

## Bringing water back to Mecklenburg-West Pomerania

*Even after a relatively rain-rich summer, large parts of Germany continue to suffer from persistent drought. This is due not only to climate change but also to the continued large-scale drainage of the landscape. In Western Pomerania, nature conservationists, moor experts and water engineers are now working together to stop this - for the sake of nature AND the climate.*

*Author: Johanna Romberg, Editor: Susanne Wedlich, Translator: Gretchen Vogel*



*Bright yellow marsh marigolds blossom in the Stubbenbrook Moor near Warin, which was rewetted eleven years ago. More than 90 % of the moors in Mecklenburg-Western Pomerania are still drained today - and emit millions of tonnes of greenhouse gases every year.*

© Akrotelm

Irene Kalinin loves to talk about water. She remembers a walk in the summer of 2018 particularly vividly. It was the first of a series of summers in which the water shortage in Western Pomerania was already painfully obvious by mid-July. The wheat in the fields was knee-high instead of the usual waist-high. The field borders were a yellow-brown that looked like autumn, and the usually damp ditches were bone dry.

But then, at the edge of a little forest: a soft burbling, the glittering of a water surface, lush greenery of moss, sedges, and fresh alder leaves. It was the Knüppelbach, a small stream south-east of the village of Friedland, where Kalinin herself had played as a child.

It was no coincidence that the Knüppelbach had not dried up and disappeared and was still flowing even in the drought-plagued summer of 2018. In the early 1990s, a few young conservationists had the idea of carefully damming some of the stream's inlets to keep its source, the bogs near its banks, permanently moist. At that time,

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

hardly anyone was thinking about drought and water shortages as a result of climate change, not even in the water authority of the district of Mecklenburgische Seenplatte, where Irene Kalinin was working at the time.



*Irene Kalinin, managing director of the Friedland Water and Soil Association, inspects a renatured stream. Kalinin has made the "liberation" of naturally flowing water her life's work.* © Sarah Pohl

"Interventions in the discharge behavior of a body of water" require a permit, even in the case of a small forest or meadow stream that is only a few hundred meters long. Kalinin had to decide whether to approve the application, and she could have easily rejected the young people's project. But she allowed it, figuring "it can't hurt."

### **Streams that flow naturally are still a rarity**

It was only on her summer walk 25 years later that she realized how far-reaching her decision had been, in the best sense of the word. And to this day, it makes her deeply happy. Because what she did almost by chance in the early 1990s has now become her life's work: to give back to nature the water that people have taken away.

Irene Kalinin, born in 1959, is lucky – and burdened – to be able to pursue her personal passion in her professional life. Since 2005 she has been managing director of the water and soil association "Landgraben" Friedland. There are several thousand such associations in Germany. Association members are landowners and, in some cases, municipalities. They are united by a common interest and a public task: to "maintain and develop" bodies of water in their region, especially the flowing ones. Maintenance includes ensuring "orderly drainage," such as clearing blockages and overgrown vegetation in the waterways to prevent flooding. What "development" means is primarily defined by the EU Water Framework Directive issued in 2000. This states that all streams and rivers should be managed so they are in "good ecological condition" - that means not only clean, but also allowed to flow as naturally as possible. Where they no longer do this, they should be freed from artificially dug channels and pipes.

This directive was supposed to have been implemented by 2015, but it is a vast undertaking. That's because most German streams and rivers no longer flow in their original beds. That's also the case in the roughly 80 square kilometers of Western Pomerania for which Irene Kalinin is responsible. Of the 1,300 kilometers of watercourses in the region, 1,236 have been straightened or otherwise significantly changed. Nearly 350 kilometers have disappeared into underground pipes. However, Irene Kalinin is doggedly working to change that. She is convinced that the renaturation of waterways will in the coming decades be key to human survival - not just for the preservation of nature. And more immediately, it is crucial to reducing the consequences of climate change, which are already more noticeable in Western Pomerania than in many other regions in Germany.



*The Golmer Mühlbach flows leisurely and in gentle curves through the meadow landscape near Friedland in Western Pomerania. Only a few years ago it was relocated from a pipeline to an open bed. © Johanna Romberg*

### **Less and less water, but thirst is growing**



*Clouds of dust lie over a corn field near Greifswald. After an unusually dry spring, many fields in northeastern Germany have dried up - especially the large ones that are exposed to the sun and wind without the protection of hedges or trees. © Akrotelm*

Hydrogeologists Toralf Hilgert and Heiko Hennig recently examined the groundwater balance in the region and calculated how it is

likely to develop over the next few decades. The results are worrying. The groundwater levels in northeastern Germany have already dropped by at least half a meter and up to one meter compared to their natural state. Meanwhile the demand for water has risen steadily in recent years and will continue to do so: The authors predict that just irrigating agricultural land will require three times as much water as it does now.

Of course, climate change is also to blame for this. As the climate warms, northeastern Germany is expected to receive about the same amount of total precipitation, but it will fall irregularly. That means long periods of drought followed by heavy rains that the parched soils will hardly be able to absorb. Another reason for the looming water crisis is the region's pine forests. Planted centuries ago, the evergreen trees draw water from the ground all year round - unlike deciduous forests, where new groundwater collects in winter. The last and perhaps most important reason for the crisis is best seen from the air, with imaginary X-ray goggles that allow the viewer to see eight meters deep into the soil of the Western Pomeranian landscape.



*The forests in Mecklenburg-Western Pomerania are also suffering from drought. The consequences are exacerbated by forestry that has intensively drained areas for decades - in part in order to create extensive coniferous forests* © Akrotelm

Even a superficial glance shows that the region has abundant water. Apart from natural watercourses, the landscape is criss-crossed by a dense network of drainage ditches. The river valleys of the Peene, Trebel, Recknitz and Uecker stretch their blue fingers to the Baltic Sea. Alongside the rivers and streams are large fen areas, which together with many smaller bogs and fens scattered across the landscape make up almost 17% of the area of Western Pomerania. However, most of them can only be recognized as peatlands by the density of their drainage ditches. Over 90% of their surface has been drained.

## **A dense network of pipes extracts moisture from the soil**

Beneath the drainage ditches is another, much more extensive network that would only be visible through X-ray goggles. It runs through the moors and large parts of the entire landscape. Its structure is reminiscent of fish skeletons: Narrow tubes that taper into wider ones at sharp angles on both sides. They are up to eight meters deep in the ground and sometimes conduct water over several kilometers into the nearest open waterway. In some places they are stacked in several layers - newer ones made of plastic over older ones made of clay. Some of them were installed more than 100 years ago. Irene Kalinin estimates that 70 to 90% of the area covered by the "Landgraben" water and soil association is drained. She can't say exactly; their employees keep coming across

undiscovered pipes, which continue to draw water from the ground.

This landscape-altering drainage system is an incredible feat accomplished by generations of hydraulic engineers and rural residents of northeastern Germany. In part with the help of imported work crews, they transformed tens of thousands of hectares of swampy, almost inaccessible "wasteland" into fertile fields and pastures - and thus ensured the prosperity and food supply of hundreds of thousands of people. Their effort also ensures that farmers can work their land from spring to autumn without sinking into the soft ground with their equipment.



*A wide drainage ditch runs through a drained fen. Despite increasing drought damage, most ditches are still regularly cleared and their banks mowed - damaging the few bog plants that still sprout on them.*

© Akrotelm

## **Half of the rain flows into the sea without detours**

What the hydraulic engineers of earlier centuries could not have guessed is that the efficiency of their work would become a gigantic problem for future generations. Hilgert and Hennig estimated the scale of the problem in their study: The extensive network of ditches and pipes in Western Pomerania diverts around 50% of the precipitation that falls over the region towards the Baltic Sea before it can seep into deeper layers of the ground. That's why the precious groundwater reserves continue to sink.

As if that weren't bad enough, the drainage also contributes to global warming. When peatlands are drained, the plant remains preserved in them decompose and continuously release large amounts of carbon dioxide. The moors of Mecklenburg-West Pomerania alone, totaling around 287,000 hectares, emit 6.1 million tons of greenhouse gases every year. That is a third of the federal state's overall emissions and more than twice as much as all 1837 wind turbines installed in the state manage to save.

Researchers at the Greifswald Moor Center (GMC), one of Germany's leading think tanks for nature-based strategies against climate change, calculated these and many other figures. The GMC, founded in 2015 by the University of Greifswald and the Succow Foundation, supports landscape ecologists, botanists and experts from other disciplines as they explore one of the most exciting biotopes in the world. It also works to make politicians and the public aware of how essential the protection of peatlands is for an effective reduction in greenhouse gas emissions.

## **Precious crops also thrive on wet moorland**

The moor-rich surroundings of Greifswald serve as a kind of open-air laboratory for the researchers to test nature-based climate protection in practice. Initial results are not only scientifically

enlightening, but also a celebration for all who love nature and biodiversity.



*In the spring, hundreds of birds-eye primroses bloom on the restored Binsenberg bog. The endangered plant is considered an ice age relict. It thrives only on calcareous fen soils.* © Succow-Stiftung

The delicate leaf rosettes of birds-eye primrose and butterwort on the Binsenberg moor are evidence of a complex, but ultimately successful botanical rescue operation. A community of extremely rare plants that thrive only on calcareous fens was saved from local extinction by returning water to the area; the sensitive plants have multiplied and spread.

A water buffalo herd wanders leisurely through the reeds and sedges of the Großer Landgraben, a 10,000-acre restored river valley fen north of Friedland. The scene could almost be confused with a branch of the Okavango Delta if the sky above weren't filled with the songs of corn buntings, skylarks and whinchats.

In the "pond pasture" near Neukalen, the Greifswald researchers demonstrate the techniques they have developed for sustainable paludiculture, the technical term for farming on permanently wet soil. The cattails grown there will later be used to produce carbon neutral insulation. And peatlands can do even more: In autumn, the GMC, together with experts in sustainable raw materials, will start a large ten-year project focused on the production of peat moss as a replacement for the environmentally destructive peat still used in horticulture. The project is primarily intended to convince farmers that paludiculture is not a niche for eco-freaks, but can be both profitable and feasible. And with a view to the carbon balance, it may soon be a compelling alternative for many who are still farming on drained peat soils.

"Something is happening! It's starting! We have to think big!" When talking with people who regularly deal with the subject of peatlands—scientists from the GMC, but also farmers and nature conservation officials – there is a spirit of optimism and enthusiasm. Large-scale renaturation of wetlands could be "a triple win for the

environment," says Gerald Jurasinski, head of the peatland research group at the University of Greifswald. Bogs and fens, he explains, are not only carbon reservoirs and habitat for rare species, they could also significantly improve the water balance of the landscape. By storing large amounts of rain and cooling their surroundings through evaporation, they act as highly effective local air conditioning systems. This process can also contribute to cloud formation and thus bring more precipitation, Jurasinski says - "a small-scale Amazon effect!". But for that to be noticeable, the water would have to return much faster.



*Wherever there is a well in a field, there is an extensive network of drainage pipes running through the ground around it, directing water from the ground into ditches or natural streams.* © Akrotelm

## Rewetting peatlands? Volunteers wanted!

Since 1995, just a tenth of the peatlands in Mecklenburg-Western Pomerania have been restored, many of them only partially or to a limited extent. One reason for the painfully slow progress is that



*A herd of water buffalo grazes on the edge of the Landgraben, a renatured river valley moor south of Anklam. The large hoofed animals are ideal protectors of bogs because, unlike normal breeding cattle, they keep grass and other vegetation short even on swampy areas.* © Kees Vegelin

renaturation in Germany has so far only been voluntary. Those wanting to protect or restore bogs are not allowed to fill even a meter of ditch or close a single drainage pipe until all affected landowners have given their consent - including those in the areas bordering the bog. But landowners and farmers are often reluctant



*Round-leaved sundew, a carnivorous plant typical of bogs, sprouts on a carpet of peat moss.* © Succow-Stiftung

to do so, fearing that their meadows and fields will lose value if they become permanently wetter.

This concern is not unfounded. The subsidy system anchored in EU agricultural policy is still geared exclusively to the management of dry soil. Direct payments flow to farmers who cultivate drained peatlands. Subsidies are paid for fields that, depending on how they are used, emit up to 40 tons of carbon dioxide per hectare each year—equivalent to a small car driving around the globe four and a half times. Preventing the escape of greenhouse gases through renaturation of wetlands and paludiculture, on the other hand, receive almost no support – even though the raw materials paludiculture farms produce are already in demand.

Enthusiastic buyers include horticulture firms eager to replace peat harvested from intact bogs and homeowners who still have to import most of the thatch used for roof construction from Southeast Europe and even China.

## Environmentally friendly agricultural policy? Still a utopia

There have already been many attempts to make EU agricultural policy more climate and nature-friendly. But so far they have largely failed. That's because those who benefit from the existing system - mostly large companies and the agriculture industry - have formed a lobby with a structure that is reminiscent of the drainage systems in the north German landscape: grown in secret over decades, extensively networked - and to this day carefully maintained.

The scientists at the Greifswald Moor Center have already felt the power of this lobby. The CDU state politician and farmer Thomas Diener described the scientists as the "Moor Taliban" and accused them of wanting to "flood" 17% of the region, forcing the evacuation of "settlements and small villages."

This scenario is absurd. It drastically overestimates the political power of the moor protectors and also underestimates how carefully they proceed when renaturing wetlands: The water level is only raised to just below the ground

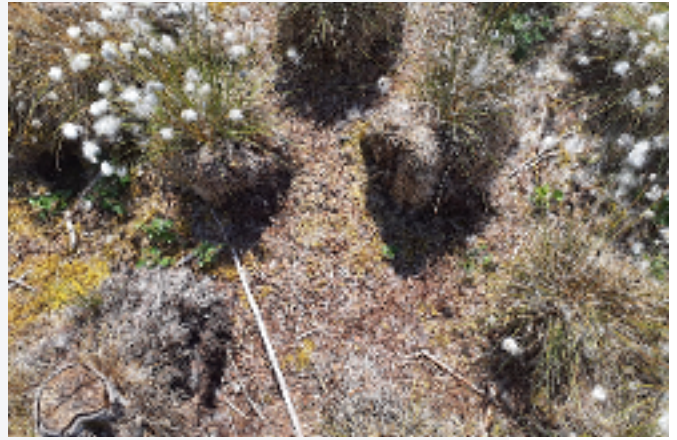


*Many meadows in north-eastern Germany looked like the village square of Gessin in recent summers. The sprinklings of green among the otherwise yellow-brown straw are robust pioneer plants whose taproots reach into moist soil layers.* ©Akrotelm



surface. In addition, the most important resource for any generous "flooding" of the landscape - water - is increasingly scarce. In some places there is not enough to even supply the moors for which restoration has been approved by all affected residents.

Especially smaller bogs far away from large river valleys sometimes look as if their plug had been pulled: the peat moss areas are overgrown by grass and birch saplings, the once spongy, water-saturated subsoil is hard as a rock, with cracks sometimes several meters deep.



*The once waterlogged soil of the Mannhagen Moor has shrunk to a hard crust due to dehydration. The peat moss that used to grow on it has dried up, and only a few clumps of cotton grass remain.*

© Succow-Stiftung

You don't have to be a naturalist to find the sight of a dying bog depressing. But there is a glimmer of hope. After all, the lack of water is not a natural phenomenon. It was caused by people, which means it could be fixed again. It only takes people with expertise in hydraulic engineering - and a lot of determination

Irene Kalinin has both. To illustrate what she calls her life's work, she sketches a cross-section of the landscape in Western Pomerania on a piece of paper. She draws a line that descends gently from the right edge of the sheet to the middle: This is a typical West Pomeranian stream that flows from a terminal moraine formed during the last ice age down into a valley to the nearest bog.

"If we want to bring water back into the landscape," she says, "then we shouldn't start down at the fens" - she taps the middle of the page - "but here, at the headwaters of the streams. If we free them from their pipes, they'll be able to flow at their natural pace again - so leisurely that they fill up one or two ponds or pools along the way" - she marks thick circles on the blue line - "from which water can seep into the ground again, down to the groundwater layers. And when they are sufficiently filled, more water will return to the fens."

It's not easy. It is true that Kalinin and her colleagues at the "Landgraben" water and soil association have already renatured ten kilometers of streams; another five are to be added in the next two years. However, the surface water recovered in this way has not yet reached the groundwater layer that feeds the largest peatland in the association area: the approximately 100 square kilometer "Friedländer Große Wiese." It was drained in the 1960s and is still waiting for the return of water.

Kalinin hopes that this will succeed in the long term, that her successors in office will continue the work she has begun. She says she remains confident because of her interactions with residents of the region during her everyday work. And, like the peatland experts in neighboring Greifswald, she has noticed a change in awareness involving water. More and more people are noticing the signs of chronic water shortages in their everyday surroundings: the dry cracks in the fields, the village ponds that have turned into green hollows, summer mornings without dew on the meadows, spring evenings that have become eerily quiet because the familiar soundscape of frog concerts is missing.



So

*An alder swamp forest that still has access to its natural water sources. Not only does it provide a habitat for many rare plants and animals, it also improves the water balance of the landscape. It provides effective rain storage and acts as a local air conditioning system that cools the area through evaporation in the summer heat.*

©akrotelm

many people are now aware of these signs that the employees of the "Landgraben" water and soil association are increasingly finding support for their renaturation projects – even among the traditionally skeptical landowners and local councils in the region.

The strongest support comes, perhaps unsurprisingly, from those who experienced the streams and moors of their homeland in their natural state.

Kalinin recently had one of those encounters that make her realize what she has been working for all these years. A chance conversation on the side of the road with an older man, initially about everyday things - the weather, the drought, a demolition measure planned in the neighborhood. And suddenly the man said with an undertone of longing in his voice: "If only I could see the stream I played in as a child flowing here again..."

"You most definitely will!" Kalinin told him. As she relates the conversation, her eyes fill with tears – of joy and satisfaction.

The restoration of the Ratteyer stream near Schönbeck, which is currently still flowing through an underground pipe, is set to begin in the next few months.

The research for this article was funded by  
Hering-Stiftung Natur und Mensch