HÄME
POLYTECHNIC
UNIVERSITY OF APPLIED SCIENCES

Evo Forest - Awareness-raising and Protection of Southern Finland Forest Biotopes

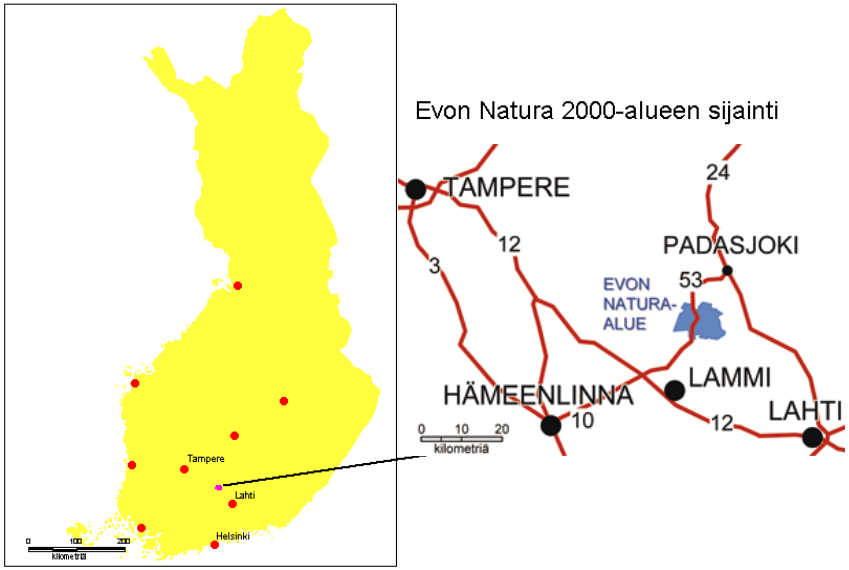
1.5.2002–30.9.2005

Life

Evo Forest - Awareness-raising and Protection of Southern Finland Forest Biotopes 1.5.2002–30.9.2005

Evo-Life-project is a three years long project funded by European Union. The project improved living conditions of endangered species in Evo Natura 2000-area.

The project has informed about its actions and produced material for schools.



The project was co-ordinated by Häme Polytechnic University of Applied Sciences

Evo-Life project received financial support from the Life Nature Foundation of European Union.

Evo Forest - Awareness-raising and Protection of
Southern Finland Forest Biotopes 1.5.2002–30.9.2005

ISBN 951-784-339-9
ISSN 1795-4231
HAMKin julkaisuja 20/2005

PUBLISHER
Hämeen ammattikorkeakoulu
PL 230
13101 HÄMEENLINNA
Tel. +358 3 6461
faksi +358 3 646 4259
julkaisut@hamk.fi
www.hamk.fi/julkaisut

Evo-Life project received financial support from the Life Nature Foundation of European Union.

Lay out: HAMK Communications

Photos: Anni Uusi-Kuitti ja Sanna Tähtinen, Rea Luttinen, Martti Kolkka, Merina Lehtiö, Matti Siivonen, Seppo Kallonen, Jukka Ruuhijärvi, Ari Westermark, Lauri Värri, Reetta Ahola and Lammin kunnan koulu

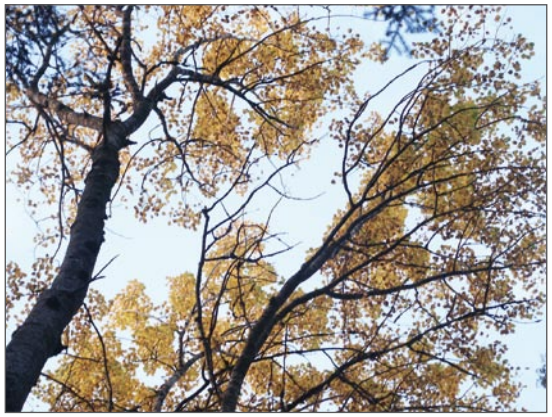
Hämeenlinna, December 2005

The main nature values of the Evo Natura 2000 area

The Evo Natura 2000 area is a mosaic formed by forests, lakes, brooks and mires and part of a larger 20 000 hectares wide forest area. The Evo Natura 2000 area contains the most valuable parts of this area: the unbuilt shores of lakes and ponds and the old growth forests of Kotinen and Sudenpesäkangas. Kotinen and Sudenpesänkangas function as nature reserves where endangered species dependant on aspen and coarse woody debris still exist.

Most of the forests in the area were treated by slash-and- burn agriculture in the19th century. Later on even silvicultural prescribed burnings have been carried out in the area. When prescribed burnings practically ceased in Finland during the 1960's, they were still continued as part of the training at Evo Forestry College, established in 1858, providing expertise and labor needed in burnings. At Evo, there is thus a strong continuity in burned areas and charred wood, which is rare in Finland.

The total size of the Evo Natura 2000 area is 7 860 hectares, of which Kotinen and Sudenpesänkangas nature reserves form 692 ha. In the area you can also find numerous other conservation areas, such as shore and mire conservation areas, private conservation areas and various smaller areas and key biotopes protected by Finnish forest and environmental legislation. The Evo area is also an important recreational area with excellent possibilities for, e.g hiking. A major part (3 880 hectares) of the Natura 2000 area also belongs to this hiking area. About half of the Natura area is under normal forestry management. One fifth of the area is privately owned whereas the rest is state-owned and governed by the Metsähallitus (Finnish Forest and Park Service).



Old aspens in Kotinen nature reserve

Actions performed in Evo-Life: summary

The area of the Evo Natura area was enlarged by a land purchase. In the vicinity of Kotinen and Sudenpesänkangas nature reserves a 1 385- hectare-large conservation forest was established by the Metsähallitus in 1997. This area will be gradually restored and is no more managed as a commercial forest. However, this area mainly consists of old commercial forests with a managed structure. 450 hectares of this area is considered to be in need of active restoration. Thus, the restoration activities of Evo-Life mainly concentrate on this conservation forest. During the project, 260 hectares were restored in this area and only 15 hectares in the rest of the area.

A management plan for the area was constructed with a close co-operation with other organizations functioning in the area. The plan sets guidelines on how the area can be utilized and managed in the future so that the natural values will not be endangered.

Along with restoration actions the project dealt with dissemination. The nature of Evo is presented to schools and pupils with special learning packages to teachers. Even the web pages of the project and the restoration activities support teaching. The home pages also have a map set of nature at Evo.

The restoration actions in Evo-Life

- 11 000 aspen, 345 lime and 173 goat willow saplings were planted in a combined area of 10-14 hectares. 3.4 hectares were protected from browsing with iron fences and 0.4 hectares with woody fences
- approximately 6 000 felled or girdled trees in an area of 100 hectares
- From a 17- hectare area young individuals of exotic tree species (mainly Siberian larch) were removed in the vicinity of the conservation areas
- Seven stands (combined area 20 hectares) were burned leaving more than 1 000 m3 charred wood. The areas will develop naturally after the burnings
- In 100 previously drained spruce swamps ditches were blocked up
- 320 meters of rapids in Keltaoja Brook were restored

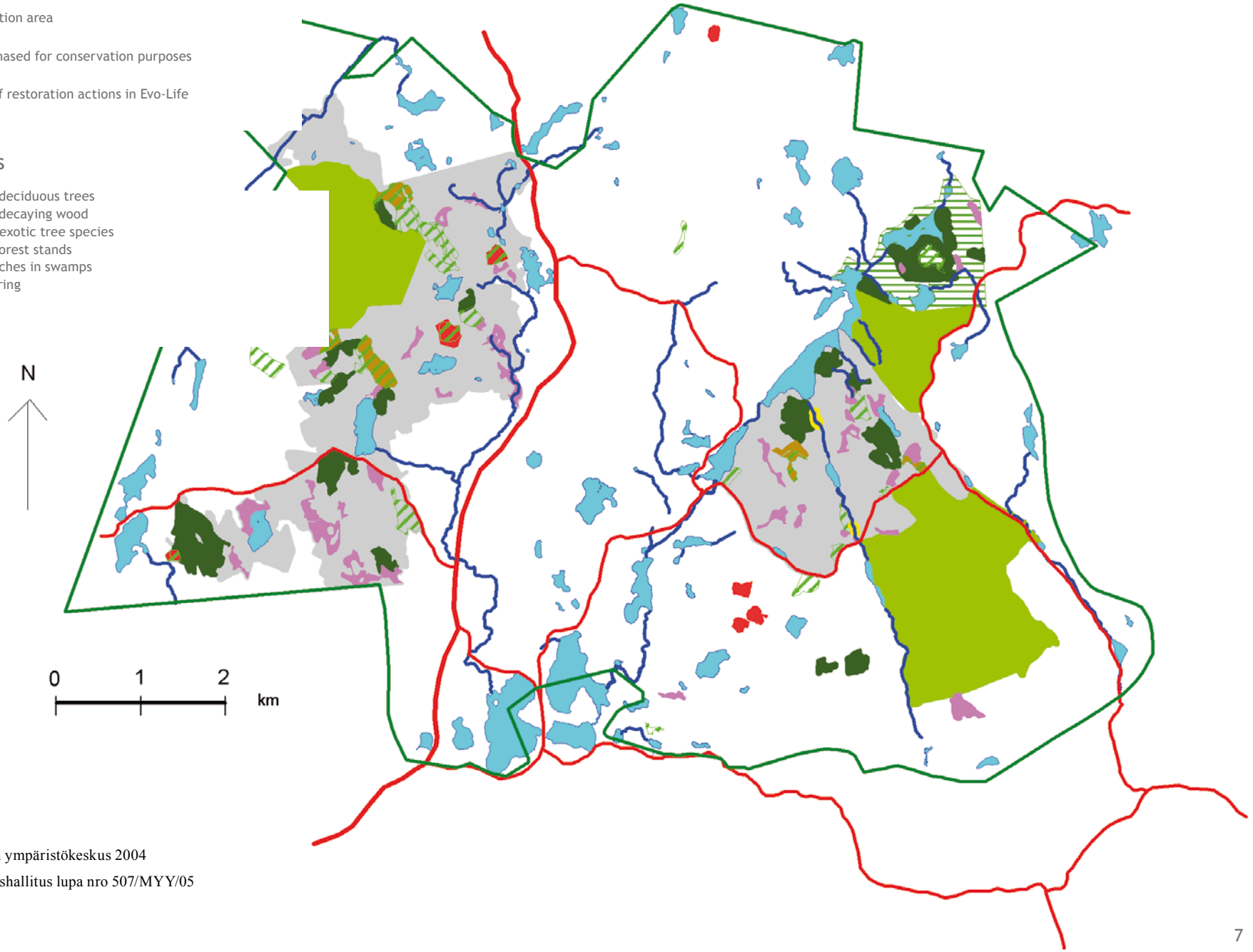
For nature conservation purposes a 132.5- hectare land parcel was purchased. The purchase increased the existing conservation area by one-fifth.

Symbols

- Evo Natura 2000-area
- Nature conservation area
- The parcel purchased for conservation purposes
- The main area of restoration actions in Evo-Life

Restoration actions

- Increase of deciduous trees
- Increase of decaying wood
- Removal of exotic tree species
- Burning of forest stands
- Blocking ditches in swamps
- Brook restoring



More areas for nature conservation

When preserving species and biotopes important to e.g. the conservation policies of EU, they are best secured in conservation areas. The northern part of the Sudenpesänkangas old-growth reserve is small with a need of enlargening. Thus, as part of Evo-Life, a 132.5- hectare parcel was bought from the forest company UPM-Kymmene, consisting of e.g 51 hectares of mature forest and three hectares of other biotopes of the Habitats Directive. Inside the area, Lake Hakojärvi will be left jointly owned as presently. The new area will be joined to the existing nature reserve.

Pupils from Lammi schools using the Luutajoki nature trail.

Evo area is widely used for various research activities. Experimental fishing in Keltaoja brook.

The conservation aims and other use of the area were adjusted by management planning. The main target of the management of the Evo NATURA 2000 area is to ensure the favorable conservation status presently and in the future. Häme Environmental Centre will publish the management plan, which was elaborated during the project The plan will be updated after ten years. In the plan the conservation targets were reconciled with other uses of the area.

Aspen, lime and goat willow were planted in forests

Aspen, lime, goat willow and rowan are the key tree species in a forest ecosystem. They serve as host trees for many other species. They have their own species groups that depend on habitats with trees of various ages. Especially large individuals – healthy, decaying, dying, dead or fallen – serve as an important resource for many species.

Aspen can live up to more than 150 years. Often, a 100-year- old aspen is already partially rotten. If winds do not fell the old tree, the aspen will die gradually: first the most rotten branches fall down and slowly it decays standing. When the tree falls the decaying process can continue for decades. Because numerous aspen-dependant species demand different types of aspen, various phases of decaying aspen should always be present, otherwise extinction threats these species.

Because the moose in the Evo area use aspen saplings as their food, new, healthy aspen stands will not be raised in the Evo area without special actions. In practical forestry, aspen with a minor commercial value is not favored in young stands also because it hosts the fungal disease of pine twisting rust of young pines. The aspen also attracts moose to young stands where it damages pine and birch saplings. Thus, the young aspens are generally removed from young stands. Goat willow and rowan suffer from moose browsing as well as aspen. Lime has suffered from slash-and-burn agriculture and the utilization of bark for rope-making. The lime tree also favors the most fertile sites in Finland and rarely regenerates from seeds. Because of these reasons lime trees nowadays grow in only a few places at Evo.

For these reasons these trees important for forest biodiversity are scarce in the Evo forests. In Evo-Life, aspen, goat willow and lime saplings were increased in the Evo forests.

Forestry student Reetta Ahola and her study subject, the aspen.

Tree lungwort grows in old tree trunks of aspen and willow.

Xylotrechus rusticus, a declined beetle species living in aspen. In Evo it is still relatively common.

Aspen

During the spring and autumn of 2004 about 11 000 aspen saplings were planted in managed forests, especially near conservation areas to secure the living conditions of aspen dependant species. The planted areas were protected from moose browsing by iron fences or fences made from slender tree trunks (pole fences). Fifteen fencings were made, with four of them pole fences. The total fenced area is 3.8 hectares.

In Finland there is no commercial market for aspen seeds or seedlings. The project succeeded to get aspen seeds, which in summer 2003 were used to raise 6 800 aspen seedlings. These saplings were planted during the spring 2004. Because seeds of local origin were wanted as well, seeds from aspen trees growing in the Evo area were collected in summer 2003. From these seeds 4 100 saplings were raised and planted during the growing season in 2004. The establishment of planted aspens is monitored and additional plantings will be done, if needed. During the first years, monitoring is more intense and will be lightened in the future. In the monitories of 2004 and 2005, hare damages were observed and the fences were repaired to be hare-proof as well.

In order to evaluate the age structure and vitality of current aspens as well as the future development of the aspen population, all aspens growing in the Kotinen nature reserve and its vicinity were surveyed in an area of approximately 1 000 hectares. This data was used to create a scenario of the spatial and temporal development of the aspen population in a B.Sc. thesis of the degree program in forestry.

Surveying aspen trees.

Raising of a pole fence.

Iron fence.

Head ranger Olavi Kinnunen and a one year old lime sapling.

Lime

In Finland, the lime tree grows at the northernmost edge of its distribution.. It flowers in June and it is an insect-pollinating species. Only seldom is the late summer warm enough to produce viable seed. Saplings can be produced with micro propagation. However, because of being cloned, they were not wanted to be used at Evo. Lime can also be added from cuttings, but the method is relatively insecure. Yet the method was tested with a result of 45 established saplings from a set of 200 ones. Evo-Life succeeded to get 300 seed-originated saplings, which were planted in groups of 20 in five stands with suitable growing conditions. In the future these saplings will hopefully develop to small lime tree clumps in the forests of Evo.

Goat willow

Goat willow is a dioecious, cross- and insect- pollinated tree that flowers in spring. As an exception in the willow family, goat willow doesn't root from suckers. On request, the Finnish nurseries grow goat willow saplings if seeds are provided. Thus, in 2004 seed was collected from goat willows and 173 saplings were raised. The saplings were planted inside the fenced areas during the autumn 2004.

Planting of goat willow.

Rowan

Rowan reproduces easily from seeds and suckers. The young rowans naturally reproduced in fenced area will grow into adult trees when protected from moose browsing.

Houses for flying squirrels

Flying squirrels nest in holes in decaying aspens. Because old aspens are rare in the Evo forests, 100 artificial houses for flying squirrels were hung in the Evo area in autumn 2003. In the next year´s survey, one flying squirrel was already found in one of the houses. In autumn 2004, the amount of houses was increased when 11 houses were taken to the northern surroundings of the Sudenpesänkangas nature reserve.

A house for flying squirrel.

Forest fires were imitated in prescribed burnings

Because of effective fire suppression no charred wood is left in Finnish forests. Species dependent on charred wood lack suitable habitats and are becoming rare. And with no forest fires there are no natural successional stages either.

Forest fires were imitated by the burning of five small sized stands in summer 2002. These stands of about two hectares were spruce-dominated, 80-90 years old managed forests. In 2003, two 60-year-old pine-dominated stands were burned with the total area of 9 hectares. In some stands the fuel loads were increased in pre-fire treatments whereas in some areas not. Altogether over 1 000 cubic meters charred wood was formed in burnings.

Decaying wood was increased in former managed forests

The amount of fallen, decaying logs is much smaller in commercial forests compared to natural ones. There has been a steady decline of many saproxylics (= species living in dead wood). In recent studies it has been estimated that the average amount of lying, dead wood in managed forests is around five cubic meters per hectare when the threshold value for many rare and endangered species is about 20. In December 2003 fallen logs were added to 80-100- year- old managed stands in a total area of 100 hectares. The trees were either felled by “normal” felling, felling by excavator -pushing with uprooting and girdling. In the girdling method a ring of bark is removed, which leads to gradual dying of a tree. About 6 000 trees in total were felled or girdled with an average of 20 trees per hectare.

Blocking ditches in swamp forests

Because of forest drainage the amount of natural swamps has decreased leading to the impoverishment of swamp dwelling species, especially in Southern Finland. When swamps were ditched, even the transition zones between uplands and peatlands disappeared. These zones are known to be important for forest biodiversity and when small swamps were ditched, an important feature of Finnish forest landscape: a mosaic-like structure of upland forests, mires and swamps was lost. Ditched swamps seldom re-develop into original swamps because even abandoned ditches will continue to function as outlets of swamp waters. Even the tree growth increment increases the respiration strengthening the drainage effect.

In order to restore the natural water table, swamp ditches were blocked. Before blocking, the trees growing along ditches were felled and left decaying. The old peat left from drainage was then removed back to ditches by excavators. Man-made dams were also constructed in some areas. The aim of filling the ditches is to raise the water table and return the drained stand to a swamp ecosystem. The original swamp dwelling species are expected to return to the restored areas in the near future. The blocking of ditches will also even the seasonal changes in water flows and decrease the leaching of nutrients and solid soils.

The blockings will strongly affect the environment usually leading to a rapid raise of waters often killing most of the trees present in the stand. Man-made dams raise the water level slower leaving more time for trees and plants to adjust to changing circumstances. The ditches were blocked in autumn 2003 and spring 2004 with a total area of 97 hectares.

The rapids in Keltaoja Brook were restored

Like in many other brooks and rivers in Finland, timber floating, forest drainage and dams have also affected the stage of Keltaoja Brook at Evo. Two rapids areas formerly cleared for timber floating were restored during the summers 2003 and 2004. The brook was restored by returning previously removed stones back to water, graveling the brook bottom, removing twig dams and trying to return the natural current behavior to the straightened river-bed by e.g. wooden obstacles. Altogether 320 meters of brook were restored in two sections. Totally 90 square meters of the river bed were graveled especially designed to function as spawning areas of the brown trout. About 70 meters of the river-bed was re-stoned in the upstream section and about 50 meters in down stream. An old artificial pond was returned into peatland by removing the dam. Now the waters run by a small waterfall to Keltaoja Brook.

The water quality monitory show an improvement achieved by the restoration acts. 3 900 young brown trout were planted in the restored parts of Keltajoki Brook in May 2004. In autumn 2005, many now 2-year-old brown trout were caught from the restored rapids in experimental fishing.

Young brown trout.

Education and dissemination material of nature and restoration in the Evo Natura 2000 area

Videos

Six videos were made of the restoration acts performed in Evo-Life: a general presentation of the project, conservation values, the role of forest fires in nature and restoration burnings, peatland restoration, aspen and watershed management. The videos are about ten minutes long and can be stored in one VHS tape or DVD disk. Häme Polytechnic and Lammi library lend the videos on request. The videos are not sold but they can later be copied if needed.

Slide series

15 slide series dealing with various aspects of Evo nature and the Evo Life project were composed for educational purposes. The series are in an electrical form and made with the PowerPoint program, which is needed to use the series. The series are stored in the same places as the videos and they are not for sale either.

Luutajoki Brook nature trail

A nature trail was constructed at Luutajoki Brook with a leaflet supporting the trail. The trail and the leaflet provide information of the brown trout, brook nature and brook restoration. The trail is about one kilometer long and it starts from the parking lot at the junction of the main road 53 (Hämeenlinna-Padasjoki) and the local road leading to the Niemisjärvi recreational fishing area. The leaflet is available in the mail box of the parking lot, in Evocenter and on Evo-Life homepages.

Nature database

A map set of Evo nature with supporting data is available in Evocenter and on the project homepages.

Material for teachers

Teaching packages for kindergartens, secondary schools and high schools presenting the features of Evo nature have been constructed. The material is available on the project homepages. Lammi municipality lends material needed in field exercises presented in the packages. More information and detailed instructions are presented on the project homepages.

www.evo.hamk.fi/Evo-Life/

Post Life life

The restoration activities will be continued

The restoration acts will be carried on in the Evo Natura 2000 area even in the future. Old plans will be updated and new ones will be elaborated when needed. In the near future, at least the following aspects will be treated

- where and when prescribed burnings will be performed to secure the continuity of charred wood essential for fire-demanding species
- The slopes of Syrjänalusenharju esker will be managed to create open, sunny habitats for esker species

The effects of restoration acts will be monitored

- how the aspen seedlings will establish
- if the fencing efforts can prevent the moose from browsing
- how the swamp ecosystems will recover after the blocking of ditches
- what the biodiversity effects of restoration burnings are and how the natural succession in burned areas will continue
- how the brook trout populations in the brooks Luutajoki and Keltaoja will develop
- how the blocking of ditches and restoration acts in the brooks will affect the water quality

The execution of management plan will be followed

As part of the Evo-Life project a negotiating committee following the achievements of management plan was founded. The committee consists of several different partners functioning in the Evo area and it will supervise and steer the general guidelines, development and management in the Evo area, even in parts not belonging to the Natura 2000 area.

Collecting water samples: the effects of project will be monitored afterwards.

Joint project of six partners

Häme Regional Environmental Center
P.O. Box 131, 13101 HÄMEENLINNA, FINLAND, + 358 20 490 103
- Management planning, land purchasing

Metsähallitus (Finnish Forest and Park Service, Nature Heritage Services, Southern Finland)
P.O. Box 36, 40101, JYVÄSKYLÄ, FINLAND, +358 205 64 5363
- Increase of aspen and decaying wood, peatland restoration, prescribed burnings, monitoring

Finnish Game and Fisheries Research Institute, Evo Research Station
Rahtijärventie 291, 16970 EVO, FINLAND, +358 205 751 423
- Brook restoration

University of Helsinki, Lammi Biological Station
Pääjärventie 320, 16900 LAMMI, FINLAND, + 358 3 631 111
- Water monitories

Municipality of Lammi
Evontie 10, 16900 LAMMI, +358 3 6313 401
- Testing of teaching material

Häme Polytechnic University of Applied Sciences
Saarelantie 1, 16970 EVO, + 358 3 6461
- Co-ordination, dissemination, increase of aspen and decaying wood, peatland restoration, prescribed burnings, monitoring

HÄME POLYTECHNIC UNIVERSITY OF APPLIED SCIENCES
METSÄHALLITUS
Lammin kunta
HÄMEEN YMPÄRISTÖKESKUS
RIISTAN- JA KALANTUTKIMUS

Evo-Life project received financial support from the Life Nature Foundation

NATURA 2000

Life

Publisher: Hämeen ammattikorkeakoulu
ISSN 1795-4231
ISBN 951-784-339-9
HAMKin julkaisuja 20/2005