

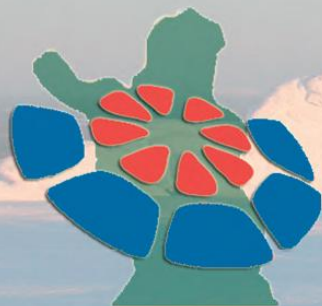
Northern Research Platform



# **Long-term Socio-ecological Research platform (Northern LTSER Platform) – cooperation in Finland: Possibilities and challenges for long-term socio-ecological research**

*Laine Kari, Järvinen Antero, Luoto Miska, Siikamäki Pirkko, Pohjonen Veli, Saikkonen Kari, Inkeröinen Jouko, Jussi Paatero and Riku Paavola*

*SAON / LTSER Finnish Perspectives*



Northern Research Platform



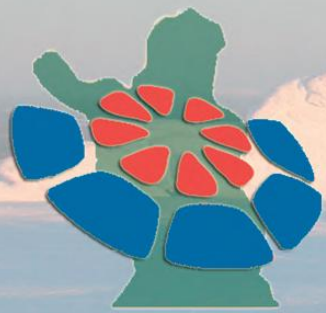
## **Finnish Perspectives:** Challenges and opportunities

### **Northern Long-Term Socio-Ecological Research Platform (Northern LTSER platform)**

– a new tool for collaborative research in Northern Finland

Northern LTSER Platform, founded as a part of Finnish LTER Network in 2007, constitutes an environmental transect from northern boreal forest landscapes to arctic tundra.



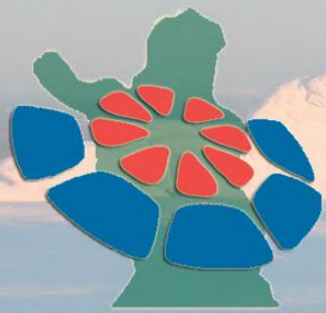


*Northern Research Platform*



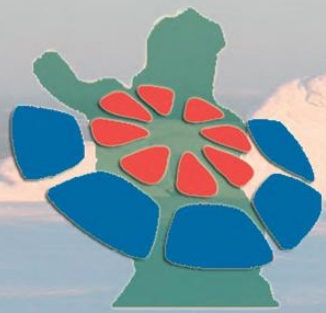
## **The main aim of the Northern LTSER Platform**

is to pool long-term research activities and monitoring data of the northernmost university research stations in Finland under five research themes related to socio-ecological changes in northern nature and communities.



## Partners

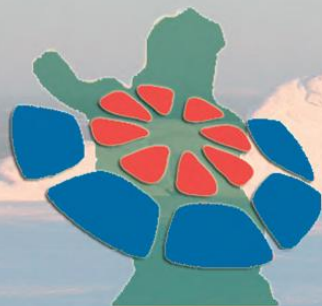
- *Thule Institute, University of Oulu, Finland, (Oulanka res. station)*
- *Kilpisjärvi Biological Station, University of Helsinki, Finland,*
- *Värriö Research Station, University of Helsinki, Finland,*
- *Kevo Subarctic Research Station, University of Turku, Finland*
- *Finnish Meteorological Institute, Finland,*
- *Forest Research Institute (Rovaniemi, Kolari and Muhos)*
- *Environmental Research Institute SYKE,*
- *Geological Survey in Finland,*
- *Game and Fisheries Research Institute,*
- *other national research institutes*



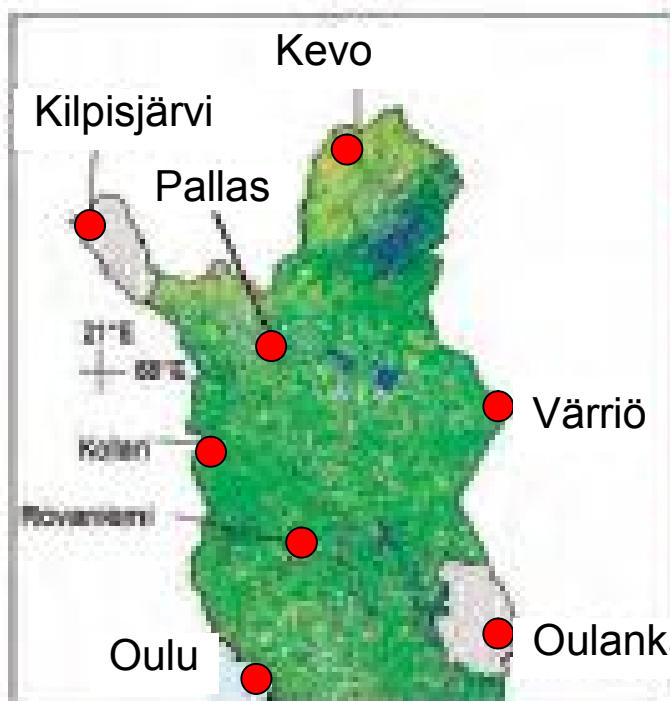
## PLATFORM STRUCTURE

The Platform consists of two LTSER-areas and additional LTER-sites and supportive facilities and monitoring programmes by research units of Finnish Forest Research Institute.

**A network of university research stations and northern units of research institutes** offers the infrastructures for conducting collaborative research, laboratory facilities, competent personnel and office as well as accommodation facilities for visiting scientists.



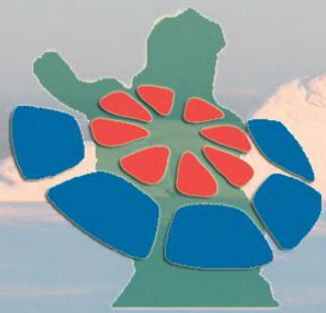
## Northern Research Platform



The Platform consists of two LTER-areas (Kuusamo and Enontekiö) and additional LTER-sites (Kilpisjärvi, Kevo, Oulanka, Pallas and Värriö) and supportive facilities by research units of Finnish Forest Research Institute. LTER-sites focus on monitoring natural systems and processes whereas LTER-areas deal with socio-ecological systems that emerge through the interaction between ecosystems and socioeconomic systems.

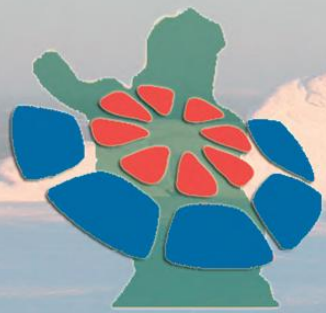
- LTER-site
- LTER-area

*Thule Institute, University of Oulu, Finland, Kilpisjärvi Biological Station, University of Helsinki, Finland, Värriö Research Station, University of Helsinki, Finland, Kevo Subarctic Research Station, University of Turku, Finland, Finnish Meteorological Institute, Finland, Forest Res. Institute, Environmental Res. Institute SYKE, Geological Survey in Finland, Game and Fish Res. Institute, other national res. institutes*



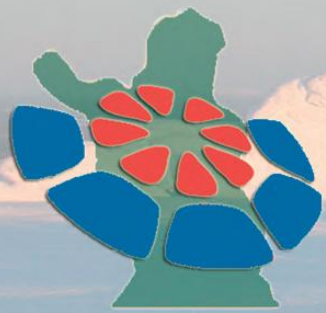
## **RESEARCH OBJECTIVES**

- To study population dynamics and productivity of populations living in northern and peripheral conditions
- To assess the effects of global change on northern ecosystems
- To study importance of the environment and environmental changes to livelihoods and people's welfare
- To study the complexity and support the practice of information management within long-term socio-ecological research collaboration



## **RESEARCH THEMES**

- A. Population dynamics and productivity of plant and animal populations living in the periphery of their distribution**
- B. Effects of global change on northern ecosystems**
- C. Changing society and livelihoods in rural and peripheral areas**
- D. Human health and wellbeing in northern communities**
- E. Information management and research infrastructure for scientific collaboration**



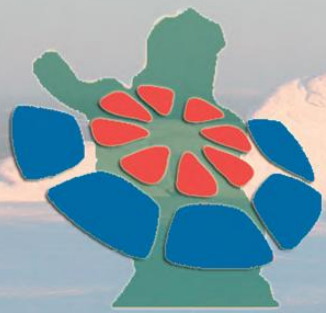
## **RESEARCH THEMES**

### **A. Population dynamics and productivity of plant and animal populations living in the periphery of their distribution**

- Monitoring a wide spectrum of plant and animal life history parameters over long periods of time to separate natural noise from unnatural alarming signals

### **B. Effects of global change on northern ecosystems**

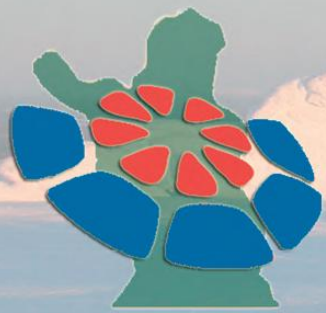
- Potential impact of climate change on the distribution and function of northern ecosystems
- Effects of heavy metal, mercury and nitrogen load on the northern environment.
- Changes in UV and stratosphere ozone and their effects on northern ecosystems
- Climate gases fluxes (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O) in northern environment



## RESEARCH THEMES

### **C. Changing society and livelihoods in rural and peripheral areas (the 'S' –component in LTSER)**

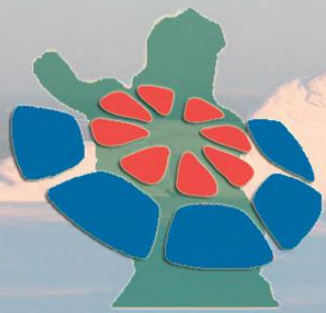
- How the policies of developing rural and peripheral areas do support ecological, social, cultural and economic dimensions of sustainable development in local level?
- Social impacts of environmental conservation at local level and social impacts of using natural resources at local level?
- Developing the methods to monitor socioecological impacts of tourism and measure the effectiveness of the development efforts towards sustainable tourism



## **RESEARCH THEMES**

### **D. Human health and wellbeing in northern communities (the 'S' –component in LTSER)**

- Consequences of ecosystem change for human wellbeing
- Building up a network of communities located in the Northern Finland - the dwellers' knowledge of environmental changes (e.g. signs of climate changes) and experienced health and wellbeing are studied and monitored at regular intervals.

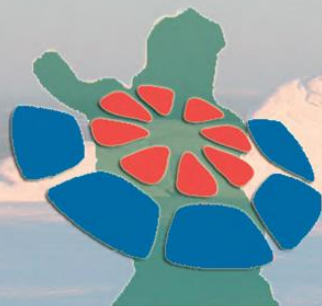


## RESEARCH THEMES

### **E. Information management and research infrastructure for scientific collaboration**

- Promotion of a collaborative socio-technical approach to the development of information infrastructure and practices in an incremental, processlike manner as a part of the evolving practices and conventions of LTSER scientific collaboration.
- Long-term development of information management to optimally account for and support the evolving ways of doing LTSER science

**Work in progress!**

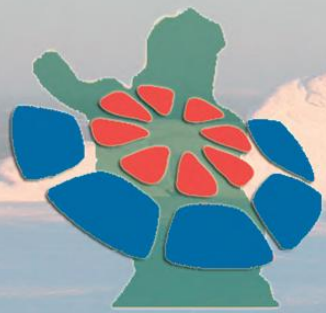


## AVAILABILITY OF THE DATA

- 1. In general the long-term data series are available** for the national and international research community in the archives at the research station and/or with the permission of the group leaders. **Work in progress!**
- 2. Birth cohorts of Northern Finland:** (<http://kelo oulu.fi/NFBC/index.html>) give a lot information about the Well-being and Health of population in northern Finland.
- 3. The automatic measurements** of Pallas and Värriö site (O<sub>3</sub>, NO, SO<sub>2</sub>, aerosol, photosynthesis, sulphates, weather etc.) co-ordinated University of Helsinki and Finnish Meteorological Institute etc
- 4. Statistical material** about the development of the rural areas in Finland and the types of Finnish rural areas
- 5. There are also monitoring programmes** covering the whole country or Northern Finland ( forest monitoring projects of Metla) ICP Forests (UN/ECE)/Forest Focus (EU) Level II Programme,

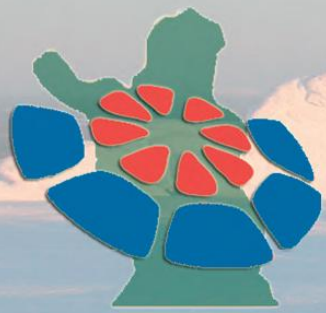
**List of networks that the LTSER-area or part of it belongs**

<i>Category</i>	<i>Name</i>	<i>LTSER/LTER-site or whole platform</i>
<b><i>a) National and/or international ecological research networks</i></b>	University of Arctic	KIL, KUU
	SMEAR	VÄR
	SCANNET Scandinavian/North European network of field bases	KIL, KUU, KEV
	ITEX International tundra experiment	KIL
	SEDIFLUX	KEV
	NORNET Northern Environmental Research Network	platform
	RERN, Recreation Research Network	KUU
	ICP Forest (UN/ECE)	KUU, ROI
	ICP Integrated monitoring	KUU, ROI
	ICP Vegetation	platform (Heavy metal sites)
	CALM – Circumpolar Active Layer Monitoring	KEV
<b><i>c) National and/or international social research networks</i></b>	ECONOR IPY	platform
<b><i>d) National and/or international socio-cultural monitoring networks</i></b>	PANParks Research Network	KUU
<b><i>e) National and/or international multidisciplinary research, education- or development networks (e.g. biosphere reserves)</i></b>	LAPBIAT Lapland atmosphere-biosphere facility	KIL, KUU, VÄR, KEV
	IMAGE – International Monitor of Auroral Geomagnetic Effects	KEV
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	FDSN – Federation of Digital Broad-Band Seismographic Networks	KEV



## ■ **Some key aspects**

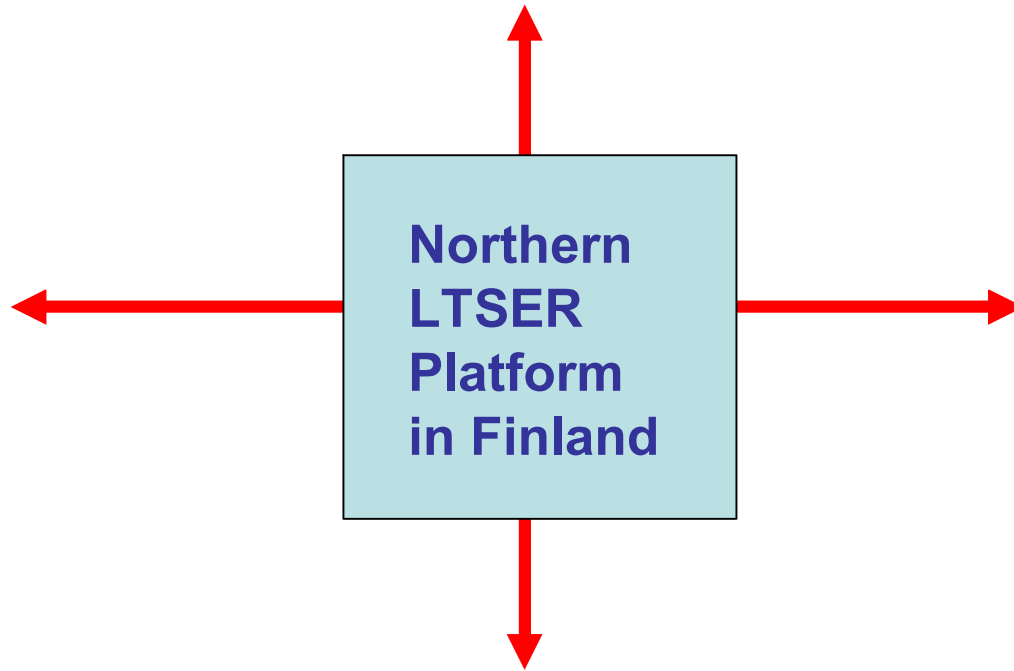
- **INFORMATION MANAGEMENT**
- **E - SCIENCE**
- **RESEARCH INFRASTRUCTURE**
- **COLLABORATION WITH TECHNOLOGY DEVELOPERS**
- **EDUCATION AND COMMUNICATION**
- **LOCAL PARTICIPATION**



*Northern Research Platform*

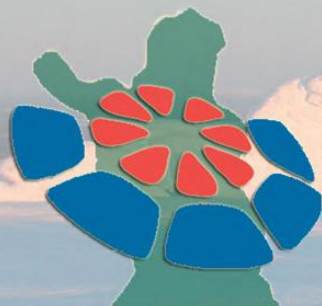


**SAON**



**JAPAN ?**

**European  
LT(S)ER  
Network etc**



Northern Research Platform



## CONTACT INFO

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email: kari.laine@oulu.fi



[www.environment.fi/syke/ltser](http://www.environment.fi/syke/ltser)

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- 4) University of Helsinki, Värriö Research Station, FIN- 98800 SAVUKOSKI
- 5) University of Turku, Kevo Subarctic Research Station, FIN- 99980 UTSJOKI
- 6) Finnish Meteorological Institute, P.O.Box 503, FI-00101 Helsinki
- 7) Finnish Forest research Institute (Rovaniemi), PL 16 (Eteläranta 55), 96301 ROVANIEMI



University of Oulu

# University of Oulu Focus Areas



## **Information technology and wireless communications** (Infotech Oulu)

- wireless communication, mobile applications, electronics, photonics, nanotechnology, machine vision, intelligent systems, ubiquitous information technology, and wellness technology



## **Biotechnology and molecular medicine** (Biocenter Oulu)

- molecular and cell biology, molecular enzymology, molecular genetics, evolutionary biology, bioprocess engineering, population genetics, and the central biological and medical aspects of cardiovascular diseases and systemic connective tissue diseases



## **Northern and Environmental issues (Thule Institute)**

- Global Change in the North, Northern Land Use and Land Cover as well as Circumpolar Health and Wellbeing
- Master's Programme in Circumpolar Health and Wellbeing, EnviroNet (Multidisciplinary environmental graduate Net school)
- Sami language and Sami culture (Giellagas Institute)



# The Thule Institute is a unit of the University of Oulu that

- Focuses on the development and coordination of research and education cooperation in the field of Northern and Environmental Issues, one of the University's focus areas.
- Focuses its activities on research programmes, graduate schools and Master's programmes.
- Operates in national and international networks.

# The main objectives and units of the Thule Institute

- To set up novel multidisciplinary research and education
- To promote northern and environmental research by elaborating research strategies internationally and nationally
- To aggregate academic education in the field of northern and environmental issues into activity that supports the university's profile
- To promote interaction between different disciplines and operators within and outside the University
- Four operational units:
  - Centre for Arctic Medicine      NorTech Oulu
  - NorNet      **Oulanka Research Station**

# LTSER-activities at Oulanka research station in 2007-08

- Data management in Long-term Socio-Ecological Research (LTSER) – case study at Oulanka Research Station.
  - Student project by the Dept. of Information Processing Science, 2007 – 2008
- LTSER- research grants
  - Changes in the fish communities of streams flowing into lake Kitkajärvi – a comparison between 1982 and 2008
  - Local and regional controls of temporal variability in lotic benthic invertebrate communities
  - Spatial modelling of threatened plant species of Oulanka national park using GIS and remote sensing data
  - Pollination biology and long-term population monitoring of *Calypso bulbosa*
- Sustainable tourism and effects of tourism on nature reserves (Pirkko Siikamäki & group)
- Land use effects on water chemistry and biological communities (Miska Luoto & group)



# LTSER-activities at Oulanka research station in 2007-08

## RECENT FUNDING (2008)

- University of Oulu infrastructure funding for Thule institute
  - Significant modernization of microscope equipment at Oulanka research station
  - Automatic water level and temperature loggers for 24 streams (at Oulanka RS)
  - Modernization of field equipment at Oulanka RS (multitester, water velocity, electrofishing)
  - New, extremely sensitive nutrient analysis equipment at Oulanka RS
  - Acquisition of aerial and satellite photos, remote sensing data and other large scale data
- VACCIA-project: Vulnerability assessment of ecosystem services for climate change impacts and adaptation
  - LIFE+ environment funding (European Union)
  - Adaptation of tourism industry to climate change