From wild forest reindeer to biodiversity studies and environmental education

Abstracts of the 20 years anniversary symposium of the Finnish - Russian Nature Reserve Friendship

Outi Isokääntä and Jari Heikkilä (eds.)

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FOREWORD

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Over the past 20 years the Finnish-Russian Friendship Nature Reserve has been involved in opening the border between the East and the West for nature conservation and research. The Reserve has operated as a gateway for the exchange of authorities, researchers and information, and has also provided entrepreneurers, school children and ordinary naturalists with opportunities to visit the area and learn about it. In addition to Finnish-Russian cooperation, the Friendship Nature Reserve has become an important centre for information exchange for nature conservation professionals from many other countries. As the first Finnish- Russian twin park the Friendship Nature Reserve became the foundation for the formation of the Fennoscandian Green Belt.

The Fennoscandian Green Belt is an ecological corridor of various protected areas and other valuable nature targets that stretches from the Gulf of Finland to the Arctic Ocean along the border of Finland, Russia and Norway. The Green Belt is an important tool in securing and protecting the biodiversity and sustainable use of natural resources in the border zone of these three countries.

Although the Green Belt has not yet been officially defined geographically, the term has been in use already from the beginning of 1990s.

From Baltic countries to the south, the Fennoscandian Green Belt joins the European Green Belt, which extends all the way to the Mediterranean and Black Sea. The Belt symbolizes efforts towards cross-border nature conservation cooperation and sustainable development.

The abstracts have not been subject to peer review, and the authors are responsible for the content.

Photo: Jani Huotari

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Patterns of plant cover formation in pristine spruce forests and after total windfall

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It is well known that huge tracts of boreal pristine forests have a special set of mechanisms for self-rejuvenation. Vast windfalls when some stands could be totally destroyed should be considered as its full member. From this position large-scale windfall which happened in Vodlozero National Park in May of 2000 was very scientifically attractive.

On the whole, research activities concerned with age and spatial dynamics of Vodlozero NP spruce forests have been started in 1999. During 1999-2004 series of permanent sample plots (11) had been laid down in various types of spruce forests. Windfall areas (5 sample plots) have been involved in our long term investigations since 2000. The main goal of our research was to investigate patterns of pristine spruce forests self-regeneration after heavy windfall. In this paper some peculiarities of spruce pristine forests ground cover and stand dynamics within the same forest type but just after total windfall and under normal gap-dynamics conditions are set forth.

In the latter case ground cover species diversity mainly depends on spatial heterogeneity of the stand when relatively large gaps alternate with closed groups of spruce specimens. The former variant implies an alternation of specific microbiotopes which includes: after-falling elevations (butt of a fallen tree and its raised roots with a soil lump), after-falling pits (depressions with a bared ground) and finally undisturbed areas among them.

Long term monitoring activities within the same sampling plots show that undisturbed areas were quite stable in its floristic composition with such *species as Vaccinium vitis-idaea, Deschampsia cespitosa, Sphagnum russowii* and *Pleurozium shreberi* as dominants in corresponding layers. After-falling depressions exhibit a number of ways in pioneer stage caused by various combinations of main abiotic factors. For example, small clumps of *Equisetum sylvaticum, Polytrichum commune* and some specimens of *Chamaerion angustifolium* were found two years after windfall. So it is obvious that microsuccession of green mosses such as *Ceratodon purpureus, Pogonatum urnigerum* and some other species of *Dicranella* and *Polytrichum* genera forms a pioneer stage on bare bottoms of after-falling depressions.

On the whole, in our case successful restoration of spruce stand is foreseeable taking into account that spruce selfregeneration was quite sufficient (7000 spruce saplings per ha) with their frequency of occurrence about 40%.

Mires of Vodlozersky National Park as objects of ecological tourism and education

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Mires are very popular objects of ecological tourism, as shown by the experience accumulated by some countries, particularly Finland. In Russia, people are not very much interested in mires as objects of ecological tourism. Russians use mires basically for gathering mire berries such as cranberry and cloudberry. Therefore, the basic mire protection policy in Karelia was to preserve berry mires.

The major task of Russian national parks (40 parks, the total area of 7 million hectares) is to popularize undisturbed nature. Vodlozersky National Park was established in 1991 to preserve North Russia's typical and unique natural and historical-and-cultural complexes and to provide conditions for recreation, tourism and education. The Park covers an area of about 0.5 million hectares. The Park is the biggest forest and mire reserve in European Russia. Mires cover more than 40% of its territory. There are a large variety of differently organized mires ranging from flora to types of mire sites, massifs and systems.

We subdivide mires into especially valuable objects such as typical and unique mire nature monuments. These nature monuments are important and interesting objects of ecological tourism. Our basic purpose is to show visitors to the park the mire world that seems mysterious to them and to change the occasionally negative attitude to mire. There are 16 mires in the park ranking as objects of ecotourism. The mires are located near camping sites, forest ranger stations, a children's ecological camp, and ancient paths.

We have to recognize that now the mires of the park are not actively advertised as objects of ecological tourism. Visitors (more than 3 000 persons a year) prefer water tourism, fishing and gathering berries and mushrooms.

North taiga soils in Russia and Finland

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Forests are an essential factor in climate control, environment formation and protection. In Karelia, they cover over 50% of the territory and are a major constituent of the republic's natural wealth, wherefore the forest sector plays a leading part in the regional economy. Finland is the most forested country of Europe, 76% of its territory covered in forests. Boreal forests of Northern Europe are exposed to ever growing anthropogenic pressure, the main impact being logging. Logging leads to alteration of the species composition of taiga forests, and the degree of ecological and soil-biological modifications depends on logging practices.

Soil properties change differently in sites where different types of forest had been logged. The main reasons for that are differences in the soil moisture under the canopy and in cut-over sites (whether or not the paludification process is underway), as well as differing physical and chemical properties of soils in different forest types prior to cutting.

Soil properties and the soil cover structure were studied in areas with forestry of varying intensity along the border between Finland and Republic of Karelia (Russia). The study was carried out within the international project "Study of soils and the soil cover along the border between Republic of Karelia and Finland" and the Russian Foundation for Basic Research grant. Surveys were done in the Russian-Finnish "Friendship" park: in the western part of the Kostomukshsky strict nature reserve (Russian part of the park) and the Juortaansalo area (Finnish part of the park), as well as in the Malahianvaara-Vartius area, which is situated between them and intensively utilized in forestry. The study objects are located on the same geographical latitude (64°30'-65°10'), in similar climatic and geomorphological settings. As a result, 1:50 000 schematic soil maps were compiled for fragments of the Russian-Finnish "Friendship" park, and for the managed forest area near Malahvianvaara-Vartius between the two protected areas.

The most widespread in the study area are morainic hilly plain landscapes, alternating with esker-kame complexes and fluvioglacial plain areas. The prevalent soils in morainic sediment areas are Ferric and Carbi-Ferric Podzols, and in fluvioglacial plains ferric and surface podzolic soils. Significant areas are covered by semihydromorphic and hydromorphic soils. The following characteristics of the soil cover were noted:

- abrupt transitions from automorphic to hydromorphic soils due to heavily dissected terrain;
- frequent bedrock outcrops in the Finnish territory, with primitive soils developing over them;
- the soil cover in the Malahvianvaara-Vartius area has been significantly disturbed by cuttings, resulting in changes in the morphological structure of the soils.

The detailed morphological descriptions of the soils compiled within the survey show that soils of the area and those of the "Friendship" park differ substantially due to differences in the intensity of human impact. The impact tells first of all on the organic profile structure and the thickness of organic horizons.

Interaction between human, wolf and wild forest reindeer – sosioeconomical dimension

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The growth of wild forest reindeer (rangifer tarandus fennicus lönb) and the wolf (canis lupus) population has created conflicts in the management of the species. Conflicts have been risen by local reactions but these contradictories have expanded between different stakeholders and institutional and governmental structures in the society.

However, the contradictories in wild forest reindeer management appeared critical during 1990', they have been fairly managed compared with conflicts in wolf management. Human relation toward the wolf and the wild forest reindeer is different. There are certain combining elements of these species: they have been endangered, they are directive species and they have an ability to cause damages to human livelihood.

Damages caused by wild forest reindeer can be compensated and partly prevented. Also, the image of species is positive. It is a potential game species, the target of hunting and utilisation. Instead, image of the wolf has been negative through the history of interaction of the wolf and the human. Also, utilisation of the wolf is difficult. The wolf as a target of hunting doesn't compensate its harmfulness to reindeer herding, use of dogs in hunting and animal husbandry. The above mentioned practices to use nature have developed almost century without the significant presence of the wolf, that is why they are vulnerable to the return of the wolf.

During the last decade the trinity: the human, the wild forest reindeer and the wolf has changed. It is a common perception that the wolf population is threatening existence of the wild forest reindeer. Concern about the damages caused by the wild forest reindeer has turn to concern about the future and reservation of the species.

This example shows how dynamic the relation of species is, how there can be identified competition between the human and the wolf, and how the abundance of species influences on attitudes towards the wolf.

Species diversity of rock mosses in Friendship Park

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Geological and bryological studies were carried out in the Russian and Finnish sectors of Friendship Park. The geological structure of six protected territories was studied. 60 bedrock exposures were studied and 350 moss samples, growing on them, were collected.

The Friendship Park territory consists dominantly of Archaean crystalline rocks such as gneiss diorite, gneissose granodiorite, tonalite, gneissose granite and migmatite. Amphibole and mica schist, microcline granite and other rocks are encountered.

75 moss species, growing on various rocks (Kostomuksha Strict Nature Reserve – 70 species, Juortanansalo-Lapinsuo Mire Reserve – 24, Iso-Palonen and Maariansärkät Nature Reserve – 23, Lentua Nature Reserve – 32, Elimyssalo Nature Reserve – 32, Ulvinsalo Strict Nature Reserve – 26) were revealed in Friendship Park. 11 obligate and 64 facultative moss species were reported. The rock distribution of moss species is analysed.

Most moss species are widespread in East Fennoscandia.

Structure and dynamic of boreal forests on the Kola Peninsula under anthropogenic influence

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Our researches are directed on revealing and an estimation of structure and dynamic of boreal forests, and also on parameters of those processes which form it or support. The used approaches to monitoring of forest cover condition are based on the complex circuit of realization ecology-coenotic researches, cartographical and statistical processing.

We have investigated changes in community structure of boreal forests around the Severonikel smelter at Monchegorsk, Kola Peninsula, northwestern Russia, between 1981 and 2008. Our study confirmed a close relationship between vegetation parameters and pollution levels. Direct and indirect effects of both air and soil pollutants from 1935 led to the following environmental changes in vicinity of the smelter: significant losses of plant species richness, simplified forest community structure, decreased of all vegetation stratums phytomass. Height spatial mosaic of vegetative cover was created as natural relief differentiation as disturbances in structural–functional organization of forest ecosystems and changes in their succession status. Condition of plant communities was estimated on ecologic and pollution gradients. Pollution decreasing last decade indicated the beginning of ecosystems regeneration. In the case of continuous such level of atmospheric deposition the further active biodiversity rehabilitation in forest ecosystems surrounding this source of pollution is expected in future.

Pasvik-Inari trilateral co-operation

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The Pasvik – Inari region is unique in many aspects. This is the area where the borders of Finland, Norway and Russia meet. The valley of the Pasvik River stretches from Lake Inari towards Barents Sea and forms a diverse habitat for a wide variety of plants and animals.

This is the area of our three countries' nature and history shared. In the hoary past this remote arctic region was populated with Finish, Norwegian, Russian and Sami people.

Several protected areas in the three neighboring countries have been established to preserve these great wilderness areas. area stretching across three. The protected areas implemented a project: Promotion of nature protection and sustainable nature tourism in the Inari-Pasvik area (EU Interreg IIIA North/Kolarctic) in 2005-2008. Pasvik - Inari Trilateral Park has got a transboundary park certificate according to criteria set by EUROPARK Federation in 2008.

Several common documents such as Action Plan for Nature Protection and Sustainable Nature Tourism in Pasvik-Inari Area and Trilateral Cooperation Agreement were created by partners to maintain the trilateral cooperation. The cooperation is coordinated by a joint trilateral advisory board.

There are the common research and monitoring on Brown bear (Ursus arctos), Golden Eagle (Aquila chrysaetos), waterbirds and some species of insects, landscape mapping, Red List in Pasvik-Inari Trilateral Park. The Partners applied for Kolarctic ENPI CBC funding of the Climate change and airborne pollutants in Pasvik River basin project.

There are jointly produced English- Finish-Norwegian-Russian Pasvik-Inari web site (www.pasvik-inari.net) and Pasvik- Inari brochure in the Park. The partners are involved in common educational projects such as The Environmental School in Rajakoski and The North Calotte Phenology.

Norwegian-Finish transboundary hiking trail (Piilola Wilderness) was opened in 2009 in the frame of Trilateral Park. The project of a Varlam Island Open Air Museum is also developed by the partners. The Pasvik –Inary Trilateral park partners are in good communication and used to meet each other for different official and friendly events.

Species exchange and Russian-Finnish joint research on game animals in border area

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Zoological investigations in border area of Russia and Finland have for many years been very intensive on both sides. They are necessitated by continuous exchange of animals in border areas, in spite of the so-called technical engineering facilities line (on the Russian side) and so-called deer fence (northern areas on the Finnish side), and their further expansion in-depth of both Russian and Finnish territory. Thus, the new mammal species we have recently "received" from Finland is the Canadian beaver, "in exchange for" the raccoon dog. Another new species – American mink, has equally succeeded in colonizing both sides of the border, and forced the native European mink out. Roe deer started expanding from the Karelian Isthmus, Leningrad Region, to resettle in Finland. Wild boar has also arrived in Finland from the Karelian Isthmus and from the Karelian part of south-western Ladoga area. The white-tailed deer – a species new for the Palaearctic region, has been sighted in the Karelian Isthmus (vagrants from Finland).

The most precious "gift" from us to Finland has been resettlement of the taiga reindeer. Joint research into the ecology of its seasonal movements, condition of the pastures, etc. is underway. The dynamics of game abundance and distribution are also being continuously monitored. The activities include annual inventories of birds and animals following a uniform procedure, and provide baseline materials for working out of coordinated game population management programmes and plans.

Investigations of soils in the Kostomuksha Strict Nature Reserve

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Due to the increased anthropogenic impact on the environment the role of protected areas considerably increases. The long-term systematic observations become important for studying the soil and soil-forming processes in the reserves**.** So, control of ecological condition of soils is necessary. Soils can be violated by emission impacts – acid rain and pollutions. So as the background (uncontaminated ones used for comparison as a benchmark) for the studies can be used the soils of the reserves. From 1997 to 2010 the staff of the Department of Geoecology and nature management of St. Petersburg State University have conducted ecological researches in the Kostomuksha Reserve as well as in Kostomuksha itself and in the direction from Kostomuksha to Kostomuksha mining plant and from the city to the reserve. Soils have been studied along with other components of the ecosystem**.** Each year there are taken samples of soil from eight soil profiles to study the distribution of chemical elements with depth. Also the samples of soils are taken from of the surface horizons in order to study and control the spreading of the atmosphere pollutants. This selection is conducted on the profile passing through basic forms relief. In the soils there are determined the mechanical composition, pH value, total sulfur content, mobile forms of heavy metals, which are derived by ammonium acetate-buffer CH_3COONH_4 with pH 4.8. Analysis of Fe, Mn, Ni, Cd, Co, Cu, Zn and Pb in soils is carried out by atomic absorption spectroscopy.

The high degree of moisture, relief and a variety of parent rocks cause the mosaic structure of the soil. Podzolic soils of various subtypes are widely represented. Terric-Fibric Histosols are formed in the hydromorphic condition. All of them are characterized by specific patterns of migration of chemical elements. The area under study is characterized by soils with high actual and potential acidity. The organic matter content in mineral soils is generally low. The soils of Podzolic type accumulate organic matter into the forest litter. Analysis of the mechanical composition showed predominance of sandy fraction. The content of mobile forms of heavy metals in soil depends on its type, parent rock**,** relief, texture, amount of organic matter and weather conditions (rainfall). The accumulation of heavy metals occurs at lower terrains, with the worsening of mechanical composition of soil and the increase of the amount of the organic matter. Heavy metals accumulate mainly in the forest litter, except Fe, whose maximum is observed in the illuvial horizons.

In general, the soils of the reserve is characterized by the low content of mobile form of Co and Ni and lowering content of Pb, Cd and Cu. Mobile forms of Fe, Mn and Zn are present in sufficient quantities. Compared with the soils of the reserve all the studied elements have higher concentrations in the impact zone of Kostomuksha mining plant.

Thus, we have accumulated a considerable amount of factual material on the content of mobile forms of chemical elements in soils of the reserve. The territory of the Kostomuksha Reserve can be used as background for estimation violations and pollution of territories of northern taiga. It's necessary to continue monitoring of soil conditions at the territory of the reserve.

Ecological features of the soil in the Karelian-Finnish border area

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The physical and chemical parameters of the forest soil have been explored. Peculiar features of soil formation, acid-alkaline parameters and content of the organic substance and elements of the mineral nutrition for a wide range of soils under conditions of various intensity of forestry operation have been identified.

A wide range of various soils of analogue types has been found on the Karelian-Finnish cross-border strip.

The depth of the ground litter of Epy Podzols and Ferric Podzols is higher in the Karelian sector than in Finland. However, the Karelian soils are poorer in terms of elements of mineral nutrition and more acid than those in Finland.

Smaller content of nitrogen is characteristic for Ferric Podzols in Karelia, yet the ground litters are distinguished by bigger biogenic accumulation of mobile compounds of phosphorous and potassium. The acidity rates are similar in the Russian and Finnish sectors.

When comparing the morphological parameters of Carbi-Ferric Podzols in the Russian and Finnish sectors, we point out the similar structure of the organic profiles and the depth of genetic horizons. The ground litters in Finland are poorer in carbon, yet the content of nitrogen is higher, the ground liters are more acid, and the content of phosphorus and potassium is relatively low.

The depth of the ground litter of Ferri-Carbic Podzols in the Russian sector is 1,5 times, and the content of carbon is 2 times higher than in the Finnish sector, but the ground litter is poorer in nitrogen.

Differences in the structure of the upper part of the profile was recorded in Histic-Glay Podzols: the ground litter in the Russian sector is thicker, yet the content of carbon is lower as well as the content of nitrogen, phosphorous and potassium.

Fibric Histosols and Terric-Fibric Histosols in Karelia and richer in carbon but poorer in nitrogen and phosphorus; Fibric Histosols are less acid than in the Finnish sector.

By and large, one can conclude that more intense forestry management in Finland reflected both the morphological and physical and chemical parameters of soils. It is particularly seen in Podzols, which are mostly intense are used in forestry operations than primitive soils. Direct dependence of the depth of ground litter on the content of carbon was recorded in automorphous and semihydromorphous soils. The organogenic horizons of peat soils in the Karelian sector is richer in carbon. It is important to note the higher accumulation of nitrogen in practically all soils in the Finnish sector, which is entailed, in our opinion, by application of mineral fertilizers. The content of mobile compounds of phosphorus and potassium in the soils of the surveyed area is similar in the both sectors. The impact of intense forestry operations reacted rather positively on the soil fertility than negatively. This is proved by high content of nitrogen in the soils of the Finnish sector.

Climate and environment changes during the Late Glacial and Holocene in Kivach Nature Reserve (Karelia, Russia)

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Paleogeographic data for Kivach Nature Reserve (62°18′N, 33°55′E), located in the mid-taiga subzone of Karelia, in the Onega Lake basin, have been obtained. Detailed reconstructions of the vegetation dynamics in the Late Glacial and Holocene are based on 6 pollen diagrams of lake-mire deposits, determination of macrofossil remains from 72 cores of 20 mires and 38 radiocarbon datings. To make them more reliable, evidence for the composition of subrecent palynospectra from the mid-taiga (163) and other regions (the author's data and the literature) was used.

It has been found that the dominant vegetation in the study area from the Allerød to the present consisted of: periglacial steppe-like (*Artemisia, Chenopodiaceae, Poaceae, Asteraceae* etc.) and tundra (*Betula nana, Salix, Dryas, Saifraga, Oxyria, Carex, Bryales* etc.) paleocommunities (PC) with sparse trees and shrubs (*Betula, Pinus, Alnus* etc.) [AL: 11700–11000 y.a.] > dwarf shrub moss tundra with Betula nana (*Salix, Juniperus, Ericales, Bryales* etc.) combined with periglacial steppe-like PC and sparse treesandshrubs[DR-3:11000–10300y.a.] forest-tundra: open birch woodlands (*Betula* sec. *Albae* with sparse *Alnus, Populus tremula* etc.) combined with dwarf shrub moss tundra with *Betula nana* and with present of *Artemisia-Chenopodiaceae*-Varia PC [PB-1,2: 10300–9700 y.a.] > northern taiga: light birch herbaceous forests (with the admixture of *Alnus,* Pine etc.) [PB-2: 9700–9300 y.a.] > light birch-pine and pine-birch tall herbaceous and dwarf shrub-club-moss forests [BO-1: 9300–8900 y.a.] > mid taiga: pine dwarf shrub-moss and birch-pine herbaceous forests[BO-2,3:8900–8000y.a.] > south taiga: pine dwarf shrub-moss, pine-birch and black alder (*Alnus glutinosa*) high-grass forests with Picea, broad-leaved species (*Acer, Quercus, Tilia, Ulmus*) and *Corylus* [AT-1,2: 8000–6500 y.a.] > pine-spruce and pine-birch herb-moss forests with broad-leaved species and hazel, spruce-black alder (with elm) high-grass forests [AT-2,3: 6500–4700 y.a.] > mid taiga (southern variant): spruce and pine-spruce moss forests with broad-leaved species, black alder-spruce herbaceous and pyrogenic birch forests [SB: 4700–2500 y.a.] > mid-taiga: spruce and pine-spruce moss and herbaceous forests [SA-1,2: 2500–800 y.a.] > spruce and spruce-pine moss and herbaceous forests with birch, alder and aspen [SA-3: 800 – present time].

Reconstructions of the space-time growth dynamics of 4 mires and aquatic-mire vegetation successions have been made.

Paleoclimatic curves of tav° January, tav° July, tav° year and total annual precipitation over the past 11500 years were constructed using 4 pollen diagrams with 23 14_C datings (Filimonova & Klimanov, 2005). As a result, a climatic-chronological scheme of vegetation dynamics from the Allerød to the present has been made for Kivach Nature Reserve (Flimonova, 2005).

To characterize the paleohydrological regime of the study area, evidence for the chronostratigraphy of lake-mire sediments, changes in relative lake level, overgrowing and paludification intensity, successions of mire paleocommunities and variations in their humidity index were used. Correlation of the available data with the transgressive-regressive activity of Lake Onega (Devyatova, 1986) and paleoclimatic curves on one time scale has provided a better understanding of changes in the paleogeographic environment in Late Glacial and Holocene time.

Holocene vegetation dynamics in the Finnish-Russian Friendship Nature Reserve

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Holocene vegetation dynamics was reconstructed on the basis on the pollen, macrofossil and radiocarbon study of deposits from Isosuo (64°34'N, 29°51'E, 250 m a.s.l.) and Härkösuo (64°12'N, 30°26'E, 235 m a.s.l.) mires, which are located in the Finnish part of Friendship Nature Reserve, as well as a number of pollen diagrams and stratigraphic data from Russian Karelia (Kostomuksha area).

The data obtained suggest that the study area had already emerged from under the ice by the middle of the Preboreal (PB) period (~ 9600 yrs BP, 10800 yrs cal. BP). This fact is evidenced by a radiocarbon date of 9500±70 yrs BP (10720 yrs cal. BP) of the Isosuo bottom layer, which contains plant remains and sand impurities. Similar sediments in the Härkösuo core have an age of 9110±80 yrs BP (10240 yrs cal. BP). In both cases, they underlie basal peat layers with minor sand impurities. This fact indicates that mire formation and peat deposition in the basins commenced in the second half of the PB-period.

Analysis of the data obtained and the literature has shown that after the deglaciation of the area and decrease of the level and the square of periglacial water-bodies, mineral soil vegetation was represented by periglacial, tundra and forest-tundra birch communities. Sedge-grass tundra and dwarf shrub moss tundra with *Betula nana, Salix, Juniperus* and *Ericales* were common in the study area in the second half of the Preboreal and had gradually lost their significance by the end of this period. The contribution of *Artemisia* and *Chenopodiaceae* to the plant cover was minor. Open birch woodland was superseded by north-taiga sparse birch and pine-birch forests, which were still widespread there in the first half of the Boreal (BO) period. Thus, the latter dominated approximately 8800 yrs BP (9750 yrs cal. BP) near Härkösuo mire.

A notable rise in pine contribution to the plant cover was observed in BO-period from 8750±50 yrs BP to a maximum in BO-3 (8300–8000 yrs BP, 9300–9000 yrs cal. BP), as corroborated by a radiocarbon date of 8240±60 yrs BP (9240 yrs cal. BP).

In the Atlantic (AT) period (8000–4800 yrs BP, 8800–5550 yrs cal. BP) pine and birch-pine forests were common; alder-birch and alder stands grew in the moistest part of depressions and near water-bodies; burnt sites were occupied by pyrogenic birch forests. Forest fires are evidenced by a rise in the amount of *Betula pubescens* pollen and the presence of *Epilobium angustifolium* pollen in the sediments of the time. The pollen grains of *Ulmus, Quercus, Tilia, Acer* and *Corylus*, identified in the samples examined, are most probably exogenous.

The data suggest that spruce started spreading in the study area in AT-3, immediately after 5440±40 yrs BP (6220 yrs cal. BP). This process became more active in Subboreal (SB) period, especially from 3290±70 yrs BP (3500 yrs cal. BP). Spruce and pine-spruce forests became most common in SB-3 (3200–2500 yrs BP, 3400–2400 yrs cal. BP).

In the Subatlantic (SA) period (2500 yrs BP – present time), spruce contribution to the plant cover decreased slightly, whereas the proportion of pine and birch increased. By the end of the period, when north-taiga spruce and pine forests still prevailed, the role of secondary forests had started growing gradually.

Mire studies in the Friendship Park Nature Reserve

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In August 2002 we started the scientific cooperation focused on mire science. The Härkösuo mire in Kuhmo was chosen as a suitable area for sharing experience and trying the Finnish and the Russian methods applied to mires.

The Härkösuo mire is a small sloping aapa mire formed in a narrow and relatively deep tectonic depression. It is adjacent to a remnant glacial lake. Being generally indentified as aapa type this mire consists of different parts that can be easily distinguished on color aerial photographs. Plant cover of the mire is very diverse and complex.

The joint research began with a short field work in Härkösuo where we learned the Nordic flora and the Finnish mire site type classification system (Eurola et al. 1994, Laine & Vasander 2005). Vegetation relevés describing the most typical mire plant communities were made also. Our research goal was formulated as following: to make two original vegetation maps based on national experiences. We had agreed to work independently and did not influence each other results.

Thus, two vegetation maps were prepared on a large scale including their legends (Galanina & Heikkilä 2007). In Finnish practice the unified system of mire site indexes is commonly used in mapping. The next task was to compare the results, to estimate the value of mapping units, correlation of patterns etc. GIS tools were used to make such kind of analysis.

A research grant of the Academy of Finland has supported our efforts to harmonize the Finnish and Russian mapping methods (2005-2006).

The other goal of joint research activities was to study small springs and spring fens in Kuhmo. Apart from flora of vascular plants and mosses special attention was paid to their ecological conditions under anthropogenic impact such as forest drainage and forest clear cutting. Some results were presented in an international conference in Serbia and later published (Galanina & Heikkilä, 2006).

During summer field seasons in 2005-2006 mire vegetation was studied in Juortanansalo nature reserve, Friendship Park. Mires Lotvonsuo, Lamposuo, Frederikinlampi and Arolampi were investigated in detail using remote sensing data. On the basis of results of aerial photo interpretation and field data, the typology of mires and the regularities of their special distribution were revealed. Cartographic scheme showing mire site types in Juortanansalo was prepared (Галанина 2007).

The complex ecosystem (biogeocoenotic) research done by transect method in 2007-2009 became a continuation of mire studies in Kuhmo. Previously observed Juortanansalo mires were chosen as polygons for zoocoenotic investigations. Three forest–mire transects crossing contrast types of mire sites that are different in ecological conditions and plant communities were established. First results of mesofauna inventorying in mire habitats were published (Galanina & Rybalov 2008)

To conclude, the Friendship Park Research Centre in Kuhmo during last decade not only initiated the research projects focusing on mires in Kainuu province, but it also promoted mire science in Russia.

Effect of the tectonic faults on the ant genus Formica spatial distribution in the Finnish – Russian Friendship Nature Reserve

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Geologically, the Friendship Nature Reserve territory connects the Kuhmo-Suomussalmi and Kostomuksha greenstone belts. Long-lived faults act as channels for the migration of deep gases and juvenile water.

A series of paleodislocations, traced on the basis of morphological characters in the relief for over20 km, was revealed in Kostomuksha Nature reserve. Faults were well-defined as anomaly emanations of radon survey. A maximum cluster gigantic anthills was discovered here.

Crustal faults and clusters of large anthills were found to be interrelated. Arguments in favor of ant-attracting properties of tectonic zones are provided. The above properties are: radioactivity, elevated temperature and humidity, low probability of rain and a simple way synthesizing formic acidy. Ant abundances are described using a simple mathematic model. Large anthills can be used as biomarkers of radioactive sites and tectonic zones

Comparative assessment of pristine and secondary forests in the Friendship Park and in adjacent areas

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Forest Research Institute of RAS Karelian Research Centre has for many years been studying forests in the Friendship Park and its adjacent areas (Russian side) within the Finnish-Russian Programme "Development of Sustainable Forest Management and Conservation of Biodiversity in Northwest Russia". The area contains large territories covered by pristine as well as secondary forests (at different seral stages of the anthropogenic succession). It is a nearly perfect model area where one can identify the consequences of taiga ecosystem transformation by large-scope clear-cutting in a variety of aspects, including flora- and fauna-related ones. Furthermore, the comparison would be scientifically well-grounded, being performed within the same type of geographic landscape – the one most typical of the East Fennoscandian northern taiga subzone. The structure and dynamics of post-fire pristine pine forests which predominate there has been described in detail in our previous publications (Gromtsev, 1998-2010). Latest research has demonstrated that pine forests successfully naturally regenerate after felling in any habitat. It is only in the true moss group of forest types, almost exclusively in the bilberry type, that competition may occur at early stages of the anthropogenic succession between pine and birch. On sandy and sandy loam podzols, and on various peated and peaty soils in northern taiga however birch cannot compete with pine, and is quite easily displaced from the tree stand. Eventually, some 50 years after felling there stand monodominant pine forests. Externally, they show little difference from even-aged pine forests formed in naturally burnt down areas. They are very similar even in the presence of patches of pristine uneven-aged forests in paludal habitats, as well as of isolated groups of trees in dry elevated areas. These elements of the forest cover remained there until felling owing to low burning capacity and partial survival of the trees after fire burns. Later on, they were not cut down because of their low stock and commercial value. Quite similar is the structure of different types of plant communities in these forest areas (in terms of the share of pine, productivity, ground cover composition, etc.), which predetermines the diversity of ecological niches for various groups of organisms. The exception is the far greater amount of dead standing and charry fallen wood at early succession stages in post-fire naturally regenerating pine forests. As the wood decays however, post-fire secondary and pristine pine forests grow more and more similar in this respect, too. Thus, when development proceeds in a natural way, the dynamics of the structure of such communities would be largely similar, being dependent on the fire regime characteristics (frequency and intensity).

“Green Ring of Fennoscandia” – the cornerstone of the nature conservation framework in Northern Europe

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The backbone of the system is large PAs along the Russian-Norwegian and Russian-Finnish borders – so-called Green Belt of Fennoscandia (Titov et al., 1995; Titov et al., 2009). The equally important chain of PA is the Green Belt along the eastern and south-eastern boundary between Fennoscandia and the Russian Plain (Titov et al., 2010). This second Green Belt combines the PA systems of Republic of Karelia, Murmansk, Arkhangelsk, Vologda and Leningrad Regions and St. Petersburg, being crucial for biodiversity conservation in Northern Europe as it supports the functioning of taiga corridors (Lindén et al., 2002; Kurhinen et al., 2009). The two belts converge in the north at the Lapland Reserve, and in the south via the PA networks of the Leningrad Region and St. Petersburg, as well as the Vepssky Les Nature park, forming a kind of the “Green Ring of Fennoscandia”. We suggest viewing the Green Ring of Fennoscandia as the framework of the nature conservation system in the north of Europe, since it combines the PA systems of Finland, Norway and regions of RF Northwestern Federal District.

To enhance the strength of the system one should maintain the existing waterside protection buffers, which connect the PAs in a natural way, and promote connectivity of the PAs, focusing primarily on boreal corridors which connect the Fennoscandian and the East-European taiga biomes.

Large carnivores in local media

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Analysing public debate on large carnivores, including local media articles, yields knowledge about the role of these animals in the society and everyday life of humans. Focus on local debate is particularly relevant for understanding the legitimacy and possibilities of protecting the carnivores. Finnish Environment Institute has collected and analysed material from local media in Kainuu region. The analysis is based on newspaper material which includes a total of 2487 articles on large carnivores from regional newspaper *Kainuun Sanomat* during the period 1987-2007. Kainuu region has strong carnivore populations, is culturally distinctive and is located near the reindeer herding area. These features make it an interesting case region for the media analysis. The rising number of articles addressing large carnivores during the study period implies that the social significance of large carnivores has increased. The changes in how large carnivores are treated in the local media reflect the diversification of social issues and concerns about large carnivores. For example, in the early 1990s the number of articles on wolves started to increase and exceeded the number of articles on brown bear. This development can be explained by a simultaneous policy change following Finland's membership in the EU. Wolf hunting was prohibited and later strongly restricted which led to population growth. In local media, news on damage caused by wolves to cattle and other domestic animals became frequent and a change in attitudes can be detected. The tone of writings became much more negative than before. In 2000s, the media offers new perspectives to large carnivores: on the one hand, the damage to traditional rural livelihoods, such as farming and reindeer herding, is addressed but, on the other hand, it is shown that new nature-based livelihoods such as tourism and photographing benefit from strong carnivore populations.

According to the local newspaper articles, large carnivores are linked with various social practices. Most writings, however, offer the viewpoint of researchers, administration and hunters. Other important groups whose voice can be heard are rural livelihoods, such as farmers, and increasingly nature-based tourism operators. Environmental NGOs and recreational users of nature (apart from hunters) have been given surprisingly little room. Following from this selection of active social actors, certain issues dominate the debate. Large carnivores are discussed mostly in terms of population management and regulation. There is little discussion on other means of coping with carnivores.

The multiplication and diversification of issues and concerns in local media reveals that the contradiction related to the protection of large carnivores does not follow from the tension between local livelihoods and top-down induced nature protection goals. There are also tensions between local social and economic practices and social groups. The analysis of local newspaper material thus shows that the public concern on large carnivores is connected with socio-economic change: social and political significance of large carnivores changes when the rural livelihoods change. Identification of these changes is a challenge to carnivore policies. Instead of focusing on management of carnivore numbers, the policies should be more concerned with increasing the capacities of local communities to resolve problems of human-carnivore cohabitation and tensions between different social groups.

Entomological research in Karelia

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The history of entomological research on the territory of Russian Karelia could be traced to the end of XVIII century when the expedition of Russian Academician Nicolay Ozeretskovsky to the Ladoga and Onego lakes occurred. Alexander Günther contributed a lot in the studying of Karelian entomofauna. He established good contacts with Finnish entomologists such as Sahlberg, Tengström, Poppius, Palmén, Lundström, etc.

In 1919-1924 The complex Olonets scientific expedition working on the territory of Karelia was organized by Zoological Institute. The publication of the book "Fauna of the lakes of Karelia" (1965) devoted to invertebrates was a notable event for Karelian entomology.

Since 1990 the intensive faunistic researches were started in Karelia. During last 20 years entomological studies were conducted in Nature reserves "Kivach", "Kostomukshsky" and "Pasvik", reserve "Kizhi skerries", National parks "Paanajärvi", "Vodlozersky", "Kaleval'sky", planned National parks "Ladoga skerries" and "Tulos", biosphere reserve "Northern Karelia", landscape reserve "Tolvajärvi", Vepsian Volost', on the coast and islands of White Sea, and other territories. In the course of these studies large materials on entomofauna were acquired, its treatment allowed us to compile insect species lists and organize the data into electronic database.

Management of the Friendship Nature Reserve – a Finnish view

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The Friendship Nature Reserve – FNR for short - consists of nature protection areas in Finland and in Russia. It was established in 1990 in order to promote cooperation in environmental protection and research in the border area between the two countries. At the core of the reserve's existence is the wild forest reindeer (Rangifer tarandus fennicus). After disappearing from Finland, the species made a comeback in the 1970´s. A strong wish to protect the habitats of the species was born. On the Finnish side, promotion of the recreational use of nature was an additional objective for the park.

The name of the reserve is typical of the times – the Agreement of Friendship, Cooperation and Mutual Assistance was the basis of Finno-Soviet –relationship for 50-odd years.

The FNR consist of 5 separate protection areas on the Finnish side, 4 of which are accessible for the public, and one strictly protected nature reserve on the Russian side, with limited access.

In the two decades, the activities of the FNR have been cooperation in research and inventories, also beyond the reserve territory, as well as in protection area management. A major theme has been environmental education. There has been exchange of know-how in the recreational use of areas and mutual visits annually. Since the 1990´s, EU –projects have been a significant financing tool for the cooperation.

The research interest will continue also in the future. Fresh topics include the interaction of wild forest reindeer and large carnivores, as well as the evolvement of Fennoscandian Green Belt. Cultural heritage inventories will be carried out: there is rich heritage to be unearthed. A joint management plan is also under consideration. Common goals are also to increase the appreciation and knowledge of natural and cultural heritage locally, to build sustainable tourism on this heritage and to ensure good monitoring and management of the valuable reserve.

Fungus gnat (Diptera, Mycetophilidae etc.) species with current distribution restricted to eastern areas in Finland

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Finland constitutes a zone of contact between large faunistical complexes associated with European deciduous forests, European north-taiga, Siberian taiga and the Arctic zone. Both the biotope spectrum and species composition of plants and animals change gradually on moving northwards whereas the longitudinal gradient is not so evident. However, available data allows showing examples regarding the distribution of the occurrence of some insect species that are rare or missing in the western parts of Finland.

Fungus gnats or mycetophilids (Diptera, Mycetophilidae etc.) constitute more than one tenth of all the Dipteran species recorded in Finland. In the European perspective, fungus gnats as opposed to many other insect groups seem to display an increasing diversity towards the North with the most species rich fauna currently found in Finland and Sweden.

In Finland the study of fungus gnats includes three periods. Period I was in 1890s-1910s when the first faunistic data were obtained by intensive collections mostly from the southernmost areas in provinces *N* and *Ab* (C. Lundström, R.Frey) and from Lapland (R. Frey, W. Hellen, J.Sahlberg, Y. Wuorentaus and others). This material was used in the first checklist of Finnish Diptera (Frey & Storå 1941) incorporated 269 species of fungus gnats.

During period II includes 1950s – 1980s a big amount of of mycetophilids throughout the whole country was collected by R. Tuomikoski, W. Hackman, L. Tiensuu, R. Väisänen and others resulting in the second checklist of Finnish Diptera (Hackman 1980) which incorporates 485 species of fungus gnats.

During period III started in 1990s the intensive studies have produced a great deal of material from a wide range of habitat types in almost all biogeographical provinces that brought the total number of Finnish fungus gnats to 734 species. These materials have allowed, for the first time, to evaluate their threat status and the results will be presented in the forthcoming 2010 Finnish Red Data Book.

In spite of the fact that traditionally good knowledge of the fungus gnat fauna has been in southern Finland, about six per cent of Finnish fungus gnats, 46 species have been found only from the Eastern Finland, e.g. Kuusamo, Kuhmo, Koitajoki areas, provinces *Savonia australis* and *Karelia ladogensis*. Of these nine species, viz:. *Macrocera nigropicea* Lundström, 1906, *M. pusilla* Meigen, 1830, *Mycomya sieberti* Landrock, 1930, *Syntemna oulankaensis* Polevoi, 2003, *Mycetophila ostentanea* Zaitzev, 1998, *M. triangulata* Dziedzicki, 1884, Phronia *gracilis* Hackman, 1970, *Ph. spinigera* Hackman, 1970 and *Anatella crispa* Zaitzev, 1994 have never been found also from Sweden and Norway, but only from adjacent Russian areas. One could guess that these species are originally Siberian, gradually moving to the West (like the well known insect invaders among bark beetles, e.g. *Ips amitinus* Eichhoff, 1871), but it is also possible that most of them that, at present, seem to have eastern distribution in Fennoscandia have become rare or extinct in its western parts due to anthropogenic changes of forest structure and composition.

Estimation of the state of northern cenopopulations of *Phleum pratense* L. under industrial heavy metal soil contamination

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It is known that soils around industrial factories are contaminated with heavy metals. Their concentrations are high even in a radius 10 km and more from the source of pollution. Heavy metals in higher concentrations have a negative effect on plant growth, development and efficiency. As a result irreversible disturbance of a natural vegetative cover may appear. Thereof, the estimation of state of a vegetative communities and separate kinds of the plants growing in territories with increased contents of heavy metals is extremely important.

On example timothy (*Phleum pratense* L.) – one of codominantes kinds of plants of grassy communities in Northern Karelia –influence of industrial heavy metal pollution of soil on a state of wild-growing cereals cenopopulations was studied. Plants state estimated on some growth and development parameters and content of chlorophyll (*a+b*) and carotinoids. Plots for research were situated in area of Kostomuksha ore-dressing mill on distance 0.5, 4 and 8 km.

It was established that the plants height and sizes (length, width and the area) of leaf blade are decrease at approach to the source of pollution. Significant changes of an inflorescence length of the main tiller as well as a development delay (on phenological phases) were not observed. On the contrary, the chlorophyll $a + b$ and carotinoids contents in leaves were increased with diminution of distance to factory. This fact, obviously, is compensative reaction of plants directed on maintenance of high level of photosynthesis at decrease of the leaf area.

As a whole, in according to the obtained data on plants growth, development and photosynthetic ability of leaves, studied cenopopulations of *P. pratense* are not observed the signs of their degradation. It speaks about high adaptive potential of this species which allows plants to grow in the conditions of pollution without an appreciable damage.

Large carnivores and the wild forest reindeer

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Wild forest reindeer (*Rangifer tarandus fennicus*) like its North American cousin, woodland caribou (*R. t. caribou*) appears to be vulnerable to human-induced changes that have taken place in their environment during last decades. The proportion of moose (*Alces alces*) habitat has increased in boreal forests, enabling higher densities of moose and its primary predators, wolf (*Canis lupus)* and brown bear (*Ursus arctos*). In the present puzzle-like forest mosaic wild reindeer cannot spatially avoid moose and encounters with carnivorous predators. Within range of the wild forest reindeer living in the province of Kainuu, east-central Finland, we have found a strong negative correlation between the number of wolves and recruitment rate of wild reindeer population. Summer mortality of calves proved out to be critically high. The return of wolves could be one of the primary reasons for the substantial decrease of population size during 2001 through 2010. The densities of brown bear and lynx (*Lynx lynx*) have increased at the same time. So far the evidence indicating increased predation as a key factor is only correlative. In fine-grained predation studies that we have performed in three wolf territories within the wild reindeer range during the two summer months (June and July), the number of calves killed by GPS-collared wolf varied from one to 21 reindeer, demonstrating a vast variation in kill rate ratio between the two primary prey species, moose and wild reindeer. There are basically two policy options for decreasing predation on wild forest reindeer: to directly control the predation risk or to control factors in the ecosystem that had led to a high abundance of predators. Managers are forced to test the effect of large carnivore control because the risk of wild reindeer's extinction has been coming increasingly actualized. In nationwide management scheme introduction of wild forest reindeer into regions where carnivorous predators are less abundant offers one noteworthy option to improve conservation status of this vulnerable ungulate.

The main tendencies of dynamics of flora in Paanajarvi National Park (Republic of Karelia, NW Russia)

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The Flora of any territory is dynamical system. For obtain the correct conclusions on dynamics of flora the greatest value is represented with territories with a long term floristic investigation. One of such territories is Paanajarvi National Park (Republic of Karelia) established in 1992 on the area of 104354 hectares.

For a long time Paanajarvi Lake area attracted the attention of Finnish botanists – from the middle of XIX century. The most detailed study of its flora was made by N. Söyrinki in 1942 (Söyrinki, 1956). The new stage of studying the territory began only in 1988 because of the projects to construct a hydroelectric power station on Paanajarvi Lake.

Totally 635 vascular plant species (502 native and 133 adventive) have been recorded in the park, including notho- and microspecies (Kravchenko, Kuznetsov, 2008, with additions). After a long time period (50-60 and more years) most of the native species have been rediscovered, including the rarest ones. Since 1988 new data on occurrences of all species have been obtained, 34 species have been discovered as new for the area. Among 'new' species adventive ones (23) prevail, which might appear here mainly at the end of the Second World War, or even later. The significant number of old-recorded adventive species (51) still survives on meadows. Almost all species which were new for this area were recorded on meadows, too. As the result of disappearance of settlements more than 50 species disappeared, in particular arable lands weeds.

It is possible to show the dynamic processes occurring here analyzing the flora in the eastern part of the park in detail. The area was carefully studied by N. Söyrinki at the beginning of 1940-ies (Söyrinki, 1956). It is noteworthy, that N. Söyrinki estimated the frequency of each species, and pointed to the precise localities of all more or less rare ones. Recently the area has been studied again by us (Kravchenko et al., 2000; Kravchenko, Kuznetsov, 2008). In total 467 taxa have been recorded for the area under consideration, 432 taxa in 1942, and 356 recently. We have not found 115 taxa: 59 native and 56 adventive, 35 taxa have been recorded for the first time, including 8 native and 27 adventive ones. A good comparison can be made only for adventive fractions of flora. Regional casual alien plants (ephemerophytes) prevail among 56 disappeared adventive species. Naturalized species (colonophytes) absolutely prevail among anthropochores newcomers. The similarity of the adventive fraction of flora in two different time slices is low (similarity coefficient - 0,45).

The long term flora dynamics analysis, which was carried has shown high stability of the native fraction of flora, while it is very labile in the adventive fraction.

The diversity of vascular plants of forest communities on automorphic sandy soils in Russian Karelia

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As the result of large-scope clear-cuttings of the second half of the 20th century, secondary forests now prevail in Karelia. Clearings and young stands currently occupy over 36% of the forested area, middle-aged stands – 33%, mature and overmature communities – about 30% (with no more than 5% covered by climax forest). Relying on the results of years of transect surveys and research into the structure of forest communities in permanent sample plots we have built regeneration series for the major types of forest (Pinus sylvestris – Cladonia, Pinus sylvestris – Vaccinium vitis-idaea, Pinus sylvestris – Vaccinium myrtillus, Picea abies – Vaccinium myrtillus, Picea abies – Oxalis acetosella). For all the series, we identified the development stages objectively distinguished in the nature by the tree stand and ground cover structure: clearing – young stands – middle aged stands – mature communities – subclimax – climax.

The list of vascular plant species inhabiting forests on sandy automorphic soils in Karelia (81 species in total) is provided within the range of the identified types of forest growth conditions: Pinus sylvestris – Cladonia (13 spp.), Pinus sylvestris - Vaccinium vitis-idaea (32 spp.), Pinus sylvestris - Vaccinium myrtillus (77 spp.). A correlation is shown to exist between the species composition on the one hand and the type of forest growth conditions and the forest community development stage on the other. Species diversity of plant communities at early development stages is higher owing to high diversity of microhabitats and arrival of alien species.

Although the species diversity of plant communities at early development stages is higher, climax communities are more valuable in terms of biodiversity conservation in the region, being the models of taiga ecosystems and habitats of some rare stenotopic species.

Current status of wild forest reindeer in Europe

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We describe up-to-date status of wild forest reindeer in Northern Europe (Finland, Russian Karelia, Murmansk, Archangel and Komi regions). In Finland, there exist about 2000-2200 wild forest reindeer within two regions, in Kainuu and as an introduced population in Ostrobothnia. Abundance in Kainuu peaked at about 1700 individuals in 2001 but has decreased to about 900 reindeer thereafter. Several herds prevail in Russian Karelia, with numbers totaling for about 2 500 reindeer. Population estimate for Archangel region is 2 000 – 2 500, and for Komi 3 000 – 3 500 heads. A portion of Komi's wild forest reindeer live near Ural Mountains. To protect small and decreased herds, hunting for them has been forbidden in Kainuu since 2002, in Russian Karelia and Archangel region since 2002 and in Komi since 2002. In Ostrobothnia, hunting has decreased owing to recent leveling off the increase of population size. Wild forest reindeer was added into Red Book List of Karelia in 1995 and that of Komi in 2008. In the management plan for Finland, the primary target is a substantial increase and expansion in compared to the present situation of wild forest reindeer. Potential reasons for the critical situation of wild forest reindeer in Europe include habitat destruction, poaching and predation by large carnivores. Verification of the key factors needs a joint research project and readiness to adopt effective conservation measures to protect the wild reindeer of northern taiga.

Vaccinium myrtillus spruce mires of West Karelian Upland

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Vaccinium myrtillus spruce mires are one of the most widespread communities among both forested mires and spruce forests of West Karelian Upland. To this group we include also the communities with domination of cloudberry along with high coverage of blueberry. The work purpose is revealing the floristic composition of communities, determine the degree of homogeneity of the group of plots, identifying ways of community occurrence. The analysis is based on the study conducted in 2006-2009 at several points in the considered territory.

The main dominants of the moos layer are *Sphagnum angustifolium*, S. *girgensohnii* and *S. russowii*. The statistical methods, taking for a basis quantitative values, divide group into subgroups on the basis of the dominance of that sphagnum species. The role of oligotrophic dwarf shrubs and cottongrass is higher in *S. angustifolium*-dominated communities. In case of comparison local samples differences between rocky and plain sites come to light. Thus, such species as J*uniperus communis*, *Solidago virgaurea*, and *Molinia caerulea* are common only for former sites.

The peat depth vary from 0,2 to 3 m. 5 deep deposits was analyzed on macrofossil remnants. It is revealed that on sites with the deep deposit, occupied now by *Vaccinium myrtillus* spruce mires, earlier developed wet *Carex-Menyanthes* pine mires which have accumulated a deep layer of peat. The peat corresponding to modern communities makes only top 15-25 cm of a deposit.

Diversity and dynamics of mire ecosystems in Kostomuksha area (west Karelia, Russia)

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The City of Kostomuksha lies in the middle of the West Karelian upland near the national border. The Kostomukshsky strict nature reserve, which is part of the Russian-Finnish Friendship Park, is situated nearby. The terrain there is of the tectonic denudation kind. Small mire massifs (from 1-2 to 200 ha) of various types, interconnected to form complex mire systems, occupy many of its depressions. Mires in the area have been quite thoroughly studied (Yelina & Kuznetsov, 1977; Kolomytsev & Kuznetsov, 1997). Similar mire systems are situated in the Finnish side of the Friendship Park (Heikkilä et al., 1997, 2003; Kuznetsov et al., 1999).

Mire formation in the area began soon after the retreat of the Valdai glacier some 10 ka BP, both through overgrowing of shallow-water reservoirs, and through paludification of forest land. Owing to the diversity of geomorphological and hydrological conditions there developed various types of mires: aapa, mesotrophic herb-Sphagnum, ombrotrophic Sphagnum ridge-hollow and pine-dwarf shrub-Sphagnum mires, as well as spruce- and pine-dominated swamp forests. Many small mires develop in tectonic depressions and have a peat deposit up to 6-7 m thick, often underlain by a layer of sapropel. The Holocene peat increment rate in such mires has been 0.6-0.9 mm/yr.

Because the bedrock composition is poor, the eutrophic development stage in most mires in the area was either short or absent. Transitional peat types prevail in the deposits, the more frequent ones being the sedge, *Scheuchzeria*, cottongrass, sedge-*Sphagnum, Scheuchzeria-Sphagnum, Sphagnum* and wood-sedge peats. Some of the mires have entered the ombrotrophic stage not earlier than the mid-Subboreal period, and the thickness of the ombrotrophic peat layer there is within two metres.

Changes in the climatic and local hydrological conditions over the Holocene have induced various successions of the plant cover in the mire massifs, as clearly demonstrated by the peat deposit stratigraphy. Some sites in the mires contain up to 10 strata of different peat types, evidencing numerous, fairly quick and discrete successions. There have been several alternations of grasses and grass-moss communities and forested ones.

Aapa mires, which develop in quite wide and shallow basins, feature a simpler stratigraphy of the deposit (3-4 peat types) and slower peat increment rate throughout the Holocene (0.3-0.4 mm/yr).

The same dynamics of mire ecosystems was detected in other parts of the West Karelian upland (Kuznetsov et al., 1996) and in adjacent areas of Finland (Heikkilä et al., 1997, 2003).

Effects of habitat quality and landscape structure on endangered saproxylic beetles dwelling in boreal spruce forests

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In Finland, loss of dead wood (micro)habitats is an ongoing process both on local and regional scales. The amount of dead wood is low in the economically managed forest stands. Regionally, the old-growth forest areas are fragmented and isolated. There are ca. 800 beetle species dependent on dead wood in Finland. In the Red Data Book of Finland, the decline in the amount of dead wood was evaluated as a major cause of threat for ca. 130 beetle species.

Agathidium pulchellum (Leiodidae, Coleoptera) is an endangered beetle species, which is associated with slime-moulds living on dead wood. We studied the occurrence of the focal species in study plots within four nature reserves situated in Kainuu Region (Hiidenportti National Park, Teerisuo-Lososuo Mire Conservation Area, Ulvinsalo Strict Nature Reserve and Jämäsvaara Recreational Forest). *Agathidium pulchellum* was found only on a single slime mould species, *Trichia decipiens*. The slime mould was more frequently associated with large mid-decay-stage logs than other kinds of logs. The amount of aspen and spruce logs had a significant positive effect on the incidence of *T. decipiens*. On the other hand, *Agathidium pulchellum* occupied only study plots with more than 30 m^3ha^{-1} of dead wood. Results from a statistical analysis suggest that, due to the overall low volume of dead wood in managed forests, the density of suitable logs and, consequently, of sporocarps of *T. decipiens* may be too low for maintaining local populations of *A. pulchellum*.

Pytho kolwensis is an endangered beetle species, which is dependent on spruce logs. It can only occupy spruce forest patches with continuous availability of spruce logs, e.g. spruce-swamp forests. We studied the occurrence of *P. kolwensis* in Kainuu and adjacent regions in Russia. In Russia, larger areas of semi-natural forests have remained until very recently. Forests have not been intensively managed and the amount of dead wood is higher both locally and regionally than in Finland. *Pytho kolwensis* occupied on average a much higher proportion of spruce logs in forest patches in Russia than in Finland. In Finland, the species has disappeared from most managed forest landscapes even if suitable habitat patches still occur.

Composition and structure of northern herbaceous communities under industrial contamination

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Composition and structure of the herbaceous communities located at different distances (0.5, 4 and 8 km) from the Kostomukshsa ore-dressing mill (KODM) along the dominant winds (SW–NE) were studied. It was established that all communities are secondary as they were generated on sites with destroyed natural vegetation. In total, 54 species of vascular plants belonging to 49 genera, 19 families were recorded on the investigated plots. In the plots, situated close to KODM the total number of species was less (14–16) compared to that (20–28) in the distant plots (4 and 8 km from the KODM). The most diverse families were Asteraceae, Poaceae, Fabaceae (0.5 km) and Scrophulariaceae, Rosaceae, Polygonaceae (4 and 8 km). Native species prevailed (68–80%) in all investigated communities.

The biomorphological and ecological structure of the communities didn't depend on the distance from the KODM. Perennials (90–100%), gemicryptophytes (81–90%), mesophytes (80–90%) and mesotrophycs (72–80%) prevail in the communities. Also it was revealed that percent vegetation cover is quite high (70–90%) irrespective of the distance from the source of pollution. However, the communities differed by dominant and co-dominant species. In the plots situated 0.5 and 4 km from the KODM considerable role in percent vegetation cover is played by Poaceae and Fabaceae species, but in the plots situated farther (8 km from KODM) Asteraceae, Equisetaceae and Onagraceae species are co-dominant.

Results obtained show that herbaceous communities in the area of the KODM differ by species composition, but similar in biomorphological and ecological structure. The closer community to the KODM the less diverse it is. Dominant species in percent vegetation cover change with the distance to the KODM.

The Finnish Moth Monitoring Scheme: patterns and trends with respect of recent climate change

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Monitoring of nocturnal moths has started in Finland in 1993. The total number of light traps so far involved is 205, also including the light trap surveys done in Nature Reserve Friendship in Russian Karelia, with varying trapping periods. Currently the monitoring is composed of 50 traps all over the country in different forest biotopes. 20 traps have been operating all the time. The sum of trap years is 1441 and the total number of macrolepidopteran species is 712. The data base includes 5.6 million individuals. In addition, from the northern traps we have also identified the so called Microlepidoptera, including 618 species and 640 000 individuals. The analyses of the last mentioned material are under preparation.

In the analyses of the moth material, we focused on patterns and trends relevant to the recent climate change. The daily average temperatures and the average lowest temperatures in Finnish Northern Karelia have both greatly risen during the last few years. This has reflected in our material as a continuous increase in the total number of species in the whole Finnish territory. There is a linear increase in species richness at Sotkamo Aarreniemi during the entire monitoring period, even though a slight decrease could be observed during the past three years. Effects of climate warming can also be seen in the form of northward range expansion of single species. On the other hand, there are northern species showing an opposite trend, i.e. their populations have clearly decreased recently.

The development of a second annual generation has been observed in more and more species and even in more northern areas than earlier. In 1999, which was a peak year in that respect, even a third generation was observed in *Gymnoscelis rufifasciata*.

Wildlife richness in the surroundings of the Finnish-Russian Friendship Nature Reserve

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Wildlife richness index (WRI) describes both the number of species present and their abundances in a selected area and time period. Both in Russia and in Finland voluntary observers count mammal tracks and grouse seen in wintertime from census routes. Using very same methods in both countries the WRI-values are calculated for each 50 x 50 km grid unit. It is worth noticing, that the WRI values are very high in The Park and in its vicinity. In general, the whole border zone seems to comprise high wildlife richness.

The species composition between the countries have some distinct differences: the abundances of small predators are much higher in Finland, while large predators prevail on Russian side. Wildlife in Finland takes more advantage of forestry activities than the wildlife in Russia that rely more on pristine forests with apparent conservational values. The elements preserving high conservation value penetrate into Finland via The Park, which acts as a gateway for wildlife to intensively managed forest areas in Finland. The threats to the functioning of this gateway relate to the landscape fragmentation and habitat loss, at least locally. To maintain the way for populations to reach at least some western parts of Finland, we must ensure continuous connection of forested areas across the country. We have certain policy tools, such as provincial and regional plans in Finland, to take into account the forest connections, but no tools in use or organization being responsible for making nationwide planning.

The quantity of human activities (the extent of anthropogenic influence) determines the structure and abundance of wildlife: in Russia the anthropogenic influence is often positive, whereas in Finland the influence being negative, due to the different degree of exploitation. There may exist some threshold values in land-use patterns, which separate out wildlife communities into ”wilderness” or ”agricultural mosaic” –types. The WRI may become an important tool for land-use planning and landscape architects in attempts to find guidelines for conservation planning, e.g. for designing forest reserve networks in boreal areas with optimal connectivity patterns in taiga forests.

Spruce and pine forests of North-West Ladoga region and large-scale vegetation mapping

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NW Ladoga coast (Leningrad oblast, Priozersk region) is located in the area of the Baltic Crystalline Shield granite rock out-crops. The relief is represented by granite ridges (selgas), limnetic clayey terraces and narrow selga depressions.

Almost 400 phytocoenotic descriptions have been made, and the map of actual vegetation was created (M 1:25000, 35 km^2).

The forests (67 %) are dominated vegetation type in the key-plot (Fig. 1). The most widespread vegetation type is pine forests (30 %). The rock selga tops are covered by light and undersized pine heather-lichen forests (*Calluna vulgaris, Cladonia rangiferina, C. arbuscula, C. gracilis, Cetraria islandica*). Pine multi-dominant dwarfshrub-green-moss forests usually grow in the upper selga slopes and the pine bilberry-greenmoss, reedgrass-bilberry (*Calamagrostis arundinacea*) forests are typical in the middle part of slopes. Birch-pine sphagnous forests grow in the small selga depressions. Spruce forests (13 %) are represented by the bilberry-greenmoss, woodsour-greenmoss (*Oxalis acetosella*), nemoral grasses-woodsour (*Hepatica nobilis, Actaea spicata, Stellaria nemorum*) communities in the gentle slopes and bilberry-sphagnous, ferny-sphagnous, hairmoss-sphagnous (*Sphagnum girgenhsonii, S. russowii, S. squarrosum, Polytrichum commune*) types in the selga foots and hollows. Former arable lands occupied secondary regenerative stages of spruce forests (willow shrubs, small-leaved and mixed coniferous-small-leaved forests).

The map of actual vegetation allows to create map of potential vegetation and to predict probable increase of spruce forests areas in future.

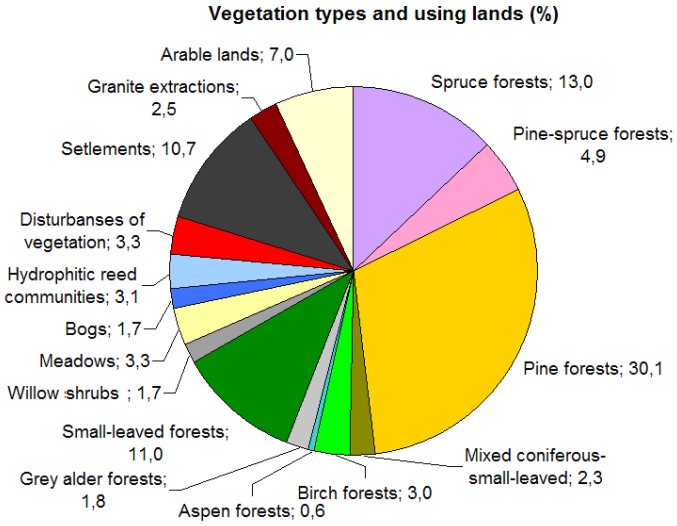

Figure 1. Correlation between area of vegetation types and area using lands of the key-plot.

Scientific research harmonization of the Green Belt of Fennoscandia

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The northern part of the Green Belt of Fennoscandia extends along border of Russia (Murmansk region), Norway and Finland. Russian State Nature Reserve Pasvik and Norwegian Pasvik naturreservat are situated in the cross-border area. The common area (about 17 000 hec.) meets the requirements of the Green Belt keeping biodiversity of northern taiga. Borderline cross Pasvik River fairway thus the territory of common nature reserve is continuous.

There are different forest complexes in the Green Belt of Fennoscandia. In Murmansk region the northern taiga changes to forest-tundra and south tundra practically close to Barents Sea. It is necessary to establish new reserve here. Norwegian side suggested creating common nature territory on Grense-Jakobselva (Vorjema) such as Pasvik Reserve (Zapovednik) and Pasvik naturreservat.

It is necessary to make global scientific program for all protected areas of the Green Belt today. It is important to monitor changes at northern border of forest and organize the monitoring of the forest along the belt from south to north.

Based on Trilateral Pasvik-Inari Park experience in Action plan for research it is possible to suggest the following:

- The Natural complexes (such as forests, bogs, lake-river system) and their components (elk, brown bear, reindeer) research.
- Special themes – rare species, interrelation pine-spruce in forests of GBF, forest pests (insects), forest-pathology monitoring, phenological research, soil cover and soil fauna.
- Industrial impact on the nature monitoring - (mining-smelting companies, HEP stations etc.).
- Tourism impact on the nature in the protected areas.

Conducting field work in all protected areas according to common program, joint expeditions of researchers and experts from protected areas, research institutions of neighbor countries, exchange of experience, common publications need to be included into management plan of the Green Belt. This work will be effective cooperation between protected areas of different level and status. These ideas can be used in work of Advisory Board of GBF as well as Russian-Finnish and Russian-Norwegian Government Commissions on environment. It should be reasonable to involve the stuff from the protected areas of GBF, leading institutions and international experts for planning Green Belt Research Program.

Regional Protected Areas in North West Russia

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In Russia, there are three levels of protected areas: those at federal, regional or municipal property. Main types at federal level are national plarks and strict nature reserves (zapovedniks); at regional level nature reserves (zakazniks), nature parks (prirodnye park) and nature monuments.

Finland and Russia established 1997 a specific "Development Programme on Sustainable Forest Management and Conservation of Biodiversity in the North-West Russia". One Project in the Programme is "Development of Regional Protected Areas in the North-West Russia", 2006-2010. Six regions participated in the programme: the Arkhangelsk Region, the Vologda Region, the Leningrad Region, theMurmansk Region, the Republic of Karelia and the City of St. Petersburg. The main Finnish Partner was Metsähallitus Natural Heritage Services managing the majority of Finland's protected area. The Baltic Fund for Nature in St. Petersburg was the main executive partner both technically and administratively. The Finnish Environment Institute SYKE acted as the financier´s consultant.

The project consisted of two main parts: 1) joint activities aimed at increasing the competence of PA managers and at facilitating contacts and experience exchange between the partners (workshops, seminars, study tours devoted to various issues related to PA management) and 2) pilot projects carried out by the participating regions and focusing on the solution of some concrete tasks of PA management. In the course of these pilot projects, close consultations on various practical issues between Russian and Finnish experts were conducted. Whenever possible, the project promoted the involvement of various stakeholders, NGOs, entrepreneurs, local communities, the Orthodox Church etc.

The Project chose jointly a wide coverage of relevant issues from strategic to grass root levels such as legal aspects and law enforcement, management plans and practices, fund raising, public involvement and interactions with NGOS, participatory management etc. International, national and regional models and practices were studied, and events took place in the regions, Finland and Estonia.

The Project also carried out an assessment of the management state and needs of the regional PAs in the participating regions using the Management Effectiveness Tracking tool (METT), developed by the World Bank and WWF. The Project and the assessment outcome is presented in the report Assessment of the Management State and Needs of Regional Protected Areas in the North-West Russia (ISBN 978-952-446-782-7). The Report is published in this symposium. and will be available at http://julkaisut.metsa.fi/julkaisut/pdf/luo/a189.pdf in English and http://julkaisut.metsa.fi/julkaisut/pdf/luo/a190.pdf in Russian.

Kalevala National Park, forest and culture

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In Viena Karelia, in Kostamus (Kostomuksha) and Kalevala regions there are middle- and northern boreal forest as such large areas, that the natural forest dynamics can continue uninterrupted. Fire and time renew the forest creating and preserving unique biodiversity. High on a hillside the forest can consist of young pine as a result of a fire occurred maybe 50-60 years ago. On the way down one passes a forest where spruce has taken over and old huge pines have fallen down. Biodiversity is at its highest in the spruce and aspen forests of creek ravines and mineral soil "islands", surrounded by mires. They may have remained untouched by fire for several hundreds of years. The Kalevala National park protects about 74.000 hectares of unique natural forests, but that is not all.

Viena Karelian villages are known to have preserved the runas of Finnish national epos, Kalevala. Karelian tradition is strong and it still echoes through in every day life. Today's Karelian villages could each inspire several different poems. Contrasts are great, the reality is strongly present. Vuokkiniemi (Voknavolok) and Venehjärvi (Sudnozero) villages carry the culture of Karelian forests and lakes, both located in immediate vicinity of the National Park.

During the twenties and thirties of the past century there were about 5000 inhabitants in the area of and close to the Kalevala National Park. Still the untouched forests surround many of the villages. Presently there are less than 700 inhabitants in the area.

Traditional use of forest has always meant very selective use of wood. Houses were built of "full grown trees, that were cut in February, so that there is a lot of tar in the wood, so that it lasts long." as a professional forestry man told. A fine and light rowing boat was built of one big spruce tree. Twelve or fourteen planks and a keel were sawn of it. What was left, was enough for a coffin (grobu). The boat is finished with tar: "The tar is taken out of the wood, and that's where it belongs to."

People spend much time in their forests. They collect berries and mushrooms, go fishing and hunt. A villager from Vuokkiniemi says: "Nobody can live here without going to the forests." Even though people use their forests a lot, they seem very untouched even near the villages. Paths can only be found close to settlements and along some waterways.

Forest has been a source of living and shelter for Karelian people. It has not been considered as a source of money, but as a tool or some other useful owning, which must be taken care of well. Wood has been only one, though valuable, gift of the forest. Biodiversity has been important in all aspects, as raw material, medicine and spiritually important objects and meanings. Skills and knowledge to use and value biodiversity are still viable and enrich life of the local people and visitors alike.

The experience of summer field activities for students of Saint-Petersburg State University in Kostomuksha Strict Nature Reserve

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The priority value in preparation of competent experts-ecologists has mastering by modern field ecological methods, which basic skills students receive during special summer practical and industrial training. In accordance with the contract in force between Saint-Petersburg State University (SPbSU) and Kostomuksha Strict Nature Reserve since 1997 students of Department of Geoecology and Nature Management SPbSU have summer field activities in Kostomuksha region. Duration of special summer practical and industrial trainings takes about 2 weeks.

The aim of practice is study rules, methods and approaches of geoecological researches. Students must know the importance of zonal and azonal geographical factors in the biogeochemical turnover at different anthropogenic loads. They can compare status of natural ecosystems without anthropogenic stress, the lightly disturbance ecosystems under local sources of pollution, the strong disturbance ecosystems in a regions of technogenic anomalies and urban territories.

Students investigate the specific geographical aspects of functioning of the background natural territorial complexes without anthropogenic load in Kostomuksha Strict Nature Reserve. Investigations include all landscape components: air, rocks, relief, natural water, soils and vegetation. The detailed ecological characteristic of landscapes on the basis of geoecological and bioindicator methods of researches is received. Students study morphological, floristic and phytocenotic marks as main phytoindicators of landscape-distraction changing and ecosystem pollution.

The map sketching is one of the most important part of the summer activities. Students use method of ecological profiling and method of etalon areas and key landscape lots (etalon stations background stations, observations). The lateral migration of chemical elements in the natural landscapes is studied. It includes researches of the eluvial, transeluvial, illuvial and accumulative elementary landscapes.

Beside that the field summer practice includes the investigations of natural complexes in impact zones near Kostomuksha city and JSC "Karelsky Okatysh". Students study principal sources of anthropogenic pollution and their impacts on the environment. Disturbance and polluted landscapes are carried out. Students distinguish the role of natural geochemical and anthropogenic contamination in the functioning of biological systems, the species-indicators of changes in geochemical conditions and high pollutants concentration in environment.

Students sample water, soils and plants for chemical analysis. Much attention devote to the comparative analysis of changes of landscape components (climate, nature water, bottom sediments, soils and plants) chemical composition in natural and destroyed territories. Data received students in practice is a basis of courses and finals scientific works.

Bioindication of the influence of JSC "Karelsky okatysh" on ecosystems of Kostomuksha Strict Nature Reserve

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Lecturers and students of the Department of Geoecology and Nature managment of Sain-Petersburg state university have been studied the influence of JSC "Karelsky okatysh" on ecosystems of Kostomuksha Strict Nature Reserve since 1997. As a study approach was used the method of bioindication, as the most representative, fast, affordable, reliable, and cheap at cost method. As an indicator species for many years used: lingonberry (*Vaccinium vitis-idaea* L), mosses (*Pleurozium schreberi* (Vrid.) Mitt. and *Hylocomium splendens* (Brid.) DeNot), needles and bark of pine (*Pinus sylvestris* L.). The effect of pollutants such as heavy metals (Cu, Ni, Cd, Zn, Pb, Fe, Mn, Co), sulphates (SO4), sulfur (S), etc on plants were studied. During the years of studies it were accumulated large amounts of data concerning the impact of the plant on the ecosystems of Kostomuksha Strict Nature Reserve. For example highest concentrations of heavy metals occur at a well-ventilated areas, with a small dencity of trees, on the tops of moraine hills, and on the banks of the lake Kamennoe. Regional geochemical background, calculated for the mosses, tens or even hundreds of times above background, calculated for the lingonberry on some elements. For iron in lingonberry regional background in 2008 is 6 mg / kg, and for mosses *Pleurozium schreberi* and *Hylocomium* splendens are 83 and 103 mg / kg, also for zinc for lingonberry background is 5 mg / kg, and for mosses 51 and 47 mg / kg respectively, as well as on many other elements.

Over the years, studies show significant reduction of iron, copper and zinc and the increase of manganese content in the plants, its indicating that the decline in the area contamination with heavy metals that may be caused by several factors. At first decline in production in the plant in the last 5-7 years and as a consequence reducing of emissions and discharges. Also it should be noted that the variability of monitoring data obtained occurs due to the difference in meteorological conditions in different years of research. In wetter years there was a slight increase in the concentration of heavy metals in plants.

Notes on remarkable species of Hoverflies (Diptera: Syrphidae) found in Russian Karelia

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With expansion of modern faunistic studies to the southern regions of Karelia since 1995, numerous remarkable species of Diptera were found. The present work deals with eleven species of Hoverflies (family Syrphidae): *Arctophila superbiens* Müller, *Chalcosyrphus piger* F., *C. rufipes* Lw., *Cheilosia naruska* Haarto & Kerppola, *Criorhina ranunculi* Panz., *Cryptopipiza notabila* Mutin, *Doros profugens* Harris, *Spheginoides obscurus* Szilady, *Sphaerophoria pallidula* , *Xylota abiens* Mg., *X. xanthocnema* Collin. Though this family may be considered as one of the best studied groups in Europe, most of the newly recorded species are not known or very rare in other Scandinavian countries. Moreover some of them were initially described from eastern Palearctic and only recently found in the west.

Here we present detailed information on collected specimens, supplied with distribution maps according to recent sources. Brief discussion of new records in biogeographical aspect is also provided.

Landscape mapping of Russian-Norwegian Reserve Pasvik

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The nature reserve Pasvik is located in Pasvik River valley at The Russian-Norwegian border. The area covers 16.6 thousand hectares (14.7 th.hec. in Russia, 1.9 th.hec. in Norway), including 3.6 thousand hectares of waters.

Since 2008 this territory, as well as National park and landscape protected areas «Øvre Pasvik» (Norway) and wilderness area «Vätsari» (Finland), were included in Trilateral Park Pasvik-Inari.

The landscape mapping method has been used for allocation different types of natural terrestrial complexes (NTC). The main research objects are tracts and sub-tracts.

Russian and Norwegian parts of the reserve have been observed during 2002-2006, and 2008 correspondingly. We used topography maps scales 1:25 000, 1: 50 000 and 1: 100 000, fragments of quaternary maps different scales and satellite image (at a height of 14.77 km, www.google.com). The field research was carried out according to Russian traditional landscaping method. NTC were described on point and routs. More than 40 routs and 270 observation points has been made during the period of works. The landscape maps were made in scale 1:25 000, transformed to electronic format, the natural complexes types has been characterized.

The landscape map of Russian-Norwegian Reserve Pasvik shows the natural complexes diversity in a mid-part of Pasvik River valley.

Features of a landscape structure in Russian part of the reserve are 46 types of tracts, relating to 6 groups:

Outliering basement elevation (tunturi): 11 types of natural complexes.
Ridged denudation plain, peneplain: 10 types.
Moraine plain: 2 parts with 7 types.
Marine plain: 8 types.
Overflow land (1 type) and ***Marine ingression terrace*** (5 types): narrow fragment in south part of the reserve. Most of the complexes have had a man- made changes.
Valleys of streams: 3 types.

14 types of NTC have been identified in Norwegian part of r the reserve, relating to 4 groups:

Esker ridges**:** 2 types.
Moraine plain with hills: 2 types.
Marine plain, the main part of naturreservat, includes 5 types of swamped complexes.
Valleys of rivers and streams: 5 types.

The landscape map is an effective instrument for scientific research planning and organization. Every data takes from concrete NTC could be extrapolate on other sections of this type of complexes.

It is an actual thing to use the landscape map in international monitoring program of Trilateral Park Pasvik-Inari and to create the same kind of maps for other Park`s areas in Norway and Finland. It could give us a possibility for effective research planning, rare species and vulnerable biotopes/natural complexes monitoring, as well as seasonal dynamic of complexes and their phenology research, making common database and provide us the comparability of observational results.

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Environmental education in the Friendship Nature Reserve

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Environmental education has been one of the most important forms of Finnish-Russian cooperation for the Friendship Nature Reserve. Actually, environmental education is included in all forms of cooperation between the parks. It is, of course, practised largely with schools, but it is not meant only for children – it is an important aspect in raising awareness of the parks, developing the ecological trails and nature based tourism and increasing the expertise of the personnel.

The aim of environmental education is to increase the ecological, social and cultural sustainability. To strengthen this sustainability we have been working on giving models for responsible actions, respecting nature and life, minimising consumption. The work also includes giving information on the areas and expanding knowledge on natural and cultural history. Giving experiences in natural surroundings directly leads to learn how to behave in nature, how to use natural resources in a sustainable way and what is the influence of human action on nature.

Cooperation in environmental education has opened up an opportunity for many people to get to know the natural environment, culture and traditions of the frontier zone on the neighbour's side of the border. During the 20 year cooperation many specialists, school groups and other guests have visited the Friendship Nature Reserve and other protected areas, visitor centres, tourism entrepreneurs, cultural sights etc. We have arranged seminars and other meetings with Finnish and Russian teachers and specialists of environmental education, and the teachers have participated in developing materials and methods for environmental education.

Cooperation is part of our everyday work, but different projects have given possibilities to realize many ideas and plans. Joint EU-funded projects began in the end of 1990s with the project "Wilderness Nature on the Kainuu – Viena Karelian Border", which produced information material on the area. The project "Back to Nature" gave the possibility to create an information cabin with a small exhibition to Lentua Nature Reserve and collect materials and methods for environmental education for schools and tourism entrepreneurs. The project "Enchanted by Nature" in a way continued the previous project by popularising the results of shared nature research. The large carnivore project opened the possibility to work out a new visitor centre in Kuhmo and compile a wealth of information on these big four and wild forest reindeer. Amongst many other achievements the projects have been a great help in improving hiking routes, building nature trails, creating exhibitions, brochures and other information material.

The work will continue. At the moment we are compiling new materials and methods for environmental education and fulfilling a project plan for ENPI-cross border cooperation project. We will also continue the work with other protected areas along the Green Belt, with schools, tourism companies etc. In the field on environmental education work is never finished.

Environmental education in the cross-border international co-operation as a part of research activity

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The Northern Water Problems Institute (NWPI) is the academic research structure conducting scientific investigations of the aquatic environment in Northwest Russia for 60 years already. NWPI is active in the implementation of new methods and technologies in water systems investigations. The areas of expertise include remote monitoring, aerospace methods, geographical information systems (GIS), mathematical modeling (diagnostic, adaptation and prognostic) of water systems. A new sphere of the institute's research work is climate changes in Northwest Russia.

A latest innovative line of NWPI's scientific investigations is the development of the expert system "Classification and typization of North Russian water-bodies". The new approach in this work is that the research objects are viewed as "integrated social-ecological-economic systems". This innovative activity demands the efforts of multidisciplinary teams of specialists, especially at the practical stages connected with application of the scientific results.

The dissemination of the results obtained during surveys and comprehensive analysis is crucial for training highly environmentally qualified specialists working for sustainable development of the region in different fields of activity.

The NWPI is an active partner of the international co-operation. One of the bright examples are the investigations conducted at the hot point of the North Karelia – Kostamuksha region together with Kainuu Regional Environmental Center in Finland.

The Kainuu Regional Environmental Center together with "Friendship" Nature Reserve was the first international partner of NWPI in connection with environmental education started in 1996. So far, about 250 students and teachers took part in this program. There are some specific issues chosen for the environmental education project that are typical for Karelia and have been dealt with in Finland: water study, use and protection, drinking water, waste utilization, transboundary water objects and some others. According to the agreement on co-operation, which is very important for sustainable activity, environmental education is performed continuously up till now, every second year NWPI has the opportunity to organize trainings for school teachers, students and young scientists in Finland, in the Kainuu Regional Environment Center together with the "Friendship" Nature Reserve. The main idea of these express-trainings was to give the opportunity for the Karelian participants to see the real environmental situation not far from the border by their own eyes.

There are a lot of things in Finland that we have to study and use in our environmental education activity. That's why we hope for the co-operation continuation with new energy and enthusiasm from both sides.

Population and diversity of soil mesofauna at the forest-mire landscape transect in the Juortanansalo nature reserve, Eastern Finland

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Data were collected in the summers 2007-2009 in the Juortanansalo nature reserve, Eastern Finland (64°30´ N и 29°50´ E). A variety of hydrological conditions causes a presence of diverse mire types and their combinations in the limited area. They are sedge aapa mires, poor fens, intermediate fens and pine bogs. Small patches of old-grown forests (*Vaccinium myrtillus*-type) scattered on mineral islands. The surrounding forests are mainly young pine stands.

The transect (catena) method is usually applied to biogeocoenoses (ecosystems) occurring in different structural parts of landscape. The Särkänpuro and the Lotvonsuo sites were chosen for the landscape transects: the top of the ridge – the slope of the ridge – the mire margin – the mire centre; the mire with spring water effect – the mineral islet – the sedge fen – the intermediate fen – the mire margin – the slope of the ridge after clear-cut. The distance between the study plots was about 20-30 m. A complex character of mire vegetation was taken into account while sampling and choosing sample plots. Samples were taken from different elements of micro relief such as hummock and hollows separately. The similarity of sampling plots as well as their representative value is required for the future analysis. Vegetation relevés were made along transects. Temperature recorders were installed for 2 weeks in the top layer of the soil/peat horizons. Standard soil-zoological samples of soil and organic materials (size 0, 0625 m^2) were obtained. Soil profiles were described and a depth of peat deposit was estimated. Measuring pH of forest soils as well as conductivity of mire waters were done as well.

The data show the decreasing of the mesofauna as a whole as well as the decreasing of individuals in the direction from boreal forests to open mires. The number of species on the study plots was follows: 864 example/m^2 (plot 1) – 251 (2) - 384 (3) - 179 (4) - 93 (5) - 136 (6) - 403 (7) – 164 (8) - 184 (9) - 436 (10) - 156 (11) – 284 (12) – 256 (13) - 264 (14) – 520 (15) - 300 (16) - 152 (17). The greatest number of species was recorded from the soils of spruce forest on the ridge top, the smallest – in the hummock-pool mire complex in Arolampi mire. The latter has the highest moisture and less warm peat soils. Thus the limited factors are waterlogged conditions and cold temperature of the substrate. A transitional zone such as forest-mire margins (plot 3), mineral islets with pine paludified forests (plot 14) as well as spruce forest sites (plots 15 and 16), and forbs-tall-sedge mires with sparse alder trees and willows (these sited are particularly rich in nutrients) show an increasing of a number of soil invertebrates and their species richness. Extreme habitats are oligotrophic hollows (plot 5) and open small-sedge lawns of mires (plot 6).

The most numerous groups of soil invertebrates in the studied mire sites were spiders (*Araneae*), *Pseudoscorpiones*, *Staphylinidae*, *Elateridae* and *Chrysomelidae*.

Trophic relations of Lepidoptera and bog plant species in raised bogs of the Belarusian Land O'Lakes

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Raised bogs in Europe are isolated «islet-type habitats» that characterised by specific microclimate, cold adapted psychotropic vegetation and relict fauna. They have some similar features with the tundra ecosystems which they kept since last glacier deviation in early Holocene. Studying of raised bog's fauna caused the great scientific interest in Europe during 20 century. Nowadays it gets a new impulse because of urgent needs of bog restoration and reclamation. There were no special studies of butterflies in Belarusian bog habitats so far. Lepidoptera is one of the most species rich groups of insects in bog ecosystems. The aim of this research was to study the main ecological aspects of Lepidoptera living in raised bogs of Belarus.

Collected field data were obtained during 1995-2007 field seasons in 10 raised bogs of the Belarusian Land O'Lakes. The most of samples has been collected by individual catching of butterflies using a manual entomological net and Malaise traps also. Sampling was done in the most typical bog habitat types covering with following plant communities: *Eriophorum vaginatum - Sphagnum magellanicum*, *Calluna vulgaris - Sphagnum fuscum*, *Pinus silvestris - Ledum palustre - Sphagnum* spp., *Betula pubescens - Calluna vulgaris - Polytrichum strictum*, *Rhynchospora alba - Sphagnum cuspidatum* (dominant plants are listed to name the communities).

210 species of Lepidoptera from 25 families were recorded in raised bogs of the Belarusian Land O'Lakes. Both in Northern Europe, and in most East European countries the kernel of this complex is formed by a small number of stenotopic and oligotopic species possessing high abundance (Mikkola & Spitzer 1983, Spitzer & Jaroš 1993, Dapkus 2001). It was revealed 21 tyrphobiontic and 20 tyrphophilous species from these insects by us.

Most of the Lepidoptera species lives on dwarf shrubs (51,48 %), mostly on *Vaccinium uliginosum* (19,40 %) and *Calluna vulgaris* (17,16 %).

Due to wide ecological plasticity many species of butterflies are trophically connected to heather which occurs both on dry sandy soils and on drainage bogs. For example *Diacrisia sannio*, *Ematurga atomaria* occur on bogs very often. Only a very few species feed on *Andromeda polifolia* (2,24 %) and *Empetrum nigrum* (1,49 %).

Many species feed on trees - 29,85 % (*Betula* sp. - 20,75 % and *Pinus silvestris* - 9,15 %). *Eriophorum vaginatum* is the most favoured monocot by 2,99 % of species.

Most of the species occurring in studied area are oligophagous (150), polyphagous (47), monophagous (13). The group of monophagous tyrphobionts and tyrphophilous are presented by two species only. They are *Colias palaeno* and *Altenia perspersella*. Polyphagous mainly belong to families Gelechiidae, Geometridae and Noctuidae, less to families Nymphalidae and Tortricidae.

The most important customers of plant biomass on raised bogs are typical inhabitants of mires: they are tyrphobionts and tyrphophilous species. Some species are remarkable by their total amount.

Impacts of changing hydrological balance on aapa mires

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Aapa mires are northern mire systems dominated by fen vegetation. Accumulation of *Sphagnum* peat is delimited apparently by factors mediated by minerogenous hydrology. Changes of hydrological balance may onset relatively rapid establishment of *Sphagnum*, triggering the development from fen to bog vegetation. In Finland, drainage of margins of aapa mires is very common. In such cases, the minerogenous hydrological influence is cut down. Observations of decadal vegetation changes of such aapa mires show that *Sphagnum* can establish and begin to dominate plant communities very rapidly. New surface peat with high potential of carbon sequestration and self-regulation of hydrology can develop within just few decades. Climate change may trigger similar changes. Indeed, the expected northward movement of mire vegetation zones includes the prospect of the development of northern fens into raised bogs, hence acidification and increase of *Sphagnum*. Several alternative or more probably interacting mechanisms to mediate the major vegetation change are shortly reviewed.

Promotion of sustainable tourism in Finland's national parks

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In many Finnish travel destinations national parks have gradually become primary attractions, especially for international tourists. The framework for tourism development in Finland's national parks is based on nine principles of sustainable tourism, jointly defined and applied by the parks' management authorities, the tourism industry and other relevant stakeholders. These principles have been promoted in national parks through sustainable tourism development strategies that follow an adaptive planning approach. Finland's approach to the indicator-based management of recreation and tourism in protected areas applies the concept of Limits of Acceptable Change (LAC). In order to promote sustainable tourism at the level of the travel destination, two progressive quality programmes, Green Destination Quality Net (Green DQN™) and Green Destination Management Net (Green DMN®), have been created by the Finnish Tourist Board, Metsähallitus Natural Heritage Services (the authority responsible for the management of protected areas in Finland) and the Haaga Institute Foundation. The beauty of these programmes is that they effectively bring together local actors from the tourism industry and the nature conservation field to promote sustainable tourism

High quality national parks clearly enhance the competitiveness of travel destinations. A study conducted in 2009 by Metsähallitus Natural Heritage Services showed that the direct impact of Oulanka National Park (175,000 visits in 2009) on the local economy in NE Finland amounted to approximately €15M a year, providing some 190 jobs. This amounts to approximately 15% of total tourism income in the region. In addition, the image benefits generated by parks for a travel destination are often very pronounced. Initial findings related to the impacts of Sustainable Tourism Quality programs (Green Destination Management Net, Green DMN®) on travel destinations support this view. Surveys conducted at Ruka, one of the largest holiday resorts in Finland, which is located near Oulanka National Park, showed that half of all tourists visiting during the summer-autumn season had decided to travel to the destination because of the national park, and two-thirds of them visited the park during their stay.

The positioning of national parks and other protected areas as integral elements of travel destinations requires strong and reliable cooperation between players working in conservation, the tourism industry and local communities. Expertise must be developed for destination management, and quality standards should be elaborated for destinations and local tourism service providers. Finland's national parks are already well managed in terms of promoting sustainable tourism development, but in many cases the methods applied are not comprehensive enough. A change is needed away from sustainable tourism development approaches towards destination perspectives.

Pasvik-Inari Trilateral Park - environmental protection in the Pasvik-Inari Area

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The Pasvik-Inari region is the area where Norway, Finland and Russia converge. The area offers a unique example of cooperative nature protection; with three nations working together to protect a continuous stretch of land crossing three national borders. The lush valley of the Pasvik River stretches from Lake Inari towards the Barents Sea, appearing as a nerve of life in the wide, forested landscape.

The trilateral cooperation between environmental authorities emerged in the early 1990s. The main objectives being: to unite the protected areas under a common name, and to establish a formal framework for the management of the common area despite the national borders.

In 2008 Pasvik-Inari Trilateral Park was awarded the European certification for EUROPARCs 'Transboundary Park – following nature's design'. This certification provides managers of the protected areas with tools for maintaining a long lasting, workable cooperation for nature management in the future.

Environmental research and monitoring provide important knowledge for environmental management. By harmonizing monitoring and research methods, the limited knowledge of border crossing species will increase profoundly. The key species that the cooperation focuses on are: brown bear, golden eagle and various waterbirds.

The Pasvik-Inari area shows great potential for the development of sustainable nature tourism. However, the sub-arctic nature is vulnerable and sensitive to human impacts. Pasvik-Inari is a great place to hike, fish, ski, canoe, bird watch, go dog sledging, as well as lots of other outdoor activities all the year round.

Imprint of traditional agriculture in forests surrounding the vanished villages of Lake Kiitehenjärvi, Russian Karelia - a pilot study

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Northern human populations have shaped their environment ever since the adoption of iron and agriculture. However, the modern industrial forestry, based on clear-cuts, has changed the historical boreal landscape fundamentally in whole Fennoscandia. Largest remnants of ancient forest landscape remain on the Russian side of Finnish-Russian border, where also lies L. Kiitehenjärvi (Oz. Kamennoe). On the shores of this lake there have been approximately 20 settlements. In 1958 the remaining villages were emptied by force. The scope of our project is to make a "transcript" from this unique natural archive and publish its story before deterministic natural processes wipe them forever.

In August 2010 we made two 1.5 km long transects starting from still treeless center areas of villages Jehrimänvaara and Luvajärvi. We measured species composition of ground vegetation from five 1 m^2 random squares. We selected compass direction pointing opposite from lake shore and repeated sampling every 200 m up to 1000 m. After this, the last sampling plot was 500 m further on. If a plot was on a mire, we moved on 100 m. On forested sites we measured stand age and composition of coarse woody debris (CWD). Our assumption is that stand age and especially CWD composition correlate negatively with past land use intensity.

NMS ordination separated clearly meadows from forests, and the closest plots around meadows from other forest plots. Both age of forests and CWD continuity value increased when we moved from the village centers towards perimeter. The results show that age and CWD continuity value give slightly different pictures from the forest naturalness, the latter being more explicit. Moreover, ground vegetation gives only very little information about forest naturalness. In future, we will pursue for longer sample transects and include information about species composition on wood decaying polypore fungi and epiphytic lichens in our studies. This might help to predict forest ecosystem recovery rate after human disturbance in boreal zone under optimal conditions (i.e. minimal landscape fragmentation). On the other hand we will co-operate with historians from Petrosavodsk State University in order to study the effect of village population size on past landscape structure.

Wolf-dog relationships in Russian Karelia

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One of the most serious problems with large carnivores, especially with wolves is their attacks on domestic animals and cattle. This problem is common for all regions except a few uninhabited wilderness territories in the World.

In Russian Karelia we have a very long history of coexistence of man and wolf. We know that wolves were "citizens" of this territory at least 4-5 thousands years ago. Their remains were found on the sites of Neolithic people of Karelia and Kola Peninsula.

The main pray for wolves here are wild ungulates especially moose. But only 30 years ago cattle and sheep had played significant role in wolf's diet. Nowadays they are very rare wolves pray because of farming were almost destroyed after the 1990 years. But according with our data and analysis of archive materials dogs were permanent and one of the favorites pray. We analysed of archive materials and literature and our questionnaire data from 1960-s till 2010 years, also we take into consideration dynamics of wolf and moose number to understand reasons of wolves attacks on dogs.

Early studies on vegetation relations in the border regions of NE Finland and Russian Karelia

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E.A. Vainio defended his doctoral thesis "Vegetation relations in the border regions of NE Finland and Russian Karelia" in 1878 at the age of 24. This was the first biological dissertation published in Finnish. In his work Vainio presented relations between plant species in his study area, identified factors, which increased or decreased the dominance of different kinds of vegetation and distributional limits for different species.

Vainio expressed the early idea of site type classification based on vegetation patterns: "Plant species tend to grow in certain clusters which occupy bigger or smaller surfaces, which offer them similar kind of physical-chemical conditions." He defined the concepts of plant topography, clarified which plant species clusters were present in his study area, what chemical-physical conditions define them and the reasons for their existence. A.K. Cajander in his classical forest and mire site-type classifications in the early 20th century developed these ideas further. Although Vainio's work was ahead of his time since he didn't only describe plant communities but tried to explain their existence with site-ecological approach, his Finnish colleagues did not cite Vainio's study during his lifetime, mainly for political reasons. His life demonstrates that the influence of a person may be hidden because of personal and/or political causes!

Region for kids – a successful brand for environmental education program at regional level

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Branding is the process of building a favourable image of a product which in the consciousness of the users to distinguish itself from the competitors' ones. A successful branding programme is based on the idea of uniqueness. It creates in the user's mind the sense that there is no such a product on the market, as a given one.

The product, subject of branding in the concrete case, is a training programme "Region for kids", presented in the form of training aids, including: handbook for teachers, a small guidebook in the biological diversity of the concrete region and a CD with special materials from the aid. The programme is being worked out by the Regional Environmental Center for Central and Eastern Europe – branch Bulgaria in cooperation with teachers and experts from Bulgaria after consultations with the possible users (the Regional Environmental Center for Central and Eastern Europe (REC) is an international organisation with a mission to assist in solving environmental problems in Central and Eastern Europe). Each topic part of the handbook has a short introductory part followed by proposals for training activities at school, activities out of school and subsequent activities. To each activity necessary additional information is given, as well as some materials which to be used by pupils in executing the activity. The topics and activities are oriented to the age range of the target audience, and the instruments proposed for performance reflect the modern trends in environmental education – interactive methods, a combination of theory and practice, inclusion of all the senses, applying the principles of natural interpretation, etc.

The target group of this initiative is 22`000 pupils at the age of 9 to 15, studying in secondary school classes (from 4th to 8th) in each region where the aid has been introduced. As the first target group, pupils, will not use the training programme independently, the second important target group of the present education programme is their teachers, teaching classes from 4th to 8th, and subjects concerning nature as a whole. Subjects as natural sciences and ecology, mathematics and technologies, social sciences, civil education and literature could be described as target for the programme.

The "Region for kids" brand and related projects is being financed by the Mitsubishi Corporation Fund for Europe and Africa. It is being implemented in 12 Municipalities from the West Stara Planina Mountains and the West Border Mountains all part of the European Green Belt territories. The main goal of this initiative is to create local support for preserving and stable usage of biodiversity in small settlements living in protected areas in trans-border ecosystems.

Insect biodiversity, guilds and community structure in early-decay-stage deadwood

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Despite their central role in boreal forest ecosystems, saproxylic insects are typically deficiently known. Even in Fennoscandia, where considerable research effort has been put in studies on (i) the composition of species dwelling in various types of decaying timber, (ii) differences in species richness between natural and transformed (managed) forest stands at multiple spatial scales, and (iii) spatial ecology of threatened species, there is still rather limited knowledge accumulated on (i) the taxonomy of some major insect groups (e.g. Diptera, Hymenoptera) associated with deadwood, (ii) the biology and microhabitat preferences of most saproxylic insect species and (iii) interactions between coexisting species, incl. trophic interactions, guild formation and community structure. Motivated by these major gaps in understanding of the life in deadwood, we experimentally studied saproxylic insect assemblages in Kainuu Region (Finland; 5 study areas) and adjacent areas in Karelian Republic (Russia; 1 study area). A total of 480 large trees (pine, spruce, birch and aspen) were felled in 2003. Decaying timber has been sampled once a year from 2004 onwards. Block and branch samples transported into laboratory facilities were subject to extraction of insects by rearing and/or direct search. Here we report on the results obtained from the first and, partly, second decay stages of our sample trees. More specifically, we focus on (i) some taxonomic and faunistic novelties from poorly known insect groups, (ii) the microhabitat choice of bark louse species, and (iii) the community structure of beetles.

Landscape ecological planning for sustainable forestry for North-West Russia

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Forestry radically changes the natural structure of forest owing to the fact that different cuttings are power artificial disturbances. The rules of cuttings are established for vast regions, take no account the specific features of a territory and practically ignore ecological requirements. The actual forest structure in North-West region of Russia is faulty as from economical point of view, as well as ecological one.

The proposing scheme of planning considers as well forest use's interests, as the importance of protection of biological and landscape diversity. The scheme was designed for Russian condition, namely: vast territories, diverse landscapes and nature conditions. The scheme takes into account the features of Russian forest inventory and planning.

By our scheme, any nature territory is a hierarchy of nature complexes of different levels. Various ecological functions, patterns and processes of forest become apparent on different levels of the hierarchy. Therefore, it's necessary to develop landscape ecological plan for nature complexes on some levels of scale: landscape, local landscape, stand and microhabitats.

On a landscape level (10^5 ha) the principal ecological functions are accentuated for a territory (water protection, prevention against soil erosion etc.). The level is also appropriate to select and conserve undisturbed woodlands. On a level of a local landscape (10^1-10^2 ha) rare and vulnerable sites are revealed, and general restrictions are determined for various local landscapes. Analysis of forest structure, forest use history, field studies allow to select rare, missing and vulnerable communities (habitats) and develop limitations on a level of a stand (10^{-1}-10^1 ha). An inventory and conservation of valuable microhabitats (10^{-2} ha) is supposed in the course of a forest operations planning for a stand. The cuttings where microhabitats are conserved are more similar to natural disturbances.

Biodiversity conservation and monitoring: methodology for Russian forestry

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The approach to conservation and monitoring of biodiversity in forestry is developed. The methodology is directed mainly on the conservation of habitats diversity. Montreal criteria and indicators for sustainable forestry are selected as methodology specification. The monitoring system uses landscape approach and interprets biodiversity on some levels (from landscape to genetic biodiversity

The three-level system is flexible, based on the existing and workable informational resource of forest inventory and monitoring ("budget" decision).

Levels	Objects of monitoring	Source of information
Federal	General level of biodiversity, other consolidated indicators	Reports, forest inventory, ICP remote sensing, pathological, fire monitoring consolidated data of forest register red lists, experts reports
Region	General level of biodiversity, other consolidated indicators	forest register, reports of forest use, protection and regeneration of forests, assessment of fauna, forestry plan, red lists, experts reports
Local (forest area)	protected areas,reserved forests, forest for environment protection, populations of animals	Primary information about forest and animal populations, forestry regulations, project of use in leasehold forests

20th anniversary symposium of the Finnish-Russian Friendship Nature Reserve 5th to 6th October, 2010 Program

Monday 4th of October, 2010
17:00 - Registration, Petola Visitor Centre
18:00 - 21:00 Ice breaking reception, Petola Visitor Centre

Tuesday 5th of October, 2010
08:00-10:00 Registration and setting up posters, Kuhmo Arts Centre
09:00-10:00 Press Conference, Artist´s lounge
10:00-12:00 Opening Session, Lentua Hall, Chair Jari Heikkilä
Opening of the symposium, *Paula Lehtomäki, Minister of the Environment of Finland*
Foundation of the Finnish- Russian Nature Reserve Friendship, a view to the history, *Professor Rauno Ruuhijärv*i
Musical performance: *Mari Mäntylä, decacorde*
Welcome address of Kuhmo town, *Eila Valtanen, Mayor*
Welcome address of Kostomuksha Strict Nature Reserve, *Sergei Tarkhov, Director*
Welcome address of the celebrating Nature Reserve Friendship, *Kerttu Härkönen, Park Superintendent, Metsähallitus*
Welcome address of the Finnish Environment Institute, *Martin Forsius, Head of Ecosystem Change Unit*

12:00-13:30 Lunch, Kuhmo Arts Centre

13:30-14:30 Session on cross-border co-operation, Lentua Hall, Chair Ari Meriruoko
Boris Erg: The European Green Belt
Timo J.Hokkanen: The Green Belt of Fennoscandia unites nature and society both in Russia and in Finland
Andrei Gromtsev: "Green Ring of Fennoscandia" – the cornerstone of the nature conservation framework in Northern Europe
Kari Lahti: Cross-border co-operation in Fennoscandian Green Belt

14:30-15:00 A group photograph in restaurant Juttua, Kuhmo Arts Centre

15:00-15:30 Coffee break, Kuhmo Arts Centre

15:30-17:00 Session on management of protected areas, Lentua Hall, Chair Aimo Saano
Sergei Tarkhov: The present and the future of the Friendship Nature Reserve – a Russian view
Kerttu Härkönen: Management of the Friendship Nature Reserve – a Finnish view
Matti Määttä: Regional Protected Areas in North West Russia
Matti Tapaninen: Promotion of sustainable tourism in Finland´s national parks
Vladimir Chizhov: Pasvik-Inari Trilateral co-operation

19:00-24:00 Dinner: Celebration of the 20th anniversary of the Nature Reserve Friendship, Kuhmo Arts Centre

15:00-15:30 Coffee break, Kuhmo Arts Centre

15:30-17:00 Session on the state of ecosystems, Pajakka Hall, Chair Petteri Vihervaara
Aleksandr Kryshen: The Diversity of Vascular Plants of Forest Communities on Automorphic Sandy Soils in Russian Karelia
Andrei Gromtsev: Comparative assessment of pristine and secondary forests in the Friendship Park and in adjacent areas
Tatjana Chernenkova: Structure and dynamics of boreal forests in Kola Peninsula under anthropogenic influence
Asiya Zagidullina: Landscape ecological planning for sustainable forestry for North West Russia
Petteri Vihervaara: Role of the conservation areas for ecosystem service research

Wednesday 6th of October

08:30-10:00 Session on environmental education, Lentua Hall, Chair Riitta Nykänen
Nina Tarkhova and Eeva Pulkkinen: Environmental education in the Friendship Nature Reserve
Tatjana Regerand: Environmental education in the cross-border international co-operation as a part of research activity
Riitta Nykänen: Kalevala National Park, Forest and Culture
Marina Opekunova: The experience of summer field activities for students of Saint-Petersburg State University in Kostomuksha Strict Nature Reserve

10:00-10:30 Coffee break
10:30-12:30 Session on wildlife, Lentua Hall, Chair Pjotr Danilov
Jyrki Pusenius: Current status of wild forest reindeer in Kainuu
Juri Kurhinen et al.: Current status of wild forest reindeer in Europe
Ilpo Kojola: Large carnivores and the wild forest reindeer
Jukka Bisi: Interaction between human, wolf and wild forest reindeer - sosioeconomical dimension
Harto Lindén: Wildlife richness in the surroundings of the Finnish-Russian Friendship Nature Reserve
Pjotr Danilov: Species exchange and Russian-Finnish joint research of hunted animals in border areas

12:00-13:30 Lunch, Kuhmo Arts Centre

13:30-15:00 Session on mires, Lentua Hall, Chair Oleg Kuznetsov
Harri Vasander: Early studies on vegetation relations in the border regions of NE Finland and Russian Karelia
Olga Galanina: Mire studies in the Friendship Nature Reserve
Raimo Heikkilä: Mire studies in the Fennoscandian Green Belt - case from Kuhmo
Stanislav Kutenkov: Vaccinium myrtillus spruce mires of West Karelian Upland
Ludmila Filimonova: Climate and environment changes during the Late Glacial and Holocene in Kivach Nature Reserve (Karelia, Russia)

15:00-15:30 Coffee break
15:30-16:30 Poster session
16:30-17:00 Closing of the symposium, Lentua Hall, Chair Tapio Lindholm
17:00 Dinner, Kuhmo Arts Centre
19:00 UMO jazz concert, Kuhmo Arts Centre
(Ticket not included in the conference fee)

Wednesday 6th of October

08:30-10:00 Session on insect biodiversity, Kuhmo town administration, Chair Gergely Várkonyi
Andrei Humala: Entomological research in Karelia
Alexei Polevoi: Notes on remarkable species of Hoverflies (Diptera: Syrphidae) found in Russian Karelia
Mervi Laaksonen: Effects of habitat quality and landscape structure on saproxylic species dwelling in boreal spruce-swamp forests
Reima Leinonen: The Boreal Moths - what do they tell us

10:00-10:30 Coffee break

12.00-13.30 Lunch, Kuhmo Arts Centre

13:30-15:00 Session on geographical and soil studies, Kuhmo town administration, Chair Leonid Rybalov
Valentin Gorkovets: Effect of the tectonic faults on the ant genus Formica spatial allocation in the Finnish-Russian Friendship Nature Reserve
Olga Bakhmet: North taiga soils in Russia and Finland
Natalia Fedorets: Ecological features of the soils in the Karelian-Finnish crossborder area
Marina Makarova: Spruce and pine forests of North-West Ladoga region and large scale vegetation mapping

Thursday 7th of October, 2010

08:00-15:00 Post-symposium excursion in the Elimyssalo Nature Reserve
09:00-15:00 Post-symposium excursion in the Lentua Nature Reserve
09:00-10:30 Petola Visitor Centre, guided tour with a short nature trail
15:00 Departure to the Kostamus railway station
16:00 Departure to the Kostomuksha Strict Nature Reserve excursion, dinner and accommodation in hotel Fregat

Friday 8th of October, 2010
08:00-15:00 Post-symposium excursion in Kostomuksha Strict Nature Reserve
18:00 Return to Kuhmo (taxi to the airport 18:30)

Posters (arranged according to the first author)
1. *Vladimir Ananyev*: Patterns of plant cover formation in pristine spruce forests and after total windthrow
2. *Vladimir Antipin*: Mires of Vodlozersky National Park as objects of ecological tourism and education
3. *Margarita Boychuk*: Mosses on the rocks of the crystalline basement in the Finnish-Russian Nature Reserve Friendship
4. *Ekaterina Elsukova*: Investigations of soils in the Kostomuksha Strict Nature Reserve
5. *Ludmila Filimonova*: Holocene vegetation dynamics in the Finnish-Russian Friendship Nature Reserve
6. *Jari Heikkilä*: Large carnivores in local media
7. *Raimo Heikkilä*: Achievements in research cooperation in the framework of Friendship Nature Reserve
8. *Timo J. Hokkanen*: Transboundary continuity of forested areas between the Republic of Karelia and Finland
9. *Natalia Kaznina*: Estimation of north cenopopulations of Phleum pratense L. state under industrial soil contamination by heavy metals
10. *Anna Kuhmonen*: Barents Protected Area Network - BPAN
11. *Oleg Kuznetsov*: Diversity and dynamics of mire ecosystems in Kostomuksha area
12. *Galina Laidinen*: Composition and structure of northern herbaceous communities under industrial contamination
13. *Olga Makarova*: Scientific research harmonization of Green Belt of Fennoscandia
14. *Ari Meriruoko*: Friendship Park - Kostomuksha Nature Reserve (Co-operation, Management plan, Enlargement areas)
15. *Sergey Moshnikov*: Assessment of the state of forests in the "Pasvik" reserve
16. *Elena Mosyagina*: Ecological trail in Pskov Model Forest
17. *Marina Opekunova*: The experience of summer field activities for students of Saint Petersburg State University in Kostomuksha Strict Nature Reserve
18. *Ekaterina Pavlova*: Bio-indication of the influence of JSC "Karelsky Okatysh" on ecosystems of Kostomuksha Strict Nature Reserve
19. *Natalia Polikarpova*: Landscape mapping of Russian-Norwegian Reserve Pasvik
20. *Pekka Punttila*: Effects of forest management history on saproxylic beetle faunas in old pine forests in Finland and Russian Karelia
21. *Ari Rajasärkkä*: Red-flanked Bluetail (Tarsiger cyanurus) in Finland
22. *Matti Tapaninen*: Promotion of sustainable tourism in Finnish national parks
23. *Nina Tarhova*: Friendship Nature Reserve – a gateway between east and west
24. *Olli-Pekka Tikkanen*: Imprint of traditional agriculture in forest surrounding vanished villages of Lake Kiitehenjärvi, Russian Karelia – a pilot study
25. *Konstantin Tirronen*: Wolf-dog relationship in Russian Karelia
26. *Asiya Zagidullina*: Biodiversity conservation and monitoring: methodology for Russian forestry
27. *The State Nature Reserve Pasvik, Metsähallitus Natural Heritage Services and the County Governor of Finnmark*: Pasvik-Inari Trilateral Park

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The Finnish-Russian Friendship Nature Reserve was established in 1990 to promote and enhance cooperation in nature conservation and conservation research. In the beginning, the main emphasis was on joint research between Finland and the Soviet Union. Over the years, the cooperation has expanded to include many universities and research institutes worldwide.

The year 2010 marked the 20-year anniversary of the Friendship Nature Reserve. To celebrate this important year, the Finnish Environment Institute, Metsähallitus Natural Heritage Services and the Kostomuksha Strict Nature Reserve (Zapovednik) arranged jointly an Anniversary Symposium "From Wild Forest Reindeer to Biodiversity Studies and Environmental Education" 5th to 6th October, 2010 in Kuhmo, eastern Finland. Parallel to the symposium, the 4th European Green Belt Conference was arranged in Kuhmo by Metsähallitus Natural Heritage Services. Around 150 people from 19 different countries participated the symposium.

SYKE

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