

LIFE BELT ALPS

REPORT ON IMPLEMENTATION MEASURES FOR ECOLOGICAL CONNECTIVITY IN THE ALPS

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About this project

Life Belt Alps is financed by the BMUB and implemented by The Alpine Network of Protected Areas – [ALPARC](#) in collaboration with the [Ecological Network Platform](#) of the Alpine Convention. It builds on ALPARC's more than ten years of experience with the ecological connectivity theme and is a precursor to a larger future project on the same topic, ALP.BIO.NET2030, which was submitted for co-financing within the framework of the ERDF/Alpine Space Programme and is expected to start in late 2016 (subject to approval of the grant application).

One of the key objectives of the [Alpine Convention](#), stated in Article 12 of the Protocol on the "[Conservation of Nature and the Countryside](#)"¹, is the establishment of an ecological network in the Alps. Biodiversity is one of the priority (inter-sectoral) action areas in the [Multiannual Programme for the Alpine Convention 2011-2016](#)².

The Alps are a European biodiversity hotspot. However, there are many anthropogenic threats to landscapes, habitats, and native species, such as climate change, the increasing presence of introduced (invasive) species, unfavourable farming practices, and landscape fragmentation due to infrastructure and housing developments that cut into natural ecosystems or cut off their connectivity. It is therefore paramount not only to manage existing protected areas for biodiversity conservation, but also to create wider ecological networks that can maintain gene flow and allow species to migrate between existing protected areas.

Connectivity can be visually perceived as the possibility of individuals of any given species to utilize their entire range, to move through suitable habitats, to allow for individual dispersal and to maintain a regular genetic flow. The Alps, and mountain environments in general are characterised by cliffs and steep slopes, which act as ecological barriers for some species, while other species can benefit from the long and regular mountain chain allowing longitudinal and altitudinal movements.

Despite the natural barrier-effects in the Alps the major concerns for ecological connectivity are still largely those created by human-induced landscape fragmentation.

(Source: Econnect³)

This report summarises the history and current legal and policy framework for the implementation of ecological networks in the Alps. It looks at the status of national strategies and highlights progress in implementation and concrete examples of implementation measures. It is based on a desk review of existing policy documents and reports, including from previous relevant projects (Econnect, greenAlps), and on expert feedback. Because the creation of ecological networks is "work in progress", and because it was not possible to document all relevant initiatives that exist, it makes no claim of completeness. The ecological connectivity policies of the Alpine States of Liechtenstein and Monaco were not analysed in detail, but despite these countries' small size they also contribute to ecological connectivity. A prior report on relevant instruments for ecological networks in the Alpine region contains additional details that may be useful⁵.

Part I – Legal and policy framework

The Global, European, and Alpine legal and policy framework in support of ecological connectivity

The principal, though by no means the only, international framework documents and policy instruments of relevance for Alpine countries are the global [Convention on Biological Diversity](#)⁶, the Alpine Convention, the EU [Birds Directive](#), the EU [Habitats Directive](#), and the [EU Biodiversity Strategy to 2020](#)⁷. Also very important for ecological connectivity is the EU [Water Framework Directive](#), which among other provisions requires achieving "good status" for all waters. This includes the general protection of the aquatic ecology, specific protection of unique and valuable habitats, and water management at a river basin scale (and so across state boundaries). There are, in addition, a host of additional policies, strategies, and recommendations that have direct or indirect links to the goals of conserving biodiversity and maintaining ecological connectivity within and between natural areas. The long list of EU Directives and other policy instruments is not enumerated here, as it can be conveniently downloaded from the greenAlps project's website. Among other tasks, greenAlps undertook an overview analysis of the European Union's "[biodiversity policy landscape](#)"⁸. The analysis found that there is great "policy richness" supporting biodiversity conservation, but insufficient progress in translating the stipulated policies into action at national and regional levels.

The Alpine Convention

The Alpine Convention, an international treaty between the Alpine countries (Austria, France, Germany, Italy, Liechtenstein, Monaco, Slovenia, and Switzerland) and the EU, aims to promote sustainable development in the region. It addresses environmental, social, economic, and cultural dimensions. All Alpine states have ratified the Convention⁹. There are various protocols that outline different aspects of sustainable development. By 2002 all member states had agreed on the various protocols, but not all protocols have yet been ratified (by passing national legislation which gives a protocol full legal effect). Member states are bound to implement the protocols they ratify. Various protocols contain elements that have an impact on ecological network planning.

Ambitious objectives for the protection, care, and restoration of ecosystems and habitat protection are stated in the [Protocol on the Conservation of Nature and Landscape Protection](#). Its objective is "*to protect, care for and, to the extent necessary, restore nature and the countryside, in such a way as to ensure the lasting and widespread functional efficiency of the ecosystems, the conservation of countryside elements and wild animal and plant species together with their habitat, the regenerative ability and lasting productivity of natural resources, and also the diversity, specificity and beauty of the natural and rural landscape; and also, in order to encourage cooperation between the Contracting Parties for these purposes*" (Article 1)¹. The conservation of biodiversity, and the "diversity, specificity and beauty of the natural and rural landscape" are to be considered in a trans-sectoral manner, including, but not limited to, territorial and urban planning, soil protection, water, energy, industry and handicraft, tourism, agriculture and forestry, but also training, education and research. All Alpine states except Switzerland, which only signed it, have ratified this protocol⁹ and are therefore *inter alia* required to draft detailed inventories, to ensure that all public projects that could affect the natural balance and the landscape prevent any avoidable damage, and that they compensate for unavoidable impairment. States are prohibited from damaging biodiversity in existing protected areas, in particular, and the Convention also encourages the establishment of new protected areas, including national parks.¹⁰ Article 8

calls for and alignment of landscape planning with territorial planning so that natural habitats of wild animal and plant species are preserved or developed. Article 11 requires the maintenance of existing and the creation of new protected areas and prohibits actions that would destroy the ecological processes of these areas, while Article 12 “Ecological network” also foresees the establishment of transboundary, transnational networks of protected areas through the harmonisation of management methods, the exchange of experiences among protected area managers and their institutional partners.

Also of great relevance for ecological connectivity is the [Spatial Planning and Sustainable Development Protocol](#). This Protocol acknowledges the risks of harming the ecological balance of the sensitive Alpine ecosystems due to human land-consuming activities, as well as agriculture and forestry. It emphasises the need to find a balance between protection of the environment, social and cultural promotion and economic development of the Alpine territory. One of the stated objectives (Article 1) is to “harmonise the use of the territory with the ecological needs and objectives”¹¹. This is further detailed in Article 3, which considers criteria for environmental protection in spatial planning and sustainable development policies, including the protection of ecosystems, species, and rate landscape elements, as well as restoring deteriorated natural and urban environments, among other points for consideration. Coordinated territorial planning across borders is specifically addressed in Article 4, while the need for cross-sectoral policy making is spelled out in Articles 5 and 6. Article 9 calls for the conservation and reclaiming of territories of major ecological and cultural value. It proposes the prohibition of buildings or infrastructure in certain “tranquil” areas as well as traffic-limiting measures.

Other Protocols are also relevant for biodiversity conservation. The [Mountain Farming Protocol](#) acknowledges that farming methods “exert a decisive influence on nature and landscapes and that extensively farmed countryside must fulfil an essential function as a habitat for Alpine flora and fauna”¹². It aims to ensure that mountain farming methods safeguard the natural environment, prevent natural risks and conserve the beauty and recreational value of nature and the countryside and of cultural life in the Alpine region. As such, this Protocol also supports ecological connectivity indirectly.

The [Mountain Forest Protocol](#) aims to preserve mountain forests as a near-natural habitat. It states the importance of mountain forests for protecting biological diversity and the enjoyment of nature (Article 8). It requires Parties to establish natural forest reserves “in a sufficient number and size”¹³ to obtain a representative sample of all mountain forest ecosystems (Article 10). This should also include cross-border natural forest reserves. Clearly the preservation of mountain forests as natural habitat has an important influence on the maintenance of ecological connectivity.

The [Tourism Protocol](#)’s objective is to contribute to sustainable development by encouraging environmentally-friendly tourism. The Protocol’s Article 5 prescribes the elaboration of specific measures that will evaluate planned developments in terms of socioeconomic consequences for the local population on the one hand, and on the other hand the consequences for soil, water, the air, natural balances and the countryside, “taking into account specific ecological data, natural resources and limitations to the ability of ecosystems to adapt”¹⁴. It requires controlling tourist flows, especially in protected areas to ensure sustainability of these areas (Article 8) and the designation of quiet areas where tourist facilities must not be developed (Article 10). Furthermore, ski slope developments affecting the landscape are to be avoided and developed areas replanted with native species where this is possible (Article 14). The Protocol also recommends that knowledge of nature and the environment be taught in vocational training for tourism jobs (Article 23).

The [Soil Conservation Protocol](#)¹⁵ requires that Alpine soils be preserved to conserve their various functions, including as a livelihood resource, but also as habitat for animals, plants and micro-organisms and as a characteristic element of nature and the landscape. It also acknowledges soil as an integral part of the ecological balance with particular reference to

water and nutrient cycles. Article 9 addresses the conservation of soils in wetlands and moors, which implies no or little use of moor soils, restriction of engineering activities to “nature-compatible” techniques, and appropriate silvicultural methods. Like in the Tourism Protocol, the effects of tourism in terms of soil impairment are to be avoided (Article 14). There is no explicit mention of ecological connectivity, but the mentioned soil conservation actions would also enhance connectivity.

The Ecological Network Platform of the Alpine Convention has developed a concept for the nomination of pilot regions (Figure 1). On this basis the Alpine Conference on 8 March 2011 officially recognised eight Alpine regions for their exemplary work aimed at the creation of an alpine ecological network. They proposed a three-stage approach for all pilot regions, some of which was implemented as part of the Alpine Space ECONNECT project (see part II below). The pilot region strategy provides common methods for creating ecological networks in the Alps, which are summarised in the guidance document Methodology for Pilot Regions.

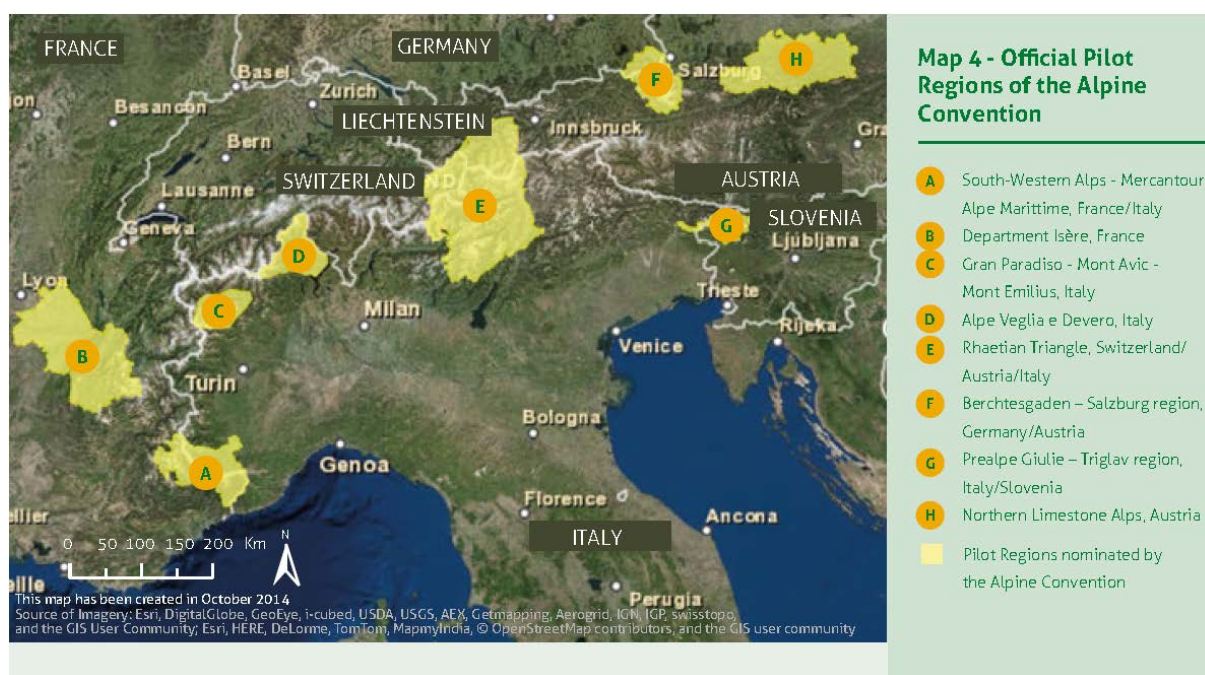


Figure 1 – The official Pilot Regions designated by the Alpine Convention (Source: ALPARC/GreenAlps, 2014)

The Global Convention on Biological Diversity

The [Global Convention on Biological Diversity \(CBD\)](#) (1992) is not the first legal agreement that aims to safeguard the world’s biodiversity; it is preceded by four older global nature conventions and European legislation¹. It is, however, arguably the most important. First, it imposes on those national governments that have ratified the Convention (all Alpine countries) a legal obligation to translate the Convention’s protocols into national law and to

¹ Convention on Wetlands of International Importance (Ramsar Convention), 1971; World Heritage Convention, 1972; Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), 1975; Convention on Migratory Species (Bonn Convention), 1979; Bern Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), 1979; Birds Directive, 1979/2009, Habitats Directive, 1992 – the latter two were created to fulfil the EU’s obligations arising from the Bern Convention, as was the subsequent creation of the Natura 2000 network.

report back to the Convention on progress in meeting their obligations. Second, it is the foundation for several other legal instruments and strategies and EU and national level. The EU Biodiversity Strategy to 2020 (see below) is closely modelled on the CBD, and in particular on the Aichi Biodiversity Targets¹⁶, which are part of the CBD's Strategic Plan for Biodiversity 2011-2020.

All targets are of relevance for the conservation of Alpine biodiversity as well, and Strategic Goal C of these targets "To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity", Target 11 focuses on the need to expand protected areas and to protect biodiversity through "...effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, ... integrated into the wider landscapes".¹⁷ To achieve this target, countries are expected to integrate protected areas into wider land- and seascapes, and mainstream conservation into other sectors. Ecosystem-based approaches to adaptation to and mitigation of climate change through carbon sequestration are recommended.¹⁸

The EU Biodiversity Strategy to 2020

The [EU Biodiversity Strategy to 2020](#)⁷ ("Our life insurance, our natural capital: an EU biodiversity strategy to 2020" /COM/2011/244 final 3.5.2011/), includes a long-term vision of protecting and restoring Europe's biodiversity and its ecosystem services by 2050. It follows from the 2006 Biodiversity Action Plan and is an ambitious document that aims to integrate biodiversity monitoring and reporting into various EU policies (apart from nature legislation also the Common Agricultural Policy, the Common Fisheries Policy, the Forestry Policy, and the Cohesion Policy). Target 2 of the Strategy includes the restoration of at least 15% of degraded ecosystems, and EU Member States are required to develop a strategic framework for ecosystem restoration at sub-national, national and EU level (by 2014).

The strategy is not itself binding on Member States, but there are several Directives that are and that support its implementation at least partly. These are first and foremost the above-mentioned Birds and Habitats Directives, which are the binding legal foundations for the Natura 2000 protected area network. The Habitats Directive also requires Member States to monitor and protect species and habitats within and outside protected areas. A voluntary goal is the coherence of the [Natura 2000 network](#), which, if implemented, has a direct positive impact on ecological connectivity.

In addition to the Natura 2000, there is also the "[Emerald network of Areas of Special Conservation Interest](#)"¹⁹, based on the same principles as Natura 2000, but extending these principles to non-EU countries. It was launched in 1989 by the Council of Europe in observance of the requirements of the [Bern Convention](#). (Within the EU Member States, Emerald network sites are those of the Natura 2000 network.) Designated areas are to be managed at the national level. In 2010 the Standing Committee to the Bern Convention adopted an ambitious calendar for the implementation of the Emerald Network, which sets milestones and deadlines for the finalisation of the different phases of the network constitution process for each country. The calendar aims for an "operational" launch of a coherent Emerald Network by 2020¹⁹. In the Alpine context this concerns non-EU member country Switzerland, which already has 37 Emerald sites (see report on Switzerland below).

Some progress has been made in the EU in following up on ecosystem-based nature conservation measures, such as plans for green infrastructure and the establishment of a platform for ecosystem assessment²⁰. In 2015 Member States were involved in mapping and assessing the state of ecosystems and their services.

The Commission presented a mid-term report²¹ to the European Parliament and the Council on the Biodiversity Strategy to 2020 in October 2015. Concerning Target 2, there is some progress, but at an insufficient rate. The report acknowledges progress mainly in the areas of policy and knowledge improvement, and mentions that some restoration activities have taken place in Member States, but that the trend of ecosystem degradation has not been reversed. It again points to the need to develop and implement national and regional frameworks and green infrastructure to halt the loss of biodiversity outside the Natura 2000 network. The sobering conclusion is that considerably bolder and more ambitious efforts, including more effective integration with a wide range of policies (particularly agriculture and forestry) are needed if the EU biodiversity strategy goals are to be met.

A side topic, but given the extent of agricultural use in the Alps nevertheless important, concerns the farming methods and their link to nature conservation employed in Alpine countries. The “best” type of agriculture from a biodiversity conservation point of view is probably organic production, although other sustainable farming methods also contribute to ecosystem conservation and can, given the right measures, enhance ecological connectivity in cultural landscapes. In absolute terms, the EU Member States with the largest areas under organic agriculture in 2011, according to an EC report dating to 2013, were Spain (1.8 million ha), Italy (about 1.1 million ha, with a declining trend) and Germany (1 million ha), which together account for around 40% of the EU-27 total organic area²². Switzerland had an area of about 128 thousand ha under organic farming in 2013²³. But whereas in the EU-27 the average share of organic area as a percentage of overall agricultural area in 2011 was 5.4%, Austria’s share in 2011 was close to 20%²². For comparison, within the Alpine Space the next largest share is Italy, with just above 8% of its agricultural land area under organic production. Switzerland had slightly more than 12% of its total agricultural land area under organic farming²³. Beyond organic the European Community also supports other environment-friendly farming measures. Under the new Common Agricultural Policy (CAP) it has identified three priority areas for action to protect and enhance the EU’s rural heritage: Biodiversity and the preservation and development of ‘natural’ farming and forestry systems, and traditional agricultural landscapes; water management and use; and dealing with climate change. From 2015, all EU Member States must use 30% of direct payments from the EU to finance farmers for sustainable agricultural practices (‘greening’).²⁴

EUSALP – the EU Strategy for the Alpine Region

In late July 2015, the European Commission published the Communication and the Action Plan for [EUSALP](#)²⁵, and a kick-off conference took place in Slovenia in January 2016. The Strategy includes all Alpine countries and regions and covers an area larger than that of either the Alpine Convention or the Alpine Space Programme, as shown in Figure 2 and Figure 3. It was prepared due to a perceived need for better cooperation between the regions and states in the Alpine region to tackle its major challenges.

The Action Plan²⁶ contains three thematic policy areas (economic growth and innovation, mobility and connectivity, environment and energy) and a cross-cutting policy area concerning governance and institutional issues.

In the environment area, the objective is to adequately tackle those environmental issues that require cooperation at the level and scale of the macro-region. The principal thematic challenge mentioned is climate change, as it will have foreseeable effects on the environment, biodiversity and living conditions. Actions 6 and 7 have definite interlinkages with the Alpine Convention and its protocols and address the importance of ecological connectivity in landscape development projects.

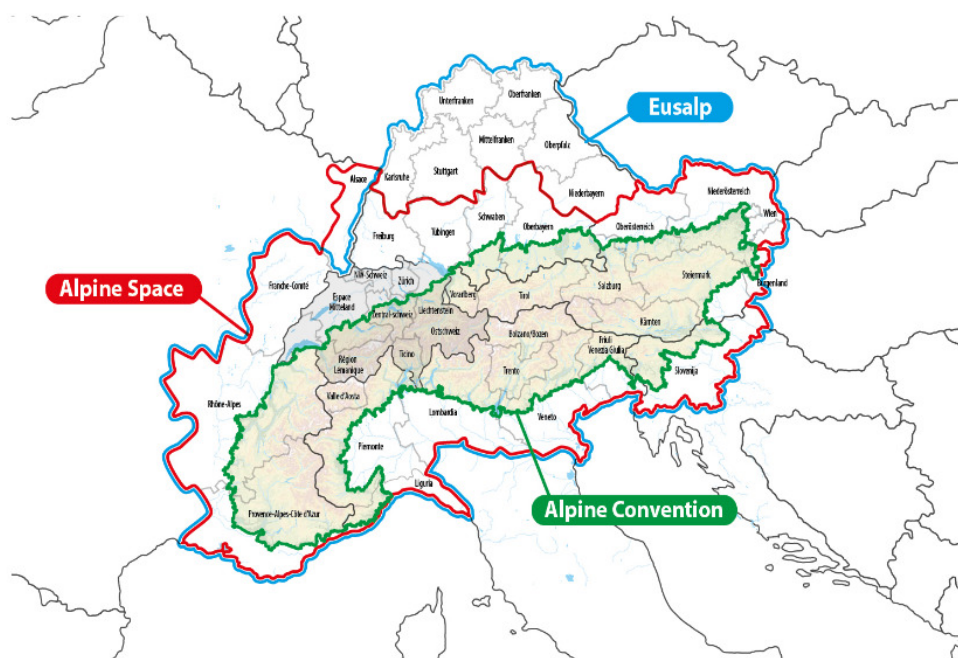


Figure 3 – Comparison of area covered by the Alpine Convention vs. Alpine Space Programme vs. EUSALP (Source: European Commission 2015)

Water resource management should be addressed at a river basin scale, and transnational river basin management plans would be of high added value. The Action Plan points out that macro-regional governance of the Alps' natural heritage could ensure that the interests of different territories and groups are better balanced, particularly regarding the distribution of economic returns. The Strategy aims to facilitate better coordination between different actors across sectors (nature protection, agriculture, processing industry, consumers), political levels (local, regional and national within the European rural development schemes), and territories (both producing and consuming). Special significance is given to the relation of core and peri-Alpine areas. The Action Plan argues that the Strategy may well lead to stronger political ownership in environmental management, since there is potential for the matter to be contributing to a common identity.

This new Strategy is thus meant to preserve the natural and cultural assets of the region, while at the same time tackling economic, social, and territorial imbalances through a "sustainable growth" focus and enhanced cross-border cooperation.

Action 7 of the Action Plan addresses ecological connectivity explicitly. It aims to promote ecological corridors and green infrastructures in unprotected areas, which was one of the recommendations that arose from the public consultation process that preceded preparation of the Action Plan. The dangers of increasing fragmentation of Alpine territory to biodiversity and ecosystem services are summarised, and the need for a more integrated view and more environmental accountability is stated. Links to the EU-wide Strategy on Green Infrastructure are referenced, in particular the need to define such infrastructure at a regional level and to create stronger links between Alpine core areas and the surrounding areas, between rural and urban areas, and between the Alps and other mountain regions. The Action Plan emphasises that connectivity not only refers to connecting various protected areas, but also to integrating the issue into a wider territorial scale and across sectors. All activities to improve connectivity should involve policy fields other than nature protection, such as spatial planning.

Apart from this specific mention of ecological connectivity in the Strategy, other Actions also provide indirect support for this topic. For example, Action 6 leaves sufficient room for interpretation when it refers to “building on the progress made by the NATURA 2000 biogeographical process”, promoting traditional land use, promoting the protection of biodiversity in forests, and strengthening soil protection and sustainable land use – in particular preventing land take and soil sealing. In fact investments into green infrastructure are also listed as a possible action indicator.

With the EUSALP-[launch conference](#) on 25 and 26 January 2016 in Brdo (Slovenia) the implementation phase is to be started.

National and sub-national policies and strategies

This chapter provides an overview of national and sub-national (provincial or regional) strategies that are of relevance for ecological connectivity and networks. Countries are listed in alphabetical order. For each country the general legal framework for nature conservation is summarised, followed by specific policies for biodiversity conservation and ecological connectivity. Part II of this report presents a selection of some concrete implementation activities by country.

Austria

In Austria there is no uniform Austrian environmental law. Instead, there is a legal framework of environmental protection that is determined by a variety of laws. Numerous legal areas have a more or less direct or indirect impact on biodiversity, both at the national and at the provincial level. These include nature and forestry legislation, but also laws from areas such as land use planning, hunting laws, air quality regulations, etc.

This report lists only those laws and regulations that have an influence on landscape fragmentation – partly based on an overview²⁷ of national and provincial laws with relevance for biodiversity dating back to February 2008. At the national level these are:

- Federal constitutional law on comprehensive environmental protection (Bundesverfassungsgesetz über den umfassenden Umweltschutz BGBl 491/1984) – expanded in 2013 into the Federal Constitutional Law on sustainability, animal welfare, comprehensive environmental protection, ensuring water and food supply and research, (Bundesverfassungsgesetz über die Nachhaltigkeit, den Tierschutz, den umfassenden Umweltschutz, die Sicherstellung der Wasser- und Lebensmittelversorgung und die Forschung, BGBl I 111/2013)
- The Alpine Convention's translation into national law – BGBl. 477/95
- Forestry law (Forstgesetz und Forstliches Vermehrungsgutgesetz) – BGBl. 440/75 and 419/96
- Environmental Control Act – BGBl. I 152/93
- Environmental Impact Assessment law – BGBl. I 89/2000
- "Wildlife protection" guideline of the federal Ministry of Traffic, Innovation and Technology (BMVIT) (Richtlinie Wildschutz – RVS 3.01) (sets minimum standards for wildlife passages at highways)

At provincial level (Landesgesetze) they include:

- Nature protection laws (all federal states/provinces)
- National park laws (all provinces)
- Moor and bog protection law (federal state of Upper Austria)
- Landscape protection laws (provinces of Upper Austria and Vorarlberg)
- Spatial planning laws (all provinces)
- Hunting laws (all provinces)
- Forestry laws (all provinces)

- Various infrastructure laws (all provinces)

According to governmental figures, 27% percent of Austria's surface is subject to some kind of nature conservation legislation, of which 16% are Natura 2000 areas, National Parks or strictly protected "Nature Protection" areas, while about 11% are under less strict forms of protection, such as landscape protection (Landschaftsschutz)²⁸. For detailed figures on Alpine Protected Areas in Austria, please consult the [ALPARC website](#).

At the same time, some 80% of the land area is used for agriculture (25%) and forestry, which points to the supreme importance of sustainable practices in this sector if biodiversity is to be safeguarded. Compared to other countries, Austria has a rather high proportion of extensive agriculture (56%)²⁸. The government promotes environment-friendly agriculture through the Austrian Programme for Environmentally Sound Agriculture (Österreichisches Programm für Umweltgerechte Landwirtschaft – ÖPUL) and through Forest-Environment Measures (Wald-Umweltmaßnahmen – WUM). Austria is also a leader in organic agriculture within the EU in terms of share of arable land under organic vis-à-vis conventional farming systems.

An integration of ecological connectivity measures (wildlife crossing points) into traffic infrastructure planning for new roads was mandated in 2006 through [instructions](#) by the Austrian Ministry for Transport, Innovation and Technology (BMVIT) to the Austrian state-owned company ASFINAG, which plans, finances and builds the country's entire primary road network. These instructions mandate that ASFINAG secure or re-establish several mutually supporting and large-scale "mobility axes" (green infrastructure) between core areas (Alps, Carpathians, Dinarids and Bavarian-Böhmerwald mountain forest areas), in order to enable gene flow, particularly in the principal Alpine valleys, where there is a marked and progressive degree of habitat fragmentation²⁹. The instructions also call on the implementation of the 2006 version of the national directive for "wildlife protection" (RVS 3.01). This directive sets minimum standards for wildlife passages on motorways and expressways. The BMVIT has no influence on the conservation of greenlands in regional planning processes, but it could require binding environmental impact assessments for transport as part of § 15a contracts with the provinces³⁰.

In terms of ecosystem management and biodiversity protection, LIFE projects have been used to restore ecosystems and a "biodiversity-community network" was established as part of the campaign "vielfaltleben". However, despite the existence of laws, the protection of large ecological networks beyond individual protected areas is still in its early development stages. Progress of implementation in provincial laws and regulations differs among provinces³¹.

Austrian Biodiversity Strategy 2020+

In December 2014 Austria's Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) published the first Austrian Biodiversity Strategy 2020+ ([Biodiversitäts-Strategie Österreich 2020+](#))²⁸.

The Strategy includes 5 "fields of action" or goals ("Handlungsfelder"):

1. Knowing and acknowledging biodiversity
2. Sustainable use of biodiversity
3. Reducing pressures on biodiversity
4. Conserving and developing biodiversity
5. Securing global biodiversity

Each of these fields has associated targets and concrete measurable sub-targets, monitoring and evaluation indicators, as well as institutions responsible for implementation. The first four fields of action all have some bearing on ecological connectivity, and the field of action of most direct relevance here is number 4 – conserving and developing biodiversity. Its targets include **Target 10: “Species and habitats are conserved”** and **Target 11: “Biodiversity and ecosystem services are taken into account in spatial planning and transport/ mobility”**. Other targets, such as Target 1: “The significance of biodiversity is acknowledged by society”, Target 3: “Agriculture and forestry support conservation and improvement of biodiversity”, or Target 6: “Energy supply is biodiversity-friendly”, to name only a few, are of course necessary pre-conditions for the implementation of all biodiversity conservation and ecological connectivity measures.

Within **Target 10**, there are three concrete sub-targets that specifically refer to ecosystem function and connectivity:

- quantitatively sufficient, functioning biotope connectivity has been established(2020+);
- 15% of the deteriorated ecosystems have been improved or restored;
- natural development takes place in 2% of Austria's territory (2020+).

Concerning specific measures to be taken, several are listed that will enhance connectivity:

- Promotion and support of voluntary measures to create a system of interlinked biotopes;
- Conservation of old growth outside forests with associated improvement of the legal framework conditions (traffic safety, safety of roads and paths);
- Implementation of the Alpine Convention (in particular the protocols on nature conservation, soil protection and mountain forests);
- Strengthening of ecosystem (“biotope”) connectivity by raising the quality of features constituting the ecosystem, quality-based improvement of the relevant areas and structural features;
- Identification and development of options for the conservation of biodiversity hotspots outside protected areas, while maintaining an adequate balance of interests.

Target 11 is almost entirely about ecological connectivity. The sub-targets are:

- Total daily land take is significantly reduced (2020+);
- Regional target values for land take are available (2020);
- Priority areas for ecological functions (Green Infrastructure²) are incorporated and designated in local and regional spatial planning (2020+);
- Ecological permeability is significantly increased for main traffic infrastructure (2020).

The Strategy lists many measures to achieve these targets, among them better coordinated spatial planning that incorporates biodiversity aspects and ecological functions at all levels of planning; an Action Plan to reduce soil consumption; safeguarding of wildlife corridors; identification of areas with need for green infrastructure; harmonised ecosystem services mapping across Europe; consideration of functional connectivity and the habitat network when establishing compensation areas; and development of nationwide strategies for habitat connectivity. (For a complete list of all recommended measures please refer to the Strategy document.)

² The strategy explains that Green Infrastructure comprises nature reserves, natural landscape features such as hedgerows or coppices, artificial wildlife crossings (“green bridges”), urban parks, and also flood protection measures, like restoration structures, as specified in EC COM(2013) 249.

In line with Austria's decentralised governance system, implementation responsibility rests with the BMLFUW alongside provincial governments, city governments, and communities (Gemeinden). Further stakeholders are also listed in the Strategy document.

Recently, in March 2016, the Austrian Ministry of Agriculture, Environment, and Water (*Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft*), brought online a web portal on natural habitat networks in Austria, lebensraumvernetzung.at, which lists the different international, national and provincial projects of ecological networks that have so far been implemented in Austria, with corresponding maps. Some of the examples of planning for ecological connectivity include the province of Carinthia ("Carinthia's green backbone – *das Grüne Rückgrat Kärntens*"), various provincial wildlife and green corridor maps, the Upper Austria province's habitat connectivity map, and the Alpine Carpathian Corridor. These are mostly still at the planning stage and not fully implemented³², but some examples of implementation are listed in Part II of this report.

Austrian National Park Strategy ***(Österreichische Nationalpark-Strategie)***

The Austrian National Parks correspond to category II of the [IUCN Protected Areas Categories System](#), which refers to "*large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities*".³³ Six National Parks, created over the past 25 years, cover 3% of Austria's land area or 2000 km². Three of them (Hohe Tauern, Kalkalpen, Gesäuse) are in Alpine territory and constitute more than 90% of Austria's National Park area.

The Austrian National Park Strategy³⁴ dates back to 2010. Spearheaded by the BMLFUW and conceived by the National Park directors with broader participation, including representatives of national and provincial National Park committees, forest administrations, and conservation NGOs, it lays out concrete goals for 5 years, and a longer-term vision for the future. The foremost goal is, by definition, biodiversity conservation. All other goals are subsumed to this and must not hamper it. The regional protection of biodiversity and the ecological connectivity with areas surrounding the National Parks is one of the expressed goals. The indicators of success for this goal are formal agreements on ecological networks between National Parks with adjacent protected areas. This is only partly implemented to date – one good example is the "Netzwerk Naturwald", which builds on the Alpine Space project Econnect (see good practice examples in Part II).

One of the concrete goals concerns improving coordination and synergies among the various Parks, as well as general management standards. This surely is a key aspect for the establishment of ecological networks.

The longer-term vision includes the protection of biodiversity under the influence of climate change, ecosystem services, the introduction of unmanaged "wilderness" areas, and the establishment of ecological networks.

Strategy of the Austrian Nature Parks ***(Strategie der Österreichischen Naturparke)***

Different from National Parks, which are category II in the IUCN Protected Areas Categories System, the Austrian „Nature Parks“³⁵ are actually primarily protected cultural landscapes (corresponding to IUCN category V), where the participating communities in a region agree

to “gentle” land use and landscape management in line with sustainability criteria. There are 48 Nature Parks in Austria ranging from 20 to 70.000 hectares in size, and geographically they are concentrated in the East of the country, although several are located in Alpine regions, and most are within the Alpine Space as defined by the Alpine Convention. A full list of these Nature Parks is available on the website of the Austrian Nature Park Association ([Verband der Naturparke Österreichs – VNÖ](#)). This association provides a joint platform for all Austrian Nature Parks and develops joint projects.

Nature Parks are composed of protected landscapes and, partly, of areas with special nature protection. The aim of the parks is the creation of model regions that, on the one hand, conserve biodiversity and landscape through sustainable use, and, on the other hand, offer recreational opportunities, environmental and cultural education and provide opportunities for regional development. Their stated strategy is in fact to implement the Agenda 21 concept of “sustainable development” that was formulated at the 1992 UN Conference on Environment and Development in Rio, and in doing so to provide Nature Park regions with economic, ecological, and socio-cultural perspectives for the future. The strategy points specifically to the need to integrate nature protection with planning in other sectors, such as tourism, agriculture, traffic, and spatial planning.

Participation of the area residents is a key component of Nature Park management, as imposed landscape protection measures are not likely to be sufficient to reach sustainability goals. The VNÖ acknowledges that in some Nature Park regions, this cross-sectoral dialogue and public participation are already working quite well – by implication this is not yet the case in all regions.

One of the central goals of the VNÖ is the protection of characteristic cultural landscapes, which include relatively natural habitats and diverse structural components (meadows, fields, hedgerows, embankments, trees in fields, copses, wetlands etc.), and to make people aware of the value of these biodiversity elements to ensure they are maintained. In 2014 the Nature Parks participated in a multi-stage preparatory process that included provincial and federal representatives to implement the Austrian Biodiversity Strategy 2020+. The VNÖ reports readiness to contribute to its implementation through special projects. Also in 2014, the VNÖ undertook a study on “Nature Parks and Biodiversity – foundation for and contributions to biodiversity conservation in Austrian Nature Parks”³⁶, which was financed by the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

Figure 4 shows the goals (“Handlungsfelder”) of the Austrian Biodiversity Strategy (in bright green) and how they relate to the strengths of Nature Parks, as determined in all Nature Park provinces. Solid lines around goals were viewed as particularly relevant in all provinces, whereas dotted lines show goals that were perceived as important in only some Nature Park provinces. Recognition of the value of biodiversity and the protection of species and habitats are both goals that were seen as very relevant.



Figure 4 - Relation of the Nature Park strategy with the Austrian Biodiversity Strategy 2020+ (Source: VNÖ)

Austrian Forest Strategy 2020+

The Austrian forest strategy 2020+ ([Österreichische Waldstrategie 2020+](#)) was published by the Ministry of Agriculture, Forestry, Environment and Water in June 2016³⁷. It was prepared with broad participation of all forest-relevant organisations and institutions in Austria. Its principal goal is to highlight the multifunctional role of forests for people. Seven “areas of action” (goals) emphasise the various functions of forests, among them their role in conserving biodiversity and protecting the climate.

Of particular relevance for ecological connectivity is strategic goal 4.6 – “Ensure forests function as ecological networks, also considering adjacent habitats”. It specifically mentions as strategic challenges the connectivity of native forest habitat types together with their plant- and animal diversity (including genetic diversity) and the avoidance of fragmentation. Factors of success are listed, including the identification of areas in need of connectivity and of possible conservation corridors; as well as habitat network structures such as forest margins, wind breaks, riverine vegetation, stepping stones and the general restoration of connectivity of forest habitat.

It acknowledges that this requires close collaboration between the forestry sector, hunting sector, nature protection, agriculture, tourism, and regional planning to elaborate strategies at a regional level while respecting national and international specifications.

The LEADER Programme

The [LEADER](#) (from French “Liason entre Actions de Développement de l'Economie Rurale”) Programme, which is financed by the European Union and operates also in other Alpine countries, promotes innovative strategies for rural development in select regions. Development is undertaken by public-private partnerships (local “action groups”) based on a bottom-up trans-sectoral approach, meaning that projects are developed within the regions. There are now 77 LEADER regions in Austria. One of the focus areas of the LEADER

Programme is the improvement of environment and landscape. In the period 2007-13 under the environment track the programme mainly paid out subsidies to farmers for environment-friendly farming measures (ÖPUL), and for sustainable forest management measures³⁸. During that period, there were several projects relating to the biodiversity conservation. Some examples that promote ecological connectivity are listed in Part II of this report.

In a study project³⁹ the Umweltdachverband and ÖAR Regionalberatung GmbH examined the implementation of conservation-related topics through the LEADER program. They looked at experiences of cooperation between regional development and nature conservation actors and found that biodiversity conservation projects are as yet insufficiently represented in the LEADER-sponsored regional and rural development initiatives. From their analysis they derived recommendations for the increased use of synergy potentials concerning the [integration of biodiversity into the future LEADER Programme 2014-2020](#). One of the important changes in the coming programming period is that European Agricultural Fund for Rural Development (EAFRD) – “ELER, Entwicklung Ländlicher Raum” in German – is no longer a stand-alone instrument, but is a component of a common strategic framework with the European Regional Development Fund (ERDF) and the European Social Fund (ESF) so as to support the EU2020 goals for growth and employment. The document includes potential LEADER-links to the EU Biodiversity Strategy 2020 and concrete recommendations to provincial authorities and local LEADER working groups. Although it is specific to Austria, it is likely also relevant for other countries that implement LEADER programmes. One of the examples cited in the document is the transnational project “[Cultlands](#)” for the conservation of European cultural landscapes. The project aims to promote products that help the participating rural areas to conserve the characteristic features of their cultural landscape. Although not directly targeting ecological connectivity, projects such as this can make a contribution to the permeability of the landscape to various species and could conceivably be expanded to include specific connectivity measures.

France

In France the protection of habitats essential to the survival of some animal and plant species, is provided by prefectural decrees. The earliest of these are Decree No. 77-1295 of November 25, 1977, promulgated to implement measures related to species protection under the law n ° 76-629 of 10 July 1976 on the protection of nature. These provisions are codified in Articles R. 411-15 to R. 411-17 and R. 415-1 of the Environment Code⁴⁰. Circular No. 90-95 was issued on 27 July 1990 on the protection of habitats needed by species living in aquatic environments.

More recently France has legally protected ecosystems and ecological connectivity in a series of national laws⁴¹.

- Law 2009-967 of 3 August 2009 relating to the implementation of the Grenelle Environment Forum (Articles 23 and 24)
- Law 2010-788 of 12 July 2010 on the national commitment to the environment (L.371-1 and following of the Environment Code)
- Decree No. 2011-739 of 28 June 2011 on regional committees "green and blue networks" and amending the regulatory part of the Environmental Code. (Articles D. 371-7 and following of the Environment Code)
- Decree No. 2012-1492 of 27 December 2012 on the green and blue network (Articles R.371-16 and following)
- Decree No. 2014-45 of 20 January 2014 adopting the national guidelines for the preservation and restoration of ecological connectivity

Apart from the Ministry, decision-making bodies at the national level include the Grenelle Environment Forum National Sustainable Development Committee (CNDDGE), a consultative body associated with the development, monitoring and evaluation of the Biodiversity Strategy. In compliance with the Grenelle I Act (article 25) the Government established a National Biodiversity Observatory (ONB), which is responsible for monitoring all activities at the interface of biodiversity and society⁴². It has created sets of indicators for strategic impact monitoring of the French National Biodiversity Strategy.

Pursuant to Article L. 371-2 of the Environmental Code, the framework document "National Guidelines for the preservation and restoration of ecological connectivity" was developed by the Operational Committee's of the "green and blue network", which was set up under the Grenelle Environment Forum, in association with the national committee "green and blue networks" set up in late 2011. National guidelines were adopted by the Council of State decree (Decree No. 2014-45 of January 20, 2014 adopting the national guidelines for the preservation and restoration of ecological connectivity⁴³.

About 25% of France's terrestrial surface is protected⁴⁴. The French Alps feature several protected areas, including three National Parks (Écrins, Vanoise, and Mercantour). For detailed figures on Alpine Protected Areas in France, please consult the [ALPARC website](#).

French National Biodiversity Strategy

France published a new National Biodiversity Strategy for 2011-2020 ([La Stratégie nationale pour la biodiversité](#)) in 2011, a "framework to inform, guide and mobilise all public and private stakeholders"⁴². It complies with French obligations as a Party to the CBD and is in line with the EU Biodiversity Strategy to 2020 as well as the National Sustainable Development Strategy (SNDD). The strategy aims to secure stronger (voluntary) commitment of different stakeholders, at all levels across the territory, to conserve and restore, reinforce and enhance biodiversity, and ensure its sustainable and equitable use in all areas of activity. It is meant as a framework for action for public and private actors at different territorial levels and in all sectoral activities (water, soils, sea, climate, energy, agriculture, forest, urban planning, infrastructures, tourism, industry, trade, education, research, health, etc). It encourages in particular also the development of shared biodiversity strategies at regional level.

The Strategy is divided into six interacting strategic goals and twenty targets. Most important in this context is **Target 5 "Build a green infrastructure including a coherent network of protected areas"**. It addresses the need for species to be able to move and therefore the need to define, preserve, and restore a coherent network of "green and blue infrastructure" (*trame verte et bleue*) at all territorial levels. At the same time, **Target 6 "Preserve and restore ecosystems and their functioning"** is relevant, as it concerns the preservation of ecosystems and, as a matter of priority, the restoration of those that have become fragmented or otherwise damaged. **Target 4 "Preserve species and their diversity"** specifically addresses the preservation of species diversity, and the need to improve the conservation status of threatened species, while also conserving those that are currently not in danger of extinction, but that play an important role in the functioning of ecosystems. The Strategy contains several other very relevant targets that support and indeed provide an implementation foundation for Target 5, such as **Target 7 "Integrate biodiversity into economic decisions"** or **Target 11 "Control pressures on biodiversity"**, and **Target 12 "Safeguard sustainability of biological resource use"**. Quite important, because this is a challenge in all countries, is also **Target 14 "Ensure consistency between public policies at all scales"**, referring in particular to consistency in spatial planning documents at the territorial level, and to coordination between the different scales of organisation in

implementing the Strategy and developing or reviewing regional and local biodiversity strategies. To implement connectivity measures, **Target 16 “Develop national and international solidarity amongst territories”** is also important, as it acknowledges the ecological interdependence of the different territories. The document points to tools that have been developed at the national level for organising such “solidarity” in the water sector, but as yet not for biodiversity.

The Grenelle law identifies the regional level as particularly relevant for biodiversity conservation interventions, which includes the development of regional and local strategies. The National Strategy is meant not only as a commitment of the National Government, but also to guide local authorities’ actions. Indeed, the French Alpine regions have developed their own matching regional biodiversity strategies (see below). It should be noted that the use of the term “regional” in France differs somewhat from that in Austria. Whereas in Austria and Germany the federal structure divides the countries into provinces (federal states or “Länder”) and “region” tends to refer to smaller administrative units below the district level, in France the largest administrative unit after national state is the region (région). Both the Rhône-Alpes region and the PACA region have prepared their own biodiversity strategies in 2014 and 2015 respectively.

In terms of the implementation of connectivity measures, France has developed a “Regional Scheme of Ecological Coherence” ([Schéma Régional de Cohérence Ecologique – SRCE](#)⁴⁵), which blends biodiversity conservation and land management. This in turn is a component of the national “Green and Blue Network” concept, the “[Trame verte et bleue- TVB](#)”. The SRCE is jointly developed by the State (DREAL) and the Regions. Implementation examples can be found in Part II of this report.

Rhône-Alpes Biodiversity and Aquatic Environment Strategy ([Stratégie biodiversité et milieux aquatiques Rhône-Alpes](#))

Given the geographical situation of the Rhône-Alpes region, at the crossroads of continental, Alpine and Mediterranean influences, it has a high level of biodiversity and thus a responsibility to preserve and manage wildlife and the rare and endangered flora. At the same time, Rhône-Alpes is the 2nd most populated region of France, and some 3000 ha of soils (farmland) are lost to conversion every year, of which 90% is attributed to urbanization⁴⁶. It ranks first in France in terms of highways and rail lines, and worldwide has the greatest number of lifts. In the face of this continuing landscape fragmentation, the region aims to halt the loss of biodiversity by preserving natural areas that are habitat to many species, and to reconcile that objective with the development of human activities and urbanization. For this the possibility for wildlife to cross existing infrastructure has to be improved.

Le réseau des 13 RNR en Rhône-Alpes



Figure 5 – The protected areas of Rhône-Alpes (Source: Région Rhône-Alpes)

Twenty-two percent of the Rhône-Alpes territory is considered "outstanding natural areas". Since May 2005 (date of the Decree on nature reserves), the Region takes full responsibility of Regional Nature Reserves. The Region is in charge of creating new reserves to protect species and the most threatened natural environments of Rhône-Alpes, but also to upgrade existing reserves (extension of their scope, implementation of new management actions, establishing local governance through management advisory committees, etc.). The natural area network is currently made up of 13 reserves (Figure 5) and covers an area of nearly 2900 hectares⁴⁷. Some of these protected areas were gazetted as recently as March 2015.

The Region has also identified priority areas⁴⁸ for the first six years of implementation of the French "Regional Scheme of Ecological Coherence" ([Schéma Régional de Cohérence Ecologique – SRCE](#)⁴⁵). The regional scheme was adopted by resolution of the Regional Council of 19 June 2014 and decreed on 16 July 2014⁴⁶. Reducing the impact of infrastructure on landscape fragmentation and ecological connectivity is a top priority for the region. In a mapping process, priority levels for action were defined: the green areas, where steps were already ongoing, and red areas where operational procedures are to start soon. Seven areas (see Figure 6, beige zones) are in advanced planning stages to become "monitoring territories vis-à-vis the maintenance and/or delivery of good ecological connectivity". For these areas, it is particularly important to ensure the maintenance or restoration of green and blue corridors. For more on green and blue corridors refer also to Part II – good practice examples – of this report.

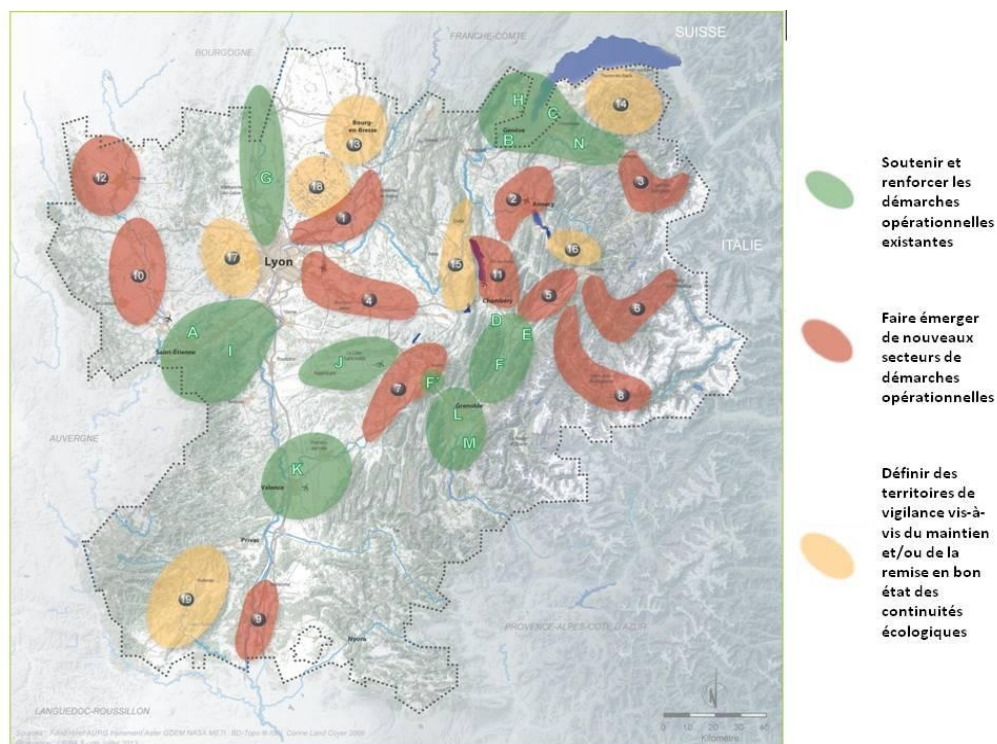


Figure 6 – Priority areas for ecological connectivity in the Rhône-Alpes region
(Source: Region Rhone-Alpes)

Some European cooperation projects have been implemented in the region in the field of water and biodiversity. The Rhône-Alpes region was leading some Interreg 2 projects funded by the ERDF during the previous programming period 2007-2013 for cooperation between France and Switzerland. Of these the "biological corridors of the wider Geneva region" project stands out in particular for relevance to the ecological connectivity theme. It is described in Part II of this report.

Within the current program (2014-2020), many programs help fund biodiversity operations in Rhône-Alpes, including LIFE, EAFRD, ERDF, some of which are dedicated to ecological network projects⁴⁹.

Provence-Alpes-Côte-d'Azur Biodiversity Strategy **(Stratégie Globale pour la Biodiversité (SGB) Provence-Alpes-Côte-d'Azur)**

Because of its geographic and climatic diversity, the region Provence-Alpes-Côte d'Azur (PACA) has an extraordinary diversity of natural environments and species combining Mediterranean and alpine character, and a high number of endemic species. The PACA region is however also characterized by its high degree of urbanization, which is often developed haphazardly at the expense of its natural and agricultural areas.

The PACA Regional Council adopted a resolution entitled "Towards a comprehensive strategy for biodiversity in Provence-Alpes-Côte d'Azur" in December 2010, which marked the start of a consultation process. The process put in place has enabled multiple exchanges with numerous stakeholders to propose a comprehensive strategy across the PACA territory. Its goal is to propel all stakeholders, the Regional Council, all partners and all stakeholders in the area, towards achieving a common goal, i.e. "rethinking the relationship between humans and nature to bring about a new model of development in which biodiversity is better known,

preserved and valued." In April 2015 the PACA region published its "Global Biodiversity Strategy for the Provence-Alpes-Côte-d'Azur Region" ([Stratégie Globale pour la Biodiversité - SGB](#))⁵⁰, a new regional environmental profile ([Le profil environnemental régional – PER](#))⁵¹ as well as some "action briefs". Through this strategy, the region has adopted a framework document and action plans that express a strong commitment of the Region for the preservation of biodiversity. The objectives of the SGB tie in with the goals of the national biodiversity strategy. The document however also remarks that the notion of planning, very present in the SGB, is barely visible among the objectives of the SNB.

Concerning ecosystems and ecological connectivity, of particular relevance are **objectives 2.1 - Protect and restore ecological integrity and the adaptive potential of different types of environment** and **2.2. - Protect and enhance any species deemed to represent heritage following ecological, economic or socio-cultural criteria**. Equally important is objective **3.2. - Ensuring the inclusion of biodiversity in all policies and public action strategies**. The PACA Biodiversity Strategy contains concrete action steps to operationalise the SGB in the form of ten more detailed "Action Plans", which relate to these Objectives and Actions.

Relevant for ecological networks is in particular **Action Plan 2, "Management and creation of protected areas and protection of threatened heritage species"**. It aims to strengthening the protected area network to increase its representativeness and functionality and to complete the regional network of protected areas. This action is highly related to **Action Plan 8 "take into account biodiversity in spatial planning and sectoral policies"**, which presents the implementation on the ground of the Regional Ecological Coherence Scheme.

The SGB is primarily supportive of regional and local initiatives to protect biodiversity. As it also points out, the region is not starting from zero with this SGB, but new actions have been added that are to be developed. It also places special importance on the development of mountain regions by "valorising" mountain products (see p.54 of the SGB), which touches on aspects of nature tourism, Alpine sustainable forest management and connections between the two, as well as the conservation of traditional mountain farming and cultural practices.

In addition to the SGB, the above-mentioned new environmental profile - **PER 2015** - presents a shared vision of the Region's environment. It is meant to function as a frame of reference for the integration of environmental issues into regional policies and plans. It was used, for instance, for European operational programming.

One of the stated priority issues is sustainable land management. The PER points out the need to fight against the deterioration and "trivialisation" of landscapes (low quality urbanism, power lines, billboards...) through the National Parks and Regional Natural Park charters and planning documents. It also aims to strengthen the legal and regulatory protection of landscapes and cultural and natural heritage. More than 200 sites are currently classified for protection.

The currently gazetted and planned National Parks and regional nature parks in the PACA region are shown in Figure 7.

PARCS NATIONAUX (PN) ET PARCS NATURELS RÉGIONAUX (PNR)

Données décembre 2013

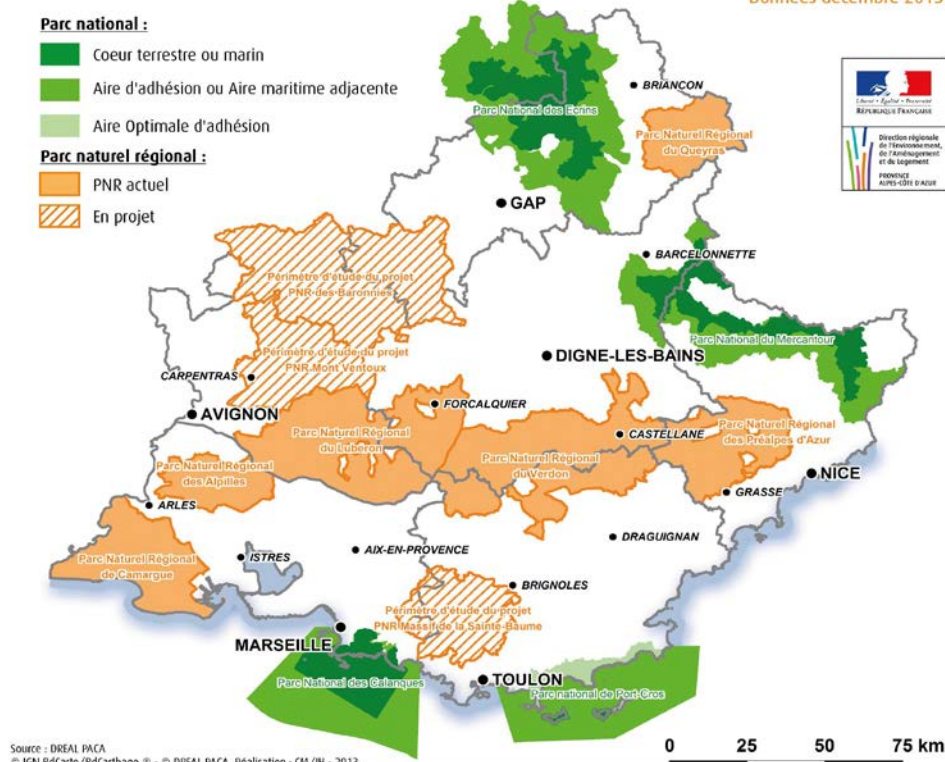


Figure 7 – Actual and planned National Parks and nature parks in the PACA region
(Source: DREAL/PACA)

Within the region there are furthermore a large number of Natura 2000 areas, three UNESCO biosphere reserves, and several other types of natural reserves⁵².

The PACA region also produced a map (2013) of [the major connectivity needs and pressures](#) for both “green” and “blue” continuum zones as shown in Figure 8.

ENJEUX ET PRESSIONS SUR LES GRANDES CONTINUITÉS ÉCOLOGIQUES

Données décembre 2013

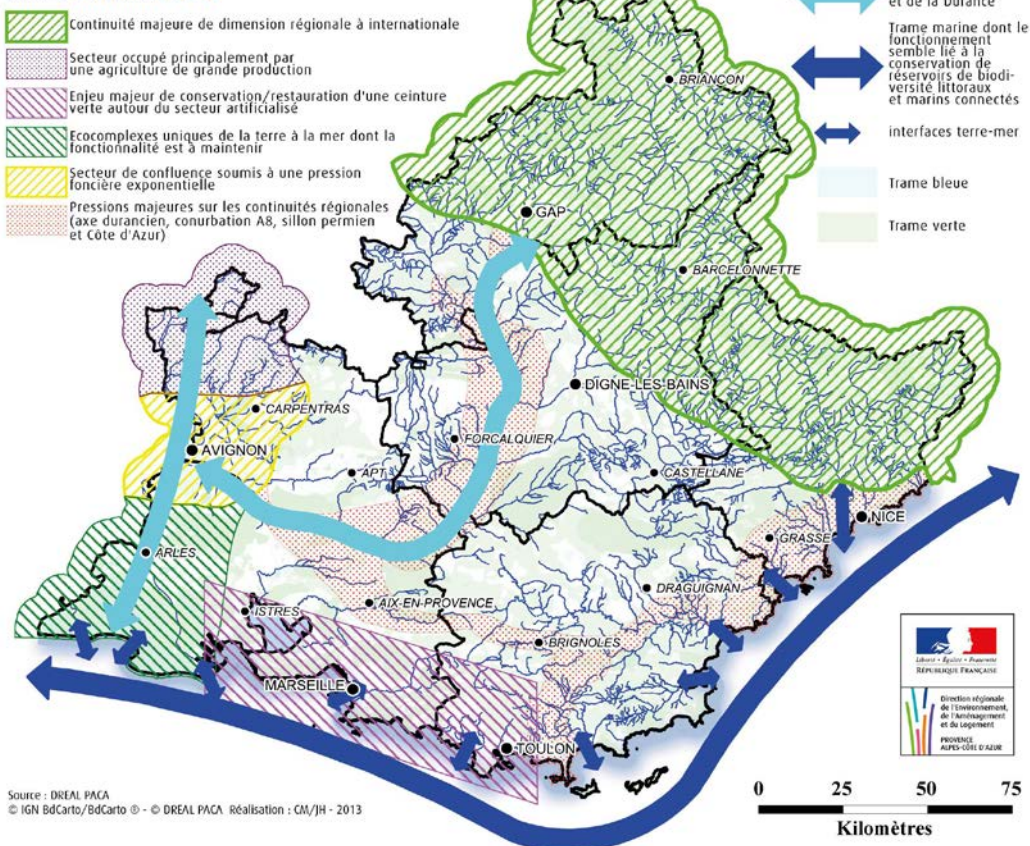


Figure 8 – Map of issues and pressures on major ecological connectivity in the PACA region
(Source: DREAL/PACA)

Between April and September 2012 the National Research Institute of Science and Technology for Environment and Agriculture (IRSTEA) of Aix en Provence conducted an [analysis of the various approved regional plans \(schéma de cohérence territoriale – SCOT\)](#) and those under construction⁵³. (The purpose of these SCOT is to outline the major spatial development priorities over the medium to long-term. They are prepared through a participatory process involving various levels of government in the region or county (*département*) in question.)

Nineteen SCOT were analysed. The study highlights that ecological connectivity began being taken into account in parallel with the construction of the regional ecological connectivity plan (SRCE). Some are derived from the Law on solidarity and urban renewal (*Loi relative à la solidarité et au Loi n° 2010-788 du 12 juillet 2010 portant engagement national pour l'environnement - loi ENE*), and this diversity reflects the diverse approaches to the topic.

Germany

Germany has a key federal environmental law that requires the lasting protection of biodiversity, and in particular demands the maintenance of viable populations of wildlife and wild plants, protection of their habitats and of the possibility of an exchange between populations, migration, and resettlement:

- Federal Nature Conservation Act (Bundesnaturschutzgesetz - BNatSchG) (2010)

This law clearly requires ecological connectivity protection and enhancement measures.

Other pertinent laws are the:

- Regulation on Soil Protection (*Bundesbodenschutzgesetz* - BBodSchG)
- Regulation on Water Usage (*Wasserhaushaltsgesetz* - WHG)
- Regulations on environmental assessment and spatial planning that require the avoidance of conflicts with nature protection

Like in Austria, in addition to federal laws, there are provincial laws and regulations. However, the new German Federal Nature Conservation Act of 2010 for the first time created a direct and federally applicable law for conservation that overrides in many areas the nature conservation laws of Germany's provinces and has led to numerous changes in the current legal situation. In addition to a new emphasis in its objectives the law includes, above all, innovations in impact regulation, but also in the protection of species.

Some 37.4 percent of Germany's land area is under some kind of protection⁴⁴, but only a relatively small proportion of German territory lies within the Alpine region (the south/south-western part. It includes the provinces of Baden-Württemberg, which borders on France in the West and on Switzerland in the South and shares the Bodensee with Austria, and the "free state" or province (*Freistaat*) of Bavaria, which borders on Austria in the South and on the Czech Republic in the East. It includes the Alpine National Park of Berchtesgaden. For detailed figures on Alpine Protected Areas in Germany, please consult the [ALPARC website](#).

Bavaria has its own **nature conservation act** (*Bayerisches Naturschutzgesetz* – BayNatSchG⁵⁴), in its current form from 23. February 2011, amended on 24 April 2015. Art. 13 f of the Bavarian Nature Conservation Act refers to an ecological network as well as species and ecosystem (biotope) protection programmes.

The framework law competence of the German nature conservation law was changed due to a reform of federalism in the national law, leading to a system of differing and sometimes complementary competences with some additional regulatory powers of provinces (e.g. approval of the establishment of ski slopes). However, excluded from the power to deviate from national law are the rules of species protection and the general principles of nature conservation, where national laws apply directly. This means that in all provinces, national law and state law both have to be considered simultaneously.

The lower nature conservation authorities (the independent cities and district offices) are responsible for the enforcement of the Bavarian Nature Conservation Act (e.g. contractual nature conservation, conservation area designation), and in some instances the governments - as higher-ranking nature conservation authorities - are in charge. For the implementation of the Habitats and Birds Directives the highest nature conservation authority, the Bavarian State Ministry for Environment and Consumer Protection (StMUV), is accountable. Municipalities are at the helm of the preparation of comprehensive landscape planning in Bavaria. With the 2015 amendment, there was a change in competence for landscape protection measures. Until then, the lower level nature protection authorities were fully in charge, but as of May 2015 they are only responsible for protecting objects up to a size of 10 ha, and beyond this the higher nature conservation authority has jurisdiction. In

addition to the nature conservation act, the **Bavarian forest law** (*Waldgesetz* – BayWaldG), like the German national forest strategy, also requires biodiversity protection. Furthermore, the **Bavarian State Development Plan** (LEP) includes objectives and principles for a Bavaria-wide ecological (“biotope”) network (Art. 1a Para. 2 No. 3 – Networking of habitats of animals living in the wild and plants; Art. 1a Para. 2 No. 4 – Protection of the Bavarian Alps⁴).

Bavaria has produced an Alpine Ecosystem map ([Bayerische Alpenbiotopkartierung](#) - ABK, 2012) because the increasing number of interventions into the landscape required a high level of technical and detailed knowledge for assessments in sensitive ecosystem types. The Alpine ecosystem map distinguishes between protected and unprotected areas and also includes protected forest ecosystems. There is an equivalent Bavarian Flatland Ecosystem map. These maps also provide a foundation for ecosystem connectivity concepts.

Similarly, **Baden-Württemberg** has, among other regulations, a **nature conservation act** (*Gesetz des Landes Baden-Württemberg zum Schutz der Natur und zur Pflege der Landschaft* – NatSchG⁵⁵), which was last amended on 23 June 2015. (The first nature conservation act actually dates back to 1976.) This law makes specific reference (§ 21 and 22 *Biotopverbund*, *Biotopvernetzung*) to the creation and protection of ecological networks, including across province borders. It requires all public planning authorities to take into account in their planning and actions the concerns of ecological networks. Ecological networks are to be secured in regional plans and land use plans to the extent it is required. It takes into account both land surface and aquatic areas.

Concerning landscape planning, the law (§ 11) stipulates that following the establishment of a **Landscape Programme** by the highest nature protection authority in consultation with relevant ministries, landscape framework plans are to be set up by the regional planning institutions in accordance with § 9 paragraph 4 of the national BNatSchG. The contents of the landscape structure plans should, as necessary and appropriate be integrated into the regional plans. Paragraph 10 requires that such landscape plans further expand ecological networks.

The classic instruments of nature conservation in Baden-Württemberg are complemented by new and innovative approaches such as the **biodiversity advisory service** for land users, which produced a “guideline document for whole farm biodiversity counselling” ([Leitfaden für die Gesamtbetriebliche Biodiversitätsberatung](#) - GBB); the integrative “**nature conservation concept**” **PLENUM** (*Naturschutzkonzept PLENUM* - *Projekt des Landes zur Erhaltung und Entwicklung von Natur und Umwelt*) for sustainable regional development.

In addition to the framework laws, there are **Land Stewardship Directives** (LPR)^{56,57} in both provinces, which engage whenever special requirements for the preservation of the cultural landscape and nature conservation need to be considered. Besides farmers and other private persons, organizations, associations and local authorities are taken into account. The States grant (partial) financial assistance to communal entities, landscape care associations, NGOs, and property owners for measures for the care, maintenance and development of protected areas and areas worthy of protection, as well as individual constituents of nature.

German National Biodiversity Strategy ([Nationale Strategie zur biologischen Vielfalt](#))

The German National Strategy on biological diversity⁵⁸ was first published in November 2007 and is now in its fourth edition (2015). It covers the ecological, economic, social, cultural, and ethical grounds for biodiversity conservation. Starting with an analysis of the situation that prevailed at the time of its drafting, it proceeds to lay out a concrete vision for the protection of biodiversity, ecosystems and landscapes, as well as their sustainable use.

In the areas marked for action (C – *Aktionsfelder*), **Action C1 is dedicated to ecosystem connectivity and protected area networks**. This mentions the expansion of the Natura 2000 protected area network based on the EU Habitats and Birds Directives. It states that by federal law the German provinces (*Länder*) are **required to establish a network of connected ecosystems covering at least 10% of the land area**, which, different from Natura 2000, should not only target specially designated habitat types and species, but should include all native animal- and plant species and their habitats. It places particular emphasis on ecological networks outside protected areas.

In concrete measures that are listed against this field of action, the province promises *inter alia* to promote large- scale conservation projects to protect essential core areas of a national ecological network system. In the Alps, this would also include securing “suitable mountain farming areas” for nature conservation purposes. At the same time, the Strategy assigns particular responsibilities to the provinces and communities (*Kommunen*), including the establishment of care and development plans for Natura 2000 areas, and the permanent establishment of a national ecological connectivity network, which must include connective areas and elements across provincial borders.

In **action field C9 – settlements and traffic**, there is an acknowledgement that **ecological connectivity must be considered when planning federal and provincial traffic infrastructure**, and that a **federal programme of measures on “fragmentation and networks”** (*“Zerschneidung – Vernetzung”*) is to be developed. Ecological connectivity is also mentioned as essential for allowing migration of species that are impacted by climate change. Similarly, action field **C12 – rural development**, mentions the need for **provincial governments to support the establishment of regional parks and green networks surrounding larger cities**.

Both alpine provinces, Baden Württemberg and Bavaria, have prepared their own biodiversity strategies (see below).

Baden-Württemberg Biodiversity Action Plan ([Aktionsplan Biologische Vielfalt](#)⁵⁹)

The Baden-Württemberg Biodiversity Action Plan consists of four “building blocks”:

1. 111-Species basket
2. Biodiversity-check for communities
3. Climate change and biological diversity
4. Old and dead wood in the forest

The most relevant piece as far as ecological connectivity is concerned is the **111-species basket**, which refers to species that are found in the province, many of which are endangered and on the Red List. Along with the species, the “basket” also contains their habitats. The Action Plan is meant to stimulate on the one hand public interest and participation in biodiversity protection, and also serves as a framework for conservation projects. Many individual conservation projects, some of them ongoing for many years, are listed on the website.

Within the block “Climate change and biodiversity”, a **strategy document** ([Nachhaltigkeitsstrategie Baden-Württemberg](#)⁶⁰) was developed in 2008 to elaborate necessary adaptations of nature conservation strategies in the face of climate change. This strategy paper **recommends the establishment of corridors and stepping stones to create an ecological network that would allow potentially migrating species to move from one area to another**. It mentions that the use of land consolidation (*Flurneuordnung*) plays an important role in the implementation of the ecological network. Even nature

conservation law compensatory measures should be used specifically for the implementation of ecological network planning.

In 2010 a **general wildlife corridor plan** ([Generalwildwegeplan - GWP](#)) for Baden-Württemberg was developed by the forest research institute (FVA) of the Ministry for rural areas and consumer protection. It is primarily a forest-related sectoral planning instrument of the State for a broad ecological network and is an integral part of a national or international ecological network of wildlife corridors. The GWP (Figure 9) shows some of the last remaining opportunities of creating a large-scale ecological network in the already heavily fragmented cultural landscape of Baden-Württemberg. It is meant to provide a foundation for planning at landscape level, but implementation at local or regional level requires the long-term securing of land areas to protect them from further fragmentation, and therefore traffic and regional planning should be taking this plan into account.

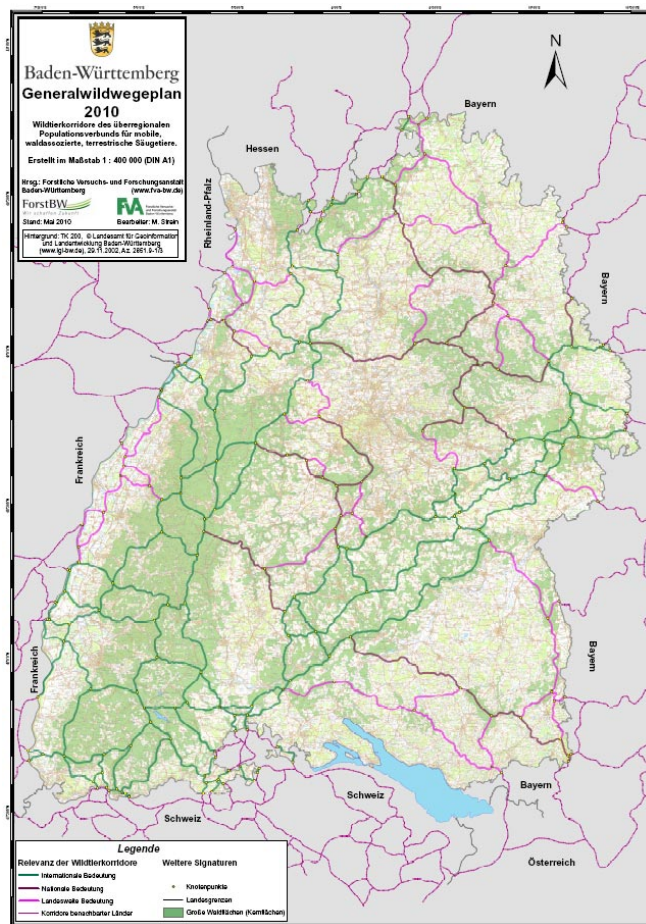


Figure 9 – General wildlife corridor plan for Baden-Württemberg
(Source: FVA)

Furthermore, in 2012 the creation of an ecological network that is mandated by the nature conservation act was included in the State's latest **landscape plan**⁶¹. The **specialised plan on a state-wide ecological network** focuses on open areas and does not account for rivers. The general wildlife corridor plan (above) was integrated into this concept. In addition, the plan was created based on the [target species concept](#)⁶², for which a web-based information system was created, supports communities in working out their special responsibility for specific target species and to develop measures for the

ecological network. The tool is designed to facilitate the integration of -- often already existing -- individual assessments of species and species groups into a coherent overall concept.

Three levels for spatial planning of habitat corridors and ecological networks are distinguished in the latest landscape plan: State-wide spaces including core areas; large-scale connectivity axes in open areas; and wildlife corridors as foreseen in the general wildlife corridor plan. The maps are divided into dry locations, medium locations and moist locations and can be downloaded from the LUBW [website](#).

Baden-Württemberg Biodiversity Strategy 2020

([Naturschutzstrategie Baden-Württemberg. Biologische Vielfalt und naturverträgliches Wirtschaften – für die Zukunft unseres Landes](#)⁶³)

The BW biodiversity strategy, approved in July 2013, aims to improve the situation of biological diversity in the province, which includes securing wildlife habitats. The strategy emerged through intensive discussions with environmental organizations, but also the

professional representations of agriculture and forestry as well as experts in environmental sciences.

The Strategy document notes that despite partial successes with nature conservation efforts so far, the negative trend of biodiversity decline has not been halted, as many protection efforts are thwarted by developments in land use, traffic policy and settlement development. The document flatly states that “as long as nature conservation is not understood as a cross-cutting issue in politics, economics and society and therefore not broadly implemented (economic activities compatible with nature, land use compatible with biodiversity, consistent ecosystem connectivity), the negative trend will not be reversible”.⁶³

Several of the focus areas of the strategy are directly relevant to implementing ecological networks. **Land use and settlement development that is compatible with nature conservation is key goal 1**, while **landscape protection, including the realisation of an ecological network on 10 percent of the land surface as “nature network” (Netzwerk Natur)** are stated as **key goal 2**. To secure this Baden-Württemberg plans to create comprehensive land stewardship associations. Furthermore, **key goal 3** concerning climate protection and moorlands aims to **restore (re-nature and re-hydrate) moorlands**. **Ecological connectivity in rivers** is also a goal mentioned in the strategy.

The strategy foresees a number of concrete partial goals to be achieved by 2016. These include the gazetting of additional protected areas and the implementation of landscape protection measures in cultural landscapes. They also prioritize the increased creation of ecological networks at the regional and local levels by creating habitats outside protected areas, especially in areas that are lacking suitable structures. There is a stated commitment to secure ecological connectivity in regional planning.

Bavarian Biodiversity Strategy ([*Strategie zum Erhalt der biologischen Vielfalt in Bayern*](#))

Bavaria first created a comprehensive **species and ecosystem conservation strategy** in 1984, (*Arten- und Biotopschutzprogramm* - ABSP), and in 1995 announced the goal of creating a **state-wide ecological network**, a goal that was integrated into the **Bavarian nature conservation act** already in 1998⁶⁴. However, given worrying declines of many animal and plant species in Bavaria, the Bavarian Council of Ministers adopted a strategy for the conservation of biodiversity in Bayern (**Bavarian Biodiversity Strategy**⁶⁵) under the motto “Nature.Diversity.Bavaria” (“*Natur. Vielfalt. Bayern*”) in April 2008. Bavaria was the first province to create an inter-ministerial biodiversity strategy in Germany.

A decision was taken in close cooperation with relevant organizations and institutions, especially the land users and landowners. This Strategy had four key objectives:

1. Ensuring the diversity of species and varieties,
2. Preserving the diversity of habitats,
3. Creating ecological networks (Improving the ecological permeability of migration barriers such as roads, railways and dams), and
4. Exchanging and improving environmental knowledge.

The **protection of habitats and connectivity between protected areas** is a **key action area (7.2)** of the Bavarian Biodiversity Strategy. The stated goal is to establish a well-functioning management system for all Natura 2000 protected areas, and to complete the Bavarian network of protected areas, stepping stone ecosystems, and other connectivity structures (primarily on a voluntary basis) by 2020. The aim is to reverse the trend of decline and to have as many species as possible “delisted” from the Red List of Endangered Species.

In accordance with the Strategy's objectives Bavaria set up three interagency working groups at the Ministry of the Environment to implement the Strategy: The working group "biodiversity and development, infrastructure and water management", the working group "biodiversity in agriculture and forestry" and the working group "biodiversity in education and research". There is also a **Biodiversity Counsel** (*Biodiversitätsrat*), tasked with providing scientifically and experience-based expertise.

Bavarian Biodiversity Programme 2030 ([Biodiversitätsprogramm Bayern 2030](#))

Following up on the Biodiversity Strategy of 2008, given that Bavarian biodiversity continues to decline, in 2014 Bavaria launched its updated **Biodiversity Programme 2030**⁶⁶. Concrete measures are now bundled in this interdepartmentally coordinated programme document. It contains elements of support to communal initiatives, and asks associations (NGOs), enterprises and farmers to participate in the implementation of the programme. The aim is to anchor biodiversity conservation in all areas of concern.

Bavaria is advanced in the process of **mapping its ecosystems and their status**. In the Alpine region, this mapping has been completed. In terms of creating ecological networks, Bavaria is well advanced with creating the **Bavarian Nature Network** ("[BayernNetzNatur](#)"), consisting of core areas, buffer zones, and connectivity elements. Particularly advanced is the county (*Landkreis*) of Berchtesgaden, where almost 45% of the county territory is under some form of nature protection – the Berchtesgaden National Park is the largest of these protected areas⁶⁷. There, many projects are ongoing or have already been completed. Bavaria uses a number of different sources of finance, including the Bavarian Nature Protection Fund (*Naturschutzfonds*), contract models for nature protection (e.g. *Vertragsnaturschutzprogramm Wald*, *Kulturlandschaftsprogramm* – KULAP-A), dedicated nature protection funding within the budget available for state forest management. Partly these measures have been supported by EU funding. (See more on BayernNetzNatur in Part II of this report.)

Bavaria has undertaken an analysis of ecological connectivity barriers and found that more than 75% of its highways had to be classified as impermeable to wild animals, and the Bavarian federal parliament has called on the provincial government to strengthen the ecological network for large wild animals and to work towards a reduction in the fragmentation effect⁶⁸. The Bavarian State Office for the Environment has therefore developed the "**Concept for the preservation and restoration of important wildlife corridors on federal highways in Bavaria**". The concept aims at maintaining and improving the province-wide ecological network for animal species that prefer forest cover. The study analysed and assessed Bavaria's important wildlife habitats and wildlife corridors on the basis of the target and indicator species lynx and red deer. These species are representative of many medium-sized and smaller mammals such as deer, wild boar, wild cat, badger or pine marten. Starting points for the concept are the official deer areas and current and potential lynx habitats as well as possible migration routes that were determined through a habitat and dispersal model. In the crossing areas of highways the existing bridge and underpass structures were evaluated with regard to their suitability as passages for large wild animals and the permeability of these road sections was assessed. From this analysis the experts derived an action plan for the protection and restoration of ecosystem connectivity for wildlife.

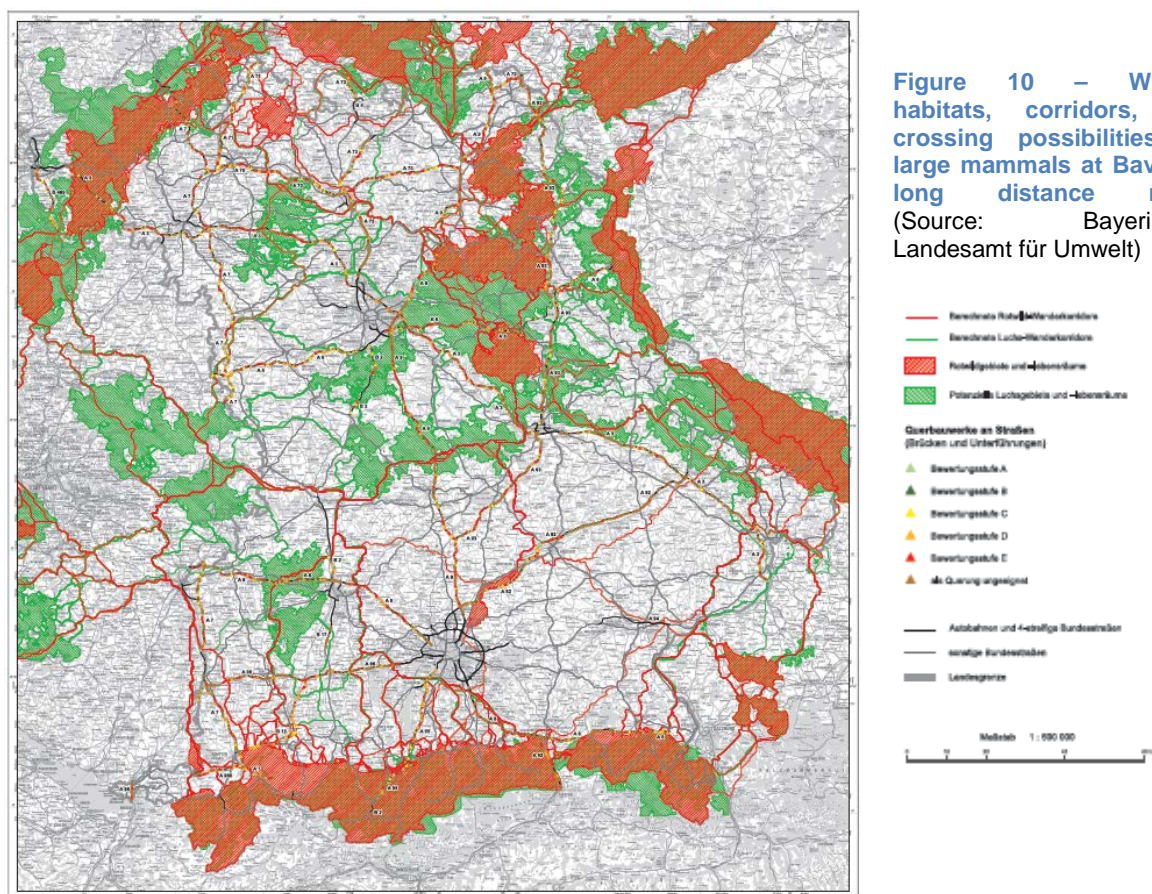


Figure 10 – Wildlife habitats, corridors, and crossing possibilities for large mammals at Bavarian long distance roads
(Source: Bayerisches Landesamt für Umwelt)

Figure 10 shows a map of wildlife habitats and corridors or crossing possibilities for large mammals in Bavaria. Areas shaded in red are red deer habitat, and red lines their calculated migration corridors, while green zones represent (potential) areas and paths for lynx. The coloured triangles refer to building structures along the highways (bridges and underpasses) where on a gradient from green to red the degree of permeability gets progressively worse. Brown indicates that this is not a suitable wildlife crossing point.

The concept enables the cost-effective implementation of measures such as the construction of crossing aids at the most suitable places. The implementation of such connectivity measures is foreseen over a period of 15 years for the most important measures, and 20-25 years for lower priority measures, so that the financial implications remain manageable.

Italy

Mountain regions are accorded a special legal protection status in the Italian constitution, and several mountain-related laws have been enacted since the 1950s, mainly referring to improving the living conditions of mountain communities. Although Italy's legal structure is different from that of Austria and Germany, it too has a degree of federalism⁶⁹. The Ministry for the Environment, Land and Sea was established in 1986 (Law 349). The Italian constitution assigns **exclusive legislative power for environmental protection to the State** (Article 117, para. II, letter s of the Constitution), but **specific management competence is transferred to the Regions** and other local bodies⁷⁰. Note that the term "province" is used differently in Italy than in Austria or Germany. In Italy a province (*provincia*) is an administrative division between a municipality (*comune*) and a region (*regione*). As in the case of France, therefore, the Region is the pertinent administrative structure when it comes to the implementation of ecological networks. Spatial and landscape

planning are subject to concurrent legislation by both the State and the Regions, as are the legal frameworks on protected areas⁶⁹.

Some of the pertinent regulations are:

- A Framework Law on Protected Areas (*Legge Quadro Sulle Aree Protette* - Law 394/91)
- Presidential Decree 1997 - 357 Regulation implementing Directive 92/43/EEC on the conservation of habitats
- Provisions for the protection of wildlife and restrictions on hunting (*Norme per la protezione della fauna selvatica omeoterma e per il prelievo venatorio* - Law 1992 – 157)
- Environmental provisions (Disposizioni in materia ambientale - Law 2002 – 179)

The establishment of Areas of Ecological Protection (AEP) is also enshrined in legislation (*Istituzione di zone di protezione ecologica oltre il limite esterno del mare territoriale* - Law 61/2006).

There are also regional laws. For example, the autonomous province of South Tyrol (Alto Adige) has its own Law on Nature Protection (Naturschutzgesetz 12 May 2010, [Landesgesetz Nr. 6](#)). This contains provisions on species protection, the protection of habitats, and special regulations for Natura 2000 areas. Habitat protection provisions, which are relevant for ecological connectivity, include for example a requirement to retain vegetation along river banks and to keep hedges and corridor woods intact.

Regions have to follow the principles outlined in the **Legislative Decree on landscape planning** (*Codice dei beni culturali e del paesaggio, ai sensi dell'articolo 10 della legge 6 luglio 2002, n. 137 - Decreto Legislativo 22 gennaio 2004, n. 42*), which mandates the **preservation of the character of protected natural elements and the restoration of damaged natural elements**. Currently more than 21% of Italy's land surface is covered by a protected area system, including Natura 2000⁴⁴. This includes four Alpine National Parks (Gran Paradiso, Stelvio, Val Grande, and Dolomiti Bellunesi). For detailed figures on Alpine Protected Areas in Italy, please consult the [ALPARC website](#).

Italy ratified the CBD in 1994 by means of Law No. 124. Following a meeting (in Siracusa, Italy), of G8 Environment Ministers on strategies for biodiversity conservation in the EU after 2010, during which the “*Carta di Siracusa on Biodiversity*” was approved by the ministers, Italy began seeing itself as a promoter of a biodiversity vision for national policies.

In 1999 the Italian Environment Ministry adopted a programme for the definition and implementation of an ecological network for vertebrate species, the [National Ecological Network \(Rete ecologica nazionale – REN\)](#)⁷¹, which ran until 2002. The concept, which was not legally binding for spatial planning, was integrated into some **landscape plans and guidelines** (e.g. in Alto Adige/South Tyrol). The goal of the programme was to outline the distribution patterns of all Italian vertebrate species and to determine whether protected areas cover all of this distribution or what actions are necessary to improve the prospects of conservation of these species. A map was produced, which forms the basis of an ecological network design, and mountain areas – the Alps and the Apennines in particular – are considered most suitable as core areas for these species⁷². The National Ecological Network project is seen as an operational tool to guide territorial planning and programming and the use of natural resources at the national level. Within this scope different models of networks have been developed: a global network that takes into account all species of vertebrates in Italy, a specific network for each taxonomic group, and a network for all 149 animals at risk of extinction in Italy. Some progress has been made in the Alpine region of integrating the concept of an ecological network into the regional planning process (see Part II below).

Several regions of Italy have put into place planning for ecological networks in their territorial planning. At provincial level, the so called “Provincial Coordination Territorial Plan (P.C.T.P.)” is used by local administrations, and the number of provinces that make explicit reference to ecological networks in their plans has increased from 90 in 2009 to 95 in 2012⁷³.

Italian National Biodiversity Strategy 2011-2020

([Strategia nazionale per la biodiversità](#) (2011-2020); an [English version](#) of this is available on the CBD website.)

Italy prepared its National Biodiversity Strategy through a participatory process that included various institutional, social and economic stakeholders. It was agreed between the State and Regions in October 2010. The three major pillars of the Strategy are biodiversity and ecosystem services; biodiversity and climate change; and biodiversity and economic policies. The “**State-Regions Conference**” was set up as the seat of political decision making on the Strategy with appropriate governance bodies by Decree of 6 June 2011 (G.U. 143 of 22/6/2011). The **Joint Committee on Biodiversity**, to support the activities of the Conference, is composed of representatives of the central government and the Regions and Autonomous Provinces⁷⁴.

The Italian strategy expresses great concern over the loss of or threat status to many species. It acknowledges that many threats are due to the failure to pragmatically implement existing natural resource use laws and procedures, and also due to a lack of adequate rules that would prevent species loss and habitat and landscape deterioration. In fact, the Strategy makes an explicit recommendation for implementation through “adequate regulatory support, by working on the existing laws and eventually issuing a specific “national policy framework for the preservation and enhancement of biodiversity”⁷⁰. **Adaptation should, according to this document, include special reference to protected areas, the Natura 2000 network and other ecological networks.**

The Strategy includes specific reference to the need to plan for ecological networks by not only safeguarding protected areas, but rather by assigning “ecological meaning” to other areas as well within the conceptual framework of ecological networks.

The Strategy provides for the development, every two years, of a report on the implementation and effectiveness of the Strategy itself. For this purpose a set of [preliminary indicators](#) has been prepared, consisting of 10 status indicators that aim to represent and assess the state of biodiversity in Italy and 30 assessment indicators to assess the effectiveness of action taken to achieve the objectives of the Strategy. The [first report](#), which covers the period 2011-2012, was presented in April, 2013. On 10 July 2014, the State-Regions Conference approved the first documents produced by the Joint Committee for Biodiversity. The Conference expressed [agreement](#) to that first report and also issued “[programmatic indications until 2015](#)”.

In 2010, the Government has, together with environmental NGOs and academic institutions published a classification of **Ecoregions** as a thematic contribution to the National Biodiversity Strategy⁷⁵. These are devised to achieve an ecosystem approach and to tackle environmental, social and economic strategies within a common geographic framework. They are meant to integrate management activities among agencies with different goals and responsibilities located in the same area, on the basis of these ecoregions having similar characteristics and management requirements or potential. The regionalisation of ecosystems is intended to allow a better definition of biodiversity conservation actions and a common framework within which national and regional policies can be harmonised. The Italian classification scheme ranges from the continental and national to the regional scale. The Alps are part of the (climatically) temperate division and are divided into two “provinces” (in an ecoregion sense, not in a political sense), namely the Northern Alpine Chain Province

and the Southern Alpine Chain Province. New phytoclimatic, geomorphologic and vegetation series maps were drafted for the entire country and can provide information for environmental, landscape and territorial planning.

Slovenia

Slovenia has several national acts and decrees concerned with biodiversity and ecosystem conservation. The principal legal tools for biodiversity conservation in Slovenia are the:

- Nature Conservation Act (*Zakon o ohranjanju narave*, amended in 2014 - Uradni list RS, No. 46/14 of 23 June 2014);
- Cave Protection Act (*Zakon o varstvu podzemnih jam* - Uradni list RS, št. 2/04, 61/06);
- Decree on ecologically important areas (*Uredba o ekološko pomembnih območjih* - Uradni list RS, Nos. 33/13, 99/13); and
- Decrees determining special protection areas (Natura 2000 sites).

The **Nature Conservation Act** defines natural components of an ecological network: a) different types of protected areas (national parks (1), regional parks (3), landscape parks (44)) – which, taken together, cover around 12,5 % of Slovenian territory. These areas are part of much larger areas, such as b) Natura 2000 sites covering more than 37 % of the country and c) so-called “ecologically important areas” and “valuable natural features”⁷⁶. The protected areas and Natura 2000 network are seen as core zones of an ecological network, while ecologically important areas function as connectors between core areas to establish a functional network. The programme for management of special protected areas (operational plan for nature conservation) has established rules that target primarily the Natura 2000 Network⁷⁷. While for protected areas and Natura 2000 sites specific protection regimes are prescribed and management plans are required, for these ecologically important areas general recommendations have been defined. The **Decree on ecologically important areas** defines them as “areas of habitat type that is part of a larger ecosystem unit which contributes significantly to biodiversity preservation” (Article 2). They include habitats of endangered wild species and endangered, rare, vulnerable or regionally typical habitat types. Ecologically important areas are officially designated, but with a weaker protection regime (based on recommendations only) than for protected areas or Natura 2000 sites⁷⁶. (Areas were classified as ecologically important by the Decree on ecologically important areas, Official Gazette of RS, no. 48 / 04 in 99/13).

Furthermore, the **Resolution on the National Environmental Action Plan 2005–2012** (ReNPVO) of 2006 stipulates long-term objectives, policies and tasks in environmental protection, including nature conservation.

Because forests are of particular significance in Slovenia, as more than 56 percent of its land area has forest cover, **forestry regulations** are also important. Slovenia has been practising sustainable forest management for a long time.

Slovenia does not have the decentralised administration system of other Alpine countries, nature conservation is administered centrally. The professional national Institute of the Republic of Slovenia for Nature Conservation (IRSNC) is responsible for conservation activities under the Nature Conservation Act. This umbrella body consists of seven regional units. For the Alpine territory, the Kranj Regional Unit operates in the northwestern part of Slovenia, covering 20 councils, including the uplands of the Julian Alps, Western Karavanke Mountains and Kamniško-Savinjske Alps, or 11% of the entire country. Triglav National Park is within its domain. The Slovenian Forest Service and local communities also have a role to play in the implementation of conservation activities.

Slovenia adopted a [National Environmental Action Programme](#) in 1999, where biodiversity was featured as one of four priorities, in accordance with Article 104 of the Environmental Protection Act.

Since then, there has been some progress of mainstreaming biodiversity conservation into non-environment focused governmental strategies. The **2007–2013 National Development Programme** lists the conservation and sustainable use of biodiversity, and Slovenia's new **Development Strategy 2014-2020** aims not only to achieve economic growth, but also to conserve natural capital for the population's wellbeing. As such, investments in green infrastructure, measures for nature protection and biodiversity conservation and an initiative for "green growth" are part of the plan.

Furthermore, the **Rural Development Programme** contains agro-environmental measures that are supposed to establish the concept of sustainable agriculture and preserve natural resources and biodiversity⁷⁸.

Slovenia's very large Alpine National Park, the Triglav National Park, has an area of 837 km². According to Slovenia's reports on the implementation of the Habitats and Birds Directives, about half of the target species in the Alpine area still have a favourable conservation status, and as such the situation is better than in other Alpine countries. The country's share of Natura 2000 terrestrial area in the national terrestrial area is impressive – close to 38%, which is well above EU average. There are 323 habitat types and species conservation sites and 31 bird conservation sites (corresponding to the obligations under the EU Habitats and Birds Directives). Seventy-one percent of Slovenia's Natura 2000 network is covered by forest^{79,80}. For a list and detailed figures on Alpine Protected Areas in Slovenia, please consult the [ALPARC website](#). The latest [Operational Programme for Natura 2000 \(2015-2020\)](#) dates back to April 2015. The **Triglav National Park management plan** was approved by the TNP's Council in October 2015, and according to prescribed procedure it was adopted by the Slovenian Government in the spring of 2016⁸¹. Some concrete activities outlined within the plan relate to **transboundary cooperation with the Julian Alps Nature Park**.

The Slovenian Environment Agency has produced an online [environmental atlas](#)⁸² of the country that enables users to select different layers to overlay on the map. In Figure 11 national protected areas (dark pink), local protected areas (light pink), zoning for protected areas (beige), Natura 2000 data as of 2013 (green), and ecologically important areas (orange) are overlaid. The map shows the Nature Conservation Act range of habitat types or larger ecosystem units that significantly contribute to the conservation of biodiversity. It makes it apparent that Slovenia has a large share of protected areas, linked by a connectivity network consisting of several ecologically important areas. The latter are, however, less effectively protected due to the absence of specific administrative control and comprehensive management⁷⁶.



Figure 11 – Environmental atlas of Slovenia showing various types of protected areas, ecologically important areas, and the national road network (Source: Slovenian Environment Agency)

Another GIS-based mapping system called “[Nature Conservation Atlas](#)” of Slovenia is also available; it provides basic details on each of the protected areas, Natura 2000 sites, and ecologically important areas⁸³.

[Biodiversity Conservation Strategy of Slovenia](#) ([Strategija ohranjanja biotske raznovrstnosti v Sloveniji](#))

The Slovenian Biodiversity Conservation Strategy⁸⁴ dates back to the end of 2001. The general objective of conserving ecosystems by maintaining a favourable status of habitat types is one of the Strategy’s objectives. There was no explicit mention of ecological connectivity or biodiversity corridors in this first Slovenian Biodiversity Strategy, although one might say it is an implicit goal. Apart from the general goal of improving the status of habitat types and species, **national target 2** refers to **cross-sectoral mainstreaming** (“By 2025 agriculture, forestry, water management and fisheries sectors will increase inclusion of conservation of species and habitat types of national and wider (EU) importance into their plans and programmes”), as does **national target 8** (“By no later than 2025, the **biodiversity values will be integrated into relevant national and local strategies and decision making processes**”). Both would be important preconditions for effectively protecting ecological connectivity. Another relevant target is Nr. 9, which aims at efficient management of all Natura 2000 sites by 2020.

In 2010, at the CBD Conference of the Parties in 2010, the Aichi Biodiversity Targets¹⁷ (on which the EU Biodiversity Strategy is also largely modelled) were adopted. Slovenia therefore began **preparing a new Biodiversity Conservation Strategy** that will run until 2025 (action plan). The new Strategy will be focused more on the implementation of global goals and will include an implementation timetable and is expected to include a financial plan for the implementation of measures, as well as monitoring indicators. Most measures of the proposed new Strategy require cross-sectoral cooperation. The [proposed targets of the updated Strategy](#)⁸⁵ for Biodiversity Conservation in Slovenia will likely include at least some concrete measures that contribute to ecological connectivity indirectly (e.g. preserving traditional landscape, encouraging the traditional use of natural resources, restoring abandoned agricultural land, etc). The document will also be based on the EU Biodiversity Strategy. The **proposed targets** of the new Strategy include at least one concrete

connectivity measure **“to identify and maintain and, where necessary, re-establish ecological connections that enable genetic exchange between populations”**. This measure covers all species recognized as endangered (red-listed) in Slovenia, and there are also **several measures that contribute to ecological connectivity indirectly** (e.g. preserving traditional landscape, encouraging the traditional use of natural resources, restoring abandoned agricultural land, etc.). According to Slovenia’s Fifth National Report on the Implementation of the CBD this new Strategy will be adopted in 2016⁸⁵.

There is some progress on creating a transnational protected area between Triglav National Park and the Julian Prealps Nature Park in Italy (see Part II below). Implementing ecological connectivity is however perceived as difficult in both areas, as was reported by participations in a 2014 GreenAlps workshop. Triglav National Park is dealing with inadequate infrastructure and traffic problems inside the Park. Reportedly forest owners sometimes obstruct activities meant to advance ecological connectivity. On the Italian side, many municipalities oppose the establishment of a National Park. Some initial steps have been made through the PALPIS (“Cross-border participative planning in areas of major naturalistic value in the Southern Julian Alps”) project (see below in Section II).

Slovenia may benefit from the Operational Programme for the Implementation of the EU Cohesion Policy 2014–2020, where the protection and restoration of biodiversity and soil and the promotion of ecosystem services, including the Natura 2000 network and green infrastructure are accorded special priority investment. The goal is to improve the status of species and habitat types of European importance and to give priority to those with poor conservation status and endemic species with financing from the European Regional Development Fund and funds from national co-financing. According to the Slovenian Ministry of Environment, Projects are planned that will contribute to the achievement of the objectives of Natura 2000 sites, in accordance with the Natura 2000 Site Management Programme for 2015–2020⁷⁸.

Switzerland

Switzerland, which is not an EU Member State, but a Council of Europe Member State, is also a party to the Bern Convention, in particular Resolutions No. 4 (1996) and No. 6 (1998), and to the Convention on Biological Diversity (ratified in 1995⁸⁶), and as such has similar obligations to protect species and habitats as stipulated in EU legislation, though implementation details differ from those in EU countries. Switzerland has established a firm national foundation for a regional ecological network, which includes plans to construct “green infrastructure” outside protected areas.

Several national laws and regulations are relevant for the conservation of ecological connectivity which mirror those of other Alpine countries and are equivalent to similar EU regulations:

- Federal act on natural and national heritage protection (*Bundesgesetz über den Natur und Heimatschutz* (NHG 1966) and corresponding regulation (NHV 1991, Art. 14 and 15)
- Federal act on hunting and the protection of wild mammals and birds (*Bundesgesetz über die Jagd und den Schutz wildlebender Säugetiere und Vögel* (JSG 1986, amended in 2012 and 2014))
- Federal act on spatial planning (*Bundesgesetz über die Raumplanung* (RPG 1979))
- Federal act on forests and Swiss forest programme (*Bundesgesetz über den Wald* (WaG 2000, amended in 2012 and 2013), *Waldprogramm Schweiz* 2004)
- Federal ordinance on the regional promotion of quality and connectivity of ecological compensation areas in agriculture (*Verordnung des Bundes über die regionale*

Förderung der Qualität und der Vernetzung von ökologischen Ausgleichsflächen in der Landwirtschaft (ÖQV 2001))

- Federal ordinance on the protection of dry meadows and pastures of national importance (SR 451.37 *Trockenwiesenverordnung*), amended in 2010, 2012 and 2014)
- Federal ordinance on hydraulic engineering (*Verordnung des Bundes über den Wasserbau* (WBV 1994))
- Federal Act on the Protection of Waters (*Bundesgesetz über den Schutz der Gewässer* (SR 814.20 1991), amended in January 2014.

The extent to which national laws are translated into on-the-ground actions varies by canton.

In order to implement targets that it committed to under the Convention on Biological Diversity, Switzerland has been increasing the number of its protected areas. It is also involved in the „[Emerald“-Network](#) as an equivalent to the NATURA 2000 network and in the [Pan European Ecological Network – PEEN](#). As of December 2014 Switzerland listed 37 Emerald sites.

The following areas are most relevant for connectivity on a national scale⁴:

- Spatial Planning: the national ecological network (REN) has to be taken into account according to the Spatial Planning Law (Art.13 RPG). Flood protection regulations include flood protection measures and renaturation requirements. Directives arrange for the amount of payments to the cantons. Bonuses are paid to cantons if connectivity concepts are taken into account when planning the measures.
- Forests: In the framework of the Swiss Forest programme (BAFU 2004) the importance of connectivity for forests is highlighted. There are implementation regulations for the inclusion of and payments for connectivity based on the Forest Law. In 2011 the Federal Council adopted the Forest Policy 2020, in which it set the conservation and improvement of forest biodiversity as one of its five strategic goals.
- Ecological compensation in agriculture: based on the ECO-Quality-Regulation (ÖQV/SR-Nr: 910.14) concrete standards are set for connectivity. The regulation also arranges for payments for connectivity measures.

In the Swiss Landscape Concept (LKV 1997) and in the 2003 mission statement of the national environment office "[Landscape 2020](#)" the development of a functioning national ecological network is of central importance. The designation of areas important for conservation and their connectivity axes provide an important tool for the implementation of a strategy for biodiversity and landscape diversity. The REN forms a national basis for implementation in the various cantons. In some cantons ecological networks have found their way into some of the cantonal spatial planning guidelines (*Kantonale Richtpläne*).

In agriculture, concrete standards are set for connectivity measures by ECO-Quality-Regulation. To be eligible for direct payments farmers have to establish ecological compensation areas (ECAs) on at least 7 per cent of their agricultural land. These are species-rich, extensively farmed meadows and pastures, and structures such as straw fields and hedgerows, plus other semi-natural habitats. The regulation also arranges for payments for connectivity measures.

As of 2010 ECAs accounted for about ten percent of Swiss agricultural areas⁵. In 2013 the Swiss Federal Council and Parliament adopted the Agriculture Policy 2014–2017, which raises the incentives for the creation, maintenance and connection of biodiversity priority areas⁸⁷.

Concerning ecological connectivity in streams, the Federal Act on the Protection of Waters contains provisions for the rehabilitation of waters and to ensure appropriate residual flow. The latest revisions also include amendments of the ordinances to the Federal Act on Fishing, on River Engineering, and on Energy to protect the ecological balance of waters⁸⁸.

In terms of nature protection, there is first and foremost the Swiss National Park with an area of over 170 km². It has the distinction of being the oldest Alpine National Park (gazetted in 1914) and is an IUCN category 1 nature reserve with the highest protection level. It is governed by the National Park law ([Bundesgesetz über den Schweizerischen Nationalpark im Kanton Graubünden](#)) and National Park regulation ([Nationalparkordnung](#)). Since 1979 the Park is also a designated UNESCO Biosphere Reserve, and work is going on to establish the [Biosfera Val Müstair](#)/Park Nazionale, where the Swiss National Park will be a core zone⁸⁹. Since 2009 the communities of Tschiers, Fuldera, Lü, Valchava, Sta. Maria, and Müstair are forming the community Val Müstair⁹⁰, a valley of about 1600 inhabitants in the Eastern part of Switzerland bordering on Italy and Austria, and connected to the rest of Switzerland via the Ofenpass. The designation of a regional park was awarded in 2010, one of the goals of this Biosfera is to conserve the traditional natural and cultural landscape and to develop sustainable economic development strategies. One of the already completed projects is the restoration of the Jufplaun fenland. The Swiss National Park was also a project partner in the Econnect project (see Part II below).

In addition to the Swiss National Park, there are other protected area categories, including regional nature parks, and “nature discovery parks” (sub-urban nature parks), all of which are considered parks of national importance. The identity label “Swiss Parks” (*Schweizer Pärke*) was created to provide visibility. Currently there are sixteen parks in the operating phase and three further park “candidates”, and between 3 and 7 additional park projects are in the assessment phase⁹¹. There are also several running initiatives for ecological connectivity outside protected areas, many of a small scale in agricultural landscapes, in addition to cantonal wildlife corridors.

The number of parks of national importance is currently being expanded to fulfil the targets Switzerland has committed itself to under the Convention on Biological Diversity (Figure 12)^{92,93}. For detailed figures on Alpine Protected Areas in Switzerland, please consult the [ALPARC website](#).

Apart from protected areas there are forest reserves, which in 2012 covered about 4.8 percent of the Swiss forest area or 58.000 ha⁸⁸. This is still below the national target, which states that 10% of forests should have reserve status by 2030, and the existing reserves are not necessarily located where forest habitat types and species are most threatened. There is a need to establish additional large size reserves in some areas of Switzerland’s National Forest Inventory. Within the framework of the **Swiss National Forest Programme** (2004), the importance of connectivity for forests is highlighted⁹⁴. There are implementation regulations for the inclusion of and payments for connectivity based on the Forest Law. The Forest Policy 2020 of 2013 lays out the conservation and improvement of forest biodiversity as one of its five strategic goals⁹⁵.

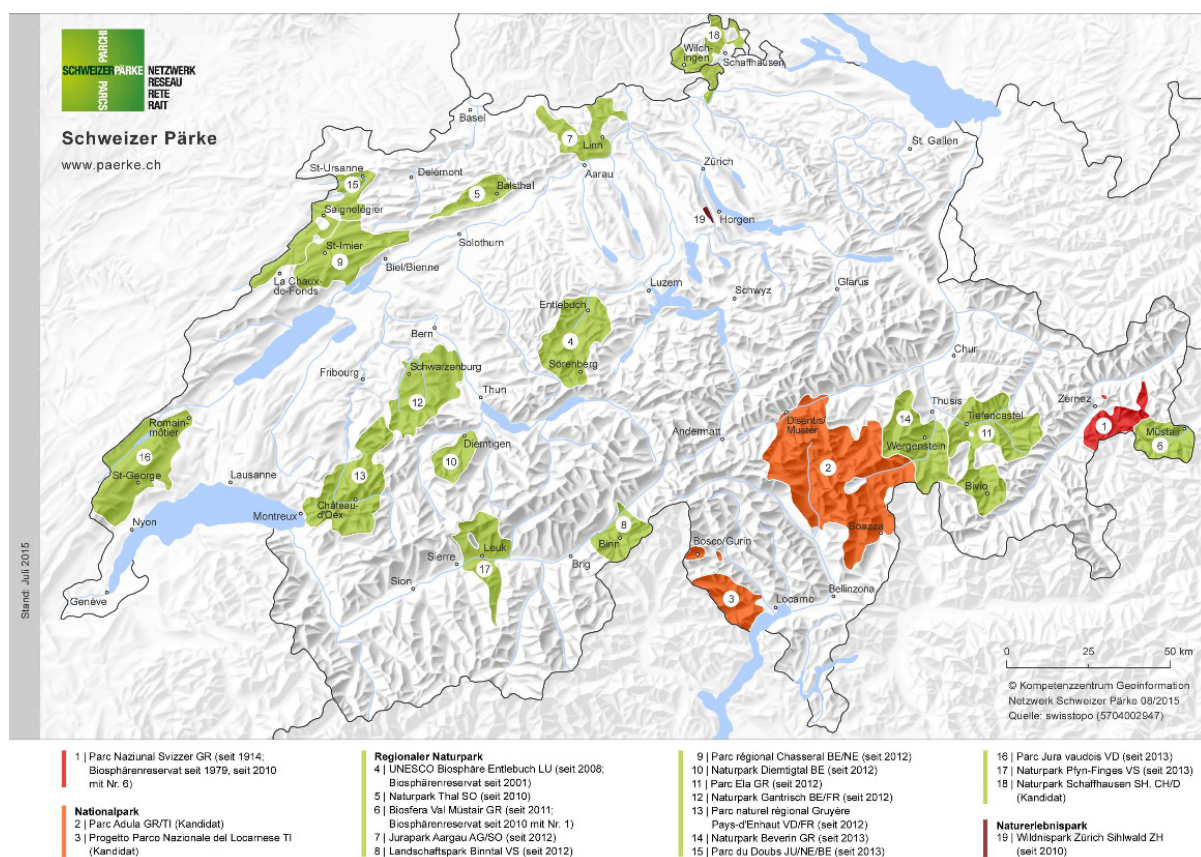


Figure 12 – Swiss protected areas as of July 2015 (Source: Netzwerk Schweizer Pärke)

The Environment Report for Switzerland of 2015 assessed the country's biodiversity to be in a "poor state", as evidenced by a reduction in valuable habitats and a high number of endangered species, due, *inter alia*, to landscape fragmentation, soil sealing and intensive agriculture⁹⁶. The review also finds that landscape-relevant sectoral policies (especially spatial planning, and policy making in agriculture, energy and economics) should be better coordinated at all state levels. In its fifth national report to the CBD, FOEN reports that the increase of settlement and urban area and landscape fragmentation through transport continues to be the most prominent reason for habitat loss⁸⁸. In this, Switzerland is not unique. Similar assessments have been published in other Alpine countries

Swiss Biodiversity Strategy (Strategie Biodiversität Schweiz)

The Swiss Biodiversity Strategy of 2012⁹⁷ contains 10 goals, of which the second goal refers specifically to ecosystem connectivity ("By 2020, an ecological infrastructure consisting of protected and connected areas is developed. The state of threatened habitats is improved.") It plans the expansion of existing protected areas and their connection to ensure the "passability of the landscape between the protected areas". Goal 8 also makes explicit reference to connectivity ("By 2020, biodiversity in settlement areas is promoted so that settlement areas contribute to the connection of habitats, settlement-specific species are conserved and the population is able to experience nature in the residential environment and in local recreational areas.").

All other goals are also indirectly in support of ecological connectivity.

Goal 1 ("By 2020, the use of natural resources and interventions involving them are sustainable so that the conservation of ecosystems and their services and of species and their genetic diversity is ensured") is a catch all that is particularly comprehensive, as it also instructs all relevant sectors (e.g. spatial planning, agriculture, hunting and fishing, forestry, tourism, transport, renewable energy, infrastructure, as well as production and consumption processes) to take the importance of biodiversity into account in their actions and decisions.

Goal 6 ("By 2020, ecosystem services are recorded quantitatively.") looks towards implementing a green accounting system.

The Biodiversity Strategy foresees the preparation of an Action Plan to provide further details on how to achieve the goals. The preparation of an interim progress report is scheduled for 2017, and an evaluation of whether the goals have been achieved will be made after 2020.

Swiss Action Plan on the Biodiversity Strategy ([Aktionsplan Strategie Biodiversität Schweiz](#))

At the time of preparation of the Biodiversity Strategy, the Federal Council also charged the Federal Office for the Environment (FOEN) with the preparation of an action plan to concretize the Strategy's objectives by 2014. The Swiss Biodiversity Strategy Action Plan therefore includes measures that place greater importance on the ecosystem services provided by biodiversity. The elaboration of a first package of measures took place with professionals from 250 associations and organizations in a broad-based participatory process. In 2013 FOEN presented first results of the participatory planning process, and in 2014 it began elaborating an implementation schedule for the measures. A central role in the Action Plan is accorded to ecological connectivity measures. Therefore, in November 2014, FOEN organised a conference on "Ecological Infrastructure". The event provided stakeholders the opportunity to comment on the contents of this central area of measures in the Action Plan.

Due to nature of the Swiss federal system, the cantons were invited to comment on the measures in 2015, as they are directly affected by the proposed implementation and financing of measures.

In its fifth report to the Convention on Biological Diversity (2014) FOEN states that the extent to which legislative amendments are required will be examined⁸⁸. This could, for example, refer to the designation of sufficient areas for biodiversity and connectivity, and to the obligation of the Confederation and cantons to ensure the functioning connection of protected areas through measures such as corridors.

Swiss Landscape Strategy FOEN

In 2011 FOEN developed a [landscape strategy](#) (*Landschaftsstrategie* BAFU) that illustrates the strategic goals of an integrated national landscape policy⁹⁸. The purpose was to update the strategic agenda of the Swiss Landscape Concept and the Landscape Vision 2020 (*Leitbild Landschaft 2020*).

The Landscape Strategy defines four principal objectives for government action: 1) sustainable and landscape-friendly design of the federal government's activities, 2) support of valuable landscapes, 3) support of a coherent landscape policy, provided by responsible

governmental and administrative units, and 4) securing and improving the landscape's ecosystem services.

Part II – Examples of ecological networks in the region

(Examples are listed by country in alphabetical order.)

Austria

Netzwerk Naturwald

The project „Network Natural Forests“ (*Netzwerk Naturwald*⁸⁹) was initiated by [Kalkalpen National Park](#)¹⁰⁰ (in the province of Upper Austria), an area of around 200 km², in collaboration with [Gesäuse National Park](#)¹⁰¹ (in the province of Styria), Austria's third largest National Park with an area of about 113 km², and the [Dürrenstein Wilderness Area](#)¹⁰² (in the province of Lower Austria), the first IUCN Category I protected area in Austria, with a surface of some 35 km². This is a unique and challenging project of cooperation among three different provinces.

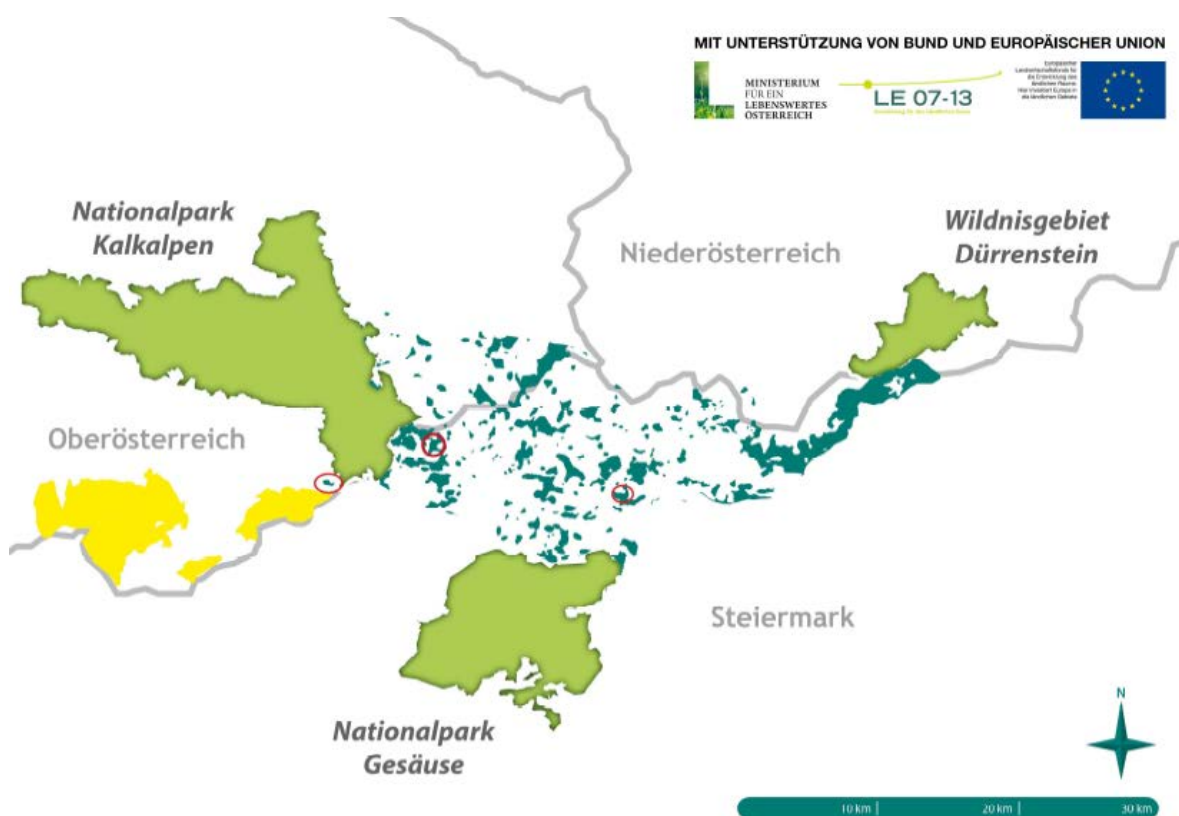


Figure 13 – Three protected areas are working on creating an ecological network – already agreed stepping stones are circled in red (Source: Netzwerk Naturwald)

The integrative design of this ecological network consists of three layers. A foundation of crosslinked core habitats of large protected areas (layer 1) will be connected by “stepping stones” (layer 2). A third layer is formed by changed forest management practices in managed forests, so that ecological connectivity can be provided by such forest areas in this region. The planning concept is publicly available from the website of *Netzwerk Naturwald*.

A first important implementation step was reached in September 2014, when the Styrian Provincial Forests (*Steiermärkische Landesforste*) signed the first “stepping stone contract”, which permanently designated a forest area of 40 ha (16 ha natural forest and 24 ha buffer zone) for ecological connectivity. The area is located in Uterlaussa, Styria, and is the first

pilot stepping stone in the larger protected area network project. A further two stepping stones were secured in 2015, an area of 54.7 ha in Hochsur/Buglkar in Upper Austria, and 38.1 ha in Landl, Styria. GIS-modelling for the stepping stone corridor has also been completed and published in the planning concept.

The [Austrian Federal Forests](#) (ÖBf), which is an official partner of the Kalkalpen National Park¹⁰³, have also elaborated a [concept for ecological networks](#) that complements the work of the Network Natural Forests project. The ÖBf are the largest property owner in the National Park and as such are responsible for the implementation of numerous management measures, including biodiversity conservation measures.

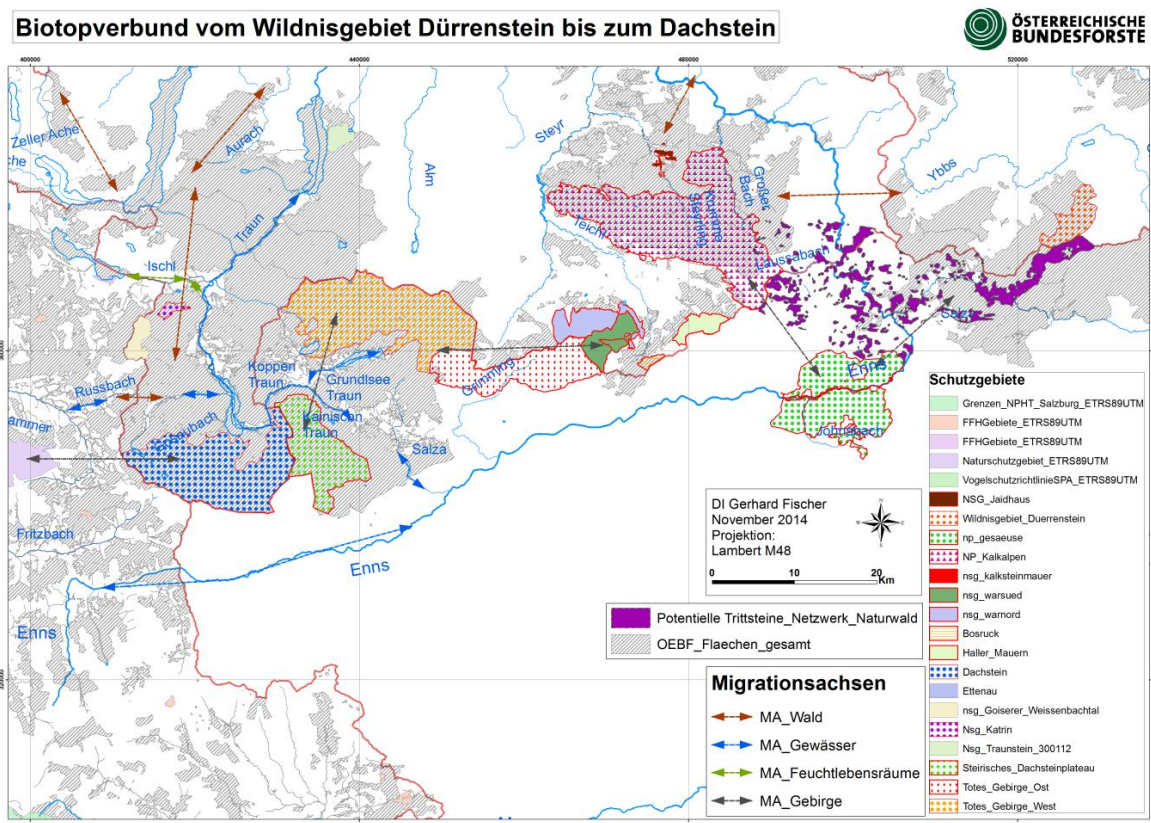


Figure 14 – Planned Ecological Network from Dürrenstein to Dachstein (Source: ÖBF 2014)

LEADER Projects

One example of a LEADER project with some ecological connectivity goals is „[Auenverbund Inn](#)“¹⁰⁴ in the province of Tyrol. In several Tyrolian communities (e.g. Telfs Pettnau¹⁰⁵) river revitalisation measures were planned and implemented to counter the drastic loss of gallery forests, floodplain streams, and ponds. The measures are meant to reconnect cut-off floodplain areas with each other and with the possibility of receiving flood waters, thereby providing valuable natural habitats for many species. The project ran from 2008-2011 and is based on the “Masterplan Inn” of the federal government of Tyrol. It is a measure to implement the EU Water Framework Directive and the Flood Protection Directive.

France

Green corridors in the Rhône-Alpes region

The Rhône-Alpes region, which is remarkably rich in plant and animal species, has undertaken steps to preserve its natural heritage. There has, however, been progressive landscape fragmentation, especially in the area around the urban center of Lyon and other cities over past decades.

With co-financing from the EU, the region has created a series of '[green corridors](#)'¹⁰⁶ in areas where biodiversity is threatened. These corridors are meant to connect or restore different natural core areas in order to preserve the ecological continuity of the region.

These green corridors are based on a system of land contracts constructed around a detailed five-year action programme, which are on average financially supported to about 50% by the region (total grant limited to EUR 1 million per contract). The contracts are drawn up through an ongoing dialogue between state authorities, associations and local stakeholders. The main objectives of the contracts are to restore corridors, ensure their sustainability, and to improve knowledge on species and ecosystems. They also aim to foster environment-friendly farming methods to protect biodiversity and counter obstacles to biodiversity conservation.

As of 2012 five corridor contracts were in place and covered 5 % of the Rhône-Alpes region (Grésivaudan, Bauges-Chartreuse, Chartreuse-Belledonne, Massif Central, Saint-Etienne). The contracts have led to the construction of wildlife passages, hedges have been planted, river banks have been restored in some areas, and sustainable farming and wetland management measures have been implemented. The five corridor contracts covered an area of 2 193, 63 km², constituting 5% of the Rhône-Alpes region.

Each party to the contract (Communities of Communes, municipalities, unions, associations, etc.) finance at least 20% of the cost of the measures. The main funders of the corridors contracts are: the Rhône-Alpes Region, the General Councils of Ain and Haute-Savoie and the Water Agency RMC. The EU is involved in corridor contracts for Champagne-Genève and Arve-Lac through an Interreg project.

The region won an EU [RegioStars Award](#) for the green corridors in 2012¹⁰⁷ in the category of "sustainable growth – investments in ecosystem services and green infrastructure leading to sustainable regional development".

The SRCE was jointly developed by the State (DREAL) and the Region, with the technical assistance of the network of urban planning agencies of Rhône-Alpes (URBA3). The green corridor contracts form the basis of the SRCE, and are part of the green and blue network "[Trame verte et bleue- TVB](#)"⁴⁵.

Most recently, a Council decision of 16 October 2015 stated pre-feasibility studies for green and blue contracts for the additional areas of Salève Voirons in the area of Vallée de l'Arve (74), plaine et collines roannaises, piémont et monts de la madeleine (42), and Vallée de la Loire Forézienne (42). New contracts were agreed in Rovaltain (23), Mandement Pays de Gex (01), Bièvre Valloire (38), and Saint-Etienne Métropole (38)¹⁰⁸.

Other French Alpine implementation examples of the Trame verte et bleue

There are also other activities, besides the green corridor contracts, that support the implementation of the TVB. Some examples from the [Département de l'Isère](#) region are worth mentioning:

In 2001, the General Council of Isère realized the departmental ecological network of Isère (REDI), which identified more than 600 points of conflict on the territory of the Department. These points of conflict have been prioritized and 10 emerged as priorities, including the Grésivaudan valley and gorge Voreppe. Since 2001, five small wildlife crossings were made and a European project was launched. In 2004, the Department wanted to implement a comprehensive project for the restoration of biological corridors in the Grésivaudan valley between the Chartreuse, Vercors and Belledonne. After studies and consultation with all partners (municipalities, infrastructure managers and space), a global project was launched in 2008, the "Corridors of Life" (*Couloirs de vie*) project, which includes provisions for [small wildlife passages](#) in Cheylas¹⁰⁹. The town area features a last stronghold of green tree frogs in the Grésivaudan valley. This project includes awareness and communication activities, evaluation, work on highways and county roads (laying fauna detectors, realization of ramps, installation of opacifying elements, etc.) and spatial management (study on the evolution of agricultural practices, agroforestry, etc.).

The Isère region has also since 2011 been testing a [wildlife detection system](#)¹¹⁰, which was installed in seven zones along departmental roads. This system allows the detection of small and large wildlife species that are in proximity of the road. Detection poles are arranged on either side of the road, with masts covering a lateral radius of 300 m and an axial distance of 50 meters, thus covering the entire target area. Once an animal is detected, a signal is sent to motorists. Within a one year period more than 4000 animals have been detected across the seven sites.

In the [Savoie](#) area, the [Commune de la Motte Servolex](#), where the dominant land use form is agriculture and forestry, but where urbanisation pressures are also increasing, has decided to preserve old trees and dead wood as biodiversity elements in the landscape. They have been creating nine "[old tree islands](#)" in commonly held forests. This approach is part of an action plan for the establishment of a natural forest network in the Rhône-Alpes region¹¹¹. La Motte-Servolex has also signed the Action Plan for Wetlands proposed by the Chambéry metropolitan administration and actively participates in the development of the Regional Plan of Ecological Coherence driven by the Savoie administration.

Also in Savoie, The [departmental forest of Combe d'Aillon](#) is partly located at the Natura 2000 site "Mont Colombier" (about 300 hectares). As such, and as part of the revision of the planning document, the General Council of Savoy, the National Office of Forests and Regional Natural Park of Bauges Massif looked for a type of forest management that would reconcile economic and environmental issues. A number of surveys were conducted in this forest. To go further in the process, the [establishment of a network of "senescence islets"](#)¹¹² in the production area was conceived. The county forest in Muret sector has benefited from a Natura 2000 forestry contract ("Measure promoting the development of senescent wood to facilitate the establishment of the network of islands"). The measure concerns a method for favouring the development of an old growth forest in order to improve the conservation status of species associated with old/dead wood and particular with the Habitats Directive's demands of representativeness and naturalness of habitats.

Under the plan, particular identified "remarkable trees" (at most 4 trees per hectare) are to be marked and excluded from forestry measures for a 30 year period as long as they do not represent a threat to people.

Like in Isère, there is also a project in support of [amphibian crossings in Combe de Savoie \(Détrier\) and Maurienne \(Aiguebelle\)](#)¹¹³. The project addresses two of the main amphibian mortality sites on county roads in Savoy. On the RD73 in Aiguebelle, every year on average some 3500 amphibians were crushed, while about 2000 were killed on the RD925 to Détrier, a road with heavy traffic of some 5000 vehicles / day. During the spring of 2012 and 2013 some smaller crossings and lateral guiding devices were constructed and are now operational. These have restored connectivity for small wildlife, and as a bonus have also allowed an optimisation of the annual amphibian counting campaigns by NGOs.

An example of a “blue corridor” is the very recent reconnection of the rivers Drac and Romanche⁴⁷. The Drac is a 130-km long river and a tributary of the Isère River. The [Natural Reserve of the Drac Isles](#) was created in July 2009. It covers an area of 15 km along the Drac for a total of 804 ha. The gazetting decision was taken by the Rhône-Alpes Regional Council, following a strong mobilization of the territory for this project and the advice of the Regional Scientific Council of Natural Heritage. Recently the water of the Drac river was topped up downstream, which had been proposed since the 1990s, so as to increase instream flow from 3 to 5.5 m³/second at the dam of Our Lady of Commiers. This topping-up became effective in early September 2015. It allows the Drac, formerly dry for some 300 days of the year to join the 78 km long mountain river Romanche and thus restore the ecological connectivity of this area^{47,114}.

Germany

One flagship project that is mentioned in the German National Biodiversity Strategy is the maintenance and securing of a “green belt” along the former iron curtain as a natural heritage and historic monument. The [Green Belt](#) is actually a European initiative that spans 24 countries from northern Europe through Central Europe southward. Within Germany it covers several provinces; however it does not extend into Alpine territory and as such is not further reported on in this report.

Berchtesgaden National Park

The Berchtesgaden National Park, Germany’s only Alpine National Park located in the province of Bavaria and bordering the Austrian province of Salzburg, has implemented many projects to enhance biodiversity conservation and ecological connectivity over the last several years. This large protected area (210 km²) is also the core and buffer zone of the biosphere reserve “*Berchtesgadener Land*” and a Natura 2000 site. Furthermore, it is a pilot area of the Alpine Convention and as such engages in the Platform Ecological Network. In 2015 it hosted an international conference on Alpine ecological networks, where some new ecological connectivity projects were proposed. One of the goals is the extension of the JECAMI online mapping software (see Econnect project below) to become an Alps-wide standard.

A regional process in the transboundary pilot region Berchtesgaden-Salzburg was initiated by the Park Administration between 2008 and 2011 during the Econnect project’s implementation. The administrative structure of the Park facilitates regular communication through a communal advisory committee, which is also involved in the spatial planning process of the park’s territory and neighbouring villages¹¹⁵. Such a process is quite conducive to achieving decisions that are backed by communities.

During the project four main connectivity focus areas were identified (Berchtesgaden National Park/Nature Park Weißbach; the northward connection to the Alpine foothills; the

east-west connection within the Northern Limestone Alps; and the north-south connection to the Hohe Tauern pilot region). Econnect partners undertook a thorough situation analysis and identified four priority topics: revitalization of the river Saletbach, amphibians at Lake Taubensee, furthering extensively utilized grasslands, and pursuing a transboundary exchange on spatial planning. For each of the priority topics some concrete measures were implemented to improve connectivity in the field. In 2011 the riverbank obstructions were broken up between Obersee and Königssee to provide new spawning grounds for the Königssee trout. After the end of the Econnect project, activities have continued, beginning with the development of a transboundary information exchange on ecological connectivity across the border region. Although there is no formal written agreement, the transboundary cooperation with the Weißbach protected area has led to the institution of a tourist bus line that connects the two parks and to the joint development of nature education and awareness raising activities.

The integrated Landscape Framework Plan (*Landschaftsrahmenplan*¹¹⁶) is a major achievement. Based on an integrative participatory regional development approach, it was jointly developed in 2014 by the municipalities of Berchtesgaden, Bischofswiesen, Marktschellenberg, Ramsau, Schönau at Königssee, as well as Berchtesgaden National Park. The aspect of connectivity was considered by integrating results of Econnect into the Landscape Framework Plan. The Plan contains detailed descriptions of the natural areas, settlements, and economic activities in the region, including maps that show different aspects (e.g. nature zones, geology, soils, and agriculture), description of landscape and ecosystem types and their ecological functions, and descriptions of important animal species. An important component of the plan is dedicated to ecological connectivity ("*Biotopverbund*"). In addition, all connectivity-relevant goals of the species and ecosystem conservation programme of 2014 and proposed measures for the improvement of ecological connectivity in rivers and streams contained in a regional water body development plan were combined into a new thematic map. Specific Bavarian concepts like the protection programme for species and biotopes (*Arten- und Biotopschutzprogramm* - ABSP) and the development concept for water bodies (*Gewässerentwicklungskonzept* - GEP) were incorporated. As a logical continuation of the previously developed results of Econnect, areas of particular importance for ecological connectivity in extensively managed grassland were integrated into the Plan (Figure 14).

ALPENPARK BERCHTESGADEN

Berchtesgaden, Bischofswiesen, Marktschellenberg, Ramsau b. Berchtesgaden, Schönau a. Königssee, Bayerisch Gmain (Teil), Bad Reichenhall (Teil), Schneizreuth (Teil)
Gemeindefreie Gebiete Eck und Schellenberger Forst

15

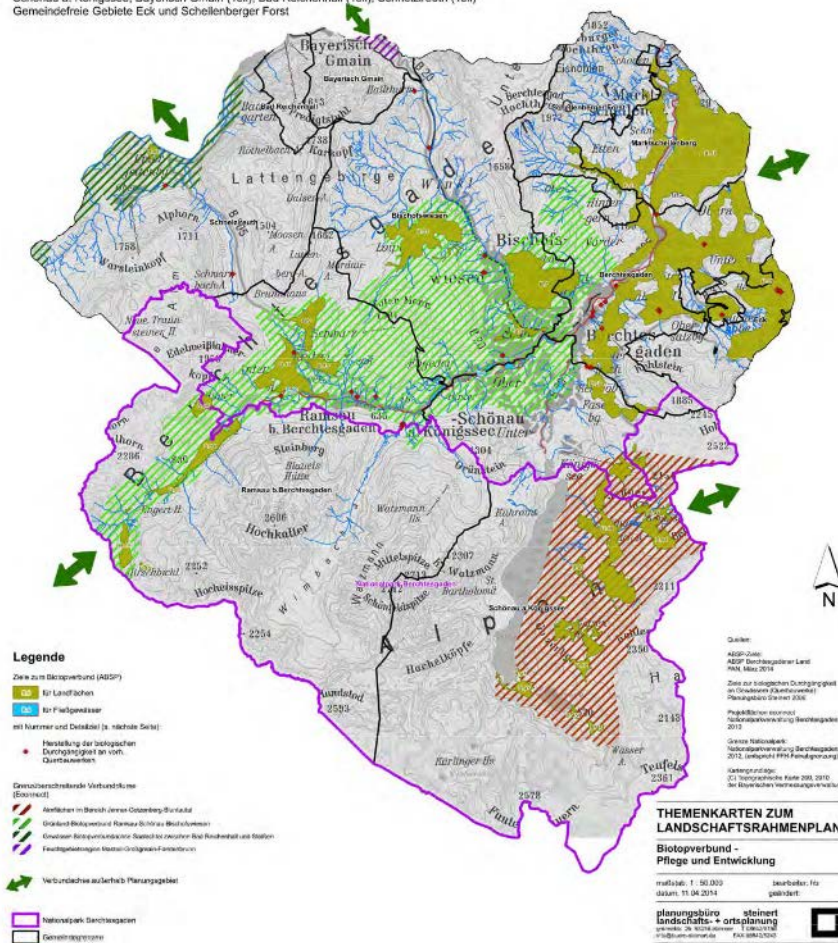


Figure 15 - Thematic map on ecosystem connectivity in the Berchtesgaden Landscape Framework Plan (Source: Steinert 2014)

Different connectivity areas were designated in the plan, e.g. for extensive grasslands, rivers, amphibians, and it makes specific planning recommendations for issues affecting ecological connectivity. Next steps would be, for instance, the implementation of wildlife corridors and developing a programme of landscape conservation measures, including for particular characteristic species.

Federal “Re-connection” Programme

Another flagship project, which directly targets the (re-)establishment of ecological connectivity in landscapes, is the Federal “[Re-connection](#)” Programme. This project is a direct implementation measure arising from the National Biodiversity Strategy and has been operational since 2008. Its aim is to conserve biodiversity by reconnecting habitats. Involved the Federal Environment Ministry (BMU), the Federal Agency for Nature Conservation are (BfN), the Ministry of Transport (BMVBS), and the Federal Highway Institution (BAST).

The aim of this flagship project is to employ sustainable landscape development principles. The long-lasting protection of ecological connectivity is to be ensured through the restoration (relinking) of important functional spaces.

A special feature of the program and of the selected projects is the cross-sectional orientation, since in addition to nature conservation and landscape management authorities it involves transport authorities (BMVBS, BAST) and nature conservation associations, as well as the German Hunting Association. Schools are also to be engaged so that public awareness on the importance of habitat networks can be raised. Such a cross-sectoral approach is essential for biodiversity conservation initiatives. In addition, the project aims for a comprehensive approach that includes, next to expertise in the natural sciences, social and economic aspects, such as public participation in the overall process, conservation education, development of natural spaces, increasing the recreational value and promotion of natural experience, accident prevention for humans and wildlife, as well as resolving conflicts of interest between different specialised departments.

The planned re-connection measures are based on several mapping and planning processes. First was a mapping of habitat corridors for humans and nature, undertaken by the BfN in 2004, which produced [maps](#) for the development of nation-wide habitat corridors in Germany. At that time, Bavaria had begun a process of planning ecological connectivity, but their plans could not be integrated into the map as they did not make data available to the map authors¹¹⁷. Building on this, the German Nature And Biodiversity Conservation Union - NABU produced a [federal wildlife corridor plan](#) in 2007, which highlighted 125 conflict points along traffic routes. Several of these are in Baden-Württemberg and in Bavaria¹¹⁸. Similarly, the NGO Friends of the Earth Germany - BUND produced a [wildcat corridor plan](#) in 2007 based on actual and potential wildcat habitats throughout Germany and across the border to guarantee trans-national connectivity for wildcats, but it does not extend into the Alpine region.

Following this the Federal Re-connection Programme was approved by the federal cabinet in February 2012¹¹⁹. By 2017 there is expected to be an interim report on the status of the programme's implementation. Several concrete connectivity infrastructure measures are listed in the programme document (priority re-connection areas). These also include several areas within the Alpine region. The provinces are responsible for the structure, functioning and the legal safeguarding of the biotope network and for the enforcement of nature conservation and landscape management. As part of the National government/Province Working Group on Nature Conservation, Landscape Management and Recreation (LANA) there is a regular exchange between national and provincial governments.

BayernNetzNatur

The Bavarian State Ministry for Environment and Consumer Protection (StMUV) is responsible for BavariaNatureNetwork⁶⁴. The ABSP, the Bavarian ecological network concept and the biodiversity strategy should primarily be implemented in the context of major conservation projects. The project group BayernNetz nature consists of the planning office PAN and the StMUV. It supports authorities, associations and municipalities in the implementation.

The BayernNetz Nature projects are linked to the European Natura 2000 network. They proceed through close cooperation between the stakeholders (including farmers, authorities, associations, municipalities). The overriding principle in BayernNetz Nature is the voluntary nature of all actions and the collaborative approach. Funding of BayernNetz Nature projects comes from various subsidies from state, federal and EU funds. Additional funding opportunities exist through foundations and sponsorship contracts.

As of May 2014 there were 389 BayernNetzNature projects in all parts of the Bavarian state, of which 114 project had already been completed. There are too many projects to list here, but the Upper-Bavarian project "[Lebensraum Lechtal](#)" may serve as an example of ongoing implementation activities.

Lebensraum Lechtal

In 1998 the Bavarian Conservation Fund began supporting a conservation project in the Lech Valley. In May 2000, the project was extended by three years and expanded geographically to the districts of Weilheim-Schongau and Ostallgäu. The entire Bavarian portion of the Lech River from the Danube up to the border at Füssen - a total of about 167 river kilometres – is included in the project, an area of around 750 km². Funding was granted for another two years in July of 2003, and the project completed at the end of September 2005.

Throughout the project area extensive measures for the maintenance and replanting of heathland were conducted. Land was acquired to allow some valuable habitats to develop. To foster ecological network creation sheep grazing plays a central role in this area. The project's area manager supports conservation-oriented grazing in the Lech Valley through technical concepts and advice to farmers and livestock keepers. He assesses the nature conservation situation of pastures and advises on how grazing can be better adapted to support rare animals and plants.

After the project ended, an association (*Verein „Lebensraum Lechtal e.V."*) was registered in order to continue working on the implementation of the project's goals, i.e. the creation of an ecological network through appropriate landscape management measures. In April 2011, the association established a field manager position for the entire Bavarian Lech Valley. This was made possible through support from the Bavarian Conservation Fund, the European Social Fund and the district of Upper Bavaria. This is the first time after the end of the project phase that full-time staff has again been made available for the promotion of nature conservation, landscape management, sustainable land use and environmental education in the Lech Valley.

As it was one of the first large-scale conservation projects in Bavaria, the project *Lebensraum Lechtal* served as an example for numerous later projects.

Italy

Various Italian regions have initiated the creation of ecological networks; the Alpine regions' efforts are excerpted here below (in alphabetical order by region).

Lombardy Regional Ecological Network ([Rete Ecologica Regionale, RER](#))

The RER was defined by law [DGR no. 10962 of 2009](#). One of the objectives (point 1.5.1) of the Lombardian regional spatial plan (*Piano Territoriale Regionale, PTR*) is the creation of an ecological network, which is recognized as infrastructure of utmost importance¹²⁰. Its significance is reiterated in the Regional Plan of Protected Areas (*Piano Regionale delle Aree Protette* - PRAP), in which a strategic line is dedicated to the implementation of the ecological network. It aims to define tools to enable the completion of a network structure, to tackle defragmentation in areas already heavily compromised in terms of terrestrial and aquatic ecological connectivity, and to promote interregional and cross-border relations. The RER is recognized as a priority in the Regional Development Plan and is to be considered in regional and local planning¹²¹. The Alpine and peri-Alpine regions are included in the approved Regional Ecological Network design.

A project was approved by resolution DGR. 10415 in October 2009 “From Parks to Regional Ecological Networks” (*“Dai Parchi alla Rete Ecologica Regionale”*). Its objectives are to implement some key ecological corridors between biodiversity priority areas; to enhance habitat quality and the ecological value of these priority areas and promote ecosystem functions; and to create a multi-purpose network that can also deliver landscape functions and recreational value.



Figure 16 – Primary elements (dark green) and secondary elements (light green) of the Regional Ecological Network in Lombardy Region (Source: Regione Lombardia – Rete Ecologica Regionale 2010)

The RER contains primary and secondary elements. Primary elements include, in addition to priority areas for biodiversity identified by the Lombardy Region, all regional and national parks and Natura 2000 sites. The secondary level is constituted of linking elements to complete the network design (Figure 16)¹²².

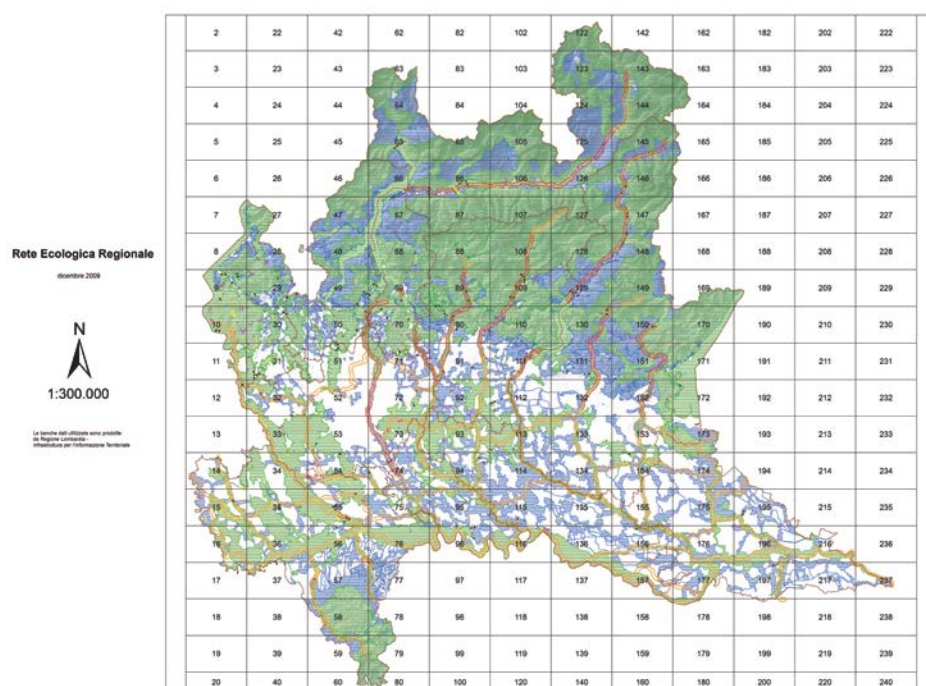


Figure 17 – Detailed ecological network map of Lombardy Region with planned corridors (Source: Lombardy Region – Regional Ecological Network)

Figure 17 shows primary level elements of the Lombardian RER in green, and corridors with low or moderate levels of anthropogenic disturbance in orange, with high disturbance in red. Yellow lines indicate passage ways in need of defragmentation, purple lines are passages to be conserved, and dotted lines are passages to be conserved and defragmented.

The document "Ecological Network and regional territorial planning of local authorities" provides essential information for the composition and the concrete protection of the Network as part of planning and programming, including detailed maps showing examples of green corridors¹²².

Piemonte Regional Ecological Network (*Rete Ecologica Regionale* - RER)

In Piemonte the design of a Regional Ecological Network (RER) is anchored in a regional law ([L.R. 19/2009](#) on the protection of natural areas and biodiversity (*Testo unico sulla tutela delle aree naturali e della biodiversità*)) and is part of the [regional planning instruments](#)¹²³. The region has mapped important biodiversity areas and a potential ecological network design. All maps are available for download from a [Geoportal](#).

The Region began in 2013 with preparatory activities for the implementation of the RER. In March 2014 decree DGR Nr. 27-7183 formally approved the creation of a working group to provide technical support to the "Environment and Nature" section of the regional agency for environment protection (Arpa Piemonte) and to coordinate, starting from the regional level, the implementation of the RER. On 9 October 2015 the Piedmont Region's Official Bulletin Nr. 36 published decree DGR Nr. 52-1979 of 31.7.2015, which formalises the methodology for defining the regional ecological network.

Arpa Piedmont and the associated working group have been active in the development of the methodology and related cartographic processing, in the identification of habitats, permeable areas and areas suitable as habitat for animal species, which all contribute to the identification of components of the regional ecological network. The developed methodology has been tested in the northwest quadrant of the Turin metropolitan area, later expanded to include the area of Corona Verde.

The methodology and associated maps can be viewed [online](#). The model FRAGM was used to evaluate and create an ecological connectivity map based on five mammal species with good mobility aptitude (hedgehog, red squirrel, badger, deer and hare). A final connectivity map was then created as a composite of the modelled species maps (Figure 18, where green indicates a very high level of connectivity and red indicates the lowest level of connectivity for the species in question).

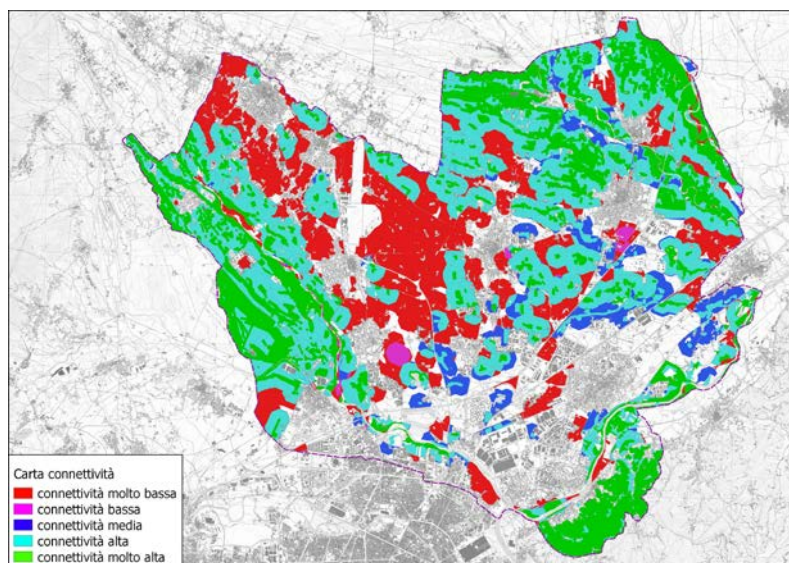
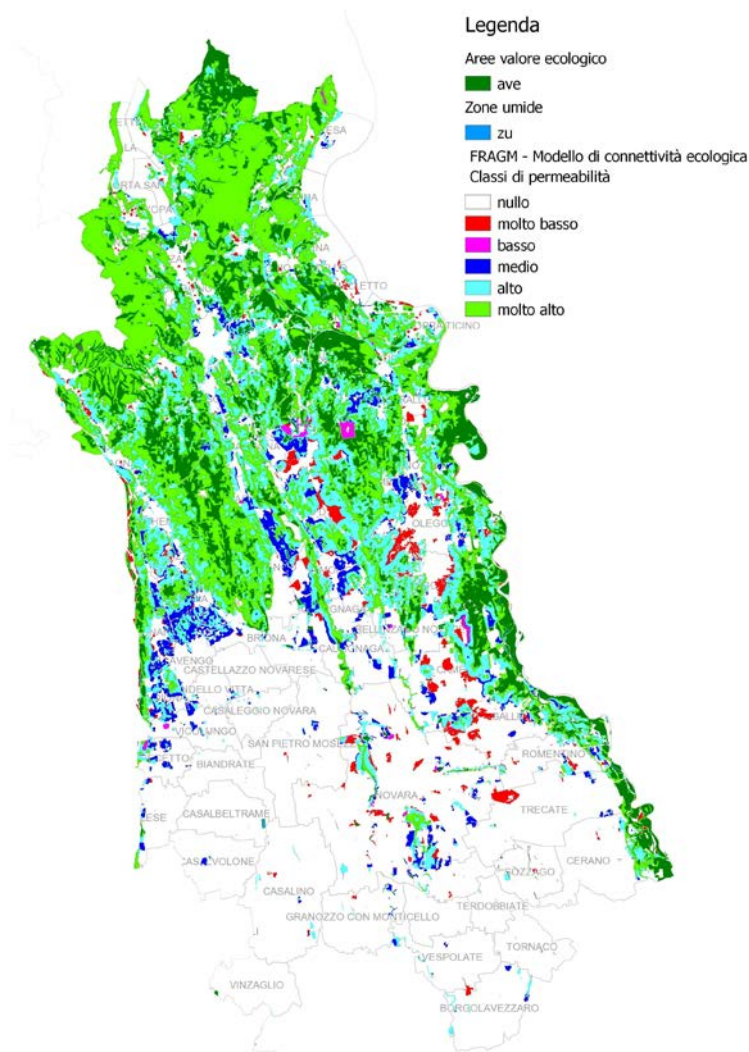


Figure 18 – Ecological connectivity map of the Piemonte Region (Source: Arpa Piemonte)

Following the application of the methodology it was possible to identify the elements that have to be combined to form the ecological network, i.e. areas of ecological value and areas with high or very high ecological connectivity. In addition to the above-mentioned areas, the method identifies elements that play a marginal role (e.g. characterized by a degree of residual connectivity or which are particularly suitable only for some of the considered systematic groups and are therefore sub-optimal). Supplemented by exogenous data such as those related to arboreal formations, they can provide useful information about the identification and effectiveness of any interventions to defragment land areas or restore the functionality of parts of the ecological network.

The next phase envisages a study of the ecological network of the province of Novara, which has designated 8 Natura 2000 sites¹²⁴, as part of the "Novara network" project funded by the Cariplo Foundation. Figure 19 shows the planned components of an ecological network in the Novara province, where green areas are those of high ecological value, light blue indicates aquatic bodies, and light green to dark red indicate the levels of permeability for animal species calculated by the FRAGM model.



Concerning the wider landscape, the law refers rather generally and cryptically to “large areas that form a natural or human-shaped landscape, including settlements, and that individually or in their entirety bear witness to civilisation”. This of course leaves much room for interpretation. Such wider landscapes are divided in administrative practice into “ban zones” (*Bannzonen*) and protected landscapes (*Landschaftsschutzgebiete*). In ban zones – previously referred to as “landscapes particularly worthy of protection” – structures may not be built so as to maintain an open view onto particular settlement areas or natural or cultural heritage objects. In protected landscapes, which are areas of great beauty that often arose through cultural use and which are frequently attractive to tourists, the goal is to maintain the landscape and recreation potential and to ensure that their use is compatible with their protection. The Landscape Plan also regulates the management and use of ecosystems (“*Biotope*”), and gardens and parks in urban areas. On the other hand, nature parks are governed by a separate administrative office and are not included in the landscape plan. They are, among others, subject to the regulations on the development and care of nature parks (*Bestimmungen und Maßnahmen für die Entwicklung und Pflege der Naturparke* – [law Nr. 7 of 12 March 1981](#)).

Objectives of article 10 of the Directive Habitats are integrated in the Landscape Plan of South Tyrol. In addition to the Landscape Plan there is also the Landscape Guiding Principle document ([Landschaftsleitbild](#))¹²⁶, which was approved by the State Government already in 2002. It defines objectives, measures and implementation strategies to conserve the South Tyrolean landscape’s natural and human living and economic spaces. In other words, it is a guideline for sustainable landscape development.

The landscape vision assumes that a widespread, permanent nature and landscape protection is only possible with active users of the landscape - agriculture, forestry, water management, tourism, leisure and recreation, and land use planning and human settlements. The guidelines require an integrative approach that goes far beyond the mere protection status of areas and individual objects.

Subsidies (*Landschaftsprämien*) are awarded for the conservation of habitats of ecological importance.

In 2007, during a joint session of the provincial governments of South Tyrol, Tyrol, and Trentino, with Vorarlberg in observer status, it was agreed that the exchange and relation between the protected areas in these regions and the creation of cross-border ecological corridors would be supported¹²⁷.

In 2000 Gufler¹²⁸ prepared a map of gene-flow potential and main barriers to wildlife in South Tyrol, shown in Figure 20.



Figure 20 - Ungulate migration routes across South Tyrolian main roads (Source: Gufler (2000), cited in Tornambé and Halilaj 2015¹²⁹)

This was followed in 2013 by an analysis of the permeability of the South Tyrolian landscape to wildlife (in particular red deer and roe deer) based on wildlife collision statistics for these species, as shown in Figure 21¹³⁰. The acquired data were used to identify and prioritize large-scale ecological network potential in a North-South and East-West direction. Overall seven corridors were identified to ensure ecological connectivity and allow gene flow among wildlife populations. Four of these are of international importance.

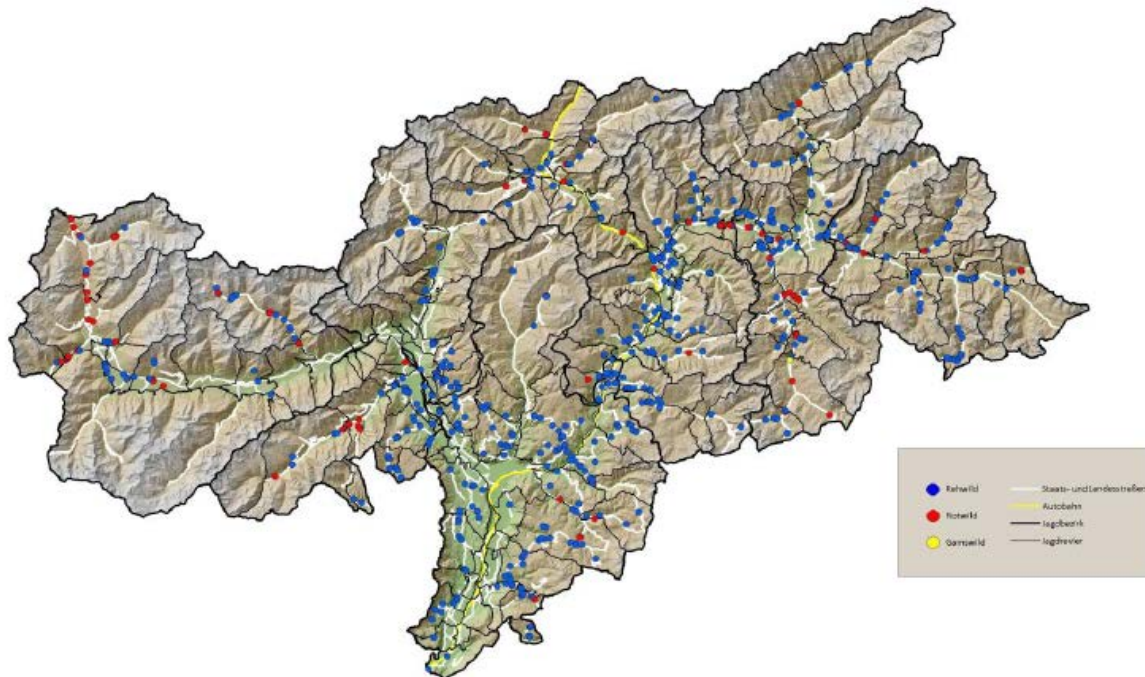


Figure 21 - Overview of traffic accidents with wildlife in 2012 (prepared for the autonomous province of Bolzano, 2013)
(Source: Eisenstecken (2013))

In early 2016 the Landscape Ecology office (*Landesamt für Landschaftsökologie*) presented a [new study on ecological corridors](#) in South Tyrol¹²⁹. The study comprises numerous examples of ecological corridors and problems with fragmentation in Pustertal, Eisacktal, Etschtal and in Vinschgau and describes the most notable challenges that these cases illustrate. The study looked at the presence of linear infrastructure (such as roads, railways, power lines, streams and canals) in narrow valleys, which constitute significant "barrier effects" for various wildlife species. Its aim was to obtain comprehensive information on wildlife movements and barriers in the territory in order to provide regional planners with information for the design of a provincial ecological network and to introduce methodologies and tools for planning for provincial environmental policies to reduce habitat fragmentation.

Trentino Regional Ecological Network

(Progetto T.E.N. - Rete ecologica del Trentino)

In the Trentino there are several types of [protected areas](#) that the [Provincial Law 11/2007](#)¹³¹ on forests and nature protection (*Legge provinciale sulle foreste e sulla protezione della natura*) classifies into different categories. They include the Trentino section of [Stelvio National Park](#); provincial natural parks ([Adamello-Brenta](#) and [Paneveggio-Pale di San Martino](#)); 75 provincial nature reserves; and 222 local reserves. In compliance with the EU Habitats Directive, 152 Sites of Community Importance, which are known as "Special Areas of Conservation", and 19 "Special Protection Areas", have been identified. Altogether, the system of protected areas in Trentino covers about 30% of the territory¹³².

The Provincial Law 11/2007 also provides that suitable protected areas located outside the parks can be linked into a Networks of Reserves. So far four have been established. It is foreseen that individual protected areas of this network be connected through the identification of "local areas of excellence" and ecological corridors.

The Trentino Region has an ongoing EU LIFE+ project, The T.E.N. Project (Trentino Ecological Network: a focal point for a Pan-Alpine Ecological Network, launched in July 2012 and running through December 2016)¹³² is to create a multi-purpose ecological network in the Trento province. It plans 12 “reserve networks”. The overall objective of the 'TEN' project is to plan an integrated long-term management system and restoration programme that targets the Natura 2000 network under the jurisdiction of the Trento province. It will be implemented based on decentralized management involving local communities (principle of “responsible subsidiarity”). The network will also be “open” vis-à-vis the territories surrounding the Trentino region and will include economic and social dimensions in addition to conservation dimensions. There are plans to elaborate harmonised agricultural policies that account for biodiversity conservation concerns and sustainable tourism policies as an integral part of the management of a reserve network.

One of the demonstration actions foreseen in the LIFE+ project is the establishment of an ecological corridor by planting a forest belt along the Avisio stream north of Trento in the Adige Valley.

Veneto Ecological Network

(Progetto di Rete Ecologica Comunale)

For biodiversity conservation in the Veneto Region a number of protected natural areas (parks and reserves) and 128 Natura 2000 areas (22,5% of the regional territory)¹³³ have been established across seven provinces.

In 2008 the concept of a community-level ecological network and the valuation of biodiversity were presented to the public and a consultation process launched. [Resolution of the Regional Council no. 2357 of 8 August 2008](#) was issued concerning the drafting of a regional territorial coordination plan (*Redazione del Piano Territoriale Regionale di Coordinamento ai sensi della legge regionale 23 aprile 2004, n.11 (articoli 25 e 4). Disposizioni per la stesura conclusiva del progetto*). Such a plan was then adopted by resolution of the Regional Council No. 372 in February 2009. The plan contains a chapter on biodiversity, including an aspirational map that depicts the Region’s ecological network with core zones, parks, and ecological corridors (Figure 22, corridors in light green)¹³⁴. The Region intends to put the regional ecological network concept into practice by promoting experimental projects that safeguard and develop ecological corridors in the municipalities of Belluno, Vicenza and Verona, in collaboration with local authorities who look after the implementation and the Cariverona Foundation, which partially finances the projects. Although the region is larger than just these pilot municipalities, to concentrate resources the region has seen fit to intervene at first only within certain well-defined areas.

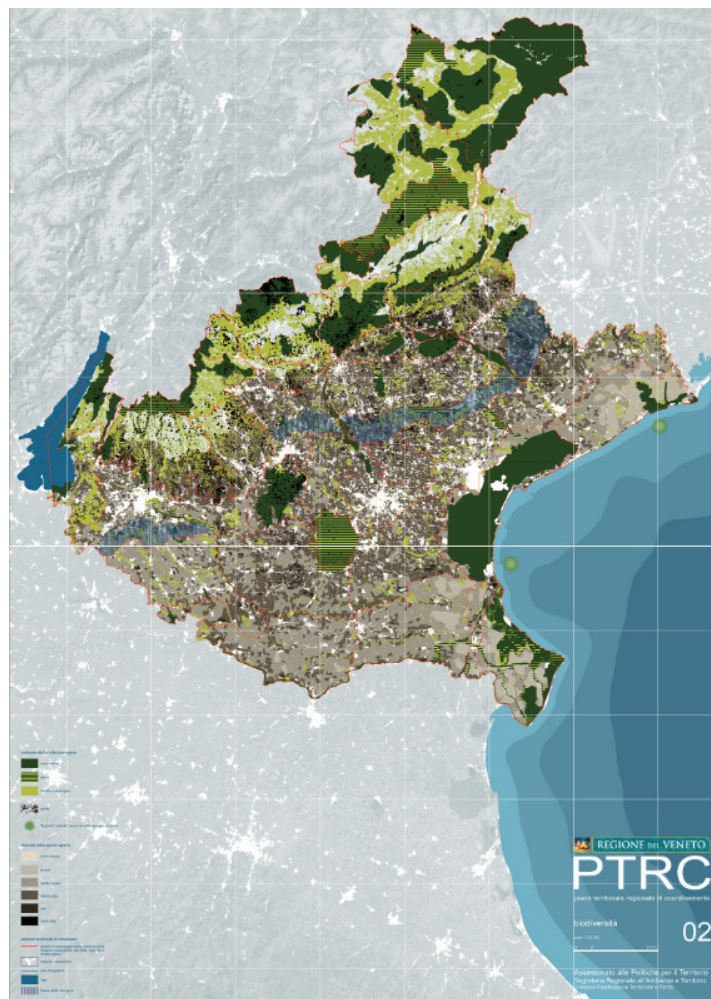


Figure 22 – Aspirational biodiversity network map of the Veneto Region - Regional territorial coordination plan (PTRC)
(Source: Regione del Veneto)

The Veneto Region's community-level network brings together the ecological and territorial aspects of involved communities and ties them into an ecological network. The actions foreseen in specific projects consist mainly of interventions to resolve problems that affect the functionality and quality of ecological corridors in the selected municipalities, such as measures for the protection of priority species, measures to prevent habitat loss, pollution reduction measures, and measures for the restoration and strengthening of the ecological value of natural areas.

Switzerland

National Ecological Network REN

[\(Nationales ökologisches Netzwerk/Réseau écologique national – REN\)](#)

The project REN (*Réseau écologique national*) proposed a vision for wildlife habitat interconnectedness on a national scale. The project was one of the main goals of the Swiss Landscape concept. The REN developed various new approaches to describe the structures and functions of a network, connecting a multitude of habitat types across large parts of Switzerland. Areas that are potentially suitable for the development of an ecological network were modelled, data were validated by cantonal administrations, and the final outcome was an aggregated product of all available useful data.

Synthesis maps were prepared at the national level (Figure 23), and individual specific network maps were also prepared. These maps and accompanying documents constitute a vision, rather than the implementation of an actual ecological network.

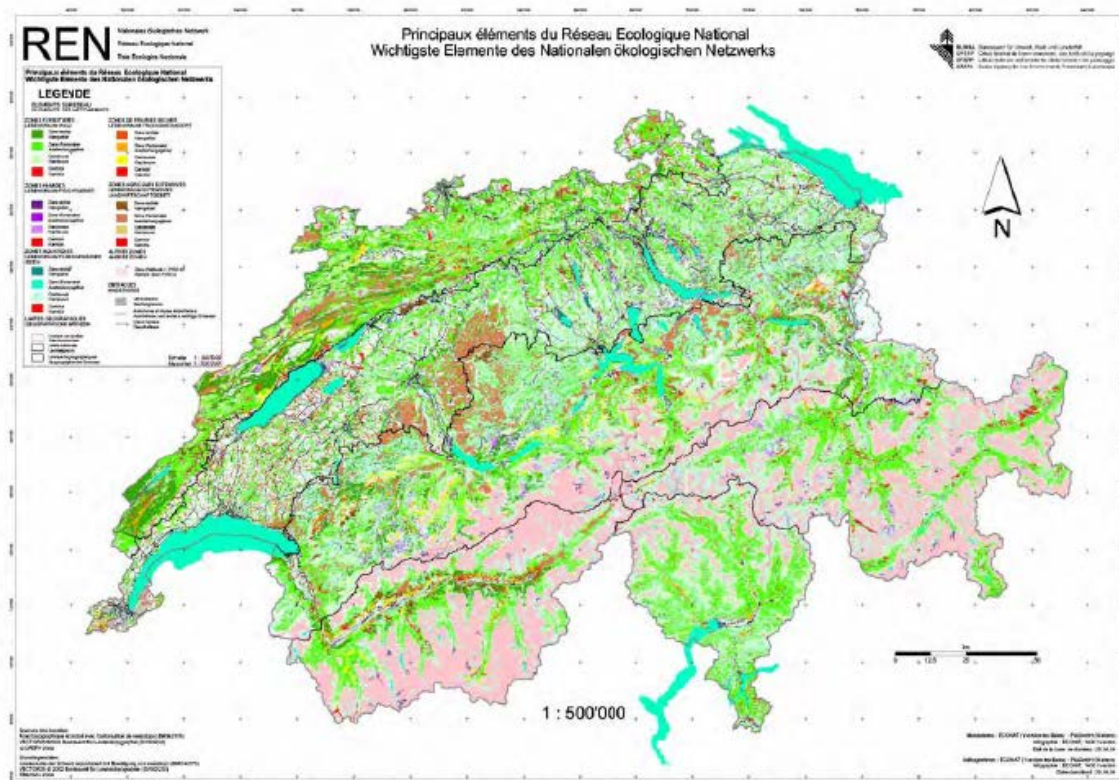


Figure 23 - Overview map of the Swiss national ecological network design (Source: Berthoud, Lebeau and Righetti 2004)

Swiss wildlife corridors ([Wildtierpassagen](#))

Wildlife passages are designed to help enhance interrupted migration corridors. The Swiss federal government has worked together with cantonal and national partners to develop wildlife passage guidelines and concepts¹³⁵.

In Switzerland, 303 wildlife corridors of national significance have been identified and described (as of 2012). Wildlife migration corridors of regional importance for particular species are linked in a network. In a first step the known wildlife corridors were collected from existing data per Canton and potential nation-wide corridors were determined using GIS. They were divided into wildlife corridors of trans-regional, regional and local importance. Subsequently, the national and regional networking system was visualized for the whole of Switzerland. The corridors were then classified into wildlife corridors of trans-regional and regional importance respectively, depending on the importance of the axis on which they lie. An overall assessment of wildlife corridors concluded, however, that 47 (16%) of a total of 303 national wildlife corridors are largely fragmented and can no longer be used by wildlife. More than half of the corridors are significantly to severely impaired (171 corridors, 56%), and about one-third (85 corridors, 28%) can be classified as intact. Already back in 2001, the government set itself the target of rehabilitating some 51 regional wildlife corridors by establishing wildlife-specific structures (what would today be called green infrastructure).

The trans-regional corridors and the connecting axes were updated by BAFU in 2012 based on information provided by the cantonal hunting administrations. These maps (Figure 24) are available [online](#) and can be zoomed into to see more details.

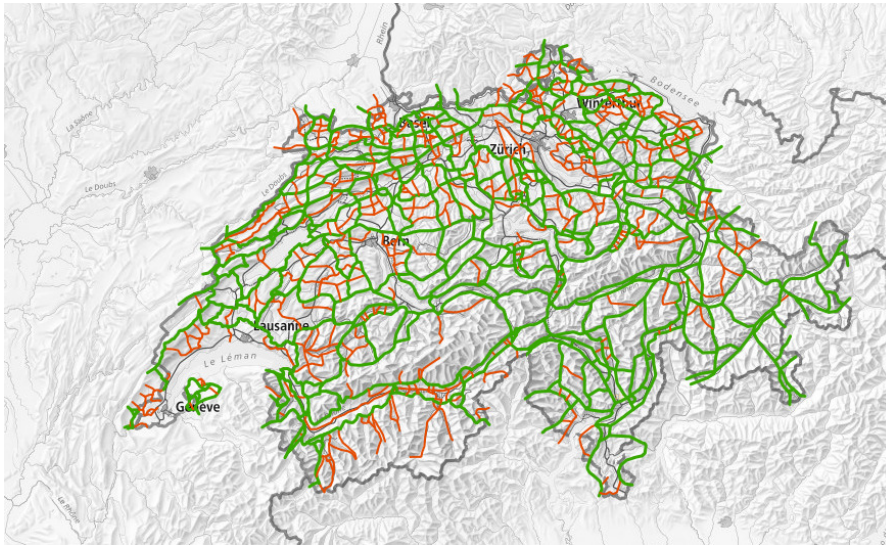


Figure 24 – Map of the Swiss wildlife corridor network (Source: Swisstopo/BAFU 2015)

The Federal Department of Environment, Transport, Energy and Communications (UVEK) issued a directive on the construction of wildlife passages in 2001. Furthermore, ASTRA, the federal Office of Roads, has issued a directive "Crossing Assistance for Wildlife", which counsels on minimizing the landscape fragmentation effect of national roads through an optimal integration of crossing structures. The Association of Road and Traffic Experts (VSS) has, in addition, issued a normative guideline for the creation of water passages in traffic systems (for renovations of existing infrastructure and new construction) to ensure the ecological connectivity of watercourses. The norm shows how structures for different groups of animals should be designed and maintained. The norms for road and rail construction have also been updated to include provisions for the safe migration of amphibian species.

In 2005 the government issued monitoring instructions to check the efficacy of different types of green bridges and other such structures. Monitoring is now an obligatory component of all traffic infrastructure renovation projects.

The federal government is in charge of the construction of wildlife bridges across national roads¹³⁶. Cantons and municipalities are responsible for the main tasks of rehabilitation of the national wildlife corridors. Cantonal structure plans or land use plans must make sure that wildlife corridors are kept intact. However, it is still rare that cantonal planning processes in fact integrate wildlife corridors.

According to an update by BAFU in 2013, of the 51 regional wildlife corridors slated for rehabilitation 40 cross federal roads. A quarter of the corridors had been restored or is under implementation, and another quarter was in the planning stages. The other half of the projects had not yet been started in 2013.

Transnational cooperation

The Alpine region also features several examples of transnational cooperation for ecological connectivity. Under the Alpine Space Programme, projects such as Econnect assembled

international nature conservation organisations linked to the Alpine Convention, scientific institutions and local implementation partners to reveal needs and opportunities for enhancing ecological connectivity in the Alpine Space. Econnect investigated how national and regional legislation affect ecological connectivity. It also produced a number of overview maps of visualised connections between Alpine protected areas within each of the Alpine Convention Pilot Regions. Other maps showed priority areas and alpine-wide results of the continuum suitability analysis. These maps were further enhanced during the implementation of the GreenAlps project (e.g. Figure 33)¹³⁷. The project also created the online visualisation tool [JECAMI](http://www.jecami.eu) (Joint Ecological Continuum Analysis and Mapping Initiative), which can be accessed and used online at www.jecami.eu.

(The following examples of transnational cooperation are listed in alphabetical order.)

Austria-Slovakia

The AKK Centrope project aimed to provide the initial impetus for a restoration of ecological connectivity in the Alps-Carpathian corridor (Figure 25). The historic migration route for wildlife between the mountain ranges of the Alps and the Carpathians that crosses from Austria into Slovakia has experienced fragmentation due to economic development. Restoration of this wildlife corridor began under this project that ran from 2007-2013 and was co-financed by the EU regional development fund for the Danube region.

The project produced a joint Austrian-Slovakian [Action Plan](#) for the corridor¹³⁸. Some initial implementation steps, such as tree planting, were undertaken during the project's lifetime. The next steps are implementation measures in the areas of spatial planning, transport infrastructure and sustainable land use. The Action Plan contains a concrete list of milestones with an associated timeline. The political decision makers and road construction companies of both countries signed a Memorandum of Understanding in 2012 that is geared towards establishing green bridges at strategic locations along highways to make the traffic network more "transparent" for wildlife. The ASFINAG already built a green bridge along the A4 highway near Arbesthal, which was opened in November 2013¹³⁹. In April 2015 the contract for the construction of a Slovak Green Bridge at the D2 in Moravský Svätý Ján was signed. The national highway company NDS is beginning with the implementation. This is a major milestone, because the D2 between Bratislava and Brno presented one of the major barriers to the corridor and has significant wildlife mortality¹⁴⁰.

By 2022 the wildlife corridor between the Alps and Carpathians is expected to be restored and secured for the future.

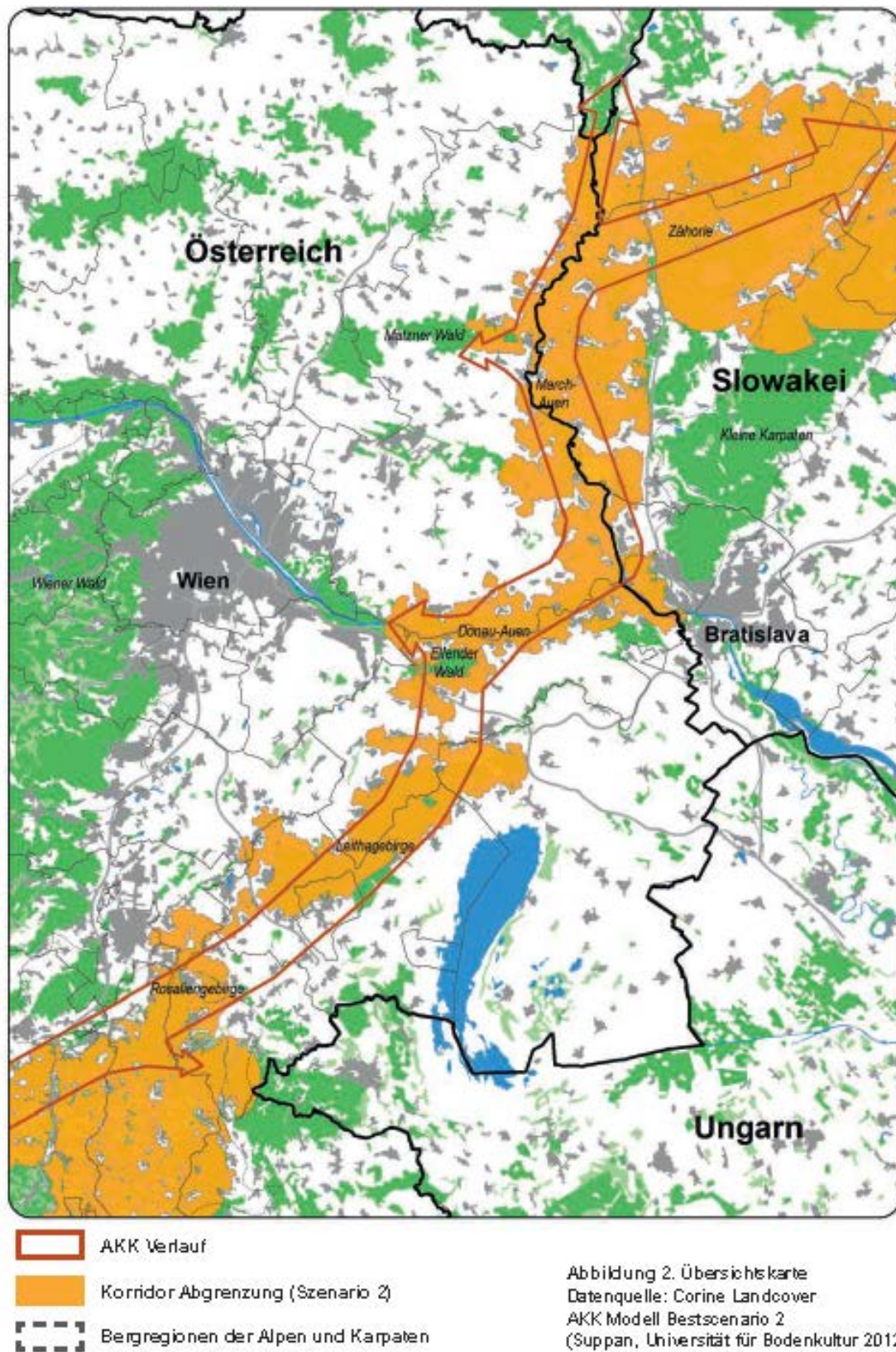


Figure 25 – Alps-Carpathian corridor overview map (Source: AKK project, Aktionsplan)

France-Italy – Mercantour and Alpi Marittime transborder protected area

There has long been cooperation between the Mercantour Park and the Alpi Marittime protected area in the Piemonte region⁶⁹. A first twinning agreement was signed in 1987, and a charter to pair the two parks was adopted in 1998, and a request issued to create a transborder biosphere reserve in 2000. Mercantour and Alpi Marittime initially began partnering on sustainable tourism management, but collaboration has expanded to begin attempts at integrated management. Supported by Interreg I, a joint bearded vulture reintroduction project was launched in the early 1990s. In the later 1990s and early 2000s (Interreg II and III) a joint Action Plan for sustainable development and protection was prepared with the goal of setting up a single joint park. A transboundary structure called “Interparcs” was created in 2002. A partnership agreement between the two parts was signed in 2008. In 2009 the managing body [Parco Naturale delle Alpi Marittime](#) (Figure 26) was created by Italian Regional Law Nr. 19 of 29 June 2009.

Through an Alcotra 2007-2013 project, the Integrated Territorial Plan (PIT) “Marittime Mercantour cross-border area: natural and cultural diversity at the centre of sustainable and integrated development” was implemented jointly as the most ambitious task of the two Parks to date. This project created a common operation body for extranational management. This was followed in 2013 by the creation of the transborder park **Parco naturale europeo Alpi Marittime Mercantour** according to the regulations of the European Grouping of Territorial Cooperation (EGTC). (A European Parliament and Council regulation (Nr. 1082/2006) allows the formation of legal super-national structures by regional and local authorities, which makes such a cross-border park possible.)

In 2014 the nature reserves and parks Marittime, Mercantour, Marguareis, Alpi Liguri, as well as Hanbury Gardens and several Natura 2000 Sites in Imperia province assembled to create the “Alpi del Mare” region and began the process of applying for UNESCO World Heritage Site status.

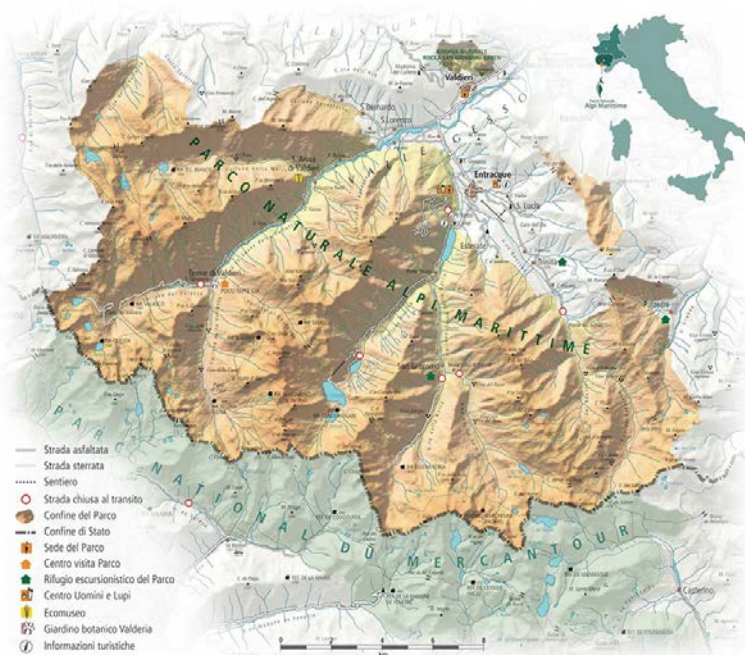


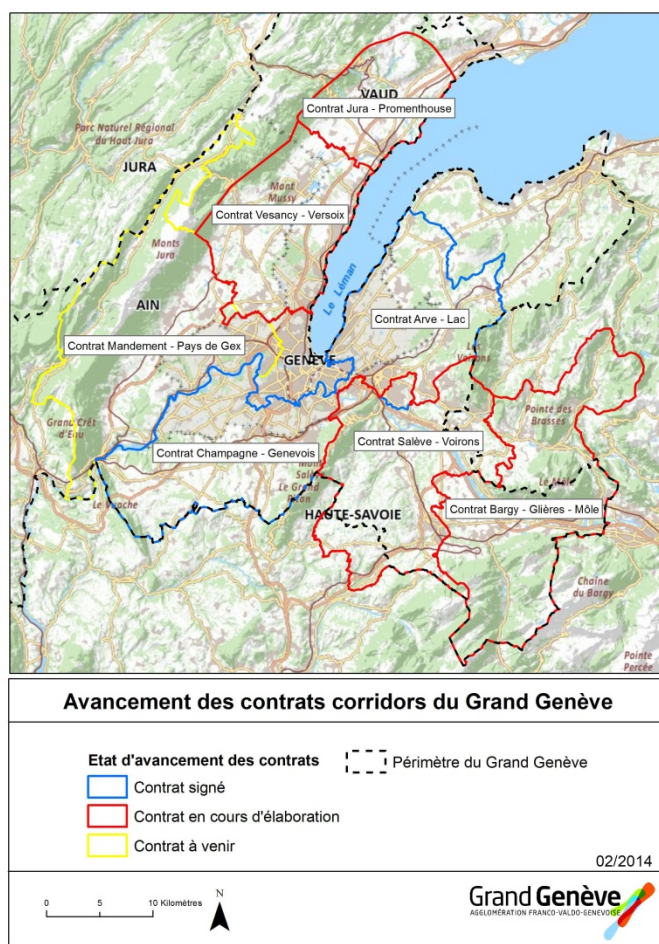
Figure 26 - The Natural Park Alpi Marittime bordering Park National du Mercantour

(Source: Parco Naturale Alpi Marittime¹⁴¹)

France-Switzerland - Agglomération Franco-Valdo-Genevoise

The Franco-Valdo-Geneva conurbation border region is dominated by agricultural and natural areas (80%) and an extremely dense core settlement. It is under pressure due to the dynamics of peri-urbanization and urban sprawl. This is a “high stake” territory for the reconnection of natural spaces (Geneva countryside / Lake Geneva and its banks; rural areas Geneva / Jura foothills and heights, Vuache, Mount Zion, Southern Jura and Northern Alps). In the Franco-Valdo-Geneva basin, eight geographical areas were identified as priorities in relation to the development of urbanization and have been the subject of [baseline studies for the development of corridors](#)¹⁴² to connect the region until 2009.

Since then a number of corridor contracts have been signed, as shown in Figure 27¹⁴³.



The partners of the agglomération Franco-Valdo-Genevoise prioritize environment conservation, and sensitive agricultural and natural areas. Since the Charter of the Agglomération Project was signed in 2007 (commitments confirmed in 2012), work has been conducted across the Grand Geneva region to preserve these spaces and their connections. Since 2010, the Grand Genève organization has been elaborating corridor contracts through a multi-stakeholder process. The implementation is achieved by different actors.

Several contracts have been signed: "Arve-Lac", "Champagne-Genevois" (2012) and "Vesancy-Versoirs" (2014), representing a first achievement. Other contracts are in the pipeline at various stages of the development process.

Corridors across the Grand Genève region are in the works for Bargy-Glières-Mole, Mandement-Pays de Gex, Promenthouse, and Salève-Voirons.

Figure 27 – Progress of corridor contracts in the Grand Geneva region until February 2014 (Source: Grand Genève)

Ecological Continuum Initiative

One of the first projects to lay the foundation for the implementation of an Alpine ecological network based on the Convention's aims was the [Ecological Continuum Initiative](#), which was funded by the Swiss MAVA Foundation and begun in 2007. This project developed a set of methodologies for connecting important areas and a catalogue of measures to enhance connectivity at an Alps-wide scale. The project partners (ALPARC, CIPRA, ISCAR, and WWF European Alpine Programme) provided the foundation for the work of the Ecological Network Platform¹⁴⁴ of the Alpine Convention.

Econnect – Restoring the web of life

The [Econnect](#) project brought together international umbrella nature conservation organisations linked to the Alpine Convention, scientific institutions and local implementation partners to demonstrate needs and opportunities for action to enhance ecological connectivity in the Alpine Space. The project was funded by the EU within the framework of the ETC Alpine Space Programme and co-funded by the European Regional Development Fund (ERDF). It ran from September 2008 to August 2011. The project was led by the Research Institute of Wildlife Ecology of the University of Veterinary Medicine, Vienna, and ALPARC, with the Task Force Protected Areas of the Permanent Secretariat of the Alpine Convention as a key partner. Partners from all Alpine countries contributed to the project.

Econnect contributed to increasing knowledge on existing ecological, legal, and administrative barriers to ecological connectivity in the Alps. This was the first project to investigate how national and regional legislation affects ecological connectivity.

The project produced a number of maps aimed at providing an overview of the location of Pilot Regions in the Alps and visualising connections between protected areas (e.g. Figure 29, Figure 30, see GreenAlps below) within each such region, as well as priority areas and alpine-wide results of the continuum suitability analysis. These were further enhanced during the implementation of the GreenAlps project¹³⁷. The maps helped to define “action areas”, where connectivity potential is still considerable and should be conserved or where more or less natural non-fragmented zones could be created, e.g. by connecting protected areas, including – importantly – in transboundary regions. Physical connections are not the only issue, harmonisation of park and wildlife management approaches is also desirable.

The potential connections within and beyond the Alps needed to ensure large-scale migration potential for Alpine species are shown in Figure 33.

The project also produced the online visualisation tool [JECAMI](#) (Joint Ecological Continuum Analysis and Mapping Initiative), which can still be accessed and used online at www.jecami.eu.

Alpine barriers and the way they affect species were analysed, the different legal frameworks, specifically concerning protected areas, wildlife management and spatial planning, of the eight Alpine countries were compared. Some strategies to deal with the legal diversity and complexity were developed to facilitate the establishment of ecological corridors across borders. Econnect concluded that the [European Grouping for Territorial Cooperation – EGCT](#)¹⁴⁵ legal instrument, which is designed to facilitate transnational cooperation, may be an opportunity to institutionalise cross-border cooperation between protected areas. However, it also found that in some instances where legal differences exist

the EGTC may not be a practicable solution (e.g. cross-border collaboration with Switzerland).

Pilot regions implemented concrete measures, which ideally should be exported to other regions. In the Berchtesgaden-Salzburg region (Austria-Germany), Econnect helped to develop solutions for the maintenance of the regional cultural landscape. Some (but not all) examples are listed here:

- In the Northern Limestone Alps-Gesäuse National Park region (Austria), which represents an important connection to other Alpine regions and the Carpathian Mountains, measures to protect the habitats of white-backed woodpeckers, ural owls were undertaken.
- In the Hohe Tauern-Dolomite region (Austria-Italy), which is a crucial intersection between the Northern Alps and the Southern foothills in Italy and Slovenia and on the East-West axis of the Alps, projects included protection of connectivity for the Western capercaillie and winter sport visitor management.
- In the Monte Rosa pilot region (Italy) tourism flows were regulated, and landscape elements beneficial to connectivity were maintained.
- In the south-western Alps-Mercantour/Alpi Marittime (France-Italy), an important connection between the mountain ranges of the Apennines and the Alps, aerial connectivity was improved by mounting devices on the cables of cable cars to make the cables more visible to birds.

All results of the project can be viewed and downloaded from the project's website at www.econnectproject.eu.

This project was further capitalised on in the GreenAlps project, which expanded on some of the themes covered by Econnect (see below).

Germany (Baden-Württemberg)-Switzerland

A project to create [international wildlife corridors](#) at the Rhine between the Swiss Jura and Black Forest was implemented between 2007 and 2012. In this area, there are many protected areas, Natura 2000 areas, but also protected landscapes and nature parks with less strict protection –Figure 28 (Borders are shown in red, protected areas are in green, and water bodies in blue).

The project's goal was the conservation and optimisation of large-scale ecological functional connectivity by designating, securing and implementing cross-border wildlife corridors between natural spaces. Partners from different sectors and functional levels (administration, regional planning, associations and scientific institutions) collaborated. Support was provided by counties and cantons in Switzerland, and expertise was brought in from the Forest Research Institute (FVA) of Baden-Württemberg, the Department of Civil Engineering, Transport and the Environment (DBVUW) of the Canton Aargau and the [Hochrhein Commission](#)¹⁴⁶, a transnational institution created to manage cross-border cooperation in the Hochrhein region (Figure 29).



Figure 28 – Location of important protected areas of the Hochrhein region (Source: Strein & Suchant)

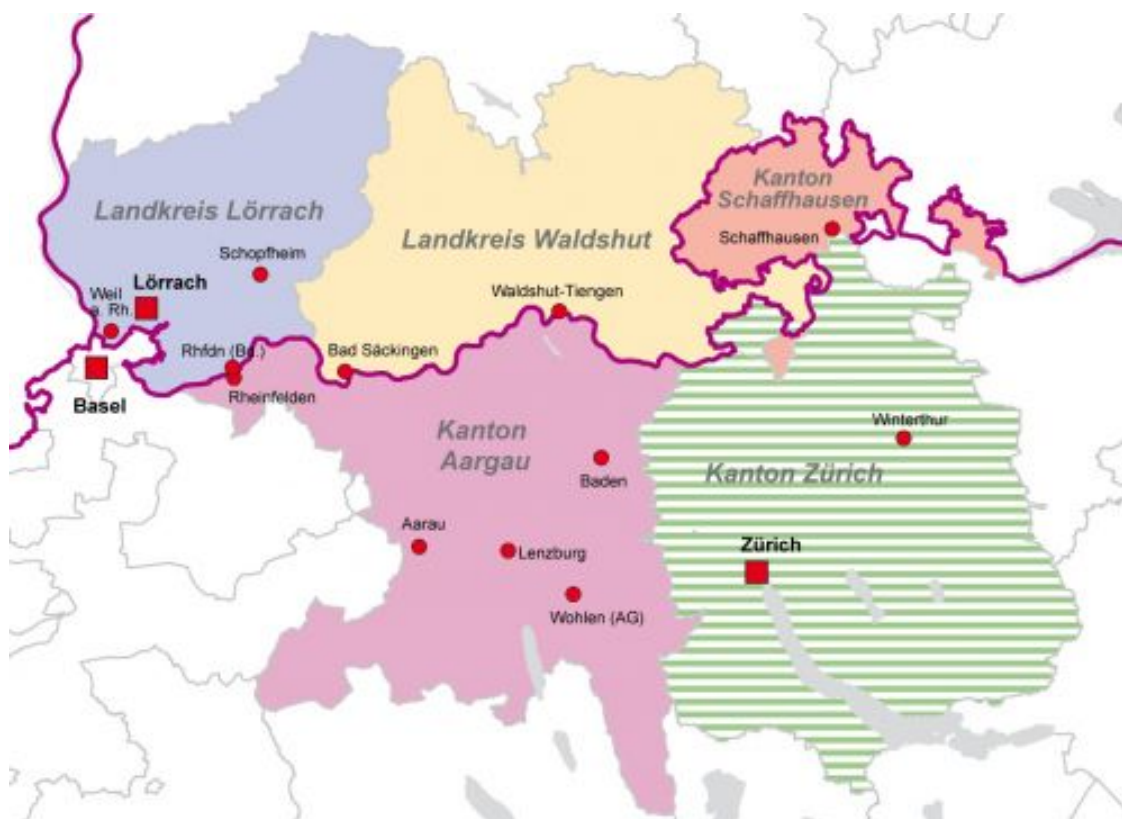


Figure 29 – The area governed by the Hochrhein Commission (Source: Hochrheinkommission)

On the Swiss side, legally binding preparatory plans for the implementation of corridors have already been implemented for several years, and Switzerland has a leadership role in this area in Europe. Germany still has some way to go to reach the level of implementation of

ecological networks that Switzerland has reached. The project concept envisaged several interlocking components of research, planning and implementation modules. The project lead was delegated to the *Forstliche Versuchs- und Forschungsanstalt* Baden-Württemberg (FVA) in close coordination with other project partners. The General Wildlife Corridor Plan of Baden-Württemberg, the wildlife corridors in Switzerland, target-species distribution data, the Natura 2000 background areas, forest ecosystem maps, and land-use data all provided the foundations for this work.

A successor project is being implemented from 2012-2018¹⁴⁷. The project region covers the entire Hochrhein region between Bodensee and Basel, and corridors are to connect to larger forest areas. In Germany the land surface area of the counties of Waldshut and Lörrach are involved, and in Switzerland the cantons of Aargau, Schaffhausen, Basel-Land, Zürich, and Thurgau. It is expected that several cross-border corridors will be planned and secured, including recommended measures for defragmentation, optimisation and conservation. Sections of the planned A98 (Hochrheinautobahn) are to be made permeable for wildlife through a two-country cooperation.

GreenAlps – connecting mountains, people, nature

The [GreenAlps](#) project was, in part, a successor to Econnect. Its goal was to capitalise on a number of completed and still ongoing Alpine Space projects, to build on previous results and to continue working towards the goals of biodiversity conservation and ecological networks in the Alps. The lead partner of greenAlps was ALPARC, and a further seven partners were involved. The project ran from September 2013 to November 2014 and was also co-funded by ERDF in the frame of the Alpine Space Programme.

The maps that had originally been produced by Econnect was further adapted by GreenAlps (Figure 30, Figure 31, Figure 32). GreenAlps primarily produced policy documents that on the one hand analysed the EU biodiversity policy landscape from the point of view of their perceived relevance in the Alpine region⁸, and provided visionary inputs¹³⁷ to what an effective and efficient framework for a biodiversity conservation policy in the Alps should contain. The better connection of mountains, people and nature was a central focus of the project and is reflected in its final documents, which are available for download at <http://www.greenalps-project.eu/download/>.

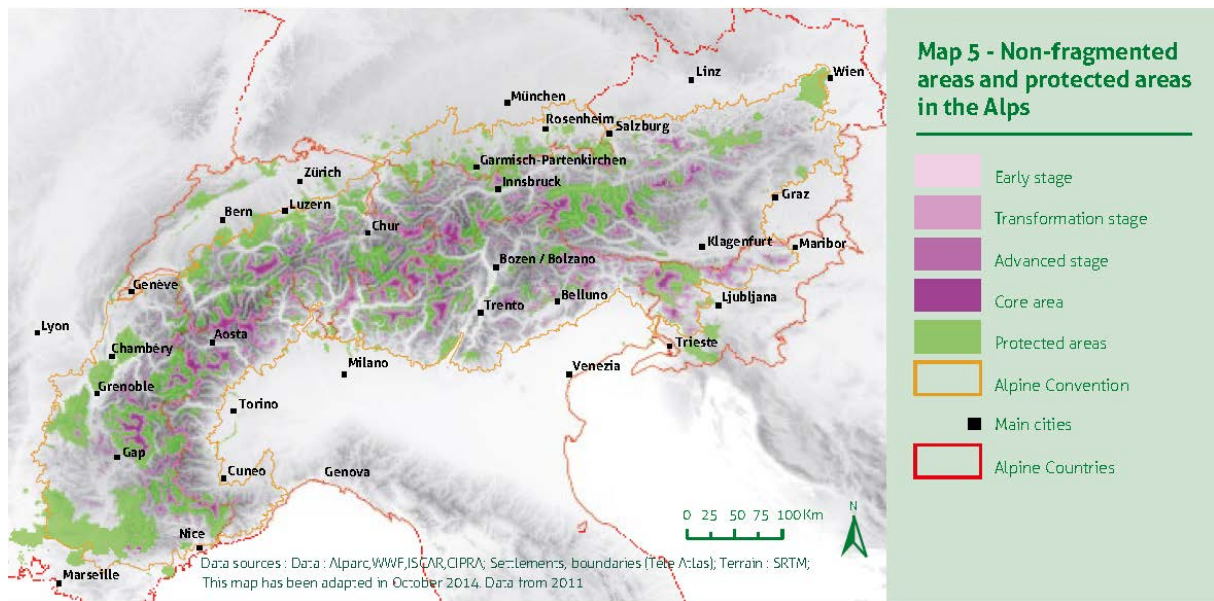


Figure 30 - The last unfragmented areas of the Alps overlaid by protected areas (Source: ALPARC/GreenAlps, adapted in October 2014 from 2011 data)



Figure 31 – Hypothetical barriers to ecological connectivity in the Alps (Source: ALPARC/GreenAlps, adapted in October 2014 from 2011 data)

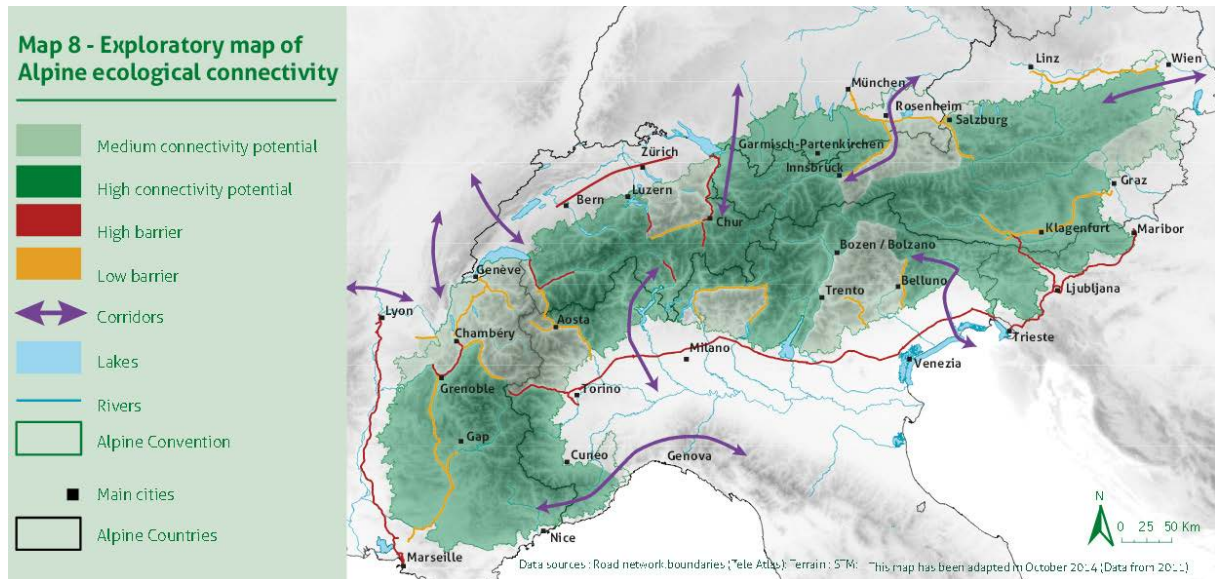


Figure 32 - Alpine ecological connectivity potential and barriers (Source: Source: ALPARC/ GreenAlps, adapted in October 2014 from 2011 data))

Slovenia-Italy - the PALPIS project

The area of the Julian Alps on the border between Italy and Slovenia (Figure 33) is the focus of the PALPIS (cross-border cooperation and cross-border management plans for conservation important areas in the southern Julian Alps) project¹⁴⁸, which was financed by the EU Interreg III programme and concluded in 2007.

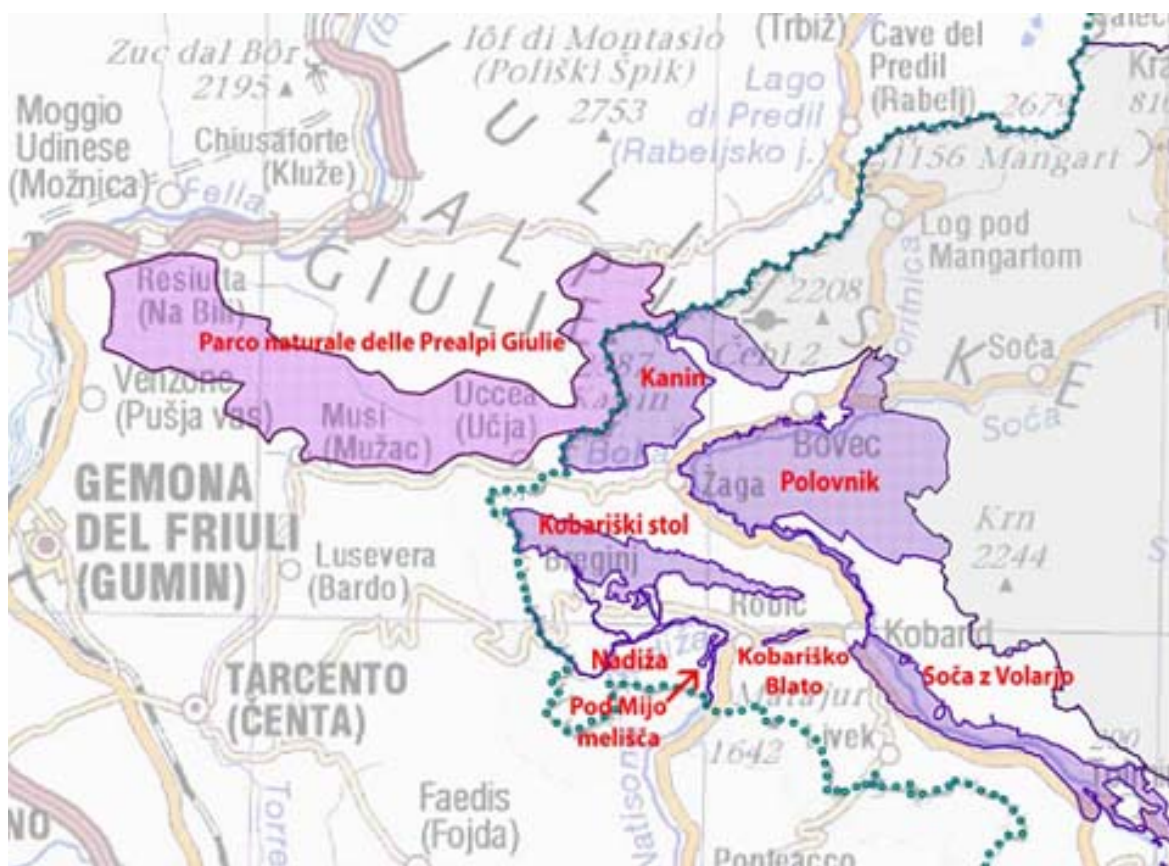


Figure 33 – Regions participating in the PALPIS project in Slovenia and Italy (Source: PALPIS project)

The area is interesting for its well-preserved nature, the landscape of exceptional beauty, the history and the intertwining of different cultural areas. On the Slovenian side the area for the protection falls within the Triglav National Park, in Italy the Natural Park of the Julian Alps was a project partner. In addition to these two areas, other areas in the municipalities of Bovec (Bovec) and Kobarid (Caporetto), which are defined as Natura 2000, participated.

The goal of the project was to develop a cross-border site management plan for areas in the southern Julian Alps. The development of management plans is an obligation under EU Directive.

There is at present no common officially agreed management plan between the two regions that focuses specifically on transboundary ecological connectivity issues. Within the PALPIS project, a management plan for selected Natura 2000 sites outside the Triglav National Park area was prepared, but, rather than being a joint transboundary document, it covered separately sites within the Slovenian and Italian territories. The Natura 2000 sites management between the neighbouring countries differs significantly. However, both regions participate as partners in some EU funded projects in order to strengthen transboundary cooperation. Furthermore, they are also designated as Europarc's "Julian Alps Transboundary Ecoregion" and within this context Action Plans covering 5 year periods have been prepared and agreed between both parties⁸¹. The latest Action Plan covers the period 2015-2019 and contains some nature conservation tasks (e.g. species and ecosystems monitoring)¹⁴⁹. While at present there is already good cooperation on joint activities in the fields of promotion, awareness raising, tourism and sustainable development, there is also great potential and willingness on the part of both management authorities to implement some concrete conservation measures (e.g. game species management, large carnivores, Natura 2000 management, mitigation of human pressure etc)⁸¹. Some common activities

were also implemented within the Alpine Space project GreenAlps (e.g. GIS data exchange, common workshops) – see above.

Concerning Natura 2000 management, the Triglav National Park Authority is competent to manage only Natura 2000 sites within the Park area and their parts lying outside the protected area. However, as a coordinator of UNESCO MAB Julian Alps, the Park Authority may be involved also in the management of other Natura 2000 sites within the Biosphere Reserve concerned⁸¹.

Conclusion

The concepts of ecological connectivity and the creation of ecological networks have been integrated variously into global, European, national, and often regional or provincial, sometimes municipal, strategies, regulations, and laws. These strategies and laws have been implemented to varying degrees in Alpine countries. Landscapes used by people are shaped in accordance with historical and current socio-economic practices and behaviours, and behaviours and uses that cause fragmentation are often difficult to change. Spatial planning is usually decentralised and often involves broad stakeholder participation, which means that supra-national and national guidelines first have to be adapted to the level at which planning is most appropriate. Given the many challenges of cross-sectoral and cross-border work the implementation of functional ecological networks proceeds slowly. In federal systems it can be difficult to achieve the required cross-provincial collaboration required to ensure networks that cross boundaries. The process is all the more challenging for trans-national cooperation, where different laws and management practices may run into each other. However, the fact that Alpine countries promote ecological connectivity at least in concept may eventually lead to the restoration of a fully functional Alpine ecological network in the long run.

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ND = no date

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