Summary

Adapting to climate change in 'Grande Brière, the Donges marsh and the Brivet' Natura 2000 site

VULNERABILITY ASSESSMENT AND ADAPTATION PLAN SUMMARY

CONTEXT

Natura 2000 site of the Grande Brière, the Donges marsh and the Brivet [FR5212008] is a wetland of 19,754 hectares which forms a mosaic of habitats conducive to a rich biological diversity. These marshes are part of the catchment area of the Brivet, the last tributary of the Loire. Due to its location on the migration routes within a network of wetlands on the Atlantic coast, this site is of international importance for the wintering and breeding of avifauna. It is a retro-littoral marsh with salt water intrusions currently limited by the management of hydraulic works. The current biodiversity of the site is highly dependent on the developments carried out since the 19th century and on management practices. The methods of this management evolved during the 20th century in the face of two phenomena: mechanisation and the abandonment of activities such as livestock farming, reed cutting and peat exploitation.

VULNERABILITY ASSESSMENT

The climate analysis of the territory reveals that climate change has already begun with a 1°C rise in average annual temperatures since the 1970s. This trend could increase and in a pessimistic scenario (RCP 8.5) reach +3.5°C in 2100, resulting in longer, hotter summers and less severe winters. In addition to the rise in temperatures, the territory must expect strong inter-annual variability in terms of rainfall, with a tendency for the cumulative amount to increase during the winter period and a reduction during the summer period. In addition, the rise in sea level could indirectly affect the site by encouraging salt water intrusion and making hydraulic management more complex.

Based on scientific literature, local experts and interviews with users, 27 target components were assessed in terms of climate change: 15 natural heritage components, 7 human activities and 5 management tools. This socio-ecosystemic analysis enabled us to propose a prospective narrative for the site and then an adaptation plan.

Water resources, both in terms of quantity and quality, could be impacted. The multiplication of heat waves would lead to earlier and longer low water levels and could alter the quality of the water. Particular attention should be paid to eutrophication but also to salinity, which could disrupt the entire site (due to repeated dry spells, possible replenishment with estuarine water, and the risk of salt water infiltration). Droughts could increase water stress. The phenology of the environments could be shifted, particularly that of the wet meadows. All the species associated with these environments could be affected, particularly aquatic fauna (risk of anoxia). Many uncertainties remain concerning the evolution of trophic resources and the interaction between species.

Concerning migratory species, questions persist as to the evolution of their migratory route, but the conservation of wetlands on an international scale in order to stop fragmentation is reaffirmed in the light of climate change. Locally, the site must continue to research the functionality of the wetland to favour the reception of avifauna and to ensure that the periods of activity between the species and human activities are staggered. Also, climate change could modify the ranges and new species (invasive or not) could arrive on the site.

Most of the human activities on the site will have to adapt. Extensive agriculture, a preferred management tool for maintaining open environments, will have to undergo profound changes. A reconfiguration of interesting plots of land is to be expected, depending on the quantity (earlier low water allowing easier access and

earlier grazing) and quality of the water (salinity for watering, water supply). But the rise in temperature could have an impact on the livestock (hyperthermia and well-being, impact on milk production and quality, parasitism and diseases, etc.) as well as on the fodder.

With approximately 8,000 ha of **peat and paratourbous environments**, climate change could also lead to the mineralisation of the substrate and therefore the release of greenhouse gases. The management methods should integrate the carbon sink functionality by favouring management that limits severe and repeated drying out or by limiting the cleaning of the hydrographic network in order to avoid draining the wetland.

Given **the lack of scientific knowledge on the ecological plasticity of species and the interplay of factors**, many uncertainties remain regarding the evolutionary trajectories of several species and habitats. Studies will complete this initial analysis. The approach has made it possible to refine the climatic analysis and to identify the main trends in order to highlight the main points of vigilance for the management of the protected area.

The application of the approach to a Natura 2000 site has highlighted a **contradiction between the objectives of maintaining or restoring the good conservation status of habitats and populations and the evolutionary dynamics underway in the area**. Furthermore, at the scale of the study area, the implementation of the current Natura 2000 system, through the DOCOB and contractual tools, does not allow for the conservation of the ecological functions of the environments and the services provided by the ecosystems to be considered (in particular regulatory services such as carbon storage, etc.).

ADAPTATION PLAN

Although many uncertainties remain concerning the possible evolution of environments, species and uses, this first stage has made it possible to initiate reflection on an adaptation plan of the Natura 2000 Grande Brière marshes of Donges site to climate change.

The vocation of the Natura 2000 site is not called into question: the conditions of existence of the site will not disappear with the climatic variations expected in the horizon studied. However, questions remain about the evolution of bird populations and habitats, but also about the evolution of management policies, and more particularly about their coherence with the objectives of the Natura 2000 site. Indeed, current management policies, such as the maintenance of the hydraulic network or the export of plant biomass, may be in contradiction with the maintenance of wetland functions such as carbon storage, in a context of climate change. Thus, climate change could exacerbate management tensions and weaken the territorial consensus.

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The Habitats and Birds objective documents drawn up in 2003 and 2007 respectively set out the general conservation principles for the site. Climate change is not mentioned, let alone integrated into the management of

the site. The objective documents are based on general objectives which, in the light of climate change, could however be adapted**. The analysis of the 36 general objectives in the light of climate change issues identified 16 as relevant, 16 as needing to be modified, 2 as needing to be deleted completely and 2 as obsolete**. These general objectives are based on four themes: management of water levels, management of plant biomass aimed at maintaining a balance between reedbeds and grasslands, the fight against invasive exotic species, and support for agriculture or the cleaning of canals and water bodies considered as management tools. These four themes must integrate new functional issues such as the preservation of the peaty subsoil, the accelerated evolution of species habitats such as woodlands, the arrival of new species through the displacement of biogeographical areas, or an evolution of the agricultural model and practices.

In view of the current dynamics and climate change, several strategic axes emerge. The conservation objectives of the habitats and species of community interest may be called into question for some of them and require accompanying measures. Ecological continuity for the movement of local populations to or from peripheral areas must be integrated into the management of the site. For certain species currently of community interest, it seems necessary to better understand their conservation through integrated and adaptive management of the entire wetland in order to maintain its carrying capacity and its functionality through the interaction of three main elements: water, biodiversity and carbon stock. The evolution of human activities, particularly livestock farming, can lead to major changes, the effects of which should be anticipated and even corrected through adaptive management of the area. This will involve proposing new models and new financial mechanisms, as well as providing support for existing professionals or those setting up in the future.

In order to implement the proposed strategy with the Natura 2000 tools on the Grande Brière, Donges and Brivet marshes site, we propose an adaptation strategy based on five main axes:

1. **Integrate climate change into the objectives document**
2. **Integrate climate change into the Natura 2000 tools**
3. **Make adaptation an issue shared with the territory via Natura 2000 coordination**
4. **Contribute to reinforcing the network of protected areas**
5. **Contribute to the evolution of the European directives**

These axes question the Natura 2000 system at both the local and European levels.

As consultation is at the heart of the Natura 2000 system, this adaptation plan is an intermediary document that marks the first step in integrating the issues related to climate change. To help local stakeholders to achieve this, a range of measures linked to the specificities of the site has been proposed. These proposals are divided into 5 main items (Governance - Regulating water flows and ensuring water quality - Specifying the potential evolutionary paths of the ecosystems - Supporting practices - Informing and raising awareness) as well as a habitat (the subhalophilous meadows) and two heritage species of the site (the Bittern and the Thorelle). These proposals are to be refined and completed by others in anticipation of the next phases of updating or revising the objective documents for the Brière marshes, Donges and Brivet marshes site.

ENTIRE DOCUMENTS AVAILABLE HERE:

Vulnerability assessment (FR)

Adaptation plan (FR)