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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. Indirect impacts may be caused by, for example, large-scale procurement of biomass and other fuels. However, our production of CO<sub>2</sub>-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 14 and 15:



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



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

### 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 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                |
|---|------------------------------------|-----------|------------------------------------|---|-----------------------|
| <b>Restoration of the area of Käkilahti-Önkköri</b>   | Lake Oulujärvi, Kajaani, Finland   | 2018-2021 | Generation Hydro Finland           | ELY-center* of Kainuu and Municipality of Kajaani, Fishing right owners' association of Manamansalo-Vuolijoki | Ongoing               |
| <p><b>Target:</b> Restore habitats for moor frog, dragonflies and other odonata as well as several bird species</p> <p><b>Description:</b> 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 2018 a wetland was created to the pond of Önkköri and dredgings were performed. In 2019 the project consists of dredgings, removal of excess aquatic flora and excavations to create small ponds and channels to increase the habitats of water birds.</p> <p>FI: <a href="https://www.fortum.fi/media/2018/03/oulujarven-onkkorin-alueen-kolmivuotinen-kunnostushanke-alkanut">https://www.fortum.fi/media/2018/03/oulujarven-onkkorin-alueen-kolmivuotinen-kunnostushanke-alkanut</a></p> |                                    |           |                                    |   |                       |
| <b>Releases of young salmon and sea trout in the tributaries of river Oulujoki</b>  | Muhos, Utajärvi and Vaala, Finland | 2005-     | Generation Hydro Finland           | Municipalities of Muhos, Utajärvi and Vaala, ELY-center* of North Ostrobothnia                                | Yearly implementation |
| <p><b>Target:</b> Improve the situation of migrant fish populations in river Oulujoki by releasing fish fry to breeding grounds</p> <p><b>Description:</b> 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 Muhosjoki, 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. Yearly monitoring has proven that fish have grown well in the stocking area.</p>  |                                    |           |                                    |   |                       |

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| <b>Habitat restorations in river Vuoksi</b>   | Imatra, Finland                 | 2013- | Generation Hydro Finland | Municipality of Imatra, ELY-center* of South-Eastern Finland                   | Planning ongoing                      |
| <p><b>Target:</b> Strengthen stream fish populations in river Vuoksi in eastern Finland</p> <p><b>Description:</b> The river restoration project started with defining suitable habitats for grayling, trout and salmon by modelling the Finnish part of the river Vuoksi with Fortum's habitat modelling tool. Three areas between the power plants of Imatra and Tainionkoski have been 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. In 2018 planning was made for the restorations in Mellonlahti and Kokonsaari. In 2019 a sample restoration will be performed in Mellonlahti, and based on the results it will be decided if restorations will be enlarged in 2020. A permit application for Kokonsaari restorations is prepared in 2019.</p> <p><a href="https://www3.fortum.com/about-us/our-company/our-energy-production/hydropower-flexible-clean-energy/environmental-0/habitat">https://www3.fortum.com/about-us/our-company/our-energy-production/hydropower-flexible-clean-energy/environmental-0/habitat</a></p> |                                 |       |                          |  |                                       |
| <b>Collection of eggs of the salmons and sea trout trapped at the trap and transport device of Montta</b>   | Muhos, Finland                  | 2018- | Generation Hydro Finland | Municipalities of Muhos, Utajärvi and Vaala, ELY-center* of North Ostrobothnia | Regular implementation                |
| <p><b>Target:</b> Improve the quality and genetic biodiversity of salmon population at Montta fish farm</p> <p><b>Description:</b> Salmon eggs are collected from the salmons trapped at the trap and transport device to improve the quality and the genetic biodiversity of the farmed salmon population at Montta fish farm. Expected result is an improvement in salmon stocking results. In 2018 the collection of eggs was not successful. In 2019 the plan is to try to collect eggs.</p> <p><a href="https://www.fortum.com/media/2018/06/hydropower-and-migratory-fish-actions-today">https://www.fortum.com/media/2018/06/hydropower-and-migratory-fish-actions-today</a></p>   |                                 |       |                          |  |                                       |
| <b>Dismantle small dams that do not support hydropower production noteworthy</b>  | Several locations around Sweden | 2017- | Generation Hydro Sweden  | Municipalities, Water Councils, County, Local fishing organizations            | 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 tens of small dams in Sweden that do no more have bigger 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 there are license application processes ongoing for several dams.

<https://www3.fortum.com/about-us/our-company/our-energy-production/hydropower-flexible-clean-energy/environmental-0/removal>

**Improving the life cycle for the Gullspång salmon**

River Gullspång, Sweden

2004-

Generation Hydro Sweden

Municipality, Counties

Ongoing

**Target:** Restoration of the rapid “Lilla Årosforsen” with the aim to increase spawning areas for the threatened Gullspång salmon.

**Description:** Fortum Hydro Sweden is one of the participants in the management and development work concerning the Gullspång salmon. Measures such as a fish way, 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 are continued to protect and strengthen the stock of the threatened Gullspång salmon. In 2018 main actions were measurements of depth, bathymetry, gravel size and water velocities at the three rapids as input data for eco-hydraulic modeling, monitoring program carried out according to plan (benthic fauna, electrofishing, red counts, DNA-sampling) and GRAP (Gullspång River Action Plan) project started. In 2019 main actions are 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-y7sampling analysis, repairing the lower part of the fishway and habitat improvement measurements in the rapids.

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

**Improving stream habitats for trout and grayling**

Bollnäs, Sweden

2018-2019

Generation Hydro Sweden

Municipality, local fishing organization

Ongoing

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**Target:** Restore stream habitats and adjust migration barriers in the Bollnäs rapids to improve the fish migration in the area.

**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 the plan is to measure another section in the river in cooperation with Bollnäs municipality and the Bollnäs anglers club.

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

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| <b>Biotope measures for salmon and its reproduction</b> | Lower Älvkarleby, Sweden | 2018-2020 | Generation Hydro Sweden | Upplandsstiftelsen, Vattenfall | Planning ongoing |
|---|--------------------------|-----------|-------------------------|--------------------------------|------------------|

**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 the results showed that possible spawning areas are considerably smaller than expected; 0,9 - 4 hectares instead of 18 hectares. In 2019 planning is ongoing for restoration of this smaller area in 2020 or later.

<https://www3.fortum.com/about-us/our-company/our-energy-production/hydropower-flexible-clean-energy/environmental-0-0>

|  |                  |       |                         |                       |         |
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| <b>Measures for protecting a red listed plant <i>Carex heleonastes</i></b> | Laforsen, Sweden | 2010- | Generation Hydro Sweden | Botanist Bengt Stridh | Ongoing |
|--|------------------|-------|-------------------------|-----------------------|---------|

**Target:** Restore habitats for *Carex heleonastes*

**Description:** A red listed plant *Carex heleonastes* grows near Laforsen hydropower plant in river Ljusnan. A protective measure for the plant is to remove salix plants from the area. In 2018 the follow up and protection measures were not possible due to forest fires in the area. In 2019 the measures are to be performed as planned.

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| <b>Measures for protecting a red listed beetle <i>Cicindela maritima</i></b>   | Klarälven, Sweden | 2018-2020 | Generation Hydro Sweden | County of Värmland | Discussions ongoing    |
| <p><b>Target:</b> Restore habitats for <i>Cicindela maritima</i>.</p> <p><b>Description:</b> 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. Discussions for 2019 actions are ongoing.</p> <p>SE: <a href="https://www.fortum.se/om-oss/hallbarhet/miljoarbete-inom-vattenkraft/atgarder-att-bevara-strandsandjagaren">https://www.fortum.se/om-oss/hallbarhet/miljoarbete-inom-vattenkraft/atgarder-att-bevara-strandsandjagaren</a></p> |                   |           |                         |                    |                        |
| <b>Creating meadows for habitats</b>   | Klarälven, Sweden | 2019-2020 | Generation Hydro Sweden | County of Värmland | Planning ongoing       |
| <p><b>Target:</b> Create meadows around hydropower plants for the purpose to attract various terrestrial species.</p> <p><b>Description:</b> 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 it is planned to do actions.</p>   |                   |           |                         |                    |                        |
| <b>Spillplan for increased survival of salmonid smolts</b>   | Klarälven, Sweden | 2018-2019 | Generation Hydro Sweden | County of Värmland | Regular implementation |
| <p><b>Target:</b> Improve the natural life cycle of wild salmon and lake trout</p> <p><b>Description:</b> 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 2018 the spillplan was taken into use with good success. In 2019 the plan is to continue the implementation of the spill plan during the spring flood.</p>   |                   |           |                         |                    |                        |

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