

# Can humans harness the power of beavers?

*The warming climate and biodiversity loss are looming problems that will require radical solutions. Beavers can help mitigate both crises. Several regions have found ways to work with the rodents, but it requires some careful balancing.*

*Author & Photos: Katharina Jakob, editing: Johanna Romberg, translation: Gretchen Vogel*



*Is it possible to work with anarchists?  
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If beavers were entrepreneurs, they would have a ready-made ad campaign: 15 million years of experience in hydraulic engineering as part of a family-run business, unrivaled prices (beets and corn gladly accepted as payment), and

construction work continues year round — with no extra charge for night shifts. And then there are the results: Wherever beavers move in, biodiversity explodes. New habitats are created, monotonous water channels are transformed into vital streams, the groundwater level on their banks rises, and the soil is protected from drying out.



*Dead trees in a beaver pond provide a home for many insect species.*

**This article appears as part of our project "Countdown Earth," a series on solutions for the climate crisis and biodiversity loss.**

Some experts hope that this creativity can be harnessed to help mitigate the enormous problems caused by the twin crises of climate change and biodiversity loss. Beavers have solutions that are often better than

any human-made efforts. Beaver populations can be a highly effective medicine against all sorts of ecological ailments — if only it weren't for the side effects.

## **A power plant designed by anarchists**

Unfortunately, the side effects can be significant. They include flooded agricultural land, collapsed walking paths, submerged railway embankments, destroyed dikes and breached flood protection systems. Beavers are anarchists, refusing to follow any blueprint except their own. Could it still be possible to harness the positive sides of beaver power while containing the bad?

This is a journey to thriving beaver populations and the people who have dared to cooperate with them. A few local communities have already embarked on the "beavers as helpers" experiment. Switzerland is planning to go even further. In its programs from 2025 to 2028, the Federal Office for the Environment gives national priority to beaver-created wetlands in the country's forests. Swiss efforts to harness beaver power are still in their early stages, but a recently designed floodplain model for the country shows what would be possible if beavers were allowed to help. Without conflict management, however, such efforts are doomed, experts warn. Conflicts must be taken into account and solutions devised right from the start. Beaver management sometimes has to be robust, to match the robust animal.

Beavers themselves came very close to being victims of the extinction crisis. Only a few hundred animals of the two species *Castor fiber* (Eurasian beaver) and *Castor canadensis* (the North American species) survived centuries of merciless hunting. Everything about the beaver was valuable. There was the thick, water-repellent fur used mainly for hats, the tasty meat, and also the castoreum, a secretion the animals use to mark their territory. It was added to medicines, used in perfumes and even flavored schnapps and cigarettes. At the beginning of the 20th century, beavers had disappeared from nearly all of Europe, surviving only in a few tiny, isolated remnant populations in southern Norway, along the Rhône river in France and along the Elbe in eastern Germany.



*The telltale signs of the beaver's work are easy to spot in a forest in the Eifel.*



*Wood chips with tooth marks cover the ground.*

## Six founding beavers in the Eifel

Then, in the early 1980s, a few foresters in the Eifel region in western Germany got together to bring the beaver back to the Hürtgen Forest, a 20-kilometer-long, densely forested ridge near the Belgian border. "This is really the beaver's living room," says Robert Jansen, the head of the regional forestry office for Rureifel-Jülicher Börde. At that time he was just starting his job. He saw how his colleagues brought six founding beavers from Poland and released them into the Hürtgen state forest. The area, approximately 11,000 hectares in size, is crossed by many small streams — an ideal habitat for beavers. Eventually an impressive population of an estimated 1,000 to 1,500 animals grew from a handful of progenitors. Today they inhabit an area that extends from the sources of the river Rur to the Meuse in the Netherlands.

Wherever beavers settle, they fundamentally change waterways. They cut down trees, build dams, and divert the water to ensure that water levels remain high enough so they can dive immediately in case of danger. Most importantly, the entrance to their lodge is always under water, which protects them from predators. The dammed water overflows its banks and creates the typical beaver ponds. Over time, beavers create connected ponds of different sizes, like thick and thin beads on a string. When beavers still populated large parts of Europe, most streams had this form. They were effective flood protection because they absorbed excess water during heavy rain and directed it into the floodplains. Flood peaks were reduced, and the valleys were better protected from flash floods. Wet meadows along the banks cooled the area in hot summers, and countless animal and plant species lived in the beaver-designed landscapes. This type of renatured landscape is urgently needed today, many experts say.



*A beaver family's garden: Felling trees allows sunlight to reach the forest floor so that grasses can thrive.*

## In beaver country

“The beaver offers enormous opportunities. They can really help us,” says Lutz Dalbeck, beaver expert and deputy head of the Biological Station in Düren, on the northern edge of the Hürtgen Forest. Bubbling streams run through the typical Eifel forest of alder, beech, hazelnut and oak — all woody plants that the beaver loves.

Dalbeck repeatedly stops on the hiking trail and points to gnawed trees still standing between the crisscross of felled trunks and branches. The marks left by the beavers' orange teeth are clearly visible. Palm-sized shavings spread across the ground. Wherever the beaver leaves its waters to enter the forest, well-trodden paths have formed, like a lumberjack's roads.

Dalbeck climbs down to the stream in his rubber boots. Beaver meadows, which are the rodent's gardens, spread out along the banks, bright green islands full of the sweet grasses that are the animals' preferred food.



*Lutz Dalbeck is a beaver expert and deputy head of the Biological Station in Düren.*

A landscape of ponds has emerged in the middle of the forest, constricted by beaver dams. The structures, layered from branches and mud, create fast-moving rivulets and sparkling waterfalls alongside calm shallows and deep pools. The scene couldn't be more full of life. Amphibians, aquatic insects and fish have settled here, even species that do not usually occur together, such as the scarlet dragonfly from the Mediterranean region and the northern moss damselfly. The black stork, a strictly protected species, only lives here because of the beavers' work.

## In case of conflicts, who can de-escalate?

But in these regions the beaver doesn't hurt anyone. Most of the low mountain valleys are so-called marginal yield areas that are not worth cultivating. Beaver trouble tends to occur in lowlands where intensive agriculture is practiced.



*Sharp front teeth: The beaver's most important tool grows throughout its life.*

One example is the Jülich Börde region, a fertile plain at the foot of the Eifel. Dalbeck drives through the villages and points out a tennis court that was flooded, a walking path that was undermined, and felled trees on the side of the road. "As soon as I hear about a beaver conflict, I drop everything and go," Dalbeck says. He knows that those affected are primarily concerned with being heard. "You have to stand by people, immediately. Otherwise the fronts will harden."

There's no money to cover damages, but Dalbeck can loan out electric fences, install so-called wire "pants" to protect trees and give tips on beaver defense. If there is no other option, for example if there is significant damage to railway embankments, he would also accept shooting an animal. The nature conservation authority has to approve this as a last resort. The approach doesn't work in the long term, because beavers quickly reoccupy vacant territories, "but you have to be realistic," says Dalbeck. "What can society tolerate? What can agriculture or the economy tolerate?"



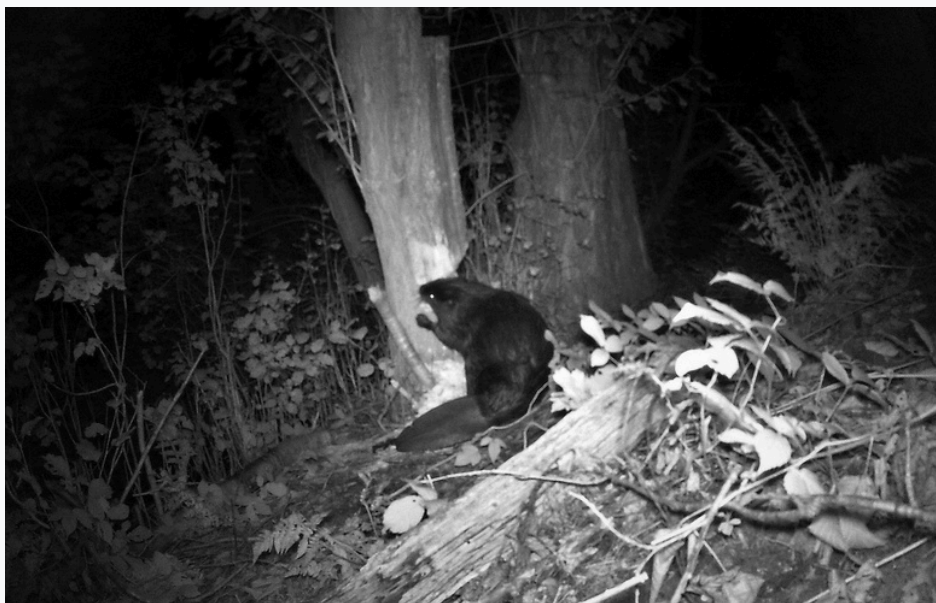
*Not here, please. A beaver has tried to settle on this railway embankment in the Jülich Börde.*

So far, his strategy seems to be working. The North Rhine-Westphalia state forestry office published a brochure on beaver reintroduction three years ago that explicitly praises his work. "Reassuring residents and providing instructions on how to avoid beaver damage has been important in recent years. The biological station in the Düren district has done exemplary work, so that at the end of the 'rapid expansion phase 2' the beavers were able to maintain their positive image," it says.

## Cooperation helps

The fact that the forestry experts cooperated with other specialists right from the start — both from the Düren Biological Station and the Eifel-Rur Water Association — also contributed to the broad acceptance of the beavers. The consortium includes people who see both aspects of the reintroduction: Not only that 32 species of dragonflies have now settled on the streams of the Hürtgen Forest, where there used to be just four, but also that beaver damage can be serious, for example to flood protection systems or pipes. Those involved summarize the most important findings, gained from many years of experience:

"I am absolutely convinced that you can cooperate with the beaver," says Jürgen Schieren from the Eifel-Rur Water Association. "But money has to be made available. When it comes to beavers, we are at our limit in terms of personnel and finances." His association's team travels to the beaver dams every day. If there is a risk of flooding, quick action is needed, in coordination with the responsible authorities. Is it enough to demolish half of the structure? Or does more have to happen? "So far we have been making case-by-case decisions," Schieren says. "But we need a comprehensive beaver management plan that provides legal security and stable financing for everyone involved."



*A beaver caught by a camera trap can't help looking a bit like a criminal.  
© Heinrich Pützler, Rheinbach*

"If you want the beaver, you have to get everyone on board," says Robert Jansen, the head of the forestry department. "But it's worth it. The beaver is an incredible creator of valuable habitat."

"If we manage to let the beavers do their work, at least in the low mountain ranges, we will have gained a lot," Dalbeck says. "For biodiversity, for the climate resilience of water bodies, for rebuilding groundwater reserves. We should use this potential."

In the Eifel, the solution currently consists of a mix of measures. In some places, beaver activities are very welcome. Elsewhere the rodent is tolerated and kept in check through controls. But there are also areas where beavers are not allowed. Settlement is prevented by deterrent measures, such as electric fences or protective grilles in embankments. A "Castor transport" box is ready in Dalbeck's Biological Station. So far, officials have not had to shoot any beavers in the Eifel.

## **A wetlands model that relies on the beaver**

But what would beaver use look like on a larger scale? Switzerland may provide some initial clues.

In the municipality of Marthalen, about 40 km north of Zurich, Christof Angst, head of the Swiss Beaver Office, leads a tour in late March through a commercial forest full of deciduous trees, especially oaks. Heavy machinery can be heard in the distance, the classic sounds of wood production.



*Christof Angst, head of the Swiss Beaver Office, leads a tour of the beaver habitat near Marthalen.*

However, around a bend, near a stone bridge, a completely different scene comes into view: a so-called forest reserve in which biodiversity has the highest priority. No trees may be felled or removed here. But that wouldn't be possible anyway, because the forest is gone.

A stream flows under the bridge into an almost treeless, swampy landscape. Only a few pale dead wood trunks stand in the water, stretching toward the sky.

The scenery is the work of a single beaver family. They have been living in the forest since 2009 and, to a certain extent, they have a government mandate. Switzerland wants to accelerate the renaturation of its rivers. The country has already lost 90% of its former floodplains, which is why wet biotopes like those created by the beaver are given high priority.



*Swamps in Marthalen: When beavers are given room, they know what to do with it.*

On behalf of the Federal Office for the Environment, the Beaver Office and a research team have now designed a floodplain model that relies on the work of beavers. The model shows the areas that the rodent would flood if it were allowed to do its work. Areas are rated with a minimum and a maximum "damming probability." The floodplain model will serve as a basis for future planning: Where can bodies of water be completely renatured with the help of beavers, as in Marthalen? Where are there other opportunities for cooperation between humans and beavers? And where would beavers likely cause problems?

Some forests would then look like this swamp, a wilderness that is not particularly human-friendly. Angst climbs over fallen trees, balances on trunks and fights his way through the undergrowth that snags at everything that moves. Piles of reeds lie like treacherous pillows over waterholes teeming with tadpoles. The mighty beaver lodge sits enthroned in the heart of the thicket. Its residents have been amply warned that intruders are on the way.

### **Commercial forest and beaver swamp, side by side**

The flooded forest covers four hectares. A buffer zone on either side takes up another six hectares before the intensively managed forest begins again. The seemingly opposite systems coexist here, in part because the Marthalen beavers only cut down a few trees. With the aquatic plants, reeds, marsh hedgenettles and various grasses, they have created an aquaculture that is more appealing than bark and branches.

The aquatic plants also make a key contribution to turning the wet forest into an effective carbon sink. "The swamp area stores three times more carbon through the growth of aquatic plants than the former forest," Angst says. He launches a drone to collect data. The "enormous influence" that the beaver has on its environment is now clear. There are now six times as many species and sixty times more



individuals in the forest reserve than in the stream beyond the protected area, where no beavers yet live. This means myriads of common toads, newts and grass frogs feed countless gray herons and grass snakes. The food chain is stable.



*This habitat is ready-made for the rare yellow-bellied toad.*



*Treecreepers build their nests behind the chipped bark in dead trees.*

Viewed from above, the commercial forest with its dense rows of trees still dominates the landscape. The swampland is limited to a wide strip along the water and, when viewed from the air, seems rather idyllic, like an untamed river running through a jungle. But the drone images also show that the beavers are staying within their zone. They leave the forest alone as long as their territory is large enough to support the family.

The drone images also make it clear that humans would never have been able to achieve these effects—a sobering realization. Mechanical renaturation is usually a one-off process in a limited space. “You can really only introduce a few structures and a little meander,” says Angst. “And then nothing else happens, except for a flood.”

### **The better caretaker**

But when streams are not consistently maintained, wetlands silt up over time, the forest returns, and the species that were attracted to the new habitat disappear again. Beavers, on the other hand, work continuously and keep the wetland alive. Basically, Marthalen gained a family of caretakers who are permanently on site, swarming out at dusk and maintaining the ecosystem. The work is free of charge – and anarchic only within its borders.



*The beaver stays within boundaries if it has enough space. Buffer zones separate the wide strip of beaver habitat from the commercial forest. © Christof Angst, info fauna Biberfachstelle*

These pioneering projects demonstrate the beaver's power to help restore lost landscapes and show that the animals do not have to be seen as pests. But intelligent approaches are needed. Where there are problems, pragmatic solutions must be found. It's clear that humans can no longer afford to do without the beaver as a tool to help shape resilient ecosystems. We have caused too much damage.

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