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BIODIVERSITY ACTION PLAN

1 BACKGROUND

Fortum's impacts on biodiversity are primarily related to our hydropower production operations in Finland and Sweden. Hydropower construction and the related water regulation alter the conditions in water systems and thus impact aquatic habitats and, in particular, species composition in flowing water environments and littoral zones. Emissions from fossil fuel-based energy production may decrease local biodiversity, especially in Russia, where most of our fossil-based production is located. Indirect impacts may be caused by, for example, large-scale procurement of biomass for use as fuel or raw material as well as the procurement of other fuels. However, our production of CO₂-free energy replaces fossil fuel-based energy production and thus mitigates climate change, which is globally one of the greatest threats to biodiversity.

Fortum aims to improve biodiversity in connection with its operations. The need for measures is defined in the [Biodiversity Manual](#). The actions shall be focused on priority areas with high biodiversity values or high potential for improvement. This group-level action plan is based on voluntary measures planned in the Generation Division. Our biodiversity-related measures are connected mainly to the Sustainable Development Goals 15 and 14:



SDG 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss



SDG 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

2 TARGETS

As Fortum's impacts on biodiversity are primarily related to hydropower production, the target of this action plan is to improve biodiversity in connection with the watercourses in Sweden and Finland where we operate hydropower plants.

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3 ACTIONS

Action	Location	Schedule	Responsible organization at Fortum	Cooperation partners	Status
Restoration of the area of Käkilahti-Önkköri	Lake Oulujärvi, Kajaani, Finland	2018-2020	Generation Hydro Finland	ELY-center* of Kainuu and Municipality of Kajaani, Fishing right owners' association of Manamansalo-Vuolijoki	Ongoing
<p>Target: Restore habitats for moor frog, dragonflies and other odonata as well as several bird species</p> <p>Description: Eutrophication and overgrowth of the area of Önkköri in the southern part of the lake Oulujärvi have weakened the living conditions of birds, fish and other organisms. Biodiversity related actions of the perennial restoration project consist of various measures such as creation of wetlands and removal of aquatic plants. In the past years a wetland has been created to the pond of Önkköri, dredgings have been performed, excess aquatic flora removed and excavations made to create small ponds and channels to increase the habitats of water birds. In 2020 the project consists of dredgings and building footbridges, piers and a birdwatching tower.</p> <p>FI: https://www.fortum.fi/media/2018/03/oulujarven-onkkorin-alueen-kolmivuotinen-kunnostushanke-alkanut</p>					
Releases of young salmon and sea trout in the tributaries of river Oulujoki	Muhos, Utajärvi and Vaala, Finland	2005-	Generation Hydro Finland	Municipalities of Muhos, Utajärvi and Vaala, ELY-center* of North Ostrobothnia	Yearly implementation
<p>Target: Improve the situation of migrant fish populations in river Oulujoki by releasing fish fry to breeding grounds</p> <p>Description: In addition to power companies' legal obligations for fish stockings in Oulujoki catchment area, about 50 000 one year old salmon or sea trout are stocked yearly to river Oulujoki tributaries, rivers Muhojoki, Utosjoki and Kutujoki. This fish stocking project initiated in 2005 contributes to the creation of a viable population of migrating fish in the river Oulujoki. Monitoring has proven that fish have grown well in the stocking area.</p>					

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Collection of eggs of the salmons and sea trouts trapped at the trap and transport device of Montta	Muhos, Finland	2018-	Generation Hydro Finland	Municipalities of Muhos, Utajärvi and Vaala, ELY-center* of North Ostrobothnia	Regular implementation
<p>Target: Improve the quality and genetic biodiversity of salmon population at Montta fish farm</p> <p>Description: The aim is to collect eggs from the salmons trapped at the trap and transport device to improve the quality and the genetic biodiversity of the farmed salmon population at Fortum's fish farm in Montta. Expected result is an improvement in salmon stocking results. However the collection of eggs at the trap and transport device, inaugurated in 2017, has not been successful so far due to low number of mature female fish coming back from the sea. In the future the main focus at the device is to trap and transport mature fish to the spawning areas in the tributaries upstream the river Oulujoki, and when suitable the aim is to try to collect eggs to the fish farm.</p> <p>https://www.fortum.com/media/2018/06/hydropower-and-migratory-fish-actions-today</p>					
Habitat restorations in river Vuoksi	Imatra, Finland	2013-	Generation Hydro Finland	Municipality of Imatra, ELY-center* of South-Eastern Finland	Planning ongoing
<p>Target: Strengthen stream fish populations in river Vuoksi in eastern Finland</p> <p>Description: The Finnish part of the river Vuoksi has been modeled with Fortum's habitat modelling tool in order to define suitable habitats for grayling, trout and salmon. Three areas between the power plants of Imatra and Tainionkoski are restored. The bottom of the river bank is reshaped and gravel and stones are added to make the bottom more natural and more suitable for spawning and shelter for young fish. Restorations continue downstream of Imatra power plant where plans are made for the restorations in Mellonlahti and Kokonsaari areas. In 2019 sample restoration was performed in Mellonlahti and based on the results planning continues for further restoration.</p> <p>https://www.fortum.com/about-us/our-company/our-energy-production/hydropower-flexible-clean-energy/environmental-0/habitat</p>					
Possibility to deviate from regulation plan to improve the nesting of Saimaa ringed seal	River Vuoksi, Finland	When needed	Generation Hydro Finland	ELY-center* of South-Eastern Finland	Implemented when needed

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Target: Improve nesting possibilities of the Saimaa ringed seal

Description: Endangered Saimaa ringed seal population consists of about 400 seals which live only in the lake Saimaa in Finland. The seal makes its nest in snow on the ice of the lake Saimaa in winter. Rapid rise or fall of the water level threatens the nesting possibilities of the seal. Fortum regulates the lake Saimaa following the natural conditions according to the rules set by the environmental authorities. Fortum has the possibility to deviate from the regulation plan to decrease the rapid rise or fall of the water level caused by natural conditions. This deviation has been applied a few times to protect nesting of the seals, last time in winter of 2020 to limit the rise of the water level.

FI: <https://www.fortum.fi/tietoa-meista/yhtiomme/energiantuotantomme/voimalaitoksemme/vuoksen-vesisto>

Dismantle small dams that do not support hydropower production noteworthy	Several locations around Sweden	2017-	Generation Hydro Sweden	Municipalities, Water Councils, County, Local fishing organizations	One dismantling foreseen for 2020 Several license application processes ongoing
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Target: Dismantle small dams and restore lake outlets and to enable migration possibility for fish and other fauna

Description: Fortum Hydro owns about 80 small dams in Sweden that do no more have much value in energy production. Many of the dams were historically built for logging and today they no longer have a purpose. Dismantling them and restoring the river continuum can improve circumstances for several species. License is needed from environmental court. In 2018 two dams, Acksjön and Kolsjön, were dismantled. In 2019 four dams in River Klamma were dismantled and river morphology was improved to enhance migration possibilities for trout and to restore crayfish habitats. In 2020 the aim is to dismantle one dam and to submit about 15 license applications to the environmental court to dismantle dams in the coming years.

SE: <https://www.fortum.se/media/2020/01/fortum-vill-riva-ut-tre-regleringsdammar-i-liman-ska-ge-battre-forutsattningar-siljansoring-och-flodparlmusslan>

Improving the life cycle for the Gullspång salmon	River Gullspång, Sweden	2004-	Generation Hydro Sweden	Municipality, Counties	Ongoing
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Target: Restoration and optimization of remaining rapid areas in the lower part of the river with the aim to increase spawning and nursery areas for the threatened Gullspång landlocked salmon.

Description: Fortum Hydro Sweden is one of the participants in the management and development work concerning the Gullspång salmon. Measures such as a fishway, restoration of habitats, spillage and measures for minimizing hydro peaking have been carried out throughout the years. Various investigations and research projects have been completed and knowledge increased. The efforts continue to protect and strengthen the stock of the threatened Gullspång. In 2019, 3500m² of habitats were restored and optimized in the rapids, and the optimization continues this year. In 2020 main actions, many of them postponed from 2019 by GRAP (Gulspång River Action Plan), will be a smolt migration study, pre-feasibility study to look at actions to increase salmon habitat (artificial spawning channel, moving the dam etc.), eco-hydraulic modelling of the rapids, Gullspång salmon and trout broodstock strategy, DNA-sampling analysis, repairing the lower part of the fishway and a completed salmon population model for the river.

SE: <https://www.fortum.se/om-oss/hallbarhet/miljoarbete-inom-vattenkraft>

Biotope measures for salmon and its reproduction	Lower Älvkarleby, River Dalälven, Sweden	2018-2020	Generation Hydro Sweden	Upplandsstiftelsen, Vattenfall	Planning ongoing
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Target: Restoration of a possible spawning area downstream of Älvkarleby hydropower plant in river Dalälven.

Description: The lower Dalälven has been investigated in a research project to explore the possibilities for fish, mainly salmon, spawning. One part of the project has been to identify possible areas to restore for improvement of habitats. In 2018 the identified river stretch was modelled and showed that possible spawning areas are considerably smaller than expected; 0,9 - 4 hectares instead of 18 hectares. In 2020 planning is ongoing for restoration of this smaller area to be performed in 2020 or later.

<https://www.fortum.com/about-us/our-company/our-energy-production/hydropower-flexible-clean-energy/environmental-0-0>

Measures for protecting a red listed plant <i>Carex heleonastes</i>	Laforsen, River Ljusnan, Sweden	2010-	Generation Hydro Sweden	Botanist Bengt Stridh	Ongoing
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<p>Target: Restore habitats for <i>Carex heleonastes</i></p> <p>Description: A red listed plant <i>Carex heleonastes</i> grows near Laforsen hydropower plant in river Ljusnan. One risk for this plant at the site is that salix will overgrow and take over the location. A protective measure for <i>Carex heleonastes</i> is to remove salix plants from the area. The development and survival of the plant is studied by counting number of plants and especially the fruit carrying ones. In 2019 the follow up was carried out and salix plants were removed. In 2020 the situation is to be assessed and salix removed if needed.</p>					
<p>Measures for protecting a red listed beetle <i>Cicindela maritima</i></p>	<p>River Klarälven, Sweden</p>	<p>2018-2020</p>	<p>Generation Hydro Sweden</p>	<p>County of Värmland</p>	<p>Discussions ongoing</p>
<p>Target: Restore habitats for <i>Cicindela maritima</i>.</p> <p>Description: Overgrowth along the shoreline of river Klarälven has weakened the living conditions of a red listed beetle, <i>Cicindela maritima</i>. The species needs open sand shore as a habitat. Biodiversity related actions of the perennial restoration project consist of various measures such as creation of sandy slopes and removal of aquatic plants. In 2018 a restoration was done in Rudsängen by river Klarälven in cooperation with the County of Värmland. In 2019, according to the County Administrative Board in Värmland, restorations were not needed as the spring flood was large and sand deposition on shores was efficient during the flood. Discussions on possible shore restoration needs continue for 2020. SE: https://www.fortum.se/om-oss/hallbarhet/miljoarbete-inom-vattenkraft/atgarder-att-bevara-strandsandjagaren</p>					
<p>Creating meadows for habitats</p>	<p>River Klarälven, Sweden</p>	<p>2019-2020</p>	<p>Generation Hydro Sweden</p>	<p>County of Värmland</p>	<p>Discussions ongoing</p>
<p>Target: Create meadows around hydropower plants for the purpose to attract various terrestrial species.</p> <p>Description: Possible strengthening of biodiversity in creating meadows instead of monoculture with short grass around the hydropower plants. In 2018 an inventory was made to identify various possible biodiversity measures by eight hydropower plants at Klarälven. In 2019 seven measures were carried out, mainly cutting invasive species and other plants and removing them from the area. Discussions are ongoing for the actions in 2020.</p>					
<p>Control of invasive species</p>	<p>River Klarälven, Sweden</p>	<p>2019-</p>	<p>Generation Hydro Sweden</p>	<p>County of Värmland</p>	<p>One action performed, planning ongoing for new actions</p>

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Target: Control of invasive species for the purpose to prevent pristine flora to be driven out.

Description: Lupines are considered invasive and are spread efficiently on shorelines. Around River Klarälven lupines were removed during autumn 2019 on a large area. Lupines take over the areas with pristine flowers, which are needed as habitats for endangered species such as bee species *Andrena marginata* and *Panurgus banksianus*. Fortum wishes to continue this type of actions elsewhere in areas where Fortum operates.

Spillplan for increased survival of salmonid smolts

River Klarälven, Sweden

2018-

Generation Hydro Sweden

County of Värmland

Regular implementation

Target: Improve the natural life cycle of wild salmon and lake trout

Description: Implementation of a spill strategy at the eight lowest hydropower plants in river Klarälven during May and June when the spring flood occurs and salmon and trout migrate downstream. Spill is distributed at spillgates in accordance with a spill plan created to ensure the highest bypass survival rate of downstream migrating fish at each powerplant. In both 2018 and 2019 the spillplan was taken into use with good success. In 2020 the plan is to continue the implementation of the spill plan during the spring flood.

Measures to preserve the Grundsjön char

River Ljusnan, Sweden

2006-

Generation Hydro Sweden

Municipality, Fishing rights organization, County of Jämtland

Ongoing

Target: Grundsjö char is classified as threatened and worth protecting from a biological diversity point of view. The aim of the measures is to preserve the Grundsjö char on site in lake Grundsjön.

Description: When regulation for power production purposes started at lake Grundsjön in the early 1970s, whitefish was introduced to the lake and now threatens the char. Fortum Sverige AB, Härjedalen municipality, Långå and Särvsjön fishing rights organizations and the county administrative board of Jämtland fund the project to protect Grundshjön char and are active partners in the collaboration. Measures are mainly reduction fishing of whitefish and supplementary stocking of char, control and follow-up. The whitefish caught is ecologically used for meals at schools and elderly housing of the municipality of Härjedalen, In 2019 a concept called “dam in the dam” was investigated as a part of the project. The idea is to construct a dam that can preserve water all year around in a minor part of the Grundsjön lake near the shoreline, thereby enabling biological production and strengthening biological diversity. This concept – if successful – could then be applied in other regulated lakes as an environment measure with low impact on hydropower production but high positive impact on local aquatic biological diversity. The project aims to further develop this concept in 2020.

SE: <https://www.langafisket.se/fisket/grundsjoprojektet>

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Improving stream habitats for trout and grayling	River Ljusnan, Sweden	2018-2019	Generation Hydro Sweden	Municipality, local fishing organization	Finalized
<p>Target: Restore stream habitats and adjust migration barriers in the Bollnäs rapids to improve the fish migration in the area.</p> <p>Description: The river stretch Bollnäsströmmarna in river Ljusnan has a variety of habitats for trout and grayling. New license conditions of Dönje hydropower plant from 2015 resulted in higher winter discharge and better adaptation of the hydro power operation for the fish. To improve the stream habitats and fish migration in the area, river stream restoration and an adjustment of migration barriers is performed in the Bollnäs rapids. In 2018 habitat measurements at one site in Bollnäsströmmarna was successfully carried out. In 2019 there were 20.000 m2 of rapids restored by riverbed shaping and graveling for habitats of trout and grayling.</p> <p>SE: https://www.fortum.se/om-oss/hallbarhet/miljoarbete-inom-vattenkraft/biotopatgarder-vid-lillstrommen</p>					

*ELY-center = Centre for Economic Development, Transport and the Environment