

A Mountain recovered

At the heart of Sierra de Guadarrama National Park

1. Sclerophyllous scrub and natural grassland formation habitats

restoration: In order to restore natural habitats such as Mountain Cytisus purgans formations (5120), Oro-Iberian Festuca indigesta grasslands (6160) and especially Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) (6220), an ambitious project of restoration was initiated in 1999 at Peñalara Peak Area with the aim to dismantle the ski resort completely and restore the ecosystems altered during its construction and functioning. As far as we know, this is a pioneer restoration experience across Europe. Inside the framework of this project, scientific investigations are being carried out in order to support the management activities with an ecological point of view.

2. Fresh water habitats conservation. High mountain wetlands restoration: Peñalara's massif wetlands are included in the Ramsar Convention List since 2006. There are several actions that are being conducted:

1) control of eutrophication through paleolimnology studies; 2) control of erosion; 3) non-native fish eradication (*Salvelinus fontinalis*); 4) amphibians and macroinvertebrate community monitoring.

3. Amphibians monitoring:

- Inventory of the current reproduction spots.
- Continuous quantification of the relative abundance of each specie and its health.
- Amphibians breeding in captivity and emerging diseases treatment.

OUTCOMES/RESULTS

1 Sclerophyllous scrub and natural grassland formation habitats restoration:

- Control of erosion
- Original orographic restitution and regeneration of the drainage system.
- Improvement of natural regeneration
- Increase of vegetation cover
- Landscape restoration

2 Fresh water habitats conservation. High mountain wetlands restoration and monitoring: thanks to active management (e.g. fencing) and continuous monitoring the restoration of Peñalara's massif main wetlands has been possible:

- Non-native fish eradication (*Salvelinus officinalis*); consequently improving the number of amphibians.
- Reduction of erosion and eutrophication.
- Boost of "*Nardus stricta* natural grassland" cover around the lake (inside de fenced area).

SIERRA DE GUADARRAMA NATIONAL PARK, SPAIN

Peñalara massif Area. "Sierra de Guadarrama" National Park.

SAC ES3110002

"Cuenca del Río Lozoya y Sierra Norte", Spain

LOCATION

*Every time we restore
a piece of nature,*

*Every time we
eliminate an artifice*

*Not only will we be
reparing a damage
against the world*

*But also recovering a
scenery of freedom.*

GRASSLANDS
RAMSAR
HABITATS CONSERVATIO
AMPHIBIANS MONITORING

KEYWORDS

- Peñalara Lake is been established as a reference for its value to identify and determine the ecological characteristics of this habitat type, and as an example of perfect compatibility between active management, recreational use and enjoyment and ecological restoration

3 Amphibians monitoring: General monitoring is conducted through counting the larvae abundance in the aquatic environments. The species subject to this surveillance are the following: Salamandra salamandra, Mesotriton alpestris, Bufo bufo, Triturus marmoratus, Alytes obstetricans, Bufo calamita, Hyla arborea, Rana iberica and Pelophylax perezi.

- Natural expansion of Pelophylax perezi population.
- Rana iberica reintroduction in certain natural wetlands and high mountain streams, accompanied by its spontaneous presence in wetlands where they have not been introduced or there is no previous sign of them.
- Alytes obstetricans successful reintroduction Programme after having been treated from the fungus infection "quitridiomicosis".
- Reduction of the mortality rate due to quitridiomicosis on Bufo bufo and Salamandra salamandra individuals.
- Monitoring of protists microorganisms and their beneficial effect to fight against the the fungus infection "quitridiomicosis".

4 Amphibians breeding in captivity at the Breeding Center for Threatened Amphibians of the National Park (belonging to the Park Research Centre):

- Thermal treatment application to fight against the fungus infection "quitridiomicosis" on Alytes obstetricans.
- Analysis of adaptation processes to quitridiomicosis on Bufo bufo.

MORE INFORMATION

Policy

BEFORE:

- "Valcotos" Ski resort opens in 1969.
- "Valcotos" area is declared a Place of National Tourist Interest in 1975 and the ski resort expands.
- A restoration Plan is established in 1987 for the summits, glaciers and Peñalara lake. Restoration works on "Chica" lake begins.
- Special Protection Area for Birds, SPA "Alto Lozoya" is declared, including "Valcotos" Area.
- Peñalara Natural Park is declared in 1990 (until 2013).

AFTER:

- After dismantling the ski resort, management measures and regulations are established to reconcile the visitor's enjoyment with conservation requirements, especially at Peñalara Peak Area, such as the obligation to keep to the authorized paths, walk on the wooden footbridges or keep pets on a leash at all times, whilst the restoration work continues.
- In 2013, "Sierra de Guadarrama" National Park is declared.
 - In 2014 the Special Area of Conservation (SAC) "Cuenca del río Lozoya y Sierra Norte" is declared accompanied by its own Management Plan.

LESSONS LEARNED

1 Supportive watering during the summer in the first stage of the plantation is vital to increase the resilience and success.

2 Trial and error method has been applied on every step of the Project from the plant selection to the monitoring, and so, learning through daily observation has been a constant: several methods or techniques have been dismissed or modified depending on the results obtained versus the ones expected. For instance, changes on the plantation period which was first established in spring (the best period has proved to be autumn instead, before the ice and snow), changes on the plantation method, the use of big rocks or shrubs as shelter for the new plants to protect them from the harsh weather conditions, etc.

3 The previous strengthening of plants coming from the nursery, for them to adapt to the harsh conditions of Peñalara Peak Area, before the plantation, is vital to improve the resilience and success. Plants were kept in temporary nurseries located very close to the plantation area.

Evidence

- Regional Public Administration annual budget (Comunidad de Madrid).
- State Administration funding (Organismo Autónomo de Parques Nacionales).
- European Commission funding: FEADER Programme.

Delivery and Outreach

At "Peñalara" Visitor Centre:

- Schools: amphibians video presentation (Spanish) and 2 explanatory posters (sp). There is also an aquaterrarium with amphibians specimen.
- Colleges and Masters degree's students and scientists:
 - "A mountain recovered" video presentation (English & Spanish).
 - "Cotos ski resort restoration project" video presentation (sp)
 - "Peñalara, the mountain recovered at the Sierra de Guadarrama National Park. Ecological Restoration of an alpine ski resort". Book (sp).
- Guided visit to Peñalara lake with a scientist from the Park Research Centre.
- General Public: 2 explanatory posters, the aquaterrarium and an audio presentation for people who are visually impaired. There are also 2 wooden boards describing emerging amphibians diseases outside the Centre.

Online tools:

- a) Web page scientific blog:
 - Sierra de Guadarrama National Park Research Centre **scientific blog**
 - **SOS Amphibians Guadarrama**

b) **Web page: ski resort restoration:**

c) **Web page: high mountain wetland restoration**

FURTHER INFORMATION

Web page

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4 Integration of all the existing uses: in order to avoid sensible zones to be trodden on by cattle or visitors, fencing has been placed on the areas undergoing restoration works accompanied by informative panning. Thus, the natural regeneration is enhanced as well as its fruition and expansion.

5 The use of pioneer native herbaceous plants on areas with harsh weather, soil or wind-exposed conditions has been proved to be essential for obtaining successful results related to vegetation.

LESSONS LEARNED

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