

LIFE Lech

DYNAMIC RIVER SYSTEM LECH

Final
Report
08/2022

www.life-lech.at

SUPPORTED BY THE FEDERAL GOVERNMENT, THE FEDERAL PROVINCE AND THE EUROPEAN UNION

 Federal Ministry
Republic of Austria
Agriculture, Forestry, Regions
and Water Management



 Wasserwirtschaftsamt
Kempten



 **LifeLech**
Dynamic River System Lech

The scarce heath lives in riparian forest clearings. It is extremely rare and endangered across Europe. A few years ago, a previously unknown population was discovered at the Tyrolean Lech, one of very few in Austria. The LIFE project supported measures to protect its habitat.

© W. Michaeler



Contents

- 3 The Tyrolean Lech**
A unique gem at the heart of Europe
- 4 Rarities**
& extraordinary inhabitants
- 5 The Lech in flux**
LIFE project background
- 7 The LIFE project Lech II**
Goals & numbers
- 8 Revitalisation measures**
... create habitats and safe spaces
- 20 Species conservation actions**
Help for natterjack toad & friends
- 23 Management plan Tyrolean Lech**
A „roadmap“ for the future
- 24 The new Lech experience**
LIFE offers and visitor facilities
- 27 Monitoring**
Remarkable results
- 30 Participants**
Many have worked together
- 32 More information**
Products & Links
- 33 Publishing information**



Natura 2000
A NETWORK FOR EUROPE



Natura 2000 is a continuous network of protected areas in the European Union. In this way, endangered animals, plants, and habitats can be protected across country borders. The Tyrolean Lech is part of this protected area network.

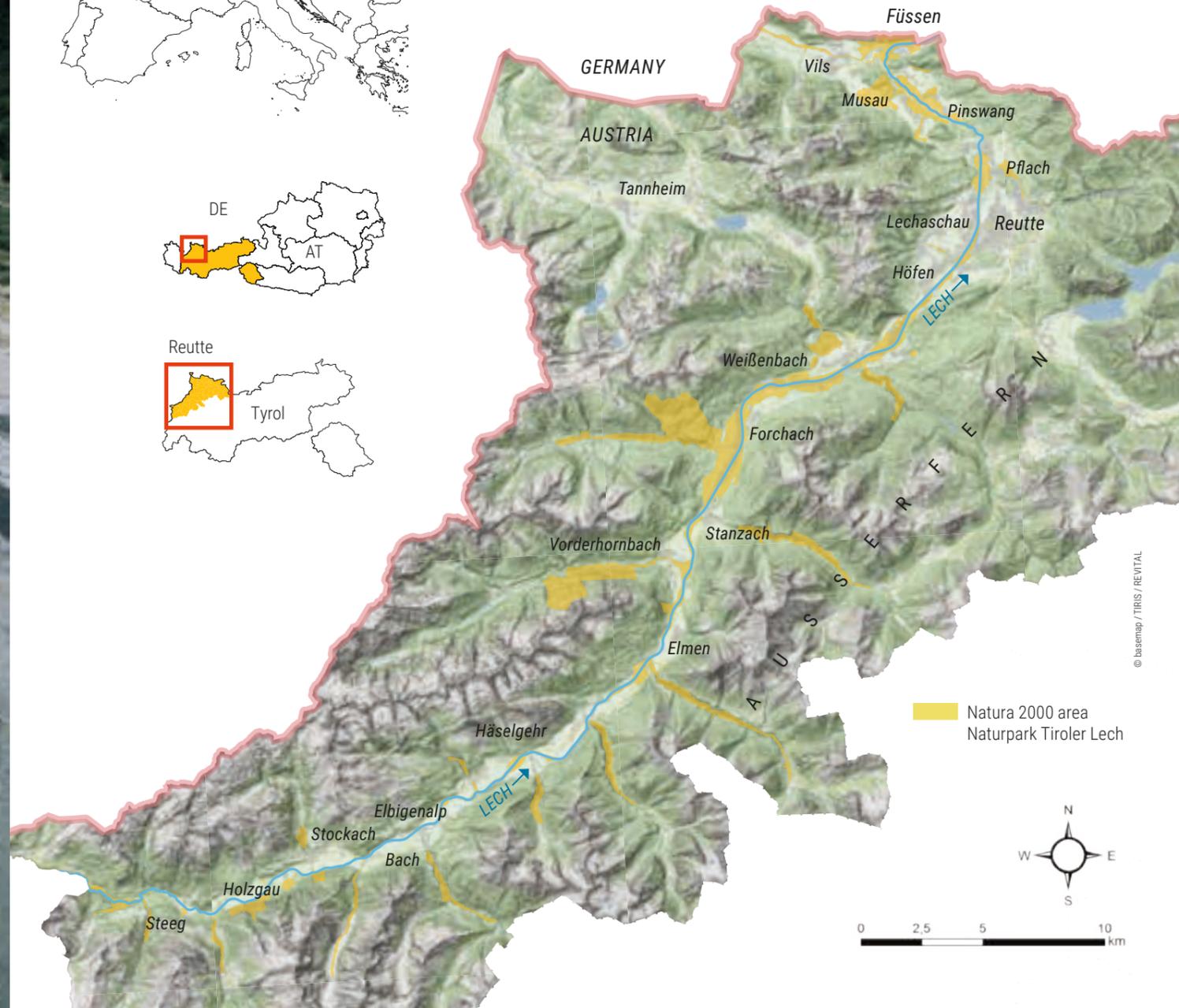
The Tyrolean Lech

A UNIQUE GEM AT THE HEART OF EUROPE

The Tyrolean Lech river valley stretches over 65 km in the political district of Reutte (Tyrol, Austria). With its side valleys, it is one of the last **near-natural alpine river basins in Austria**. It hosts the last larger connected wild river area in the northern Alps. Due to its size, appearance, habitats, and species, it is one of the most significant wild river landscapes in Central Europe. The area, around 41 km² large, was declared a Natura 2000 area in 2000. It was designated a **"Naturpark"** (Nature Park) in 2004.

The association Naturpark Tiroler Lech has been managing efforts in conservation, research, education, recreation, and regional development in the protected area since 2006.

Sprawling sand and gravel bars, wide riparian zones and its shimmering turquoise water lend the Tyrolean Lech its beauty. The river is characterized by **braided channels** and an expansive riverbed, which spans over 100 m in many stretches and even up to 400 m in its middle reaches.



Rarities & EXTRAORDINARY INHABITANTS

In some places, fresh gravel bars still show the typical plant succession of a highly dynamic, **braided Alpine river**. They feature gravel specialists like the flower *Chondrilla chondrilloides* ①, purple willow shrubs (*Salix purpurea* ②), and rosemary willow (*Salix eleagnos*), sprinkled with stands of German tamarisk (*Myricaria germanica* ③). At Unterpinswang, the Lech hosts one of the largest remaining populations of the dwarf bulrush (*Typha minima* ④).

The **fauna** of the Tyrolean Lech valley, too, is unique. It is home to the Siberian bluet (*Coenagrion hylas freyi* ⑤). This species of damselfly was only discovered in Central Europe in 1952 at the northern rim of the Alps. Currently, the only population in Europe is in Tyrol. Research on its prevalence, genetics, and distribution in the Tyrolean Lech valley was part of the LIFE project.

There is also a notable population of the rose-winged grasshopper (*Bryodemella tuberculata* ⑥) at the Upper Lech, one of the species' most important in Austria. Naturally, the Tyrolean Lech is also a hotspot for birds that breed on gravel bars, such as the common sandpiper (*Actitis hypoleucos* ⑦) and the little ringed plover (*Charadrius dubius* ⑧).

The natterjack toad (*Epidalea calamita* ⑨) is another **extraordinary inhabitant** of the Lech valley. It occurs only in one other Austrian region, the Waldviertel.

The bullhead (*Cottus gobio* ⑩) prefers clean, cool, and fast-flowing rivers with a rocky bed. In the Tyrolean Lech and its side waters, it feels right at home. Through the LIFE Lech project, its habitat is seeing further improvements.



Purple willow shrub

© REVITAL



German tamarisk

© REVITAL



Dwarf bulrush

© REVITAL



Siberian bluet

© J. M. Müller



Rose-winged grasshopper

© NP Tiroler Lech



Common sandpiper

© F. Lassercher



Little ringed plover

© F. Lassercher



Natterjack toad

© REVITAL



Bullhead

© NP Tiroler Lech



Removal of the Hornbach retention dam during the first LIFE project at the Tyrolean Lech 2001-2007

© A. Wernner

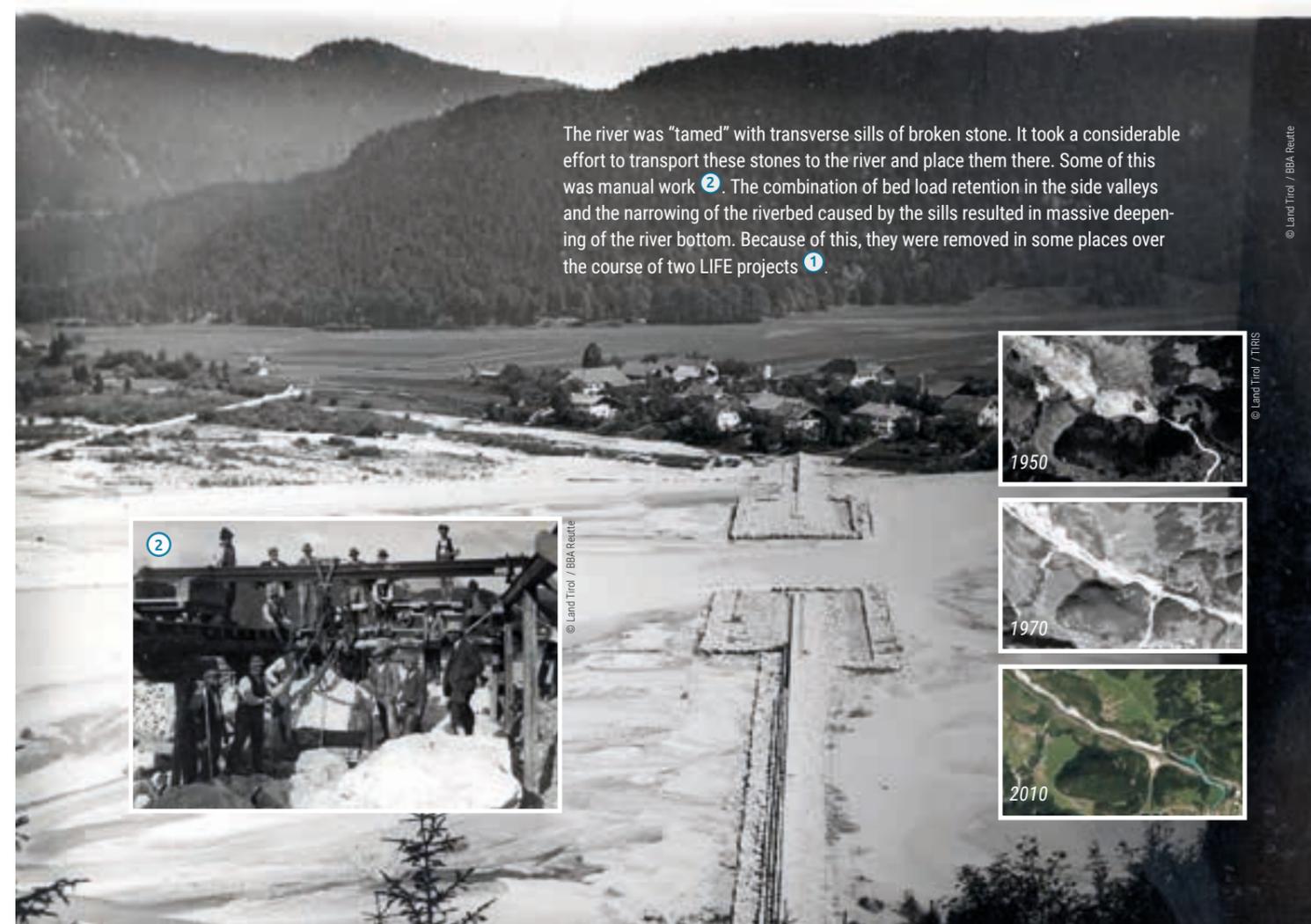
The Lech in flux LIFE PROJECT BACKGROUND

After a catastrophic flood devastated much of the valley floor in 1910, **efforts to regulate** the Tyrolean Lech began in earnest. Long stretches of the Lech were regulated according to the contemporary state of the art, with the goals of expanding farmland and facilitating bed load transport.

For generations, the valley's inhabitants earned a meagre extra income during the winter months by building these river control structures. In some places along the Tyrolean Lech, they still characterise the river's appearance. Around 1960, **bed load retention dams** were constructed at the Lech's tributaries to hold back gravel and boulders.

This had serious consequences for the river. The **riverbed deepened** and the groundwater table fell, in some places by over a metre. Consequently, the specialist flora and fauna lost parts of the habitat they depend on – open, actively shaped river areas that are flooded regularly.

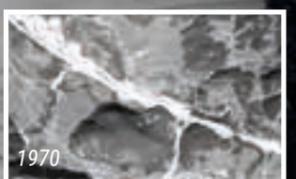
Therefore, some of these bed load retention dams were progressively demolished during the **first LIFE Lech project** (2001-2007). Many groynes and bank protections were shortened or fully removed over the course of the **second LIFE project** (→ page 8ff.).



The river was "tamed" with transverse sills of broken stone. It took a considerable effort to transport these stones to the river and place them there. Some of this was manual work ②. The combination of bed load retention in the side valleys and the narrowing of the riverbed caused by the sills resulted in massive deepening of the river bottom. Because of this, they were removed in some places over the course of two LIFE projects ①.



1950



1970



2010



②

© Land Tiro / BBA Reinte

© Land Tiro / BBA Reinte

© Land Tiro / THRS

© Land Tiro / THRS

© Land Tiro / THRS

Results in numbers

72,000

cubic metres
of rip rap removed

750

people informed
on-site

400

experts brought
to the Tyrolean
Lech

7,000

metres of
longitudinal structures
removed

38

new amphibian
ponds and
pools

14

Jobs
created

23

hectares of
additional "active
channel area"

56

excursions
took place

33,000

work hours performed
by the BBA Reutte
employees

1,300

metres of
groynes
shortened

3

additional
side arms

20,000

heads of dwarf bulrush
counted

13

river engineering
measures to re-dyna-
mise the Tyrolean
Lech

What is LIFE?

LIFE is a European Union funding programme which supports conservation projects in Natura 2000 areas.

LIFE projects help implement the protected area network Natura 2000 in the EU member states and conserve wild animal and plant species in Europe.

There have been two LIFE projects on the Tyrolean Lech so far: from 2001 to 2007, large riverbed widenings at Vils, Johannesbrücke and Martinau were carried out, from 2016 to 2022 the revitalisation effort was successfully continued in the middle and lower reaches of the Tyrolean Lech.



The LIFE project Lech II

GOALS & NUMBERS



On 24/05/2017, high-ranking politicians and administration officials held a groundbreaking ceremony for the second LIFE project at the Tyrolean Lech. Schools and many locals attended this opening event, which took place in Elmen.

 **Federal Ministry**
Republic of Austria
Agriculture, Forestry, Regions
and Water Management



 **Wasserwirtschaftsamt**
Kempten



The Lech valley has been the site of a LIFE project once before. From 2001 to 2007, the first positive steps towards a re-dynamisation of the river landscape were taken. This provided a foundation for the second LIFE project.

The upper Tyrolean Lech, in particular, still possessed a large potential to re-establish actively shaped gravel surfaces and pioneer habitats. These are essential to sustain populations of the highly specialised, severely endangered "gravel bar species" mentioned above in the long term. The **revitalisation measures** designed to accomplish this additionally aimed to stop further riverbed deepening (1-2 m between 1935 and 2005) and to stabilise or even raise the groundwater table.

Special **species conservation measures** were to support particularly endangered animal and plant species, for whose continued survival the Tyrolean Regional Government bears a special responsibility on the national and European level. A comprehensive **monitoring program** was to verify the project's success.

Another aim was to improve visitor guidance in the protected area. Increased **visitor information, awareness raising** efforts, and a "guiding" visitor offer sought, in particular, to protect the breeding areas of disturbance-sensitive birds (e.g., common sandpiper, little ringed plover). At the same time, acceptance of the Natura 2000 protected area among locals was to be increased.

The **leadership** of the 6-million-Euro project lay with the Federal water engineering administration of Tyrol. It was represented by the Baubezirksamt (district construction office) Reutte, which implemented the majority of the construction measures.

The Department of Environmental protection of the Tyrolean Regional Government was the **project partner** responsible for the implementation of the species conservation measures, the monitoring, and public relations. It was actively supported by the Tiroler Lech Nature Park. The Water Management Administration Kempten implemented a river revitalisation measure at the federal border of Austria and Germany.

Project name	LIFE Lech - Dynamic River System Lech
Project duration	1 st September 2016 to 30 th September 2022
Project area	Natura 2000 area "Tiroler Lech"; area: 41.38 km ² ; length: approx. 65 km
Budget	6.09 million €
Funding	→ European Union (LIFE) 3.65 million € (share of funding: 60%) → Federal Water Engineering Administration (BWV): 1.92 million € → Tyrolean Regional Government, Department for Environmental Protection: 0.32 million € → Water Management Administration Kempten: 0.17 Mio €
Project leadership	→ Water Engineering Administration of Tyrol / Baubezirksamt Reutte
Project partners	→ Water Engineering Administration of Tyrol, Baubezirksamt Reutte (district construction office), representing the Federal Water Engineering Administration (BWV), Austria → Tyrolean Regional Government, Department for Environmental Protection, Austria → Water Management Administration Kempten, Germany

Revitalisation measures

... CREATE HABITATS AND SAFE SPACES

Though “only” 11 river engineering measures were originally planned within the second LIFE project, cost-conscious construction and good project process ultimately enabled the implementation of **13 revitalisation measures**. This included eliminating the Lech bottleneck at Forchach in conjunction with the renewal of the pedestrian suspension bridge there.

Most of the measures involved removing bank protection structures, widening the riverbed, and shortening transverse structures. The municipalities of Elbigenalp and Bach also received flood protection (financed exclusively with national funds).

In the area of the border, the Wasserwirtschaftsamt Kempten implemented measures to accelerate beneficial bank erosion on the German side (C.11). Thus, the project became a cross-border effort.

Both sides benefited from the excellent **cooperation**.



C.1
VORDERHORNBACH “Soft” banks with rich structural diversity replace linear “hard” banks. → **page 13**



C.4
HÄSELGEHR-GRIESAU The existing side arm was lengthened and has become an ideal habitat for small fish. → **page 11**



C.2
HORNBERG After moving the bank protections further inland, the river has regained space to spread. → **page 16**



C.3
GRÜNAU A new side arm conveys water into the riparian forest and serves as a refuge for fish. → **page 11**



C.6
LUXNACH The shortening of 3 groynes has given the river new room to develop. → **page 12**



C.7
STOCKACH The widened riverbed increases safety during floods and provides better access to the river. → **page 10**



C.8
VORDERFELD-KRAICHEN The mouth of the small tributary stream was reshaped into a delta. → **page 10**



C.9
ALACH-RAUCHWAND A massive stone groyne was shortened by 40 m. → **page 12**



C.10
LECH FORCHACH Groynes were shortened, a channel was reactivated as the “Koppenbach”, and the river area given over to dynamisation. → **page 16**



C.11
FEDERAL BORDER TO LECH-SCHLUCHT A stone block spur steers the Lech towards the German side and brings new dynamics to the riparian forest. → **page 17**



C.13
FORCHACH SUSPENSION BRIDGE The bottleneck is gone! The new bridge is an ideal place for visitors to experience the wild river up close. → **page 14**



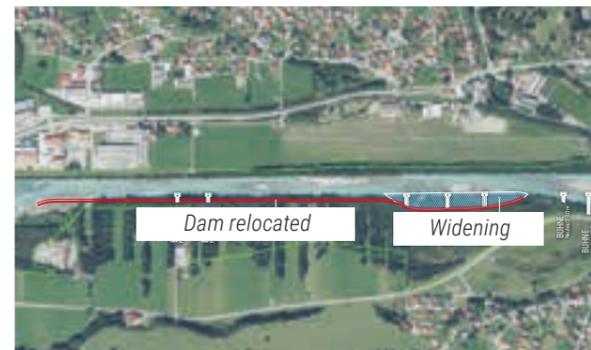
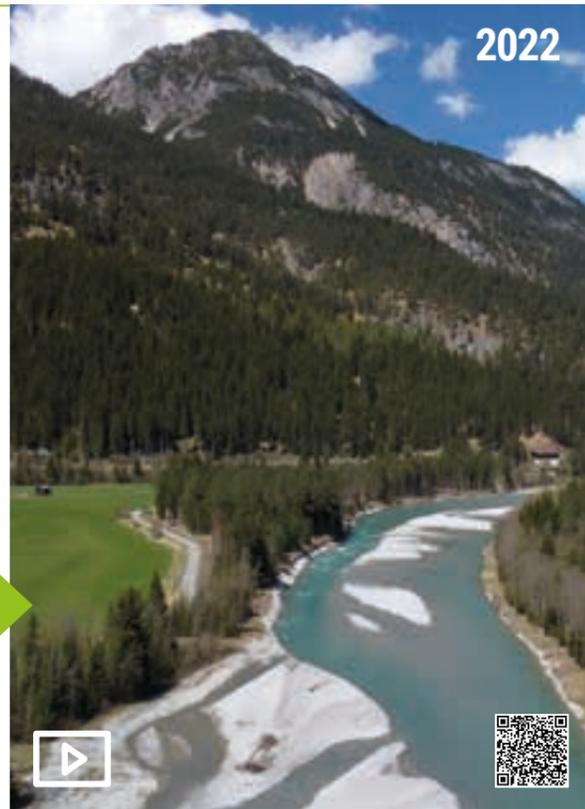
C.14
LECHASCHAU The reactivation of side arms creates spawning grounds and refuges for fish. → **page 17**



C.1

VORDERHORNBACH

On the Stanzach-Vorderhornbach stretch, the Lech was heavily constricted and dug itself further and further into the ground. As part of the LIFE project, the **old bank protections and groynes were removed**. The bank path was moved a safe distance inland. The Lech can now shape its own banks again. This has given the river room to spread during floods and mitigates further deepening of the river bottom.



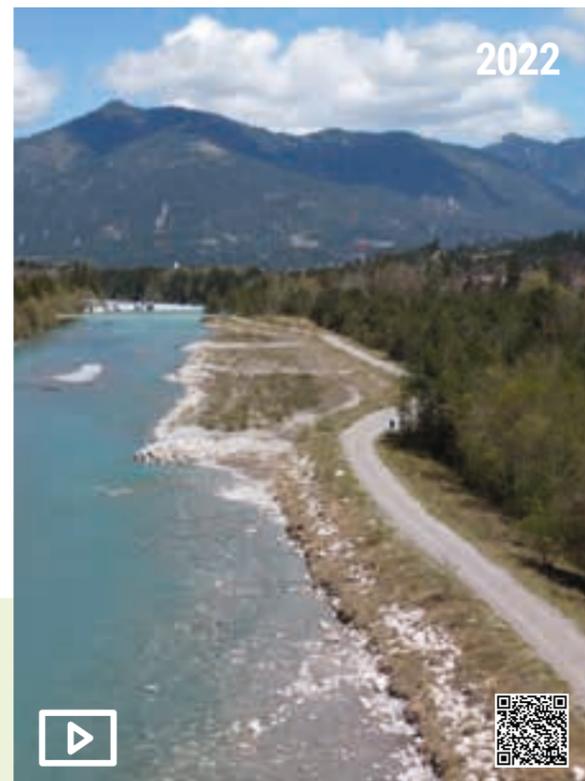
HORNBERG

C.2



At the right bank of the Lech at Hornberg, the existing dam and the bank path were relocated 15 m inland.

Groynes increase the **structural diversity** and facilitate bed load transport (solid materials). Upstream at the Lechsteg, the river was **widened** and gravel bars created.



C.3

GRÜNAU



The revitalisation of the Tyrolean Lech at Grünau in Elbigenalp included the creation of a **flood channel** on the left bank of the Lech (left image) and a **side arm** (right image). An old bank protection was demolished.



HÄSELGEHR-GRIESAU

C.4

Old **bank protections** from the 1950s and 1970s were removed. An existing **side channel** at the Grießbach's mouth was expanded upstream and now serves as a habitat for fish. Additionally, a new **amphibian pool** was created.



ELMEN-NUSSAU

C.5



The left bank of the Lech at Elmen-Nussau featured ten **stone groynes** of varying lengths which constrained the natural development of the river. They were **removed** entirely or shortened by up to 70 m. Additionally, the riparian wood fringe of the whole measure area underwent **rejuvenation**. The right bank was left untouched out of consideration for the settlement area nearby.



LUXNACH

C.6



To give the Lech more space here as well, three **groynes** on the right bank were **shortened** by 20-30 metres. The Lech can now transform the current riparian forest area into a part of its riverbed.



Shortly downriver of the mouth of the Bachabach, the Lech's bed was **widened** on the right side. This also increased flood protection for the area of the campsite.

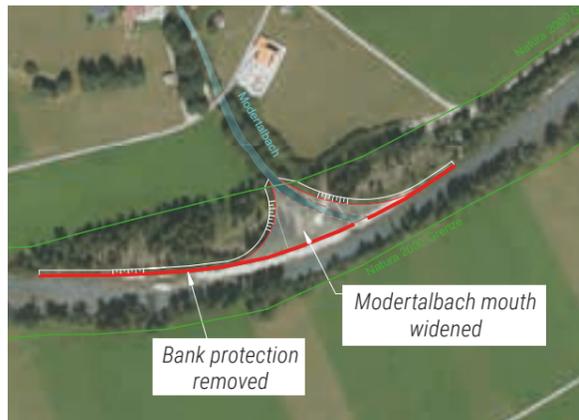


C.7

STOCKACH



Downstream of the Lech bridge at Stockach, a **widening** provides more space to benefit everyone: The characteristic flora and fauna of the Lech gained new habitats, people find opportunities for recreation at the easily accessible banks, and the nearby settlement and commercial area is protected through higher discharge capacity in combination with additional flood embankments.

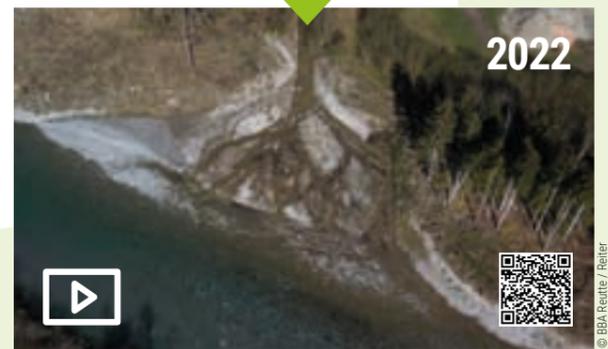


The **mouth** of the Modertalbach in the municipality of Bach was widened into a **delta**. This improves the discharge behaviour and connectivity of the side stream, and nature regained actively shaped gravel habitats.



VORDERFELD-KRAICHEN

C.8



C.9

ALACH-RAUCHWAND



The massive **stone groyne** near the Streimbach mouth on the right side of the river was **shortened** by 40 m. The Lech can now reclaim riparian forest here.



2017



2018



2022



2021

Koppenbach

At the Forchach quarry pond at the Lech, the upper western **groyne** was shortened by 80 m, while the lower groyne was removed entirely. A **shallow water zone** was created in the south. Some of the excavated material was used to reduce the steepness of the quarry pond's banks. The former bed of the **Koppenbach** was reactivated over a length of more than 1 km, re-enabling continuous water flow. This creates new fish habitats and an opportunity to reintroduce the native stone crayfish. The Lech will, however, shape its future appearance itself.



Shortening the upper groyne



LIFE information board

FORCHACH QUARRY POND

C.10



2019

Quarry pond
Lech
Groynes



2022

Shallow water zone
Groyne shortening
Lech
Groyne removal

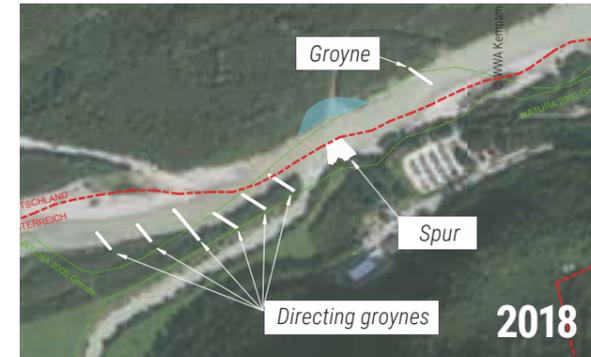
Koppenbach



© BBA Reutte / Reiter

C.11

FEDERAL BORDER TO LECHSCHLUCHT



2018



2021

Directing groynes



AUSTRIA

GERMANY

Directing groynes

Spur

2021



© WWA Kempten / Bachmann

Shortly upstream of where the Lech straddles the federal border to Germany, six **groynes** and a larger **spur** now direct the river towards the German bank opposite. Here, this will induce more bank dynamics to ultimately transform the stretch back into a braided wild river landscape.



2022

Removing bank protections



© BBA Reutte / Reiter

LECHASCHAU

C.14

In this construction project, the **bank protections** on the left bank of the river at Lechaschau were **removed** over a length of approximately 750 m. Dried-out **oxbow lakes** of the Lech were deepened. They are now once again fed by groundwater, and the river flows through them during flood events. This creates important new spawning and refuge areas for fish such as grayling, river trout, or bullhead.

The **mouth area** of the Lainmure (also called Mühlbach) has also been optimised. The angle at which the stream formerly joined the Lech reduced flow velocity, causing its lower stretch to silt up. Now, the Lainmure flows into the Lech more dynamically.



Oxbow lakes are no longer dry

© BBA Reutte / Reiter



New Lainmure mouth

© BBA Reutte / Reiter

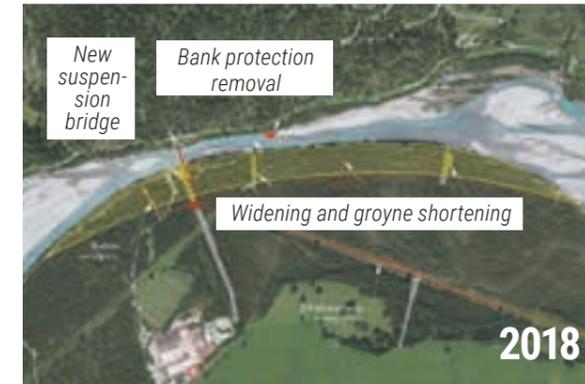


Tyrolean Lech near Forchach. View downstream towards Reutte (July 2022).



© Furetschach Adventures

FORCHACH SUSPENSION BRIDGE



© BBA Reutte



© REVITAL

Old suspension bridge

Cost savings and sales of timber and gravel made it possible to implement an additional large-scale measure in 2019. At the Forchach suspension bridge, the riverbed was widened from 40 m to 110 m by **excavating the foreland**. The dilapidated **pedestrian suspension bridge** over the Lech was replaced at the same time.

This eliminated the last bottleneck on the middle Tyrolean Lech. The river is now several hundred metres wide over a stretch 11 km long.

Along with the new suspension bridge, an attractive **visitor facility** was created. It provides a playful, interactive introduction to the LIFE project, the Nature Park, and the Lech ecosystem (→ page 22).



© B. Kogelbauer

The new suspension bridge over the Lech is 150 m long.



© Furetschach Adventures



© BBA Reutte / Reiter

© BBA Reutte / Reiter

© B. Kogelbauer

© BBA Reutte / Reiter

Construction 2020-2021



The top 20 species of the Tyrolean Lech

1. *Austropotamobius torrentium*, stone crayfish
2. *Typha minima*, dwarf bulrush
3. *Myricaria germanica*, German tamarisk
4. *Epidalea calamita*, natterjack toad
5. *Bryodemella tuberculata*, rose-winged grasshopper
6. *Chorthippus pullus*, gravel grasshopper
7. *Tetrix tuerki*, a groundhopper
8. *Arctosa cinerea*, a wolf spider
9. *Charadrius dubius*, little ringed plover
10. *Actitis hypoleucos*, common sandpiper
11. *Coenagrion hylas*, Siberian bluet
12. *Triturus cristatus*, great crested newt
13. *Chondrilla chondrilloides*, a flower
14. *Hyla arborea*, European tree frog
15. *Alcedo atthis*, kingfisher
16. *Mergus merganser*, goosander
17. *Cottus gobio*, bullhead
18. *Coenonympha hero*, scarce heath
19. *Apium repens*, creeping marshwort
20. *Thymallus thymallus*, grayling

Species conservation actions

HELP FOR NATTERJACK TOAD & FRIENDS

In order to select effective and well-targeted LIFE species protection measures, the University of Innsbruck conducted a **study on species protection actions** ("Studie Artenschutzmaßnahmen") at the beginning of the LIFE project.

For this purpose, the experts drew up a list of 108 species important for the Nature Park Tyrolean Lech and ranked them according to criteria such as protection status, endangerment, regional importance, or public appeal. The result was a

"priority ranking" of species for the conservation measures (→ table).

Proposals for measures were developed for the "top 20" species. These proposals were implemented either - if time and funding allowed - as LIFE species conservation measures or became part of the **management plan** for the Nature Park Tyrolean Lech. This plan was developed within the LIFE project between 2020–2021 with the participation of the regional population (→ S.21).

Help for the dwarf bulrush



The **DWARF BULRUSH** *Typha minima* is a **pioneer plant** that grows 30–70 cm high. It colonises open sites in the river that are covered with fine sediments and frequently flooded. As a result of river regulation, it is critically endangered in Austria. The Tyrolean Lech valley is home to one of the last natural populations in the Northern Alps. Since 2003, repeated

efforts have been made to preserve the existing population, also as part of the second LIFE project.



Under the guidance of the expert Prof. Norbert Müller, over **1,000 young dwarf bulrushes** propagated in Innsbruck's botanical garden were planted in the revitalisation sections C.5, C.6, C.9 and C.10. They were marked with wooden stakes.



Additionally, **sods** of dwarf bulrush were extracted from an existing population at the Forchach quarry pond using an excavator. They were replanted at suitable sites (image: "Koppenbach" at Forchach). This transplantation was the first of its kind within the Alps and the EU.

More nurseries for amphibians

The Tyrolean Lech valley is home to a whole range of remarkable amphibian species that are protected at the national and European level. To support them, the LIFE project created **39 new spawning pools** (16 are intermittently filled by

groundwater, 15 are permanently filled, 7 are drainable foil pools). They are spread over eight measure areas in the municipalities of Musau, Pinswang, Pflach, and Lechaschau. In addition, **raw soil** was exposed for the benefit of the natterjack

toad along a power line corridor between Unterpinswang and Oberpinswang. In total, these habitat improvements covered an area of **2 hectares**.



The **NATTERJACK TOAD** is considered critically endangered in Austria. Only two populations are known, one of them in the Lech valley. As a pioneer species, the natterjack toad is found in open areas in riparian areas. It requires shallow ponds and pools for spawning.



The **GREAT CRESTED NEWT** is the largest indigenous newt in Austria. With its large head, the dorsal crest and the red belly, the male resembles a small "water dragon" around spawning time. Its European populations are declining. In Austria, the great crested newt is threatened by extinction.

The **TREE FROG**, highly endangered in Austria, has its largest Tyrolean population at the Lech. The frog prefers warm habitats, which it finds at the lower reaches of the Lech between Reutte and Vils. Its light green colour serves as a perfect camouflage. Only the males' loud mating calls reveal its presence.



Inspection of one of the new pools in the Pinswanger Au. Numerous natterjack toads (circle) and their larvae were found.



This amphibian pool at Oberpinswang can be drained in autumn. This keeps the pool free of fish, allowing the tadpoles to develop undisturbed.



The Erschbachweiher at Unterpinswang was cleared of silt and additional open water areas were created. This pond is extremely valuable as an amphibian habitat, especially for the great crested newt and the tree frog.



More than 30 additional pools and small water bodies for amphibians were created in 2021 in the Tyrolean Lech's floodplains at Pflach, Musau, Oberpinswang, and Unterpinswang.

Let there be light - new hope for the scarce heath



© F. Lessacher

In Austria, too, the survival of the small, inconspicuous butterfly is in question. Small remnant populations survive only in the Tyrolean Lech valley near Musau and Pinswang. The LIFE project has supported the continued survival of this rare butterfly species with **targeted care measures**.

In Central Europe, the **SCARCE HEATH** is now only rarely seen flying through loosely forested, grazed riparian areas.

The scarce heath inhabits a mosaic habitat: sparse riparian forest areas interspersed with meadows. To prevent

shrubs from overgrowing the flood-plain meadows, and to ensure the genetic exchange between subpopulations, shrubs were removed and **"flight connection corridors"** created.

Cattle **grazing** has also resumed on these areas, which benefits the scarce heath. The grazing keeps grass and shrubs short.



© REVITAL



© K. Cerny



© K. Cerny

An ideal habitat for the scarce heath at Musau. Here, shrubs were selectively removed on an area of 7.4 ha, allowing light to shine through again.

Denser "living quarters" for the Siberian bluet

The **SIBERIAN BLUET** *Coenagrion hylas*, is a highly threatened damselfly protected across all of Europe. Its most important **refuge** in Europe is at the Tyrolean Lech.

Although its population in the Tyrolean Lech valley is considered secure, eight additional **shallow pools** were created near existing spawning pools.

They ensure high **habitat connectivity** and enable crucial genetic exchange between the loosely spread populations. This should further anchor the populations of this extremely rare damselfly in the region.



© REVITAL



© J.M. Müller

This new groundwater pool will probably be colonised by the Siberian bluet soon.

Management plan Tyrolean Lech

A „ROADMAP“ FOR THE FUTURE



© Revital

A new management plan for the Nature Park Tyrolean Lech lays out goals and measures for the next 10 years.

In **2020–2021**, representatives of the Tyrolean Regional Government, Department for Environmental Protection, the association Naturpark Tiroler Lech, and of local institutions (municipalities, tourism, agriculture, forestries, regional development, schools, NGOs, ...) met several times in **working groups** and for **discussions** within the LIFE project framework. With expert guidance, they defined goals and measures for the protected area for the next 10 years – and beyond.



© Revital

Together, the participants developed **175 individual measures**.

- 126 of them are concerned with nature conservation.
- 38 measures concern environmental education, recreation, regional development, and research.
- 11 overarching measures are meant to strengthen the Nature Park region Tyrolean Lech beyond the bounds of the protected area itself.

A first step towards the implementation is the beginning of a "forest-wildlife-dialogue". Additionally, further specialist workshops as well as Lech nature tours for the regional tourism board employees are planned.

The top goals and measures



The new Lech experience

LIFE OFFERS AND VISITOR FACILITIES

An exhibition on tour



Since 2018, roll-ups with information on the goals and measures of the LIFE project Tyrolean Lech have moved from place to place in the region and beyond. Some of the **stations**:

- district construction office Reutte
- district administration office Reutte
- Forum Alpinum 2018 conference
- University of Innsbruck
- Alpenzoo Innsbruck
- Nature Park centre Elmen
- Burgenwelt Ehrenberg (castle)
- forest experience centre Ziegelwies
- Riverfest am Lech (event)
- Alpentherme Ehrenberg (spa)
- chamber of commerce Reutte
- secondary school of Elbigenalp

The LIFE project Tyrolean Lech placed great emphasis on **information and awareness raising**. This included media work, a dedicated project website (www.life-lech.at), a travelling exhibition, short films, up-to-date information materials (→page 28), but also more active visitor offers such as lectures, excursions, and action days. In the years before the Covid-19 pandemic, around 8,000 people a year visited the Naturparkhaus (Nature Park Centre) Elmen to learn about the protected area and the LIFE project.

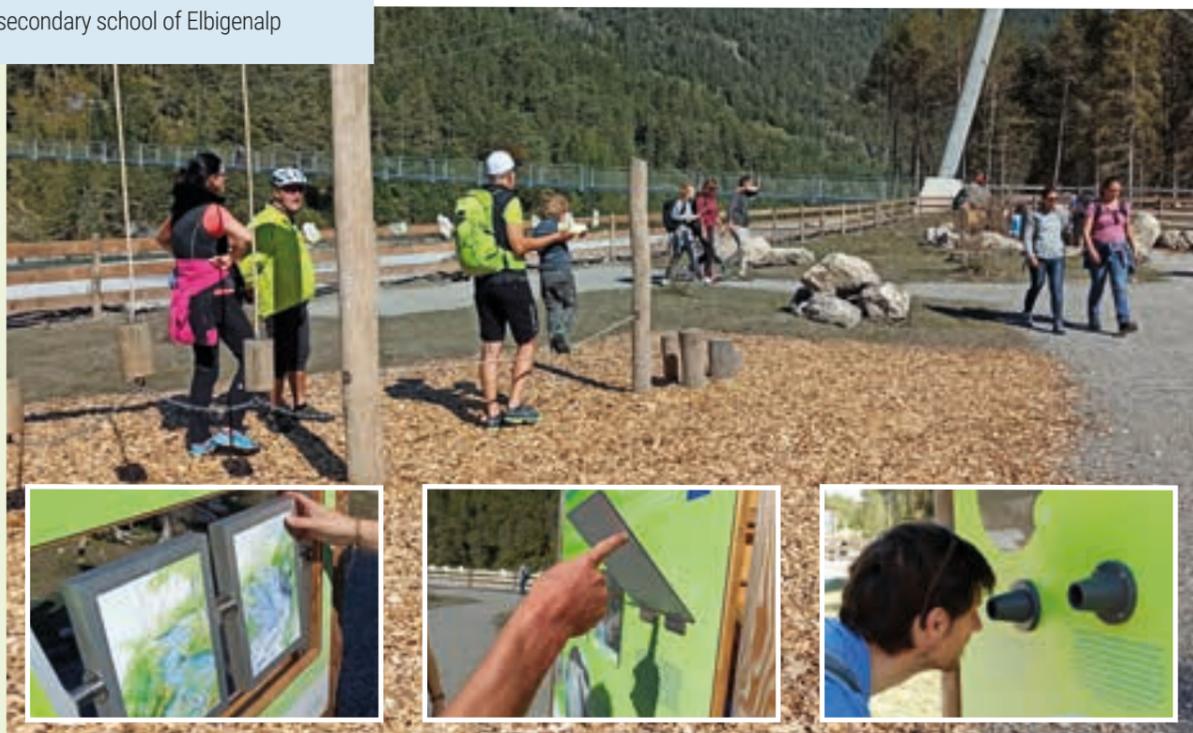
Outstanding highlights included the renewal of the **suspension bridge** at Forchach in combination with newly designed interactive **visitor information**, as well as the "2. Internationales Wildflusssymposium" ("2nd International Wild River Symposium") LIFE Lech, held from the 22nd to the 24th of September 2021 in Breitenwang.

This event attracted a number of renowned scientists and interested parties from all over the EU and was received with enthusiasm.

Visitor hotspot "Suspension bridge Forchach"

On the right bank of the Lech, directly beside the access path to the new suspension bridge at Forchach, a new **experience and recreation area** for both locals and visitors was set up in 2020. It was created within the LIFE project framework. The space is split into an entrance area, "information islands" on the topic of wild rivers, a "calm island", a "barbecue island", and a low rope course in the riparian forest.

The location – at the heart of the Lech valley – was a deliberate choice: Here, hikers, walkers, and cyclists encounter a particularly impressive stretch of the Lech. It is an ideal place to **sensitize** people to the need to protect the Lech, but also to **guide visitor flows** to relieve sensitive natural spaces.



In combination with the new suspension bridge, this is an attractive visitor facility that serves as a playful, interactive introduction to the LIFE project, the Nature Park, and the Lech ecosystem.

2nd International Wild River Symposium Lech

From the **22nd to the 24th of September 2021**, the Event Centre Breitenwang hosted the 2nd International LIFE Lech Symposium "Wildflusslandschaften" ("wild river landscapes").

In their **lectures**, experts and scientists presented new, exciting findings and research results on the topic "wild river landscapes", seen through the lens of flood protection as well as river and na-

ture conservation. The first LIFE monitoring results were also presented here, and the challenges of the climate crisis and of conflicts of interest were highlighted. The "casual" evening of the symposium was arranged by the music group "Bluatschink" from the Lech valley. The group grew out of an environmental initiative and had much to tell about the beginnings of the protected area.

The new LIFE Lech **short film series** also premiered during the symposium. It highlights the wild river Tyrolean Lech as a model water body for Europe (→ page 28).

The event closed with a joint **excursion** to select measures of the LIFE Lech project.



Expert presentations and an excursion to the Tyrolean Lech were the focus of the 2nd International Wild River Symposium Lech in Breitenwang, in September 2021. Around 80 people participated.



Representatives of the Water Engineering Administrations from all federal states visited the Lech in 2020 and were enthusiastic.

Excursions and action days



On 17/05/2019, the Tiroler Umweltnachwacht (Office of the Tyrolean Environmental Ombudsman) visited the Lech and gained an impression of the LIFE measures.



The LIFE project participating in the "Lange Nacht der Museen" ("long night of the museums") on 10/10/2020 in the Ehrenberg Castle ruins.

The **exchange of experience** is very important for LIFE projects. The Tyrolean Lech project was no exception. Some **impressions ...**



In May 2019, a visit to the Isar in Bavaria was on the agenda. The return visit at the Tyrolean Lech came in 2021.

Monitoring

REMARKABLE RESULTS

Goals for protected habitats and species – put to the test

Monitoring is essentially “success checking”. As required for LIFE projects, scientists studied the effects of the implemented measures over the period of 2018–2022. The Lech ecosystem and the project’s declared goals were examined by zooming in on the following representative topics:

- Active channel area
- Small fish (bullhead, minnow)
- Gravel bar breeding bird species
- Amphibians
- Insects and spiders
- Dwarf bulrush
- Habitats protected at the European (Flora-Fauna-Habitat) level
- Socio-economic impact

The results are grounds for optimism - but also make clear that much is left to be done.

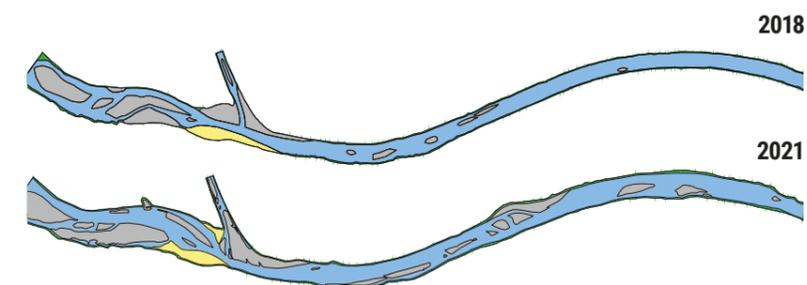
Active channel (“dynamically shaped river landscape”)

Here, the effect of the LIFE river revitalisation measures on the morphology - that is, the appearance - of the Lech is examined. The parameter is the “active channel”, meaning the space in which the river dynamically shapes and reshapes its own bed.

For this purpose, drones buzzed over the 13 measure areas in 2018 and 2021. They took aerial photographs of the river stretches. Experts evaluated them and tallied up the morphological changes.

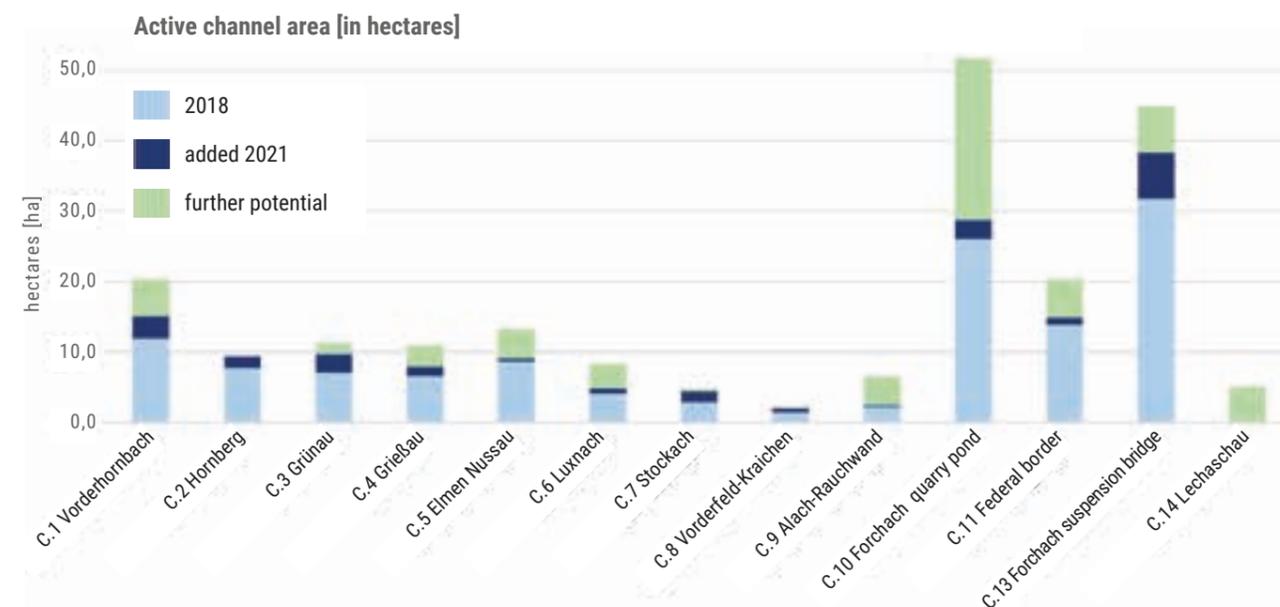
The results show that about 14 km of “soft”, unsecured riverbanks have been created so far. As a consequence, the river has added around **23 ha to its active channel area**.

However, the potential is much higher still. Large floods could enable up to **62 ha of additional active area** around the measure stretches (→ figure below).



Example: Active channel changes at measure C.1 Vorderhornbach

- Water area at low flow
- Sediment bank, bare
- Sediment bank, vegetated
- Bank areas



Active channel area has grown by 23 ha across all LIFE measure stretches. 7 ha were added at measure C.13 alone. The potential for further development of the measures (green bar) amounts to approximately 62 ha, almost 23 ha of which could result from measure C.10.



Small fish monitoring



© ARGE Limnologie / Moritz

populations of small fish, especially the bullhead, which is protected across Europe. To this end, they carried out **electrofishing** during low water in autumn.

In 2017 and 2021, aquatic ecologists studied to what extent the LIFE revitalisation measures are able to benefit

The results are **encouraging**: Bullhead were found frequently, especially in the new, slow-flowing side arms. Furthermore, the redesigned stream mouths – such as that in Kraichen (C.8) – showed high densities of river trout juveniles.



© REVITAL / Wehländer



© ARGE Limnologie / Moritz

The bullhead (left image) was detected frequently, showing a very positive development. The new mouth area of the Modertalbach (small image) proved to be a hotspot. Once again, this shows how important the side streams are for the reproduction of the fish in the Lech.

Insect & spider monitoring

The occurrence of insect and spider species characteristic of dynamic wild rivers was also monitored: **rose-winged grasshopper** (*Bryodemella tuberculata*), **gravel grasshopper** (*Chorthippus pulvis*), **Tetrix tuerki**, and **Arctosa cinerea**. Monitoring studies of these species took place late in the summers of 2017 and 2020 on 11 LIFE revitalisation stretches between Stockach and the federal border.

As the monitoring period (2017–2020) is short, the results are not yet conclusive. However, a positive effect could already be observed at the revitalisation measure C.2 in Ehenbichel-Hornbach, completed in 2018 (images on the right).



© INUK / A. Landmann



© REVITAL / O. Söhr

River widening improves the habitats of the gravel grasshopper (left image) and Tetrix tuerki (right image). Arctosa cinerea (upper image), too, benefits from the re-dynamisation of the Lech.

Other measure areas may also experience positive effects. To prove them, further regular checks are to be carried out. Above all, it has to be determined to what extent revitalisation measures can promote the renewed expansion of isolated populations.



© NPTL

Arctosa cinerea

The low-water groynes, like those installed at the federal border near Pinswang (measure C.11), also led to strong increases in small fish populations. Especially minnows and stone loach thrive here.

This **positive development** will likely continue over the next years. This is not just due to river widening, but also to new water bodies like the Koppenbach or the reconnected oxbow lakes at Lechaschau (C.14), whose potential as spawning grounds is far from reached.

Monitoring Amphibien

The amphibian monitoring already shows positive trends for the protected species **natterjack toad**, **tree frog**, and **great crested newt**.

For instance, a tendency towards increasing **tree frog** calls was observed. More than half the sites also showed evidence of reproduction. The number of observed **great crested newts** was also higher in 2021 than in 2018. **Natterjack toad** populations have been stagnating on a low level for years. In 2021, however, offspring were able to develop again.

With the creation of new **spawning waters** and raw soil sites for amphibians, the LIFE project has, in any case, laid good foundations for a positive development of amphibian populations in the Lech valley. Better-founded statements on whether the measures were successful will only become possible in the near future. Some first **evidence of reproduction** in the newly created water bodies gives cause for optimism.



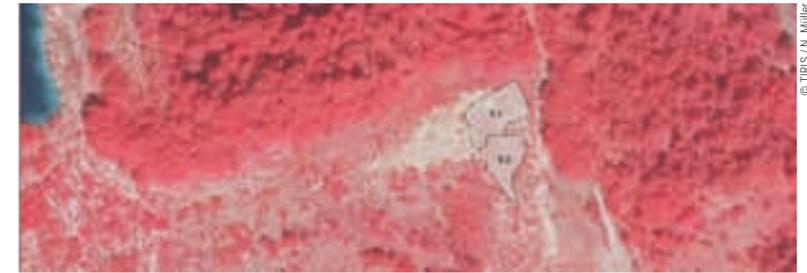
© REVITAL / Ch. Riegler

The tree frog population is developing well, also thanks to the many new spawning grounds established within the LIFE project.



© REVITAL

In the new spawning waters at Pinswang, the natterjack toad also reproduced successfully in 2021.



© TIRIS / N. Müller

Dwarf bulrush monitoring

The reintroduction and conservation of the dwarf bulrush populations at the Tyrolean Lech have been promoted since 2003. Further measures were implemented in 2017–2021 (→ page 20).

The monitoring of the population development between 2003 and 2021, carried out as part of the LIFE monitoring, shows a large increase in the total number of shoots over the years. However, subpopulations outside the active channel are not viable in the long term.

The transplantations in Elmen, Alach, and Luxnach, which were carried out as part of the LIFE project, have **rooted well** and are spreading further via **root runners**. Whether these stands can sustain themselves will only be seen in the coming years, and it will depend on the flood dynamics at their sites.



© N. Müller

Dwarf bulrush at the Forchach quarry pond, made visible on infrared aerial photo (large image above). This population, established by seeding in 2003, was still the largest in the Tyrolean Lech valley in 2017.

In subsequent years, willows overgrew it because of a lack of river dynamics. Therefore, sods of bulrush were removed as part of the LIFE construction works in 2021 (small image) and transplanted into new, dynamic sites.



© REVITAL

Socio-economic impact



Regional economy: More than 80% of the costs, around **5 million Euros** were expended within the region and so benefited the regional economy.



Jobs: At the BBA Reutte alone, **10 people** worked on the project on average, and were paid from its funds. Another 900,000 Euros in wages went into the local construction industry.



In total, river widening has created an additional **200,000 m² of retention areas**. These areas act as buffers during floods and reduce downstream flood risk.



Tourism: The wild river Lech has been one of the main factors shaping the tourist image of the region for years. The LIFE project strengthens this positioning and further increases its visibility in Europe.



Acceptance: In an online survey, a large majority of **70%** saw the renaturation and species conservation measures of the LIFE project as important.

Thank you!

Participants

MANY HAVE WORKED TOGETHER

More than 40 project team meetings, 10 steering group meetings, repeated meetings of the working groups on species conservation and monitoring, as well as countless construction progress meetings accompanied the second LIFE project at the Tyrolean Lech. Only the cooperation and the engagement of a large number of people (over 100!) made it possible for the project to succeed. **Sincere thanks are due to all of them!**

Project lead:

Bernhard Kogelbauer (Land Tirol, Abt. WW), PL seit 2021
Wolfgang Klien (BWV Tirol, BBA Reutte); PL bis 2021
Florian Keller (BWV Tirol, BBA Reutte), PL-Stv.

Project coordination:

Marian Unterlercher, Martin Weinländer (Revital)

Steering group:

Markus Federspiel (Land Tirol, Abt. WW)
Heinrich Ginther (Bgm. Gemeinde Elmen)
Reinhard Lentner (Land Tirol, Abt. U)
Walter Michaeler (Land Tirol, Abt. U)
Martin Mohr (WWA Kempten)
Fritz Weiss, Gerhard Bachner (BML)

Project group:

Bernhard Kogelbauer, Stefan Walder,
Lukas Krassnitzer (Land Tirol, Abt. WW)
Wolfgang Klien, Florian Keller (BWV Tirol, BBA Reutte)
Reinhard Lentner, Walter Michaeler, Felix Lassacher,
Monika Egger, Daniela Wagner (Land Tirol, Abt. U)
Martin Mohr, Tobias Hiepp (WWA Kempten)
Anette Kestler, Marlene Salchner, Yvonne Markl,
Isabella Hilti, Nora Schneider (NPTL)
Marian Unterlercher, Martin Weinländer (Revital)

Participation:

Leopold Füreder, Anna Schöpfer, Laura Kanduth (Uni Innsbruck), Andreas Murrer, Barbara Eberhard, Teresa Müllauer, Sophie Riccabona, Samuel Sieder, Silvia Flucher (Abt. U)

Visitor facilities / public relations:

Simone Knitel, Sabine Resch, Johanna Probstmeier,
Caroline Winklmeier (NPTL), Lukas Furtenbach, Patricia Winder (Furtenbach Adventures), Michael Auer, Eva Radenich (pronatour), Bernhard Reiter (BBA Reutte), Karl-Heinz Köpfler (Designskills kreativagentur), Susanne Frauenhoffer, Elisa Köll (Web-Style, Barwies), Christoph Rohrbacher

Planning and construction monitoring:

Florian Keller, Wolfgang Klien, Bernhard Reiter (BBA Reutte), Florian Glaser (TB, Absam), Christian Moritz, Richard Schwarzenberger (Arge Limnologie), Norbert Müller (Uni Erfurt), Christina Kollnig (Ökologisches Büro Reutte), Susanne Reisinger (Donauconsult), Armin Landmann (TB, Innsbruck), Dietmar Gstrein (Atelier Gstrein), Christian Ragger, Clemens Holzer-Salcher, Martin Weinländer (REVITAL), Nessler ZT GmbH

Work on construction / tree clearing / habitat care:

Fridolin Golser, Erwin Hosp, Georg Friedl, Franz Kleinhans, Markus Moll, Norbert Pohler, Heinrich Willmann (BBA Reutte), Günter Geisenberger, Anton Leitner, Peter Nigg, Thomas Schubeck, Rudi Schweiger, Thomas Vollmair (WWA Kempten), Harald Hammerle, Michael Falger (Zobl Erdbau), Rainer Heel, HTB, Vermessung AVT, TPA, Forstbetrieb Markus Linder (Buching), Forstbetrieb Andreas Wagner (Reutte), Verein JARO Jaroměř (CZ), Umweltbüro Karel Cerny (Innsbruck), Botanischer Garten Innsbruck

Monitoring:

Abiotics: Daniel Haas, Josef Schönherr (IB, Biberwier)
Monitoring concept, ecosystem functions: Leopold Füreder, Anna Schöpfer, Laura Kanduth (Uni Innsbruck),
Small fish: Christian Moritz (Arge Limnologie),
Wolfgang Mark (Uni Innsbruck)
Amphibians: Florian Glaser (TB Glaser)
Insects & spiders: Armin Landmann (TB, Innsbruck)
Dwarf bulrush: Norbert Müller (University of Erfurt),
Christina Kollnig (Ökologisches Büro Reutte)
FFH-Habitats: Evelyn Brunner (Revital)

Project municipalities:

Pinswang, Musau, Reutte, Lechaschau, Ehenbichl,
Breitenwang, Forchach, Elmen, Elbigenalp, Häselgehr, Bach

Help & support:

Naturparkschule Elmen, Toni Knittel/Bluatschink, Zacharias Schähle (Tiroler Fischereiverband), Helmut Kudrnovky (UBA Wien), Stefan Ossyssek (WWF Weilheim), Julia König (WWA Kempten), Janina Schaper (UNB LRA Oberallgäu)

LIFE monitoring team / CINEA:

Conny Schmitz, Theresia Holzamer / Rosi Hingsamer

Political responsibility:

LRin Ingrid Felipe, LR Josef Geisler

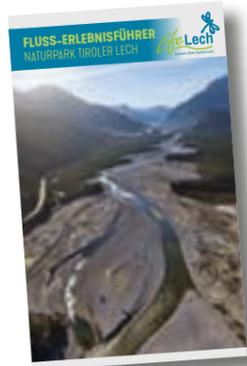


More information

PRODUCTS & LINKS

LIFE Lech Homepage

The www.life-lech.at is kept up to date with news on the project's progress.



Guidebook "Flusserlebnisführer"

The "river experience guidebook" dives into the Naturpark Tiroler Lech and its habitats, presenting specialist and endangered animal and plant species. Selected hiking and bike tours in the Nature Park area Lechtal-Reutte guide these insights.



Also available online here (German only): https://www.life-lech.at/fileadmin/PDF/BRO_Fluss-Erlebnisfuehrer_WEB.pdf

Folder

This eight-page folder on the LIFE project shows the motivations behind the measures and their goals. It also presents the most important habitats of the Tyrolean Lech. Available in German and English.



Version DE: unter: https://www.life-lech.at/fileadmin/PDF/20191021_LIFE_Folder_FINAL_homepage.pdf



Version EN: unter: https://www.life-lech.at/fileadmin/PDF/LIFE_Folder_engl_low1.pdf



LIFE postcard with latent image effect

An unusual flip-image postcard visualizes how the Tyrolean Lech changed near the new suspension bridge at Forchach. Try it yourself!

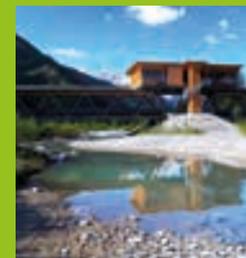
Available at the Naturparkhaus Elmen. Come by!



LIFE short films



The LIFE Lech website provides access to interesting clips and videos around the Tyrolean Lech and the LIFE project at <https://www.life-lech.at/service/downloads/>



The Naturparkhaus Klimmbrücke provides in-depth information on the LIFE Lech project.

VISIT US DURING OPENING HOURS!

Daily from May to September (10:00–16:00)

Naturparkhaus Klimmbrücke
Klimm 2, 6644 Elmen
www.naturpark-tiroler-lech.at
info@naturpark-tiroler-lech.at

The Flusserlebnisführer (DE), the folder (DE/EN), and the postcard are available **for free** at the **Naturparkhaus Elmen! Orders via** info@naturpark-tiroler-lech.at



Publishing information

Editor and publisher:
Office of the Tyrolean Regional Government, Department for Water Management,
Herrengasse 3, 6020 Innsbruck
Responsible for the content: DDI Bernhard Kogelbauer

Concept, text, and graphics: Marian Unterlercher, REVITAL Integrative
Naturraumplanung GmbH, www.revital-ib.at

Editorial assistance: Bernhard Kogelbauer, Wolfgang Klien, Florian Keller,
Bernhard Reiter, Walter Michaeler, Felix Lassacher, Leo Füreder, Isabella Hiltl,
Nora Schneider, Martin Weinländer, Norbert Müller

Cover image: The Tyrolean Lech at Forchach. © BBA Reutte/Bernhard Reiter
Image credits: see images

Printed on recycled paper
Print: Oberdruck, Dölsach

LIFE15 NAT/AT/000167



LifeLech

Dynamic River System Lech

The LIFE project “Dynamic River System Lech” was implemented by the Federal Water Engineering Administration of Tyrol (BWV Tirol), represented by the district construction office of Reutte (BBA Reutte), in collaboration with the Department for Environmental Protection of the Tyrolean Regional Government (Amt der Tiroler Landesregierung, Abt. Umweltschutz) and the Water Management Administration of Kempten (WWA Kempten) from 2016 to 2022.

The focus of the project was the implementation of numerous revitalisation and species conservation measures in the Nature Park Tyrolean Lech, accompanied by public relations work and the creation of a management plan for the Natura 2000 protected area.

The European Union and the Austrian Federal Ministry of Agriculture, Forestry, Regions and Water Management provided funding.

More information at: www.life-lech.at

LIFE15 NAT/AT/000167

SUPPORTED BY THE FEDERAL GOVERNMENT, THE FEDERAL PROVINCE AND THE EUROPEAN UNION

 Federal Ministry
Republic of Austria
Agriculture, Forestry, Regions
and Water Management



Wasserwirtschaftsamt
Kempten

