

**MONITORING AND CONSERVATION STATUS ASSESSMENT OF
HABITAT TYPES IN GREECE:
FUNDAMENTALS AND EXEMPLARY CASES**

P. DIMOPOULOS*, E. BERGMEIER**, P. FISCHER**

**University of Ioannina, Dept. of Environmental and Natural Resources Management, Lab. of Ecology and Biodiversity Conservation, Seferi 2, GR-30100 Agrinio, Greece*

***University of Göttingen, AvH-Institute of Plant Sciences, Dept. of Vegetation Analysis and Phytodiversity, Untere Karspüle 2, D-37073 Göttingen, Germany*
e-mail: pdimopoul@hol.gr

ABSTRACT - In the frame of the EU Habitats Directive, the basic principles for planning and implementing an effective monitoring and conservation status assessment system for habitat types of Greece are outlined. Emphasis is given to parameters that are essential for monitoring concepts and in urgent need of clarification such as: Representation of species and habitat types in Natura 2000 sites in Greece, national responsibility for habitat types and certain subtypes on the level of EU and the Mediterranean biogeographic region, degree of vulnerability on a national level. Specific methodical aspects are recommended for habitat types and a comparison is made emphasizing shortcomings and the short-termed additional actions for bridging the gaps. An evaluation matrix of the conservation status for habitat types of Community interest is suggested for implementation in Greece, and an exemplary case for a habitat type is given. The following criteria are adopted for the assessment of the conservation status of habitat types: intactness of habitat-specific structures, completeness of habitat-specific species, impacts.

KEYWORDS - Conservation status, Greece, Habitat types, Natura 2000, Responsibility, Sclerophyllous scrub.

INTRODUCTION

In the Sites of the Ecological Network Natura 2000, the Member States are obliged to establish the conservation measures that are necessary to maintain or restore a favourable conservation status for habitats and species listed in the Annexes I and II of the EU Habitats Directive (Council of Europe, 1992). These include measures that have been designed to avoid deterioration of habitats and species populations, to improve poor conservation status, as well as the regular measures to maintain a favourable conservation status of habitat types and species

in areas influenced by man. Article 11 of the Habitats Directive demands: Member States shall undertake surveillance of the conservation status of the natural habitats and species referred to in Article 2 with particular regard to priority natural habitat types and priority species. The European Commission (EC) requires Member States to report on the implementation of the Habitats Directive every six years formally starting in 2001 (2001-2006). The national reports should include information on the conservation status of the listed habitat types and species and about the implementation and effects of applied management measures. Monitoring of habitat types and species is an obligatory task to fulfil the demands of the National Report that each Member State has to submit in 2007. Based on monitoring results, the conservation status assessment and the effects of land use and management measures can be assessed.

According to Article 17 of the Habitats Directive, the European Commission has to provide an official format for the reports. A common reporting strategy for the Habitats Directive has very recently been decided by the Habitats Committee (May 2005) and will soon become available to the Member States. However, a common monitoring system has not yet been developed on the European level. The specifications of this National Report are primarily designed to suit - from a nature conservation point of view - the requests on the implementation of the reporting obligations as they can be derived from the Habitats Directive and in addition to minimize the efforts as far as possible.

The habitat types mapping project implemented in the Greek Natura 2000 Sites of Community interest (1999-2001), was followed by the establishment of 27 Management Institutions for the application of conservation management measures in about 80 Sites of Community interest (2003). Presently, Greece has to be activated in the direction of planning and implementing a monitoring procedure for habitat types and species and for the establishment of a system for the conservation status assessment of habitats and species.

In Greece there is no tradition on long-term sampling and monitoring procedures; hence for the planning of a monitoring system we have to take into consideration that: i) 15.000 relevés have been sampled in the Greek Natura 2000 sites during the habitat types mapping project (1999-2001), ii) the Conservation Status Assessment (CSA) of habitat types (Annex I) and species (Annex II, IV and V) is crucial in monitoring programmes (article II of the Habitats Directive), iii) vegetation sampling on permanent plots should be combined in Greek Natura 2000 sites with the monitoring procedure 'Evaluation of the Conservation Status' (in accordance with the Directive 92/43/EEC).

Objectives of the present paper are: a) to clarify the essential parameters on monitoring concepts for habitat types, b) to specify the monitoring guidelines, using as an exemplary case the group of the sclerophyllous scrub (matorral) habitat types of the Dir. 92/43/EEC, c) to give the guidelines for the Conservation Status Assessment scheme to be implemented in Greece, d) to specify the guidelines and recommendations by applying to the sclerophyllous scrub habitat type group, e) to give an example on the implementation of the protocol on the Conservation Status Assessment of a habitat type included in the above mentioned habitat type group.

MATERIALS AND METHODS

In order to meet the requirements of the EU Habitats Directive we have specified the monitoring guidelines and the guidelines for the establishment of a Conservation Status Assessment system for habitat types in Greece (Dimopoulos *et al.*, 2005). In doing so we have taken into consideration existing approaches from other European countries (chiefly from Germany) to adjust the monitoring activities in Greece and the reporting approach (among others, Rückriem & Roscher 1999, Ssymank 2000, Fartmann *et al.*, 2001, HDLGN 2003a, 2003b, NLÖ 2003, Burkhardt *et al.* 2004), as well as textbooks and guidelines on vegetation ecology and monitoring, to mention but few: Dierschke (1994), Vives (1996), Traxler (1997), Lawesson (2000), Elzinga *et al.* (2001), Busch & Trexler (2003).

For the interpretation of the habitat types included in Annex I, as well as for the Hellenic habitat types (not listed in Annex I of the EU Directive) the following sources have been used: Dafis *et al.* (1996, 2001), European Commission DG Environment (2003).

RESULTS AND DISCUSSION

Fundamentals for monitoring of habitat types

An important parameter for monitoring concepts is the scale of observation. Thus, the criteria for monitoring and assessment of the conservation status of habitat types should be based on different spatial references (Rückriem & Roscher, 1999). For the monitoring and analysis of quantitative data such as distribution and size of the total occurrence of habitat types of Community interest, the total surface area of Greece serves as spatial reference. However, for the monitoring of qualitative criteria such as the conservation status it is the actual occurrence of a habitat type or species of Community interest that serves as spatial reference. Parameters that are essential for monitoring concepts in Greece are the following:

a) *Total national distribution of habitat types and species.* This parameter contributes in taking decisions on the type of sampling and the scale of observation. Hence, monitoring for widespread habitat types and species is suggested to take place by means of restricted sampling on a national level; e.g. not all occurrences of a species or habitat type are to be monitored in a detailed way, and the increase or decrease of distribution of certain species or habitat types should be monitored by means of national distribution maps. The priority, rare, endemic and distribution border cases of habitat types and species are to be included in each site-specific monitoring programme. On the level of Natura 2000 sites, actual stands of these habitat types or populations are monitored along with various environmental parameters.

Distribution categories were differentiated depending on the total number of occurrences (TABLE 1) to the Greek Natura 2000 sites, in which the corresponding habitat type occurs. In order to do justice to the general distribution of the habitat types in the rest of Greece, an annotation is provided, where necessary (TABLE 3).

b) *Habitat types and their geographical and ecological sub-types*. From the point of view of scientific nature conservation, monitoring should not only assess the habitat types as such, but also separately each geographical and ecological subtype, as well as the variants related to land use and conservation status level. This is because the Habitats Directive attempts to conserve habitat types also in its regional expressions. In Greece, floristic regions such as the thirteen units adopted for the Flora Hellenica project may be used as geographic reference (Strid & Tan 1997).

Example: In the case of the habitat type 5210 (Arborescent matorral with *Juniperus* spp.), two clear subtypes (geographical and ecological) are distinguished: the coastal sub-types of *Juniperus* matorrals (thermophilous matorral with *J. phoenicea*, *J. oxycedrus* ssp. *macrocarpa*) found on the Aegean islands and in southern Greece and the high mountain sub-types with *J. communis*, *J. drupacea*, *J. excelsa* and *J. foetidissima* (matorral of northern and southern Greece).

c) *National responsibility for certain habitat types and sub-types* on the levels of EU and of the Mediterranean Biogeographical Region. In the frame of the EU and the Mediterranean Biogeographical Region, Greece may be exclusively responsible, or almost so, for the conservation of certain habitat types and species. Criteria for the responsibility of Greece towards habitat types accompanied by exemplary cases for habitat types which are exclusively or almost exclusively assigned to only one of these criteria (because there are certain habitat types for which more than one of these criteria are fulfilled) are given in TABLE 2.

d) *Priority habitat type and degree of vulnerability* on a national level, for habitat types included in Annexes I and II of the Directive 92/43/EEC

Examples: 3170*: Mediterranean temporary ponds, 7210*: Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*.

Monitoring guidelines for the sclerophyllous scrub habitat type group (Dir. 92/43/EEC)

Six (6) of the habitat types of the sclerophyllous scrub habitat group listed in the EU Directive 92/43 and three (3) Hellenic habitat types are present in Greece (TABLE 3).

Vegetation sampling on permanent plots

Vegetation relevés represent a suitable method for monitoring habitat types of the group "Sclerophyllous scrub (matorral)". In light of the fact that relevés should not be made too small (see below) and the cover scale correspondingly should not be made too fine, the modified Braun-Blanquet scale is recommended.

Constant parameters that should be noted only once when establishing the relevé plot are the following: Natura 2000 site, habitat type, number of relevé, location (in words and by GPS coordinates), altitude, number of topographic map 1:50,000, plot size, shape, aspect and inclination. Each plot should be precisely marked in a map 1:5,000.

With each single assessment at a given plot the following data are to be noted: Field researcher, date, plant community and surrounding vegetation, impacts, cover and height of vegetation layers. The selection of environmental parameters depends

on the habitat type group. However, with all habitat type groups the following information should be given as basic information when establishing the plot: geological substratum, soil characteristics (colour, texture), relief (topographic situation). The assessment of the soil type by means of soil corer is discouraged in the framework of a Natura 2000 assessment since the correct identification of the soil type requires too much time effort and facilities.

Furthermore, an assessment of impact and land use is an important feature for vegetation and conservation status in Greece. Therefore, both land use (livestock grazing, which livestock, mowing, woodcutting, etc.) and intensity must be assessed. Land use intensity may be subdivided into the categories 'low', 'moderate' or 'high'.

Additional textual information per plot should be given where needed. Cover estimation should include tree, shrub, sub-shrub and herb layer, moreover litter and ground cryptogams, dead wood, and stones. It is important that the tree, shrub, sub-shrub and herb layer are differentiated using a consistent method.

Investigation of habitat factors

Information on the water regime should be collected for the rare *Laurus nobilis* thickets (code 5310), as they are threatened by the exploitation of springs, channalization of streams and slope stabilization in ravines. Thus, it is useful to note the distance to the nearest stream or valley bottom for each relevé. Moreover, the condition of the stream (whether flowing, puddles present, or dried out) and spring source (whether or not impacted) should be noted during every monitoring cycle and it should be checked whether any water diversions are present. Every monitoring cycle should take place at the same time from a phenological point of view.

Mapping

Selected occurrences of all the habitat types of this group, at the level of the whole of Greece, should be monitored based on a presence/absence survey to assess whether there have been any changes in their overall occurrence and distribution.

Sampling design

At the level of Greece, selected occurrences of all habitat types should be monitored. For instance, in the case "Endemic phryganas of the *Euphorbio-Verbascion*" (code 5430), high sampling intensity should be the goal, since this is an endemic habitat type. Selected occurrences should not only be representatively distributed across the floristic regions of Greece, but also include the various floristic variants. In the case of the habitat type 5210, for instance, both the coastal sub-types of *Juniperus* matorrals and the high mountain sub-types should be monitored (see example in the parameter habitat types and their geographical and ecological sub-types). The different types of substrate, slope/inclination and elevation should be noted when sampling on different types of sites. In the case of habitat type 5420, both the species composition and the sites occupied (e.g., soils, slope/inclination) vary considerably; accordingly, both stands with high floristic diversity and cover (e.g., on the Aegean islands and in Sterea Ellas) and those with lower diversity and lower plant cover should be surveyed in the course of monitoring.

In the individual Natura 2000 sites, vegetation sample plots should be paired to document sites both with and without use/management. This is important especially in light of the impacts to these habitats from abandonment of traditional use forms, on the one hand (habitat types 5150, 5340, 5350, 5420 and 5430) and over-grazing, on the other (habitat type 5430). The fencing-in of enclosures as reference areas is thus necessary for habitat types 5330, 5340, 5350 and 5430 (see TABLE 3).

Size of the sample plot

The sample plot size should be relatively large, in order to cover representative stands with a high proportion of the diagnostic and rare species. A sample plot size of 100 m² is recommended.

Sampling timeframe

Special attention must be paid to the optimal development of the various types of vegetation for sampling, especially in phrygana habitat types, which are characterized by seasonal dimorphism and a considerable number of vernal and autumnal species (habitat types 5330-5430, except for 5350). Accordingly, a relatively early sampling window (May, and depending on the elevation, into June) is thus important in order to estimate the cover of the species at comparable phenological phases. If necessary, a return visit may take place to check for species that develop later. The most suitable sampling window for the other habitat types of this group (5110, 5150, 5210, 5310 and 5350) is June/July, depending on the elevation.

Marking and relocation of permanent sample plots

The sample plots should be permanently marked. Their 'relocatability' in the dense stands of macchia, however, requires in addition very precise location map entries, written directions to the site and GPS readings with as high of accuracy as possible.

Remote sensing methods

Spatial changes in the habitat types can be recorded using aerial photo interpretation; such changes can be brought about through road and trail construction (e.g., habitat type 5110), rural building projects (habitat types 5330/5331, 5340, 5350, 5430), and quarrying/excavation and deposition/disposal of stones and debris (e.g., 5110). Aerial photo interpretation may also be relevant for the monitoring of large-scale, long-term dynamics of the habitats/sites of this habitat type group. An example for this would be the monitoring of the expansion of (irrigated) plantations (such as of olives) at the expense of habitat types 5330, 5340, 5420 and 5430.

Assessment of land use

A land use assessment in the form of use mapping in Natura 2000 sites, as well as accompanying entries on vegetation relevés is especially important for habitat types 5420 and 5430, as these habitat types are threatened by the establishment/expansion of plantations, succession due to the abandonment of grazing/traditional grazing regimes, or by over-grazing. For this habitat type group, the remarks on use could be given first of all as "use present" or "use absent", and where use is pres-

ent this can be further differentiated into the categories defined as “low”, “moderate” or “high” use.

Monitoring timetable

The habitat types of the sclerophyllous scrub (matorral) group should be monitored every 3 years using vegetation sample plots, including accompanying surveys, data on use patterns and the estimation of the conservation status. This return cycle is necessary also for the more widespread habitat types (e.g., 5210, 5420), as the conditions can change very suddenly if there has been fire. All mapping and aerial photo interpretation should take place if possible within the timeframe of the reporting cycle (every 6 years).

Criteria for Conservation Status Assessment - general scheme

The assessment of the Conservation Status of habitat types serves as a suitable basis for the recognition of negative trends at present management and environmental conditions. The general scheme for the conservation status of habitat types is composed of three parameters and three value categories or status degrees (A, B and C), which are based on the EU Directive 97/266/EG (TABLE 4). Value categories are estimated for each of the three parameters and then combined to a total value. From the calculations made on the basis of the algorithm included in TABLE 5, the conservation status of the habitat type, as expressed in the respective area unit, is at one of the following levels: **A**: excellent conservation status, **B**: good conservation status, **C**: conservation status restricted or average.

Land use, in Greece as elsewhere in Europe, may have positive as well as negative effects on habitat types and species; thus it must be considered and recognized within the parameter ‘impacts’. Since in the frame of the evaluation scheme the degree of impact is evaluated, the particular causes of threat must also be assessed.

These are preliminary schemes, which are in need of differentiation and modification, in particular with respect to regional differences within habitat types in Greece. As concerns the definition of the conservation status, it is suggested to proceed in such a way that present optimal conditions represent conservation status category A. Should an improvement be observed after some time of monitoring, the criteria and thresholds of the evaluation frame will have to be updated.

The procedure of evaluating the conservation status (sampling design, time and interval) should be alongside vegetation sampling. The conservation status should be estimated for that polygon in which the permanent plot is situated. Commonly, the plot itself is too small for the assessment of the conservation status. A combination of vegetation sampling and conservation status assessment is recommendable as long as there are no regionally adapted evaluation frames. On the basis of such regional frames which take into consideration the variants and subtypes of the habitat types, subsequent studies may be initiated. So far, in the Greek Natura 2000 sites, the conservation status of a habitat type was estimated for the entire area and was not judged on polygon level. However, information on how a habitat type within a Natura 2000 site develops with respect to its proportion of different conservation status categories is urgently needed. This requires an approach per partial area (polygon).

In such a way, in the framework of a management plan for a specific Natura 2000 site and by means of a further developed evaluation frame, the conservation status for each partial area (polygon) could be mapped and displayed. This allows at the same time a regular updating of the standard data sheets. By means of the evaluation frame the amount of work for very widespread and frequent habitat types could be reduced. Vegetation sampling (and conservation status estimation) could be performed in only a few sites from which generalizations of the conservation status in several sites will become possible.

Guidelines for conservation status assessment of the sclerophyllous scrub (matorral) habitat type group & implementation protocol

I. Intactness of habitat structures typical of the habitat type

Erosion gullies and small-scale erosion patterns can be viewed as typical structures for the habitat types of sclerophyllous scrub (matorral). These should however be differentiated from the large scale, deep erosion gullies that are to be viewed as impacts. The existence of terraces/terrace walls in good condition can be seen as an enhancing feature for these habitat types.

A further criterion is the naturalness of the stands. For instance, stands of pronouncedly dry climatic conditions that slowly, if at all, develop into Mediterranean woodland should be ranked higher with respect to the intactness of the typical habitat structures of the habitat type, than e.g., stands that merely represent degradation phases of former Mediterranean evergreen forests. In this connection, natural phrygana stands (habitat type 5430) are to be ranked higher than those that grow on terraces (most stands of 5420). Furthermore, the surroundings in which the stands occur are important for the evaluation of "Sclerophyllous scrub (matorral)". The value of the stands is enhanced if they are interdigitated with sclerophyllous forest stands. A difference must be made also in this habitat type group between the occurrence of shrubs that naturally belong to the habitat type and the spread of allochthonous woody species, whose presence should be noted as a part of the impact assessment. An important assessment factor with respect to the co-dominance of different species that determine vegetation structure is the proportion of growth forms that are typical for the habitat type. The presence of the low, often thorny, normally hemispherical dwarf shrub growth form with seasonal dimorphism should for instance determine the conservation status class for phrygana habitat types (e.g., 5420, 5430). However, for macchia, the presence of the densely arranged, evergreen, sclerophyllous shrub growth form enhances the ranking.

II. Completeness of habitat-specific species

A list of characteristic species of the habitat types should be constructed, including their various subtypes, occurrences in the various floristic regions of Greece and their various expressions. The assignment of threshold values for the individual conservation status classes is useful. The plant species list should also be tailored to the diversity of the species composition of the individual habitat types (e.g. *Sarcopoterium spinosum* phryganas, code 5420). Furthermore, species that are thorny or aromatic or exhibit seasonal dimorphism should be given priority when

assigning species typical of the habitat types. In the example given for implementing a protocol (TABLE 6), to the Endemic phryganas of *Euphorbio-Verbascion* (code 5430), in the species list constructed under the parameter 'habitat-specific species', each species is followed by a numerical value. A higher value is given to endemic, rare or endangered species. Evergreen sclerophyllous shrubs are to be treated as especially typical for stands of macchia.

III. Impacts

Factors relevant for the habitat type group "Sclerophyllous scrub (matorral)" are over-grazing (habitat type 5430) and cessation of traditional use (such as grazing; habitat types 5150, 5340, 5350, 5420 and 5430). Eutrophication and damage to the site (e.g., through use of herbicides) are further impact factors. Impactive changes to the site can be evaluated on the basis of the proportion of negative indicator species. Another substantial criterion is the relative fragmentation of the habitat type. Devaluing factors here are establishment of (irrigated) plantations, construction of (forest) roads and trails, building of sports and recreation infrastructure and tourist facilities, uncontrolled rural development, quarrying and waste disposal. Also relevant for the assessment is the degree of disturbance brought about by illegal camping, trampling, picnicking, campfires, garbage disposal/littering, and moto-crossing. In the case of *Laurus nobilis* thickets (code 5310), it is important that aspects of water diversion, management and consumption (e.g., channelization of streams and dumping of rubbish on embankments and water courses) are incorporated into the evaluation of the degree of disturbance. With respect to threats through tourism, sports and recreation facilities and construction and mining activities, the accessibility of the habitat type occurrences are an important criterion for the habitat structures. Devaluing factors include structural degradation by fire (habitat types 5310, 5430) and the large scale presence of deep erosion gullies. The area of impact may be used for the assessment as a means of weighting the impact.

REFERENCES

- BURKHARDT R., ROBISCH F. & SCHRÖDER E., 2004 - *Umsetzung der FFH-Richtlinie im Wald. Gemeinsame bundesweite Empfehlungen der Länderarbeitsgemeinschaft Naturschutz (LANA) und der Forstschefkonferenz (FCF)*. Natur und Landschaft 79 (7): 316-323.
- BUSCH D.E. & TREXLER J.C. (eds.), 2003 - *Monitoring Ecosystems. Interdisciplinary Approaches for Evaluating Ecoregional Initiatives*. Island Press, Washington, Covelo, London, 447 pp.
- COUNCIL OF EUROPE, 1992 - Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Off. J. Eur. Communities L206/7/1992.
- DAFIS S., PAPASTERGIADOU E., GEORGHIOU K., BABALONAS D., GEORGIADIS T., PAPAGEORGIU M., LAZARIDOU T., TSIAOISSI V., 1996 - Directive 92/43/EEC The Greek "Habitat" Project Natura 2000: An overview. - Greek Wetland and Biotope Center (EKBY), Thessaloniki.
- DAFIS S., PAPASTERGIADOU, LAZARIDOU T., TSIAFOULI M., 2001 - Technical Guide for identification, description and mapping of habitat types of Greece. - Greek Wetland and Biotope Center (EKBY), Thessaloniki.
- DIERSCHKE H., 1994 - *Pflanzensoziologie* - Eugen Ulmer, Stuttgart.
- DIMOPOULOS P., BERGMEIER E., THEODOROPOULOS K., FISCHER P. & TSIAFOULI M., 2005 - Identification, interpretation and monitoring guide for habitat types and plant species: Natura 2000 sites of Greece with management institutions [in prep.].
- ELZINGA C.L., SALZER D.W., WILLOUGHBY J.W. & GIBBS J.P., 2001 - *Monitoring plant and animal populations*. Blackwell Science, Malden, Massachusetts, USA, 360 pp.
- EUROPEAN COMMISSION, DG ENVIRONMENT, 2003 - *Interpretation Manual of European Union Habitats (EUR25)*. Nature and Biodiversity. Brussels.
- FARTMANN T., GUNNEMANN H., SALM P. & SCHRÖDER E., 2001 - Berichtspflichten in Natura-2000-Gebieten. Empfehlungen zur Erfassung der Arten des Anhangs II und Charakterisierung der Lebensraumtypen des Anhangs I der FFH-Richtlinie. + table volume. *Angewandte Landschaftsökologie* 42: 1-725.
- HDLGN (HESSISCHES DIENSTLEISTUNGSZENTRUM FÜR LANDWIRTSCHAFT, GARTENBAU UND NATURSCHUTZ) (ed.), 2003a - Leitfaden zur Erstellung der Gutachten FFH-Monitoring (Grunddatenerhebung/ Berichtspflicht). Bereich Lebensraumtypen (LRT). Stand: 12.5.2003. - Rev.: Arbeitsgruppe FFH-Grunddatenerhebung & Weissbecker M. (HDLGN). Gießen.
- HDLGN (HESSISCHES DIENSTLEISTUNGSZENTRUM FÜR LANDWIRTSCHAFT, GARTENBAU UND NATURSCHUTZ) (ed.), 2003b - Protokoll der Schulung des HDLGN zur FFH-Grunddatenerfassung 2003. - Rev.: Geske C., Herrmann M., Weissbecker M. Gießen.
- LAWESSON, J. (ed.), 2000 - A concept for vegetation studies and monitoring in the Nordic countries. Nordic Council of Ministers, Copenhagen.
- NLÖ (NIEDERSÄCHSISCHES LANDESAMT FÜR ÖKOLOGIE) (ed.), 2003 - Hinweise zur Definition und Kartierung der Lebensraumtypen von Anh. I der FFH-Richtlinie in Niedersachsen. Mit Angaben zur Einstufung des Erhaltungszustands. Stand: 06.2003. - Rev.: O. v. Drachenfels, Hildesheim.
- RÜCKRIEM C. & ROSCHER S., 1999 - *Empfehlungen zur Umsetzung der Berichtspflicht gemäß Artikel 17 der Fauna-Flora-Habitat-Richtlinie: Ergebnisse des Life-Projekts "Beurteilung des Erhaltungszustandes natürlicher Lebensräume gemäß der FFH-Richtlinie" des Bundesamtes für Naturschutz von 1996-1998*. - *Angewandte Landschaftsökologie* 22: 1-456. Bonn-Bad Godesberg.
- SSYMANK A., 2000 - *Fachliche Anforderungen an Artensteckbriefe zur Umsetzung der FFH-Richtlinie und Analyse der Meldung*. - In: PETERSEN B., HAUKE U., SSYMANK A., *Der Schutz von Tier- und*

Pflanzenarten bei der Umsetzung der FFH-Richtlinie. Schriftenr. Landschaftspflege Naturschutz 68: 57-75. Bonn-Bad Godesberg.

STRID A. & TAN K., 1997 - Flora Hellenica, 1. Koeltz Scientific Books, Königstein.

TRAXLER A., 1997 - Handbuch des vegetationsökologischen Monitorings. Methoden, Praxis, angewandte Projekte Teil A: Methoden. - Monographien vol. 89A: 1-397. Wien.

VIVES P.T. (ed.), 1996 - Monitoring Mediterranean wetlands. A methodological guide. MedWet Publication; Wetlands International, Slimbridge, UK, and Instituto da Conservação de Natureza, Lisbon. 150 pp.

TABLE 1 - Distribution categories of the habitat types based on their occurrence in the Natura 2000 Sites of Greece.

Number of sites	Category
1-9	Rare
10-19	Infrequent
20-39	Scattered
40-69	Widespread
70	Abundant

TABLE 2 - Criteria for the responsibility of Greece towards habitat types and exemplary cases.

Code	Criteria for responsibility	Example
D	Position near the borderline of the range of a habitat type or subtype	9410: Acidophilous <i>Picea</i> forests of the montane to alpine levels (Vaccinio-Piceetea)
R	Rarity of the habitat type or subtype	2270: Wooded dunes with <i>Pinus pinea</i> , which also fulfils the criterion D
E	Endemic habitat type or subtype	6270: <i>Lygeum spartum</i> steppes of Crete
L	Harbouring the most extensive (largest) stands of a widespread habitat type	9340: <i>Quercus ilex</i> forests
C	The stands in Greece are located in the centre of the overall range and are very representative	9320: <i>Olea</i> and <i>Ceratonia</i> forests
S	Certain habitat types in Greece could serve as stepping stones in the sense of the coherent Natura 2000 network	2110: Embryonic shifting dunes
T	Important habitat type for endemic species	8210: Calcareous rocky slopes with chasmophytic vegetation, which also fulfils the criteria R, E

TABLE 3 - Total national distribution, distribution in the Natura 2000 Sites and degree of responsibility for the sclerophyllous scrub (matorral) habitat type group of the Dir. 92/43 (codes according to TABLE 2).

Code	Habitat Type	Distribution in Greek Natura 2000 sites	Degree of Responsibility carried by Greece
HABITAT TYPES OF ANNEX I OF THE DIR. 92/43/EEC			
5110	Stable xerothermophilous formations with <i>Buxus sempervirens</i> on rock slopes (<i>Berberidion</i> p.p.)	rare (general distribution in GR: scattered)	R
5210	Arborescent matorral with <i>Juniperus</i> spp.	abundant (general distribution in GR: scattered)	C
5310	<i>Laurus nobilis</i> thickets	rare (general distribution in GR: infrequent)	C L
5330	Thermo-Mediterranean and pre-desert scrub	scattered	C
5420	<i>Sarcopoterium spinosum</i> phrygas	abundant (general distribution in GR: widespread)	C
5430	Endemic phrygas of the <i>Euphorbio-Verbascion</i>	infrequent (general distribution in GR: scattered)	E T
HELLENIC HABITAT TYPES (not included in Annex I of the Dir. 92/43/EEC)			
5150	<i>Pteridium aquilinum</i> stands	infrequent (general distribution in GR: abundant)	-
5340	Garrigues of Eastern Mediterranean	widespread	C
5350	Pseudomaquis	scattered (general distribution in GR: widespread)	L C

TABLE 4 - Parameters and value categories for the conservation status assessment of habitat types.

Parameters	Value categories			irreversibly disturbed, regeneration not possible
I. Intactness of habitat-specific structures	A excellent representation	B well represented	C moderate to average representation	
II. Completeness of habitat-specific species	A habitat-specific species fully represented	B habitat-specific species largely represented	C habitat-specific species partly represented	
III. Impacts	A low	B medium	C strong	

TABLE 5 - Conservation status degrees and calculations for the total value.

Habitat structures	A	A	A	A	A	B	B
Species	B	A	B	C	A	B	C
Impacts	C	B	B	C	C	C	C
Total assessment	B	A	B	C	B	B	C

TABLE 6 - Implementation of a Protocol for CSA of the Annex I Habitat Type 5430 (adapted from a formula created by K.P. Buttler, Frankfurt).

Habitat type 5430		"Endemic phryganas of the <i>Euphorbio-Verbascon</i> "	
Recorder:		Site Number: - -	
Assessment of Conservation Status			
<input type="checkbox"/> A		<input type="checkbox"/> B	
<input type="checkbox"/> C			
Species Inventory (habitat-specific species)			
<input type="checkbox"/> A: ≥ 9		<input type="checkbox"/> B: 4 - 8	
<input type="checkbox"/> C: ≤ 3			
<input type="checkbox"/> <i>Asparagus aphyllus</i>	1	<input type="checkbox"/> <i>Fumana arabica</i>	1
<input type="checkbox"/> <i>Asperula rigida</i>	1	<input type="checkbox"/> <i>Fumana thymifolia</i>	1
<input type="checkbox"/> <i>Asphodeline lutea</i>	1	<input type="checkbox"/> <i>Genista acanthoclada</i>	1
<input type="checkbox"/> <i>Biarum davisii</i>	2	<input type="checkbox"/> <i>Globularia alypum</i>	1
<input type="checkbox"/> <i>Calicotome villosa</i>	1	<input type="checkbox"/> <i>Hyparrhenia hirta</i>	1
<input type="checkbox"/> <i>Centaurea idaea</i>	1	<input type="checkbox"/> <i>Leontodon tuberosus</i>	1
<input type="checkbox"/> <i>Cistus creticus</i>	1	<input type="checkbox"/> <i>Muscari spreitzenhoferi</i>	1
<input type="checkbox"/> <i>Cistus parviflorus</i>	1	<input type="checkbox"/> <i>Phagnalon groecum</i>	1
<input type="checkbox"/> <i>Coridothymus capitatus</i>	1	<input type="checkbox"/> <i>Phlomis cretica</i>	1
<input type="checkbox"/> <i>Drimys maritima</i>	1	<input type="checkbox"/> <i>Phlomis fruticosus</i>	1
<input type="checkbox"/> <i>Erica manipuliiflora</i>	1	<input type="checkbox"/> <i>Phlomis lanata</i>	2
<input type="checkbox"/> <i>Euphorbia acanthothamnus</i>	2	<input type="checkbox"/> <i>Polygala venulosa</i>	1
<input type="checkbox"/> <i>Piptatherum coerulescens</i>	1		
<input type="checkbox"/> <i>Salvia fruticosa</i>	1		
<input type="checkbox"/> <i>Sarcopoterium spinosum</i>	1		
<input type="checkbox"/> <i>Satureja thymbra</i>	1		
<input type="checkbox"/> <i>Teucrium alpestre</i>	2		
<input type="checkbox"/> <i>Teucrium microphyllum</i>	1		
<input type="checkbox"/> <i>Thymelaea tartonraira</i>	1		
<input type="checkbox"/> <i>Verbascon spinosum</i>	2		
Habitats and Structures (habitat structures typical of the habitat type)			
<input type="checkbox"/> A: ≥ 4		<input type="checkbox"/> B: 2 - 3	
<input type="checkbox"/> C: ≤ 1			
of the habitats and structures mentioned below are present in good condition on <u>major part</u> of the site. Habitats /structures that occur only in minor parts of the site may be summed up.			
<input type="checkbox"/> pronounced patchiness of vegetation	<input type="checkbox"/> interspersed with single trees or groves (<i>Cupressus</i> , <i>Pistacia</i> , <i>Ceratonia</i> , <i>Quercus coccifera</i> , wild <i>Olea</i>)		
<input type="checkbox"/> high cover proportion of hemispherical shrubs	<input type="checkbox"/> relief natural, undisturbed		
<input type="checkbox"/> pronounced microrelief (rock outcrops, dolines, gravel, torrents, erosion gullies etc.)	<input type="checkbox"/> terrace walls, if present, in good condition		
	<input type="checkbox"/> interdigitated with rocks, cliffs, etc.		
Impacts			
<input type="checkbox"/> A:		<input type="checkbox"/> B:	
<input type="checkbox"/> C:			
No impacts or only one more extensive impact of very low intensity and/or only local impacts of moderate to high intensity.	1-2 more extensive impacts of rather low intensity or impacts of medium to high intensity only in minor parts.	Several extensive impacts of low intensity or one to few extensive impacts of medium to high intensity.	
More frequent impacts of this habitat type:			
<input type="checkbox"/> Plantations (olive etc.)	<input type="checkbox"/> Structural degradation by fire impact	<input type="checkbox"/> Apiculture	
<input type="checkbox"/> Succession following abandonment of grazing	<input type="checkbox"/> Rural building projects (cisterns, stables)	<input type="checkbox"/>	
<input type="checkbox"/> Intense pasturing (enclosures) or impacted by overgrazing	<input type="checkbox"/> Construction of roads and trails	<input type="checkbox"/>	
	<input type="checkbox"/> Invasion by <i>Pinus brutia</i>	<input type="checkbox"/>	