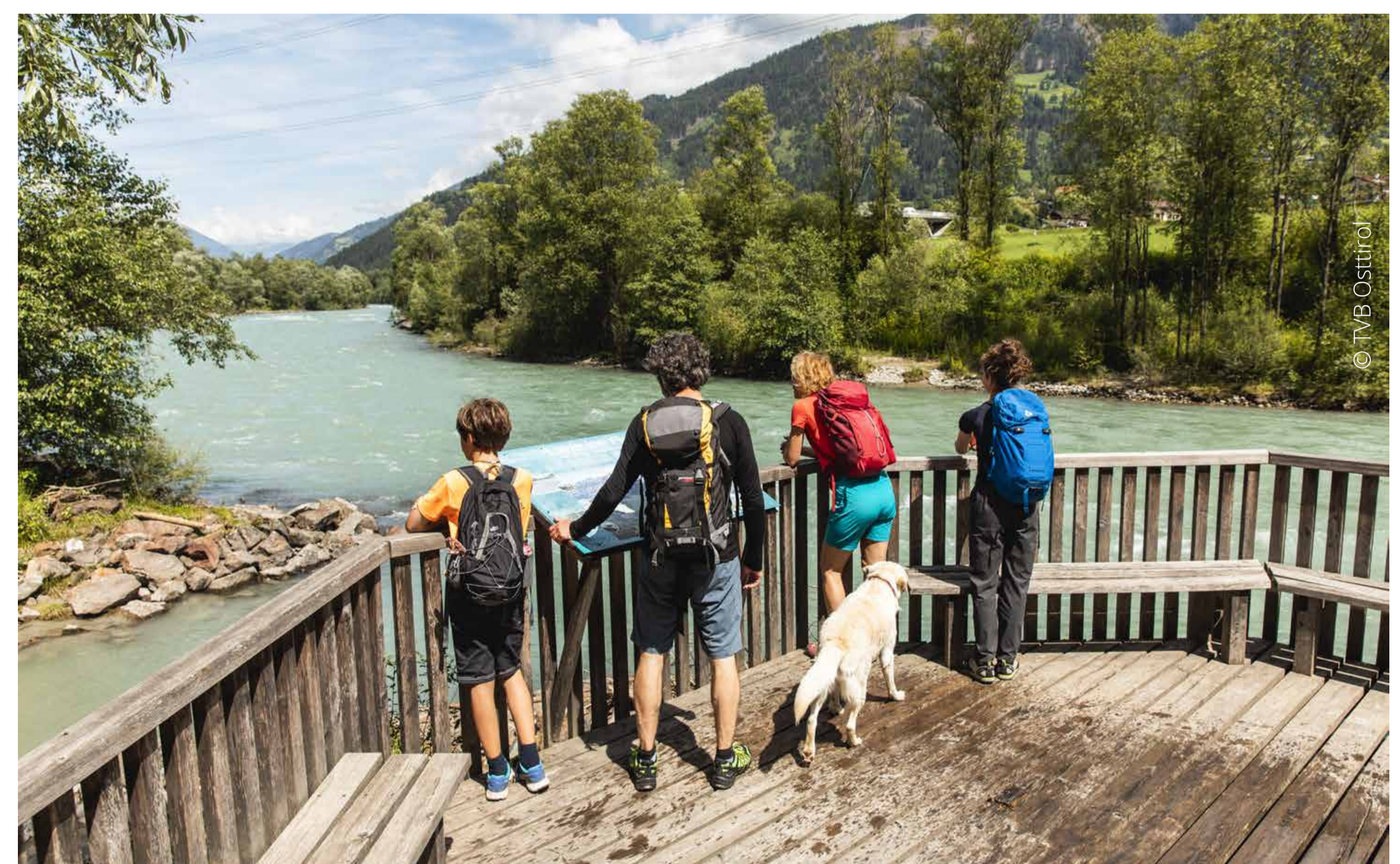
Starting point: Lienz

End point: Umbalkees or Ströden Osttirol

Highest point: 2,500 m

Ascent altitude: 2,120 m

Descent altitude: 1,380 m



Etappe 1 Iseltrail

The long-distance hiking trail is divided up into 5 stages. Whether you choose to cover all stages over the course of several days with overnight stays in accommodation, or just cover selected stages and use public transport, the choice is yours, depending on your level of fitness, desire and mood.

While the first 3 stages are more leisurely along the calmly flowing Isel, the spectacular part of the Isel long-distance hiking trail begins further upstream at the Ströden car park in Hinterbichl, and leads through the breathtaking landscape of the Hohe Tauern National Park and into its core zone. On the way past deep rocky gorges and through the spray of thundering waterfalls on the Umbal Falls Power of Nature Trail, you experience a

special feeling of connection to nature. The fourth stage leads to the Clarahütte, which is spectacularly built into the slope due to the danger of avalanches and falling rocks.

For the last stage, however, you need to be absolutely sure-footed and in good physical condition. A steep route with a glacier feel has to be overcome to reach the end of the long-distance hiking trail at an altitude of 2,500 metres. There, against the backdrop of the Dreiherrnspitze, is the glacier tongue of the Umbalkees - and the destination, the now famous Isel trail pyramid.

After the descent to the Ströden car park, you can take the 951 bus back to Lienz. The journey is free with a valid guest ticket.

Sports on the river - the Isel's white water paradise

The opening of Europe's first water viewing trail on the Isel in the Umbaltal valley in 1976, long before the Tyrolean part of the Hohe Tauern National Park was established, laid the foundation for a visitor hotspot that still attracts tens of thousands of visitors to the national park region today. White water sports originated at the beginning of the 20th century and became one of the most important activities on flowing waters in the 1960s. Today, they play an important role in the tourism industry at hot spots such as the Soca (SLO) or Salza and Isel.

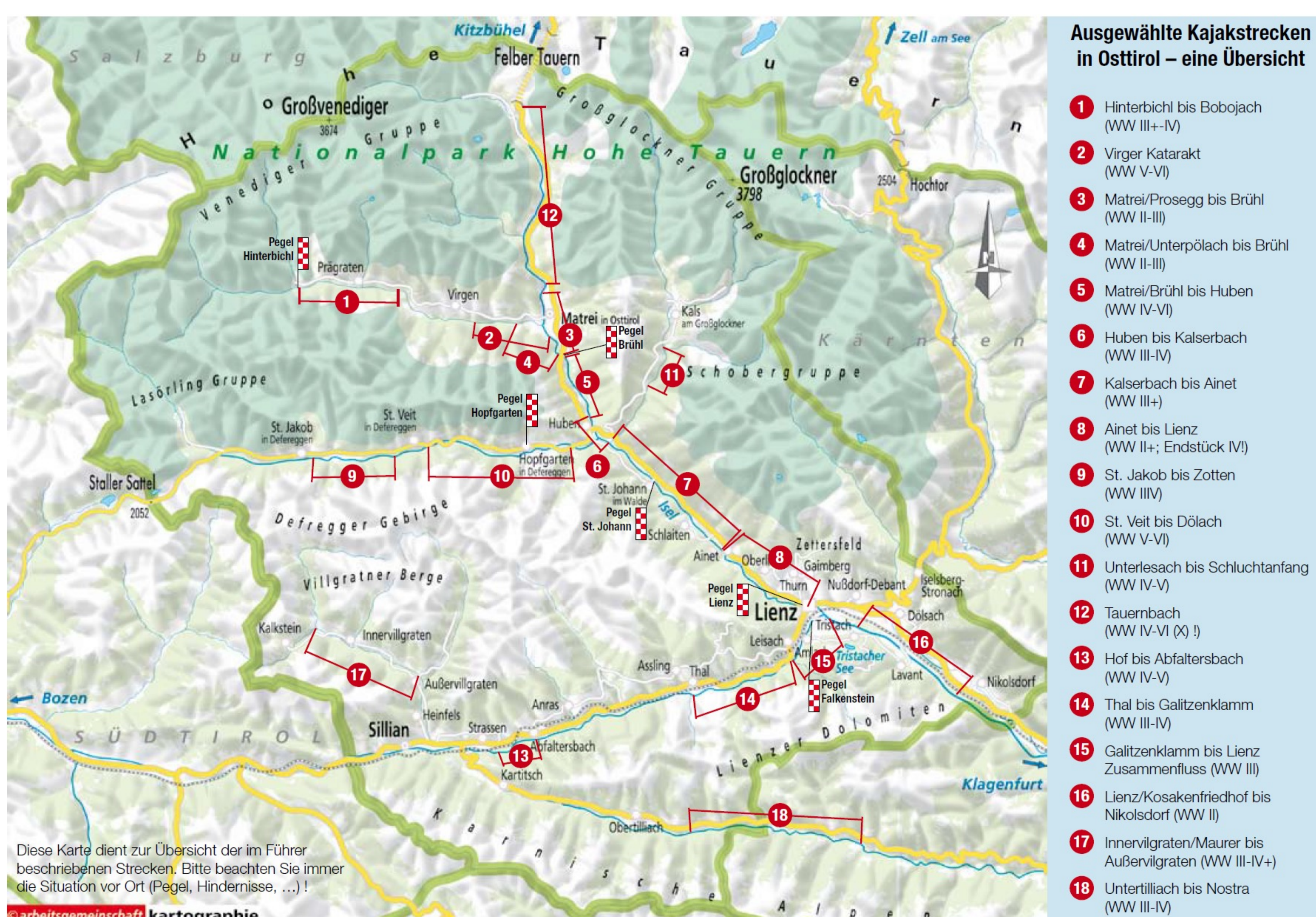


White water paradise on the Isel - between Mautrei and Huben. The Isel offers cool refreshment for all levels of difficulty.



Whether it's the wild waters of the Isel between Mautrei and St. Johann or the quieter stretch of the Isel downstream to Lienz - the Isel offers a rafting experience providing everything from adrenaline to gentle river enjoyment.

The Isel is a water-rich glacial river in a wide valley. A paradise for white-water kayaking and rafting in the summery waters of the melting glacier! While some technically difficult stretches on the "upper Isel" are a challenge for experienced paddlers, the "lower Isel" from the mouth of the Kaiserbach to Lienz offers numerous kilometres of enjoyment with easier levels of difficulty.



Water sports in harmony with nature

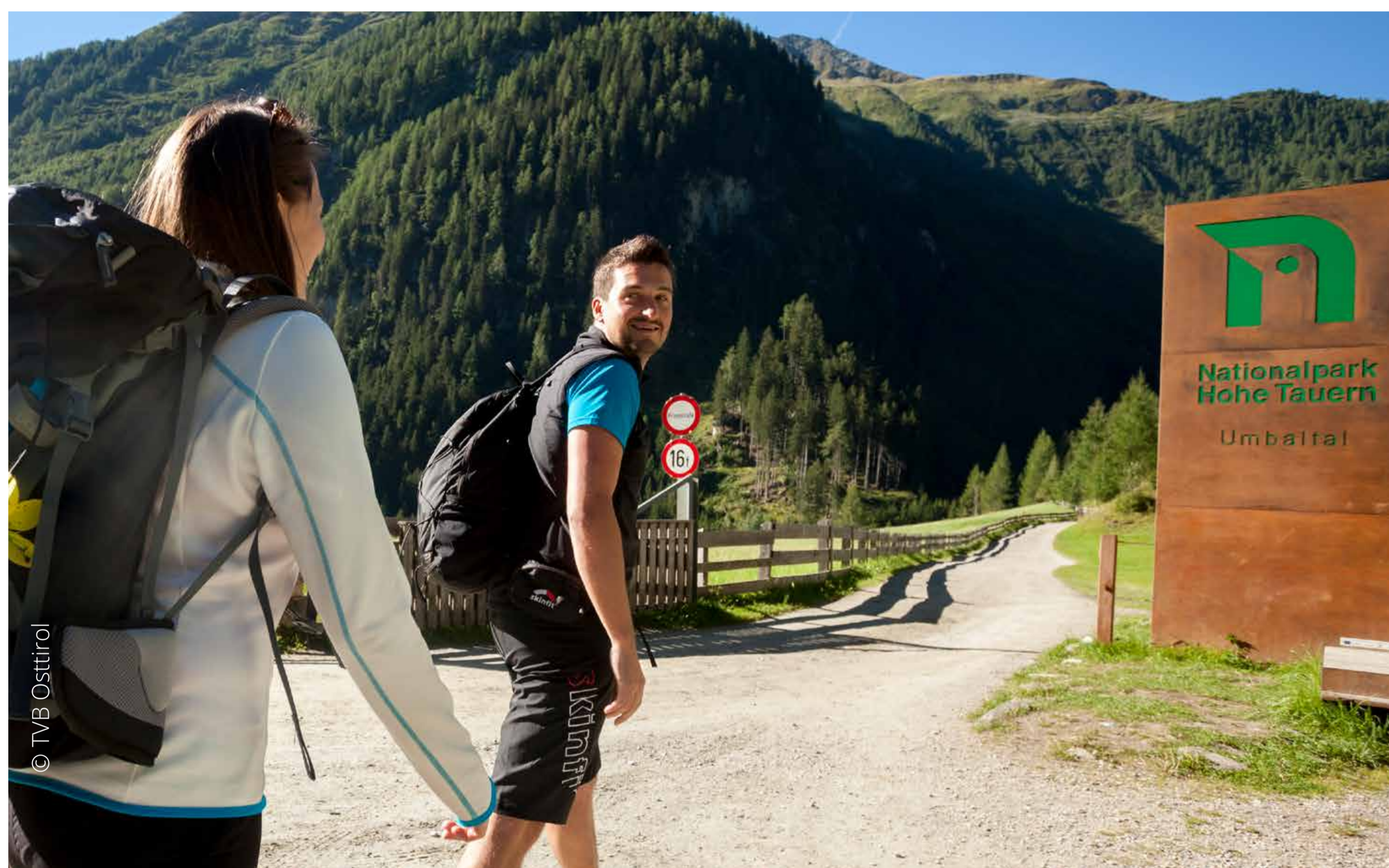
The Isel is the only river in East Tyrol with navigation guidelines - not least to avoid jeopardising the fish population. Paddling on the Isel is only permitted from 15 May to 30 September. In addition, water sports are only permitted between 9.00 and 19.00. These restrictions apply from the bridge at Feld to the confluence with the Drau.

Favourite kayak routes in East Tyrol; map: TVB Osttirol

From an object of controversy to an indoor magnet for visitors - the "Umbal Falls Power of Nature Trail" trail

"The Isel unfolds here a wealth of water scenes of the most original kind, as hardly the richest imagination can conceive. Sometimes there is a beautiful waterfall between rocks on which stand magnificent groups of spruce trees, sometimes the stream rushes again, hissing high and spraying in a rich abundance of water under natural rocky ridges, half invisible or flowing in dark narrowness, sometimes it hurls itself in a broad sparkling mass over the chaos of rocks, or in silver strands and arms between the cliffs." (Rabl, 1882)

The opening of Europe's first water viewing trail on the Isel in the Umbaltal valley in 1976, long before the Tyrolean part of the Hohe Tauern National Park was established, laid the foundation for a visitor hotspot that still attracts tens of thousands of visitors to the national park region today.



Entrance to the Umbaltal valley and the Umbal falls in the Hohe Tauern National Park.

The starting point is the Ströden car park in Prägraten on the Grossvenediger. From the starting point of the "Umbal Falls Power of Nature Trail" at the Umbaltal/Maurertal fork, the trail leads to the Pebellalm and Islitzeralm via a gravel road through a spruce and larch forest. Here you can already get a first impression of the "narrow Isel" in the gorge sections. The Kleinbach and Großbach waterfalls, the first of numerous waterfalls on this hiking route, can already be seen at the widening of the Almen valley. From the mountain pastures, the "Umbal Falls Power of Nature Trail" trail continues upstream on a path, past the impressive cataracts of the Isel, the Umbal Falls - and numerous stops invite you to linger and enjoy. Near the next opening of the valley ("Blinig") and a gentle Isel in the flat area is the turning point of the water viewing route.

Starting point: Ströden car park, Hinterbichl
Arrival by public transport: Public transport to Ströden in the summer months.

Info at www.wt.at

Opening hours of the "Umbal Falls Power of Nature Trail: Spring to autumn

Refreshment stops: Islitzeralm (or if you continue into the Umbaltal: Clara-Hütte);

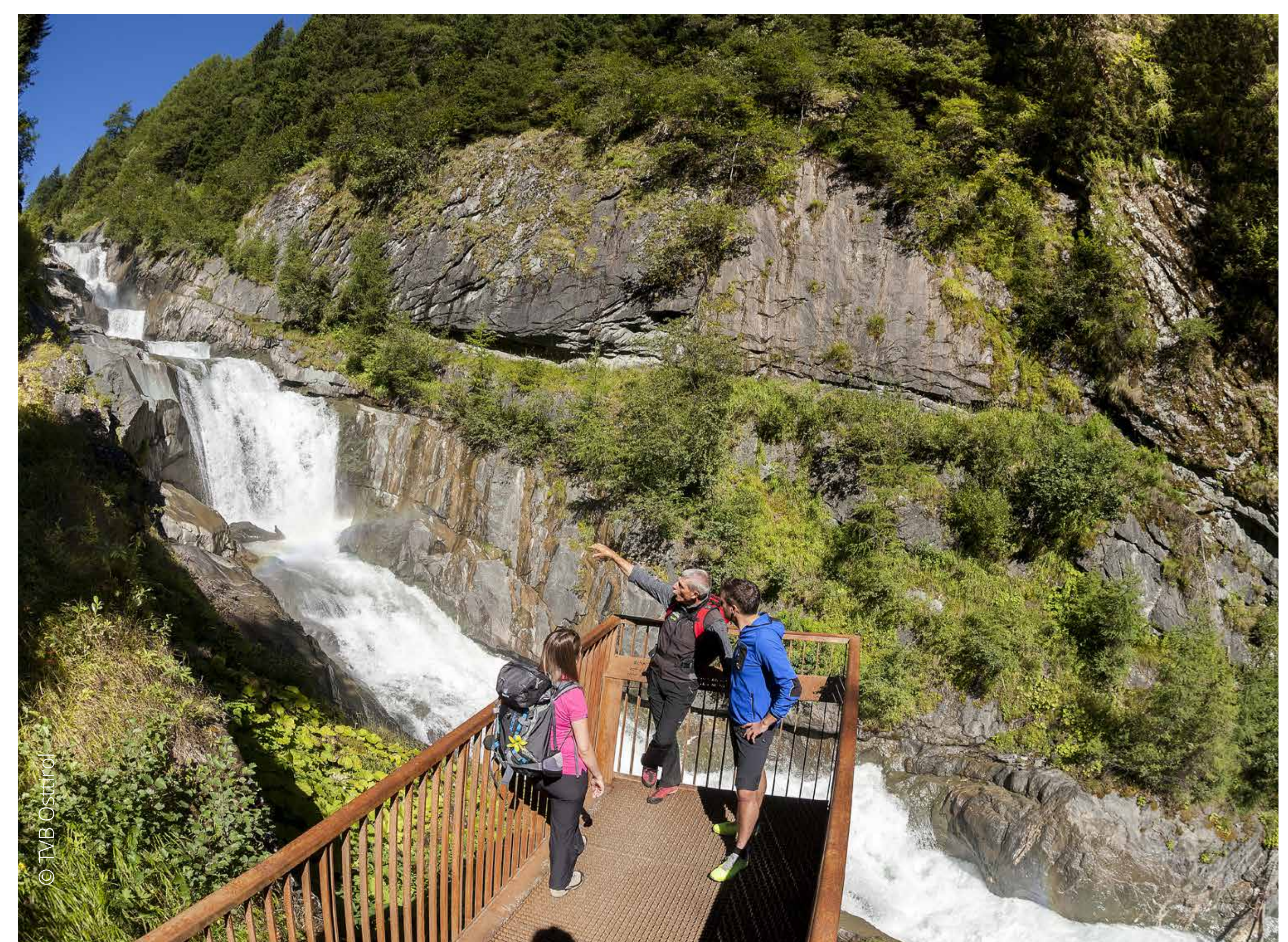
Trail length / walking time: approx. 8 km / 3 h (there and back)

Trail conditions: easy (from Islitzeralm path along the cataracts with steps)

Information: Hohe Tauern National Park Tirol
Kirchplatz 2 9971 Mauterndorf / AUSTRIA

Visitor Service Hotline: +43(0)4875 5161 10
nationalparkservice.tirol@tirol.gv.at

Literature: Natural history guide to the Umbal Falls water trail of the ÖAV (2012)



View of the cataract steps of the Isel - the Umbal Falls

Fly fishing with the fly - catching food or leisure activity?

They look elegant and wildly romantic, the fishermen on the autumnal Isel - nestled between the glacial river, which is crystal clear in autumn, and the golden-yellow landscape of East Tyrol's "Indian summer". The Isel is a European hot spot, especially for fly fishing.



Fishing on the Isel - these days it's less about getting food and more about sporting recreation on the water.

Originally, fishing along the Alpine rivers was part of the food supply and, like hunting, was regulated early on. It was often in the hands of the nobility or monasteries - with limited access to this resource for the general population. The democratisation of society transformed fishing into a popular leisure activity and thus also a tourist attraction.

Alpine rivers in particular, such as the Isel, offer fishermen and women an attractive variety of species in an impressive landscape with a high recreational value. The cool and oxygen-rich waters offer ideal conditions for gravel spawners and therefore interesting and otherwise rare species for angling, such as brown trout and grayling - or even the Huchen, a true rarity.

"Tying a fly" - craftsmanship meets aesthetics

This expression is often heard among experienced fishermen and women who have mastered the craft of fly fishing. An imitation of a living insect is created artificially as bait - a so-called tied fly. With the lures, which often look like works of art, you try to trick the predatory fish into biting in the best possible way through shape, colour and materials. In addition to the right bait, fly fishing also requires a high level of casting technique, as well as equipment such as rods and special lines. The dynamic casting movements and

the impressive river landscape characterise the elegance of fly fishing.



It takes a lot of patience, craftsmanship and knowledge to tie a fly.