Abstract

Adaptation to climate change of the Morvan peat bogs Regional Nature Reserve

VULNERABILITY ASSESSMENT AND ADAPTATION PLAN

BACKGROUND

The Morvan peat bogs Regional Nature Reserve (RNR des Tourbières du Morvan), managed by the Morvan Regional Nature Park, is made up of 12 sites ranging from 480 m to 600 m in altitude. It is home to a mosaic of peat, mud, pond and stream habitats hosting around 200 rare or protected species. Four of the twelve sites are grazed by Highland cattle under in-house management or in partnership with the breeders. The reserve in itself covers 266 ha but is depending on a watershed of 9.000 ha for its water supply.

The vulnerability assessment and the adaptation plan are documents aiming to initiate an approach to adaptation to climate change on the reserve. Both were developed as part of the LIFE Natur'Adapt project, coordinated by Reserves Naturelles de France.

METHOD

The vulnerability assessment was based on the analysis of 48 objects: 13 species, 15 habitats, 3 functionalities, 3 large nature habitats, 2 activities, 6 management resources and 4 provided services.

The evolution of pressures was studied at the level of the watersheds feeding the sites. The Covid health crisis did not allow to organize all the participatory workshops planned. These were supposed to foster discussions about global warming and help the stakeholders (farmers, foresters, local council members) to consider choose the best option in order to adapt their activities to climate change. Nevertheless, thanks to a few interviews, possible future developments arose.

Beyond the vulnerability score given to each object, further considerations on sensitivity, adaptability and changes in pressures have led to identify possible actions to be implemented as well as the gaps in knowledge to be fulfilled for the adaptation plan.

SUMMARY OF THE VULNERABILITY ASSESSMENT

The analysis of climate change has shown an increase of the annual temperature by around 2 ° C since 1960 in the Morvan area, a figure slightly higher than in Burgundy (+/- 1.5°C). The rainfalls remained stable but the flow of the rivers has dropped significantly - between 30 % and 50 % in August - due to evapotranspiration.

Evapotranspiration and summer droughts will increase due to climate change. A drop - between 29 % and 69 % for the river low-flows, and between 10 % and 20 % for the water table - is forecasted.

By 2050, peat bogs and wet meadows will no longer be waterlogged for longer and more frequent periods. Despite the possibility of regulating water by opening the sluice gates, the level of the ponds will be harder to maintain, and thus the species of the pond ends could change quickly. The rivers will be impacted by the drop of the water flow, temperature warming and the degradation of water quality: this directly threatens the heritage species typical of the cool streams of the watershed.

Rising temperatures will change the composition of communities. Wet meadows species could change from patrimonial communities to more mesophilic species communities. Low-marshes habitats supplied by runoff or underground water seem to be more vulnerable than those of mires, supplied by rains.

Under drier conditions, woody species and grass could easily develop. Rare species, such as the northern emerald (*Somatochlora arctica*), could disappear. Some areas could evolve into mesophilic grasslands and one can expect the emergence of new habitats not yet known. Flora and fauna could change for more common species. Finally, the resistance to droughts of sphagnum mosses should have to be very closely monitored: they condition the subsistence of peatlands as well as carbon storage.

SUMMARY OF THE ADAPTATION PLAN

The main adaptation strategy of the reserve will be to try to maintain as much as possible the functionality of peatlands, wet meadows and rivers. The management objectives are not called into question for the moment. However, the ambition to "restore" the peatbog functionalities has now become unattainable because of the warming, and the restoration goal will undoubtedly have to be removed of next management plan.

The actions to be undertaken should respond to the issues highlighted during the vulnerability assessment:

1. Maintain the hydraulic operation of the sites: interact with the area of influence of peatlands in order to reduce by 25% the use of drinking water as well as the need of water in agriculture, and develop forestry management that uses less water. The staff of the reserve (2 FTEs[1] only) do not allow the managers to take themselves all the actions to reduce the use of water in the watersheds. It will have to rely on the other stakeholders in place, in particular in the frame of the Cure-Yonne river contract.

2. Foster the resilience of habitats and species by reducing pressures and maintaining the chance to move around sites. The state of the "wetland and peatland" weft is a condition for the resilience of species. Work must be carried out to identify wetlands and small peat bogs in the Morvan massif. This is a prerequisite for actions to restore and open up new natural habitats.

3. Have knowledge of the possible evolution of habitats and species, linked to climate change. All the monitoring and inventories written in the management plan cannot be reoriented, but they should as far as possible be correlated with meteorological data and in the long term with climate change. Partnerships should be developed. The climate projections and the vulnerability analysis of the objects in the reserve will have to be updated when the management plan is renewed.

4. Develop awareness of the general public and stakeholders on the interactions between peatlands and climate change. The communication and animation planned for the territorial anchorage of the reserve will be based on the tools of the LIFE Natur'Adapt project to develop the argumentation on the role of peatlands towards climate: the carbon storage capacity but also the ecosystem services of peatlands as "solutions" to adapt to global warming.

5. Adapt our management resources, in particular by anticipating the shortage of water and forage for herds, and better understanding the agronomic value of the forage of wet meadows.

CONCLUSION

- **The process raised awareness** of the extent of climate change. Water resources could be significantly impacted.
- Questions around vulnerability led the manager and the experts to make projections and to identify **knowledge gaps** to fulfil and integrate into their work.
- The forward-looking narrative does not allow to conclude that a particular species will disappear, but one can expect the appearance of new habitats and the decline of certain species
- If the reserve wants to have influence on the adaptation choices that will be made in the watersheds and thus reduce pressures as much as possible, **it must operate outside its perimeter.**
- **We must show the reserve as a user** who needs water and **communicate on its role** on carbon sequestration and climate regulation.
- **The Natur'Adapt approach has resulted in concrete measures that will have to be refined, but above all it is an increase in the skills of all the stakeholders acting within the reserve. It has been the starting point for integrating climate change into day-to-day management.**

CONSULTATION OF ENTIRE DOCUMENTS

Vulnerability assessment (fr)

Adaptation plan (fr)

[1] FTP: Full-time equivalent