



Action Plan for the Swiss Biodiversity Strategy

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Biodiversity means

the **species diversity** of animals, plants, fungi and microorganisms,
the **genetic diversity** within the different species,
the **diversity of habitats**, and
the **interactions** within and between these levels.

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1 Introduction

Why is biodiversity important?

Biodiversity forms the basis of our existence and that of all future generations.

1.1 Conserving and promoting biodiversity – a matter of social consensus

In accordance with the Federal Constitution of the Swiss Confederation, the Confederation and Cantons are obliged to ensure the long-term conservation of the natural basis of life and to protect the population and its natural environment against damage or nuisance (Art. 2 and 74 Federal Constitution). The necessity of providing long-term protection for our environment is explained by the existential and economic importance of biodiversity as the basis of human existence. The application of the precautionary principle for the conservation of biodiversity is also intended to ensure that future generations will be able to fulfil their needs. This sustainable use of biodiversity is enshrined in the Convention on Biological Diversity and is also valid for Switzerland.¹

The conservation and promotion of biodiversity is referred to in different federal acts, including: the Protection of Nature and Cultural Heritage Act, the Environmental Protection Act, the Hunting Act, the Water Protection Act, the Fisheries Act (*Fischereigesetz*), and the Gene Technology Act. The sustainable use of biodiversity is also regulated, inter alia, in the Spatial Planning Act, the Agriculture Act, the Forest Act and the National Park Act.

1.2 Biodiversity – a social and economic necessity

Biodiversity is indispensable to human welfare.^{2 3 4} In addition to its considerable economic importance (Chapter 1.2.1), biological diversity has an intrinsic value and is also of aesthetic and emotional value (Table 1D). Apart from knowledge, labour (human capital) and physical capital (e.g. machines, production plants), economics also refers to natural capital, that is the economic value of a landscape, the main component of which is biodiversity.

The communities of plants, animals, fungi and microorganisms, which interact with each other and with their inanimate environment (ecosystems) as a functional unit, provide indispensable services of great economic, social and ecological value (Table 1).^{5 6} These services include, for example: the supply of drinking water, food for people and animals, and raw materials; the capacity to adapt to climate change; carbon sequestration as a contribution to climate protection; protection against natural hazards; natural pest control; the supply of active ingredients for pharmaceuticals; and the provision of natural areas for physical and mental recreation and thus benefits for human health. These ecosystem services make human existence and the exercise of economic activities possible. Hence a reduction in biodiversity not only means an irreversible loss of flora and fauna, it also poses risks to human welfare and the functioning of the economy.^{7 8}

Table 1**Ecosystem services for human well-being and economic development⁹**

A Basic/supporting services	B Provisioning services
• Soil formation¹⁰ • Maintenance of nutrient cycles¹¹ • Maintenance of the global water cycle¹² • Production of oxygen¹³	• Food and feed materials¹⁴ • Drinking water^{15 16} • Medication¹⁷ • Technical innovation¹⁸ • Genetic resources¹⁹
C Regulating services	D Cultural services
• Climate regulation/carbon sequestration²⁰ • Erosion control²¹ • Flood protection²² • Soil fertility²³ • Crop pollination^{24 25 26} • Biological pest control^{27 28} • Pathogen control²⁹ • Noise control, air pollution control and climate regulation in cities^{30 31 32}	• Recreation^{33 34} • Tourism^{35 36} • General welfare³⁷ • Location factor^{38 39 40} • Aesthetic pleasure⁴¹ • Spatial identity ("sense of home")⁴²

1.3 Marked decline in biodiversity poses a risk to Switzerland's welfare

The loss of biodiversity and impairment of ecosystem services further intensify the major challenges facing the twenty-first century (e.g. food production, availability of recreational areas and provisioning of clean drinking-water). Biodiversity loss is one of the nine most important planetary boundariesⁱ and one of four boundaries that have already been exceededⁱⁱ (along with climate change and nitrogen flows).⁴³

Consequences of biodiversity loss

The goods and services provided by ecosystems were considered **self-evident** up to now and availed of free of charge in most cases. However, the continuing **loss of biodiversity** and the associated damage to ecosystems will give rise to **high social costs** in the medium to long term, as the **services provided by ecosystems are irrevocably lost** along with biodiversity.

Without taking measures to counteract the continuing loss of biodiversity in our country, we also risk losing natural and ecosystem services and the deterioration of our quality of life. Biodiversity and the associated ecosystem services for the economy and society can only be substituted by technical measures to a very limited extent. Hence biodiversity loss affects not only today's generation but also future generations. They will only be able to manage the global challenges they face successfully if they can rely on biodiversity that is capable of reacting to change.

ⁱ The planetary boundaries show the level of environmental impact that can be tolerated for humanity to remain within a "safe operating space". These boundaries include climate change, biodiversity loss and biogeochemical flows (nitrogen and phosphorous).

ⁱⁱ Exceeding the defined boundaries runs the risk of irreversible and sudden environmental changes resulting in a reduction in the liveability of the Earth for humans.

2 Action Requirement

The action requirement for biodiversity is extensive and urgent. Increasing development and the fragmentation of habitats, the intensification of agricultural use in favourable locations in the mountain regions, the abandonment of agriculture in areas that are difficult to farm, the impacts of climate change, the increase in leisure activities in previously undisturbed regions, and the spread of invasive alien species will further intensify the already strong pressure on biodiversity in the future.^{44, 45, 46}

Urgent action requirement

The long-term **survival** of many species is **not guaranteed**.
The proportion of intact, near-natural areas
 on the Swiss Central Plateau and in the mountain valleys has
 reached a **worryingly low level**.
 Without **considerable additional efforts**, the **losses**
 will continue **throughout the country**.⁴⁷

2.1 State of biodiversity in Switzerland

The state of biodiversity in Switzerland is unsatisfactory.^{48 49} Various instruments were developed in recent decades with a view to obtaining information about the state of biodiversity and conserving it.ⁱⁱⁱ Based on this, it was possible to curb the loss of biodiversity in Switzerland minimally, however it was not possible to halt it entirely. The expansion of settlements and transport infrastructure, the increase in tourism and leisure activities in previously undisturbed regions, the development of renewable energy sources, the increasing intensity of agriculture in mountain regions, the fragmentation of natural habitats, the direct and indirect impacts of climate change, and the spread of invasive alien species will add to the already significant pressure on biodiversity in Switzerland.^{50 51}

In addition, the factors that cause biodiversity are arising more frequently and overlapping, with the result that the negative impacts on biodiversity are multiplying. Furthermore, ecosystem services (see Table 1) can disappear abruptly.⁵² Another aggravating factor is that the functions that many species fulfil in the ecosystem, the benefits humans and the economy can derive from them, and the role they will assume in the future (for example with changing climate conditions) are as yet unknown.⁵³ It is now known that not only common species but also rare ones are very important for the provisioning of ecosystem services.⁵⁴ Hence it is a matter of great urgency that the trend in relation to biodiversity loss be reversed.

2.2 International obligations

The 13th Conference of the Parties to the Convention on Biodiversity (CBD), which was held in Cancùn (Mexico) in December 2016, issued an urgent appeal to the global community to act quickly: to ensure the security of human well-being in the long term, all policy and economic areas should make the conservation and promotion of biodiversity and ecosystem services their central objective.

The warnings are repeated at regular intervals. It was already evident at the 10th Conference of the Parties to the Convention on Biological diversity in October 2010 in Nagoya (Japan) that biodiversity loss was progressing rapidly throughout the world.⁵⁵ None of the Parties to the Convention, which include Switzerland, had attained the goal agreed in 2002 to reduce biodiversity loss significantly.

ⁱⁱⁱ For example, biotope inventories, red lists, biodiversity monitoring, ecological compensation in agriculture, hydropower remediation

As a result, the Conference of the Parties adopted the Strategic Plan for Biodiversity for the period 2011 to 2020,⁵⁶ which contains five strategic goals covering a total of 20 headline targets (known as the Aichi Biodiversity Targets). The Plan is intended to provide a framework for national and regional objectives and to promote the coherent and efficient implementation of the main objectives of the Convention on Biological Diversity. One of the key requirements is that the Parties adopt national biodiversity strategies and associated action plans and implement them by 2020. In the case of Switzerland, the Aichi Biodiversity Targets have already been incorporated into objectives of the Federal Council's Swiss Biodiversity Strategy.⁵⁷

**Switzerland is one of the last countries
not to have passed a Biodiversity Action Plan.**

The 193 Member States of the United Nations passed the 2030 Agenda for Sustainable Development on 25 September 2015. Since 2016 this has been the globally applicable framework for national and international efforts to find joint solutions to the major challenges facing the world.⁵⁸ These challenges also include the conservation of biodiversity. The Federal Council's Sustainable Development Strategy 2016–2019 is based on Agenda 2030.⁵⁹ The key component of Agenda 2030 is the 17 Sustainable Development Goals (SDGs) and their 169 associated targets.^{iv} Goal15 requires the protection and restoration of land ecosystems, the promotion of their sustainable use, and the halting of biodiversity loss. The implementation of the Aichi Biodiversity Targets is considered an important contribution to the implementation of Agenda 2030.

^{iv} <https://www.eda.admin.ch/agenda2030/en/home/agenda-2030/die-17-ziele-fuer-eine-nachhaltige-entwicklung.html>

3 Action Plan for the Swiss Biodiversity Strategy

3.1 From the strategy to the action plan

The Swiss Parliament responded to the loss of biodiversity and the corresponding international developments by including the development of a Swiss Biodiversity Strategy into the legislature planning for 2007-2011 on 18 September 2008. The Federal Council resolution of 1 July 2009 mandated the Federal Department of the Environment, Transport, Energy and Communications (DETEC) to develop such a strategy. The Swiss Biodiversity Strategy (SBS), which was passed by the Federal Council on 25 April 2012, contains ten strategic objectives for the promotion and long-term conservation of biodiversity. It is intended to provide orientation for all actors so that they can jointly attain sufficient impacts and obtain clear results.

The Swiss Biodiversity Strategy states the following as its overall objective: *“Biodiversity is rich and has the capacity to react to change. Biodiversity and its ecosystem services are conserved in the long term”*. The ten strategic goals are coordinated with each other, their implementation is mutually influential and supportive, and they are based on the Aichi Biodiversity Targets.

With its resolution of 25 April 2012 on the SBS, the Federal Council mandated the Federal Department of the Environment, Transport, Energy and Communications (DETEC) to develop an Action Plan that substantiates the objectives of the SBS and proposes a general package of measures for their attainment. The development of the Action Plan for the Swiss Biodiversity Strategy (Biodiversity Action Plan) is an element of the legislature planning for 2011-2015⁶⁰ and 2015-2019.⁶¹

The Federal Council was particularly concerned that the measures be developed on the basis of a participative process so that broad acceptance could be achieved among the partners and actors affected by their implementation. It was also aimed to identify possible conflicts of interest through intensive dialogue. The development of an initial package of measures under the auspices of the Federal Office for the Environment (FOEN) was carried out with the involvement of 650 experts from 250 associations and organisations.⁶² The proposed measures were examined, evaluated, substantiated and bundled by the FOEN and other federal offices. An initial version of the Biodiversity Action Plan comprising 110 measures was completed by late 2013. The work carried out on its further refinement focused on the question as to whether and to what extent the ten objectives of the Swiss Biodiversity Strategy can be achieved through the measures contained in the Biodiversity Action Plan.

On 18 February 2015 the Federal Council decided to present to the cantons for pre-consultation the measures whose implementation would affect them directly in relation to both finance and human resources. Most cantons were agreeable to both the general thrust of the measures and the proposed temporal horizon for their implementation. Based on the reports from the cantons, the measures contained in the Biodiversity Action plan were then examined from the perspective of synergies and duplication. The results of the pre-consultation process were summarised in a report.⁶³

Following the pre-consultation process, taking the reports of the cantons and activities that had already been initiated or implemented into account (e.g. elimination of measures that had already been implemented such as the development of a strategy on invasive alien species⁶⁴), the FOEN then revised and consolidated the catalogue of measures in multiple stages. The measures were prioritised, bundled and phased based on their effect, urgency and financeability.

To enable the most urgent deficits in relation to biodiversity in Switzerland to be tackled, on 18 May 2016 the Federal Council decided to invest an additional CHF 55 million in the areas of nature conservation and forest biodiversity: an additional CHF 80 million was re-allocated from the FOEN's budget for this purpose (immediate measures).⁶⁵ This means that the Confederation can spend a total of CHF 135 million on urgent remediation and upgrading measures in biotopes of national im-

portance, on promotional measures in the area of forest biodiversity, and on the eradication of invasive alien species in the period 2017 to 2020. The cantons contribute a similar sum to the financing of the immediate measures. The legal framework for the implementation of the immediate measures is provided by both the Protection of Nature and Cultural Heritage Act and the Forest Act. The allocation of the finance is based on the targets and measures contained in the manual for programme agreements in the area of the environment (Handbuch Programmvereinbarungen im Umweltbereich⁶⁶).

3.2 The Biodiversity Action Plan – three action fields with 26 measures

3.2.1 Action fields and the associated measures

Direct, long-term promotion of biodiversity. The creation, development and maintenance of countrywide ecological infrastructure is one of the core concerns of the Swiss Biodiversity Strategy. This ensures the connectivity of ecologically valuable areas throughout Switzerland and thus forms both the spatial and functional basis of a biodiversity that is rich, has the capacity to react to change and is conserved in the long term. To do this, the biological quality of existing protected areas must be improved and the spatial and functional connectivity between habitats that are worthy of protection must be ensured. The functional connectivity of habitats exists when the exchange and movement of individuals, genes and ecological processes (for example through migration) between these habitats is ensured by wildlife corridors and stepping stones. Where necessary, protected areas should be extended or areas designated in which measures can be taken for the specific promotion of species. This benefits in particular endangered species, whose conservation is a matter of international responsibility for Switzerland (national priority species).

Sustainable use, economic values, international commitment. Numerous interfaces exist between federal biodiversity policy and other policy areas which already contribute to the conservation of biodiversity. These include, for example, the Swiss Landscape Concept (SLC),⁶⁷ the property strategy of the Federal Department of Defence Civil Protection and Sport DDPS,⁶⁸ the growth strategy for tourism,⁶⁹ agricultural policy,⁷⁰ the action plan for the reduction of risks and sustainable use of plant protection products,⁷¹ the Spatial Strategy for Switzerland⁷², the Forest Policy 2020,⁷³ the action plan for adaptation to climate change,⁷⁴ agglomeration policy,⁷⁵ the sectoral plan for transport,⁷⁶ the Action Plan for the Sustainable Development Strategy,⁷⁷ foreign policy,⁷⁸ and air pollution control⁷⁹ and chemicals policy.⁸⁰ The aim is to engage with these interfaces in the context of the proposed measures so that potential synergies for the benefit of biodiversity can be identified and exploited.

It should be noted, however, that the protection and use of biodiversity are not necessarily mutually exclusive. For example in spaces in which biodiversity is under pressure (e.g. agricultural land and built-up areas), there is major potential for the promotion of biodiversity (e.g. near-natural areas with connectivity and habitat function as a part of the ecological infrastructure) with direct positive impacts for the population (e.g. conservation and improvement of soil quality, regulation of air quality and microclimate, noise reduction, nature as an alternative to the built environment).^v

Knowledge generation and sharing. The poor state of the environment and urgent need for action in relation to biodiversity are insufficiently rooted in the thinking and action of the Swiss economy and society. The population lacks knowledge and information about the variety of species and their habitats in particular.⁸¹ Thus the focus should be on raising public awareness of the problem of biodiversity loss and the benefits of its promotion. In addition, greater emphasis should be placed in educa-

^v Almost three quarters of Switzerland's residents currently live in cities and urban agglomerations.

tion and further training on the knowledge of natural processes, the understanding of ecological interdependencies and information about species, and research projects and priorities should focus on practical issues relating to biodiversity. The Confederation supports the efforts to promote biodiversity in that, first, it acts and provides a role model in its own areas of responsibility and, second, makes instruments, knowledge and finance available to the policy implementation authorities and third parties.

3.2.2 Measures contained in the SBS Action Plan

This Action Plan for the Swiss Biodiversity Strategy (SBS) contains 27 measures (Tables 2 and 3), which are based on the objectives of the SBS (Annex B) and require the commitment of all sectors to biodiversity (Annex C). Following the Federal Council decision on the Biodiversity Action Plan, the measures were formulated in detail by the FOEN together with the other affected federal authorities and the implementing partners and supplemented, in particular, by the key indicators for performance monitoring. The descriptions compiled during or subsequent to the stakeholder process act as a guideline. The detailed descriptions of the measures are documented by the Confederation and published.

Immediate measures (Chapter 4.1). On 18 May 2016 the Federal Council resolved to support the cantons in the implementation of measures for the urgent alleviation of implementation deficits in the areas of nature conservation and forest biodiversity during the period 2017-2020. These immediate measures are based on the implementation of tasks defined on a four-yearly basis in the programme agreements between the Confederation and the cantons in the area of the environment.⁸² The aim of the immediate measures is to supplement the cantonal efforts already under way in the area of the environment; for this reason they are defined in the renegotiation of the programme agreements for the period 2016-2020 and their implementation should continue in the period 2021-2023.

The measures listed in Chapter 4.1 indicate the most important topics for projects and for further initiatives for the implementation of immediate measures. To begin, biotopes of national importance and also those of cantonal and regional importance are in a poor qualitative state and must be remediated, upgraded and maintained. Thanks to the implementation of the Forest Policy 2020, the situation in relation to biodiversity in Switzerland's forests has already improved somewhat. However, the areas in which biodiversity takes priority over human interests are not sufficient to ensure the long-term conservation of forest biodiversity. In addition there is insufficient old growth and deadwood to ensure sufficient habitats for saproxylic (i.e. wood-dwelling) species. Approximately one quarter of all species living in Switzerland's forests (some 6,000 species) rely on old growth or deadwood for their survival. Moreover, action is urgently required in relation to the national priority species which are dependent on diverse habitats and structures – also outside of biotopes.

Synergy measures (Chapter 4.2). The aim of these measures is to improve the information basis, define conceptual framework conditions and exploit potential synergies so that greater support can be provided for biodiversity within individual sectors and policies (e.g. nature conservation, landscape, spatial planning) and through concerted efforts with different sectors and policies (e.g. financial and construction sector, international cooperation). This includes, for example, the more effective implementation of existing instruments for the promotion of habitats, the provision of best practice examples (e.g. model building regulations) and the integration of biodiversity-relevant factors into decision-making processes (e.g. avoidance of inappropriate incentives in domestic subsidy allocation and in international biodiversity financing). In addition, a conceptual basis must be established for the long-term securing of space for biodiversity in terms of quantity, quality and optimal regional distribution.

Measures with pilot projects (Chapter 4.3). Pilot projects guarantee initial concrete and effective steps for the implementation of complex and costly measures. This applies in particular to the establishment or further development of the ecological infrastructure (e.g. through the promotion of the regional network planning), species promotion (national priority species), and the raising of awareness among user groups and the public for the relevance of biodiversity in terms of human and social welfare. The pilot projects demonstrate how the available resources can be used effectively and efficiently to promote biodiversity in practice.

Table 2

Measures of the Biodiversity Action Plan to be implemented in the initial implementation phase 2017-2023.

	Chapter
Immediate measures	4.1
Maintenance and remediation of existing protected areas	4.1.1
Creation and maintenance of forest reserves	4.1.2
Ensuring the availability of old growth and deadwood in sufficient quantities and quality	4.1.3
Specific promotion of national priority species	4.1.4 / 4.3.4
Synergy measures	4.2
Design of the countrywide ecological infrastructure	4.2.1
Development of a Swiss soil strategy	4.2.2
Adaptation of agricultural production to local natural conditions	4.2.3
Evaluation of the impact of federal subsidies	4.2.4
Consideration of ecosystem services in spatially relevant decisions	4.2.5
Incorporation of biodiversity factors into existing sustainability standards	4.2.6
Biodiversity requirements in model building regulations	4.2.7
International cooperation for the benefit of biodiversity and implementation of obligations in the area of biodiversity financing	4.2.8
Use of international insights for the benefit of national biodiversity policy	4.2.9
Measures with pilot projects	4.3
Regional connectivity planning for ecologically valuable habitats	4.3.1
Optimisation of intersectoral habitat promotion	4.3.2
Rezoning of development land for the benefit of biodiversity	4.3.3
Specific promotion of national priority species	4.3.4
Raising of awareness about biodiversity	4.3.5
Exemplary protection and promotion of biodiversity in actively used federal areas	4.3.6

Table 3**Measures to be examined for a second implementation phase 2024-2027**

Chapter	
Measure	5
Binding safeguarding of particularly valuable biodiversity areas	5.1
Elaboration and further development of sector-specific instruments and programmes for the avoidance of genetic impoverishment	5.2
Creation and development of ex-situ collections for the conservation of priority genetic resources and endangered species	5.3
Strengthening of Swiss research in the area of biodiversity	5.4
Strengthening of the topic of biodiversity in general and vocational education	5.5
Sector-specific strengthening of the topic of biodiversity in further education and consultancy	5.6
Strengthening of measures against the illegal trade in animals and plants	5.7
Optimised and modernised data management	5.8

3.2.3 Pilot projects

The pilot projects^{vi} (Annex A) are implemented under the auspices of the FOEN or jointly by the FOEN and other federal authorities. In the area of roads and rail infrastructure, these authorities are the Federal Roads Office (FEDRO) and the Federal Office of Transport (FOT). Cooperation with the Federal Department of Defence, Civil Protection and Sport (DDPS) is planned on the topic of safeguarding federal areas for biodiversity.

Pilot projects under the auspices of the FOEN The pilot projects (Annex A) contribute to accelerating the creation and development of the ecological infrastructure, for example through the upgrading of the aquatic environment for biodiversity or through the promotion of biodiversity in urban agglomerations. The promotion of national priority species aims to consider these species' specific requirements of their habitats and to promote their long-term survival in other ways. The pilot projects should demonstrate the economic added value of the promotion of biodiversity (e.g. improvement of site qualities, valorisation of aquatic areas for the economy and society) and contribute to raising awareness among decision-makers in business, politics and society and also among the general public (e.g. experience of nature in built-up areas).

Pilot projects in the roads sector Transport infrastructure (roads, railways) have a very negative impact on biodiversity.^{vii} The Federal Roads Office (FEDRO) already takes the FOEN's requirements in relation to biodiversity and the environmental regulations into account in its road construction projects today. For example, the fragmentation effect of transport modes can be reduced through the selection of suitable wildlife crossing aids. The FOEN-FEDRO pilot projects aim to improve and complement efforts for the remediation of wildlife corridors. In addition, better use should be made of the

^{vi} The definitive compilation of the project descriptions for the pilot projects is part of the implementation of the SBS Action Plan.

^{vii} Oggier, P., Righetti, A., Bonnard, L. (Eds., 2001): Zerschneidung von Lebensräumen durch Verkehrsinfrastrukturen COST 341. Umwelt-Wissen Nr. 0714 (2. aktualisierte Auflage der BUWAL-Schriftenreihe Umwelt Nr. 332). Bundesamt für Umwelt; Bundesamt für Raumentwicklung; Bundesamt für Verkehr; Bundesamt für Strassen. Bern, 101 pp.

habitat potential of green spaces along transport infrastructure (in accordance with the methodology used by FEDRO for the maintenance of green spaces along the national highways).^{viii}

As part of a joint pilot project, FEDRO will clarify whether it will be possible to tighten up the schedule for the national highway programme *Sanierung der Wildtierkorridore* ("Remediation of wildlife corridors"). To this end, working in cooperation with the cantons, the FOEN will revise and update the information base on the remediation of wildlife corridors of regional importance by the end of 2019. In addition, by way of example, the protection and promotion of national priority species will be demonstrated based on measures adopted for bats.

Pilot projects in the area of railway infrastructure Railway infrastructure also has a very damaging impact on biodiversity. For this reason, a lot is already done for biodiversity in connection with new railway infrastructure. The Federal Office of Transport (FOT) has established, however, that action is needed in relation to maintenance (e.g. embankment maintenance). Hence the FOT shall provide better support to the FOEN in the promotion of biodiversity in the railway sector. This includes, in particular, plans for the better protection, promotion and long-term conservation of biodiversity by railway infrastructure operators. The FOT aims to adopt biodiversity as a component of performance agreements from 2021. To this end, the FOT will define corresponding performance targets with the railway infrastructure operators and monitor their compliance. The implementation of the measures is the responsibility of the infrastructure operators. They are obliged to implement the measures commensurately and in the context of pending maintenance work so that the efficient use of resources is guaranteed. It is also planned to establish further pilot projects with the railway infrastructure operators. The FOEN's core concerns in this regard relate to site-appropriate embankment maintenance, wildlife crossing aids (overpasses and underpasses) for railway lines and the biodiversity-relevant design and maintenance of railway station areas. These measures should help with the improvement of the ecological infrastructure in particular and also the promotion of national priority species.

Pilot projects in the area of safeguarding federal areas for biodiversity Biotopes, habitats and species hotspots, which are of great relevance for the conservation and promotion of biodiversity in Switzerland and particularly for the creation and development of ecological infrastructure, are located in numerous areas owned by the Federal Department of Defence, Civil Protection and Sport (DDPS). In the process of the further development of the army, several sites and properties will be eliminated from military use in the years to come and will be available for civil use (disposable inventory, in accordance with the army's stationing strategy). For this reason, as part of a joint project, the FOEN and DDPS will establish a general overview of biodiversity-relevant areas and properties from the army's disposable inventory. They will also assess which areas should initially remain the property of the Confederation so that they will then be available for a possible exchange of lands with the cantons for the purpose of promoting biodiversity. General conditions for ensuring the sustainable management of these areas will also have to be defined.

3.3 Implementation phases, financing and reporting

The urgent need for action in relation to biodiversity is undisputed (see also Chapter 2). However, political reality and, particularly, financial and temporal conditions in Switzerland pose an obstacle to the implementation of measures in support of biodiversity. The tense budgetary situation and efforts to achieve savings at federal and cantonal levels considerably limit the capacity to provide additional

^{viii} Location-suitable embankment maintenance in accordance with FEDRO Guideline 18007 *Grünräume an Nationalstrassen* (Green Spaces along national highways) and the associated document 88007 *Methodologie zur Festsetzung von Biodiversitätsschwerpunkten* (Methodology for definition of biodiversity priorities).

financial and human resources for improving the state of the environment and guaranteeing the provision of these resources for extended periods. For this reason, the practical implementation of the measures contained in the Action Plan will take place in phases and across extensive areas using existing resources.

Two implementation phases are currently planned (Fig. 1). Implementation Phase I covers the years 2017-2023 and Implementation Phase II the years 2024-2027. The end of Implementation Phase I and all of Implementation Phase II are deliberately aligned with the periods set out in the programme agreements between the Confederation and cantons in the area of the environment. The programme agreements are a federal subvention instrument for joint tasks in the area of the environment. This enables the more efficient and effective use of existing resources for the benefit of biodiversity. At the same time, in the context of the programme agreements the Confederation can define priorities for the promotion of biodiversity, and the cooperation between the Confederation and cantons in the implementation of corresponding measures can be intensified.

Implementation Phase I: 2017-2023. Implementation Phase I involves the implementation of measures for the urgent reinforcement of policy execution (immediate measures), synergy measures and, from 2019, pilot projects.

Impact Analysis 2022 and Financial Decision 2023. All measures and pilot projects included in Implementation Phase I will be evaluated in 2022 in relation to their ecological and economic impact on the conservation and promotion of biodiversity. This impact analysis will form the basis for the substantive and financial decisions in relation to Implementation Phase II. Applications for the continuation of measures or projects or the inclusion of additional measures in the Biodiversity Action Plan will be presented to the Federal Council in 2023 at the latest.

Implementation Phase II: 2024-2027. Measures from Implementation Phase I will be continued, adapted or supplemented by additional measures during Implementation Phase II. From today's perspective, the continuation of the immediate measures for the urgently required reinforcement of policy execution for the benefit of biodiversity will be essential. The existing deficits are so extensive that they cannot be completely eliminated by the end of 2023. In addition, it is planned to carry out measures in Implementation Phase II that could not be included in Implementation Phase I due to a lack of resources. These include, for example, measures in the areas of research, education and further training, and data management.

Overall Evaluation 2026 and continuation of the Biodiversity Action Plan after 2027. Implementation Phase II includes an overall evaluation for the assessment of the Swiss Biodiversity Strategy and its implementation. The results of the remediation efforts made by the cantons up to then and the remaining deficits will also be demonstrated. The Overall Evaluation of 2026 will also act as a decision basis for the continuation of the Biodiversity Action Plan after 2027. The conservation and promotion of biodiversity will continue to be a vital task to be carried out in the interest of the population after 2027.

Figure 1**Temporal structure of the Action Plan and alignment with the NFE (New Fiscal Equalisation) programme periods**

		Implementation Phase I							Implementation Phase II				
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	...
Immediate measures	✓*	Federal Council decision financing 2019**-2023					Impact Analysis	Federal Council decision continuation 2024-2027			Overall Evaluation		
Synergy measures													
Pilot projects													
Programme agreements in the area of the environment	2016 - 2019				2020 - 2023				2024 - 2027				

* In accordance with the Federal Council decision of 18 May 2016 on the financing of immediate measures in the areas of nature conservation and forest biodiversity 2017-2020.

**Additional funding for the continuation of the immediate measures will not be required until 2021..

3.4 Legislative action requirement

The measures contained in the Biodiversity Action Plan and proposed for Implementation Phase I can be carried out within the framework of the existing legislation. Eventual gaps in relation to acts and ordinances can be addressed as a output of the Impact Analysis of 2022.

4 Measures for Implementation Phase I 2017-2023

All measures to be carried out in Implementation Phase I are based on existing legislation.

4.1 Immediate measures

The purpose of the immediate measures is to remedy urgent implementation deficits in existing biotopes and in the area of forest biodiversity and to fill the gaps that exist in the information base relating to the national priority species. The implementation of the immediate measures is defined in the framework of programme agreements between the Confederation and cantons in the area of the environment. The allocation of resources is based on the targets and measures contained in the manual on the programme agreements.

4.1.1 Maintenance and remediation of existing protected areas

The aim of programme agreements between the Confederation and Cantons is to ensure that the biotopes of national importance, including sufficient buffer zones, are upgraded or remediated and that these areas are maintained.

There is a backlog in relation to the maintenance and remediation of existing protected areas, both for the biotopes of national importance in accordance with the Protection of Nature and Heritage Protection Act (NCHA) and for the hunting-free and low-noise protected areas in accordance with the Federal Act on the Hunting and Protection of Wild Mammals and Birds (HuntA). The implementation of the remediation measures will be agreed between the Confederation and cantons, defined in management and maintenance plans, and phased and prioritised on the basis of the criteria: action requirement, significance, upgrading potential and feasibility. The Confederation will develop a system for the monitoring of the maintenance and remediation measures and will systematically monitor the quality of their implementation. The cantons will ensure that similar measures are formulated and implemented for biotopes of regional and local importance. With a view to enabling the greater integration of biotopes into spatial planning, an effort will also be made to ensure the binding guaranteeing of biotopes among landowner.

4.1.2 Creation and maintenance of forest reserves

The programme agreements between the Confederation and cantons in the area of forest biodiversity will be further developed and impact analyses will be carried out to ensure the consistent implementation of the objectives for natural forest development defined in the Forest Policy 2020.

The Forest Policy 2020 stipulates that the existing area accounted for by forest reserves (5.6% of forest area as of the end of 2014) shall be increased to 8% by 2020 and to 10% by 2030 and that 30 large reserves (>500ha) shall be created by then. This shall enable the attainment of the Federal Council's Vision 2030 regarding the sustainable use of the natural resource forest. Natural forest reserves facilitate a natural dynamic in which the world of organisms and their inanimate environment are left to develop naturally. In this way, natural forest reserves afford the protection of processes necessary for the long-term conservation of biodiversity and also provide important reference areas for the monitoring of natural processes and objects of study for nature education. Special forest reserves will also be created for the implementation of habitat promotion measures

for national priority forest species and communities and for the promotion of ecologically valuable forest habitats.

4.1.3 Ensuring the availability of old growth and deadwood in sufficient quantities and quality

As part of the implementation of the Forest Policy 2020, it is planned to remedy the most significant ecological deficits in Switzerland's forests (lack of decay phase, lack of old trees, insufficient old growth and deadwood in terms of both quality and quantity).

Switzerland's forest is a relatively near-natural habitat which is managed on a near-natural basis (e.g. no fertilisers or pesticides, natural regeneration, long-term harvesting cycles). Nonetheless it presents deficits in relation to biodiversity.⁸³ In many forest areas, the target values for the deadwood volume defined in the Forest Policy 2020 have not yet been reached and its distribution is unsatisfactory. Old trees and old growth and deadwood are a crucial resource for the survival of many forest species. As a result almost half of Switzerland's saproxylic beetle species are defined as threatened.⁸⁴ The target values for deadwood defined in the in the Forest Policy 2020 are attained indirectly through the promotion of islands of old growth and biotope trees and through natural processes (e.g. storms). Awareness of the importance of islands of old growth, biotope trees and deadwood shall be raised among forest owners, forest managers and the public.

4.1.4 Specific promotion of national priority species

Building on the "Swiss Species Promotion Plan", the Confederation will develop action plans for the promotion of national priority species, based on which the cantons will plan and implement region-specific species promotion measures. National consultancy offices will be established and supplemented by regional ones. The training of species experts will also be funded.

The action plans in accordance with the "Swiss Species Promotion Plan" will be based, inter alia, on the habitat requirements of the national priority species and their species groups. In addition, areas will be identified in which measures for the promotion of the national priority species and/or species communities shall be carried out. Adapted use and species promotion are not mutually exclusive. The action plans and identified areas will provide the cantons with a basis for the planning and implementation of region-specific measures for the long-term conservation and promotion of national priority species. The protection objectives and the implementation of specific promotional measures for national priority species will be defined in the context of the programme agreements and thus funded by the Confederation. The cantons will ensure that analogue measures are defined and implemented for the regional priority species.

4.2 Synergy measures

Synergy measures improve the fundamentals, define conceptual framework conditions and exploit potential synergies so that more optimal support can be provided for biodiversity within individual sectors and policies (e.g. nature conservation, landscape, spatial planning) and through concerted efforts with different sectors and policies (e.g. financial and construction sector, international cooperation).

4.2.1 Design of the countrywide ecological infrastructure

In cooperation with the cantons, the Confederation will develop a holistic system of targets for the ecological infrastructure incorporating substantive and spatial principles and objectives for the safeguarding of space for the long-term conservation of biodiversity (quantitatively, qualitatively and regionally distributed). Existing elements of ecological infrastructure in the regions shall be conserved or promoted through the establishment and development of the countrywide ecological infrastructure.

Working in close cooperation with the cantons and other interested circles – primarily actors involved in the protection and use of biodiversity – the Confederation will begin by developing a conceptual basis for the further development of the ecological infrastructure. Data available for the portrayal of the ecological infrastructure will be verified and deficits identified. Further measures ensuring an efficient and comprehensive portrayal will be applied. The added value of a concept in accordance with Art. 13 of the Spatial Planning Act (RPG) and the integration of the principles of ecological infrastructure into an existing planning instrument (e.g. Swiss Landscape Concept, LKS) will be examined.

4.2.2 Development of a Swiss soil strategy

The Confederation will develop a Swiss soil strategy with the aim of ensuring the long-term conservation of the soil as a non-renewable resource and of its natural functions.

The Swiss soil strategy shall present measures for sustainable and integrated soil management. It is aimed to establish a “National Competence Centre for Soil” for the management and provision of information about soil (in fulfilment of parliamentary motion 12.4230^{ix}). In addition, policy implementation in relation to soil matters shall be intensified and efforts introduced for increasing the awareness of users and the general public of the importance of the resource soil. Concrete measures will be formulated in the context of the development of the Swiss soil strategy.

^{ix} Motion Müller-Altermatt. Nationales Kompetenzzentrum Boden als Gewinn für Landwirtschaft, Raumplanung und Hochwasserschutz (“National Competence Centre for Soil as a benefit for agriculture, spatial planning and flood protection”). https://www.parlament.ch/centers/kb/Documents/2012/Kommissionsbericht_UREK-S_12.4230_2015-03-30.pdf

4.2.3 Adaptation of agricultural production to local natural conditions

In accordance with the findings of the report compiled in response to parliamentary postulate 13.4284^x and in fulfilment of the objectives of the Swiss Biodiversity Strategy, the target deficits identified in the environmental objectives for agriculture will be remedied, particularly in relation to biodiversity and nitrogenous atmospheric pollutants.

To remedy the deficit in the area of biodiversity, existing production systems will be evaluated and further developed. In addition, the question as to whether and to what extent a “Biodiversity evaluation, criteria and consultancy system” would add value for the specific promotion of species and habitats will be examined. To eliminate the deficits in relation to nitrogenous atmospheric pollutants in agriculture, the Confederation and cantons will improve the implementation of emissions reduction measures (sheds, manure stores and manure spreading). In addition, the direct payment instruments for the promotion of biodiversity in grassland and arable areas contained in the Direct Payments Ordinance (biodiversity compensation areas, habitat connectivity, structural elements) will be examined in relation to their biological impact on the promotion of native species and habitats. The design of these instruments, their service requirements and compensation will be improved with a view to increasing effectiveness.

4.2.4 Evaluation of the impact of federal subsidies

The Confederation will present an overall evaluation of the impacts of federal subsidies and other incentives with consequences for biodiversity by 2023.

The impacts of existing federal subsidies and other incentives with impacts on biodiversity will be examined and options for the avoidance of misplaced incentives will be demonstrated. Selected issues will be analysed in detail and processed for the overall evaluation. The latter will provide a comprehensive overview of the progress attained up to 2023. Resulting possibilities for improvement will be indicated and recommendations for optimising policy implementation will also be made.

^x Report compiled in response to the Bertschy postulate, Po. 13.4284. <https://www.bafu.admin.ch/bafu/de/home/themen/biodiversitaet/publikationen-studien/publikationen/umweltziele-landwirtschaft-statusbericht-2016.html>

4.2.5 Consideration of ecosystem services in spatially relevant decisions

The Confederation will initiate and support groundwork for the definition of indicators that demonstrate the economic and social significance of ecosystem services for the Swiss economy and society. The indicators will be examined every four years and adapted and updated if required.

Reliable information about many ecosystem services is lacking and this makes it difficult to take sufficient account of them in political, economic and social decision-making processes.⁸⁵ For this reason, the Confederation would like to record, quantify and communicate information about these services in a coordinated fashion. The international project "The Economics of Ecosystems and Biodiversity" (TEEB) provides a model for this process.⁸⁶ To begin, a system of indicators for ecosystem services and the natural capital will be developed. Synergies with existing monitoring programmes, environmental surveys and research platforms operating at both national and international levels will be exploited. Based on this indicator system, instruments will be developed that facilitate the incorporation of the ecosystem services into technical, political and economic decision-making processes. The Confederation will also engage in knowledge transfer on the topic of ecosystem services. The focus here will be on the practical application and integration of ecosystem services, in particular in the context of spatially-relevant decisions by authorities and construction clients. The insights gained from this work will be used to raise awareness among decision makers and society in general.

4.2.6 Incorporation of biodiversity factors into existing sustainability standards

Based on its label strategy,⁸⁷ the Confederation will support the incorporation of concrete biodiversity criteria into sustainability standards and their increasing consideration in the financial decisions of different sectors.

Sustainability standards shall be based more specifically on criteria for the protection and promotion of biodiversity and be applied more frequently, for example in the context of construction projects, public sector procurement decisions, private companies, the financial market processes of private financial services providers and pension schemes, and in international negotiations and investments, and projects carried out in developing and newly industrialised countries. The Confederation will also establish the conditions necessary for assessing the impact of products on biodiversity based on life cycle assessments (LCA).

4.2.7 Biodiversity requirements in model building regulations

With a view to promoting biodiversity in built-up areas, the Confederation will develop model building regulations and make them available to the cantons and communes as guidelines. The implementation of the model building regulations may require the adaptation of the cantonal building legislation.

Model building regulations will provide the cantons and communes with guidelines for local planning and for the formulation, verification and implementation of legal building and planning regulations. The legal requirements for ecological compensation in built-up areas, that is the promotion of habitats and their connectivity, will be substantiated in the model building regulations. In addition, biodiversity-relevant factors will be taken into account in the context of invitations to tender

for planning projects, the assessment of planning applications, and the assessment and authorisation of building projects.

4.2.8 International cooperation for the benefit of biodiversity and implementation of obligations in the area of biodiversity financing

In accordance with the “Dispatch on Switzerland’s International Cooperation 2017-2020”, Switzerland will focus on the protection and sustainable management of natural resources and ecosystems.

Switzerland will intensify its commitment to biodiversity in the context of international cooperation.⁸⁸ The focus here is on the sustainable use of biodiversity, the sustainable management of natural resources and ecosystems, the promotion of sustainable production methods, the promotion of sustainable trade, and the implementation of the principles of Access and Benefit-Sharing (ABS).

Switzerland will also provide the maximum possible support for the secretariats of biodiversity-relevant multilateral agreements (e.g. Convention on Biological Diversity, Bonn Convention, Ramsar Convention, CITES Convention).

4.2.9 Use of international information for the benefit of national biodiversity policy

Switzerland will intensify its commitment to international organisations and collaborate on international reporting so that political decisions relating to the topic of biodiversity can be based on comprehensive scientific knowledge.

Switzerland will provide financial support for projects for the provision and global exchange of biodiversity-relevant information by institutions such as UNEP-Grid, IUCN, UNEP-WCMC and the GBIF and will support the CBD’s scientific expert groups. Switzerland will also contribute to GEO-BON, one of the most important global coordination bodies that records information about biodiversity (in particular on the monitoring of biodiversity and its change over time), and intensify its commitment to the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), e.g. by supporting the Technical Support Unit (TSU) for Europe/Central Asia which is based in Switzerland.

4.3 Measures with pilot projects

Pilot will projects will ensure the initial concrete and effective steps towards the implementation of complex and costly measures.

4.3.1 Regional connectivity planning for ecologically valuable habitats

The barrier effect of built-up areas and transport infrastructure is an obstacle to functional spatial connectivity throughout the country. To advance the establishment and further development of the ecological infrastructure, the cantons will develop connectivity planning, and requirements for the conservation and promotion of biodiversity will be added to the transport sectoral plan and its sub-plans.

Pilot Projects (Annex A)

- A1.1 *Wasserschloss 2.0* vision ('Water Castle 2.0' vision)
- A1.2 Valorisation of the ecological infrastructure in the parks of national importance
- A1.3 Where the forest is still wild
- A1.4 Potential of land exchange for biodiversity

The following pilot projects by the infrastructure authorities will also contribute to habitat connectivity:

FEDRO

- A7.1 Re-establishment of habitat connectivity and habitat promotion along the national highway network

FOT

- A8.2 Making railway tracks passable
- A8.4 Improving habitat quality along railway tracks

4.3.2 Optimisation of intersectoral habitat promotion

The Confederation would like to advance the countrywide functional connectivity of habitats. To this end, greater use will be made of the synergies between farming, forestry and water bodies in the upgrading of habitats.

Pilot Projects (Annex A)

- A2.1 Mitigation of climate change: sustainable use helps Swiss mires
- A2.2 Promoting biodiversity and landscape quality in agglomeration areas

4.3.3 Rezoning of development land for the benefit of biodiversity

The Confederation will support the cantons in the implementation of the requirements of the Spatial Planning Act in relation to reducing oversized development areas with a view to preventing fragmentation. In accordance with the Swiss Biodiversity Strategy, areas that are located, inter alia, in a federal or cantonal biotope or that fulfil an interregional connectivity function shall be rezoned.

Pilot Project (Annex A)

A3.1 Rezoning of development land for the benefit of biodiversity

4.3.4 Specific promotion of national priority species – see also 4.1.4

Building on the *Konzept Artenförderung Schweiz* ("Swiss species promotion strategy"), the Confederation is developing action plans for the promotion of national priority species, based on which the cantons will plan and implement region-specific measures for the promotion of species. Among other things, areas will be identified in which measures shall be implemented for the promotion of the national priority species and/or species communities. Other possible measures include adapted land use and species promotion. National advice centres will be further developed and replaced by regional ones. Funding will also be provided for the training of species experts.

Pilot Projects (Annex A)

- A4.1 Avoiding the electrocution of birds throughout Switzerland
- A4.2 Incentive system for the designation and maintenance of areas for species promotion
- A4.3 Defusing the conflict between traffic and the protection of small animals

Pilot projects carried out by the infrastructure authorities also contribute to the promotion of national priority species:

FEDRO

- A7.1 Re-establishing habitat connectivity and habitat promotion along the national highway network

FOT

- A8.1 Bird-safe medium voltage railway power poles
- A8.2 Making railway tracks passable
- A8.3 Biodiversity hotspots in railway areas
- A8.4 Improving habitat quality along railway tracks

4.3.5 Raising awareness about biodiversity

A large proportion of the population is unaware of the loss of biodiversity and its consequences for society and the economy.⁸⁹ For this reason, the Confederation wishes to increase the population's awareness of the risks associated with biodiversity loss and in this way promote public willingness to engage in biodiversity-friendly action.

Pilot Projects (Annex A)

- A5.1 Mainstreaming Biodiversity
- A5.2 Tracking down the value of water
- A5.3 Nature on the doorstep

4.3.6 Exemplary protection and promotion of biodiversity in actively used federal areas

All federal areas will be examined in relation to their potential for promoting biodiversity and, if suitable, conserved, maintained, upgraded and connected. The targets defined in the management systems of the different federal authorities will be standardised by 2023. Insofar as the conservation targets for the benefit of biodiversity are harmonised or coordinated with the main use of federal areas and can also be guaranteed in the long term, such areas form part of the ecological infrastructure. The Confederation will collect and document examples of best practice based on the experience of its own federal operations, the cantons, communes and third-party operations and, as part of the promotion of biodiversity, will communicate these experiences and recommendations for the biodiversity-friendly maintenance of public sector areas or their upgrading to the cantons and communes.

Pilot Project (Annex A)

- A6.1 Safeguarding of federal areas as a valuable component of the ecological infrastructure

5 Measures to be Examined for Implementation

Phase II 2024-2027

For reasons of resource availability, the implementation of the following measures is not planned until the period 2024-2027. An impact analysis of the measures and pilot projects carried out during Implementation Phase I will demonstrate whether these measures are relevant to the attainment of the objectives defined in the Swiss Biodiversity Strategy.

5.1 Binding safeguarding of particularly valuable biodiversity areas

As part of the planned impact analysis of the Biodiversity Action plan, new measures and instruments that support the public sector in its efforts to establish and develop the ecological infrastructure and conserve ecologically valuable areas will be examined by 2022 at the latest. In particular, the obligation to promote biodiversity in the corresponding areas shall be intensified.

The public sector has a key role to play in the targeted establishment and development of the countrywide ecological infrastructure. The public sector shall make multiple use of the interaction between the varying approaches of different policy areas (e.g. environmental, spatial planning and agricultural law). As a priority measure, a suitable incentive system combined with an obligation for the expedient agricultural management of ecologically valuable areas that could be implemented within the framework of the existing legislation is being examined. The acquisition of agricultural land on the open market (as a result of the abandonment of agricultural use) can be examined can also be examined in extreme cases. However, this would require the establishment of a new exception to the owner/farmer principle under agricultural land law. Lands acquired in this way must serve the conservation of biological diversity directly (through ecological upgrading) or indirectly (as like-for-like compensation). The care and maintenance of these areas will be ensured through leasing agreements.

5.2 Elaboration and further development of sector-specific instruments and programmes for the avoidance of genetic impoverishment

In fulfilment of Aichi Biodiversity Target 13 of the Strategic Plan to the Convention on Biological Diversity, the Confederation aims to safeguard the genetic diversity of cultivated plants and farmed animals and their wild relatives. The long-term conservation of other socio-economically and culturally valuable species shall also be ensured in the long term.

Measures to counteract genetic impoverishment will be defined and implemented for different sectors, e.g. agriculture and forestry, horticulture and fisheries. They will focus on the use of native species and genetically adapted, local ecotypes and on the conservation and promotion of near-natural habitats. The uses shall also take species-specific characteristics into account (e.g. growth, spawning season, spawning location for fish).

5.3 Creation and development of ex-situ collections for the conservation of priority genetic resources and endangered species

The Confederation will coordinate a network of national ex-situ collections for the long-term conservation of priority genetic resources and of the genetic diversity of Switzerland's priority species.

Ex-situ collections will concentrate on highly-endangered plant species, for which in-situ conservation is insufficient. Where possible, priority genetic resources for Switzerland will be stored and conserved in national botanic and zoological gardens or in other ex-situ collections (e.g. culture collections). This approach is in line with the objectives of the Global Strategy for Plant Conservation. In accordance with the strategy, 75% of Switzerland's endangered plant species shall be conserved in seed and spore databases.

5.4 Strengthening of Swiss research in the area of biodiversity

In addition to engaging in disciplinary exchange, Swiss biodiversity research will also aim specifically to involve other scientific disciplines in seeking answers to research questions in the area of biodiversity. It will also try to increase its focus on practice-oriented issues.

Switzerland's universities and research institutes will be motivated to intensify their cooperation, networking and coordination on the topic of biodiversity at national and international levels. The Confederation and cantons will clarify whether teaching and research on biodiversity should be increased and coordinated nationally. This will be done through the bodies of the Schweizerische Hochschulkonferenz SHK (Conference of Swiss Universities) with the involvement of swissuniversities (conference of rectors of Swiss institutions of higher education) and will also take the autonomy of the universities into account.

5.5 Strengthening of the topic of biodiversity in general and vocational education

The Confederation has great interest in ensuring that greater emphasis be placed on the transfer of knowledge in relation to biodiversity in the context of general and vocational education.

In compliance with the division of powers, the Confederation will make the case to the cantons for incorporating biodiversity as an interdisciplinary topic into curricula, teaching resources and course provision, and into the education and further training of teachers working in compulsory and general education at upper secondary level.

In relation to both basic and higher vocational education, the Confederation invites the cantons and professional organisations to incorporate biodiversity-specific competencies into the regulations for professions in biodiversity-relevant sectors and into curricula, and to integrate them into teaching materials and course provisions and their quality development.

In addition, the Confederation will make the case to the cantons for the integration of the topic of biodiversity as an interdisciplinary topic into the education and further training of teachers working in vocational schools, persons responsible for training in host companies and lecturers involved in higher vocational education.

5.6 Evaluation of the sector-specific strengthening of the topic of biodiversity in further education and consultancy

The Confederation has great interest in ensuring that biodiversity is established as an interdisciplinary topic in the education and further-training of those responsible for further training and for consultants working in biodiversity-relevant areas.

The Confederation will invite the cantons and educational and consultancy institutions to offer advice and further training for professionals, to act as appoint of contact, to operate platforms for exchange, and to provide documentation. In this way professionals can acquire the specialist and general skills necessary for understanding biodiversity as a central factor and to support its protection and conservation in their professional environment. This will strengthen the acceptance of measures for the promotion of biodiversity and cooperation between the different actors.

5.7 Strengthening of measures against the illegal trade in animals and plants

The Confederation will intensify its commitment to measures against the cross-border trade in protected animal and plant species.

The illegal importation of species listed in the CITES Appendices will be further restricted through optimised border and domestic controls. The severity of penalties will be increased through the adaptation of the Federal Act on the Trade in Protected Animal and Plant Species (FA-CITES). The sanctions shall act as a deterrent from engaging in the illegal trade in protected animals and plants.

5.8 Optimised and modernised data management

Faster and easier access to existing data on biodiversity shall be made available to interested circles.

Federal data surveying programmes⁹⁰ will be assessed in relation to their topicality, technological status, standardisation and accessibility; gaps in the data will be demonstrated and existing methods further developed. Possible interfaces with data surveys carried out by different federal authorities and the cantons that can be used for the benefit of biodiversity will be identified. Optimisation measures will be formulated and implemented based on this.

At international level, optimisation measures in the area of data management and reporting aim, inter alia, to reduce the work involved for the Member States in reporting to the biodiversity-relevant conventions. These efforts, which are supported by Switzerland, aim to establish a simplified, modular reporting system (e.g. development of a global data reporting tool).

Annex A – Pilot Projects

Table 4

Overview of pilot projects and lead offices

Office	No	Title
FOEN	1 – Regional connectivity planning for ecologically valuable habitats	
	A1.1	Wasserschloss 2.0 vision ('Water Castle 2.0' vision)
	A1.2	Valorisation of the ecological infrastructure in the parks of national importance
	A1.3	Where the forest is still wild
	A1.4	Potential of land exchange for biodiversity
	2 – Optimisation of intersectoral habitat promotion	
	A2.1	Climate change mitigation: sustainable use helps Swiss mires
	A2.2	Promoting biodiversity and landscape quality in urban agglomerations
	3 – Rezoning of development land for the benefit of biodiversity	
	A3.1	Rezoning of development land for the benefit of biodiversity
	4 – Specific promotion of national priority species	
	A4.1	Avoiding the electrocution of birds throughout Switzerland
	A4.2	Incentive system for the designation and maintenance of areas for species promotion
	A4.3	Defusing the conflict between traffic and the protection of small animals
	5 – Raising awareness about biodiversity	
	A5.1	Mainstreaming biodiversity
	A5.2	Tracking down the value of water
	A5.3	Nature on the doorstep
DDPS	6 – Exemplary protection and promotion of biodiversity on actively used federal lands	
	A6.1	Safeguarding of federal areas as a valuable component of the ecological infrastructure
FEDRO	A7.1	Re-establishing habitat connectivity and habitat promotion along the national highway network*
FOT	A8.1	Bird-safe medium voltage railway power poles
	A8.2	Making railway tracks passable
	A8.3	Biodiversity hotspots in railway areas
	A8.4	Improving habitat quality along railway tracks

*Implementation by 2027

1 Regional connectivity planning for ecologically valuable habitats

Pilot project	Background, motivation	Aim, effectiveness
A1.1 <i>Wasserschloss 2.0 vision</i> ("Water Castle 2.0" vision)	Background: The unique topographical structure of our country makes Switzerland the 'water castle' of Europe. Water is fundamental to our survival and an extremely important raw material for our economy. Switzerland's water bodies also form the backbone of the connectivity between biodiversity-relevant areas. Hence our water bodies are a central component of the ecological infrastructure. Motivation: As a valuable good, water is associated with wide-ranging interests and desires today but also with major responsibilities vis-à-vis future generations. When it comes to designing Switzerland's environmental policy in relation to water bodies and formulating and implementing concrete measures for nature and the landscape, it is important to establish how the population and other interest groups imagine the 'water castle' of the future.	Aim: To record the needs and perceptions of the public and different economic user groups in relation to the topic of Swiss water bodies and their use in three suitable pilot regions; to identify commonalities and conflicts of interest and possible ways of resolving them; and, finally, to outline a concrete vision of the 'water castle' of the future that relates to the pilot regions. Effectiveness: A basis will be created for the design of Switzerland's environmental policy in relation to water bodies. Awareness of the ecological, economic and social importance and beauty of Switzerland's water bodies will also be raised among stakeholders and the general public.
A1.2 Valorisation of the ecological infrastructure in the parks of national importance	Background: The Federal Office for the Environment (FOEN) launched a project for the promotion of the ecological infrastructure in the parks of national importance in 2016. Ten cantons are participating in the project as contractual partners of the FOEN. The project perimeter includes all 15 regional nature parks and the Sihlwald nature discovery park. Motivation: The creation of ecological infrastructure throughout Switzerland should support and boost the existing nature and landscape value of the parks of national importance. Added value for the local populations and for the park visitors should also be generated through the sustainable use of the ecological infrastructure.	Aim: To record the ecological, economic and cultural values that arise or are intensified through the creation of ecological infrastructure in the parks of national importance and demonstrate the added value generated in terms of sustainable and integrated use. Effectiveness: The demonstration of a use of public resources that is efficient and effective per se is to be welcomed. The exploitation of the ecological infrastructure can make a significant contribution to ensuring that measures for the protection of nature and the landscape gain the broad support of the population as well as economically-oriented sectors and political circles.

Pilot project	Background, motivation	Aim, effectiveness
A1.3 Where the forest is still wild	Background: Over 15% of Switzerland's forest area has not been managed for over 50 years and the trend is increasing. This forest wilderness provides habitats for species that are underrepresented in managed forests and protective forests, for example saproxylic (wood-living) beetles and fungi. In addition, forest wilderness areas make a major contribution to the connectivity of designated forest reserves. Motivation: The potential offered by unmanaged forest areas as a valuable element of Switzerland's ecological infrastructure and as future forest reserves should be exploited.	Aim: To develop a geo-referenced inventory of Switzerland's forest wilderness areas which have been left unmanaged for over 50 years. Based on this, awareness-raising measures will be formulated to convey the importance of islands of old growth, biotope trees and dead wood to forest owners, forest managers and the general public. Effectiveness: An inventory of Switzerland's forest wilderness areas will provide an important basis (model habitats) for the development of measures in the forestry sector for the specific promotion of biodiversity. The model habitats also offer major potential for increasing awareness about forest biodiversity among the general public and relevant sectors. The clarification of compensation options available to the public sector in the context of the programme agreement between the Confederation and cantons in the area of forest biodiversity will encourage the participation of forest owners in the development of a functional ecological infrastructure.
A1.4 Potential of land exchange for biodiversity	Background: Based on the current law, construction clients are obliged to implement compensation measures if their projects impair protected landscapes or habitats that are worthy of protection. Motivation: It is often difficult to find suitable compensation areas. Pools of compensation areas (land-for-land exchanges) offer a possible solution to this problem. This would enable the pooling of compensation and upgrading measures by different developers and their joint implementation.	Aim: To demonstrate the opportunities and risks associated with the establishment of a pool of compensation areas in terms of the conservation and promotion of biodiversity but also in relation to the economic impacts of this kind of land exchange. The project should also demonstrate the way in which the instrument of land exchange would have to be designed in such a way that the negative impacts of individual construction projects on nature and the landscape can be minimised. The project should also clarify whether the Confederation should play a role in the structure of a land exchange and what form this role could take. Effectiveness: Against the background of land as a scarce and sought-after commodity in Switzerland, this project could demonstrate ways of reconciling the protection and use of nature and the landscape.

2 Optimisation of intersectoral habitat promotion

Pilot project	Background, motivation	Aim, effectiveness
A2.1 Climate change mitigation: sustainable use helps Swiss mires	Background: Changes in land use, overfertilisation and climate change have a negative impact on the water balance of Switzerland's mires and can lead to the loss of this habitat. Mires are an important carbon dioxide sink and thus play a major role in the mitigation of climate change. Motivation: As part of its pilot programme <i>Anpassung an den Klimawandel</i> ("Adaptation to climate change"), the FOEN and 16 cantons has developed working tools for the improvement of the water balance in Switzerland's mires (<i>espace marais</i>, pilot programme on the maintenance of water resources in the catchment areas of mire biotopes of national importance, 28 case studies).	Aim: Based on the data developed by the <i>espace marais</i> project, to provide a model for reconciling the protection and use of the hydrological catchment areas of mires of national importance. In particular, suitable upgrading, renaturation and use methods need to be defined and tested with a view to application – both from the perspective of the mires and their role in climate change and also in relation to the interaction between protection and use. An example of the latter is the extensive use of wet grassland, e.g. by suitable grazing animals like bison and water buffalo, and the discontinuation of the use (or non-remediation) of drainage systems. The pilot project will be implemented in cooperation with one or more cantons and representatives from the agriculture sector. It should also be carried out in different biogeographical regions and at least one region that includes more than one canton. Effectiveness: The pilot project will boost the sustainable use of biodiversity and involve the valorisation of the work already carried out in relation to the Swiss Biodiversity Strategy (creation of ecological infrastructure, remediation/upgrading of habitats with a high biodiversity value, long-term qualitative conservation of mire soil, inter alia interface with climate) and, accordingly, the acknowledgement and long-term conservation of ecosystems and their services for society.
A2.2 Promoting biodiversity and landscape quality in urban agglomerations	Background: Urban agglomerations play a key role in the development of ecological infrastructure for the long-term securing of the space for biodiversity and the promotion of biodiversity in built-up areas. In addition, good landscape quality in built-up areas, e.g. near-natural open spaces that are well connected with non-motorised transport, contributes to improving human well-being and the general welfare by the increasing of the attractiveness of locations. Motivation: The implementation of the measures relating to biodiversity and the landscape developed by the bodies responsible for the agglomeration programmes is progressing very slowly due to the lack of information bases, proof of effectiveness and, correspondingly, low levels of financial support by the Confederation. For this reason, the topic of biodiversity and landscape quality should be promoted in the context of the agglomeration programmes.	Aim: To show how the future generations of agglomeration projects can be extended effectively and efficiently through the inclusion of nature and landscape values. The planning information bases in the area of biodiversity and landscape that have already been developed for the third generation agglomeration projects could provide a basis for this. Effectiveness: Based on the insights gained from this pilot project, agglomeration policy can be further developed with a view to the integrated coordination and planning of biodiversity and landscape conservation. This would establish pre-conditions for enabling the greater integration of biodiversity and the landscape as a relevant and effective element into the agglomeration programmes and plans – for the benefit of humans, settlements and nature.

3 Rezoning of development land for the benefit of biodiversity

Pilot project	Background, motivation	Aim, effectiveness
A3.1 Rezoning of development land for the benefit of biodiversity	Background: In accordance with Art. 15 of the Spatial Planning Act (SPA), the cantons are obliged to reduce the size of oversized development zones. Motivation: In terms of conserving valuable areas for biodiversity, the Confederation has a great interest in ensuring the designation for rezoning of areas that are listed in a federal or cantonal biotope inventory or that fulfil an inter-regional connectivity function.	Aim: Through close cooperation between the Confederation and a model canton or a suitable commune, to rezone development land in cases where the maximum possible benefit for biodiversity arises and added value can also be generated for the local commune or the canton, for example through the maintenance of an intact, near-natural landscape. Effectiveness: The rezoning of development land that has a positive effect on biodiversity not only supports the creation of ecological infrastructure, it can also make a crucial contribution to increasing public awareness of the needs of biodiversity.

4 Specific promotion of national priority species

Pilot project	Background, motivation	Aim, effectiveness
A4.1 Avoiding the electrocution of birds throughout Switzerland	Background: A considerable number of medium voltage power poles still exist in Switzerland that can be fatal to birds and thus require remediation. Death by electrocution is relevant because the affected birds are generally from rare and protected species. In many cases the species involved are among those, whose conservation is a matter of international responsibility for Switzerland (national priority species). Motivation: Birds with large wing spans are at particular risk. Electrocution is one of the most common known causes of death among the White Stork and owls. For example, a large proportion of owl mortality in the canton of Valais (40%) is due to electrocution on medium voltage power poles. In addition to storks and owls, birds of prey (Red Kite, Eagles, Bearded and Griffon Vultures, all of which are national priority species) are also affected.	Aim: To develop an information base for the targeted remediation of medium voltage power poles that pose an objective risk to birds. Under the auspices of the Federal Office for the Environment, potentially hazardous medium voltage power poles will be identified and the network operators will be notified about their location. In addition to the technical specifications of the lines, the criteria for the risk assessment will include their location within an area where endangered birds arise. Effectiveness: Based on the results of this project, the network operators should instigate the necessary remediation work and target their resources at locations where endangered birds arise. The Federal Office for the Environment and the Swiss Ornithological Institute in Sempach will evaluate the effect of the project on biodiversity. Potential for synergy exists with the Federal Office for Transport's pilot project 8.1 "Bird-safe medium voltage railway power poles".
A4.2 Incentive system for the designation and maintenance of areas for species promotion	Background: As a Contracting Party of the Bern Convention, Switzerland has undertaken to protect particularly valuable European species and habitats. However, the current efforts (in particular the designation of protected areas in accordance with Art. 18 of the Nature and Cultural Heritage Act, NCHA) are not sufficient to ensure the long term conservation and promotion of endangered species, whose survival is a matter of international responsibility for Switzerland (national priority species). Motivation: The existing legal requirements (habitat protection) should be supplemented by voluntary measures for the promotion of national priority species. Particular attention should be paid here to reconciling the interests of protection and use here.	Aim: An incentive system should motivate land-owners and farmers to voluntarily designate and maintain areas for national priority species. To this end, the opportunities and risks associated with different incentive systems must be identified against the background of the available resources and other factors (e.g. the nature of the necessary promotional measures, affected sectors). Accordingly, through cooperation between the Confederation and cantons, incentive options, instruments, and the involvement and remuneration of actors will be developed, tested and implemented for four representative areas for the promotion of national priority species in all of Switzerland's biogeographical regions. Interfaces with connectivity projects in agriculture, special forest reserves and nature conservation areas will also be taken into account here. Effectiveness: The process for the designation of areas, the implementation of the developed instruments, e.g. management plans, and the remuneration of actors for services provided, will be analysed to enable the development of an optimal incentive system.

Pilot project	Background, motivation	Aim, effectiveness
A4.3 Defusing the conflict between traffic and the protection of small animals	Background: Road traffic poses a major threat to small migratory species of fauna (in particular amphibians). The main locations involving conflicts of interest between road traffic and nature and landscape protection are the object of surveys by the cantons and Confederation (amphibian migration routes, sections of road with regular accidents involving wild animals, breaks in ecological connectivity etc.). Motivation: Even the comparatively low volumes of traffic on communal roads can increase the mortality risk to small species considerably and in the case of amphibians, entire stocks can be at risk. Around 800 critical points for amphibian migration on communal and cantonal roads are known to the Centre for the Protection of Amphibians and Reptiles in Switzerland (Koordinationsstelle für Amphibien- und Reptilienschutz in der Schweiz, karch). Hence the technical remediation of the critical points within the small species' migratory routes constitutes an essential addition to the existing instruments for the protection of amphibians.	Aim: To make existing data demonstrating the problem locations in the Swiss transport network publicly accessible and update them if necessary. Together with the affected stakeholder groups, solutions will also be developed that enable the integration of these data into existing and future policy instruments so that the mortality risk to small animals posed by road traffic can be reduced (e.g. in the spatial planning and transport infrastructure sectors). A federal dialogue platform should also contribute to the identification of critical locations and formulate approaches to the resolution of these conflicts. Effectiveness: Contribution to the conservation of stocks of protected and threatened national priority species, securing of the migratory corridors leading to the amphibian spawning areas of national importance. Implementation can begin quickly as the sections of road that require remediation are already known.

5 Raising awareness about biodiversity

Pilot project	Background, motivation	Aim, effectiveness
A5.1 Mainstreaming biodiversity	Background: The Swiss population lacks knowledge about the diversity of species and their habitats in our country. Representative surveys present the following picture: although biodiversity has been declining for decades, in 2013, 74% of respondents assumed that it is in a generally good state. The corresponding value for 2016 was 61%, and almost one in five respondents (19%) were unable to explain the concept of biodiversity. Motivation: It is only possible to value something we know. There are many indications that people only perceive the decline in biological diversity as a problem if they have previously gained knowledge of plants and animals and value them. The situation with regard to the perception and knowledge of species and their diversity is not good. For example, school pupils in Switzerland can only name five plant and six animal species that they encounter on their way to school, and the majority of these species are ornamental and garden plants and pets.	Aim: The pilot project will analyse the causes of the limited awareness of the problem of biodiversity loss, demonstrate suitable methods for reducing the Swiss population's perception deficits in the area of biodiversity, and implement these methods using suitable measures and channels. Demographic contributory factors will also be examined and taken into account in the selection of suitable communication measures. The pilot project should also create a basis for biodiversity-aware action, transfer knowledge about biodiversity and the services it provides for society and the economy, and raise public awareness about the significance of progressive biodiversity loss. Effectiveness: The project will contribute to improving the competencies and understanding necessary to ensure that society as a whole supports the conservation and promotion of biodiversity. In addition, the project will enable the provision of in-depth clarification of the need for long-term awareness-raising measures and potential synergies that exist in this area. The existing surveys designed by gfs.bern, which are designed for the long-term analysis of the public perception of biodiversity, can also be used to measure the general public's understanding of biodiversity.

Pilot project	Background, motivation	Aim, effectiveness
A5.2 Tracking down the value of water	Background: Flowing water bodies are formative elements of the landscape, play a role in the connectivity of biodiversity-relevant areas, and provide major services for the economy (e.g. tourism, location quality, renewable energy) and society (e.g. drinking-water supply, recreation, experience of nature, soft mobility). Motivation: The valuing of flowing water bodies is key to the willingness of the Swiss population to support the conservation of the ecological functions and services provided by Swiss water bodies for the economy and society. However, the values that the population associate with our flowing water bodies are largely unknown.	Aim: To record how the Swiss population values exploited and unexploited flowing water bodies. To provide a technical basis, the existing data will be complemented by a directory of all unimpaired natural water bodies and the national directory of source habitats will be developed rapidly using already publicised methods. A survey to be carried out at national level will record the values that the Swiss population associates with exploited and unexploited flowing water bodies, compare the different perceptions, demonstrate synergies and conflicts between the protection and exploitation of Switzerland's flowing water bodies, and draw conclusions from this for the country's future environmental policy. Effectiveness: In addition to the creation of a relevant information base for the design of Swiss environmental policy, this project will contribute to raising awareness among both the general public and political and economic decision-makers of the beauty, economic relevance and economic benefits of Switzerland's flowing water bodies.
A5.3 Nature on the doorstep	Background: There is extensive potential in built-up areas for conserving and promoting biodiversity (e.g. niches in built structures, green spaces, planted areas) while also contributing to a good quality of life for their human inhabitants (e.g. providing a contrast to the built environment, regulating local climate conditions, providing possibilities for experiencing nature). Motivation: The Swiss Biodiversity Strategy aims, inter alia, to improve the population's quality of life through the promotion of biodiversity in built-up areas. In addition, according to Art. 18b section. 2 of the Nature and Heritage Protection Act (NCHA), ecological compensation should also be provided within settlements.	Aim: To demonstrate the potential of built-up areas to promote biodiversity. To this end the Federal Office for the Environment's (FOEN) 1995 guideline <i>Naturnahhe Gestaltung im Siedlungsraum</i> ("Near-natural design in built-up areas") will be updated and concrete practical examples developed for use in publicity. A website on the topic of "Biodiversity in settlements" will be created in cooperation with the FOEN and the Schweizerischer Gemeindeverband (Association of Swiss Communes). Effectiveness: Best-practice based on an updated guideline will be available to the public and applied, particularly by the communes.

Pilot projects to be carried out in cooperation with other federal authorities

6 Federal Department of Defence, Civil Protection and Sport (DDPS)

Pilot project	Background, motivation	Aim, effectiveness
A6.1 Safeguarding of federal areas as a valuable component of the ecological infrastructure	Background: According to the army's stationing plan, in the course of the further development of the army more shooting grounds and properties will be eliminated from military use in the years to come and can be made available for civil use (disposable inventory, e.g. Glaubenberg shooting grounds). Many of these areas host diverse biotopes and protected sites of national importance and habitats of national priority species (e.g. Glaubenberg mire landscape as a habitat for the capercaillie <i>Tetrao urogallus</i>). Motivation: Biotopes, habitats and species hotspots located on areas to be relinquished by the DDPS are highly relevant for the conservation and promotion of biodiversity in Switzerland, in particular the creation and development of ecological infrastructure. Such areas should continue to be sustainably used in accordance with the Swiss Biodiversity Strategy or upgraded for biodiversity.	Aim: To create an overview of biodiversity-relevant areas and properties from the army's disposable inventory. Based on the example of Glaubenberg shooting grounds, the general conditions for the further implementation and guaranteeing of sustainable management and the monitoring of this form of use will be defined. Not only must questions regarding the compatibility of protection and use be clarified, but also legal and process-related issues. In particular, the future ownership structures must be determined, the contractual process defined and guidelines for compensation developed. Furthermore, the question as to which areas should initially remain in federal ownership so that they are then available for an eventual exchange of areas with the cantons for the purpose of biodiversity promotion must also be examined. Effectiveness: Impact analysis of the protection and use of the areas in question. Through the conservation and sustainable use of the biodiversity-relevant habitats in its ownership, the Confederation can make a publicly effective commitment to the protection of nature and make a major contribution to increasing the awareness of decision-makers and society in general of the associated issues. This will also enable the Confederation to fulfil its role as a model for the cantons and communes in accordance with its constitutional mandate (Art. 2 and 73 Federal Swiss Constitution) and a federal task specified in Art. 3 NCHA.

7 Federal Roads Office (FEDRO)

Pilot project	Background, motivation	Aim, effectiveness
A7.1 Re-establishing habitat connectivity and habitat promotion along the national highway network	Background: Transport infrastructure, in particular fenced-in sections and sections with heavy traffic have a considerable barrier effect on invertebrates, amphibians, reptiles, mammals and also on plants. However, transport infrastructure can also assume a connectivity function and provide valuable habitats for the conservation and promotion of biodiversity. Motivation: Habitat fragmentation by transport infrastructure is one of the main reasons for species decline today. In accordance with the Swiss Biodiversity Strategy, this negative effect of transport should be reduced.	Aim: The pilot project has two main aims which make a synergetic contribution to the establishment and development of the countrywide ecological infrastructure: 1. Improving and supplementing efforts for the remediation of wildlife corridors. 2. Strengthening the potential of green spaces beside transport infrastructure to provide habitats. 1a) FEDRO will clarify whether it will be possible to tighten the schedule for the remediation of wildlife corridors in the national roads programme. To simplify the implementation of the programme, FEDRO will adapt the criteria for the financing of crossing aids, in particular through their broader definition. This will enable FEDRO to include directly adjacent railway and cantonal infrastructure that only gives rise to secondary fragmentation in the remediation of a national highway (over-/underpass). 1b) The current traffic situation and the distribution dynamics of wild fauna (in particular, deer, risk of collision) make it necessary to revise and update the information bases concerning the action requirement for the remediation of wildlife corridors of interregional importance. To this end, the FOEN and the cantons will identify problematic locations in the national highway network by the end of 2019. Class 3 national highways will also be included in the studies as will stretches of national highway dealt with in the road links of national importance defined by Parliament in 1960 (Netzbeschluss, NEB). Basic permeability is taken into account in accordance with Document 88013 <i>Grunddurchlässigkeit von Nationalstrassen für Wildtiere</i> ("Basic passability of national highways for wild animals"). Based on these results, additional wildlife crossings will be added to the ongoing national highway programme "<i>Sanierung der Wildtierkorridore</i>" (2001) ("Remediation of wildlife corridors"). An initial supplementary crossing aid will be created in the context of the remediation of the FR-23 wildlife corridor which the canton of Freiburg aims to carry out. The results of the ongoing study supported by the FOEN of the ASTRA for monitoring of the success of wildlife bridges along national highways will also be incorporated into this project. In addition, a maintenance or development project will be selected as a model for the testing of the existing FEDRO guideline 8008 <i>Querungshilfen für Wildtiere</i> ("Crossing aids for wildlife"). 2a) The site-adapted maintenance of embankments will be carried out in accordance with FEDRO guideline 18007 <i>Grünräume an Nationalstrassen</i> ("Green spaces along national highways") and the accompanying document 88007 <i>Methodologie zur Festsetzung von Biodiversitätsschwerpunkten</i> ("Methodology for the

		definition of biodiversity focus points”) and will also include the site-appropriate design of embankments. 2b) A stretch of national highway will be selected jointly by FEDRO and the FOEN on which measures for the protection and promotion of bats will be implemented (in accordance with the publication of recommendations for the protection of bats in transport infrastructure (under development), to be supported by FEDRO and the FOT). Effectiveness: The evaluation of the pilot project and the insights gained from it will form the basis for further remediation and upgrading of the national highways and cantonal roads throughout Switzerland at a later point in time. The evaluation will also include an impact analysis of the site-adapted maintenance of embankments.
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8 Federal Office of Transport (FOT)

Pilot project	Background, motivation	Aim, effectiveness
A8.1 Bird-safe medium voltage railway power poles	Background: A considerable number of medium voltage power poles still exist in Switzerland that can be fatal to birds and thus require remediation. Death by electrocution is relevant because the affected birds are generally from rare and protected species. Motivation: Birds with large wing spans are at particular risk. Electrocution is one of the most common known causes of death among the White Stork and owls. In addition to storks and owls, birds of prey (Red Kite, Eagles, Bearded and Griffon Vultures, all of which are national priority species) are also affected. The types of pole structures that are hazardous for birds are known. The majority of accidents can be avoided with the help of the appropriate measures, see corresponding guideline issued by the Federal Office of Transport (FOT) <i>Vogelschutz bei Fahrleitungsanlagen</i> ("Protection of birds in overhead contact line systems").	Aim: Phase 1: To remediate support poles for SBB overhead contact lines (here: medium voltage power poles) to enable the protection of birds. The SBB's medium voltage power poles will be remediated in the first phase of the project. The pilot project can be expanded in that the medium voltage power poles of the feeding networks can be remediated. The experience gained from Phase 1 will then provide a basis for the remediation of all of the power poles belonging to the SBB (Swiss Federal Railways) and other railway operators in Switzerland that pose a threat to birds in the second phase, see also pilot project 4.1 "Avoiding the electrocution of birds throughout Switzerland". Potentially hazardous poles belonging to the railway infrastructure operators must first be identified here. Effectiveness: An impact analysis will be carried out in cooperation with the Swiss Ornithological Institute in Sempach. The impact analysis of Phase 1 will provide a basis for the subsequent countrywide remediation of medium voltage power poles by the SBB and other railway infrastructure operators.
A8.2 Making railway tracks passable	Background: Railway tracks increasingly present insurmountable barriers for fauna. The barrier effect of railway tracks increases with the width of the system (multi-track stretches). In general, the negative impact of the transport infrastructure on biodiversity is exacerbated by the fact that different transport systems are located next to each other (railways and national highways). Possible solutions to this problem are known and standards have been defined by the VSS (Research and standardization in the field of road and transportation) for the planning and construction of over- and underpasses for animals. The priority migratory corridors and hence also the action needed in this area are also known. Motivation: The fragmentation of wildlife corridors threatens the medium-term survival of various wild migratory animal species and hinders the connectivity of habitats in the long-term.	Aim: To re-establish the passability of wildlife corridors whose functionality is disrupted or impaired by railway infrastructure. Existing culverts (flowing water bodies) should be converted so that they can fulfil a connectivity function (in accordance with existing VSS standard <i>Gestaltung der Wasserdurchlässe für die Fauna</i> ("Design of water passages for fauna")). In addition, new (in most cases) overpasses should be built (in accordance with VSS standard <i>Wildtierpassagen</i> ("Wildlife corridors")). Synergies with planned road overpasses enable economic optimisation. Effectiveness: Greater connectivity of habitats and wild animal stocks, contribution to traffic safety, exploitation of synergies with planned road network measures for the reestablishment of important disrupted or impaired wildlife corridors.

Pilot project	Background, motivation	Aim, effectiveness
A8.3 Biodiversity hotspots in railway areas	Background: In accordance with Article 3, section 2 of the Nature and Heritage Protection Act (NCHA), federal enterprises, hence also the SBB, must ensure that biodiversity-relevant factors are taken into account in the planning, implementation, remediation and maintenance of railway infrastructure. Motivation: The consideration of biodiversity in the design of the main railway station in Zurich resulted in the area around the main railway station becoming one of the most species-rich areas in the city of Zurich.	Aim: To identify – in close cooperation with the infrastructure operators, cantonal authorities and local nature conservation organisations – other railway areas that can be designed in a way that takes biodiversity-relevant factors into account in a similar way to Zurich main railway station and can thus become models in this regard. The upgrading of railway station areas should arise primarily in the context of projects that have already been planned. A supplementary programme will be planned if necessary. Simultaneous to the planning of biodiversity-promoting measures, methods for the analysis of their impact will be defined. The impact analysis will be implemented on a periodic basis and the results will be publicly accessible. The biodiversity-friendly design of railway areas provides models for corresponding upgrade projects to be implemented by the cantons and private actors. It also serves the purpose of promoting biodiversity in built-up areas in accordance with objective 8 of the Swiss Biodiversity Strategy (SBS) and the promotion of species in accordance with objective 3 SBS, and can make a key contribution to increasing awareness among local decision-makers and the population for biodiversity-relevant factors. Effectiveness: The knowledge gained from the impact analysis will be incorporated into the corresponding management plans and act as a basis for the subsequent countrywide upgrading of other railway station areas to accommodate the needs of biodiversity.
A8.4 Improving habitat quality along railway tracks	Background: To reduce the fragmentation effect of railway lines and improve the connectivity of areas with a high biodiversity value (creation of ecological infrastructure in accordance with the Swiss Biodiversity Strategy), areas along the railway tracks must be upgraded both qualitatively and quantitatively. A strategy for the maintenance of SBB railway embankments in compliance with the principles of nature conservation (<i>Konzept naturschutzgerechter Böschungsunterhalt SBB</i>), which was commissioned by the SBB, FOEN and FOT, was produced by an environmental consultancy in 2009, however it was not implemented. Motivation: The site-adapted maintenance of railway embankments serves in the creation and upgrading of habitat connectivity and thus makes a significant contribution to the creation of ecological infrastructure (in accordance with SBS objective 2).	Aim: The development – in close cooperation with cantonal authorities and local nature conservation organisations, by the infrastructure operators of a consistent strategy for the long-term and site-adapted maintenance of embankments along the railway tracks. Overpasses between railway tracks and national highways and cantonal or communal roads should also be taken into account here. The methodology for the definition of biodiversity focus points applied by FEDRO (<i>Grünräume an Nationalstrassen</i> ("Green spaces along national highways")) can be adopted as a basis for the development of the strategy. The strategy for the maintenance of railway embankments should be included the service agreements between the FOT and the railway infrastructure operators from 2021. Effectiveness: Creation and connection of habitats for fauna and flora.

Annex B – Link with the SBS

Table 5

Contribution of the measures to the fulfilment of the ten strategic objectives

Contribution of the measures to the fulfilment of the ten strategic objectives		CONTRIBUTION OF THE MEASURE TO THE FULFILMENT OF SBS OBJECTIVE									
		1. USE BIODIVERSITY SUSTAINABLY	2. DEVELOP ECOLOGICAL INFRASTRUCTURE	3. IMPROVE THE CONSERVATION STATUS OF NATIONAL PRIORITY SPECIES	4. CONSERVE AND PROMOTE GENETIC DIVERSITY	5. EVALUATE FINANCIAL INCENTIVES	6. RECORD ECOSYSTEM SERVICES	7. GENERATE AND DISSEMINATE KNOWLEDGE	8. PROMOTE BIODIVERSITY IN BUILT-UP AREAS	9. STRENGTHEN INTERNATIONAL COMMITMENT	10. MONITOR CHANGES IN BIODIVERSITY
✓✓	Central contribution										
✓	Further contribution										
No	TITLE OF MEASURE										
Implementation Phase I 2017-2023											
Immediate measures											
4.1.1	Maintenance and remediation of existing protected areas	✓	✓✓	✓	✓						
4.1.2	Creation and maintenance of forest reserves	✓	✓✓	✓	✓						✓
4.1.3	Ensuring the availability of old growth and deadwood in sufficient quantities and quality	✓✓	✓	✓	✓			✓			
4.1.4	Specific promotion of national priority species	✓	✓	✓✓	✓			✓			
Synergy measures											
4.2.1	Design of the countrywide ecological infrastructure	✓	✓✓	✓	✓			✓			
4.2.2	Development of a Swiss soil strategy	✓✓						✓			✓
4.2.3	Adaptation of agricultural production to local natural conditions	✓✓	✓	✓	✓	✓		✓			
4.2.4	Evaluation of the impact of federal subsidies	✓				✓✓					
4.2.5	Consideration of ecosystem services in spatially relevant decisions	✓	✓				✓✓	✓		✓	✓
4.2.6	Incorporation of biodiversity factors into existing sustainability standards	✓✓						✓			
4.2.7	Biodiversity requirements in model building regulations	✓	✓	✓	✓				✓✓		
4.2.8	Integration of biodiversity into Switzerland's bilateral development work and implementation of obligations in the area of biodiversity financing					✓				✓✓	
4.9.9	Use of international insights for the benefit of national biodiversity policy						✓	✓		✓✓	

Measures with pilot projects											
4.3.1	Regional connectivity planning for ecologically valuable habitats	✓	✓✓	✓	✓			✓	✓		
4.3.2	Optimisation of intersectoral habitat promotion	✓✓	✓	✓	✓	✓					
4.3.3	Rezoning of development land for the benefit of biodiversity	✓✓	✓	✓	✓						
4.3.4/ 4.1.4	Specific promotion of national priority species	✓	✓	✓✓	✓			✓			
4.3.5	Raising awareness about biodiversity	✓	✓	✓				✓	✓		✓
4.3.6	Exemplary protection and promotion of biodiversity in actively used federal areas	✓✓	✓	✓				✓✓	✓		
Measures Implementation Phase II											
5.1	Binding safeguarding of particularly valuable biodiversity areas	✓	✓✓	✓					✓		
5.2	Elaboration and further development of sector-specific instruments and programmes for the avoidance of genetic impoverishment	✓	✓	✓	✓✓			✓	✓		
5.3	Creation and development of ex-situ collections for the conservation of priority genetic resources and endangered species	✓			✓✓	✓		✓			
5.4	Strengthening of Swiss research in the area of biodiversity						✓	✓✓		✓	
5.5	Strengthening of the topic of biodiversity in general and vocational education	✓						✓✓			
5.6	Sector-specific strengthening of the topic of biodiversity in further education and consultancy	✓						✓✓			
5.7	Strengthening of measures against the illegal trade in animals and plants							✓		✓✓	
5.8	Optimised and modernised data management	✓	✓	✓	✓			✓			✓✓

Annex C – Contribution of the Actors

Table 6

Contribution of the actors and sectors to the measures contained in the Action Plan

No		TITLE OF MEASURE	ACTORS AND SECTORS										
			FORESTRY SECTOR	AGRICULTURE	ECONOMY	HUNTING AND FISHERIES	NATURE AND LANDSCAPE	TOURISM, SPORT, LEISURE	ENERGY	TRANSPORT	SPATIAL PLANNING	MONITORING	EDUCATION AND RESEARCH
Implementation Phase I 2017-2023													
Immediate measures													
4.1.1	Maintenance and remediation of existing protected areas	✓	✓		✓	✓	✓					✓	
4.1.2	Creation and maintenance of forest reserves	✓				✓						✓	
4.1.3	Ensuring the availability of old growth and deadwood in sufficient quantities and quality	✓				✓						✓	
4.1.4	Specific promotion of national priority species	✓	✓		✓	✓		✓	✓				
Synergy measures													
4.2.1	Design of the countrywide ecological infrastructure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4.2.2	Development of a Swiss soil strategy	✓	✓	✓		✓				✓		✓	
4.2.3	Adaptation of agricultural production to local natural conditions		✓									✓	
4.2.4	Evaluation of the impact of federal subsidies		✓	✓								✓	
4.2.5	Consideration of ecosystem services in spatially relevant decisions	✓	✓	✓	✓		✓	✓	✓			✓	
4.2.6	Incorporation of biodiversity factors into existing sustainability standards			✓									
4.2.7	Biodiversity requirements in model building regulations			✓		✓				✓			
4.2.8	International cooperation for the benefit of biodiversity and implementation of obligations in the area of biodiversity financing												✓
4.2.9	Use of international insights for the benefit of national biodiversity policy											✓	✓

Measures with pilot projects												
4.3.1	Regional connectivity planning for ecologically valuable habitats	✓	✓			✓			✓	✓		
4.3.2	Optimisation of intersectoral habitat promotion	✓	✓		✓	✓						
4.3.3	Rezoning of development land for the benefit of biodiversity			✓		✓				✓		
4.3.4/ 4.1.4	Specific promotion of national priority species	✓	✓		✓	✓		✓	✓			✓
4.3.5	Raising awareness about biodiversity	✓	✓	✓	✓		✓	✓	✓			✓
4.3.6	Exemplary protection and promotion of biodiversity in actively used federal areas	✓	✓		✓	✓						
Measures Implementation Phase II												
5.1	Binding safeguarding of particularly valuable biodiversity areas		✓							✓		
5.2	Elaboration and further development of sector-specific instruments and programmes for the avoidance of genetic impoverishment	✓	✓		✓							✓
5.3	Creation and development of ex-situ collections for the conservation of priority genetic resources and endangered species		✓	✓								✓
5.4	Strengthening of Swiss research in the area of biodiversity					✓					✓	✓
5.5	Strengthening of the topic of biodiversity in general and vocational education	✓	✓	✓	✓		✓					✓
5.6	Sector-specific strengthening of the topic of biodiversity in further education and consultancy	✓	✓	✓	✓		✓	✓	✓			✓
5.7	Strengthening of measures against the illegal trade in animals and plants			✓	✓	✓	✓					✓
5.8	Optimised and modernised data management	✓	✓		✓	✓					✓	✓

6 Bibliography

- ¹ Convention on Biological Diversity (1992): United Nations Environment Programme, New York.
- ² Cardinale B.J. et al. (2012): "Biodiversity loss and its impact on humanity", *Nature* 486, 59-67.
- ³ Millennium Ecosystem Assessment (2005). Ecosystems and human well-being: General synthesis. Technical report, Island Press, Washington, DC, USA.
- ⁴ Sukhdev P. et al. (2010): The economics of ecosystems and biodiversity: mainstreaming the economics of nature: a synthesis of the approach, conclusions and recommendations of The Economics of Ecosystems and Biodiversity TEEB.
- ⁵ Allan E. et al. (2013): "A comparison of the strength of biodiversity effects across multiple functions", *Oecologia* 173, 223–237.
- ⁶ Soliveres S. et al. (2016): "Biodiversity at multiple trophic levels is needed for ecosystem multifunctionality", *Nature* 536(7617): 456-459
- ⁷ Secretariat of the Convention on Biological Diversity (2014). Global Biodiversity Outlook 4. Montréal, 155 S.
- ⁸ Rockström et al. (2009): Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society* 14(2): 32
- ⁹ Staub C., Ott W. et al. 2011: Indikatoren für Ökosystemleistungen: Systematik, Methodik und Umsetzungsempfehlungen für eine wohlfahrtsbezogene Umweltberichterstattung. Bundesamt für Umwelt, Bern. Umwelt-Wissen Nr. 102: 106 S.
- ¹⁰ NFP 68, FOEN, FOAG, ARE (eds.) (2015): Soil – A Precious Natural Resource. Published in the International Year of Soils 2015.
- ¹¹ Turbé A. (2010): Soil biodiversity: functions, threats and tools for policy makers. Bio Intelligence Service, IRD, and NIOO, Report for European Commission (DG Environment).
- ¹² Lejeune Q., Davin E.L., Guilloid B.P. et al. (2015): "Influence of Amazonian deforestation on the future evolution of regional surface fluxes, circulation, surface temperature and precipitation", *Climate Dynamics* 44, 2769-2786.
- ¹³ Staub C., Ott W. et al. (2011): Indikatoren für Ökosystemleistungen: Systematik, Methodik und Umsetzungsempfehlungen für eine wohlfahrtsbezogene Umweltberichterstattung. Bundesamt für Umwelt, Bern. Umwelt-Wissen Nr. 1102: 106 pp.
- ¹⁴ Myers N. (1989): "Loss of biological diversity and its potential impact on agriculture and food production," in: Pimentel D., Hall C.W. (Hrsg.): Food and Natural Resources. Academic Press, San Diego. 49–68.
- ¹⁵ Mayer P.M. et al. (2007): Meta-analysis of nitrogen removal in riparian buffers. *Journal of Environmental Quality* 36(4), 1172–1180.
- ¹⁶ Eawag (Hrsg.) (2009): Wasserversorgung 2025 – Vorprojekt Standortbestimmung. Im Auftrag des Bundesamtes für Umwelt, Bern.
- ¹⁷ Altmann K.H. (2005): Die Natur als Arzneimittelhersteller und als Quelle der Inspiration für den Chemiker: die Bedeutung von Naturstoffen in der Arzneimittelforschung. Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich 150/3–4, 97–105.
- ¹⁸ www.bionische-innovationen.de
- ¹⁹ Staub C., Ott W. et al. (2011): Indikatoren für Ökosystemleistungen: Systematik, Methodik und Umsetzungsempfehlungen für eine wohlfahrtsbezogene Umweltberichterstattung. Bundesamt für Umwelt, Bern. Umwelt-Wissen Nr. 1102: 106 S.
- ²⁰ Drösler M. et al. (2012): Beitrag ausgewählter Schutzgebiete zum Klimaschutz und dessen monetäre Bewertung. BfN-Skripten 328, 152.
- ²¹ Pohl M. et al. (2009): "Higher plant diversity enhances soil stability in disturbed alpine ecosystems", *Plant and Soil* 324, 91–102.
- ²² Damm C. et al. (2012): Auenschutz – Hochwasserschutz – Wasserkraftnutzung. Beispiele für eine ökologisch vorbildliche Praxis. Reihe: Naturschutz und Biologische Vielfalt, Band 112, 321.
- ²³ Bender F., van der Heijden M. (2015): "Soil biota enhance agricultural sustainability by improving crop yield, nutrient uptake and reducing nitrogen leaching losses", *Journal of Applied Ecology* 52(1), 228-239.

- ²⁴ Gallai N. et al. (2009): "Economic valuation of the vulnerability of world agriculture confronted to pollinator decline", *Ecological Economics* 68(3), 810 – 821.
- ²⁵ Akademien der Wissenschaften Schweiz (2014): Bienen und andere Bestäuber: Bedeutung für Landwirtschaft und Biodiversität. Factsheet der Akademien der Wissenschaften Schweiz, Bern.
- ²⁶ Ramseier H. et al. (2016): Blühstreifen fördern Honig- und Wildbienen. *Agrarforschung Schweiz* 7(6): 276-283.
- ²⁷ Kremen C., Miles A. (2012): "Ecosystem services in biologically diversified versus conventional farming systems: benefits externalities, and trade-offs", *Ecology and Society* 17(4): 40.
- ²⁸ Tschumi M. et al. (2016): "Perennial, species-rich wildflower strips enhances pest control and crop yield. Agriculture", *Ecosystems and Environment* 220: 97-103.
- ²⁹ Keesing F. et al. (2010): "Impacts of biodiversity on the emergence and transmission of infectious diseases", *Nature* 468 (7324): 647–652.
- ³⁰ Bolund P., Hunhammar S. (1999): "Ecosystem services in urban areas", *Ecological Economics* 29(2): 293–301.
- ³¹ Buccolieri R. et al. (2011): "Analysis of local scale tree-atmosphere interaction on pollutant concentration in idealized street canyons and application to real urban junction", *Atmospheric Environment* 45(9): 1702–1713.
- ³² Mathey J. et al (2011): Noch wärmer, noch trockener? Stadtnatur und Freiraumstrukturen im Klimawandel. Bundesamt für Naturschutz. Bonn-Bad Godesberg.
- ³³ Siegrist D., StremLOW M. (Hrsg.) (2009): Landschaft Erlebnis Reisen. Naturnaher Tourismus in Parks und UNESCO-Gebieten. Rotpunktverlag, Zürich.
- ³⁴ Bundesamt für Umwelt BAFU, Eidg. Forschungsanstalt für Wald, Schnee und Landschaft WSL (Hrsg.) (2013): Die Schweizer Bevölkerung und ihr Wald. Bericht zur zweiten Bevölkerungsumfrage Waldmonitoring soziokulturell (WaMos 2). Bundesamt für Umwelt, Bern; Eidg. Forschungsanstalt für Wald, Schnee und Landschaft WSL, Birmensdorf. Umwelt-Wissen Nr. 1307. 92 S.
- ³⁵ Job H., Becken S., Paeth H. (2011): Schutzgebiete, Biodiversität und Tourismus – künftige Herausforderungen. In: *Natur und Landschaft* 12. Bonn: W. Kohlhammer 2011, S. 521–526.
- ³⁶ Schweizerischer Bundesrat (2010): Wachstumsstrategie für den Tourismusstandort Schweiz: Bericht des Bundesrates vom 18. Juni 2010 in Erfüllung des Postulates 08.3969, Darbellay vom 19. Dezember 2008, Bern.
- ³⁷ Lindemann-Matthies P. et al. (2010): "Experimental evidence for human preference of biodiversity in grassland ecosystems", *Biological Conservation* 143, 195–202.
- ³⁸ BSS – Volkswirtschaftliche Beratung (2012): Landschaftsqualität als Standortfaktor: Stand des Wissens und Forschungsempfehlung. Schlussbericht zuhanden Bundesamt für Umwelt BAFU.
- ³⁹ Scheidegger E. (2009): Tourismus im naturnahen Raum – die wirtschaftliche Sicht. In: Siegrist D., StremLOW M. (Hrsg.). *Landschaft Erlebnis Reisen. Naturnaher Tourismus in Parks und UNESCO-Gebieten*. Rotpunktverlag, Zürich.
- ⁴⁰ Pattaroni L. et al. (2010): Nachhaltiger städtischer Lebensraum für Familien mit Kindern. *Collage – Zeitschrift für Planung, Umwelt und Städtebau* 4.
- ⁴¹ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (2010): *Naturbewusstsein 2009. Bevölkerungsumfrage zu Natur und biologischer Vielfalt*. Berlin / Bonn.
- ⁴² StremLOW M. (2008): "Heimat" - ein brauchbarer Begriff für den Landschaftsschutz? *Anthos* 47(1): 60-61.
- ⁴³ Rockström et al. (2009). Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society* 14(2): 32.
- ⁴⁴ Stöcklin et al. (2007): Landnutzung und biologische Vielfalt in den Alpen. Nationales Forschungsprogramm Landschaften und Lebensräume der Alpen. NFP 48.
- ⁴⁵ Bundesamt für Umwelt BAFU (Hrsg.) 2014: Biodiversität in der Schweiz. Kurzfassung des 5. Nationalberichts zuhanden der Biodiversitätskonvention, Bundesamt für Umwelt, Bern, 20 S.
- ⁴⁶ Lachat T. et al. (Red.) (2010): Wandel der Biodiversität in der Schweiz seit 1900. Ist die Talsohle erreicht? Bristol-Stiftung, Zürich. Haupt Verlag, Bern.
- ⁴⁷ Fischer M. et al. (2015): Zustand der Biodiversität in der Schweiz 2014. Hrsg.: Forum Biodiversität Schweiz et al., Bern.
- ⁴⁸ Bundesamt für Umwelt BAFU (Hrsg.) 2017: Biodiversität in der Schweiz: Zustand und Entwicklung. Ergebnisse des Überwachungssystems im Bereich Biodiversität, Stand 2016. Bundesamt für Umwelt, Bern. Umwelt-Zustand Nr. 1630.
- ⁴⁹ Bundesamt für Umwelt BAFU (2014). Switzerland's Fifth National Report under the Convention on Biological Diversity. Federal Office for the Environment, Bern.

-
- ⁵⁰ Stöcklin et al. (2007): Landnutzung und biologische Vielfalt in den Alpen. Nationales Forschungsprogramm Landschaften und Lebensräume der Alpen. NFP 48.
- ⁵¹ Lachat T. et al. (Red.) (2010): Wandel der Biodiversität in der Schweiz seit 1900. Ist die Talsohle erreicht? Bristol-Stiftung, Zürich. Haupt Verlag, Bern.
- ⁵² Leadley et al. (2014): "Interacting Regional-Scale Regime Shifts for Biodiversity and Ecosystem Services", *BioScience* 64(8): 665-679.
- ⁵³ Brugger E.A., Limacher S. (2011): Biodiversität und Wirtschaft: Enge Wechselwirkungen. Brugger und Partner AG.
- ⁵⁴ Mouillot D. et al. (2013): "Rare Species Support Vulnerable Functions in High-Diversity Ecosystems", *PLoS Biol* 11(5): e1001569
- ⁵⁵ Secretariat of the Convention on Biological Diversity (2010) *Global Biodiversity Outlook 3*. Montréal. 94 pp
- ⁵⁶ Convention on Biodiversity (2010). Strategic Plan 2011 – 2020 and the Aichi Biodiversity Targets. In: UNEP/CBD/COP/10/Decision/X2. Tenth Meeting of the Conference of the Parties to the Convention on Biological Diversity. <http://www.sib.admin.ch/en/convention-on-biodiversity/the-convention/strategic-plan-2011-2020/index.html>
- ⁵⁷ Schweizerischer Bundesrat (2012). Strategie Biodiversität Schweiz vom 25. April 2012. Anhang 2. BBl 2012: 7239–7342.
- ⁵⁸ Vereinte Nationen (2016). Transformation unserer Welt: die Agenda 2030 für nachhaltige Entwicklung. New York, USA.
- ⁵⁹ Swiss Federal Council, Sustainable Development Strategy 2016–2019, 27 January 2016
- ⁶⁰ Bundesbeschluss über die Legislaturplanung 2011-2015, Massnahme 99: Konkretisierung der Strategie zur Erhaltung und Förderung der Biodiversität.
- ⁶¹ Bundesbeschluss über die Legislaturplanung 2015-2019, Massnahme 36: Verabschiedung der Botschaft zum Aktionsplan Strategie Biodiversität Schweiz.
- ⁶² Bundesamt für Umwelt BAFU (2014): Partizipativer Prozess zur Erarbeitung des Aktionsplans Strategie Biodiversität Schweiz: Zusammenfassende Berichterstattung.
- ⁶³ Bundesamt für Umwelt BAFU (2015): Ergebnisbericht Vorkonsultation Massnahmen Aktionsplan Strategie Biodiversität Schweiz. 48 Seiten.
- ⁶⁴ Schweizerischer Bundesrat (2016): Strategie der Schweiz zu invasiven gebietsfremden Arten. Herausgegeben vom Bundesamt für Umwelt. Bern.
- ⁶⁵ Schweizerische Bundeskanzlei (2017): Bericht des Bundesrates über seine Geschäftsführung im Jahre 2016. Band II. Seite 57. Bern
- ⁶⁶ Bundesamt für Umwelt BAFU (Hrsg.) (2015): Handbuch Programmvereinbarungen im Umweltbereich 2016–2019. Mitteilung des BAFU als Vollzugsbehörde an Gesuchsteller. Bern. Umwelt-Vollzug Nr. 1501: 266 S.
- ⁶⁷ Bundesamt für Umwelt, Wald und Landschaft BUWAL, Bundesamt für Raumplanung BRP (1998): Landschaftskonzept Schweiz. Teil I Konzept, Teil II Bericht. Bern.
- ⁶⁸ Eidgenössisches Departement für Verteidigung, Bevölkerungsschutz und Sport VBS (Hrsg.) (2005): Immobilienstrategie VBS. Bern.
- ⁶⁹ Schweizerischer Bundesrat (2010): Wachstumsstrategie für den Tourismusstandort Schweiz. Bern.
- ⁷⁰ Schweizerischer Bundesrat (2012): Botschaft zur Weiterentwicklung der Agrarpolitik in den Jahren 2014–2017. Bern.
- ⁷¹ Eidgenössisches Departement für Wirtschaft, Bildung und Forschung WBF: Aktionsplan zur Risikoreduktion und nachhaltigen Anwendung von Pflanzenschutzmitteln. Draft of 4 July 2016
- ⁷² Schweizerischer Bundesrat, Konferenz der Kantonsregierungen KdK, Bau-, Planungs- und Umweltdirektoren-Konferenz BPUK, Schweizerischer Städteverband SSV, Schweizerischer Gemeindeverband SGV (2012): Raumkonzept Schweiz. Bern.
- ⁷³ Federal Office for the Environment FOEN (2013): Forest Policy 2020. Visions, objectives and measures for the sustainable management of forests in Switzerland. Bern.
- ⁷⁴ Bundesamt für Umwelt BAFU (Hrsg.) (2014). Anpassung an den Klimawandel in der Schweiz. Aktionsplan 2014 – 2019. Zweiter Teil der Strategie des Bundesrates vom 9. April 2014. Bern.
- ⁷⁵ Schweizerischer Bundesrat (2015): Agglomerationspolitik des Bundes 2016+. Für eine kohärente Raumentwicklung Schweiz. Bern.
- ⁷⁶ Eidgenössisches Departement für Umwelt, Verkehr, Energie und Kommunikation UVEK (2015): Sachplan Verkehr, Teil Infrastruktur Schiene, Anpassungen und Ergänzungen 2015. Bern.
- ⁷⁷ Swiss Federal Council (2016): Sustainable Development Strategy 2016-2019. Bern.
- ⁷⁸ Swiss Federal Council (2016): Swiss Foreign Policy strategy 2016-2019. Bern.
-

⁷⁹ Schweizerischer Bundesrat (2009): Luftreinhaltekonzept des Bundesrates, BBI 2009 6585

⁸⁰ Unterlagen zur Schweizer Chemikalienpolitik: Vernehmlassungsunterlagen PARCHEM, 2003; obtainable on request from the Federal Office of Public Health FOPH, Chemical Products Division, 3003 Bern

⁸¹ Univox Umwelt (2016); gfs-zürich, Markt- & Sozialforschung February 2017

⁸² Bundesamt für Umwelt BAFU (Hrsg.) (2015): Handbuch Programmvereinbarungen im Umweltbereich 2016–2019. Mitteilung des BAFU als Vollzugsbehörde an Gesuchsteller. Bern. Umwelt-Vollzug Nr. 1501: 266 S.

⁸³ Imesch N., Stadler B., Bolliger M., Schneider O. (2015): Biodiversität im Wald: Ziele und Massnahmen. Vollzugshilfe zur Erhaltung und Förderung der biologischen Vielfalt im Schweizer Wald. Bundesamt für Umwelt, Bern. Umwelt-Vollzug Nr. 1503: 186 S.

⁸⁴ Monnerat C., Barbalat S., Lachat T., Gonseth Y. (2016): Rote Liste der Prachtkäfer, Bockkäfer, Rosenkäfer und Schröter. Gefährdete Arten der Schweiz. Bundesamt für Umwelt, Bern; Eidgenössische Forschungsanstalt für Wald, Schnee und Landschaft (WSL), Birmensdorf; Info Fauna – Schweizer Zentrum für die Kartographie der Fauna (Info Fauna – CSCF), Neuenburg. Umwelt-Vollzug. Bundesamt für Umwelt, Bern.

⁸⁵ econcept und Eidg. Forschungsanstalt für Wald, Schnee und Landschaft WSL, (2013). Ökosysteme und ihre Leistungen erfassen und räumlich darstellen. Im Auftrag des Bundesamts für Umwelt BAFU, Bern.

⁸⁶ The Economics of Ecosystems and Biodiversity, TEEB (2010). Ecological and Economic Foundations. Edited by Pushpam Kumar. Earthscan, London and Washington.

⁸⁷ IDARio (Interdepartementaler Ausschuss Rio) (2000). Bericht über die Umsetzung der Strategie des Bundesrates zur nachhaltigen Entwicklung, Massnahme Nr. 6 „Anerkennung und Förderung von Labels. IDARio, Bern.

⁸⁸ Schweizerischer Bundesrat (2016). Botschaft zur internationalen Zusammenarbeit 2017–2020. Bern.

⁸⁹ gfs.bern (2013). Studie Biodiversität 2013. Im Auftrag von: Bundesamt für Umwelt, Schweizer Vogelschutz, SVS/BirdLife Schweiz, Forum Biodiversität sowie Schweizerische Vogelwarte Sempach.

⁹⁰ Bspw. Biodiversitäts-Monitoring der Schweiz BDM, Schweizerisches Landesforstinventar LFI, Langfristige Waldökosystem-Forschung LWF, Rote Listen, Wirkungskontrolle Biotopschutz, Projekt „Arten und Lebensräume Landwirtschaft – Espèces et milieux agricoles“ ALL-EMA, etc.