Achievements in Finnish-Russian research cooperation in the framework of Friendship Nature Reserve

Raimo Heikkilä & Tapio Lindholm

Finnish Environment Institute

Friendship nature reserve

- Zapovednik Kostomukshkii
- Five reserves in Kuhmo (Friendship park)
- Established as a Finnish-Russian nature reserve in 1990
- Main task cooperation in nature conservation research

Friendship Nature Reserve and its extensions (in green)

A Landsat satellite image shows the pristine forests and mires of the boundary region

Concrete cooperation, hand in hand, in Kostamus in 1991

Seminars, workshops and symposia

1994 Lentiira

1997 IMCG workshop

2000 Kuhmo 10 years anniversary

2000 Disturbance Dynamics in Boreal Forests

2003 HCF

2005 Raptor workshop Kostamus

Numerous smaller meetings and workshops

First meeting of Russian and Finnish scientists in Friendship Nature Reserve in Kostamus, July 1990

Meeting in Kostamus in the autumn of 1990 chaired by Nikolai Feofanov who was the director of Kostamus nature reserve at the time

A delegation of Finnish scientists visiting Kostamus Nature Reserve in 1991

Excursion in Kuhmo 1993 in connection with the official opening of Friendship Park

In 2000, 140 persons from 8 countries participated the 10 years anniversary symposium of Friendship Nature Reserve in Kuhmo

The Finnish Environment 485

NATURE AND
NATURAL RESOURCES

Raimo Heikkilä & Tapio Lindholm (eds.)

Biodiversity and conservation of boreal nature

Proceedings of the 10 years anniversary symposium of the Nature Reserve Friendship

KAINUU REGIONAL ENVIRONMENT CENTRE

The Finnish Environment 671

INTERNATIONAL COOPERATION

Tapio Lindholm and Erna Keinonen (eds.)

Habitat Contact Forum in Kuhmo 2003

Proceedings of the 3rd Meeting of the International Contact Forum on Habitat Conservation in the Barents Region

Контактный форум по местообитаниям в Кухмо 2003

Сборник материалов 3-его совещания Международного контактного форума по сохранению местообитаний в Баренцевом регионе

FINNISH ENVIRONMENT INSTITUTE

Karelian Research Centre
of the Russian Academy of Science
Finnish-Russian Working Group
on Nature Conservation

STATUS OF RAPTOR POPULATIONS IN EASTERN FENNOSCANDIA

Kostomuksha, Karelia, Russia,

Proceedings of the Workshop
November 8–10, 2005

Projects

Inventories to promote Kalevala National Park and extension of Kostamus Nature Reserve (EU LIFE)

EU Interreg projects

- Impact of Russian Karelian forests on animal populations in the old-growth forests of Kainuu region (2001-2004)
- Enchanted by Nature – getting familiar with the boundary region nature (2005-2007)
- The influence of Kostamus mining plant on human environment in the boundary region (2007)

Ministry of the environment (YM)

- Ecological sustainability of old-growth forest conservation in northern Finland 1997-2001

Numerous smaller projects funded by YM and Metsähallitus 1990-2008, Finnish-Russian cooperation annually

Boris Kashevarov from Kostamus Nature Reserve studying insects in the laboratory of Friendship Park Research Centre in Kuhmo

Starting an experimental study on the insect and fungus communities in decaying wood

Phenological study in Kuhmo, an important monitoring tool for the assessment of climate change

Dr. Natalia Fedorets from Karelian Research Centre studying a soil profile in Kuhmo

Dr. Oleg Kuznetsov working with plant specimens during a joint expedition

Peat sampling during a joint expedition in Kuhmo

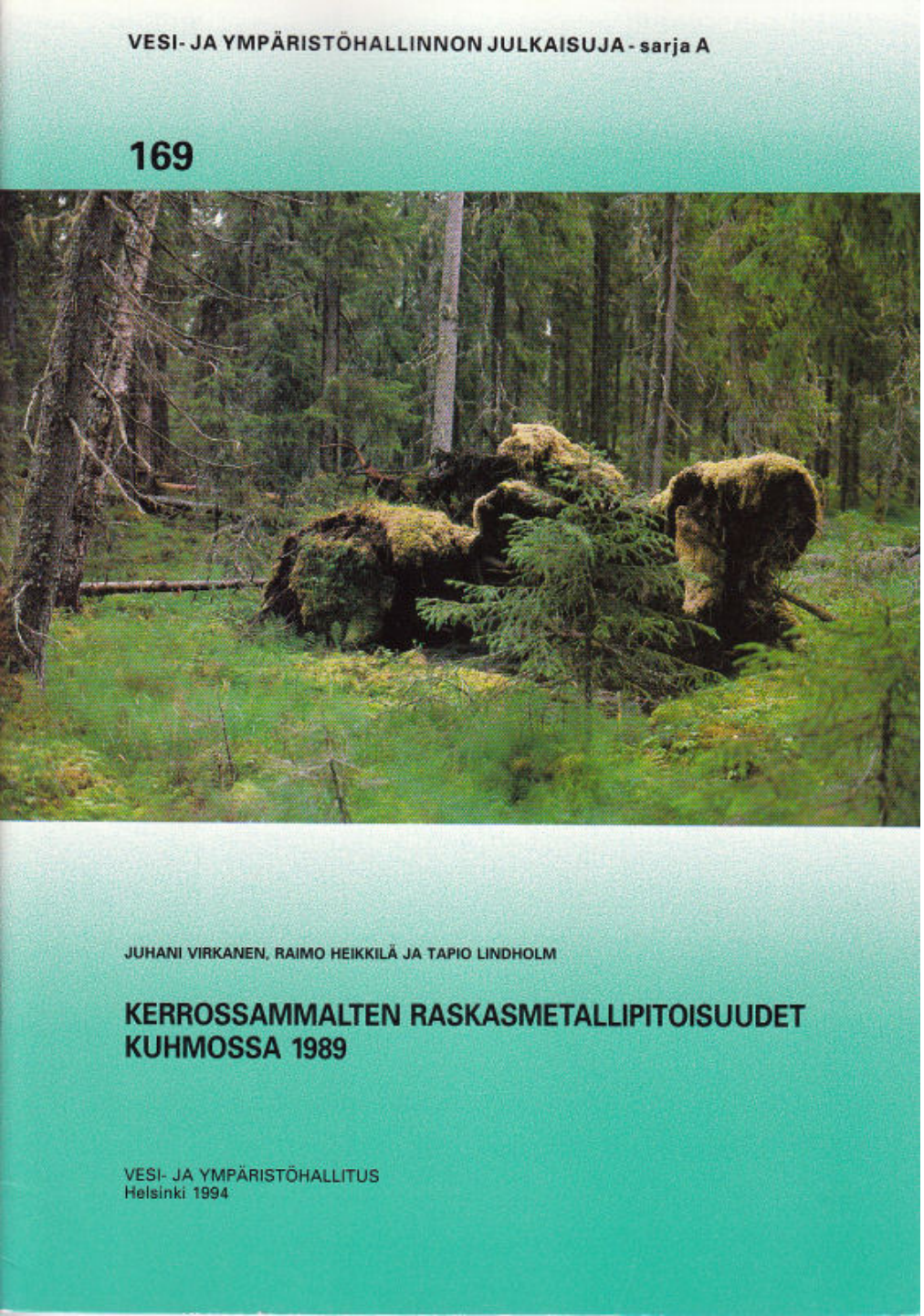
Peat sampling in winter in Ypäyssuo mire, Kalevala region

Joint botanical expedition in Vieljärvi, southern Karelia

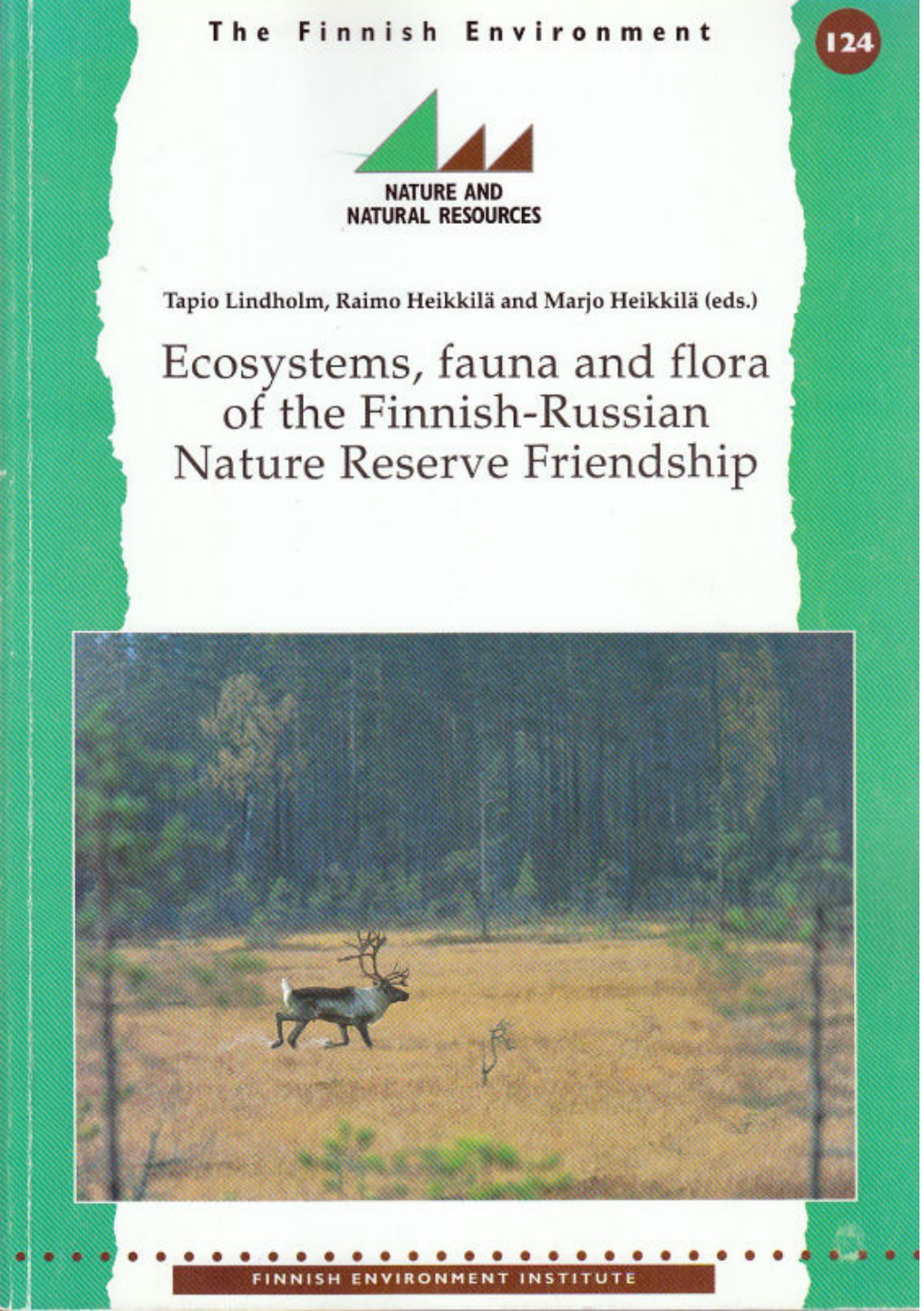
Publications

So far altogether over 400 publications

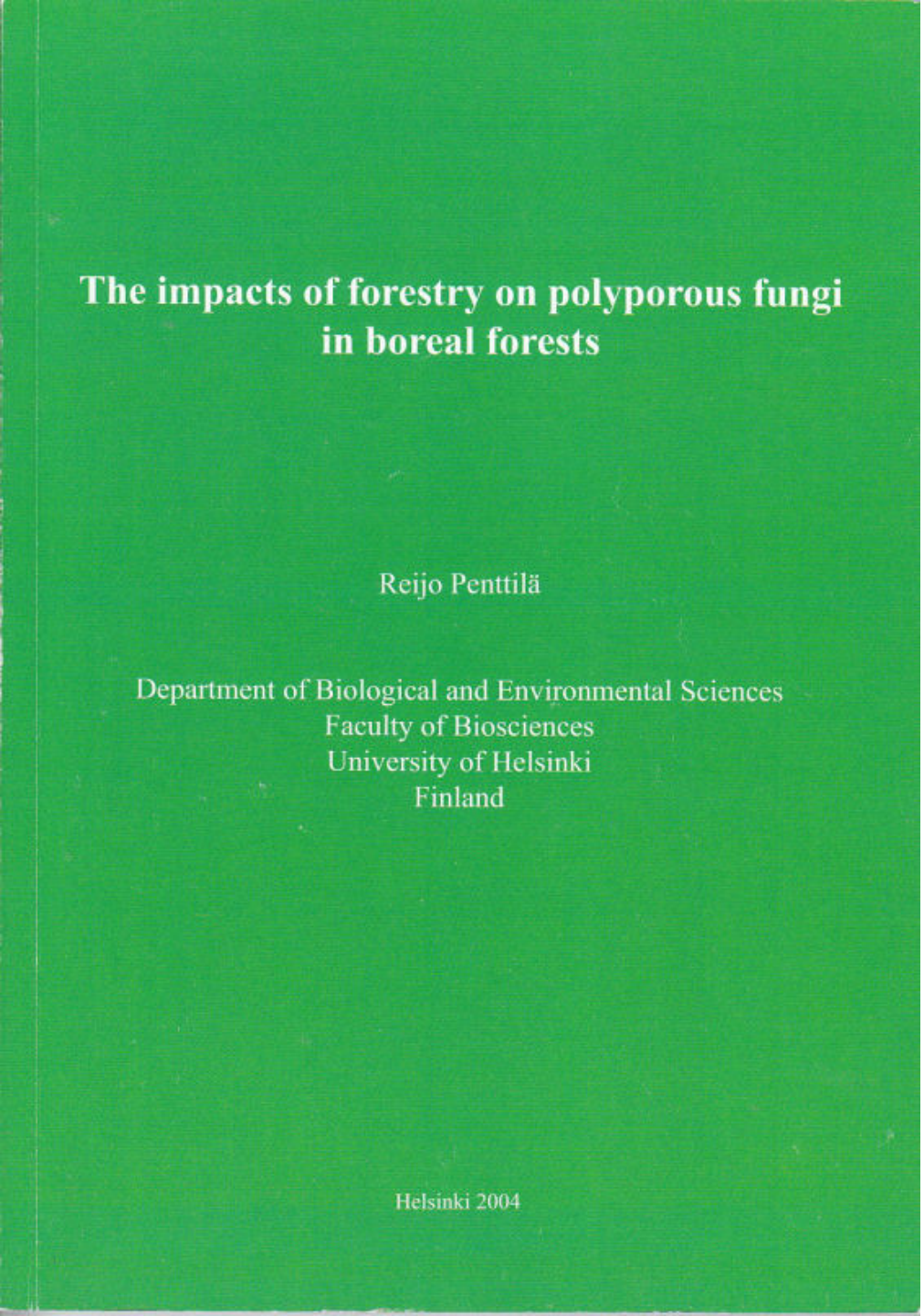
- Books
- Articles in journals
- Reports
- 11 dissertations and over 30 master’s theses



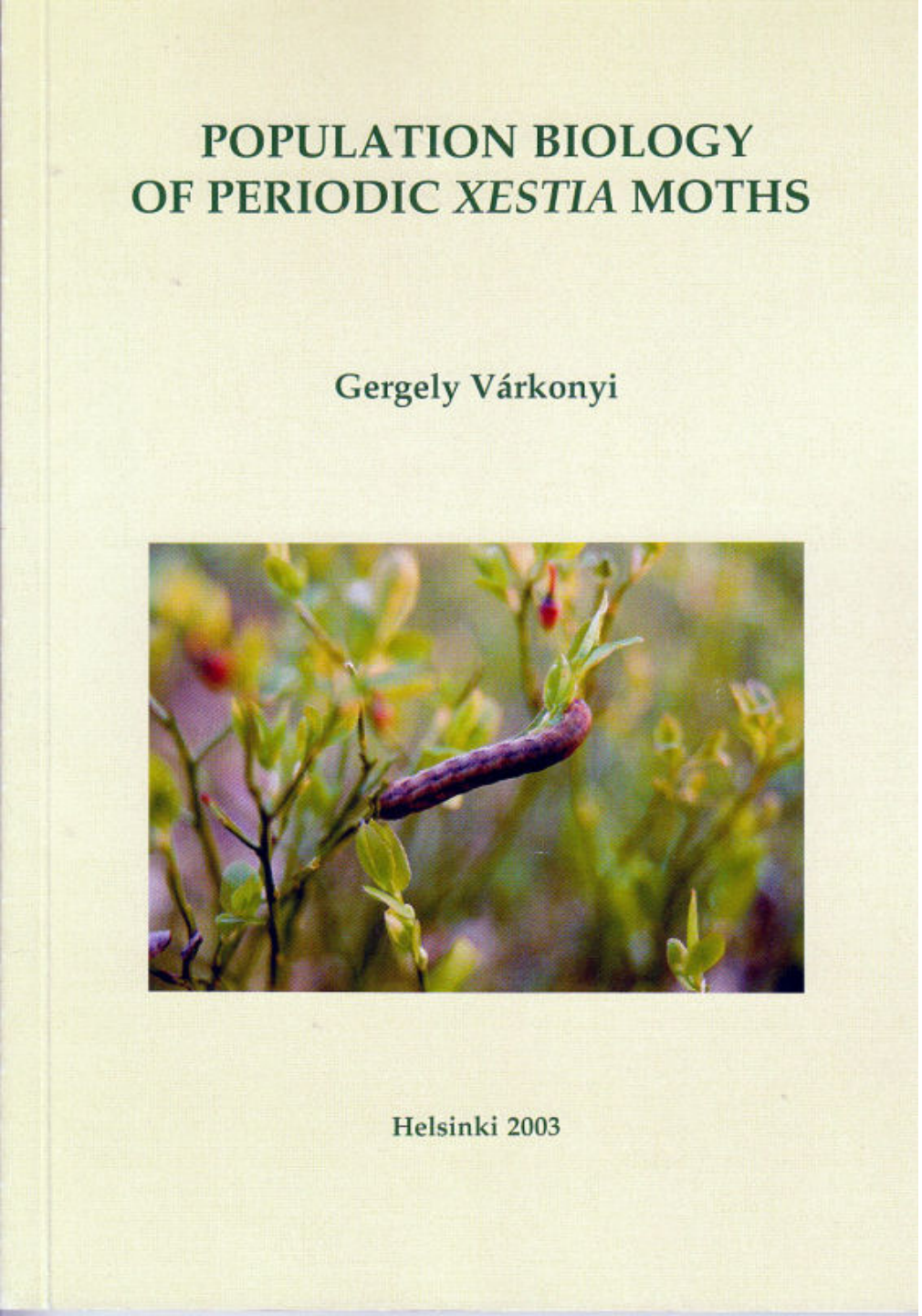
Result of the first project of Friendship Park Research Centre about heavy metal content in forest mosses in Kuhmo and adjacent region in Kostamus



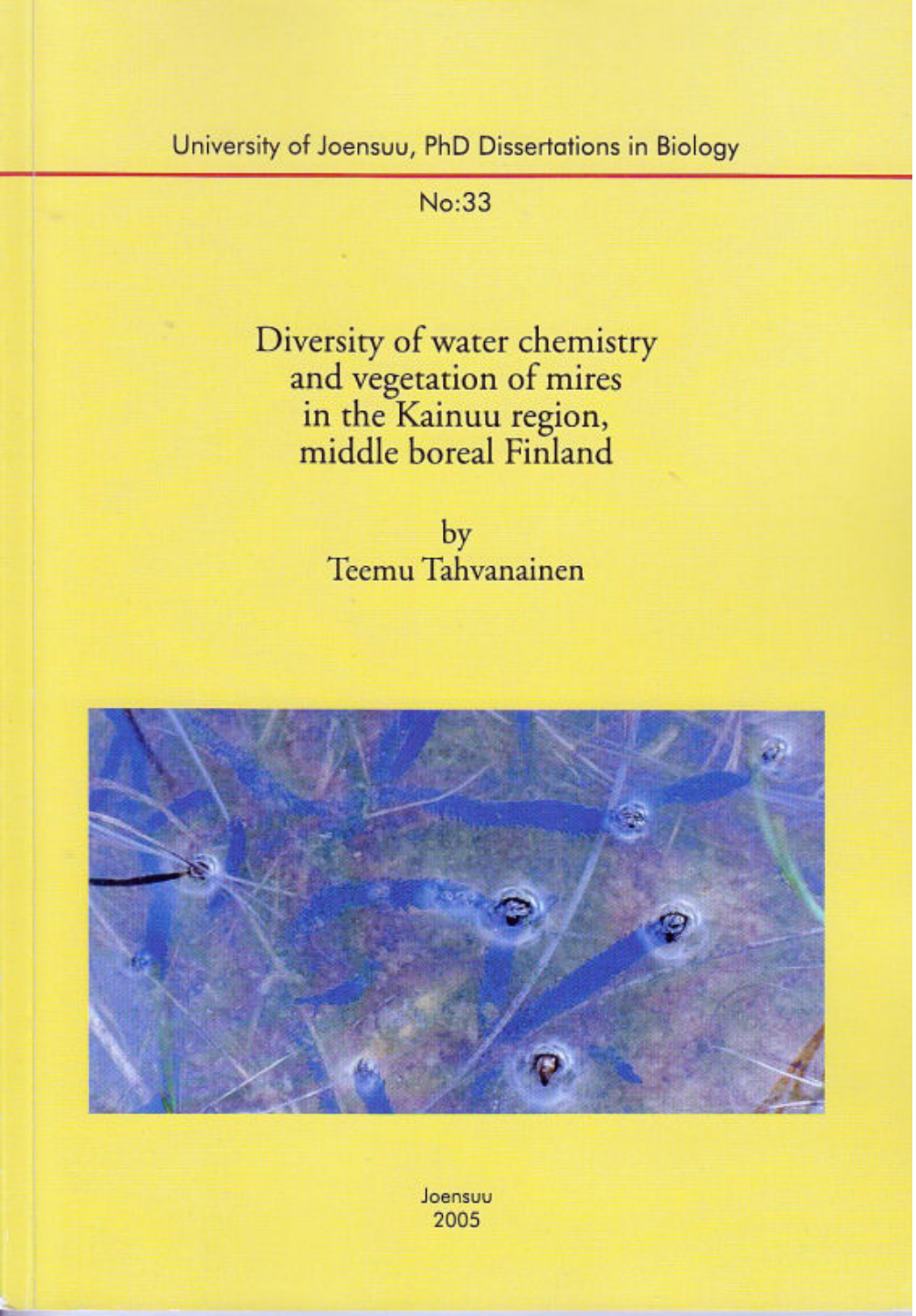
Proceedings of the first scientific symposium of Friendship Nature Reserve, organized in Kuhmo 1994



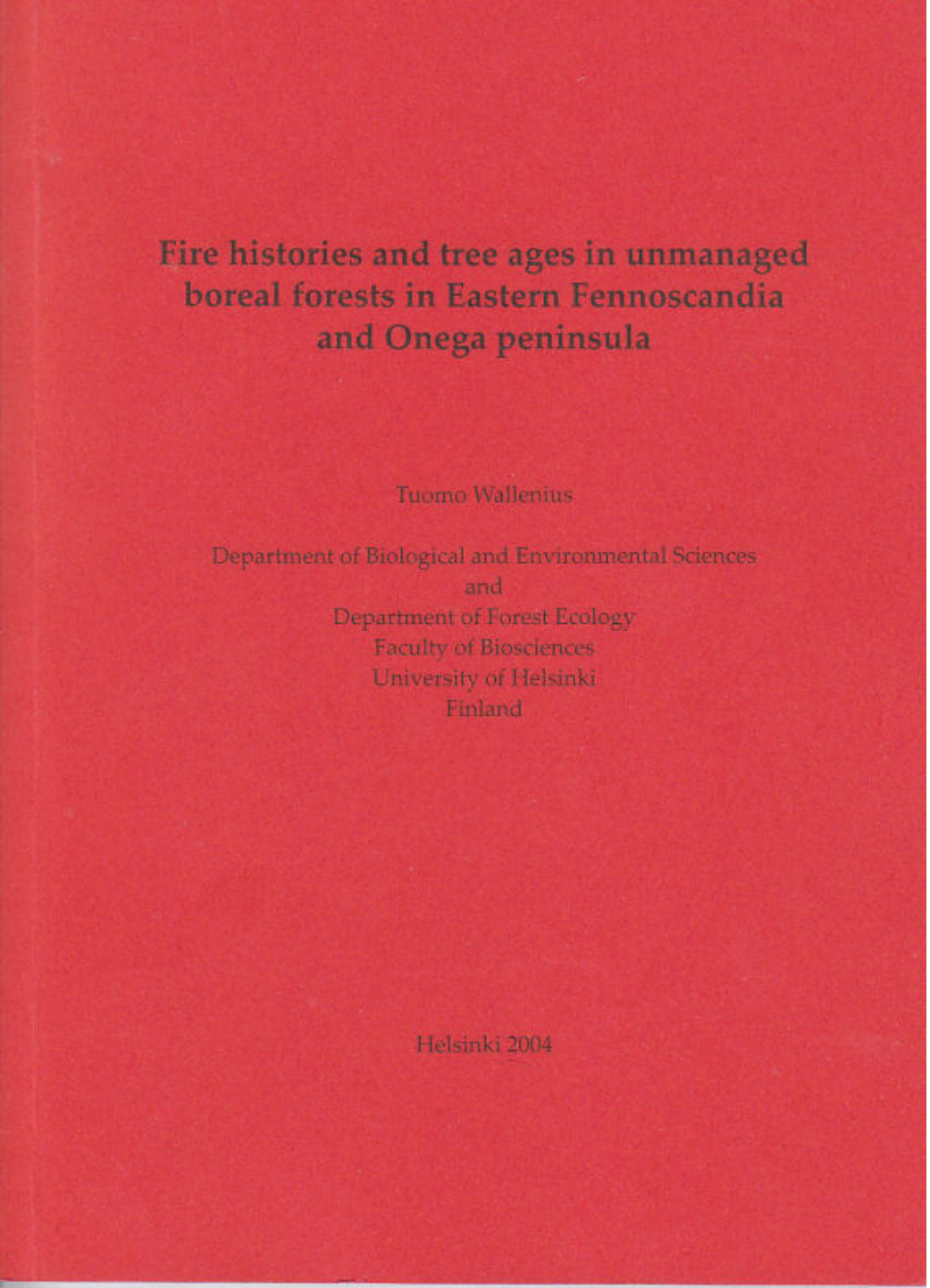
Doctor’s dissertation of Reijo Penttilä prepared in a joint project of Friendship Park Research Centre and Helsinki University



Dissertation of Gergely Várkonyi about moths in Kuhmo



Dissertation of Teemu Tahvanainen about mire ecology in Friendship Park



Dissertation of Tuomo Wallenius about forests in Kuhmo and adjacent Russian territory

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Helsinki 1997

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Suo 48(4): 93–114

Vegetation of Lishkmokh mire in Vodlozersky National Park, eastern Karelian republic, Russia

Karjalan tasavallan Vodlajärven kansallispuistossa sijaitsevan Lishkansuon kasvillisuus

Vladimir Antipin, Raimo Heikkilä, Tapio Lindholm & Pavel Tokarev

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Raimo Heikkilä, Kainuu Regional Environment Centre, Research Centre of Friendship Park, Tönölä, FIN-88900 Kuhmo, Finland (e-mail raimo.heikkila@kai.inet.fi)
Tapio Lindholm, Finnish Environment Institute, Nature and Land Use Division, P.O. Box 140, FIN-00251 Helsinki, Finland

The article presents the results of Finnish–Karelian co-operation in mire conservation research with the aim to study the diversity of mires in Finland and Russian Karelia on a uniform basis. The classification of mires in Finnish and Karelian schools of vegetation science has been compared. The vegetation of Lishkmokh mire has been studied using aerial photographs and field surveys. The area consists of ombrotrophic bog complexes as well as aapamires, all in a totally virgin state. As a result of the surveys, two maps of vegetation have been compiled. Results of vegetation analyses in releves have been presented in the form of tables and DCA ordination. According to the Finnish mire classification, 32 mire site types have been distinguished, which is a high number in an area of ca. 2 000 ha. On the basis of the high diversity of site types, and the occurrence of some rare plant species, e.g. *Juncus stygius, Drepanocladus vernicosus* and *Meesia triquetra* as well as some eastern species like *Rubus humulifolius* and *Polygonum bistorta*, the conservation value of Lishkmokh mire can be considered as very high.

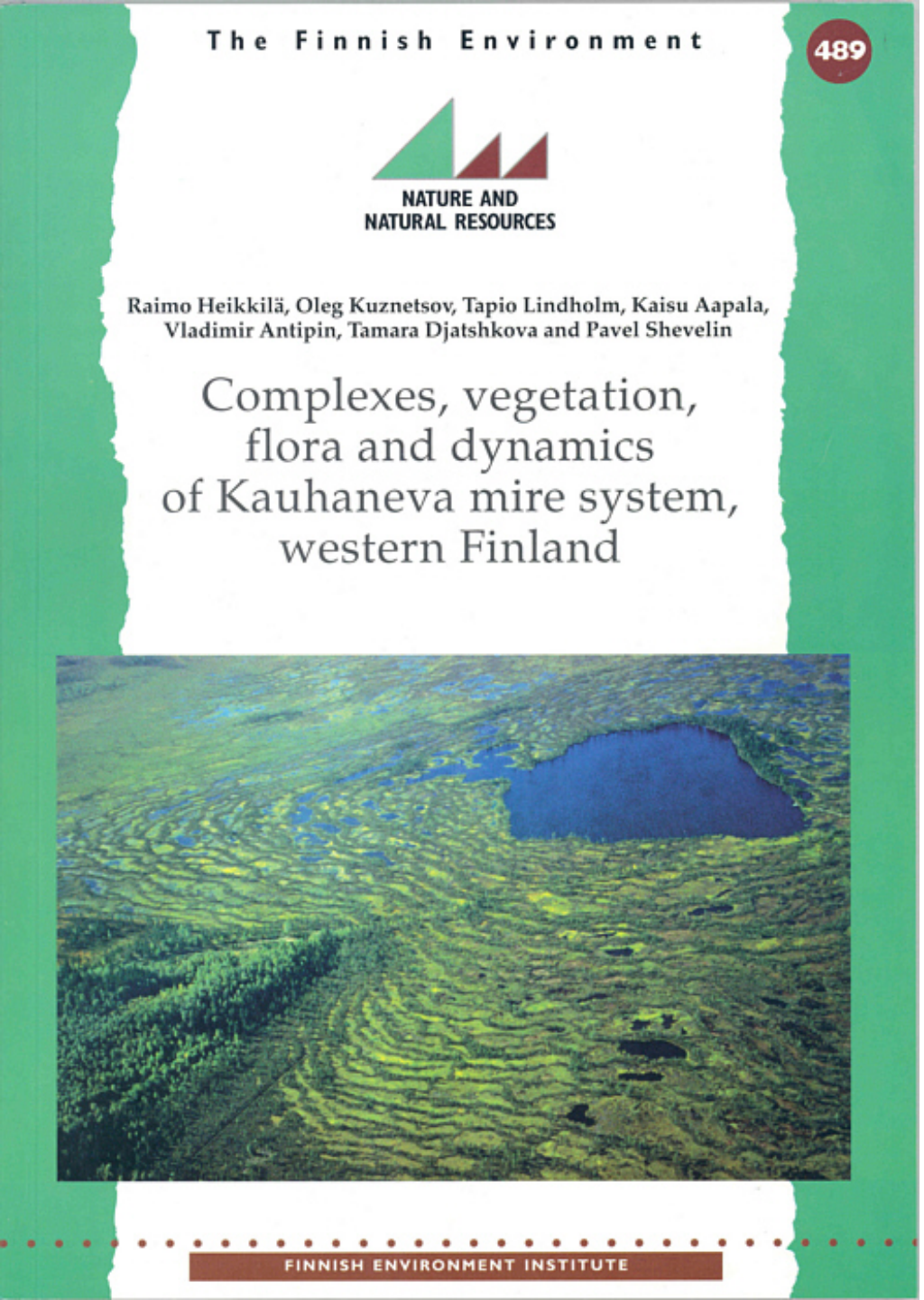
Key words: Karelia, mire classification, mire conservation, mire vegetation

INTRODUCTION

The Karelian school of mire science was formed by the middle 1970s. It was founded by E. Galkina, N. Pyavchenko and V. Lopatin, and developed further by G. Elina and R. Kozlova. They considered a mire as a specific natural object characterized by a constant or a long-term abundant moisture regime, predominance of hygrophilic vegetation, and peat accumulation.

Microcenosis, phytocenosis, mire sites, mire massifs and systems are major territorial objects

Result of joint studies on mire vegetation



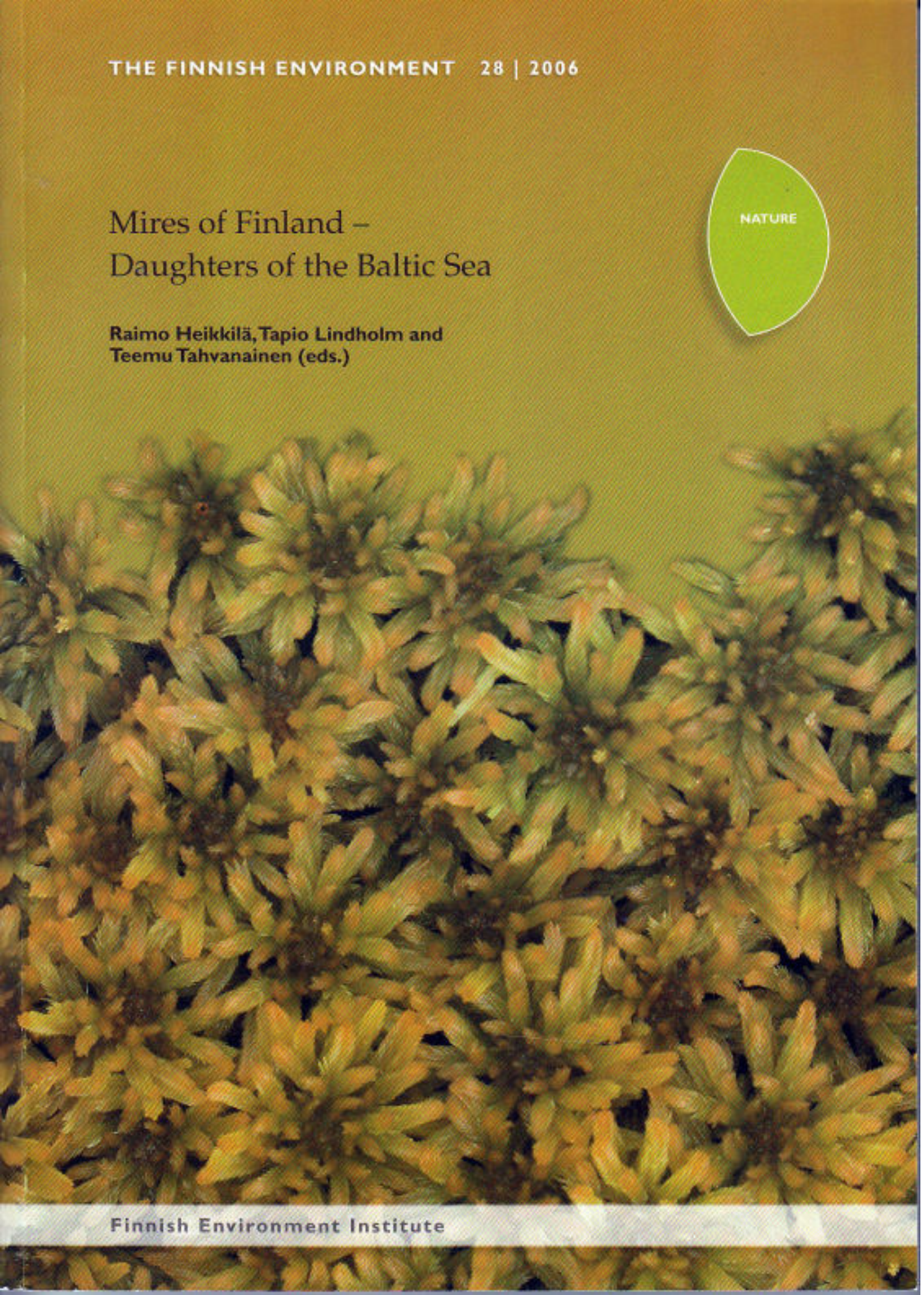
Result of joint mire studies

Network

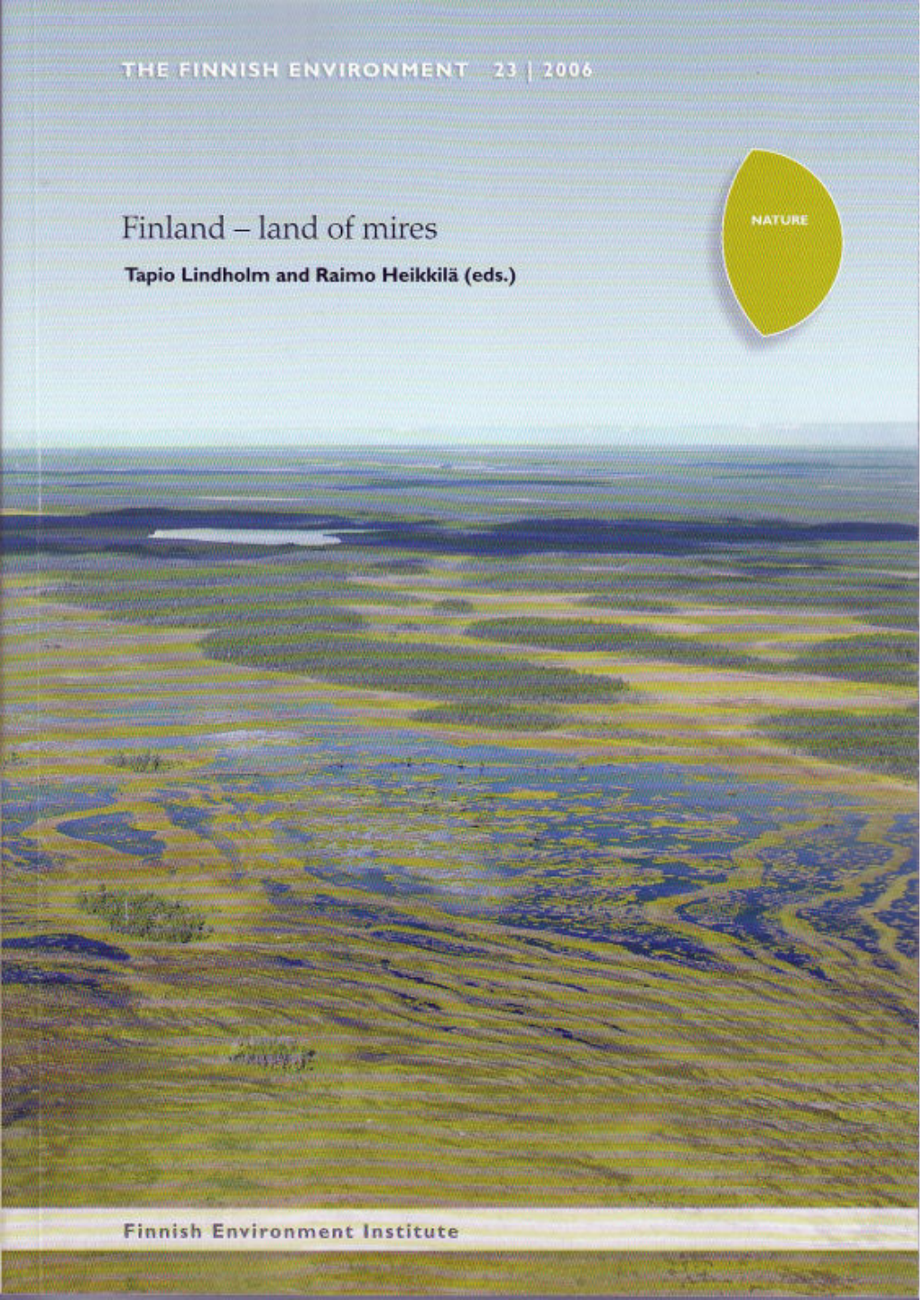
- Finnish and Russian universities, research institutes and authorities
- Universities and research institutes from 15 other countries

Dr. Leonid Rybalov from Moscow studying soil fauna in Kuhmo

Scientists from Heilongjiang Forest Academy, China studying mire restoration in Kuhmo



A book prepared in connection with International Mire Conservation Group symposium in Finland 2006 with active participation of Friendship Park Research Centre



Another book prepared in connection with International Mire Conservation Group symposium in Finland 2006, with active participation of Friendship Park Research Centre

Landscape Ecology **18:** 279–291, 2003.

Research article

Metapopulation dynamics of the bog fritillary butterfly: comparison of demographic parameters and dispersal between a continuous and a highly fragmented landscape

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Key words: conservation, Capture-Mark-Recapture, habitat fragmentation, patch size, specialist butterfly

Abstract

We investigated the effects of habitat loss and fragmentation on population functioning. We compared demography (daily and total population sizes) and dispersal (dispersal rate and dispersal kernels) of the bog fritillary butterfly in two 6-km^2 landscapes differing in their degree of fragmentation. In 2000, we conducted a Capture-Mark-Recapture experiment in a highly fragmented system in the marginal part of the species distribution (Belgium) and in a more continuous system in the central part of its distribution (Finland). A total of 293 and 947 butterflies were marked with 286 and 190 recapture events recorded in the fragmented and the continuous system respectively. Our results suggest that habitat loss and fragmentation affect dispersal more than demography. Although density was lower in the continuous system, it remains in the yearly range of variation observed on 10 generations in the fragmented system. However, in the fragmented system, the dispersal rate dropped drastically (39 vs. 64%) and females moved longer distances. Patch area had a significant effect on migration in the fragmented system only. From our results, we propose the definition of a new parameter, the minimal patch area (MPA) needed to establish a local population in highly fragmented landscapes.

Introduction

It is widely accepted that habitat loss and fragmentation of wildlife habitats are the main causes of the present biodiversity crisis (e.g., Wilcox and Murphy 1985; Saunders et al. 1991). Habitat fragmentation is assumed to (1) modify population demography, (2) limit individual movements and (3) induce loss of genetic variability, and is therefore considered to have detrimental consequences on the long-term survival of specialist species that strictly depend on remnant habitats (e.g., Soulé 1986; Hanski and Gilpin 1991; Saunders et al. 1991; Van Dongen et al. 1994; Saccheri et al. 1998). Nevertheless, depending on their dispersal power, specialist species may survive in highly fragmented landscapes as networks of more or less scattered local populations located in suitable habitat patches, interconnected by dispersal and in a stochastic balance between extinction and recolonisation, e.g., as a metapopulation (Levins 1969; Hanski 1991; Hanski and Gilpin 1997; Hanski 1999).

The conceptual model of metapopulation has proven to be a useful framework for conservation biology and has initiated numerous empirical and theoretical studies on the structure and dynamics of populations living in fragmented landscapes (e.g., Hanski et al. 1995; Hanski et al. 1996; Mousson et al. 1999; Thomas and Kunin 1999; Hanski 2001). As a consequence, considerable advances in the understanding of the structure and functioning of metapopulations in highly fragmented landscapes have been realised: metapopulation biology points out the importance of

Friendship Park has attracted also Belgian scientists

Presentations in symposia in several countries

Student courses and excursions of different universities (e.g. Helsinki, Vienna, Greifswald, St. Petersburg)

A GAP meeting in Vologda

LINKING THE WEST TO THE EAST: RUSSIAN-FINNISH MUTUAL "FRIENDSHIP" NATURE CONSERVATION AREA

Boris Kashevarov[1] & Raimo Heikkila[2]
[1]Kostomuksha Nature Reserve
[2]Research Centre of Friendship Park (Finland)

In 1990, for monitoring typical ecosystems of Central Fennoscandia, for studying rare and valuable plants and animals, and for outworking special measures for their protection and for propaganda of ideas of nature conservation and ecological education, the Finnish-Russian nature reserve "Friendship" was established. It has joined the Kostomuksha strict nature reserve (zapovednik) of Russia and 5 protected areas of Finland. All of them are situated near the Finnish-Russian frontier. These areas are situated on the slopes of the Maanselka ridge, which is a watershed between the basins of the White Sea and the Baltic Sea. This territory is of great scientific value as:

- It is situated in the zone of two milliards of years old tectonic activities and later on influenced by several glaciers;
- It is a region where significant areas of virgin northern taiga has been preserved. This taiga region is characterized by specific features (i.e. floristic poverty, great amount of mires, prevalence of pine forests in which several mire species grow and which during the period of their development were influenced by fires);
- The territory was only slightly disturbed by various activities during development of human culture;
- Nowadays a process of intensive industrialisation of the region has been started.

The areas of the Friendship park (Finland) supplement each other: it is the large lake Lentua of the same titled area; there are large mires in the area Juortanansalo-Lapinsuo and various pine and spruce forests of different ages in the areas Elimyssalo and Iso-Palonen & Maariansarkat; meadows in Elimyssalo and old-growth spruce forests in Ulvinsalo. Totally these Finnish protected areas have the same biodiversity as the Kostomuksha strict nature reserve, but these areas are like small islands of taiga surrounded by clear-cuttings. On contrary the boundaries of the Kostomuksha nature reserve are marked only by narrow (5 m) line of cut trees. All above-mentioned facts allow conducting scientific researches in wide scale.

The Kostomuksha strict nature reserve in Karelia has been established in 1983 on the territory of 47,5 thousand hectares. The area was chosen because a stock of wild forest reindeer remained here and in the river Kamennaya there are spawning grounds of

A joint article based on a presentation in a workshop in Paanajärvi National Park in 1999

A student from St. Petersburg state university doing summer practice in Kuhmo, 2004

Dr. Oleg Kuznetsov teaching in a mire ecology field course of Helsinki University in Kuhmo

Influence of the activities

- Scientific impact
- Influence on nature conservation
- Influence on environment awareness
- Employment in difficult regions

Landscape Ecology **17:** 699–710, 2002.

Estimating the consequences of habitat fragmentation on extinction risk in dynamic landscapes

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Received 27 September 2000; accepted in revised form 7 May 2002

Key words: Boreal forest, Connectivity, Habitat loss, Metapopulation dynamics, Regional stochasticity

Abstract

Analyzing the population dynamic consequences of spatio-temporal changes in landscape structure is a formidable challenge for spatial ecology. One key population dynamic process in fragmented landscapes is the influence of isolation on colonization rate and thereby on the occurrence of species in habitat fragments, but it is not obvious how isolation should be measured in landscapes that are affected by on-going habitat loss and fragmentation. We suggest the following procedure for the measurement of spatio-temporal isolation. First, a historical record of habitat loss and fragmentation in the landscape is prepared based on snapshots of the extent of the suitable habitat for the focal species. Second, a metapopulation model is used to simulate the occurrence of the species in this landscape, assuming the empirically observed landscape change. The model-predicted pattern of habitat occupancy at a particular point in time (usually the present time) is then compared with empirical observations on the occurrence of the species. We describe a metapopulation model that has been constructed for this purpose, and we apply it to a changing landscape of boreal forests in eastern Finland. We give an example on the occurrence of four threatened polyporous fungi in 18 small fragments of old-growth forest. In none of the species does the current isolation of the fragments nor the time since their isolation explain the occurrence of the species in the study fragments, but in three species the model-predicted occupancy probability had a significant effect on the observed abundance of the species. The model-predicted occupancy probabilities were also calculated by ignoring past landscape changes, that is, by assuming that the landscape had remained in the present configuration for a long time. These probabilities had a significant effect on the abundance of only one of the four species, suggesting that the occurrence of the species tracks landscapes changes with a noticable time lag.

Introduction

Habitat loss and fragmentation are the primary causes of population, metapopulation and species extinction worldwide (Heywood 1995). Unfortunately, obtaining reliable empirical information about the population dynamic consequences of habitat fragmentation across large spatial scales is difficult. Long-term and large-scale experiments would provide the most conclusive results, but such experiments are expensive and it takes a long time before the results would be available. What experimental results there are typically involve isolated and relatively small habitat fragments (Lovejoy et al. 1984; Robinson et al. 1992; Margules 1996; Debinski and Holt 2000), whereas the most significant questions about habitat fragmentation concern the capacity of entire fragmented landscapes to support viable metapopulations (Hanski and Ovaskainen 2000). 'Natural experiments' (non-experimental observations of the occurrence of species) on the effects of habitat fragmentation (e.g., Harris (1984); Heckert (1994) and Settele et al. (1996)) are

Example of a highly cited scientifically influential article prepared in a Friendship Park project

Karjalan SANOMAT
Keskiviikkona, 18. kesäkuuta 2003

YHTEISTYÖ

Suomalaiset uskovat lakan viljelyhankkeen onnistumiseen

Suomalaiset uskovat lakan viljelyhankkeen onnistumiseen. Lakan viljelytutkimusta tekee Kuopion yliopiston soveltavan biotekniikan instituutti. Viljelytutkimuksia tehdään Maatalouden tutkimuskeskuksen Kainuun tutkimusasemalla Sotkamossa. Koulutuksesta ja neuvonnasta vastaa Kainuun maaseutukeskus. Lakan viljelykoetta rahoittaa Interreg III A Karjala. Tärkeimmät yhteistyökumppanit ovat Karjalan tasavallan tiedekeskuksen suontututkimusosasto sekä Norjassa Tromssan yliopisto ja sikäläinen maatalouden tutkimusasema.

Mikko Ollikainen

– Suomessa lakan viljelykokeita on suoritettu jo yli 30 vuotta, Karjalan tiedekeskuksen suontutkimusosaston johtaja Oleg Kuznetsov kertoo.

TANJA KARHU
Karjalan Sanomat

Luonnonsuolta saatu paras lakkasato on 30 kiloa hehtaarilta, mutta viljellystä lakasta odotetaan ainakin kaksinkertaista satoa. Esimerkiksi Norjassa on viljellystä lakasta odotettavissa sato jopa 250 kiloa hehtaarilta.

Lakan viljelymahdollisuuksien selvitys katsotaan tarpeelliseksi, kun lakkasadot vaihtelevat vuosittain. Viljelyllä pyritään saamaan tasainen sato joka vuosi. Suomessa tutkitaan myös kaksineuvoisia kantoja, joissa heteet ja emit ovat samassa kukassa. Näissä kannoissa kaikki kukat tuottavat marjaa.

Tutkimuksissa on havaittu, että suo voi olla täynnä lakan hedekukkia. Marjoja ei kuitenkaan muodostu, jos paikalla ei ole hedelmöityviä emikukkia.

Etenkin Lapissa on kiinnostusta lakkasadon lisäämiseen ja siihen vaikuttavien haittatekijöiden poistamiseen. Marjanjalostajat ostaisivat lakkaa enemmänkin, jos sitä olisi saatavissa.

Viljelykokeet eivät ole aktuaalisia Karjalassa

– Esimerkiksi Amerikassa karpalon viljelykokeita on suoritettu jo noin sata vuotta. Norjassa ja Suomessa lakkaa on kasvatettu keinotekoisissa oloissa yli 30 vuotta, Karjalan tiedekeskuksen suontutkimusosaston johtaja Oleg Kuznetsov kertoo.

Soita on Karjalassa tutkittu jo monta vuotta. Suontutkimusosastossa toimii suuri henkilökunta. Asiantuntijat tutkivat soiden kasvillisuutta, ekologiaa ja kehityshistoriaa ja suorittavat muita tutkimustöitä.

– Suolla kasvavat marjat ovat osaston päätutkimusala. Pohjoismaiden asukkaat käyttävät marjoja ruokatarvikkeina, vitamiinilähteinä ja lääkekasveina, Kuznetsov selittää.

Yhteinen lakanviljelyhanke aloitettiin vuonna 1998 ja se päättyi vuonna 2001. Nykyisin Suomi ja Karjala toteuttavat projektin toista vaihetta, jonka tarkoituksena on koota tarvittavaa materiaalia Karjalan alueelta.

Suontutkimuslaboratorion osuus hankeessa on pieni. Lakan viljelykokeet eivät ole aktuaalisia Karjalassa, jossa on paljon luonnonsoita. Juuri sen takia Karjalan ja Suomen tiedemiehet tekevät yhteisiä retkiä lakkasoiden tutkimiseksi.

Suomessa monet suot kadonneet

Lakka on hyvin oikullinen marja. Karjalan eteläalueella lakkasadot ovat pienempiä kuin pohjoisessa. Hilla kukkii toukokuun lopussa, jolloin hallat uhkaavat marjaa. Lakkasadot vaihtelevat vuosittain. Suomuurain kasvaa tundravyöhykkeellä, Vienanmeren rannikolla. Eniten hillaa kasvaa Belomorskin ja Kemin piireissä.

Sekä venäläiset että suomalaiset ovat kiinnostuneita lakan kasvatusmahdollisuuksien parantamisesta. Suomessa lakka on myös kansallinen marja, vaikka sitä ei poimita sangoittain kuin Karjalassa. Monet lakkasuot ovat kadonneet Suomesta soiden kuivaamisen takia.

– Lakan viljelykokeiden suorittamiseksi otetaan vain parhaita marjoja. Viime vuonna suomalaisissa lehdissä ilmoitettiin kilpailusta, jonka päätavoitteena oli saada toimitukseen kaikista suurin marja. Kilpailuun otti osaa ihmisiä eri puolilta maata. Suomalaiset lähettivät kuudenkin gramman painoisia marjoja. Tavallinen marja painaa noin kaksi grammaa, suontutkimusosaston johtaja kertoo.

Suomalaiset ovat valmiit järjestämään sellaisia kilpailuja myös Karjalassa. Kuznetsovin mukaan parhaista lakkapaikoista kertovat pikemminkin suomalaiset eikä karjalaiset. Monilla suomalaisilla on yksityisiä lakkapeltoja, mutta karjalaiset pelkäävät, että joku vieras tulee heidän paikalleen marjoja poimimaan.

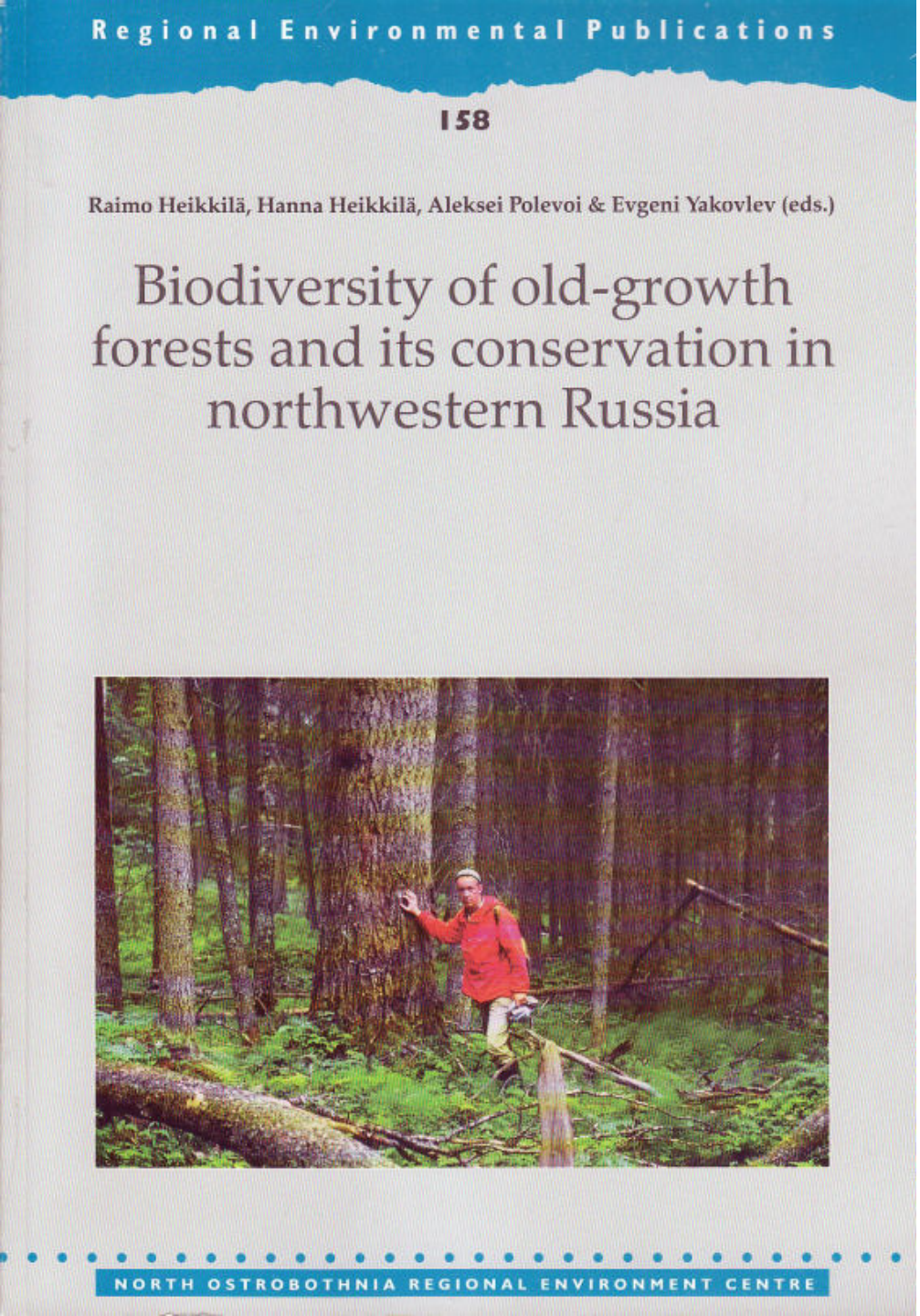
A Finnish-Russian-Norwegian project supports the cultivation of cloudberry to improve livelihoods in the boundary region

Environmental education: a school group from Kuhmo visiting Kostamus Nature Reserve

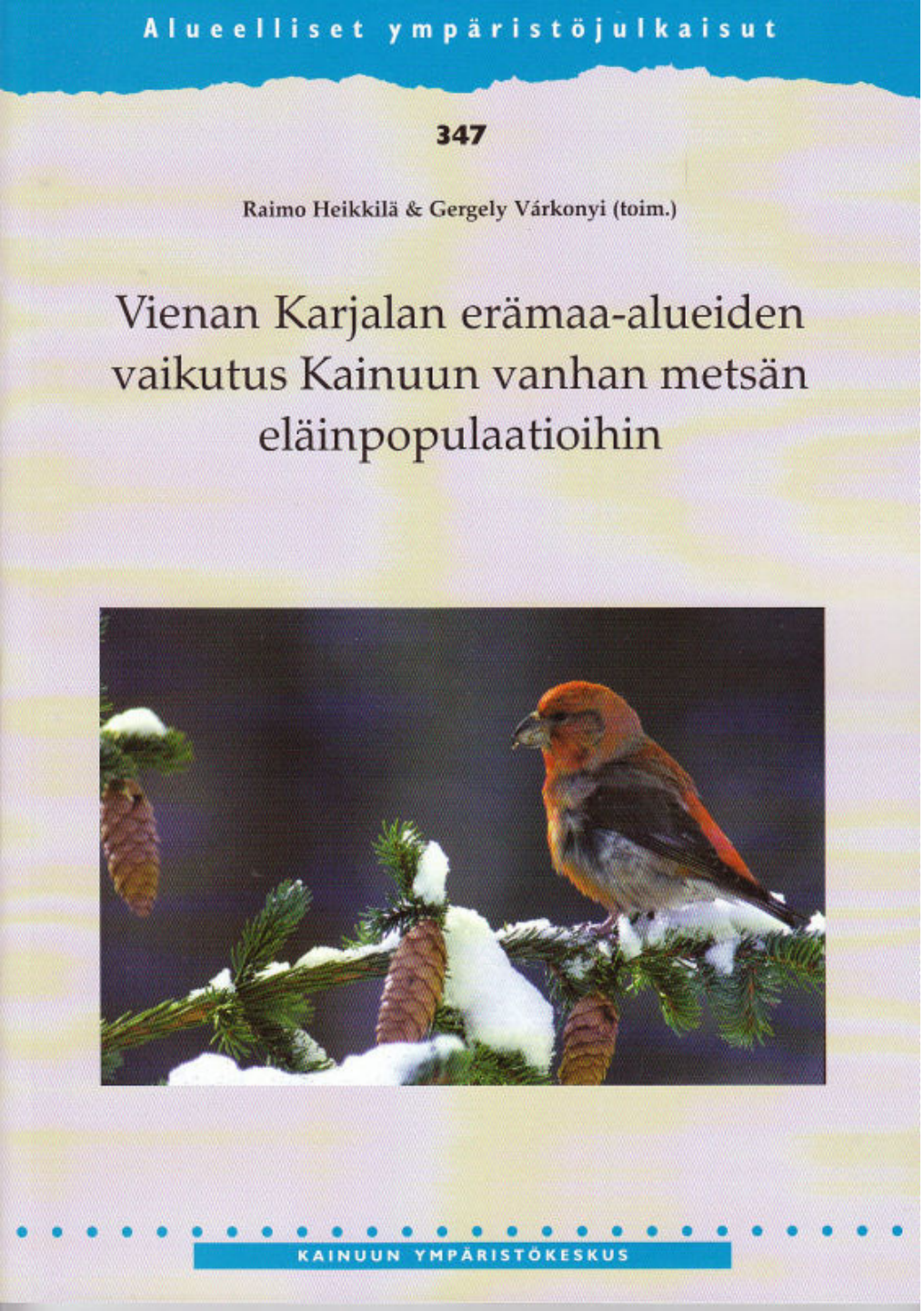
Environmental education: a group of school teachers from Karelia visiting Kuhmo

Establishing a national park in Vodlozero in 1990 in Russian-Finnish cooperation

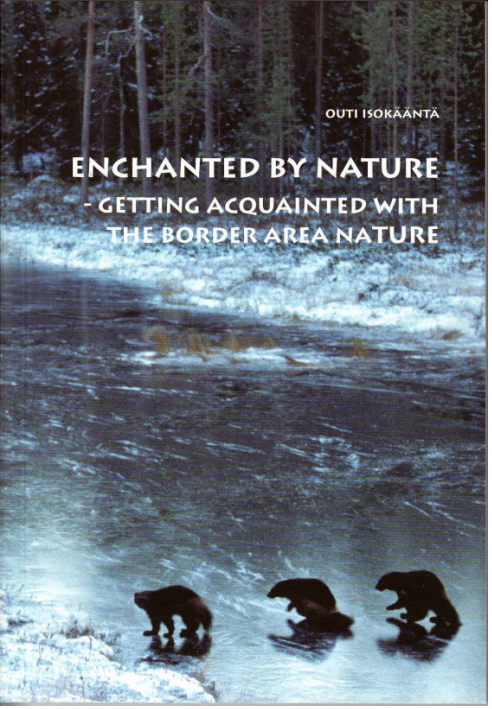
Discussing the Fennoscandian Green Belt in 1995, chaired by M. Feshenko

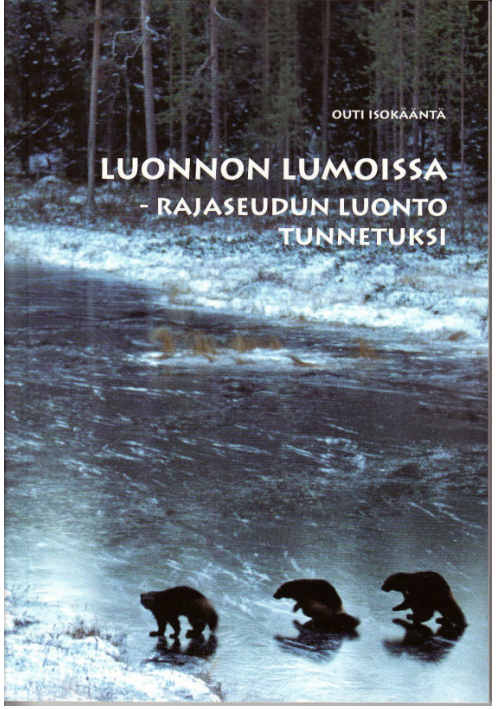


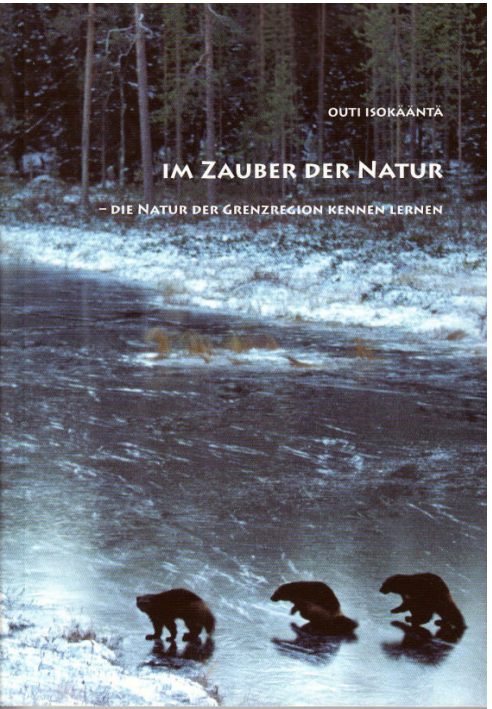
Scientific studies supporting the establishment of Kalevala National Park and the extension of Kostamus Nature Reserve

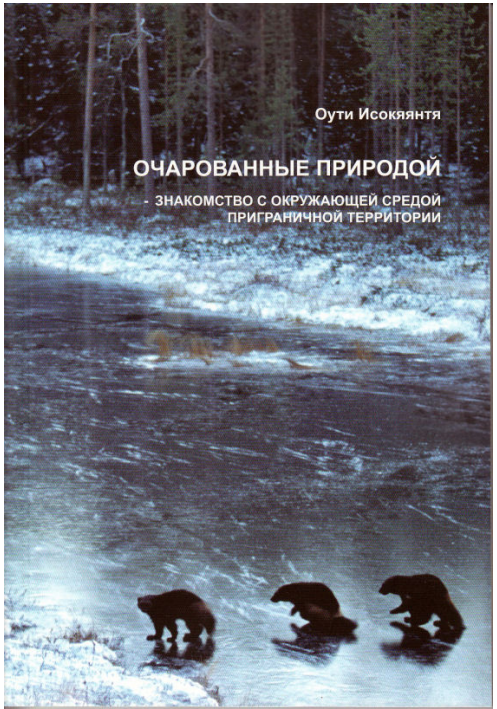


A study supporting the development of nature tourism in the boundary region









Popular book on the nature in the boundary region: a synthesis of numerous studies to add the awareness on nature and to support tourism marketing