

*Estonian
Environmental
Review 2013*



ESTONIAN ENVIRONMENTAL REVIEW 2013

Estonian Environment Agency
Tallinn 2014

Editor: Ingrid Hermet¹

Contributors:

Socioeconomic background: Ingrid Hermet¹ (population, GDP, energy production and consumption, industry, tourism), Kerli Karoles² (tourism), Ere Ploomipuu³ (agriculture), Helen Heintalu¹ (transport), Valdur Lahtvee⁴ (green economy)

Natural resources and their use: Mati Valgepea¹ (forestry), Inga Jõgisalu¹ (hunting), Peeter Marksoo¹, Kristi Altoja¹, Nele Sinikas¹, Kristiina Olesk¹, Salme Kuusik¹, Rain Elken¹ (water), Kaire Martin⁵ (fishery), Moonika Aunpuu⁵ (mineral resources), Raimo Kõlli⁶ (soil), Andre Zahharov¹ (water)

Weather patterns and climate: Kaidi Virronen⁵ (ozone layer), Tiina Tammets¹, Tiia Pedusaar¹ (weather patterns), Karin Radiko⁵, Anne Mändmets⁵, Reeli Jakobi⁵ (climate)

Waste: Matti Viisimaa¹, Marit Leevik¹, Merike Liiver¹, Andres Rattur¹, Pille Aarma⁵, Cäthy Kuusik¹, Rain Päären¹

Ambient air: Ardi Link¹, Alla Romanova⁵, Erik Teinemaa⁷, Priit Alumaa⁷, Elo Mandel¹, Natalija Kohv¹

Changes in land use and urban ecology: Tõnu Oja⁸ (land use), Meelis Uustal⁴ (urban ecology)

Biological diversity: Lauri Klein¹, Marika Arro¹, Herdis Fridolin⁵, Reigo Roasto¹, Piret Gorban¹, Kaire Sirel¹, Triin Neemre¹.

The environment and health: Knut Tamm⁹ (drinking water), Aune Annus⁹ (bathing water), Monika Lepasson¹⁰ (ionising radiation, noise), Kalju Eerme¹¹ (UV radiation), Ott Roots⁷ (hazardous substances in food and the water environment), Ingrid Hermet¹ (pesticides), Hans Orru⁸, Marek Maasikmets⁷ (the impact of ambient air pollution)

Environmental management tools: Sjusanna Meos⁵ (environmental taxes and charges), Helen Poltimäe⁴ (impact of environmental charges), Julia Linnik¹² (environmental offences and penalties), Anto Raukas¹³, Peep Siim⁵ (residual pollution)

Maps: Silja Moik¹, Rain Elken¹

Copy editor: Meeli Pajula

Design: OÜ Purk

Cover photo: Juhan Ressar (breakthru.planet.ee)

Publisher:

The Estonian Environment Agency

Mustamäe tee 33

10616 Tallinn, Harjumaa

Phone: 66 60 901/ Fax: 66 60 909

<http://www.keskkonnaagentuur.ee/>

e-post: kaur@envir.ee



REPUBLIC OF ESTONIA
ENVIRONMENT AGENCY

Copyright: The Estonian Environment Agency, 2014

Please credit the source when using or citing information from this publication.

The publication is free of charge.

ISSN (publication) 1736-3373

ISSN (e-publication) 1736-3519

1 Estonian Environment Agency
2 State Forest Management Centre
3 Estonian Agricultural Research Centre
4 Estonian Institute for Sustainable Development (SEI)
5 Ministry of the Environment

6 Estonian University of Life Sciences
7 Estonian Environmental Research Centre
8 University of Tartu
9 The Health Board
10 Environmental Board

11 Tartu Observatory
12 Environmental Inspectorate
13 Tallinn University of Technology

Dear reader,

The publication you are holding provides an overview of and a valuable insight into the status of the environment in Estonia. The useful and interesting information contained in this publication can be used for various purposes – for educating yourself about the environment, for preparing environmental measures as well as for studying the environment.

Ensuring economic growth and wellbeing in Estonia inevitably requires the use of natural resources. However, economic growth must not come at the expense of biological diversity or lead to the deterioration of the environment.

According to a study conducted in 2012, more than 80% of respondents considered themselves, to a greater or lesser extent, to be environmentally aware. The number of people who search for comprehensive information about environmental issues is growing year on year.

I hope that this environmental performance review will be used by partner agencies, local authorities, communities and citizens' associations who play a key role in ensuring balanced development. Environmental data that are collected by using competent methodology facilitate and support better and more sustainable decisions.

This Environmental Performance Review 2013 was prepared by the Estonian Environment Agency, established by merging the Estonian Environmental Information Centre and the Estonian Meteorological and Hydrological Institute (EMHI). A purpose of the new agency is to continue to collect, analyse and make available reliable and independent environmental information.

Finally, I wish to thank all the scientists and specialists who have contributed to this publication and ensured the accuracy and quality of the information provided.



Jalmar Mandel
Director-General of the Estonian
Environment Agency

Contents

1. Socio-economic background	14
1.1 Population	16
1.2 ECONOMY	18
1.2.1 Gross Domestic Product	18
1.2.2 Energy production and consumption	20
1.2.3 Industry	22
1.2.4 Agriculture	23
1.2.5 Transport	26
1.2.6 Tourism	28
1.2.7 Estonia can be a green economy	30
2. Natural resources	34
2.1 Forestry	36
2.1.1 Forest area and growing stocks	36
2.1.2 Share of tree species	38
2.1.3 Prescribed cut and increment	39
2.1.4 Reforestation	41
2.1.5 Forest fires	42
2.1.6 Distribution of forest land by the reason for protection	43
2.2 Hunting	44
2.2.1 The status bi-ungulate populations	44
2.2.2 Populations of large carnivores	46
2.3 Water	48
2.3.1 Legal background	48
2.3.2 Water resource and use of water	48
2.3.3 Water abstraction and water use	49
2.3.4 Mining and cooling water	52
2.3.5 Pollution load	54
2.3.6 Groundwater status	58
2.3.7 Assessing the status of surface water bodies	61
2.3.8 The status of Estonian coastal waters	61
2.3.9 Status of lakes	63
2.3.10 Status of rivers	66
2.4 Fisheries	70
2.4.1 Fish stocks	70
2.4.2 Fish stocks in the Baltic Sea	70
2.4.3 Fish stocks in inland water bodies	70
2.4.4 The condition of deep-sea target species (in the Atlantic Ocean)	71
2.4.5 Fisheries catch and fishing capacity	71
2.4.6 Fish stocking	73
2.5 Mineral resources	74
2.5.1 Mineral resources with energy value	74
2.5.2 Mineral resources used in construction	76
2.6 Soil	79
2.6.1 Legal background	79
2.6.2 Services and benefits provided by soil	79
2.6.3 Reserves of organic carbon in soils of Estonia	80
2.6.4 Deficiencies of Estonian soils and soil degradation threats	81
2.6.5 Measures to reduce soil degradation and to ensure sustainable use and protection of soil	81

3. Weather patterns and climate change	84
3.1 Weather patterns and climate	86
3.1.1 Air temperature	86
3.1.2 Precipitation	88
3.1.3 Water levels and flow rates	89
3.2 Greenhouse gas emissions and protection of the ozone layer	89
3.2.1 Legal background	89
3.2.2 Greenhouse gas emissions and their reduction	89
3.2.3 Use and emissions of ozone depleting substances	91
3.3 Adaptation to climate change	92
4. Waste	94
4.1 Legal background	96
4.2 Waste generation and handling	96
4.2.1 Recovery of waste	98
4.2.2 Waste disposal	100
4.3 Generation and handling of hazardous waste	101
4.4 Generation and handling of municipal waste	103
4.5 Generation and recovery of packaging waste	107
4.6 Generation and recovery of waste from products of concern	109
4.6.1 Generation and recovery of end-of-life motor vehicles	109
4.6.2 Waste electrical and electronic equipment and their recovery	110
4.6.3 Collection and recovery of end-of-life tyres	110
4.6.4 Collection and recovery of batteries and accumulators	111
4.6.5 Collection and disposal of equipment containing PCB	111
4.7 Transboundary shipment of waste	112
4.8 Number of landfills in use and classification	113
5. Ambient air	116
5.1 Legal background	118
5.2 Emissions of acidifying pollutants	118
5.3 Tropospheric ozone and other pollutants	121
5.3.1 Particulate matter (PM_{sum} ; $PM_{2.5}$; PM_{10})	123
5.3.2 Heavy metals	125
5.3.3 Persistent organic pollutants	127
5.4 Ambient air quality monitoring	129
5.5 Fuel monitoring	132
5.5.1 Motor fuels	132
5.5.2 Fuel oils, fuels used in ships and biofuels	132
6. Changes in land use and urban ecology	134
6.1 Changes in land use	136
6.1.1 Changes reflected on the base map of Estonia/in ENT D	136
6.1.2 Changes in land use by the intended purpose of cadastral units	139
6.1.3 Distribution of the protection status of land areas by counties (dataset EELIS)	141
6.2 Urban ecology and creating a biologically diverse city	142
6.2.1 Urban ecology as science	142
6.2.2 Development of urban ecology	142
6.2.3 Shaping biota and creating artificial habitats	144

7. Biological diversity	146
7.1 Legal background	148
7.2 The status of biological diversity	149
7.2.1 Mires	152
7.2.2 Meadows	155
7.2.3 Forests	158
7.3 Pressures on species and habitats	161
7.3.1 Mires	162
7.3.2 Meadows	163
7.3.3 Forests	164
7.4 Measures	165
7.4.1 Protection	166
7.4.2 Subsidies and compensations	168
7.5 Ecosystem services	170
8. The environment and health	172
8.1 Drinking water	174
8.2 Bathing water	175
8.3 Environmental noise	176
8.3.1 Legislation on noise	177
8.3.2 Wind turbines and wind farms	177
8.3.3 Noise map of Tallinn and Tartu in 2012	177
8.4 Ionizing radiation	178
8.5 Availability of solar energy and UV radiation	179
8.6 The impact of ambient air pollution on human health	181
8.7 Dangerous substances in food	182
8.8 Dangerous substances in the aquatic environment	184
8.9 Pesticides	186
9. Environmental management tools	188
9.1 Environmental taxes and charges	190
9.2 Impact of the environmental charges	193
9.3 Infringement of environmental requirements and penalties	195
9.4 Residual pollution	197

Introduction

This environmental review is a publication that describes the state of the environment and the pressures exerted on the environment in Estonia. This publication covers all key environmental aspects in order to provide as comprehensive an overview of the surrounding environment as possible. The environmental review is published every four years. This edition is similar in structure to the previous environmental reviews, in order to ensure the uniformity and comparability of time series data. While the review focuses on the last four years, some time series are longer in order to highlight the trends more effectively.

As the title of the publication indicates, the topics are dealt broadly. However, each chapter includes references to sources and additional materials for those readers who wish to explore the topic in more detail.

The previous review was published before the economic downturn. This edition shows how changes in various spheres of the economy have affected the environment. It is clear that decreased and more responsible consumption during the economic recession has had a positive impact on the environment.

The publication begins with a socio-economic overview because the processes that affect the environment are often triggered by the processes in the economy and those related to population. The second chapter, which is the longest, deals with the key natural resources from mineral resources to forest to soil.

The subsequent chapters provide an overview of our weather and climate and explain the climate change effects in Estonia. The publication also gives an overview of waste management, air quality, land use changes, urban ecology and biological diversity. The chapter “The environment and health” looks at the links between human health and the environment. The last chapter is dedicated to the means of managing the environment. The publication also deals with some new topics, such as green economy, urban ecology and ecosystem services, which have recently become the focus of attention.

Each chapter begins with an overview of the legislation that governs the relevant topic. These are mainly international directives and agreements, because the natural environment has no borders, but national objectives and legislation are also described.

We are grateful to everybody who has contributed to this publication!

Abstract

Socioeconomic background. Compared to 2009 – the year of publication of the previous environmental performance review – Estonia’s population has decreased by 54,395 people. The economic downturn caused GDP to plummet and unemployment rates to soar, which in turn increased labour migration to other countries. Now, the economy is on the mend. Estonia is a sparsely populated country; much of Estonia’s population is concentrated in and around urban areas. Much of Estonia’s energy needs are met by local oil shale-fuelled production. However, in recent years the importance of renewables has increased, which alleviates the harmful environmental effect of oil shale production. The economic depression also resulted in a decrease in industrial production, but the recovery has given a new impetus to that too. The numbers of domestic and foreign tourists are increasing. Sustainable tourism is considered to be a developing industry – people have started to make more sustainable choices and spending time in nature is growing in popularity. Although the number of vehicles has increased, improved fuel quality, use of catalytic converters and more efficient motor vehicles have helped to reduce the amounts of emissions (CO, CO₂, NO_x and heavy metals (lead in particular). Organic farming is a form of agriculture – beneficial to both nature and human health – that is growing in popularity across the world, as well as in Europe and Estonia. Pollinators, whose numbers have been decreased by intensive farming and the use of pesticides, are among the chief beneficiaries of organic farming. We are progressing towards a green economy in order to foster economic development while preserving the integrity of the natural environment. Estonia has great potential to become a green(er) economy.

Natural resources and their use. Forests are one of the most important natural resources in Estonia – they cover about one-half of the country’s territory. The total forested area and reserves have increased significantly in the last half-century. Forest land accounts for about 48.9% of Estonia’s area (50.6% if we leave out Lake Peipsi). The importance of forest felling in increment has increased over last years, constituting 75% in 2012. A relatively big share of mature stands means that more forest could be felled. The volume of reforestation, mainly forest planting, has grown in the last decade. The share of protected forests in total forest land has increased considerably. Today, the main focus of hunting lies on bi-ungulates (cloven hoofed mammals), which are hunted both for meat and for trophies. The monitoring of large carnivores is focused on mapping litters. Estonia has sufficient freshwater reserves. While the pollution of water remains a serious concern, the threat of pollution has been reduced by the reconstruction of sewerage and waste water treatment plants as well as by high pollution taxes. The status of water is mainly deteriorated by eutrophication and hydromorphological changes (land improvement, impoundment of water bodies by dams and alteration of water regime). None of the 16 coastal water bodies has a very good ecological status; the status of Hiiu shallows and Kihelkonna bay (located to the west of the islands) is good; the status of Haapsalu bay is bad and the status of the remainder of the Estonian coastal water bodies is assessed as poor. The ecological status of Lake Peipsi and Lake Pihkva continues to deteriorate. The status of Narva reservoir has been assessed as poor, while Võrtsjärv has a good status. The status of small lakes is mostly good. The quality of water in Estonian rivers has improved due to new and reconstructed waste water treatment plants. The resources of Baltic herring in the Baltic Sea have started to increase, while natural salmon resources are still scarce and catches are mainly based on fish farms. The resources of the most important fish species in coastal waters – perch, perch pike and smelt – are also not very big. High dioxin levels have been found in fatty fish (salmon, Baltic herring, etc.) from the Baltic Sea. Fishing in inland water bodies is largely driven by fishing in Lake Peipsi and Võrtsjärv where the fish resources are stable. Although oil shale production has been on the rise since 1999, the volumes of oil shale mining have not reached those of the early 1990s. Both well-decayed and undecayed peat have been extracted in equal volumes in recent years. The main construction materials produced in Estonia are sand and gravel. The mining of natural resources poses various threats to the environment, such as noise, dust, changes in water flow, etc. Currently, the main factor disturbing the environment is the mining and processing of oil shale. The condition of Estonian soil is relatively good and land use corresponds to that characteristic of cool forest areas.

Weather patterns and climate change. The air temperature is rising and the annual average total precipitation amount is increasing. Various studies conducted to date indicate that while the effects of climate change are less extreme in Estonia than in many other countries (including Central and South Europe), we, too, can expect changes in weather caused by climate change: temperature and rainfall changes, rise of sea level. It has become a common view that climate change is triggered by anthropogenic emissions; in Estonia, the main contributor is carbon dioxide from the oil shale-fuelled energy sector.

Waste. The proportion of waste deposited in landfills has decreased, while the recovery of waste, including municipal waste and biodegradable waste, is on the increase. New recovery methods are developed, such as the production of rubber mats from end-of-life tyres and construction materials from plastic waste as well as the production of biogas from manure, slurry, landfill gas, waste water sludge and bio waste, etc. It is paramount that Estonia seeks and finds options to increase the recovery of oil shale waste. The number of landfill sites continues to fall. Depositing waste in landfill sites that do not meet the environmental requirements was stopped by 2009. All such landfills must be rehabilitated by the end of 2015. Waste generation is tightly linked to the economic situation: as the economy grows, so does the amount of waste.

Ambient air. The main sources of pollution into ambient air are oil shale-based energy production and the shale oil industry, closely followed by transport. In recent years, Estonia has had no problems with adhering to the emission limit totals. There has been an increasing focus on particulates and their fractions. The smaller the particle size, the deeper the penetration and potential damage to human health.

Biological diversity. There are around 400 species of birds (nearly 300 of them are breeding birds), 75 species of fish, five species of reptiles, 11 species of amphibians and 70 species of mammals registered in Estonia. We have about 1,450 species of vascular plants, 550 species of Bryophyta and 2,500 species of algae. The total number of species registered in Estonia is 23,476. The nature conservation status of habitats of European concern has improved over the past five years. Mires account for 5.5% of the territory of Estonia; the remaining 17% are paludified forests and grasslands as well as degraded bogs. A major pressure factor affecting biodiversity in Estonian mires is draining (land improvement), and peat extraction to a lesser extent. Around 60% of Estonian mires have a very high nature conservation value, with no or low drainage impact. Meadows cover about 2.5% of the territory of Estonia; 35.6% of them have a high natural value. The most important pressure factor affecting the biodiversity of Estonian meadows is a lack of maintenance and the resulting overgrowth with shrubs. The main risk factor is the disappearance of small farms and traditional extensive rural economic activity. In general, we can say that Estonian forest ecosystems are becoming younger and their structure as habitats is shifting away from being natural. This has resulted in the disappearance of species characteristic of forest ecosystems. According to the Red List, about one third of the assessed species and three per cent of all species registered in Estonia are endangered.

Changes in land use and urban ecology. The process of urban sprawl described in the previous environmental performance review has continued over the past four years. This is evident from the concentration of people around bigger cities and towns and from the increasing number of cars. The lifestyles of many people have become increasingly urbanised and governments are looking for ways to make urban areas as people-friendly as possible. Nowadays, the development of urban ecology is facilitated by growing awareness and appreciation of ecosystem services. People have realised that green spaces improve the quality of life in cities.

The environment and health. The majority of the population of Estonia consume good quality, safe drinking water; the quality of water continues to improve as new water treatment plants are built and pipes are repaired and reconstructed. Likewise, there are no major concerns regarding bathing water: the majority of swimming places were assigned to the quality class “very good” in 2012. Our oil shale mining region continues to be problematic in terms of the concentrations of hazardous substances, while the concentrations of organotin compounds are high in the areas of ports and shipyards. In our surroundings, there are various sources of noise emitting environmental noise. This issue has become more acute in connection with wind turbines. The best solution for this problem is meticulous and skilful planning to ensure the protection of noise-sensitive objects, thereby reducing the effect of noise on human health. Ionising radiation is ubiquitous in the environment and humans are constantly exposed to ionising radiation from a variety of natural and artificial, i.e. man-made, sources. In Estonia, information about radiation levels in the environment is collected annually in the course of the national monitoring programme. No concentrations exceeding the limits have been registered. The limit values of radon were only exceeded in single cases. The depletion of the ozone layer has slowed down and the phasing out of chemicals with Ozone Depletion Potential is progressing. However, some loss of ozone will persist for several decades due to the increasing GHG content in the atmosphere. People should be careful when sunbathing and avoid using sunbeds, as there is a positive statistical correlation between ultraviolet radiation and the number of deaths from skin cancer. The spectral composition of the UV lamps used in sunbeds differs somewhat from that of natural sunlight and may increase the risk of skin cancer.

Environmental management tools. Estonia is implementing environmental policy by using economic instruments – environmental taxes and charges. The purpose of environmental taxes is to motivate consumers to reduce the “use” of the environment. The environmental taxes implemented in Estonia are fuel excise duty, electricity excise duty, excise duty on packaging, heavy vehicle tax and excise duty on motor vehicles. In 2009–2012, state revenues from environmental taxes and duties increased, constituting around 9% of the total state budget tax revenue. No significant changes in either direction have been observed that could be attributed to the increase in the rates of environmental charges. However, environmental charges have an important role in raising environmental awareness because they give a clear signal to entrepreneurs. Most infringements in the area of environmental protection are related to waste. For example, fly-tipping, i.e. illegal deposit of any waste in the environment, e.g. on land or in forests, continues to be a problem. The pollution of water bodies and land also continues to be a problem. A significant number of offences in the area of nature conservation are related to people’s behaviour in nature, such as illegal construction in riparian and shore zones. The data of the last four years indicate that by the end of 2012, the number of environmental offences dropped by 33% compared with 2009. An important environmental measure that reduces risks to human health is the removal of residual pollution. However, there are still numerous residual pollution objects of various risk levels in Estonia (asphalt, wax and tar residues, fuel and oil waste and their emulsions, waste paint and lacquer as well as zinc sheet scrap, etc.) and their complete rehabilitation will take decades. These objects do not pose a direct risk to life but are still unpleasant and disturbing.

