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# Final Report

## *Flow of Funds, Recipients and Impact of Investments in Nature Conservation and Forest Biodiversity. Cantonal Survey*

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### Title page photos

Habitat improvement in the Petite Sarine forest reserve (canton of Fribourg)

to promote rare amphibian species such as the yellow-bellied toad (photos: Canton of Fribourg)

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This publication is also available in French and Italian. The original version is in German. In cases of doubt in relation to terminology, the German version is authoritative.

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## 1 Summary

This report sets out the flow of funds made available by the federal government under the programme agreements in the area of the environment for the years 2016–19 to compensate the cantons' implementation tasks in the areas of nature conservation and forest biodiversity. It identifies the recipients of these funds and illustrates the implementation work with examples of best practice. The data was collected using standardised surveys of cantonal experts in the two fields concerned. As well as ordinary implementation funds, the federal funding also includes money for immediate measures. The Federal Council pledged these funds in May 2016 for the alleviation of the most urgent implementation deficits in the years 2017–20. It made them conditional upon the cantons contributing a similar sum to the financing of the immediate measures.

### *Federal government's financial commitment sends out a message*

The cantons greatly appreciate the federal government's willingness to release extra funds to finance immediate measures for biodiversity, at a time when it is under pressure to make savings. They see the additional financial commitment as a powerful signal in favour of biodiversity and one that sends out a strong message, particularly at the political level. The Federal Council and Parliament are setting clear priorities in an area where the need for action has been demonstrated and which is key to Switzerland's economic prosperity and social well-being. As a result, there is greater support among policymakers in the cantons for cantonal funding of implementation work in the areas of nature conservation and forest biodiversity.

In view of the short time frame between the Federal Council decision in mid-2016 to finance immediate measures and their implementation from 2017 onwards, as well as the general scarcity of resources, the cantons were hard-pressed to carry out the necessary planning work on time. Accordingly, if the immediate measures are to be continued from 2021 onwards, the cantons would like the additional federal funding to be included in the ordinary programme agreements.

### *Regional economic benefits*

Biodiversity measures enhance our natural environment and generate business for local firms, making the region more economically attractive and helping to stem the exodus from rural areas. Federal funds for nature conservation are deployed primarily in the agriculture and construction industries, while the bulk of forest biodiversity funding goes to forest owners. The peripheral regions benefit most, as this is where the majority of the biodiversity measures are implemented. Small communes with valuable natural habitats are often reliant on federal funding to maintain and preserve their protected biotopes. In view of the discussions about savings taking place at federal level, the cantons would therefore like to point out that any cuts in federal funding could adversely affect not only biodiversity but also the regional economies that benefit significantly from these funds.

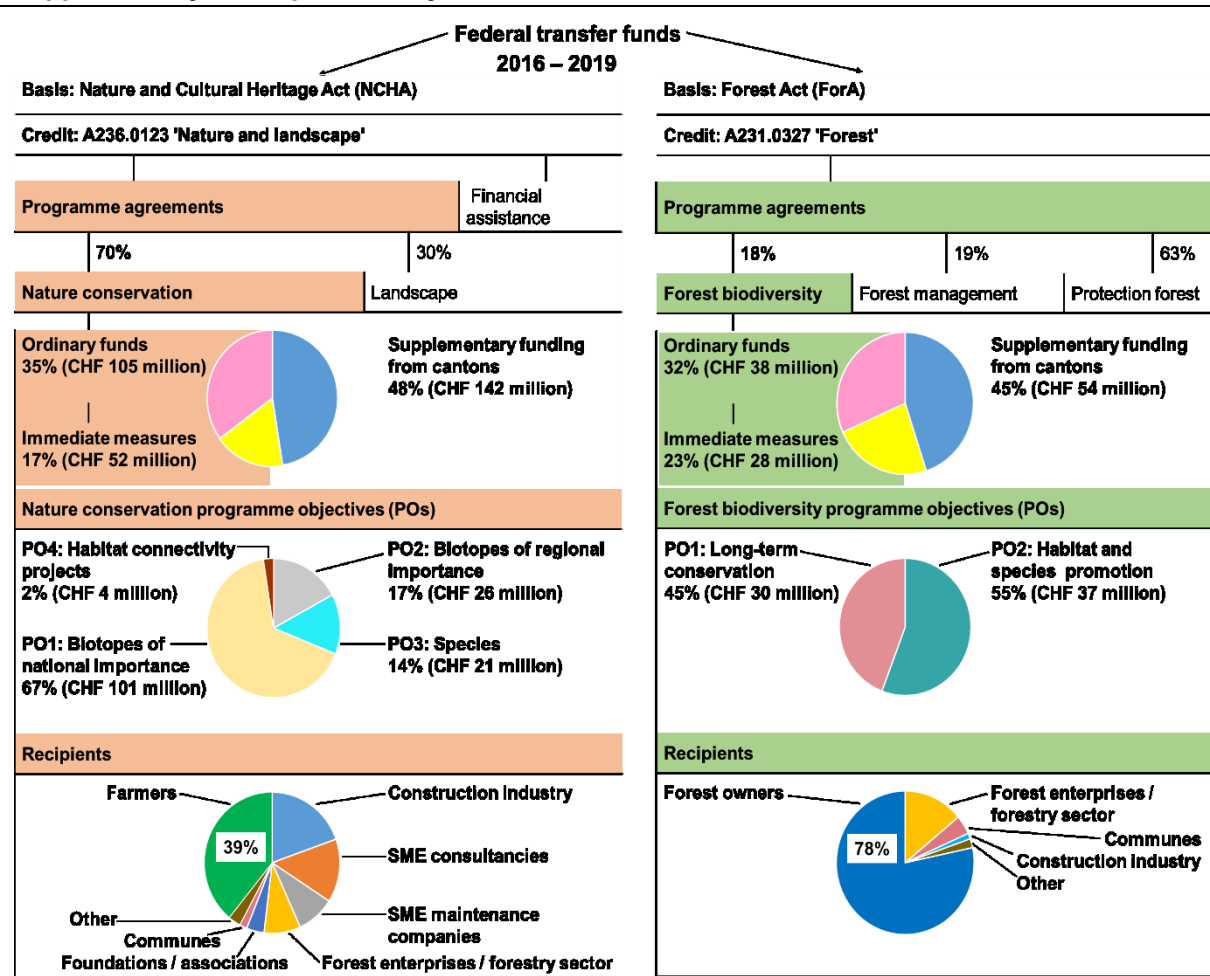
### *Enhanced recreational value for people*

Many cantons have observed that improving habitats also enriches people's experience of nature and enhances the recreational value of the landscape and thus people's quality of life. In addition, people benefit from the improved functioning of ecosystems and the services they provide. Media coverage of habitat improvements can also help to educate and engage local communities on nature-related issues.

### *A thriving natural environment*

The success of biodiversity investments can also be seen directly on the ground. The implementation examples from the cantons clearly show how different species benefit from improved habitat quality in enhanced and newly created biotopes.

**Figure 1. General overview of the flow of federal government transfer funds for environmental programme agreements in 2016–19 (nature conservation and forest biodiversity) as well as supplementary funds provided by the cantons\*.**



\*The analysis of cantonal supplements to federal funds and the use of federal funds in the cantons (programme objectives, recipients) is based in part on estimates by the cantonal authorities. The cantons will only be able to provide definitive information at the end of the programme period.

## 2 Background

The state of biodiversity in Switzerland is unsatisfactory<sup>1</sup>, yet the economy and society depend on its services (ecosystem services). Investing in biodiversity is therefore in everybody's interests. However, to date there has been very little research in Switzerland on the benefits of investing in biodiversity, and the federal government's financial commitment in this area is difficult for many people to understand. Against this backdrop, the Federal Office for the Environment (FOEN) carried out a survey of Swiss cantons between August and late November 2018 with the aim of showing the flow of federal funds used for measures to promote nature conservation and forest biodiversity in the cantons and identifying the beneficiaries of these funds. Implementation examples from the cantons are intended to illustrate the benefits of investing in biodiversity.

### 2.1 Instruments, legal bases and federal funds for promoting biodiversity

The federal government has various instruments at its disposal to subsidise and finance measures and projects that promote biodiversity. These are linked to various credits. The environmental programme agreements are an important instrument in this regard.

The conservation of biodiversity is enshrined in the Federal Constitution (Art. 77–79) as a joint responsibility of the federal government and the cantons, with the federal government having full federal jurisdiction to protect species and habitats (Art. 78 para. 4 Cst.). This is further elaborated in a number of federal acts (Nature and Cultural Heritage Act<sup>2</sup> (NCHA), Forest Act<sup>3</sup> (ForA), Hunting Act<sup>4</sup> (HuntA), Fishing Act<sup>5</sup> (FishA), etc.). The joint tasks in the area of the environment are laid down in programme agreements between the federal government and the cantons and are geared towards the federal government's strategic objectives in the environmental field and the federal funds available for them. The programme objectives for the two areas are shown below (Table 1 and Table 2). The programme objectives set out in the manual for programme agreements in the area of the environment 2016–19<sup>6</sup> form the basis for financing measures in the areas of nature conservation (based on the NCHA) and forest biodiversity (based on the ForA). The federal government has CHF 37 million a year in ordinary transfer funds to compensate the cantons' implementation tasks in the areas of nature conservation (CHF 27 million, 'nature and landscape' transfer credit) and forest biodiversity (CHF 10 million, 'forest' transfer credit).

To strengthen existing instruments and alleviate urgent implementation deficits, the Federal Council decided on 18 May 2016 to finance immediate measures in the areas of nature conservation and forest biodiversity between 2017 and 2020. The purpose of the immediate measures is to remedy the biggest implementation deficits in existing biotopes of national importance (remediation and maintenance measures) and in the area of forest biodiversity (creation and maintenance of forest reserves, promotion of islands of old growth and deadwood and of national priority forest species and habitats). The immediate measures also include laying the foundations for implementation, e.g. communication or awareness-raising measures, and coordinating environmental actors. In addition, the funds are used to implement measures under the invasive alien species strategy.

On condition that the cantons contributed roughly the same amount as the federal government to financing the immediate measures, the Federal Council was willing to increase the ordinary transfer funds for nature conservation and forest biodiversity by a total of CHF 135 million, to be paid in tranches

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<sup>1</sup> Federal Office for the Environment FOEN (ed.) 2017: Biodiversity in Switzerland: Status and Trends. Results of the biodiversity monitoring system in 2016. Federal Office for the Environment, Bern. State of the Environment series No. 1630: 60 pages

<sup>2</sup> Federal Act on the Protection of Nature and Cultural Heritage, NCHA, SR 451.0

<sup>3</sup> Federal Act on Forest, ForA, SR 921.0

<sup>4</sup> Federal Act on the Hunting and Protection of Wild Mammals and Birds, HuntA, SR 922.0

<sup>5</sup> Federal Act on Fish and Fisheries, FishA, SR 923.0

<sup>6</sup> Federal Office for the Environment FOEN (ed.) 2015: Handbuch Programmvereinbarungen im Umweltbereich 2016-2019. Mitteilung des BAFU als Vollzugsbehörde an Gesuchsteller. Bern. State of the Environment series No. 1501: 266 pages

(CHF 20 million in 2017, CHF 35 million in 2018, CHF 40 million in 2019 and CHF 40 million in 2020). Around two thirds of these funds (CHF 91 million) are earmarked for nature conservation and CHF 40 million for forest biodiversity measures, with a small proportion (CHF 4 million) being used to lay the foundations for implementation.

Through its decision to supplement the ordinary funds with funds for the implementation of immediate measures, the Federal Council almost doubled the federal funding for nature conservation and forest biodiversity in the period 2017–20. To this end, the FOEN's budget was increased by CHF 55 million, with CHF 80 million being offset internally. All federal funds are subject to Parliament's annual budgetary decisions.

<b>Table 1. Programme objectives in nature conservation according to the manual for programme agreements in the area of the environment 2016–19<sup>7</sup> with examples of implementation in the cantons</b>
<p><b>PO 1:</b> Protection, maintenance and improvement of biotopes, habitats and mire landscapes of national importance to ensure the functionality of the ecological infrastructure.</p> <p><i>Example of PO 1: Regeneration of the Saumbach meadow in the Neeracher Riet biotope of national importance (canton of Zurich).</i></p>
<p><b>PO 2:</b> Protection, maintenance and improvement of biotopes and habitats of regional or local importance to ensure the functionality of the ecological infrastructure.</p> <p><i>Example of PO 2: Targeted and continuous control of invasive alien species in the regional protected areas (canton of Zurich).</i></p>
<p><b>PO 3:</b> Implementation of action plans for national priority species<sup>8</sup> and control of invasive alien species.</p> <p><i>Example of PO 3: Implementation of reptile support concept through action plans for the natterjack toad, yellow-bellied toad and tree frog (canton of Zug).</i></p>
<p><b>PO 4:</b> Habitat connectivity</p> <p><i>Example of PO 4: Development and monitoring of the implementation of habitat connectivity projects in accordance with the Direct Payments Ordinance (canton of Uri).</i></p>
<p><b>PO 5:</b> Innovations/opportunities</p> <p><i>Example of PO 5: Management of fallow dry meadows and pastures with free-ranging goats in the Gotthard region (cantons of Graubünden and Uri).</i></p>

<sup>7</sup> Federal Office for the Environment FOEN (ed.) 2015: Handbuch Programmvereinbarungen im Umweltbereich 2016-2019. Mitteilung des BAFU als Vollzugsbehörde an Gesuchsteller. Bern. State of the Environment series No. 1501: 266 pages

<sup>8</sup> National priority species are endangered species for whose survival Switzerland is internationally responsible.

**Table 2. Programme objectives in forest biodiversity according to the manual for programme agreements in the area of the environment 2016–19<sup>9</sup> with examples of implementation in the cantons**

**PO 1:** Long-term conservation of forest areas and trees of special natural value

*Example of PO 1: Enhancement and maintenance of forest reserves for the capercaillie (canton of St Gallen).*

**PO 2:** Habitat and species promotion (forest edges, ecological connection elements, improved habitats and wetlands, forms of use).

*Example of PO 2: Creation and maintenance of forest edges (canton of Lucerne).*

## 2.2 Cantonal survey: objectives and methodology

Surveying the cantons on the benefits of investing in biodiversity provides a basis for identifying the economic, social and environmental benefits of the federal government's financial commitment to biodiversity.

The aim of the survey is to:

- demonstrate the flow of funds disbursed by the federal government to co-finance cantons' measures in the areas of nature conservation and forest biodiversity. The survey focuses on the period of the 2016–19 environmental programme agreements, which from 2017 includes funds for financing immediate measures (section 3.1);
- identify any funding provided by cantons, communes or third parties to supplement the federal funds (section 3.1);
- illustrate the allocation of these funds to specific recipients (section 3.3);
- show how these funds are/were used and their economic, social and environmental benefits, based on practical real-life examples (section 5).

The chosen method of data collection was to interview the cantonal experts in nature conservation and forest biodiversity using a standardised questionnaire (Annex 1). The cantonal experts reviewed and approved a summary of the survey. Following a test run with the cantons of Lucerne and Thurgau, the cantonal authorities in Basel-Landschaft, Fribourg, Schwyz, St Gallen, Zurich and Zug were surveyed in August and September 2018. The remaining cantons were interviewed in a second phase from September to mid-November 2018. The full set of survey results are presented in this report.

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<sup>9</sup> Federal Office for the Environment FOEN (ed.) 2015: Handbuch Programmvereinbarungen im Umweltbereich 2016-2019. Mitteilung des BAFU als Vollzugsbehörde an Gesuchsteller. Bern. State of the Environment series No. 1501: 266 pages



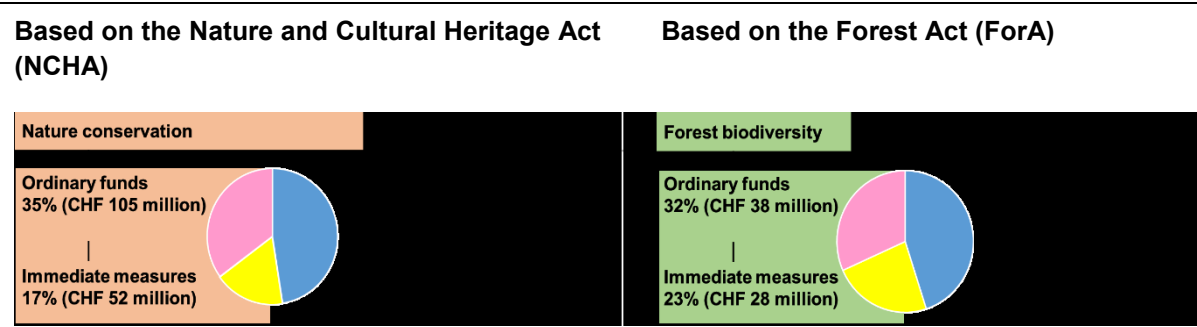
### 3 Key findings of the cantonal survey

#### 3.1 Flow of funds for biodiversity under the programme agreements

##### *Costs covered jointly by federal government and cantons*

In the current environmental programme agreement period 2016–19, the federal government and cantons are investing a combined total of around CHF 420 million to conserve and promote biodiversity in the areas of nature conservation (approx. CHF 300 million, based on the Nature and Cultural Heritage Act (NCHA)) and forest biodiversity (approx. CHF 120 million, based on the Forest Act (ForA)). The federal government and cantons share the costs of biodiversity measures more or less equally (Fig. 2; Annex 2, Table 4).

**Figure 2. Flow of funds for biodiversity in the 2016–19 environmental programme agreement period**



##### *Federal funds for biodiversity send out a positive message*

Despite efforts to achieve savings, the federal government is prepared to increase its commitment to biodiversity. By financing immediate measures in 2017–20, the federal government has been able to increase its funding for nature conservation and forest biodiversity by over 50% in the 2016–19 programme agreement period. The financial commitment to biodiversity at federal level sends out a positive message and releases (additional) cantonal funds for nature conservation and forest biodiversity tasks. According to the cantons, this has been key to enabling them to meet their implementation commitments, particularly as regards resource-intensive measures such as the remediation, enhancement and maintenance of biotopes of national importance.

However, the fact that the federal government did not release the funds for the immediate measures until 2016, i.e. after the completion of the negotiations for the 2016–19 programme agreements, proved a challenge for the cantons. The short time the cantons had to plan immediate measures to be implemented as early as 2017 placed a great additional administrative burden on them. Consequently, if the immediate measures are to be continued from 2021 onwards, the cantons would like the additional federal funding required for these measures to be included in the ordinary programme agreements, rather than pledged at short notice.

##### *Cantons want federal government to finance a bigger share of implementation tasks*

Without questioning the joint responsibility for nature conservation, the cantons would like the federal government to compensate them more for the implementation work they undertake, in particular for measures in whose implementation the federal government has a particular interest, such as the resource-intensive measures in favour of biotopes of national importance or actions to promote national priority species.

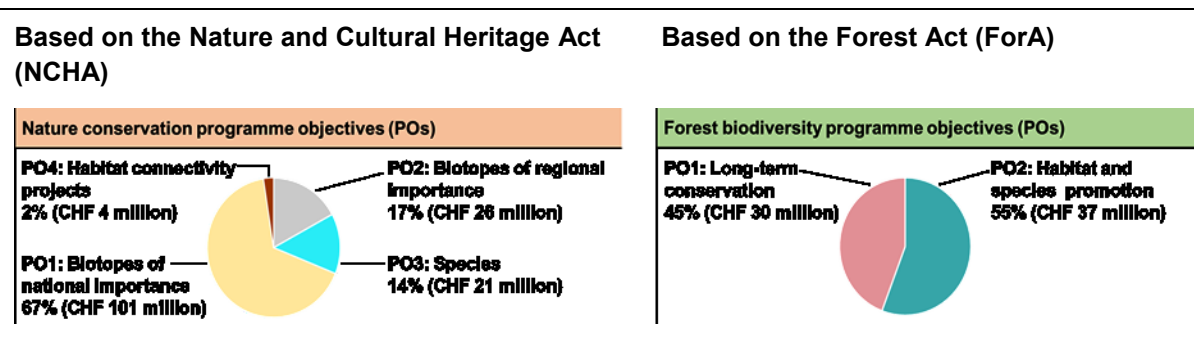
### 3.2 Priorities for the use of federal funds

#### *Federal funds promote biotopes of national importance, forest reserves and forest edges*

In the current programme agreement period 2016–19, the cantons are spending around two thirds of the federal funds for nature conservation on remediating and enhancing biotopes of national importance. The remainder is used for remediating, maintaining and enhancing biotopes of regional or local importance, promoting national priority species and controlling invasive alien species. Habitat connectivity projects are only a peripheral concern for the cantons in the current agreement period (Fig. 3, Annex 2, Table 5).

In terms of forest biodiversity, the cantons are using the federal funds primarily to designate forest reserves, to restore and maintain forest edges and to improve ecologically valuable forest habitats (Fig. 3, Annex 2, Table 5). The immediate measures have enabled the cantons to double the agreed surface area for designation as forest reserves in the 2016–19 programme period. In some cantons, this has allowed large reserves to be planned by the end of 2019.<sup>10</sup>

**Figure 3. Use of federal funds according to programme objectives under the environmental programme agreements 2016–19**



#### *Include performance monitoring in programme agreements*

Many cantons would like to see the programme agreements include not only the actual implementation measures in the field but also evaluations of the implementation and success of these measures, compensated accordingly by the federal government. Until now, such evaluations have been carried out by cantonal employees or external experts, and most have been funded out of cantonal budgets (not under the programme agreements). However, the cantons point out that these evaluations are an integral part of a project and, as such, should also be compensated by the federal government.

<sup>10</sup> The increase in federal funds for forest biodiversity has enabled the Cantons of Graubünden, Uri and Ticino to plan the designation of large reserves by the end of 2019 (e.g. the Lavizzara forest reserve in the canton of Ticino, covering over 1,800 hectares).

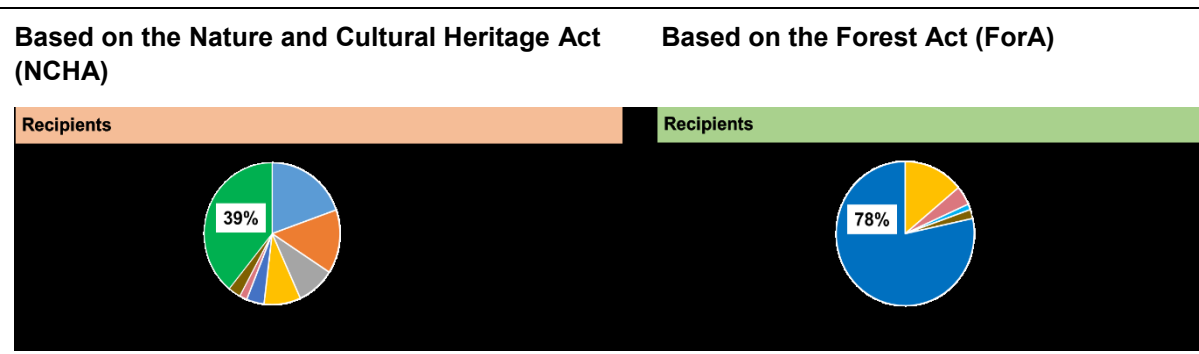
### 3.3 Recipients of federal funds

#### *Agriculture and construction benefit from nature conservation*

The biggest recipient of the federal funds spent by the cantons on implementing nature conservation tasks between 2016 and 2019 is agriculture, accounting for just under 40%. The construction industry receives around 20%. The remainder goes to SME consultancies, forest enterprises and SME maintenance companies (Fig. 4; Annex 2, Table 6).

In the area of forest biodiversity, forest owners receive almost 80% of the federal funds, with 14% going to forest enterprises and 4% to communes. The small remaining share is divided up between the construction industry, SME consultancies, cantonal administrations, other landowners, foundations and associations or farmers.

**Figure 4. Recipients of federal and cantonal funds from the environmental programme agreements 2016–19**



#### *Good planning: the basis for targeted, efficient and effective nature conservation*

The cantons stress that careful planning and support with implementation are critical to the success of a nature conservation project. However, as the cantons often have too few staff to carry out this work, the cantonal authorities need to call in external experts to assist them. Thus, around a quarter of the federal funds for nature conservation flow into the private sector and are used by SME consultancies or maintenance companies. They prepare baseline reports (e.g. detailing current knowledge about a species group), develop plans (e.g. support programmes for specific species, maintenance plans for protected areas), supervise implementation work in the field, plan, support and document improvement work (e.g. pond construction) and monitor/evaluate its implementation and effectiveness. A comparatively small proportion of federal funds (1%) – although far from insignificant from the perspective of nature conservation – is made available to the cantonal administrations to ensure that local nature conservation measures are carried out on a long-term basis. The cantons emphasise that they do not use the federal funds to develop nature conservation plans for biotopes of cantonal and local importance. The costs incurred in these areas are paid entirely out of cantonal funds.

#### *Federal funds for biodiversity promote jobs in peripheral regions*

The cantons point out that one particularly positive effect of investing in the implementation of biodiversity measures is the promotion of jobs in peripheral regions. The cantons believe that implementing these measures improves the employment situation, which is problematic in many peripheral regions, by preserving or creating jobs. In particular, companies in productive sectors such as agriculture, construction and forestry benefit from the investments in biodiversity. For example, nature conservation supported by federal or cantonal funding is an important and secure source of income for many forest enterprises. Thanks to federal funds for biodiversity, small-scale farms in mountainous parts of the peripheral regions are experiencing a significant improvement in economic conditions. Small communes with valuable natural habitats are often reliant on federal funding to maintain and preserve protected biotopes.

### *Enhanced recreational value for people*

Finally, many cantons point out that improving habitats also improves people's quality of life. Improved habitats enhance the recreational value of a landscape and allow people to have a more intense experience of nature. Furthermore, people benefit from the improved functioning of ecosystems and the services they provide. Tailoring communication about biodiversity measures to specific target groups is an excellent opportunity for the cantons to raise public awareness about the value and benefits of biodiversity.

## **3.4 Political framework**

### *Federal Council and Parliament show their commitment to biodiversity*

In recent years, the Federal Council and Parliament have clearly shown that biodiversity is an issue that matters to them and that they are prepared to invest in biodiversity conservation and promotion. In 2016, the Federal Council approved the financing of immediate measures. In 2017, it adopted the Biodiversity Action Plan, entailing measures and pilot projects worth around CHF 10 million a year. Although this funding came under pressure in 2017 and 2018 during budget debates in the National Council,<sup>11 12</sup> the proposed cuts were ultimately rejected.

Their financial decisions in favour of biodiversity show that the Federal Council and Parliament attach great importance to our natural environment. Biodiversity is thus firmly on the political agenda at both federal and cantonal level, and policymakers' awareness and willingness to act set a good example. Federal funding for biodiversity is needed to enable the cantons to carry out their implementation tasks to the required extent. As an example, the cantons cite the area of forest biodiversity: without federal funds for the designation of forest reserves, some cantons might not be in a position to achieve the forest policy target of having forest reserves make up 10% of total Swiss forest area<sup>13</sup> by 2030.

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<sup>11</sup> 17.041. Federal Budget 2018 with integrated task and financial plan for 2019–21.

<sup>12</sup> 18.041. Federal Budget 2019 with integrated task and financial plan for 2020–22.

<sup>13</sup> Federal Office for the Environment FOEN (ed.) 2013: Forest Policy 2020. Visions, objectives and measures for the sustainable management of forests in Switzerland. Federal Office for the Environment, Bern: 66 pages

## 4 Conclusion

A lot needs to be done to conserve and promote biodiversity in Switzerland.<sup>14</sup> The federal government and cantons are therefore redoubling their commitment to biodiversity under the environmental programme agreements 2016–19, and have made 50% more funding available to carry out the necessary work. This directly benefits nature and, as this report impressively illustrates, also pays dividends for the economy and society.

In 2016, the Federal Council pledged funding for immediate measures in favour of nature conservation and forest biodiversity, to be implemented in 2017–20. This clear commitment to biodiversity by the federal government acted as a catalyst for the cantons. They worked extraordinarily hard, finding their own additional funding and developing a range of immediate measures within a few months. However, having to respond at very short notice and after the ordinary programme negotiations were completed placed the cantonal authorities under huge pressure. Consequently, the cantons' call for additional federal funds to be included in the ordinary programme agreements in future will be heeded if the immediate measures are continued from 2021 onwards.

As this report shows, funding for biodiversity does more than promote our natural environment. It also supports a broad range of implementation partners in rural areas, primarily in the agriculture, construction and forestry sectors but also consultancies and maintenance companies.

Last but not least, the cantons emphasise the social dimension of implementing biodiversity measures. The implementation examples presented in this report clearly show that improving habitats significantly enhances the attractiveness of a landscape while also helping people to experience the beneficial effects that proximity to nature affords.

Based on the survey results, the FOEN will compile an in-depth analysis of the economic and social benefits of biodiversity promotion.

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<sup>14</sup> FOEN (ed.) 2017: Biodiversity in Switzerland: Status and Trends. Results of the biodiversity monitoring system in 2016. Federal Office for the Environment, Bern. State of the Environment series No. 1630: 60 pages

## 5 Implementation examples from the cantons

### *Nature is grateful*

Implementing biodiversity measures helps nature and generates business in the agriculture, construction and forestry sectors. The following examples illustrate the implementation work undertaken by the cantons in the areas of nature conservation and forest biodiversity. The decision to supplement the ordinary funds with immediate measures means that the cantons are able to implement additional projects. The success of these investments in biodiversity can be seen directly on the ground, with plant and animal species benefiting from the improved habitat quality in enhanced and newly created biotopes. Chief among them are national priority species such as the grass snake and the lady's-slipper orchid (*Cypripedium calceolus*).

### *Valuable forms of use and attractive landscapes*

Measures to promote biodiversity also create a better quality of life for people. Work to improve habitats often enhances the cultural landscape too. Forms of use that have historical and cultural value, such as dry meadows and pastures, chestnut groves in the canton of Ticino or wooded pastures in the canton of Jura, enrich the landscape and make it attractive to local people (providing opportunities to experience nature or for recreation); they contribute to people's quality of life and help create a sense of identity. The public also benefits from the services provided by functioning ecosystems (e.g. better water quality, pollination, CO<sub>2</sub> storage in mires). The direct marketing of enhanced landscapes and their produce promotes tourism and commerce, especially in the peripheral regions. In addition, the beauty and ecological value of enhanced landscapes can be used for targeted public relations work to raise public awareness of nature-related issues.

### 5.1 Canton of Aargau: Musital special reserves

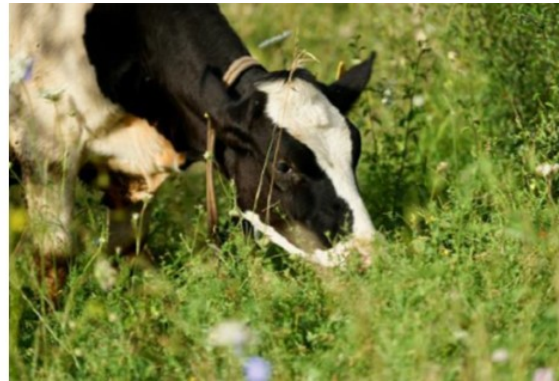
Long a limestone quarrying and marl mining area, the Musital is now one of the largest nature conservation areas of cantonal importance. The 15-hectare site is home to a diverse landscape of woodland, rough pasture, rock faces, marl slopes, limestone ledges and standing water bodies of varying sizes. It has been colonised by rare butterflies and wild bee species, grass snakes, dragonflies and various rare plants as well as endangered amphibian species such as the midwife toad and the yellow-bellied toad. The Musital has been an amphibian spawning site of national importance since 2007.

To conserve the range of biodiversity and the light-filled habitats, regular and strategic maintenance is required. Every year, the trees and bushes are cut back, the lightly wooded areas are grazed and problem plants are controlled. Preserving this unique mosaic of habitats in the Musital therefore requires extensive work by a forest enterprise as well as maintenance work by farmers in the open countryside, on an annual basis. This costly and time-consuming activity, which is financed by the canton (CHF 79,695) and the federal government (CHF 46,805), is the only way to conserve this unique landscape with its variety of habitats for a multitude of wildlife.

**The Musital nature conservation area is home to a variety of habitats, flora and fauna.  
(Photos: Forest Department, Canton of Aargau)**



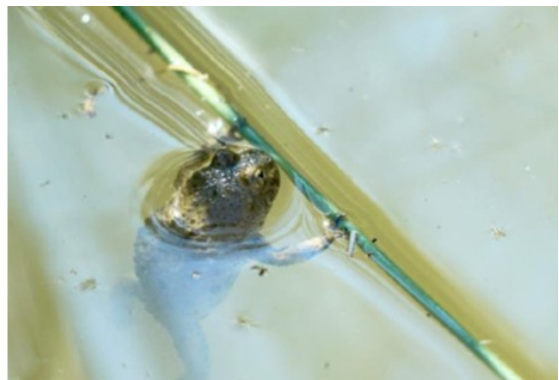
Blue butterfly on bird's-foot trefoil



Sustainable agricultural use



Former mining terraces



Yellow-bellied toad

## 5.2 Canton of Appenzell Innerrhoden: Repairing a dry stone wall

According to the Federal Inventory of Landscapes and Natural Monuments of National Importance (ILNM), the formative natural and cultural/historical landscape structures and elements of the Säntis region merit preservation. Among these formative landscape elements are dry stone walls. Parts of a 100-year-old dry stone wall at the Schäfler restaurant in the Säntis region collapsed in August 2016 following heavy rain and had to be repaired. The work has enabled plant and animal species that depend on such structures to be promoted at the site and conserved for the long term.

The initial plan was to rebuild the wall using modern construction equipment, but in the end it was rebuilt as a traditional, large dry stone wall measuring approximately 90 m<sup>2</sup>. The repair work was carried out by Stiftung Umwelteinsatz Schweiz (SUS) using only stones from the surrounding area. The work cost CHF 115,000 and was funded by the Federal Office for the Environment, the Swiss Landscape Fund (FLS) and the Canton of Appenzell Innerrhoden, among others.

### Repairing a dry stone wall in the Säntis region.

(Photos: repair work - Primin Reichmutz, newly repaired wall - Bruno Inauen)





### 5.3 Canton of Appenzell Ausserrhoden: Schwägalp mire landscape of national importance

The Schwägalp mire landscape lies at the foot of the Säntis mountain range and extends across the cantons of Appenzell Innerrhoden, Appenzell Ausserrhoden and St Gallen. The landscape is extremely varied, with a high proportion of mire (12% of the area consists of raised bogs and fens). The Schwägalp also provides habitat for the capercaillie, a species that is highly endangered in Switzerland. Owing to its diversity, the Schwägalp is considered a mire landscape of outstanding beauty and of national importance.

The Canton of Appenzell Ausserrhoden has carried out a number of projects in this region to protect and enhance the Schwägalp. On the one hand, a range of measures have been taken to enhance the Choldwald and Chräzerenpass raised bogs of national importance, such as forest thinning. The work was carried out by local forest enterprises and cost a total of around CHF 150,000, paid for by the federal government (65%) and the canton (35%). Forestry work was also undertaken in the Bruggeren special forest reserve to help the capercaillie and black grouse.

To ensure that game are left in peace during the winter months, the canton has designated a 'southern Appenzell hinterland' quiet zone. This region is very popular with tourists, so information panels and signs are an effective way of guiding visitors' movements. The project cost CHF 70,000, paid for by the federal government (65%) and canton (35%).

Thanks to the federal contributions for forestry measures and ecological enhancements, it has been possible to generate business for local forest enterprises and other companies; the (mostly private) forest owners can sell their wood profitably and the timber is processed in the local area.

#### Habitat improvement measures in the Schwägalp mire landscape. (Photos: habitat - Naturerlebnispark Säntis, improvement measures - Canton of Appenzell Ausserrhoden)



Schwägalp mire landscape habitat



Forestry work on the Choldwald raised bog



Volunteers enhancing the Bruggeren special forest reserve

#### 5.4 Canton of Bern: Sponsoring neophyte-free areas

Non-native plants (neophytes) can spread uncontrollably and impair natural diversity. That is why the City of Bern's Nature and Ecology Unit (part of Stadtgrün Bern) is working hard to curb the spread of these invasive neophytes, which include Japanese knotweed, Canada goldenrod, buddleia, annual fleabane and Himalayan blackberry.

Since 2017, Stadtgrün Bern has been running a volunteer coordination unit for combating invasive neophytes. The unit recruits and coordinates volunteers to help with the city's neophyte strategy. It has become apparent that the most effective and efficient way to deploy volunteers is to have them 'sponsor' neophyte-free areas. Volunteers take responsibility for a defined area, whether big or small, and monitor that area regularly on a voluntary and unpaid basis. If they find any invasive neophytes, they remove them in the correct way. The coordination unit gives the volunteers an introductory briefing, records the areas being monitored and organises training and thank-you events. The project is evaluated annually and the methods expanded where successful. It is running from early 2017 to late 2019 and is financed by federal funds. The target is for around 100 hectares to be sponsored by the end of 2019.

#### Volunteers taking part in the 'Sponsoring neophyte-free areas' project. (Photos: Stadtgrün Bern)



Invasive neophytes (Himalayan blackberry)



A class of schoolchildren removes annual fleabane

## 5.5 Canton of Basel-Landschaft: Habitat improvement measures for rare snails, Bubendorf

The dry meadows of the Landschachen-Huppergruben cantonal nature conservation area in the commune of Bubendorf are an important habitat for the endangered *Granaria frumentum* snail and the potentially endangered heath snail (*Helicella itala*). These snails are now only found at a handful of locations in the canton of Basel-Landschaft.

In 2018, a number of measures were carried out at the oolite limestone quarry to improve the habitat of these molluscs. The quarry was cleared of scrub and organic matter was removed. At the same time, shading and leaf fall into the quarry were reduced and the adjacent forest edge was thinned to connect the quarry with the neighbouring dry meadow. The work has not only benefited the endangered snail species but also many other rare species including orchids and butterflies.

The project cost around CHF 30,000, half of which was paid using the funding for immediate measures. The work was carried out by the Bubendorf Forest District, a civil engineering firm and local farmers.

### Construction work to improve the habitat for rare snail species in the commune of Bubendorf. (Photos: Canton of Basel-Landschaft)



## 5.6 Canton of Basel-Landschaft: Remediation of the Läubern ponds, Allschwil

During remediation work, the amphibian ponds in the Läubern area of Allschwil were fitted with new waterproof liner and an outflow control system, for ease of maintenance. In addition, special hiding places were created or enhanced for the natterjack toad, a highly endangered species in Switzerland. The project cost around CHF 55,000, of which CHF 34,000 was paid for with federal funds (immediate measures). More specifically, the money went to a civil engineering firm for soil excavation and small-scale structural work, a farmer for sowing the area around the ponds, a company for providing materials and a consultancy for overseeing the amphibian habitat work.

### Construction work to enhance the Läubern amphibian ponds. (Photos: Canton of Basel-Landschaft)



## 5.7 Canton of Basel-Stadt: Measures to help redstarts

In late 2011, the Canton of Basel-Stadt finalised its Redstart Action Plan, including a timetable of measures designed to support the bird. In 2017 and 2018, the measures focused on enhancing allotment areas. In all, the canton's conservation department has upgraded 10 allotments as 'stepping stone' biotopes and habitats for the redstart.

In the Bettingerweg allotments, as well as creating extensive meadow areas and patches of waste ground, they planted fruit trees and built or installed dry stone walls, ponds, piles of branches, rubbish heaps, bird nesting boxes, bat boxes, bee hotels and 'reptile castles'. To date, the project has cost just over CHF 65,000 (CHF 15,000 for developing the action plans; CHF 46,000 for redesigning the plots (horticultural/landscaping contractors); CHF 2,800 for environmental consultancy fees; CHF 1,600 for building nest boxes (social/educational support facility for young people)). The federal government is covering 50% of the costs via the programme agreements. Redstart numbers in the canton are monitored every year. Measures to promote them will continue in the coming years and will be extended to agricultural areas. The redstart project has featured on SRF's current affairs show *Schweiz aktuell*.<sup>15</sup>

### Redstart-friendly allotment on Bettingerweg. (Photos: Y. Reisner, Stadtgärtnerei Basel)



Male redstart



Female redstart



<sup>15</sup> Schweizer Radio und Fernsehen (SRF). *Schweiz aktuell*. Editions of October 1-5, 2018. <https://www.srf.ch/sendungen/schweiz-aktuell/wildes-basel>

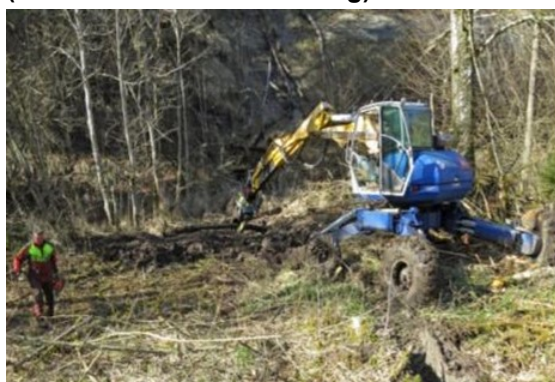
## 5.8 Canton of Fribourg: Petite Sarine forest reserve

The Petite Sarine forest reserve along the River Sarine has exceptional ecological value due to its rare forest communities.<sup>16</sup> As a result of extensive forestry exploitation within the reserve, many plant populations are near-natural and rampant. The reserve is also rich in fauna, including 10 endangered amphibian species and over 70 species of breeding birds, some rare and endangered, among them five types of woodpecker.

The reserve was designated in 2015. Tourism, agricultural and silvicultural measures (such as timber use) as well as measures to promote biodiversity are planned and carried out in accordance with the Petite Sarine Management Plan, which is implemented jointly by various cantonal offices, the relevant communes and landowners. Implementation costs to date stand at CHF 1.7 million, paid for by the federal government, the Canton of Fribourg and the communes.

In 2017 and 2018, the federal funding for immediate measures enabled the following nature conservation and forest biodiversity work to be undertaken: enhancement of forest edges, creation of wetland and measures to support various amphibian and reptile species. The work was carried out by local forestry companies and amphibian and reptile specialists. The measures are proving effective. For example, the wetland areas were colonised by seven rare amphibian species in the first year after the immediate measures were implemented.

### Habitat improvement in the Petite Sarine forest reserve (canton of Fribourg). (Photos: Canton of Fribourg)



Construction of wetlands



Wetland habitat for amphibians and reptiles



The midwife toad colonised the newly created wetlands in the first year



The yellow-bellied toad (a national priority species): assisted by funding for immediate measures

<sup>16</sup> A forest community is a plant community dominated by woodlands.

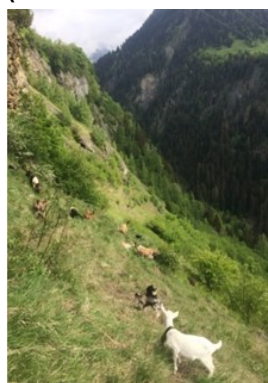
## 5.9 Canton of Graubünden: Using free-ranging goats to graze dry pastures

In the canton of Graubünden, roughly 10% of the approximately 7,070 hectares of dry meadows and pastures included in the Inventory of Dry Meadows and Pastures of National Importance are fallow. These areas are very steep and difficult to access and are therefore no longer used and maintained. To ensure that these dry meadows and pastures do not eventually diminish in quality or even disappear, they are now grazed by a herd of free-ranging goats. Throughout the growing season, around 200 goats wander back and forth between the Chur Rhine valley and the Urserental. The she-goats overwinter with local farmers, and the young goats are turned into high-quality sausages, marketed by Coop under the Pro Montagna label as a 'biodiversity-friendly sausage'. The project also helps farmers to establish pastures and get started with marketing their produce.

The project provides both expert support and start-up investment. It benefits: 1) biodiversity (preservation of dry meadows and pastures of national importance; raising consumer awareness of rare and important species). The free-ranging goat project also promotes conservation of the following target species: *Pulsatilla montana*, *Libelloides coccajus* (owly sulphur), *Bothriochloa ischaemum* (yellow bluestem), *Dianthus sylvestris* (woodland pink), *Paradisea liliastrum* (St Bruno's lily), *Zygaena filipendulae* (six-spot burnet), *Parnassius apollo* (Apollo) and *Pseudophilotes baton* (baton blue). 2) farmers (higher sales margin thanks to biodiversity label) and 3) tourism and local people, because the dry meadows and pastures are beautiful and uplifting to look at. The aim is to roll out the goat project to other parts of the canton of Graubünden.

60% of the project is financed by federal funds (CHF 99,000), 27% by funds from the Canton of Graubünden (CHF 44,550) and 13% by the Canton of Uri (CHF 21,450). Swiss nature conservation organisation Pro Natura is coordinating the project using its own resources.

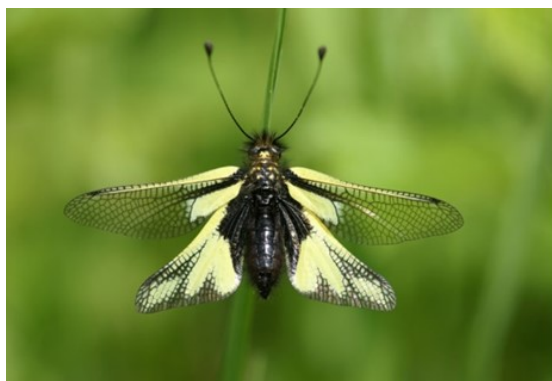
### Target species promoted by the free-ranging goat project. (Photos: Canton of Graubünden)



Free-ranging goats at Pisque, Ilanz



*Pulsatilla montana*



*Libelloides coccajus* (owly sulphur)



*Bothriochloa ischaemum* (yellow bluestem)

### 5.10 Canton of Jura: Étang de la Gruère – holistic approach

The area around the Étang de la Gruère lake is truly an unspoilt gem. A nature reserve since 1943, it is listed in no fewer than five national inventories of nature and landscape conservation as being of national importance. The site includes 80 hectares of extremely valuable raised bog. The area's richness and extraordinary beauty have long been admired and now attract some 150,000 visitors each year, making the Étang de la Gruère and surrounding area one of the main tourist attractions in the canton of Jura and the entire Jura Arc.

Both the raised bog and the lake itself provide wetland habitats for some very special flora and fauna, including amphibians, dragonflies and carnivorous plants. The area is also of unquestionable historical value. The lake was artificially constructed in the 17th century as a means of powering a mill and sawmill. To supply water for the lake and sawmill, deep drainage channels were dug through the bog. This intervention was the first 'industrial' activity in the region, marking the start of its economic rise.

However, using the water in this way caused the bog to dry out, which had a significant impact on this habitat and the flora and fauna living there. Among other things, draining such bogs leads to the emission of greenhouse gases. Consequently, the Canton of Jura has been working for a number of years to rehabilitate the raised bog in order to restore its ecological functionality. Among other things, this entails filling in the drainage channels in the bog, to the east of the lake. The Canton of Jura is also currently working on an infrastructure project to provide facilities for visitors. The aim is to showcase the area and illustrate the interplay between nature and landscape conservation.

#### Work taking place around the Étang de la Gruère. (Photos: Canton of Jura)



The Étang de la Gruère



Rehabilitation work (October 2018)



Overview of planned visitor facilities



### 5.11 Canton of Lucerne: Habitat improvement measures in the Chüsenrainwald special forest reserve

The Chüsenrainwald special forest reserve is listed in the Federal Inventory of Amphibian Spawning Sites of National Importance. The reserve is located in a pine and birch carr with peaty soil. To enhance the site, old drainage ditches were dammed using eight wooden sheet piles and filled with a total of 900 cubic metres of local peat and clay and sawdust.

These measures were designed to improve water retention, make the site more waterlogged, promote the original raised bog vegetation including downy birch, Scots pine, peat moss and heather, and encourage the rare bog arum (*Calla palustris*). The measures also aimed to reduce competition from alder buckthorn and brambles, with the indirect benefit of requiring less maintenance.

The work took place in February 2018. The project cost around CHF 46,000 and was implemented by local forestry companies and SME consultancies. The costs of all forest biodiversity projects are shared between the canton (60%) and the federal government (40%).

#### Work in the Chüsenrainwald special forest reserve (canton of Lucerne). (Photos: Canton of Lucerne)



Carrying out the improvement measures



Adding peat to a drainage ditch



Newly created habitat after backfilling and damming a drainage ditch



Pond with the rare bog arum

### 5.12 Canton of Neuchâtel: Promoting habitat for hazel grouse

The hazel grouse is a potentially endangered species throughout Switzerland. Over the past 100 years, their numbers have steadily declined, including in the canton of Neuchâtel. Reasons for this include habitat loss, inbreeding, predation by birds of prey, owls and predatory mammals, and disturbance, e.g. due to tourism-related use of habitats.

The hazel grouse's preferred habitat is large, structured coniferous and mixed forest with softwood species and a well-developed shrub and herb layer. To create such habitats, the Canton of Neuchâtel has been undertaking various silvicultural and forest management measures for the past 30 years (structuring woodland, creating forest edges and boosting food availability). Other bird species that benefit from these habitat improvements include the woodcock, pygmy owl, boreal owl and long-eared owl.

Thanks to the funding for immediate measures on forest biodiversity and the kind cooperation of forest owners, it has been possible to step up the support measures for the hazel grouse. In particular, ornithologists specialising in woodland birds are planning measures to thin the forest, preserve hazel grouse nesting sites and increase food availability. Monitoring of population trends will also be carried out.

#### Forests fit for the hazel grouse.

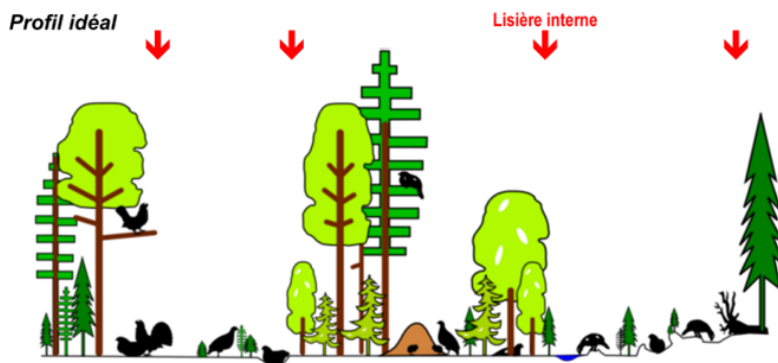
(Photos: Jean-Lou Zimmermann, ideal forest profile - Canton of Neuchâtel)



Hazel grouse



Grouse habitat



Ideal forest profile for grouse habitat

### 5.13 Canton of Neuchâtel: Revitalising the Marais-Rouge (Vallée des Ponts-de-Martel)

Until 1987 (the year of the Rothenthurm Initiative on wetland protection), the Marais-Rouge (Red Marsh) was the site of industrial peat extraction for use in horticulture. In the federal inventory compiled in 1978, this raised bog was described as a 4.5-hectare area of exposed peat that had been dried out by means of drainage channels. By 2004, its indicator species of flora and fauna had all but disappeared. As part of a national programme of economic measures, major revitalisation work was carried out in 2009 to restore the bog's hydrological balance. Large bodies of water were created and the effects of the drainage ditches were neutralised.

Hydrological monitoring carried out between 2010 and 2017 found that the water table in the elevated parts of the site was very low. As a result, only low-lying surface areas and areas near the water table had been successfully colonised by typical raised bog flora. In autumn 2018, work was carried out to minimise the sloping topography caused by soil erosion and bring the surface nearer to the water table. In all, around 1,500 m<sup>2</sup> of peat was removed and transferred to the southern part of the bog, where it was used to fill in an area previously exploited for peat extraction. This work, costing CHF 100,000, was carried out by local companies.

Similar revitalisation work has been undertaken at other mires in the canton of Neuchâtel in recent years, with federal government support. Federal funds have been used to create a network of wetlands and water bodies in the valleys of Les Ponts-de-Martel and La Brévine. The success of these measures is being monitored and the results are very encouraging. They include an increase in peat moss and the continued presence, and in some cases return, of national priority species such as the large white-faced darter (*Leucorrhinia pectoralis*), a type of dragonfly not seen in the canton of Neuchâtel for 70 years. Another species of dragonfly that is very rare throughout Switzerland, the dark whiteface (*Leucorrhinia albifrons*), was discovered in the canton for the first time in 2017.

#### Measures to revitalise the Marais-Rouge. (Photos: Canton of Neuchâtel)



Earthworks at the Marais-Rouge in 2018



Marais-Rouge as revitalised habitat



Large white-faced darter



Dark whiteface

#### **5.14 Canton of Nidwalden: Habitat improvement at the Rieter Oberrickenbach fen**

The Canton of Nidwalden has been carrying out maintenance work at the Rieter Oberrickenbach, a fen of national importance, to provide a better habitat for the woodland brown (*Lopinga achine*). The woodland brown is a rare species of butterfly, both nationally and in the canton of Nidwalden, where it was spotted for the first time in half a century in 2006. As the woodland brown has been designated a target species for the Rieter Oberrickenbach, the canton has carried out a number of maintenance measures aimed specifically at this butterfly.

Vegetation on a marshy slope is being maintained in such a way that traditional agricultural management methods can be used again. The adjacent forest is being thinned and the forest edges given a tiered structure, and measures are being taken to promote hardwood. As well as the woodland brown, these maintenance activities are benefiting around 60 other butterfly species. With land management now tailored to local conditions, landowners and farmers also benefit from the project, as do the local forestry sector and other local timber processing companies.

The project costs amount to CHF 187,000. The federal and cantonal authorities have paid a total of CHF 105,000, with CHF 82,000 coming from timber revenues, i.e. from the landowners. The work undertaken outside the forest was financed by the canton's Department of Nature and Landscape Conservation, with the Forest and Energy Office paying for the work in the forest.

#### **Improved habitat for the woodland brown at the Rieter Oberrickenbach. (Photo: Canton of Nidwalden)**



### 5.15 Canton of Obwalden: Breeding and resettlement of midwife toads

There are two known populations of midwife toad in the canton of Obwalden. The animals live in and around two pools: the Ribiseeli in the area of Glaubenbielen (Giswil) and the Zinggenseeli near the Melbach gypsum pit (Kerns). In 2007, the Zinggenseeli was at risk of leaking due to the unstable geological situation. This could have impaired or even destroyed the midwife toad's entire habitat. To ensure the survival of the midwife toad population, in 2009 a group of ponds was dug in the Melbach gypsum pit to provide an alternative spawning ground. However, the midwife toads did not spontaneously colonise the new ponds.

A subpopulation was therefore actively relocated to the alternative spawning ground as part of a species promotion project. In addition, the substitute habitat was enhanced in various ways, e.g. by piling up branches, stacking logs and thinning woodland. For the resettlement, midwife toad larvae were collected, grown on and released into the replacement spawning waters.

The measures were carried out by local environmental consultants (project planning, resettlement of midwife toads, monitoring implementation of the measures on site) and by the forestry service (thinning the woodland). The project was financed by the federal government, the Canton of Obwalden and the landowners (gypsum pit operators).

#### Enhancement measures and midwife toad-friendly habitat. (Photos: UTAS AG)



### 5.16 Canton of St Gallen: Helping the capercaillie at the Amden forest reserve

A primary objective of the Amden forest reserve (approx. 975 hectares) is to help the capercaillie, which is not only endangered but is also a national priority species. Careful thinning, promotion of silver fir and tending of young forest creates light mixed mountain forest with an underlayer of bilberry bushes. This provides suitable habitat for the capercaillie as well as other rare species such as the three-toed woodpecker and the woodcock.

Silvicultural impact analyses and capercaillie surveys conducted from 2015 to 2017 show that the enhancements of the Amden forest reserve have had a positive effect on the capercaillie population.

In the canton of St Gallen, the forestry contributions are generally paid to the forest owners, as they are responsible for forest management. The maintenance work in the reserve is carried out by the Amden community forest enterprise and a private forestry firm. The basic cost as well as compensation for loss of revenue from the discontinuation of timber use for the entire 50-year contract period has been met with funds for the immediate measures for forest biodiversity, paid to the Canton of St Gallen in 2017 (CHF 810,000, split 50-50 between the federal government and canton).

#### Habitat improvement in the Amden forest reserve to help the capercaillie in the canton of St Gallen.

(Photos: habitat - Canton of St Gallen, capercaillie - markus.staehli@staehli-edia.ch)



Thinning the forest to create capercaillie habitat



Capercaillie roost in tall silver fir trees



Capercaillie

### 5.17 Canton of Schaffhausen: Promoting rare plant species in the Tannbüel nature reserve

Tannbüel near Barga is one of the most important and best-known nature reserves in the Randen. It is a nature conservation area of national importance, known in particular for its more than 20 orchid species, including lady's-slipper (*Cypripedium calceolus*). Many other species contribute to the area's biodiversity, including the great yellow gentian and creeping lady's-tresses (*Goodyera repens*).

A maintenance plan is in place to preserve the Tannbüel's botanical value over the long term. The aim of the maintenance measures is to create optimal growing conditions for the rare plant species, to promote biodiversity in the shrub and tree layer and to preserve the site's structural diversity. The following labour-intensive measures, among others, are carried out under the direction of Grün Schaffhausen: thinning forest stands to regulate light in the shrub and herb layers, removing fast-growing shrubs, removing cut vegetation to deplete the soil, mowing dry meadows, promoting rare tree species (e.g. wild fruit trees, wild service tree, whitebeam), managing the forest edge to create a variety of structures and maintaining the infrastructure.

Tannbüel attracts many visitors to the area every year, especially when the lady's-slipper orchid is in bloom. Due to the large number of visitors, the canton is investing in visitor information and guidance (path maintenance, monitoring and guided tours). The maintenance measures are mainly financed by the canton, with the federal government helping to pay for the forest thinning work.

#### Rare orchid species in the Tannbüel nature reserve. (Photos: Grün Schaffhausen, Canton of Schaffhausen)



Lady's-slipper



Orchis

### 5.18 Canton of Solothurn: Dorfholle-Rämel forest reserve, Kleinlützel

By preventing commercial exploitation, forest reserves allow the natural dynamics of the forest to play out. However, at selected locations within a reserve, specific measures may be taken to guide the forest's development in a way that favours biodiversity. In the canton of Solothurn, the additional funding pledged by the federal government for immediate measures is being used to implement such measures in forest reserves. The canton has around CHF 200,000 at its disposal for this purpose.

To ensure the sustainability of these measures, protection objectives are set out in long-term plans. The individual measures are documented in detail, with each component of an intervention being recorded in its own dossier. The dossier is passed on to the forest owner, the district forester, the Nature and Landscape Department and the canton's head forester. In addition to the basic data, the dossier includes a description of the stand, the objectives of the intervention, the measures required and a cost estimate.

In the winter of 2017/18, special forest measures were implemented on 0.83 hectares in the 'Risi, Rote Fluh' area of the Dorfholle-Rämel forest reserve. The non-wooded area was expanded, the spruce forest was thinned and a tiered and shrubby forest edge was created. Such measures help to create habitats for reptiles and rare, heat-loving herb and shrub species. The measures were carried out by local forest enterprises. The interventions in the Dorfholle-Rämel forest reserve would not have been financially viable without the federal funds provided.

#### Special forest measures in the Dorfholle-Rämel forest reserve, Kleinlützel (canton of Solothurn).

(Photos: Canton of Solothurn)



Forest area prior to the measures



Thinned forest area

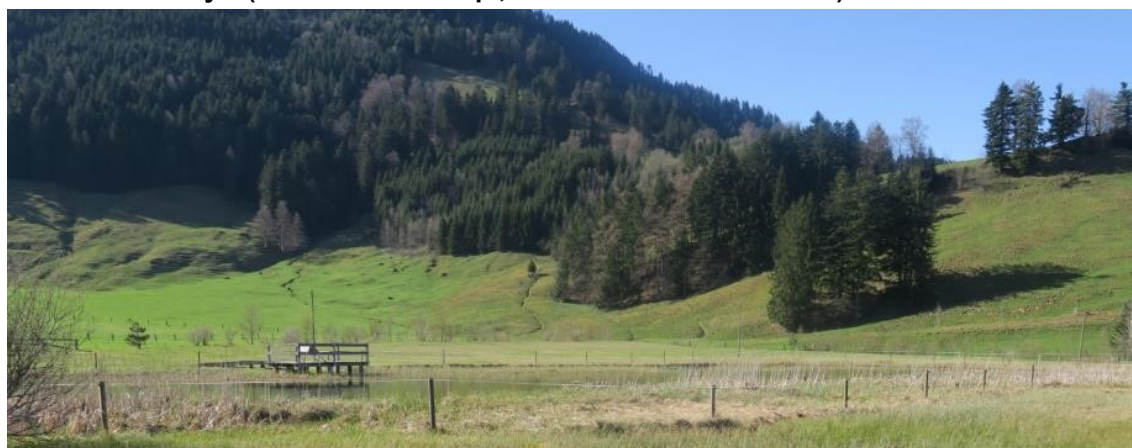


### **5.19 Canton of Schwyz: Forest edge enhancement on the Seebodenalp**

Korporation Berg und Seeboden carries out alpine agriculture and forestry on the Seebodenalp ob Küssnacht. For more than a decade, the corporation has been implementing a plan to enhance the area's landscape and special natural value and to promote recreational activities on the Seebodenalp. Its efforts are greatly appreciated by the local council and community and it has therefore decided to carry out further enhancement measures on the Seebodenalp.

With financial support from the federal government and the canton, forest edges are now being ecologically improved for the benefit of fauna and flora, thus helping to improve the landscape. A tiered and undulating forest edge is being created at suitable places over a roughly 6-hectare area. These forestry works are being coordinated by the Office for Forestry and Natural Hazards. The total costs amount to just under CHF 130,000. CHF 60,000 is being funded 50-50 by the federal government and the Canton of Schwyz (forest edge design, additional planting). The remaining CHF 70,000 or so (enhancement project and support with implementation) will be covered by foundations, private sponsors and Korporation Berg und Seeboden.

#### **Example of an area with potential for forest edge enhancement in the Seeboden area, canton of Schwyz. (Photo: Erwin Leupi, AG Natur und Landschaft)**



## 5.20 Canton of Thurgau: Biotope trees

As biotope trees age and decay, they create niches for a variety of animal and plant species that depend on old or dying trees for their survival. In Diessenhofen, three groups of biotope trees (20 trees in total) over an area of 0.51 hectares have been given official protection for a 50-year period thanks to funding for immediate measures. Two of the protected beech trees had a diameter at breast height of over 100 cm. The Citizens' Commune of Diessenhofen, which owns the forest, received compensation of CHF 8,860.

### Biotope tree in the canton of Thurgau. (Photo: Canton of Thurgau)



## 5.21 Canton of Uri: Restoration of a chestnut grove in Treib, Seelisberg

Between the 12th and 17th centuries, the chestnut was a very important staple food in central Switzerland. However, over the past 300 years, chestnut trees have virtually disappeared from the region, with just a few remnants of the old stands remaining. To give a helping hand to this culturally and historically important tree, over the past 10 years a total of 20 chestnut groves covering a total area of 20 hectares have been looked after, as well as a number of individual trees.

The woods around Treib in Seelisberg are home to numerous large chestnut trees. The Canton of Uri and the Corporation Citizens' Commune of Seelisberg have restored the former chestnut grove to allow traditional management practices to be resumed. The following measures, among others, were undertaken over a 1.4-hectare area of forest: felling 430 m<sup>3</sup> of timber, cutting back stumps, thinning the crowns of old chestnut trees, planting and protecting young native chestnut trees and grazing the woodland with goats and sheep.

This work was carried out by people doing civilian service and cost around CHF 75,000. The project was jointly financed by the federal government, the Canton of Uri, the Corporation of Uri and the Corporation Citizens' Commune of Seelisberg. Plant and animal species benefit from the open, light forest structure and the piles of stone and branches. In addition, the local community is being informed about the presence and management of chestnut trees in the Lake Lucerne region. Dimitri Moretti, the cantonal councillor responsible for the project, is proud and delighted by its success, having no doubt that the collective effort is all in a worthwhile cause.

### Work to restore a chestnut grove. (Photos: pictures of the work - Amt für Forst und Jagd, Canton of Uri; picture of goats - Hermann Wipfli)



People clearing the area as part of their civilian service



Protecting young chestnut trees



Grazing the chestnut grove with goats



Old and newly planted chestnuts

## 5.22 Canton of Vaud: Opening up an abandoned dry meadow

The dry meadow of La Daille is located above the village of Bretonnières, halfway between Les Gorges de l'Orbe and Le Vallon du Nozon. This small area of just 1.89 hectares is listed in the Inventory of Dry Meadows and Pastures of National Importance. It adjoins the Bois de Forel and is therefore regularly crossed by walkers, who enjoy the views and tranquil surroundings on their way to the forest. The meadow is home to some exceptional flora, including a number of plants rarely found in the western part of the Swiss Plateau and the Lake Geneva basin, such as crested cow-wheat (*Melampyrum cristatum*) and knotted clover (*Trifolium striatum*).

Historically, oaks were grown for forestry purposes in this area and sheep and pigs roamed the undergrowth. When commercial forestry was discontinued 50 years ago, the dry meadow and pasture area gradually became overgrown and eventually turned into a thicket of bushes and deciduous trees.

In 2017, the Canton of Vaud launched a project to revitalise La Daille in order to preserve its botanical and landscape diversity. To start with, part of the area was cleared of scrub so that only around 50% of the thicket now remains. In the winters of 2017 and 2018, forestry work was carried out and habitat corridors created to connect the clearings with the remaining herbaceous vegetation. This work was completed in the following summers, with targeted clearing of the remaining stumps and shoots.

The work was carried out by forest enterprises in the region and local companies. For cutting operations, a rotating excavator with cutting head was used to limit the impact on the surrounding vegetation. Near the dry meadow area, woodchip parking areas have been created to guide walkers and prevent parking in inappropriate places. A wooden bench has also been installed. An information board describing the treasures to be found in the dry meadow area and what visitors should do to help conserve them will follow in due course. The measures cost around CHF 28,000, of which 65% was funded by the federal government and 35% by the MAVA Foundation.

### Conservation measures at the La Daille dry meadow and pasture in Bretonnières. (Photos: David Grobety and Atelier Nature et Paysage)



Rotating excavator being used in the forest



Example of a habitat corridor in the dry meadow and pasture

### 5.23 Canton of Valais: The tree of heaven in the Valais - current situation

The tree of heaven (*Ailanthus altissima*) is an invasive alien species in Switzerland. In the canton of Valais, its spread is seen as posing a risk to a number of economic sectors such as viticulture and agriculture, as well as to forests, and protection forests in particular. The Communes of Sion and Sierre have therefore undertaken a pilot project involving control measures designed to contain the tree of heaven in the short term and to eradicate it in the medium term.

The focus was on felling trees capable of reproducing, in order to curb the colonisation process. At the same time, council maintenance staff also eliminated saplings and shoots growing from stumps on public land. Coordinated and sustained efforts at cantonal level will be needed over the next decade to bring the situation under control. The total cost of the pilot project is CHF 133,000, of which 50% is borne by the federal government, 27% by the Canton of Valais and 23% by various communes.

#### Measures to combat the tree of heaven in the canton of Valais. (Photos: Canton of Valais)



Individual trees are girdled to stop them spreading



## 5.24 Canton of Zug: Repairing a dry stone wall to help the smooth snake

Habitat improvement and creation is an important measure to promote national priority species such as the smooth snake (*Coronella austriaca*). Between November 2017 and March 2018, the Canton of Zug repaired a 100-year-old dry stone wall in Walchwil, thereby creating additional habitats for the smooth snake within the cultural landscape. Structures such as dry stone walls are this snake's preferred habitat.

The work to repair the dry stone wall was coordinated and carried out by various local companies, including supplying the equipment and machinery, carrying out the walling and disposing of the waste material. The total cost was CHF 65,000.

### Work to repair a dry stone wall for smooth snakes in the canton of Zug (2017 to 2018). (Photos: landscape - Canton of Zug, smooth snake - Dominik Thiel)



Before repair work



During repair work



After repair work



Smooth snake

### **5.25 Canton of Zurich: Remediation and enhancement of the Chruzelen raised bog**

Various regeneration measures were carried out at the nationally important Chruzelen raised bog in Rifferswil to restore the original character of the mire and to support typical species found in such habitats.

Drainage structures and ditches were sealed using peat blocks and finally closed off with sheet piling. A weir was built into in the sheet piling so that the water level can be lowered when required. The total cost of the project was just under CHF 180,000, 65% of which was financed by the federal government and 35% by the Canton of Zurich. The implementation work was carried out by specialised construction and maintenance firms, design and site management by a specialised SME consultancy.

#### **Remediation and enhancement measures at the Chruzelen raised bog in Rifferswil. (Photos: Canton of Zurich)**



## **6 Annexes**

### **6.1 Annex 1 - Questionnaire**

#### **Cantonal survey on the benefits of investing in biodiversity**

##### **1. Background and aim of the survey**

On 6 September 2017, the Federal Council approved the Action Plan for the Swiss Biodiversity Strategy (AP SBS). The first implementation phase of the action plan (2017–23) includes the immediate measures in 2017–20 (in accordance with the Federal Council decision of 18 May 2016) as well as synergy measures to exploit the biodiversity potential of specific sectors (in particular agriculture and spatial development) and pilot projects to supplement measures in areas of nature conservation where the need for action is particularly great. To implement the synergy measures and pilot projects in 2019–23, the Federal Council has provided funding of around CHF 10 million a year.

The immediate measures are intended to alleviate the most urgent implementation deficits in the areas of nature conservation and forest biodiversity. To this end, the Federal Council intends to invest a total of CHF 135 million in the years 2017 to 2020, to be paid to the cantons in tranches<sup>17</sup> under the environmental programme agreements between the federal government and the cantons, with the cantons providing top-up funding of their own. To finance the immediate measures, the budget of the Federal Office for the Environment (FOEN) will be increased by a total of CHF 55 million and CHF 80 million of its budget will be redeployed.

With their decisions on the AP SBS and the associated action plan, the Federal Council and Parliament have recognised the urgent need for action on biodiversity. Nevertheless, funding for biodiversity is repeatedly the subject of critical discussion in parliamentary debates. To boost transparency in the upcoming budget debates, the FOEN is conducting a cantonal survey on the benefits of investing in biodiversity.

The aim of the survey is to:

- demonstrate the flow of funds disbursed by the federal government to co-finance cantons' measures in the areas of nature conservation (based on the Nature and Cultural Heritage Act) and forest biodiversity (based on the Forest Act). The focus is on the periods 2017 and 2018–19, which is when the funds pledged by the Federal Council to finance immediate measures are disbursed. If possible, statements will also be made about the year 2020;
- show the allocation of these funds to specific recipients;
- identify any funding provided by cantons, communes or third parties to supplement the federal funds;
- show how these funds are/were used and, if possible, their economic, social and/or environmental benefits. This can be done quantitatively and/or qualitatively (best practice examples).

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<sup>17</sup> CHF 20 million in 2017, CHF 35 million in 2018, CHF 40 million in 2019 and CHF 40 million in 2020



## 2. Method and results

The data will be collected by surveying the cantonal experts in nature and landscape as well as forest biodiversity using a standardised questionnaire (see section 4). The first phase of the survey will cover the cantons represented on the National Council Finance Committee (FC-N).<sup>18</sup> The results of this survey will be processed so that they can be made available to interested parliamentarians. The remaining cantons will be surveyed in a second phase. By the time of the 2018 winter session, a final report will be drawn up, depicting the situation throughout Switzerland and aimed primarily at members of Parliament and other interested stakeholders.

## 3. Contacts at federal and cantonal level

*Federal government:* FOEN, Species, Ecosystems, Landscapes Division, Director of the Action Plan for the Swiss Biodiversity Strategy: Franziska Humair, Franziska.Humair@bafu.admin.ch

*Cantons:*

- Representative of the Canton of Lucerne's Nature Conservation Authority: Thomas Stirnimann, Thomas.Stirnimann@lu.ch
- Conference on Forest, Wildlife and Landscape (KWL): Thomas Abt, Thomas.Abt@kwl-cfp.ch

## 4. Questions concerning the benefits of investing in biodiversity

### 1) General questions about cantonal projects in the field of biodiversity

1a) What are your canton's priorities and focal areas under the programme agreements in the areas of nature conservation and forest biodiversity?

.....

### 2) Questions about the flows and uses of funds

This questionnaire is mainly concerned with the funds for financing immediate measures between 2017 and 2020. If you already have the figures available, we would like to combine your information on the immediate measures with information on the nature conservation and forest biodiversity funds forthcoming as part of the 2016–19 programme agreement period and as financial assistance between 2016 and 2018. In preparation for the financial application to the Federal Council for the continuation of the immediate measures from 2021 onwards, the FOEN will contact you again, no later than next November, concerning the flows of funds as part of the 2016–19 programme agreement period. The cantonal governments have already been informed of this. On 1 May 2018, they received a joint communication from the Conference of Directors of Public Works, Planning and Environmental Protection (DPPE) and the Conference on Forest, Wildlife and Landscape (KWL), with the Conference of Nature and Landscape Conservation Officers (KBNL) in CC.

2a) How much federal funding has your canton received for nature conservation and forest biodiversity as part of the immediate measures in 2017–20, the 2016–19 programme agreement period and financial assistance for 2016–18?

=> Please confirm or edit the federal funds listed in Table 2-1, divided into immediate measures, programme agreements and financial assistance.

2b) Has your canton made full use of the federal funds provided (immediate measures, programme agreements and financial assistance)? If not, why?

.....

<sup>18</sup> Basel-Landschaft, Fribourg, Jura, Lucerne, St Gallen, Solothurn, Schwyz, Thurgau, Valais, Zug, Zurich

2c) Has your canton supplemented the federal funds, including the funding for immediate measures, in accordance with the terms of the programme agreements? If so, by how much?

=> Please enter these funds in Table 2-1 or enter 'done' in the corresponding fields if you have already reported this data to the FOEN as part of your normal reporting for the programme agreements.

2d) For what purpose and in what amount were/are the federal funds being used in the areas of nature conservation and forest biodiversity, in accordance with the programme objectives for immediate measures (2017–20), as set out in the manual for programme agreements in the area of the environment (2016–19), the programme agreement period (2016–19) and financial assistance (2016–18)?

=> Please enter the federal funds in Table 2-2, divided up according to programme objectives and into completed, ongoing and planned measures for each year. For 2017, please list the projects actually undertaken.

=> If you can provide information on supplementary funding from communes or third parties, please name these third parties (e.g. owners, private individuals, foundations, associations, spatial development bodies, agriculture sector) and list the corresponding funds.

2e) Have evaluations of the implementation and success of these projects/measures been undertaken or are they planned?

.....

2f) Who are the recipients of the federal funds used to implement projects/measures for the conservation and promotion of biodiversity, and how much did/will they receive? If no concrete figures are yet available, please provide estimates if possible.

=> Please enter the funds in Table 2-3, broken down by recipient. Possible recipients include the cantonal administration, communes, SME consultancies, forest enterprises (private or public), forest owners (private or public), farmers, SME construction firms, fishermen, hunters, Swiss parks and tourism bodies.

2g) Do you think that the federal government should provide additional funding for immediate measures in the areas of nature conservation and forest biodiversity? Four scenarios are outlined below. Please give brief reasons for your answers.

2g – 1) Even if the cantons had to supplement this funding under the programme agreements?

.....

2g – 2) By raising the compensation rates that the federal government is required to apply?

.....

2g – 3) Without further financial commitments on the part of the cantons?

.....

2g – 4) Do you have another approach for allocating funds for the financing of immediate measures?

.....

2h) Do you have any further expectations concerning additional federal funds?

.....

2i) In your opinion, do the federal funds provided have benefits for...(see 2i – 1 to 3)? Why do you think that such benefits do or do not exist? Please give brief reasons for your answers.

2i – 1) society (social, cultural, aesthetic value)?

.....

2i – 2) ecology/environment (habitats, species)?

=> If these measures have already been implemented, were the ecological objectives achieved?

.....

2i – 3) the economy (jobs, value creation, etc.)?

.....

### 3) Examples of implementation

3a) Please illustrate the output and/or the necessity of the immediate measures based on actual projects implemented by the cantons to conserve and promote biodiversity. The projects should not be politically controversial, should highlight the economic, social, cultural, aesthetic and environmental benefits and should relate to existing rather than newly created areas.

=> Do you have such a 'best practice' project? If so, can you provide the FOEN with further information on the following points?

3a – 1) Are there projects from which the main stakeholders benefit (e.g. farmers, builders, catering trade, cantonal spatial development and planning (DPPE), hunters, fishermen, SAC)?

3a – 2) Is it possible to provide high-quality (at least 300 dpi) photos showing the impact of the projects (before and after)?

3a – 3) What measures were taken as part of the project and who implemented them?

3a – 4) How much did these measures cost and how were they paid for (federal funds and other funds made available)?

3a – 5) Is it possible to cite quantifiable, positive socio-economic changes resulting from the projects (e.g. additional jobs, added economic value, number of overnight stays, social media feedback, improved water quality)?

3a – 6) Can the projects be linked to verifiable successes of the entrepreneurs or companies involved?

3a – 7) Are there visible benefits for social cohesion within a community or region?

3a – 8) Can quantifiable, positive environmental changes be attributed to the projects (e.g. improvement in water quality, preservation of protected species, remediation of a protected area)?

=> Please indicate a contact person that we can contact if we have questions about the projects.

.....

**4) General conditions**

4a) What would be the economic, social and environmental impacts of a decision to scrap or cut the federal funding for immediate measures in 2019 (2020) in terms of

4a - 1) ongoing projects/measures?

=> Please indicate specific projects that would have to be abandoned or shortened.

.....  
.....

4a -2) planned projects/measures?

=> Please indicate specific projects that would have to be abandoned or shortened.

.....  
.....

4a - 3) In the event of a decision to scrap or cut the federal funding for immediate measures in 2019 (2020), would the canton continue to invest the already budgeted cantonal funds in the affected projects/measures?

.....  
.....

4a - 4) What does the canton want from its cooperation with the federal government?

.....  
.....

## 6.2 Annex 2 – Data from the cantonal surveys

**Table 4. Funding\* under the programme agreements for nature conservation and forest biodiversity 2016–19.** In CHF million (rounded)

	<b>Federal government</b>	<b>Cantons</b>
<b><i>Nature conservation</i></b>		
Ordinary funds	105	108
Immediate measures	52	34
<b>Total</b>	<b>157</b>	<b>142</b>
<b><i>Forest biodiversity</i></b>		
Ordinary measures	38	31
Immediate measures	28	23
<b>Total</b>	<b>66</b>	<b>54</b>

\*The analysis of cantonal supplements to federal funds and the use of federal funds in the cantons (programme objectives, recipients) is based in part on estimates by the cantonal authorities. The cantons will only be able to provide definitive information at the end of the programme period.

**Table 5. Use of federal funds\* according to programme objectives under the environmental programme agreements 2016–19, areas of nature conservation and forest biodiversity.**

In CHF million (rounded)

<b><i>Nature conservation</i></b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>
Ordinary funds	71	20	11	3
Immediate measures 2017–19	30	6	11	2
<b>Total</b>	<b>101</b>	<b>26</b>	<b>21</b>	<b>4</b>
<b><i>Forest biodiversity</i></b>				
	<b>PO1</b>	<b>PO2</b>		
Ordinary funds	14	24		
Immediate measures 2017–19	16	13		
<b>Total</b>	<b>30</b>	<b>37</b>		

\* The analysis of cantonal supplements to federal funds and the use of federal funds in the cantons (programme objectives, recipients) is based in part on estimates by the cantonal authorities. The cantons will only be able to provide definitive information at the end of the programme period.

**Table 6. Recipients of federal and cantonal funds\* from the environmental programme agreements 2016–19, areas of nature conservation and forest biodiversity.**

In CHF million (rounded)

<i>Nature conservation</i>	Ordinary funds	Immediate measures 2017–19	Total	%
Farmers	28.7	6.6	<b>35.2</b>	39.1
Construction industry	8.3	9.3	<b>17.6</b>	19.6
SME consultancies	7.7	5.4	<b>13.1</b>	14.6
SME maintenance companies	4.9	3.3	<b>8.2</b>	9.1
Forest enterprises/forestry sector	5.1	2.8	<b>7.9</b>	8.7
Foundations/associations	2.7	1.1	<b>3.8</b>	4.2
Communes	1.4	0.3	<b>1.6</b>	1.8
Cantonal administration	1.0	0.3	<b>1.3</b>	1.4
Other landowners	0.9	0.2	<b>1.1</b>	1.2
Other	0.2	-	<b>0.2</b>	0.2
Hunters	0.1	-	<b>0.1</b>	0.1
Forest owners	-	-	-	-
<b>Total</b>	<b>60.9</b>	<b>29.2</b>	<b>90.0</b>	<b>100.0</b>

<i>Forest biodiversity</i>	Ordinary funds	Immediate measures 2017–19	Total	%
Forest owners	26.54	18.5	<b>45.1</b>	78.4
Forest enterprises/forestry sector	5.27	2.8	<b>8.1</b>	14.0
Communes	1.34	1.1	<b>2.5</b>	4.3
Construction industry	0.46	0.3	<b>0.7</b>	1.3
SME consultancies	0.30	0.2	<b>0.5</b>	0.9
Cantonal administration	0.25	0.1	<b>0.4</b>	0.6
Other landowners	0.15	0.0	<b>0.2</b>	0.3
Foundations/associations	0.07	0.0	<b>0.1</b>	0.1
Farmers	0.01	-	-	-
SME maintenance companies	-	-	-	-
Hunters	-	-	-	-
<b>Total</b>	<b>34.4</b>	<b>23.1</b>	<b>57.5</b>	<b>100.0</b>

\*Funds amounting to less than 1% of the total for an area are not shown. The analysis of cantonal supplements to federal funds and the use of federal funds in the cantons (programme objectives, recipients) is based in part on estimates by the cantonal authorities. The cantons will only be able to provide definitive information at the end of the programme period.