



NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS
SCHOOL OF SCIENCE
FACULTY OF BIOLOGY
DEPARTMENT OF BOTANY

Conservation of priority forests and forest openings in "Ethnikos Drymos Oitis" and "Oros Kallidromo" of Sterea Ellada
LIFE11 NAT/GR/1014 - "ForOpenForests"

ACTION A.3.

Determination of vegetation structure and of flora and fauna composition and phenology in the Mediterranean temporary ponds (3170*)

DELIVERABLE A.3.3

Monitoring protocol for the temporary pond (3170*) plant communities



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ΤΟΜΕΑΣ ΒΟΤΑΝΙΚΗΣ

Διατήρηση δασών και ανοιγμάτων προτεραιότητας στον "Εθνικό Δρυμό Οίτης" και στο "Όρος Καλλίδρομο" της Στερεάς Ελλάδας
LIFE11 NAT/GR/1014 - "ForOpenForests"

ΔΡΑΣΗ Α.3.

Καθορισμός της δομής της βλάστησης και της σύνθεσης και της φαινολογίας της χλωρίδας και της πανίδας στα Μεσογειακά εποχιακά λιμνία (3170*)

ΠΑΡΑΔΟΤΕΟ Α.3.3

Πρωτόκολλο παρακολούθησης των φυτοκοινοτήτων των εποχιακών λιμνίων (3170*)

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SUMMARY

The monitoring objectives for the plant communities of the temporary ponds (3170*) are in the framework of the project ForOpenForests are:

- Assessment of the results of conservations actions C.1, C.3, and C.4 (action D.1).
- Assessment of the conservation status of the habitat and the long term results of the conservation actions (after-LIFE monitoring).

The main monitoring parameters for assessing the conservation status of a habitat according to the requirements of Directive 92/43/EEC are: distribution and range, area, structures and function including the typical species, and conservation potential (pressures and threats). The same parameters can be used as indicators of the success of the conservation actions.

For the ponds of the project sites monitoring will include the following:

- Habitat mapping including plant community identification (after-LIFE).
- Vegetation transects (D.1). A less intensive scheme must be designed for after-LIFE.

ΠΕΡΙΛΗΨΗ

Οι αντικειμενικοί στόχοι της παρακολούθησης της των φοιτοκοινοτήτων των εποχιακών λιμνίων στο πλαίσιο του έργου ForOpenForests είναι:

- Εκτίμηση των αποτελεσμάτων των δράσεων διατήρησης C.1, C.3, και C.4 (δράση D.1).
- Εκτίμηση της κατάστασης διατήρησης του οικοτόπου και των μακροπρόθεσμων αποτελεσμάτων των δράσεων διατήρησης (παρακολούθηση μετά το LIFE).

Οι κύριες παράμετροι παρακολούθησης για την εκτίμηση της κατάστασης διατήρησης ενός είδους σύμφωνα με τις απαιτήσεις της Οδηγίας 92/43/ΕΟΚ είναι: κατανομή και εύρος εξάπλωσης, έκταση, δομές και λειτουργίες συμπεριλαμβανομένων των τυπικών ειδών και προοπτικές διατήρησης (πιέσεις και απειλές). Οι ίδιες παράμετροι μπορεί να χρησιμοποιηθούν και ως δείκτες για την εκτίμηση της επιτυχίας των δράσεων διατήρησης.

Στην περίπτωση της *Veronica oetaea*, λόγω του πολύ μικρού μεγέθους και της εξειδίκευσης του φυτού, του προτύπου κατανομής του στα λιμνία, του πολύ μεγάλου αριθμού ατόμων, και της σημαντικής διακύμανσης του μεγέθους του πληθυσμού και της χωρικής κατανομής, προτείνεται να παρακολουθούνται ετήσια:

- Χαρτογράφηση οικοτόπου συμπεριλαμβανομένης της αναγνώρισης του οικοτόπου (μετά το LIFE).
- Διατομές βλάστησης (D.1). Λιγότερο εντατική παρακολούθηση θα πρέπει να σχεδιαστεί για μετά το LIFE.

1. Monitoring objectives and parameters for the plant communities of habitat 3170*

At the project site of Mt. Oiti there are four temporary ponds which correspond to habitat 3170*: Livadies, Greveno, Alykaina and Louka. At the project site of Mt. Kallidromo there are three temporary ponds which correspond to habitat 3170*: Nevropoli and the two small neighbouring ponds Mourouzozos and Mouriza.

Monitoring of temporary ponds within the project ForOpenForests has two main objectives:

- Assessment of the results of the conservation measures of actions C1 (fencing of the perimeter of the ponds), C3 (additional fencing to preclude grazing at part of the ponds), and C4 (restoration of the biotic communities) on the plant communities of the ponds. This corresponds to monitoring within the LIFE project in the frame of action D.1.
- Assessment of the conservation status of the plant communities of the ponds including the long-term results of the conservation actions C1, C3, and C4. This corresponds to after-LIFE monitoring.

The main monitoring parameters for assessing the conservation status of a habitat in terms of the Directive 92/43/EEC and the relevant reporting (Article 17) by member states are (Evans & Arvela 2011):

- i. Distribution and range of the habitat (expressed in 10x10 grid).
- ii. Area of the habitat.
- iii. Special structures and functions of the habitat, including the typical species.
- iv. Conservation potential (as assessed by the impacts of threats and pressures on the area and structures and functions of the habitat).

The above parameters were used during the base study of the temporary pond plant communities (actions A.2 and A.3) and can also be used as indicators of the success of the conservation measures within the LIFE project.

The significant interannual variation in the spatial distribution and abundance of the flora species in the absence of any restoration interventions poses difficulties in the assessment of the results of the restoration actions in the short term. Monitoring should be intensive and long term in order to produce reliable results. On that count, the application of the surveying methodology used in action A.3 will be advantageous since there will be direct comparison with the existing data. In addition, coupling with meteorological data is important in order to assess at least part of the variation of the monitored parameters due to stochastic events.

Distribution and range

Distribution is defined as the number of grid cells where a species occurs and range is an envelope including these cells. For habitats in Greece a 10x10 grid has been used, but this has little meaning in monitoring in the case of the temporary ponds of the project sites since they have a small area and occupy one 10x10 grid cell on Mt. Oiti and one 10x10 grid cell on Kallidromo, so even if one of the ponds disappears the distribution and range will not change.

A 1x1 grid would be appropriate for this habitat. Monitoring of distribution and range only needs the confirmation of the existence of the typical temporary pond communities at the known or other sites. This includes plant community identification which means at least recording of the typical species.

Distribution and range do not change in the short term (except in case of catastrophic events). Their assessment is an object for after-LIFE monitoring.

Area

The use of a current satellite image combined with ground truthing is an adequate methodology for mapping and monitoring the area of any habitat. Ground truthing includes plant community identification.

Distribution and range do not change in the short term (except in case of catastrophic events). Their assessment is an object for after-LIFE monitoring.

Structures and functions including typical species

The assessment of the structures and functions of temporary pond communities includes monitoring of important abiotic and biotic factors.

Abiotic factors are related to hydrology (water depth, duration of wet and dry ecophase) and hydrogeochemistry and are ideally coupled with meteorological data mainly due to the fact that the ponds are rain fed and dependent on precipitation. The monitoring protocol of abiotic factors for the temporary ponds of the project sites is provided in the deliverable A.2.2.

Biotic factors include the plant and animal communities. Regarding the plant communities, spatial distribution and abundance of the species present significant interannual variation depending at a large degree on water depth and the duration of the wet ecophase. Recording the plants on transects scanning the pond area provides an adequately accurate picture of the spatial distribution and abundance of the plant species and their respective assemblages. It is a good method to identify changes which may not be evident when few and random vegetation plots are applied. Assessment of the transect data should include coupling of the transect data with the data on abiotic factors by multivariate methods and the use of indices such as the number/abundance of typical species of the habitat versus the number of species of other vegetation units and the number/abundance of alien species versus the number of native species. This method is also capable to assess the success of restoration procedures (planting of typical species, removal of aliens, effects of grazing) since it will provide data on the abundance and spatial distribution of the species planted at or removed from each site and on the status of plant communities with or without grazing.

The above described monitoring methodology is intense, time consuming and expensive. It is certainly required within action D.1 but may not be appropriate for after-LIFE monitoring. Depending on the results of the restoration actions, a scheme with less intense sampling (e.g. 1 or 2 transects) should be designed.

Conservation potential

Pressures (current in the past 10 years) and threats (projected in the future) acting on the plant communities generally include natural or anthropogenic loss of habitat area, disastrous events as well as impacts of interspecific relationships such as competition, invasion or predation. The main pressures identified at the ponds of the project sites are grazing and trampling by animals and vehicles (Alykaina, Louka, Nevropoli, Mourouzos, and Mouriza). The effect of the restoration actions on these pressures will be assessed by monitoring for the structures and functions of the habitat.

2. Monitoring protocol

Distribution, range, and area

Method: Aquisition of current satellite image and visit at all the ponds for plant community identification and recording of the boundaries of the habitat with GPS (point data).

Plant community identification by recording of all the plant species in 4x4 plots: 2 plots for Livadies, Greveno, Alykaina, Louka, Mourouzos, and Mouriza; 4 plots in Nevropoli. Plots should be places at the centre and at the margins of the ponds. Plant community identification is not necessary if vegetation monitoring by transects takes place.

Process of GPS and plant community data and construction of GIS map using the satellite image as a background. The results of plant community data should be assessed by an expert.

Timing: Every 3 years. Field work in early or late June on Mt. Oiti and in August or September on Mt. Kallidromo.

Man-days: Two days of field work for all ponds. Approximately four days of office work.

Vegetation transects

Method: Methodology as in Deliverable A.3.1. Setting of permanent transects at distances of 2 m throughout the area of each ponds Livadies, Greveno, Alykaina, Louka, Mourouzos, and Mouriza, and at distances of 20 m at the pond of Nevropoli. The permanent transects established in action A.3 will be used. At Louka new transects will be added between the existing ones. At Mourouzos and Mouriza the transects established in 2015 will be used and new transects will be added.

Recording of the cover-abundance of all plant species and total vegetation cover in 1x1 plots placed systematically along the transects at distances of 2 m in Livadies, Greveno, and Alykaina; at distances of 5 m at the pond of Nevropoli; and at continuous plots at Louka, Mourouzos, and Mouriza.

Timing: Annually, in early or late June on Mt. Oiti and in August or September on Mt. Kallidromo. Checking of the ponds every 15 days starting in late May is advisable.

DELIVERABLE A.3.3. Monitoring protocol for plant communities of the temporary ponds

In general, the suitable period at Alykaina and Louka is usually 15 days earlier than in Livadies and Greveno and suitable period in Mourouzoa and Mouriza is a month earlier than in Nevropoli.

Equipment: Measuring tapes at least 50 m, printed protocol (Table 1 and Table 2) and stationery. For Nevropoli setting of transects also requires a 300 m rope. Equipment for the collection and storage of plant samples.

Man-days: Two people for 8 or 10 days, depending on the weather conditions.

Table 1. Protocol for vegetation transects at the ponds of Mt. Oiti.

| Transect* | A_____ | | GPS file | | | Pond Name*: Alykaina | | | | | |
|--|--------|-----|----------|-----|-----|----------------------|------|-----|-----|-----|--|
| Author | | | | | | | Date | | | | |
| Notes | | | | | | | | | | | |
| Plot No | A__ | A__ | A__ | A__ | A__ | A__ | A__ | A__ | A__ | A__ | |
| Distance from start (m) | | | | | | | | | | | |
| GPS | | | | | | | | | | | |
| Plant cover % | | | | | | | | | | | |
| Carex ovalis | | | | | | | | | | | |
| Eleocharis palustris | | | | | | | | | | | |
| Elymus repens | | | | | | | | | | | |
| Erophilla verna | | | | | | | | | | | |
| Juncus compressus | | | | | | | | | | | |
| Juncus minutulus | | | | | | | | | | | |
| Limosella aquatica | | | | | | | | | | | |
| Lythrum portula | | | | | | | | | | | |
| Lythrum thymifolia | | | | | | | | | | | |
| Mentha pulegium | | | | | | | | | | | |
| Myosurus minimus | | | | | | | | | | | |
| Polygonum arenastrum | | | | | | | | | | | |
| Ranunculus lateriflorus | | | | | | | | | | | |
| Spergularia rubra | | | | | | | | | | | |
| Trifolium hybridum | | | | | | | | | | | |
| Trifolium repens | | | | | | | | | | | |
| Veronica oetaea | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Anthoxanthum odoratum | | | | | | | | | | | |
| Armeria canescens | | | | | | | | | | | |
| Campanula spatulata | | | | | | | | | | | |
| Centaurea nervosa subsp. promota | | | | | | | | | | | |
| Cerastium brachypetalum | | | | | | | | | | | |
| Convolvulus betonicifolius | | | | | | | | | | | |
| Cruciata pedemontana | | | | | | | | | | | |
| Dianthus tymphresteus | | | | | | | | | | | |
| Festuca jeanpertia subsp. achaica | | | | | | | | | | | |
| Festuca dalmatica | | | | | | | | | | | |
| Galium verum | | | | | | | | | | | |
| Hieracium cymosum | | | | | | | | | | | |
| Hieracium hoppeanum subsp. pilisquamum | | | | | | | | | | | |
| Leontodon cichoriaceus | | | | | | | | | | | |
| Lotus augustissimus | | | | | | | | | | | |
| Lotus corniculatus | | | | | | | | | | | |
| Luzula spicata | | | | | | | | | | | |
| Nardus stricta | | | | | | | | | | | |
| Phleum alpinum | | | | | | | | | | | |
| Plantago argentea | | | | | | | | | | | |
| Plantago holosteum | | | | | | | | | | | |
| Plantago lanceolata | | | | | | | | | | | |
| Poa bulbosa | | | | | | | | | | | |
| Poa trivialis | | | | | | | | | | | |
| Potentilla pedata | | | | | | | | | | | |
| Ranunculus paludosus | | | | | | | | | | | |
| Rumex acetosella | | | | | | | | | | | |
| Rumex crispus | | | | | | | | | | | |
| Trisetum flavescens | | | | | | | | | | | |
| Veronica arvensis | | | | | | | | | | | |
| Veronica serpyllifolia subsp. humifusa | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

* Livadies Transect L, Greveno Transect G, Alykaina transect A, Louka Transect K

3. Literature

Evans D., Arvela M. 2011 Assessment and reporting under Article 17 of the Habitats Directive - Explanatory Notes & Guidelines for the period 2007-2012 - Final Draft. European Topic Centre on Biological Diversity, p. 1-123.