Nummela 'GATEWAY' Wetland Park, Finland

Year of issue

2025

Summary

In 2010, the Nummela Gateway Wetland Park (2 ha) was built as both a water-quality mitigation landscape and an urban park. Early monitoring (2010–2011 spring floods) and a three-year ecological survey showed rapid self-establishment, rising biodiversity and multiple ecosystem services (erosion/flood control, pollutant reduction), alongside strong recreational and educational use. According to the project managers, EU LIFE+ “Urban Oases” began in 2012; from 2012–2016 the team deployed high-frequency, year-round monitoring and also sampled sub-catchments to separate urban vs. agricultural loads, which guided the construction of an additional upstream wetland (Nummelan Niittu). Peer-reviewed work documents seasonal nutrient-removal dynamics and highlights the creation of endangered clay-stream habitats. Today, municipal pages present both Portti and Niittu as accessible nature sites (trails, bird tower). The municipality also continues periodic lake-water monitoring in Enäjärvi under local programmes. Comparative studies (including Nummela) underscore how vegetation and design influence phosphorus removal performance.

Photo Gallery



Location

60.3277, 24.3375

Project

NWRM

National ID

Finland_02

Sector

Hydromorphology

Installation Date

2010

Implementation status

Completed

Overview

Location of the project

Nummela (Vihti, Uusimaa), between Porintie / Highway 2 (Vt 2) and Enäjärvi’s Ridalinlahti bay; parking at the end of Ritalantie with access via Luhtaniitynpolku trail.

Country

Finland

NUTS2 Code

Helsinki-Uusimaa

Sponge measures implemented in the case study

Ponds and scrapes

Wetland restoration and management

Objectives

Water-quality mitigation before Lake Enäjärvi, with the wetland expected to provide only moderate pollutant removal because the mean inundated area was ~0.1% of the watershed, whereas 1–5% wetland area is commonly suggested for water-pollution control. Peak-flow attenuation and erosion reduction were also explicit aims.
Habitat restoration/creation, specifically re-establishing clay-dominated stream habitat (classified as critically endangered in Southern Finland) and acting as a “gateway” for lake fauna into the Kilsoi stream corridor.
Recreation & environmental education via an accessible urban park with nature trails and information boards.
Catchment-scale concept: create an interconnected chain of wetlands along ~1.5 km of the degraded stream corridor to manage flashy urban/agricultural runoff before it reaches the lake.
Designed as a research/monitoring site (“field laboratory”) for water quality and flows, greenhouse gases, vegetation, biota and ecosystem services from the outset.

Involved partners

Authority type	Authority name	Authority role	Comments	Authority responsibility
Local water authority	University of Helsinki	Initiation of the measure	—	Responsible
Other	Municipality of Vihti	Initiation of the measure	—	Responsible
NGO	The Water Protection Association of the River Vantaa and Helsinki Region	Monitoring	—	Supporting
Other	Uusimaa, Centre for Economic Development, Transport and the Environment	Other	Regional Policy: Cohesion Funds, ERDF	Supporting

Site Information

Climate Zone

Cool temperate moist

Precipitation

650.00 mm

Temperature (°C)

4.60 °C

Elevation range

61m

Vegetation class

Herbaceous wet meadow/emergent vegetation dominates (self-established), with grass-dominated meadow on moderately dry zones (e.g., Poa, Calamagrostis) and riparian willows; open water and small habitat islands are present.

Water quality status

Phosphorus-rich clay erosion from fields, de-icing salt inputs (salinity up to 10–20% of Baltic Sea water during snowmelt in the stream), and warmer urban runoff (~+5 °C vs other sources) were identified pressures to the Kilsoi stream/Enäjärvi system.

Design and Implementation

Project scale

Micro

Project scale specifications

a local, site-specific urban wetland park and short stream corridor within the Nummela district (≈2 ha wetland park at the mouth of a ~500–550 ha sub-catchment), i.e., a localised hydromorphological & stormwater intervention rather than regional basin management.

Project area

500

Area subject to Land use change or Management/Practice change (ha)

2.00 ha

Size

2.00

Size unit

ha

Financing

Total cost

87000.00 €

Total cost information

Nummela Gateway Wetland Park (2 ha) - €62,000
Restoration of 250 m of the Kilsoi stream - €25,000

Financing authorities

Authority name	Type of funding	Comments
Uusimaa Region	Sub-national funds	regional authority of the Uusimaa Centre for Economic Development, Transport and the Environment (UUDELY)
Vihti municipality	Local funds	Budget of Vihti municipality

Authority name	Type of funding	Comments
European Union	EU-funds: LIFE+	For follow up project called Urban Oasis

Compensations

No

Policy and Governance

Policy description

1) due to land-use changes and inadeqaute urban waste water management the Lake Enäjärvi watershed have resulted in poor water quality and related adverse impacts such as increased algal blooms and fish mortality.
2) problems such as erosion, flooding, draught, habitat degradation and low water quality were common in the area, preventing local people from accessing and enjoying from their surrounding natural environment

Land ownership

The Municipality of Vihti acquired land along the Kilsoi stream corridor for the project and designated it as a functional water-protection zone. This includes the site of the Nummela Gateway Wetland Park.

Policy targets

Pollutants Removal

Improved Biodiversity

Oher Societal Benefits

Runoff control

Peak-flow reduction

Part of a wider plan

Yes

Wider plan

Wider plan type	Wider plan focus	Name	Comments
Local	Urban	Vihti municipality plan	Local municipal plan reflects the change in zoning of land use.

Public consultation

Yes

Has contractual arrangements

Yes

Contractual arrangements

Arrangement type	Responsibility	Name	Role	Comments
Contractual agreement	Supporting	Th partnership agreement on implementation of the LIFE+ project	Implementation	for LIFE+ project Urban Oasis

Impacts and Monitoring

Monitoring System

Monitoring requirements

Intensive monitoring was run during LIFE+ Urban Oases (2012–2016) by the University of Helsinki and partners, with the municipality continuing periodic Enäjärvi water-quality monitoring afterwards.

Monitoring parameters

During and after construction, teams tracked water quantity and levels (weirs, water-level loggers), turbidity (used as a proxy for total phosphorus at Gateway), suspended solids, temperature, and conductivity/salinity (for road-salt impacts). Dissolved oxygen at inflow/outflow shows seasonal patterns. Vegetation plots recorded species richness and succession. In parallel, the site hosted eddy-covariance measurements of CO_2 and CH_4 fluxes. Ongoing municipal programmes sample Enäjärvi seasonally for core limnological indicators.

Maintenance

Maintenance requirements

Routine needs are minimal—annual nature-trail upkeep, with wet-meadow management and sediment-trapping pool maintenance roughly every 5–10 years.

Impact Assessment Methodology

Performance impact assessment method

Edge of Field/Plot

Performance impact estimation information

Monitoring was performed to monitor impacts with regard to water quality and quantity, carbon content in soils, greenhouse gases, vegetation as well as evaluating ecosystem services.

Socio-economic Impacts

Direct benefits

Recreation & education: trails, interpretive boards; the site is promoted as a public park and nature destination by the municipality/visitor pages.

Biophysical impacts: Hydrology

Information on retained water

Flood mitigation & flow moderation reported qualitatively; no site-level volumes given. Hydraulic features include a stilling pond and rock-bottom dams “to keep water level relatively even.”

Peak flow reduction

40.00

Peak flow reduction unit

% Percent

Biophysical impacts: Biodiversity

Improved biodiversity

Yes

Information on improved biodiversity

These wetlands were constructed by excavation in abandoned crop fields. Vegetation was allowed to selfestablish. Seven vegetation zones were identified at the Gateway wetland: natural flood meadow by the lake, constructed islands, constructed wetland area, two dryer wet meadow areas, area of Salix shrubs, and adjacent forest edge. Annual monitoring for species and foliar coverage in summers of 2010, 2011 and 2012 (94 area 0.5m2 plots) revealed that the vegetation selfestablishment at the Gateway wetland was rapid, rich in taxa, and dominated by native wetland species. Only two alien species were identified: Elodea canadensis in deep water areas and Epilobium adenocaulon in dryer meadow areas. Coverage exceeded 90% in 2012.

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

Positive impact-WQ improvement

Information on water quality overall

Wetland decrease the risk of eutrofication in Lake Enäjärvi. High-frequency year-round monitoring (0.5 ha wetland at mouth of an urban/agricultural catchment): incoming loads 24 g P m^{-2} yr^{-1} and 130 g NO_3-N m^{-2} yr^{-1}; retention 3.1 g P m^{-2} yr^{-1} and 18 g NO_3-N m^{-2} yr^{-1} (≈ 13% TP and 14% NO_3-N annual reduction). At a monitored wetland with 0.1% wetland:catchment ratio, average annual TP reduction ~10%, with up to 71% TP reduction in individual events during the growing season. Highest load reductions occurred during heavy rain/snowmelt outside the growing season.

Water quality improvements - Phosphorus (P)

9.00

Water quality improvements - Phosphorus (P) - Unit

% reduction pf pollutant

Information on water quality improvements (P)

Wetland retained phosphorus comparatively most efficiently in July, but terms of terms of absolute quantity in October – November.

Water quality improvements - Total Suspended Solid (TSS)

12.00

Water quality improvements - Total Suspended Solid (TSS) - Unit

% reduction pf pollutant

Information on water quality improvements (TSS)

Monitoring data from late April 2012 show two peaks of suspended sediments following two rain events. In both cases the wetland reduced sediment load into the lake (by 24% and 12%, respectively)

Ecosystem erosion control

Yes

Biophysical impacts: Others

Ecosystem impact climate regulation

Impact on GHGs (net emissions and storage) including soil carbon

Information on ecosystem impact climate regulation

GHGs have been continuously monitored at the Gateway wetland by the eddy covariance method from air (measures fluxes) and directly from water (measures concentrations).
Measurements of GHG concentration in water during winter 2012-2013 indicate that the site has been a source of CO2 and CH4 into the atmosphere. However, ice cover has prevented 4
GHG emissions. The GHG concentrations in the water were sensitive to changes in flow rates. Polluted spills within the urbanized areas impacted water quality as well as GHGs released from the water at the wetland.

Lessons Learned

Key lessons

Rigorous monitoring is indispensable. High-frequency, year-round measurements captured seasonal and event-driven dynamics (e.g., high loads in snowmelt, highest relative TP reductions in summer) and verified benefits that snapshot sampling would have missed. The NWRM team’s emphasis on monitoring is fully borne out here.
Partnerships make or break urban NWRM. The municipality, regional ELY Centre, University of Helsinki, VHVSY and local associations co-planned, implemented and communicated the work; this collaboration between environmental, planning and technical authorities was crucial, echoing the existing NWRM lesson.
Design and dimensioning matter. With a very small wetland-to-catchment ratio (~0.1%), expectations for pollutant removal had to be realistic; chaining wetlands along the corridor and allowing vegetation to mature improved function. Vegetation cover strongly conditions phosphorus retention and stability.
Source control remains necessary. Road-salt pulses and warmer urban runoff challenged treatment; the project team explicitly notes that wetlands complement - rather than replace - reductions at source (imperviousness management, harmful-substance control).
Climate lens: early-stage created wetlands on mineral soils can be net GHG sources, especially from open-water surfaces. Gateway’s eddy-covariance study found a net warming effect over the monitored year, suggesting designs should favor larger emergent-vegetation patches if climate impact is a priority.
Socio-economic co-benefits are tangible and cost-effective. The park provided recreation, education and local identity at lower capital and maintenance costs than grey drainage or conventional parks, strengthening public support for nature-based solutions.

Drivers

Driver type	Comments

Organisation committed to it	To improve the situation, the existing unsustainable means of disposal of runoff water was examined at the watershed level, seeking solutions through a holistic assessment of watershed processes and dynamics. As a result, new wetlands were created along the heavily degraded stream corridor to compensate for land-use changes within the watershed and to restore lost stream corridor habitats. In addition, a large wetland park named the Nummela Gateway Wetland Park was established at the mouth of the Kilsoi stream. The construction of wetlands was led by the project team and supported by a range of local and regional stakeholders.

Success factors

Success factor type	Success factor role	Comments
Attitude of relevant stakeholders	Main factor	Participatory approaches and engagement of stakeholders in the design and implementation of the process were found beneficial to long-term success. Collaboration between environmental, planning and technical authorities has been crucial. In addition, the local association for water protection (VESY ry) has been an active partner in the project supporting several voluntary actions. The Uusimaa Centre for Economic Development, Transport and the Environment (UUDELY) has participated in project management and monitoring from the beginning, providing guidance and support at the regional level. Appropriate technical expertise (e.g. sustainable landscape design and monitoring) has been secured by involving experts from the University of Helsinki, Luode Consulting Oy, UUDELY, and Water Protection Association of the River Vantaa and Helsinki Region. Finally, the Finnish Association for Nature Conservation (SLL) has supported communication and environmental education activities.
Financing possibilities	Main factor	Initially, the project was funded by municipality and regional development center. LIFE+ project was developed and is implemented 2012-2016 as follow up and expension with similar activities in the area
Conducted assessments (incl. economic)	Main factor	Availability of the information on key ipacts and results from the activities
Other	Main factor	The project combines environmental (water pollution, habitat degradation, etc.) and social aspects (recreation)

Cost effectiveness

Gateway park construction €62k. Restoring 250 m of the Kilsoi stream cost €25k vs an estimated €125k for culverts over the same reach; conventional park costs would have been “several hundred thousand euros.” Maintenance expected to be minimal.

Transferability

Highly transferable to urban catchments for flood moderation, water-quality gains and amenity. Take care with sizing (wetland:catchment ratio), secure dense emergent vegetation, and control upstream sources (sediment, road salt). Expect strong seasonality; use chained cells where space is tight. Commit to continuous/regular monitoring, and plan low-effort upkeep, including periodic sediment-trap cleaning.

Sources

Sources

Carbon dioxide and methane fluxes from different surface types in a created urban wetland

Vihdin Enäjärven vedenlaatu 2024

Urban wetland parks in Finland: improving water quality and creating endangered habitats

Benefits of green infrastructure - socio-economic importance of constructed urban wetlands, Nummela, Finland

Taajamakeitaan tarina: Hulevesillä luontokohteita

EXAMPLE: Constructed wetlands to compensate for urbanization in southern Finland (FIN)

Phosphorus removal efficiency by in-stream constructed wetlands treating agricultural runoff: Influence of vegetation and design

Seasonal variation in nutrient removal efficiency of a boreal wetland detected by high-frequency on-line monitoring