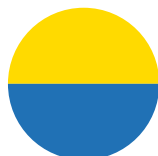


Biodiversity projects in Vattenfall

Focus on a greener world



VATTENFALL

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Latest update: March 2024

Enhancing biodiversity

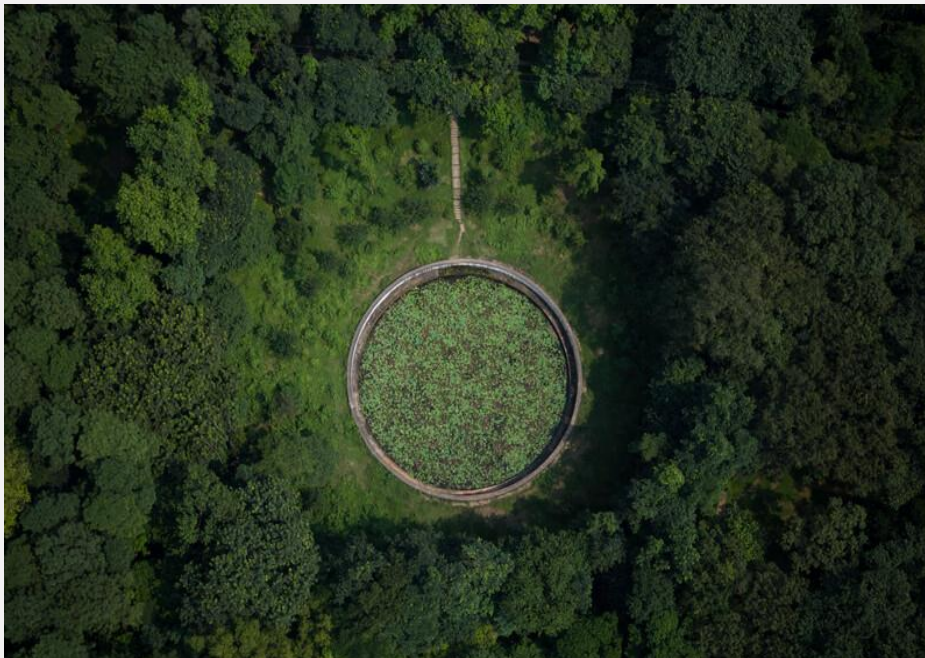
A living planet relies on a diverse nature and the complex web of species that underpin the functioning of the ecosystems. Biodiversity provides fundamental and important services like climate regulation, carbon sequestration and pollination. Today, human activities continue to put pressure on nature, and we see that the current rate of extinction is only accelerating. As a society, and as an energy company, we rely on the many goods and services provided by nature, and it is therefore critical that we act upon the challenges we are facing.

At Vattenfall, nature protection and biodiversity is embedded in our daily business, permit processes and R&D activities. To steer our efforts in the most efficient way we have a long-term 2030-approach to strive towards Net Positive Impact on biodiversity and we have several strategic targets to deliver on our overarching ambition.

This brochure summarizes a selection of projects and initiatives within our biodiversity work. There is a broad range of projects ranging from forefront biodiversity research programs to small scale measures that enhance biodiversity locally at our different sites. Some initiatives are connected to permits and legal obligations while some are done on a voluntary basis.

With this brochure we want to share some of the things we do, and we hope to inspire.

Our efforts to protect nature and biodiversity will continue and we would like to invite other companies, organisations and authorities to collaboration and exchange knowledge. Together we can make great things for a greener world.



1. Biodiversity projects in hydropower

The implementation of the European Water Frame Directive (WFD), Habitats Directive and Eel Regulation have influence on Swedish hydropower. Our goal is to achieve an environmental adaptation of hydropower in a balance between the national demands of renewable energy and the Swedish and European environmental goals. Vattenfall has, together with seven other hydropower companies, established a fund where we and the other companies will invest 10 billion SEK over a 20-year period. The work has only just begun, and we will continue to see a strong focus on biodiversity for the next coming 20 years. During 2023 we started a biodiversity program that will invest 65 million SEK in research and development to find sustainable solutions for the future. The program is an addition to our already ongoing R&D regarding biodiversity and hydropower and will have a specific focus on developing and evaluating biodiversity measures in large-scale hydropower regulated rivers.

1.1. Restoration of Juktån

Juktån is a regulated tributary to Ume River in northern Sweden. In the first half of the 20th century, it was used as a float way for timber transport to the sawmills at the coast. The waterways were cleared from rocks, boulders and debris and piers were built to straighten the waterways to allow the timber floating. The negative ecological impact on the aquatic environment was extensive as spawning and nursery areas for stream living fish were destroyed. In the late 1960's Juktans power station was finished and the majority of Juktåns flow was diverted through the power station.

A project to restore Juktån started in 2016 by Vattenfall, University of Umeå, Samverkan Umeälven and other power companies. The aim of the project has been to restore the negative impact from timber floating and adapt the river's morphology to the reduced flow due to hydropower regulation. Important goals were to regain spawning areas for trout and grayling, to increase stream habitats areas, and increase Juktån's potential as an attractive area for fishing and recreation. The restoration process was finished during the autumn 2020 and Vattenfall was at that time granted permit to change the minimum flow pattern flow to imitate a more natural seasonal distribution. The ecological effects of the project will be monitored 2021-2025.



Juktån, Photographer: Åsa Widén

1.2. Voluntary protected areas



Lady's slipper orchid
Photographer: Bengt Hemström

We protect rare and endangered species in several voluntary protected areas. Voluntary protected areas are sites with very high, and sometimes unique, biodiversity values. Through this voluntary initiative we preserve and manage biodiversity, but we also enhance recreation values and inform the public about the values in the different locations. In our protected areas we have species like the fairy slipper, moonwort, the lady's slipper and witches cauldron. We have four areas in northern Sweden located along the Lule River. We also have one protected area located along the river Dalälven called "Kungsådran Älvkarleby. The area was chosen by Vattenfall because of its unique combination of calcareous soil that gives rise to

a rich flora, older trees, and its location near the river Dalälven. The path crossing the area has interpretive signs about the special flora that is found in the area.

1.3. World unique ethohydraulic laboratory

“Laxeleratorn” is a unique, large-scale laboratory for hydropower related environmental and hydraulic experiments. It is located in Vattenfall’s Älvkarleby Laboratory in Sweden and was inaugurated in 2019. Here we combine expert knowledge of biology and hydraulics to find solutions that allow safe fish passage past powerplants with minimal effects on production. The main projects conducted in Laxeleratorn has been focused on innovations for up and downstream fish migration, e.g. intake racks, “dancing rods”, and bubbles curtains to avoid turbine passage. Several studies have been conducted in the laboratory and during 2023 we were focusing on two key species and downstream migration, eel and post spawning salmon (kelt). Here we investigate guidance efficiency and eel behaviour towards different rack designs, but also how kelt react to changes in acceleration and water velocity in order to set design criteria for bypass systems. Studies have also been conducted on upstream migration both in natural bypasses and technical fishways as well as on effects on fish behaviour from hydropeaking.



Laxeleratorn. Photographer: David Aldvén

1.4. Fish are mapped with AI technology

To ensure that the fish passage works efficiently, Vattenfall initiated a project to improve the biodiversity of watercourses with new technology. A variant of artificial intelligence (AI) was developed, and the program is trained on a large image material that directly analyses images of migratory fish filmed underwater. Initially a large amount of data was gathered, and the algorithm was trained and we have since worked in several projects to implement this technology in our fishways and fish farms.



Photo: Vattenfall

The AI-based fish recognition is used in the fish ladder in the hydropower plant Stornorrfor in northern Sweden to count and register properties of salmon and trout individuals. The algorithm has gradually been improved for each season. The algorithm is carrying out a differentiation between male and female salmonids and the system is also now in real time monitoring fish on an online dashboard. The latest feature allows for measuring the size of fish, which can be used to show patterns in a heatmap and determine the health of the fish population. The data collected can also provide insight into the behaviour of the fish, such as swimming patterns and whether they swim alone or in swarms. By analysing the data, claims can be made about the state of the fish population and how to improve it. For 2024 the system will also be tested for the fish ladder of Lilla Edet hydropower unit.

Over the years we have conducted several other R&D projects to evaluate new technology and solutions. Here follows two additional examples:

- **Guiding fish using pumps** - In 2022 and 2023 R&D tested an attraction flow raft in the river Dammån, Jämtland. The purpose is to evaluate the flow created by the pumps and how this could be used to guide downstream migrating fish. This Vattenfall R&D initiated project is run by the Swedish University of Agricultural

Science (SLU) in cooperation with Xylem, Fortum, Jämtkraft and Karlstad University. In 2024, a large pump (9 m³/s) will be tested at a larger hydropower plant. The aim of the project is to evaluate the guidance of post spawning salmonids using water jets.

- **Net as guidance barrier-** During spring of 2023, Vattenfall R&D assessed a net as a guidance barrier for downstream migrating salmon smolts. During the experiments we followed salmon smolts with high resolution 3D-telemetry to study how well they were being guided to follow the net during their downstream migration towards the sea. Nets as a guiding structure has many advantages compared to conventional trash racks both in terms of cost and weight, and a successful result would give us a new tool for fish guidance at our hydropower plants.

1.5. Building fish ladders

At several hydropower stations, for example Stornorrfors (Ume River), Hietamankoski and Leuhunkoski (Kymmene River), we have constructed fish ladders and increase passage capacity for migrating fish such as salmon and sea trout.

In Stornorrfors, which is one of Europe's most modern fish ladders, over 3 200 salmon and 250 sea trouts passed through the fish ladder during 2023. Upstream migrating fish can reach their spawning areas in the river Vindelälven. In addition, extensive measures have been taken to facilitate fish migration in the old riverbed downstream of the hydropower plant.

The 300-meter-long ladder was put into operation in 2010. In collaboration with the Swedish University of Agricultural Science (SLU), Vattenfall also analyses how the downstream passage of fish through Stornorrfors can be improved.

1.6. Biotope restoration and species protection

Biotope restoration and species protection is an important part in the environmental adaptation of hydropower. Here are some examples of biotope restoration projects targeting specific species:

- **Saimaa salmon:** Vattenfall is supporting the Natural Resources Institute Finland in their research about the Saimaa salmon. The Saimaa salmon is an important part of Finland's natural heritage, and the research focuses on restoring their natural life cycle.
- **European eels:** Vattenfall, together with several other hydropower owners, is a part of the project "Krafttag ål". This project involves the "trap and transport" of spawning migrating European eel past hydropower stations in the river Göta Älv between Lake Vänern and the sea.
- **Noble crayfish, freshwater pearl mussel, trout and grayling:** Vattenfall has been engaged in biotope restoration of tributaries to the river Upperudsälven and Lule River to improve conditions for the Noble crayfish, freshwater pearl mussel, trout and grayling.
- **Sea trout:** Vattenfall participated in the ReTrout project to reintroduce sea trout by stocking of roe in restored tributaries to the Vindelälven river.
- **Brown trout:** A new fishway was taken into use in central Finland and the construction of another fishway was started. The fishways are located approx. 20 km from each other and the aim is to free the route for brown trout.

- **Kestrels and bats:** Vattenfall Hydro Germany was awarded a certificate for species protection on buildings by Kulturbund, an acknowledged nature conservation association, honoring our actions for the protection of kestrels and bats at our Hohenwarte and Eichicht sites. Further actions taken in 2023 include the construction of habitat spaces for sand lizards.



*Floating island, Indalsälven.
Photographer: Göran Ekström*

1.7. Conservation project lesser white-fronted goose (Hydro, Sweden)



*Lesser white-fronted goose.
Photographer: Berth-Ove Lindström*

The areas where Vattenfall has many of its hydro operations, are home to EU's only breeding population of the lesser white-fronted goose. For 2021–2022, Vattenfall supported the Swedish conservation project for lesser white-fronted goose by sponsoring specially designed transmitters used to follow the individual geese that have been raised in captivity and released in the wild. The transmitters are charged by solar cells. Movement mapping is a very important piece in evaluating the effectiveness that the measures have on the population. The project is led by the Swedish

Hunter's Association in collaboration with the foundation Nordens Ark and the Ornithological Society in Norrbotten. The work to prevent the extinction of the species has been active since the mid-1970s. During 2023 we continued to support the project by assisting the team on site stocking and monitoring of geese.

1.8. Salmon compensatory stocking

In Sweden, power companies that operate hydropower plants are obliged to breed and stock fish to compensate for the reproduction areas that are lost as a result of hydropower regulation. Vattenfall's largest fish farm is in Heden, Lule River. Every year, Vattenfall releases 550 000 salmon smolts, 100 000 sea trout and 12 000 trout in the Lule River. In Sweden we stock in total 1,3 million salmon and sea trout each year.

1.9. Projects funded by Bra Miljöval

When Vattenfall sells electricity marked Good Environmental Choice, money is set aside to an environmental fund that can be used to improve aquatic biodiversity. Throughout the years the environmental fund has helped restoring nature and provided natural habitats for animals. Below is a few of the project examples:

- **Restoring tributaries to Lule River**
In the Lule River we have co-financed restoration of tributaries since 2014. The Lule River tributary, Flarkån, which was heavily affected by the timber floating era was restored during 2014-2015. During 2017-2022 the tributaries Pärälven and Linabäcken have been restored. Spawning grounds and riparian environments have been recreated for the benefit of grayling, trout and the endangered freshwater pearl mussel. Pärälven (the Pearl River) was historically known as having the richest population of freshwater pearl mussel in northern Europe. The

populations were however heavily depleted by pearl fishing and later by forestry and timber floating, which have affected nearly all the Lule Rivers larger tributaries.

- **LIV in lower river Dalälven**

The purpose of the project has been to investigate the lower parts of the river Dalälven's potential for salmon and trout production and, through surveys, to increase the knowledge of the river's fish stocks and its habitats. The project has provided information how to restore a natural reproduction of salmon and sea trout in the lower parts of the river.

- **Floating island for black-throated diver in a hydropower reservoir in the river Indalsälven**

The project has built and deployed a floating island in the Indalsälven upstream of the hydropower plant Midskog, where the water level variations in the hydropower reservoir adversely affect the breeding of the black-throated diver. The nesting has proven to be successful on the floating island.

- **Measures for Noble crayfish in river Upperudsälven, Rävmarksälven and Älgeröälven**

A successful reintroduction of species is dependent on that suitable habitats are available or could be restored. In the southwest of Sweden we have had two projects to improve the situation for the acutely endangered Noble Crayfish. Measures are carried out to improve survival of juvenile crayfish by restoring and creating new habitats in the watercourses. During 2022 reintroduction of 7300 crayfish juvenile and 1-3 year old noble crayfish were performed in these restored areas.



*Crayfish juvenile.
Photographer: Erik Sparrevik*

- **Reintroduction and restoration of habitats for freshwater pearl mussel in Rolfsån**

The freshwater pearl mussel (*Margaritifera margaritifera*) is a native and endangered species for European rivers and streams. In Rolfsån a project was initiated during 2022 to identify the need for different measures aimed at strengthening the declining populations of freshwater pearl mussels. The project identified a need to restore habitats for the mussels and their host fish trout and salmon which they are dependent upon during their early, juvenile, life stage. In 2023, we continued to remove obstacles, repair parts of the river where trees are floating, and bring back mussels by infecting host fish with mussel larvae (glochidia).

1.10. Eels in Elbe river



Photo: Vattenfall

In the area of the Geestacht pumped storage plant, above the Geestacht fish ladder, the Elbe serves as a lower basin for the pump storage operation. In order to have a positive influence on the fish fauna at the site, a fish-friendly operational model has been applied by the plant for years, resulting in a period of decreased pump activities during August and September. Additionally, an agreement has been signed with the local environmental ministry for a period of 5 years for financial support that is decided to recovery measures for the European eel. As the

European eel is regarded as particularly sensitive species from environmental protection perspective, this measure is an important contribution to increase biodiversity in the Elbe river and stabilize the eel stocks in a sustainable way.

2. Biodiversity projects within wind and solar power

In developing both wind and solar power we strive for co-existence with a rich natural environment, including protected species and habitats. We do this by:

- adopting the necessary mitigation measures to ensure there will be no significant impacts on protected species and habitats;
- considering opportunities to make improvements to local biodiversity; and
- investing in research to close knowledge gaps on the environmental impacts of wind farms and how these can be most efficiently mitigated.

Below follow some concrete examples of how this is realised in a practical context.

2.1. Offshore activity of bats in Kattegat and West Baltic – the big picture

Understanding the big picture in bat movements over the sea between Denmark, Sweden and German Baltic coasts is important background knowledge for offshore wind farm impact assessments and considerations around curtailment procedures to mitigate the risk of collisions. This was the background for the Kattegat West Baltic Bats Project (KABAP) aimed at coordinating multiple site-specific studies and filling the gaps between these in order to compile data to allow for one big geographical overview of migration patterns in spring and autumn. The bat species in focus being nathusius pippistrelle, common noctule, particoloured bat and pygmae pippistrelle.



Photo: Vattenfall

Since bats are mainly active during night, the primary means of monitoring them is by recording their calls with so called bat detectors. A large number of such recorders were successfully fitted to buoys and structures all across the Kattegat Sea and the South West Baltic west of the Island of Bornholm and have been collecting data throughout 2023.

2.2. Understanding where at sea auks spend the non-breeding season

Connected to the European Offshore Wind Deployment Centre (EOWDC) located in Aberdeen Bay, Scotland, a EUR 3 million research and monitoring programme was set up to improve the evidence base for planning and impact assessment for future of offshore wind farms. The program is now completed and the final reports published - for a full overview of the programme, please visit the [EOWDC website](#).



Guillemot. Photographer: Bob Furness

Understanding where at sea seabirds from specific colonies spend the non-breeding season is key information for the assessment of potential impacts of new offshore wind farms. To provide evidence on this for the razorbill and the guillemot, several hundreds were fitted with light logger tags across a large number of colonies in Scotland and Northern England. The results showed that razorbills tended to winter in the same area of the North Sea, while guillemots tended to have colony-specific wintering areas. [Final report](#)

2.3. Documenting seabird flight behaviour within an offshore wind farm

Another study connected to the European Offshore Wind Deployment Centre (EOWDC) research and monitoring programme focused on documenting the effect of the wind farm on flight patterns of seabirds.

Using a state of the art combination of radar and video tracking technology, the study collected data on seabirds like gannets, kittiwakes and herring gulls and how they adapted their flight behaviour to the presence of the wind turbines during the breeding and post-breeding period. In this area there are more seabird colonies on the coast, the birds of which are commuting to offshore feeding areas and potentially passing the wind farm. The results showed that the seabirds actively avoided flying close to the turbines, and when they did they often adapted their flight paths to avoid crossing the spinning rotor. The final report is available [here](#).



Black-legged kittiwake. Photographer: NatureEyes

2.4. Trialling new technology for seabird tracking close to wind turbines

Existing technologies have come short in documenting flight tracks of seabirds in 3D in the immediate vicinity of wind turbines, as was the case for the above EOWDC seabird study. Having solid objective evidence on close range behaviour is the last bit missing in piecing together the full picture on the avoidance response of seabirds, key to allowing more realistic predictions of collision risk for new wind farms.

On that background, a collaborative project was initiated with the Norwegian start-up spoor.ai to trial new and promising technology in this respect involving video cameras and AI. Further the research institution at British Trust for Ornithology (BTO) was engaged to do a scientific independent validation of the technology, and a panel of key stakeholder experts established to follow and advise on the project – all to ensure a high quality and useful outcome.

The four cameras installed in the EOWDC wind farm have been collecting data during 2023, where both on-site, observer based, and offsite, drone based, validation trials have been conducted as well. Results to be published in 2024.

2.5. Coexistence with capercaillies



Capercaillie. Photo: Vattenfall

In Bruzaholm wind farm, Sweden, a new method for coexistence between capercaillie and wind power has been developed as part of the permit process for the new wind farm. The solution is based on a declaration of intent with the landowner to adjust forestry methods so that the capercaillie population is in focus. This means that, among other things, so-called "skirt spruces" are saved, which protect capercaillies from predators. Another commitment is not to clear-cut the area and save larger deciduous trees. This is an important part of

the permit in Bruzaholm that Vattenfall received in April 2020 and the measures will support protection of capercaillies.

To learn more about the species and its boreal habitats, Vattenfall has initiated a project that is led by the Swedish University of Agricultural Science, where AI-based software is used to monitor wildlife in Capercaillie habitats at four different locations in Sweden. Capercaillies and other birds and mammals are monitored with remote cameras and audio recorders, a work that started in 2022. So far the AI-based recognition systems looks promising with high detection rates for Capercaillie. The project also use GPS-tracking and eDNA from droppings to validate the result. The first phase of the project is scheduled to end in 2024.

2.6. Testing systems to manage collision risk for eagles

Being long-lived and slowly reproducing, eagles may be relatively more vulnerable to increased mortality from wind farms than many other bird species. This makes mitigation measures a key area for wind farm development and identifying the necessary mitigation measures to secure the protection of the species of particular importance.



White-tailed eagle. Photographer: NatureEyes

With the purpose of exploring the possibilities to develop and operate wind farms in an area with presence of eagles, Vattenfall has been involved in a test and documentation of the efficacy of a camera and AI based system (Identiflight) developed for closing down turbines when eagles are in risk of colliding. The project tested and found a very high detection and identification efficiency of the system for Golden and White-tailed eagles. Also, the study showed that if implemented the system would imply approx. 1% loss in annual energy production. The project was carried out as a collaborative project between The Swedish Energy Agency, GVP, the County of Gotland and Vattenfall and was conducted at the Vattenfall and Slite Vind wind farms at Näsudden on the island of Gotland, Sweden.

2.7. Testing potential measures to reduce collision risk for birds

Vattenfall have invested both in studies to improve the evidence base on collisions risk (e.g., as described in 2.6), allowing for more realistic predictions for new wind farms, and in studies to test potential measures to reduce collision risk without restricting the operation of turbines.



*Rotor blade painted black, Smøla.
Photographer: Roel May*

Vattenfall was part of the first study to test a number of innovative measures to reduce collision risk by increasing the visibility of the turbines to birds – the collaborative INTACT project on Smøla. Of the measures tested, especially increasing the contrast in the rotor blades, by painting one blade black, and painting the tower base black showed a lot of promise. The former for high flying birds, including white-tailed eagles, and the latter for a species of grouse.

Vattenfall have now entered into a new collaborative research project to further test the black blade measure at a site in the Netherlands. More information on the project can be found [here](#). Key questions being, the degree to which the results can be generalised, and how it applies to different species groups.

2.8. Biodiversity measures at Ray Wind Farm

Our Ray Wind Farm in England comprises a variety of habitats typical of an upland setting including coniferous woodland, blanket bog, wet and dry heath, acid grassland and waterways. Here we successfully conducted mitigation measures during construction for many different types of species and habitats. These support a diverse range of wildlife including several rare or protected species: red squirrel, badger, otter, bats, reptiles, white clawed crayfish and several owl and raptor species including barn owl, merlin, hen harrier and goshawk.

Following construction of the wind farm, a range of operational monitoring measures have been undertaken to ensure that the ecological sensitivities present within the site are being maintained and enhanced where possible. This includes habitat management works to enhance moorland habitats, dedicated breeding bird surveys and monitoring and mitigation for bat populations using the site.



*Ray Wind Farm. Photographer: Peter Skelton,
KGPhotography*



A merlin chick at Ray Wind Farm. Photo: Vattenfall

2.9. Biodiversity enhancement at Princess Ariane Windfarm

Since the second half of 2022 efforts has been made to improve the biodiversity at the Princess Ariane Windfarm (Wieringermeer). Located in the agricultural north-west area of the Netherlands, the windfarm has 50 Vattenfall owned and 32 Vattenfall maintained WTGs in its portfolio. Large amounts of agricultural lands can no longer be used for their original purpose due to land use restrictions caused by the turbines and their cables.

Some of this land, including the service center area, has been repurposed for biodiversity improvement. In total 4 hectares of land was turned into flower rich grassland.



Flower rich grassland at the Princess Ariane Windfarm. Photographer: Stan Marx

2.10. Peatland habitat management at UK windfarms



Photographer: Robin Cox

At two of our sites in the UK we have been carrying out forest to bog restoration, which means restoring land that was previously under commercial conifer plantation to open peatland habitats. The relatively small scale (approx. 35 ha) work at Clashindarroch was completed early 2022. The much larger scale (up to 1500 ha) work at Pen y Cymoedd began in late 2021 and will continue for many years to come. Vattenfall is investing £3m in the scheme and has also partnered with the neighbouring Lost Peatlands of South Wales Project meaning it is one

of the biggest restoration projects of its kind in the country, find out more [here](#). The restoration in Pen y Cymoedd and Clashindarroch aims to increase biodiversity and restore functioning peatland ecosystems, which can provide multiple ecosystem service benefits in addition to biodiversity increase. Both schemes are required as part of our permits, but in addition to this we have voluntarily provided

substantial funding to Swansea University to undertake a three year research programme to help understand the risks and opportunities of wind farm development and associated peatland restoration on forested peatlands.

A significant aspect of peat restoration within these Habitat Management Plans is to improve and enhance the upland habitats within the site and is typically achieved by ditch blocking and/or ground smoothing. Existing drainage systems are blocked, the topography of plough furrows and ridges associated with former forestry are 'smoothed out' and where appropriate remnant stumps are flipped and pushed into the peat. This has the effect of raising the water table to at or near the ground surface, essential for a functioning peat bog.



Photo: Vattenfall

Functioning peatlands have the potential to be a natural solution to reducing greenhouse gas emissions and are a huge store of carbon. By restoring these habitats, it will not only increase the biodiversity within the site but also reverse carbon loss and create carbon sinks. In addition, wider ecosystem services are also expected such as reducing the flood risk to downstream settlements by improving the storage of water and reducing rapid flood surges.

2.11. Biodiversity enhancing measures at offshore wind farm Hollandse Kust Zuid

In offshore wind farm Hollandse Kust Zuid in the Netherlands, Vattenfall included measures to enhance biodiversity, as part of the permit obligations. All the foundations have water replenishment holes that allow marine life to enter and exit the foundation. On 9 locations, large rocks have been added to the regular scour protection, to increase habitat complexity for marine life. Vattenfall will monitor how biodiversity is developing, after 2 years, 6 years and 11 years.

In 2023, Vattenfall joined the KOBINE project, a Ministry of Agriculture, Nature, and Food Quality-funded initiative that maps the costs and advantages of nature-inclusive policies. The project aims to assess the costs and benefits of different Nature Inclusive Design (NID) measures. One of their case studies are the rock reefs in HKZ. Data about the costs of deployment of the rock reefs is being shared in the project and the biodiversity on the rock reefs and regular scour protection is being monitored to assess the ecological value of the measure. Video footage was collected by an innovative autonomous underwater vehicle (AUV) from BeeX and water samples were taken for e-DNA analysis. Results are expected end of 2023 and will provide a first insight in biodiversity at the rock reefs.

2.12. Increasing seabird population productivity

In the context of developing two large-scale offshore wind farms in the North Sea off the English Norfolk coast, the Norfolk Vanguard, Vattenfall have implemented measures on a voluntarily basis to enhance the breeding productivity of local seabird populations. Even if collision risk for seabirds seems to be low, concerns remain about potential cumulative effects across a large number of offshore wind farms. This is why specific measures have been implemented to help compensate for potential impacts of the projects on kittiwakes and lesser black-backed gulls, two species of particular concern.

For kittiwakes this involves the construction of artificial breeding structures in the harbour of Lowestoft, also known as "kittiwake hotels". Advised by experts from Natural England, RSPB, East Suffolk Council and the Marine Management Organisation, the structures have

been designed to offer the best possible conditions for breeding kittiwakes, and with room for up to 430 breeding pairs, For lesser black-backed gulls, predator proof fencing have been put in place at the breeding colony at the Alde-Ore Estuary bird protection area to help reduce predation pressure from e.g. foxes.

2.13. Enhancing ecosystem services in solar farms

Within our solar business we are working towards enabling multi-functional land use. This means combining our fossil-free ambitions with other sustainability objectives within agriculture, soil restoration, nature zones and climate adaptation. An important part of our work is to assess what measures we can take in the design and operational phases of the project, i.e. by adding plants, trees and flowers to the edges of the solar farm.

In the Netherlands we are currently involved in several pilot projects that aim to increase the provision of different ecosystem services. For example, the Symbizon partnership between Vattenfall and academic and industry organisations aims to investigate the possibilities of combining solar panels and strip cultivation for organic food production. We are also involved in developing the so-called 'NatuurZONE' project that offers farmers close to existing nature zones (e.g. Natura2000 areas) the option to use their



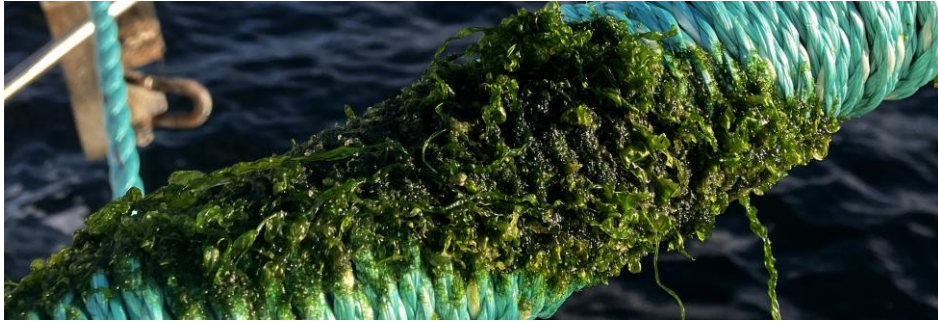
Photo: Vattenfall

land for solar panels instead of farming, enabling the soil's condition, previously degraded from intensive agriculture, and the natural nutrient and water levels to be restored. Additional biodiversity enhancing measures such as introducing berry-bearing thickets, herb-rich bushy edges and sandy paths to support biodiversity of small animals, birds and insects are also part of this project.

In the Tützpätz project in northeast Germany, Vattenfall is also pioneering agrivoltaics. The 79 MWp project combines agriculture (organic egg production) with solar power electricity production. Tützpätz agrivoltaic farm is built without state subsidies and is to be completed in 2024. Thanks to the support of the landowner and the municipality, Vattenfall can now implement this innovative concept of land use on a commercial scale with partners for the first time. Moreover, Vattenfall is currently participating in the development of the Eco-certified Solar Label. The purpose of this label is to develop a practical tool with measures and maintenance guidelines to enhance biodiversity compared to the current situation on site. The certificate can be used in the Netherlands to show that sufficient steps for biodiversity enhancement has been taken during development and maintenance.

2.14. Sustainable food production at Scandinavia's largest offshore wind farm

At Vattenfall's Danish Kriegers Flak, Danish researchers are working on the WIN@sea project, where they aim to test multi-use concept of producing sustainable food while producing fossil-free energy. In the spring of 2024, the first seaweed will be harvested, and lines will also be laid out for mussels production. Ultimately, the project will take the practical learning of the pilot to identify the risks and opportunities of scaling up regenerative aquaculture in windfarms in the Baltic Sea and in the North Sea.



Photographer: T. Boderskov

2.15. Artificial stone reef for coastal protection and biodiversity

The BARREEF project, conducted by the National Institute of Aquatic Resources and funded by Velux Foundation and Vattenfall, aims to investigate the potential of coastal stone reef to address the increasingly important societal issue of coastal erosion while also achieving net gain for nature, i.e. a Nature Based Solution. A pilot test will be carried out on the Island of Samsø in Denmark. If positioned and designed correctly, the stone reef can absorb part of the waves' energy before they reach the shore, while also creating a habitat for marine fauna and flora. In a dialogue with local stakeholders and authorities, the project aims to reduce the need for destructive beach nourishment methods and make coastlines and marine biodiversity more resilient to future climate change. Ultimately, the BARREEF project could offer proof point to a promising nature-based solution that protect the coast and support marine life simultaneously.

2.16. Unwanted waste or brilliant habitats

Technical University of Denmark, and Vattenfall are partnering up to analyse the impact of decommissioning offshore windfarm on marine biodiversity. The study will help make scientifically based decisions about the best course of action in relation to marine biodiversity. The PhD project aims to develop a model that can estimate the effect on biodiversity of completely removing wind turbine structures, compared to leaving parts of the foundations in place.

The project also aims to build knowledge that will make it possible to better include marine biodiversity in life cycle assessments. By linking various human activities to a conversion key, it will be possible to quantify the impact of underwater noise on the number of potentially lost species. The goal is to develop approaches where biodiversity is increased and the resilience is improved through human initiatives.



Photo: Vattenfall

3. Biodiversity in the distribution network

For Vattenfall Distribution, the conservation of biodiversity is one of the most important environmental aspects, both in permit processes and within maintenance of the operations.



Photographer: Eva Grusell, Sweco

3.1. Biodiversity enhancement in power line corridors

The recurring clearings of Vattenfall's power line corridors, required to secure a reliable and safe transmission of power, keep them free from trees and bushes which inevitably impacts environment and carbon uptake. But it also opens up the landscape and provides good habitats for grassland species - even several threatened and red-listed species. Research reports point at the importance of power line corridors as part of a green infrastructure of grasslands as the amount of traditional, species-rich grasslands decreases and the power line corridors increase in numbers due to the energy transition.

Identifying biodiversity hotspots

In 2017 and 2019, Vattenfall conducted a GIS-based analysis to identify areas that could be of importance for biodiversity in its power line corridors. The result indicated that 1,600 km of the total 8,600 km could be hotspots of potentially valuable grassland in middle and northern Sweden. After we had conducted the GIS analysis, we proceeded to do field studies and biodiversity assessments of the 1,600 km to validate the results of the GIS analysis and to prioritise the most valuable hot spots from a biodiversity perspective.



Photographer: Eva Grusell, Sweco

During the field studies, habitats and species were documented and the hotspots were classified into four categories based on the prevalence of red-listed species, indicator or signal species, regionally important species and the quality of the biotope. When the field visits had been finalised, the results showed 980 hotspots which cover about 250 km of the power line corridors.

Maintenance tailored to improve biodiversity

To ensure that electricity can be transported as safely and reliably as possible, Vattenfall's maintenance routine involves clearing out its power line corridors every eighth year at a width of 40 metres, and every fourth year the so-called patrol path that is used for inspections and maintenance is cleared out at a width of 3 metres. This maintenance routine keeps the landscape underneath our power lines open.

The insights obtained from the identification of hotspots lead to implementation of tailored maintenance plans for each of the 980 identified hotspots, so that they enhance the conditions for biodiversity and increase the hotspots value. The plan may include creation of glades, widening patrol paths and removing the cut material as well as special trimming and thinning out to prevent overgrowth and maintain the living conditions for flora and fauna. The tailored maintenance has been conducted on 30% of the hotspots in 2023, and the target is to have introduced the approach at 100% of the hotspots by 2026.

Red-listed marsh fritillary butterflies

One of the species that have benefitted from Vattenfall's biodiversity efforts is the marsh fritillary butterfly. It has gone down considerably in numbers over the past 30 years, is red listed and a part of EU's habitats directive as well as covered by national measures for protection. At Vattenfall's facilities in and around Älvkarleby, this butterfly is present in power line corridors and special plans have been implemented for the area by Vattenfall in cooperation with authorities in Uppsala and Gävleborg.

3.2. Biodiversity enhancement in sub stations

In 2022 and 2023, a GIS-based analysis of 90 sub stations has been conducted. The sub stations were classified according to their potential to conduct biodiversity enhancement measures. The potential was based on closeness to species and habitats, historical land use, the size and character of the sub station and the areas surrounding the stations i.e. forests, grasslands, sub urban areas and fields.

Out of the 90 sub stations analyzed, 16 sub stations with high biodiversity potential were selected. Field studies and visits were conducted to these to get a detailed picture of the habitats and species. The field visits resulted in suggestions on site specific enhancing measures that focus on pollinators and enhancing measures that both improves biodiversity and decrease our maintenance costs. The results show that certain stations have conditions that make it relatively easy to change maintenance or supplemented maintenance to benefit several different species of bumblebees, bees and butterflies.



Photographer: Eva Grusell, Sweco

35 species of wild bees and 28 species of butterflies were found in the three of the station areas. In Sweden there are about 300 species of wild bees (of which 40 are bumblebees) and about 113 species of butterflies. For wild bees, this means that 12% of Sweden's wild bees occur in these three surveyed areas, and for butterflies, this means that 25% of Sweden's butterflies also occur here.

Maintenance tailored to improve biodiversity

Proposals for biodiversity enhancing measures have been drawn up for five of the substations during 2023. Enhancing measures are tailored to each site and consist for example of leaving certain areas alone to maximize their contribution as food for pollinators. The target is to implement the biodiversity enhancing maintenance plans in all five sub stations by 2024 and to further develop our way of working systematically with biodiversity at our sub stations.

3.3. Building salamander hotel



Photographer: Mats Dahler, Sweco

Building the distribution network involves different types of challenges. Nature protection and biodiversity are important aspects both in existing power line corridors and when planning and building new projects. As an example, in one of our concessions from 2021 (Nykvarn-Almnäs in Sweden) a salamander population was found during planning of the project. To further enhance conditions for the northern crested newt, which is one of the protected salamander species, a pond and a wintering shelter (so-called salamander hotel) was constructed in

order for the salamanders to continue to thrive in the area. This type of biodiversity measure is embedded in the work of building the grid infrastructure as our projects go through many different environments in the landscape. Being an owner of a salamander hotel is therefore also a natural part of being an electricity distribution company.

3.4. Buzzing bees in Gotland

During the work of renovating an existing power line in Gotland, Sweden, a sand bed has been created to help endangered bees. GEAB's power lines in Stånga, Gotland, is in fact one of Sweden's best habitats for sand-living solitary bees. Vegetation in the power lines has been removed and replaced by open sandy areas to create habitats and nests for these endangered species. The project was initiated by and conducted in collaboration with the County Administrative Board in Gotland.

To increase awareness and to enlighten employees that they could help bees in their gardens, the project has also been communicated internally. Small bee nests can easily be created by removing vegetation in parts of the garden so that sandy areas are exposed.



Before and after measures in Stånga, Gotland. Photographer: David Lundgren.

3.5. Project Bumblebee

Over the past few years, there has been a decline in the population of wild bees and bumblebees. Given our extensive coverage across most of Sweden, our numerous facilities present a distinctive prospect to aid in their conservation. Our initiative to plant meadow flowers that attract bees and bumblebees to collect nectar, coupled with the creation of bee and bumblebee hotels, underscores our commitment to their wellbeing. These efforts will be carried out across various stations in Sweden.

4. Biodiversity measures connected to our heat operations

Our Heat operations are commonly located near urban areas. The land we own in connection to our power plants can therefore be used to benefit urban ecology as well as the people living in the surroundings.

4.1. Biodiversity enhancement in an industrial landscape

Vattenfall has generation assets in locations where we are close to protected areas and where we collaborate with local stakeholders to perform conservation actions. In Diemen, one of our power plants in the Netherlands, we work with the foundation FREE Nature (Foundation for Restoring European Ecosystems), that manages three nature reserves around the power plant on behalf of Vattenfall. Highland cows are used for natural grazing on a part of the site that Vattenfall own but do not use for industrial purposes. Together with FREE, we are continuously looking for possibilities to support the existing nature, and we monitor insects, plants and birds in the area on an annual basis.



*Highland cows used for natural grazing in Diemen.
Photographer: Dannis Haverkamp*

4.2. Sustainable biomass sourcing

Biomass is an important energy source and a key component in our work to phase out fossil fuels, hence, ensuring environmentally and socially sustainable biomass sourcing is of highest priority. For our biomass-fired power plants, we mainly source forest residues from forestry and by-products from the wood processing industry (such as sawdust and untreated wood residues).

Vattenfall Energy Trading sources biomass for third parties. Our trading unit is certified by the Sustainable Biomass Program, the Forest Stewardship Council and ENplus. As a founding member of the Sustainable Biomass Program, Vattenfall Energy Trading has been involved in the development of global sustainability standards for biomass for several years and continues to support the programme by strongly relying on SBP- and/or FSC certified suppliers.

5. Biodiversity measures connected to our nuclear power operations

Vattenfall runs nuclear operations in Forsmark and Ringhals in Sweden and we are also part-owner of SKB who are accountable for responsible management of radioactive waste from nuclear power plants in Sweden. Our biodiversity work within nuclear encompass both complex ecological investigations, permit related biodiversity measures for the operation and research.

5.1. New habitats for pool frogs & forest management in Forsmark

When the Swedish Nuclear Fuel and Waste Management company (SKB) is going to establish the nuclear fuel repository in Forsmark, a pond in which pool frogs are known to live, will need to be filled in. The pool frog is on the national endangered species list, and it is a legal requirement to ensure measures to protect the frogs. SKB has in advance created new habitats in the form of ponds (six new ponds) and a frog hotel has also been built as a bonus. The hotel stands two meters above ground level and offers shelter from frost during winter.

SKB's annual inventories show that the pool frogs have found the new ponds. During the spring of 2023, frogs amphibians from the pond which is to be filled in were caught and removed to the new ponds. Fifty pool frogs and 240 great crested newts were relocated this first year and the project will continue during coming years



A pool frog. Photographer: Anders Löfgren, EcoAnalytica

SKB's green forestry plan is another example of biodiversity work in the Forsmark area. In forest areas with high natural values, we have adapted a management plan to preserve and enhance biodiversity. We have, for example, made targeted efforts to enhance conditions for a population of the protected orchid lady's slipper. The lady's slipper is found in open forest and wet land areas, hence careful clearance and maintenance is needed to prevent overgrowth.

SKB has, as a part of the Uppsala County Administrative Board's initiative 'Roadmap for a sustainable county', signed 8 so-called "sustainability promises" to strengthen biodiversity (2020). Building the final repository in Forsmark will involve several ecological dimensions and it is something that SKB has worked extensively with for a long time.

5.2. Biotope assessment for nuclear fuel suppliers

In addition to including biodiversity considerations early on in environmental impact assessments and permit processes we also assess the effects on biodiversity when we do our Environmental Product Declaration for electricity from nuclear power. Except for our own operations, all uranium mines are included in the assessment of land use change due to their operations. In addition, the potential impact on biodiversity is described based on available material such as environmental impact analysis, the mining companies' environment programmes, information from open databases of the areas of flora and fauna including for example rare species, as well as the effect of land use changes mentioned earlier.

5.3. Return of fish and control of invasive species on Ringhals

Cooling water is necessary for the electricity production at Ringhals and it is taken from the sea via two intake channels to the nuclear power plant. One of the channels belongs to Ringhals reactor 1 and 2 (R12) and the other channel belongs to Ringhals reactor 3 and 4 (R34). The flow in the R12 channel is nowadays very small since R1 and R2 are shut down (the flow is a few m³/s), compared with the flow to R3 and R4, which is closer to 100 m³/s. Although most fish can swim against the current, the cooling water evidently comes with animals and plants that are normally found in the sea. Fish and other smaller species, such as jellyfish and seaweed, which come with the sea water are therefore taken up in a special cleaning facility. The species that are found are then returned to the sea via a common sewer pipe that empties into the sea at a depth of 10 meters. We follow up the procedure and the result shows that eels have a particularly high survival rate (86% survive).

As part of the environmental permit in Ringhals, there is also a biological control program for invasive species which has been running since 2011. Flora and fauna surveys are conducted in several different locations along the coast to discover alien species that do not belong in these coastal ecosystems. Sampling is also taking place inside Ringhals where there is an open pool and a cooling water tunnel that is part of the system that handles the cooling water. Within the control program, alien invasive species like the Asian blue crab (*Hemigrapsus sanguineus*), the pacific Oyster (*Magallana gigas*), the red algae *Bonnemaisonia hamifera* and *Dasya baillouviana* as well as the brown alga *Sargassum muticum* have been identified on several occasions. When invasive species are found, Ringhals immediately reports to the County Administrative Board in Halland. The findings are also reported to a database to make the data available to other authorities, researchers etc.

5.4. Supporting pollinators in Forsmark

The industrial area connected to our nuclear power plant in Forsmark, Sweden, consist of a variety of habitats and soil types, including coniferous and mixed forests, open areas of grass as well as sand, gravel and excavated masses. The topography shifts moderately throughout the industrial area and there are sites with sunny and windy features as well as sites that are more sheltered. All these habitats and features exist in a rather small area, which increase the potential to do effective measures for different types of pollinating species.



Forsmark. Photographer: Elin Bergqvist

An evaluation of suitable habitats for enhancing diversity of pollinating species on Forsmark's industrial site were completed in 2021, and in total nine different areas were proposed for implementing measures. In 2022, nesting habitats for pollinating insects were constructed, two fauna depots and a large sandbank with plug plants in the industrial area.



Sandbank being created at Forsmark. Photo: Vattenfall

Routines of cutting grass were changed for some of the areas, allowing plants to bloom the entire season and to set seed for following seasons. In 2023, parts of the thick grass lawn was removed and seeds from wildflower and herbs were sewn-in. Large bee-hotels has been constructed in shapes of our nuclear reactor buildings (F1, F2 and F3) and placed visibly for visitors and employees during 2023.

In 2024, the industrial area will be surveyed for pollinating insects for the second time. This is exciting and will provide indications of whether our measures and changed routines have had the desired effect and led to more species thriving in the area. Other measures are planned for the year as well, measures such as to cut trees and create high stumps, as well as to fill the fauna depots with more material. New managing routines will be continued, but may change given the outcome of inventory in order to improve the management. This initiative is a part of our "sustainability commitments" in the Uppsala County Administrative Board's initiative 'Roadmap for a sustainable county'.

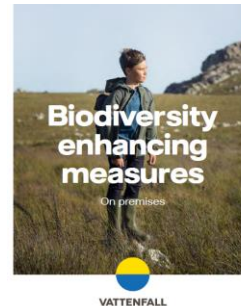


Inauguration of bee hotels in 2023.

6. Other biodiversity examples

6.1. Biodiversity enhancing measures in our office premises

In Vattenfall we want to make sure that our office premises constitute, as far as possible, an extension of and a connection between habitats. Therefore, we have set a target to work with biodiversity enhancing measures connected to our offices and we have also developed a catalogue of ideas for initiatives that can support nature and biodiversity at our many different premises. The [catalogue of ideas](#) is available at [Vattenfall.com](https://vattenfall.com) and we want to share it also to inspire others.



The Hexham and Penzance locations in the UK are the two offices that have outdoor areas where we can influence changes. We have installed three insect houses which have created a safe space for bugs and pollinators essential to the ecosystem. We are looking into further measures which include planting a dedicated wildflower area and installing an open-air seating area for staff to enjoy informal meetings or lunch amongst nature. In 2024, an inventory of the existing trees and plants will be carried out to detail exactly what types of wildlife this benefits and where we can make further improvements to increase the local biodiversity.

An insect-friendly green roof was planted on the new, sustainable office building in Berlin, Germany. In the city, we are investigating also other locations to increase biodiversity with measures such as rough grassland or wildflowers.

At several Dutch locations like Leeuwarden, Delft Zoeterwoude and Slootdorp, we conducted an inventory on possible measures. Some activities have already been implemented like sowing native plants or placing insect houses. Sedum roofs have been installed in Weesp at the initiative of the landlord.

In Sweden we favour species like birds and bats by installing nests at Ringhals, Trollhättan, and Älvkarleby. At Ringhals we currently implement biodiversity enhancing measures outside the V2 Office including new social areas. Some examples are new native plants, flowers, trees and bushes as well as insect hotels. In Trollhättan we have planned veteranisation of trees, which is a nature conservation method to create old tree structures in younger trees to mimic for example wood-pecker holes and deadwood habitats that favor red-listed species. In 2024, the work will continue with nature value inventories and development of biodiversity plans for prioritized locations based on the GIS-analysis of our portfolio done during 2023.

6.2. Vattenfall Umweltstiftung

The Vattenfall Umweltstiftung – an independent environmental foundation in Germany - has supported more than 220 different environmental projects since the foundation was established in 1994. The foundation is a non-profit organisation managed by Vattenfall, from which schools, associations, nature protection groups and other NGOs can apply for grants. The projects mainly focus on urban areas, environmental education, restoration of water courses and re-naturalisation. One subject the foundation is paying special attention to is biodiversity. The development of biotopes, the protection of endangered species and awareness raising is something the foundation considers to be fundamental for protecting nature and halting the degradation of ecosystems. In 2021 the foundation was honoured with the “Protection of Species Award 2021” by one of its project organisations, the initiative “Artenschutz in Franken®”. The award represents the initiative’s respect towards

the foundation engagement for the protection of endangered species in Germany, like wild bees and bats. Below you can find a selection of examples of projects supported by Vattenfall Umweltstiftung in 2023, more information in German can also be found [here](#).

Re-settlement of endemic species in Harz mountains

Kindergarden and school children are closely involved in re-settlement programmes for the brown trout, the minnow and the fire salamander in and around the small streams in Wernigerode and the near surroundings. The children realize low-level water research tasks and learn about how to safeguard living conditions for the endemic fauna and flora.

Gardening in times of climate change

During 2023 the Vattenfall Environmental Foundation supported a project of the Rückenwind e.V., an association in Hamburg which helps young people receiving social work instead of prison sentences. They have the chance to be part of a team developing an urban garden oasis located in the densely-built center of Hamburg. A raised-bed garden with foil-sealing to the underground was realized on a sealed and polluted ground and turned into a real green jungle. With fertile and water-storing soil - homemade according to the terra preta principle - and with plants that are compatible and support each other, this oasis offers relaxing space, fresh air and a green sight to behold to everyone in the neighbourhood.

Forest development

Although the ecological status of German woods have developed positively in recent years, there is some catch-up demand with regard to tree species composition and structure variety. The Vattenfall Environmental Foundation therefore supports a project where forest development measures are realized. The objective is a mixed forest with near-natural structures and endemic tree species. This wilderness will make forests resilient to climate change and promote woodland ecosystems. The necessary activities comprise gradual removal of pines and increasing the portion of broadleaf trees. New knowledge about different forest situations shall be collected and spread among all responsible and interested actors.

6.3. Honeybees, wild bees and bee flowers

More than 80 percent of the plants on Earth depend on pollination through bees and other pollinators and Vattenfall supports biodiversity in various ways. In the Wieringermeer wind farm (WRM) project in the Netherlands we have for example worked to enhance local biodiversity. We have together with organization "I Love Beeing" placed two cabinets of beehives for bees at the site in the spring of 2020. Before the beehives were placed, bee flowers and herbs were sown around the office to provide food for the bees. As the bees also need the honey they produce as food, it is not for sale but kept in the hives. The beehives stayed at the Wieringermeer wind park until construction were completed. During the winter where bees are less sensitive to transportation, they were taken to their new home area close to the O&M service building. This is only of many initiatives at the WRM construction site to connect with the surrounding nature to make a positive and sustainable impact.

In 2022/2023 additional hectares near the O&M building were sowed with flower-rich grass and a.s.r. (owner of Wieringermeer Extension) sponsored 2 more cabinets with beehives. The aim is to increase the flower-rich grassland and other measures in the coming years to support ecological development and ecological 'highways' in the area. At Haringvliet (combined wind, solar and battery park) we have 3 additional cabinets with beehives. These beehives feed on flowers available in the nearby area and energy park and are also maintained by "I Love Beeing".



Photo: Vattenfall

6.4. Changing Land use Impact on Biodiversity (CLIMB)

CLIMB is a model for Nordic conditions that calculates biodiversity within a geographic area. The project's main objective is to create a tool that enables companies to accurately quantify and communicate their impact on biodiversity, both negative and positive, when land is transformed or restored.

Vattenfall is leading the steering committee and has co-financed the project, along with other organizations such as LKAB, Boliden, Skellefteå Kraft, Svenska kraftnät, Cementsa, Talga, Skanska, Specialfastigheter, and SBMI. The official launch of the tool was in September 2023. CLIMB has several applications, including localizing and evaluating environmental impact, communicating and visualizing impact, as well as setting requirements, reporting, and tracking KPIs. By participating in the CLIMB project, Vattenfall reinforces its commitment to sustainable practices and responsible environmental stewardship. During 2024 a number of pilots are planned to be implemented to test the tool in practise.

CLIMB has also been awarded with the Sustainability Achievement of the Year 2023, presented by the Network for Sustainable Business, to recognize and promote notable examples of sustainability.

6.5. Nature photo app contest

Vattenfall has created a user-friendly app accessible to all employees, allowing them to share photos and videos of nature at diverse locations throughout the company's operations, with the primary goal of enhancing environmental consciousness, advancing scientific knowledge, and promoting environmental protection. Moreover, the app enabled employees to participate in Vattenfall's first joint Nature Photography Contest 2023, with an internal jury selecting the best images for display at an office exhibition across several European offices. The winner of the competition is this photo of a young owl. It was captured at Krümmel nuclear power plant in Germany which has been closed down since 2011. The owl used the roof as an occasional roost.



Young owl at Krümmel nuclear power plant, Germany. Photographer: Stefan Cramer