Project Life-Nature
03 NAT/GR/000093

Rehabilitation

of *Quercus frainetto* & *Quercus ilex* woods

OF MOUNT ATHOS

Beneficiary

Holy Community of Mount Athos

Partner

THE GOULANDRIS NATURAL HISTORY MUSEUM
GREEK BIOTOPE/WETLAND CENTRE

Thessaloniki 2006

The present report has been prepared in the framework of the Life-Nature project 03 NAT/GR/000093 entitled "Rehabilitation of coppice *Quercus frainetto* woods (9280) and *Quercus ilex* woods (9340) to high forest" which is funded by the DG Environment of the European Commission, the Ministry of Rural Development and Food, the Holy Community of Mount Athos and the Greek Biotope - Wetland Centre.

Project's identity	
	Life-Nature 03/NAT/GR/000093
Project:	**"Rehabilitation of coppice *Quercus frainetto* woods (9280) and *Quercus ilex* woods (9340) to high forest"**
	www.athos-life.gr
Duration:	10/2004 - 12/2006
Budget:	1,942,100 €
Funding	E.C.: 971.050 € (50%)
	Ministry of Rural Development and Food: 388,420 € (20%)
	Holy Community of Mount Athos: 572,920 € (29.5%)
	Greek Biotope/Wetland Centre: 9,710 € (0.5%)
Beneficiary	**The Holy Community of Mount Athos**, Karyes, Mount Athos 63086.
	Communication:
	Father Gregorios Gregoriatis +30 23770 23710, +30 23770 23359, ik@mount-athos.gr, admin@athos-life.gr
Head of project	Father Gregorios Gregoriatis, Holy Monastery of Hosiou Gregoriou, Holy Mountain, Greece +30 23770 23359
Partner	**Greek Biotope/Wetland Centre**-EKBY (www.ekby.gr), coordinator for EKBY: Petros Kakouros +30 2310 473320 (petros@ekby.gr).

1. The natural environment of Mount Athos

The great variety of geological formations and rocks, the fractured geomorphology of the ground, the relatively high elevation (Mount Athos rises abruptly from sea level to 2033 m), the extraordinary variety of climate types, the isolation of the region and the absence of grazing animals all combine to create an extremely diverse mosaic of types of vegetation, ranging from purely Mediterranean to sub-Alpine, unique in its plenitude and sumptuous profusion and providing habitat for a wide variety of plant and animal species, including a large number that are endemic to the region. The combination of ground morphology and vegetation creates landscapes of rare beauty and diversity, running the gamut from the relatively domesticated coastal zone to the wilder landscapes of gorge, loose rock and sheer cliff. Together, these things make this mountain a truly magical place, and they must be preserved untouched. The natural environment of Mount Athos is an inseparable element of its total cultural heritage, and it must be protected and kept "as the apple of an eye".

2. The oak forests on Mount Athos

Oak forest covers a total of about 1014 ha, mostly in the south-southwest part of the peninsula, and at altitudes of from 100 to 1400 metres. Most of the oak forest is in the higher wooded areas of the monasteries of Great Lavra, Simonopetra and Hosios Gregorios. The latter region has mature unmixed stands of oak at Pigadi and in the area of Plagara, while in the environs of the Great Lavra unmixed stands and mixed stands of oak, fir and beech are found in the areas of Kerasia, Krya Nera and the Skete of St Anne. These stands are of exceptional ecological interest, because of their great age and because they have remained untouched for more than 100 years.

Forests of holm oak cover more than 5600 ha, mostly in the eastern part of the peninsula. They occur at heights from 0 to 1100 m, and over the entire length of the peninsula. The chief characteristic of these holm oak forests, particularly on the eastern side, is the density of climbing plants, mainly smilax (*Smilax aspera*) and old-man's-beard (*Clematis vitalba*), in the understory and the absence of an understory in many places, due to the heavy shade and the competition of climbing species. Laurel (*Laurus nobilis*), flowering ash (*Fraxinus ornus*), "Judas tree" redbud (*Cercis siliquastrum*) and other deciduous broadleaf zone species are also found in the holm oak forests.

Although most of the oak and holm oak forests on Mount Athos are highly representative with regard to plant species composition, the fact that they have been coppiced has adversely affected their structure. Their chief characteristic is the absence of individuals of any great age, the density of trunk growth and the accumulation of non-decomposed biomass on the forest floor. Long-term coppicing increases the risk of soil degradation, which affects both the productivity of the forest and its floristic composition. It should, however, be noted that in some areas there are still tracts of virgin oak and holm oak forest, and that much of these areas has already been excluded from the management programme.

Holm oak forest on Mount Athos

Oak forest

Hungarian oak, *Quercus frainetto* Ten.

This deciduous species of oak grows to a height of 35 m. It creates extensive mixed and unmixed forests that account for nearly 1/3 of our total forested area and 80% of the deciduous oak forest. It occurs over the entire semi-mountainous area of mainland Greece, from the Peloponnese to the country's northern borders.

The Italian oak *Quercus frainetto* is the most important and valuable species of oak in Greece, both for the extent of forest cover it provides and as a source of timber for fuel, construction and furniture making.

Holm oak, *Quercus ilex* L.

The holm oak, which grows to a height of 15-20 m, is an evergreen species commonly found in the cooler and damper Mediterranean temperate zone. It occurs throughout the coastal areas of Western Greece and Western Crete, in the higher broad-leafed evergreen zone in the Eastern Peloponnese and Eastern Sterea Hellas (Central Greece), on the eastern slopes of Mt Pelion, Mavrovouni, Ossa, Lower Olympus, Olympus, the Pieria massif, Southern and Eastern Halkidiki, Mount Athos, coastal Macedonia and Trace, and occasionally on the islands of the Northern and Northeastern Aegean.

The once magnificent stands of dense holm oak forest, always mixed with other evergreen and/or deciduous species have either been felled to clear the land for other uses (farming, housing, infrastructure, etc.) or have been reduced to coppice woods, dense or sparse scrub, garrigue or brush.

Downy, or white, oak (*Quercus pubescens* Willal)

A deciduous species, usually of the lower deciduous oak zone, that grows to a height of about 25 m. It occurs throughout Greece, frequently in the higher deciduous zone, in groves of deciduous hardwoods, together with the Italian oak, and more rarely in unmixed stands, and also as isolated individuals of large size by roadsides and in fields at altitudes of from 200-1200 metres.

The downy oak once formed extensive forests with an understory of kermes oak or hornbeam (*Carpinus duinensis*), which were of considerable importance to the economy of the semi-mountainous regions. Unregulated felling and overgrazing led to the deterioration and eventual disappearance of these forests. Today the downy oak is found as a relic in the holly oak and hornbeam ecosystems currently being rehabilitated, in the higher, cooler zone of the broad-leafed evergreens, and chiefly in the ecotone between evergreen and deciduous hardwoods or in clumps, copses or groves on limestone rock formations, ridges and south-facing slopes in the lower region of the deciduous oak zone.

Sessile, or Durmast, oak (*Quercus petraea* subsp. medwediewii A. Camus.)

Quercus petraea subsp. *medwediewii* is a tall tree (over 30 m) with a very straight trunk. Native to the Balkans, Asia Minor, the Caucasus and northern Iran, it differs from the standard *Q. petraea* in leaf and crown, and in the colour of its wood, its heartwood being of a deep rich chestnut to chocolate brown.

Although it only occurs sporadically, and chiefly in the northern and southern Pindus massif, on Northern Greece, Thrace, Northeast Halkidiki, on Pelion, Mavrovouni, Ossa, Lower Olympus, Vermion and the Pieria massif, it is economically the second most important species of deciduous oak in Greece, yielding timber of very high quality. Forests of sessile oak display less biodiversity than those of broad-leafed oak.

3. Monasticism and the natural environment on Mount Athos

Monastic life appeared very early in Athos Peninsula, but the foundation year is 963 A.C. when the Holy Monastery of Megistis Lavras was founded. Since then the whole peninsula was devoted to the Christian Orthodox faith, the name Holy Mountain was given and today after more than 1000 years is the sacred Arc of Orthodox Christianity and one of the most important monastic communities of the world. In the Holy Mountain there are 20 Holy Monasteries and the monastic community has the status of a self-governed area of the Greek State.

Orthodox monasticism is characterised by temperance, careful use of the bounties of nature, and affectionate solicitude for the preservation of natural balance and harmony.

The use of natural resources is governed by the requirement to observe a symmetry between human need and the use of goods and space, to preserve peace and to ensure that the boundaries of the monastic life serve to protect the natural environment.

To this end, in addition to everyday practice there are also established rules, dating from time of the *Typikon*, or Rule, of St Athanasios the Athonite, for avoiding any action or use or natural resources that would disturb the harmony of nature.

This obviously had to include forest management. And indeed, as early as the time of the *Typikon* of Emperor John Tsimiskes (972 AD) there were strict limits on trade in forest products, while the second *Typikon* of Constantine VII Monomachos lays down that trees may be felled and wood products produced only to provide for the needs of the monasteries. This over-millennium high preservation perspective of the monks retained the rich biodiversity and unique natural features of Athos's peninsula forests.

Today, the increased requirements of the monasteries notwithstanding, the monks remain true to the Athonite tradition of "order" and "economy", and with prudent management take loving care of their natural environment, and especially of their forests, harnessing to this end both scientific knowledge and the invaluable experience of the older monks.

In this framework the Holy Community was satisfied with the efforts of the Greek Government and the European Union for the inclusion of Holy Mountain in Natura 2000, but an unexpected problem occurred when the northern part of the peninsula was omitted from the designation as a SCI site, a problem that has to be solved in the near future.

4. Aim of the Life-Nature Project

The LIFE-Nature project "Rehabilitation of coppice *Quercus frainetto* and *Quercus ilex* woods to high forest" was implemented by the Holy Community of Mount Athos (beneficiary of the project) and the Greek Biotope - Wetland Centre (project partner). The primary aim of the project, which lasted from 2003 to 2006 and cost 1,942,100 €, was to initiate the rehabilitation of coppice holm oak and Italian oak woods to high forest. The holm oak forests constitute an habitat type of the "*Quercus ilex* forest" type (Annex I to EEC Directive 92/43: 9340), and the

oak forests an habitat type of the "*Quercus frainetto* forest" type (Annex I to EEC Directive 92/43: 9280).

The method selected for the rehabilitation of the coppice oak and holm oak woods was that of selective inversion thinnings, which during the three-year life of the project would be applied to an area of 500 ha.

5. Project actions

The project included preparatory, management and information actions, the primary action being the imlementation of selective inversion thinnings.

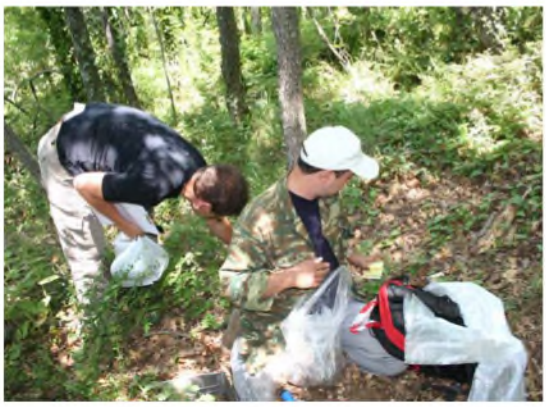
More specifically, the rehabilitation of the sylvan ecosystems of the oak and holm oak forests on Mount Athos was to be based on the natural method of selective thinnings – the same method, in both philosophy and implementation, that is applied to high forests. In selective thinning, the basic rule is to select and favour the best individuals (positive selection). In this type of thinning the very finest specimens are sought, and their growth encouraged by removal of the most vigorous competitors surrounding them, regardless of whether they are well or poorly formed.

The aim of selective thinning is to convert a coppice wood into a high forest. Once the process has been repeated a few times, the stands will acquire high forest form, despite their coppiced origin.

On Mount Athos selective thinning was carried out over an area of 500 ha, divided pro rata between the monasteries and the oak and holm oak woods.

In preparation for the implementation of selective inversion thinnings, a technical study for the rehabilitation of the coppice oak and holm oak woods was drawn up, and a training programme relating to the method of selecting the trees to be felled was developed and delivered to the monks who will be assuming the responsibility for managing the monastery woods and a number of woodcutters or contractors who will be undertaking harvesting operations.

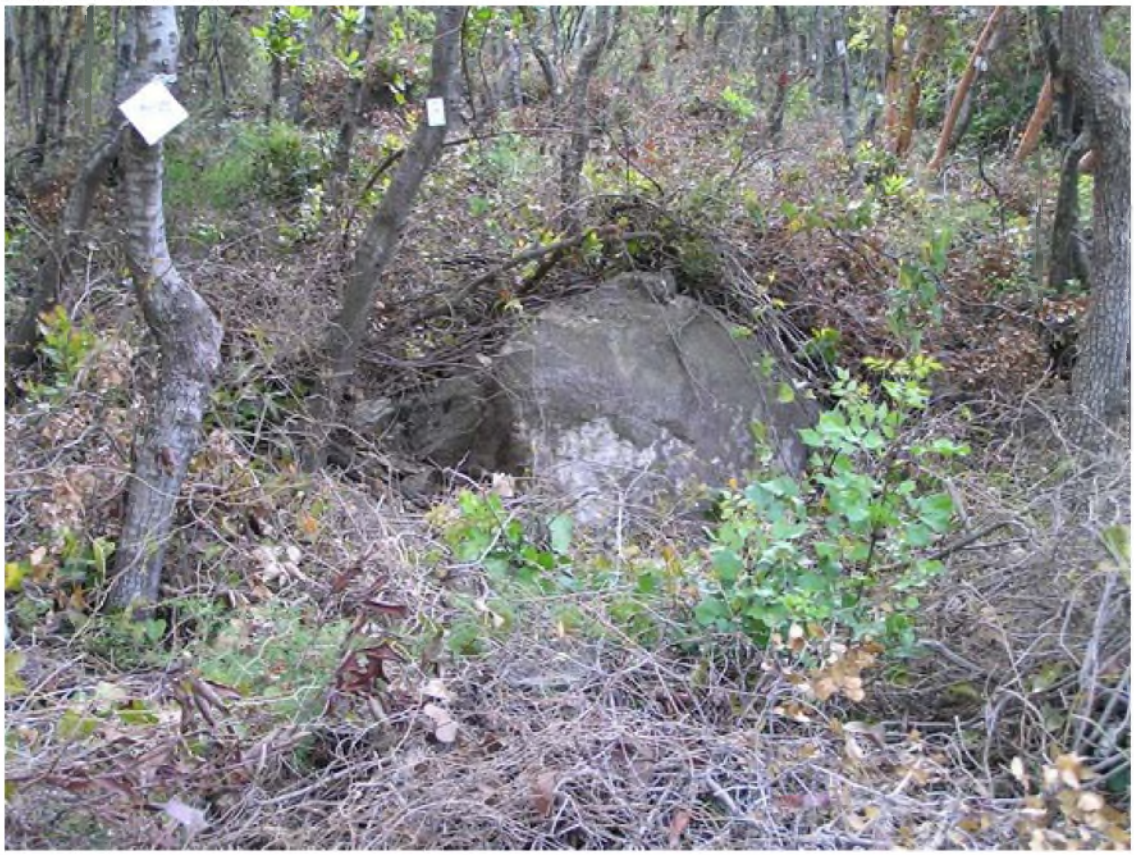
The final step was to set up a system for monitoring the woods designated for conversion. Forty-five tracts were marked out and divided in two: one part would be thinned and the other left as a control. Data were collected for both parts of each tract, so that the results of the project could be assessed through comparison of the two areas.



Outdoor data collection activities

Training the monks and foresters

Stand of holm oak before ...



...and after the interventions

Finally, the project also included a number of information actions. These were:

- the publication of an information booklet,
- the production of this summary report and a final technical report,
- the development of a website (www.athos-life.gr)
- the making of a film,
- the preparation of a technical guide to forest rehabilitation, and
- the organisation of a final meeting to present the results of the project, which took place on 28/9/2006 in Ouranoupoli, Halkidiki.

The technical rehabilitation guide is a scientific document on the rehabilitation of holm oak and oak forests. It is intended to promote the application of the selective thinning method in Greece and the rest of the Mediterranean, as wholly in harmony both with the principles of sustainable forest management and with the special requirements of the protection of sylvan biodiversity, and at the same time to present other methods of coppice conversion in the Mediterranean region. The guide is published in English and in Greek.

On behalf of the Holy Community and the Holy Monasteries 15 monasteries participated in the project with 25 monks and 80 forest workers, as well as the administrative personnel. On behalf of EKBY 20 persons participated, scientific and technical personnel.

6. Results

for the woods and landscapes of Mount Athos…

The rehabilitation of these woods to high forest, that is, to their natural condition prior to the end of the 19th century, will contribute to the achievement of an almost perfect state that can serve as a benchmark for this type of forest all around the Mediterranean basin. It is useful to remember that very few of the types of forests that are covered by the Natura 2000 programme have examples of areas in a good state of conservation that can serve as models.

Apart from the importance of these forests for nature conservation on the European scale, their rehabilitation will restore the image of the peninsula's flourishing virgin forests and will create a landscape worthy of the spiritual and cultural importance of Mount Athos and its monasteries. More concretely, it will improve the structure of the forests, which is expected to foster biodiversity, reduce the risk of fire and generally rehabilitate the landscape.

Dense climbing plants help fire climb to the crowns of the trees.

Boundary between the thinned and the unthinned parts of a stand of holm oak. The difference in structure is obvious.

…and for the conservation of oak forests of the Mediterranean

Another of the objectives of the Life project, apart from rehabilitating the Hungarian oak and holm oak forests of Mount Athos, is to promote the rehabilitation by selective inversion thinning of oak forests in general, and holm oak woods in particular, in other areas as well. This project, it should be noted, marks the first use of selective thinning methods to rehabilitate coppice holm oak woods in the broadleaf evergreen zone.

Successful implementation of the selective inversion thinning method will reveal it as the best method for rehabilitating broadleaf evergreen forests, and certainly preferable to the ecologically harmful and excessively costly method of reforestation by planting pines and other species that are foreign to the local flora.

The method will be diffused and projected through information actions designed to attract the interest of a foreign as well as a Greek public, and much of the material will be produced in English and other languages as well as Greek.

The Life project has already focused attention on the high cost of thinning operations, which cannot be recovered from the sale of forest products as is the case with other forestry operations. Costing the work is essential if the method is to be used more widely, since it could potentially be applied to hundreds of hectares of forest.

During the implementation of the project the partial inclusion of the Athos peninsula in the Natura 2000 network causes several difficulties and the necessity of inclusion of the remaining part Holy Mountain in the SCI GR1270003 «Chersonisos Athos». This problem has to be fixed as soon as possible and the Holy Community has already undertaken relevant actions.

The inclusion of the remaining part is possible since the area holds several habitat types of Habitats Directive and because in the missing part the major part of the forests of the Holy Monastery of Chilandariou and other holy convents are included. Their inclusion in Natura 2000 network will improve the management of the Athonian landscape.