



LAHTI REGION 2013

ENVIRONMENTAL REVIEW



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FOREWORD

This is the seventh issue of the joint Hollola, Lahti and Nastola environmental review containing key figures depicting the environmental status of each municipality. The City of Lahti has produced a similar report on the changes in its environmental status since 2002.

The environment and sustainable development have become a core issue in Lahti's strategic development programme. The Lahti region environmental committee prepared a new joint environmental policy for 2013 to 2016, which was approved by the municipal councils last winter. Based on this policy, work was launched on a common environmental programme with the different actors in our municipalities.

The City of Lahti produced a "Sustainable energy action plan" as part of the EU Covenant of Mayors' climate agreement. The plan shall also be implemented where applicable in Hollola and Nastola municipalities.

A broad-reaching joint project during 2013 has been participation in a European Regional Development Funded project lead by the city of Helsinki called "ILKKA" – Climate-Proof City. One goal of the project is to become familiar with urban planning tools and methods for adapting to and preparing for the effects of climate change.

The Pesäkalio conservation area in Lahti was expanded towards the end of 2013. The Häme ELY-Centre approved the approximately 130 hectare expansion and the City received compensation for the donated forest through the Kunta-Metso programme. In Nastola, planning for a guided nature trail network in the Lapakisto conservation area was completed and implementation started. In Hollola, the traditional meadows of Messilä were treated to ensure the preservation of the natural and cultural environments.

For the year 2013, the portion of waste bound for the landfill decreased once again. The amount was halved and the rate of recycling/reuse is about 95%. In all municipalities, the per capita consumption of water and energy was reduced. New in this edition of the environmental review is a per capita greenhouse gas emission for housing, services, agriculture, waste management and traffic. In all of our region's municipalities, the number of passenger cars has grown and public transportation use has waned over the long-term.

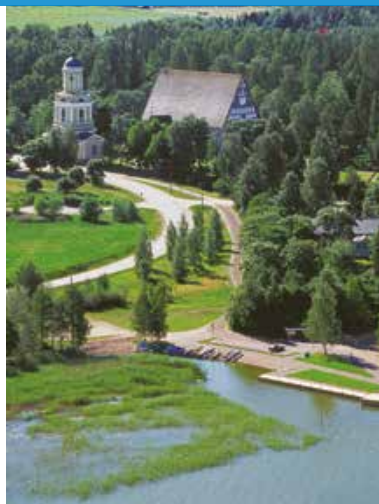
Environmental counselling was strengthened and resident co-operation increased with the goal of increasing environmental responsibility within our municipalities. During 2013, environmental advice reached an unprecedented number of residents in a number of different informational events. Together the Trio shopping centre and The Lahti Region office opened an environmental and tourist information point inside the Trio shopping centre.

As a step to promote environmental responsibility, the city has implemented the WWF's Green Office management system. The coordination of this campaign is managed by Lahti Region Environmental Services.


Päivi Rahkonen
Mayor of Hollola


Jyrki Myllyvirta
Mayor of Lahti


Pauli Syyrakki
Mayor of Nastola





JOINT ENVIRONMENTAL POLICY FOR THE CITY REGIONS 2013 – 2016

A joint environmental policy directs the activities of the municipalities and cities in environmental issues. The management of environmental issues is a part of good housekeeping, and its continuous improvement will ensure that the municipalities and cities are among forerunners in the promotion of environmental issues and sustainable development. The joint environmental policy is implemented in all the city and municipal activities. Implementation is monitored and reported annually to local residents, decision-makers and stakeholders.

The objectives of the joint environmental policy are:

- To plan for climate change-induced risks and changes, to improve energy and material efficiency, and to reduce greenhouse gas emissions
- To protect the quality of life in residential environments
- To protect and promote biodiversity and the cultural environment
- To safeguard the quality and quantity of groundwater
- To actively improve the water quality in waterways and safeguard both their recreational and natural value
- To allocate resources for the distribution of up-to-date environmental information and to increase the opportunities for residents and businesses to act for the good of their environment.

In order to achieve these environmental objectives, the following principles should be upheld:

- **The municipalities of Hollola, Lahti and Nastola work in partnership with residents, businesses, organizations and other stakeholders for the good of their common environment.**
- **Business activities are taken into account in decision-making and operations with increased cooperation between city/municipal entities and group companies on environmental issues.**
- **Awareness of the value of nature and natural resources is increased and prejudices regarding environmental protection are reduced**
- **Opportunities for acting to promote ecological sustainability are reinforced by Lahti Region Environmental Services**

The municipality and city leadership are responsible for the implementation of the joint environmental policy within their own organizations, as well through their roles in the management of group companies. An additional goal is for all employees and staff representatives to be aware of their own responsibility concerning environmental matters. Implementation of the environmental policy will be integrated into the functions of the various municipal units. The effects of decisions on environmental goals will be monitored at every level of decision-making.

In order to achieve the objectives of the joint environmental policy, the Lahti Region Environmental Services shall establish and maintain a common environmental management system. This system will support political commitments and allow for the monitoring of policy implementation by taking measures for accountability and tracking of resources in sufficient detail. An implementation report on this management system will be presented to the Lahti Region Environmental Board at least once a year.

LAHTI REGION ENVIRONMENTAL OBJECTIVES AND KEY MONITORING FIGURES

The Lahti Region Environmental Review 2013 presents the region's environmental status in the form of key figures accompanied by a written account. The environmental review is published annually, and describes the implementation of the Joint Environmental Policy within the Lahti region municipalities. The regular monitoring of the environment in Lahti was initiated in 2002 through the use of an environmental balance sheet. In 2007, part of the Hollola and Nastola indicators began to be included as well.

Data and information for the Lahti Region Environmental Review 2013 have been collected from Lahti, Hollola and Nastola officials, as well as from a variety of other sources. Where the name of the municipality is not specifically mentioned for any indicator, the information applies only to Lahti. Where information ten years old or older has been available, longer term environmental changes have been indicated in the environmental report with colour-coded arrows. A green arrow indicates a positive environmental change, a red arrow a negative change and a blue arrow means there has been no dramatic change either compared to the initial situation or to that of the last ten years or so. This environmental review has been compiled as a joint venture by the Lahti city group and the Hollola and Nastola municipalities. Also included in this report are the cost and investments arising from the Lahti City Groups' environmental activities.



Kotona on paljon laitteita, jotka tuhlaavat energiaa ollessaan turhaan päällä, huonosti huollettuina tai väärin sijoitettuina. Energiaa saattaa kulua hukkaan myös omista tavoista johtuen.

Testaa kuinka nopeasti saat kuriin kodin energiasyöpöt sammuttamalla tauluun syttyvät valot!

OMI ENERGIAKUNTOKSET:

00 - 15 sammutusta:

Yritä uudelleen, koodiasi on vielä paljon energiasyöpöä.

16 - 35 sammutusta:

Hyvä, tuhlausta on alkanut taittua.

36 - ... sammutusta:

Tasoa on alkanut parantua, jotta voit tulla kotiin.

YOUR OWN ENERGY RATING:

00-15 switch-offs:

Try again, there are still many energy gluttons at your home.

16-35 switch-offs:

Good! the gluttons are almost tamed.

36... switch-offs:

Excellent, you have managed to tame all your energy gluttons.

In every modern home, there are devices that waste energy if needlessly kept on, poorly maintained or incorrectly placed. Bad habits may also result in considerable waste of energy.

Test how quickly you can tame the energy gluttons at your home by turning off the lamps lighting up on the board!



TALTUTA KODIN ENERGIASYÖPÖ
TAME THE ENERGY GLUTTONS

Monitoring the quality of life and health of the environment

Road traffic emissions have a major impact on urban health and comfort, as the emissions are released at ground level where people breathe. Next to industrial operations and energy production, road transport is one of the largest sources of air pollution in Lahti. Nitrogen oxides, which are released by traffic exhaust, can cause respiratory symptoms in sensitive people and therefore sensitivity to other irritants may also increase, for example, pollen and freezing temperatures. Air-quality measurements can be monitored in real time at www.ilmanlaatu.fi. The air-quality index can also be found on electric displays at local bus stops and on the Etelä-Suomen Sanomat's website at www.ess.fi.

The number of lots and houses in the noisy areas does not necessarily reflect the actual noise situation near residences. When areas are being built, noise mitigation structures are constructed, such as noise barriers and embankments. As new areas are being zoned for usage, possible noise pollution and potential impacts are taken into account when considering the placement of buildings. The effects of noise abatement measures are not immediately evident in the defining of noisy areas, since these areas are classified every five years.

The city centre will be made more attractive by reducing through-traffic and its associated environmental impacts. Helping to serve this purpose, among others, an underground parking lot is being constructed underneath the central square. The parking hall's construction began in the spring of 2013 with the removal of contaminated soils from the site of the lower square's former petrol station. Archaeological excavations were then carried out at the site during the summer of 2013. For the duration of the construction, all central square functions have been transferred to Lanu Square and the space in front of the Main Library. The construction of the actual parking structure began in autumn 2013 and the project will be completed in the summer of 2015.



Key monitoring figures	2013	2012	2011	Longer term environmental change	
Number of days with poor air quality	32	28	33	14 in 2002	
Percentage of building lots in noisy areas in relation to all planned single-family house lots (%)	0	4.1	10.5	11 in 2004	
Percentage of apartments in noisy areas in relation to all planned apartment square metres (%)	24.9	-	17.4		



Reduction of environmental loading

Energy production and transfer creates various environmental impacts. Some of these impacts are global or national in scale, while others are more localized. The environmental impacts of energy production can be reduced by improving purification technology and by transferring to less polluting sources of energy. Efficient production and use are also important ways to reduce the environmental impacts of energy production.

According to the preliminary data of the CO2 report, the greenhouse gas emissions from housing, services, agriculture, transportation and waste management in the Lahti region were 9% lower in 2013 than in 2012. Warmer weather reduced the need for heating in buildings, yet at the same time, emissions from electricity consumption increased over the previous year, due particularly to growth in the national or European emission factor for electricity (NEEFE). More than a third of Lahti residents' emissions are associated with the production of district heating. In turn, Hollola and Nastola's largest source of emissions was from transportation, which accounts for more than 40% of emissions in both municipalities. The analysis of greenhouse gas emissions from energy, waste and industry within the municipalities does not take proper account of the climate change effects of consumption, because the indirect emissions from the production of foods, goods and services are excluded from the calculations.

Some portions of material consumption eventually end up as waste. The creation of landfill waste is prevented by increasing the environmental awareness of residents (e.g. education, advice) as well as through the recycling centre services. Päijät-Häme Waste Disposal's website's 'Recycling Lane' is an alternative to discarding used goods. The Recycling Lane works on the principle "Sell, buy or donate serviceable goods online." Almost all of the waste generated is utilized either as reusable material or for energy production. In 2013, less waste ended up in landfills than previous years, approximately 21 kg per capita. The use of mixed municipal waste for energy generation begun in 2009 has substantially reduced the amount of waste that ends up in landfills.

The wastewater produced by the 120,000 residents of the Lahti and Hollola region is treated at Lahti Aqua Ltd's Kariniemi and Ali-Juhakkala sewage treatment plants. In 2013, a total of 12.6 million cubic metres of wastewater was treated. The Ali-Juhakkala treatment plant did not achieve the nitrogen reductions set forth in its permit conditions; otherwise, both wastewater treatment plants fulfilled the purification requirements set forth in their permit conditions. The plants are bio-chemical wastewater treatment plants where solid waste and sand are removed mechanically, organic matter and nitrogen are removed biologically and phosphorus is removed chemically. In Nastola, a total of 1.2 million cubic metres of wastewater was treated.

Key monitoring figures	2013	2012	2011	Longer term environmental change	
Amount of mixed waste produced by city offices and plants (tons)	1,160	1,076	1,069	1,304 in 2001	↗
Amount of municipal waste to be disposed of by landfilling per resident (kg)	21	40	48	234 in 1999	↗
Carbon dioxide emissions from energy production and industry (tons)	692,900	610,300	811,533	691,300 in 1997	→
Greenhouse gas emissions from housing, service, agriculture, waste management and transportation per resident (tons CO ₂)					
Lahti	5.2	5.9	6.1	6.1 in 2008	
Hollola	6.2	6.8	7.2	7.2 in 2008	
Nastola	7.0	7.2	7.6	7.5 in 2008	
NO _x emissions from transportation (LIISA 2012 model) kg/resident)					
Lahti	5	5	5	12 in 1997	↗
Hollola	10	10	10	25 in 1997	↗
Nastola	12	12	13	30 in 1997	↗
CO ₂ emissions from transportation (LIISA 2012 model) kg/resident)					
Lahti	1,433	1,471	1,453	1,458 in 1997	→
Hollola	2,807	2,799	2,750	2,816 in 1997	→
Nastola	3,346	3,307	3,254	3,109 in 1997	→
Emissions into the Porvoonjoki River from wastewater treatment plants (tons) Ho-La total and purification efficiency (%)					
Phosphorus	3.3 (97.2%)	3.3 (97.2%)	2.8 (97.6%)	5.8 in 1997	↗
Nitrogen (NH ₄)	31.4 (96.1%)	29.3 (96.1%)	26.0 (95.9%)	28.8 in 1997	→
BHK ₇	74.5 (98.5%)	89.5 (98.4%)	59.0 (98.6%)	140 in 1997	↗
Nastola, wastewater nutrient loading (tons) and purification efficiency (%)					
Phosphorus	0.2 (98.9%)	0.2 (98.9%)	0.2 (98.9%)		
Nitrogen (NH ₄)	0.1 (99.9%)	0.5 (99.4%)	0.3 (99.7%)		
BHK ₇	3.1 (99.5%)	4.4 (99.2%)	3.3 (99.4%)		
Wastewater quantities (million m ³) Na, Ho-La (total)	12.6	15.8	12.8	12.5 in 1997	→

Sustainable development in the use of natural resources



Most of the district heating used in local buildings is co-generated at Lahti Energy Ltd's Kymi-järvi power plant. Heat produced as a by-product of electricity production is recovered and used for district heating. This cogeneration of electricity and heat uses fuel efficiently and economically. In the Lahti region, the heating network almost covers the entire metropolitan area, and more than 90% of the buildings use district heating. With the completion of the Nasta-line in 2013, the Nastola and Lahti heating networks were connected, and now the district-heating network extends all the way to the Nastola municipal centre. The most significant contributions in meeting the strategic emission goals were the local plans for a bio-fuel power plant to replace the Kymi-järvi I cogeneration plant as well as the Kymi-järvi III power plant and its associated biofuel storage.

Towards the end of 2013, an invitation to tender for public transport services resulted in a renewal for the Lahti region. Environmentally significant progress is being made with respect to the equipment; the bid-winning operators, Koiviston Auto Ltd and Lehtimäen Liikenne Ltd, acquired a total of 75 new buses for use in the Lahti region. All of the buses are handicapped accessible and meet the latest Euro6 emission criteria.

95% of the Lahti region's municipal waste collected and received by Päijät-Häme Waste Disposal Ltd was reused in 2013. Separately collected energy waste is turned into eco-gas for use in Lahti Energy's Kymi-järvi II power plant and even mixed waste has been used for energy production. Bio-waste is handled at Labio Ltd's composting plant, where it is turned into compost for agricultural use; this way, nutrients stored in biowaste and sludge are put back into circulation. Sorted glass, metal

and paper collected at recycling stations and by property associations were delivered for use in place of virgin raw materials. Additionally, newly developed designs have found methods for utilizing construction and demolition waste, reducing the need for landfilling.

The indicator for the functionality and leakage of the water supply network is the unmetered consumption percentage. The lower the unmetered consumption percentage is, the less water, energy and chemicals go to waste. The percentage of unmetered water consumption pumped in Lahti was 5.9, which was an excellent result nationally, considering that the national average was about 20%. The unmetered water consumption for Hollola was 14.6%, also well below the national average.

In autumn 2012 Lahti joined the EU Covenant of Mayors with over 5,700 other cities across Europe. In doing so, Lahti committed to promoting the sustainable use of energy and to seeking to reduce greenhouse gases emissions 20% by 2020. Prepared in December 2013, the sustainable energy action plan (SEAP) brings together the city's departments, public enterprises and subsidiaries to promote energy efficiency and renewable energy sources in the Lahti region.

Committing to the EU Covenant of Mayors project is simply a continuation of Lahti's long history with energy efficiency and climate work and it supports Lahti's 'Green City' urban strategy. Based on forecasts for greenhouse gas emissions made in conjunction with the SEAP, a per capita goal for greenhouse gas emissions reduction was set to 35% of 1990 levels by the year 2020. This target includes impacts from the City of Lahti's activities, as well as the impacts of actors outside of the City's sphere of influence.

Key monitoring figures	2013	2012	2011	Longer term environmental change	
<i>The degree of recycling of municipal waste received by Päijät-Häme Waste Disposal Ltd (%)</i>	95.0	90.6	87.9	51 in 2001	↗
<i>Water consumption per resident, (L/day)</i>					
<i>Lahti, household consumption</i>	124	125	127	154 in 1997	↗
<i>Lahti, specific consumption</i>	184	189	197	269 in 1997	↗
<i>Hollola, specific consumption</i>	113	113	115		
<i>Nastola, specific consumption</i>	211	192	212	173 in 2000	↘
<i>Electricity consumption, kWh/resident/year</i>	9,051 in 2012	8,358 in 2011	9,233 in 2010	8,620 in 2000	↘
<i>Specific electricity consumption in the city/municipality properties, kWh / r-m³</i>					
<i>Lahti</i>	18.2	17.9	17.2	18.2 in 2001	→
<i>Hollola</i>	23.0	20.4	21.0		
<i>Nastola</i>	17.6	22.4	22.6		
<i>Heat consumption in the city/municipality properties, kWh / r-m³</i>					
<i>Lahti</i>	41.1	43.4	44.5	52.1 in 2001	↗
<i>Hollola</i>	34.5	31.2	33.3		
<i>Nastola</i>	42.9	48.2	44.5		
<i>Environmental aspects accounted for in invitations to tender (%)</i>	38	24	26	11 in 2003	↗
<i>Relative change index for vehicle traffic *</i>	109.0	108.3	109.7	100 in 2001	↘
<i>Number of public transport passengers journeys / resident / year</i>	57.1	58.2	55.0	67 in 1997	↘
<i>Combined pedestrian and cycling paths (km)</i>					
<i>Lahti</i>	392	397	395	344 in 2001	↗
<i>Hollola</i>	66	59	58		
<i>Nastola</i>	48	48	47	55 in 2006	
<i>Car dependency, cars / 1,000 residents</i>					
<i>Lahti</i>	502	492	487	387 in 2001	↘
<i>Hollola</i>	606	588	574	392 in 2001	↘
<i>Nastola</i>	614	599	585	422 in 2001	↘

*The relative change index for vehicular traffic is made up of 10 different targets by which the amount of traffic is monitored.

Preservation of landscape and cultural values

The master plan is a city-wide general plan describing the general zoning and is used as the basis for town planning. The master plan is heavily influenced by the city's strategy. Town planning was carried out in 2013 in accordance with the sustainable urban design principles of Lahti's 2025 master plan. During the 2013-2016 master plan cycle preparation for the objectives began. New residential building rights were primarily zoned for filling in the urban centre and the suburbs. Urban and suburban infill construction helps to support and develop the existing service infrastructure. Blocks of wooden apartment buildings were planned for the Karisto area. Zoning for new low-rise and sin-

gle-family dwellings was concentrated in the Kytölä II area. A competition held in accordance with the Architectural Policy Programme requested designs for the Merrasjärvi neighbourhood. The winning design will create novel high-rise apartment blocks while carefully taking into consideration the neighbouring and newly expanded Pesäkalio conservation area.

Landscape conservation practices maintain and preserve existing landscapes, but they also prevent damage and disturbances to different types of landscapes. Landscape conservation relates to key assets, for example, to settlements and village environments, prehistoric relics, as well as traditional landscapes. Landscape management not only improves and maintains views but also promotes the conservation of increasingly rare plant species. Hollola's old parish village is an entity with high scenic value, which only increases with its layers of cultural features. In Uskila, Hatsina, Sairakkala and Kastari a well-balanced Häme cultural landscape opens out onto an equally beautiful agricultural landscape. Ruuhijärvi is the most important Iron Age settlement in Nastola. For Lahti, the provincially valuable Myllymäki forest grazing land, located in the Koiskala cultural and scenic region is a precious traditional landscape.





Key monitoring figures	2013	2012	2011	Longer term environmental change	
Percentage of parks and green areas within the city planning areas (%)					
Lahti	30	30	29	22 in 2001	↗
Hollola	25	25	25		
Nastola	38	38	38		
Valuable areas protected by city planning regulations (number of lots)	1,027	1,011	1,008	60* in 1983	↗
Number of protected buildings	295	288	281	3 in 1979	↗
Traditional landscapes (ha)					
Lahti	26.6	26.6	26.6	26.6 in 1995	➡
Hollola	54.9	54.9	54.9		
Nastola	9.9	9.9	9.9		

* City plan for the Tapanila single-family home area

The quality and availability of groundwater in the Lahti Region



About one-fifth of the combined surface area of Lahti, Hollola and Nastola is classified as a groundwater recharge area. Water quality is monitored in the recharge areas, at water abstraction sites and in the water supply network. Of the region's groundwater abstraction sites, seven are located in Lahti, five in Hollola and six in Nastola.

Around 100,000 m³ of groundwater is generated daily in Lahti and the surrounding areas. Lahti Aqua Ltd uses approximately a quarter of this amount for community household water, which is approximately one half of all current permits for water abstraction. The majority of raw water for use in Lahti and Hollola is taken from the Jalkaranta catchment basin and the Hollola-Lahti joint municipal waterworks abstraction sites in Hollola and Hämeenkoski. In Nastola, the largest water abstraction sites by volume are the Mälkönen and Peltola sites.

The Lahti groundwater area, the Nastola Nastonharju and Uusikylä B groundwater areas have been classified as being in chemically poor condition. In addition to the aforementioned areas, Salpakangas, Kolava, Villähde and Nastonharju-Uusikylä B groundwater areas have been classified as risk groundwater areas. In Lahti and Nastola special attention has been given to the levels of pesticides with regards to groundwater quality. In Lahti about ten years worth of pesticide analysis results were compiled into a single report. In Nastola pesticide concentrations have been monitored in the surroundings of the Uusikylä water abstraction site. Pesticides have been found in the groundwater in Lahti, particularly around the railroad tracks and areas south of the existing line. The highest levels measured during the study period exceeded the limits set for drinking water by a hundredfold.

The pesticides found at the study's observation points are all ones that had stopped being used. Pesticides degrade very slowly in groundwater conditions and may still be present in groundwater decades after cessation of treatment. The origin of these pesticides is unknown and they are probably derived from a variety of sources. Among other places, herbicides were used along the tracks and in train yards as a brush killer and also in market gardens for weed control. Pesticides have not been found in the groundwater in Hollola.

An extensive study was conducted in Nastola in 2013 that describes the geology of the first Salpausselkä Ridge and the catchment areas of the abstraction sites. The study examined the groundwater flow directions and the watershed areas within the study area, as well as investigated possible new sites for water abstraction. At the same time, the study also determined the amount of surface water that could be found in the wells of water abstraction sites located close to surface waters. According to the report, all of the water abstracted in Nastola is groundwater formed via the Salpausselkä Ridge, and that at least at current volumes of abstraction there is no surface water intrusion. In 2013, a two-year project began, mapping the number and size of groundwater observation points in Hollola, Lahti and Nastola. The inventory will be useful for both the drinking water plants and municipal officials for use in environmental protection as well as in land-use decisions. This updated information will also be useful to residents. For example, the inventory will provide information required for construction projects, such as the knowledge of groundwater observation sites and the height of the water table.



Key monitoring figures	2013	2012	2011	Longer term environmental change	
Groundwater conductivity (µS/cm), depicts the total amount of salts dissolved in the water (limit value 2,500 µS/cm)					
Lahti, Jalkaranta	184	175	192		
Hollola, Ruoppa	106	83	110		
Nastola, Mälkönen water abstraction area	200	220	220		
Atrazine levels in groundwater µg(L). (Depicts the levels of the pesticide Atrazine detected at the observation point)					
Nastola Uusikylä (GA1)	1.3	2.9			
Lahti (HP137, trackside)	2.3	2.2	1.6		

Preservation of the recreational and natural values of lakes

Lahti region lakes are managed through the monitoring of future external loading, oxygenation, the management fishing of roach fish, the stocking of predatory fish and the cutting of reed beds. Lahti Region Environmental Services' water-body management is part of the Vesijärvi programme, which is carried out together with the Päijät-Häme Vesijärvi Foundation. The aim of the Vesijärvi programme is to maintain and improve the condition of Lake Vesijärvi and smaller water bodies in the Lahti region. Water analysis and maintenance activities are part of the programme, as well as the promotion of other types of nature conservation and environmental protection. Another purpose of the programme is to draw the attention of people who live near the lakefront to the state of the lake and encourage activities and measures that improve water quality.

Lahti Region Environmental Services, the City of Lahti's Land Use and Municipal Engineering departments and the Koiskala Fishing Association have committed to management procedures at Lake Kymijärvi for the period from 2004 to 2013. Some of the management measures aim to prevent the adverse effects of shore construction on the lake's water quality. Various management measures that have been used include management fishing, removal of aquatic plants, construction of sedimentation ponds and wetlands, stocking of predatory fish, as well as the chemical precipitation of phosphorus. The current treatment agreement is to be

extended for a new five-year period.

In 2013, The condition of water bodies were followed via a monitoring programme on six lakes in Hollola, eight in Lahti and eight in Nastola. Samples are taken at the end of the winter stratification in March and the end of the summer stratification in August. Vesijärvi, Alasenjärvi, Kymijärvi, Ruuhijärvi and Hahmajärvi lakes were all monitored, as was the water quality in the most significant drainages, with samples taken during the spring high flow and in the autumn. Water quality was monitored in Lake Vesijärvi's Enonselkä basin, Vähäselkä basin, and Paimelanlahti bay via five continuous monitoring stations whose results were available on the internet. In Lake Vesijärvi, the status of fish and benthic animals were investigated as well as the effects of oxygenation on the release of methane and carbon dioxide from the lake. Aquatic vegetation reports were prepared for Lake Kymijärvi, Lake Työtjärvi and Lake Mustajärvi. A wetland plan was begun for Sammalsillansuo bog at Lake Sylvöjärvi in Nastola, the implementation of which was rescheduled due to a mild winter.

Vesijärvi's Enonselkä basin was oxygenated at nine stations and Lake Kymijärvi's Rekolanpohja bay at one station; these processes are in addition to the natural seasonal mixing in the lakes. In 2013, the Enonselkä basin deeps remained oxygen-rich compared to earlier when the hypoxic season lasted about one-hundred days. Vesijärvi was stocked with 10,000 elvers (juvenile eels). The





total management fishing catch for all water bodies was 191,969 kg, of which Vesijärvi's catch accounted for 159,000 kg.

The heat load from Kymijärvi power plants is directed into Lake Vesijärvi with the cooling water from the plant. This is primarily during the warm season, when the by-product heat from the cooling water is in less demand for district heating. This heat load has not caused any observable disturbance in the lake. With the rapid onset of the summer, the hypolimnion (lower layers of the lake) remained unusually cool, which contributed

to the success of salmonids. Smelt and whitefish were more abundant than before in the Enonselkä basin. Pike-perch stocks continued to dip due to poor juvenile cohorts; however, according to reports next year should already be better. Within the City's jurisdiction, the minimum mesh size for gill nets was increased from 50 mm to 60 mm in order to help the pike-perch population grow. Concurrently, the total number of licenses sold was limited to 500 instead of the previous 600, and only two licenses are sold per household compared to three previously.

Key monitoring figures	2013	2012	2011	Longer term environmental change	
Lake water chlorophyll a, measured in August (µg/L)					
Lake Vesijärvi, Enonselkä basin - Lankiluoto	16.0	13.0	14.0	10 in 1995	↘
Hollola, Lake Arkiomaanjärvi	5.7	6.7	4.4		
Nastola, Lake Salajärvi	14.0	15.0	10.0		
Lake water transparency measured in August (m)					
Vesijärvi, Enonselkä basin	1.8	1.8	2.3	1.9 in 2001	→
Lake Alasenjärvi	2.0	3.2	3.5	3.5 in 2001	→
Hollola, Lake Arkiomaanjärvi	1.8	2.0	2.4		
Nastola, Lake Salajärvi	2.0	2.0	3.0		
Lake Vesijärvi management fishing catch (tons/year)	159	218	206	86 in 2001	↗
Kymijärvi power plant's heating load into Lake Vesijärvi, (TJ)	1,293	817	1 246	722 in 1995	↘

Nature's diversity is the region's wealth

Maintenance of the city forests has focused on recreational and conservation values, which also provides for the protection of biodiversity. Nature conservation ensures urban residents the opportunity to hike and recuperate in nature. Conservation areas offer experiences for outdoor pursuits you will not find in maintained recreational forests. Lahti has wide green spaces, most of which are managed as forest parks or recreational forests. These nature conservation areas ensure that the biodiversity of the region is safeguarded for future generations as well. In particular, the preservation of forested areas ensures that regional development proceeds in a more valuable direction and the aging of the trees in these forests creates habitats for many endangered species. The Lahti green space programme was completed in 2013.

Currently, there are almost 50 areas protected under the nature conservation act in the Hollola, Lahti and Nastola region. Measured by area, they are relatively small; their average surface area is less than 30 hectares and those larger than 100 hec-

tares in size number less than 10. The newest nature conservation area is the Pesäkalio expansion. In 1989, 70 hectares of Lahti's Pesäkalio area were placed under protection, and in 2004 it became a part of the Natura-2000 network. In 2013, the preserve was expanded to 200 hectares as a part of the city's master zoning plan.

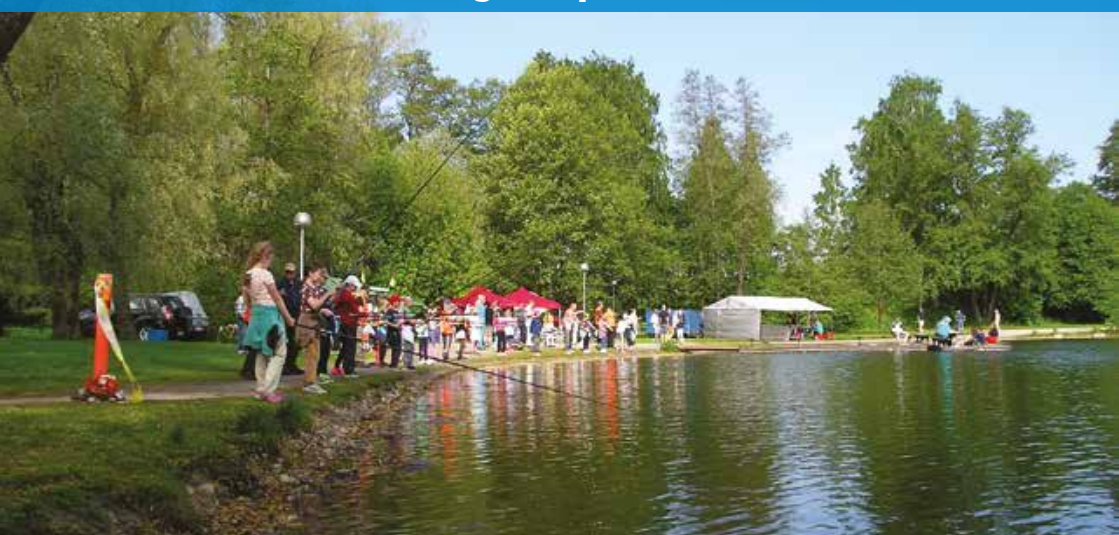
In addition to the nature preserves there are numerous different natural areas and destinations for shorter outdoor excursions. They are located in various corners of the sub-regions and they vary greatly in size as well as in their specific attractions. Among the areas are gorgeous landscapes, good birding locations and excellent day-trip destinations for the whole family. All of the region's nature trails were restored and maintained during the year. The Linnaistensuo wetland boardwalk was renewed. Additionally, all three municipalities continued their maintenance work on traditional landscapes. Several themed nature trips, such as night singer and bat tours, were arranged at the Lahti region's natural heritage sites during the year.





Key monitoring figures	2013	2012	2011	Longer term environmental change	
Areas protected under the Environmental Protection Act Percentage of the entire municipal land area (%)					
Lahti	3.28	2.80	2.80	1.9 in 1995	↗
Hollola	2.33	1.35	1.35		
Nastola	0.82	0.82	0.14		
Areas protected under the Environmental Protection Act (ha)					
Lahti	507	380	380	256 in 1995	↗
Hollola	1,237	751	751		
Nastola	297	297	67		
LUMO sites in Lahti (ha)	700	700	700	500 in 1995	↗
Habitat type sites (ha)					
Lahti	23.6	23.5	23.5	17.5 in 2005	↗
Hollola	19.2	16.5	16.5		
Nastola	12.2	9.1	9.1		

Environmental counselling as a part of education



Sustainable development is included in the national curriculum for schools and for early childhood education. Active teachers and early childhood educators make use of nature in their teaching, sort waste and strengthen children's and young people's relationship with nature and their growth as environmentally aware citizens. The level of sustainable development in comprehensive schools is monitored with an annual survey. The survey encourages schools to continuously improve their operations and to maintain previously achieved objectives. It also provides concrete advice on how put environmental work into practice. Schools and early childhood education centres have designated contact persons for environmental matters.

Schools and kindergartens use the city's local forests as a learning environment. By examining the available forests from the children's point of view and by marking these areas on maps, more opportunities have been created for using local forests in education. Teachers and early childhood educators can borrow material such as nature trail maps, bug science kits, binoculars and Messi Menninkäinen -sorting portfolios from Environmental Services.

Lahti Region Environmental Services operates as a local promoter for the Eco-Schools environmental management system (Green Flag). Eco-Schools provide an integrated system for sustainable development in day-care centres, schools, colleges and providers of leisure time activities. Currently Kivimaa School as well as Kanerva, Kytölä, Humpula and

Herrasmanni day-care centres have earned the Eco-Schools certificate (Green Flag). Assistance and advice from the Lahti Environmental Counselling Centre has increased the knowledge and readiness of educators as well as adult, child and youth groups.

Resources for environmental education have been acquired through project funding and therefore have varied annually. Funding for Kymppi-project enabled the environmental counselling centre to develop a diverse set of tools to supporting its environmental counselling and education work. The most significant product of this project is an exhibition called "Vähähiilistä fiilistä" – Low carbon vibes. It is a functional way to introduce how living, transportation and food choices impact our climate. In 2013 the exhibition had about 900 visitors; most of which were students or school children. The project also developed a loaning service for the environmental counselling centre in the form of new tools and materials for environmental education. A water science kit, a nature trail programme as well as other environmental education material was produced for loaning to kindergartens, schools, clubs and associations. For adults, the counselling centre acquired a special box bike to promote ecological movement and a thermal camera. As part of the exhibition, a model kitchen was built to demonstrate how environmental issues can be taken into consideration in homes, particularly in the kitchen.

In early May, a traditional cleanup day was arranged in the schools of Hollola, Lahti and Nastola.

Under teacher supervision, students cleaned up litter and trash from their local streets and parks. In 2013 about 10,050 students from various grades took part in the cleanup day. During the national energy conservation week, energy-related material was provided for second-grade teachers and students. Together, Lahti Region Environmental Services and Lahti Energy Ltd offered energy-related lessons in area schools.

Development of the City-owned farm, Yli-Marola began in the autumn of 2012 with EU based funding. The goal of this project is to transform Yli-

Marola into a diverse year-round visitor site which promotes environmental awareness for wide-ranging groups. During the summer, the livestock yard run by the 4H club in Lahti is a popular site for families and there is a desire to expand its activities. The report on the condition of the main house in Yli-Marola was completed and a number of actors interested in the development of the farm have been brainstorming in workshops to come up with ideas for the future. Their work is being assembled into a project plan in the beginning of 2014.

Key monitoring figures	2013	2012	2011	Longer term environmental change	
Children and youth who participated in environmental education	2,652	3,941	2,119	2,750 in 2001	➔
Päijät-Häme Waste Disposal Ltd's investment in waste education (€/resident) (includes compensation paid to LRES)	1.06	0.90	0.93	1.24 in 2001	➔



Opportunities for participation and meaningful contribution



Opportunities for citizen participation are promoted through various resident events and questionnaires. The number of land-use planning events for residents varies each year and depends on the interest in the planning area as well as the nature of the zoning items. The town plans and any proposed or passed changes to these are available for review at the Technical and Environmental Services’ customer service centre located at Vesijärvenkatu 11C, at Land-Use Unit offices, in the Land-Use folder in the lobby of the City Library, and on the City of Lahti website.

There are a number of area sponsors in the Lahti region, who are voluntary contacts between residents and City officials. With the help of their area sponsors, residents can contribute to their area’s common issues. The Oma Teko (My Act) resident forum is, in turn, a group of volunteer Lahti residents who, via social media, discuss, brainstorm, test and implement measures to mitigate and reduce climate change. The principle behind the resident forum is that actions and ideas begin with the residents themselves and are intended for all residents. Young people are encouraged to begin influencing com-

munity issues in the Lahti youth council. Each upper comprehensive school, secondary school and youth association selects two representatives to the youth council. The representatives are selected for one year at a time at the beginning of each school year. The youth council keeps issues that are important to Lahti youth on the agenda by assembling a list of key project proposals. This list consists of the top project proposals that in one way or another contribute to the well-being of children and young people in our city.

From a local project for developing environmental outreach tools, The Kymppi-project, a new form of volunteer work for resident contribution was created -- environmental grandparents at day cares. Under their own steam, ‘grandmas and grandpas’ visit their local day cares in the spirit of volunteerism. Their mission is to support the day care’s environmental and nature education, while at the same time provide the children with a grandparent role model. Currently, there are seven grandparents, and six day care centres. The goal is to expand the programme so that each day-care centre will have its own environmental grandma or grandpa.

Key monitoring figures	2013	2012	2011	Longer term environmental change	
Number of land use planning-related resident events	15	10	17	49 in 2000	↘
Satisfaction percentage in resident questionnaires, Technical Services (%)	69	65	67	70 in 2001	➡
Number of environmental advice-related resident events	178	180	114	53 in 2001	↗

Summary of the Environmental Balance Sheet 2013 (1,000 € units)

Environmental Category	City of Lahti			Lahti City Group			Operational area of Lahti Environmental Services		
	Return	Expenditures	Investments	Return	Expenditures	Investments	Return	Expenditures	Investments
1. Air and climate protection	15.6	168.1		15.6	3,092.4	186.0	15.6	3,174.4	192.0
2. Water protection and wastewater treatment		246.2		12,469.0	7,998.2	1,517.0	13,987.0	9,002.2	6,021.0
3. Waste management and litter prevention		828.1		14,857.0	17,389.8	736.0	14,869.7	17,454.9	736.0
4. Soil and ground-water protection		1,254.0			1,462.5			1,471.0	
5. Noise and vibration prevention		52.0			67.6			67.6	25.0
6. Nature and landscape conservation/protection					16.2			31.6	85.0
7. Administrative functions associated with Environmental protection	952.0	2,376.0	31.0	952.0	2,376.0	31.0	952.0	2,377.0	31.0
8. Promotion of environmental protection	94.5	1713.5		94.5	1,852.6	57.0	94.5	1,852.6	57.0
9. Environmentally based taxes and payments		826.6			1,954.8			1,983.8	
Total	1,062.1	7,464.5	31.0	28,388.1	36,210.1	2,527.0	29,918.8	37,415.1	7,141.0
Interest costs					101.0			101.0	
Environmental provisions					-222.0			-222.0	
Change in environmental provisions					-222.0			-222.0	
Environmental Debt (Estimated cost)									





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