

IFSA Winter Meeting 2015: Delavnica na Gozdarskem inštitutu Slovenije *Day at the Slovenian Forestry Institute*

Izvedba in rezultatih delavnice na Gozdarskem inštitutu Slovenije

Implementation and the results of the workshop at Slovenian Forestry Institute



Gozdarski inštitut Slovenije, Ljubljana, Slovenija, Marec 2015

Slovenian Forestry Institute, Ljubljana, Slovenia, March 2015



IFSA Winter Meeting 2015:

Delavnica na Gozdarskem inštitutu Slovenije /

Day at the Slovenian Forestry Institute

Izvedba in rezultatih delavnice na Gozdarskem inštitutu Slovenije /

Implementation and the results of the workshop at Slovenian Forestry Institute

Odgovorni urednik / *Editor in chief*: Urša Vilhar, Boris Rantaša

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Gozdarski inštitut Slovenije

Ljubljana, maj 2015



GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE





Uvodnik

Gozdarski inštitut Slovenije je v sredo, 11.3.2015 za udeležence »Winter Meeting of Forestry Students 2015« organiziral delavnico z naslovom »Dan na Gozdarskem inštitutu Slovenije« v okviru LIFE+ projektov LifeGenMon in MANFOR C.BD ter projektov SIMWOOD in EUFORINNO 7. okvirnega programa Evropske Unije. Glavni namen delavnice je bila teoretična in praktična predstavitev aktivnosti Gozdarskega Inštituta Slovenije ter izmenjava znanja in izkušenj z več kot tridesetimi študenti gozdarstva, ki prihajajo iz enajstih evropskih držav in študirajo na trinajstih različnih univerzah.

»IFSA Winter Meeting« je srečanje, namenjeno študentom gozdarstva in sorodnih ved iz tujine, ki ga je tradicionalno že šesto leto zapored organiziralo Društvo študentov gozdarstva v okviru Mednarodne zveze študentov gozdarstva (International Forestry Students Association - IFSA). Izvaja se vedno v mesecu marcu, na prehodu med zimo in pomladjo. Namen srečanja je udeležencem skozi serijo ekskurzij in predavanj predstaviti slovenske gozdove, način gospodarjenja z njimi, naravne znamenitosti in slovensko kulturno dediščino. Velik poudarek je namenjen tudi druženju, izmenjavi mnenj in znanj ter sodelovanju za doseganje trajne prihodnosti gozdov in gozdarstva v evropskem in svetovnem merilu. Letos je srečanje potekalo od 8. 3. 2015 do 14. 3. 2015, udeležilo pa se ga je štirideset domačih in tujih študentov.

Prvi del delavnice se je odvijal v Veliki dvorani Gozdarskega inštituta Slovenije s predstavitvami Gozdarskega inštituta Slovenije ter tekočih aktivnosti v okviru LIFE+ projektov LifeGenMon in MANFOR C.BD ter SIMWOOD in EUFORINNO projektov 7. okvirnega programa Evropske Unije. Predstavljen je bil tudi Zavod za gozdove Slovenije. Drugi del delavnice se je odvijal v skupinah, pri čemer so se udeleženci najprej udeležili gozdnih pedagoških aktivnosti po principu tekočega učenja (»Flow learning«) v Dendrološkem vrtu pod Rožnikom. Sledilo je delo v štirih skupinah, in sicer smo študentom v okviru projekta EUFORINNO predstavili delo v mikroskopirnici, v okviru projekta SIMWOOD so iskali rešitve za trajnostno mobilizacijo gozdne proizvodnje na razdrobljenimi zasebni posesti v Sloveniji, v okviru projekta ManFor C.BD so si ogledali »Gozd eksperimentov« na raziskovalni ploskvi Rožnik, v okviru projekta LifeGenMon pa so se udeleženci seznanili z raziskavami v Laboratoriju za gozdno genetiko.

Evalvacija in zaključki delavnice so potekali v Veliki dvorani Gozdarskega inštituta Slovenije. Študentje so pohvalili organizatorje in program delavnice ter predlagali izboljšave. Organizatorji in udeleženci delavnice so se strinjali, da je bila delavnica uspešna in bi jo lahko ponovili.

Dogodek je potekal v angleškem jeziku, moderator je bil mag. Andrej Breznikar iz Zavoda za gozdove Slovenije.

Urša Vilhar, Boris Rantaša





Editorial

On Wednesday, 11th of March 2015 a workshop titled: “Day at the Slovenian Forestry Institute” was organised at the Slovenian Forestry Institute for the participants of the Winter Meeting of Forestry Students 2015. The workshop was organised as a part of the LIFE + projects LifeGenMon and MANFOR C.BD project. SIMWOOD and EUFORINNO projects of the 7th Framework Programme the European Union were also presented. The main purpose of the workshop was to present, theoretically and practically, the activities of the Slovenian Forestry Institute and to exchange knowledge and experience of between our staff and more than 30 students of forestry, coming from 11 European countries and studying at 13 different universities.

“IFSA Winter Meeting” is a meeting of foreign students of forestry and forestry-related disciplines, which is traditionally organised by the Slovenian Association of Forestry Students in the framework of International Forestry Students Association - IFSA. It is traditionally held in the end of March, the transition season between winter and spring. The purpose of the meeting is to present to the participants the Slovenian forests, their management, the Slovenian natural attractions and cultural heritage through a series of field trips and lectures. Great emphasis was laid upon networking, the opinion and knowledge transfer and cooperation in order to achieve sustainable future of forests and forestry in Europe and worldwide. This year the meeting was held from 8th to 14th of March 2015 and has been attended by more than 40 Slovenian and foreign students.

The first part of the workshop was held at the Big Lecture Hall of the Slovenian Forestry Institute with the presentation of current activities of the Slovenian Forestry Institute, namely LIFE + projects LIFE GEN MON and MANFOR C.BD and 7th EU Framework Programme projects SIMWOOD and EUFORINNO. Slovenia Forest Service was also presented.

The second part of the workshop was organized in groups. The participants first attended forest educational activities, based on the “Flow learning” principles in the Dendrological garden under Rožnik. Afterwards, the students were split into four groups: i. in the framework of EUFORINNO project, the microscope laboratory was presented to the students; ii. For the project SIMWOOD a workshop was held for a sustainable mobilization of forest production in fragmented private forest estate in Slovenia; iii. for the project ManFor C.BD the “Forest of Experiments” at the research plot Rožnik was presented, and iv. for the project LIFE GEN MON the research at SFI’s Laboratory of Forest Genetics was presented.

Evaluation and closing of the workshop was held in the Big Lecture Hall of the Slovenian Forestry Institute. The participants complimented on the organization and workshop programme, but also some improvements were proposed. The organisers and participants concluded that the workshop was a success and should be repeated again.

The event was held in the English language. It was moderated by mag. Andrej Breznikar from the Slovenian Forest Service.

Written by: Urša Vilhar, Boris Rantaša



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Program delavnice / Workshop programme

- 10:45 Prihod udeležencev
Arrival of participants
- 11:00 Predavanja v Veliki dvorani Gozdarskega inštituta Slovenije
Lectures at the Big Lecture Hall of the Slovenian Forestry Institute
dr. Primož Simončič, Pozdravni nagovor in predstavitev
Gozdarskega inštituta Slovenije / Wellcome and presentation of
the Slovenian Forestry Institute
prof. dr. Ivan Kreft, EUFORINNO
dr. Urša Vilhar, ManFor C.BD
dr. Nike Krajnc, SIMWOOD
Domen Finžgar, LIFE GEN MON
- 12:30 Odmor s kavo in rogljički (*financira projekt EUFORINNO*)
Coffee break (financed by the project EUFORINNO)
- 13:00 Skupinska fotografija pred stavbo Gozdarskega inštituta Slovenije
Group photo in front of the Slovenian Forestry Institute
- 13:15 – 14:00 Delo v skupinah
Groupwork
Urša Vilhar, Boris Rantaša: Tekoče učenje - Učinkovit sistem dejavnosti za motivacijo udeležencev za aktivnosti na delavnici / Flow learning – effective system of activities for participants motivation at the workshop
- 14:00 – 16:15 Delo v 4 skupinah
Groupwork
1. Tine Grebenc: EUFORINNO – Laboratorij za gozdno genetiko / Laboratory for Forest Physiology
 2. Urša Vilhar: ManFor C.BD – Gozd eksperimentov / Forest experiments
 3. Nike Krajnc: SIMWOOD – Trajnostna mobilizacijo gozdne proizvodnje na razdrobljenimi zasebni posesti / Sustainable Innovative Mobilisation of Wood
 4. Marko Bajc: LIFE GEN MON – Laboratorij za mikroskopiranje / Laboratory for microscopy
- 16:15 – 16:30 Evalvacija in zaključki delavnice
Evaluation and closing of the workshop
- 16:30 Kosilo (financira projekt ManFor C.BD)
Lunch (financed by the project ManFor C.BD)





Predstavitve / Lectures

IFSA Winter Meeting 2015. Welcome to the Slovenian Forestry Institute! - Urša Vilhar

EUFORINNO european forest research and innovation - project overview - Ivan Kreft, Tanja Mrak, Tine Grebenc, Marko Bajc, Hojka Kraigher

Life+ ManFor C.BD. Project Managing forests for multiple purposes: carbon, biodiversity and socio-economic wellbeing - Urša Vilhar, Lado Kutnar, Mitja Ferlan, Mitja Skudnik, Maarten de Groot, Milan Kobal, Andrej Breznikar, Primož Simončič

Sustainable Innovative Mobilisation Of Wood – SIMWOOD – Nike Krajnc, Andrej Breznikar

LIFEGENMON: Monitoring of genetic diversity - an early warning system to aid the assessment of a species response to environmental change at a long-term temporal scale. LIFE for European Forest Genetic Monitoring System - Domen Finžgar, Marjana Westergren, Barbara Fussi, Phil Aravanopoulos, Hojka Kraigher

Caring for forests to benefit nature and people. Slovenia Forest Service – Andrej Breznikar

IFSA Winter Meeting 2015. Visit to the Slovenian Forestry Institute – reflections - Urša Vilhar, Andrej Breznikar



IFSA Winter Meeting 2015

Welcome to the Slovenian Forestry Institute!

Urša Vilhar



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Slovenian Forestry Institute





IFSA Winter Meeting 2015

Slovenian Forestry Institute Programme

11:00 – 12:30 **Welcome and introduction**

- **EUFORINNO** – European Forest Research and Innovation
- **Life+ ManFor C.BD** project – Managing forests for multiple purposes: carbon, biodiversity and socio-economic wellbeing
- **SIMWOOD** project - Sustainable Innovative Mobilisation of Wood
- **Life+ LifeGenMon** project – Life for European Forest Genetic Monitoring System
- **Slovenia Forest Service**

12:30 – 13:00 **Coffee break**



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IFSA Winter Meeting 2015

Slovenian Forestry Institute

Programme

13:00 – 13:15 **Group photo session**

13:15 – 14:00 **Flow Learning Workshop** (2 groups) - Natural Steps to Nature Awareness

14:00 – 16:00 **Workshops** (4 groups)

1. EUFORINNO – Microscopy
2. ManFor C.BD – Forest experiments
3. SIMWOOD – Sustainable Innovative Mobilisation of Wood
4. LIFE GEN MON – Laboratory for Forest Genetics

16:30 – 17:30 **Lunch and reflections**

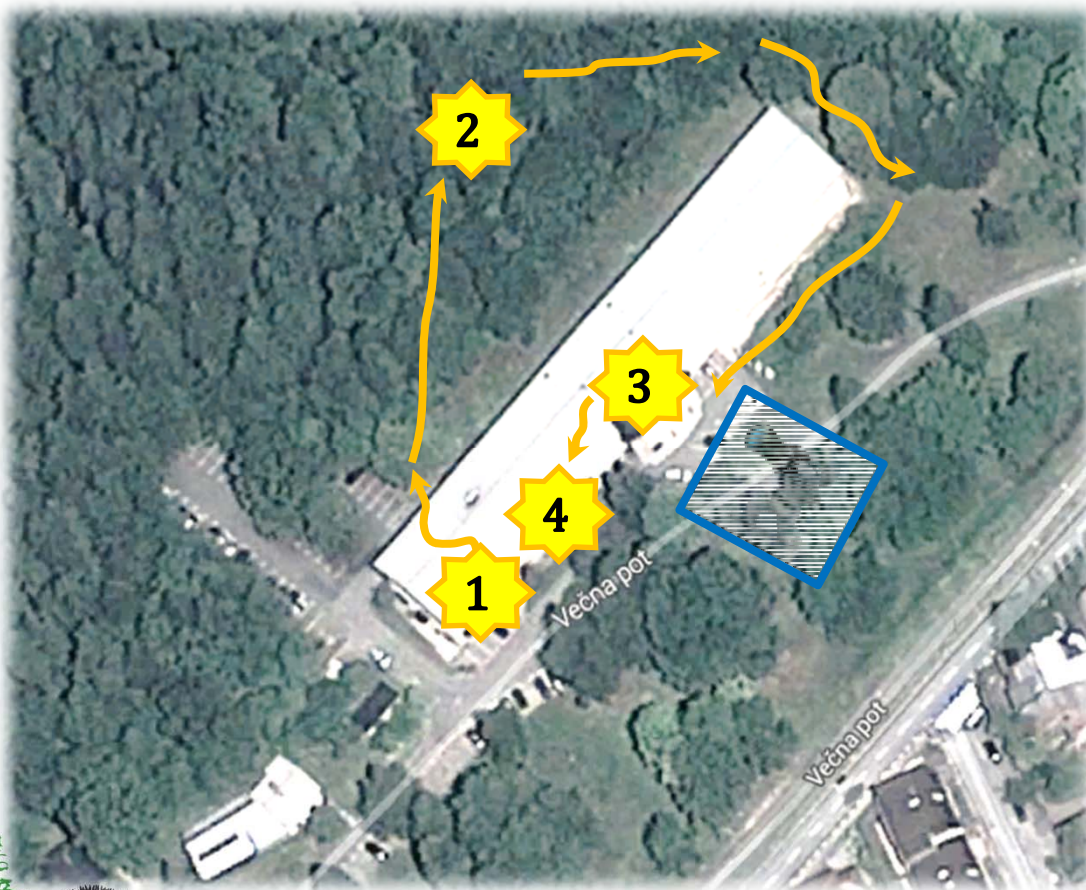


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IFSA Winter Meeting 2015

Slovenian Forestry Institute



1. EUFORINNO – Microscopy
2. ManFor C.BD – Forest experiments
3. SIMWOOD – Private forest ownership
4. LIFE GEN MON – Laboratory for Forest Genetics



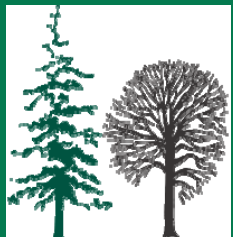


Lets' start!



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Slovenian Forestry Institute





EUFORINNO



EUROPEAN FOREST RESEARCH AND INNOVATION PROJECT OVERVIEW

- FP7 Capacities – **REGPOT-2012-2013-1**: Unlocking and developing the research potential of research entities in the EU's convergence regions and outermost regions
- Support action – 100% EU: 2.9 M€
- 01.10.2012 – 31.03.2016 (36 mth + 6 evaluation)
- Supported by 8 excellent partners from EU
- Activities: equipment, secondments, trainings, workshops, publications...



Project logo & schematic presentations: Marko Bajc



GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE



Coordinator: Prof. Dr. Hojka Kraigher

EUFORINNO (RegPot No. 315982)



RATIONALE

Slovenian Forestry Institute (SFI)



- has established its position as the only research institute in Slovenia of national importance in the field of forests, forestry, forest ecosystems and wildlife management.
- is an official authority in the fields of forest reproductive material, forest health, forest inventories and carbon reporting in Slovenia



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RATIONALE

- Thanks to **EUFORINNO**, scientific excellence and visibility of SFI has been enhanced and promoted.
- Five major expected impacts in the FP7 programme have been addressed:
 - i) penetration in the ERA;
 - ii) upgrade of RID capacity;
 - iii) contribution to regional economic and social development;
 - iv) participation in FP projects; and
 - v) increase of the innovation potential.

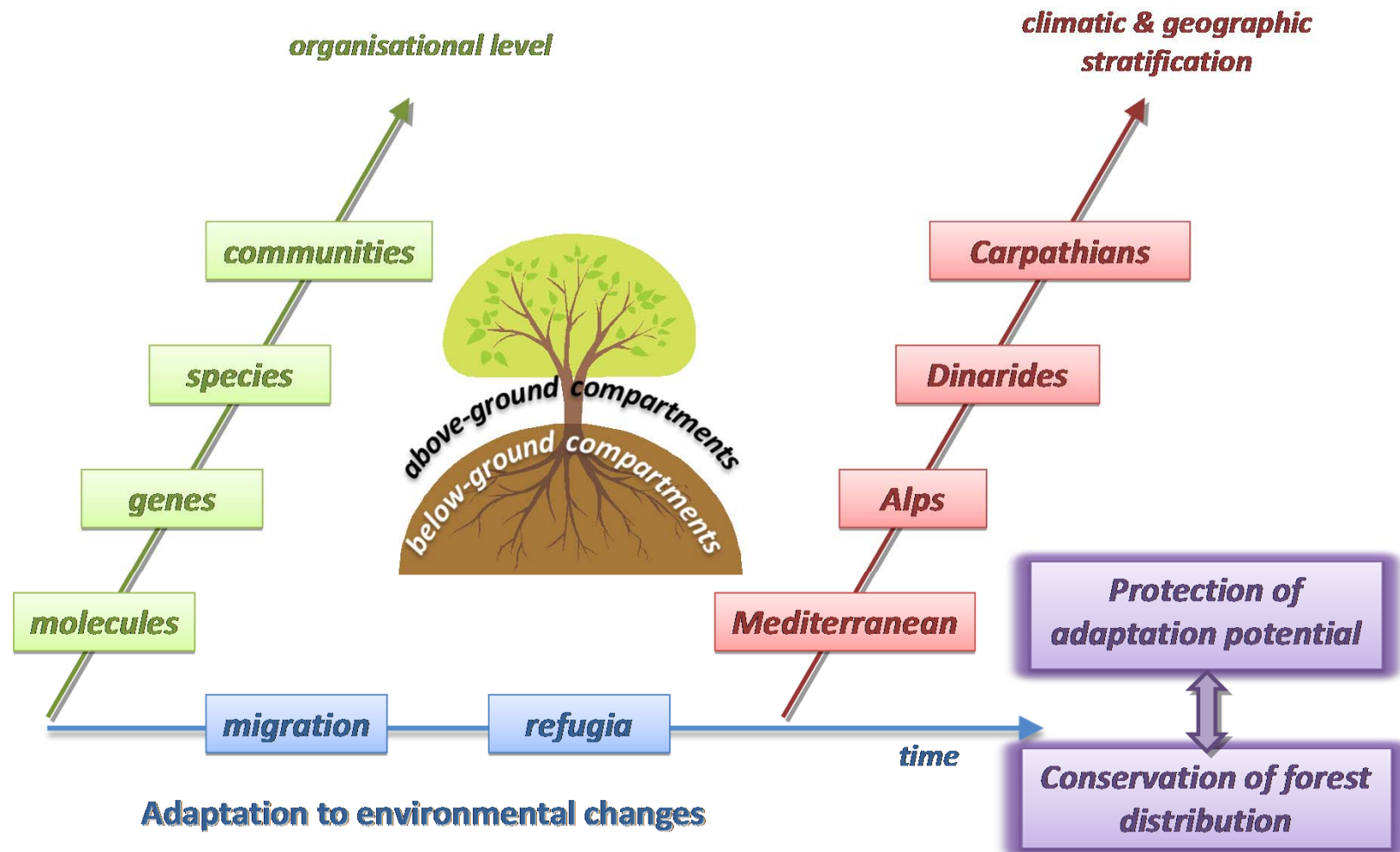


EUROPEAN FOREST RESEARCH AND INNOVATION AREA: **EUFORIA**

- **Scientific excellence** based on / proved by:
 - RID outlines and justification
 - commitment of 8 excellent partners
 - employments of reknown scientists & skilled specialized post docs
 - research infrastructure
 - scientific secondments, trainings and networking
- **Impact visible from support by relevant stakeholders:**
 - research agency, ministries, industry, forest-based sector end-users;
- **Well defined dissemination & visibility:**
 - employments – Techn. Editor *Silva Slovenica*, IP Manager
 - **Networking, workshops & publishing**
- Support of partners in the Advisory Board



RID OUTLINE: CLIMATE CHANGE AND BIODIVERSITY IN FOREST ECOSYSTEMS ON DIFFERENT SCALES

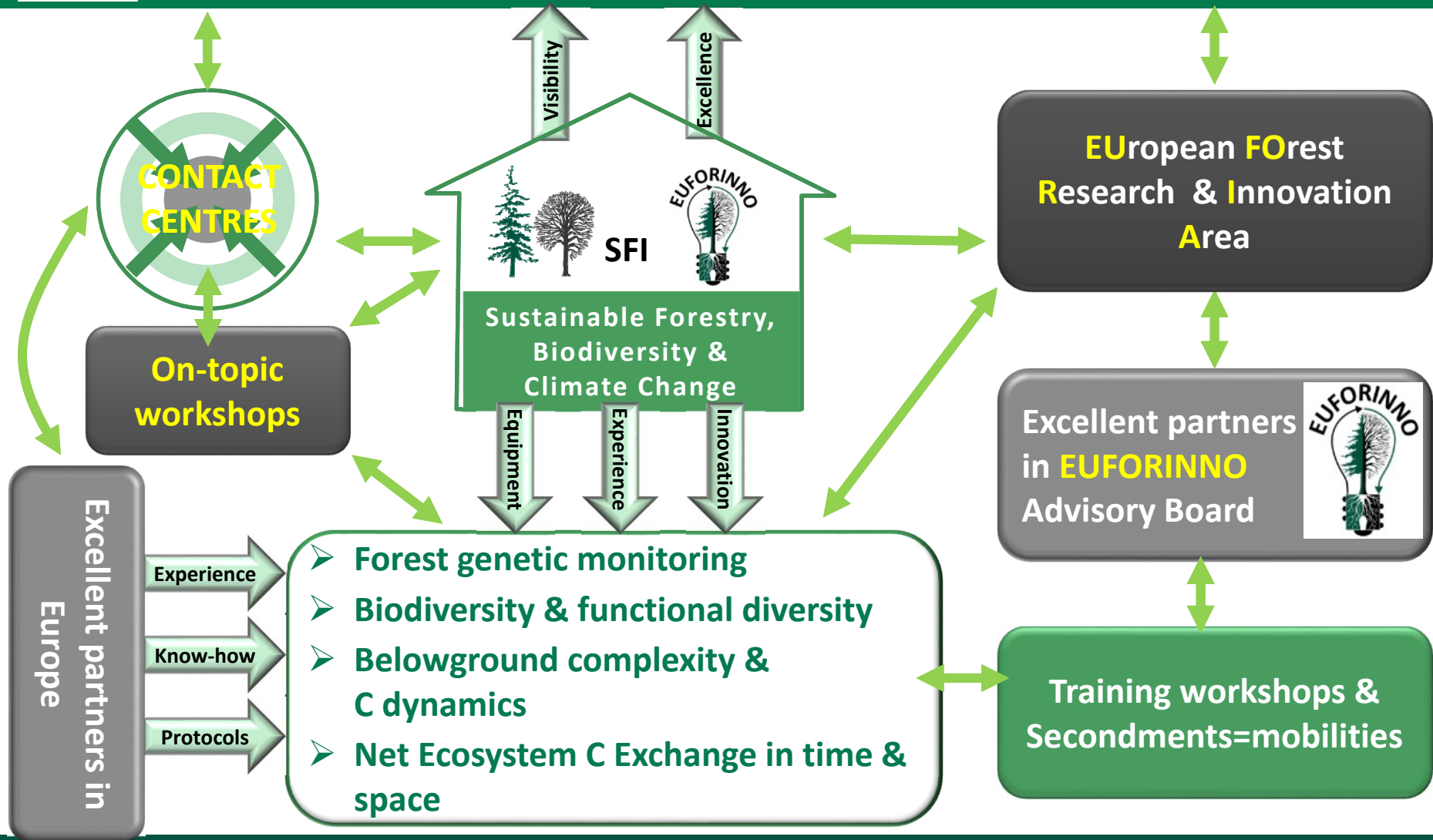




EUROPEAN FOREST RESEARCH & INNOVATION



This project is funded by the European Union



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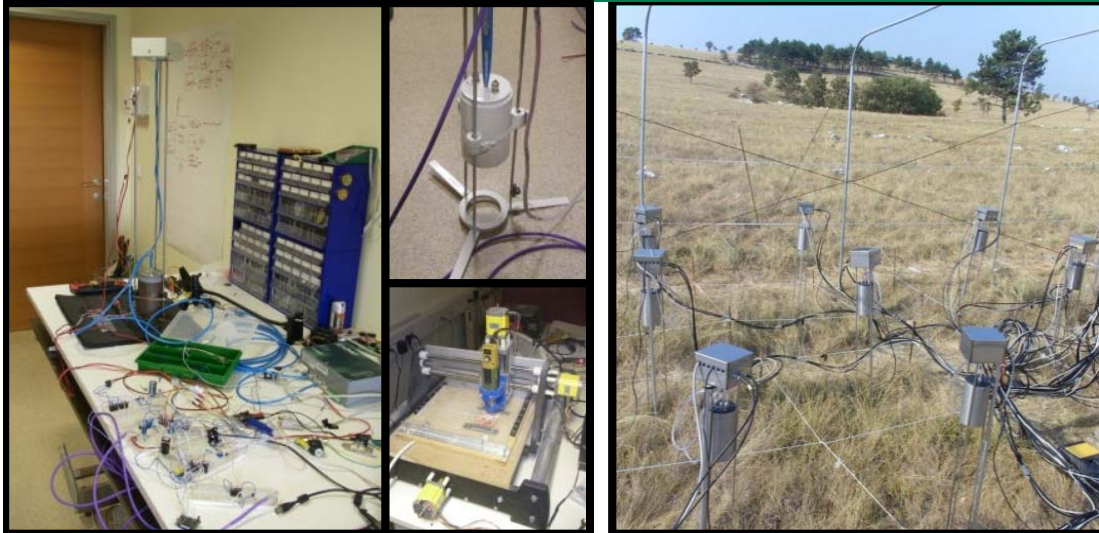


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RESEARCH AND INNOVATION – AS SUPPORT FOR & BASED ON - EARLY STAGE RESEARCHERS



Patents:

ŽELEZNIK & FERLAN 2012.

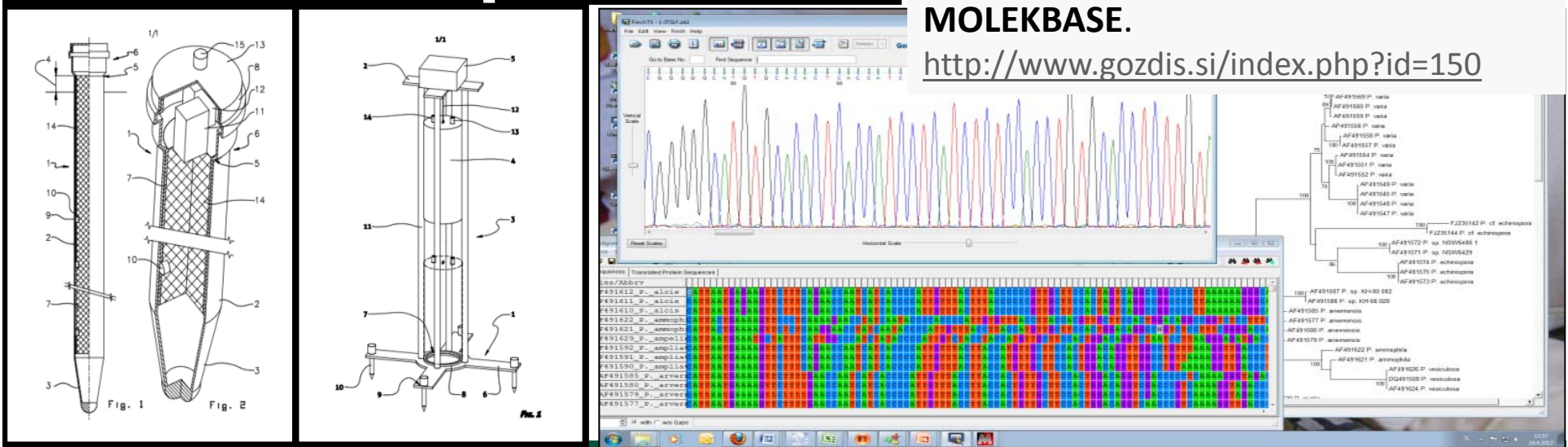
<http://worldwide.espacenet.com/publicationDetails/biblio?DB=EPODOC&adjacent=true&locale=en T1&FT=D&date=20110303&CC=US&NR=2011048144A1&K=C=A1>.

Certification & bioinformatics:

WESTERGREN & KRAIGHER 2012.

MOLEKBASE.

<http://www.gozdis.si/index.php?id=150>



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EUFORINNO (RegPot No. 315982)



EUFORINNO STRUCTURE: RID OUTLINE

EUFORINNO: Getting better and more visible on the following RID target:
 ‘Climate change and disturbance consequences on biodiversity and carbon dynamics in forest ecosystems’

SCIENTIFIC KNOWLEDGE INCREASE (equipment purchase, trainings) on 4 RID sub-objectives

Sub-objective A			Sub-obj B	Sub-objective C				Sub-objective D		
A1	A2	A3		C1	C2	C3	C4	D1	D2	D3
Development and standardisation of a system for genetic monitoring of forest trees			Biodiversity & functional diversity at gene, species and community levels	Belowground complexity and carbon dynamics				Net Ecosystem Carbon Exchange in time and space		
Genetic monitoring & dynamic conservation of forest genetic resources	Certification of forest reproductive material	Forest gene bank		Fine root turnover and modelling	Mycorrhizal turnover and function	Forest management and disturbance regimes	Microbial activity & soil respiration measurements	Super sites with trace gas isotopes monitoring	Remote sensing	Stable isotopes in wood, plants, fungi and soils

Involvement of partners

ASP	ASP	ASP	HMGU, SWANSEA, ULund	PLECO, UH For	ZALF, ULund	UH For	PLECO, IBAF-CNR	Nate Mc Dowell, PLECO, IBAF-CNR	SWANS EA	SWANS EA, ZALF, ULund
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EXPLOITATION OF INNOVATION

Publishing	Innovation and IP management	Networking
Reinforcing the publishing in scientific writing skills (PLECO) and internationalization of <i>Silva Slovenica</i>	Optimally combine existing methodologies to produce patentable / exploitable innovative outputs	Regional networking in SEE + intercontinental networking to multiply exploitation opportunities

Involvement of partners

All of the partners



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OUR PARTNERS

CP nb	Short name	Partner representative	Scientific contribution to the red line	Techniques & methodologies
2	PLECO	Prof. Reinhart Ceulemans	C dynamics measurement and modelling, data interpretation and publishing	C fluxes measurement, fine root turnover, ecosystem modelling
3	ASP	Dr. Monika Konnert	Forest genetic resources; genetic biodiversity: criteria and indicators	Development of methodology for forest genetic monitoring
4	HMGU	Dr. Dieter Ernst	Genomic, transcriptomic and high throughput sequencing;	Pyrosequencing, primer construction, bioinformatics
5	ZALF	Prof. Dr. Arthur Gessler	Mycorrhizal fungal turnover and function	Isotopes differentiation of auto- and heterotrophic C dynamics
6	SWANSEA	Prof. Danny McCarroll	Stable isotopes in wood; Remote sensing	IR MS, LIDAR techniques
7	IBAF-CNR	Dr. Giorgio Matteucci	Multilevel research and monitoring platforms	Trace gas isotope studies, establishment of 'super sites'
8	UH For	Prof. Dr. Heljä-Sisko Helmisaari	Fine root turnover, modelling	Fine root turnover, water model WATBALL, forest C dynamics model YASSOE 07
9	ULund	Prof. Dr. Håkan Wallander	Microbiological characterization of soils, mycelial turnover	Fungal and microbial growth rates - incorporation of stable isotopes



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WORKSHOPS AND CONFERENCES

Workshops & conferences:

- 3 small conferences – end of May 2013, 2014, 2015
- **1 final conference in September 2015**
- **Regional workshops: 16 (Slovenia Oct / Nov 2013, SEE, EU & other continents)**

Networking:

- **KEN, EUFORGEN, COST...**

Forecast: **SCIENCE EUROPE**

Trainings:

- Bioinformatics & stress induced gene expression
- Stable isotopes, matter balance (biomass and turnover) over spatial and temporal scales
- Developing multilevel research and monitoring platforms
- Data analysis, ecological modeling & interpretation
- **Scientific publishing & (new) project preparation**



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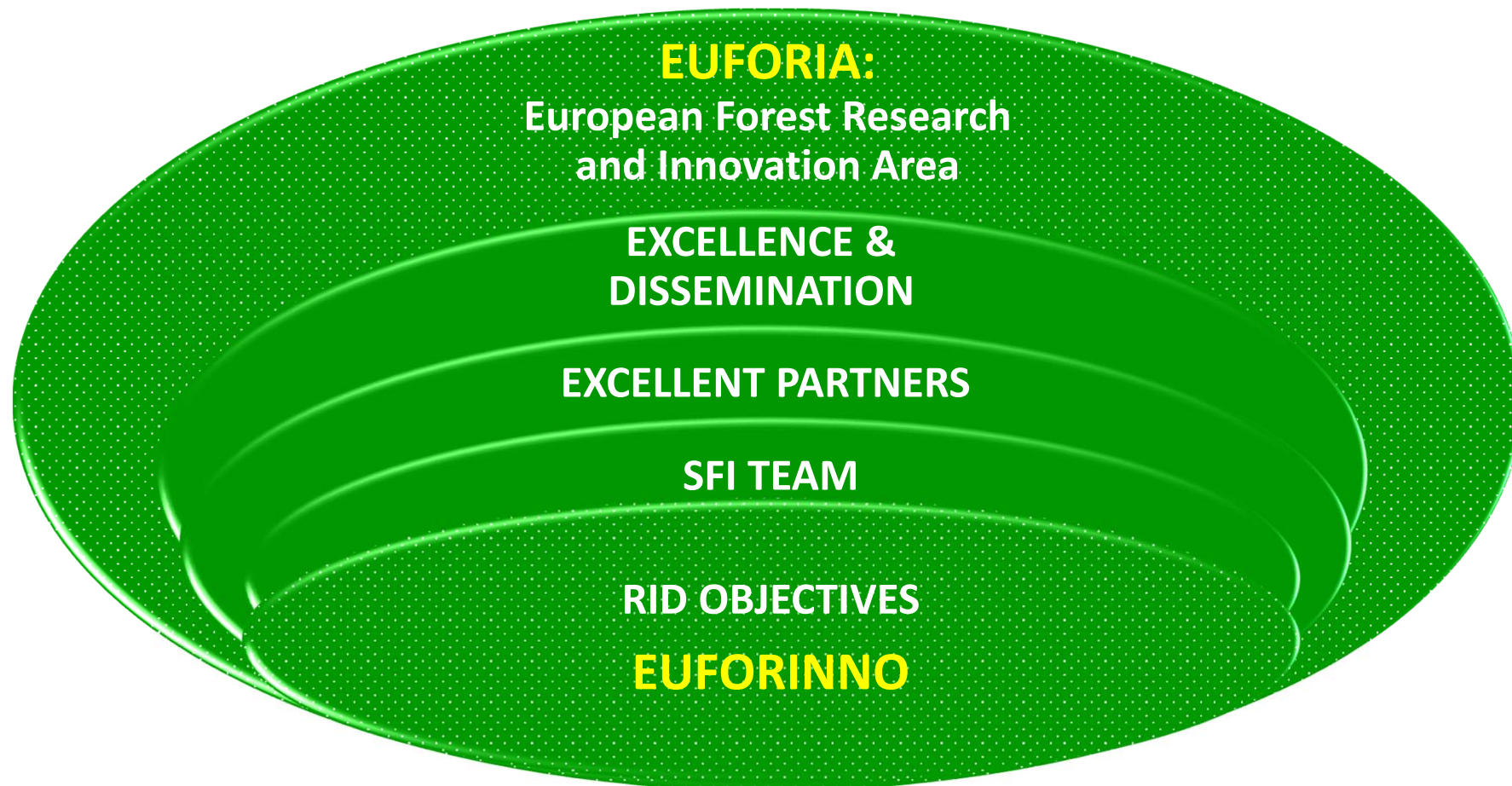
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EUFORINNO – COMPLEMENTING SCIENCE EUROPE & FOREST EUROPE PROGRESS



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EUFORINNO (RegPot No. 315982)



STABLE ISOTOPE FACILITY AT SLOVENIAN FORESTRY INSTITUTE

- The Stable Isotope Laboratory at SFI (SFI-IsoLab) is a research, service and teaching oriented facility for the study of stable isotopes in ecology and environmental sciences.
- We apply elemental and stable isotope analysis of light elements (H, C, N, O) in organic samples, mostly plants, wood, α -cellulose, fungi, roots etc.
- Our mission is to provide and expand high-quality facilities and expertise to the scientific community and to facilitate new and emerging research in forest science.
- Equipment was provided by **Elementar** (TC/EA) and **IsoPrime** (IRMS)



STABLE ISOTOPE FACILITY AT SFI

Equipment

- **IsoPrime100 CF-IRMS** coupled with a **Vario PYRO cube TC/EA**



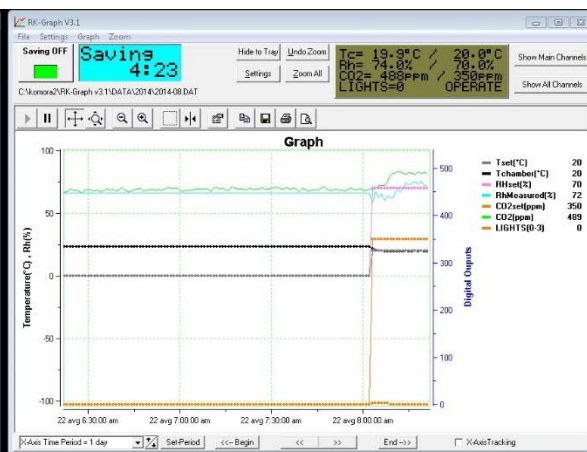
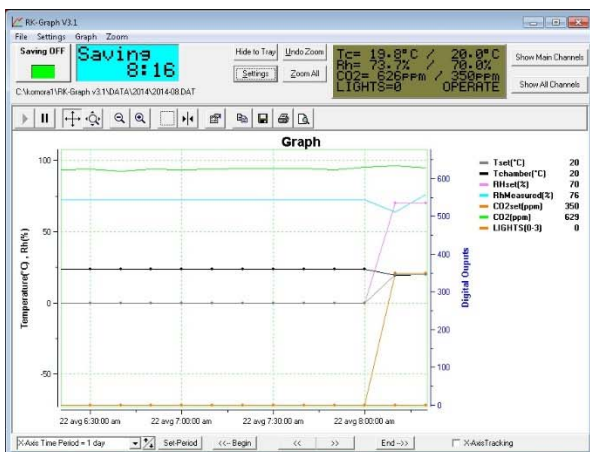
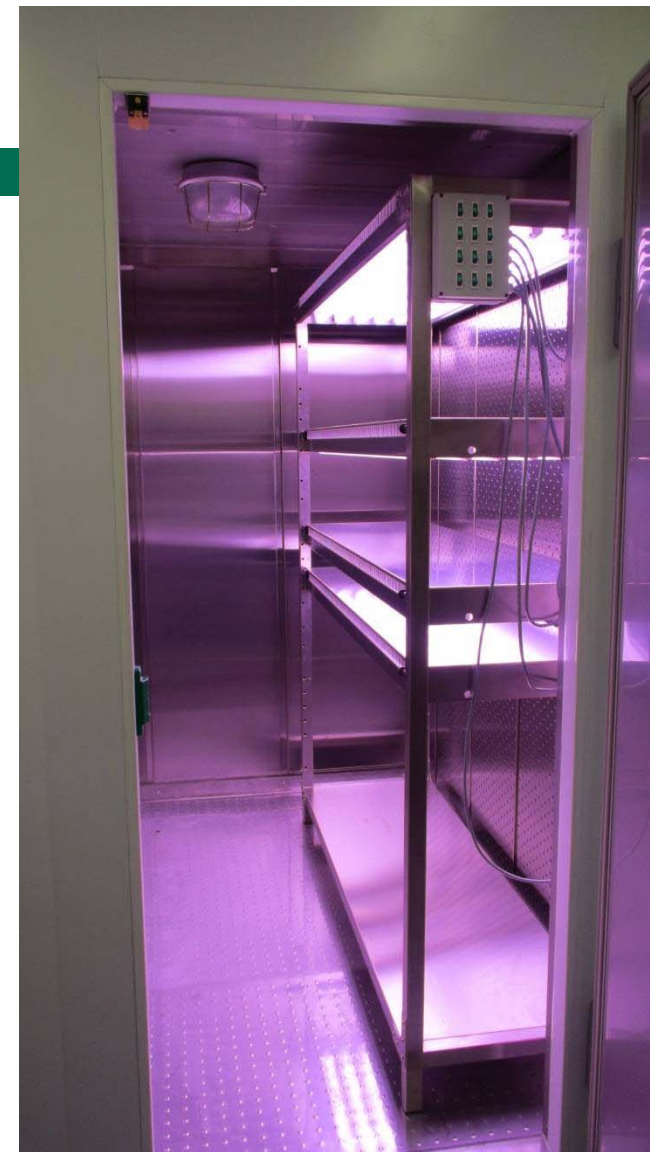
- HQ and high-throughput system for elemental and stable isotope analyses ($\delta^2\text{H}$, $\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $\delta^{18}\text{O}$)
 - Enables **combustion** at $\sim 950\text{ }^\circ\text{C}$ in O_2 excess and **pyrolysis** at up to $1500\text{ }^\circ\text{C}$
 - Uses purge and trap technology which separates sample gases
 - Analytical precision of IRMS: $\leq 0.06\text{‰}$ for $\delta^{13}\text{C}$, $\delta^{18}\text{O}$ and $\delta^{15}\text{N}$; $\leq 0.20\text{‰}$ for $\delta^2\text{H}$
- **Micro-balance** (Sartorius CPA2P; $0.1 - 2\text{ g} \pm 0.001\text{ mg}$)
 - **α -cellulose extraction system**



FULLY CONTROLLED GROWTH CHAMBERS

- Level 2 containment-ready laboratory
- Two plant growth chambers with control of:
 - Temperature (5-45°C, stability $\pm 0.2^\circ\text{C}$)
 - Relative air humidity (30-90%, stability $\pm 5\%$)
 - CO₂ concentration (up to 5000 ppm, stability ± 10 ppm)
 - Lighting with 3-stage intensity control
- Continuous recording of controlled parameters values
- Biological safety cabinet for sample processing purposes
- Suitable for studying:
 - Climate / atmosphere change effects on vegetation (forest trees) and their root associates (symbionts – mycorrhiza,...)
 - GMO plant species and GMO symbionts (mycorrhizal fungi)
- Facility open to external users / transnational access





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SEVENTH FRAMEWORK
 PROGRAMME

EUFORINNO (RegPot No. 315982)



SERVICES OFFERED

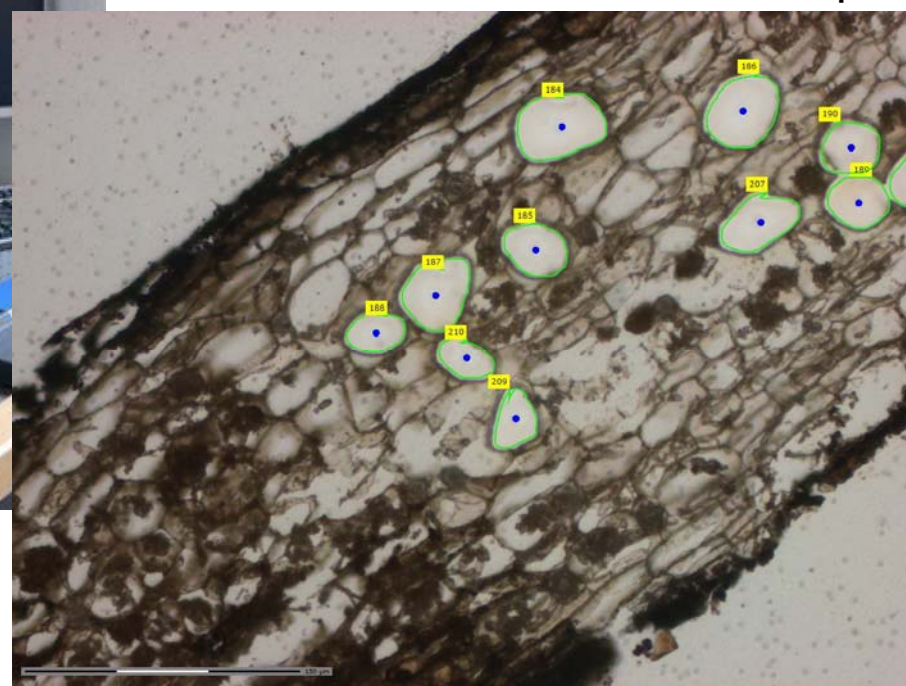
- Full processing - from raw sample, data analysis, interpretation to publishing
- Plant, animal, fungal, microbial and heterogeneous (e.g. soil) sample analysis
- Sequencing and sequence-based genetic analyses (Sequencher,...)
- SSR / fragment analysis
- Genetic diversity analysis (Arlequin, Bionumerics, MEGA, Biolinux based programmes)
- DGGE-based community analysis (Bionumerics)
- Phylogenetic, phylogeographic and demographic studies (PAUP, Mr.Bayes, PhyML, Network, Bionumerics, SAMOVA, ...)
- Population genetics analysis (BAPS, Structure)
- Molecular identification
- PCR primer design
- Facility open to external users / transnational access



LASER MICRO-DISSECTION SYSTEM



An example of a single-cell cut from the fixed root sample



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SEVENTH FRAMEWORK
PROGRAMME

EUFORINNO (RegPot No. 315982)



LASER MICRO-DISSECTION SYSTEM – DOWNSTREAM APPLICATIONS



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EUFORINNO (RegPot No. 315982)



Laboratory for Electronic Devices, Slovenian Forestry Institute

Products:

- Data recorders with a desired number of channels for temperature and analog signals from 0 – 2500 mV.
- Automatic soil respiration systems.
- Automatic irrigation systems independent from public water or electricity supply.
- Construction of customer-tailored measurement systems.
- Maintenance and repair of digital field equipment.

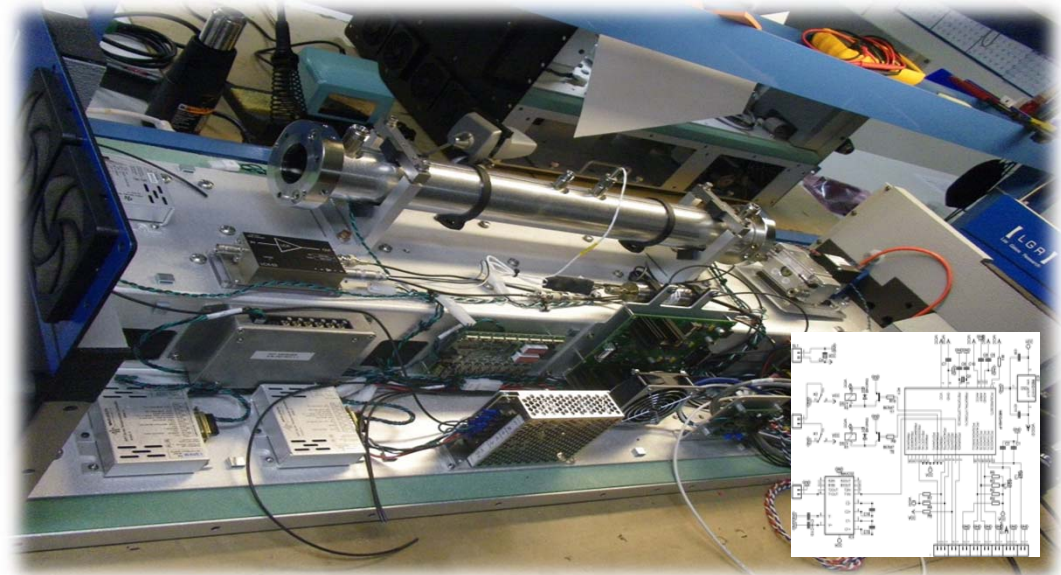
The Laboratory for electronic devices (LED) has experience and know-how in designing, constructing and adapting of various measuring devices allows us to develop completely new customized measurement systems or offer finished systems for lease.



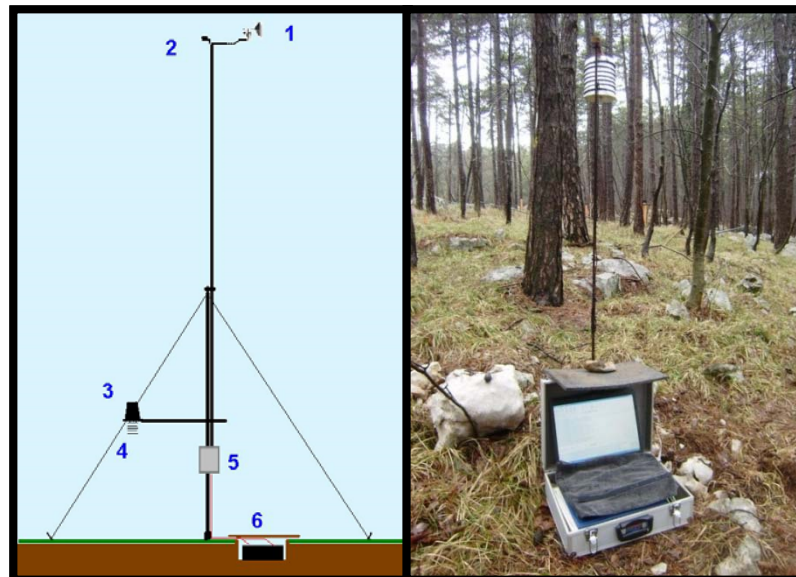
Applications with a stable carbon dioxide isotopologues analyzer – model CCIA-46 ($^{13}\text{CO}_2$, $^{12}\text{CO}_2$, $^{12}\text{CO}^{17}\text{O}$, $^{12}\text{CO}^{18}\text{O}$ in ppm and the isotopic ratios of $\delta^{13}\text{C}$, $\delta^{17}\text{O}$, $\delta^{18}\text{O}$ in real time).

The instrument also allow:

- high concentration measurements via dynamic dilution system and manual sample injection via syringe
- use in net ecosystem exchange measurements via Eddy covariance method or connected to an automated soil respiration system.



Dodatne slike za laboratorij....



- 1 – Wind speed and wind direction measurements
- 2 – Global radiation measurements
- 3 – Rain guge
- 4 – Air temperature and air humidity measurements
- 5 – Enclosure with datalogger and pressure sensor
- 6 – Main battery (small solar panel could be used)



IFSA Winter Meeting 2015

Life+ ManFor C.BD. Project

Managing forests for multiple purposes:
carbon, biodiversity and socio-economic
wellbeing

Urša Vilhar, Lado Kutnar,
Mitja Ferlan, Mitja Skudnik, Maarten de Groot, Milan Kobal, Andrej Breznikar, Primož Simončič



Slovenian Forestry Institute

Life+ ManFor C.BD. Project

Objectives

- Testing and verify traditional and new forest management practices in meeting multiple objectives:
 - Carbon cycling
 - Biodiversity
 - Timber production
- Demonstration areas for forest management and forest inventory
- Communication and dissemination actions



Selected forest ecosystems along a North-South transect in Italy and an East-West transect between Italy and Slovenia.



Life+ ManFor C.BD. Project

Slovenian Forestry Institute

Dinaric silver fir – beech forests

- Habitat type 91K0 Illyrian *Fagus sylvatica* forests (*Aremonio-Fagion*)
- High forest with close-to nature silviculture,
- Traditionall group-shelterwood (Femmelschlag) cuttings,
- Long history of forest management planning.



ManFor site KOČEVSKI ROG



ManFor site SNEŽNIK



MANAGING FORESTS
FOR MULTIPLE PURPOSES:
SOCIO-ECONOMIC WELLBEING



ManFor site TRNOVSKI GOZD



MANAGING FORESTS
FOR MULTIPLE PURPOSES:
SOCIO-ECONOMIC WELLBEING

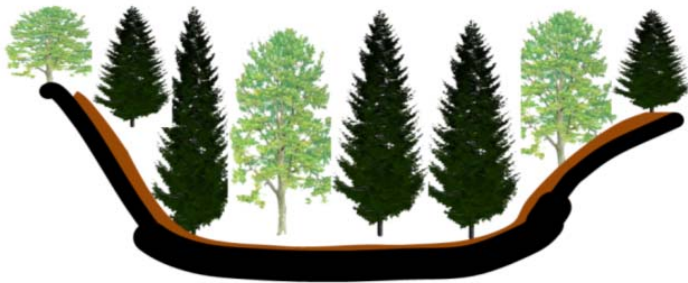


New forest management practice

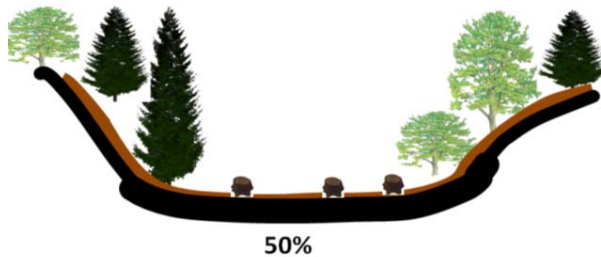


Life+ ManFor C.BD. Project

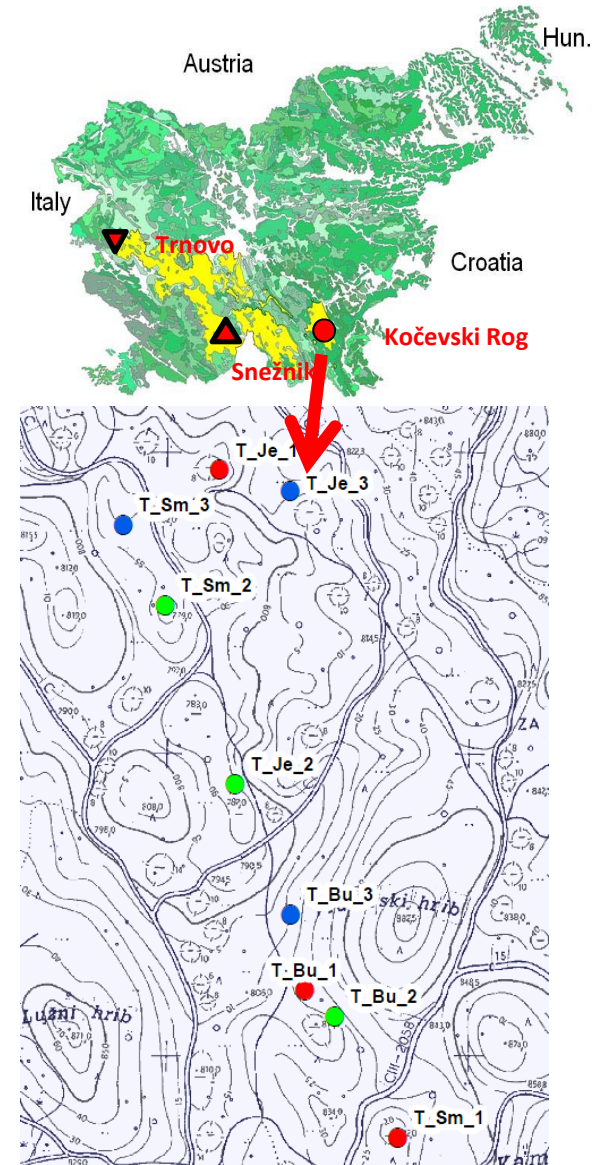
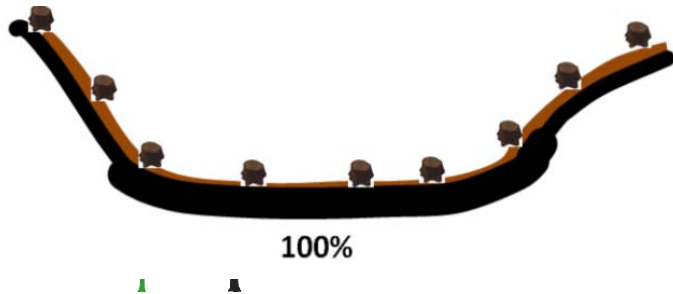
No intervention



Felling of 50 % Growing Stock (0,4 ha)



Felling of 100 % Growing Stock (0,4 ha)



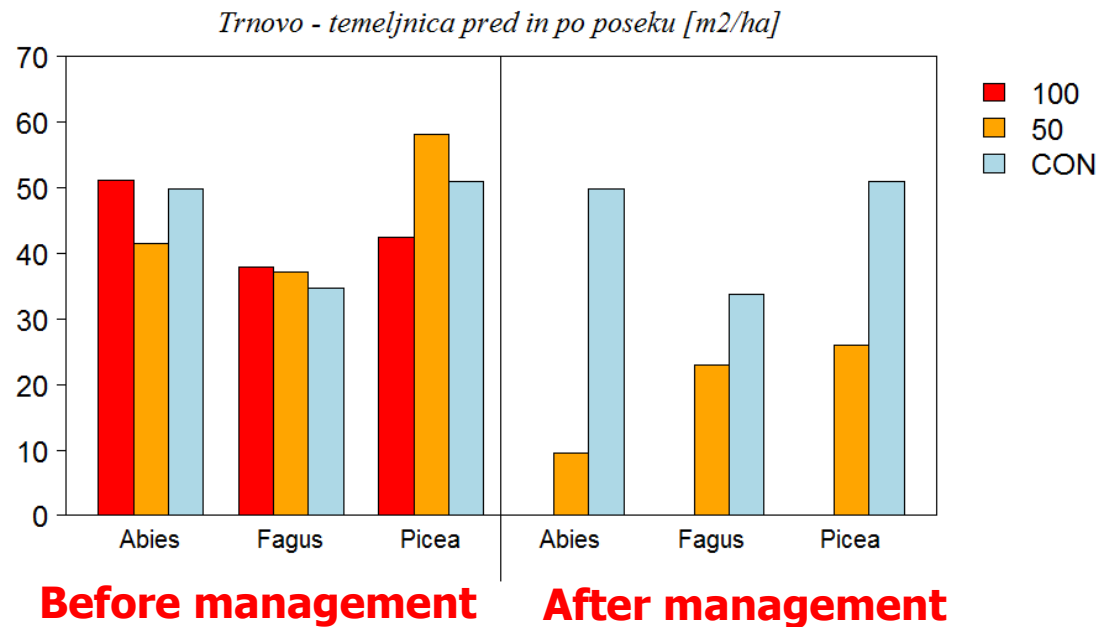
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Life+ ManFor C.BD. Project

Preliminary results

➤ Indicators for Timber production

- Basal area

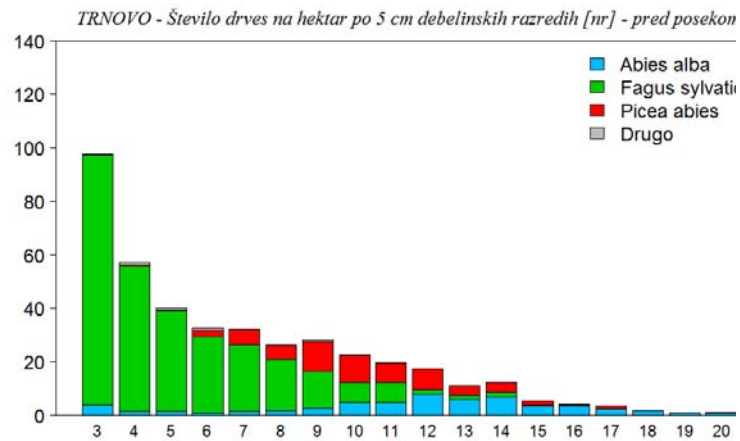


Slovenian Forestry Institute

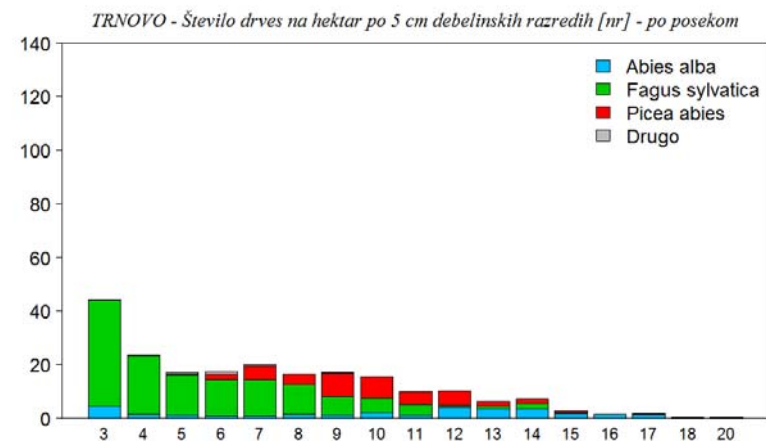
Life+ ManFor C.BD. Project

Preliminary results

- Indicators for Biodiversity
 - Number of trees ha⁻¹



Before management



After management



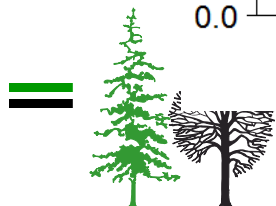
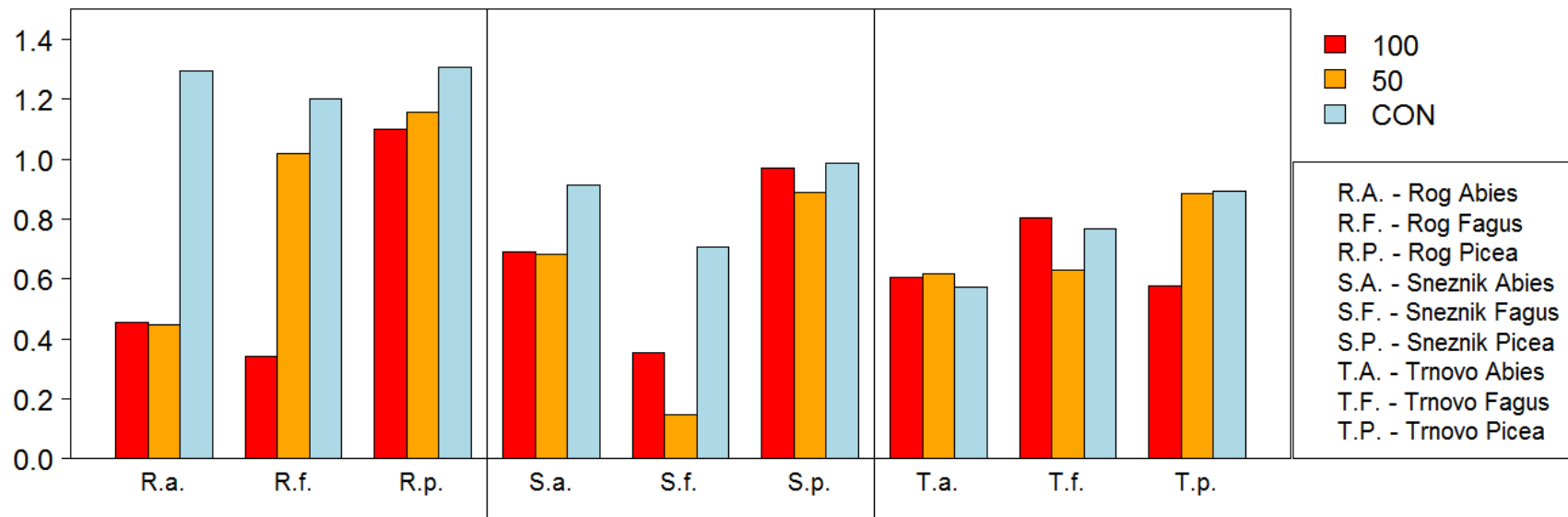
Slovenian Forestry Institute

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Preliminary results

- Indicators for Biodiversity
 - Tree species richness

SH - Shannon index for tree species diversity (number)

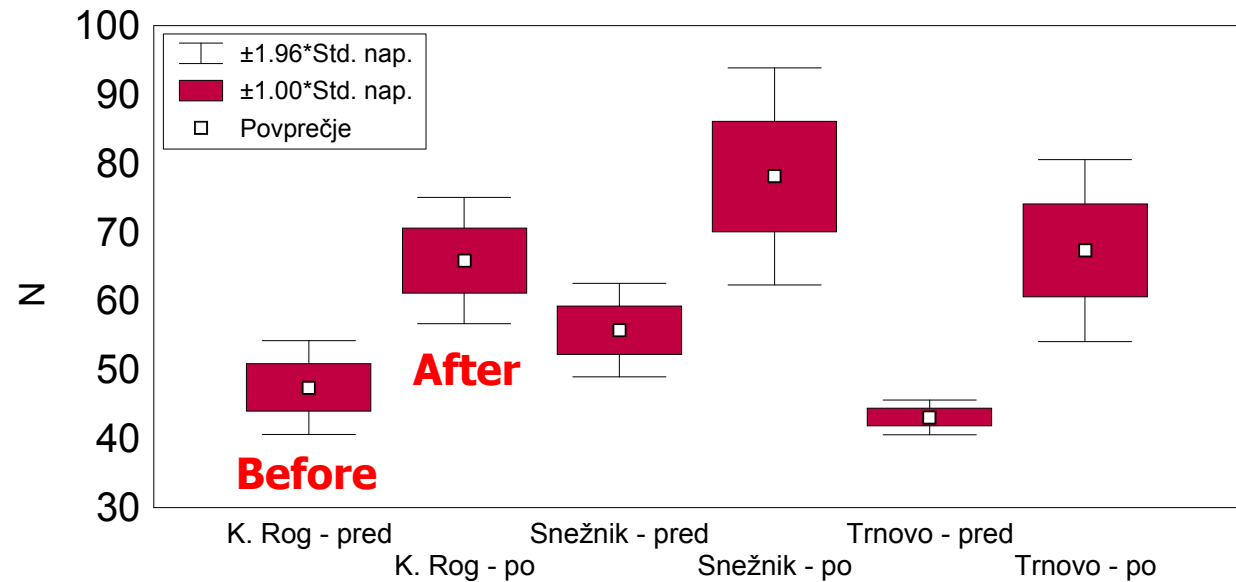


Slovenian Forestry Institute

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Preliminary results

- Indicators for Biodiversity
 - Number of plant species



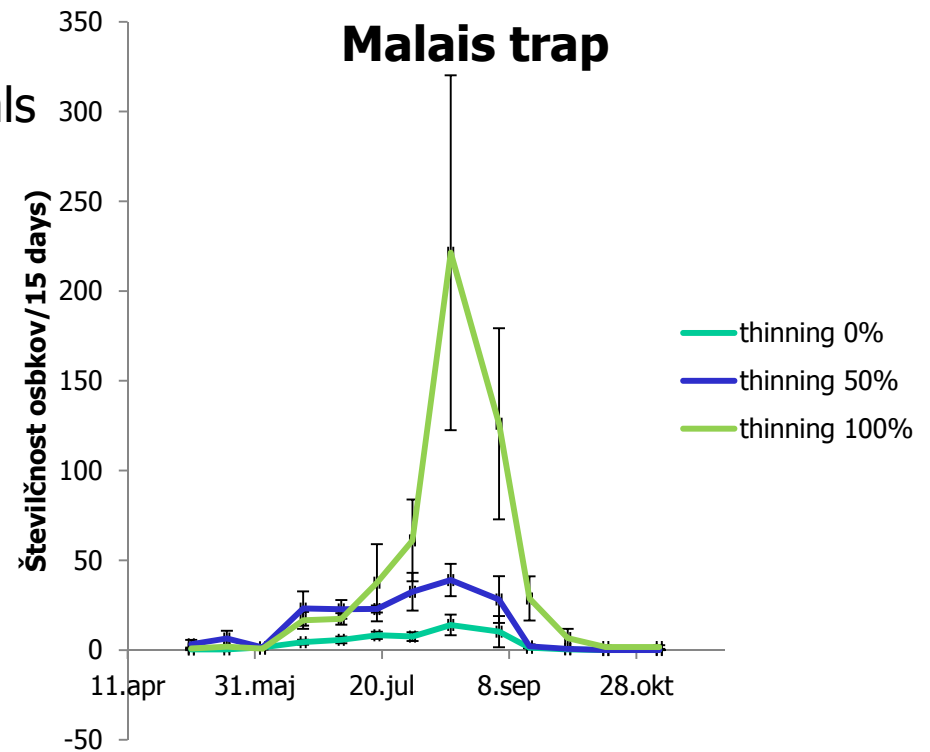
Slovenian Forestry Institute

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Preliminary results

➤ Indicators for Biodiversity

- Hoverflies: number of individuals



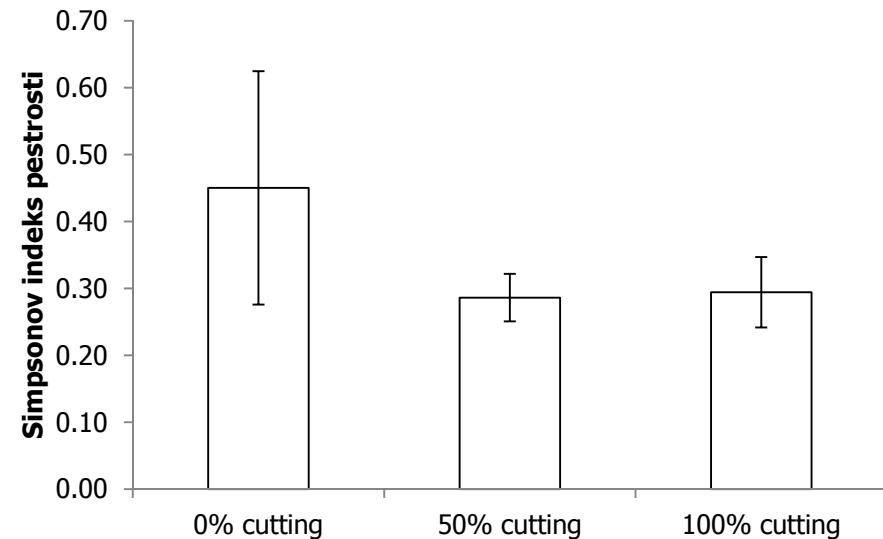
Slovenian Forestry Institute

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Preliminary results

➤ Indicators for Biodiversity

- *Cerambycidae*: Simpsons Diversity Index

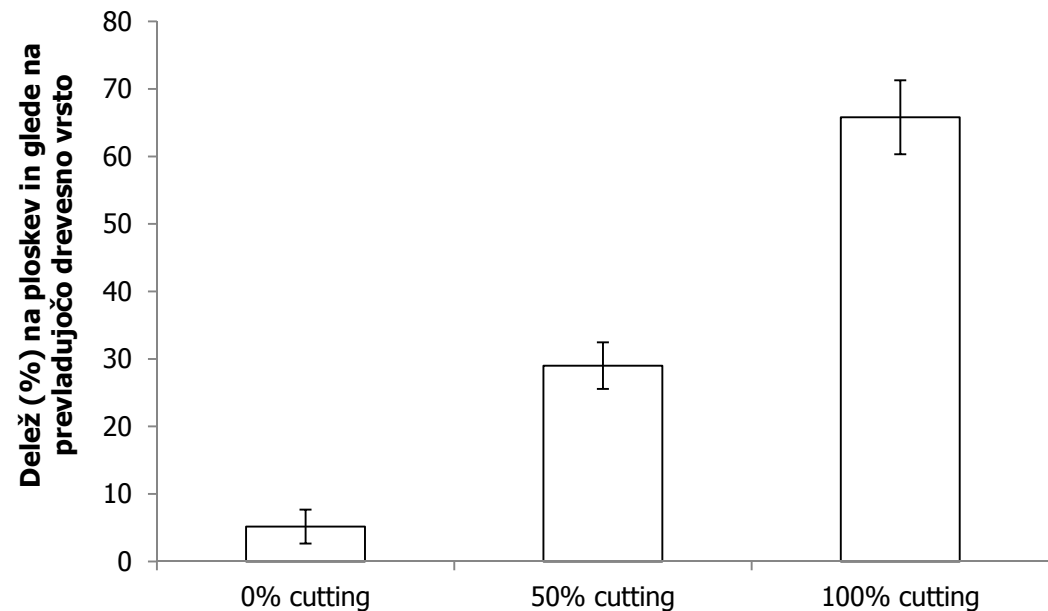


Slovenian Forestry Institute

Life+ ManFor C.BD. Project

Preliminary results

- Indicators for Biodiversity
 - *Scolytidae*: % per plot and tree species

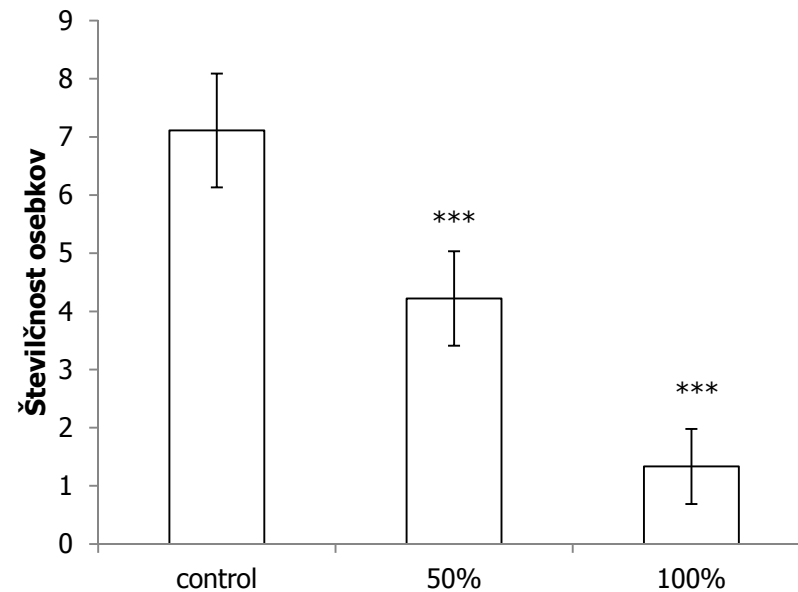


Slovenian Forestry Institute

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Preliminary results

- Indicators for Biodiversity
 - Birds: number of individuals (Natura2000 species)

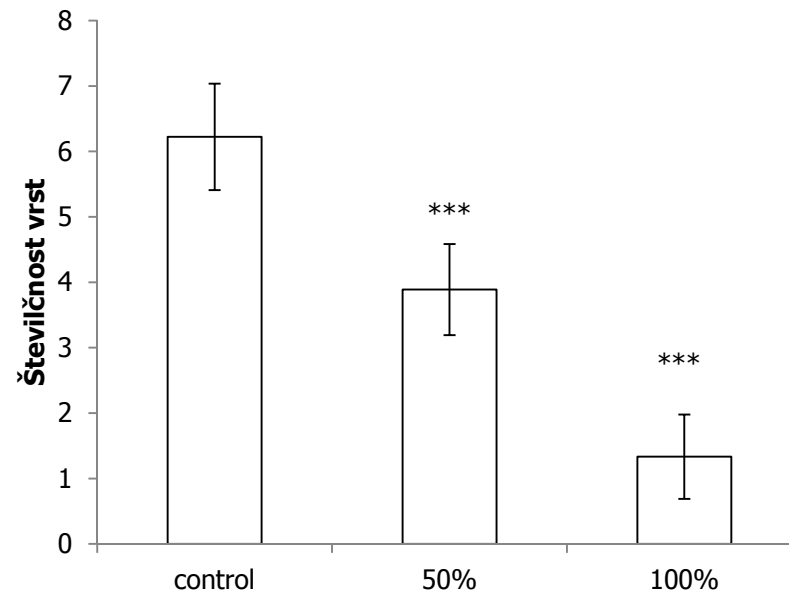


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Life+ ManFor C.BD. Project

Preliminary results

- Indicators for Biodiversity
 - Birds: species diversity (Natura2000 species)



Slovenian Forestry Institute

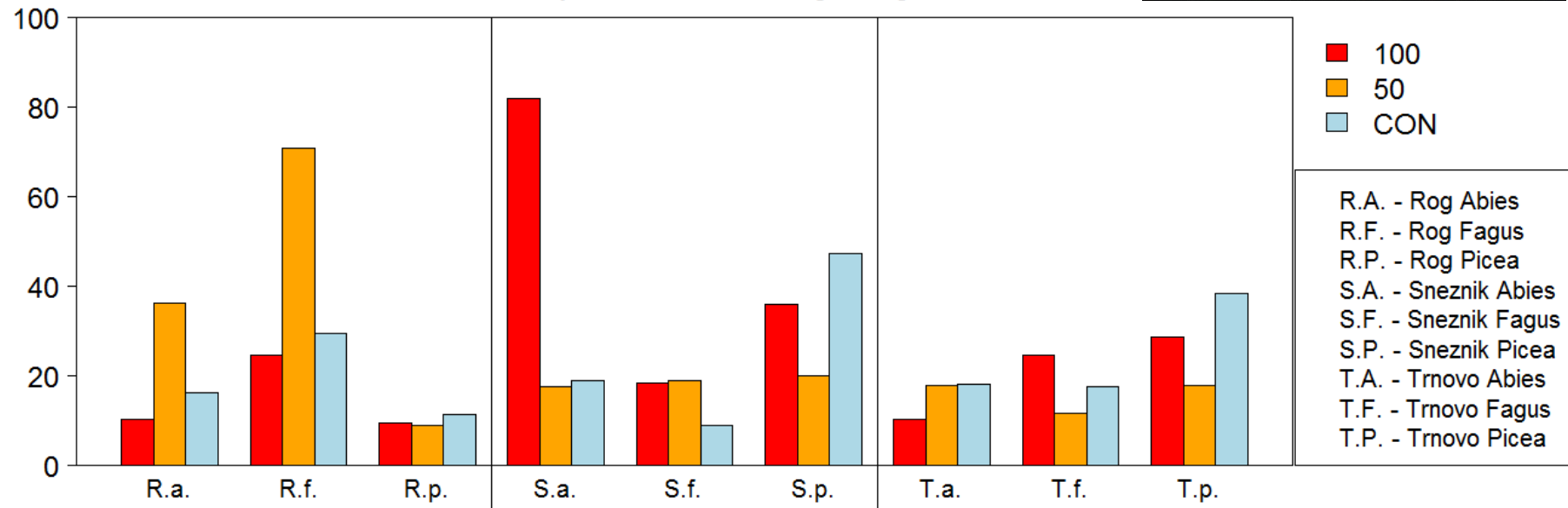
Life+ ManFor C.BD. Project

Preliminary results



➤ Indicators for Coarse woody debris

Volume of dead wood biomass [m3/ha]

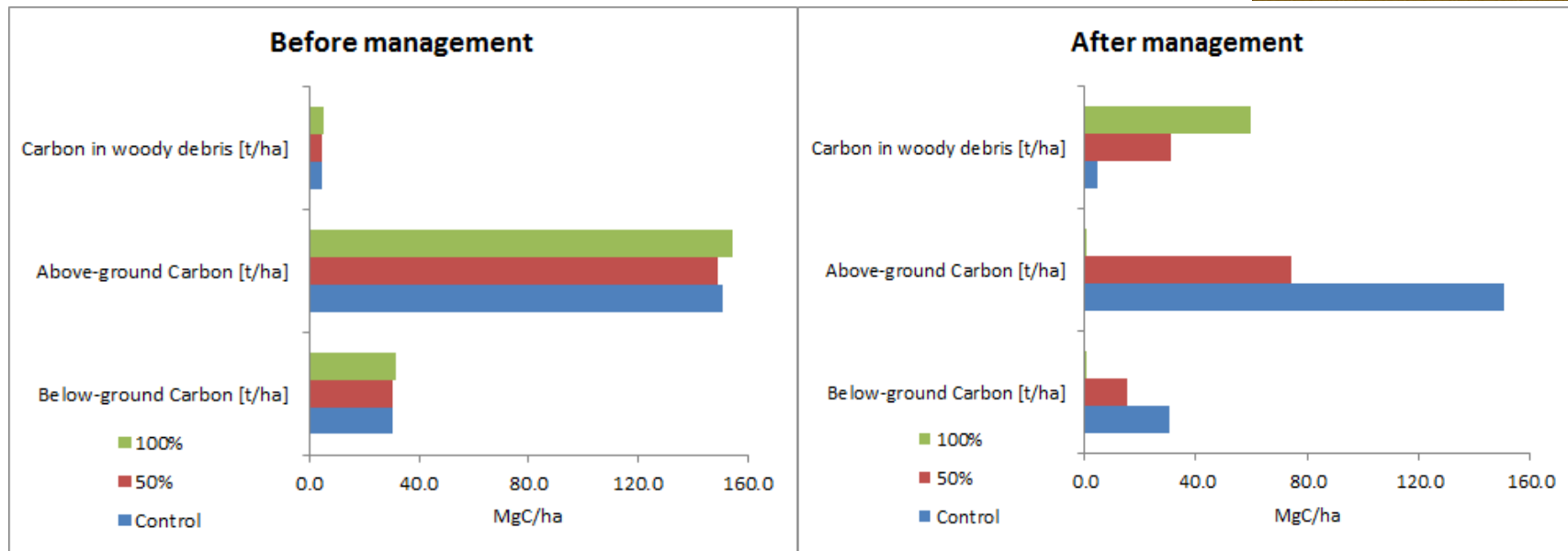
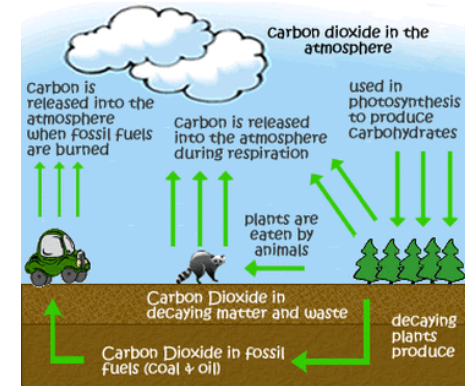


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Preliminary results

- Indicators for Carbon pools

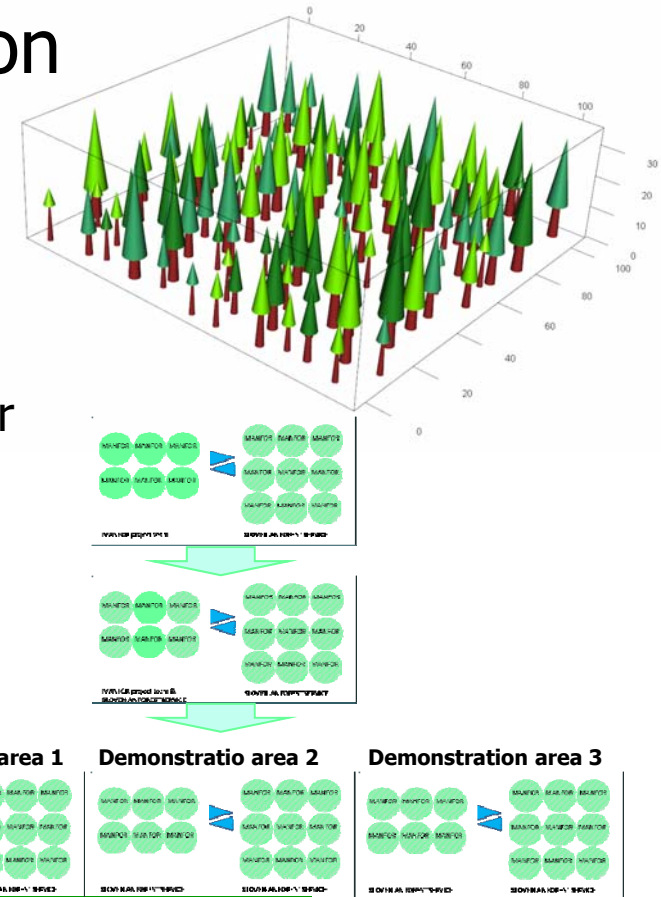


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Life+ ManFor C.BD. Project

Communication and Dissemination

- Visualization of forest stands and the effects of forest management practices on selected indicators
- Collaborative ManFor C.BD learning program for forest practitioners and its transfer to the State Forest Service



Slovenian Forestry Institute

Life+ ManFor C.BD. Project

Communication and Dissemination

- ManFor Newsletters
- Workshops
- Scientific and professional papers
- Patent



The collage includes:

- ManFor NOVICE newsletter (Slovenian text)
- Workshop with a map of Europe
- Forest field day with people in a forest
- Patent document for a silvicultural method
- Meeting in a conference room
- Group photo of participants holding a Life+ banner
- Journal article: "Response of *Fagus sylvatica* L. and *Abies alba* Mill. in different silvicultural systems of the high Dinaric karst" by Matjaž Čater and Tom Levanec.



Gozdarski inštitut Slovenije
Slovenian Forestry Institute

IFSA Winter Meeting 2015

Forest experiments



A tree (Giovanna Mantegazza)





Gozdarski inštitut Slovenije
Slovenian Forestry Institute

IFSA Winter Meeting, Ljubljana
11. 8. 2015





SUSTAINABLE INNOVATIVE MOBILISATION OF WOOD - SIMWOOD



GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE

dr. Nike Krajnc

mag. Andrej Breznikar



ZAVOD za GOZDOVE
SLOVENIJE
Slovenia Forest Service



IFSA Winter Meeting 2015, Ljubljana, 11.3.2015

About the project

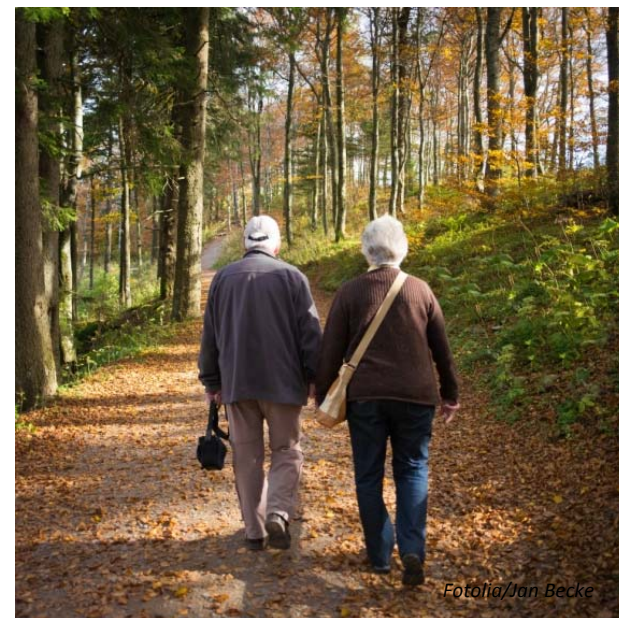
- 28 partners in 11 countries (11 SMEs)
- 4 year project (2013-2017)
- Budget approx. 7.5 million Euros (EU contribution 5.9 million Euros)
- Funded by the EU 7th Framework Programme (FP7)



To increase the mobilisation of wood from forests and woodlands in Europe

SIMWOOD reaches out to stakeholders and regional initiatives with the **aim** of:

- Raising awareness and mobilising public and private forest owners
- Promoting collaborative forest management
- Ensuring sustainable forest functions.



A growing demand for wood

EU forest-based industries

- 4-5 million employees, 600,000 enterprises
- 550 bn € annual turnover
- 10-15% of total manufacturing
- Total expected demand of 853 million m³ in 2030
- 'solid' uses will grow steadily, new chemical uses will emerge
- Wood fuel +1.5% growth per year, 585 million m³ in 2030

Expected to lead to -> scarcity of wood, stronger competition and structural shifts in the forest sector.

159 million ha = 37% of Europe's land area
(Eurostat 2013)



Underused wood resources

- Current harvesting levels below sustainable allowable cut
- Theoretical potential very high, 'mobilisable' potential still unknown

Main potential is 'locked' in private forests



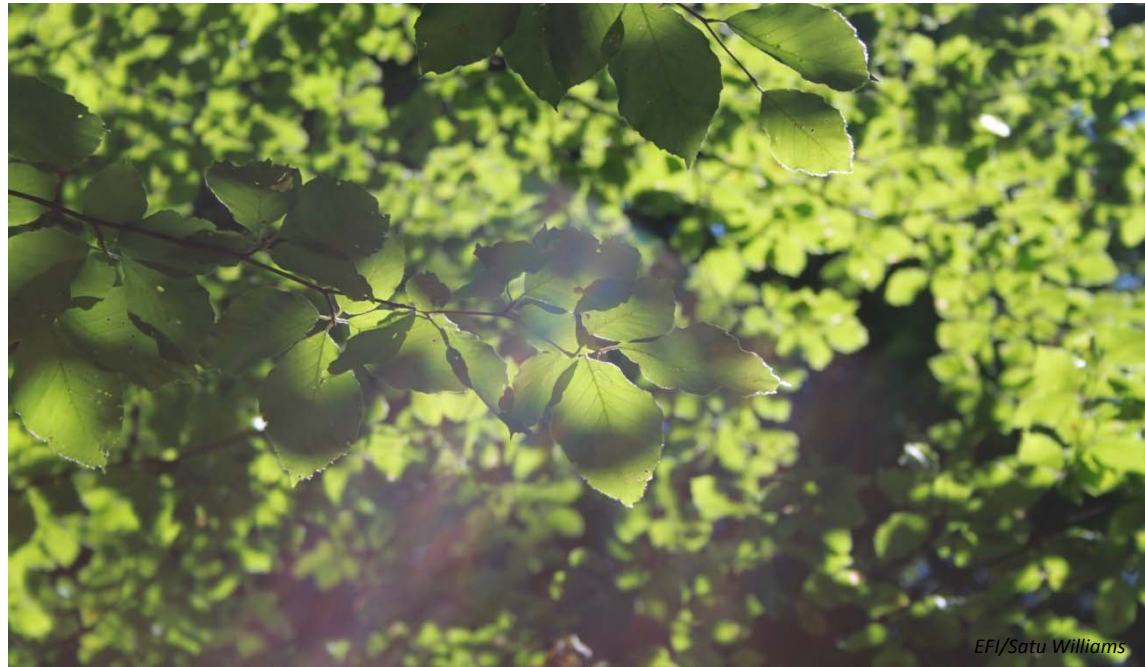
Private forest owners in Europe

16 million in Europe, increasing due to inheritance

- Traditional owners: declining
- Urban forest owners: increasing
- Timber no longer 1st priority
- Land fragmentation: 2/3 of owners have less than 1 hectare
- Lack of interest, skills and capacity for forest management



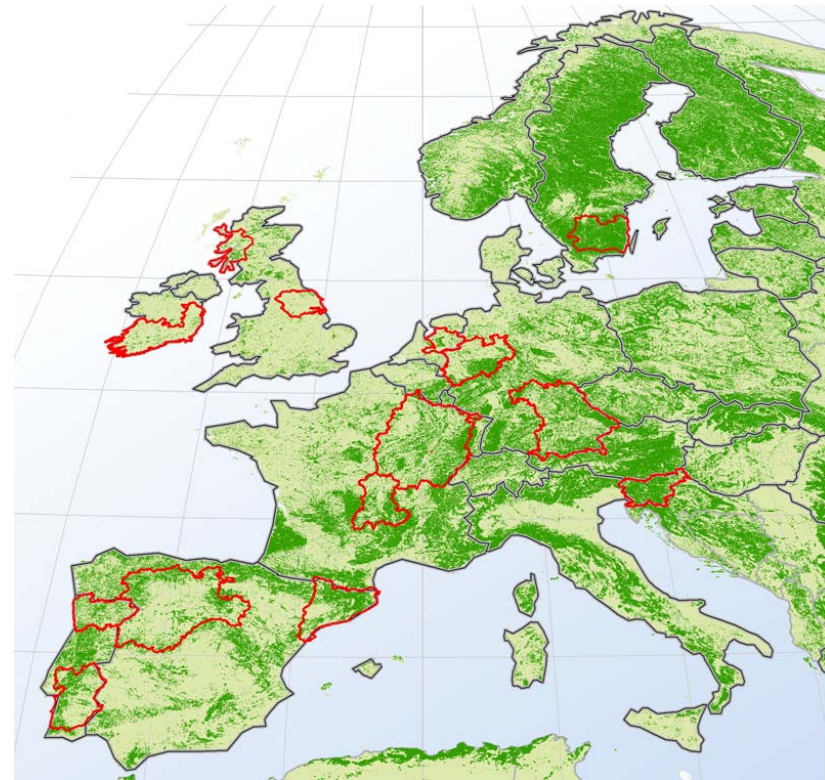
Wood mobilisation: mobilisation of forest owners!



Promotes collaborative wood mobilisation in the context of multifunctional forest management across European forest regions

14 European model regions

- Represents main European forest types
- Regional Learning Labs ensure stakeholder involvement
- Regional profiles developed and evaluated



Partners

National research organisations



Small and medium sized enterprises (SMEs)



European research organisations




Project support organisations





Department for forest technique and economics

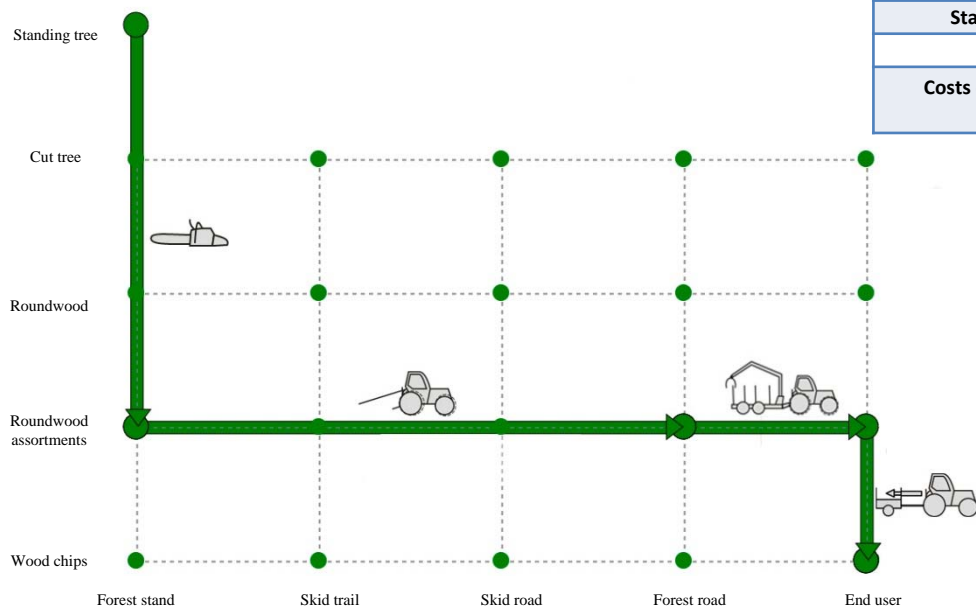
- Harvesting technologies
- Wood Chain Manager: <http://wcm.gozdis.si/>
- Wood biomass production and use (www.biomassstradecentre2.eu)
- Forest infrastructure
- Forest owners
- Woodflow analysis
- Quality of wood fuels - Trade mark: 
- <https://www.facebook.com/gisgte>



Fire wood production

Wood Chain Manager:

<http://wcm.gozdis.si/>



Machine	Total cost (€/h)	Direct material costs (€/m ³)	Predicted efficiency (m ³ /8h)	Comment
Chainsaw (4kW)	4,0	2,1	15,0	Felling
Forestry tractor	41,2	13,2	25,0	Skidding
Forestry transport composition	101,9	11,6	70,0	Roundwood transport
Chainsaw (6kW)	5,7	1,5	30,0	Cutting to 1m
Standard tractor	25,8	12,9	16,0	Logs (1m)
Splitter (30t)	13,0	6,5	16,0	Logs (1m)
Standard tractor	25,8	12,9	16,0	Firewood (33 cm)
Circular saw	7,5	2,5	24,0	Firewood (33 cm)
Costs of production chain	224,9	63,2		



Our projects:



This project is funded by the European Union





 Thank you



Nike.krajnc@gozdis.si



LIFEGENMON

Monitoring of genetic diversity - an early warning system to aid the assessment of a species response to environmental change at a long-term temporal scale

LIFE for European Forest Genetic Monitoring System

Domen Finžgar, Marjana Westergren, Barbara Fussi, Phil Aravanopoulos, Hojka Kraigher



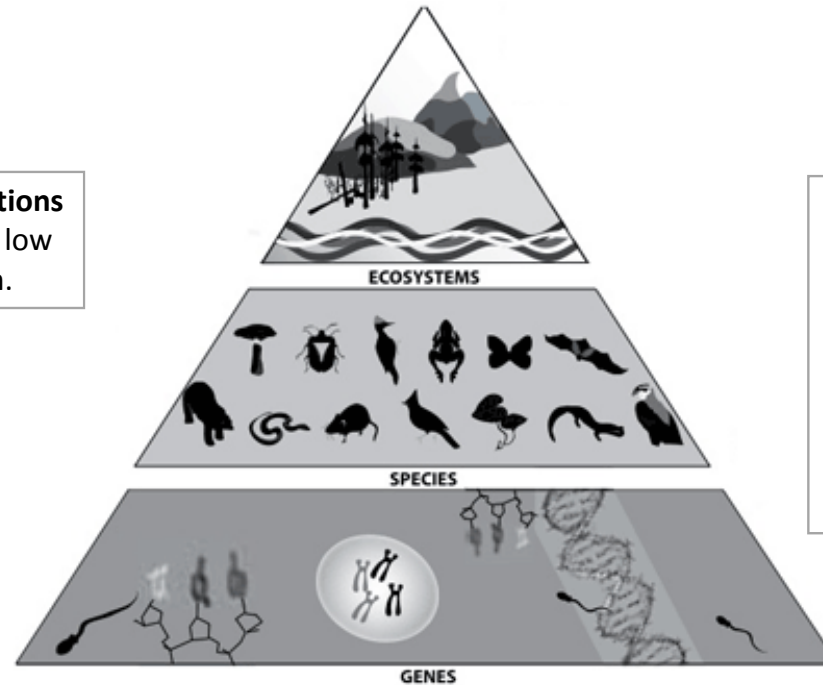
Winter meeting, Ljubljana, Slovenia

11.3.2015



Biodiversity vs. Genetic Diversity

The most **vulnerable species and populations** will be those of limited genetic variation, low dispersal abilities and high fragmentation.

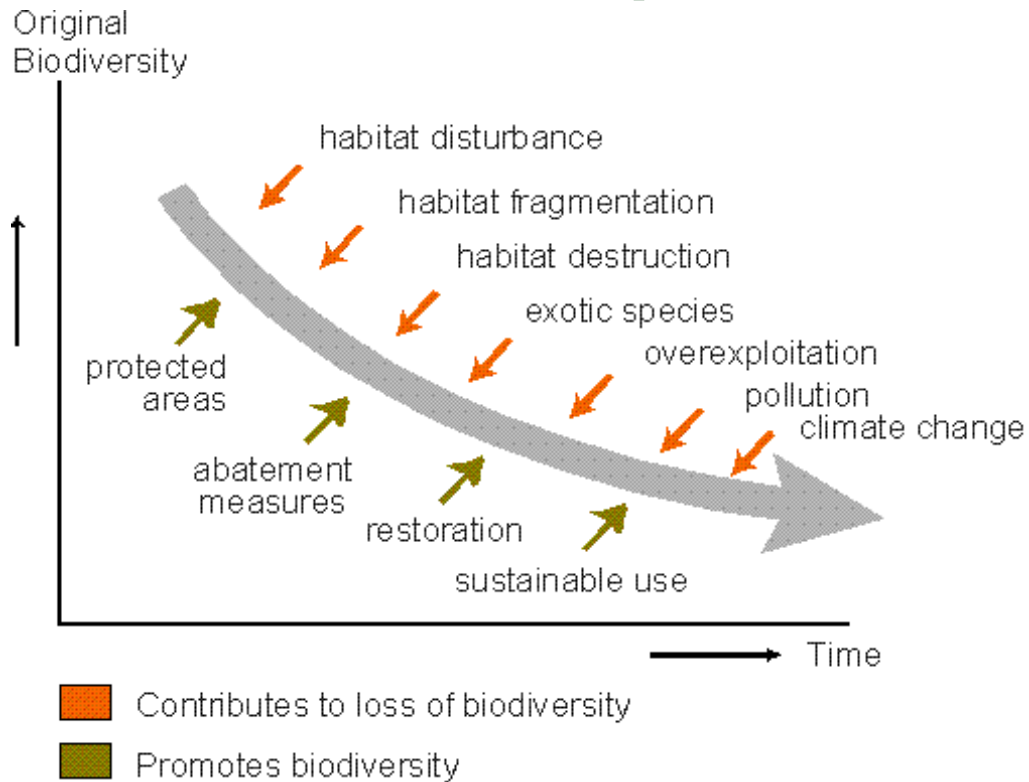


Genetic variation is the biodiversity component ensuring species survival and adaptive potential in a changing environment.

Source: www.biodiversitybc.org/EN/main/downloads/tnp-1.html



Loss of Biodiversity – Where are we?

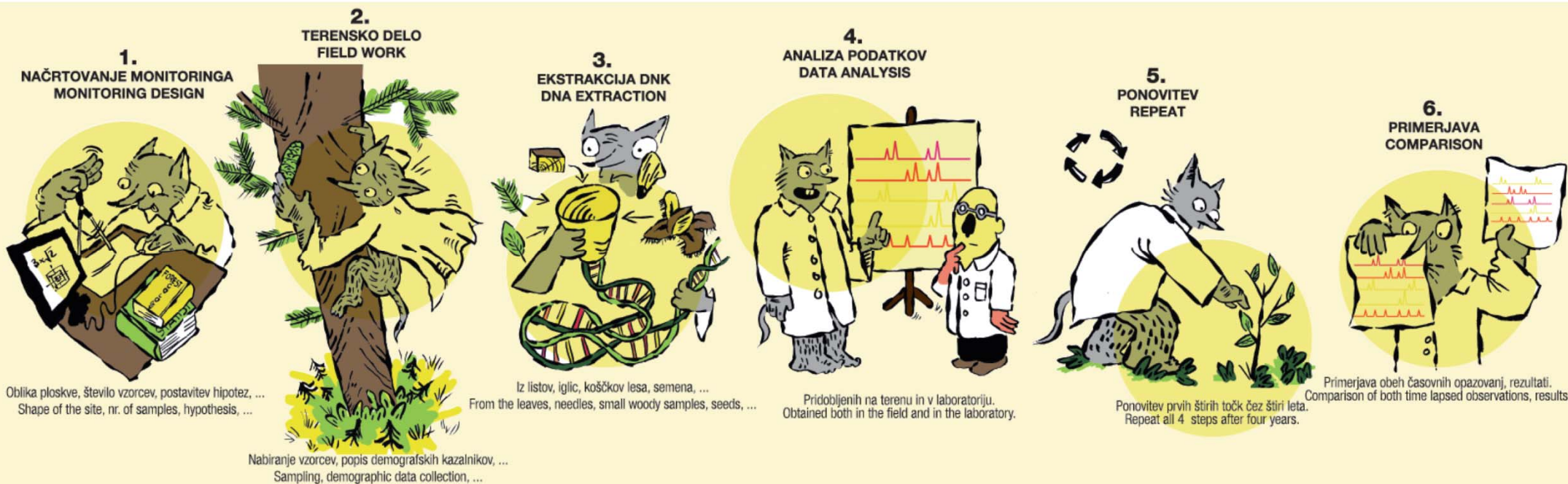


European forests, expected to be strongly affected by the ensuing **climatic change**, are in **immediate need** of a genetic monitoring scheme.

With genetic monitoring, temporal changes in population genetic variation can be measured and thereby form a special part of **biomonitoring** that **contributes to biological conservation**

Source:
RIVM/UNEP (1997).

Genetic monitoring





Forest genetic monitoring is an integral part of management of Forest Genetic Resources.

Theoretical basis

- First proposed by experts from FAO, Group on forest genetic resources in 1996 (Namkoong et al. 1996, Namkoong et al. 2002)
- Simplified for practical use by experts from EUFORGEN working group on forest genetic monitoring (Aravanopoulos *et al.* 2013) and German programme for conservation of forest genetic resources (Konnert *et al.* 2011)

Implementation

- pilot study of the German system in Bavaria

→ **LIFEGENMON** - LIFE for European Forest Genetic Monitoring System





PILOT STUDIES



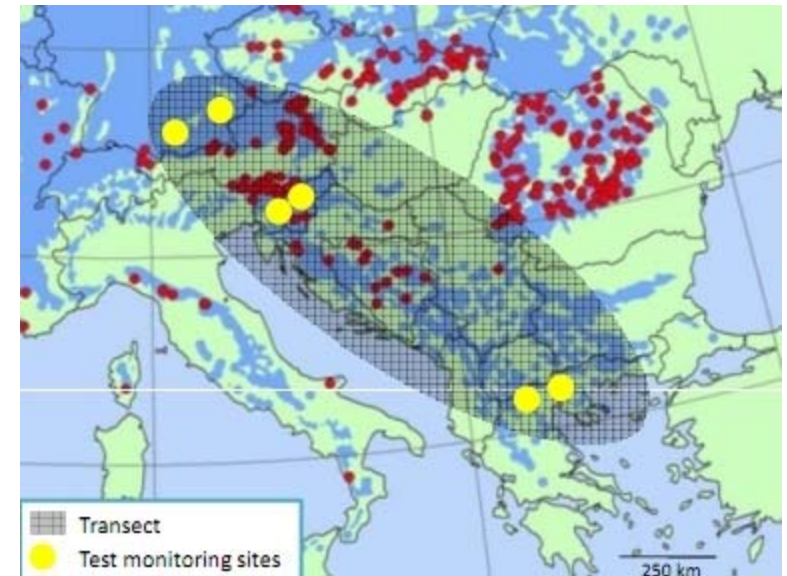


LIFE GEN MON Data

Duration: 01.07.2014 – 30.06.2020.

6 partners from 3 countries/states

- SFI: Slovenian Forestry Institute – leading partner;
- SFS: Slovenia Forest Service;
- CNVOS: Centre for information service, co-operation and development of NGOs;
- ASP: Bavarian Institution for Forest Seeds and Seedlings;
- FGL-AUTH: Aristotle University of Thessaloniki;
- GDDAY-DAMT: General Directorate of Forests and Agricultural Affairs - Decentralized Administration of Macedonia – Thrace.





Main Project Aims (1)

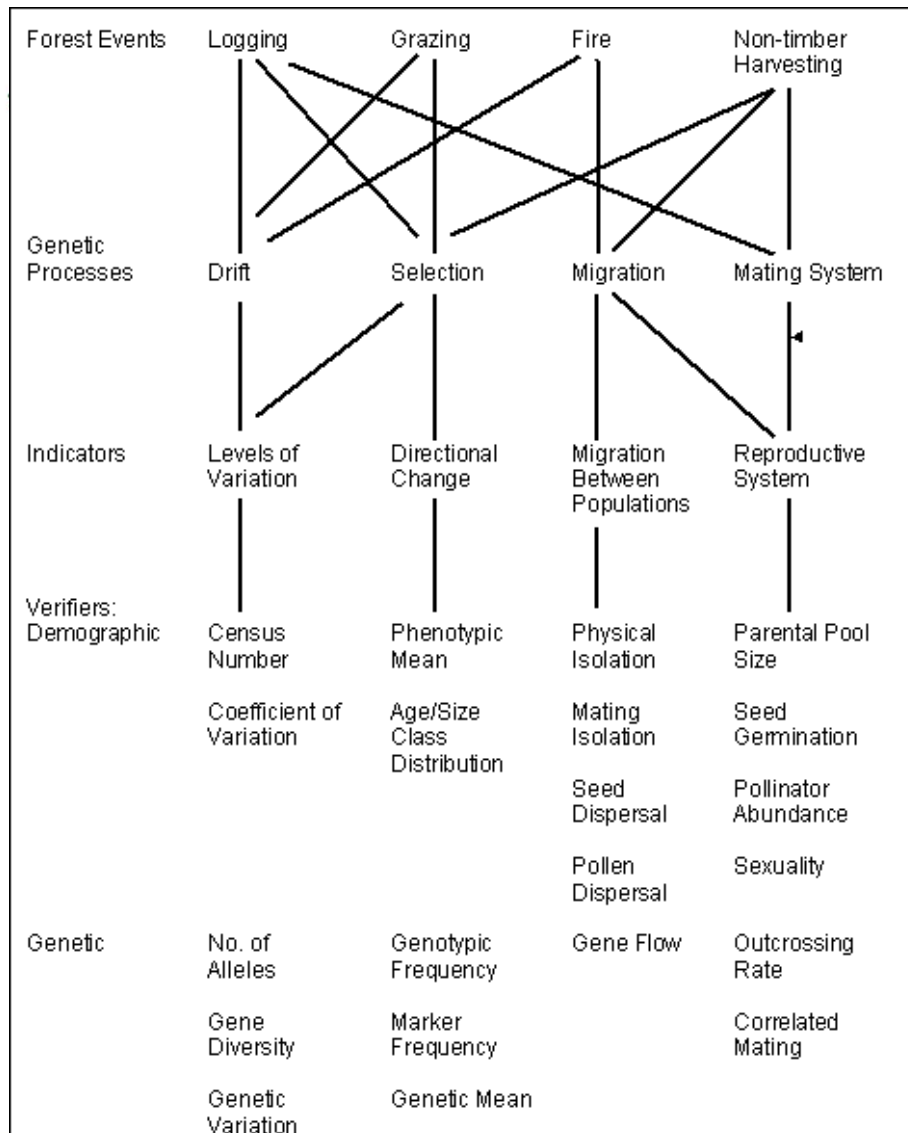
To define optimal indicators and verifiers for monitoring of genetic diversity changes in time across a transect from Bavaria to Greece for two selected target species:

- a stand forming broadleaf (*Fagus sylvatica*) and
- a stand forming coniferous species (*Abies alba* / *A. borisii-regis* complex)





Indicators and verifiers



Cost-benefit analysis



Decision support system

Source:

<http://www.fao.org/docrep/005/ac649e/ac649e06.htm>



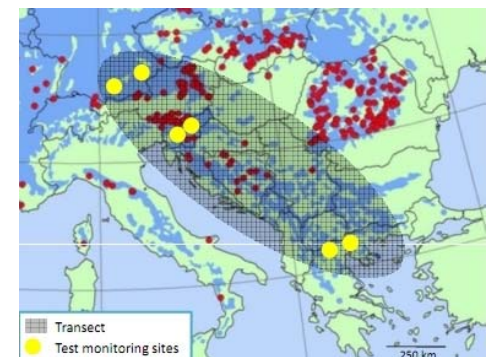
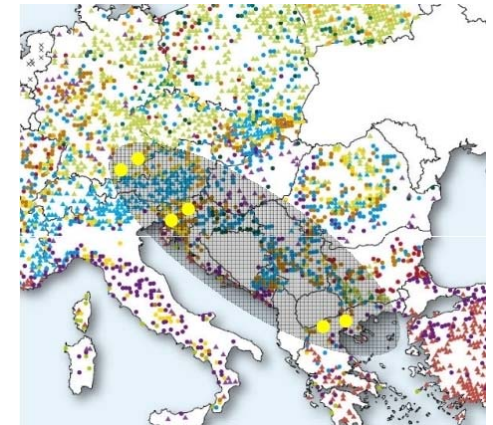
Project Aims (2)

- To prepare a Manual for Forest Genetic Monitoring & a Decision support system for an optimal choice of the level of FGM based on needs and means
- To organize series of workshops / trainings for the forestry sector to be capable of implementing FGM according to standardized procedures in their territories
- To prepare background professional documents / guidelines for policy makers at the national, regional and the EU level for supporting development of possible new regulations at the national level, and future European Forestry and Biodiversity Conservation policies and strategies
- To discuss and disseminate FGM
- To establish a well functioning internationally linked team of forestry professionals working in and for FGM.



Basic criteria for selection of monitoring sites

- Representative stands in the region (association, bedrock, soil, climate, management)
- Managed and unmanaged stands
- Natural regeneration present: seedlings/saplings from 2-10 years of age
- Flowering and fructification frequently observed
- Flat or mild slope up to max 40% (gene flow)
- If even-aged stand is selected, it should not be in the latest stages
- Typical rather than the very best location within a stand
- If possible, genetic, climatic and other monitoring data (e.g. ICP parameters) available
- Additional criteria considered: formal status - interest of the forest owners, local foresters, capacities for acting as a long-term 'Dislocated Developmental Center'





In search of the site – Potential monitoring plots





In search of the site – Potential monitoring plots



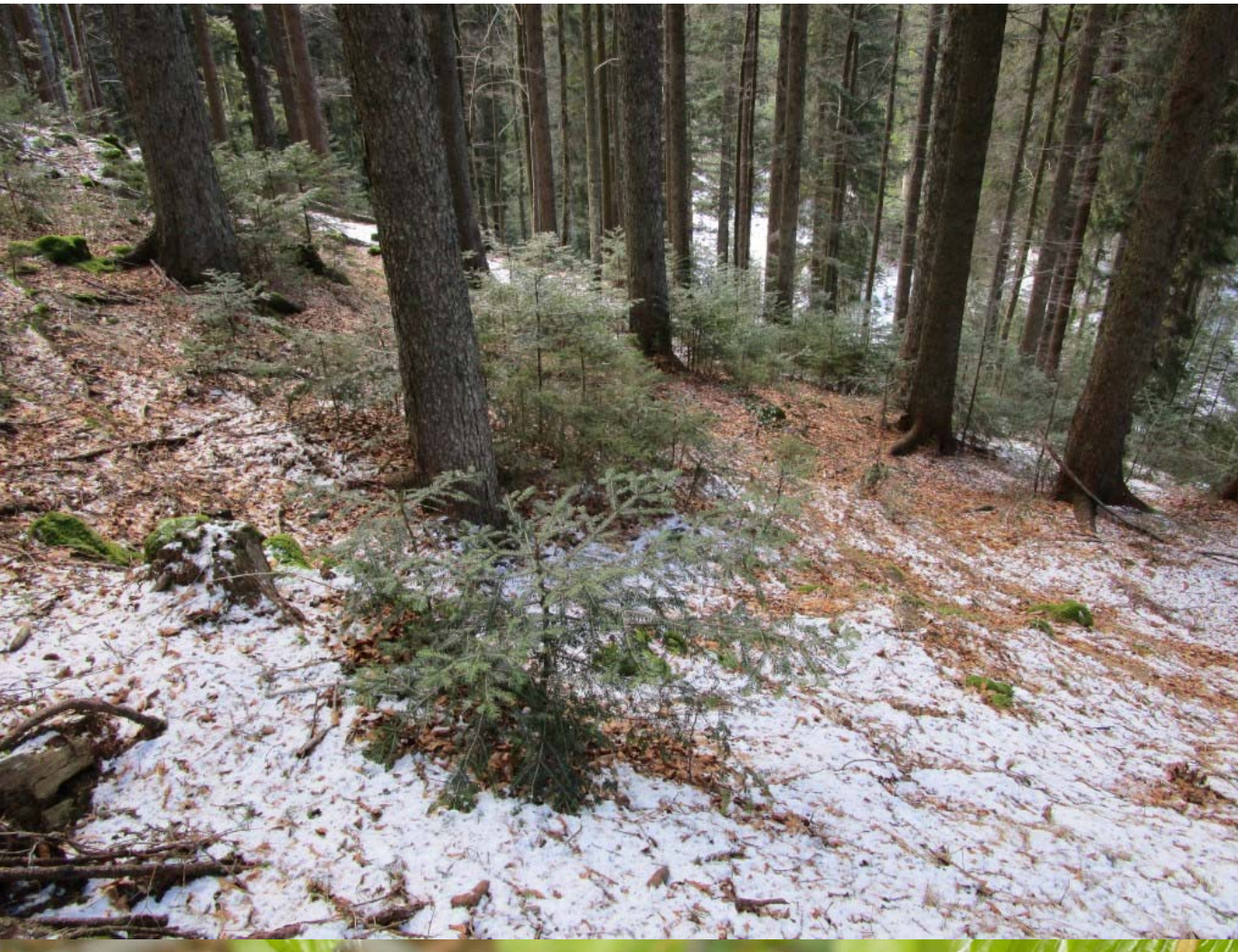
Natural regeneration
present?







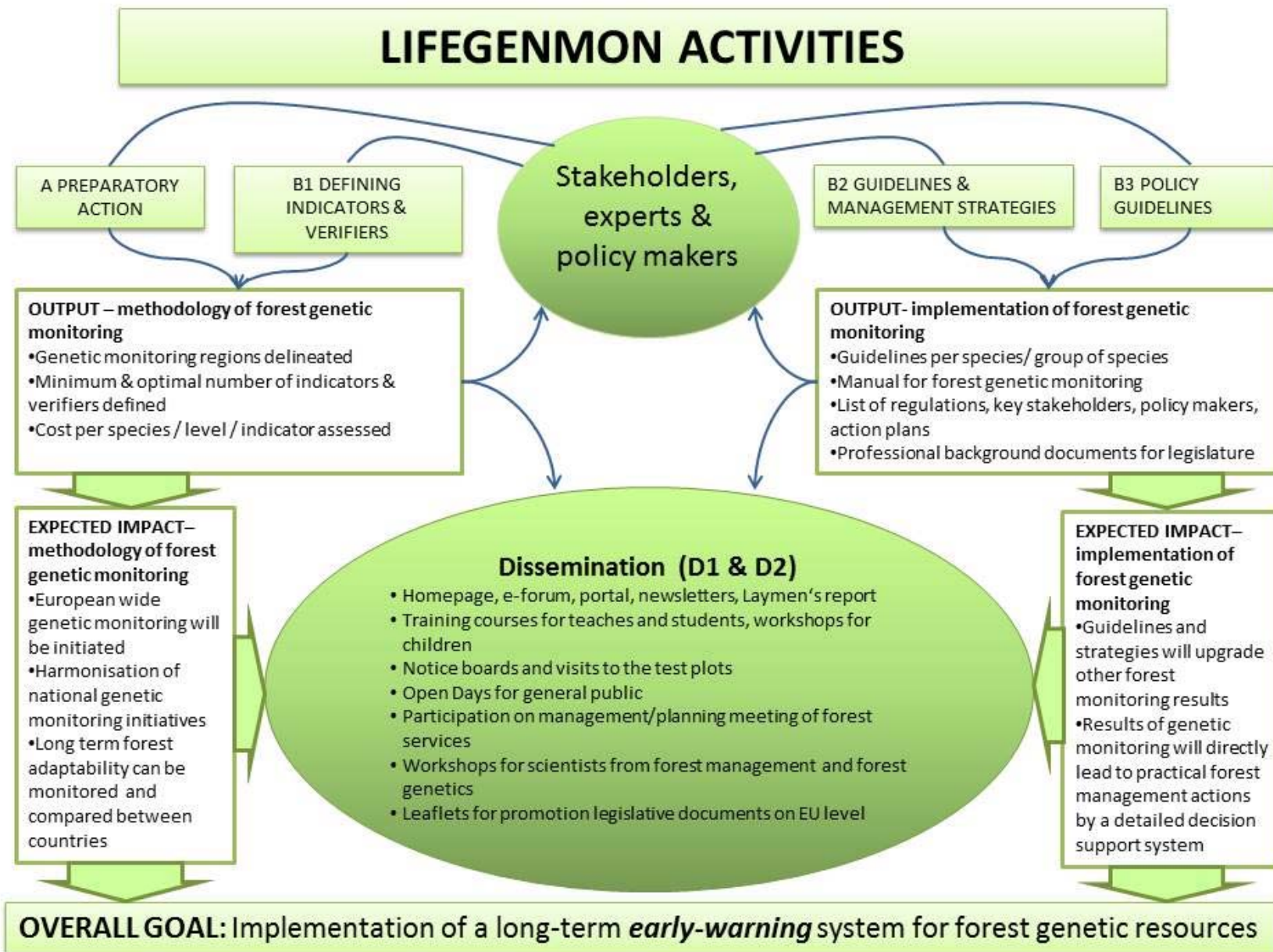
GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE



Flat or mild slope (gene flow)







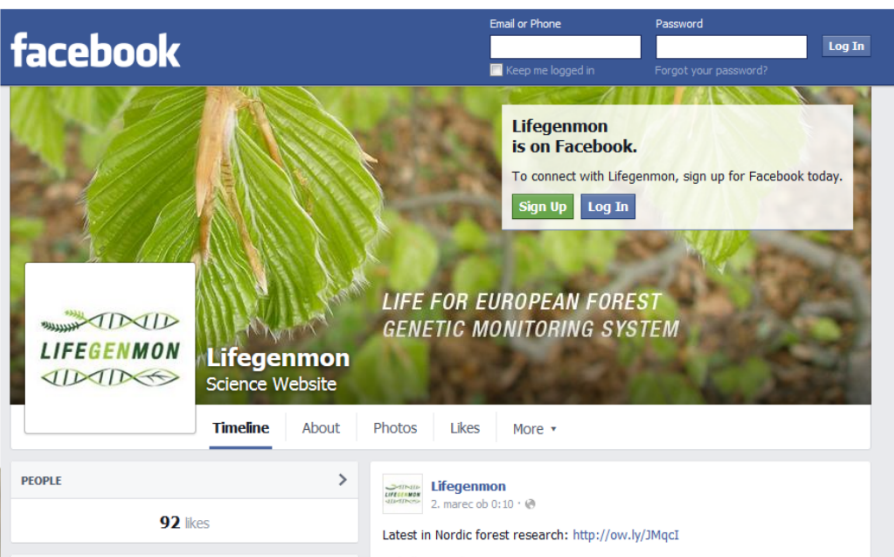
Prepared by:
B. Fussi



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- Twitter.com/LIFEGENMON
- LinkedIn.com/company/Lifegenmon





ZAVOD za GOZDOVE
SLOVENIJE

Slovenia Forest Service



“Caring for forests to benefit nature and people”

Slovenia Forest Service



**ZAVOD za GOZDOVE
SLOVENIJE**

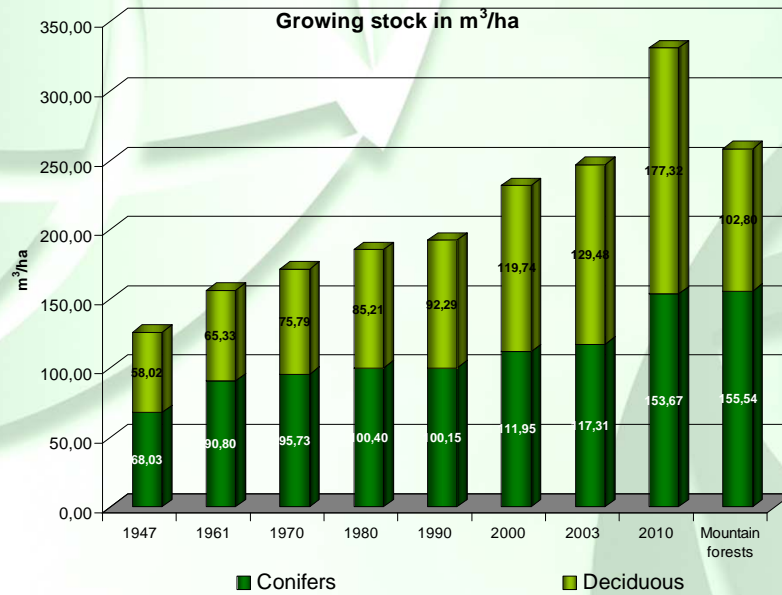
Slovenia Forest Service

Andrej Breznikar

Structure of this presentation:

- **Basic data about slovenian forests and forestry**
- **Slovenia Forest Service organizational structure**
- **Human resources in SFS**
- **Main tasks of Slovenia Forest Service**
- **Icebreak in Slovenian forests (February 2014)**

Slovenian forests - basic data

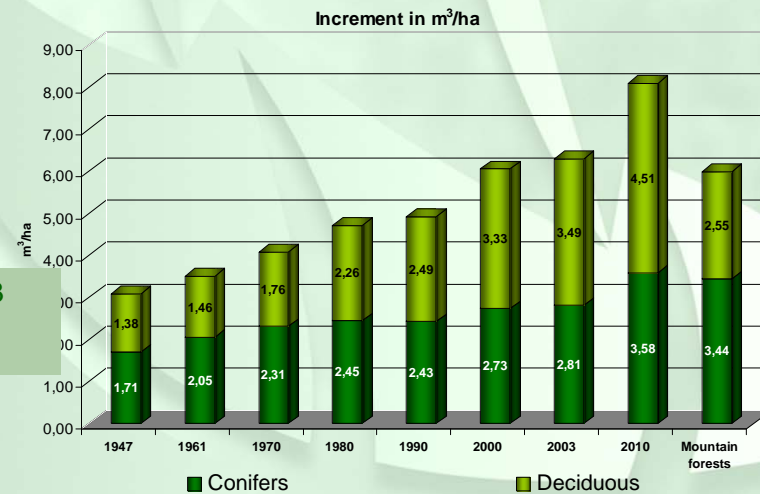


forest area 1.185 mio ha
59 % of Slovenia

75 % private forest,
23 % state forest
2 % local communities

Growing stock:
338 million m³ (285 m³ /ha)

- 🍁 **Annual increment: 8,4 millions m³ (7,1 m³ /ha)**
- 🍁 **Planned (allowable) cut: 5.7 millions m³/year**
- 🍁 **Annual cut (2012): 4 million m³ (63 % of possible cut)**



Forest area in Slovenia:



Main actors in Slovenian forestry:

- 1) Ministry of Agriculture and Environment**
- 2) Slovenia Forest Service**
- 3) Slovenian Forestry Institute**
- 4) Faculty for Forestry and Renewable resources**
- 5) Found for Agricultural Land and Forests**
- 6) Forest enterprises**
- 7) Agriculture and Forestry chamber**
- 8) Private forest owners associations**
- 9) Forestry societies and their associations**

Slovenia Forest Service

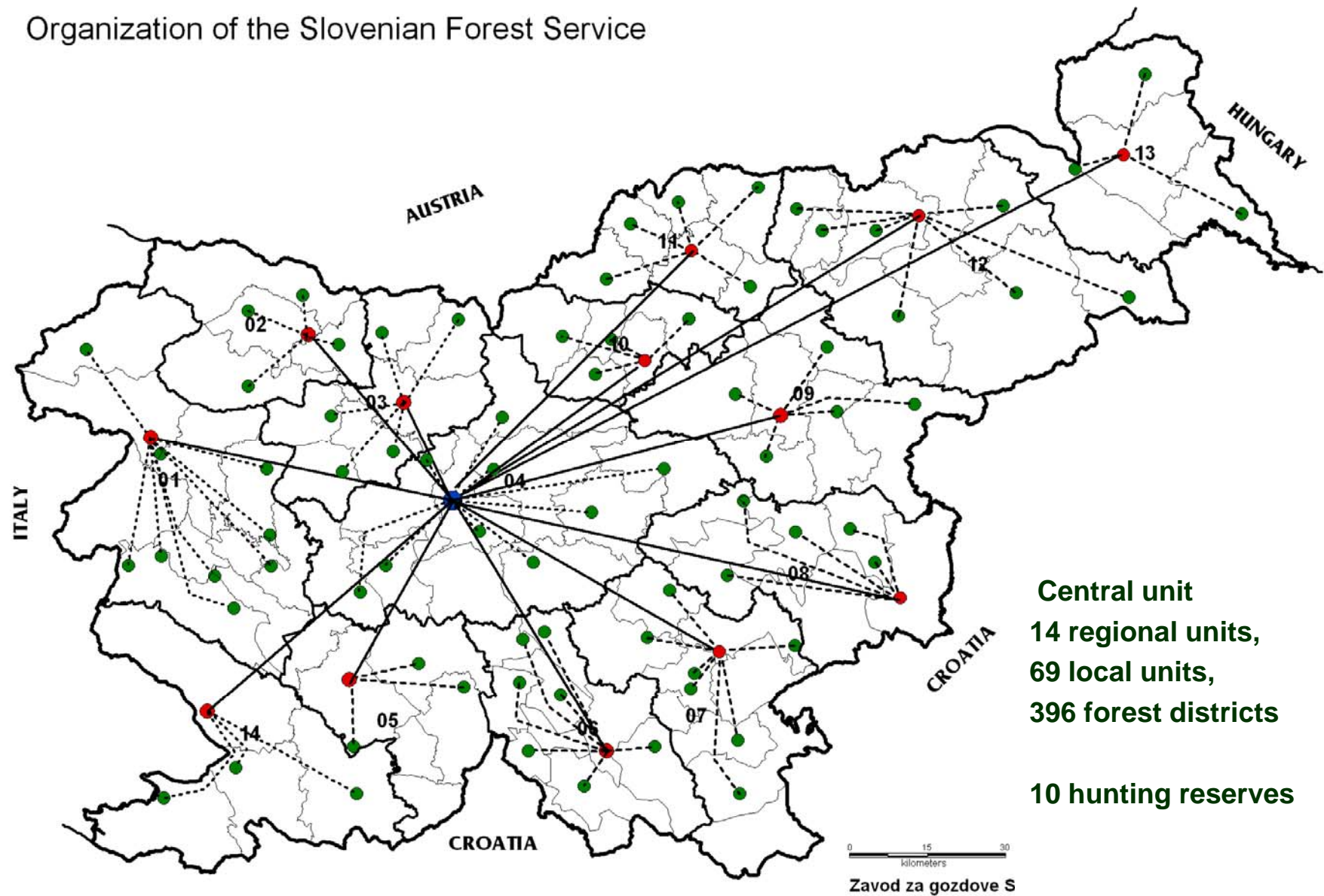
🍁 **Forest Act 1993**

🍁 **Constituted in May 1994**

🍁 **Main fields of work and budget sources:**

- 🍁 **Public forestry service (Forest Act),**
- 🍁 **Public service at the field of wildlife management (ZDL),**
- 🍁 **Supervision on the field of nature conservation (ZON),**
- 🍁 **Management of hunting areas with special purpose**
- 🍁 **EU projects**
- 🍁 **Commercial activities (management plans, education, ...)**

Organization of the Slovenian Forest Service



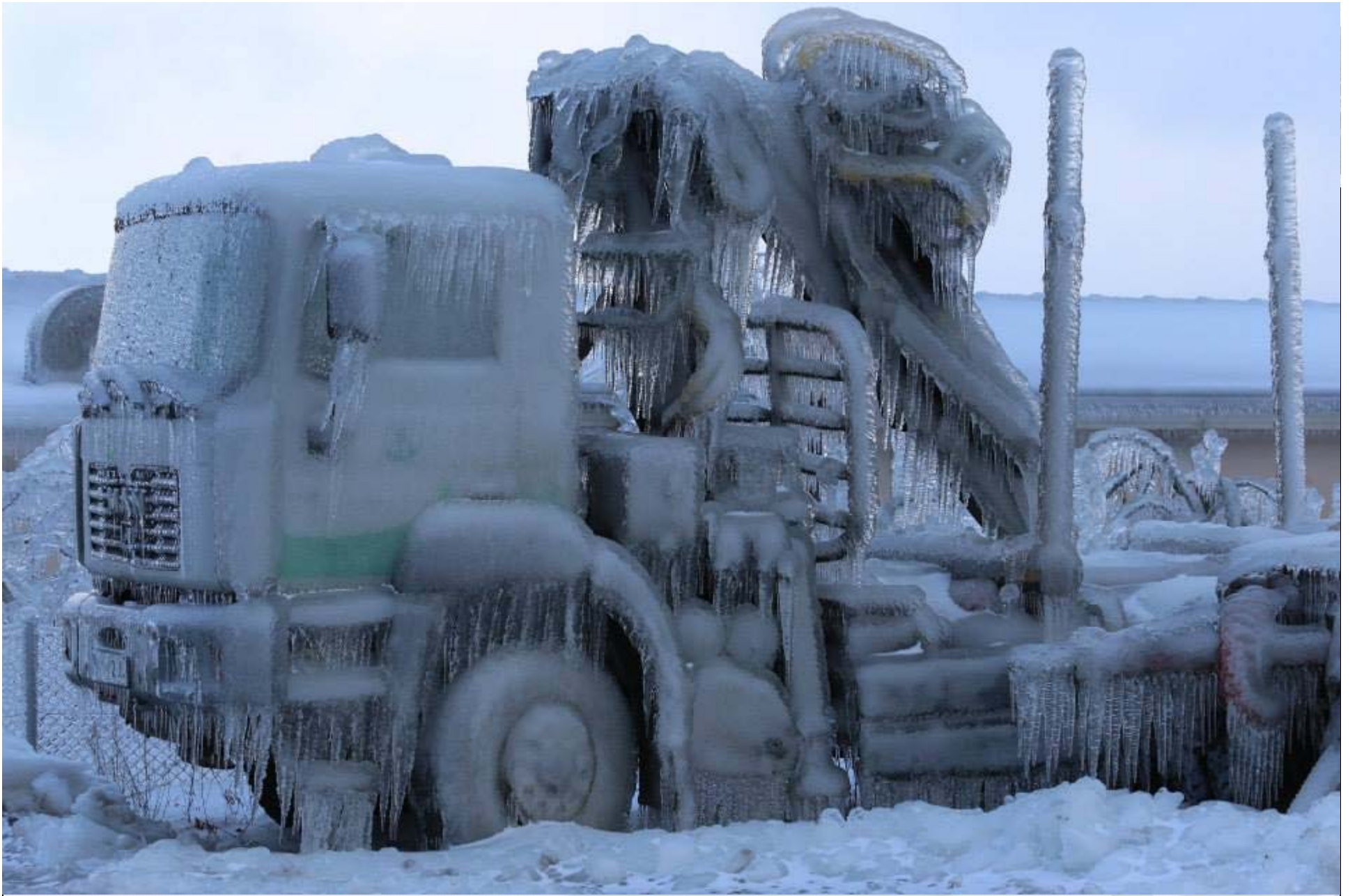
Main tasks of Slovenia Forest Service:

- ❁ **Collecting and keeping data on forests,**
- ❁ **Monitoring biological balance and damages of forests,**
- ❁ **Forest management planning and game management planning,**
- ❁ **Silvicultural planning – marking of trees for felling, silvicultural and protection measures**
- ❁ **Elaboration programmes for protection of forests,**
- ❁ **Cooperation in regional and state land use planning,**
- ❁ **Planning of the construction and maintenance of forest roads,**
- ❁ **Subsidies in forestry – planning, supervision,**
- ❁ **Popularisation of forests and informing public on forests,**
- ❁ **Extension for forest owners**

Icebreak in Slovenian Forests

(30th January – 10th February 2014)





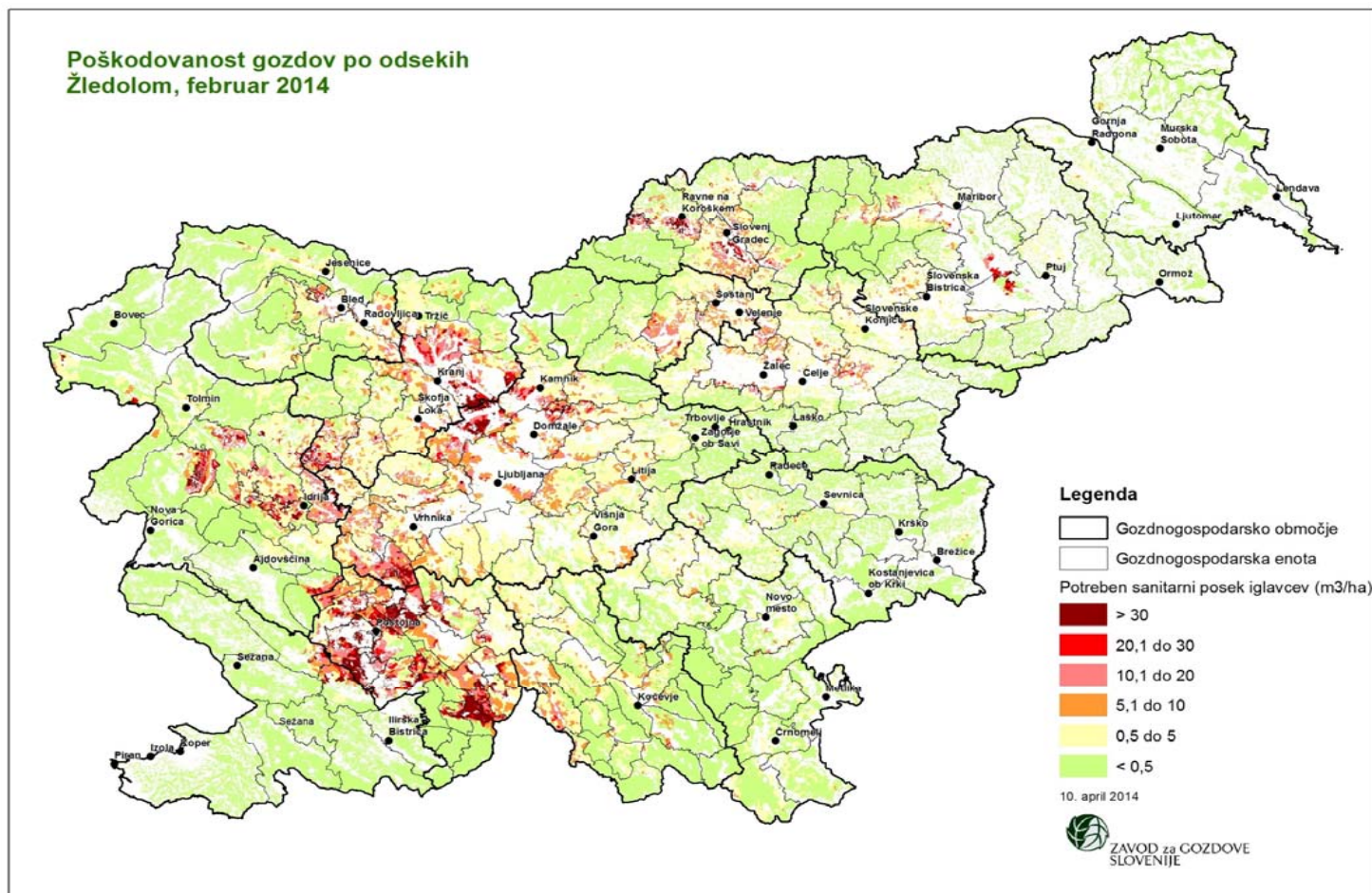


20 let

ZAVOD za GOZDOVE
SLOVENIJE

Eisbreak consequences in Slovenian forests

- 602.000 ha (51 %) of forests
- 9,3 mio m³ damaged wood
- 15.000 km of blocked forest roads
- 14.000 ha – reestablishment of new forest
- 214 mio EUR – financial damage





IFSA Winter Meeting 2015

Visit to the Slovenian Forestry Institute - reflections

Urša Vilhar, Andrej Breznikar



Gozdarski inštitut Slovenije
Slovenian Forestry Institute





IFSA Winter Meeting 2015

Slovenian Forestry Institute

Reflections

How did you like the visit at Slovenian Forestry Institute

1. What could be better?
2. What was good?



Gozdarski inštitut Slovenije
Slovenian Forestry Institute



IFSA Winter Meeting 2015

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Reflections

