



Peri-urban wetland and braided river

Petite Camargue Alsacienne
National Nature Reserve, Alsace

An interview with **Daphne Schloesser**
by Olivier de Sadeleer, EUROPARC Federation

Mosaic of habitats on the River Rhine

The Petite Camargue Alsacienne National Nature Reserve is an island of nature covering 904 hectares of wetlands. It is located in a highly anthropized environment in the south of the Plain of Alsace in what is known as the Trinational Eurodistrict of Basel. Its main purpose is to protect the mosaic of habitats in an old braided part of the River Rhine.

This braided course of the river is composed of pioneer habitats such as cobble banks and shrubby willow forests. On the less flooded but humid parts, there are meadows, thickets and softwood forests including willow, poplar and ash. In the drier areas, there are hardwood forests containing oak, beech and linden trees. The aquatic environments are made up of slow-moving streams, springs and small ponds of groundwater origin and those fed artificially by water intakes from a canal. There are also numerous wetlands, such as reed beds, wet meadows and a great swamp. Among other things, there are orchids, including the highly endangered *Liparis loeselii*. The reserve also provides wintering grounds for certain birds. The *Petite Camargue Alsacienne* association participates in a programme to repopulate the Rhine system with Atlantic salmon from former imperial fish farms.

In the vicinity of the reserve, the River Rhine flows through a cross-border peri-urban landscape with commuter towns, villages and intensive agriculture (cereals, maize and soya). The vicinity also includes the infrastructure of the Basel-Mulhouse airport and the hydroelectric power stations installed on the river.

In their natural state, habitats should be continually reshaped by floods, but these are contained by dams, and the flow is managed by power utility Électricité de France (EDF).

Daphne Schloesser, who are you?

Hi, I am 25 years old and from Alsace. I have a master's in eco-physiology and ethology from the University of Strasbourg. This mission is my first job. I am very interested in climate change. It was a peripheral subject during my studies, but I think it should be central. On this project, I have been able to work on the link between climate and biodiversity. And I have enjoyed the highly rewarding collaborative dynamic within the LIFE Natur'Adapt team.

When I'm not working on conservation, I enjoy spending time in the wilderness. I like hiking, birdwatching and photography.



Daphné Schloesser, Project Manager,
Petite Camargue Alsacienne NNR



“Climate change will have significant negative effects on the quantity and quality of available water. Water is a vital resource for most species and stakeholders. We expect to see increasing conflicts over its use. It is therefore more important than ever to collaborate upstream to create balanced land management strategies to sustain natural environments and human communities.”

Léa Merckling, Conservator
of the Petite Camargue Alsacienne NNR

U-shaped pond of the Petite Camargue Alsacienne NNR
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Warmer air and water, disturbed hydrological regime

The IPCC's RCP 8.5 scenario sets out the most structuring climatic deviation for the reserve's habitats by 2100. These major trends predict warmer air and water temperatures and a change in the precipitation regime from glacial to snow glacier, thus affecting the seasonality of the River Rhine's flow.

How will the climate change?

Air temperature projections indicate that we will reach about 100 days/year above 25°C compared to 40 days today. We also expect to have fewer frost days and more snow. We are likely to see an increase in the average water temperature of the River Rhine to over 25°C in summer. This is a threshold for juvenile salmon and trout, which will suffer or even die.

With regard to precipitation, the average annual total is expected to increase. This precipitation is expected to be more concentrated in winter and less in summer. Although it is difficult to quantify, it is likely that we will experience more frequent torrential rains, thus increasing the risk of mudslides and flooding.

An important effect on the scale of the catchment area is the modification of the flow of the Rhine due to the expected reduction in the snow stock upstream in the Alps. Today, the flow peaks around the month of June, offering a continuous supply of fresh water in the summer, while it is low in winter. This is called a glacier regime. By 2100, a snow glacier regime could hold sway around Basel. The river would be fed more regularly by winter precipitation in the form of rainfall and less by the share of water from melting alpine glaciers. Peak flow would then be brought forward to April or May. The average summer flow could therefore fall by 40%.

These changes are expected to result in changes in the level of groundwater flowing up to the surface and an increase in plant evapotranspiration. An increase in wind strength in general would exacerbate the effect of droughts, which are expected to be more frequent, longer and more intense.

Will you be monitoring the climate locally?

Yes, we already monitor piezometric levels. Now, we would like to invest in a weather station to monitor weather conditions and water temperatures more accurately.

Climate projections to 2100

(IPCC RCP 8.5 scenario)



Air: 100 days at +25°C

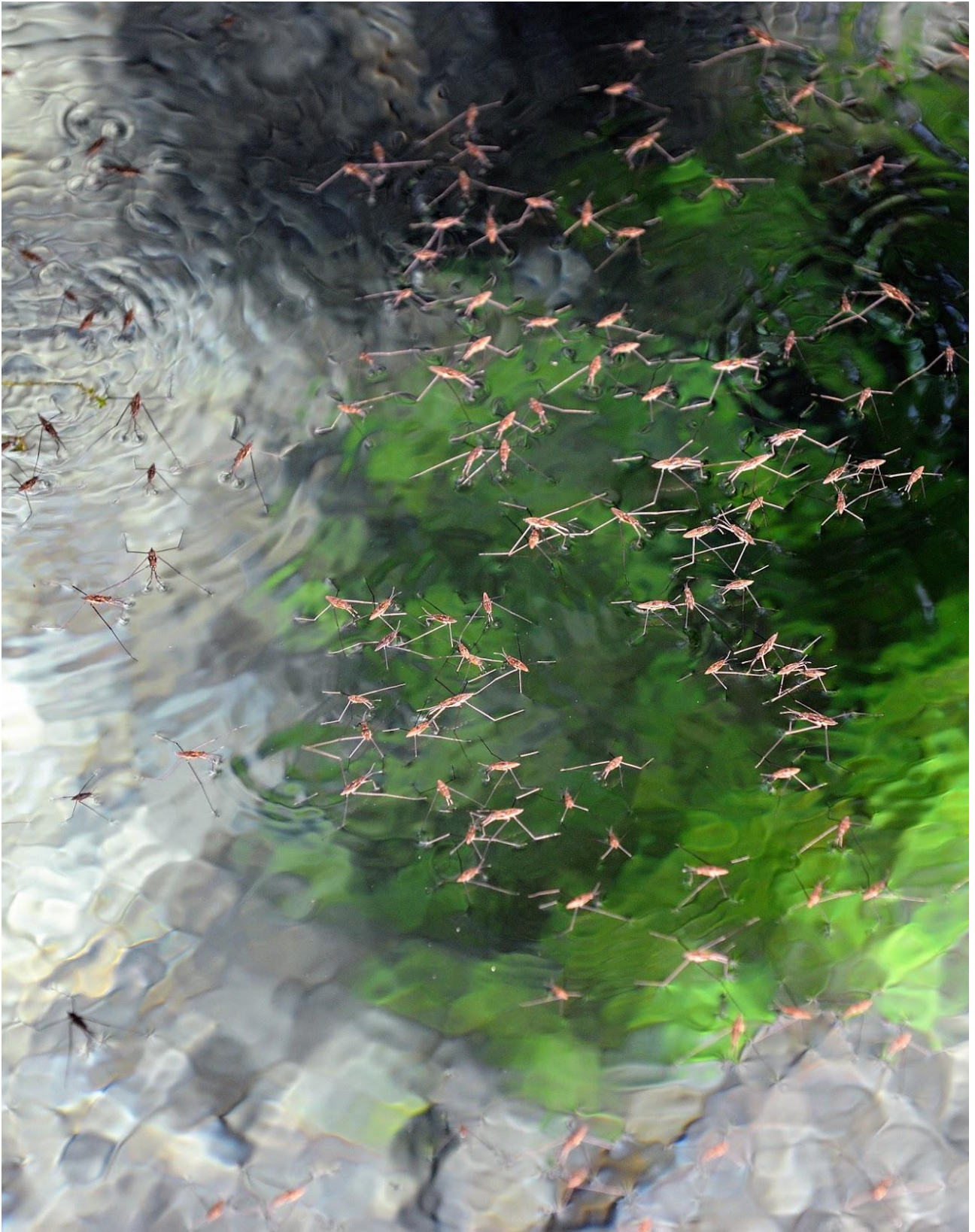
Water: > 25°C.



Disruption and modification of the precipitation regime



- 40% in average summer flow



Vulnerable aquatic habitats and strained relationships

In the future, the vulnerability of natural habitats and human activities is potentially high. It will be linked to summer droughts and their impact on the quantity and quality of water. We expect to see an increase in conflicts related to the use of water resources. Particular biotopes such as dry grasslands could benefit from this development.

Is the *Petite Camargue Alsacienne* reserve vulnerable?

The *Petite Camargue Alsacienne* Reserve is vulnerable. The increase in the number of days of drought and their intensity is likely to greatly reduce the quality of aquatic habitats. For the part located on the Old Rhine*, the low-water period will be longer and the temperature rise will threaten freshwater species. If water levels and flows decrease, we also expect to see greater eutrophication of these environments. As water temperature rises, the amount of oxygen in the water will decrease and the concentration of pollutants and nutrients will increase. There is also a real risk of phreatic biotopes disappearing during the summer. On the other hand, we are "lucky" to have artificial water sources for the main ponds. They are therefore less at risk than the reedbeds, wet meadows and marshes. For these particular habitats, we are likely to see a negative impact on the fauna and flora that are associated with them. They may even disappear in the long term. However, it is difficult to estimate the exact timing of these changes.

Is there only bad news?

No, the change in precipitation patterns could represent opportunities for some habitats or species. In winter, precipitation is likely to be higher and could increase winter water replenishment. This would help to create wet,

aquatic environments at this time of year. It would support early breeding species. Droughts could cause mesophilic grasslands to become dry grasslands, which are very rich in the heritage species that the reserve supports. Unfortunately, exotic species such as the Canada thistle may also benefit from these changes.

What about the vulnerability of the socio-ecosystem around the reserve?

There is a major issue around the quantity of water available for human activities.

Hydroelectric production is likely to be affected, when the need for renewable energy is increasing. On the Alsatian Rhine, there are about ten power stations. Their role is more important than ever following the shutdown of the Fessenheim nuclear power station.

Droughts will probably affect local *agriculture* and the region's large cereal crops. To our knowledge, the Chamber of Agriculture is studying ways to adapt to climate change, but has not yet produced a plan.

Lastly, *river transport* is vulnerable, because low water levels will prevent navigation on the Grand Canal. In summer, projections show that flows will drop by half, which will be problematic for the ports of Basel and Strasbourg.

* The course of the original Rhine is known as the Old Rhine. It looks more natural, but is artificially fed. It serves as a flood channel in case of flooding.

Vulnerability assessment (continued)

We don't have a crystal ball, but there is a risk that political priorities will be given to the economic activities linked to the river, at the expense of the Rhine's natural environment.

Today, the Grand Canal d'Alsace has an average flow that varies between 900 and 1400 m³/s depending on the time of year. Only 50 to 150m³/s are allocated to the Old Rhine, on which the reserve depends.

The part of the reserve located on the Île du Rhin, between the Grand Canal d'Alsace and the Old Rhine is an interesting case. We are actively

working on the restoration of a small river whose flow is managed by EDF, the manager of the hydroelectric plant located downstream. We would need a sufficient and variable flow to restore this functional riparian environment on the island and to restore an alluvial forest of soft wood. The current flow of 7m³/s negotiated with EDF is already at the lower limit. With the coming droughts, it might be even more complicated.



Highland cattle. A management practice that will undoubtedly be impacted by future changes

Anticipate, restore and collaborate to adapt

The adaptation measures we propose, such as the geomorphological restoration of the Old Rhine, are specific to each issue and each habitat. They aim to anticipate and adapt to future conditions. Many of them concern water or require increased collaboration. We also propose some readjustments to current measures.

What are the main adaptation measures?

In order to make the reserve more suitable for future climate conditions, we wish to carry out a **geomorphological restoration and renaturation of the course of the Old Rhine***. Research carried out at the University of Strasbourg has shown that the creation of banks of pebbles and sediment encourages groundwater to rise, providing temperate thermal refuges for fauna in general and salmonids in particular. They are cooler in summer and warmer in winter. As the Rhine is highly artificial, the natural reload of sedimentary material is insufficient. Floods can no longer play a role because of the dams. In concrete terms, the solution we are implementing consists of dumping trucks of sediment (sand, pebbles, etc.) into the Old Rhine. At the same time, we would like to renaturalise and de-rock the banks, but these solutions are less easy to achieve, as there is a risk of erosion, which could threaten the integrity of the dikes on the Grand Canal d'Alsace. In the heart of the reserve, we are going to try to adjust the water supply in accordance with seasonal changes. Practices such as grazing will be adapted by managing, for example, the size of the herds or the type of species.

The other key measure in our plan is to **work closely with local players and to involve them at an earlier stage**. On the island area, it is a question of anticipating. Flow management will be governed by the hydroelectric concession

contract until 2035. We are going to initiate discussions with EDF today to negotiate flows that will enable the restoration of a functional riparian environment on the island in the future. We are also going to work with the agglomeration of Saint-Louis to become part of their climate plan and the "Climate Change and Rurality" strategy. We want to collaborate on the development of ecological corridors and natural green spaces on the edge of the reserve to manage over-frequentation by tourists. Concerning agricultural practices, we also hope that a grass production industry will develop on the territory. This would provide the opportunity to move from cereal crops in and around the reserve to cultivated meadows that are more favourable to biodiversity and consume less water.

Who did you work with on this plan?

I worked a lot with Léa Merckling, the reserve's manager and our scientific council. Laurent Schmitt helped us a lot. He conducts research on the Rhine at the University of Strasbourg. We have involved local players and developed a relationship with the St-Louis agglomeration to work on the integration of climate plans. We have also had initial contacts with EDF.

A little advice for the road?

Working alone on such complex issues is not easy. The experimental aspect of the process and the uncertainties surrounding climate projections and the evolution of the challenges can lead to inaction. I would therefore advise involving colleagues, partners of the reserve, scientific experts and establishing good contacts with local stakeholders to make adaptation to climate change a collaborative process. In our case, we can see that the future of the reserve's ecosystems is closely linked to that of the economic actors who depend on the river's water resources. It will therefore be crucial to plan an integrated management that is beneficial to all stakeholders, including the reserve.

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To go further :

1. [\[English\] Summary - Vulnerability assessment and adaptation plan >>](#)
2. [\[English\] About the Tri-national Eurodistrict of Basel >>](#)
3. [\[French\] Website of the Petite Camargue Alsacienne National Nature Reserve >>](#)
4. [\[French\] Diagnosis of the vulnerability of the Petite Camargue Alsacienne National Nature Reserve. SCHLOESSER D. and MERCKLING L., 2020. LIFE Natur'Adapt - PCA reports. 46p >>](#)
5. [\[French\] Adaptation plan for the Petite Camargue Alsacienne National Nature Reserve. SCHLOESSER D. and MERCKLING L., 2020. LIFE Natur'Adapt - PCA reports. 52p. >>](#)

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