Restoration of natural habitats in the Ardenne liégeoise region

Simplified report
The Ardenne liégeoise LIFE project was the last in a series of six LIFE projects on the high plateaux of the Ardenne in Wallonia since 2003. This regional meta-project to restore the mires was initiated and coordinated by Wallonia (DEMNA and DNF), with essential collaboration from a number of external partners: several nature protection associations, a natural park, a river contract and a private design office. Together, these six projects have enabled the restoration of 6,000 ha of natural habitats with great biological value and the long-term protection of 3,750 ha of new natural sites, most of which have now become nature reserves.

**A Collective Success**

The Ardenne liégeoise LIFE project was initiated and coordinated by the Wallonia region, and more specifically the Département de la Nature et des Forêts (DNF, department of nature and forests) and the Département d’Etude du Milieu Naturel et Agricole (DEMNA, department for studies of natural and agricultural habitats). The project was co-funded by the European Commission and Wallonia, with financial support from the company Spa Monopole.

The principal project partner was the Domaine de Bérinzenne not-for-profit association, which was responsible for implementing the project actions.

The LIFE project also owed its success to the crucial collaboration of a series of external local stakeholders:

- the municipalities of Vielsalm, Stoumont, Malmedy, Liernuex, Trois-Ponts and Jalhay;
- many private landowners, who sold their plots or signed long-term agreements;
- all the contractors who carried out the ecological restoration work;
- all the people who took part in the project’s awareness raising activities or supported it in one way or another.

This symbolic number, **SIX**, will serve as a guiding thread for this simplified report, which sets out the results of the Ardenne liégeoise LIFE project through:

- 6 key questions to outline the general framework of the project;
- 6 challenges to be met, which guided and motivated the organisations involved;
- 6 of the most significant results;
- 6 testimonials from a variety of stakeholders who helped make the project a success;
- 6 plant and animal species already benefiting from the project’s actions;
- 6 restored sites you can discover for yourself on foot.
6 QUESTIONS
1. **Why are there so many fens and other wetland habitats in the Haute-Ardenne region?**

In Ardenne, the climate conditions above 500 metres of altitude are quite distinctive. It is colder and it rains plentifully due to the hills. Annual rainfall frequently exceeds 1300 mm, compared with an average of 600 mm in the rest of Walonia. All this water falls on impermeable, clayey soil over bedrock consisting principally of schist and phyllite, which water can only penetrate with great difficulty. It thus accumulates on the relatively flat plateaux, forming large marshy areas known as fens.

2. **How have these landscapes evolved over time?**

Between the end of the last glacial period (25,000 to 12,000 years ago) and the settlement of the first villages on the high Ardenne plateaux (10th century), the whole region was covered with a huge forest dominated by beech, oak and birch. This primary forest was gradually cleared by humans, who needed wood for heating and to build houses, but also, and more importantly, space for livestock rearing and crops. At the end of the 18th century, the first maps show the Ardenne plateaux as completely clear, consisting of broad heathlands, prairies and marshes, with the forest confined to a few slopes and aristocratic estates of the time. These vast stretches were used for a multitude of agricultural activities: itinerant grazing, slash-and-burn cultivation, haymaking. These practices shaped and maintained the landscapes over several centuries, enabling a rich biodiversity to take hold. Starting in the first half of the 19th century, the agricultural revolution – mechanisation and soil fertilisation – led to large stretches of these open-area habitats being abandoned as they could not be exploited using modern techniques. These plots, left uncultivated, were planted on a large scale with exotic coniferous trees, chiefly spruce, and drained when they became too marshy.

3. **What are the threats to biodiversity on the Ardenne plateaux?**

In this region, as elsewhere, the first and largest threat to biodiversity is the destruction and deterioration of natural habitats due to human activities. The natural habitats have suffered serious damage over nearly two centuries: systematic plantation of conifers, soil drainage and enrichment, simplification of agricultural habitats, rapid urbanisation, deterioration in the quality of watercourses. These changes have led to major biodiversity loss, with the size and quality of attractive habitats shrinking more and more over time. Global effects are also having an impact, such as climate change (warming and a rise in the frequency of droughts) and atmospheric nitrogen deposition, which enriches naturally poor soils, associated with air pollution.

4. **Is it possible to restore lost natural richness?**

It is easy to imagine the difficulties of fighting at local level against the consequences of global climate changes and other planetary environmental impacts, such as air pollution. The negative effects of intensive agriculture, forestry and urbanisation may be mitigated by changes in practices arising from the current increase in awareness of environmental problems. But more radical local actions are needed if we hope to safeguard or extend very rich habitats or habitats that have become very rare. The implementation of ecological restoration techniques in recent decades has shown that appropriate work can improve the condition of damaged habitats and even restore them to their former state. The effectiveness of this work is based on nature’s capacity to repair itself when given the time and space and when certain favourable conditions (soil quality, hydrology, absence of external disturbance) are re-established. The purpose and usefulness of ecological restoration projects such as the Ardenne liégoise LIFE project are predicated on this resilience of biodiversity and natural habitats.

5. **What effects will the ecological restoration of these habitats have?**

The primary aim of the project is to increase local biodiversity by increasing the area and improving the general condition of the natural habitats concerned and by reducing the risk of extinction of threatened species while enabling them to colonise new sites. But an increase in biodiversity, even locally, also improves all the services provided to humans and their activities, now known as ecosystem services. Analyses of the effects of the Ardennes liégoises LIFE project have shown a series of positive consequences. One benefit that can be highlighted is the improvement in landscape quality. In general, the restored habitats – heathlands, prairies, mires, natural forests – are seen as more attractive than the monotonous coniferous plantations they have replaced. Combining this with the new infrastructure for welcoming the public, we can easily see that the project improves the region’s tourism value. But other positive effects have also been demonstrated: improved natural water purification, an increase in the habitats’ ability to store carbon and the long-term mobilisation of local economic stakeholders, such as the farmers who are now responsible for maintaining certain restored habitats.

6. **How will this exceptional natural landscapescape evolve in the future?**

As we have already seen, nature takes over most of the work once the major restoration tasks are completed, spreading out into the newly prepared spaces at its own pace. However, this renewal will be guided and supervised attentively by the stakeholders responsible for managing the sites. As the LIFE project drew to a close, detailed management plans for all the sites were drawn up and approved, covering a minimum of 20 years. These plans define the maintenance work required and the people responsible for implementing it. As part of this management, the project’s partner farmers will take care of the essential role of maintaining the open-area habitats, heathlands and prairies via grazing or mowing, just as farmers used to do. The other habitats – mires and natural forests – will evolve without much intervention except the regular removal of natural spruce growth, which will no doubt occur everywhere. This site management will be monitored closely by staff from the Département de la Nature et des Forêts (public land and nature reserves) or associations and individual landowners (private land and nature reserves).
1. **Uniting the Partners and Stakeholders from Outside the Project**

The scope of the Ardenne liégeoise LIFE project covers 18 Natura 2000 sites totalling 7,544 ha across the High Fens and the Plateau des Tailles. These sites are divided between 16 municipalities. The public forests and nature reserves are managed by nine different cantonments within the Département de la Nature et des Forêts (DNF). About two thirds of the plots targeted by actions within the scope of the project belong to a multitude of private owners, with a third in municipal or public ownership managed by the DNF. In addition, the scope of the project also includes several private nature reserves managed by nature protection associations: Ardenne & Gaume, Natagora, Patrimoine Nature, Cercles des Naturalistes de Belgique.

The initial challenge for the project was to establish positive collaboration between this multitude of local players, informing them of its objectives and the resources available, suggesting concrete actions and, above all, convincing them that these suggestions were well founded and beneficial. The scale of the consultation work with the many private landowners was a distinctive feature of the Ardenne liégeoise project.

2. **Making Efficient Use of a Total Budget of €6,840,000**

The budget available for the project’s implementation was provided by the European Commission (59%), the Walloon region (47.5%) and the company Spa Monopole (2.5%). This money was allocated to personnel costs and the operation of the project team (40%), purchasing plots and compensating owners (30%) and implementing the concrete actions within the project (30%). The use of the budget was monitored by the joint funders, who ensured that it was used efficiently and the objectives were achieved. Effective budget management enabled the project to be extended and several major targets to be exceeded.

3. **Protecting 600 ha of Land with a High Natural Value for the Long Term**

Before the project actions could be put into practice, it was first essential to gain the consent of the landowners concerned. Secondly, to guarantee that the results would be maintained in the future, the restored habitats had to be given legal protection and continue to be managed appropriately after the project came to an end. Two complementary approaches were planned to secure the sites: acquiring plots (200 ha) or signing long-term contracts with the owners (400 ha). Before the end of the project, the newly acquired plots and the public land had to achieve official status as public or private nature reserves or be incorporated into DNF forest management plans for the purpose of nature protection. Private owners who retained their land had to sign a long-term contract (30 years) guaranteeing that the restored sites would be left to nature and managed properly. Compensation was also provided for landowners if spruce plantations were cut prematurely.

4. **Improving the Conservation Status of 14 Habitats of European Interest**

LIFE projects aim to restore natural habitats or species whose conservation has officially been declared a priority at European level. These natural habitats and species – described as being of European interest – are listed in the legal texts governing the implementation of the Natura 2000 network (the European «Birds» and «Habitats» Directives). The Ardenne liégeoise LIFE project specifically targeted the restoration of the following habitats of European interest:

- Bog woodlands, alpine alder forests, slope forests, acidophilous oak woods and beech forests
- Active raised bogs, transitional mires
- Dry and wet heathlands, juniper heathlands
- Natural forests
- Heaths
- Mires

5. **Restoring 650 ha of Natural Environments**

Various types of restoration work were planned for the natural habitats targeted by the project:

- Eliminating planted spruce (250 ha) and natural resinous trees growth (750 ha);
- Hydrological restoration: neutralising ditches (50 km), restoring lithalsas (30), basins where the topsoil layer has been removed (4 ha), peat or clay dams (7 km);
- Restoring heathlands through sod cutting (15 ha) or soil milling/rotovating (20 ha);
- Restoring natural forests by installing fences to protect against large herbivores (20 km);
- Controlling the regeneration of exotic conifers after restoration (325 ha);
- Restoration mowing of degraded prairies and heathlands (75 ha);
- Creating extensive grazing pens (20 km);
- Various communication and awareness raising actions: information panels at the sites, educational materials and activities, training, a museum module, a film, leaflets, newsletters, a website.

All these actions, sometimes taking place in sequence at the same plots, were intended to restore at least 650 ha of natural habitats of great biological interest. All the targets were achieved or exceeded.

6. **Restoring Ecological Continuity Within and Between the Natura 2000 Sites Involved**

The geographical scope of the Ardenne liégeoise LIFE project is strategically located between the High Fens and the Plateau des Tailles. One of its major goals was thus to improve the ecological connections between these two plateaux by undertaking to restore several small favourable sites in the intermediate area. Once restored, these stepping-stone sites can serve as an ecological link between the huge plateau sites and be colonised by species characteristic of these environments. On a more local scale, the project’s interventions also aimed to extend the area of the protected habitats and reduce ecological barriers as far as possible, such as coniferous plantations in the bottom of a valley.
RESULTS
The scope of the Ardenne liégeoise LIFE project’s action covered an area of over 7,500 ha in the Hauto-Ardenne region in south-eastern Belgium (Wallonia). Eighteen Natura 2000 sites across the High Fens and the Plateau des Tailles were the subject of direct interventions between 2012 and 2019. First of all, the project, added 1,250 ha to the 900 ha of nature reserves already in existence in the area. Within these nature reserves, ecological restoration work was carried out on no fewer than 1,450 ha.
1. **Protected natural sites covering nearly 1,250 ha!**

Large-scale canvasing and negotiation with private and public landowners since the beginning of the project resulted in:
- The acquisition of 220 ha of plots to be restored or land of great biological interest;
- The signature of 30-year agreements with the municipalities of Stoumont, Vielsalm, Malmedy, Jalhay, Lienneux and Trois-Ponts covering 260 ha of sites to be restored;
- The signature of 30-year agreements with 30 private landowners covering a total area of 160 ha;
- The abandonment of coniferous timber production and the long-term protection of 150 ha of public land.

The sites involved are now covered by a system of protection that guarantees future capitalisation on the project’s achievements:
- Creation of nine public nature reserves (592 ha, including the Malchamps fans, public land that was already managed and protected as a nature reserve);
- Extension of ten pre-existing public nature reserves (316 ha);
- Creation of a private nature reserve (11 ha);
- Extension of four private nature reserves (20 ha);
- Private plots under long-term management contracts (160 ha);
- Municipal plots subject to forestry law, protected and guaranteed by an amendment to the forest management plans prepared by the DNF (1143 ha).

2. **1,450 ha of natural habitats restored**

The targets of the project’s concrete restoration actions were achieved, and most were exceeded:

<table>
<thead>
<tr>
<th>ACTION</th>
<th>TARGET</th>
<th>FINAL RESULT</th>
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<tbody>
<tr>
<td>Permanent clearance of coniferous plantations</td>
<td>250 ha of coniferous stands eliminated</td>
<td>355 ha + 70 ha in nature reserves</td>
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<tr>
<td>Cutting isolated trees in open-area habitats</td>
<td>750 ha of heathlands reopened</td>
<td>838 ha</td>
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<td>Cutting of spruce regeneration</td>
<td>110 ha of young spruce cut in former clear-cuts</td>
<td>110 ha</td>
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<tr>
<td>Tidying clear-cuts</td>
<td>350 ha of clear-cuts tidied (branches stacked)</td>
<td>280 ha</td>
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<tr>
<td>Blocking drains</td>
<td>50 km of drains to be blocked at regular intervals with plugs of peat or clay</td>
<td>50 km + 51 lithalsas</td>
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<td>Topsoil layer removal</td>
<td>4 ha of basins where the topsoil layer was removed in degraded or exploited peatlands</td>
<td>4.9 ha</td>
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<td>Flooding</td>
<td>7 km of peat or clay dykes erected to flood large areas</td>
<td>8.5 km</td>
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<td>Sed cutting</td>
<td>15 ha of degraded heathlands cuts</td>
<td>19.5 ha</td>
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<td>Soil milling/rotovating</td>
<td>20 ha of degraded heathlands milled and cut</td>
<td>21 ha</td>
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<tr>
<td>Regeneration of deciduous forests</td>
<td>20 km of fences to be installed to protect young growth against herbivores’ teeth + deciduous diversification through planting/seedling</td>
<td>24 km</td>
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<tr>
<td>Mowing</td>
<td>75 ha of abandoned prairies, common bracken (invasive species) and old heathlands</td>
<td>79 ha</td>
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<tr>
<td>Grazing</td>
<td>20 km of new fences enabling cattle, sheep or horses to graze</td>
<td>21 km</td>
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3. **Over 40 private companies were involved in the works**

Almost all the restoration work was entrusted to specialist private companies. Almost all these independent firms were based within or very close to the scope of the project’s action. Over time and through the course of the successive restoration projects, these contractors acquired appropriate equipment and machinery together with solid experience in ecosystem management. This expertise can provide value in the future, both in ensuring the management of the restored sites and in enabling the project’s good practice to be transferred to other sites and other ecological contexts. From this viewpoint, the positive consequences of the project in terms of economics (€1,800,000 invested in restoration work) and of the acquisition and spread of knowledge are thus considerable!

4. **25 site management contracts were signed with farmers**

A large proportion of the restored open-area habitats – heathlands and prairies – will be managed in the future by grazing or mowing. This management was naturally entrusted to local farmers. These agroenvironmental operators are either specialists in natural habitat management or traditional farmers with knowledge of environmental problems who wish to diversify their operation or manage it more extensively. As grazing and mowing of the natural habitats concerned brings in very little profit, they receive significant financial support via agroenvironmental bonuses (+ high nature value grassland). This collaboration for mutual benefit puts the management of semi-natural habitats on a long-term footing, restores a use to land abandoned by farmers for almost a century and increases farmers’ awareness of their role as managers of natural landscapes and habitats.

5. **New management plans were established for 1,900 ha of restored sites**

The project team, working closely with the managers involved (DNF, nature protection associations, private landowners), prepared management plans for the sites. These plans define and locate the operations needed to manage the habitats undergoing ecological restoration for a period of 20 to 30 years. To guarantee that this future management runs smoothly, the planned operations were kept simple and low-cost:
- Regular elimination of natural resinous tree growth;
- Targeted clearing of young deciduous trees;
- Grazing or mowing of open-area habitats;
- Monitoring dykes and fences and repairing them when necessary;
- Maintaining infrastructure for welcoming the public.

6. **221 awareness-raising activities reached a broad audience**

With its long experience and relevant skills, the Domaine de Bérinzenne association developed a wealth of communication initiatives throughout the project in order to circulate information about the project and its achievements widely. As well as the usual leaflets, newsletters, information panels, nature guiding and training courses, specific tools were also developed to inform as broad an audience as possible. Working closely with the Centre Régional d’Initiation à l’Environnement (CRIE) in Spa, an educational pack for school pupils was prepared, tested and distributed. A module dedicated to the project was also installed in the Musée de la Forêt et des Eaux. Finally, a film describing the results of the Walloon meta-project to restore the high plateaux – i.e. all six dedicated LIFE projects, including Ardenne liégeoise – was also produced and circulated widely. In all, over 8,000 people were reached directly by this set of awareness-raising activities, not including the readers of the many articles and publications.

Given the areas and the number of sites involved, this is still a considerable task! All the management plans are collected together in an After LIFE plan, which can be downloaded or reviewed on the project website: [www.lifeardenneliegeoise.be](http://www.lifeardenneliegeoise.be).
TESTIMONIALS
What did you expect from the LIFE project? Were these expectations fulfilled?

« When the LIFE project was announced, we knew there would be a positive impact on the protected spaces in our forest districts. Personally, I expected that the LIFE project would launch restoration work that would not otherwise have taken place. We also hoped that these protected spaces could grow via the purchase of new plots in Natura 2000 sites. Finally, after the restoration, long-term management had to be considered and launched before the end of the LIFE project where necessary. »

What impact did the LIFE project have on your professional or personal projects?

« The actions taken by the LIFE project have definitely had a great advantage we didn’t initially expect, which is the momentum created at the sites. No doubt foresters see their public nature reserves and Natura 2000 sites from a different perspective. As a result of all these actions, foresters take more interest in these protected areas, which are too often left aside due to lack of knowledge or fear of getting it wrong. The discussions, site visits and meetings with contractors have a positive impact for everyone. It all enables foresters to plan the future management of the sites and, why not, undertake further restoration work where it is needed. Thanks to the management plan created at the end of the project, we have a simple management schedule to follow for each plot. »

Did the LIFE project change your perception of biodiversity issues?

« For my part, I have always been interested in biodiversity and its conservation, but the LIFE project has enabled me to learn techniques for restoring priority natural habitats. »

How do you see the future evolution of the sites restored by the LIFE project?

« That’s the big question troubling DNF staff: what will happen to the restored sites? In the Thier des Carrières public nature reserve in my forest district, installing fences and letting sheep graze should make management much easier. I think management is in progress at most sites, so we ‘just’ have to keep going. But one thing is vital for me: in general, the DNF needs to devote enough manpower and financial resources to make sure management of the restored sites continues in the long term. The conservation of our biodiversity and the public’s attention and acceptance at the protected sites depend on it. Restoration work must remain the exception rather than a management method: Ordinary management absolutely must remain the priority. »

Do you have anything else to add?

« We should pay tribute to the huge job done by the Ardennes liégeoises LIFE team in a fairly short period. At the Thier des Carrières public nature reserve, introducing grazing under difficult conditions and, above all, the unforeseen acquisitions are actions that would probably not have taken place, or at least not in the near future, without the LIFE project. »
What did you expect from the LIFE project? Were these expectations fulfilled?
« As a farmer, I have taken care of managing part of the Prés de la Lienne public nature reserve for a number of years. I expected the LIFE project to carry out a series of restoration jobs I had wanted to see for some time, including cutting the conifers. This work was indeed done. »

What impact did the LIFE project have on your professional or personal projects?
« Overall, the impact has been positive. Several tasks I suggested have been carried out – restoring fences, restoration mowing, digging new ponds. »

Did the LIFE project change your perception of biodiversity issues?
« My perception hasn’t really changed. I’m 69, and I’ve been a self-taught naturalist almost all that time! Like many people, I think our planet is in pretty poor shape and we have to make major changes to our lifestyles urgently… »

How do you see the future evolution of the sites restored by the LIFE project?
« Above all, I hope the project actions will be sustained in the coming years, that some tasks will continue and that financial and human resources will still be available to ensure the future management of the sites. »

Do you have anything else to add?
« Faced with the general degradation of our environment, I think it is very important for consumers to change their individual behaviour. If they do so, this will force changes in agricultural production methods, even if they are not imposed by legislation or politics. Young people in particular need to be made aware of this individual lever for change. »

What did you expect from the LIFE project? Were these expectations fulfilled?
« As the new conservationist of four nature reserves for the association Ardennen & Gaume, I had no particular expectations of the LIFE project, except the aspiration to collaborate actively with the project at these sites. The actions that have taken place here – new acquisitions and restoration work – are very positive, even if some of the results are slightly different from what I expected. »

What impact did the LIFE project have on your professional or personal projects?
« This rich collaboration has improved my technical knowledge about restoring and managing natural habitats, introduced me to some interesting people and enabled me to do good work on the ground. The project was a real benefit and a valuable support in my role as a conservationist. The work would not have been possible with just my association’s resources. The LIFE project has also made people around here more aware of local issues in nature protection. »

How do you see the future evolution of the sites restored by the LIFE project?
« My biggest worry relates to the impact of climate change on the natural habitats of the Haute-Ardenn region, changes we probably can’t do much about at local level. On the other hand, the management that will be continued or put in place in the reserves I manage is fairly simple and perfectly achievable with the time and resources at my disposal, and with the support of the professional team from Ardenne & Gaume. »

Do you have anything else to add?
« Faced with environmental problems, informing and educating the public seem more essential than ever to me! We are currently seeing an increase in public awareness, but most people feel powerless or wonder what they can do. This makes it very important to provide avenues or tools for concrete individual action at local level. »
What did you expect from the LIFE project? Were these expectations fulfilled?

« I own about four hectares of land at Les 4 Vents in Vielsalm, with two hectares as a private nature reserve and two hectares of spruce plantation, removed at the beginning of the LIFE project. With my friends from La Trientale (CNB), we had an opportunity to take part in the « Réseau écologique en Wallonie » in the 1990s with the aim of creating a « green » network between Wallonia’s big nature reserves. Our dream was to be able to offer the Les 4 Vents site as an element of this ecological network. The project unfortunately remained on hold due to a lack of resources… So we hoped the LIFE project would finally make it a reality. »

What impact did the LIFE project have on your professional or personal projects?

« Sometimes dreams come true! We were contacted by the LIFE team for various projects at various places, and the variety of species we see is amazing: a family of barn owls, wildcats, pine martens… »

Did the LIFE project change your perception of biodiversity issues?

« Not really! Our motivation remains the same, but we are happy to see the culmination of this great project. We often quote the words of Hubert Reeves, astrophysicist and naturalist: ‘Nature has given me so much joy that it is my duty to defend it’ »

How do you see the future evolution of the sites restored by the LIFE project?

« The project will not have saved the world on its own, but it makes a contribution. People are feeling more and more involved, but nothing is guaranteed. Think of the little hummingbird that tried to put out a forest fire by shuttling between the river and the fire with two drops of water in its beak. Animals that were safe from the fire laughed at him. ‘You know, you’re not going to put out the blaze with your two drops of water!’ The hummingbird answered, ‘I know, but at least I will have done my bit!’ »

Do you have anything else to add?

« As a vet, the project inspired me to maintain the restored area with sheep or cattle. I hadn’t thought of it before. But it’s still a dream, in my view, because I don’t think I have the resources (time or strength) to launch into an adventure like that at my age! In personal terms, what could be more gratifying, for example, than to see a flock of common cranes taking a break on my land during their autumn migration? Which they couldn’t do before the restoration of the wetlands. In general, we can see nature taking back control from month to month since the work, which is extremely encouraging. »
1. **Sphagnum mosses**

Omnipresent in mires and similar environments, sphagnum mosses are familiar to most walkers who appreciate our fens. Everything in a sphagnum moss is optimised to capture and store water: the arrangement in tight mats, the leaves and the cells. Sphagnum mosses can absorb about 20 times as much water as their own volume! This role as a sponge is fundamental to the development and maintenance of mires, which need to remain constantly saturated with water. Mires are also characterised by the presence and sometimes accumulation of peat, in which sphagnum mosses play a leading role. Peat consists mostly of dead sphagnum moss fragments, which build up without decomposing in the cold, acidic water beneath the living top layer. This very distinctive environment prevents the action of decomposing organisms. Bryologists (specialists in mosses) have identified no fewer than 28 different species of sphagnum mosses in Wallonia! Some are common while others are very rare, but all have very specific ecological preferences. There are aquatic sphagnum mosses, some that can withstand periods of drought, pioneer sphagnum mosses and others than can only take hold when the mire is already well established. This diversity is reflected in a rich palette of different sizes, shapes and colours. The widespread development of sphagnum mosses in the ponds created by the LIFE project is a very good sign for the future restoration of the mires.

2. **Bladderwort**

When we mention carnivorous plants that live in mires, everyone immediately thinks of sundews (or drosera), whose leaves have a crown of sticky hairs to trap small insects. Much more discreet and mysterious, bladderworts are only noticed when they deploy their pretty yellow flowers, which seem to float on the surface of the water. Because bladderworts are aquatic, and grow in pools of cold, acidic water offering very few nutrients and in mires and marshes. Beneath the water, the plant’s leaves have tiny hollow bladders with traps no larger than a millimetre. These traps function like minuscule vacuum cleaners. When a small aquatic creature approaches – a water flea or rotifer – it touches sensitive hairs near the opening of the bladder. The trap opens suddenly, and the insect is sucked inside. The plant then slowly digests its prey, drawing out the nutrients it needs to grow, which are absent from the poor water of the mire. There are several species of bladderworts in Wallonia, but they have all become very rare. Bladderwort has recently been found in a pool of water cleaned as part of the LIFE project.
4. **The Cranberry Fritillary**

Fritillaries are pretty butterflies that have orange wings dotted with black (or black dotted with orange, depending on how you look at them…). There are about ten species in our region, each associated with one or more plants on which their caterpillars feed, often exclusively. As their name suggests, Cranberry fritillary caterpillars eat the leaves of this small plant that spreads across the mounds of sphagnum mosses found in mires. When the weather is cold or rainy, which is often the case on the Ardenne plateaux, the caterpillars seek refuge inside the mounds of sphagnum moss, which are as essential to their development as the cranberry they eat. As young seedlings struggle in competition with other plants, finally, brace yourself – the seed must freeze in two consecutive winters, or its germination will not be activated… This release through frost, known as vernalisation, ensures the seed will only germinate in spring, when the climatic conditions are most favourable for its development and future survival. To help the common juniper to spread again across the Ardenne plateaux, the LIFE project planted thousands of young shrubs (produced with cuttings from local individuals) in heathlands restored by sod cutting, often close to areas managed with extensive grazing.

5. **The Large White-Faced Darter**

Absent from Wallonia for decades, this small dragonfly reappeared in large numbers in 2012, probably due to a massive influx of individuals from Central Europe. On their route, these whiteface dragonflies encountered the many ponds created by the Tournaiers (mires) LIFE projects. They clearly found them to their taste, because the species is now established in the Plateau de Saint-Hubert, the Plateau des Tailles and the High Fens. The species has also been observed in about ten sites restored by the Ardenne liégeoise LIFE project. The name of this dragonfly reflects the off-white colour of the front of its head (from the Greek leukos = white and rhinios = nose). They generally remain in the larval stage for two years before metamorphosing. The larvae appreciate the acid waters of mires, free of fish, because they are very sensitive to predation. The large white-faced darter seeks out pools rich in underwater riparian aquatic plants. Here adults can be seen flying on sunny days in June. The males patrol and defend their territory. The females, more discreet and constantly harassed by the males, only approach the water to mate or lay their eggs.
6 SITES TO DISCOVER
1. THE MALCHAMPS FEN (SPA)

This huge and beautiful fen can be explored through a number of circuits, revealing the wide range of restoration work that has taken place: cutting conifers, soil milling/rotovating, sod cutting and creating ponds. Malchamps consists of a vast stretch of wet heathlands scattered with small mires and lined with deciduous forests.

**Starting point for the circuits:**
car park at the entrance to the Domaine de Bévinzanne, in the hills above Spa. GPS coordinates: 50.458813 – 5.882531.

**Length:** circuits of 2 to 12 km – 1 to 4 hours.

**Difficulty:** easy to moderate

**Facilities:** reception building, Musée de la Forêt et des Eaux, educational trail, observation tower, information panels, boardwalk.

**Marking:** variable depending on the circuit.
2. Les fagnes de la Vecquée (Stoumont)

A marked path snakes around this vast restored site, where coniferous plantations have given way to grazed heathlands occupied by hardy cattle, ponds and newly-forming mires. The bird life at the site is fascinating whatever the season: great grey shrike and red-backed shrike, Eurasian hobby, woodlark, Eurasian wryneck…

Starting point for the circuits: car park at the entrance to the stone track that crosses the N606 between Stoumont and Haute-Desnié. GPS coordinates: 50.435551 – 5.792639.

Length: circuit of 5.2 km – 2 hours – a shorter variant is available.

Difficulty: easy

Facilities: car park, information panels, picnic area, boardwalk.

Marking: red rectangle
This circuit is a tour of the Prés de la Lienne public nature reserve, consisting of a series of wet meadows, grazed or mown, of great biological interest. The reserve is home to a wide diversity of birds, insects and plants typical of these habitats. LIFE project work at the site has included restoration mowing, cutting conifers and digging ponds.

**Starting point for the circuits**: Entrance to the village of Hierlot. GPS coordinates: 50.310451 – 5.790034.

**Length**: circuit of 4 km – 1 hour 30 minutes.

**Difficulty**: easy

**Facilities**: viewing area, information panels, picnic area

**Marking**: red rectangle
This route takes visitors around the Thier des Carrières public nature reserve, which includes former slate and coticule quarries in the Vallée du Glain. This site of great natural and landscape interest offers magnificent views over the valley and contains a wide diversity of habitats: rocky outcrops, scree, dry heathlands and natural forests. The ramparts of a fortified camp from the Celtic period can also be seen, together with traces of old mining activities. The LIFE project enabled management through grazing to be established in a part of the site, alongside various other ecological restoration tasks such as sod cutting and clearing conifers.

**Starting point for the circuits:** Along the N68 between Salmchâteau and Vielsalm, car park by the nature reserve entrance sign. GPS coor-
dinates: 50.272036 - 5.907394.

**Length:** circuit of 3.2 km – 1 hour 30 minutes.

**Difficulty:** moderate (considerable hill climbing)

**Facilities:** viewing area, information panels

**Marking:** route, on public footpaths, not currently marked.
This circuit combines visits to the wetlands that constitute the sources of the Lienne and the wooded hill of Colanhan, which was once the site of small-scale quarrying for slate and is now a nature reserve managed by the Ardenne & Gaume association. The wetlands house a great variety of butterflies. The former quarries, now being reforested, are a paradise for mosses and lichens. The LIFE project worked actively at both sites: conifer cutting, sod cutting and installing fences for extensive grazing.

Starting point for the circuits: church in Hébronval. GPS coordinates: 50.255693 – 5.813966.

Length: circuit of 7 km – 2 hours 30 minutes – a shorter variant is available.

Difficulty: easy

Facilities: car park, information panels

Marking: route, on public footpaths, not currently marked.
6. **The Binche Fens**

This walk takes in one of the flagship sites in the large Plateau des Tailles nature reserve and provides opportunities to observe a huge variety of natural habitats: mires, lithalsas, dry and wet heathlands, flower meadows, natural forests and streams. A biodiversity hotspot in Wallonia: mammals, birds, butterflies, dragonflies, plants… Work carried out by the LIFE project included cutting conifers, sod cutting, soil milling/rotovating, fencing for grazing, mowing and creating ponds.

**Starting point for the circuits:**
car park off the N89 (at the end of a short stone track that crosses the main road) between the Baraque de Fraiture and the village of Reigné. GPS coordinates: 50.249459 – 5.762258.

**Length:** circuit of 6 km – 2 hours 30 minutes.

**Difficulty:** easy

**Facilities:** car park, picnic area, viewing area, boardwalks, information panels.

**Marking:** blue cross
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