ASSESSING THE CONSERVATION STATUS OF HABITATS IN FRENCH NATURA 2000 SITES: METHOD FOR FOREST HABITATS

Lise Maciejewski (MNHN-SPN), March 2016

The aim of the Natura 2000 network is to reconcile the preservation of nature and socio-economic concerns, through the concerted and contractual management of a group of sites dedicated to maintaining or restoring species and natural habitats listed in the annexes of the Habitats-Fauna-Flora Directive (Habitats Directive) at a favourable conservation status. Favourable conservation status is not considered an absolute scientific reference but rather a co-construction between ecological principles and socio-economic requirements compatible with preservation of nature. In order to help Natura 2000 site managers, the French Ministry of Ecology asked the French Museum of Natural History (MNHN) to develop standardized methods for assessing the conservation status of habitats at a site level. Here, we present the method for forest habitats (Photo 1).

CONTEXT

Built by the French Natural Heritage Service (a unit of the French Museum of Natural History) this method meets the following four objectives:

1. Establish a scientific basis to determine and discuss the conservation objectives at a site level within the Natura 2000 steering committees (concerted management), as well as provide managers with a management support tool (but not a management evaluation tool).
2. Assess the conservation status of the habitats which have led to the designation of the sites according to French law, as part of the management documents ("DOCOB": objectives document).
3. Indicate the degree of conservation in the standard data forms.
4. Locally define the favourable conservation status and the relevant indicators to measure it, in order to help setting up surveillance at a large scale (article 11 of the Habitats Directive).

Photo 1: Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (UE 9120), © A. Lagrave

METHODOLOGICAL CHOICES

The Habitats Directive establishes a definition of the conservation status of a natural habitat, which is only valid at a biogeographical scale. We needed first to redefine these concepts at a local scale. Assessing the conservation status of a habitat at a Natura 2000 site level means to assess its composition (identity of its components), structure (physical organization of its components) and functions (natural process and actions resulting from the interactions between the components of the habitat, and with the environment), which are interdependent. The conservation status is favourable when all the components and theirs interactions lead to a functioning of the habitat which allows its continuity in time and its stability or expansion in space (according to the article 1 of the Habitats directive), within the limits of the habitat type described in the interpretation manual EUR 28.

Assessment of the conservation status at a local scale is based on parameters, the choice of these parameters is based on a bibliographic review about the ecology of the chosen habitats. These parameters are themselves composed of criteria to which one or more indicators are associated.

With the need for evaluation comes the need of making choices. We decide to define the "optimal selected state" as a long-term aim, and the "chosen favourable status" as an operational target for managers, which lead to establish

threshold for each indicators. These choices are enlightened by scientific evidences in a socio-economic and cultural context bounded by the Habitats directive.

Unlike community evaluation, a grade decreasing gradually is the approach for conservation status that has been chosen. For each indicator, the observed value is compared to threshold values. Based on the difference with these threshold values, a grade is attributed to each criterion. A final grade is obtained by subtracting all of these grades from 100. Lastly, the conservation status is obtained by transferring that grade onto an axis representing the conservation status gradient, which can be divided into different levels of conservation status (Fig. 1) for communication purposes.

Criterion (cf. table 1)	Observed values	Threshold values	Grade
"A"	2	0 < A < 3	0
		3 < A < 6	-5
		6 < A < 9	-10
"B"	10%	80 % < B < 100 %	0
		20 % < B < 80 %	-10
		0 % < B < 20 %	-20
"C"	7	C > 10	0
		C < 10	-15
		Final grade	100 - 0 -20 -15 = 65

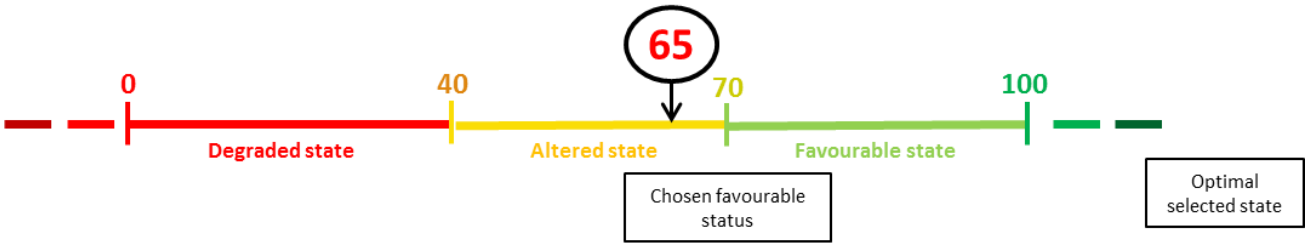

Figure 1: axis representing the conservation status gradient

This approach helps independently highlight criteria whose evaluation is good or bad, and rank them according to their importance. It helps to situate the habitat more precisely within a conservation status category. This sharp evaluation is used to better adapt the efforts that need to be made for the habitat and should highlight the management efforts carried out.

MATERIALS AND METHODS

In 2009, in collaboration with the French National Forestry Office (ONF), the French Natural Heritage Service has elaborated its first method for assessing the conservation status of forest habitats. The methodological foundations have been built with this first release. Nevertheless, ever since we have developed several methods for different major habitat groups, and our interpretation of the underlying concepts has evolved. Moreover, we had feedbacks from the users and new scientific literature was available, that is why we have decided to work on a second version.

The evaluation leads to a judgment on the value assigned to an object, in this case the conservation status of a habitat. As the object is complex, the evaluation must go through a simplification process to improve its understanding by many actors. For the sake of the evaluation, it is important to identify which processes to consider and to define thresholds or 'reference' values i.e. the values when a habitat is changing status. These values can be

ecological thresholds in the case of non-linear relationships related to pressures. When such relationships do not exist or have not been studied, they can be simple evaluation benchmarks. We have selected the relevant processes to consider thanks to a bibliographic review, but also with the help of different stakeholders gathered on a steering committee. We have tried to establish benchmarks using data coming from the national forest inventory. When this was not possible, we have tried to find a consensus between all the stakeholders.

RESULTS

This method, based on a set of indicators which are easy to calculate and practical to collect in the field, can be used by the majority of site managers. You can use the method even if you are not familiar with dendrometric data, but for some indicators we propose an alternative with the use of basal area.

This method has been set up for all the forest habitat types existing in France, with few exceptions, for example for assessing the conservation status of some habitats much more close to matorral or the softwood alluvial forest ecosystem, this method will need few adjustments. For few indicators, some adjustments of the thresholds are needed on the Mediterranean region, or on less fertile plots.

Following the bibliographic review and the consultation of the stakeholders, the main parameters chosen concern the spatial dynamics of the habitat, the forest dynamics and the matter cycle.

Photo 2: standing dead tree, ©F. Lebourgeois

Spatial dynamics of the habitat is assessed in particular thanks to the area evolution trend of the habitat within the site (this parameter is really important especially regarding the island biogeography theory issues). We also tried to evaluate the connectivity of the habitat within the site, and with its environment, but the difficulty to find simple tools imposes to make these indicators optional.

Forest dynamics and matter cycle are closely interlinked, indeed the existence of certain critical sylvigenetic phases as ageing and decay phases will influence deeply the biomass (including dead organic matter) in forest, therefore the functioning of the matter cycle. The functioning of the matter cycle will also influence the ability of forest to regenerate. An autochthonous dendrological composition is also really important, because it defines the type of wood and decaying wood that you will find in forest (and according to the use of a habitat typology, each habitat needs to remain within the limits defined in the manual EUR 28).

Consequently, we have implemented indicators on presence of allochthonous tree species (regarding a type of habitat), measured with the cover or the basal area. Invasive species are included in this indicators, but we have decided to look a bit more closely the frequency of these species within the site, to help to measure the rapidity of colonization. To assess the functioning of the forest dynamics, we have tried to simplify and only look on the presence of the young phases and the mature phases (with the presence of large living trees as an indirect indicator). For the matter cycle, the method only demands to mark the number of large dead standing or lying dead wood (Photo 2). It is also possible, according to the availability of data, to collect information about specialised saproxylic beetles.

DISCUSSION

To improve the readability and feasibility of the evaluation, the method only proposes to make a statement at the present time. Consideration of the past, such as management history, is really important but the availability of these informations is not the same everywhere. Several studies showed that the impact of different management regimes cannot be generalized from one site to another. This is why we designed an assessment of the conservation status without considering the past or predicting the future. It is then much easier to compare the evaluations between sites and to share experience.

The conservation status of a habitat is not only the result of management practices; that is why the evaluation of the conservation status does not directly assess the effectiveness of management. The evaluation of management is therefore a different and complementary exercise to conservation status assessment.

Sampling must adapt itself to the question being asked, but also to the site's history and (financial and technical) means available. According to the indicators (Tab. 1), data can be collected on different units of sampling.

PERSPECTIVES

Conservation and management of complex objects like habitats require the establishment of a habitat typology. This common language is an important step to reach a consensus among the different actors of conservation science. But even if creating types and defining their limits provides a validation of their existence, it can also fix our vision of a natural environment that is dynamic and constantly changing. An assessment at the scale of the eco-complex would partly correct this 'fixist' vision by integrating the dynamics as an intrinsic property of the eco-complex. The habitat assessment would be considered as one element of the diagnosis of a wider ecosystem. The assessment of the conservation status would have a fractal nature; the process can take place at different scales from the plot to the site and then the eco-complex. The proposed methodological approach is common to all habitats types which represents a major advantage for assessing in a global and synthetic way all the habitats of an eco-complex at a given scale. More broadly, this common approach provides elements to design projects and to connect monitoring and evaluation programs at a larger scale, with the aim to improve the coherence between nature conservation policies.

OTHER HABITATS TYPES

So far, the French Museum of Natural History has created method to assess conservation status at a site level of: unwooded Atlantic coastal dunes, lagoons, alpines and Mediterranean Rivers, natural and semi-natural grasslands.

CONTACTS

Lise Maciejewski: maciejewski@mnhn.fr

Farid Bensettiti: bensettiti@mnhn.fr

Julien Touroult: touroult@mnhn.fr

REFERENCE

Maciejewski, L., 2016. *État de conservation des habitats forestiers d'intérêt communautaire, Evaluation à l'échelle du site Natura 2000, Version 2. Tomes 1 et 2.* Mars 2016. Rapport SPN 2016-75, Service du patrimoine naturel, Muséum national d'Histoire naturelle, Paris. 82 p. + 62 p.

DOWNLOADS

- *Method for assessing conservation status of Forest habitats in French Natura 2000 site, Volumes 1&2 (in French)*: https://inpn.mnhn.fr/docs/N2000_EC/Eval_EC_habitats_forestiers_version2_MNHN-SPN_2016.zip
- *Learn more and find guides for others habitats types*: http://inpn.mnhn.fr/telechargement/documentation/natura2000/evaluation?lg=en

Inventaire National du Patrimoine Naturel

Table 1: Criteria and indicators chosen for assessing of the conservation status forest habitats. For the thresholds and grades associated to each indicator, please refer to the implementation guide.

PARAMETER	CRITERION			Indicator	Scale of data's collection	Informations highlighted
Area covered (spatial dynamic)	Habitat extent			Area evolution trend (indicate the causes of the evolution)	SITE	Presence and continuity of the habitat type, capacity to host viable populations of species (especially specialists ones), and capacity to maintain exchanges, in order to maintain biotic and abiotic characteristics
	Parcelling and fragmentation			Trend within the site	SITE	
				Connection with the environment	SITE	
Composition, Structure and Functions	Composition's integrity	Dendrological integrity		Presence of tree species allochtonous of the habitat (cover *or* BA)	PLOT	Continuity of the habitat type, regarding its biotic components (includind the risk of expansion of invasive species), with feed-back on the abiotic part (biogeochemical cycle)
		Invasive species		Frequency within the site	PLOT	
	Forest dynamics	Large living trees		Number of large living trees per ha *or* BA large living trees/Total BA	PLOT	Continuity of the forest dynamics, based on the presence of "critical" stages (young and mature)
		Renewal processes	Regular woodland or coppice	% of area with young trees	PLOT **or** SITE	
			Others	Regeneration potential	PLOT **or** SITE	
	Matter cycle			Number of standing and lying dead woods per ha	PLOT	Functionning of the matter cycle
				Specialized saproxylic bettles (optional, according to data's avalaibility)	According to the method	
Deterioration	Damage to the polygon			Localized damage and its recovery	PLOT	Remainder of disruptions not taken into account indirectly by the other indicators
	"Diffuse" damage to the site			Damage whose impact is difficult to quantify on the surface	SITE	Large-scale damage