


Workshop on active management of forest protected areas

1st – 5th August 2016

Mikulov, Czech Republic

ABSTRACT BOOK

More info: http://www.forumochranyprirody.cz/workshop-active-management-forest-protected-areas

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Faculty of Forestry and Wood Sciences

Scientific partner

SCB Europe Section

Day	Time	Person	Country	Title
Monday				
	Evening			Registration/Dinner/Informal welcome
Tuesday				
	7.30	--		Breakfast
	8.30	Several (organisers)	--	Welcome, Information
	8.50	Bengt-Gunnar Jonsson	Sweden	Introduction and background
	9.10	Daniel Kraus	Germany	The importance of restoration from the perspective of integrative management
	9.30	Jennie Sandström	Sweden	What is the impact of active management on biodiversity in boreal and temperate forests set aside for conservation or restoration? A systematic map
	9.50	Björn Nordén	Norway	When is active management favourable for biodiversity? Examples from temperate deciduous forest in Sweden and Norway
	10.10			Coffee break
	10.40	Fredrik Carlsson	Sweden	Wood decaying fungi adaptation to forest fire; impact on restoration
	11.00	Petri Keto-Tokoi	Finland	Differences in the goals for restoration burnings between western USA, Finland and Sweden
	11.20	Miriam Matheis	Germany	Does restoration fire enhance regeneration of deciduous trees in boreal forests?
	11.40	Anna-Lisa Ylisirniö	Finland	How to preserve epiphytic lichens in managed forests? Suggestions based on research in boreal forests
	12.00	--	--	Lunch
	13.30	Johnny Schimmel	Sweden	Management of Arboretum Norr – the wish to "build" a natural forest environment in a recreational area.
	13.50	Tibor Standovár	Hungary	A novel multi-purpose forest state assessment methodology to support conservation and forest management planning
	14.10	Tamás Frank	Hungary	Conservation management actions in oak forests in Natura 2000 sac sites of Bükk National Park Directorate, Hungary
	14.30	Tomáš Vrška	Czech Republic	Lessons from the disturbance dynamics of lowland forests
	14.50	Petr Petřík	Czech Republic	Close-to-nature forestry in the Czech Republic in the view of the Platform for Sustainable Landscape Management
	15.10			Coffee break
	15.30	--	--	Excursion – Pollard stand near Jevišovka
	Evening			Dinner – Wine tasting
Wednesday				
	7.30			Breakfast
	8.30	Mark Sixsmith	UK	Ancient or old growth forests?
	8.50	Lasha Khizanishvili	Georgia	Georgian forests
	9.10	Iosebi Turashvili	Georgia	About forest of Kakheti region
	9.30	Nana Charkhoshvili	Georgia	Tusheti protected areas
	9.50	Eva Murtazashvili	Georgia	Batsara-Babaneuri protected areas
	10.10			Coffee break
	10.40	Guntis Brumelis	Latvia	Experimental management of EU protected forest habitats in Latvia
	11.00	Zigmars Rendenieks	Latvia	Fragmented deciduous forest habitats in Latvia – how can active management help?
	11.20	Frank Krumm	Germany	Bees in trees – tradition meets restoration
	11.40	Ondřej Vild	Czech Republic	Six years of experimental litter collecting: Effects on forest understorey vegetation
	12.00			Lunch
	13.30	Excursion	--	Coppice with standards in Pálava, restored parkland, coppice woodland, Křivé jezero reserve
	Evening			Dinner

Thursday				
	7.30			Breakfast
	8.30	Marek Leskovjanský	Slovakia	New management plan and new zonation of NP Slovenský raj – introduction, experiences
	8.50	Pavel Šebek	Czech Republic	Pollarding: an important, but overlooked tool for conservation of woodland associated biodiversity
	9.10	Jan Roleček	Czech Republic	Site preferences of endangered species in a former coppice of high conservation value
	9.30	Radim Hédl	Czech Republic	Restoration of coppicing management in Děvín: Can a biodiversity decline trend be reversed?
	9.50	Gerhard Egger	Austria	Floodplain forests in Austria – management experiences from the WWF reserve Marchegg
	10.10			Coffee break
	10.40	Excursion	--	Drösing (coppice with standards, Austria); Marchegg (WWF reserve, Austria)
	Evening			Reception and beer party
Friday				
	7.30	--	--	Breakfast
	All day	Excursion	--	Floodplain forests and open woodlands (CZ), Záhorie (military training ground, continental sands and fire affected woodlands, Slovakia)
	Evening			Dinner/Departure. There is a possibility to departure to Wien by train from Břeclav at 15.56.
Saturday				
	Morning			Breakfast and departure

The importance of restoration from the perspective of integrative management

Kraus Daniel
daniel.kraus@efi.int
European Forest Institute (EFI)

Habitat loss is one of the leading causes for native species becoming endangered or even extinct. Further ecosystem services of forests in general can be negatively affected by habitat loss. There are two practical ways to contribute to mitigating or reversing the trend of habitat loss. Those are the conservation of currently viable habitats and actively restorating degraded habitats. Several studies have clearly shown the importance of distinct management strategies within integrative nature conservation approaches. The so called 'Triple-R' strategy describes the three main pillars of biodiversity conservation of forests:

- Reserve
- Retain
- Restore

Setting aside areas for conservation (reserve) and ensuring continuity in forest structure, composition and complexity (retention) in managed forest attempt to maintain and protect existing habitat and biodiversity, whereas restoration aims at reversing existing environmental degradation and population declines. This implies targeted human intervention is used to promote habitat, biodiversity recovery and associated gains.

Main focus of most integrative approaches is the retention approach, i.e. retaining deadwood, habitat trees and smaller set aside areas (stepping stone habitats) often combined with larger protected forest areas as a mosaic at landscape level. However, retention can only be applied in areas with good to very good preconditions for integrating biodiversity aspects into management. In most European forests such conditions are not given since naturalness, structures and tree species composition have been changed historically and are therefore not yet suitable for high value conservation through retention. In this case restoration activities may come into place. Common elements of forests targeted for restoration are individual structures (e.g. active creation of standing/lying dead wood and habitat trees), organisms (e.g. process-limited species), and processes (e.g. dynamic mosaic of early and late seral stages). Scientific knowledge of the biological legacies created by natural processes may provide some guidance for the types, quantities, and spatial distribution of structures and organisms targeted. The underlying premise is that species are likely to be adapted to natural processes with which they evolved. Relating this premise to restoration, understanding the types, spatial distribution and aggregation of living and dead trees and microhabitats that develop under natural conditions, can help guide selection of legacies for restoration to maintain key ecological processes also in commercially managed forests.

What is the impact of active management on biodiversity in boreal and temperate forests set aside for conservation or restoration? A systematic map

Sandström Jennie
jennie.sandstrom@miun.se, Mid Sweden University

Jonsson Bengt Gunnar bengt-gunnar.jonsson@miun.se, Mid Sweden University

Biodiversity values in many protected forests are often legacies of past disturbances, e.g. recurring fires, grazing or small-scale wind-throw. These forests may need active management rather than non-intervention to keep their characteristics. In a systematic map, we have identified studies on a variety of interventions that could be useful for conserving or restoring aspects of forest biodiversity in boreal and temperate regions. A systematic map gives an overview of the evidence base but does not synthesize the results. We made a very thorough search for literature in several languages and all identified articles were screened for relevance using an a priori protocol with inclusion/exclusion criteria. Our searches identified almost 17,000 articles and 798 articles remained after screening. Almost two-thirds of the included studies were conducted in North America, whereas most of the rest were performed in Europe. The interventions most commonly studied were partial harvesting, prescribed burning, thinning, and grazing or exclusion from grazing. The outcomes most frequently reported were effects of interventions on trees, other vascular plants, dead wood, vertical stand structure and birds. The wealth of evidence identified in this systematic map is available at an external website and could be of value for researchers and managers.

When is active management favourable for biodiversity? Examples from temperate deciduous forest in Sweden and Norway

Norden Björn
Bjorn.Norden@nina.no
Norwegian Institute for Nature Research

The effects of active management may differ among forest types, organism groups and climatic regions. In a long-term experiment in 25 oak dominated forests in SE and SW Sweden, 25 % partial cutting favored oak regeneration, total species richness and red-listed species of vascular plants, bryophytes, beetles, lichens and mycetophilids. We found negative effects for wood-inhabiting fungi on fine woody debris and for land molluscs. To maintain the forest type and its biodiversity, we recommend conservation cutting, but some areas should be left with no intervention.

In another study, we surveyed lichens, wood- and bark-living fungi, and bryophytes on coarse elm and ash trees in Norway. The trees were either 1) Pollarded at least once, or 2) Never pollarded (n=350). Coarser trees had higher species richness, and *Fraxinus* trees had higher species richness than *Ulmus*. Pollarded trees had significantly more trunk cavities. Pollarded and unpollarded trees did not differ in total species richness, or number of redlisted species of lichens or bryophytes. For wood- and bark-living fungi, total and redlisted species richness were higher on pollarded trees. Based on our results, we conclude that the value of (re-)pollarding as a conservation effort can be questioned, at least for epiphytic cryptogams.

Wood decaying fungi adaptation to forest fire; impact on restoration

Carlsson Fredrik
fredrik.carlsson@miun.se
Mid Sweden University

Studies indicate that wood decaying fungi prevalent in forests with a fire history has adapted, increasing the chance of survival during and after a forest fire. It is also suggested that these species will be favored by forest fire, so that fitness will be higher in relation to non adapted species. Three adaptations have been investigated so far; Increased heat tolerance, increased competitiveness after heat shock, and increased decay rate after heat shock. The success of a restoration fire depends on many variables and our research adds yet another; the possibility to favor already present species by carefully managing the fire so that dead or dying wood are readily affected but not entirely consumed.

Differencies in the goals for restoration burnings between Western USA, Finland and Sweden

Keto-Tokoi Petri
petri.keto-tokoi@tamk.fi
Tampere University of Applied Sciences

Restoration burning is seen as an important management tool in many protected fire-influenced ecosystems. However, significantly different goals are given to restoration burnings in Western USA, Finland and Sweden. In Western USA National Parks Service started to use prescribed burnings already in 1968. The main goals have been to maintain more natural fire regimes, to reduce the risk for catastrophic fires and to enhance the regeneration of tree species like giant sequoias and ponderosa pines. In Western USA creating habitats for fire-dependent fungi and invertebrate species isn´t a goal like in Finland and in Sweden. In Finland restoration burning has been used to restore young planted pine stands to more diverse naturally regenerated early successional stands. Another important goal is to produce dead and fire-injured trees and burnt soil. Target set for the mortality of trees is typically 25–75 %. In Sweden restoration burnings in protected areas are carried out in significantly older stands than in Finland. The goal is to restore open, multi-layered stand structures that were typical for frequently burned pine forests before fire suppression era. Objectives for burning are reducing stand density, killing most of the spruce trees, maintaining old pines and creating charred, resin-impregnated and fire-killed wood.

Does restoration fire enhance regeneration of deciduous trees in boreal forests?

Matheis Miriam
miriam.matheis@gmx.de
Mid Sweden University

Prevalent non-intervention policies of protected areas leads, particular in combination with the suppression of forest fires, to increasingly denser forests. This favours shade-tolerant species and outcompete deciduous pioneer species. The latter can be seen as key species in boreal forests and contribute greatly to forests' biodiversity. Prescribed fire is considered a management tool to mimic natural disturbance and enhance the regeneration of deciduous trees. However, the effectiveness of prescribed fires has hardly been evaluated in this regard. A systematic review (SR) was conducted in order to find evidence for the effects of fire on deciduous tree regeneration. A total of 2135 articles have been consecutively screened and data of seventeen articles were analysed in a meta-analysis. Effect sizes (Hedges g) were calculated for each study and their heterogeneity (Cochran's Q) was evaluated in several moderator- analyses. Most of the included studies were conducted in North America, investigating post-fire regeneration of either oak or aspen forests. Eurasian studies are clearly underrepresented. The study revealed higher response effects of aspen and birch and the combination of fire with a thinning-treatment showed highest effects. However, there was no evidence found that the fire effect may ensure the long-term persistence of aspen in forests.

How to preserve epiphytic lichens in managed forests? Suggestions based on research in boreal forests

Ylisirniö Anna-Liisa
anna-liisa.ylisirnio@ulapland.fi
Arctic Centre / University of Lapland

Epiphytic lichens is a group of species that has suffered from intensive forestry. Many of them prefer shady environment, and they recover slowly from disturbances. We studied the occurrence of 14 old-growth forest indicator lichens in boreal spruce forests, comparing clear-cut areas with different amounts of living and dead retention trees, and woodland key habitats (WKHs) of varying sizes, to old-growth spruce forests. The areas showed decreasing species richness in the following order: old-growth forests >larger WKHs (>0.35 ha) > smaller WKHs (<0.25 ha) > clear-cuts with higher amount of retention trees > clear-cuts with lower amount of retention trees. Tree species, diameter of trunk and slope direction were the main factors affecting species richness. All Chaenotheca species, as well as *Lobaria pulmonaria* and *Arthonia incarnata* were lacking from clear-cuts. The results emphasize the importance of old and big trees for epiphytic lichen diversity, but also moist and shady environment. Set-asides safeguarded for prolonged period from logging (50-300 yrs) would greatly enhance preservation of rare and threatened lichens. WKHs surrounded by buffer zones could act as nuclei for this kind of “new old-growth forest patches”.

Management of Arboretum Norr – the wish to „build“ a natural forest environment in a recreational area.

Schimmel Johnny
johnny.schimmel@slu.se
Arboretum Norr / Department of Forest Ecology and Management, SLU, Umeå

Arboretum Norr is situated in Umeå, Northern Sweden (63°50’N, 20°07’E) and is one of the northernmost arboreta in the world. The goal is to present as many as possible of all ligneous plants that are able to grow this far north. For most of the 16 ha large area, we also have a goal of presenting the trees and bushes in stands that resembles a natural (unmanaged) forest of their domestic habitat, e.g. by leaving excessive quantities of coarse woody debris in the stands. We consistently leave trunks from trees we have to fell in the stands and commonly we also try to leave parts of the trees as standing snags. Although we only have scattered data, this procedure seem to have led to an increase among wood inhabiting, fungi, insects and birds (i.e. three species of very rare woodpeckers). There are also problems associated to this strategy in a recreational area with lots of visitors, and we have received complaints from both conservationists (that don’t want to cut at all) and from common visitors (that think the dead wood spoils the beauty value). This has learned us how important it is to communicate your purposes to the public when you apply an unorthodox management in protected areas.

A novel multi-purpose forest state assessment methodology to support conservation and forest management planning

Standovár Tibor
standy@caesar.elte.hu
Eötvös Loránd University, Budapest

The primary objective of our Swiss-Hungarian Cooperation project is to develop and implement a forest state survey methodology providing data that can support the planning process of forest use such as forestry operations or conservation actions. Collected data complements existing information (e.g. national forestry database, vegetation maps), and also reflects the needs of several forest-dwelling organisms. The survey uses a dense systematic grid of plots to collect data at a fine spatial resolution suitable to catch within subcompartment heterogeneity of forest characteristics. Measured indicators describe canopy composition and structure, dead wood, herbs, microhabitats, disturbances, shrubs and regeneration. A smartphone application has been developed to enable fast and reliable electronic data collection. Due to the spatially explicit systematic grid, each variable can be analysed separately and spatial statistics can be applied at various scale. The results can inform managers about the structural and compositional diversity of forests stands in the form of thematic maps and can provide the basis for the assessment of forest conservation status.

Conservation management actions in oak forests in Natura 2000 SAC sites of Bükk National Park Directorate, Hungary

Frank Tamás
frankt@bnpi.hu, Bükk National Park Directorate

Bölöni János
Aszalós Réka
Ádám Réka
Harmos Krisztián
Csikos Valéria csikosv@bnpi.hu, Bükk National Park Directorate
Ősz Gabor oszg@bnpi.hu, Bükk National Park Directorate
Jozsef Julia rowenna.julia@gmail.com, Szent Istvan University, Budapest
Veréb Krisztina heavy.vodka@gmail.com, Eötvös Loránd University, Budapest

Homogenizing effect of the cutting silvicultural management system can be most markedly detected in the oak dominated forests of hilly regions and middle range mountains. Conservation management actions were started in two Natura 2000 SAC sites targeting the enhancement of structural and compositional diversification of the designated stands. Both sites are approximately 80 years old sessile oak-Turkey oak dominated forest stand. Artificial gaps were created in the homogeneous canopy of the first site 10 years ago to foster the regeneration of the seedling and saplings of both the dominant and of the admixing species. Altogether six different targets were set in case of the second site, where the management actions took place in the last winter; 1) create gaps, or enlarge existing ones; 2) support regeneration layer, where well developed saplings can be found, especially oaks or rare admixing species; 3) maintain large canopy tree individuals 4) or important admixing species in the canopy; 5) create snags, 1.5 meter high stumps and 6) logs. The survey of the deadwood, the tree-, the shrub- and the herb-layer was accomplished with a systematic network survey before the management actions. For the assessment of the changes the survey will be repeated in this year and in 2025.

Lessons from the disturbance dynamics of lowland forests

Vrška Tomáš
tomas.vrska@vukoz.cz, The Silva Tarouca Research Institute for Landscape and Ornamental Gardening, Department of Forest Ecology

Král Kamil kamil.kral@vukoz.cz
The Silva Tarouca Research Institute for Landscape and Ornamental Gardening, Department of Forest Ecology

It is a very bold statement that disturbance dynamics of lowland forests does not create sufficient conditions for the existence of light-demanding organisms. But who knows how it works in the current environmental conditions? We present the results from Cahnov-Soutok (17 ha) and Ranšpurk (22ha) lowland forest reserves secondary left to spontaneous development since 1932. Data are based on the stem position maps from 1973, 1994, 2006.

During the 21 years (70s to 90s) 29 % of the area was represented by cyclical development along the theoretical cycle, 37 % of the area was represented by the noncyclic development – across backward the cycle and only the 34 % of the area was stable. The stage of growth`s area decreased from 70s to 00s from 40 % to 29 % and in opposite the breakdown`s area increased from 10 % to 17 %. But the mean patch size of breakdown stage varies about 500 m^2 only.

The increase of the Breakdown stage in time is the result of several independent phenomena – dieback of the European white elm and in particular the dieback of old abundant cohort of pedunculate oak. It has been accelerated by the decrease of the water table level caused by elimination of natural spring inundations after 1976.

Close-to-nature forestry in the Czech Republic in the view of the Platform for Sustainable Landscape Management

Petřík Petr
petrik@ibot.cas.cz, Institute of Botany, The Czech Academy of Sciences, Průhonice

Fanta Josef jfanta.cz@gmail.com
Institute of Botany, The Czech Academy of Sciences, Průhonice

The Platform for Sustainable Landscape Management was set up to share information, assistance in developing strategic advice and education for sustainable landscape use. We collaborate with the Czech Ministry of the Environment on the National Action Plan for Climate Change Adaptation in the Czech Republic in formulating adaptation measures concerning the way forests are managed in a changing climate. We call in particular for: the elimination of clear-cutting, preference of natural forest regeneration, employment of pioneer trees within recovering forests, reduction of game stocks, abandonment of forestry based on age categorisation, biodiversity protection and monitoring, retaining of old trees and dead wood, enhancement of water retention and prevention of forest wetland desiccation, restoration of wetlands and reassessment of existing ameliorative measures in forests, exclusion of tree aliens, environment-friendly afforestation of non-forest land, and reduction or elimination of liming and fertilization. As a member of the Government Council for Sustainable Development, we encourage the participation of land owners in decision making leading to sustainable local and regional forestry, the return of residents to the countryside and economic activity on private land.

Ancient or old growth forests?

Sixsmith Mark
mark@environmentalenglish.co.uk
Environmental English Ltd.

Ancient, old-growth, virgin, primary, primeval, late seral, climax or semi-natural forest? There are so many synonyms, but which one do you use and is it correct?! The terminology is unclear; even foresters and woodland mangers in the same country disagree. Each name can convey a different meaning, depending on forest stand age and level of human disturbance. As a former manager of woodland nature reserves in the UK and now an English teacher, I have my suggestions to share with you! We can discuss each term, what it really means, and its relevance for conservation and biodiversity.

Georgian forests

Khizanishvili Lasha
lasha.khizanishvili@giz.de
IBIS project, GIZ

Forests are one of the most valuable natural resources in Georgia. They occupy about 40 % of the territory of the country and have an exceptional importance at national, regional and global level. 95–98 % of the Georgian forests have natural origin. Characteristics of their composition, size, growth and development, etc. determine a rich biological diversity – up to 400 tree and shrub species are registered in Georgian forests. The large number of endemic timber tree species points at the high diversity of dendroflora. Among endemic species 61 species are endemic to Georgia and 43 – endemic to the Caucasus.

The Georgian forests provide shelter and migration routes to many animal species. Georgia lies in one of the Earth's biologically richest regions. One of the WWF's 35 "priority places" covers the Caucasus region. Moreover, Georgia is located within the two "biodiversity hotspots" – the Caucasus and Iran-Anatolia – from the 34 "biodiversity hotspots" identified by Conservation International as being the richest and at the same time most threatened reservoirs of plant and animal life. Forest massifs survived in Georgian mountains are the last untouched forests in the moderate climate zone of the Earth thus having a global importance.

Georgian Forests have long history, first protected area – Lagodekhi National Reserve was established in 1912. Protected Areas cover 585 883 ha, 8.41 % of Georgian Forests.
First Georgian protected landscape – "Tusheti Protected Landscape" was established in 2003 (31, 518 thousand ha), and afterwards in 2009 "Kintrishi Protected Landscape" 3,190 thousand ha) was established. Sustainable use of natural resources and development of eco-tourism to promote conservation objectives is allowed on this type of protected area.

About forest of Kakheti region

Turashvili Iosebi
iosebiturashvili@yahoo.com
National Forestry Agency, Kakheti Forestry Service

Kakheti Forestry Service covers administrative-territorial boarders of Akhmeta, Gurjaani, Dedophlistskaro, Telavi, Lagodekhi, Signagi and Kvareli municipalities.
The forests of Kakheti in total is 300 000 ha where beech, oak, hornbeam and other species are spread but 50 % is covered by beech forest. In Kakheti we also have *Taxus baccata* forests.

Tusheti protected areas

Charkhoshvili Nana
nanacharkhoshvili@gmail.com
Administration of Tusheti protected areas of Agency of protected areas

Tusheti is located in the Eastern Caucasus Mountains. One of the largest protected areas in Europe, Tusheti's 113,660 hectares of high mountain terrain is considered one of Georia's most beautiful regions.It locates in east Georgia and includes three categories - National Park, state reserve and protected landscape.

There are different unique and rare species of flora and fauna as well as rich culture and traditions which determined so big importance of Tusheti. Vast mountains and alpine pastures, unique virgin pine forests, crystal clear streams and rivers; old villages and well preserved towers of the Middle Ages. Tusheti is home to the endangered East Caucasian tur, chamois and Bezoar goat. Other animals include roe deer, wild boar, brown bear, red fox and wolf.

Tusheti protected Aras is managing according to management plan which includes main goals of Protected Areas: development of eco tourism, to raise awareness of local people through eco educational activities, to protect biodiversity and conduct different efficient measurement such as forest management – monitoring biodiversity and collect date, prevent forest from disease, patrol the special routs by rangers, prevent and manage pastures from erosion.

All these serve for protection and save the unique natural and cultural values of Tusheti.

Batsara-Babaneuri protected areas

Murtazashvili Eva
eva_murtazashvili@yahoo.com
Agency of protected areas of Georgia,
Batsara-Babaneuri protected areas

Batsara-Babaneuri protected areas is located in Kakheti, on territory of Akhmeta municipality. It was created in 2003, covers 10 891.1 hectares of territory. The Protected areas includes Batsara-Babaneuri Nature Reserve and Ilto Managed Reserve.

Batsara State Nature Reserve was first created in 1935. Batsara Nature Reserve is located in Pankisi gorge. The nature reserve is located at an altitude of 700-2,000 meters above sea level. In the middle part of Batsara gorge there are remains of tertiary relict dendroflora, almost 270 ha stands of yew forests. Such size of yew stand cannot be found anywhere in the world.

Babanauri Nature Reserve was established relatively late, in 1961. Nature reserve is located in eastern part of the Caucasus Mountain. Area is located at an altitude of 380–1 100 m. The purpose of creation was to protect up to 240 ha Zelkova stands, which is part of the Red List of Georgia.

Ilto Managed Reserve includes the parts of the head of Ilto valley, which extends up to 900–2000 meters. It borders Batsara Nature Reserve to the east. The purpose of establishment is to protect and restore precious wood species and characteristic fauna.

Experimental management of EU protected forest habitats in Latvia

Brumelis Guntis
guntis.brumelis@lu.lv, Faculty of Biology, University of Latvia

Ikauniece Sandra sandra.ikauniece@daba.gov.lv,
Nature Conservation Agency, Latvia

The Nature Conservation Agency within the EU Life project "National Conservation and Management Programme for Natura 2000 Sites in Latvia" has developed guidelines for management of EU protected forest habitats. Based on the premise "we might know what we are doing", the preparation of guidelines involved many specialists including research biologists, forest managers, and persons with experience in management projects. Also within this project, management was conducted in winter 2013/2014 in EU habitat types. In two forest stands designated as 9060 "Coniferous forests on, or connected to, glaciofluvial eskers" cutting of overstorey and understorey Picea abies was conducted with the aim to improve habitat for sun-loving species. In one of the stands, the organic layer was scraped off in patches for emulation of fire. In a forest stand designated as 9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*, cutting of overstorey and understorey *P. abies* was conducted to create well-lit patches around *Quercus robur* with the aim to reduce competition for *Q. robur* trees and to promote its regeneration, and to improve habitat for typical nemoral species. The results of monitoring started before management are presented for the period including 2015.

Fragmented deciduous forest habitats in Latvia – How can active management help?

Rendenieks Zigmars
zrend@outlook.com
University of Latvia

In times of changing climate, there is a need to adapt strategies for species and habitat protection to maintain and enhance the existing level of biodiversity. The concept of active management as an alternative to static conservation approaches is being increasingly recognized and applied throughout the world. Latvia is located in the intermediate zone between boreal and nemoral biomes and contains elements from both. Small, spatially scattered fragments of nemoral species-dominated habitats are being partially protected by strict protection or by voluntary set-asides. We studied the spatial patterns and characteristics of broadleaved species-dominated forests in the entire territory of Latvia using GIS tools and statistical methods. Our aim was to detect the functionality of the current network of protected areas in a context of nemoral habitats and, additionally, to identify regions with insufficient levels of formal protection status for nemoral habitat patches or spatial aggregations. The analysis showed that the majority of nemoral tree species are found as minor admixtures in stands dominated by other trees species and often lack sufficient protection. We conclude that protection focus should be shifted from small, isolated forest patches towards larger, multipurpose protection zones to protect habitat hotspots and spatial aggregations.

Bees in trees – tradition meets restoration

Krumm Frank
frank.krumm@efi.int
European Forest Institute

The natural habitats of wild honey bees are hollow trees and tree cavities. Bees are well adapted to forests and are a part of forests. Forest management is usually focussing on timber production and habitat trees, including cavities and other structures are not economically interesting and are therefore undesirable. Consequently, habitat for wild honey bees have disappeared over large scales and also the accompanying species community is lacking widely.

Tree beekeeping has a long tradition in many regions of Europe and was distributed across eastern and Central Europe until the 18th century when cane sugar was not available and honey was essential to store nutrients and to produce sweets, in particular the famous Gingerbread that was mainly produced around Nuremberg. Tree beekeepers, also called Zeidler / Bartnik did not really treat the forests well as they were trying to optimise flowering and therefore burned the forest ground extensively. Also they cut tree crowns not to predispose cavity trees to wind disturbances. This craftsmenship then disappeared and only survived in eastern Russia (Shulgan Tash).
As forest restoration activities are now promoted more and more, also the tradition of tree-beekeeping seems a reasonable option to promote non timber products in forests. Even more since modern beekeeping is facing manifold problems, and the role of nutrition, natural habitat conditions, symbionts and antagonists is most probably much more important for ecosystem functioning, at least on the long run.

Six years of experimental litter collecting: Effects on forest understorey vegetation

Vild Ondřej
ondrej.vild@ibot.cas.cz, Institute of Botany, The Czech Academy of Sciences

Kalwij Jesse M. Institute for Ecosystem Research – Geobotany, Kiel University
Hédl Radim Radim.Hedl@ibot.cas.cz, Institute of Botany, The Czech Academy of Sciences

Litter raking was once a widespread activity in the European forests, together with coppicing, timber cutting and wood pasture. We experimentally investigated the impact of tree litter removal on understorey plants in a mixed oak forest in spring and autumn. This experiment was conducted in 45 plots (5 × 5 m) in a randomized complete block design, in the Podyjí National Park, Czech Republic. Each block consisted of one plot per treatment. Annual treatments consisted of (i) tree litter removal during spring, (ii) tree litter removal during autumn, or (iii) no litter removal as control over a time span of six years. We recorded understorey plant species composition before treatment and in each subsequent year. Total species richness per plot changed over time. Annual species richness increased, but only for the autumn treatment. Endangered species were not affected. The effect of autumn raking on species composition was stronger than the effect of spring raking. To conclude, the season in which tree litter removal took place had a significant impact on the understorey vegetation, in particular affecting the germination and establishment of annual species. Long-term monitoring will be necessary to assess the effect on other species, including the endangered species.

New managment plan and new zonation of NP Slovenský raj – introduction, experiences

Leskovjanský Marek
marek.leskovjansky@sopsr.sk
State Nature Conservancy of SR, NP Slovenský raj

Administration of NP Slovensky raj in 2015 prepared new managmet plan for NP Slovensky raj for period 2016-2025. Managmet plan was approved by Government of SR. Also we prepared new zonation of NP (new borders of NP, new zones) along with tools for forest owners and users. These tools are: purchase of land, lease of land, contractual protection, finansial compensations. I want to presentate the process of negotiation with land owners and users and the creating of new zones in NP (criterias for forests, meadows...). Also I want to presentate new posibilities for visitors of NP (rafting on the river Hornad, ferrata in gorge Kysel). One part of presentation will be introduction of our NP (presentation of photos with most nature values of NP) and presentation of forest mangment in our NP.

Pollarding: an important, but overlooked tool for conservation of woodland associated biodiversity

Šebek Pavel
pav.sebek@gmail.com
Institute of Entomology, Biology Centre CAS

Veteran trees and trees with hollows are key features sustaining biodiversity in wooded landscapes. They, however, have become rare and localised, and most of the associated biota is declining or endangered. Therefore, safeguarding the presence of hollow and veteran trees in sufficient numbers is a challenge for conservation in protected woodlands. In this context, pollarding is one of the best managements. It is a silvicultural practice that used to be common in most European countries, and old trees all around the countryside often bear signs of former pollarding. By reducing weight of branches, pollarding prolongs the lifespan of old trees. It also leads to rapid formation of tree hollows and bare wood even in young trees. Pollarding thus increases density as well as continuity of microhabitats associated with veteran trees. Despite its potential, pollarding is rarely practiced as a conservation management. Traditional woodland habitats with old pollards, like wood pastures, are largely abandoned in the cultural landscape and in protected areas they often become victims of the minimal intervention approach leading to rapid dissapearance of veteran trees. Pollarding should play an important role in restoration of woodland habitats in protected areas to prevent loss of biodiversity.

Site preferences of endangered species in a former coppice of high conservation value

Roleček Jan
honza.rolecek@centrum.cz
Institute of Botany, The Czech Academy of Sciences

Transformation of coppices to high forests has caused fundamental changes in site conditions and a decline of many species across Central Europe. Nevertheless, some formerly coppiced forests still harbour a number of the declining species and have become biodiversity hotspots in the changing landscape. To improve our understanding of the ecology of the declining species, we studied site preferences of endangered vascular plants in the best preserved remnant of formerly grazed and coppiced subcontinental oak forest in the Czech Republic – Dúbrava forest near Hodonín. We found that sites with endangered species have a highly uneven distribution in ecological space and their species composition is often similar to open-canopy oak forests. Within this habitat, the endangered species are concentrated in places with a high light availability and high soil pH. These results support the view that the occurrence of many endangered species in the study area is a legacy of the long history of traditional management that kept the canopies open. The light-demanding species are now threatened by ongoing successional changes. Therefore, active conservation measures are recommended, including opening up the canopies, early thinning of young growths, control of expansive and invasive species and understorey grazing or mowing.

Restoration of coppicing management in Děvín: can a biodiversity decline trend be reversed?

Hédl Radim
radim.hedl@ibot.cas.cz
Institute of Botany, The Czech Academy of Sciences

Děvín hill in Pálava, southeastern Czech Republic, is famous for picturesque topography and unique biota. Most of its 380 hectars is covered with species-rich deciduous forest bearing clear signs of historical coppicing. The coppicing management has been regularly conducted since at least the 14th century and completely abandoned only in the first half of the 20th century. Due to no-management conservation strategy since 1946, biodiversity of Děvín's ecosystems has significantly declined. This trend was documented thanks to the resurvey of about 180 vegetation plots originally recorded in the 1950s. The conservation authority has therefore currently changed the policy towards careful restoration of the active management. In 2009 to 2016, selected forest stands have been thinned in various intensities, sometimes resembling the historical coppices-with-standards. Monitoring of vascular plant and spider communities has shown positive effects on functional diversity of the both groups shortly after the active management restoration. The strongest response of plants and spiders was on the increased light availability. A new regular monitoring has been established in 2016. The first results indicated that thinning in 2012–2013 supported species richness and occurrence of several target species, e.g. *Primula veris*, *Melittis melissophyllum*, *Stachys germanica*, *Dictamnus albus*, or *Lathyrus niger*.

Floodplain forests in Austria – management experiences from the WWF reserve Marchegg

Egger Gerhard
gerhard.egger@wwf.at
WWF Austria

The floodplains of Lower Morava river are among the most species-rich river basins in Austria. In the year 1970 a large forest reserve, with approx. 1.100 hectare was bought by WWF and the city of Marchegg. Two years later it became a nature protected area. Since then the site is managed according to the overall goal to maintain near natural conditions and to preserve biodiversity. In the past 40 years various management strategies and practices have been discussed and applied. Some of them were more, some less successful. Today the main objective in terms of forest management is to maintain a network of hands-off areas and to continue with traditional forest practices (such as pollarding and coppices with standards) to a limited extent. In 2015 a grazing project on 70 hectares has been started.

Consideration of edge effects for adaptive management in black alder swamp woods in Latvia – regional assessment

Liepa Liga
liga.liepa@outlook.com
Latvian University of Agriculture, Forest Faculty,
Department of Silviculture

Black alder swamp woods are important habitats for biodiversity and are protected as Woodland Key Habitats. Conservation approach in Europe and other regions of the World is changing to better fit the changing environment and adopting new knowledge about the functioning of ecosystems and landscapes. We analyzed black alder swamp woods with tools of GIS and Spatial Analysis in regions of Latvia to assess spatial and compositional characteristics of habitat patches and clusters. These results were combined with experimental data from vegetation surveys at edges in Southern Latvia – forest structural characteristics: volume of living and dead wood, composition of understorey vegetation and epiphytic lichens. We found that black alder swamp woods comprise relatively small fraction of all forest habitats and are spatially scattered with clusters in particular regions of country. Southern Latvia is a characteristic example of severely fragmented and edge-influenced swamp wood habitats and thus are not functional for species persistence due to their small size and isolation.